D-List Categorical Exclusion

I-40

Interchange at SR-265 (Central Pike)

City of Mt. Juliet

Wilson County

PIN 124884.00

Submitted Pursuant to the National Environmental Policy Act of 1969, 42 U.S.C. 4332(2)

Environmental Commitments

Owner	Commitment
Noise	A preliminary noise impact review was completed for planning purposes. The review identified noise-sensitive land uses within the project area. Per 23 CFR 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise), a detailed noise impact analysis and abatement evaluation will be required with survey-based design plans and design year traffic projections. Noise impacts are possible. TDOT is committed to continual impact analysis and abatement evaluation.

Project Information

General Information

Route: I-40

Termini: Interchange at SR-265 (Central Pike)

Municipality: City of Mt. Juliet

County: Wilson

PIN: 124884.00

Plans: Preliminary

Date of Plans: 02/04/2023

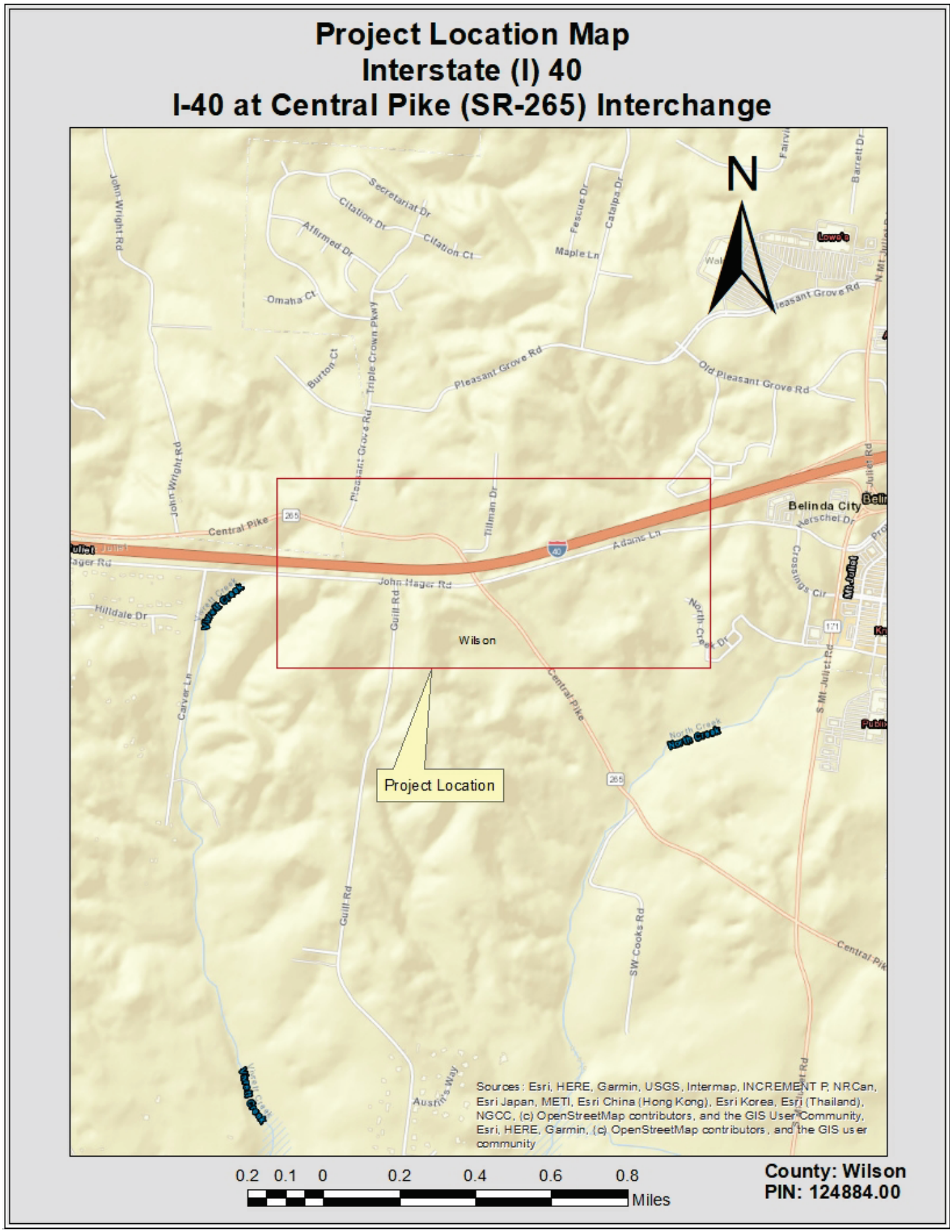
Project Funding

Planning Area: Nashville MPO

STIP/TIP: I-40 at Central Pike (SR-265) Interchange - TIP# 2019-73-090

Funding Source	Preliminary Engineering	Right-of-Way	Construction
Federal	PE-D: NH-I-40-5(150)	N/A	N/A
State	PE-N: 95100-0113-04 PE-D: 95100-1113-44	N/A	N/A

Project Location



Project Overview

Introduction

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), proposes to construct a new Diverging Diamond Interchange (DDI) on Interstate 40 (I-40) at State Route 265 (Central Pike), to improve capacity and operations.

This federal-aid highway project has been determined to be a "D-List" Categorical Exclusion (CE) pursuant to 23 CFR 771.117(d)(13), "Actions described in paragraphs (c)(26), (c)(27), and (c)(28) of this section that do not meet the constraints in paragraph (e) of this section." The project does not meet the constraints of 23 CFR 771.117(e)(1): "An acquisition of more than a minor amount of right-of-way or that would result in any residential or non-residential displacements." The project also does not meet the constraints of 23 CFR 771.117(e)(2), "An action that needs a bridge permit from the U.S. Coast Guard, or an action that does not meet the terms and conditions of a U.S. Army Corps of Engineers nationwide or general permit under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899." The project exceeds the following threshold listed in Section IV(A)(1)(b) of the 2023 Programmatic Agreement between the Federal Highway Administration, Tennessee Division, and the Tennessee Department of Transportation, and is therefore not eligible for processing as a Programmatic Categorical Exclusion (PCE): Paragraph i: Involves acquisition of more than a minor amount of right-of-way (26.6 acres); Paragraph ii: involves acquisitions that result in any residential or non-residential relocations; Paragraph viii: Results in the loss of 0.5 acres or more per permit impact site of waters of the U.S.; and Paragraph ix: Requires a U.S. Coast Guard bridge permit.

Background

According to the Interstate Access Request (IAR), provided in the Technical Appendices, "The Tennessee Department of Transportation (TDOT) initiated study of a request for new interchange access on I-40 at State Route (SR) 265 (Central Pike) in Wilson County, Tennessee at the request of the Nashville Area Metropolitan Planning Organization (MPO), the City of Mt. Juliet, and Wilson County. The purpose of the new interchange access is to accommodate future traffic demands and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange." The proposed interchange location along I-40, near Mile Marker 225, at SR 265 is located in Wilson County, Tennessee, within the city limits of City of Mt. Juliet and within the Nashville Urbanized Area Boundary. The proposed interchange location lies approximately 1.1 miles west of the existing Exit 226 (SR 171) Interchange and 3.9 miles east of the existing Exit 221 (SR 45) Interchange. SR 265 is the only state route that crosses I-40 between these two interchanges.

The IAR further states, "On June 20, 2000, FHWA provided engineering and operational approval for an Interchange Justification Study (IJS) for a new interchange at this location. The proposed improvements included a new diamond interchange with auxiliary lanes along both directions of I-40 connecting to the Exit 226 (SR 171) (Mt. Juliet Road) Interchange. FHWA's Policy on Access to the Interstate System states that if a project has not progressed to construction within eight (8) years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a)), then an updated study based on current and projected future conditions must be resubmitted to FHWA for review and approval."

The proposed interchange is located along I-40, near Mile Marker 225, 1.1 miles west of the Exit 226 (SR 171)

Interchange and 3.9 miles east of the Exit 221 (SR 45) (Old Hickory Boulevard) Interchange. No other interchange studies are currently underway within the study area. FHWA approved an Interchange Modification Study in 2006 for the Exit 226 (SR 171) Interchange.

The study recommended:

1. Addition of combined ramp behind barrier along eastbound I-40: to provide access to the SR 171 South directional ramp, SR 171 North loop-ramp, and the slip ramp that connects to Belinda Parkway.

2. Geometric improvements to ramps to meet design speed,

3. Realignment of the eastbound I-40 On-Ramp and bridge it over the Belinda Parkway slip ramp,

4. Widening the westbound I-40 Off-Ramp for dual left turn lanes and a single right turn lane,

5. Provide a two-lane westbound I-40 On-Ramp,

6. Increased storage lane lengths at all signalized intersections to reduce disruption of flow to the mainline traffic on I-40 and SR 171.

The recommended improvements were constructed in 2009. The Design Year for the SR 171 Interchange Modification Study (IMS) was compressed to 10 years (2016) in anticipation of a new interchange being constructed along I-40 at SR 265 to alleviate traffic demand at the existing SR171 Interchange. The 2016 Design Year analysis identified that the intersection of the westbound I-40 Ramps with SR 171 would operate at Level of Service (LOS) F and the intersection of the eastbound I-40 Ramps with SR 171 Intersection to operate at LOS E (southbound) and F (northbound). The IMS was approved by FHWA with the understanding that a new interchange would need to be constructed along I-40 at SR 265 to alleviate traffic demand at SR 171 beyond the 2016 Design Year.

In February 2006, the Exit 229 (Beckwith Road) Interchange was let to construction. It is located 3.2 miles east of SR 171. The traffic analysis from the SR 171 Interchange Modification Study included the Beckwith Road interchange in its analysis. As predicted in the 2006 SR 171 IMS, SR 171 currently experiences congestion and poor traffic operations."

According to the IAR, "Construction to widen I-40 within the study area from six (6) lanes to eight (8) lanes was completed in 2015. The interstate consists of four (4) twelve (12)-foot travel lanes in each direction with a center concrete median barrier, a six (6)-foot paved inside shoulder and six (6)-foot paved outside shoulder."

The IAR concludes that "The City of Mt. Juliet supports the proposed interchange. The city has committed to access management along SR 265 within the functional area of the interchange to help preserve traffic operations into the future. TDOT's Design Division supports the Build Alternative presented in this Interstate Access Request (IAR). The proposed project is included in the current Nashville Area MPO Regional Transportation Plan."

According to the 10/07/2021 TDOT Traffic Data for proposed project limits (see Technical Appendices), the annual average daily traffic (AADT) for SR 265 is 6,610 vehicles per day (vpd) for the base year (2025). The modeled AADT traffic count is predicted to increase to 11,370 vpd for the design year (2045). This represents an increase of 14%. The AADT for I-40 is 97,840 vpd for the base year (2025), and the modeled AADT traffic count is predicted to increase to 109,240 vpd for the design year (2045). This represents an increase of 8%.

The proposed project limits were initially studied by TDOT Environmental Division Technical sections in 2020 as an Environmental Technical Study Area (ETSA) Layout dated 04/24/2020. A copy of the ETSA Layout dated 04/24/2020 is included in the Technical Appendices.

Since then, Preliminary Plans dated 02/04/2023 have been developed for the proposed project, which are included in the Technical Appendices. An Environmental Studies Request (ESR) initiating a review of the Preliminary Plans, dated 02/04/2023, was distributed to TDOT Environmental Technical sections and the TDOT Multimodal Transportation Resources Division. The Preliminary Plans are included in the Technical Appendices and will serve as the focus of this D-List CE.

Project Development

Need

According to the IAR, the City of Mt. Juliet, Wilson County, and the Nashville Area MPO initiated the request for a new interchange access to accommodate future traffic demands and relieve existing and anticipated capacity and operational deficiencies at the adjacent Exit 226 (SR 171) Interchange. According to the IAR, the proposed project limits and adjacent Exit 226 (SR 171) Interchange currently experience high volumes of traffic, poor levels of service, and vehicle queuing.

The IAR further states, "The City of Mt. Juliet has experienced rapid growth in the last decade and has the potential for additional development both north and south of the I-40 corridor, particularly in close proximity to SR 265." According to the U.S. Census Bureau data included in the proposed project's Conceptual Stage Relocation Plan (CSRP) dated 10/10/2023 (included in the Technical Appendices), the population of Wilson County, Tennessee in 2021 was 151,917, a 24.96 percent increase over the 2010 census of 113,993. The IAR concludes, "This rapid growth and associated increase in traffic volumes support the need for transportation network improvements in order to maintain acceptable operations on existing facilities, as well as provide additional connectivity in the area."

Purpose

According to the IAR, "The purpose of the proposed new interchange access is to accommodate future traffic demands and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange." The proposed new interchange access project would address the capacity and operational deficiencies noted in the Need section (above), by implementing transportation network improvements in order to maintain acceptable operations on existing facilities, as well as by providing additional connectivity in the area.

Range of Alternatives

Other than the selected design, were any alternative build designs developed for this project? **Yes**

No-Build	In the development of design solutions that address the needs outlined above and achieve the purpose of the project, TDOT evaluated the potential consequences should the project not be implemented. This option, known as the No-Build alternative, assumed the continuation of current conditions and set the baseline from which the impacts of the selected design were compared. The No-Build Alternative was not selected as it does not meet the purpose and need of the proposed project.
Alternative A	The Diamond Interchange Alternative. Alternative A would have proposed a new interchange access between I-40 and SR 265 and would have relieved traffic demand at the existing Exit 226 (SR 171) Interchange. Alternative A would have levels of service of C or better at the proposed SR 265 Interchange through the 2040 Design Year. Queues would no longer be projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange. Alternative A was not selected because the DDI Build Alternative would provide better operations and improve overall safety.
Alternative B	Diamond Interchange with Roundabouts at Ramp Terminals. Alternative B would have proposed a new interchange along I-40 at SR 265, similar to the Diamond Interchange and DDI Build Alternatives. It would have alleviated traffic demand at Exit 226 (SR 171) similar to the Build Alternative. Alternative B proposed a diamond interchange configuration with roundabouts at the

	two I-40 Ramp intersections with SR 265. Multilane roundabouts would have been required due to the traffic demand. Alternative B was eliminated by TDOT in early project screening.
Alternative C	Transportation Systems Management (TSM) Alternative. The Alternative C approach to congestion mitigation seeks to identify improvements to enhance the capacity of existing transportation systems. Through better management and operation of existing transportation facilities, these techniques are designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety. Alternative C strategies are low-cost but effective in nature, minimizing the need for major construction/reconstruction projects. Many Alternative C strategies are already implemented within or near the study area, including High Occupancy Vehicle (HOV) lanes, Intelligent Transportation Systems (ITS) along I-40, signal optimization along arterials, and transit service. A Park and Ride lot is located nearby along Belinda Parkway, near I-40. The Music City Star Commuter Rail Line provides access between Mt. Juliet and Nashville. An Adaptive Signal Control Technology (ASCT) project was installed in 2016 along SR 171. The ASCT project includes the eight signalized intersections located along SR 171 between Graves Crossing (located 0.7 miles south of I-40) and Pleasant Grove Road (located 0.5 miles north of I-40). The ASCT project provides optimized signal timing along the SR 171 corridor that can instantly adapt to changing traffic patterns. With these strategies in place, the Exit 226 (SR 171) Interchange still experiences high traffic demand and poor operations. The SR 171 Bridge over I-40 is planned to be widened to provide two continuous travel lanes in the northern direction (Nashville MPO RTP Project # 1167). However, these nor other additional Alternative C strategies have been identified that would accommodate future traffic demands in the area and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. The Selected Alternative would complement the ongoing Alternative C strategies in the area, and would not prohibit nor conflict with these existing strategies.

Public Involvement

Has there been any public involvement for the project? **No**

On 11/13/2023, the TDOT Region 3 Project Development Office confirmed, "There have not been any Design Public Meetings held yet. My guess is that it will be held some time in Spring 2024."

A copy of the referenced correspondence is included in the Project Development section of the Technical Appendices.

Project Design

Existing Conditions and Layout

According to the Enhanced Tennessee Roadway Information Management System (E-TRIMS), the subject section of I-40 is classified as a Urban Interstate with a speed limit of 70 miles per hour. Within the study area, I-40 is an eight (8)-lane barrier divided interstate with four (4) 12-foot travel lanes in each direction, with a center concrete median barrier, a 12-foot paved inside shoulder, and 12-foot paved outside shoulder. The 2022 Average annual daily traffic (AADT) for the subject area is 87,572 vehicles per day. SR 265 (Central Pike) is classified as a Urban Minor Arterial and consists of a two (2)-lane ditch section with two 10-foot travel lanes (one lane in each direction), with minimal shoulders. The posted speed limit on SR 265 is 35 mph. SR 265 runs east-west within the study area connecting to SR 45 to the west and SR 171 to the east. SR 265 is the only state route crossing I-40 between the Exit 221 (SR 45) and Exit 226 (SR 171) Interchanges. The majority of traffic accessing SR 265 utilizes the Exit 226 (SR 171) Interchange.

Pleasant Grove Road currently intersects with SR 265 approximately 1/3 of a mile west of Tillman Drive, and is a three-leg, one-way stop controlled intersection. None of the approaches have turn lanes. The Pleasant Grove Road approach stops for SR 265 traffic. Pleasant Grove Road is a two-lane rural roadway at the intersection with SR 265. Pleasant Grove Road continues northeast to provide access to SR 171 and numerous retail and hospitality businesses.

John Hagar Road/Adams Lane currently intersects with SR 265 just south of the existing SR 265 bridge over I-40, and is a four-leg, four-way stop controlled intersection. John Hagar Road continues west of the SR 265 intersection and is a two-lane rural roadway with 2-foot or less shoulders. Adams Lane continues east of the SR 265 intersection and is a two-lane rural roadway at the intersection with SR 265. Adams Lane continues east and widens to a three-lane urban section near the connection with SR 171. Adams Lane parallels I-40 and serves as a connection for local traffic between SR 265 and SR 171. It provides access to multiple retail shopping, residential, and business park locations.

Providence Parkway currently intersects with SR 265 approximately 0.29 miles south of John Hagar Road/Adams Lane, and is a three-leg, one-way stop controlled intersection. None of the approaches on SR 265 have turn lanes. The Providence Parkway approach stops for SR 265 traffic. Providence Parkway is a three-lane facility at the intersection with SR 265, consisting of one dedicated right turn lane, one dedicated left turn lane, and one through lane (in the opposite direction). Currently, there is a multi-use path on the south side of Providence Parkway that terminates at SR 265. Providence Parkway continues east to provide access to SR 171 and numerous retail businesses and residential homes in Mount Juliet.

Guill Road is a local access street that provides access to residential homes. Guill Road extends south from John Hagar Road just west of SR 265 and provides a connection to Alvin Sperry Road. Guill Road has one travel lane in each direction with a total pavement width of approximately 20 feet. The speed limit is not posted and there are no pedestrian or bicycle facilities.

Tillman Drive currently intersects with SR 265 less than 200 feet north of I-40, and is a three-leg, one-way stop controlled intersection. None of the approaches have turn lanes. The Tillman Drive approach stops for SR 265 traffic.

Tillman Drive is a two-lane rural roadway at the intersection with SR 265. Tillman Drive accesses two residences.

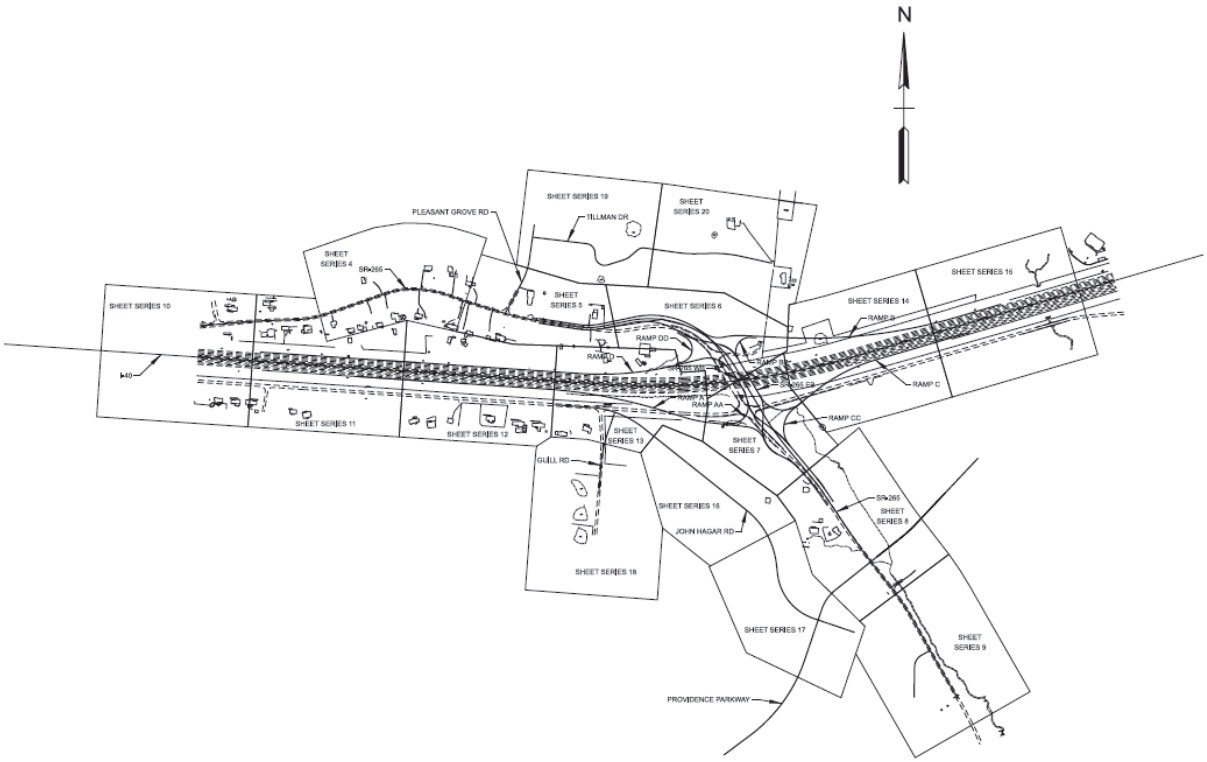


Figure 1. Proposed layout of the DDI (Preliminary Plans, 02/04/2023)



Figure 2. Existing layout of Pleasant Grove Road and SR-265 (source: IAR)



Figure 3. Existing layout of John Hagar Road/Adams Lane and SR-265 (source: IAR)



Figure 4. Existing layout of Providence Parkway and SR-265 (source: Google Streetview)



Figure 5. Existing layout of Guill Road (source: IAR)



Figure 6. Existing layout of Tillman Drive (source: IAR)

Proposed Project Description

According to the Preliminary Plans dated 02/04/2023, the proposed project would construct a new Diverging Diamond Interchange (DDI) connecting SR 265 (Central Pike) to I-40, from west of Pleasant Grove Road to East of Providence Parkway. The new proposed interchange would be west of the existing SR 171 (Mt. Juliet Road) I-40 Interchange (Exit 226). The new proposed SR 265 ramps would extend to the SR 171 ramp tapers to create an auxiliary lane between the two interchanges. SR 265 would be widened to five lanes with curb and gutter and a 12-foot shared-use path. The DDI would consist of two new structures over I-40, constructed to the east of the existing SR 265 overpass so that traffic could be maintained during construction. Side roads Pleasant Grove Road, Tillman Drive, John Hagar Road, and Providence Parkway would be realigned to accommodate access control for the new interchange. Please see **Figure 1** (on page 11) for the an image of the proposed project layout (as depicted in the Preliminary Plans dated 02/04/2023).

Proposed Typical Section

According to the Preliminary Plans dated 02/04/2023, the proposed typical section of I-40 would consist of eight 12-foot travel lanes (4 lanes in each direction), with a center concrete median barrier, a 12-foot paved inside shoulder, and 12-foot paved outside shoulder. Ramps would be constructed on both sides of I-40. Ramps A, B, and C would consist of a single 12-foot wide lane on I-40. Ramp D would consist of two 12-foot wide lanes on I-40. See **Figures 7, 8, and 9** for the proposed I-40 typical sections.

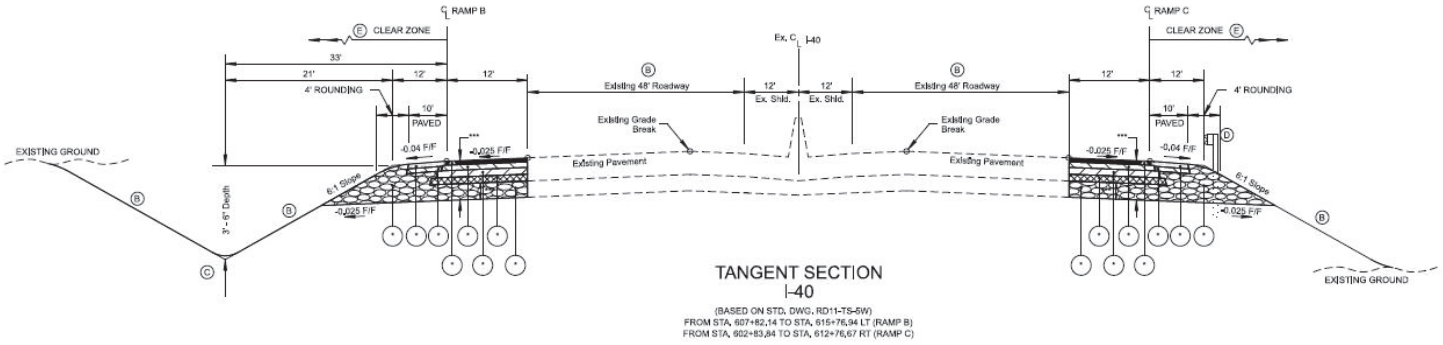


Figure 7: Proposed typical section for I-40 (with Ramps B & C) (Preliminary Plans, 02/04/2023)

According to the Preliminary Plans dated 02/04/2023, the proposed typical sections for interchange ramps (see **Figure 9**), would consist of one and two lane configurations (12- to 24 feet wide), with variable-width inside and outside paved shoulders (4- to 12 feet wide).

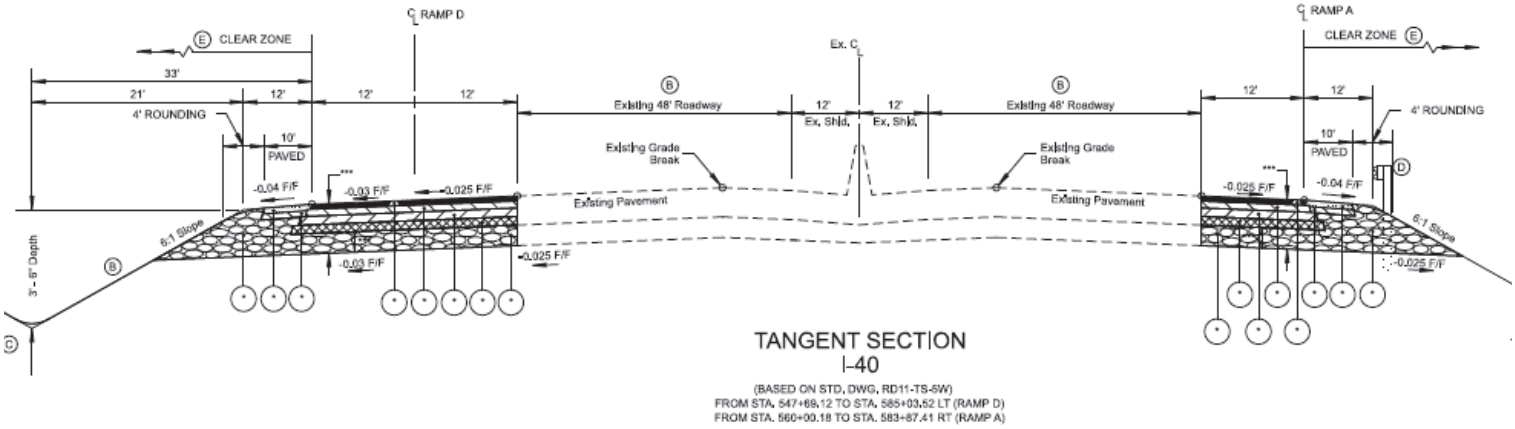


Figure 8: Proposed typical section for I-40 (with Ramps A & D) (Preliminary Plans, 02/04/2023)

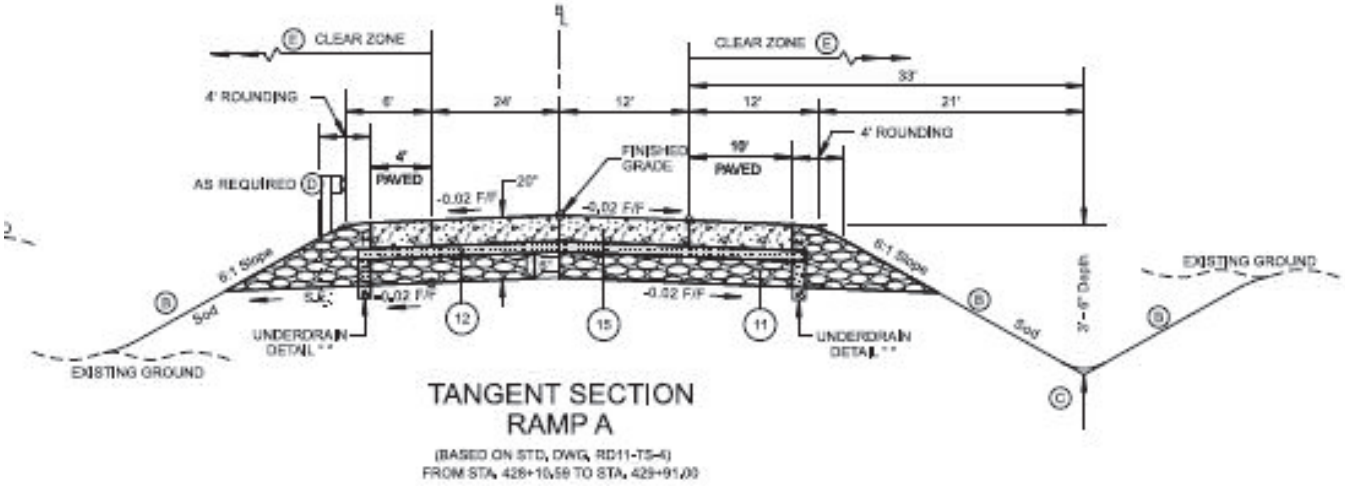


Figure 9: Proposed typical section for interchange ramps (Preliminary Plans, 02/04/2023)

According to the Preliminary Plans dated 02/04/2023, the proposed typical section for SR 265 (Central Pike) (see **Figure 10** and **Figure 11**) would consist of four 12- to 14-foot travel lanes (two lanes in each direction), a 12-foot center left turn lane, a variable width raised concrete median, 6-foot paved outside shoulders, 4-foot paved inside shoulders, 2-foot 6-inch curb and gutter, and a 12-foot sidewalk).

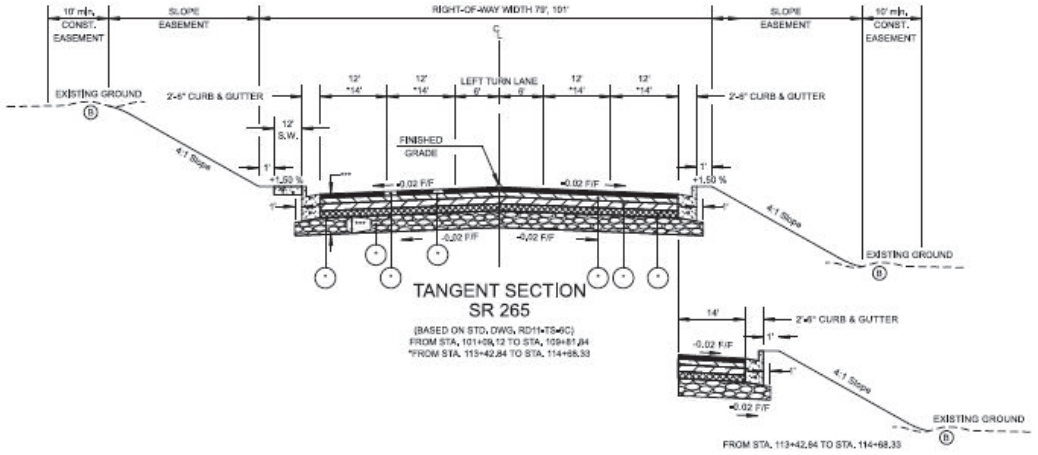


Figure 10: Proposed typical section of SR 265 (Central Pike) (w/ center left turn lane) (Preliminary Plans, 02/04/2023)

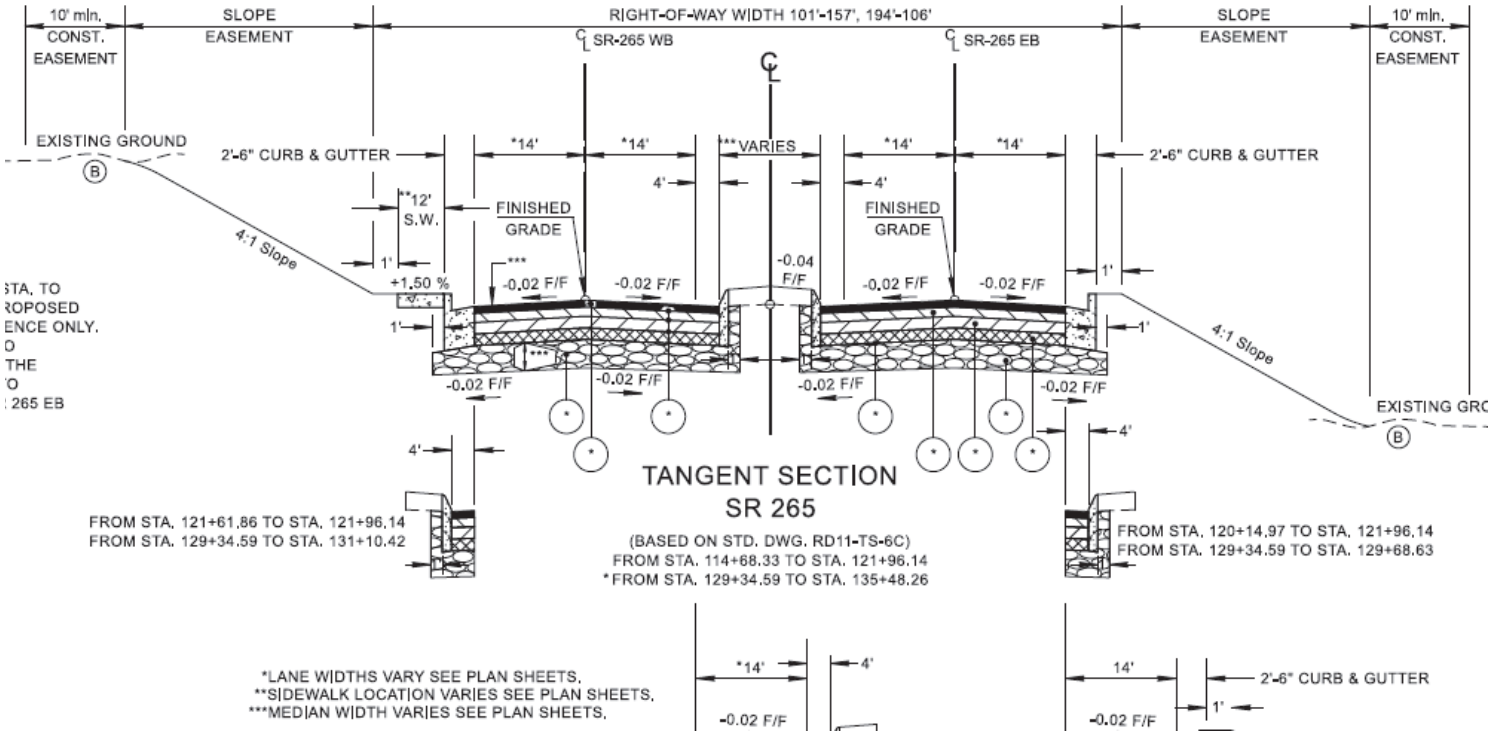


Figure 11: Proposed typical section of SR 265 (Central Pike) (w/ raised concrete median) (Preliminary Plans, 02/04/2023)

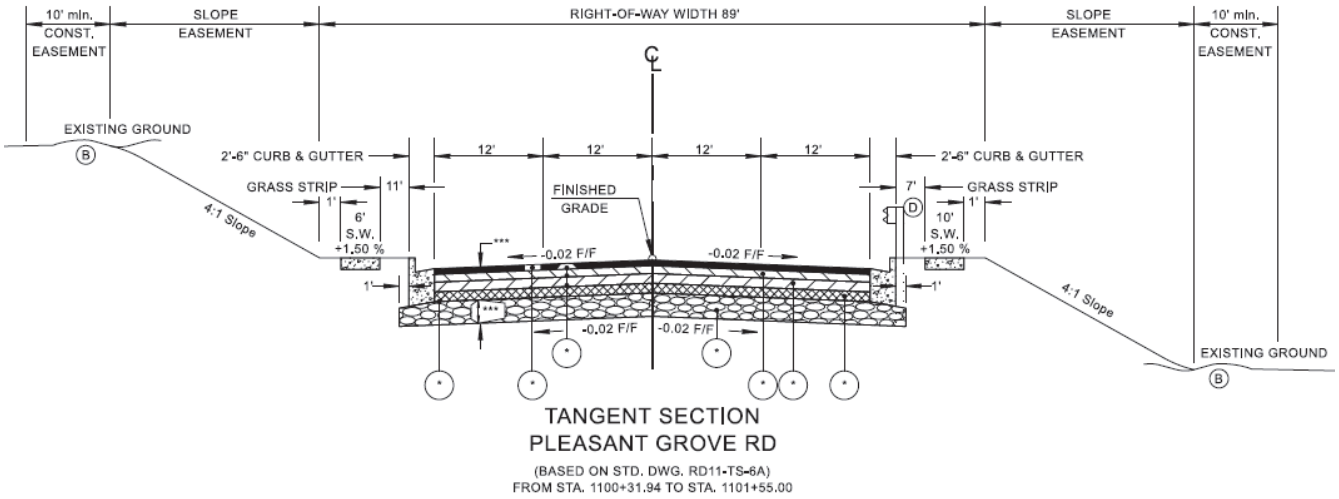


Figure 12: Proposed typical section of Pleasant Grove Road (Preliminary Plans, 02/04/2023)
Pleasant Grove Road: Would consist of four 12-foot travel lanes (two lanes in each direction), with 2-foot 6-inch curb and gutter, 7- to 11-foot grass strips on both sides of the facility, and 6- to 10-foot sidewalks on both sides of the facility.

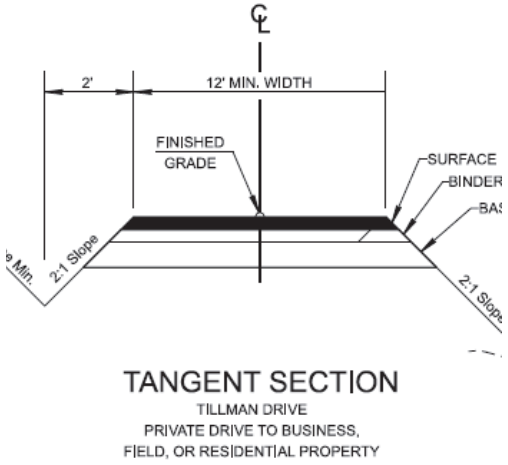


Figure 13: Proposed typical section of Tillman Drive (Preliminary Plans, 02/04/2023)
Tillman Drive: Would consist of a 12-foot wide (minimum width) private drive, for access to business, field, or residential property.

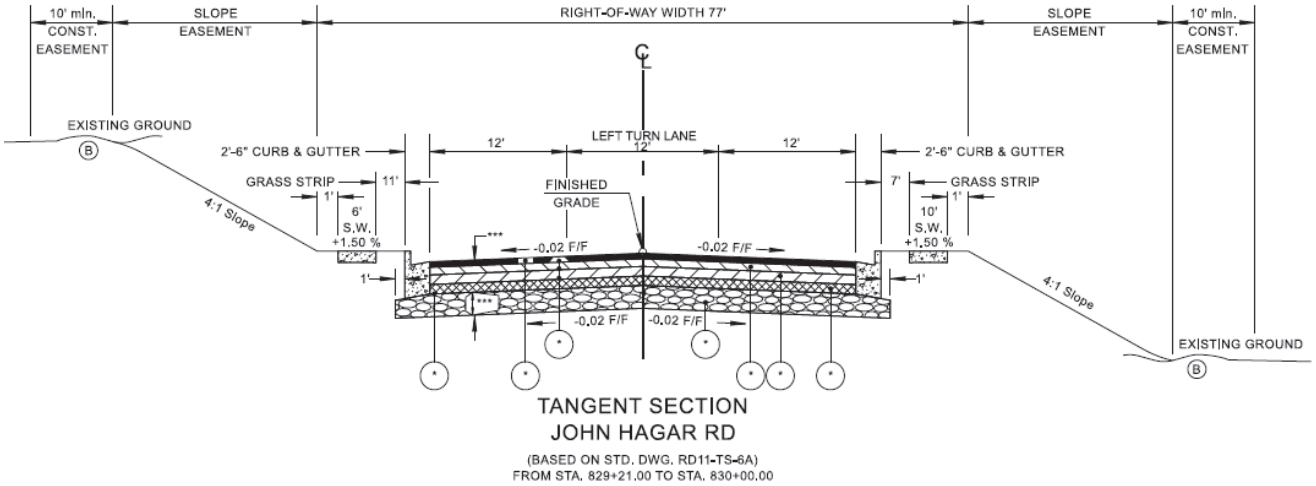


Figure 14: Proposed typical section of John Hagar Road (Preliminary Plans, 02/04/2023)

John Hagar Road: Would consist of three 12-foot lanes (one through lane in each direction, and one center left turn lane), with 2-foot 6-inch curb and gutter, 7- to 11-foot grass strips on both sides of the facility, and 6- to 10-foot sidewalks on both sides of the facility.

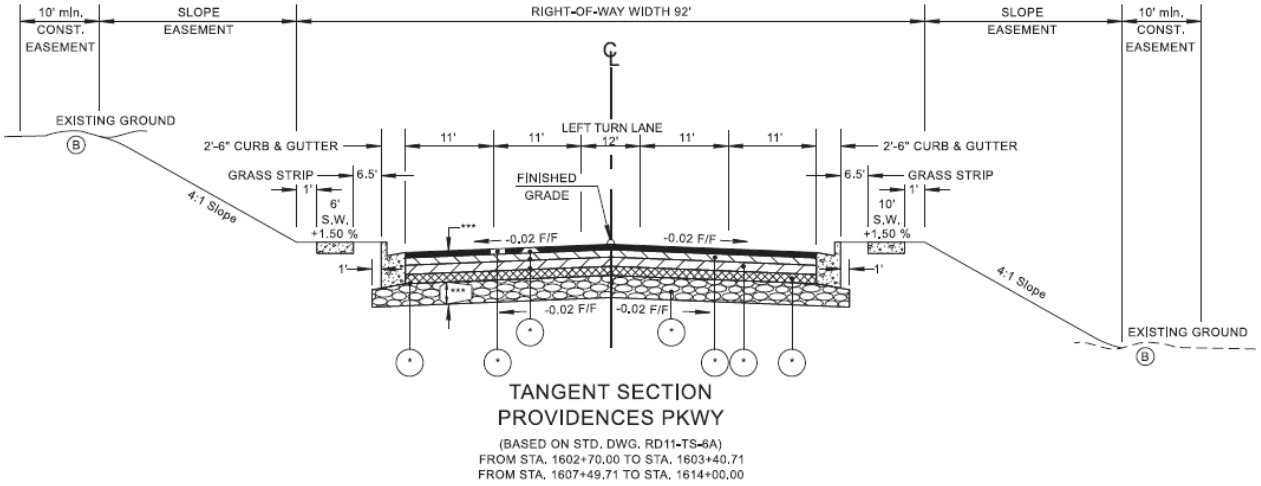


Figure 15: Proposed typical section of Providence Parkway (Preliminary Plans, 02/04/2023)

Providence Parkway: Would consist of four 11-foot travel lanes (two lanes in each direction), one 12-foot center left turn lane, 2-foot 6-inch curb and gutter, 6.5-foot grass strips on both sides of the facility, and 6- to 10-foot sidewalks on both sides of the facility.

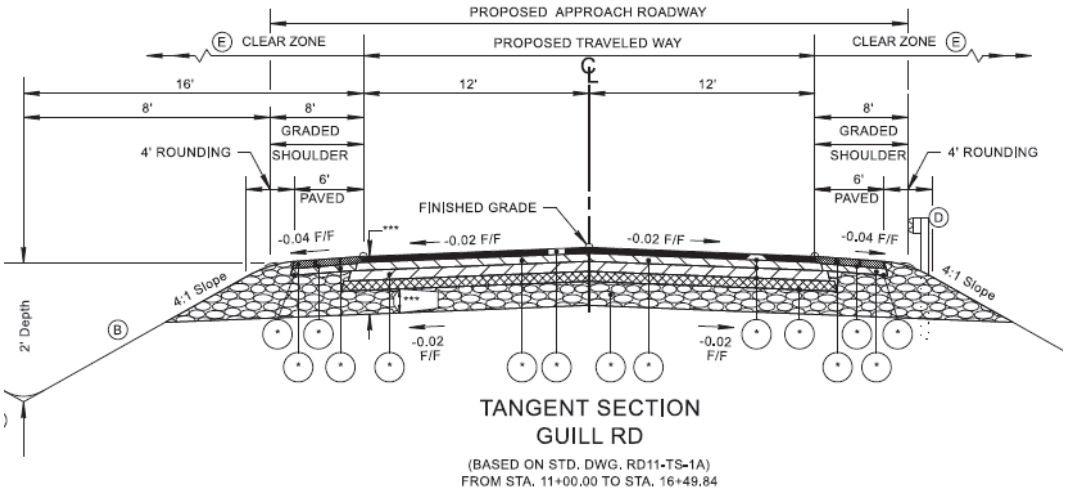


Figure 16: Proposed typical section of Guill Road (Preliminary Plans, 02/04/2023)
Guill Road: Would consist of two 12-foot travel lanes (one lane in each direction), with 8-foot graded shoulders

Right-of-Way

Does this project require the acquisition of right-of-way or easements? **Yes**

Right-of-Way Acquisition Table					
Permanent Acquisition				**Temporary Acquisition**	
R.O.W Acquisition	Drainage Easements	**Total**	Slope Easements	Construction Easements	**Total**
26.6	0	**39.5**	12.9	6.5	**6.5**

*Measured in acres

According to correspondence dated 08/30/2023 with the TDOT Project Development Office, the Preliminary Plans dated 02/04/2023 show the acquisition of 26.6 acres of ROW, 12.9 acres of slope easements, and 6.5 acres of construction easements. A copy of the 08/30/2023 email has been included in the Technical Appendices.

Relocations

Will this project result in residential, business or non-profit relocations? **Yes**

Relocations			
Residential	Business and Commercial	Non-Profit Organizations	**Total**
2	0	0	**2**

According to the TDOT Conceptual Stage Relocation Plan (CSRP) dated 10/10/2023, it is anticipated the proposed project will implement two single-family residential relocations. The specific findings are as follows: "There are Two (2) Single-Family Residences that would be relocated, and both appear to be inhabited. Of these, one is due to the

septic system being impacted, while the other is directly impacted by a Construction Easement."

"The Tennessee Department of Transportation (TDOT) will make relocation assistance available to all eligible persons impacted by this project, including residences, businesses, farm operations, non-profit organizations, and those requiring special services or assistance. The Regional Relocation Staff will administer the relocation program under the rules, policies, and procedures set forth in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Uniform Relocation Assistance Act of 1972, implementing federal regulations, TCA 13-11-101 through 119, The State of Tennessee Relocation Assistance Brochure and Chapter IX of the State of Tennessee Department of Transportation Right-of-Way Manual. TDOT's relocation program is practical and will allow for the efficient relocation of all eligible displaced persons in accordance with State and Federal Guidelines."

Copies of the 10/10/2023 CSRP and the Marked Relocations Plans are included in the Technical Appendices.

Changes in Access Control

Will changes in access control impact the functional utility of any adjacent parcels?	**No**

Traffic and Access Disruption

At this time, are traffic control measures and temporary access information available?	**Yes**
Will this project involve traffic control measures that may result in major traffic disruptions?	**No**

According to the Preliminary Plans dated 02/04/2023, traffic would be maintained during construction. While official Traffic Control Plans have not yet been developed for the proposed project, the Preliminary Plans dated 02/04/2023 confirm that TDOT would construct the two new structures over I-40 to the east of the existing SR 265 overpass. Doing this would allow traffic to be maintained during construction.

Water Resources

Are there any water resources, wetlands or natural habitat located within the project area? **Yes**

Project Name: Wilson Co. I-40, Interchange at SR-265 (Central Pike) **PIN:** 124884.00

Water Resource Table for NEPA Documentation

Based on: Plans

Date: 2/4/2023

Table Amounts are based on (choose only one): Estimated extent of resource with proposed ROW

Water Resources (Non-Wetland)

Label	Type	Latitude	Longitude	Receiving Waters	Quality	Amount (Linear Feet)	Amount (Acres)
STR-3	Intermittent Stream	36.166865	-86.543734	Misc. tribs to Percy Priest	Unassessed	355	0.029
WWC-3/EPH-3	Wet Weather Conveyance/Ephemeral	36.166829	-86.542904	Misc. tribs to Percy Priest	Unassessed	146	0.01
STR-2	Perennial Stream	36.166865	-86.542013	Misc. tribs to Percy Priest	Unassessed	587	0.07
SEP-3	Seep	36.169755	-86.530917	N/A	Unassessed	0	0.0006
STR-6	Perennial Stream	36.166766	-86.529565	North Creek	Unassessed	688	0.05
SEP-1	Seep	36.167935	-86.529284	N/A	Unassessed	0	0.0003
SEP-2	Seep	36.166757	-86.529327	North Creek	Unassessed	0	0.003
STR-7	Intermittent Stream	36.166659	-86.529438	North Creek	Unassessed	40	0.001
STR-4	Perennial Stream	36.162941	-86.52726	North Creek	Unassessed	1,650	0.38
WWC-4/EPH-4	Wet Weather Conveyance/Ephemeral	36.166303	-86.531381	North Creek	Unassessed	188	0.009
STR-5	Intermittent Stream	36.163951	-86.530606	North Creek	Unassessed	596	0.04
WWC-6/EPH-6A	Wet Weather Conveyance/Ephemeral	36.163413	-86.528789	North Creek	Unassessed	33	0.001
					Total:	4,283	1

Water Resources (Wetland)*

Label	Type	Latitude	Longitude	Receiving Waters	Quality	Amount (Acres)
WTL-8	Forested	36.167088	-86.540248	Misc. tribs to Pery Priest	Low Resource Value	0.02
WTL-9	Emergent	36.167023	-86.531334	N/A	Low Resource Value	0.02
WTL-10	Forested	36.167919	-86.52941	North Creek	Moderate Resource Value	0.02
WTL-12	Emergent	36.168228	-86.529294	North Creek	Low Resource Value	0.19
WTL-6	Shrub	36.166371	-86.529437	North Creek	Moderate Resource Value	0.01
WTL-7	Emergent	36.166375	-86.530709	North Creek	Low Resource Value	0.05
WTL-2	Emergent	36.166239	-86.531919	North Creek	Low Resource Value	0.02
WTL-13	Emergent	36.164451	-86.531415	North Creek	High Resource Value	0.11
WTL-4	Emergent	36.164300	-86.531029	North Creek	Moderate Resource Value	0.04
WTL-5	Emergent	36.163999	-86.530778	North Creek	Moderate Resource Value	0.01
WTL-3	Emergent	36.163233	-86.527602	North Creek	Low Resource Value	0.04
WTL-13B	Emergent	36.162476	-86.529634	North Creek	Low Resource Value	0.004
WTL-13A	Forested	36.162171	-86.529607	North Creek	Moderate Resource Value	0.02
					Total:**	0.554

*Unless described otherwise in the NEPA document; all wetlands are presumed to serve the following functions to varying degrees, based on location: wildlife habitat, flood storage, groundwater recharge, nutrient processing, contaminant filtering, and recreation.

**For the purposes of the NEPA document, Amount is assumed to be Permanent Loss.

Note- Features and estimated amounts referenced in this table are based on information available and may change as the project is further refined througout project development.

On 08/18/2023, the TDOT Ecology Section stated: "Based upon review of the Preliminary Plans dated 02/04/2023, an updated Environmental Boundaries Report dated 8/17/23 was required to reflect the new Right-of-Way (ROW).

On 08/17/2023, the TDOT Ecology Section submitted an Environmental Boundaries Report (EBR) identifying six (6) streams and three (3) ephemeral streams (WWC/EPH) within the project area. There are thirteen (13) wetlands within the project area. Other features include three (3) seeps and four (4) potential sinkholes within the project area. According to the Water Resource Table for NEPA documentation (above), the proposed project is expected to result in 4,283 linear feet of permanent impacts to non-wetland water resources, and 0.554 acres of permanent impacts to wetland water resources. The complete EBR dated 08/17/2023 and the Water Resource Table for NEPA Documentation have been included in the Technical Appendices.

Throughout the design process, TDOT will endeavor to mitigate impacts to streams, wetlands, or any other jurisdictional water features through avoidance and minimization. Where impacts cannot be avoided or sufficiently minimized, compensatory mitigation for permanent stream and wetland impacts would be accomplished either through permittee responsible mitigation, mitigation banking, or In-Lieu Fee mitigation to satisfy statutory requirements.

Protected Species

Are the GPNEA between TDOT and USFWS (2022), the TDEC MOA (2023), and the TWRA MOA (2022) applicable to this project? **No**

U.S. Fish and Wildlife Service (USFWS):

Coordination with the USFWS was completed on 11/02/2022.

According to the 08/17/2023 EBR "Coordination with USFWS was completed and a bat survey was required. The bat survey was completed in August 2022."

On 10/05/2022, the TDOT Ecology Section submitted the negative results of the bat survey to the USFWS, requesting concurrence with TDOT's determination of "no likely to adversely affect" for the federally endangered Indiana bat (*Myotis sodalis*) and the federally endangered northern long-eared bat (*Myotis septentrionalis*).

On 11/02/2022, the USFWS provided the following determination: "Efforts resulted in no captures of bats. Based on these results, we concur with your determinations of "not likely to adversely affect" for the Indiana bat and the northern long-eared bat. This survey will be valid until April 1, 2028. We are not aware of any federally listed species that would be impacted by the project. Therefore, based on the best information available at this time, we believe that your obligations have been fulfilled for all species that currently receive protection under the Endangered Species Act of 1973 (ESA)." A copy of the 11/02/2022 USFWS concurrence has been included in the Technical Appendices.

Tennessee Wildlife Resources Agency (TWRA):

Coordination with TWRA was completed on 01/13/2022.

The Tennessee Wildlife Resources Agency (TWRA) provided the following determination on 01/13/2022: "The implementation of standard BMP's will be sufficient to satisfy the needs of the Tennessee Wildlife Resources Agency for this proposed project." On 01/26/2022, the TWRA stated, "TWRAs response is still valid for this project with the current data." A copy of the TWRA concurrence is included in the Technical Appendices.

Tennessee Department of Environment and Conservation (TDEC):

Coordination with TDEC was completed on 01/25/2022.

The Tennessee Department of Environment and Conservation (TDEC) - Division of Natural Areas - Natural Heritage Program provided the following determination on 01/25/2022: "The Division of Natural Areas - Natural Heritage Program has reviewed the location of the proposed project workspace with respect to rare plant species. Based on the habitat within the project area and the type of project, we do not anticipate any impacts to occurrences of rare, threatened, or endangered plant species from this project." A copy of the TDEC Division of Natural Areas - Natural Heritage Program concurrence is included in the Technical Appendices.

Floodplain Management

Flood Zone: Zone X (White) - Area Determined to be Outside the 500-year Floodplain.

The project is not in a FEMA floodway, floodplain, or study area, and is located on Flood Insurance Rate Map (FIRM) in Wilson County, Panels 142 and 145 of 445, Map #s 47189C0142D and 47189C0145D. Portions of the FEMA FIRMs are included in the Technical Appendices

Air Quality

Transportation Conformity:

A response from the TDOT Air Quality and Noise Section dated 07/24/2023 states, "This project is in Wilson County which is in attainment for all regulated criteria pollutants. Therefore, conformity does not apply to this project."

Mobile Source Air Toxics (MSAT):

A response from the TDOT Air Quality and Noise Section dated 07/24/2023 states, "This project qualifies as a categorical exclusion under 23 CFR 771.117 and, therefore, does not require an evaluation of MSATs per FHWA's "Interim Guidance Update on Air Toxic Analysis in NEPA Documents" dated January 2023."

Noise

In accordance with FHWA requirements and TDOT's Noise Policy this project is determined to be **Type I**

Did a screening analysis for this Type I project predict potential noise impacts? **Yes**

According to the TDOT Air Quality and Noise Section ESR dated 07/24/2023, "A preliminary noise impact review identified areas containing noise-sensitive land uses, called Noise Analysis Areas (NAAs), including thirteen NAAs (1 through 13) adjacent to the section of the project currently being evaluated. Within the thirteen NAAs, 651 Category B receptors were identified along with 3 Category C receptors and 1 Category F receptor.

TDOT is committed to detailed noise modeling using the FHWA Traffic Noise Model (TNM) to estimate the distance within which noise impacts might occur. The TNM models will use the survey-based design plans, the design year 2045 (or most current) design hour traffic volumes provided by TDOT, and the existing posted speed limits of 70 miles per hour on I-40 and 35 miles per hour on Central Pike.

Should the impact evaluation indicate that there are impacts to residences, TDOT will commit to noise abatement evaluation.

Noise barriers may be feasible due to the proximity of numerous receptors adjacent to a major interstate facility. Noise barriers may need to be evaluated at other locations for the noise study, but are not likely to be feasible due to receptors adjacent to Central Pike/Providence Parkway that have direct driveway access.

Construction activities may generate intermittent and temporary noise above existing noise levels. The noise levels resulting from construction activities will depend on the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses. However, the noise increases will be temporary and will not constitute a noise impact as defined by TDOT's noise policy. The procedures in TDOT's Standard Specifications for Road and Bridge Construction will help minimize construction noise effects.

Some tracts of undeveloped land exist in the project area. TDOT encourages the local governments with jurisdiction over these lands, as well as potential developers, to practice noise compatibility planning to avoid future noise impacts. Additionally, the federal and state noise regulations do not allow federal funds to be used to construct noise abatement for newly constructed land uses in known noise-sensitive areas."

The TDOT Air Quality and Noise Section has included an environmental commitment for the proposed project, which states, "A preliminary noise impact review was completed for planning purposes. The review identified noise-sensitive land uses within the project area. Per 23 CFR 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise), a detailed noise impact analysis and abatement evaluation will be required with survey-based design plans and design year traffic projections. Noise impacts are possible. TDOT is committed to continual impact analysis and abatement evaluation."

The environmental commitment has been included on the Green Sheet of this D-List CE.

A copy of the TDOT Air Quality and Noise Section's ESR dated 07/24/2023, and the Preliminary Noise Technical Review dated 04/25/2023 for the proposed project, have been included in the Technical Appendices.

Farmland

Is this project exempt from the provisions of the Farmland Protection Policy Act (FPPA)? Yes

FPPA Exemption: Urbanized Area

Section 4(f)

Does this project involve the use of property protected by Section 4(f) (49 USC 303)? No

Section 6(f)

Does this project involve the use of property assisted by the L&WCF? No

Cultural Resources

Does the Interstate Highway exemption or Section 106 Programmatic Agreement (2021) apply? No

Are NRHP listed or eligible cultural resources within the project Area of Potential Effect (APE)? No

Archaeology Concurrence:

Concurrence from the TN State Historic Preservation Office (TN-SHPO) was received on 06/13/2023.

On 06/13/2023, the TN-SHPO provided the following determination: "Considering the information provided, we find that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking." Copies of the TDOT Archaeology Assessment Report and the TN-SHPO concurrence are included in the Technical Appendices.

Historic/Architectural Concurrence:

Concurrence from the TN State Historic Preservation Office (TN-SHPO) was received on 08/01/2023.

On 08/01/2023, the TN-SHPO provided the following determination: "Considering the information provided, we concur that no architectural resources eligible for listing in the National Register of Historic Places will be affected by this undertaking." Copies of the TDOT Historic/Architectural Assessment Report and the TN-SHPO concurrence are included in the Technical Appendices.

Native American Consultation

Does this project require Native American consultation? **Yes**

Native American Consultation was requested on 07/20/2020.

Native American Consultation					
Sent	Response		Sent	Response	
☒	☐	Absentee Shawnee Tribe of Oklahoma	☒	☒	Muscogee (Creek) Nation
☒	☐	Cherokee Nation	☐	☐	Poarch Band of Creek Indians
☐	☐	Chickasaw Nation	☐	☐	Quapaw Nation
☐	☐	Choctaw Nation of Oklahoma	☒	☐	Shawnee Tribe
☒	☐	Eastern Band of Cherokee Indians	☒	☐	Thlopthlocco Tribal Town
☒	☐	Eastern Shawnee Tribe of Oklahoma	☒	☐	United Keetoowah Band of Cherokee Indians
☒	☐	Kialegee Tribal Town	☐	☐	Jena Band of Choctaw Indians

Correspondence from the TDOT Cultural Resources Section dated 08/14/2023, states, "An invitation to participate in the Section 106 process was sent to all federally recognized Native American tribes with interests in the subject county on July 20, 2020.

The Muscogee (Creek) Nation responded on July 29, 2020. No copy of the letter attached in the Muscogee (Creek) Nation's email message could be obtained, but the Muscogee (Creek) Nation is being treated as a consulting party. As such, reports were sent to this consulting party on October 28, 2020. Updated cultural resources reports were sent to the Muscogee (Creek) Nation on August 14, 2023.

To date, no other responses have been received.

TDOT will re-initiate consultation if additional cultural resources studies are required or if archaeological materials or human remains are discovered during construction."

A copy of the 08/14/2023 correspondence is included in the Technical Appendices. Native American Consultation materials and responses are on file with the TDOT Cultural Resources Section.

Environmental Justice

Are there any disproportionately high or adverse effects on low-income or minority populations? **No**

Table 1

Environmental Justice Analysis Tables

Minority Populations				
Census Tract (CT)/ Block Group (BG)	CT 303.10 BG 1	CT 303.10 BG 2	CT 309.06 BG 1	Wilson Co.
% Minority/Non-White	3.6%	33.6%	36.9%	17.1%
Exceeds County Average by 10% or More	No	Yes	Yes	
Is BG Population Avg. >50%	No	No	No	
Meet EJ Criteria?	**No**	**Yes**	**Yes**	
Low-Income Populations				
Census Tract (CT)/ Block Group (BG)	CT 303.10 BG 1	CT 303.10 BG 2	CT 309.06 BG 1	Wilson Co.
% Low-Income/Below Poverty Line	5.6%	2.6%	3.1%	8.4%
Exceeds County Average by 10% or More	No	No	No	
Is BG Population Avg. >50%	No	No	No	
Meet EJ Criteria?	**No**	**No**	**No**	

Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates. ACS data was accessed and reviewed on 09/07/2023 from the U.S. Census Bureau website.

According to Executive Order (EO) 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, EJ analyses serve to ensure that each Federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, any disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

An environmental justice (EJ) analysis was undertaken to identify any disproportionately high and adverse human health or environmental effects on minority and low-income populations for the subject project. The EJ analysis utilizes the most current annual U.S. Census Bureau (USCB) data, which is from the 2017-2021 American Community Survey (ACS) 5-Year Estimates database. The proposed project area is within three (3) Census Block Groups (BG) in the City of Mt. Juliet, Wilson County, Tennessee. The following Census Blocks with Census Tracts (CT) are within the project area limits: CT 303.10, BGs 1 and 2; and CT 309.06, BG 1.

The EJ Analysis Table above displays the population data for the CT, BG pair compared to the respective minority population and low-income population percentages of each to that of Wilson County.

Minority Populations

Based on the EJ analysis, the minority population percentage for the CT 303.10, BG 2 and CT 309.06, BG 1 exceed the county average by 10 percentage points or more. Block groups where the minority and/or low-income population percentage exceeds the county average by 10 percentage points or more and/or are greater than 50 percent of the overall census block group population are considered EJ populations.

Low-Income Populations

Based on the EJ analysis, the low-income population percentages for the CT 303.10, BGs 1 and 2; and CT 309.06, BG 1 do not exceed the county average by 10 percentage points and/or are greater than 50 percent of the BG's total population. Block groups that satisfy either of these criteria are considered EJ populations.

Summary

Based on this EJ analysis, the minority populations located within CT 303.10, BG 2, and CT 309.06, BG 1 are considered EJ populations. Due to the results of the EJ analysis, the project was coordinated with the TDOT Civil Rights Division for review and comment on 10/10/2023. On 10/10/2023, the TDOT Civil Rights Division reviewed the EJ analysis and stated: “Actions and steps taken are found to be in accordance with the mandates of Title VI of the 1964 Civil Rights Act, the National Environmental Policy Act of 1969, and 42.U.S.C. 4332(2), and Executive Order 12898. There does not appear to be any Title VI nor Environmental Justice issues.”

The proposed project's EJ Analysis, the U.S. Census Bureau data for low-income and minority populations within the proposed project limits, and the TDOT Civil Rights Division project concurrence letter, are included in the Technical Appendices.

Hazardous Materials

Does the project involve any other hazardous material sites? **No**

On 02/22/2023, the TDOT Hazardous Materials Section stated, "Based on the Preliminary Initial Studies Plans dated 4 February 2023, no known hazardous materials sites affect this project as it is currently planned, and no additional hazardous material studies are recommended at this time."

A copy of the TDOT Hazardous Materials Section ESR response is included in the Technical Appendices.

Bicycle and Pedestrian

Does this project include accommodations for bicycles and pedestrians? **Yes**

On 07/11/2023, the TDOT Multimodal Transportation Resources Division stated, "This project accomodates both bicyclists and pedestrians with a sidewalk and a shared use path."

Copies of the TDOT Multimodal Transportation Resources Division ESR response and the 2015 TDOT Multimodal Access Policy are included in the Technical Appendices.

Environmental Commitments

Does this project involve any environmental commitments? **Yes**

Additional Environmental Issues

Are there any additional environmental concerns involved with this project? **No**

Conclusion

Review Determination

Determination: D-List Categorical Exclusion

This federal-aid highway project qualifies for a Categorical Exclusion under 23 C.F.R 771.117(d) and exceeds the thresholds listed in Section IV(A)(1)(b) of the 2023 Programmatic Agreement between the Federal Highway Administration, Tennessee Division and the Tennessee Department of Transportation. This project is therefore designated as a D-list Categorical Exclusion and requires Administration approval.

Reference Material

All source material used in support of the information and conclusions presented in this document are included in the technical appendices. The technical appendices are compiled as a separate document and include information on funding, agency concurrence, applicable agency agreements, special commitment support, project plans, technical reviews, reports and any other additional information.

Preparer Certification

By signing below, you certify that this document has been prepared in compliance with all applicable environmental laws, regulations and procedures. You can attest to the document's quality, accuracy, and completeness, and that all source material has been compiled and included in the technical appendices.

Brian Kluttz

Digitally signed by Brian Kluttz
Date: 2023.12.05 13:42:23 -06'00'

Document Preparer

Document Approval

By signing below, you officially concur that this document is in compliance with all applicable environmental laws, regulations and procedures. You have reviewed and verified the document's quality, accuracy, and completeness and that all source material has been compiled and included in the technical appendices.

Sam Patterson

Digitally signed by Sam Patterson
Date: 2023.12.05 13:31:58 -06'00'

Tennessee Department of Transportation

CARUS FRANKLIN DUBOSE

Digitally signed by CARUS FRANKLIN DUBOSE
Date: 2023.12.06 12:40:53 -06'00'

Federal Highway Administration

Attachments

Acronyms

AADT	Annual Average Daily Traffic
ADA	Americans with Disabilities Act
APE	Area of Potential Effect
BMP	Best Management Practice
CAA	Clean Air Act
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality
DEIS	Draft Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
EPH	Ephemeral Stream
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
GIS	Geographic Information System
IAC	Interagency Consultation
LWCF	Land and Water Conservation Fund
LOS	Level of Service
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PCE	Programmatic Categorical Exclusion
PIN	Project Identification Number
PM	Particulate Matter
PND	Pond
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
ROD	Record of Decision
RPO	Rural Planning Organization
SIP	State Implementation Plan
SNK	Sinkhole
SR	State Route
STIP	State Transportation Improvement Program
STR	Stream
TDEC	TN Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
SHPO	State Historic Preservation Office
TPO	Transportation Planning Organization
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USDOT	U.S. Department of Transportation
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day
WWC	Wet Weather Conveyance

Technical Appendices

D-List Categorical Exclusion

I-40

Interchange at SR-265 (Central Pike)

Wilson County

PIN 124884.00

TIP Page

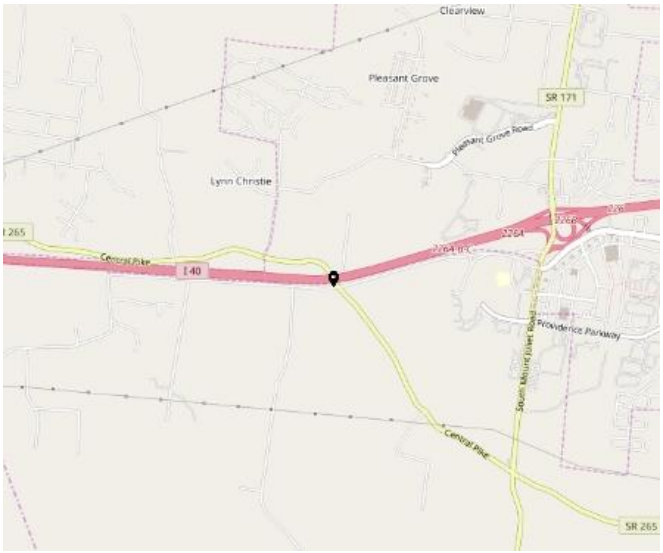
Transportation Improvement Program for FYs 2023-2026

Project Name	I-40 at Central Pike (SR-265) Interchange			**TIP #**	2019-73-090
Improvement Type	Interchange			**Lead Agency**	TDOT
County	Wilson County	**Length**	0.00	**Regional Plan ID**	2864
Air Quality Status	Exempt	**TDOT PIN**	124884.00	**Project Cost**	$30,300,000.00
Route	I-40				
Location	At Central Pike (SR-265)				
Project Description	This project is for a new interchange on I-40 at Central Pike (SR-265) in Mt. Juliet. An Interchange Access Request (IAR) has been completed by TDOT and been accepted by FHWA. In addition to the new interchange, the project will also include multi-modal modes of transportation in the design for Central Pike. Future multi-modal connections will be provided with Central Pike improvement plans. Central Pike improvements from Old Hickory Blvd. to S. Mt. Juliet Road are also included in the IMPROVE Act.				

Fiscal Year	Type of Work	Funding Type	Total Funds	Federal Funds	State Funds	Local funds
2023	PE-N	LOCAL	$1,000,000.00	$0.00	$0.00	$1,000,000.00
2023	PE-D	NHPP	$1,400,000.00	$1,120,000.00	$280,000.00	$0.00
TOTAL			$2,400,000.00	$1,120,000.00	$280,000.00	$1,000,000.00

REVISION HISTORY

PROJECT NOTES



Project Development

Samuel T. Patterson

From: Samuel T. Patterson
Sent: Wednesday, November 29, 2023 2:37 PM
To: Samuel T. Patterson
Subject: FW: I-40 at SR 265 (Central Pike) Monthly Meetings PIN 124884.00

From: Bradley Martin <Bradley.Martin@tn.gov>
Sent: Monday, November 13, 2023 4:34 PM
To: Brian Kluttz <Brian.Kluttz@tn.gov>
Subject: RE: I-40 at SR 265 (Central Pike) Monthly Meetings PIN 124884.00

Brian,
There have not been any Design Public Meetings held yet. My guess is that it will be held some time in Spring 2024.

Thanks,

BRADLEY MARTIN, P.E. | Civil Engineering Manager 1
Region 3 Project Development
Building A, 2nd Floor
6601 Centennial Blvd., Nashville, TN 37243-0360
Phone – (615) 350-4219
Cell – (615) 406-8209
E-Mail – bradley.martin@tn.gov
tn.gov/tdot

From: Brian Kluttz <Brian.Kluttz@tn.gov>
Sent: Monday, November 13, 2023 4:10 PM
To: Bradley Martin <Bradley.Martin@tn.gov>
Subject: I-40 at SR 265 (Central Pike) Monthly Meetings PIN 124884.00

Hi Bradley, I wanted to ask if there has been any Design Public Meetings held so far for the above listed project. Thank You.

Brian

Brian Kluttz| Environmental Studies Specialist Advanced
Environmental Division/ NEPA Programs Office
James K. Polk Building, 9th Floor
505 Deaderick St., Nashville, TN 37243
P: 615-391-9840
Brian.Kluttz@tn.gov
tn.gov/tdot
NEPA Programs Office (tn.gov)

#57624

James Maness
Mayor

Bill Trivett
Vice-Mayor

Kenny Martin
City Manager

TA
CoP Alec 1/18
TDOT/F

CITY OF MT. JULIET

Commissioners
Ray Justice
Scott Hefner
Jennifer Milele

January 10, 2023

RECEIVED
JAN 18 2023
GOVERNOR'S OFFICE

The Honorable Bill Lee
Governor of Tennessee
State Capitol
600 Dr. Martin Luther King Blvd
Nashville, TN 37243

Dear Governor Lee,

First and foremost, please know what an honor it was to meet and fellowship with you on 1-4-23. I know how super busy you are, and I greatly appreciate you taking time from your busy schedule to meet with my team and me to discuss SR-265 and the Central Pike Interchange in Mt. Juliet, Tennessee.

I'm happy to report that our elected body unanimously voted to support resolution 1-2023. A resolution confirming The City of Mt. Juliet's Commitment and Partnership with the State of Tennessee to improve infrastructure and economic development. We realize this is an important need and are committed to working with you and your team in every way to bring this project to reality.

If we can ever be of assistance, please do not hesitate to contact us.

Your friend in service,

James Maness

Mayor James Maness

Mayor

Bill Trivett
Vice-Mayor

Kenny Martin
City Manager

CITY OF MT. JULIET

Commissioners
Ray Justice
Scott Hefner
Jennifer Milele

RESOLUTION 1-2023

A RESOLUTION CONFIRMING THE CITY OF MT. JULIET'S COMMITMENT TO TRANSPORTATION IMPROVEMENTS

WHEREAS, the recent report from the Boyd Company ranked Mt. Juliet as the number one city in the central U.S. as a potential destination for corporate headquarters; and

WHEREAS, the State of Tennessee was named the number one best fiscally managed state in the country, the best business climate in the U.S., the number one in the nation for advanced industry job growth, and the best state for small business growth; and

WHEREAS, the City of Mt. Juliet has a long and successful history of partnership with TDOT on state routes; and

WHEREAS, the City of Mt. Juliet has over $160 million in city commitments to transportation on state and local roads; and

WHEREAS, in November, Governor Lee announced infrastructure as a priority for the state; and

WHEREAS, the IMPROVE Act provided much-needed additional funding for transportation improvements, but it is still inadequate to meet all funding needs.

NOW THEREFORE BE IT RESOLVED by the Board of Commissioners of the City of Mt. Juliet, Wilson County, Tennessee, is committed to providing up to $25 million toward the Central Pike (SR-265) interchange/ roadway widening to expedite the project delivery.

This Resolution shall take effect at the earliest date allowed by law, the public welfare requiring it.

PASSED: 1/09/23

James Maness, Mayor

ATTEST:

Sheila S. Luckett, MMC
City Recorder

L. Gino Marchetti, Jr.
Attorney

APPROVED AS TO FORM:

Kenneth D. Martin
City Manager

I certify this to be a true and exact copy of the files and records of the City of Mt. Juliet

Sheila S. Luckett, MMC
Deputy City Manager/City Recorder

State of Transportation

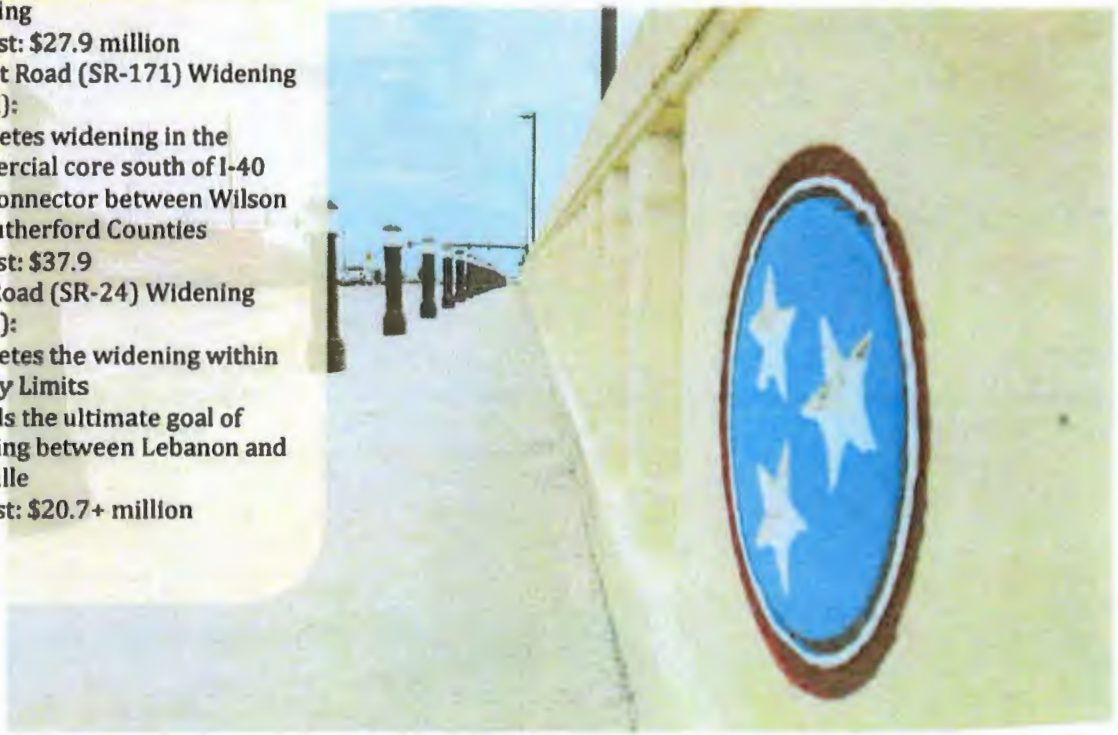
Mt. Juliet, Tennessee

City Project Priorities

1. Central Pike (SR-265) Interchange at I-40 (Proposed):
   - Key to economic vitality for Mt. Juliet and Western Wilson County
   - Mt. Juliet Road at I-40 interchange experiencing poor levels of service despite maximizing improvements
   - SR-265 and SR-171 provide vital commercial routes between I-40 and I-24
   - Cost Est: $20.9 million
2. Central Pike (SR-265) Widening, I-40 to SR-171 (Committed):
   - Critical to traffic flow and safety to and from the new interchange
   - Connects interchange to SR-171 widening
   - Cost Est: $27.9 million
3. S. Mt. Juliet Road (SR-171) Widening (Proposed):
   - Completes widening in the commercial core south of I-40
   - Vital connector between Wilson and Rutherford Counties
   - Cost Est: $37.9
4. Lebanon Road (SR-24) Widening (Proposed):
   - Completes the widening within the City Limits
   - Extends the ultimate goal of widening between Lebanon and Nashville
   - Cost Est: $20.7+ million

City of Mt. Juliet Transportation Commitments:

- History of partnering with TDOT on state routes:
  - SR-171 Widening, Phase I (purchased ROW)
  - SR-171 Widening, Phase II (purchased ROW)
- $4+ million spent on SR-171 bridge over I-40
  - Recently completed
- $3+ million committed to ongoing state route projects within the City:
  - SR-24 Widening (Park Glen to Curd Road)
  - SR-171 Widening (SR-265 to Providence Way)
  - SR-265 Interchange at I-40
- Over $160 million in City commitments to transportation on state and local roads
  - Urgency in completing projects to maintain economic competitiveness
  - Willing to put skin in the game for state projects
- **City willing to commit up to $25 million toward the Central Pike interchange or other state projects on priority list to help expedite project delivery**



U.S. Department of Transportation
Federal Highway Administration

Tennessee Division

404 BNA Drive, Suite 508
Nashville, Tennessee 37217
Phone (615) 781-5770

November 15, 2017

In Reply Refer To:
HFO-TN

Mr. Steve Allen
Director of Strategic Transportation Improvements
Tennessee Department of Transportation
James K. Polk Building, Suite 1000
Nashville, TN 37243-0349

Subject: Interchange Access Request for Interstate 40 at SR-265 (Central Pike), Wilson County

Dear Mr. Allen:

The Federal Highway Administration (FHWA) has received the Tennessee Department of Transportation's (TDOT) Interchange Access Request (IAR) for the proposed modification of Interstate 40 at SR-265 (Central Pike), in Wilson County. After reviewing the request in accordance with FHWA's Policy on Access to the Interstate System, the Division has determined the alternatives presented in your submittal are both engineering and operationally acceptable. Therefore the alternatives, as presented are conceptually approved and may now proceed into the National Environmental Policy Act (NEPA) phase for environmental review and analysis. If significant engineering and operational changes occur during the course of the NEPA process, then further review will be warranted by FHWA.

To receive approval to proceed with Final Design, TDOT will need to notify FHWA once the NEPA process is complete, that the design studied and approved in the NEPA document is consistent with the recommended alternative from the IAR, and the project is in the current TIP/STIP and LRTP.

If you or your staff needs additional assistance, please contact Thor Steffen at 615-781-5763.

Sincerely,

Gerald Varney, P.E.
Field Operations Team Leader

cc: Ms. Pamela Kordenbrock, Division Administrator, FHWA Tennessee Division
Ms. Sabrina David, Assistant Division Administrator, FHWA Tennessee Division
Ms. Theresa Claxton, Planning & Program Mgmt. Team Leader, FHWA Tennessee Division
Ms. Pam Heimsness, Safety & Traffic Operations Team Leader, FHWA Tennessee Division
Mr. Paul Sharp, Technical Programs Team Leader, FHWA Tennessee Division

Mr. Paul Degges, Deputy Commissioner/Chief Engineer, TDOT
Mr. Toks Omishakin, Deputy Commissioner/Chief of Environment and Planning, TDOT
Mr. Jeff Jones, Assistant Chief Engineer of Design, TDOT
Ms. Susannah Kniazewycz, Director of Environmental Division, TDOT
Ms. Jennifer Lloyd, Director of Roadway Design, TDOT
Mr. Jim Waters, Assistant Director of Strategic Transportation Investments, TDOT
Mr. Joe Deering, Region 3 Director of Project Development, TDOT
Mr. Shaun Armstrong, Transportation Manager 1, Strategic Transportation Investments, TDOT

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 95100-1113-44 ROUTE: S.R. 265 @ I-40
COUNTY: WILSON CITY: MT. JULIET
PROJECT PIN NUMBER: 124884.00
PROJECT DESCRIPTION: S.R. 265 @ I-40 DIVERGING DIAMOND INTERCHANGE

[1] S.R. 265 AVERAGE TRAFFIC DATA.
[2] I-40 AVERAGE TRAFFIC DATA.

DIVISION REQUESTING:

		PAVEMENT DESIGN	☐
MAINTENANCE	☐	STRUCTURES	☐
S.T.I.D.	☐	SURVEY & ROADWAY DESIGN	☒
PROG. DEVELOPMENT & ADM.	☐	TRAFFIC SIGNAL DESIGN	☐
PUBLIC TRANS. & AERO.	☐	OTHER	☐

YEAR PROJECT PROGRAMMED FOR CONSTRUCTION: 2025
PROJECTED LETTING DATE: DECEMBER, 2024

TRAFFIC ASSIGNMENT:

	BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
	AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
[1]	6,610	2025	11,370	1,599	14	2045	55-45	1	2	65	87
[2]	97,840	2025	109,240	8,628	8	2045	50-50	9	13	2,732	4,198

REQUESTED BY: NAME SHARON SCHUTZ P.E. DATE 10/5/21
DIVISION REGION III PROJECT DEVELOPMENT
ADDRESS 6601 CENTENNIAL BLVD.
NASHVILLE TN 37243

REVIEWED BY: RANDY BOGUSKIE Randy Boguskie DATE 10/7/2021
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: TONY ARMSTRONG Tony Armstrong DATE 10/7/2021
TRANSPORTATION MANAGER 2
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

THIS TRAFFIC WAS TAKEN FROM A S.R. 265 STUDY PREPARED FOR S.T.I.D. DATED 8/28/2021 AND IS BASED ON 2019 CYCLE AND RAMP COUNTS AND [10] 8-HOUR TURNING MOVEMENT COUNTS [OCT. 2019] AND INCLUDES A PROPOSED DEVELOPMENT @ JOHN HAGER INTERSECTION. THE DESIGN YEAR TRAFFIC IS BASED ON GROWTH RATE FROM THE UPDATED NASHVILLE MPO COMPUTER ASSIGNMENT MODEL. AADT's, BOTH YEAR DHV's AND ADL's ARE INCLUDED.

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR ADTs OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS. (REV. 6/9/21)

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENT DIVISION

PROJECT NO.: 95100-1113-44 ROUTE NO.: S.R. 265 [1]
COUNTY: WILSON CITY: MT. JULIET
PROJECT DESCRIPTION: I-40 @ S.R. 265 DIVERGING DIAMOND INTERCHANGE

FAP Urban

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles (1-2)		6,718	0.001	7	0.001	7
Pick-up, Panel, Van (3)		2,068	0.004	8	0.004	8
Sing. Unit	Buses (4)	4	0.300	1	0.300	1
	2-axle, 6-tire (5)	82	0.260	21	0.260	21
	3-axle or more (6-7)	58	1.000	58	1.500	87
Comb.	4-axle (8)	41	0.640	26	0.800	33
	5-axle or more (9-13)	19	1.200	23	1.900	36
Totals (2035 AADT)		8,990		145		193

Suggested Percentages of Trucks in Design Lane

5,000 or less ADT	95%
5,000 - 10,000 ADT	90%
10,000 - 15,000 ADT	85%
15,000 - 20,000 ADT	80%
20,000 - 30,000 ADT	75%
30,000 - 40,000 ADT	70%
40,000 Plus	60%

No. of Lanes: 5
% Trucks in Design Lane: 90%
ADL in Design Lane:

FLEX:	0.5	X	0.90	X	144.6	=	65
RIGID:	0.5	X	0.90	X	193.4	=	87

ADL Calculations By: TONY ARMSTRONG Date: 10/7/2021
Reviewed By: Randy Boguskis Date: 10/7/2021
[REV. 7/1/14]

TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

PROJECT NO.: 95100-1113-44 ROUTE NO.: I-40 [2]
COUNTY: WILSON CITY: MT. JULIET
PROJECT DESCRIPTION: S.R. 265 @I-40 DIVERGING DIAMOND INTERCHANGE.

Interstate

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		ADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles	(1-2)	69,601	0.001	70	0.001	70
Pick-up, Panel, Van	(3)	20,465	0.004	82	0.005	102
Sing. Unit	Buses (4)	1,060	0.300	318	0.300	318
	2-axle, 6-tire (5)	2,634	0.170	448	0.170	448
	3-axle or more (6-7)	1,416	0.700	991	1.000	1,416
Comb.	4-axle (8)	451	0.700	316	0.780	352
	5-axle or more (9-13)	7,913	1.100	8,704	1.780	14,085
Totals (2035 AADT)		103,540		10,928		16,791

Suggested Percentages of Trucks in Design Lane

	4 Lane	6 Lane	8 Lane
5,000 or less ADT	90%	75%	70%
5,000 - 10,000 ADT	80%	70%	65%
10,000 - 15,000 ADT	75%	65%	60%
15,000 - 20,000 ADT	75%	65%	55%
20,000 - 30,000 ADT	70%	60%	50%
30,000 Plus ADT	65%	60%	50%

No. of Lanes: 10
% Trucks in Design Lane: 50%
ADL in Design Lane:

FLEX:	0.5	X	0.50	X	10928.4	=	2,732
RIGID:	0.5	X	0.50	X	16790.6	=	4,198

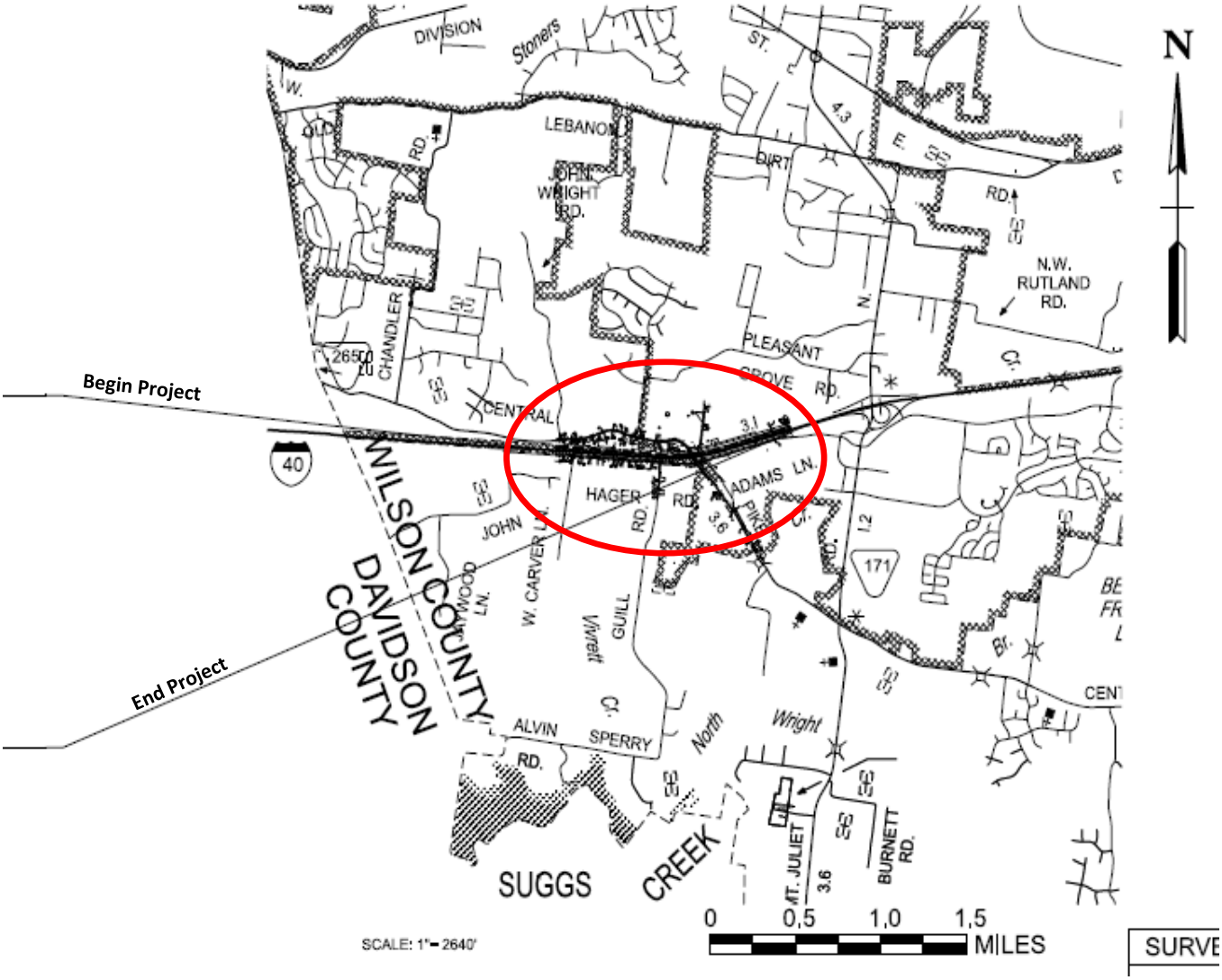
ADL Calculations By: TONY ARMSTRONG Date: 10/7/2021
Reviewed By: Randy Boguskie Date: 10/7/2021
[REV. 7-1-14]

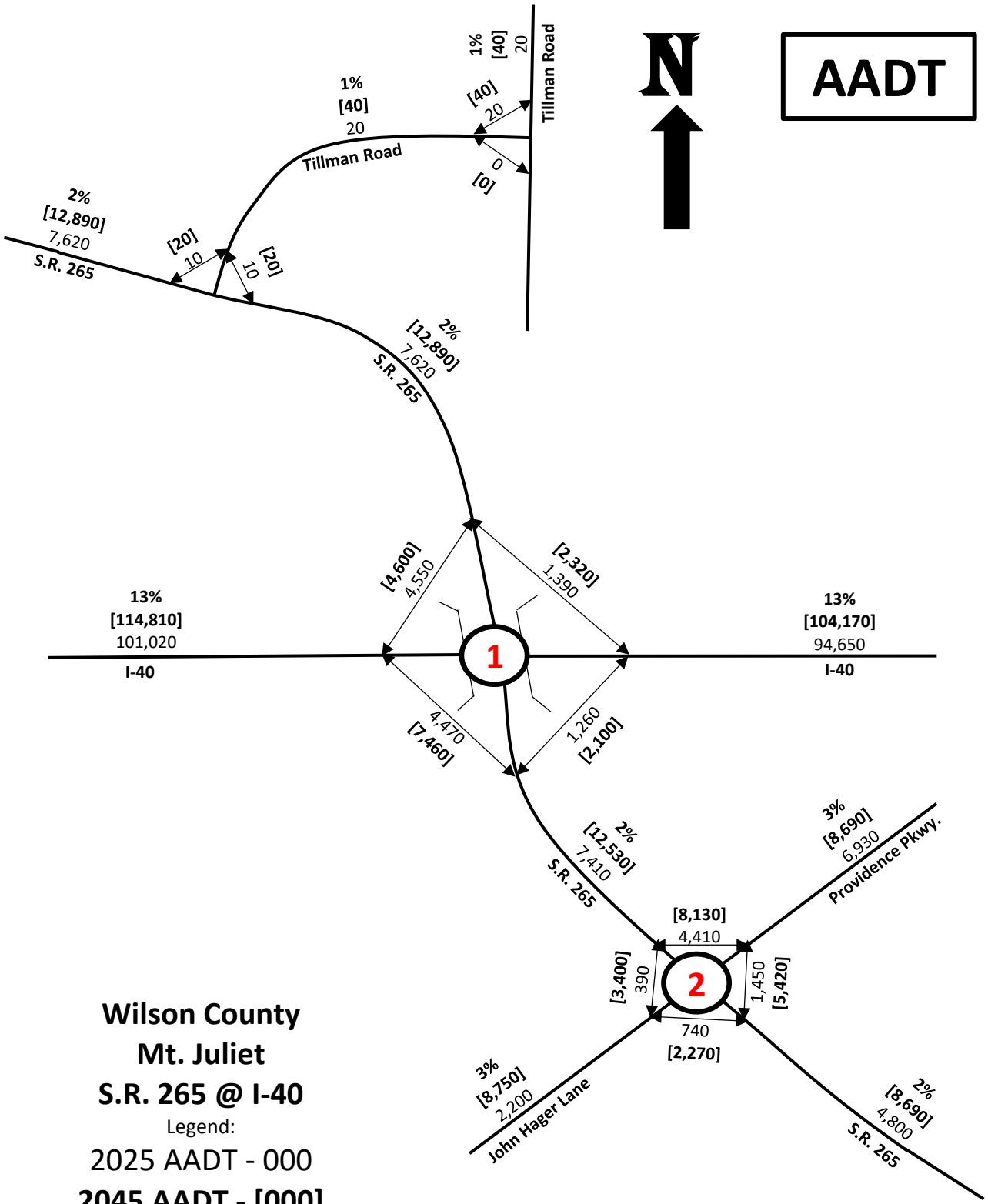
WILSON COUNTY

INTERSTATE 40
DIVERGING DIAMOND INTERCHANGE
AT STATE ROUTE 265

PRELIMINARY

STATE HIGHWAY NO. F.A.H.S. NO.





Wilson County

Mt. Juliet

S.R. 265 @ I-40

Legend:

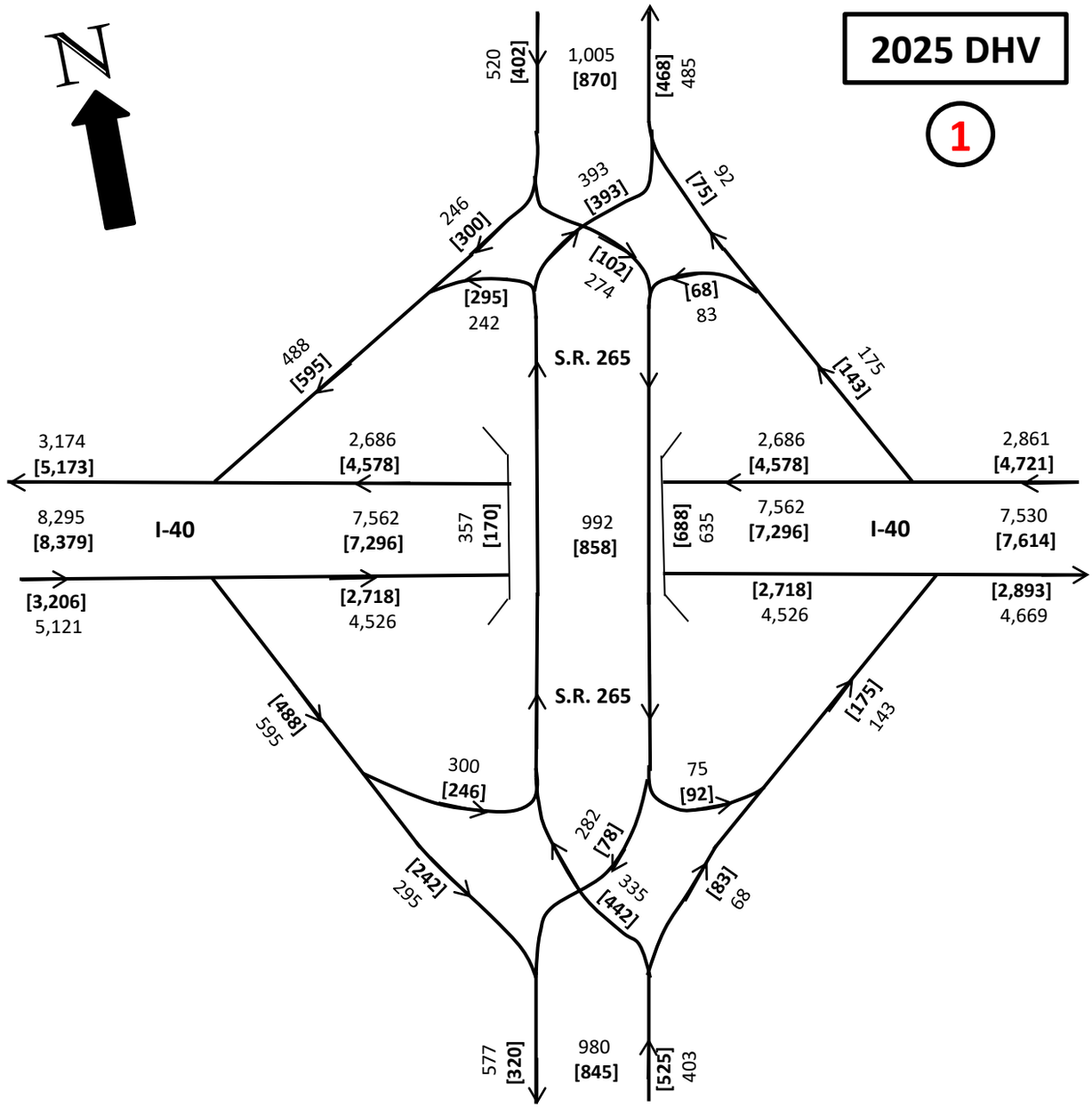
2025 AADT - 000

2045 AADT - [000]

AADT Truck % - **0%**

Date: October 7, 2021

TA



Wilson County
I-40 @ S.R. 265

Diverging Diamond

2025 DHV
PM
[AM]

Rev. Date: August 24, 2021
TA

2025 DHV

2

N

980
845

577
320

403
525

S.R. 265

16
4

282
118

279
198

265
171

196
126

135
67

565
266

165
28

John Hagar Lane

Providence Pkwy.

390
297

1,053
675

37
23

194
171

105
89

488
409

52
59

45
55

101
331

104
122

S.R. 265

499
205

250
508

713

749

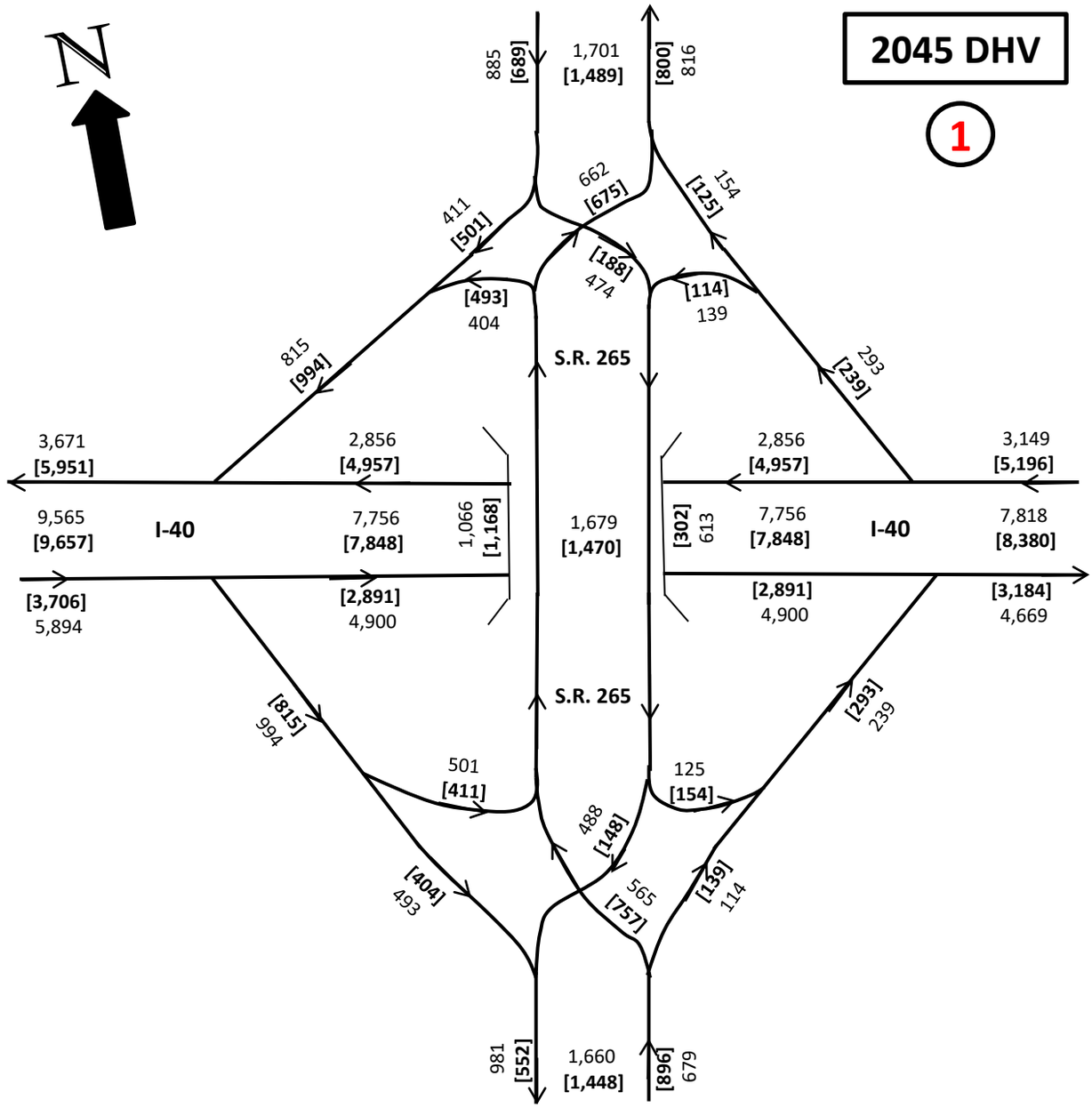
Wilson County
S.R. 265 @ John Hagar Lane & Providence Pkwy.

2025 DHV

PM

AM

Rev. Date: August 24, 2021
TA



Wilson County
I-40 @ S.R. 265

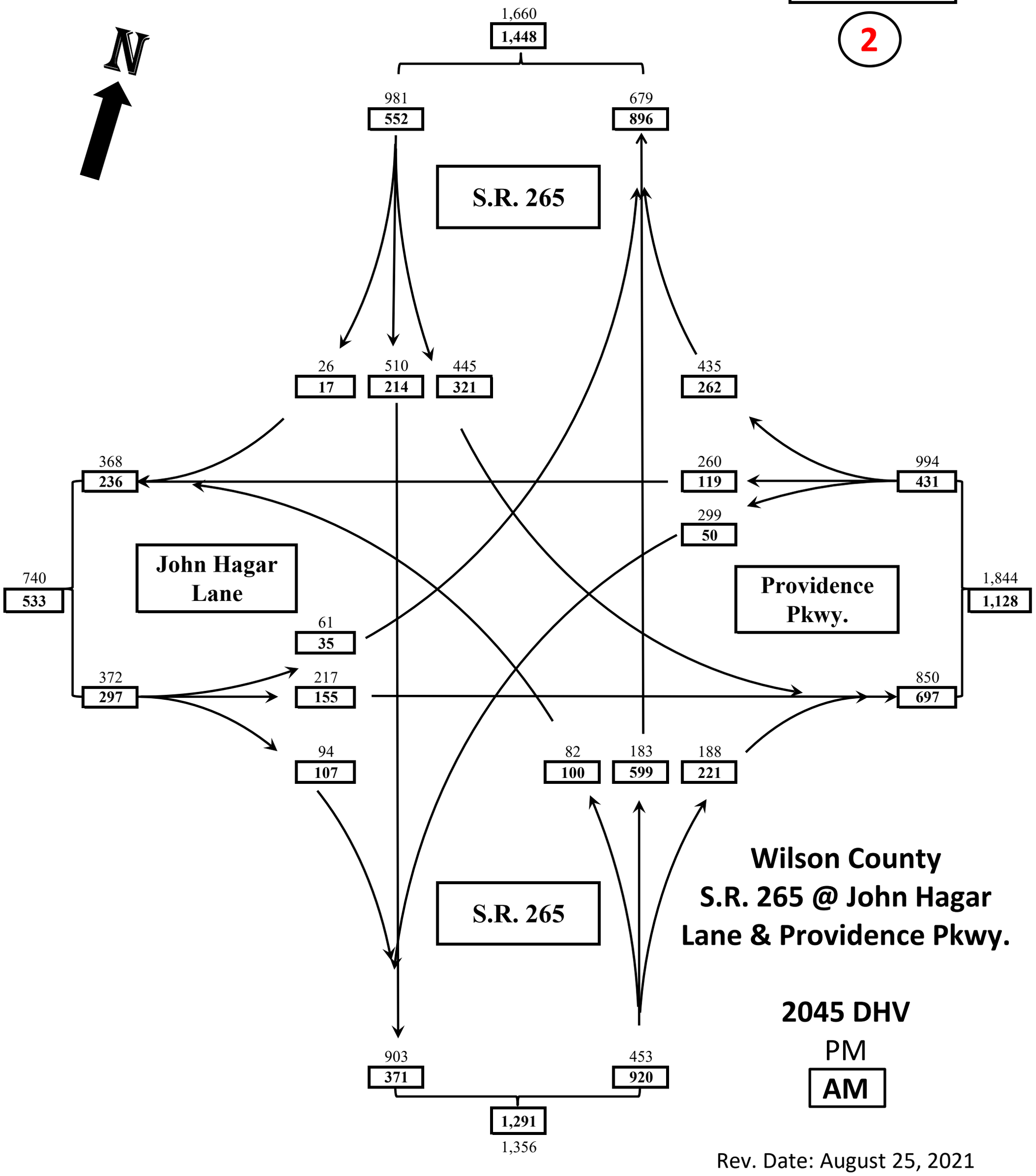
2045 DHV
PM
[AM]

Diverging Diamond

Rev. Date: August 25, 2021
TA

2045 DHV

2



Wilson County
S.R. 265 @ John Hagar Lane & Providence Pkwy.

2045 DHV

PM

AM

Rev. Date: August 25, 2021

TA

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265 (CENTRAL PIKE)
MT. JULIET, WILSON COUNTY
PIN 124884.00

PREPARED BY
GRESHAM, SMITH AND PARTNERS
FOR THE
TENNESSEE DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.

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EXECUTIVE SUMMARY

The City of Mt. Juliet, Wilson County, and Nashville Metropolitan Organization (MPO) request an evaluation of providing new access to Interstate 40 (I-40) at State Route (SR) 265 (Central Pike) near Mile Marker 225 (MM 225) in the City of Mt. Juliet in Wilson County. **Figure ES-1** provides a Vicinity Map of the area.

Several studies have been completed along this section of I-40, including:

- *Interchange Justification Study for I-40 at SR 265* (completed in 2000)
- *Interchange Modification Study at Exit 226 (SR 171)* (completed in 2006)
- *I-40/I-81 Corridor Feasibility Study* (completed in 2008)
- *Nashville Area MPO's 2040 Regional Transportation Plan* (adopted in 2016)
- *Mt. Juliet Comprehensive Transportation Plan 2017*
- *Central Pike Subarea Study* (2017)

On June 20, 2000, FHWA provided engineering and operational approval for an Interchange Justification Study (IJS) for a new interchange at this location. FHWA's Policy on Access to the Interstate System states that if a project has not progressed to construction within eight (8) years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a)), then an updated study based on current and projected future conditions must be resubmitted to FHWA for review and approval.

The primary purpose and need for providing access along I-40 at SR 265 is to address high volumes of traffic, poor levels of service, and projected ramp queues at the adjacent Exit 226 (SR 171) Interchange. FHWA approved the Exit 226 (SR 171) Interchange Modification Study (IMS) in 2006 with the understanding that a new interchange would need to be constructed along I-40 at SR 265 to alleviate traffic demand at SR 171 beyond the IMS's 2016 Design Year. SR 171 is known locally as Mt. Juliet Road.

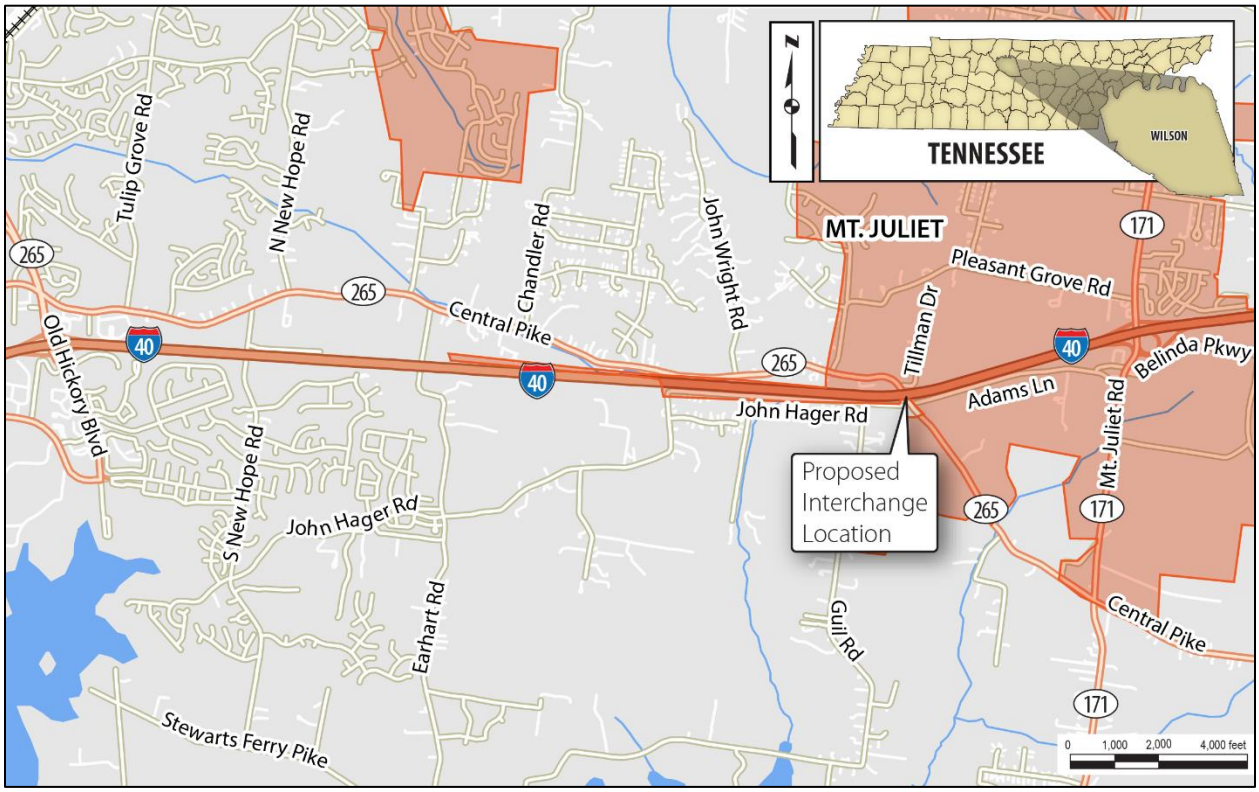
Three alternatives are proposed in this IAR: a No-Build Alternative, a Diamond Interchange, and a Diverging Diamond Interchange. The No-Build Alternative results in poor Levels of Service (LOS) and queues along the westbound I-40 Off-Ramp at SR 171 that reach the mainline of I-40, creating safety and operational concerns.

The Diamond Interchange Alternative provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have levels of service of C or better at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange. The estimated project cost is $19.8 million.

The Diverging Diamond Interchange (DDI) Alternative provides many of the same advantages as the Diamond Interchange Alternative. It also provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have levels of service of B at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange. The estimated project cost is $20.9 million.

Both interchange build alternative configurations meet the purpose and need for the new interchange access along I-40. The construction of an interchange at SR 265, along with other planned and associated roadway improvement projects within the area of influence, is calculated to reduce crashes within the study area by 9%. Data from the HSM CMF Clearinghouse website indicates the DDI Build Alternative will operate more safely than the Diamond Interchange Build Alternative. Both Build Alternatives are recommended for consideration.

This study analyzes the proposed I-40/SR 265 Interchange's engineering feasibility and defines the required improvements best suited to meet the current and future regional needs. This report will be submitted by the Tennessee Department of Transportation (TDOT) for a determination of Engineering and Operational Acceptability to the Federal Highway Administration (FHWA). Receipt of this determination does not guarantee approval of any new access or changes to current access. Final approval of the Interstate Access Request will be requested once all National Environmental Policy Act (NEPA) requirements have been met and a determination that this document and any potential changes from the NEPA process have been addressed, and that the project is in the appropriate Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP) or State Transportation Improvement Program (STIP).



ES-1: VICINITY MAP

1.0 INTRODUCTION

1.1 STUDY BACKGROUND

The Tennessee Department of Transportation (TDOT) initiated study of a request for new interchange access on I-40 at State Route (SR) 265 (Central Pike) in Wilson County, Tennessee at the request of the Nashville Area Metropolitan Planning Organization (MPO), the City of Mt. Juliet, and Wilson County. The purpose of the new interchange access is to accommodate future traffic demands and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. As shown in **Figure 1**, the proposed access point is located in Wilson County, Tennessee within the City of Mt. Juliet.

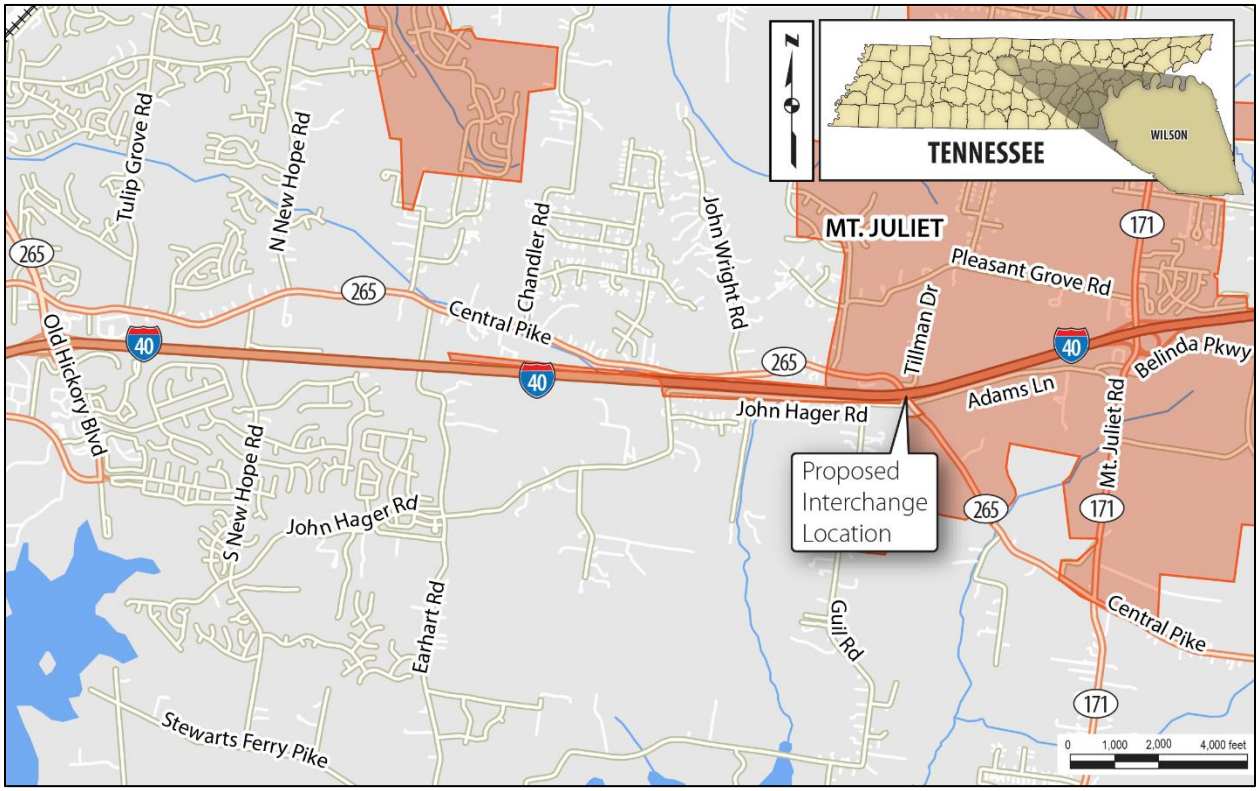


FIGURE 1: VICINITY MAP

On June 20, 2000, FHWA provided engineering and operational approval for an Interchange Justification Study (IJS) for a new interchange at this location. The proposed improvements included a new diamond interchange with auxiliary lanes along both directions of I-40 connecting to the Exit 226 (SR 171) (Mt. Juliet Road) Interchange. FHWA's Policy on Access to the Interstate System states that if a project has not progressed to construction within eight (8) years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a)), then an updated study based on current and projected future conditions must be resubmitted to FHWA for review and approval.

The proposed interchange is located along I-40, near Mile Marker 225, 1.1 miles west of the Exit 226 (SR 171) Interchange and 3.9 miles east of the Exit 221 (SR 45) (Old Hickory Boulevard)

Interchange. No other interchange studies are currently underway within the study area. FHWA approved an Interchange Modification Study in 2006 for the Exit 226 (SR 171) Interchange. The study recommended:

1. Addition of combined ramp behind barrier along eastbound I-40: to provide access to the SR 171 South directional ramp, SR 171 North loop-ramp, and the slip ramp that connects to Belinda Parkway,
2. Geometric improvements to ramps to meet design speed,
3. Realignment of the eastbound I-40 On-Ramp and bridge it over the Belinda Parkway slip ramp,
4. Widening the westbound I-40 Off-Ramp for dual left turn lanes and a single right turn lane,
5. Provide a two-lane westbound I-40 On-Ramp,
6. Increased storage lane lengths at all signalized intersections to reduce disruption of flow to the mainline traffic on I-40 and SR 171.

The recommended improvements were constructed in 2009. The Design Year for the SR 171 Interchange Modification Study (IMS) was compressed to 10 years (2016) in anticipation of a new interchange being constructed along I-40 at SR 265 to alleviate traffic demand at the existing SR 171 Interchange. The 2016 Design Year analysis identified that the intersection of the westbound I-40 Ramps with SR 171 would operate at LOS F and the intersection of the eastbound I-40 Ramps with SR 171 Intersection to operate at LOS E (southbound) and F (northbound). The IMS was approved by FHWA with the understanding that a new interchange would need to be constructed along I-40 at SR 265 to alleviate traffic demand at SR 171 beyond the 2016 Design Year.

In February 2006, the Exit 229 (Beckwith Road) Interchange was let to construction. It is located 3.2 miles east of SR 171. The traffic analysis from the SR 171 Interchange Modification Study included the Beckwith Road interchange in its analysis. As predicted in the 2006 SR 171 IMS, SR 171 currently experiences congestion and poor traffic operations.

The City of Mt. Juliet supports the proposed interchange (see **Attachment A**). The city has committed to access management along SR 265 within the functional area of the interchange to help preserve traffic operations into the future (see **Attachment B**). TDOT's Design Division supports the Build Alternatives presented in this Interstate Access Request (IAR) (see **Attachment C**). The proposed project is included in the current Nashville Area MPO Regional Transportation Plan (See **Attachment D**).

1.2 PROJECT LOCATION AND DESCRIPTION OF STUDY AREA

The proposed interchange location along I-40, near Mile Marker 225, at SR 265 is located in Wilson County, Tennessee, within the city limits of City of Mt. Juliet and within the Nashville Urbanized Area Boundary. The proposed interchange location lies approximately 1.1 miles west of the existing Exit 226 (SR 171) Interchange and 3.9 miles east of the existing Exit 221 (SR 45) Interchange. SR 265 is the only state route that crosses I-40 between these two interchanges. Construction to widen I-40 within the study area from six (6) lanes to eight (8) lanes was completed in 2015. The interstate consists of four (4) twelve (12)-foot travel lanes in each direction with a center concrete median barrier, a six (6)-foot paved inside shoulder and six (6)-foot paved outside shoulder.

I-40 serves as a major east-west traffic artery, ultimately connecting southern California to the Atlantic Ocean in Wilmington, North Carolina. In the immediate proximity of the proposed interchange, I-40 serves as the major traffic corridor connecting Nashville, Tennessee and Knoxville, Tennessee. The study area's five-mile distance along I-40 between Exit 221 (SR 45) and Exit 226 (SR 171) is the longest segment along I-40 without an interchange within the 57-mile corridor from Exit 188 (SR 249 in Kingston Springs) and Exit 245 (Linwood Road in Wilson County). This area is shown in **Figure 2**.

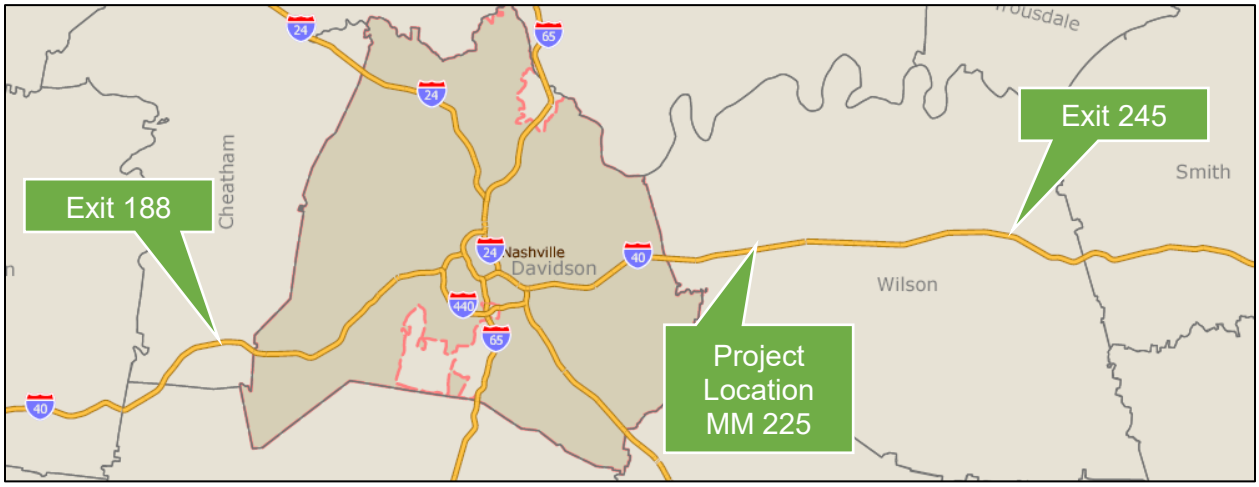


FIGURE 2: INTERCHANGE SPACING ALONG I-40

SR 265, locally known as Central Pike, is functionally classified as an urban minor arterial on the State's Surface Transportation System. The roadway section on SR 265 consists of a two (2)-lane ditch section with eleven (11)-foot travel lanes and three (3)-foot shoulders in Davidson County and ten (10)-foot travel lanes and minimal shoulders in Wilson County.

The area of influence along I-40 evaluated in this request includes the adjacent interchanges of Exit 221 (SR 45) and Exit 226 (SR 171) and is 5.0 miles in length. Additionally, the area of influence includes SR 265 from Pleasant Grove Road to SR 171, which is 1.7 miles. The area of influence for the study area is shown in **Figure 3**. The study boundary was selected to incorporate the proposed build alternative limits, future development, and the adjacent interchanges and intersections.



FIGURE 3: AREA OF INFLUENCE

1.3 PURPOSE AND NEED

The purpose of this IAR is to determine the feasibility of providing access along I-40 at SR 265, and to evaluate traffic operations over the area of influence including the adjacent interchanges along I-40 and intersections along SR 265. The City of Mt. Juliet, Wilson County and the Nashville Area MPO initiated the request for a new interchange to accommodate future traffic demands and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. The following key points were identified to be studied:

- Capacity deficiencies within the area of influence;
- Interchange improvements to provide the desired level of service for the Design Year of 2040;
- Evaluate operational characteristics of the proposed improvements to improve capacity;
- Evaluate Transportation System Management options;
- Ensure pedestrian and bicycle traffic is accommodated along SR 265;
- Develop a planning-level construction cost estimate; and
- Address any additional right-of-way requirements.

The City of Mt. Juliet has experienced rapid growth in the last decade and has the potential for additional development both north and south of the I-40 corridor, particularly in close proximity to SR 265. This rapid growth and associated increase in traffic volumes support the need for transportation network improvements in order to maintain acceptable operations on existing facilities, as well as provide additional connectivity in the area.

Table 1 provides the operational measures for the Exit 226 (SR 171) Interchange. The measures reported are for SR 171 with a planned project to add an additional northbound lane. Even with the planned improvement, the interchange is still calculated to fail and queue vehicles to the interstate mainline.

TABLE 1: OPERATIONAL MEASURES (NO BUILD ALTERNATIVE)

Operational Measure	**2020**	**2040**
AADT on I-40	92,950 vpd	111,725 vpd
AADT on SR 171	26,015 – 51,400 vpd	30,875 – 71,150 vpd
SR 171 at I-40 WB Ramps		
	2020 LOS (AM/PM)	**2040 LOS (AM/PM)**
Northbound Approach	D / D	F / F
Southbound Approach	D / E	F / F
Westbound Approach[A]	F / F	F / F
Overall Intersection LOS	**D / E**	**F / F**

[A] Traffic simulation demonstrates queues will reach I-40 mainline by 2040.

Source: Gresham, Smith and Partners

2.0 EXISTING CONDITIONS

2.1 EXISTING NETWORK

Within the study area, I-40 is an eight (8)-lane barrier divided interstate with four (4) lanes in each direction and has a posted speed of 70 miles per hour (mph). SR 265 consists of a two (2)-lane ditch section with one (1) ten (10)-foot travel lane in each direction in the vicinity of I-40. The posted speed limit on SR 265 is 35 mph. SR 265 runs east-west within the study area connecting to SR 45 to the west and SR 171 to the east. SR 265 is the only state route crossing I-40 between the Exit 221 (SR 45) and Exit 226 (SR 171) Interchanges. SR 265 is functionally classified as an Urban Minor Arterial. The majority of traffic accessing SR 265 utilizes the Exit 226 (SR 171) Interchange. **Figure 4** illustrates the existing interchange ramp geometry at the Exit 226 (SR 171) Interchange.

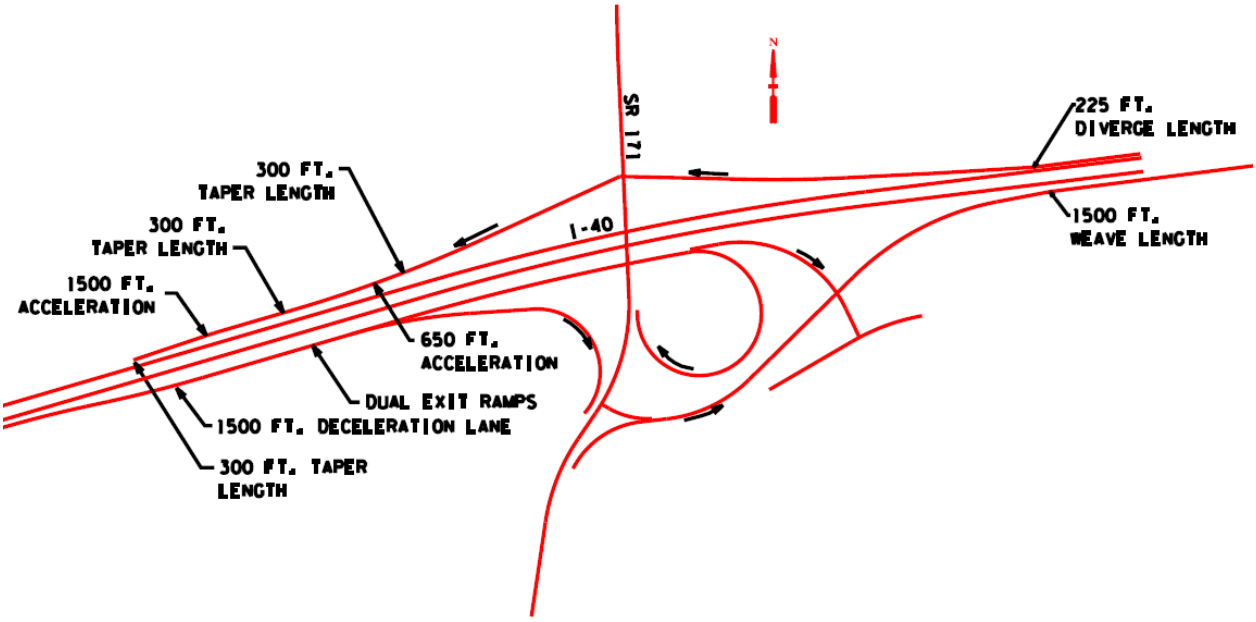


FIGURE 4: EXISTING SR 171 RAMP GEOMETRY

Source: Gresham, Smith and Partners

The area of influence includes multiple intersections. The geometry and laneage for each is listed on the following page.

I-40 Westbound Ramps at SR 171 is a four (4)-leg signalized intersection. Southbound SR 171 has two (2) through lanes and single right turn lane that free flows onto the westbound on-ramp. Northbound SR 171 has two (2) through lanes and a dual left turn lane onto the westbound on-ramp. The westbound on-ramp has three (3) accepting lanes. The westbound off-ramp has two (2) left turn lanes and one (1) right turn lane. The intersection is within a coordinated set of signals, controlled by an Adaptive Signal Control Technology (ASCT) system, along SR 171 that is maintained by the City of Mt. Juliet.

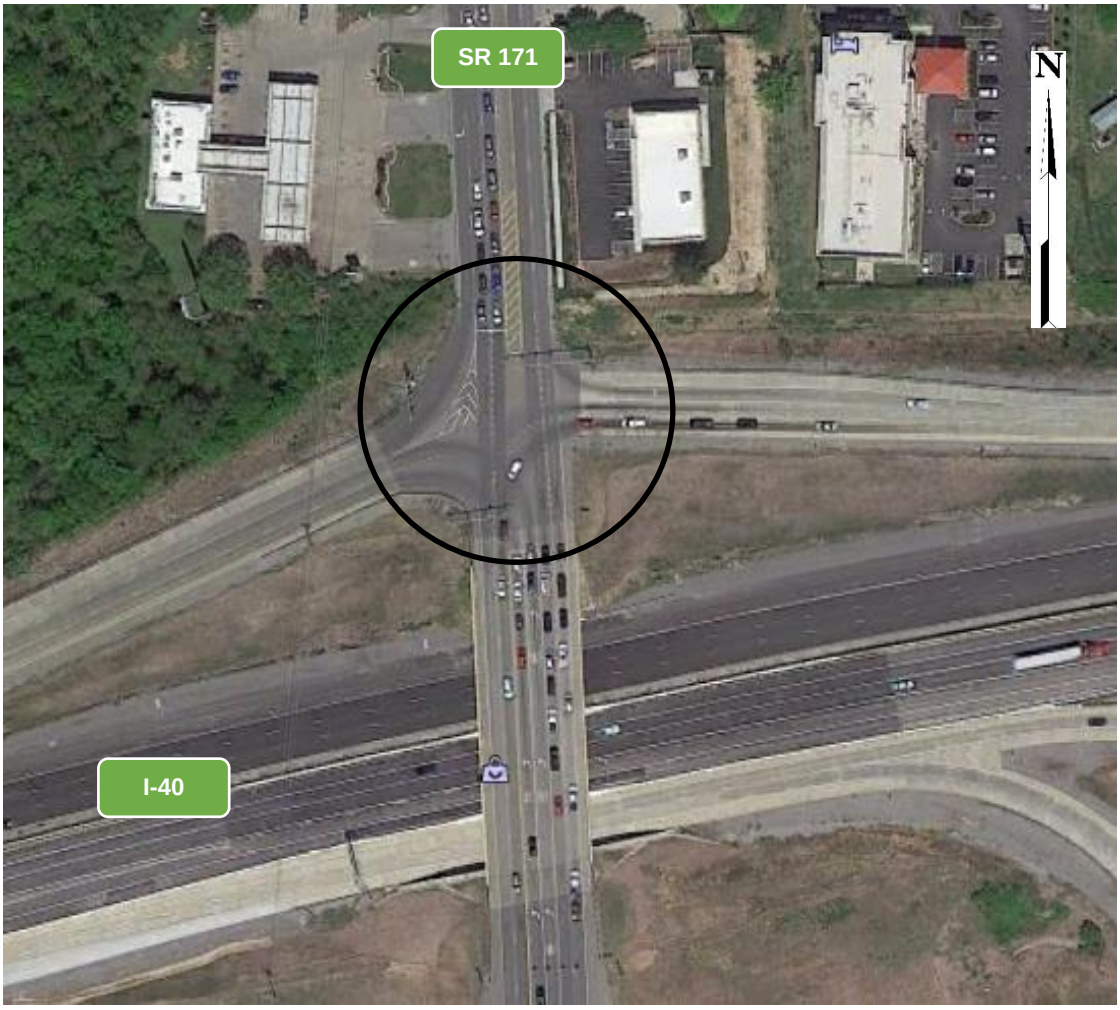


FIGURE 5: SR 171 SIGNALIZED INTERSECTION AT I-40 WESTBOUND RAMPS

I-40 Eastbound Ramps at SR 171 is a partial cloverleaf with directional ramps that form a signalized intersection along SR 171. The eastbound off-ramp is a two (2)-lane ramp that provides access to northbound and southbound SR 171 and Belinda Parkway. The slip ramp to Belinda Parkway allows traffic to bypass SR 171 to access commercial developments within the Providence Marketplace development. The loop ramp from eastbound I-40 forms an added lane onto northbound SR 171. The eastbound on-ramp is a two (2)-lane ramp accepting both northbound and southbound traffic from SR 171. There is a signal for a protected southbound left turn onto the eastbound on-ramp that crosses northbound SR 171. All other movements at this intersection are free-flow movements. The intersection is within a coordinated set of signals, controlled by an ASCT system, along SR 171 that is maintained by the City of Mt. Juliet.

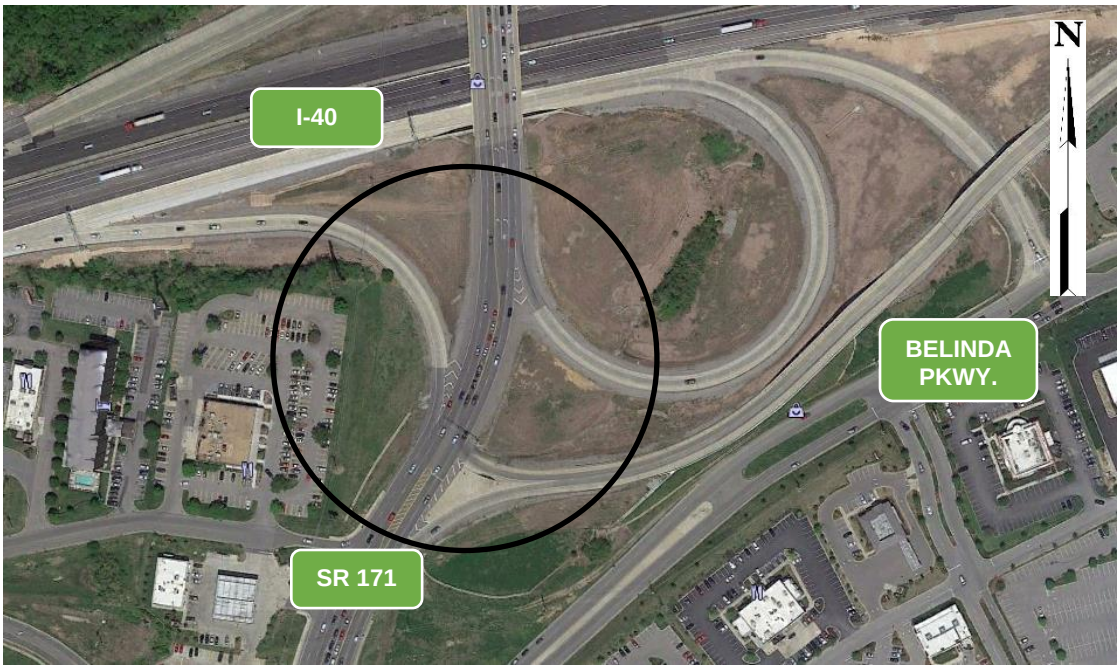


FIGURE 6: SR 171 DIRECTIONAL I-40 EASTBOUND RAMPS

SR 265 at Adams Lane/John Hagar Road is a four (4)-leg, four-way stop controlled intersection (note the aerial imagery below predates conversion to four-way stop control). John Hagar Road continues west of the SR 265 intersection and is a two-lane rural roadway with two (2)-foot or less shoulders. Adams lane continues east of the SR 265 intersection and is a two-lane rural roadway at the intersection with SR 265. Adams Lane continues east and widens to a three (3) -lane urban section near the connection with SR 171. Adams Lane parallels I-40 and serves as a connection for local traffic between SR 265 and SR171. It provides access to multiple retail shopping, residential, and business park locations.



FIGURE 7: SR 265 AT JOHN HAGAR ROAD / ADAMS LANE

SR 265 at SR 171 is a four (4)-leg, signalized intersection. SR 171 is a two (2)-lane roadway that transitions to a five (5)-lane urban section approaching the Providence Marketplace development and the interchange with I-40. SR 171 provides access to multiple retail shopping centers and residential neighborhoods. The eastbound and westbound approaches on SR 265 consists of a shared left-through-right lane. The northbound and southbound approaches on SR 171 both consist of a shared thru-right lane and a dedicated left turn lane. The City of Mt. Juliet maintains the intersection signal timings.

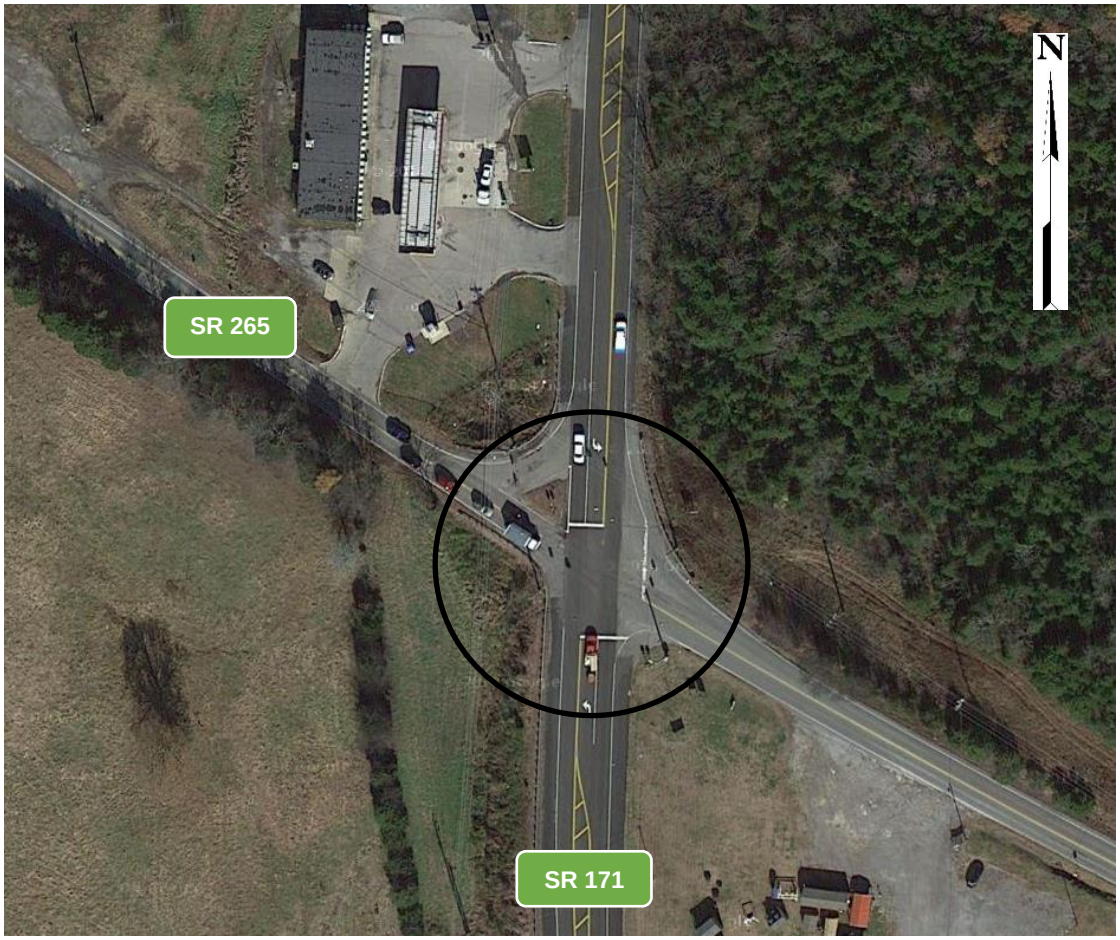


FIGURE 8: SR 265 AT SR 171

SR 265 at Tillman Drive is a three (3)-leg, one-way stop controlled intersection. The intersection is located less than 200 feet north of I-40. None of the approaches have turn lanes. The Tillman Drive approach stops for SR 265 traffic. Tillman Drive is a two-lane rural roadway at the intersection with SR 265. Tillman Drive accesses two residences.

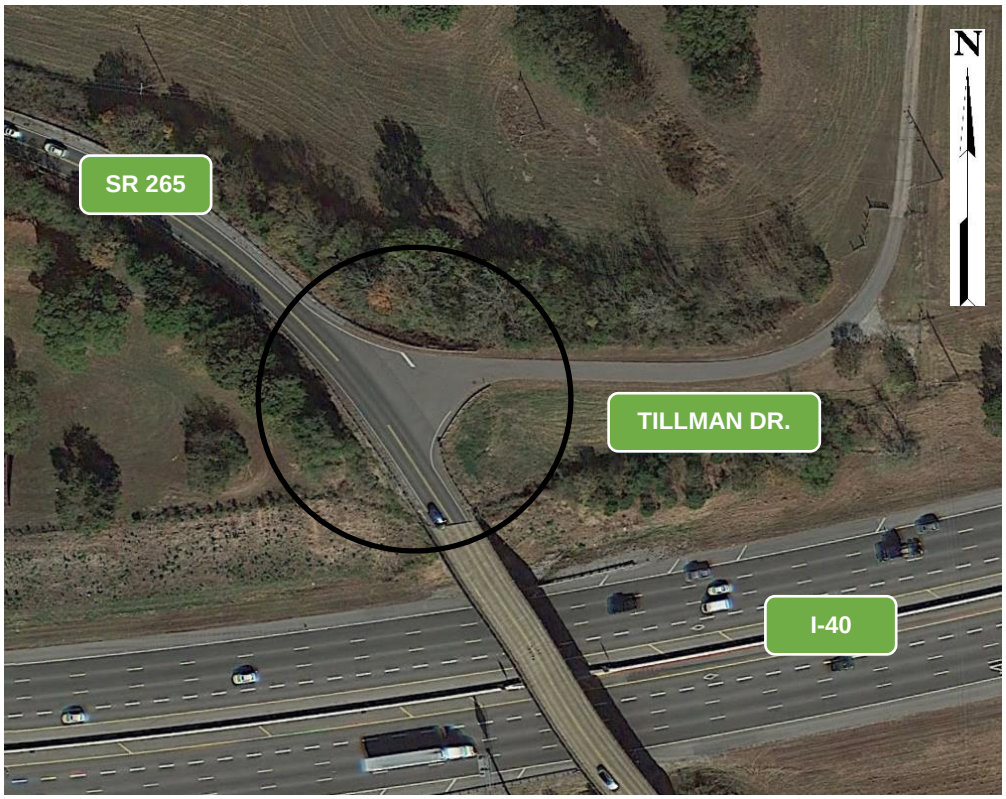


FIGURE 9: SR 265 AT TILLMAN DRIVE

SR 265 at Pleasant Grove Road is a three (3)-leg, one-way stop controlled intersection. The intersection is located approximately 1/3 of a mile west of Tillman Drive. None of the approaches have turn lanes. The Pleasant Grove Road approach stops for SR 265 traffic. Pleasant Grove Road is a two-lane rural roadway at the intersection with SR 265. Pleasant Grove Road continues northeast to provide access to SR 171 and numerous retail and hospitality businesses.



FIGURE 10: SR 265 AT PLEASANT GROVE ROAD

I-40 at SR 45, to the west of SR 171, forms a traditional diamond interchange. SR 45 is a five-lane cross section. The ramps have turn lanes. The intersections of the ramps with SR 45 are signalized. Metro Nashville Public Works maintains the signal timings.

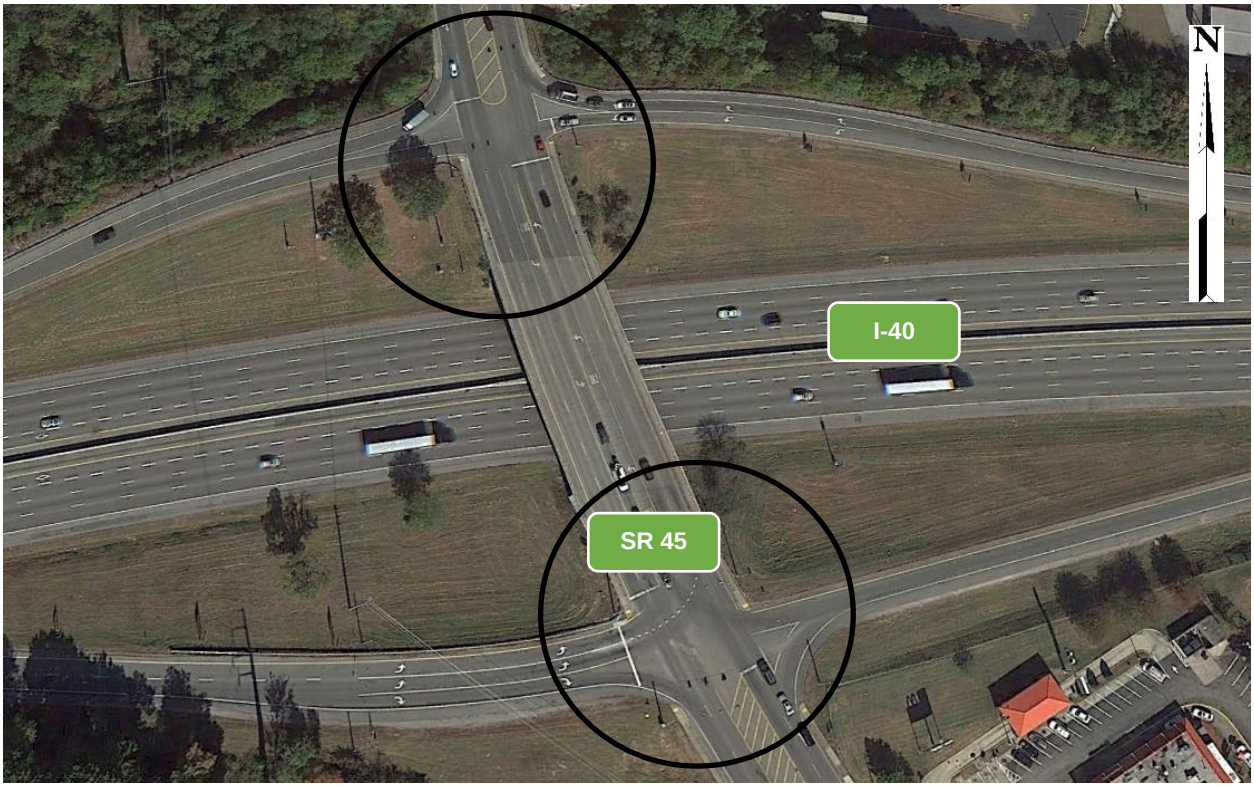


FIGURE 11: I-40 AT SR 45

2.2 GEOMETRIC DEFICIENCIES

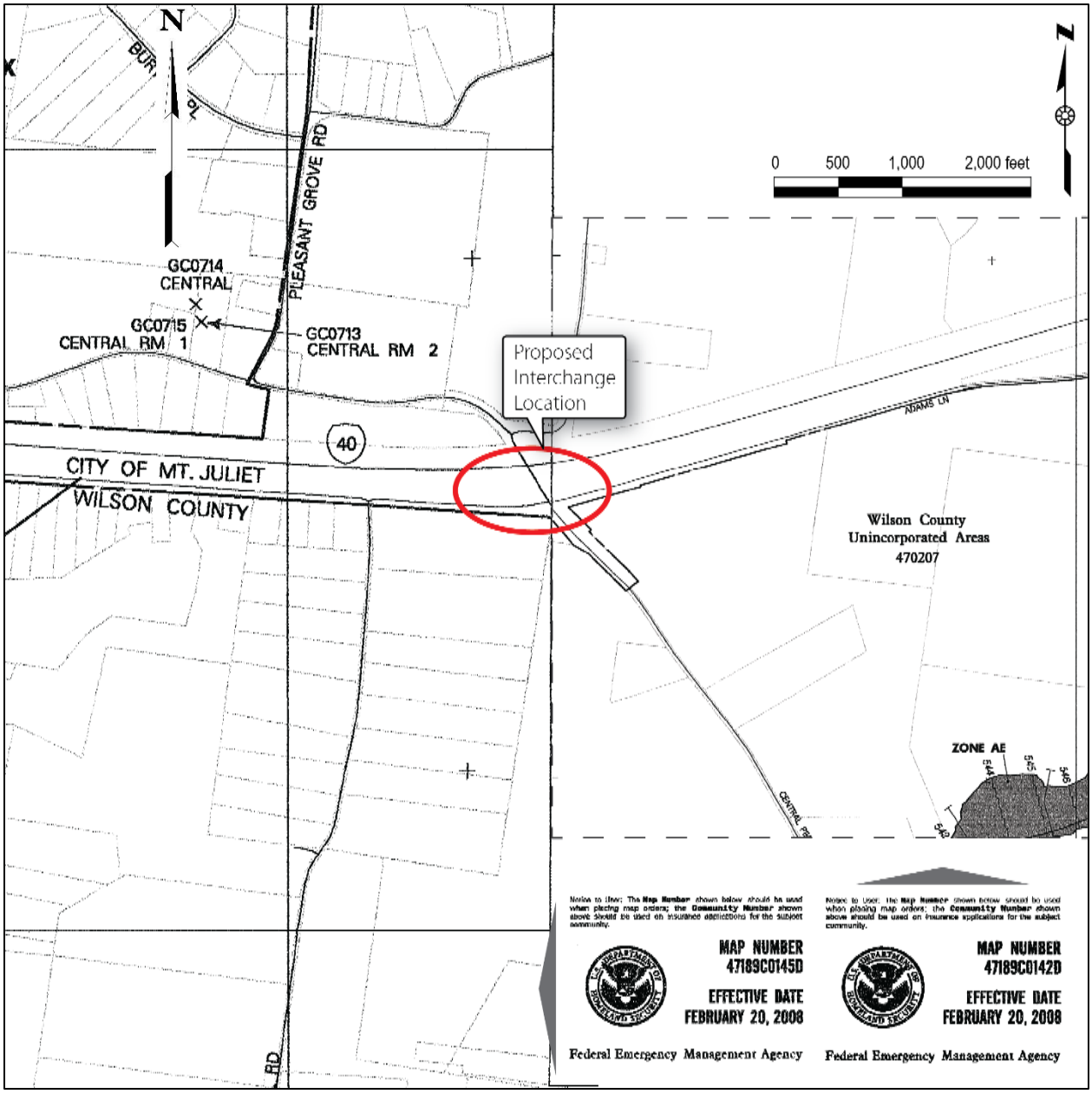
SR 265 has ten (10)-foot travel lanes with no shoulders. Its right-of-way in the area of influence varies from thirty (30) feet to eighty (80) feet. It is an unforgiving roadway with little roadside clear zone. It is lacking bicyclist and pedestrian features. The City of Mt. Juliet desires these multimodal features because more nearby residential development is planned.

2.3 PRELIMINARY ENVIRONMENTAL CONSTRAINTS

The proposed alternatives will require new right-of-way acquisition. All necessary studies, including ecological, hazardous materials, air quality/noise, archaeological, and historical studies are required as the project continues into environmental planning.

The project is located within the Stones River watershed. The Federal Emergency Management Agency (FEMA) Mapping Information Platform was used to identify flood zones within the interchange area. The FEMA data indicate that there are no floodways or flood hazard zones within the study area. The EPA MY Waters Mapper database was used to locate streams and wetlands within the area. No streams or wetlands are located within the footprint of the proposed interchange. One freshwater pond is located in the area of the proposed westbound off-ramp. No permit is required for impacts to freshwater ponds. **Figure 12** shows the FEMA mapping information for the interchange area.

No superfund sites listed on the EPA National Priority List (NPL) Database are located in Wilson County. A review of the EPA EnviroMapper indicated no sites within the project area with environmental concerns.

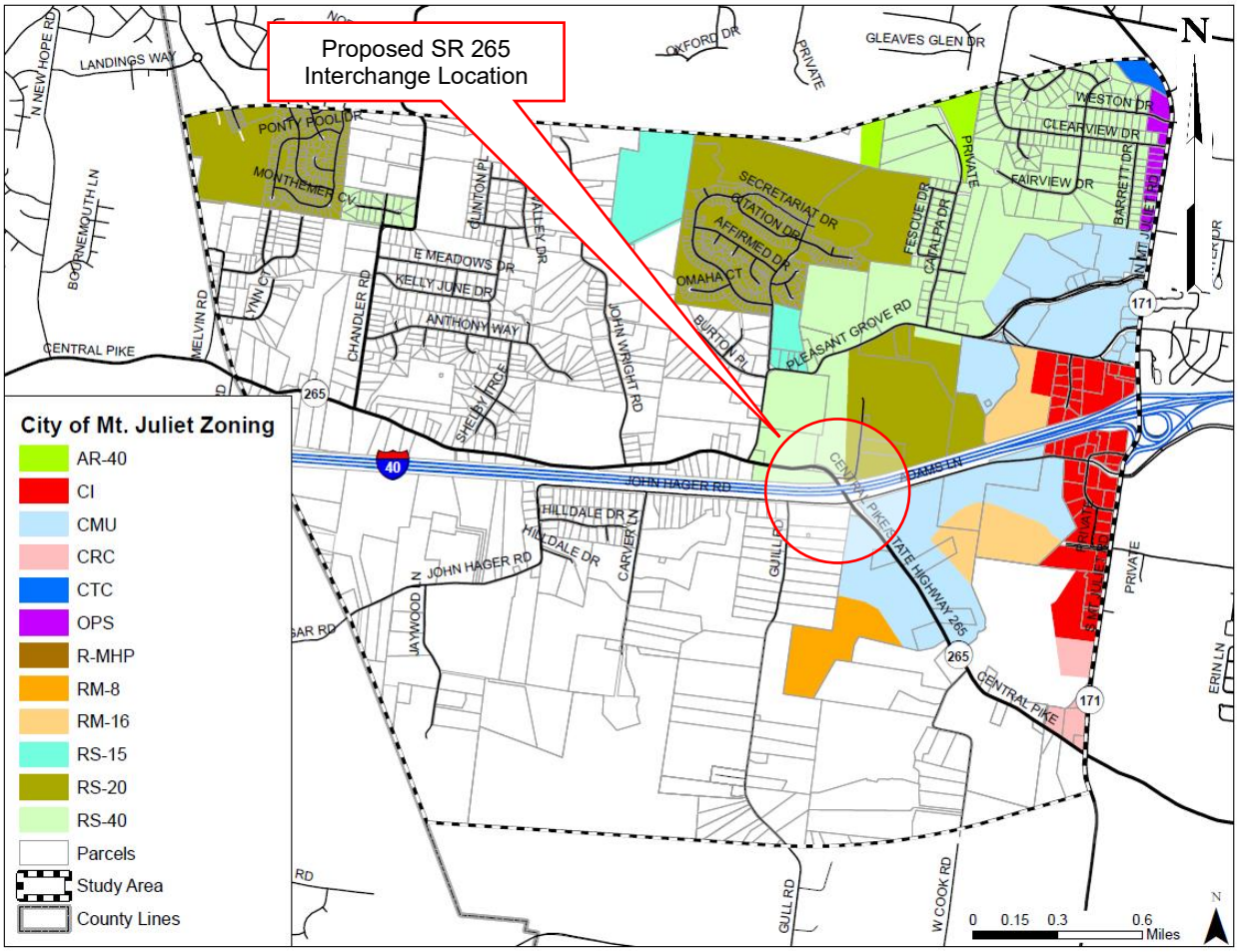


Source: FEMA Flood Maps: 47189C0142D, 47189C0145D

FIGURE 12: FEMA FLOOD MAP

2.4 EXISTING LAND USE AND ZONING

The segment of I-40 between SR 171 (Exit 226) and the proposed interchange with SR 265 is located within the city limits of the City of Mt. Juliet. **Figure 13** shows the zoning map of the study area. The zoning is characterized by a mix of agricultural and rural land, suburban residences, and a strong presence of large-scale retail development and commercial uses at the I-40/SR 171 Interchange and along SR 171.



Source: City of Mt. Juliet

FIGURE 13: ZONING MAP, MT. JULIET

3.0 FUTURE CONDITIONS

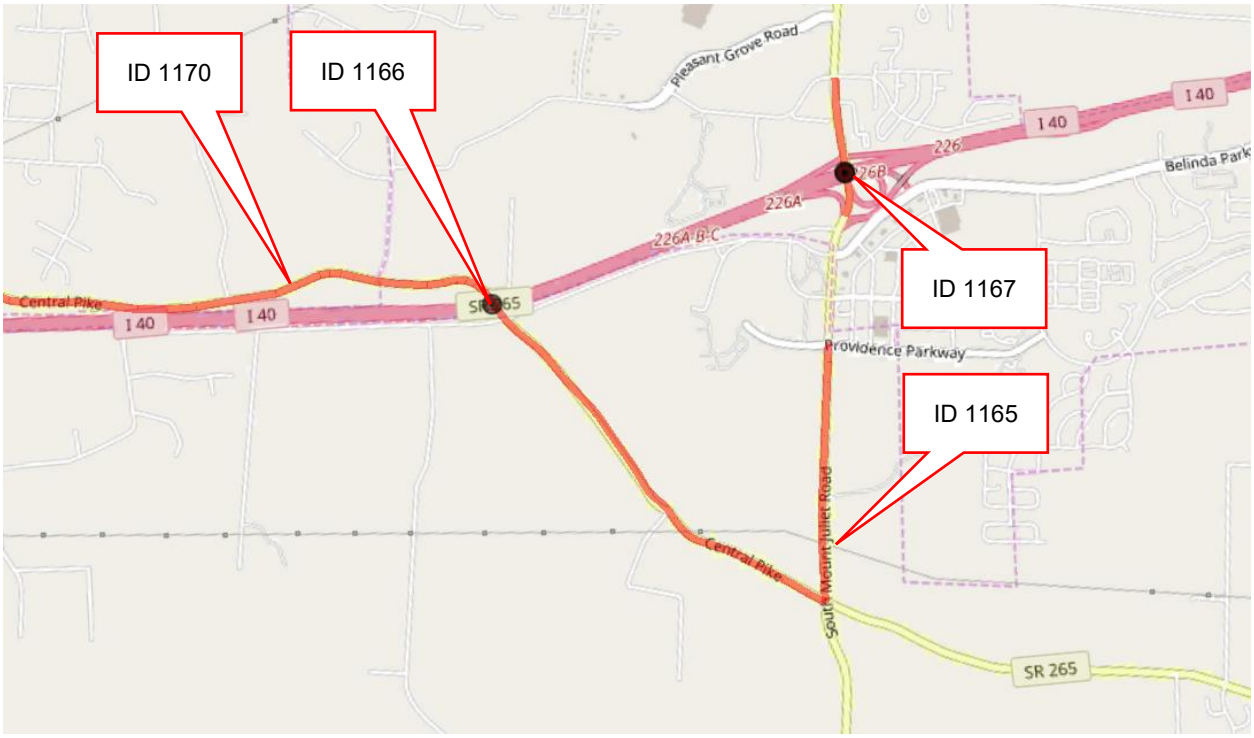
3.1 PLANNED TRANSPORTATION PROJECTS

Four projects are listed as cost-feasible in the Nashville Area MPO's 2040 Regional Transportation Plan (RTP), which was adopted in 2016. These projects are listed in **Table 2** and shown in **Figure 14**. The relevant RTP sheets are provided as **Attachment A**.

TABLE 2: MPO 2040 RTP COST-FEASIBLE PROJECTS

RTP ID	Project Type	Project Name and Description
1166	Interchange New	I-40 at SR 265 Interchange
1167	Roadway Widening	SR 171 at I-40 Bridge
1165	Roadway Widening	SR 171 widening, 2 to 5 lanes, from SR 265 to Providence Parkway
1170	Roadway Widening	SR 265 widening, 2 to 5 lanes, from SR 45 to SR 171

Source: Nashville Area MPO 2040 Regional Transportation Plan



Source: Nashville Area MPO KMZ file, Google Earth

FIGURE 14: MPO 2040 RTP COST-FEASIBLE PROJECTS

The Regional Transportation Plan-listed projects are summarized as follows:

- Project ID 1166 is the proposed I-40 at SR 265 Interchange that is the subject of this IAR.
- Project ID 1170 will widen SR 265 from its existing two lanes to five lanes (two lanes in each direction with a center two-way left-turn lane) between SR 45 and SR 171. The proposed I-40 at SR 265 Interchange is located within these limits. Project ID 1170 will connect to either end of the improvements proposed along SR 265 in this IAR.
- Project ID 1165 will widen SR 171 from two to five lanes from SR 265 to the existing five-lane section at Providence Parkway. The project is located 0.5 miles south of the Exit 226 (SR 171) Interchange.
- Project 1167 will widen SR 171 within the Exit 226 (SR 171) Interchange, including the bridge over I-40. This project will provide two continuous travel lanes along northbound SR 171 through the I-40 Interchange area. Both north and south of the I-40 Interchange, SR 171 has two northbound lanes. Within the interchange, one of the northbound lanes becomes a left-turn lane to I-40 Westbound. Therefore, only one northbound travel lane is present along SR 171 between the intersections with the I-40 Eastbound and Westbound ramps. This restricts flow along northbound SR 171 and creates a safety concern due to vehicular weaving.

TDOT identified the I-40/I-81 Corridor from Memphis to Bristol as a strategic statewide corridor through their statewide planning effort. In 2008, TDOT completed the *I-40/I-81 Corridor Feasibility*

Study. The study area for the I-40/I-81 corridor extends from Memphis to Bristol, a distance of about 550 miles. The purpose of the *I-40/I-81 Corridor Feasibility Study* was to gain a more detailed understanding of the deficiencies of the corridor and to develop corridor level multi-modal solutions to address these deficiencies. The study considered improvements to the I-40/I-81 corridor, investigated parallel arterials to I-40/I-81 that could be used for local travel, rail lines that could be candidates for freight diversion from the interstate, and considered major intermodal hubs located along the corridor. Two projects were listed in the *I-40/I-81 Corridor Feasibility Study* that are within this IAR's study area:

- I-40 from SR-46 (Exit 172) to Briley Parkway (Exit 204) and from Donelson Pike (Exit 216) to SR-840 (Exit 235)/ ITS Freeway Management
- I-40 from Mt. Juliet Rd (Exit 226) to SR-840 (Exit 235)/ Widen to 6 lanes

I-40 has since been widened to six or more lanes to within 2 miles of I-840 (formerly SR 840). ITS message board are now present along I-40 within the study area between SR 45 and SR 171. The *I-40/I-81 Corridor Feasibility Study* may be downloaded at:
http://www.tn.gov/tdot/article/i40-i81-corridor-study-library

The *Mt. Juliet Comprehensive Transportation Plan 2017* lists an interchange at I-40/SR 265 as a high priority project (see **Appendix A**). It also recommends improvements along SR 265 that include roadway widening with a shared-use/multimodal sidepath.

3.2 FUTURE LAND USE, ZONING, AND DEVELOPMENTS

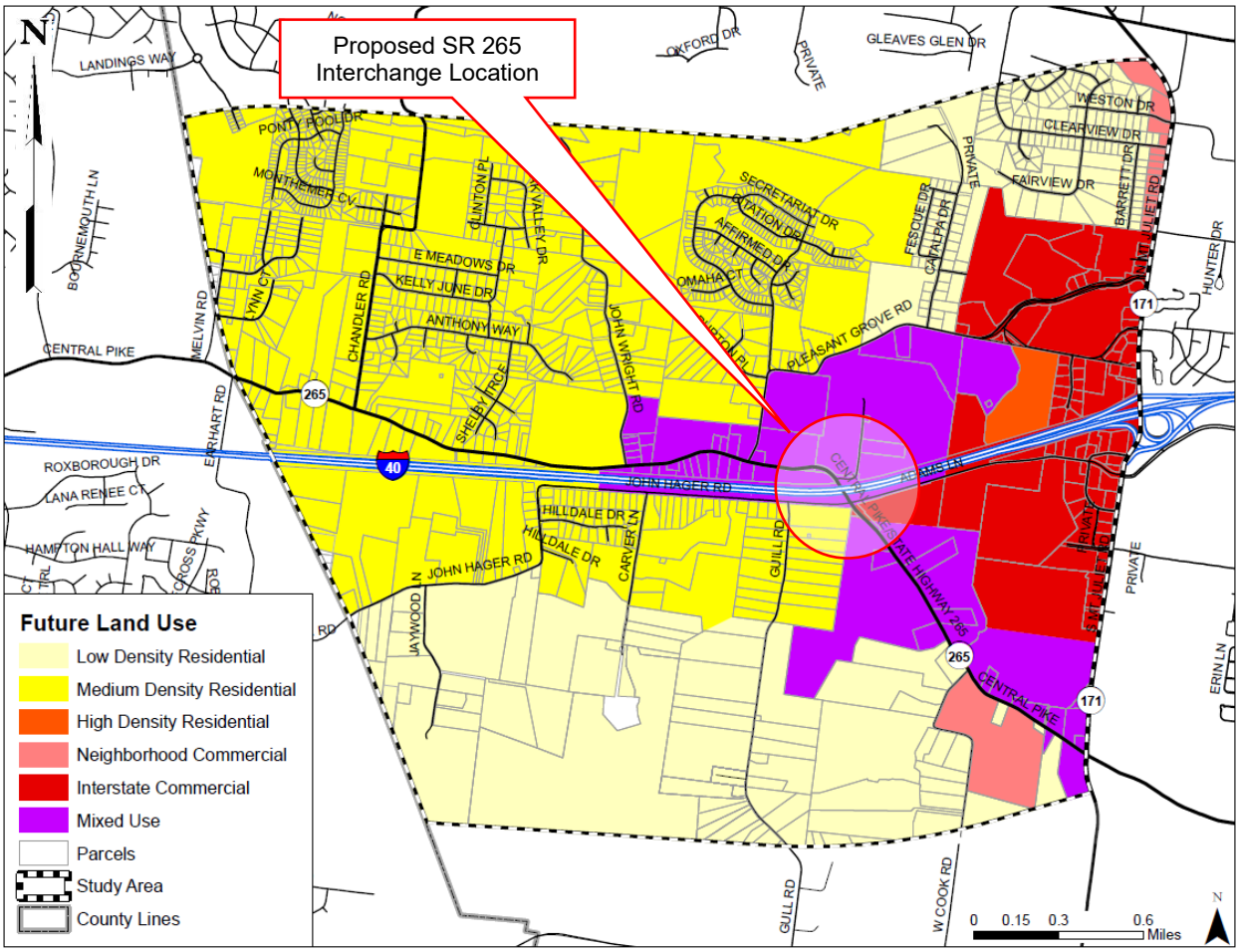
A map of the Future Land Use policy for the study area, assuming the construction of an interchange along I-40 at SR 265, is shown in **Figure 15**. A medium density development pattern is planned to continue mostly to the north of I-40 and a low-density development pattern is planned to continue primarily to the south of I-40 in the more rural area of Wilson County. A low-density development pattern will accommodate residential development with a density of 1.1 to 1.3 dwelling units per acre, whereas a medium density residential development pattern will accommodate a density range of 2.18 to 2.9 dwelling units per acre. Interstate commercial development at the Exit 226 (SR 171) Interchange will extend westward to SR 265, and mixed-use development is planned along SR 265 near the proposed I-40/SR 265 Interchange. Tillman Drive is located in this area, intersecting SR 265 within the footprint of the proposed I-40/SR 265 Interchange. Tillman Drive currently accesses two residences. With the zoning change, it would be expected to access more and should be relocated farther from the proposed interchange. High-density development, which is suitable for multi-family dwellings with a density range of 4.36 to 16.0 dwelling units per acre, is currently being built off Old Pleasant Grove Road, just south of Pleasant Grove Road. A neighborhood commercial type development is expected to extend along SR 171 to the north of Pleasant Grove Road and off SR 265 between Southwest Cook Road and SR 171. These commercial areas are envisioned as smaller, neighborhood retail concentrations that serves the surrounding communities with convenience shopping goods.

Providence Central is an approved master development plan in the City of Mt. Juliet that will be located across from the existing Providence Marketplace, spanning to the west of SR 265 across a 275-acre tract of land that is zoned Commercial Mixed Use (see **Figure 16**). The master plan includes a mixture of high-end office, retail and residential uses. The majority of it will be office and retail, which will front SR 265. Two sections are set aside for high density residential, and a small portion to the west of SR 265 will be for single-family homes. The first phase will be an extension of Providence Parkway to the west, which will provide improved access to the high-density living area that has already been constructed. The next phase will connect Adams Lane

to the extended Providence Parkway and finish in the office and retail space around Adams Lane, which will curve southwest, and another high-density living area. The last phase will fill in the rest, including the proposed SR 265 Interstate Exit and widening of SR 265 to five lanes. Utilities are currently in place to support the Providence Central development. A benefit of this development is it will relocate Adams Lane to the extension of Providence Parkway. The relocated roadway will be farther from the proposed SR 265/I-40 Interchange.

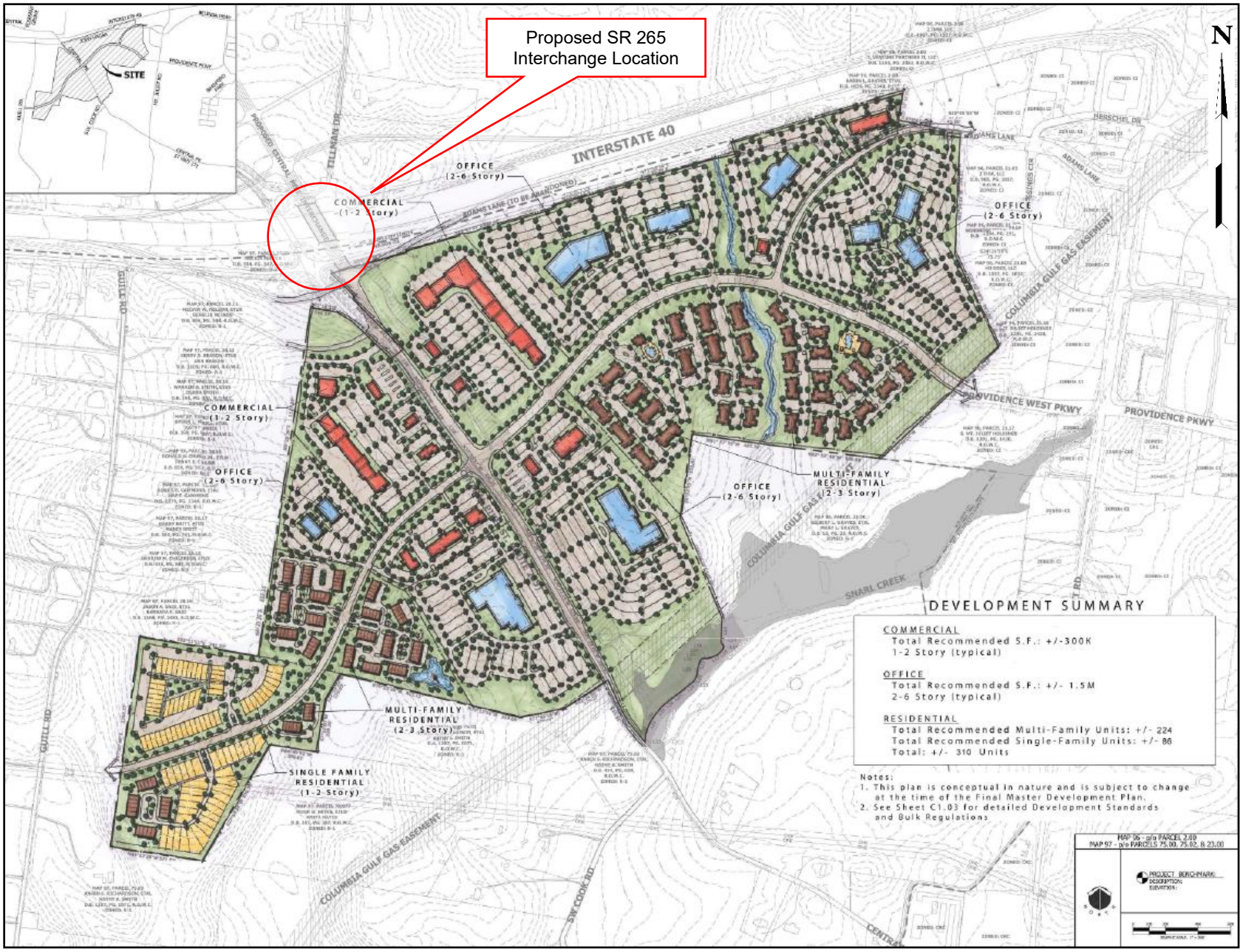
To assist with the coordination of the planned projects and developments within the study area, the City of Mt. Juliet initiated the *Central Pike Subarea Study*. This study guides access control measures and development decisions in the area surrounding SR 265 to ensure the proposed interchange functions optimally. **Appendix B** contains *Central Pike Subarea Study*.

Several additional developments have been approved near the study area that will have an impact on future traffic volumes. The locations of these developments are shown in **Figure 17**.



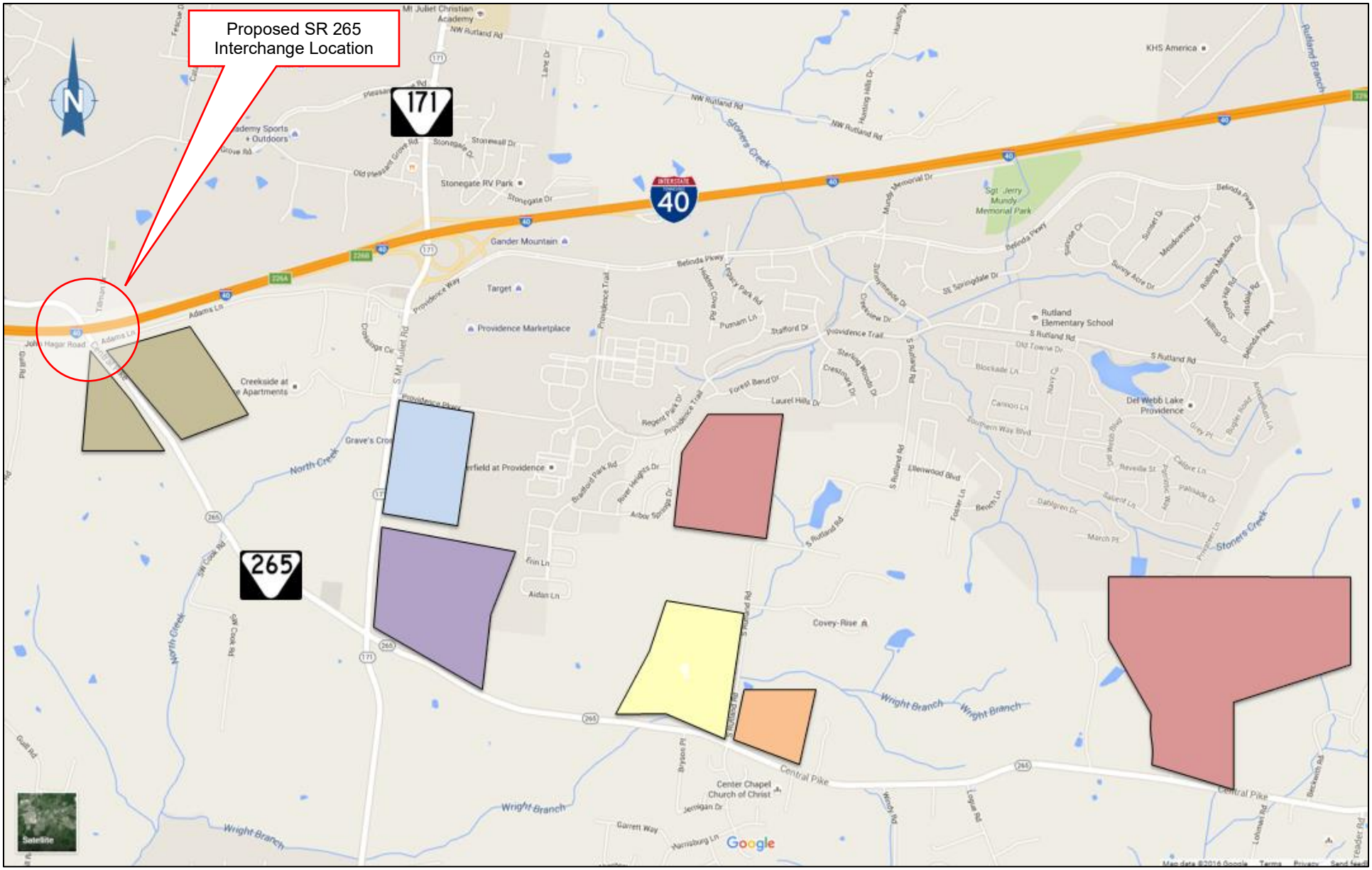
Source: City of Mt. Juliet 2008 Land Use and Transportation Plan

FIGURE 15: FUTURE LAND USE PLAN



Source: City of Mt. Juliet

FIGURE 16: DEVELOPMENT PLAN ALONG CENTRAL PIKE



Source: City of Mt. Juliet

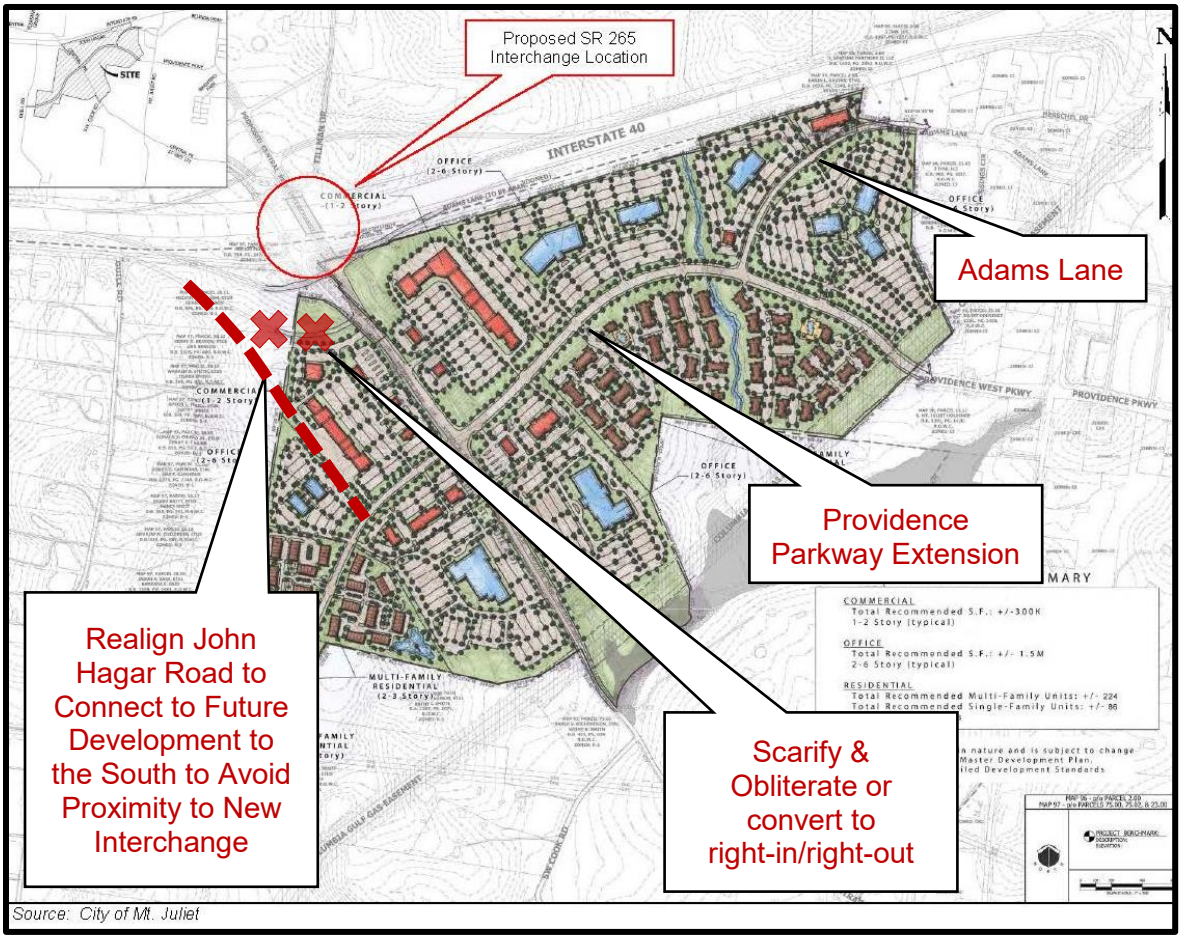
FIGURE 17: ADDITIONAL APPROVED DEVELOPMENTS NEAR THE STUDY AREA

3.3 FUTURE STREET NETWORK NEAR THE PROPOSED INTERCHANGE

SR 265 is planned to be widened from SR 45 to SR 171. The zoning surrounding the proposed interchange is such that higher-density development is expected with the construction of a new interchange. The City of Mt. Juliet will initiate access management strategies to preserve the functionality of the proposed interchange as improvements are made to SR 265 and as the city approves developments. Those measures include the construction of a raised median along SR 265 that will extend 1,200 feet from both sides of the interchange. The raised median will not permit left turns from SR 265, and will limit side road and driveways along SR 265 to right-in/right-out operations. The City of Mt. Juliet has committed in writing to require access management along SR 265 (see **Attachment B**).

John Hagar Road and Adams Lane currently intersect with SR 265 within the footprint of a proposed interchange. These roadways will be realigned as part of the interchange project to connect to SR 265 approximately 1,000 feet South of I-40. As future development occurs, the city plans to extend Providence Parkway from SR 171 to SR 265. The future intersection of the Providence Parkway Extension with SR 265 will be to the south of the future access management median along SR 265. Existing Adams Lane (including the portion realigned with the interchange construction) will be realigned to connect to the Providence Parkway Extension. The existing roadway will be scarified and obliterated. A planned development scenario with roadway realignment is shown in **Figure 18**.

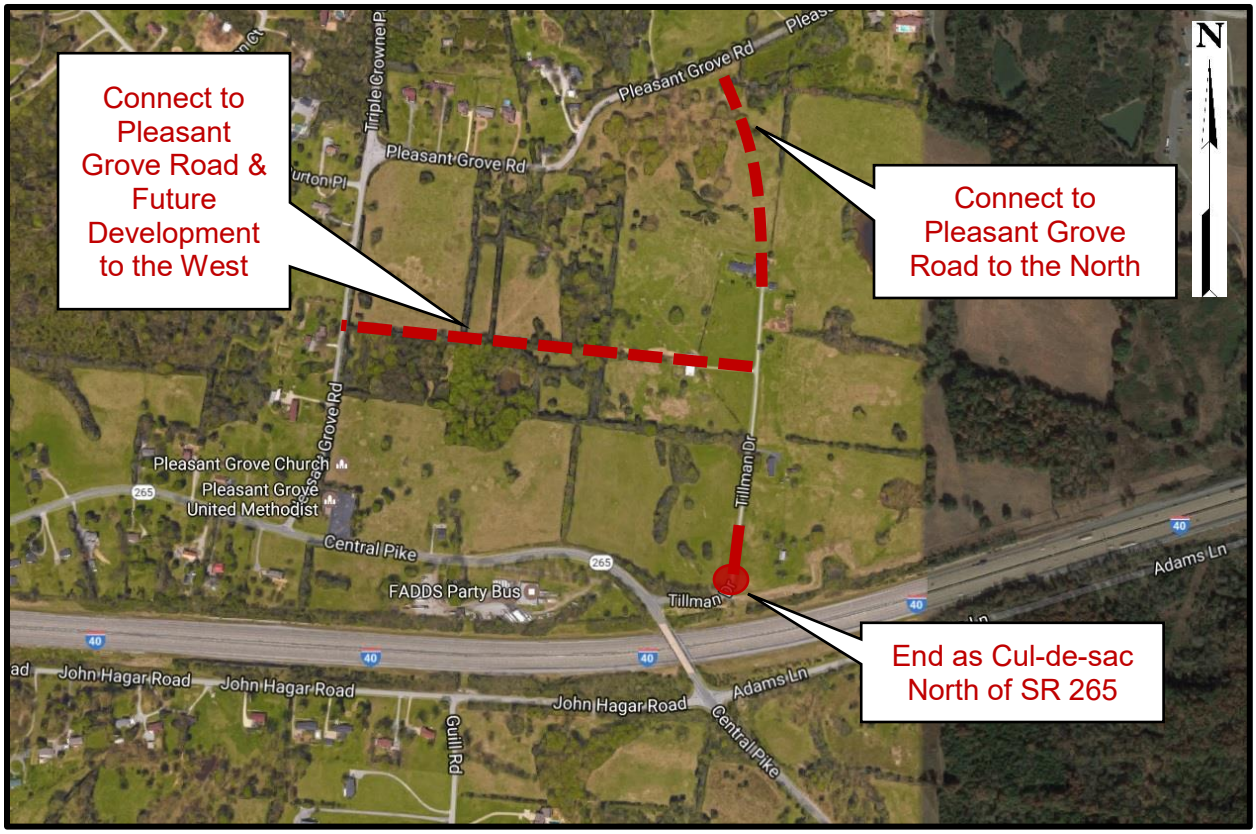
On the west side of SR 265, John Hagar Road will be realigned to the south. John Hagar Road (including the portion realigned with the interchange construction) will be realigned to connect to SR 265 across from the proposed Providence Parkway Extension. The existing roadway will either be scarified and obliterated, or converted to right-in/right/out operations at SR 265. A planned development scenario with roadway realignment is shown in **Figure 18**.



Adapted from: State Route 265 Subarea Study (2017)

FIGURE 18: PLANNED ROADWAY REALIGNMENTS SOUTH OF I-40

North of I-40, Tillman Drive intersects SR 265 within the footprint of a proposed interchange. Tillman Drive currently access two residences. However, the land is zoned mixed-use and can reasonably be expected to service much denser development in the future. Tillman Drive will be realigned as part of the interchange project approximately 1,200 feet northwest of I-40. The realignment places relocated Tillman Drive outside the future 1,200-foot access management zone from the interchange. As future development occurs, Tillman Drive could be connected to Pleasant Grove Road in order to reduce access points along SR 265 and provide improved access management. A potential development scenario with roadway realignment is shown in **Figure 19**.



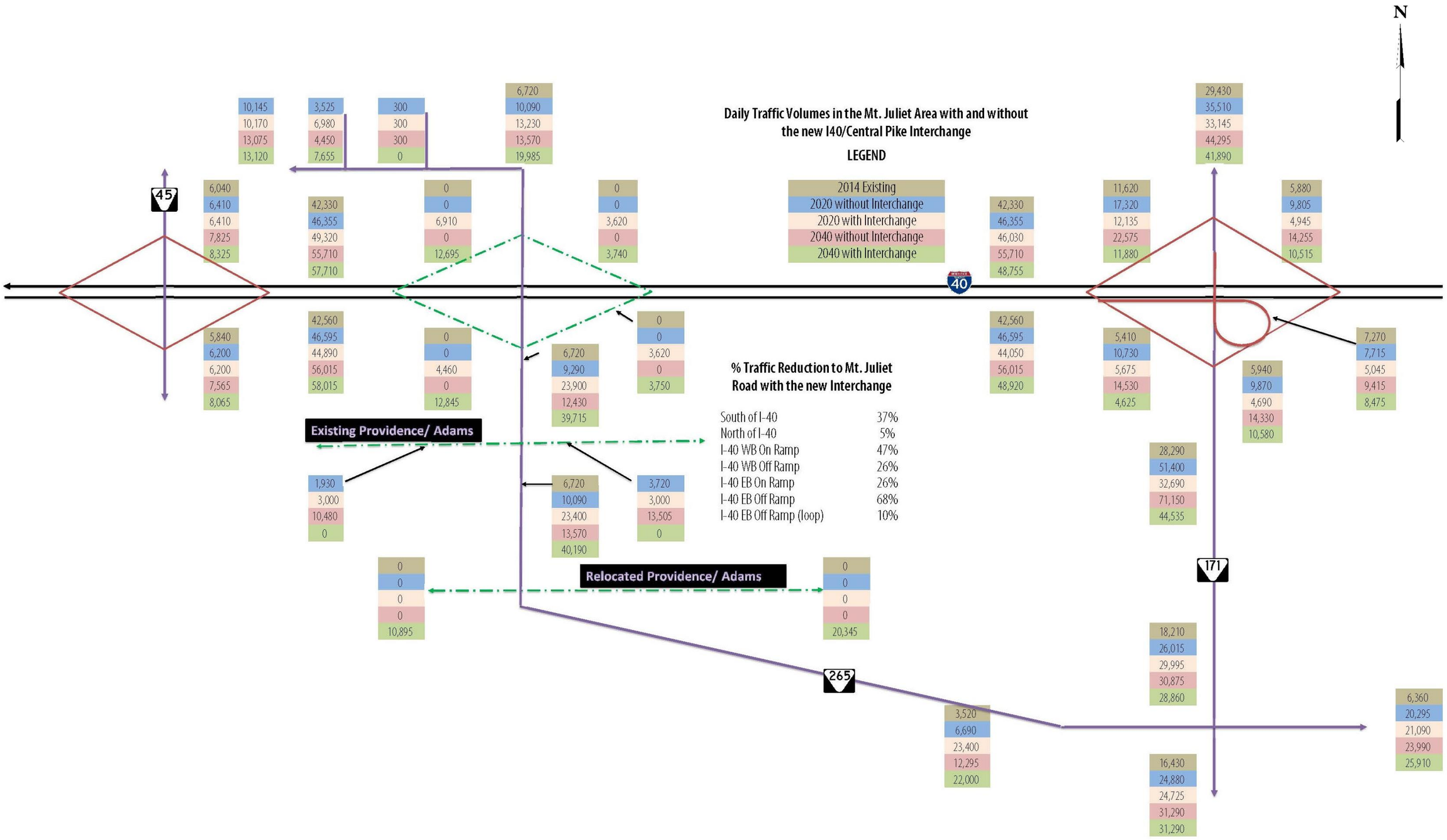
Source: State Route 265 Subarea Study (2017)

FIGURE 19: PLANNED ROADWAY REALIGNMENTS NORTH OF I-40

4.0 TRAFFIC PROJECTIONS

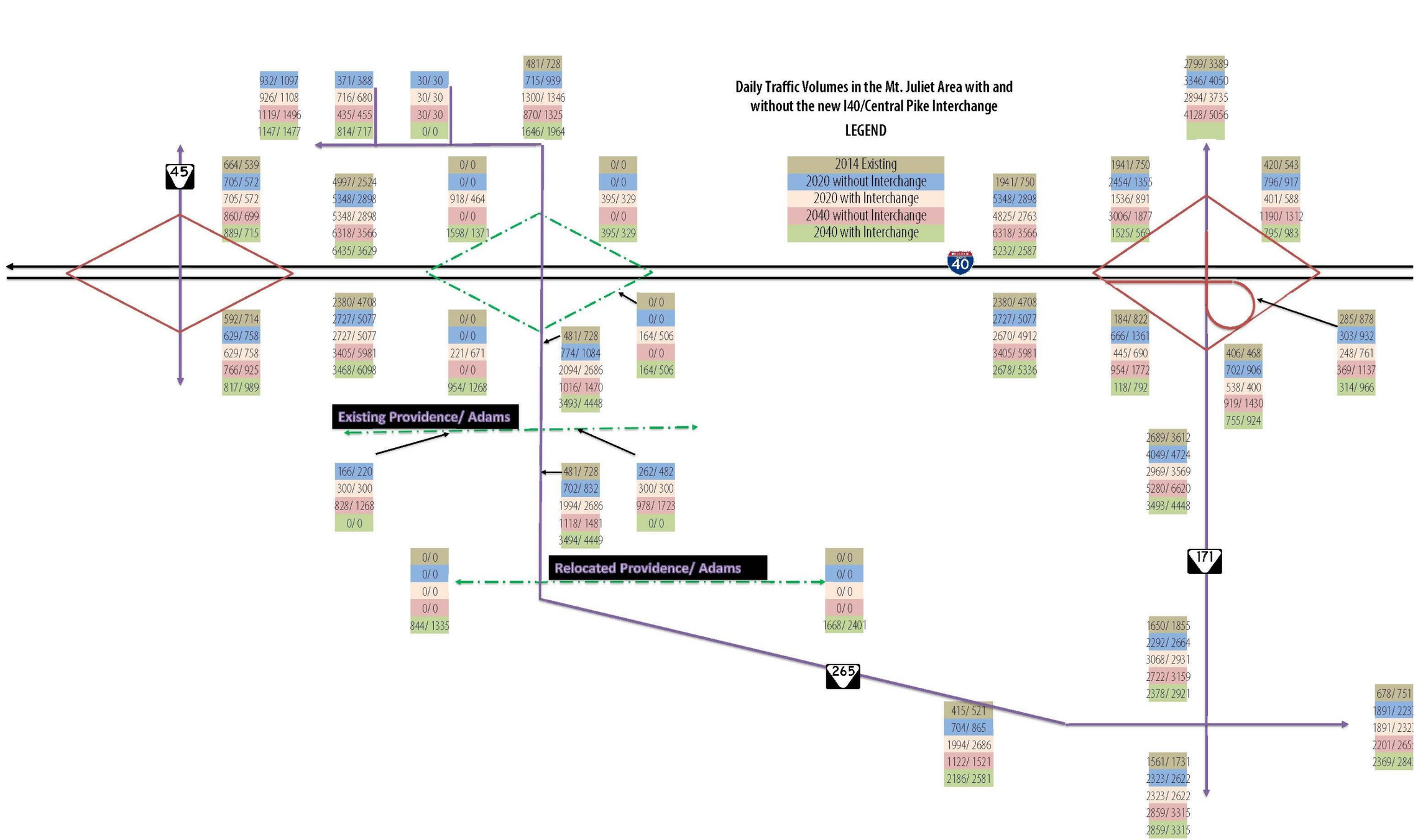
Gresham, Smith and Partners conducted a preliminary traffic forecasting study to support the I-40 at SR 265 (Central Pike) Interchange Access Request (IAR). This preliminary traffic forecasting study was based on the traffic volumes projected by the Nashville Area MPO's travel demand model (TDM). Based on additional information received from the City of Mt. Juliet, the preliminary traffic forecasting study was updated to reflect the traffic generated by the various approved developments that would influence traffic within the study area (see **Figure 16** and **Figure 17**). The year 2020 and 2040 Average Annual Daily Traffic (AADT) and the Design Hour Volumes (DHV) for the AM and PM peak hours utilized in this IAR therefore incorporate data from both the MPO's TDM, developments approved subsequent to the development of the TDM, and developments with a high likelihood to be constructed pending construction of a new I-40 Interchange at SR 265. The traffic forecasting study is located in **Appendix C.**

Figure 20 through **Figure 23** summarize the results of the traffic forecasting effort. **Figure 20** provides a summary of the daily traffic volumes with and without the proposed I-40 Interchange at SR 265. **Figure 21** provides a summary of the hourly traffic volumes with and without the proposed I-40 Interchange at SR 265. As can be seen in these two figures, without a new interchange along I-40 at SR 265, the highest growth in traffic will occur to the south and west of SR 171. **Figure 22** summarizes the turning movement volumes at the study area interchanges without the proposed I-40 at SR 265 Interchange. **Figure 23** summarizes the turning movement volumes at the study area interchanges with the proposed I-40 at SR 265 Interchange. The proposed interchange is predicted to pull considerable traffic volumes from critical turning movements along SR 171.



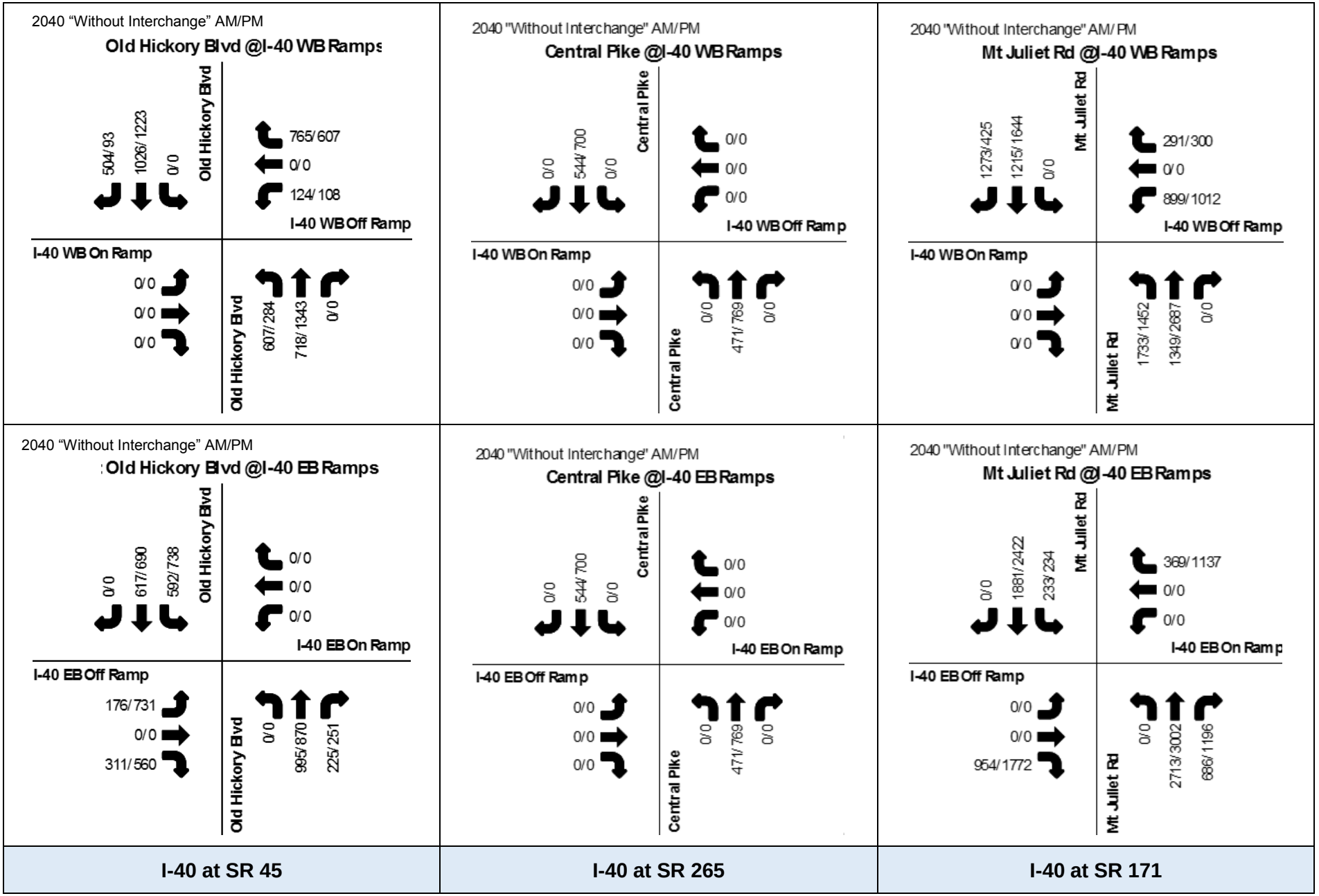
Source: Gresham, Smith and Partners Traffic Forecasting Study (Appendix A)

FIGURE 20: DAILY TRAFFIC VOLUMES WITH AND WITHOUT THE NEW I-40/SRS 265 INTERCHANGE



Source: Gresham, Smith and Partners Traffic Forecasting Study (Appendix A)

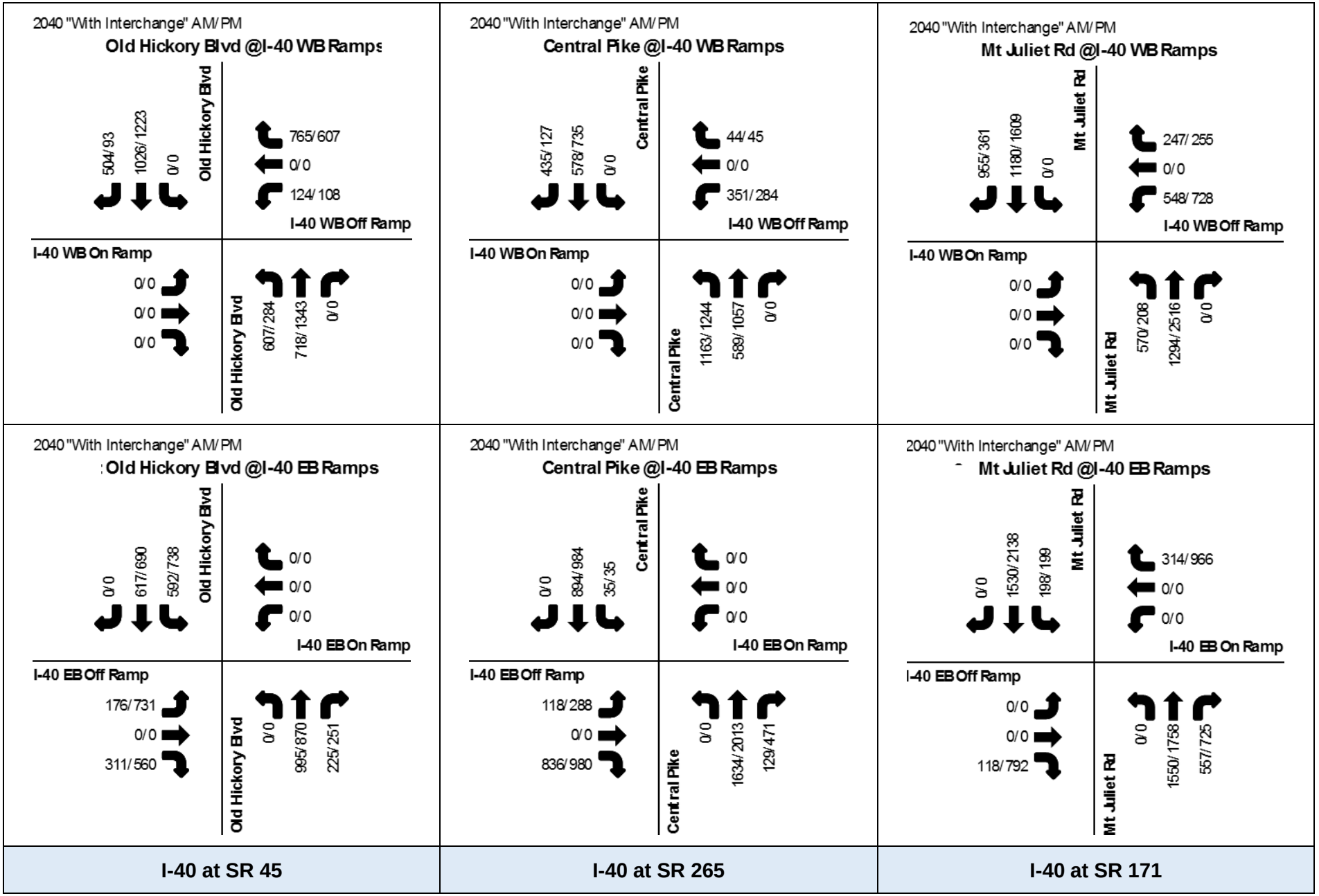
FIGURE 21: PEAK HOUR (AM/ PM) TRAFFIC VOLUMES WITH AND WITHOUT THE PROPOSED I-40/SR 265 INTERCHANGE



I-40 at SR 45	I-40 at SR 265	I-40 at SR 171

Source: Gresham, Smith and Partners

FIGURE 22: 2040 PEAK HOUR (AM/ PM) INTERSECTION TURNING MOVEMENT VOLUMES WITHOUT SR 265 INTERCHANGE



Source: Gresham, Smith and Partners

FIGURE 23: 2040 PEAK HOUR (AM/ PM) INTERSECTION TURNING MOVEMENT VOLUMES WITH SR 265 INTERCHANGE

5.0 CONCEPTUAL ALTERNATIVES

5.1 NO BUILD ALTERNATIVE

The No Build Alternative, as described in **Section 2.0 Existing Conditions**, serves as a baseline for the demand of the region. The traffic demand in the area would continue to be served primarily by the Exit 226 (SR 171) Interchange. This interchange currently experiences congestion and poor traffic operations. The Exit 226 (SR 171) Interchange is shown in **Figure 24**.



FIGURE 24: NO BUILD ALTERNATIVE - EXIT 226 (SR 171) INTERCHANGE

5.2 BUILD ALTERNATIVES

Two build alternatives are proposed in this IAR: a Diamond Interchange, and a Diverging Diamond Interchange (DDI). Both build alternatives provides access between I-40 and SR 265. They will alleviate traffic demand on the existing interchange at Exit 226 (SR 171). They both provide twelve-foot travel lanes, a five-foot wide sidewalk along the westbound side of SR 265 and a twelve-foot wide shared-use path along the east side of SR 265. Grass strips/pedestrian buffers will be provided between the roadway's curb and the sidewalk/shared use-path. These multimodal accommodations are consistent with the city's *Comprehensive Transportation Plan 2017* (see **Appendix A**). All signalized intersections will include crosswalks, curb ramps, and pedestrian countdown signals. SR 265 will be an urban design with curb and gutter and raised median. Many mixed-use developments with residential units are planned within and adjacent to the study area. Pedestrian and bicyclist accommodations are therefore important to the City of Mt. Juliet.

The Conceptual Layouts include initial connections for Tillman Drive, Adams Lane and John Hagar Road to connect to SR 265. These roadways will be relocated even farther from the proposed interchange in separate, development-driven, projects to conform with planned land use changes that are contingent upon construction of the SR 265 interchange. Additionally, the city has committed to providing access control along SR 265, extending 1,200 feet north and south of the interchange (see **Attachment B**). The access management measures will consist of a raised median along SR 265 and only right-in/right-out access within these limits. The access management measures will be installed concurrent with future development. Existing Adams Lane, John Hagar Road, and Tillman Drive will be relocated outside of the 1,200-foot access control limits (or converted to right-in/right/out operations), also concurrent with the future developments. This will ensure the proposed interchange functions optimally into the future. Additional information is provided in **Section 3.0**. The *Central Pike Subarea Study* also provides guidance concerning access control measures and roadway improvements along SR 265 and other roads within the study area to accommodate future developments (see **Appendix B**).

The build alternatives will transition to SR 265's existing two-lane cross section away from the functional area of the interchange. The transition areas will not include curb and gutter or sidewalks/shared-use paths. The future SR 265 improvement project that will extend from SR 45 to SR 171 (Nashville MPO RTP Project #1170) will construct these elements with full widening of the corridor.

5.3 DIAMOND INTERCHANGE BUILD ALTERNATIVE

Figure 25 provides a schematic diagram of the Diamond Interchange Build Alternative. Conceptual Layouts of the alternative are provided in **Section 10**. Conceptual Signing Plans for the interstate are provided in **Section 11**.

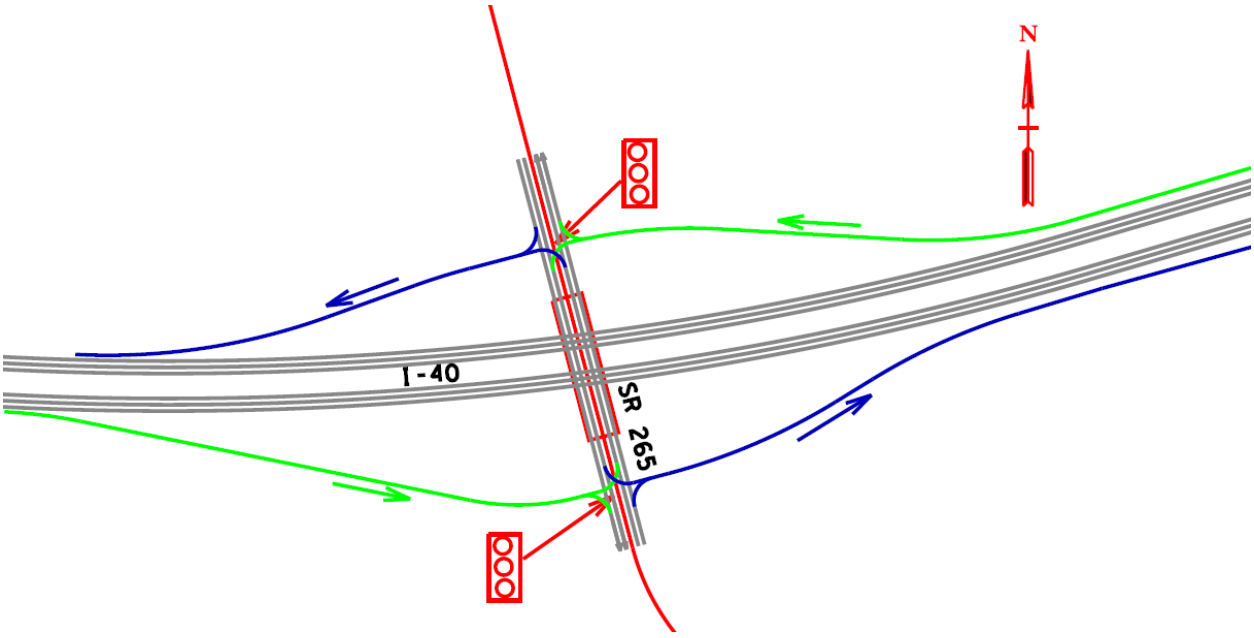


FIGURE 25: PROPOSED MOVEMENTS FOR DIAMOND INTERCHANGE BUILD ALTERNATIVE

The following are recommended as part of Diamond Interchange Build Alternative:

SR 265 Northbound:

- SR 265 Northbound will transition from one (1) existing lane to two (2) through lanes south of the interchange. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.
- Two (2) lanes will enter from the signalized intersection with John Hagar Road/Adams Lane.
- At the signalized intersection with the eastbound I-40 Ramps, SR 265 will have three (3) through lanes and one (1) right turn lane with 1,000 feet of storage.
- At the signalized intersection with the westbound I-40 Ramps, SR 265 will have two (2) left turn lanes entering westbound I-40 with approximately 300 feet of storage each and two (2) through lanes.
- East of the intersection with Pleasant Grove Road, SR 265 will transition from two (2) through lanes to one (1) through lane. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.

SR 265 Southbound:

- SR 265 southbound will transition from one (1) existing lane to two (2) through lanes north of the interchange. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.
- At the intersection with the westbound I-40 Ramps, SR 265 will have two (2) through lanes and a right turn lane with approximately 250 feet of storage.
- At the signalized intersection with the eastbound I-40 Ramps, SR 265 will have one (1) southbound left turn lane entering eastbound I-40 with approximately 180 feet of storage and two (2) through lanes.
- At the intersection with John Hagar Road/Adams Lane, SR 265 will transition from two (2) through lanes to one (1) through lane. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.

I-40 Eastbound Off-Ramp:

- The eastbound I-40 to SR 265 single lane exit will transition to three (3) lanes on the ramp, becoming a single left turn lane for the movement to northbound SR 265 and a dual right turn lane for the movement to southbound SR 265.
- The single left turn lane will provide approximately 700 feet of storage and will be under signal control.
- The two (2) right turn lanes will provide approximately 1,000 feet of storage (the leftmost right turn lane will provide 700 feet of storage and the rightmost right turn lane will provide 300 feet of storage). The right turn lanes will be under signal control with permitted right turns on red.

I-40 Eastbound On-Ramp:

- Southbound SR 265 will have a single left turn lane proceeding to the one (1) lane I-40 Eastbound On-Ramp.
- Northbound SR 265 will have a single right turn lane that will yield onto the single lane ramp.
- The ramp continues for approximately 900 feet as a single lane ramp. The existing deceleration lane from Exit 226 (SR 171) will be extended into an auxiliary lane between SR 265 and the eastbound Exit 226 (SR 171) Off-Ramp.
- The proposed auxiliary lane along I-40 is approximately 2,400 feet where traffic from SR 265 will weave across one lane to continue on to eastbound I-40.

I-40 Westbound Off-Ramp:

- An auxiliary lane will be constructed along westbound I-40 between the existing acceleration lane from Exit 226 (SR 171) to the single lane westbound SR 265 Off-Ramp. The proposed auxiliary lane along I-40 is approximately 2,400 feet.
- The westbound I-40 to SR 265 single lane off-ramp will then transition to three (3) lanes, becoming a double left turn lane to go south on SR 265 and a single right turn lane to go north on SR 265.
- The three (3) turn lanes will each provide approximately 300 feet of storage and will be under signal control.

I-40 Westbound On-Ramp:

- Northbound SR 265 will have a dual left turn lane proceeding to the two (2) lane I-40 Westbound On-Ramp.
- Southbound SR 265 will have a 400-foot right turn lane proceeding to the two (2) lane I-40 Westbound On-Ramp.
- The ramp continues for approximately 735 feet as a two (2) lane ramp before transitioning to a single lane ramp.
- The on-ramp will have an acceleration lane of approximately 1,000 feet and then merge into westbound I-40.

5.4 DIVERGING DIAMOND INTERCHANGE (DDI) BUILD ALTERNATIVE

Figure 26 provides a schematic diagram of the DDI Build Alternative. Conceptual Layouts of the alternative are provided in **Section 10**. Conceptual Signing Plans for the interstate are provided in **Section 11**.

SR 265 is anticipated to have heavy movements from northbound SR 265 to westbound I-40 towards Nashville. The layout of the DDI allows free flow left turns. This free flow movement allows the layout of the proposed bridge across I-40 to be reduced by one travel lane in comparison to the traditional Diamond Interchange.

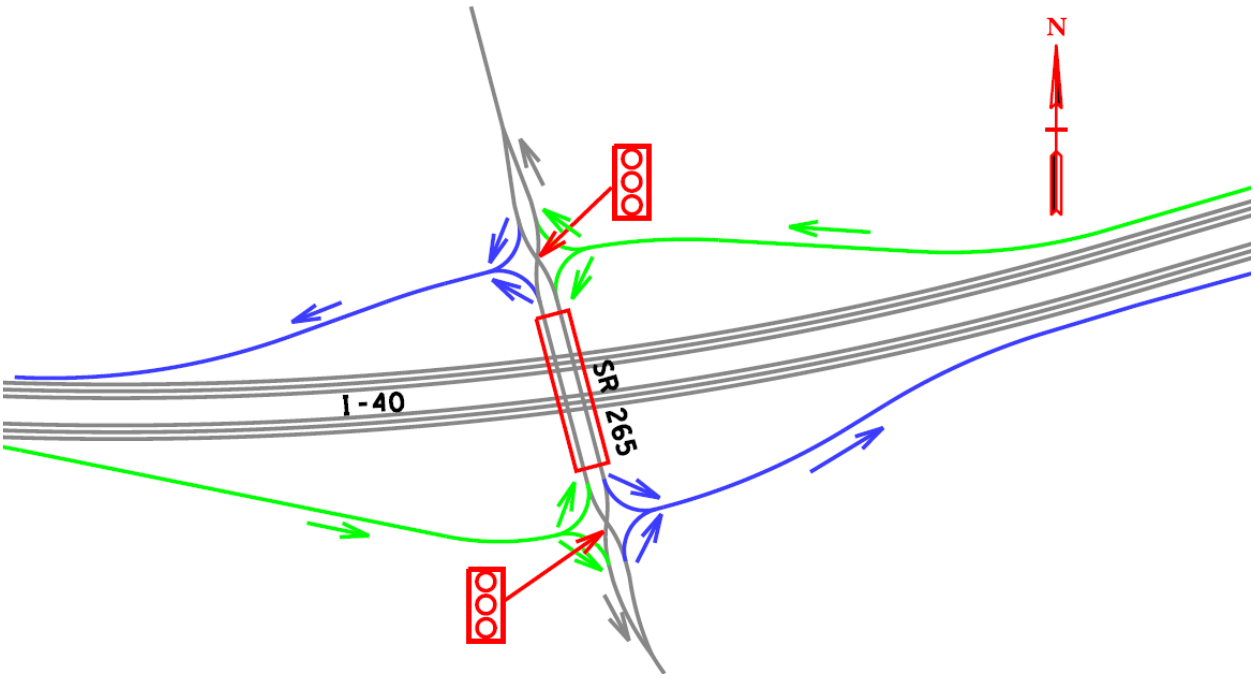


FIGURE 26: PROPOSED MOVEMENTS FOR DDI BUILD OPTION

The following are recommended as part of the DDI Build Alternative:

SR 265 Northbound:

- SR 265 Northbound will transition from one (1) existing lane to two (2) through lanes south of the interchange. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.
- Two (2) lanes will enter from the signalized intersection with John Hagar Road/Adams Lane.
- At the signalized crossover intersection with the eastbound I-40 Ramps, SR 265 will have three (3) through lanes.
- Three (3) through lanes will be carried across the northbound SR 265 Bridge.
- The three (3) through lanes will diverge such that two (2) lanes proceed to westbound I-40 and two (2) lanes proceed north along SR 265.
- At the signalized crossover intersection with the westbound I-40 Ramps, SR 265 will have two (2) through lanes.
- East of the intersection with Pleasant Grove Road, SR 265 will transition from two (2) through lanes to one (1) through lane. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.

SR 265 Southbound:

- SR 265 southbound will transition from one (1) existing lane to two (2) through lanes north of the interchange. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.
- At the crossover intersection with the westbound I-40 Ramps, SR 265 will have two (2) through lanes.
- At the crossover intersection with the eastbound I-40 Ramps, SR 265 will have two (2) through lanes. The eastbound I-40 On-Ramp will depart SR 265 by diverging into a single ramp.
- At the intersection with John Hagar Road/Adams Lane, SR 265 will transition from two (2) through lanes to one (1) through lane. As noted in **Section 3.0 Future Conditions**, SR 265 is planned to be widened, and will eventually create a continuous five-lane typical section between SR 45 and SR 171.

I-40 Eastbound Off-Ramp:

- The eastbound I-40 to SR 265 single lane exit will transition to three (3) lanes on the ramp, becoming a single left turn lane for the movement to northbound SR 265 and a dual right turn lane for the movement to southbound SR 265.
- The single left turn lane will provide approximately 275 feet of storage and will be under signal control.
- The two (2) right turn lanes will provide over 1,000 feet of storage each and will be under signal control with permitted right turns on red.

I-40 Eastbound On-Ramp:

- Southbound SR 265 will have a single free-flow left turn lane proceeding to merge onto the one (1) lane I-40 Eastbound On-Ramp.
- Northbound SR 265 will have a single right turn lane that will yield onto the single lane ramp.
- The ramp continues for approximately 365 feet as a single lane ramp. The existing deceleration lane from Exit 226 (SR 171) will be extended into an auxiliary lane between SR 265 and the eastbound Exit 226 (SR 171) Off-Ramp.
- The proposed auxiliary lane along I-40 is approximately 2,800 feet where traffic from SR 265 will weave across one lane to continue on to eastbound I-40.

I-40 Westbound Off-Ramp:

- An auxiliary lane will be constructed along westbound I-40 between the existing acceleration lane from Exit 226 (SR 171) to the single lane westbound SR 265 Off-Ramp. The proposed auxiliary lane along I-40 is approximately 2,400 feet.
- The westbound I-40 to SR 265 single lane off-ramp will then transition to two (2) lanes, becoming a single left turn lane to go south on SR 265 and a single right turn lane to go north on SR 265.

- The single left turn lane will provide approximately 300 feet of storage and will be under signal control.
- The single right turn lane will provide approximately 350 feet of storage and will be under yield control.

I-40 Westbound On-Ramp:

- Northbound SR 265 will have dual left turn lanes proceeding to merge onto the two (2)-lane I-40 Westbound On-Ramp.
- Southbound SR 265 will have a single right turn lane that merges into the two (2)-lane I-40 Westbound On-Ramp.
- The ramp continues for approximately 600 feet as a two (2)-lane ramp before transitioning to a single lane ramp.
- The on-ramp will have an acceleration lane of approximately 1,000 feet and then merge into westbound I-40.

5.5 ALTERNATIVES EXAMINED, BUT NOT CARRIED FORWARD

One additional interchange configuration alternative was evaluated as part of this study, but not carried forward to concept development. Additionally, Transportation Systems Management (TSM) options were considered, but not carried forward.

DIAMOND INTERCHANGE WITH ROUNDABOUTS AT RAMP TERMINALS

This alternative would have proposed a new interchange along I-40 at SR 265, similar to the Diamond Interchange and DDI Build Alternatives. It would have alleviated traffic demand at Exit 226 (SR 171) similar to the two build alternatives. The alternative proposed a diamond interchange configuration with roundabouts at the two I-40 Ramp intersections with SR 265. Multilane roundabouts would have been required due to the traffic demand. This alternative was eliminated by TDOT in early project screening. A schematic diagram of this alternative is provided in **Appendix D**.

TSM ALTERNATIVE

The TSM approach to congestion mitigation seeks to identify improvements to enhance the capacity of existing transportation systems. Through better management and operation of existing transportation facilities, these techniques are designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety. TSM strategies are low-cost but effective in nature, minimizing the need for major construction/reconstruction projects.

Many TSM strategies are already implemented within or near the study area, including High Occupancy Vehicle (HOV) lanes, Intelligent Transportation Systems (ITS) along I-40, signal optimization along arterials, and transit service. A Park and Ride lot is located nearby along Belinda Parkway, near I-40. The Music City Star Commuter Rail Line provides access between Mt. Juliet and Nashville. An Adaptive Signal Control Technology (ASCT) project was installed in 2016 along SR 171. The ASCT project includes the eight signalized intersections located along SR 171 between Graves Crossing (located 0.7 miles south of I-40) and Pleasant Grove Road (located 0.5 miles north of I-40). The ASCT project provides optimized signal timings along the SR 171 corridor that can instantly adapt to changing traffic patterns.

With these strategies in place, the Exit 226 (SR 171) Interchange still experiences high traffic demand and poor operations. The SR 171 Bridge over I-40 is planned to be widened to provide two continuous travel lanes in the northbound direction (Nashville MPO RTP Project #1167). However, these nor other additional TSM strategies have been identified that would accommodate future traffic demands in the area and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. The proposed SR 265 Interchange will provide an important connection between I-40 and SR 265, which provides access to many existing and proposed commercial and residential developments in Mt. Juliet and Wilson County. It will serve to relieve traffic at the Exit 226 (SR 171) Interchange. The proposed SR 265 Interchange will complement the ongoing TSM strategies in the area. It will not prohibit nor conflict with these existing strategies.

6.0 TRAFFIC ANALYSIS

6.1 CAPACITY ANALYSIS METHODOLOGY AND ASSUMPTIONS

Merge, diverge, and weave capacity analyses were developed for the I-40 Ramp areas for the three alternatives under consideration: the No Build Alternative, a Diamond Interchange Alternative, and a DDI Alternative. These analyses were developed using Highway Capacity Manual (HCM 2010) methodology as implemented through the Highway Capacity Software 2010 (HCS 2010).

Intersection capacity and queue analyses were developed along SR 45, SR 265, and SR 171 for the three alternatives under consideration. These analyses were developed using HCM 2010 methodology as implemented through the Synchro 9 traffic analysis software and its corresponding traffic simulation software, SimTraffic.

The capacity and queue analyses were performed for AM and PM peak hour conditions for the three alternatives. The traffic for the years 2020 and 2040 were analyzed. The year 2020 is estimated as "opening day" for the proposed project and provides a baseline condition for the No Build Alternative. The year 2040 is the Design Year for the proposed project, and provides an estimate of future conditions if the No Build Alternative is selected. The year 2040 is the Design Year, and provides a basis to select and analyze an alternative for operations through its anticipated lifespan. The traffic analysis for the year 2020 and 2040 No Build Alternative assumes no geometric improvements within the study area. The traffic analysis for the year 2020 Build Alternatives assume an interchange along SR 265 is constructed, along with only those roadway improvements shown in the conceptual layouts in **Section 10**. The 2040 Build Alternatives assume all roadway improvements discussed in **Section 3.0 Future Conditions** are constructed, including the widening of SR 265 from SR 45 to SR 171 and the extension of Providence Parkway to SR 265.

The objectives of the traffic analysis were as follows:

- Forecast the projected No Build Alternative and Build Alternatives conditions;
- Determine intersection capacity;
- Identify traffic flow and queuing concerns;
- Identify mitigation measures and alternatives; and
- Model and analyze the operational improvements under the Build Alternatives.

Level of Service (LOS) is a qualitative traffic capacity measure that is used to gauge the operational performance of an intersection or roadway segment. There are six (6) levels ranging from 'A' to 'F' with 'F' being the worst. Each level represents a range of operating conditions. **Table 3** defines the traffic flow conditions and approximate driver comfort at each LOS for signalized and unsignalized intersections. **Table 4** defines the traffic flow conditions and approximate driver comfort at each LOS for freeway segments.

A schematic diagram summarizing the Design Year LOS traffic analysis is provided in **Source:** *Gresham, Smith and Partners*

Figure 27. A more in-depth discussion of each alternative's analysis, along with summary tables, follows. The traffic analysis calculations/output are provided in **Appendix E**.

TABLE 3: LEVEL OF SERVICE INDEX FOR INTERSECTIONS

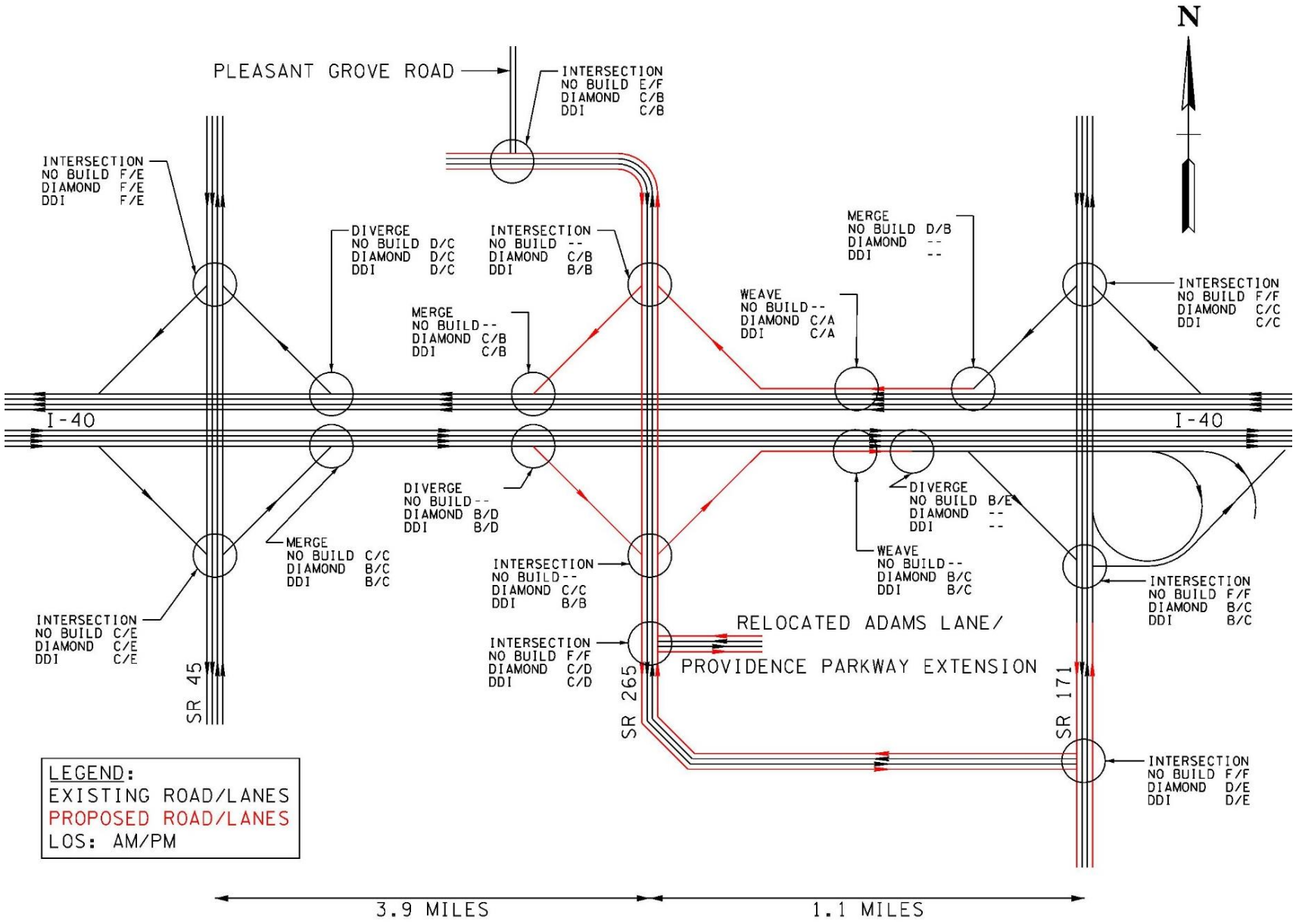
LOS	TRAFFIC FLOW CONDITIONS	SIGNALIZED INTERSECTIONS DELAY (SEC/VEH)	UNSIGNALIZED INTERSECTIONS DELAY (SEC/VEH)
A	Progression is extremely favorable and most vehicles do not stop at all.	0-10	0-10
B	Good progression, some delay.	10-20	10-15
C	Fair progression, higher delay.	20-35	15-25
D	Unfavorable progression, congestion becomes apparent.	35-55	25-35
E	Poor progression, significant delay.	55-80	35-50
F	Poor progression, extreme delay.	>80	>50

Source: Gresham, Smith and Partners, HCM 2010

TABLE 4: LEVEL OF SERVICE INDEX FOR RAMP JUNCTIONS

LOS	TRAFFIC FLOW CONDITIONS	DENSITY (PC/MI/LN)
A	Unrestricted operations.	0-10
B	Merging and diverging maneuvers noticeable to drivers.	10-20
C	Influence area speeds begin to decline.	20-28
D	Influence area turbulence becomes intrusive.	28-35
E	Turbulence felt by virtually all drivers.	>35
F	Ramp and freeway queues form.	Demand exceeds capacity

Source: Gresham, Smith and Partners, HCM 2010



Source: Gresham, Smith and Partners

FIGURE 27: 2040 LOS SINGLE LINE SKETCH

6.2 NO BUILD ALTERNATIVE

Under the No Build Alternative there is no direct connection from I-40 to SR 265, and all traffic would utilize the adjacent interchanges at Exit 221 (SR 45) and Exit 226 (SR 171).

The SR 45/eastbound I-40 Ramps overall intersection LOS is E in the Design Year of 2040. The SR 45/westbound I-40 Ramps overall intersection LOS is F in the Design Year of 2040. Despite the poor intersection LOS, queues are not calculated to reach the I-40 mainline.

The SR 171/eastbound I-40 Ramps overall intersection LOS is F in the Design Year of 2040. The SR 171/westbound I-40 Ramps overall intersection LOS is also F in the Design year of 2040. A project is planned along northbound SR 171 that will widen the bridge over I-40 to add a through-lane. The improvement will provide two continuous through lanes along northbound SR 171, where one is currently dropped as a left-turn lane to westbound I-40. The improvement will improve driver expectancy and possibly safety, but is calculated to have minimal effect on LOS. The LOS of the SR 171 intersections with both the eastbound and westbound I-40 Ramps is calculated to remain F in the Design Year of 2040. More significantly, the vehicular queue lengths along the westbound I-40 Off-Ramp are calculated to reach the I-40 mainline by the year 2020, even with the added travel lane along northbound SR 171. The summary of the LOS are shown in **Table 5** and **Table 6**. The queue summaries are shown in **Table 7** and **Table 8**. Locations with a LOS F are highlighted in red in the tables. Locations where queues are calculated to reach the I-40 mainline are highlighted in red.

A merge and diverge analysis was developed for the I-40 Ramp areas. Along I-40, there are five (5) miles separating the Exit 221 (SR 45) Interchange and the Exit 226 (SR 171) Interchange. Due to this separation, both interchanges operate under a merge and diverge condition, and not a weave condition. Through the year 2040, all of the ramps within the study area will operate at LOS D or better with the exception of the eastbound SR 171 Off-Ramp. This Off-Ramp will operate at LOS E in the PM Peak Hour. The summary of the LOS are shown in **Table 9**.

The following non-interchange intersections within the study area were also analyzed: SR 265 at SR 171, SR 265 at Pleasant Grove Road, SR 265 at Tillman Drive, and SR 265 at John Hagar Road/Adams Lane. The summary of the LOS are shown in **Table 10**. Without improvements all of these intersections, with the exception of SR 265 at Tillman Drive, will operate at a LOS F by the 2040 Design Year. SR 265 at Tillman Drive will operate at LOS D. Only SR 265 at SR 171 is currently signalized. SR 265 at Pleasant Grove Road and SR 265 at Tillman Drive are two-way top intersections. With two-way stop intersections, an overall LOS is not reported; LOS are reported only for each approach to the intersection. The intersection of SR 265 at John Hagar Road/Adams Lane has recently been converted to a 4-way stop, and the LOS are reported as such.

6.3 DIAMOND INTERCHANGE BUILD ALTERNATIVE

The Diamond Interchange Build Alternative would construct an interchange along I-40 at SR 265. Direct access between I-40 and SR 265 would be provided. The new interchange would mitigate congestion at the over-capacity Exit 226 (SR 171) Interchange. The proposed interchange would have minimal effect on traffic volumes at the Exit 221 (SR 45) Interchange.

The Diamond Interchange Build Alternative's SR 265/eastbound I-40 Ramps overall intersection LOS is C or better through the Design Year of 2040. The SR 265/westbound I-40 Ramps overall intersection LOS is also C or better through the Design Year of 2040.

With the Diamond Interchange Build Alternative, the SR 45/eastbound I-40 Ramps overall intersection LOS is E in the Design Year of 2040. The SR 45/westbound I-40 Ramps overall intersection LOS is F in the Design Year of 2040. Despite the poor intersection LOS, queues are not calculated to reach the I-40 mainline. This is consistent with the No Build Alternative.

A new interchange along I-40 at SR 265 will pull considerable traffic volumes from the Exit 226 (SR 171) Interchange. With the Diamond Interchange Build Alternative, the SR 171/eastbound I-40 Ramps overall intersection LOS is C or better through the Design Year of 2040. This is an improvement compared to the No Build Alternative's overall intersection LOS of F. The SR 171/westbound I-40 Ramps overall intersection LOS is C through the Design Year of 2040. This is an improvement compared to the No Build Alternative's overall intersection LOS of F. More significantly, the vehicular queue length along the westbound I-40 Off-Ramp is not calculated to reach the I-40 mainline by the year 2040, as it is with the No Build Alternative. The summary of the LOS are shown in **Table 5** and **Table 6**. The queue summaries are shown in **Table 7** and **Table 8**. Locations with a LOS F are highlighted in red in the tables. Locations where queues are calculated to reach the I-40 mainline are highlighted in red.

A merge, diverge, and weave analysis was developed for the I-40 Ramp areas. Along I-40, there are five (5) miles separating the existing Exit 221 (SR 45) Interchange and the Exit 226 (SR 171) Interchange. The proposed interchange at SR 265 will be 3.9 miles from the Exit 221 (SR 45) Interchange and 1.1 miles from the Exit 226 (SR 171) Interchange. Due to the separation from the Exit 221 (SR 45) Interchange, the SR 45 Ramps and the eastbound SR 265 Off-Ramp and westbound SR 265 On-Ramp will continue to operate in merge and diverge conditions, and not as weaves. Due to the 1.1-mile spacing, one-lane auxiliary lanes will be constructed between the proposed SR 265 Interchange and the Exit 226 (SR 171) Interchange. The eastbound SR 265 On-Ramp and eastbound SR 171 Off-Ramp will operate in a weave condition, as will the westbound SR 171 On-Ramp and westbound SR 265 Off-Ramp. Through the Design Year of 2040, all of the ramps within the study area will operate at LOS D or better. In general, each ramp terminus along I-40 will operate one LOS letter grade better than it would under the No Build Alternative. The summary of the LOS are shown in **Table 9**.

6.4 DDI BUILD ALTERNATIVE

The DDI Build Alternative would construct an interchange along I-40 at SR 265. Direct access between I-40 and SR 265 would be provided. The new interchange would mitigate congestion at the over-capacity Exit 226 (SR 171) Interchange. The proposed interchange would have minimal effect on traffic volumes at the Exit 221 (SR 45) Interchange.

The DDI Build Alternative's SR 265/eastbound I-40 Ramps overall intersection LOS is B through the Design Year of 2040. The SR 265/westbound I-40 Ramps overall intersection LOS is also B through the Design Year of 2040. This is an improvement compared to the Diamond Interchange Build Alternative's LOS of C for both intersections.

With the DDI Build Alternative, the SR 45/eastbound I-40 Ramps overall intersection LOS is E in the Design Year of 2040. The SR 45/westbound I-40 Ramps overall intersection LOS is F in the Design Year of 2040. Despite the poor intersection LOS, queues are not calculated to reach the I-40 mainline. This is consistent with the No Build Alternative.

A new interchange along I-40 at SR 265 will pull considerable traffic volumes from the Exit 226 (SR 171) Interchange. With the DDI Build Alternative, the SR 171/eastbound I-40 Ramps overall intersection LOS is A through the Design Year of 2040. This is an improvement compared to the A new interchange along I-40 at SR 265 will pull considerable traffic volumes from the Exit 226 (SR 171) Interchange. With the DDI Build Alternative, the SR 171/eastbound I-40 Ramps overall intersection LOS is C or better through the Design Year of 2040. This is an improvement compared to the No Build Alternative's overall intersection LOS of F. The SR 171/westbound I-40 Ramps overall intersection LOS is C through the Design Year of 2040. This is an improvement compared to the No Build Alternative's overall intersection LOS of F. More significantly, the vehicular queue length along the westbound I-40 Off-Ramp is not calculated to reach the I-40 mainline by the year 2040, as it is with the No Build Alternative. The summary of the LOS are shown in **Table 5** and **Table 6**. The queue summaries are shown in **Table 7** and **Table 8**. Locations with a LOS F are highlighted in red in the tables. Locations where queues are calculated to reach the I-40 mainline are highlighted in red.

A merge, diverge, and weave analysis was developed for the I-40 Ramp areas. Along I-40, there are five (5) miles separating the existing Exit 221 (SR 45) Interchange and the Exit 226 (SR 171) Interchange. The proposed interchange at SR 265 will be 3.9 miles from the Exit 221 (SR 45) Interchange and 1.1 miles from the Exit 226 (SR 171) Interchange. Due to the separation from the Exit 221 (SR 45) Interchange, the SR 45 Ramps and the eastbound SR 265 Off-Ramp and westbound SR 265 On-Ramp will continue to operate in merge and diverge conditions, and not as weaves. Due to the 1.1-mile spacing, one-lane auxiliary lanes will be constructed between the proposed SR 265 Interchange and the Exit 226 (SR 171) Interchange. The eastbound SR 265 On-Ramp and eastbound SR 171 Off-Ramp will operate in a weave condition, as will the westbound SR 171 On-Ramp and westbound SR 265 Off-Ramp. Through the Design Year of 2040, all of the ramps within the study area will operate at LOS D or better. In general, each ramp terminus along I-40 will operate one LOS letter grade better than it would under the No Build Alternative. The summary of the LOS are shown in **Table 9**.

TABLE 5: INTERSECTION LOS AT SR 45 AND SR 265 INTERCHANGES

ALTERNATIVE:	NO BUILD		BUILD DIAMOND		BUILD DDI	
INTERSECTION	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**
SR 45 at I-40 WB Ramps						
Northbound Approach	C / A	F / C	C / A	F / C	C / A	F / C
Southbound Approach	C / C	F / F	C / C	F / F	C / C	F / F
Westbound Approach	C / C	F / E	C / C	F / E	C / C	F / E
Overall Intersection LOS	**C / B**	**F / E**	**C / B**	**F / E**	**C / B**	**F / E**
SR 45 at I-40 EB Ramps						
Northbound Approach	B / C	D / F	B / C	D / F	B / C	D / F
Southbound Approach	A / B	B / E	A / B	B / E	A / B	B / E
Eastbound Approach	B / C	B / E	B / C	B / E	B / C	B / E
Overall Intersection LOS	**B / B**	**C / E**	**B / B**	**C / E**	**B / B**	**C / E**
SR 265 at I-40 WB Ramps						
Northbound Approach	--	--	B / B	B / A	A / A	B / B
Southbound Approach	--	--	B / B	D / D	B / B	A / B
Westbound Approach	--	--	C / C	C / D	A / A	B / B
Overall Intersection LOS	--	--	**B / B**	**C / B**	**A / B**	**B / B**
SR 265 at I-40 EB Ramps						
Northbound Approach	--	--	A / A	B / C	B / B	B / B
Southbound Approach	--	--	A / A	B / C	B / B	B / B
Eastbound Approach	--	--	B / B	D / D	B / B	B / C
Overall Intersection LOS	**--**	**--**	**A / A**	**C / C**	**B / B**	**B / B**

Source: Gresham, Smith and Partners

TABLE 6: INTERSECTION LOS AT SR 171 INTERCHANGE

ALTERNATIVE:	NO BUILD		NO BUILD		DIAMOND & DDI BUILD ALTERNATIVES	
	WITHOUT PLANNED IMPROVEMENTS TO SR 171		WITH PLANNED IMPROVEMENTS TO SR 171		WITH PLANNED IMPROVEMENTS TO SR 171	
INTERSECTION	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**
SR 171 at I-40 WB Ramps						
Northbound Approach	D / E	F / F	D / D	F / F	C / C	C / B
Southbound Approach	C / E	F / F	D / E	F / F	A / B	B / C
Westbound Approach	F / F	F / F	F / F	F / F	D / E	E / E
Overall Intersection LOS	**D / E**	**F / F**	**D / E**	**F / F**	**B / C**	**C / C**
SR 171 at I-40 EB Ramps						
Northbound Approach	E / F	F / F	E / F	F / F	A / B	B / E
Southbound Approach	B / B	B / C	B / B	C / C	B / A	A / A
Eastbound Approach	A / B	A / F	A / C	A / F	A / A	A / A
Overall Intersection LOS	**D / D**	**F / F**	**D / D**	**F / F**	**B / A**	**B / C**

Source: Gresham, Smith and Partners

TABLE 7: QUEUE LENGTHS ALONG INTERCHANGE RAMPS (2020)

ALTERNATIVE:		NO BUILD	DIAMOND	DDI
INTERSECTION	**RAMP LENGTH[A]**	**2020 QUEUE LENGTH (AM/PM)**	**2020 QUEUE LENGTH (AM/PM)**	**2020 QUEUE LENGTH (AM/PM)**
SR 45 at I-40 WB Ramps				
Westbound Approach	1,250	256[C] / 246[C]	256[C] / 246[C]	256[C] / 246[C]
SR 45 at I-40 EB Ramps				
Eastbound Approach	1,100	56 / 186[C]	56 / 186[C]	56 / 186[C]
SR 265 at I-40 WB Ramps				
Westbound Approach	1,300	--	103 / 87	135 / 119
SR 265 at I-40 EB Ramps				
Eastbound Approach	1,300	--	52 / 116	31 / 77
SR 171 at I-40 WB Ramps				
Westbound Approach	1,150	470[C] / 549[D]	153 / 267	153 / 267
SR 171 at I-40 EB Ramps[B]				
Eastbound Approach	--	--	--	--

[A] Measured from I-40 to arterial terminus

[B] Free-flow ramps on C-D Road

[C] Demand exceeds capacity, simulation demonstrates queue will not reach I-40

[D] Demand exceeds capacity, simulation demonstrates queue will reach I-40

Source: Gresham, Smith and Partners

TABLE 8: QUEUE LENGTHS ALONG INTERCHANGE RAMPS (2040)

ALTERNATIVE:		NO BUILD	DIAMOND	DDI
INTERSECTION	**RAMP LENGTH[A]**	**2040 QUEUE LENGTH (AM/PM)**	**2040 QUEUE LENGTH (AM/PM)**	**2040 QUEUE LENGTH (AM/PM)**
SR 45 at I-40 WB Ramps				
Westbound Approach	1,250	615[C] / 621[C]	615[C] / 621[C]	615[C] / 621[C]
SR 45 at I-40 EB Ramps				
Eastbound Approach	1,100	80 / 497[C]	80 / 497[C]	80 / 497[C]
SR 265 at I-40 WB Ramps				
Westbound Approach	1,300	--	132 / 135	151 / 118
SR 265 at I-40 EB Ramps				
Eastbound Approach	1,300	--	338[C] / 500[C]	173 / 247
SR 171 at I-40 WB Ramps				
Westbound Approach	1,150	803[D] / 922[D]	362 / 548[C]	362 / 548[C]
SR 171 at I-40 EB Ramps[B]				
Eastbound Approach	--	--	--	--

[A] Measured from I-40 to arterial terminus

[B] Free-flow ramps on C-D Road

[C] Demand exceeds capacity, simulation demonstrates queue will not reach I-40

[D] Demand exceeds capacity, simulation demonstrates queue will reach I-40

Source: Gresham, Smith and Partners

TABLE 9: RAMP TERMINI LOS ALONG I-40

ALTERNATIVE:	NO BUILD		BUILD ALTERNATIVES DIAMOND[A] AND DDI[A]	
Ramp Junction	**2020 (AM / PM)**	**2040 (AM / PM)**	**2020 (AM / PM)**	**2040 (AM / PM)**
SR 45 at I-40				
I-40 WB Off-Ramp Diverge	D / B	D / C	D / B	D / C
I-40 EB On-Ramp Merge	B / C	C / C	B / C	B / C
SR 265 at I-40				
I-40 WB Off-Ramp Diverging Weave	--	--	C / B	C / A
I-40 WB On-Ramp Merge	--	--	B / A	C / B
I-40 EB Off-Ramp Diverge	--	--	B / C	B / D
I-40 EB On-Ramp Merging Weave	--	--	B / C	B / C
SR 171 at I-40				
I-40 WB Off-Ramp Diverge	C / C	D / C	C / C	D / C
I-40 WB On-Ramp Merge	C / B	D / B	--	--
I-40 WB On-Ramp Merging Weave	--	--	C / B	C / A
I-40 EB Off-Ramp Diverge	B / D	B / E	--	--
I-40 EB Off-Ramp Diverging Weave	--	--	B / C	B / C
I-40 EB On-Ramp Merge	B / C	B / D	B / C	B / C

[A] Diamond and DDI Build Alternatives include auxiliary lanes between SR 265 and SR 171

Source: Gresham, Smith and Partners, HCS2010

6.5 INTERSECTIONS IN STUDY AREA

The following intersections within the study area were also analyzed: SR 265 at SR 171, SR 265 at Pleasant Grove Road, and SR 265 at John Hagar Road/Adams Lane. The traffic analysis for the year 2020 and 2040 No Build Alternative assumes no geometric improvements to intersections within the study area. The traffic analysis for the year 2020 Build Alternatives includes the intersection improvements shown in the conceptual layouts in **Section 10**. The 2040 Build Alternatives assume all roadway improvements discussed in **Section 3.0 Future Conditions** are constructed, including:

- SR 265 will be widened to a 5-lane cross section throughout the study area.
- The SR 265 at John Hagar Road/Adams Lane Intersection would be incorporated into the Providence Parkway Extension project, relocated farther from I-40, signalized, and incorporate turn-lane improvements. The Providence Parkway Extension will have four travel lanes (two in each direction)

- The SR 265 at Pleasant Grove Road intersection would be improved with the SR 265 widening project. Tillman Drive will no longer connect directly to SR 265; it will be accessed via Pleasant Grove Road.
- Lastly, the SR 265 at SR 171 intersection would have through-lane, turn-lane, and signal timing improvements as part of the planned SR 265 and SR 171 widening projects (see **Section 3.0**).

With these improvements, these intersections will operate at a LOS E or better through the 2040 Design Year. Without improvements, these intersections will typically operate at a LOS F by the 2040 Design Year. **Table 10** provides a summary of the non-interchange intersection LOS.

TABLE 10: INTERSECTION LOS (NON-INTERCHANGE)

ALTERNATIVE:	NO BUILD		BUILD DIAMOND		BUILD DDI	
INTERSECTION	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**	**2020 LOS (AM/PM)**	**2040 LOS (AM/PM)**
SR 265 at SR 171						
Northbound Approach	F / F	F / F	F / F	C / D	F / F	C / D
Southbound Approach	F / F	F / F	F / F	D / E	F / F	D / E
Eastbound Approach	F / F	F / F	F / F	D / E	F / F	D / E
Westbound Approach	F / F	F / F	F / F	D / E	F / F	D / E
Overall Intersection LOS	**F / F**	**F / F**	**F / F**	**D / E**	**F / F**	**D / E**
SR 265 at Pleasant Grove Road[A]						
Southbound Approach	C / E	E / F	F / F	C / B	F / F	C / B
Eastbound Approach	A / A	A / A	A / A	C / B	A / A	C / B
Westbound Approach	A / A	A / A	A / A	A / B	A / A	A / B
SR 265 at Tillman Drive[A, D]						
Northbound Approach	A / A	A / A	-	-	-	-
Southbound Approach	B / C	A / A	C / D	-	C / D	-
Eastbound Approach	-	-	A / A	-	A / A	-
Westbound Approach	B / C	B / D	A / A	-	A / A	-
SR 265 at John Hagar Rd/Adams Lane[B]						
Northbound Approach	C / D	F / F	F / F (A / A)[C]	D / E	F / F (A / A)[C]	D / E
Southbound Approach	C / F	F / F	F / F (A / A)[C]	C / D	F / F (A / A)[C]	C / D
Eastbound Approach	B / B	F / F	C / C (B / C)[C]	D / E	C / C (B / C)[C]	D / E
Westbound Approach	B / C	F / F	C / C (B / C)[C]	C / D	C / C (B / C)[C]	C / D
Overall Intersection LOS	**B / E**	**F / F**	**F / F (A / A)[C]**	**C / D**	**F / F (A / A)[C]**	**C / D**

[A] Unsignalized intersection

[B] Unsignalized intersection with No Build Alternative and 2020 Build Alternatives, signalized with 2040 Build Alternatives

[C] Signalized intersection analysis

[D] Roadway realigned such that Tillman's existing westbound approach becomes southbound with the Build Alternatives and the northbound approach becomes westbound.

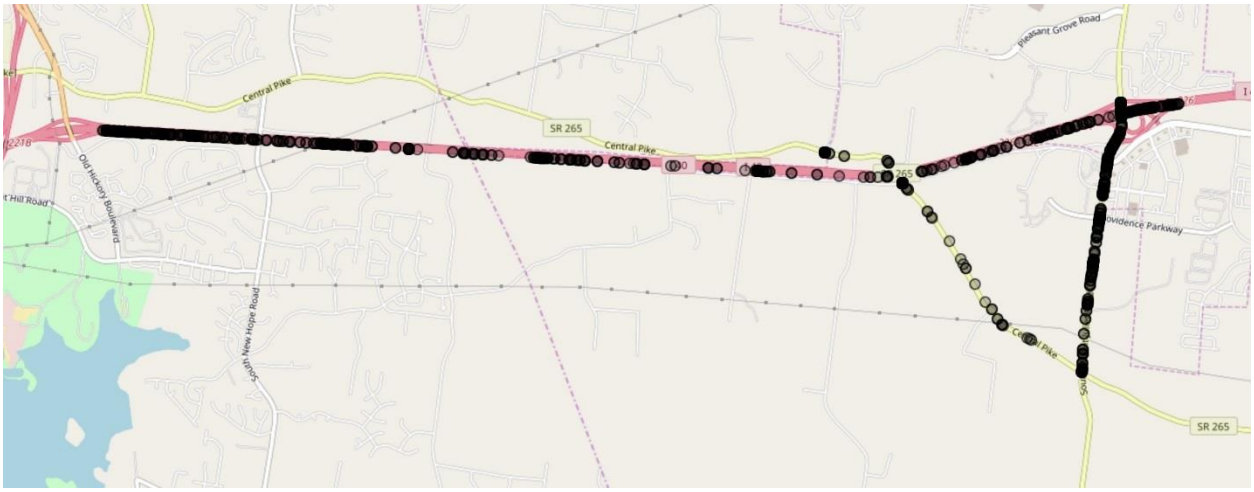
Source: Gresham, Smith and Partners

7.0 SAFETY ANALYSIS

7.1 CRASH HISTORY

Crash history was reviewed for I-40, SR 265, and SR 171, within the proposed interchange's area of influence. I-40 was analyzed from SR 45 to SR 171, SR 265 was analyzed from Pleasant Grove Road to SR 171, and SR 171 was analyzed from SR 265 to I-40. These limits were chosen because they include the proposed interchange location and are the limits along these routes that will see diverted traffic associated with the construction of a Build Alternative. Crash data are not available for Adams Lane, or it would have been included in the analysis. The reviewed data included the period from January 1, 2014 through December 31, 2016. Crash data and calculations are provided in **Appendix F**.

Crashes along I-40, SR 265, and SR 171 are mapped in **Figure 28**. The crash data are reported in **Table 11**.



Source: eTRIMS Crash Data, Google Maps

FIGURE 28: REPORTED CRASHES IN STUDY AREA

Along I-40, 379 crashes were reported in 2014, 2015, and 2016. Eighteen (18) occurred along the ramps in the study area; the remaining 361 occurred along the I-40 mainline. The crash rate along the I-40 mainline was 0.69 crashes per million vehicle miles. This is 33% lower than the statewide average along interstates with similar characteristics.

Along SR 265, fifty (50) crashes were reported in 2014, 2015, and 2016. Twenty-seven (27) occurred at intersections in the study area; the remaining twenty-three (23) occurred along the SR 265 mainline. The crash rate along the SR 265 mainline was 1.49 crashes per million vehicle miles. This is 42% lower than the statewide average along arterials with similar characteristics.

Along SR 171, 253 crashes were reported in 2014, 2015, and 2016. One hundred and twenty-two (122) occurred at intersections in the study area; the remaining one hundred and thirty-one (131) occurred along the SR 171 mainline. The crash rate along the SR 171 mainline was 4.69 crashes per million vehicle miles. This is 57% higher than the statewide average along arterials with similar characteristics.

TABLE 11: CRASH HISTORY (2014-2016)

Year	Criteria/Route	I-40	SR 265	SR 171
	Distance (Miles)	5.12	3.57	1.28
2016	AADT	93,120	3,960	19,910
2014-2016	Fatal Crashes	1	0	0
	Injury Crashes	129	16	53
	Fatal + Injury Crashes	130	16	53
	Property Damage Crashes	256	34	65
	Intersection Crashes	--	27	122
	Ramp Crashes	18	--	--
	Mainline Crashes	361	23	131
	Total Crashes	379	50	253
	Mainline Crash Rate (Crashes per Million Vehicle Miles)	0.69	1.49	4.69
	Statewide Average Crash Rate (Crashes per Million Vehicle Miles)	1.04	2.56	3.00
	Percent Difference	-33%	-42%	57%

Source: GS&P, TDOT eTRIMS Crash and Traffic Data

Notes:

- I-40 from SR 45 to SR 171 (Log Miles 29.5-31.2; 0-3.4)
- SR 265 from Pleasant Grove Road to SR 171 (Log Miles 1.89 to 3.57)
- SR 171 from SR 265 to I-40 Westbound Ramps (Log Miles 3.57 to 4.85)
- Mainline Crash Rates do not include intersection or ramp crashes
- Crash data not available for Adams Lane

7.2 PREDICTED CRASH ANALYSIS

Two Build Alternatives are proposed that would construct a new interchange along I-40 at SR 265. An analysis was conducted to predict how either of the Build Alternatives would affect safety within the study area.

The Highway Safety Manual (HSM) (AASHTO, 2010 with a 2014 Supplement) is a resource that aides in providing safety performance measures. The HSM provides a number of Crash Modification Factors (CMFs) to determine how improvements impact safety. The HSM defines a CMF as "an index of how much crash experience is expected to change following a modification in design or traffic control. CMF is the ratio between the number of crashes per unit of time expected after a modification or measure is implemented and the number of crashes per unit of time estimated if the change does not take place." Applying the CMFs available in the HSM and the CMF Clearinghouse website (www.cmfclearinghouse.org) provides a quantitative basis for estimating how a given CMF might improve safety. The CMF Clearinghouse is a website funded by the U.S. Department of Transportation Federal Highway Administration and is maintained by the University of North Carolina Highway Safety Research Center. The website provides a database of CMFs to assist in selecting appropriate improvements based on safety.

The Interactive Highway Safety Design Model (IHSDM) was used to predict crashes within the proposed interchange's area of influence along I-40, SR 265, SR 171, and Adams Lane. IHSDM is an integrated system of modules that evaluates the safety of highway geometric design alternatives. IHSDM supports the implementation of the HSM procedures. The predicted crash analysis calculations are provided in **Appendix D**.

Table 12 provides a comparison of the annual average crash history from 2014, 2015, and 2016 with the number of crashes predicted by the HSM for the No Build Alternative.

Along I-40, an average of 126.3 crashes per year were reported in 2014, 2015, and 2016. The HSM predicts 108.6 crashes per year. The actual average number of crashes is 16% higher than the HSM prediction. The actual fatal + injury crashes are 20% higher than the HSM prediction. This indicates the I-40 mainline operates in a manner less safe than routes used in the nationwide calibration of the HSM.

Along SR 265, an average of 16.7 crashes per year were reported in 2014, 2015, and 2016. The HSM predicts 8.9 crashes per year. The actual average number of crashes is 88% higher than the HSM prediction. The actual fatal + injury crashes are 75% higher than the HSM prediction. This indicates SR 265 operates in a manner less safe than routes used in the nationwide calibration of the HSM.

Along SR 171, an average of 84.3 crashes per year were reported in 2014, 2015, and 2016. The HSM predicts 34.2 crashes per year. The actual average number of crashes is 147% higher than the HSM prediction. The actual fatal + injury crashes are 55% higher than the HSM prediction. This indicates SR 171 operates in a manner less safe than routes used in the nationwide calibration of the HSM. This is consistent with the finding that SR 171 has a higher crash rate than the statewide average for similar facilities.

TABLE 12: ANNUAL AVERAGE CRASHES VS. HSM PREDICTED CRASHES (2016 NO BUILD ALTERNATIVE)

Year	Criteria/Route	I-40	SR 265	SR 171
	Distance (Miles)	5.12	3.57	1.28
2016	AADT	93,120	3,960	19,910
Actual	Fatal + Injury Crashes	43.3	5.3	17.7
HSM 2016	Fatal + Injury Crashes	36.2	3.1	11.4
	Difference	7.2	2.3	6.3
	Percent Difference	20%	75%	55%
Actual	Property Damage Crashes	85.3	11.3	21.7
HSM 2016	Property Damage Crashes	72.4	5.8	22.8
	Difference	12.9	5.5	-1.1
	Percent Difference	18%	95%	-5%
Actual	Total Crashes	126.3	16.7	84.3
HSM 2016	Total Crashes	108.6	8.9	34.2
	Difference	17.8	7.8	50.2
	Percent Difference	16%	88%	147%

Source: GS&P, TDOT eTRIMS Crash and Traffic Data, HSM (2010), HSM Spreadsheet Tools

Notes:

- Actual annual crashes are 3 year totals from 2014 to 2016 divided by 3 years
- Crash data not available for Adams Lane

Table 13 provides a comparison of the HSM-predicted Year 2040 crashes for the No Build Alternative vs. the Build Alternatives within the proposed interchange's area of influence.

Along I-40, constructing an interchange at SR 265 is projected to increase crashes by 5%. Fatal + injury crashes are projected to increase by 3%. The positive effect of 12% reduced traffic volume along I-40 is offset with the negative effect of the additional conflict points created with the addition of ramps to the mainline.

Along SR 265, the number of crashes is estimated to increase 57% with the Build Alternatives. Fatal + injury crashes are projected to increase 52%. This increase is associated with the 79% increase in predicted traffic volumes and construction of signalized intersections required with the new interchange and roadway widening.

Along SR 171, the number of crashes is estimated to decrease 34% with the Build Alternatives. Fatal + injury crashes are projected to decrease 38%. This decrease is associated with the 37% decrease in predicted traffic volumes along SR 171 anticipated because of the new interchange at SR 265.

Along Adams Lane/Relocated Adams Lane/Providence Parkway Extension, the number of crashes is estimated to increase 13%. Fatal + injury crashes are projected to increase 11%. This increase is associated with the 51% increase in predicted traffic volumes along the route.

The net effect is that crashes are predicted to decrease 9% along the routes within the proposed interchange's area of influence. Fatal + injury crashes are predicted to decrease 12%. The increase in predicted crashes along I-40, SR 265, and Adams Lane is offset by the decrease in crashes along SR 171.

TABLE 13: HSM-PREDICTED CRASHES (2040 NO BUILD AND BUILD ALTERNATIVES)

Alt.	Criteria/Route	I-40	SR 265	SR 171	Adams	Total
	Distance (Miles)	5.12	3.57	1.28	1.00	9.97
No Build	Fatal + Injury Crashes	44.11	9.14	51.91	1.75	106.91
Build	Fatal + Injury Crashes	45.63	13.92	32.41	1.95	93.91
	Difference	1.52	4.78	-19.50	0.20	-13.00
	Percent Difference	3%	52%	-38%	11%	-12%
No Build	Property Damage Crashes	93.49	16.71	91.45	3.7	201.65
Build	Property Damage Crashes	93.6	26.55	62.16	4.21	182.31
	Difference	0.11	9.84	-29.29	0.51	-19.34
	Percent Difference	0%	59%	-32%	14%	-10%
No Build	Total Crashes	137.60	25.85	143.36	5.45	312.26
Build	Total Crashes	144.06	40.47	94.57	6.16	285.26
	Difference	6.46	14.62	-48.79	0.71	-27
	Percent Difference	**5%**	**57%**	**-34%**	**13%**	**-9%**

Source: GS&P, TDOT eTRIMS Crash and Traffic Data, HSM (2010), HSM and IHSDM

Queues at the Exit 226 (SR 171) Interchange are predicted to reach the I-40 mainline by the Year 2040 with the No Build Alternative. Queued vehicles adjacent to high-speed freeway traffic poses a notable safety concern that is not accounted for in the HSM-predicted crash analysis. With either Build Alternative, the ramp queues are not calculated to reach the I-40 mainline. This will provide an additional safety benefit with either Build Alternative.

The IHSDM analysis utilized did not differentiate between the Diamond Interchange Build Alternative and the DDI Build Alternative. The results were therefore presented for a No Build Alternative and "Build Alternatives". However, the HSM CMF Clearinghouse website does have a CMF for converting a Diamond Interchange into a DDI. The CMF reported is 0.592, meaning a DDI is projected to have 41% less crashes than a traditional Diamond Interchange. The CMF document is provided in **Appendix D**.

8.0 CONSTRUCTION

8.1 CONSTRUCTABILITY

Full functionality of SR 265, I-40, and the two adjacent interchanges at SR 45 and SR 171 can be maintained during the construction of either build alternative.

The Diamond Interchange Build Alternative can be constructed in three (3) construction phases. The proposed construction shall maintain traffic and ensure minimal disruption in traffic flow.

1. Phase 1 includes the following:
    - Construct proposed SR 265 Bridge over I-40.
    - Realignment of John Hagar Road, Adams Lane, and existing SR 265 (Adams Lane realignment is an interim improvement until development realigns Adams Lane to the south as discussed in **Section 3.0)**.
    - Provide temporary connections to existing SR 265 south of the proposed bridge.
2. Phase 2 includes the following:
    - Place traffic on proposed SR 265 Bridge.
    - Construct proposed I-40 Eastbound and Westbound ramps.
    - Complete SR 265 southbound lanes south of proposed bridge.
3. Phase 3 includes the following:
    - Remove existing SR 265 Bridge.
    - Scarify and abandon existing pavement.
    - Install proposed signals at ramp terminals

The DDI Build Alternative also includes three (3) construction phases.

1. Phase 1 includes the following:
    - Construct proposed SR 265 Bridge over I-40.
    - Provide temporary connections from south of proposed bridge to existing SR 265.
    - Realign John Hagar Road, Adams Lane, and existing SR 265. (Adams Lane realignment is an interim improvement until development realigns Adams Lane to the south as discussed in **Section 3.0)**.
    - Construct I-40 Westbound Off-Ramp.
2. Phase 2 includes the following:
    - Place traffic on proposed SR 265 Bridge
    - Maintain one lane in each direction along SR 265.
    - Construct I-40 Eastbound On and Off-Ramps and I-40 Westbound On-Ramp.
3. Phase 3 includes the following:
    - Remove the existing SR 265 Bridge.
    - Install proposed traffic signals at ramp terminals.
    - Complete construction of south crossover intersection.
    - Remove temporary pavement.

8.2 INITIAL COST ESTIMATE

The estimated costs for the Diamond Interchange Build Alternative and the DDI Build Alternative are summarized in **Table 14**.

The estimated costs include all associated ramp improvements, improvements to SR 265, signalization, and side road realignments. The following assumptions were made when developing the cost estimates:

- Concrete ramp pavement.
- Reconstruction of SR 265 within the interchange area from John Hager Road/Adams Lane to east of Pleasant Grove Road.
- Curb and gutter with a sidewalk on one side of SR 265 and a shared-use path on the other.
- Lighting within the interchange.
- Temporary transitions to existing SR 265 include roadside ditches, and not curb and gutter; nor do they have multimodal facilities. The future widening project along SR 265 will construct these features.

The detailed cost calculations are included in **Appendix G**.

TABLE 14: SUMMARY OF COST ESTIMATES – BUILD ALTERNATIVES

	Diamond	DDI
Right-of-Way Cost	$857,000	$857,000
Construction Cost	$14,783,000	$15,657,000
Utility Cost	$96,000	$96,000
Mobilization	$739,000	$783,000
Engineering and Contingency (10%)	$1,562,000	$1,654,000
Total Construction Cost	$17,181,000	$18,189,000
Preliminary Engineering (10%)	$1,718,000	$1,819,000
Project Cost	**$19,755,000**	**$20,865,000**

9.0 SUMMARY

9.1 DISCUSSION OF FHWA POLICY POINTS

Policy Point 1: ***The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).***

The proposed I-40/SR 265 Interchange is located in Wilson County, Tennessee, within the city limits of the City of Mt. Juliet. SR 265 is an urban minor arterial through the study area with no direct access to I-40. The existing Exit 226 (SR 171) Interchange to the east is a diamond interchange for westbound ramps and has directional ramps for the eastbound ramps. The eastbound exit-ramp has a slip ramp to Belinda Parkway to let traffic by-pass SR 171.

As demonstrated in the traffic analysis in **Chapter 6.0**, anticipated traffic demands over the next twenty years will require capacity beyond what can be accommodated by the existing Exit 226 (SR 171) Interchange.

On June 20, 2000, FHWA provided engineering and operational approval for an Interchange Justification Study (IJS) for a new interchange at this location. FHWA's Policy on Access to the Interstate System states that if a project has not progressed to construction within eight (8) years of receiving an affirmative determination of engineering and operational acceptability (23 CFR 625.2(a)), then an updated study based on current and projected future conditions must be resubmitted to FHWA for review and approval.

The primary purpose and need for providing access along I-40 at SR 265 is to address high volumes of traffic, poor levels of service, and projected ramp queues at the adjacent Exit 226 (SR 171) Interchange. FHWA approved the Exit 226 (SR 171) Interchange Modification Study (IMS) in 2006 with the understanding that a new interchange would need to be constructed along I-40 at SR 265 to alleviate traffic demand at SR 171 beyond the IMS's 2016 Design Year. The proposed build alternatives will provide for efficient traffic operations through the Design Year of 2040.

Policy Point 2: ***The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).***

Many TSM strategies are already implemented within or near the study area, including High Occupancy Vehicle (HOV) lanes/facilities, Intelligent Transportation Systems (ITS) along I-40, signal optimization along arterials, and transit service. A Park and Ride lot is located nearby along Belinda Parkway, near I-40. The Music City Star Commuter Rail Line provides access between Mt. Juliet and Nashville. With these strategies in place, the Exit 226 (SR 171) interchange still experiences high traffic demand and poor operations. An Adaptive Signal Control Technology has recently been implemented along SR 171, and the SR 171 Bridge over I-40 is planned to be widened to provide two continuous travel lanes in the northbound direction. However, these nor other additional TSM strategies have been identified that would accommodate future traffic demands in the area and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. The proposed SR 265 Interchange will provide an important connection between I-40 and SR 265, which provides access to many existing and proposed commercial and residential developments in Mt. Juliet and Wilson County. It will serve to relieve traffic at the Exit 226 (SR 171) Interchange.

Policy Point 3: ***An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).***

Three alternatives are proposed in this IAR; a No-Build Alternative, a Diamond Interchange, and a Diverging Diamond Interchange. The No-Build Alternative resulted in poor Levels of Service (LOS) and queues along the westbound I-40 Off-Ramp at SR 171 that reach the mainline of I-40, creating safety and operational concerns.

The Diamond Interchange Alternative provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have levels of service of C or better at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange.

The Diverging Diamond Interchange (DDI) Alternative provides many of the same advantages as the Diamond Interchange Alternative. It also provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have

levels of service of B at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange.

Both interchange build alternative configurations meet the purpose and need for the new interchange access along I-40 and are recommended for consideration. The build alternatives are calculated to reduce crashes by 9% within the study area. The conceptual layouts and conceptual signing plans for both of the build alternatives are included in **Sections 10** and **11**, respectively.

Policy Point 4: ***The proposed access connects to a public road only and will provide for all traffic movements. Less than ``full interchanges'' may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).***

Both of the build options provide a full interchange option with access to all movements. SR 265 is a public road. All minor roads within the study area requiring realignment are also public roads. A more detailed survey of existing topography will be performed during the preliminary design phase to fully determine the extent of the construction limits.

Sidewalks and a shared-use path will be provided along SR 265 and through the interchange area to accommodate both bicycles and pedestrians. The City's desire for bike and pedestrian accommodations was confirmed during project development and in their *Comprehensive Transportation Plan*.

Conceptual design geometry and traffic control measures for both the Diamond and DDI Build Alternatives are in accordance with TDOT's current design standards and with the appropriate Federal policies and standards mentioned in 23 CFR 625.4(a)(2) and 23 CFR 655.603(d). The Synchro 9 traffic analysis software was used to evaluate queue lengths and overall traffic operations through the interchange area.

Policy Point 5: ***The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.***

The project has been coordinated with TDOT, Wilson County and the City of Mt. Juliet. The proposed improvements are consistent with all local, regional and statewide land use and transportation plans.

A previous Interchange Justification Study was completed in 2000 and has since expired. This proposal is an update of the previous request. The project is on the current Nashville MPO Regional Transportation Plan and is a priority to the City of Mt. Juliet.

Policy Point 6: ***In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired***

access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

There are no plans for future interchange additions between the proposed SR 265/I-40 Interchange and the adjacent interchanges on I-40 to the east and west. The recommended improvements for this section of I-40 do not include any interchange additions. No new interchanges are anticipated to be proposed within the study boundary.

Policy Point 7: ***When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).***

TDOT initiated study of a request for new interchange access on I-40 at State Route (SR) 265 (Central Pike) in Wilson County, Tennessee at the request of the Nashville Area Metropolitan Planning Organization (MPO), the City of Mt. Juliet, and Wilson County. The new access point is not requested due to any single development, but due to continued overall growth in the area. To assist with the coordination of the planned projects and developments within the study area, the City of Mt. Juliet has developed a *Central Pike Subarea Study* (see **Appendix B**). Additionally, the city has committed to providing access management measures along SR 265, extending 1,200 feet north and south of the interchange (see **Attachment B**). The access management measures will consist of a raised median along SR 265 and only right-in/right-out access within these limits. The access control measures will be installed concurrent with future development. Existing Adams Lane, John Hagar Road, and Tillman Drive will be relocated outside of the 1,200-foot access control limits, also concurrent with the future developments. This will ensure the proposed interchange functions optimally into the future.

Policy Point 8: ***The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).***

Both of the build alternatives will require proposed right-of-way (ROW). All necessary studies, including but not limited to, ecological, archeological, historical, air and noise, environmental justice and HAZMAT will be conducted during the NEPA phase of the project. **Section 2.3** provides an overview of known social and environmental issues that could be impacted by the addition of the SR 265 at I-40 Interchange. The conclusions of this report will be presented to the City of Mt. Juliet; TDOT will emphasize that this is the first step of a two-step process, including engineering and environmental approvals.

Prompt List for Review of Interstate System Access Change Requests		
Adequately Addressed?		**FHWA Interstate Access Policy Points**
Yes	**No**	
X		**Policy Point 1:** The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).
X		**Policy Point 2:** The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).
X		**Policy Point 3:** An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).
X		**Policy Point 4:** The proposed access connects to a public road only and will provide for all traffic movements. Less than ``full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).
X		**Policy Point 5:** The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.
X		**Policy Point 6:** In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

Prompt List for Review of Interstate System Access Change Requests		
Adequately Addressed?		**FHWA Interstate Access Policy Points**
X		**Policy Point 7:** When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).
X		**Policy Point 8:** The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Policy Point 1: "The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a))."

Addressed Adequately?			Question	Reference Location
Y	**N**	**N/A**		
X			**Does the access request clearly describe the need and purpose of the proposal and identify project goals and objectives that are specific and measurable?**	***Section 1.3***
X			**Is the proposal in the best interest of the public, or does it merely serve a narrow interest?**	***Section 1.3, 6.2***
X			**Is the proposal serving a regional transportation need, or is it merely compensating for deficiencies in the local network of arterials and collectors?**	***Section 1.1, 1.2, 1.3***
X			**In lieu of granting new access, is there any reasonable alternative consisting of improvements to the existing roadway(s) or adjacent access points that could serve the need and purpose?**	***Section 5.5, 6.2 and 6.3***
X			**Has the evaluation of existing interchanges and the local road network taken into account all proposed improvements currently identified in the State and/or Regional Long Range Plan?**	***Section 1.1, Chapter 3, Chapter 6***
X			**Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange?**	***Section 1.1, Chapter 3, Chapter 6***

Policy Point 2: "The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a))."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			**Was FHWA actively involved in preliminary studies and decisions? If not, then more detailed information may be required in support of proposed action.**	***Section 1.1***
X			**Did the study area cover sufficient area to allow for an evaluation of all reasonable alternatives?**	***Section 1.2***
X			**Was a No-Build Alternative evaluated?**	***Section 5.1***
X			**Considering the context of the proposal, is this the best location for the proposed new interchange?**	***Section 1.1, 1.2***
X			**Were different interchange configurations (Tight diamond, SPDI, Parclo) considered?**	***Chapter 6***
X			**Were pedestrians and bicyclists considered in the alternative evaluation?**	***Chapter 5***
X			**Was there an evaluation of different intersection configurations (stop control, signal, roundabout, free right turns, etc?)**	***Chapter 6***
X			**Have Transportation Systems Management (i.e. HOV, ITS, Ramp Metering, Transit etc.) options been evaluated as an alternative to a new or modification to an existing interchange?**	***Section 5.5***
X			**Did the report discuss how TSM alternatives were evaluated and eliminated from consideration?**	***Section 5.5***
X			**Does the proposal consider any future planned TSM strategies and is the design consistent with the ability to implement the future TSM strategies?**	***Section 3.1, 5.5***

Policy Point 3: **"An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d))."**

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the report demonstrate that a proper traffic operational analysis was conducted? The analysis should include the applicable basic freeway segments, freeway weaving segments, freeway ramp segments, ramp junctions and crossroad intersections related to the proposed access point and at least the two adjacent interchanges.	*Chapter 6*
X			Does the report include a safety analysis of the mainline, ramps and intersections of the proposed access point and the nearest adjacent interchange (provided they are near enough that it is reasonable to assume there may be impacts)?	*Chapter 7*
X			Has the design traffic volume been validated?	*Appendix C*
X			Does the report include verification that the data used in the traffic analysis is consistent with the traffic and air quality models MPOs use to develop their current Transportation Plan (20-year) and Transportation Improvement Program (TIP)?	*Section 3.1*
X			Does the report include a design period of 20 years commencing at the time of project approval (PS&E approval)?	*Chapter 6*
X			Does the report include quantitative analyses and results to identify operational differences between alternatives that are heavily congested?	*Chapter 6*
X			Has a conceptual signing plan been provided?	*Chapter 11*
X			Is guidance signing (i.e., way-finding or trail blazing signs) clear and simple?	MUTCD Chapter 2E: Guide Signs – Freeways and Expressways
X			Do the results of the operational analysis result in a significant adverse impact to existing or future conditions?	*Chapter 6*
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange? If so, have impacts to the local network been disclosed and fully evaluated?"	*Chapter 3*

Policy Point 3: **"An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d))."**

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Are the cross roads or adjacent surface level roads and intersections affected by the proposed access point analyzed to the extent (length) where impacts caused or affecting the new proposed access point are disclosed to the appropriate managing jurisdiction?	*Chapter 6*
X			Are pedestrian and/or bicycle facilities included (as appropriate) and do these facilities provide for reasonable accommodation?	*Section 5.2*
X			Does the proposed access secure sufficient Limits of Access adjacent to the Interchange ramps?	AASHTO's "A Policy on Design Standards Interstate System, 2005" Pg. 2; NCHRP Synthesis 332
X			Does the proximity of the nearest crossroad intersections to the ramps contribute to safety or operational problems? Can they be mitigated?	*Chapter 6, 7*
X			In addition to HCS, what analysis tools were employed and were they appropriate?	*Chapter 6*
X			Has the proposal distinguished between nominal safety (i.e. adherence to design policies and standards) and substantive safety (actual and expected safety performance)?	*Chapter 7*
X			Will any individual elements within the recommended alternative be degraded operationally as a result of this action? If yes, are reasons provided to accept them?	*Chapter 6*
X			In evaluating whether the proposal has a "significant adverse impact" on safety, has the State Strategic Highway Safety Plan been used as a benchmark?	*Chapter 7*
X			Are the proposed interchange design configurations able to satisfactorily accommodate the design year traffic volumes?	*Chapter 6*
X			If the project is to be built in stages, has the traffic operational and safety analyses considered the interim stages of the proposal?	*Section 8.1*

Policy Point 4: "The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d))."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			Does the proposed access connect to a public road?	*Section 1.2*
X			Are all traffic movements for full interchange access provided?	*Section 5.2, 5.3, 5.4*
		X	If not, is the proposed access for special purposes such as transit vehicles, HOVs, and/or a park and ride lot?	*Not Applicable (N/A)*
		X	If a partial interchange is proposed, is there sufficient justification for providing only a partial interchange?	AASHTO Greenbook 2004 Pg. 821-823
		X	If a partial interchange is proposed; was a full interchange evaluated as an alternative and is there sufficient justification to eliminate or discard it?	*Not Applicable (N/A)*
		X	Is sufficient ROW available (or being acquired) to provide a full interchange at a future date (staged construction)?	*Not Applicable (N/A)*
		X	Are you comfortable with how the missing movements will be accommodated on the surface streets and adjacent interchanges?	*Not Applicable (N/A)*
X			Does FHWA support the selection of design controls/criteria and desired operational goals?	*Chapter 1.1*
X			Does the proposed access meet or exceed current design standards for the Interstate System?	AASHTO's Greenbook and A Policy on Design Standards Interstate System, 2005
		X	If not, have anticipated design exceptions been identified and reviewed (at least conceptually)?	*Not Applicable (N/A)*
		X	If expected design exceptions could have significant operational impacts on the Interstate and/or Crossroad system, are mitigation measures described?	*Not Applicable (N/A)*
X			Will the length of access control along the crossroad provide for acceptable operations and safety? (100-300' is a minimum. Additional access control is strongly encouraged when needed for safety and operational enhancement)	AASHTO "A Policy on Design Standards Interstate System" 2005
X			Does FHWA support selection of opening and design years?	*Chapter 4*
X			Has each movement of the proposal been "tested" for ease of operation?	AASHTO Greenbook 2004 Pg. 863
Have all design criteria (including but not limited to the following) been adequately addressed?				
X			a. Sight distance at ramp terminals (Don't overlook signal heads obscured by structures.)	AASHTO Greenbook 2004 Pg. 841
X			b. Sufficient storage on ramp to prevent queues from spilling on to the Interstate (based on current and/or future projected traffic demand)	*Chapter 6*
X			c. Vertical clearance	AASHTO "A Policy on Design Standards Interstate System" 2005

Policy Point 4: "The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d))."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			**d. Pedestrian access through the interchange**	**AASHTO Greenbook 2004 Pg. 864**
X			**e. Length of acceleration/deceleration lanes**	**AASHTO Greenbook 2004 Pg. 823, 847**
X			**f. Length of tapers**	**AASHTO Greenbook 2004 Pg. 849**
X			**g. Spacing between ramps**	**Greenbook pg 843 & Ex. 10-68 and operational analysis**
X			**h. Lane continuity**	**AASHTO Greenbook 2004 Pg. 810**
X			**i. Lane balance**	**AASHTO Greenbook 2004 Pg. 810 AASHTO Greenbook 2004 Pg. 807**
X			**j. Uniformity in interchange design and operational patterns (i.e. right-side ramps, exit design consistent w/adjacent interchanges)**	***Section 5.2, 5.3, 5.4***

Policy Point 5: "The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			**Does the IJR discuss or include (as appropriate) other project(s), studies or planned actions that may have an effect on the report analysis results?**	***Section 3.1***
X			**Does the project conform to the local planning, MPO or other related plans?**	***Section 3.1***
X			**Does the report include an endorsement of land use plans by the appropriate government entity before it is utilized for traffic generation purposes?**	***Chapter 4***
X			**Is the access request located within a Transportation Management Areas? (TMAs are metropolitan areas of 200,000 or more in population)**	***Section 3.1***
X			**Is the access request located within a non-attainment area for air quality? (requests for access in a non-attainment or maintenance areas for air quality must be a part of a conforming transportation plan)**	***Section 3.1***
X			**Is the project included in the TIP/STIP and LRTP?**	***Section 3.1***

Policy Point 5: "The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93."				
X			Is the access point covered as a part of an Interstate corridor study or plan? *(especially important for areas where the potential exists for construction of future adjacent interchanges)*	*Section 3.1*

Policy Point 6: "In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111)."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			Is it possible that new interchange(s) not addressed in the IJR could be added within an area of influence to the proposed access point? (If so, could the proposal preclude or otherwise be affected by any future access points?)	*Section 1.1*
		X	Does the IJR report include the traffic volumes generated by any future additional interchanges within a vicinity of influence that are proposed?	*Not Applicable (N/A)*
		X	Does the IJR report fail to include any other proposed interstate access points within a vicinity of influence that are being proposed or are in the current long range construction program?	*Not Applicable (N/A)*

Policy Point 7: "When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d))."				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			Does the access request adequately demonstrate that an appropriate effort of coordination has been made with appropriate proposed developments?	*Chapter 3*
X			Are the proposed improvements compatible with the existing street network or are other improvements needed?	*Chapter 3, 5.2, 5.3, 5.4*
		X	Are there any pre-condition contingencies required in regards to the timing of other improvements?	*Not Applicable (N/A)*
X			Have all commitments to improve the local transportation network been included in a TIP/STIP/LRTP prior to the Interstate access approval (final approval of NEPA document)?	*Section 3.1, 9.3*
		X	If pre-condition contingencies are required, are pertinent parties in agreement with these contingencies and is this documented?	*Not Applicable (N/A)*
		X	If the proposed improvements are founded on the need for providing access to new development, are appropriate commitments in place to ensure that the development will likely occur as planned?	*Not Applicable (N/A)*

Policy Point 7: "When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).”				
		X	**If project is privately funded, are appropriate measures in place to ensure improvements will be completed if the developer is unable to meet financial obligations?**	***Not Applicable (N/A)***
X			**If the purpose and need to accommodate new development/traffic demands aren't fully known, is a worst case scenario used for future traffic?**	***Section 3.2, Chapter 4***
		X	**Does the project require financial or infrastructure commitments from other agencies, organizations, or private entities?**	***Not Applicable (N/A)***

Policy Point 8: "The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).”				
Addressed Adequately?			**Question**	**Reference Location**
Y	**N**	**N/A**		
X			**Are there any known social or environmental issues that could affect the proposal?**	***Section 2.3***
X			**Is the project consistent with the current TIP/STIP and LRTP and/or proposed amendments to the plan?**	***Section 3.1***
X			**Although NEPA is a separate action, is an environmental overview for the proposed improvements included?**	***Section 2.3***
X			**Is it appropriate to emphasize to the project stakeholders that the access approval will be handled as a two-step process? (i.e. Step 1: Engineering and Operational Acceptability and Step 2: Environmental Approvals)**	***Section 9.3***
X			**Are all funding commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?**	***Section 3.1***
X			**Are all commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?**	***Section 3.1***

9.2 CONCLUSIONS AND RECOMMENDATIONS

Based on operational deficiencies and to accommodate the future growth in Mt. Juliet, Wilson County, and the surrounding region, two build alternatives were fully studied for new interstate access; a Diamond Interchange Build Alternative and a DDI Build Alternative. Both build alternatives provide operational improvements to the transportation network. In particular, both build alternatives improve traffic operations at the adjacent Exit 226 (SR 171) Interchange. Neither build alternative has notable impact on the adjacent Exit 221 (SR 45) Interchange due to its 3.9-mile distance along I-40.

Three alternatives are proposed in this IAR; a No-Build Alternative, a Diamond Interchange, and a Diverging Diamond Interchange. The No-Build Alternative resulted in poor Levels of Service (LOS) and queues along the westbound I-40 Off-Ramp at SR 171 that reach the mainline of I-40, creating safety and operational concerns.

The Diamond Interchange Alternative provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have levels of service of C or better at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange. The estimated project cost is $19.8 million.

The Diverging Diamond Interchange (DDI) Alternative provides many of the same advantages as the Diamond Interchange Alternative. It also provides access between I-40 and SR 265 and relieves traffic demand at the existing Exit 226 (SR 171) Interchange. This alternative will have levels of service of B at the proposed SR 265 Interchange through the 2040 Design Year. Queues are no longer projected to reach the I-40 mainline at the Exit 226 (SR 171) Interchange. The estimated project cost is $20.9 million.

Both interchange build alternative configurations meet the purpose and need for the new interchange access along I-40. The construction of an interchange at SR 265, along with other planned and associated roadway improvement projects within the area of influence, is calculated to reduce crashes within the study area by 9%. However, data from the HSM CMF Clearinghouse website indicates the DDI Build Alternative will operate more safely than the Diamond Interchange Build Alternative. Both Build Alternatives are recommended for consideration.

9.3 NEXT STEPS

This report is an evaluation of the impacts of a No Build Alternative, Diamond Build Alternative, and DDI Build Alternative for the I-40/SR 265 interchange. The next step is for FHWA to make a determination of Engineering and Operational Acceptability (E&OA). The NEPA environmental documentation development can proceed as Federal requirements do not require the finding of E&OA to precede the NEPA process; only final approval of access cannot precede the completion of NEPA. This finding of Engineering and Operational Acceptability by FHWA of the IAR is contingent on the consistency of the chosen NEPA alternative with the proposed access change outlined in this IAR. The No-Build and Build Alternatives, as presented, would need to be included for review in the NEPA document.

10.0 CONCEPTUAL LAYOUTS

Index Of Sheets

SHEET NO.	DESCRIPTION
1	..... TITLE SHEET
2-2L	..... TYPICAL SECTIONS
3-6	..... FUNCATIONAL LAYOUTS DIAMOND INTERCHANGE
7-10	..... FUNCATIONAL LAYOUTS DIVERGING DIAMOND INTERCHANGE

LETTER "I" NOT USED IN SHEET NUMBERING

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

WILSON COUNTY

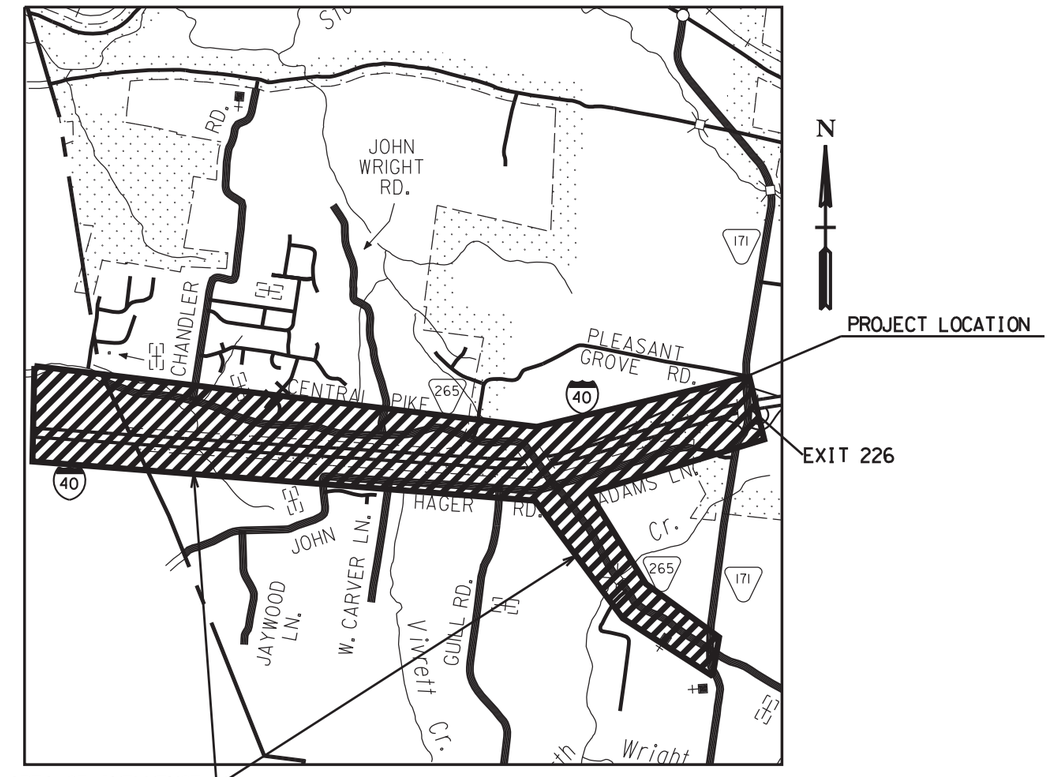
INTERSTATE 40 AT STATE ROUTE 265 (CENTRAL PIKE)

INTERSTATE ACCESS REQUEST

STATE HIGHWAY NO. I-40 F.A.H.S. NO. I-40

TENN.	YEAR	SHEET NO.
	2017	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		





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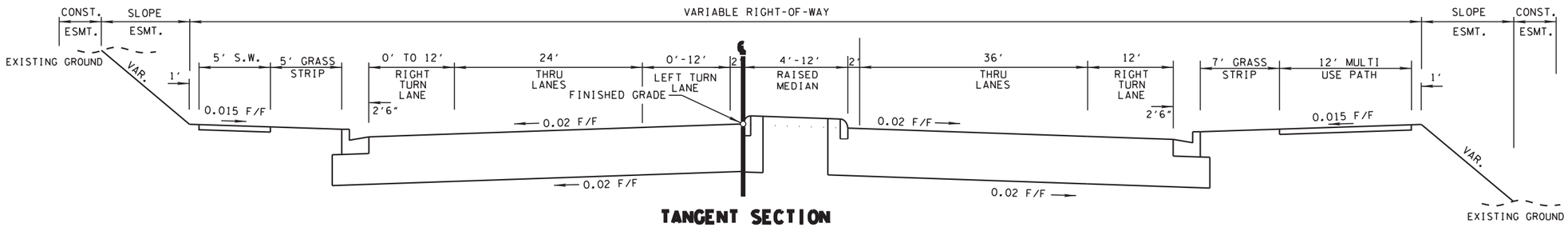
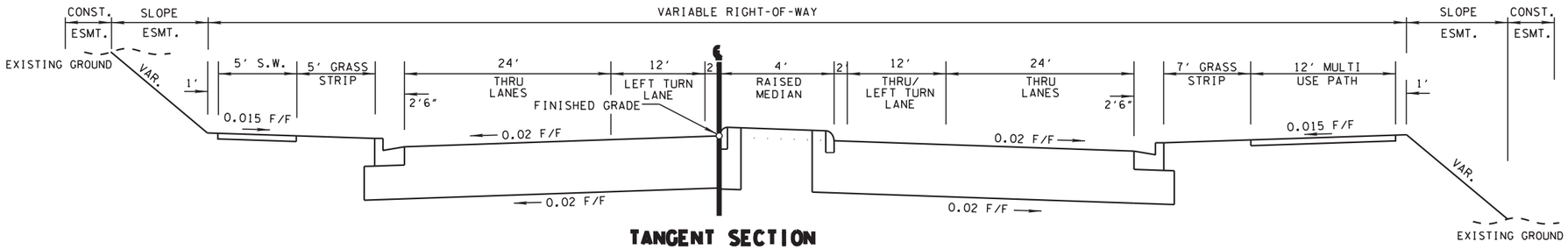


TANGENT SECTION

(BASED ON STD. DWG. RD-TS-6)
DIAMOND INTERCHANGE
S.R. 265 FROM ADAMS LANE
TO RAMPA/RAMPC



TANGENT SECTION

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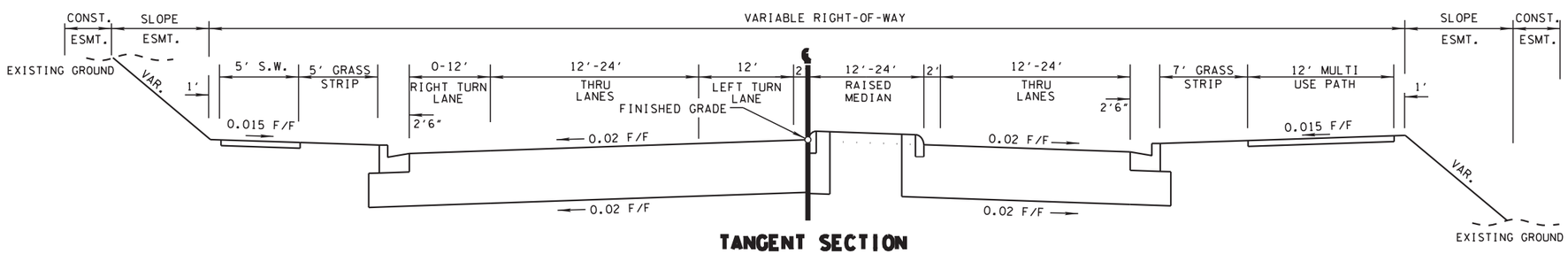
DIAMOND INTERCHANGE
S.R. 265 FROM RAMP A/RAMP C
TO NORTH OF RAMP B/RAMP D



TANGENT SECTION

(BASED ON STD. DWG. RD-TS-6)
DIAMOND INTERCHANGE
S.R. 265 FROM NORTH OF RAMP B/RAMP D
TO END OF FULL BUILD

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

TYPICAL SECTIONS DIAMOND INTERCHANGE

N.T.S.

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

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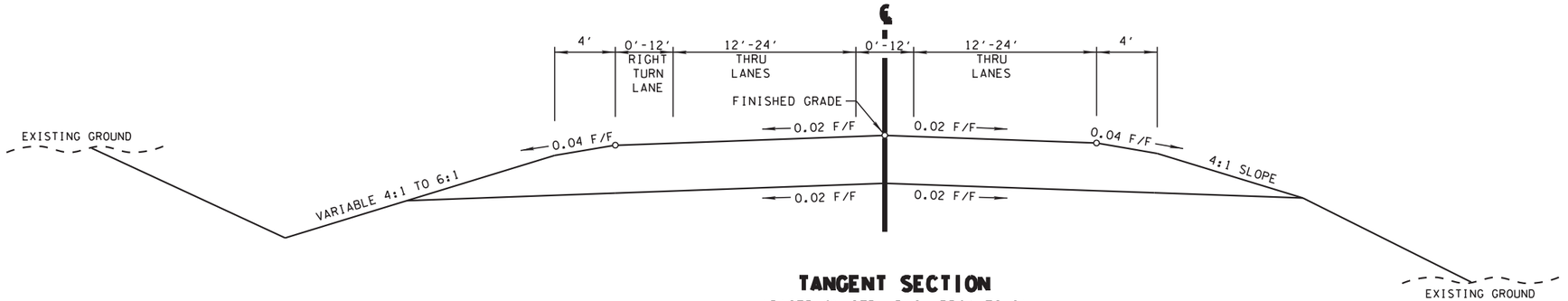
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.



TANGENT SECTION
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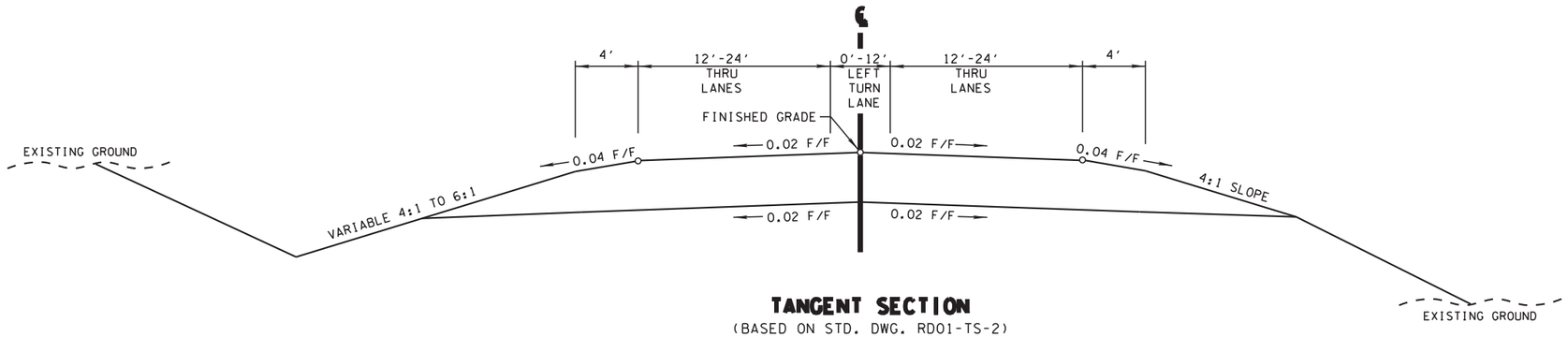
S.R. 265 NORTH OF I-40
FROM END OF FULL BUILD TO TILLMAN DRIVE



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-2)
S.R. 265 SOUTH OF I-40
FROM SOUTHERN TIE-IN TO ADAMS LANE

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DIAMOND INTERCHANGE
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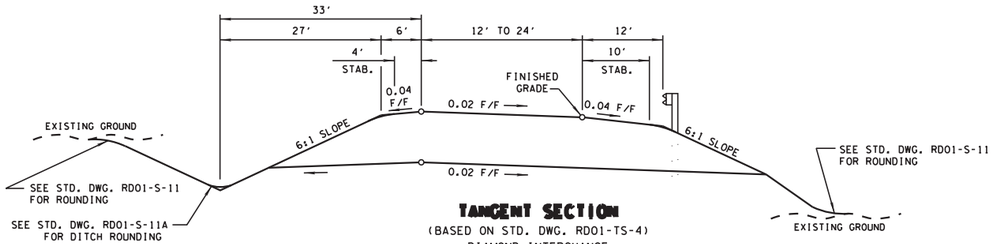

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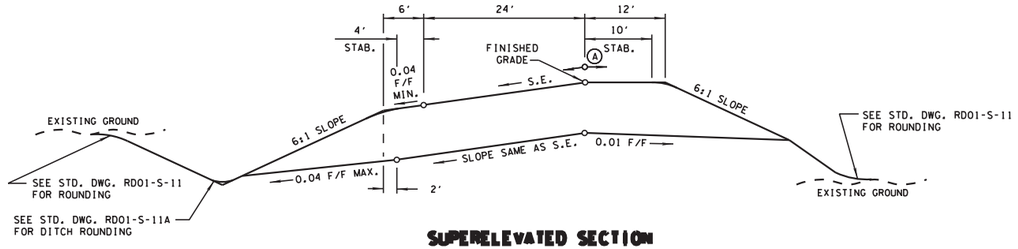
RAMP D



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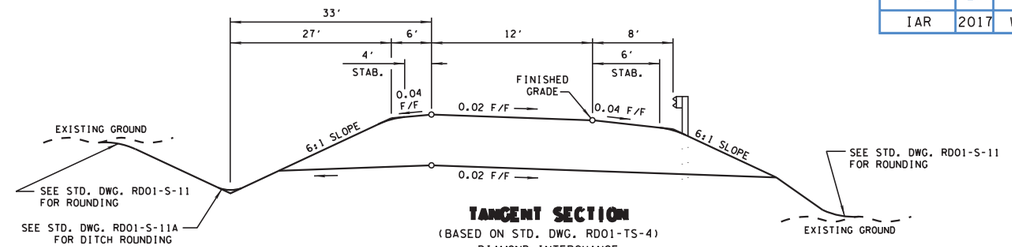

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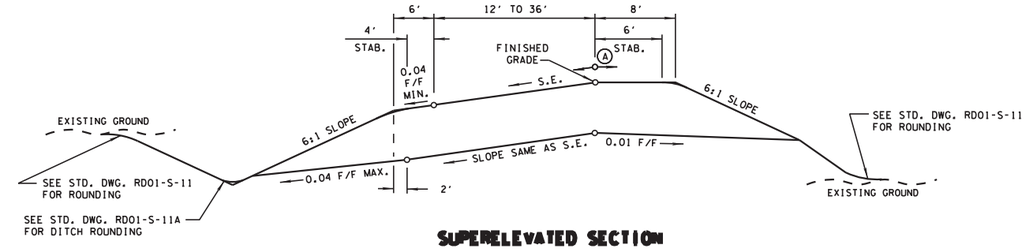
RAMP B



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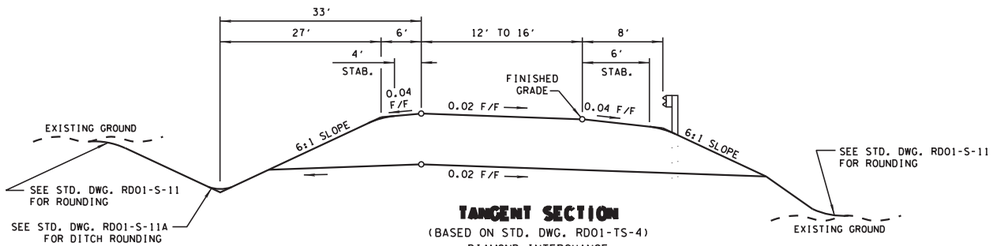
DIAMOND INTERCHANGE
RAMP B



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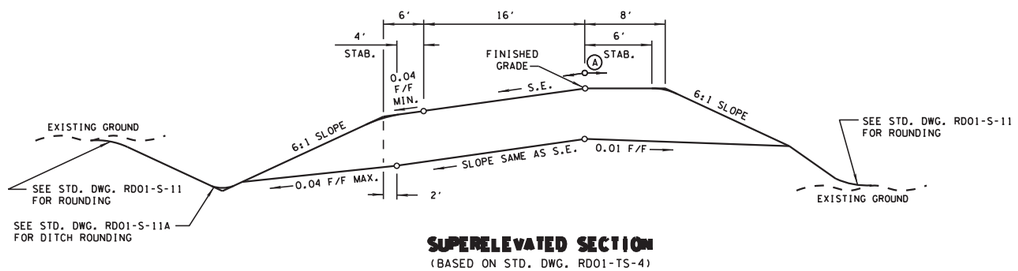
DIAMOND INTERCHANGE
RAMP C



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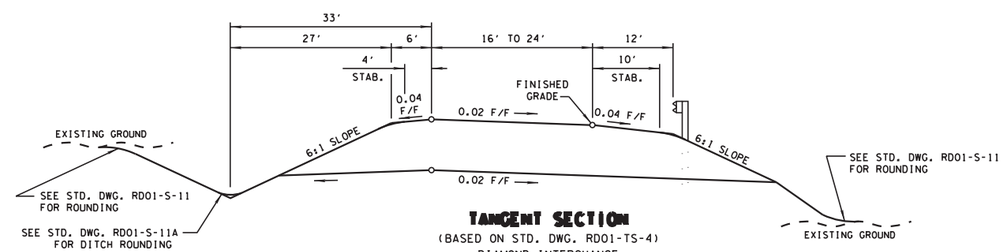
DIAMOND INTERCHANGE
RAMP C



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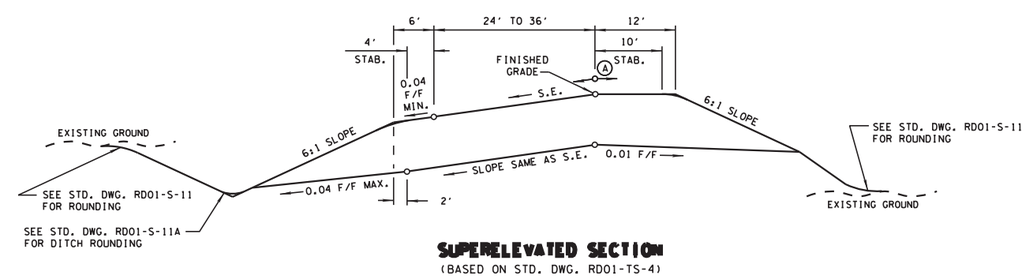
DIAMOND INTERCHANGE
RAMP A



SUPERELEVATED SECTION
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DIAMOND INTERCHANGE
RAMP A

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DIAMOND INTERCHANGE
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STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
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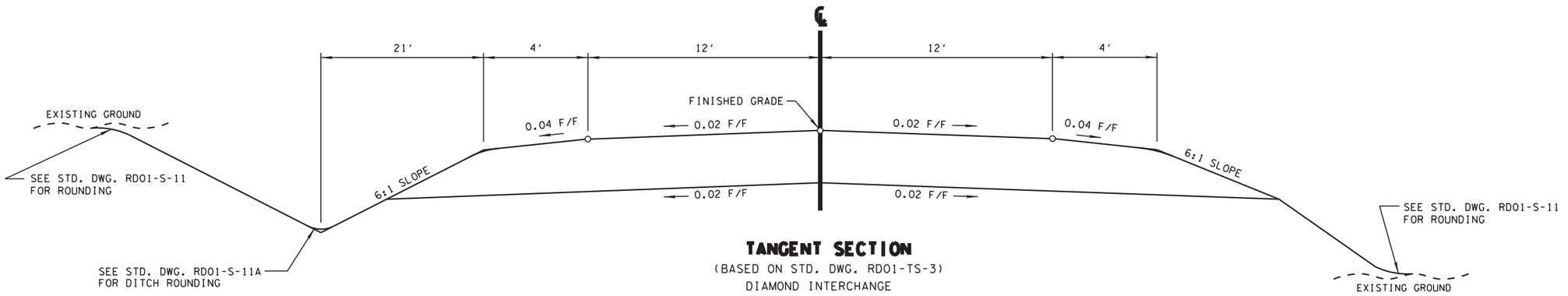

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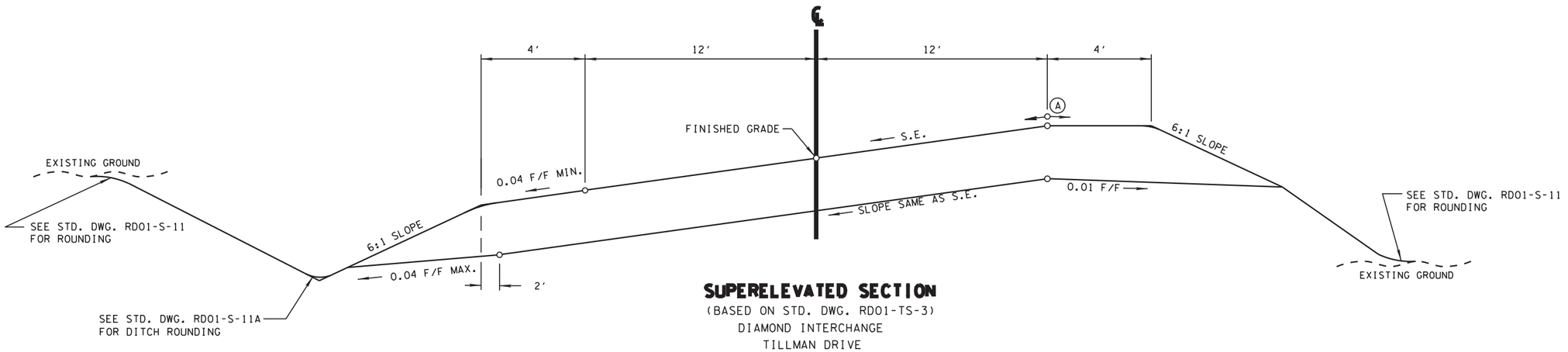
DIAMOND INTERCHANGE
TILLMAN DRIVE



SUPERELEVATED SECTION
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DIAMOND INTERCHANGE
TILLMAN DRIVE

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DIAMOND INTERCHANGE
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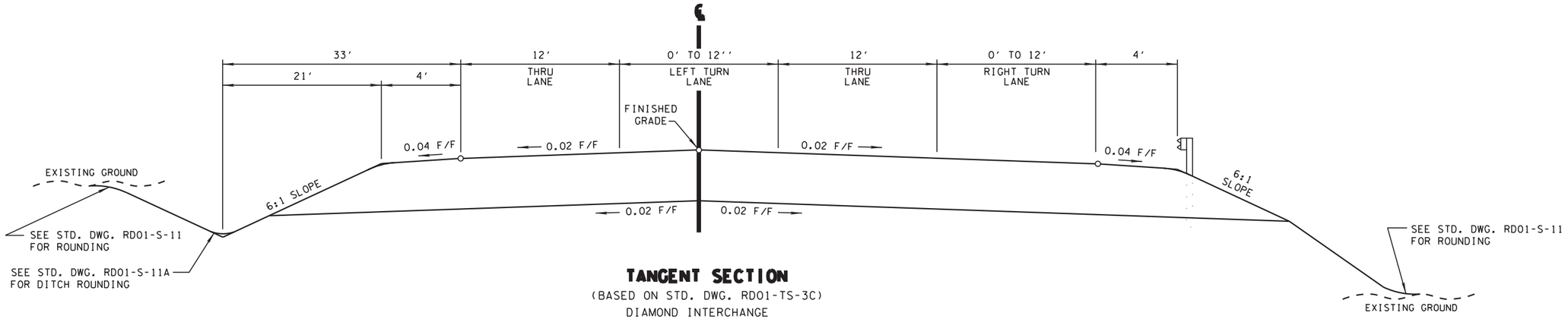

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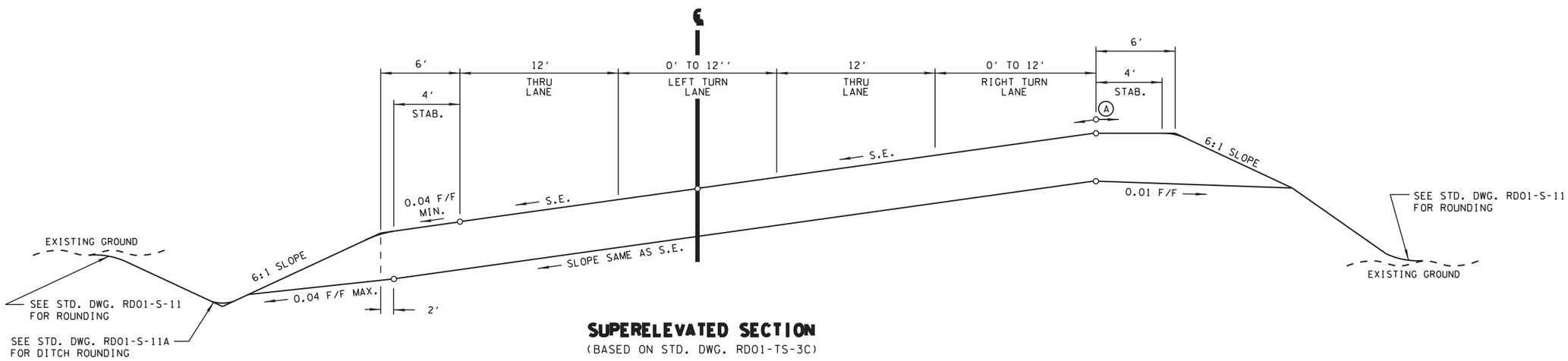
DIAMOND INTERCHANGE
JOHN HAGAR ROAD
ADAMS LANE



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DIAMOND INTERCHANGE
JOHN HAGAR ROAD
ADAMS LANE

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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DIAMOND INTERCHANGE
N.T.S.

TYPE	YEAR	COUNTY	FIGURE NO.
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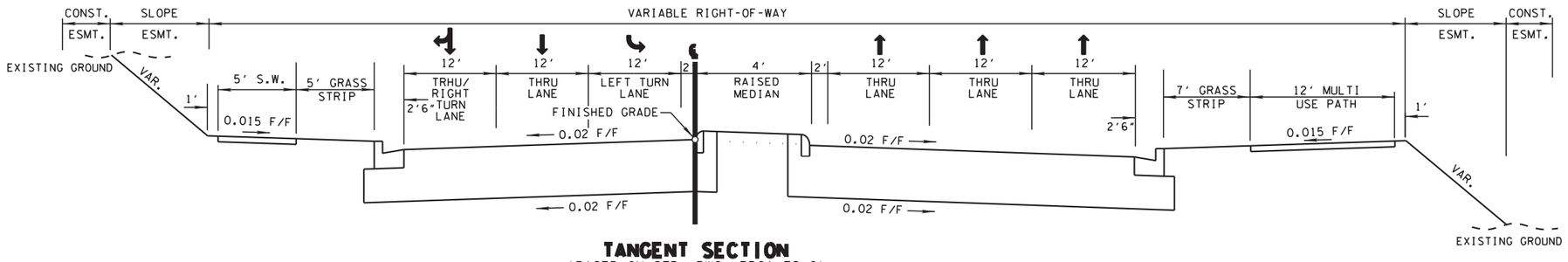
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.



TANGENT SECTION
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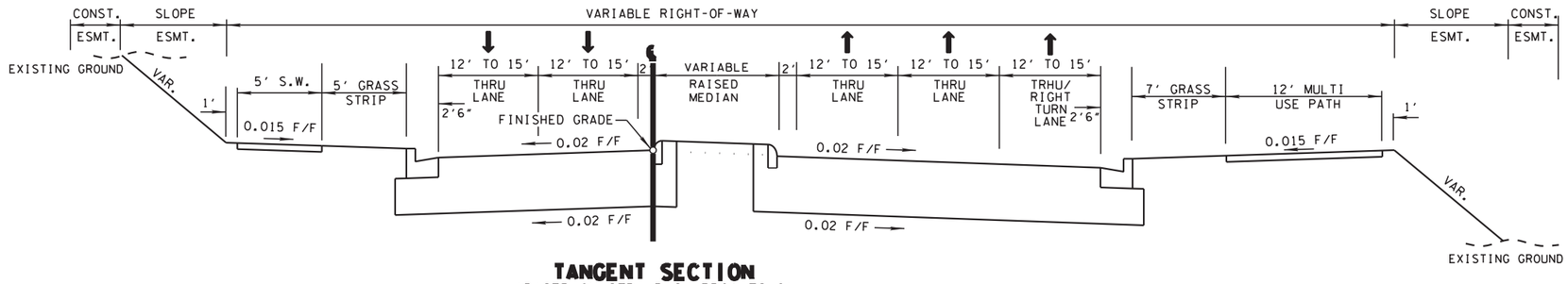
DIVERGING DIAMOND INTERCHANGE
S.R. 265 FROM ADAMS LANE
TO NORTH OF ADAMS LANE



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-6)
DIVERGING DIAMOND INTERCHANGE
S.R. 265 FROM NORTH OF ADAMS LANE
TO SOUTHERN CROSS OVER

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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TYPE	YEAR	COUNTY	FIGURE NO.
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TENNESSEE D.O.T.
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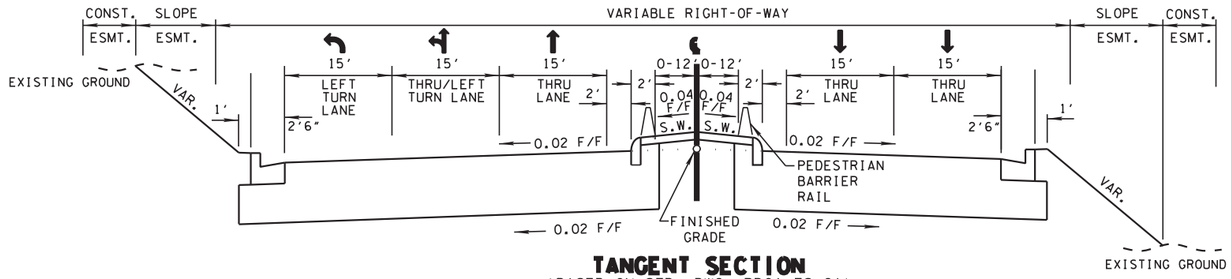

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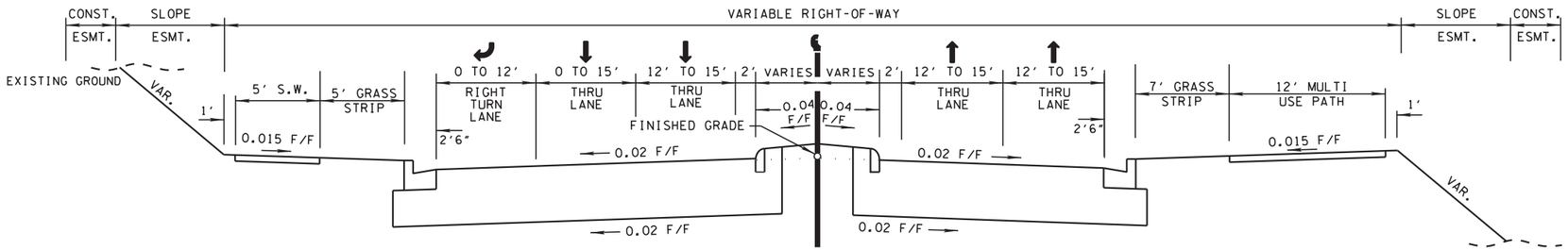
DIVERGING DIAMOND INTERCHANGE
S.R. 265 FROM SOUTHERN CROSS OVER
TO NORTHERN CROSS OVER



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-6)
DIVERGING DIAMOND INTERCHANGE
S.R. 265 FROM NORTHERN CROSS OVER
TO END OF FULL BUILD

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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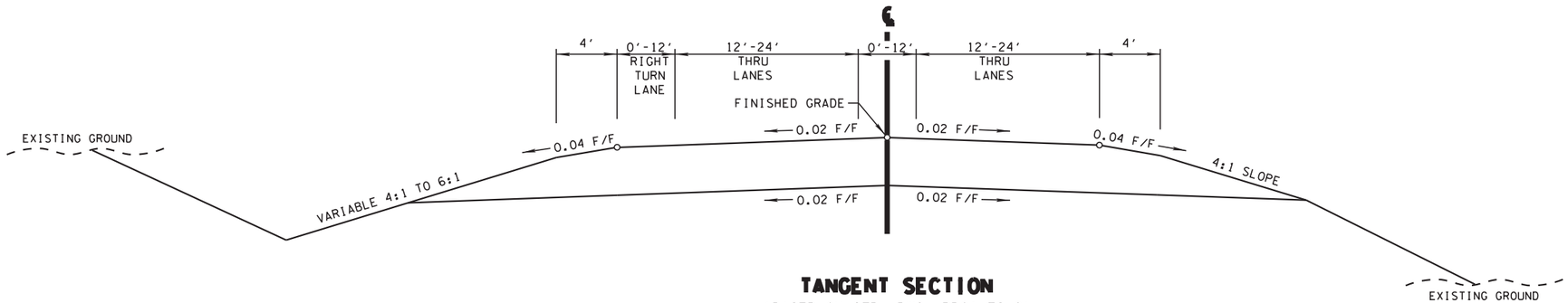
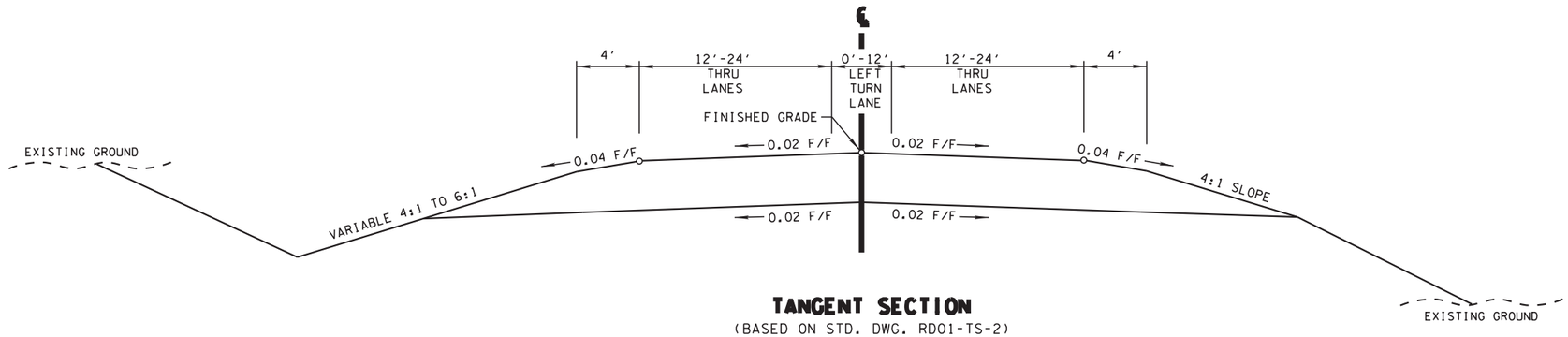


TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-2)
S.R. 265 NORTH OF I-40
FROM END OF FULL BUILD TO TILLMAN DRIVE



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-2)
S.R. 265 SOUTH OF I-40
FROM SOUTHERN TIE-IN TO ADAMS LANE

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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

N.T.S.

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

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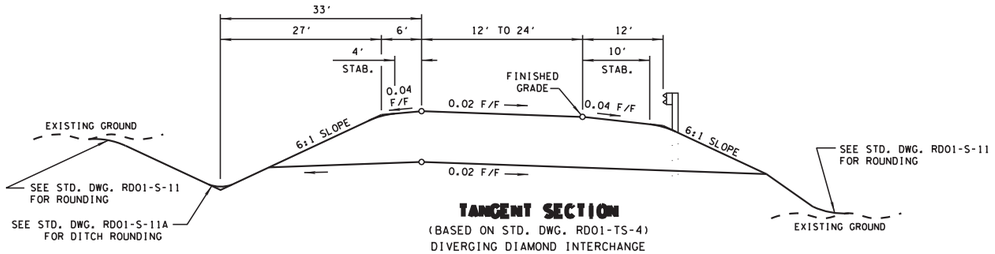
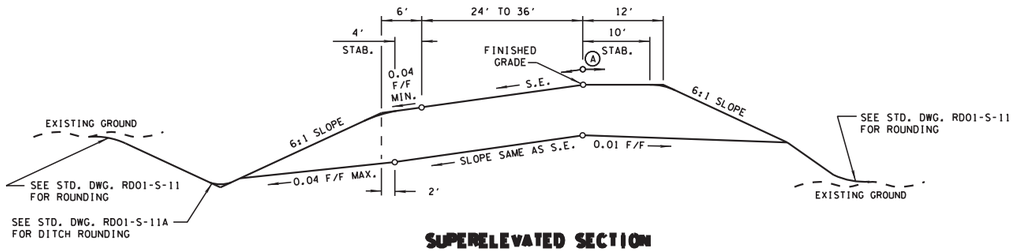
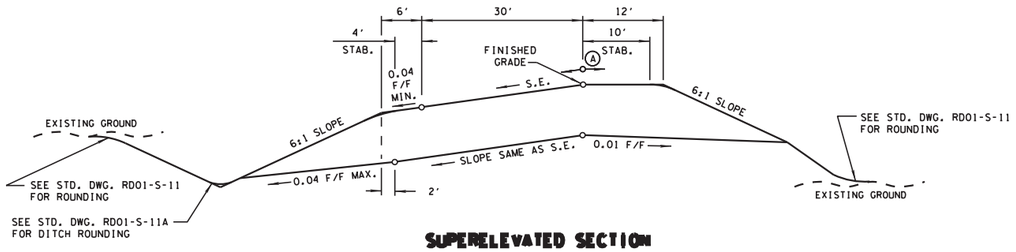


TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. MERGED ENTRANCE RAMP

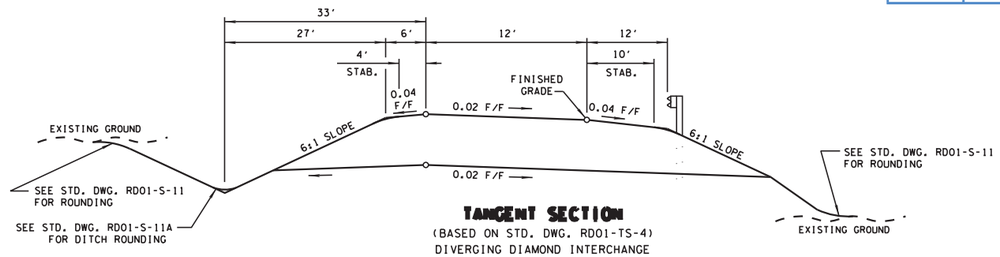


SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. MERGED ENTRANCE RAMP

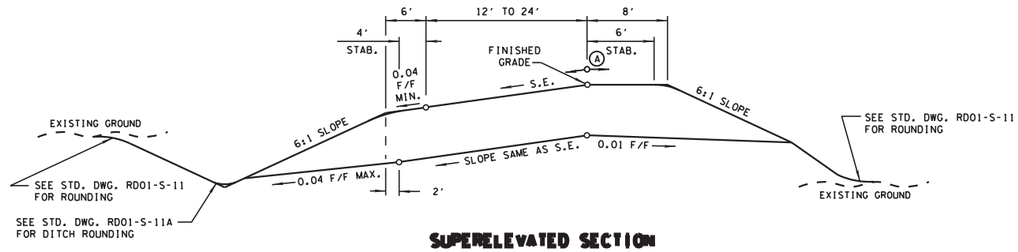
SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. ENTRANCE RAMP FROM S.R. 265 S.B.



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. ENTRANCE RAMP FROM S.R. 265 N.B.

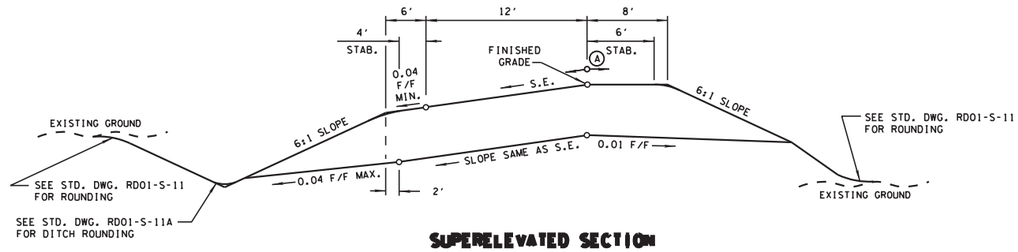


TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. EXIT RAMP BEFORE SPLIT



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. EXIT RAMP BEFORE SPLIT

SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. EXIT RAMP TO S.R. 265 S.B.



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 W.B. EXIT RAMP TO S.R. 265 N.B.

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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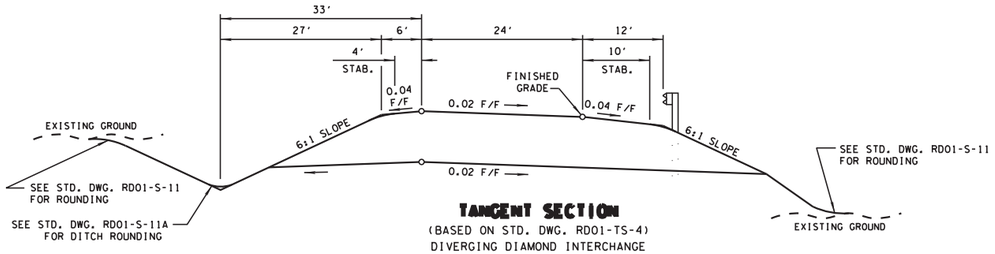
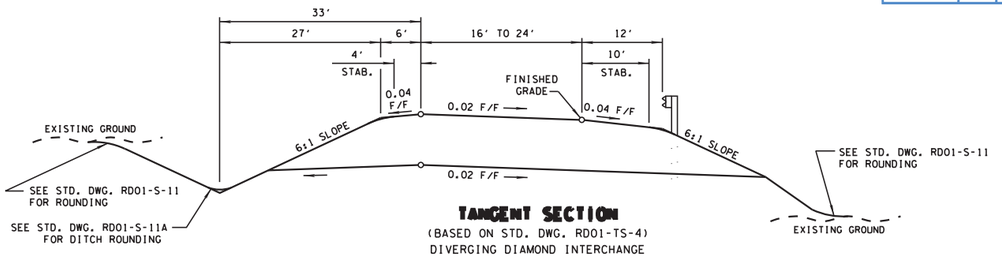
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

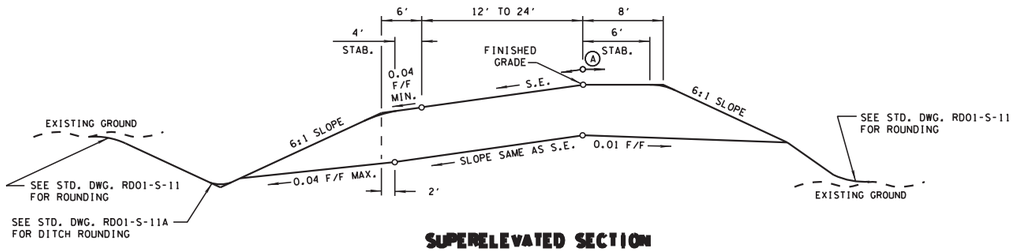
TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	2J



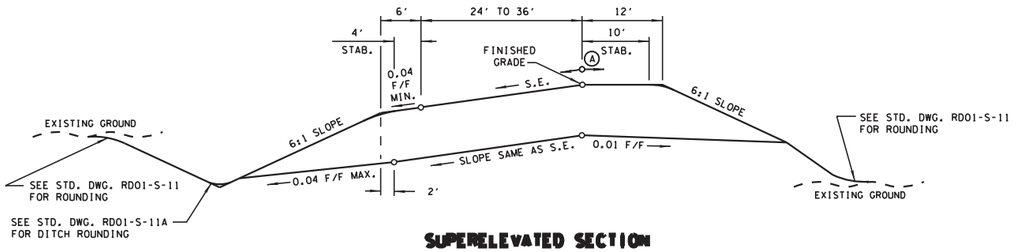
TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. MERGED ENTRANCE RAMP



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. EXIT RAMP BEFORE SPLIT



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. MERGED ENTRANCE RAMP



SUPERELEVATED SECTION
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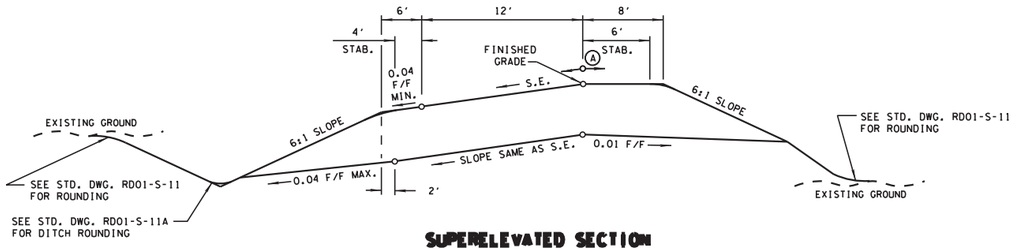
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. EXIT RAMP BEFORE SPLIT



SUPERELEVATED SECTION
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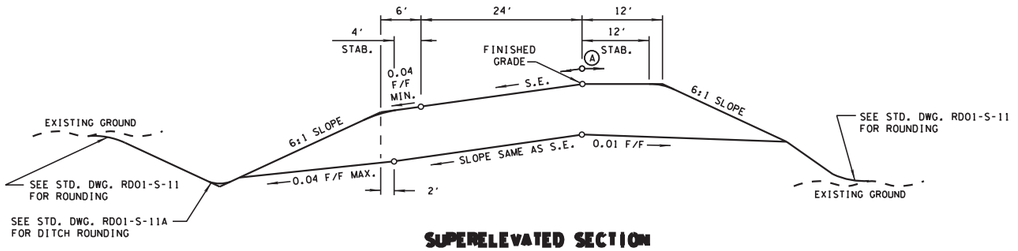
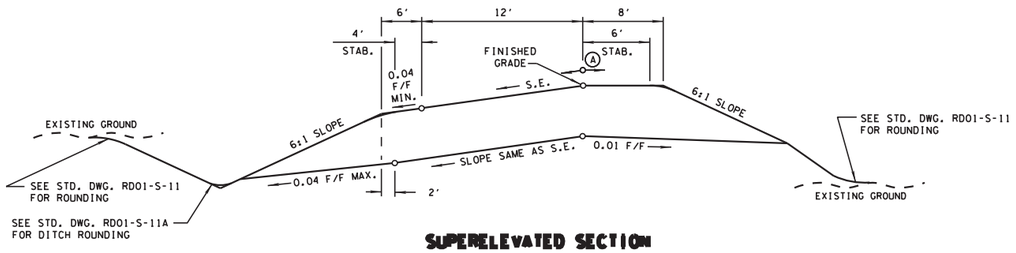
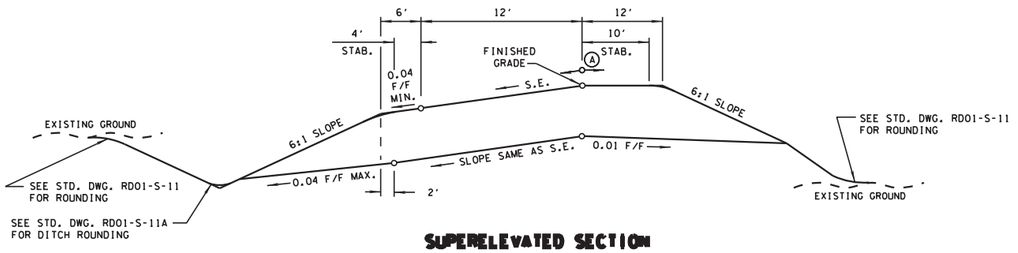
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. ENTRANCE RAMP FROM S.R. 265 S.B.



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. EXIT RAMP TO S.R. 265 S.B.



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. ENTRANCE RAMP FROM S.R. 265 N.B.



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-4)
DIVERGING DIAMOND INTERCHANGE
I-40 E.B. EXIT RAMP TO S.R. 265 N.B.

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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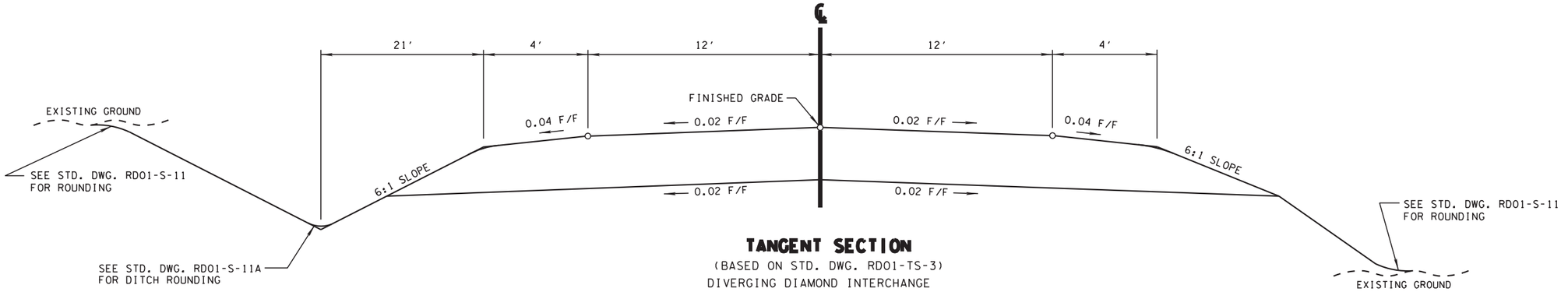
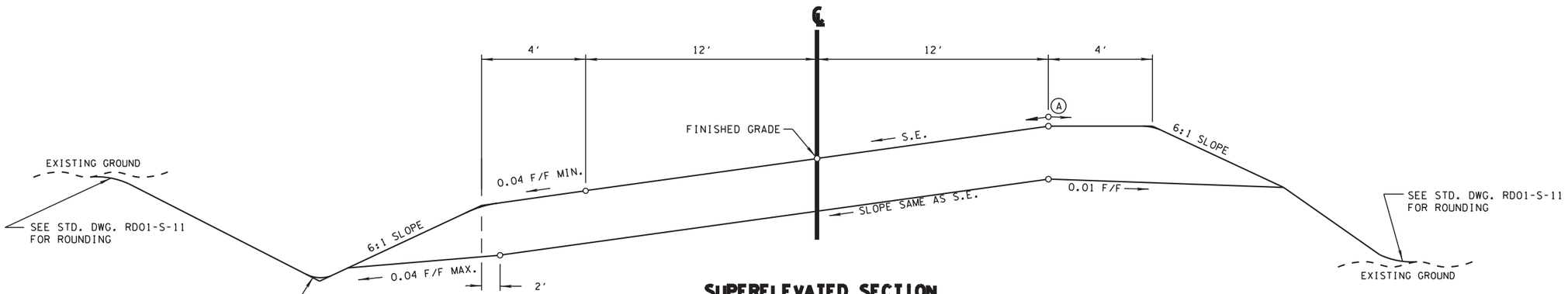
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	2K



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-3)
DIVERGING DIAMOND INTERCHANGE
TILLMAN DRIVE



SUPERELEVATED SECTION
(BASED ON STD. DWG. RD01-TS-3)
DIVERGING DIAMOND INTERCHANGE
TILLMAN DRIVE

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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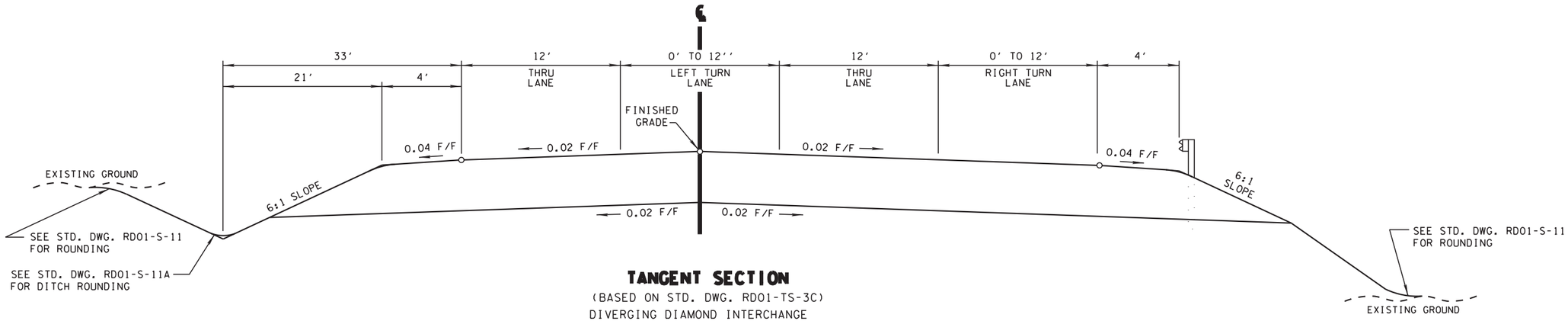
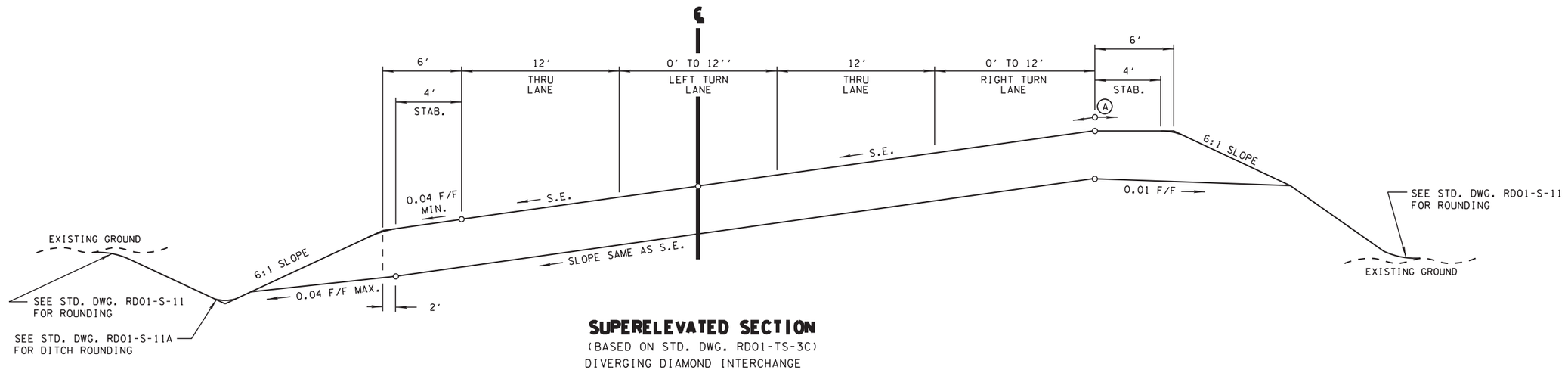
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	2L



TANGENT SECTION

(BASED ON STD. DWG. RD01-TS-3C)
DIVERGING DIAMOND INTERCHANGE
JOHN HAGAR ROAD
ADAMS LANE



SUPERELEVATED SECTION

(BASED ON STD. DWG. RD01-TS-3C)
DIVERGING DIAMOND INTERCHANGE
JOHN HAGAR ROAD
ADAMS LANE

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

TYPICAL SECTIONS DDI

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TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	3



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 3
DIAMOND INTERCHANGE

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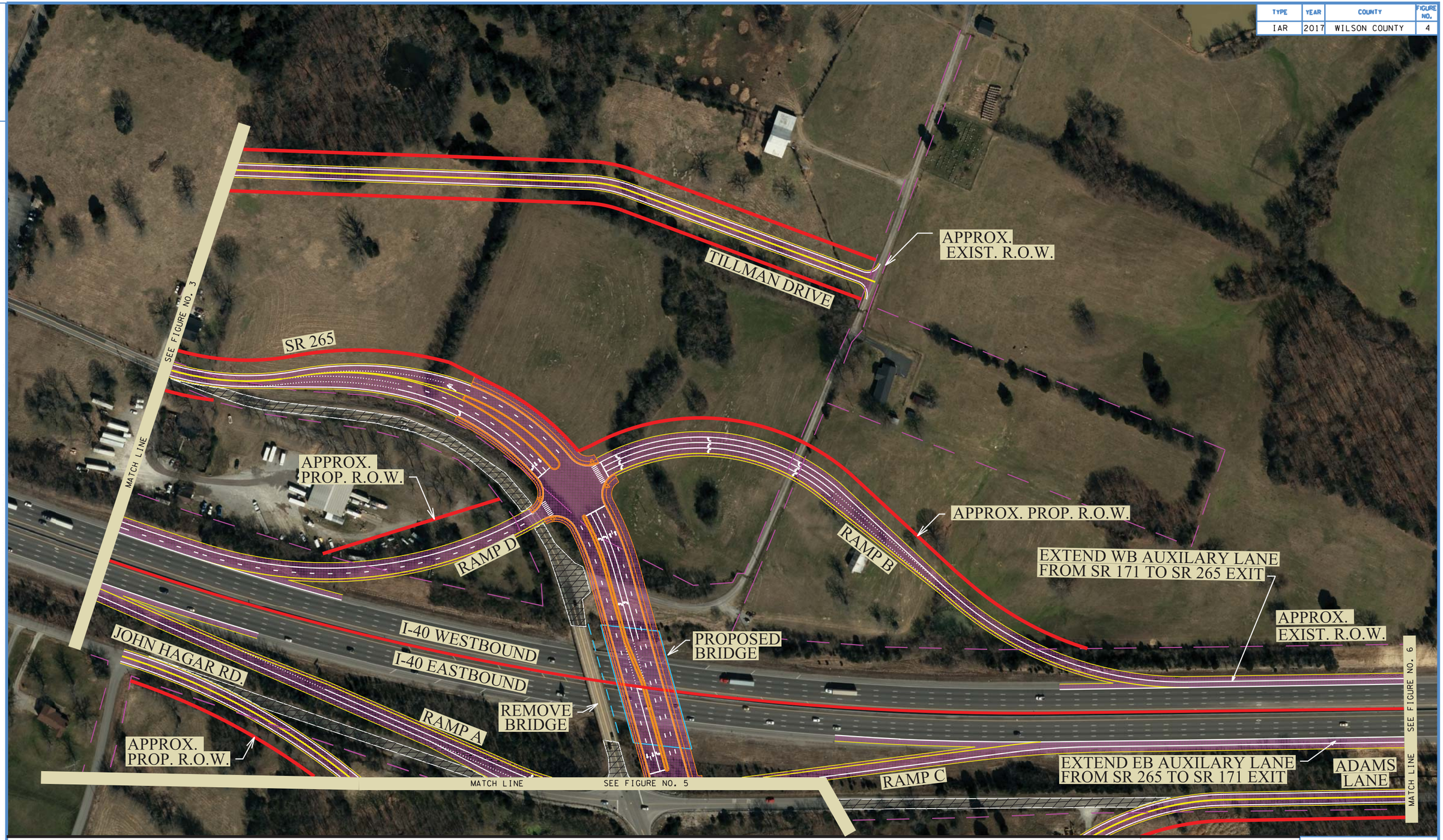
TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	4



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 4
DIAMOND INTERCHANGE

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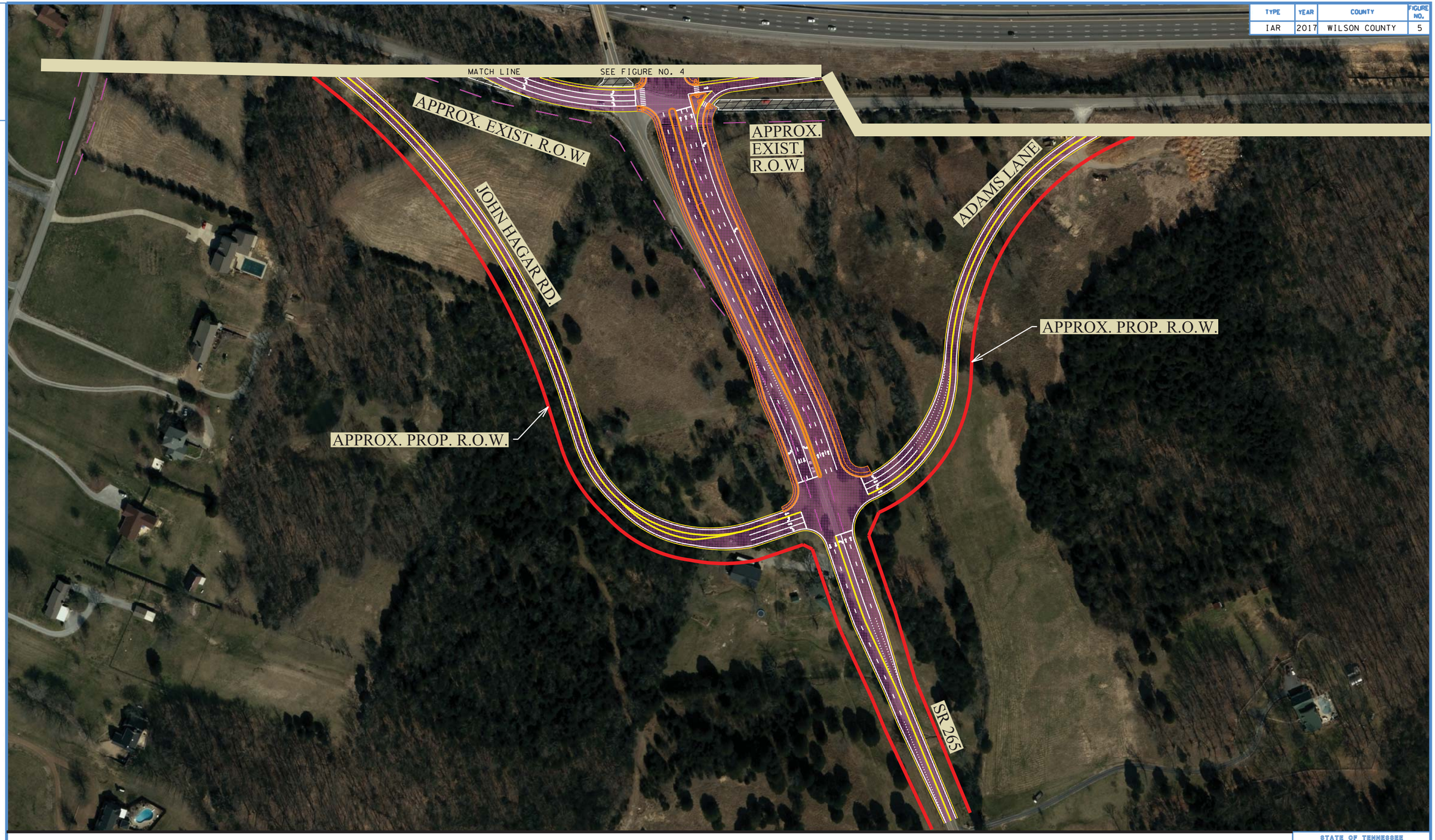
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	5



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 5
DIAMOND INTERCHANGE

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TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	6



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 6
DIAMOND INTERCHANGE

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TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	7



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 7
DIVERGING DIAMOND INTERCHANGE

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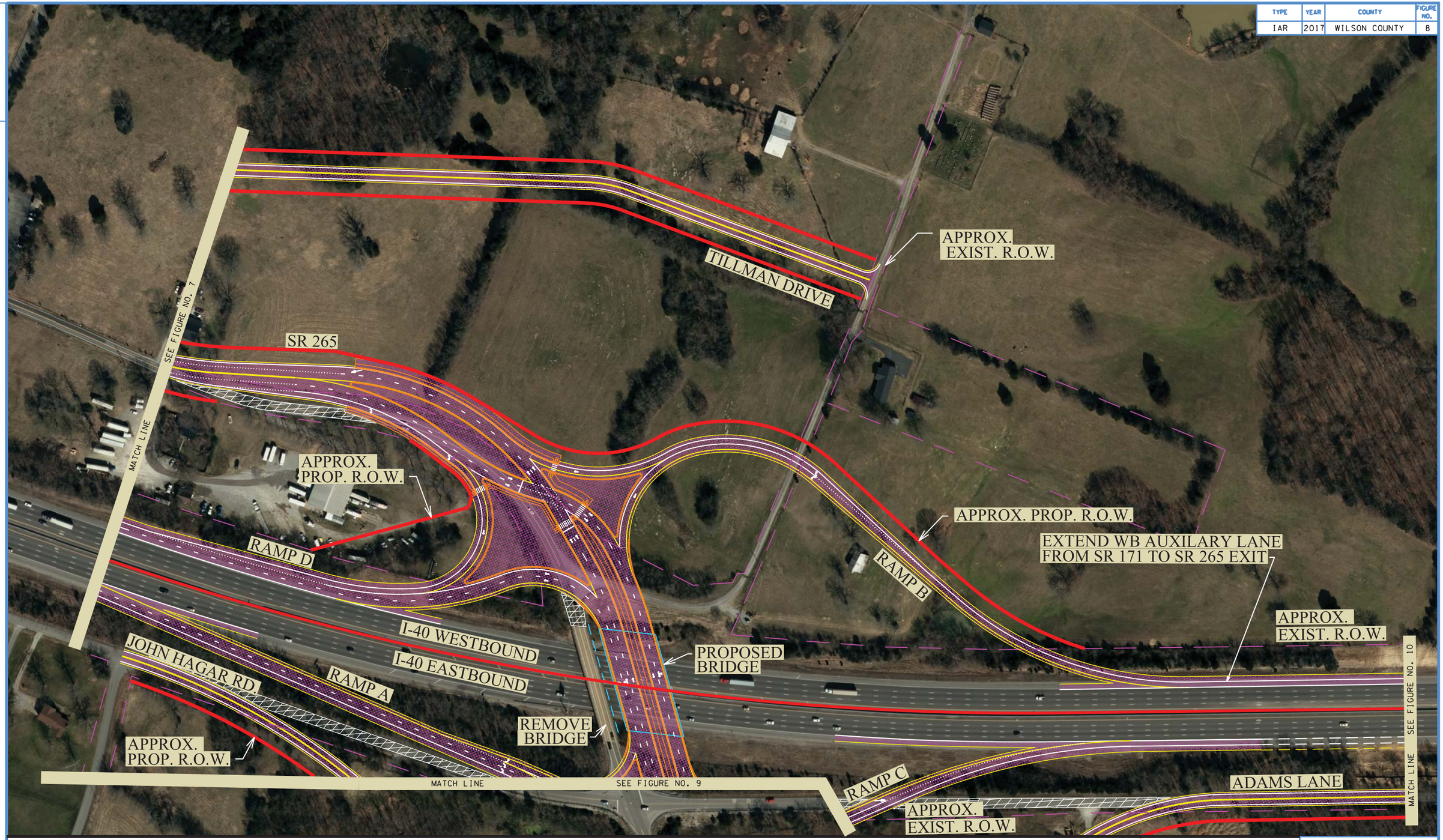
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	8



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 8
DIVERGING DIAMOND INTERCHANGE

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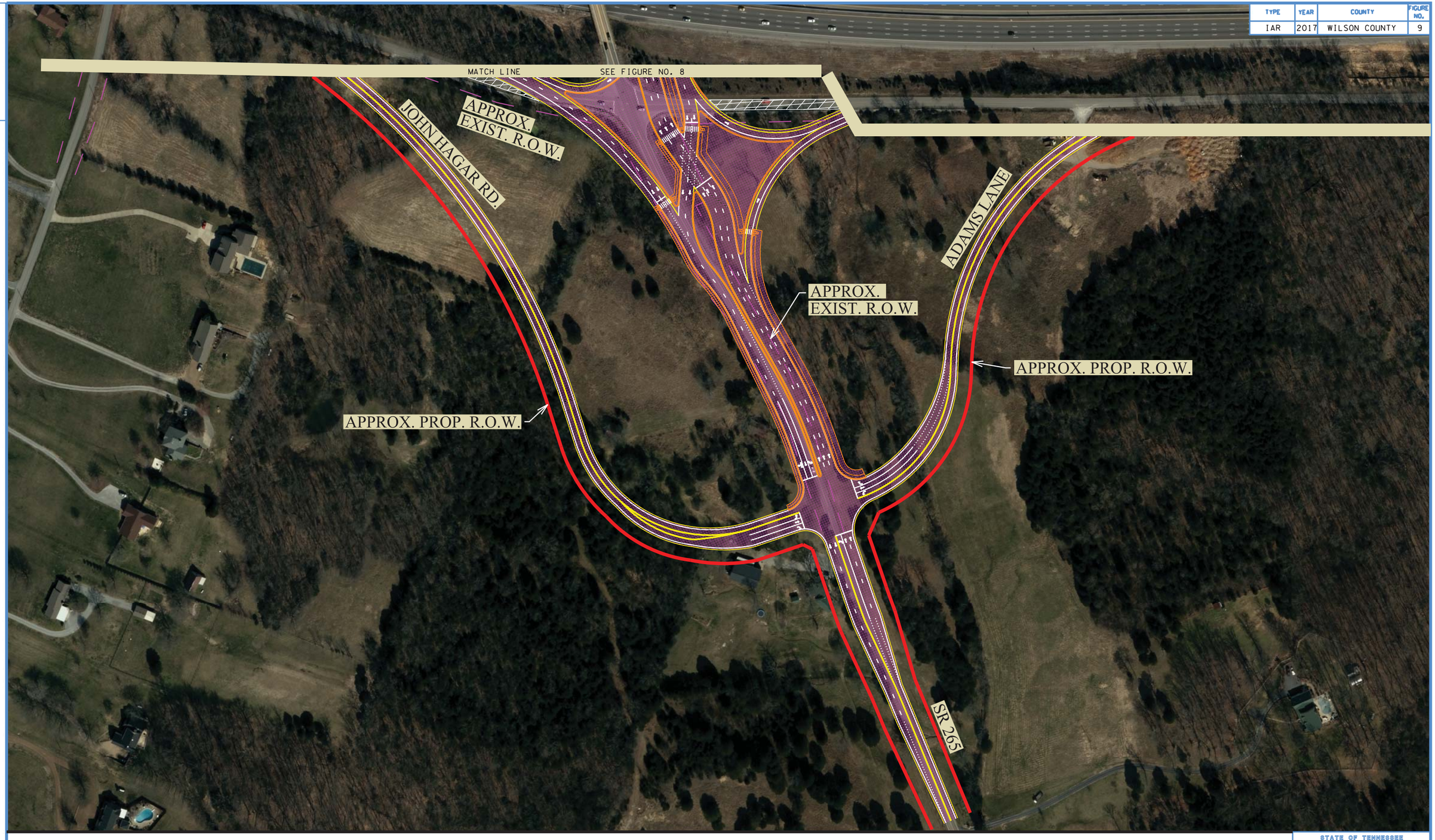
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	9



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 9
DIVERGING DIAMOND INTERCHANGE

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TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	10



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 10
DIVERGING DIAMOND INTERCHANGE

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11.0 CONCEPTUAL SIGNING PLANS

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S1



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE S1
DIAMOND SIGNING LAYOUT

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TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S2

TILLMAN DRIVE
APPROX. EXIST. R.O.W.
SR 265
SHARE THE ROAD
SR 265
SOUTH 265
DO NOT ENTER
WRONG WAY
SEE FIGURE NO. S1
MATCH LINE
EAST NASHVILLE 40
WEST NASHVILLE 40
WEST 40
RAMP D
NASHVILLE WEST 40
RAMP B
EXIT 225
APPROX. EXIST. R.O.W.
EXIT 225 CENTRAL PIKE 265
I-40 WESTBOUND
I-40 EASTBOUND
EAST 40
WEST 40
RAMP A
WRONG WAY
EAST KNOXVILLE 40
EXIT 225
JOHN HAGAR RD.
RAMP C
MATCH LINE
SEE FIGURE NO. S3
APPROX. EXIST. R.O.W.
ADAMS LANE
MATCH LINE
SEE FIGURE NO. S4

0' 200' 400' 600'

N

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE S2 DIAMOND SIGNING LAYOUT

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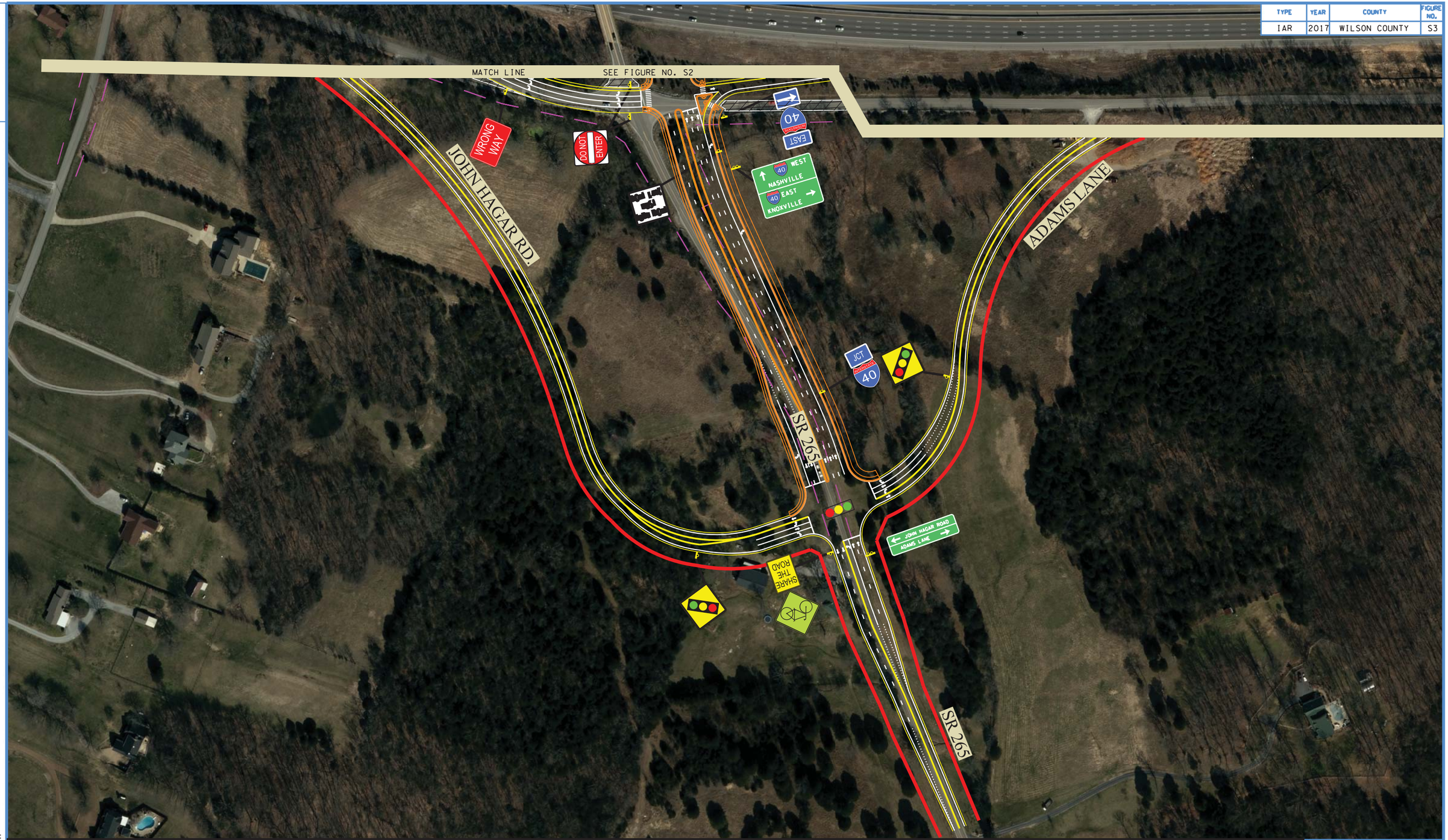
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S3



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE S3
DIAMOND SIGNING LAYOUT

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TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S4



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N

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE S4
DIAMOND SIGNING LAYOUT

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TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S5



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE S5
DDI
SIGNING
LAYOUT

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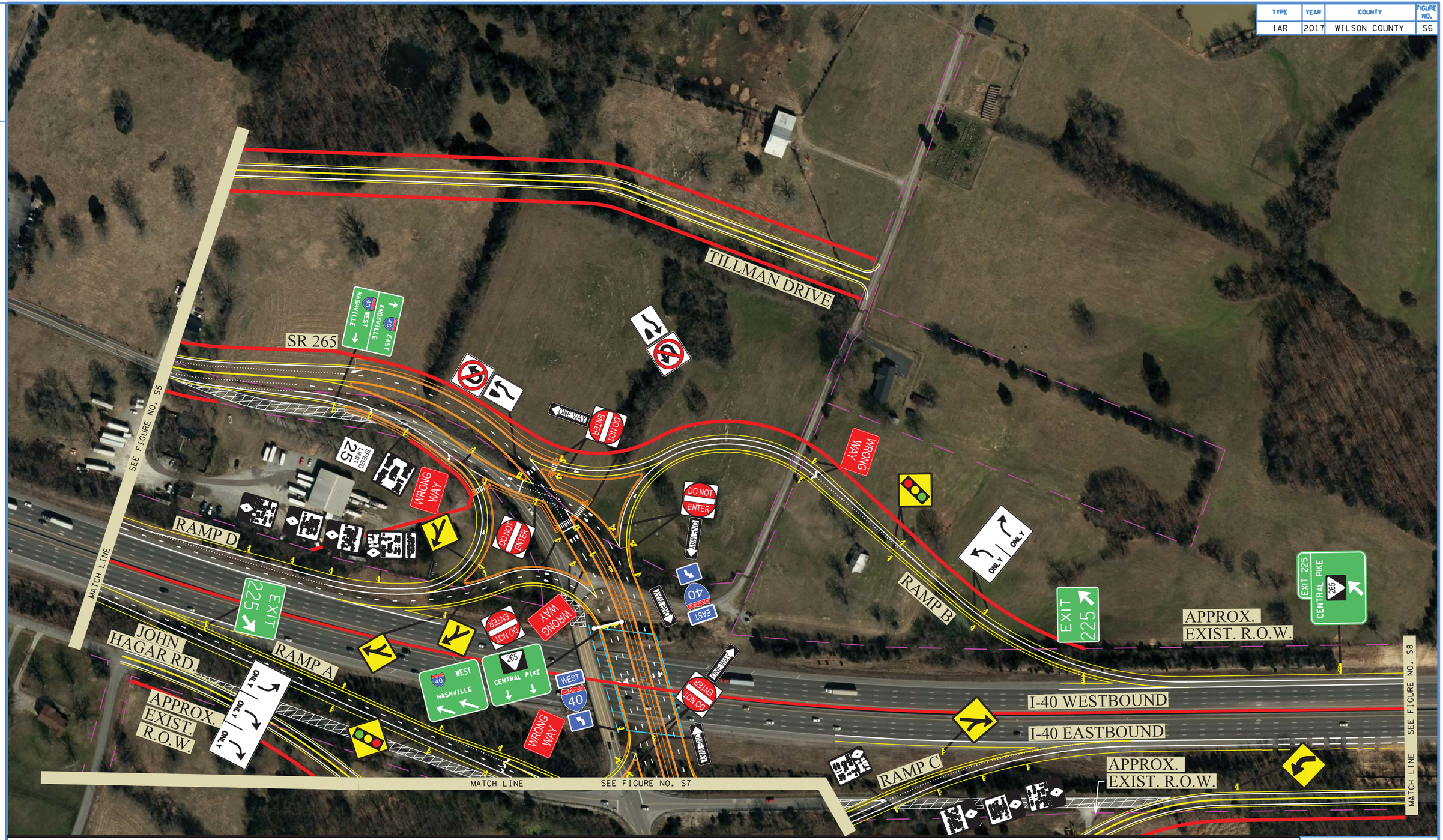
TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S6



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE S6
DDI
SIGNING
LAYOUT

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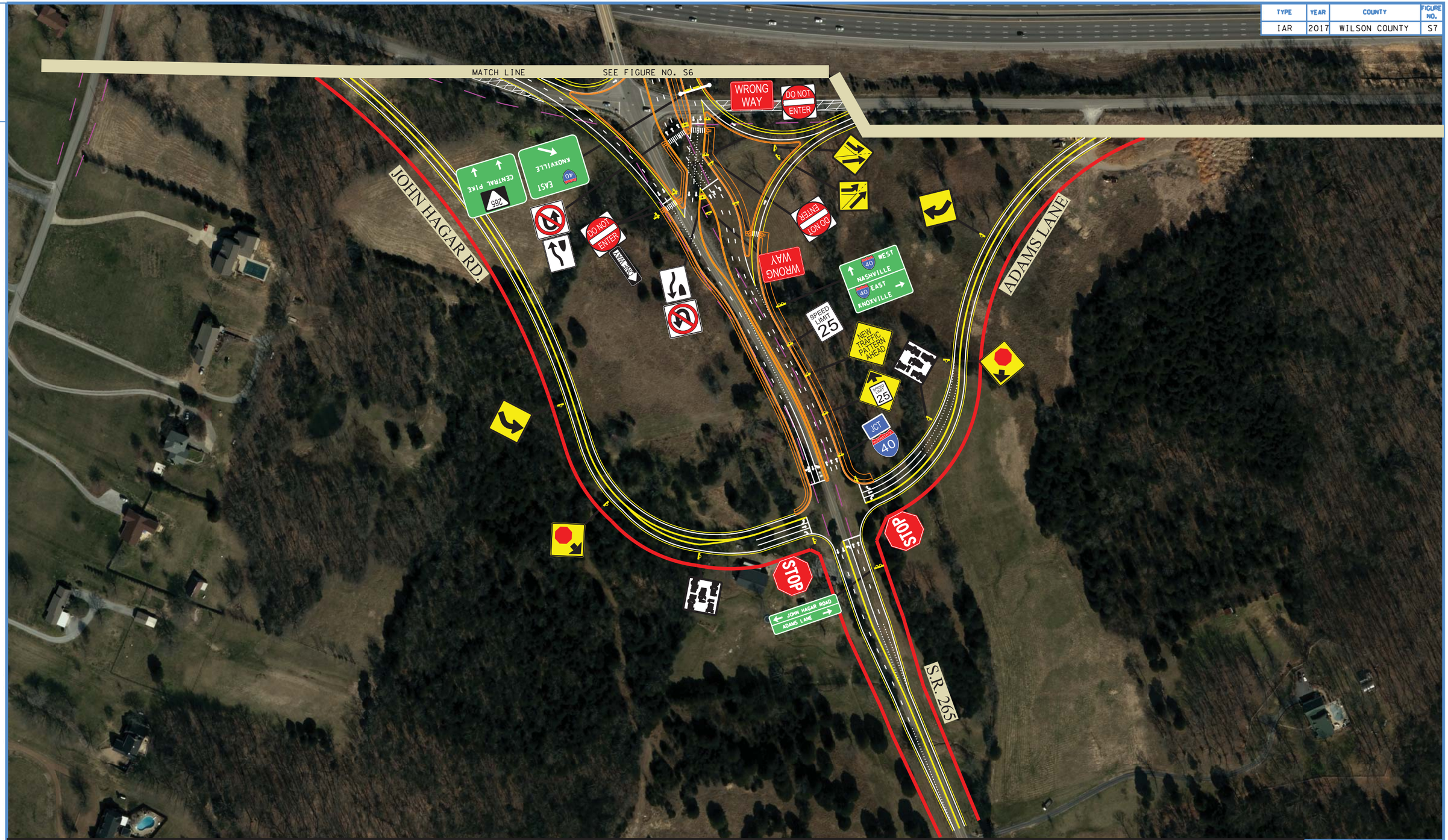
TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S7



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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE S7
DDI SIGNING LAYOUT

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TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2017	WILSON COUNTY	S8



0′ 200′ 400′ 600′

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INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

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ATTACHMENT A: COMJ LETTER OF SUPPORT

ED HAGERTY
MAYOR

JAMES MANESS
VICE-MAYOR

KENNY MARTIN
CITY MANAGER

CITY OF MT. JULIET

COMMISSIONERS

BRIAN ABSTON
ART GILES
RAY JUSTICE

Mr. Paul Degges, P.E.
Chief Engineer
Tennessee Department of Transportation
Suite 700, James K. Polk Building
Nashville, TN 37243

RE: I-40 Interchange at Central Pike (SR-265)

Dear Mr. Degges:

I am writing to support efforts of TDOT on the planning, design, and construction of a new interchange on Interstate 40 at Central Pike (SR-265) in Mt. Juliet and to obtain approval from the Federal Highway Administration for the project. We appreciate the opportunity to coordinate with TDOT on the project and also want to commend your staff for their hard work.

With the exponential growth occurring in Mt. Juliet and of the greater metropolitan Nashville region, we are presently experiencing traffic capacity issues on Mt. Juliet Road (SR-177) with much of the traffic utilizing the existing interchange with Interstate 40. The interchange has served the City and TDOT well over its history, but improved local and regional access from the two area State Routes to the Interstate is now needed. In the area of the proposed interchange, the approved Providence Central development proposes to add over 30,000 daily trips from a mix of office, retail, and residential land uses. In conjunction with this development, the realignment of Adams Lane and the extension of Providence Parkway will aid in the construction of the interchange.

The proposed interchange will result in a dramatic, positive impact to the City as well as western Wilson County and we appreciate TDOT's funding and support of this proposal. Not only will the new Central Pike (SR-265) interchange with Interstate 40 support economic growth, it will also help to meet the current and future traffic demands from area land uses. Again, we appreciate your support and coordination of the project and look forward to partnering with you through the development and construction of the interchange.

Sincerely,

Ed Hagerty, Mayor
City of Mt. Juliet

P.O. Box 256 • Mt. Juliet, TN 37121 • (615) 754-2552 • Fax (615) 754-5742

ATTACHMENT B: COMJ LETTER OF COMMITMENT FOR ACCESS MANAGENET ALONG SR 265

City of Mt. Juliet

September 28, 2017

Mr. Paul Degges
Deputy Commissioner and Chief Engineer
Tennessee Department of Transportation
Suite 700, James K. Polk Building
Nashville, TN 37243

RE: I-40 Interchange at Central Pike (SR-265)

Dear Mr. Degges:

I am writing in support of efforts by TDOT for access management on Central Pike (SR-265) in the area of the proposed interchange on Interstate 40 at Central Pike (SR-265). We appreciate the opportunity to coordinate with TDOT on access management and also want to commend your staff for their hard work. We agree that regardless of how much the roadway network is expanded, the benefits will be short-lived unless proper access control is achieved.

The City of Mt. Juliet has recently undertaken efforts to complete a comprehensive transportation plan. As part of the plan, access management guidelines have been put in place to control the distances of full and partial access to roadways based on speed. This will apply to all roadway designs and development proposals that affect state or local roadways within the City's jurisdiction.

Specific to Central Pike (SR-265), we agree and support TDOT's efforts to prohibit any full access points within 1,200 feet of the interchange. For this roadway, this distance meets the City's guidelines for full access points. This will ensure to preserve roadway capacity in the area of the interchange by providing appropriate signal spacing and protecting the safety of the roadway.

Again, we appreciate your support and coordination of the project and look forward to partnering with you through the development and construction of the interchange and surrounding network connections.

Sincerely,

Ed Hagerty, Mayor
City of Mt. Juliet

71 E. Hill Street | Mt. Juliet, TN 37122 | (615) 773-7957 | Fax (615) 773-6286

ATTACHMENT C:
TDOT PROJECT DEVELOPMENT CONCURRENCE LETTER

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
REGION 3
6601 CENTENNIAL BOULEVARD
NASHVILLE, TENNESSEE 37243
(615) 350-4300

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Steve Allen, Director, Strategic Transportation Investments Division

FROM: David Layhew, Assistant Chief Engineer, Region 3

DATE: October 10, 2016

SUBJECT: Interstate Access Request
Interstate 40 at SR-265 (Central Pike)
PIN 104360.00
Wilson County

The Interstate Access Request for the subject project has been received by my office and we concur with the conceptual plan for both alternatives.

Please notify me if you need further assistance.

JD:dl

Cc: Joe Deering
Jim Waters
Ron Baker
Shaun Armstrong

ATTACHMENT D: NASHVILLE AREA MPO RTP LISTINGS

Nashville Area MPO - 2040 Regional Transportation Plan
Cost-Feasible Project List, 2016 to 2040

RTP ID	Need ID	TIP ID (PIN)	County	Lead Agency	Project Type	Project Name and Description	Miles	Horizon	Grant/ Source	Federal Funding	State Funding	Local Funding	Total Amount
1052-273	1243	2011-510-017	Sumner	Gallatin	Roadway Widening	Airport Road Widening, 2 to 4 lanes, from SR-109 to Hartsville Pk (SR-25)	3.8	2030	O-STP	$ 21.47	$ -	$ 5.37	$ 26.84
1652-176	1431		Sumner	TDOT	Roadway Widening	I-65 Widening (Seg 1), 4 to 6 lanes, SB only from Blue Star Rd (US 31) to Bethel Rd (SR-257)	4.8	2030	NHPP	$ 53.68	$ 13.42	$ -	$ 67.10
1652-177	1376		Sumner	Hendersonville	Roadway Widening	Indian Lake Rd Widening, 2 to 5 lanes, from E Main St to Crosby/Pin Oak Dr	0.5	2030	O-STP	$ 6.44	$ -	$ 1.61	$ 8.05
1652-178	1277		Sumner	TDOT	Roadway Widening	NET Corridor Section 2A - Vietnam Veterans Pkwy (SR-386) Multi Modal Widening, 4 to 6 lanes, from US 31E/Saundersville Rd to SR 109 Bypass	7.0	2030	NHPP	$ 105.21	$ 26.30	$ -	$ 131.52
1052-176	1254		Sumner	Hendersonville	Roadway Widening	New Shackle Island Rd (SR-258) Widening (Phase 2), 2 to 4 lanes, from Iris Dr to W Main St (US 31E)	1.3	2030	O-STP	$ 8.48	$ -	$ 2.12	$ 10.60
1652-179	1392		Sumner	Hendersonville	Roadway Reconstruct	Old Shackle Island Rd Reconstruction, 2 to 3 lanes, from Volunteer Dr to Wessington Dr	0.6	2030	O-STP	$ 6.44	$ -	$ 1.61	$ 8.05
1652-180	1221		Sumner	TDOT	Roadway Widening	Red River Rd (SR-174/SR 25) Widening, 2 to 4 lanes, near and across CSX RR	0.3	2030	O-STP	$ 4.29	$ -	$ 1.07	$ 5.37
1663-181	1175		Williamson	TDOT	Interchange New	I-65 New Interchange between Old Hickory Blvd (SR-254) and Concord Rd (SR-253)	-	2030	NHPP	$ 37.58	$ 9.39	$ -	$ 46.97
1666-182	1319		Williamson	Franklin	Roadway Multi-Modal	Murfreesboro Rd (SR-96) Sidewalks from Pinkerton Park to Mack Hatcher Pkwy (SR-397)	1.1	2030	O-STP	$ 0.86	$ -	$ 0.21	$ 1.07
1062-163	1174		Williamson	Brentwood	Roadway Reconstruct	Wilson Pik (SR-252) Reconstruction, 2 to 3 lanes, from Church St to Concord Rd (SR-253)	2.6	2030	S-STP	$ 20.94	$ 5.23	$ -	$ 26.17
1662-183	1195		Williamson	Spring Hill	Roadway Widening	Buckner Ln Widening, 2 to 5 lanes, from Duplex Road (SR-247) to Thompson's Station Rd	2.6	2030	S-STP	$ 35.43	$ 8.86	$ -	$ 44.29
1662-184	1204		Williamson	Spring Hill	Roadway Widening	Columbia Pk (SR-6/ US-31) Widening, 2 to 5 lanes, from Buckner Rd to Miles Johnson Pkwy	1.8	2030	S-STP	$ 26.84	$ 6.71	$ -	$ 33.55
1062-142	1359	2011-62-011	Williamson	Franklin	Roadway Widening	East McEwen Dr (Phase 4) Widening, 2 to 4 lanes, from near Cool Springs Blvd to Wilson Pk (SR-252)	1.5	2030	O-STP	$ 29.31	$ -	$ 7.33	$ 36.64
1062-138	1341		Williamson	Franklin	Roadway Widening	Lewisburg Pk (SR-106/ US 431) Widening (Phase 1), 2 to 4 lanes, from Mack Hatcher Pkwy (SR-397) to Donelson Creek Pkwy	0.7	2030	S-STP	$ 13.96	$ 3.49	$ -	$ 17.45
1073-256	1166		Wilson	TDOT	Interchange New	I-40 @ Central Pk (SR-265) Interchange	-	2030	NHPP	$ 24.16	$ 6.04	$ -	$ 30.19
1679-185	1427		Wilson	Lebanon	Roadway Maintenance	Main St (SR-26/US 70) Restriping, from 4 to 3 lanes, from Hartmann Dr/Tennessee Blvd to Sparta Pk/ High St	3.0	2030	S-STP	$ 0.54	$ 0.13	$ -	$ 0.67
1679-186	1381		Wilson	Lebanon	Roadway Reconstruct	SR-10/US-231 Reconstruction, 4 to 3 lanes, from High St (SR-26) to North Castle Heights	0.8	2030	S-STP	$ 2.15	$ 0.54	$ -	$ 2.68
1072-112	1346	2008-72-042	Wilson	Lebanon	Roadway Widening	Hartmann Dr Widening, 2 to 5 lanes, from Baddour Pkwy (SR-26) to Coles Ferry Pk	1.4	2030	O-STP	$ 6.44	$ -	$ 1.61	$ 8.05
1672-187	1167		Wilson	Mt. Juliet	Roadway Widening	Mt. Juliet Rd (SR-171) @ I-40 Bridge Widening	-	2030	O-STP	$ 13.75	$ -	$ 3.44	$ 17.19
1672-188	1165		Wilson	Mt. Juliet	Roadway Widening	S Mt. Juliet Rd (SR-171) Widening, 2 to 5 lanes, from Central Pk (SR-265) to Providence Pkwy	0.7	2030	S-STP	$ 5.90	$ 1.48	$ -	$ 7.38
1679-189	1379		Wilson	Lebanon	Roadway Reconstruct	SR-10/US-231 Widening, 2 to 3 lanes, from North Castle Heights to Tenear Dr	0.2	2030	S-STP	$ 1.40	$ 0.35	$ -	$ 1.74
1682-190	1170		Wilson/ Davidson	TDOT	Roadway Widening	Central Pike (SR-265) Widening, 2 to 5 lanes, from Old Hickory Blvd (SR-45) to Mt. Juliet Rd (SR-174)	5.4	2030	S-STP	$ 42.94	$ 10.74	$ -	$ 53.68
Mid-Term Horizon (2030) Totals										**$ 2,677.59**	**$ 518.07**	**$ 144.22**	**$ 3,339.88**

APPENDIX A: COMPREHENSIVE TRANSPORTATION PLAN



Mt. Juliet, Tennessee
Comprehensive Transportation Plan
2017



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Acknowledgments

Thank you to all of the organizations and individuals who committed their time, energy and resources to this effort. This study would not have been possible without the support of many throughout the process. On behalf of the City of Mt. Juliet, thanks to the diverse group of participants whose collective efforts are reflected in the Mt. Juliet Comprehensive Transportation Plan (CTP). These groups and individuals include the Transportation Advisory Committee, local staff and elected officials, the Nashville MPO, Tennessee Department of Transportation, numerous stakeholders, and the dedicated citizenry of the greater Mt. Juliet area. ***Thank you!***

City Officials

Ed Hagerty (Mayor)
Ray Justice (Commissioner)
James Maness (Commissioner/Vice Mayor)
Art Giles (Commissioner)
Brian Abston (Commissioner)

Transportation Plan Steering Committee

Tyler Chandler
Bill Robinson
Mark Hinesley
William Anderson
Art Giles
Mary Connelly
Pam Perry
Kelly Morgan

Mt. Juliet Planning & Engineering

Andy Barlow
Jessica Gore
Rob Ealy
Bo Logan

Stantec Consulting Team

Mike Rutkowski
Cherie Akers
Scott Lane
Erin Convery
Amanda Morrell
Matt Noonkester
Michelle Peele
Chandler Hagen
Jaquasha Colón

The Mt. Juliet CTP was adopted by the Mt. Juliet City Commissioners on [Insert Date].



Introduction & Vision



Located just miles from Nashville, there's no wonder why Mt. Juliet has become an attractive community to work, live, and play. While there are so many economic, social, and educational advantages that accompany rapid growth, there are also trade-offs associated with these benefits.

Mt. Juliet is experiencing tremendous growth due to its proximity to Nashville and connectivity to I-65, I-40, I-24, and I-840. It's important for Mt. Juliet to accommodate continued future growth while maintaining the community's values and unique "small town" feel. Growth in any community comes with opportunities and challenges, so it's imperative to develop a comprehensive transportation plan that will shape the future transportation system in Mt. Juliet. This plan supports regional mobility and safety while addressing local access needs - now and in the future - to create a viable comprehensive transportation plan.

This comprehensive multi-modal plan will address the city's transportation needs and establish the goals and objectives in order to improve access and circulation. It will also create multi-modal opportunities, transit oriented development, and improve the connectivity between the city and the Nashville region. The character of Mt. Juliet mixes the charm of a small town with the dynamics of a larger city so we understand the need to create a community that benefits from providing walking, bicycling, transit and vehicle accessibility.

"Cities have the capability of providing something for everybody, only because, and only when they are created by everybody"

—Jane Jacobs

In the past 17 years, Mt. Juliet has experienced a **136 percent increase in population**. This tremendous incline strains the transportation network.




WELCOME TO
Mt. JULIET
City Between The Lakes

Mt. Juliet continues to grow and change significantly in ways that affect transportation.

The Mt. Juliet Comprehensive Transportation Plan will guide decision making for the future by recommending improvements for all modes of transportation, including walking, cycling, and vehicles. The City seeks to embrace the concept of "complete streets" by providing strategies and polices to improve mobility. Roadways should become public spaces for multi-modal travel meeting current and future mobility needs. The results of this project is a series of recommendations to help the City address transportation problems that will help the area grow to become a livable and sustainable community.

The process is designed to include input from local citizens, business owners, City and County staff, and local officials. In the Spring of 2016, City officials developed a scope for the project that outlined the process of developing the plan with a steering committee to help lead the project and a time-line for the project.

The following sections describe the existing system, usage, and performance for travel modes in the study area. These performance measures define the final project recommendations.







Planning Process

1 PROJECT INITIATION

Data Collection, Review of Existing Plans & Studies, Area Tour

2 CITY ASSESSMENT

Assessment of Current and Emerging Conditions, Identification of Issues & Opportunities

3 PLAN DEVELOPMENT

Evaluation of Current Policies and Testing of Alternatives to Define a New Direction to Better Achieve Stated Goals

4 POLICY RECOMMENDATIONS & IMPLEMENTATION STRATEGIES

Policies and Action Steps to Realize the Desired Transportation Options

5 PLAN DOCUMENTATION

Transportation Plan Document

Guiding development of the Plan is an inclusionary public engagement process. Understanding community values today ensures that this Plan, implemented in accordance with the recommendations, supports and advances those priorities over the long term.

Advisory Committee Meetings

This effort was guided by the Advisory Committee, made up primarily of business owners, residents, City staff, and property owners in the area. Also included on the committee were representatives from local governing agencies. Regular meetings of this group throughout the process were held to set goals, provide feedback, and advise the project team on plan concepts and recommendations. A list of the Advisory Committee members can be found in the Acknowledgments section of this document.

"The only place I walk is in my neighborhood because the area lacks sidewalks"

—Survey respondent

Meetings & Symposiums

Community meetings were held throughout the process to provide an opportunity for property owners, residents and other interested stakeholders to learn about the project, refine the goals established by the Advisory Committee, provide comments on plan components, react to concepts developed in response to that input, help define the future land use vision, and suggest ways in which the Plan can be effectively implemented over time.

Stakeholder Interviews

Stakeholder interviews were conducted to verify and supplement the data gathered, to explain the conditions observed, and to further understand the issues and opportunities that affect the study area. Their input supplemented the feedback received directly from citizens and property owners participating in the process. The stakeholders included key personnel from City departments as well as representatives of interest groups who addressed questions about the following topics: economic development, transportation, and neighborhoods.

Website

To supplement the information gathered during community meetings, a project website **(www.gomj.info)** was created so residents, property owners, business owners and other stakeholders could access information and provide input throughout the process. Such input was recorded, and like the input shared at the community meetings, used to clarify the concerns and desires of the community.



Past planning documents provide valuable insight and background on the community and have influenced the development of this Plan.

The following plans were reviewed early in the planning process as they relate to existing conditions and future needs for transportation improvements.

The table below encapsulates the types of recommendations found in each plan

The 2015 Comprehensive Transportation Plan will serve as a holistic document that combines the services provided in previous pedestrian, bicycle, and roadway plans.

Mt. Juliet Town Center Master Plan

Leadership in Mt. Juliet recognized changes happening in the area and heard the desire from local businesses and citizens for the City to establish a new Town Center identity. The Plan focused on properties along Mt. Juliet Road from Old Lebanon Dirt Road to just north of Oakmont Drive. This district contains significant civic buildings such as the Library, City Hall, Post Office and Mt. Juliet Elementary Schools. The Plan was developed with goals to reduce reliance on Mt. Juliet Road and promote alternative forms of transportation along the corridor; encourage mixed use development; and to connect adjacent neighborhoods by multi-modal transportation infrastructure.

Plans	Types of Recommendations Found in Each Plan Reviewed						
	Roadway	Sidewalk	Bicycle	Greenway & Trail	Public Transport	Design Guidelines	Land Use & Zoning
Mt. Juliet Town Center Master Plan	●	●	●				●
Mt. Juliet Greenway, Bike and Pedestrian Master Plan		●	●	●		●	
Nashville MPO Regional Bicycle and Pedestrian Study		●	●	●			
Wilson County Bicycle and Pedestrian Master Plan		●	●	●		●	
MPO Tri-County Transportation & Land Use Study	●	●	●	●	●		
Middle Tennessee Connected 2016-2040 Regional Transportation Plan	●	●	●	●	●		

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The Town Center Plan presents the needs and ideas for the future as it pertains to Mt. Juliet Rd. The plan identifies opportunities and constraints to future development and strategies to encourage new development, such as rezoning and new zoning overlays. Ideas for streetscaping, intersection, and roadway standards are presented to transform local roads into a gateway for the Town and encourage multi-modal transportation options.

Mt. Juliet Greenway, Bicycle and Pedestrian Master Plan

The Greenway, Bicycle and Pedestrian Master Plan identifies multi-modal facility needs on and off roadways as well as policies that should be implemented during development to address impacts. Objectives of the plan include:

- Promote a greenway system that connects public and private open spaces and attracts a wide range of users.
- Encourage local support for greenway development.
- Create a greenway system that enhances economic development.
- Preserve and enhance sensitive features.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The Master Plan advocates the need for a multi-objective trail system in Mt. Juliet as well proactive policies for avoiding impacts during development. The recommendations detailed in the Plan are used to guide the recommendations in the Multi-Modal Plan.

Nashville MPO Regional Bicycle and Pedestrian Study

The Nashville Metropolitan Planning Organization undertook a regional study to improve walking and biking in the greater Nashville region. Mt. Juliet was included in the study area for the development of the Plan. The Study included a comprehensive inventory of existing on- and off-road facilities, a traffic analysis to define congestion along corridors, a non-motorized demand analysis, and identification of barriers to walking and biking to understand the region's issues and needs.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The Regional Bicycle and Pedestrian Study is intended to serve as a means of guidance for future policies and programs to maximize walking and biking opportunities. The Plan provides an improvement list for bicycle and pedestrian facilities and will serve as a framework for prioritizing future projects.

Wilson County Bicycle and Pedestrian Master Plan

The overall goal of the Wilson County Bicycle and Pedestrian Master Plan is to provide a connectivity and access plan for area communities. The Plan includes an evaluation of existing conditions and a final set of recommendations for enhancing multi-modes of travel within Wilson County.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The purpose of the Bicycle and Pedestrian Master Plan is to provide municipalities in the County a list of recommended improvements that can be integrated with future multi-modal transportation plans. A few of the projects in the Plan, including the addition of bicycle lanes on Mt. Juliet Road, have been completed. Project and policy recommendations from the Master Plan will be considered in the Multi-Modal Plan.

Middle Tennessee Connected 2016-2040 Regional Transportation Plan.

The Middle Tennessee Connected 2016-2040 Regional Transportation Plan, complied by the MPO, is a comprehensive Plan defining solutions to transportation infrastructure issues in the region. The overall goal of the Plan is to improve mobility across the region. Over 200 improvement projects were identified and prioritized according to the goals and objectives of the Plan.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The Regional Transportation Plan designed a vision for the future in regards to roadways, active and walkable communities, and transit infrastructure for Wilson County. Major corridors in the area were considered for improvements to maximize economic impacts of limited dollars to prepare roadways for the future. The Plan contains detailed information in regards to trends, growth, accidents, and transportation needs in the study area and provides recommendations regarding expansion of transit, multi-modal infrastructure, and design guidelines for the region.

NMotion Nashville Mt.A/RTA Strategic Plan

The Nashville Metropolitan Transit Authority and Regional Transportation Authority developed a Strategic Plan to address public transit needs for the Greater Nashville area. The area continues to growth at a rapid pace, as does ridership for regional bus and train service. Routes and new technologies in the Plan were studied to determine feasibility of the various options proposed.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

The Plan not only includes transit elements, it includes recommendations to improve accessibility for every neighborhood by improving pedestrian and bicycle access.

MPO Tri-County Transportation and Land Use Study

The Tri-County Transportation and Land Use Study was conducted by the MPO and completed in 2012. The study area consisted of Robertson, Wilson, and Sumner counties in Middle Tennessee. The study area is located in a high growth area in Middle Tennessee. The Study was conducted to assist the MPO in identifying the needs and priorities for the study area in regards to transportation projects in the Region. The Tri-County Transportation and Land Use Study focused on the future land uses and the local governmental growth plans for the communities and the goals was to improve regional mobility and to plan for an efficient transportation network that supported the growth patterns. The Study also served as a precursor to the MPO's 2035 Long Range Transportation Plan for the entire Middle Tennessee Area. The local governments in the Tri-County area used the Study to develop and improve their Comprehensive Plans.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

Wilson County and the City of Mt. Juliet are included in the Tri-Study area. The Study has been used by the City to update their Land use and Transportation Plan and also in the development of this effort to create a Multi-Modal Transportation Plan. The Study contains detailed information in regards to growth patterns in the study area and provides detailed Regional and Local transportation improvement recommendations including adoption of Complete Streets Policies to increase

mobility for bicycles and pedestrians. Many of these recommendations have been included in the City of Mt. Juliet Future Land Use and Transportation Plan and in the current update taking place today.

City of Mt. Juliet Land Use and Transportation Plan (2008)

The 2008 Mt. Juliet Land Use and Transportation Plan provides the foundation for the City's future land use and development policies. The Plan was officially adopted by the Mt. Juliet Planning Commission and Board of County Commissioners in 2008. The Plan was updated during 2016. The purpose of the Plan is to guide the future development and redevelopment of the City of Mt. Juliet and the surrounding area and to establish a long-range vision for the City of Mt. Juliet.

The 2008 Mt. Juliet Land Use and Transportation plan was adopted by the City based upon five principles as outlined in the Plan:

- To be a safe place for people to live;
- To have viable neighborhoods working together as a community;
- To be an attractive, clean, and aesthetically pleasing City;
- To be a financially responsible City government providing high quality services and infrastructure; and
- To achieve economic vitality through healthy business. (2008 Mt. Juliet Land Use and Transportation Plan).

Overall the Plan provides a "road map" for future growth and redevelopment. More specifically, the Plan details the existing physical conditions and summarizes the growth issues and planning initiatives that have taken place in the region at the time of Plan adoption. More specifically, the Plan identifies the key policy issues to be addressed in the Mt. Juliet Land Use and Transportation Plan, and it sets the goals and policies for future growth. The Plan provides specific recommendations for the following: Land Use, Transportation, Community Facilities and Services, Natural Resources, Economic Development, Housing, and Parks and Recreation. The bulk of the Plan is dedicated to the Future Land Use Element, which is referred to as the Development Plan. The Development Plan illustrates future growth and development patterns for the City of Mt. Juliet.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

As the main Planning document directing development in the City of Mt. Juliet, the Plan advocates for efficient, quality and fiscally sound growth; conservation and protection of natural resources; open space preservation; efficient public facilities and Services; and transportation and land use integration. Mt. Juliet is transitioning from a suburban residential community to a more self-sustaining urban city and the Plan proposes to continue to allow suburban residential densities in the majority of the City; however, it limits suburban densities at the City's fringe in order to protect the rural areas. The Plan further discourages the expansion of city services to low density areas. The Plan encourages the development of neighborhood and employment commercial centers and strongly discourages further development of strip commercial centers along the major roadways in the City.

The Transportation Element of the Plan recognizes the importance of integrating land use and transportation. The long term goal is to provide a transportation system in Mt. Juliet that is convenient, accessible, efficient, and economical. The Plan adopts specific transportation policies which support multi-modal choices, including transit, walking, bicycling, and driving. Additional policies strive to reduce dependence on the automobile and require the City to develop a transportation demand program. The 2008 Land Use and Transportation Plan encourages mixed uses, employment centers and other activity centers that must be supported

by a network of pedestrian, bicycle, and automotive systems. In addition to the policies, there are a number of specific road improvements recommended in the 2008 Land Use and Transportation Plan. Finally, the Plan recognizes the need to have the Major Thoroughfare updated, a key component of the current effort to create a Multi-Modal Transportation Plan. This effort will use the Land Use Plan to identify the anticipated growth patterns and identify the transportation system improvements that will be necessary to accommodate the future land uses.

City of Mt. Juliet Land Use and Transportation Plan (2015 Update)

The 2015 Mt. Juliet Land Use and Transportation Plan (herein referred to as the Update) was adopted by the City of Mt. Juliet in 2016.

The Mt. Juliet Vision Statement was expanded and updated to emphasize Mt. Juliet's commitment to maintaining a sense of community and a place for its residents and future generations. The new Vision Statement also incorporates the need to provide for a variety of housing and transportation choices in order to allow residents to live and work in Mt. Juliet. The Update includes an extensive review of the existing conditions and considers recent regional and state planning efforts that are occurring in the Middle Tennessee area. During the update process, a number of meetings and discussions were held with the general public, key stakeholders, and elected officials in the region and the City.

The Update contains a number of new goals, objectives and policies that encourage the City of Mt. Juliet to:

- Maintain and improve design guidelines for future development
- Protect and preserve open space, park lands and environmentally sensitive areas
- Create a Town Center to "recapture" the small town feel of Mt. Juliet

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

In this draft Update, the Development Plan divides the City of Mt. Juliet into six planning areas for the purpose of recognizing the unique set of strengths and weaknesses of each geographic. For each of the planning areas, the Update analyzes the existing conditions, growth patterns, and land uses, and identifies issues in these areas. In addition, the Update includes specific transportation needs and recommendations for each of the planning areas. While the Update is not officially adopted, the data and recommendations will be considered during the planning process for the Multi-Modal Transportation Plan.

MPO Southeast Area and Land Use Study

The Southeast Area Transportation and Land Use Study was conducted by the Nashville Metropolitan Organization (MPO). The purpose of the Southeast Area Transportation & Land Use Study was to plan for future growth in the southeastern portion of the Nashville-Murfreesboro metropolitan area, and to establish a shared vision among regional and local partners in the area paralleling I-24 between I-40 and I-65 in Davidson, Rutherford, Williamson, and Wilson counties. The southeast area continues to experience strong population and job growth in the region. The Study seeks to coordinate plans for future development among participating agencies and jurisdictions so that they can put in place the multi-modal transportation improvements and land use policies necessary to support long-term prosperity and quality of life throughout the area.

Recommendations for improving roadways and intersections, transit routes, sidewalks, and bicycle lanes will be provided to the participating jurisdictions and agencies, and to the MPO -- the regional agency responsible for selecting transportation projects for federal funding

and coordination with TDOT. The project team will define needs for transportation infrastructure and services based on (1) the systems and services that exist today, (2) those that are needed to support the preferred growth vision, and (3) the gap between them.

Relationship to the City of Mt. Juliet Multi-Modal Transportation Plan

Wilson County and the City of Mt. Juliet are included in the Study area. This Study can be used by the City to update their Land use and Transportation Plan and in the development of the Multi-Modal Transportation Plan. The Study contains detailed information in regards to growth in the study area and provides detailed transit service and improvement recommendations along the I-24 corridor.



Existing Conditions

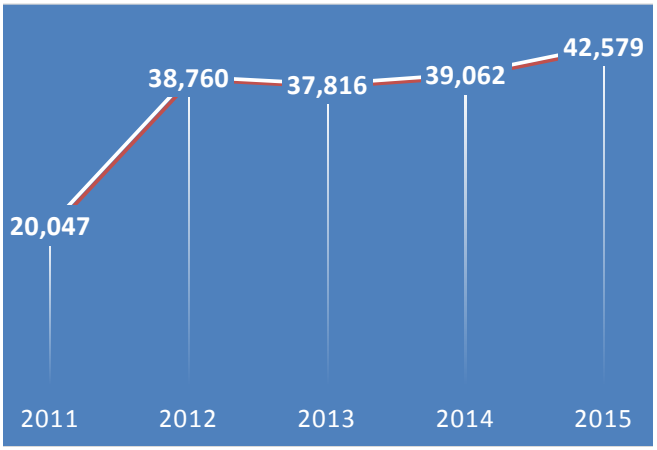


Identifying the characteristics and operations of the community provide an understanding of how the system is currently operating.

Mt. Juliet is located just east of Nashville, a large metropolitan city, in Middle Tennessee. The study area for the Mt. Juliet Comprehensive Transportation Plan encompasses over 55 sq. miles of Wilson County and includes all areas within the Mt. Juliet urban growth boundary. The study area has grown significantly in the last decade. The population has increased by 136% since 2000 deeming Mt. Juliet as one of the fastest growing cities in Tennessee. Recent growth paired with close proximity to Nashville are indicators for more growth. Motorists experience delays and congestion on area roadways currently. Additional growth in the study area will continue to impact the already suffering roadways. The plan will address the potential effects of additional growth by reviewing the conditions and understanding where issues and deficiencies are occurring. Final recommendations will be developed based on the findings.

Unique to the State of Tennessee, Mt. Juliet offers limitless scenic beauty. Dominant features of the area include historic agricultural lands, scenic waterways, and parkland. Choices in lifestyle range from suburban neighborhoods to rural living. The roadway network in the study area consists of an Interstate Highway (I-40), several major roadways and local streets. Critical corridors in the area consist of Lebanon Rd (US Highway 70, State Route 24), Mt. Juliet Rd (State Route 171), I-40, Division St and Old Lebanon Dirt Rd. Recent progress on area roadways include bicycle lanes added to Mt. Juliet Rd and Lebanon Rd. A majority of the existing sidewalks can be found in residential areas, newer commercial areas such as Providence, and those along Mt. Juliet Rd. Connectivity by alternative forms of transportation are limited in the area. The Plan should provide recommendations for regional sidewalk and bicycle connectivity.

Public transportation is a growing need for the community. Currently there is no bus operation in the study area. The Middle Tennessee Regional Transportation Authority operates a commuter train service in Mt. Juliet. The station is located near the intersection of Division St and Mt. Juliet Rd. In 2015, 42, 579 riders were reported at the Mt. Juliet Music City Star Station. Ridership for the line continues to grow each year. The commuter train offers alternative transportation into Nashville for work and recreation. There is also a concurrent planning study that is looking into Transit Oriented Development at this location.



Music City Star Ridership 2011-2015

Did you know there are...

662 miles of roadway

80 miles of sidewalks

9 miles of greenways/trails

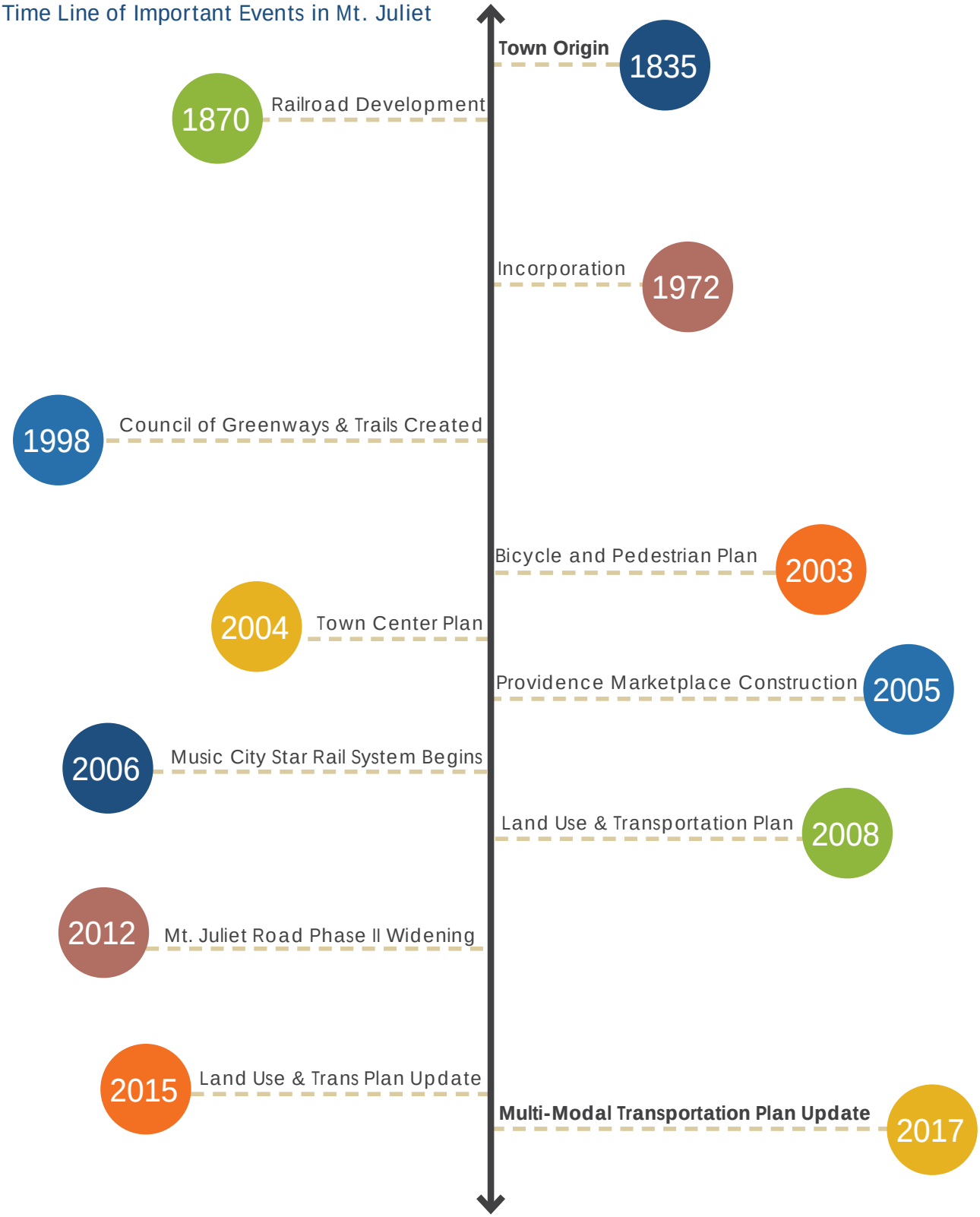
13 miles of bicycle lanes

AND

90% of population drive to work

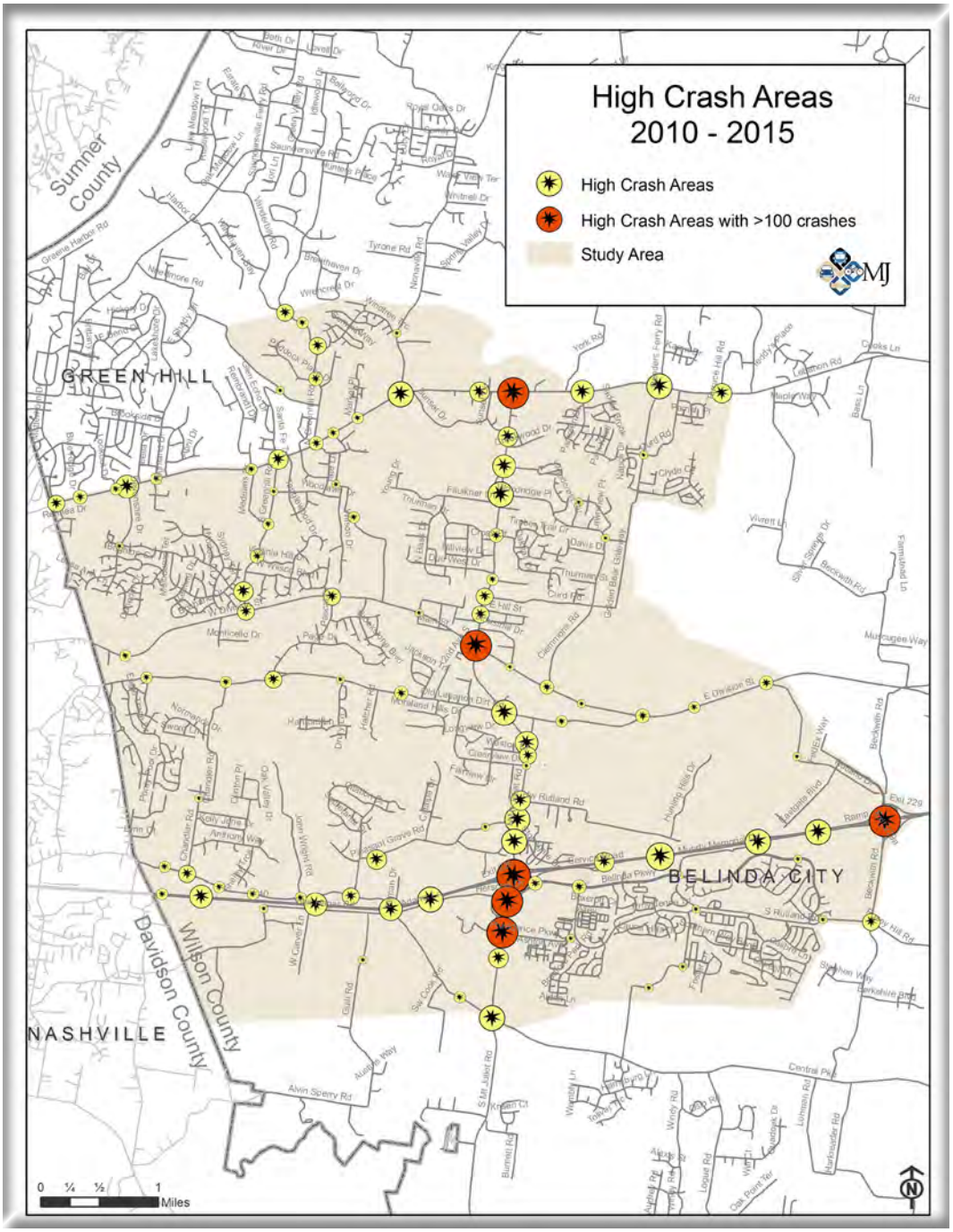


Time Line of Important Events in Mt. Juliet



Crash Analysis

An assessment of high-crash severity intersections was completed using crash data from State of Tennessee Highway Patrol's safety database. Analysis of vehicle crashes was conducted for the study area The data was derived from January 2010 to December 2015 reported crash data along the major roadways in the area. The map below shows areas in yellow that reported less than 100 crashes and the red depicts areas that reported more than 100 crashes for that location. Crashes are an indicator of specific locations that are experiencing issues. An assessment of the data reveals significant issues at or near intersections along Mt. Juliet Rd and Lebanon Rd. Further studies will be completed to define safety enhancements needed to reduce the number of accidents in the high crash areas.



The City of Mt. Juliet enjoys a strategic location just a half-hour (or an hour using the Music City Star train service) away from downtown Nashville, one of the Southeast's most dynamic cities. Heralded as the number one housing market in the U.S.; number one metro area for creating white-collar jobs; top retirement destination; and one of the best cities in the country in general, Nashville has many admirers. As many satellite communities in Tennessee elsewhere have developed, their evolution has included some common themes that are shared with Mt. Juliet.

Mt. Juliet in the Middle.

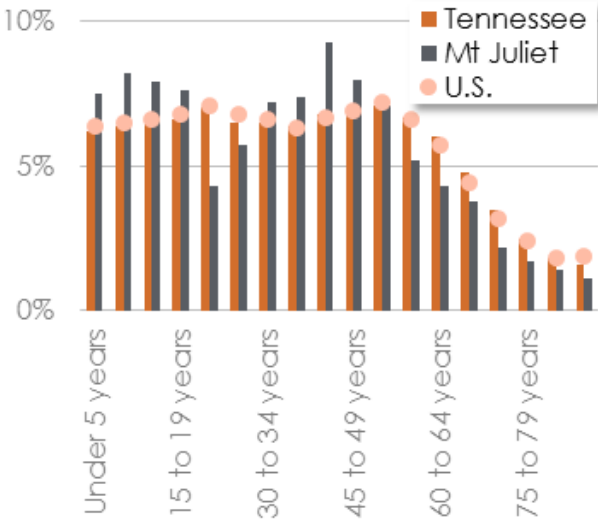
Over 28% of the residents of Mt. Juliet arrived in their current home in 2010 or later; nearly two-thirds of those renting homes have moved in since 2010. Mt. Juliet's current population skews heavily towards middle-aged families. Both the young (under 30) and older (over 60) percentages of the population are much lower in Mt. Juliet than in the State of Tennessee.

A Good and Fast Alternative.

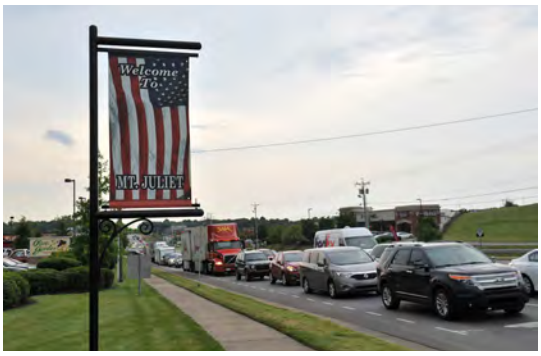
People that want to work in Nashville have to contend with escalating housing prices that follow in the wake of the City's success.

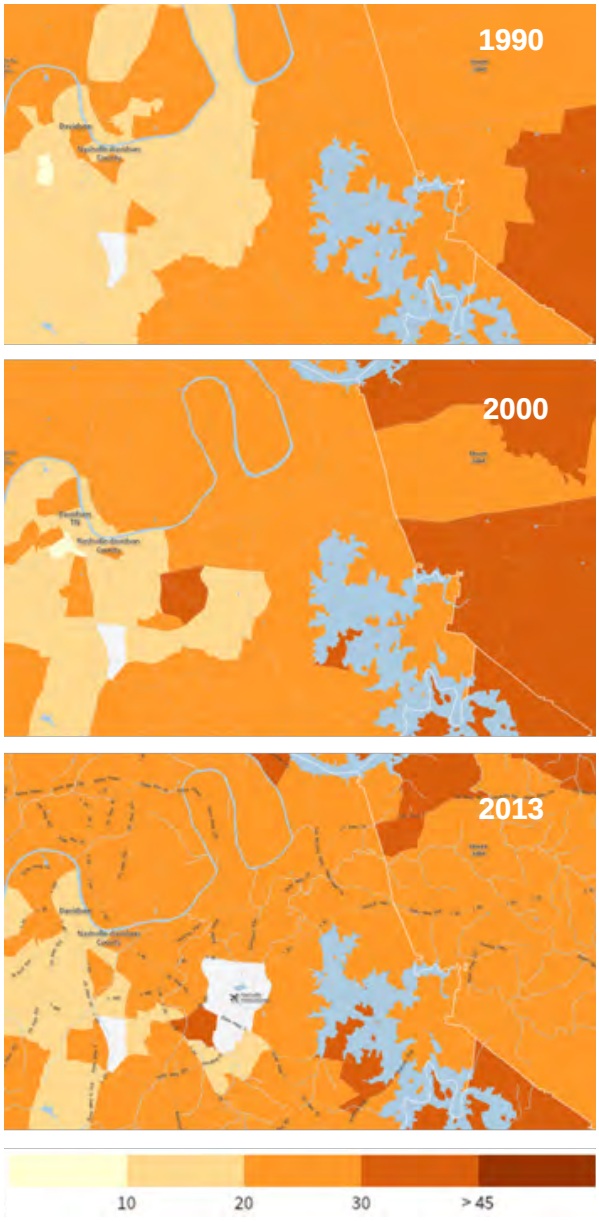
However, Mt. Juliet offers a reasonably affordable alternative without an unreasonable commute time to work (about 28 minutes, on average – see Figure 2).

Figure 1. 2014 Ages in Mt. Juliet, Tennessee, and the U.S. *The middle-age family composition of Mt. Juliet is evident (these figures do not reflect the special (re-) count of the Census conducted in Mt. Juliet in 2015).*





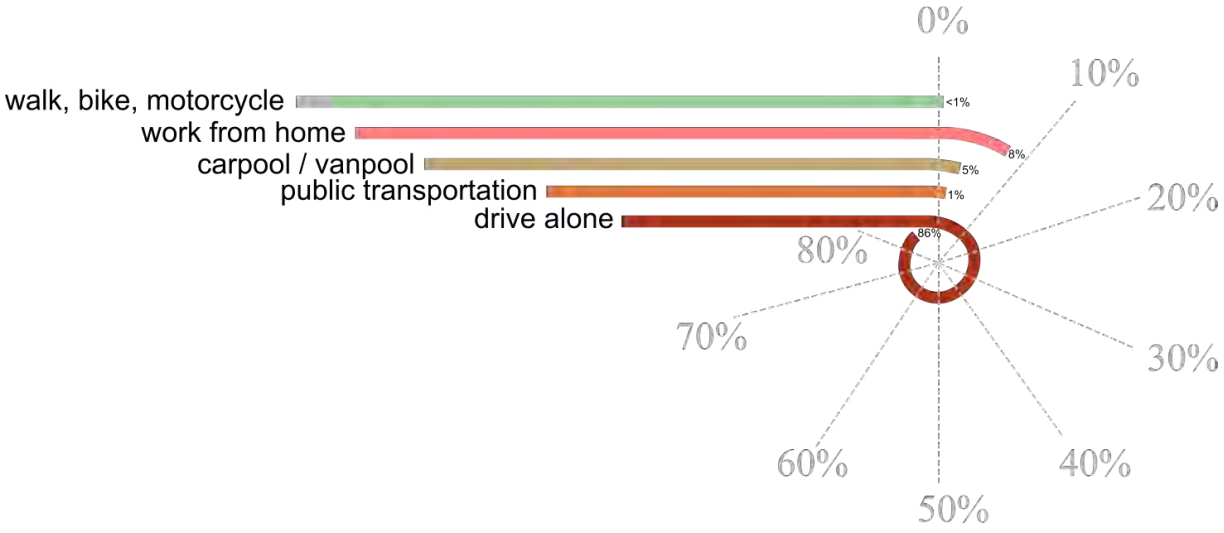




The U.S. Bureau of the Census conducts partial surveys of commuters, including in Mt. Juliet. Transportation should mean something, and the trip to work is one of the most common trip types where success is achieved (or not).

By far, automobile travel is the preferred choice for commuting in Mt. Juliet (and just about everyplace else): over 85% of all commute trips were made in a car - alone. Transit use in 2015 only accounted for 1% (149) of all commute trips; walking had nearly as many (109). Working from home garnered nearly 10% of all work trips, more than all of the other non-single occupant vehicle commute trips combined (walking, biking, transit, carpool/vanpool).

Figure 2. My Commute Got Better?
Census results of work trips from 1990 (top), 2000 (middle), and 2013 (bottom) suggest fewer places have commute times of over 30 minutes.



An Incomplete Picture. Although the term "bedroom community" doesn't necessarily apply to all aspects of Mt. Juliet, the City doesn't possess every type of business required to support its residents now. Figure 3 illustrates employment across major sectors of the economy, as well as how Mt. Juliet's employment stacks up proportionately compared to Tennessee.

Industry	Tennessee		Mt. Juliet		LQ
Accommodation and Food Services	261,909	9.50%	1,776	22.50%	2.4
Real Estate and Rental and Leasing	36,014	1.30%	232	2.90%	2.2
Retail Trade	327,953	11.90%	2,032	25.80%	2.2
Utilities	16,843	0.60%	94	1.20%	2.0
Professional, Scientific, and Technical Services	122,099	4.40%	661	8.40%	1.9
Finance and Insurance	103,118	3.80%	346	4.40%	1.2
Arts, Entertainment, and Recreation	31,669	1.20%	96	1.20%	1.0
Other Services (excluding Public Administration)	74,360	2.70%	201	2.50%	0.9
Construction	110,863	4.00%	278	3.50%	0.9
Information	44,645	1.60%	104	1.30%	0.8
Wholesale Trade	124,669	4.50%	285	3.60%	0.8
Health Care and Social Assistance	394,921	14.40%	663	8.40%	0.6
Administration & Support, Waste Management	208,616	7.60%	323	4.10%	0.5
Manufacturing	330,342	12.00%	428	5.40%	0.5
Public Administration	132,574	4.80%	160	2.00%	0.4
Transportation and Warehousing	140,194	5.10%	112	1.40%	0.3
Educational Services	240,455	8.70%	83	1.10%	0.1
Management of Companies and Enterprises	36,995	1.30%	9	0.10%	0.1
Agriculture, Forestry, Fishing and Hunting	7,562	0.30%	0	0.00%	0.0
Mining, Quarrying, and Oil and Gas Extraction	3,342	0.10%	0	0.00%	0.0



Figure 3. Employment Representation in Mt. Juliet, Compared to Tennessee (2014). *This table shows the number and percent of employees working in basic employment sectors in Tennessee and Mt. Juliet. The far-right column (LQ, or Location Quotient) shows which industries have (compared to Tennessee) a relatively high (green), equivalent (orange), and low (red) proportion of workers engaged in various sectors of the economy.*

The chart at left shows the same information just for Mt. Juliet – the size of the circle is the percent of all employees, the left axis shows the comparative (to Tennessee) ratio of those employees, and the bottom axis shows the total number of employees in that sector of the economy. Retail trade and Accommodation / Food Services have large total numbers of employees, and both are over-represented compared to the percentages of those employees in Tennessee. Health Care & Social Assistance employment and Educational Services typically have to be sought outside of Mt. Juliet.

A (Not) Single Community? As more homes are added to the area, the pressure will increase to add more service types. Promoting this evolution is critical to the transportation system since many people traveling farther for goods and services creates more traffic congestion. Exacerbating these effects is the fact that these types of trips are poorly suited to public transit service since bus and rail services are set up to handle commuting trip patterns, not shopping, health care, school, or other kinds of trips-making.

The average household size of Mt. Juliet (2.75 people) is just over 10% more than that of the State of Tennessee, which correlates with the age cohort discussed earlier. A third of these households fall squarely into the "Soccer Mom" segment (Figure 4): suburban lifestyles, dual workers, owner-occupied housing, highly educated, and low unemployment are commonplace – and that is true of many residents here. Household incomes are 50% higher in Mt. Juliet, on average, compared to Tennessee as a whole, and the percentage of people in poverty (9.3%) is half that of the State. Mt. Juliet is not as racially diverse as the State: 87% of the population is White, according to the 2010 decennial census count.



Figure 4. 2014 Description of Life Mode: Soccer Moms Demographic

Presenting: the Future… Although predicting the future changes in Mt. Juliet isn't possible with absolute certainty, we do know that many suburban communities behave much the same way as they continue to add people and employment locally. Mt. Juliet could see its large middle-age cohort grow up (as will their children) in place – provided that strong schools and transportation are there to support their lifestyles. Attracting younger age groups to the City also has implications that suggest a stronger dependence on "walkable" lifestyles and a more diverse entertainment market than is currently the case.

A strong asset that the City has not fully realized is the development of the emerging City Center near the passenger train station, the subject of a 2005 planning study conducted for the City. Concepts are currently being discussed that would see the potential for a great mix of uses and a push towards a more walkable, village center development style. The interchange areas that have helped drive the kinds of retail growth seen in the preceding figures do not have to always end up as the same kind of auto-only development. Good examples exist throughout the Southeast of mixed-use communities that employ both vertical (three-story, generally) and horizontal mixtures of retail, office, and variable lot sizes of residential uses. Supporting these higher-density nodes of development will be crucial to creating a more "closed" system in Mt. Juliet, one that doesn't rely on longer external, or as many internal, automobile trips. Planning this way can help focus precious public investment dollars to enhance the community in ways besides large roadways. Wilson County is imposing tax increases to accommodate the same growth that is driving the demand for transportation services.

High-growth areas share one thing in common if they are successful: traffic congestion. The growth in vehicular traffic congestion closely tracks with greater commercial success; therefore, creating a more diverse set of planning-level indicators to enhance our understanding of success is paramount to managing expectations and accurately planning for this future. The following considerations are therefore incorporated into the concept of performance measures and guiding principles for the development of this Plan:

- **Multi-modal Quality Service Standards** – instead of traditional, vehicular delay-only measures used in development reviews to ensure a more walkable, aesthetically focused community;
- **Remember Safety as a Measure** – to reflect that more crashes equal more delay (as much as 40% of all travel delay can be attributed to crashes), as well as greater human misery and costs in a community; and
- **Utilize Mt. Juliet's Assets** – while they are still here. The commute times, while still reasonable, are already four minutes longer than the State average; it's not likely that figure will decrease going forward. Opportunities like developing a downtown core, leveraging the demand for premium Interstate access, and a population that is both relatively homogeneous and prosperous aren't "forever" conditions – and once they are exhausted they are hard or impossible to replace. Mt. Juliet needs to take steps to ensure that new and redeveloped properties reflect the values and quality of construction that the City wants to have for a long time to come.

"We're not in a vacuum. We're seeing the same things that other counties in this high-growth area are seeing. We all have to deal with it the same way. Unfortunately, it comes with tax increases."

—Wilson County Finance director Aaron Maynard (Xavier Smith, MtJulietNews.com)



Transportation and land use planning are integrated and should be planned together. A transportation network allows access to destinations, if a network is not present then destinations would be impossible to get to and if there are no destinations, then a network is not necessary.

A land use analysis was completed for the study area to define which areas has the most potential for future development. CommunityViz™ software was used for this task. CommunityViz™ is a scenario planning software tool that allows decision-makers to evaluate the impacts related to development. It helps translate complex planning data into easily understandable outputs. Using existing land use data, including land use types, building heights, and floor to area (FAR) ratios, the tool can reasonably estimate figures for a number of metrics, such as total population, total employment, total dwelling units, water and sewer impacts, number of students (K – 12), and trips generated from different land use types.

Working with the Mt. Juliet officials, a variety of data inputs were generated for use in the CommunityViz model for the study area. To begin, each parcel in the study area was coded for development status and place type. The development status element consists of five groups, underdeveloped, undeveloped, developed, committed development, and permanent open space, while the place type refers to the specific land use. Development status is very important, as only those parcels designated as underdeveloped or undeveloped are able to accommodate new growth. The placetype codes are also very important and provide the basis for applying metrics to each specific land use type. Placetypes were created using aerial imagery and by examining the land use and zoning data for the area and aerial photography. Existing and future facilities as well as constraints are included in the scenario planning analysis. Factors such as slopes, wetlands, flood prone areas, wildlife management areas, historic properties, century farms, locality near major activity centers, and current and future water and sewer service are used when factoring potential for development.

Based on the results, (Figure 5) the scenario planning revealed most of the areas on the southern and northern portion of the study area are least likely to development. These areas present the most challenges due to steep slopes (>15%). The central portion of the study has a higher probability of development due to the locality within the current network, current or future water service prevalent and lower elevations. The scenario planning activity identified two catalyst site project areas for future studies. The site for the future interchange at I-40 and Central Pike and vacant parcels near Industrial Drive and Division St were identified as areas with higher opportunity to development and to receive a return on investment if developed. More detailed market and economic analysis will provide an opportunity to better understand development potential.

"Stop developing without proper infrastructure"

—Survey Respondent

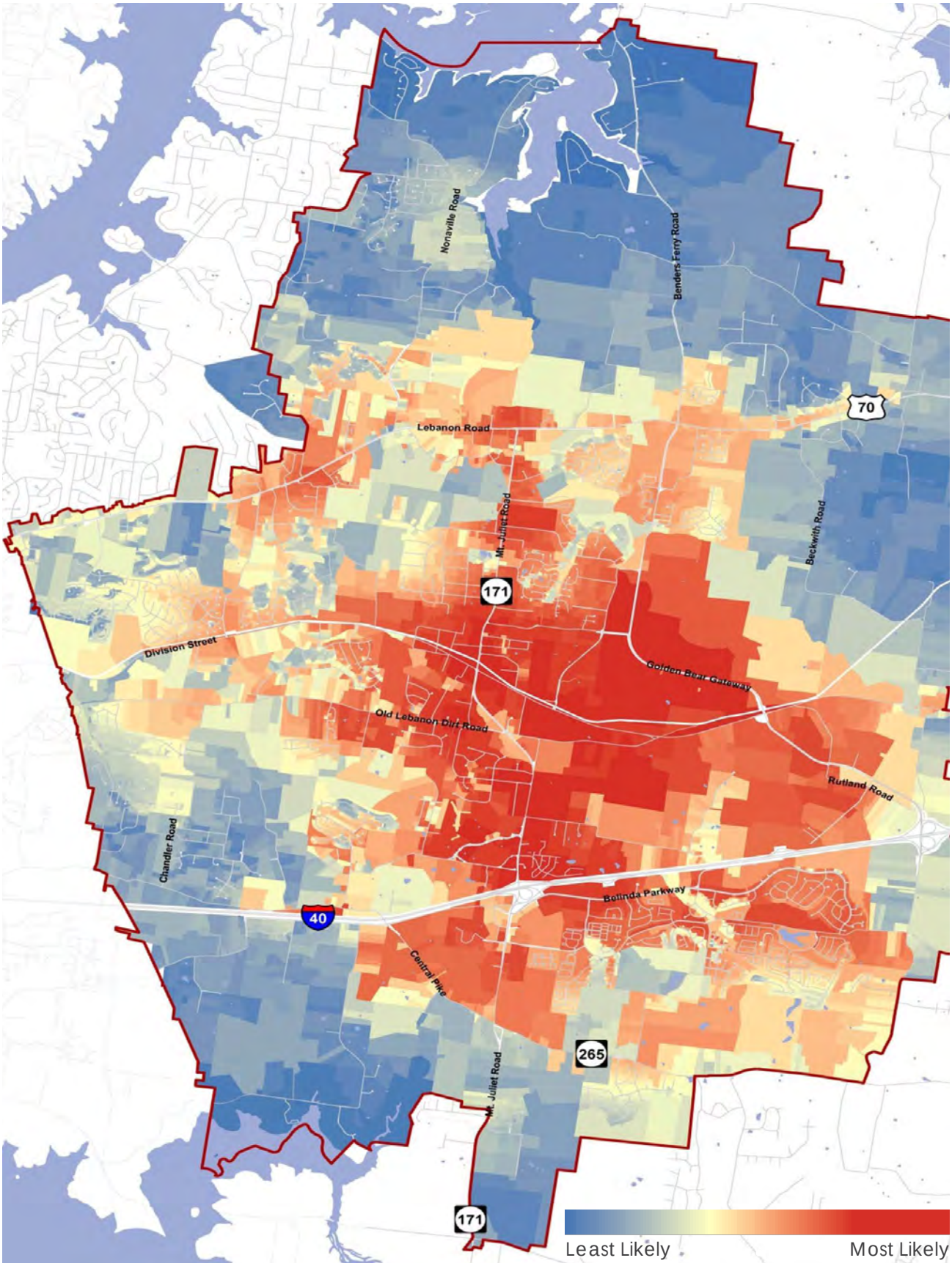


Figure 5. Likelihood of Development Map

Transportation planning models are tools used to predict future roadway and travel conditions for all users. Identifying deficiencies define needs and assist in building project recommendations.

Roadway Deficiencies

The 2010 base year highway network was compared with the 2040 E+C (Existing plus Committed projects) roadway network using the results from the Nashville Area Metropolitan Planning Organization Regional Travel Demand Model (TDM) volume to capacity analysis.

According to the travel model, most of the study area roads experience a significant increase in traffic capacity in 2040. Congestion issues caused by the increase will be addressed through the recommended roadway projects. Figures 7 and 8 define existing and future traffic capacity for area roadways.

Level of Service

Level of Service (LOS) describes measures of effectiveness for various transportation operations. The idea of LOS presents a report card on how area roadways are performing in regards to moving vehicles, pedestrians, and cyclists. LOS ranges from A to F. LOS D and E indicate roads that are operating with longer vehicle delays and are getting closer to capacity. LOS F indicates a road has exceeded capacity and vehicles are experiencing the longest delays. A low LOS indicates pedestrians and cyclists experience safety issues and delays as they maneuver area roadways.

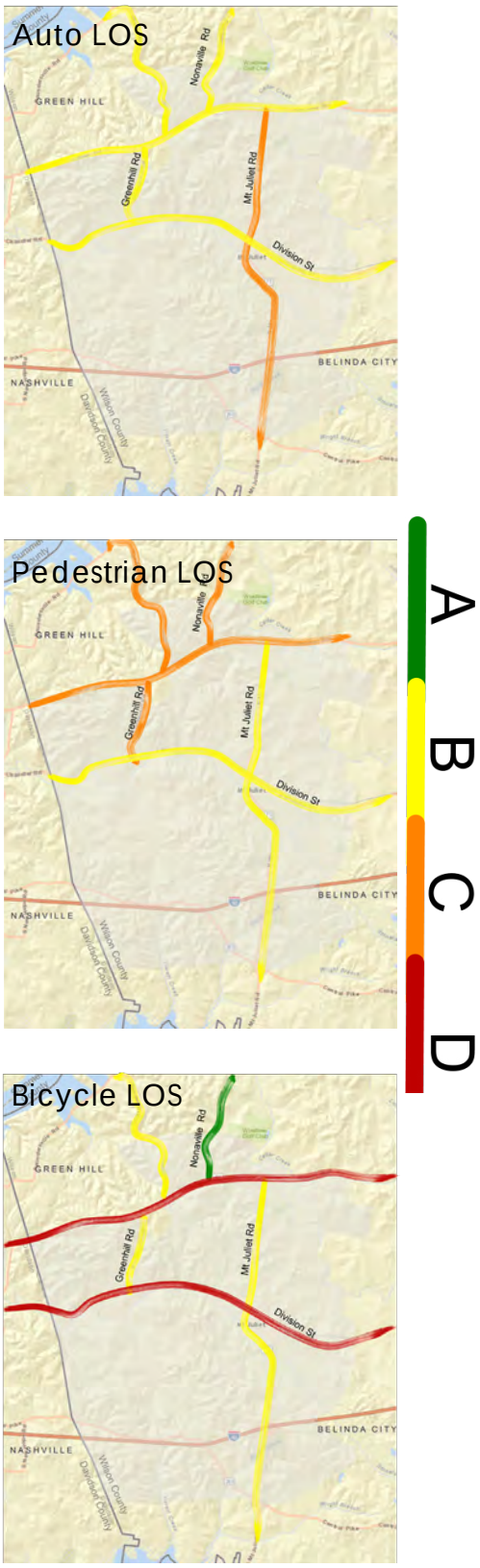


Figure 6. Level of Service (LOS)



Figure 7. 2015 Peak Hour Traffic Capacity

- <.3
- 0.31 - 0.60
- 0.61 - 0.80
- >.8
- Study Area

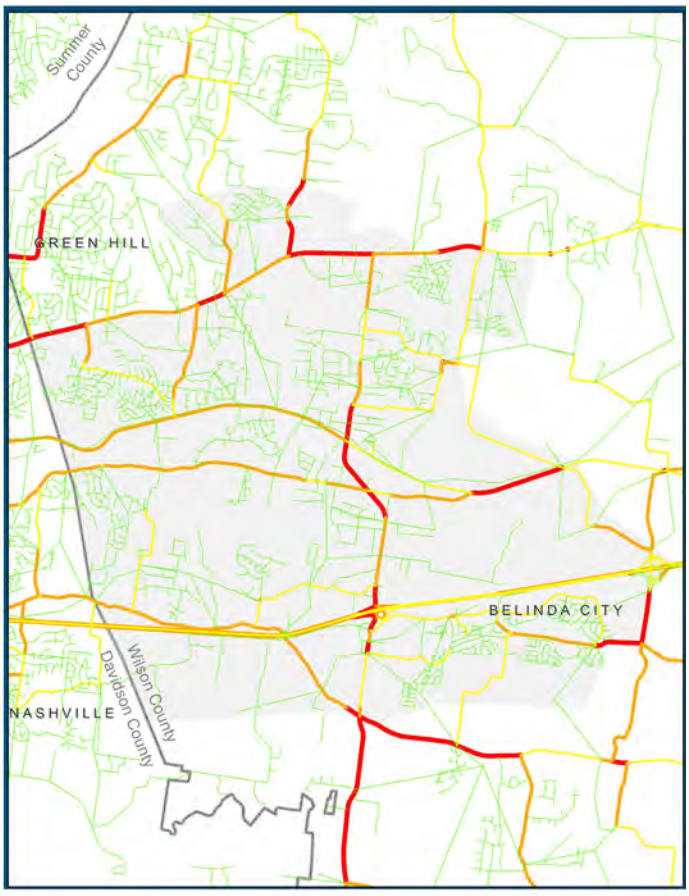
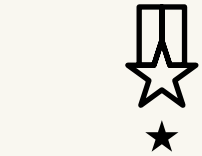


Figure 8. 2040 Peak Hour Traffic Capacity

- <.3
- .3-.6
- .6-.8
- >.8
- Study Area

Directions for Mt. Juliet

The preceding section describes some of the current conditions in the City, as well as some of the places we expect the City could go in the near future. The following is a brief summary of some of the major trends that the Mt. Juliet Comprehensive Transportation Plan will have to address to ensure it remains economically competitive, enjoys a high level of mobility, and improves the safety and security of its residents. Going forward, each of the following sections will address these directional issues and identify specific recommendations for each major mode of travel.



Congestion is Coming

And is already Here, Sometimes

The periodic congestion that is seen at key intersections now will continue to worsen, spreading to peak period "shoulders" as time goes on. People will tend to leave earlier from home to reach work, or simply travel out of the current peak hours of travel, thereby extending the period of time when traffic congestion is noticeable.

To an extent, traffic congestion is both unavoidable and desirable: only areas that are dying have lowering levels of traffic congestion. A multi-pronged approach of increasing connectivity, capacity, smarter signals, crash (delay) reductions, and enhancing mobility choices will be necessary to keep traffic congestion manageable.



Isolation Hurts

More Connections = Better Travel

Highly interconnected cities and towns tend to have much lower levels of congestion. Even when congestion does appear, it is relatively short-lived and avoidable by taking a different route. Mt. Juliet has a relatively low level of connectivity now, but it is important to build on these connections, especially as new / redeveloped properties are planned. Putting these connections in place sooner rather than later helps reduce the amount of push back received by concerned neighbors, as does a more thoughtful set of design criteria that includes requirements for roadway curvature, traffic calming, and streetscaping.



Diversity of Product

Design for Success

In nearly every marketplace across the country that is growing, there is market-driven call for more multifamily development. The old-school, poorly constructed and maintained multifamily developments that eventually become eyesores are largely gone now, but ensuring a quality of materials, design features, and appropriate location is still very important to ensure that existing properties are not damaged and roadway capacity is not completely absorbed.

Multifamily, experiential retail, and even offices come in many different "flavors" now, some of which are vertically or horizontally integrating various land uses. This close proximity of complimentary land uses reduces the number of automobile trips and trip lengths while improving reliability.

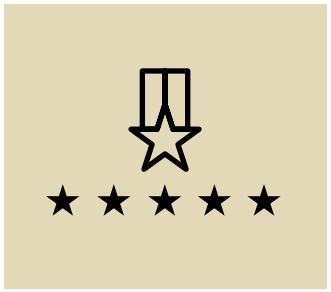


A Place to Walk

(And Bike)

In years past, a company's CEO would dictate where their employees would relocate by deciding on a house or neighborhood that suited that one person. Now, places dictate where valuable people want to go to live and work, often in an environment that is walkable, scenic, and with many nearby destinations like schools, parks, shopping, and workplaces. The CEO then follows their workers to set up the new office.

To continue to attract Millennials and young families, a place should have sidewalks, street trees, integrated parks, and possess a fine-grained street network. Even if one more person doesn't make one more trip by walking or biking (though they will), walkable spaces are attractive to these young professionals.

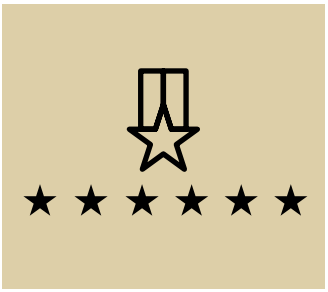


Adjust the Spine

It's All About Mt. Juliet (Road)

Mt. Juliet Road dominates the car crash experience, as it is used for nearly every trip made by anyone who starts or ends their trip in the City.

Proposals to change Mt. Juliet Road need to address key intersections at Interstate 40, Division Street, Old Lebanon Dirt Road and Lebanon Road. Stricter management of new driveways entering the road should be coupled with better management of crossing traffic through the use of medians, cross-access between properties, rear access, and driveway channelization.



Tie It Together

Land & Transport Go Together

People use the transportation system because they want to go someplace. Transportation improvements become necessary because too many people are using (or sometimes, abusing) the roadway or other transportation space and services available to them.

To get the most out of our public and private investments, it is necessary to plan for both land use / development and transportation together. Questions about resiliency, choices, capacity, design, density, external v. internal demand, diversity of uses, connectivity, and policy have to come together to make a great transportation system. Simply reacting to new development won't be enough.



Roadway & Freight Element



With 85% of Mt. Juliet residents driving - alone - to work each day, roadway congestion and alleviating it will be a major point of discussion for years to come.

The most significant traffic issue, both in terms of public commentary and observations analysis is Mt. Juliet Road, the north-south "spine" of the City. Typically a five-lane roadway with a center "suicide" two-way left-turn lane, this road is where a majority of all crashes occur in the City.

Other roadways that the public noted as needing improvement included the following:

- Division Street
- Lebanon Road
- Old Lebanon Dirt Road
- Nonaville Road
- North Greenhill Road
- Central Pike

To address the most common concerns brought up by the public - traffic congestion and safety, as well as better connections for biking, walking, transit, and automobiles - several overarching strategies are proposed. These strategies work much better when they are implemented together: each tends to reinforce the others in a "virtuous circle" of improvements.



Increase Capacity

Build the Road

It seems obvious: if freight and travelers encounter congestion, then simply expand the capacity of the road(s) to accommodate them. In isolation, such as the case with limited-access freeways and Interstates, this approach makes a lot of sense (although it is often breathtakingly costly to implement). However, in real-world communities, the advantages of bigger roads have to be weighed against needs beyond short-term (and it is short-term in a growing region) congestion relief: right-of-way / private property acquisitions, disruption due to construction, damage to streams, and the costs to appearance and aesthetics. While this last category of impact is less tangible, it's impact is felt keenly in communities that have lost, or given away, a sense of place, economic vitality, and historic character in exchange for temporary traffic relief. Adding more lanes to a road or intersection as well as building new roads fall into this category. Special considerations for freight are necessary on major truck routes, including intersection design and pavement depth and width, as well as accommodating pedestrians, cyclists, and transit patrons to create complete streets.

"My daddy said that's what I get for putting 50 pounds of mud in a five-pound bag."

- Dolly Parton, 1978 CMA Awards Show, during acceptance speech shortly after splitting her dress



Continue Creating the Options

Walk, Bike, Bus, Train Connections

Biking, walking, and public transportation are good options in Mt. Juliet because of relatively short distances and existing infrastructure. Promoting connectivity through street extensions, streetscaping, and better, safer intersection and street design will continue to improve on critical options to offer relief (and health) to more people in Mt. Juliet. A bonus is that more people and businesses are favoring "walkable" communities - as are older populations.



Manage Access

Preserving Precious Road Capacity

Regardless of how many new roads are built, the benefits don't last long if access to them isn't managed. Driveway spacing standards, left-turn controls (e.g., with medians), and cross-access requirements are key elements of an access management policy. Generally, no roadway should be constructed without strong access management controls in place. This practice can, if implemented consistently and fairly, preserve accessibility to existing businesses, accommodate traffic from future businesses, and grow fiscal revenues without incurring downstream costs for major roadway improvements.



Controlling Demand

Policy and Land Use Integration

Ultimately, congestion compromises any roadway if more development and travelers are added to the network than it can handle. Land use and development should respond to known constraints, and help pay for future improvements. In broad stroke terms, this practice of balancing infrastructure capacity with the development types and quantities that create demand is called *concurrency* planning. Many of the survey respondents requested measures along these lines, often citing the need to slow or halt development until the infrastructure can "catch up" with the existing or future needs. As with Access Management, a balance between mobility and a supportive business environment has to be struck for land use planning to be long-lived partner in helping to build a successful transportation system: it's important to remember that places with traffic congestion are often successful economically. Ghost towns in the midwest have no traffic and not much else. Creating a permanent dialogue with the public is the best way to continuously "plan-do-check-act" the roles, strategies, and effectiveness of land-transportation partnerships. Part of that dialogue should be understanding how to create transit- and walk-supportive densities without apartments: auxiliary units, rear alley-loading, and a variety of attached townhomes can accomplish this objective near the developing downtown core.

Recommendations

Map ID	Street	From	To	Length (mi.)	Type
1	Benders Ferry	Lebanon Road	Mays Chapel Road	2.6	Widening 2/3 Lanes
2	Nonaville Road	Windtree Trace	Saundersville Road	2.8	Widening 2/3 Lanes
3	Nonaville Road	Lebanon Road	Windtree Trace	0.5	Widening 2/3 Lanes
4	John Wright Road	Central Pike	New Collector	1.4	Widening 2/3 Lanes
5	Mt. Juliet Road	Providence	NW Rutland Road	1.5	Access Management
6	N. Mt. Juliet Road	W. Division Street	Lebanon Road	2.2	Access Management
7	Lebanon Road	Devonshire Drive	Nonaville Road	2.5	Access Management
8	Lebanon Road	Nonaville Road	York Road	1.4	Access Management
9	Central Pike	County Line	Tillman Drive	2.2	Widening 4 Lane Divided
10	Central Pike	N. Mt. Juliet Road	Tillman Drive	1.4	Widening 4 Lane Divided
11	Mt. Juliet Road	Central Pike	Providence Parkway	0.7	Widening 4 Lane Divided
12	E. Division Street	N. Mt. Juliet Road	Golden Bear Pkwy	2.4	Widening 4 Lane Divided
13	Lebanon Road	York Road	Dogwood Trail	2.1	Widening 4 Lane Divided
14	Greenhill Road	Division Street	Lebanon Road	1.4	Widening 4 Lane Divided
15	Central Pike	Mt. Juliet Road	Stockbridge Way	1.2	Widening 4 Lane Divided
16	Beckwith Road	S. Rutland Road	I-40 EB Ramp	0.6	Widening 4 Lane Divided
17	New Location	Golden Bear	Eastgate Boulevard	2.5	New Location 4 Lane Divided
18	Golden Bear	Curd Road	Lebanon Road	1.9	Widening 4 Lane Divided
19	N. Mt. Juliet Road	NW Rutland Road	Division Street	1.5	Access Management
20	W. Division Street	Greenhill Road	N. Mt. Juliet Road	2.1	Widening 4 Lane Divided

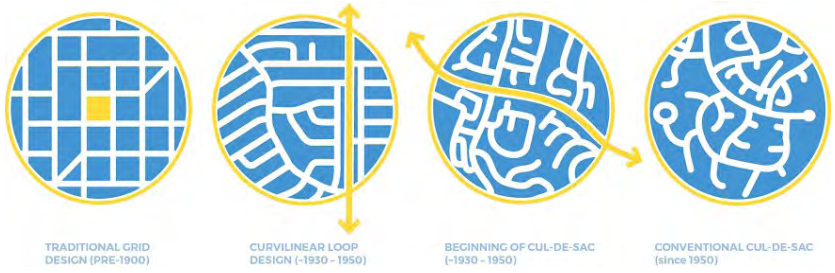
Some projects listed herein are already under development; others would be financed by either or both public and private sector sources. For example, the connector streets shown on the map are likely to be under developer requirements. However, these connector streets are intentionally narrow (two lanes), curvaceous (to self-enforce slower speeds), and indirect (to accomplish movement of all types within an area) to reduce cut-through traffic volumes while promoting walking, biking, and low-speed automobile travel.

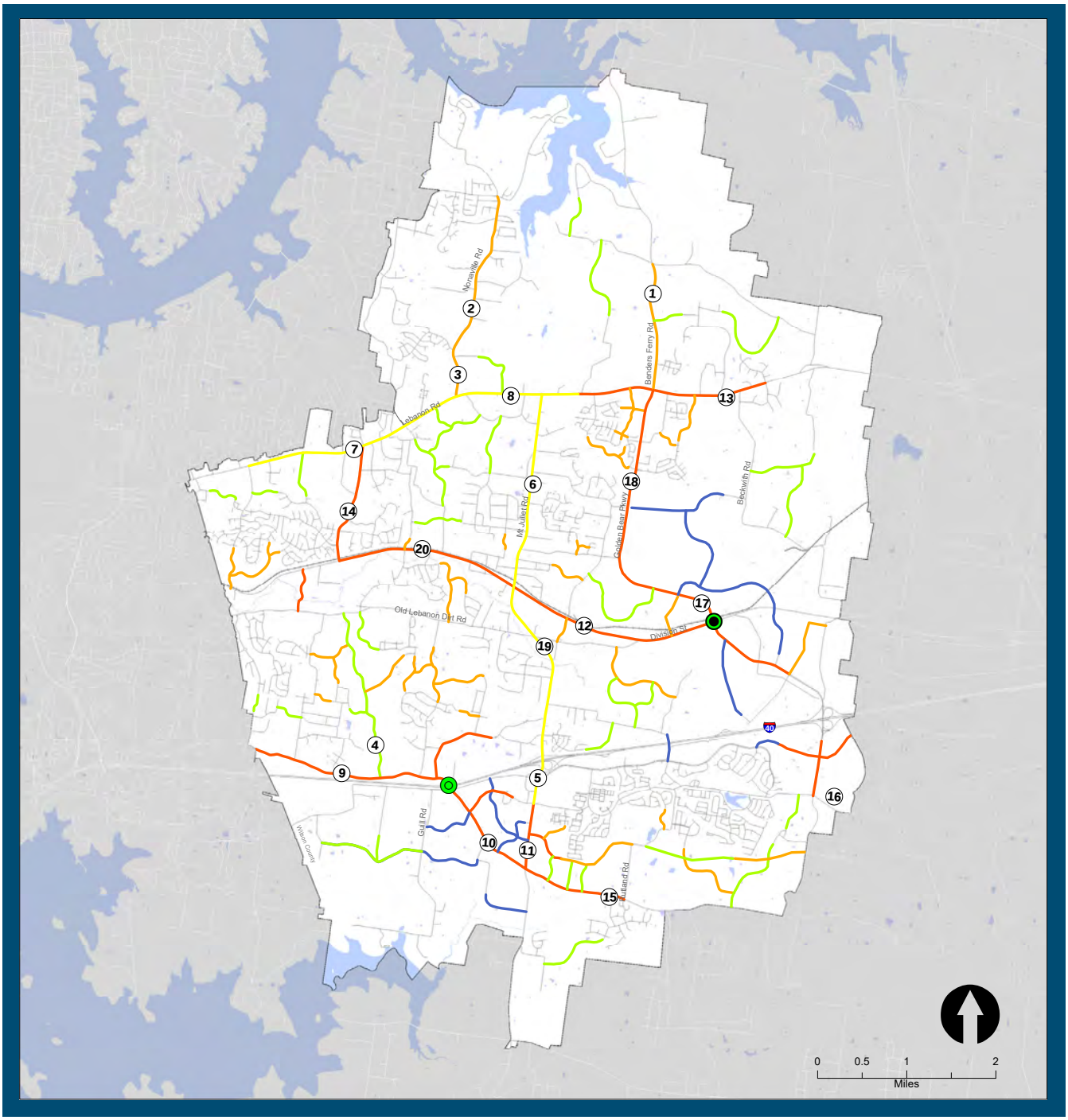


We used to know how to build new streets and neighborhoods that supported people; then we started buildings streets for cars.

Good streets respect a specific purpose: moving lots of cars quickly is desirable in one place and perceived as dangerous and detrimental in another. The collector street connections proposed should be built to people scale, with narrow lanes, curvy paths, lighting (as needed), streetscaping, and provisions for putting more people on them walking and biking.

source: Congress for New Urbanism





Intersections

- High-Priority (I-40/Central Pike)
- Under construction (Golden Bear/Division)

Roadway Laneage

- Rural Collector (2 Lanes)
- Residential Collector (2 Lanes)
- Commercial (2-3 Lanes)
- Multi-Lane (4 Lanes Divided)
- Access Management (Driveway Closures/Median Use)

Figure 9. Roadway Projects

Corridor Recommendations

Two of the most problematic roadways in Mt. Juliet are also the ones that form most of the identification of the City: Lebanon Road and Mt. Juliet Road. To address some of the design concerns associated with each road, the project team developed conceptual designs for each roadway, incorporating Complete Streets and Access management design elements in both.

Shown here is N. Mt. Juliet Road; Lebanon Road is shown on the following pages.

Safety First | "crash and learn"

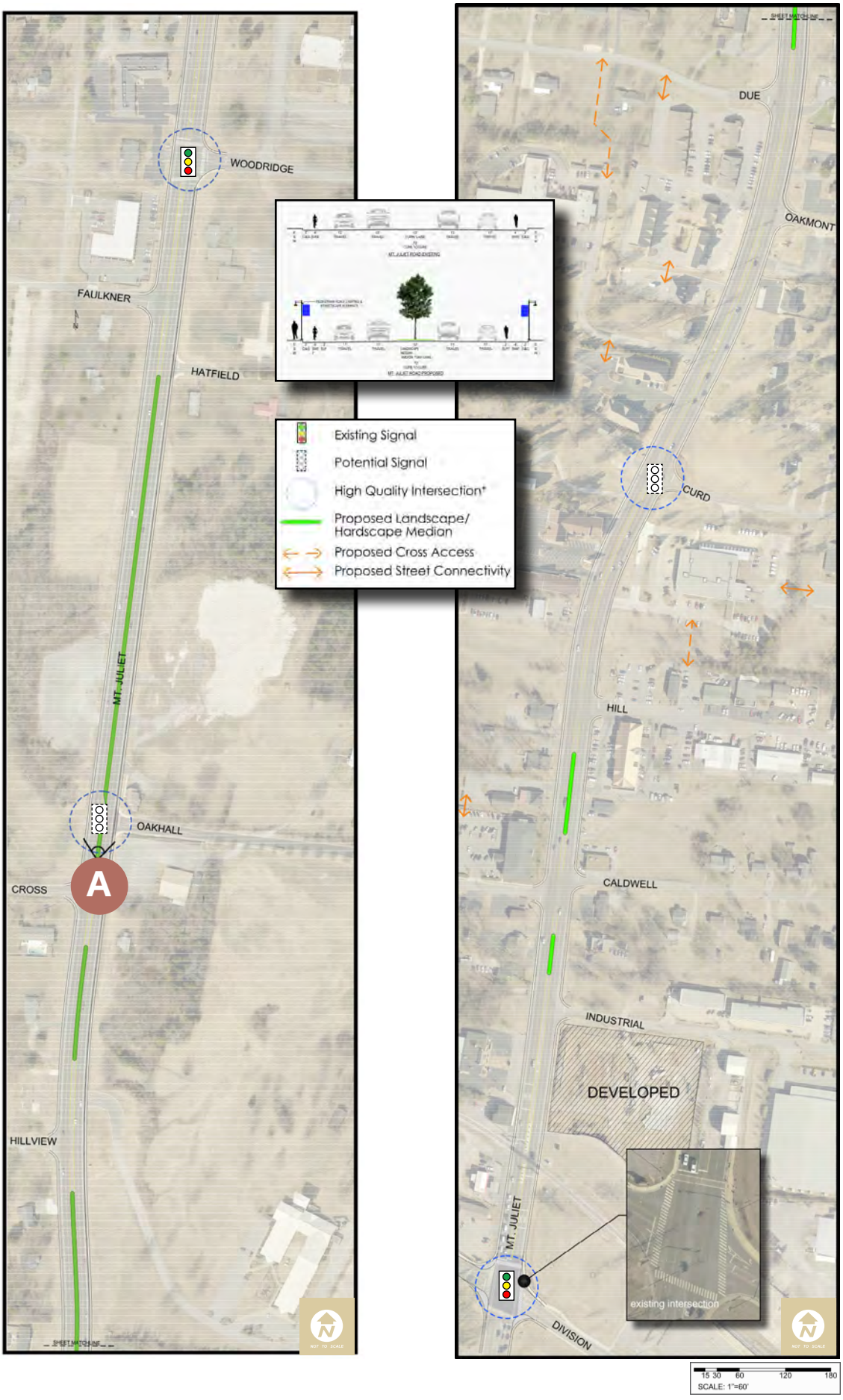
N. Mt. Juliet Road

Division Street to Woodridge Place

About 60% of crashes that occur in Mt. Juliet happen on its namesake roadway, and the public comments support the need to do something soon to help make the road safer, as well as improve its appearance and "walkability."

ISSUES	RESPONSES
Too many crashes	Add median to reduce conflicts from turning vehicles except at key locations; redesign key intersections to improve geometry. The median can reduce crashes by as much as 40% in some cases.
Roadside Appearance	Landscape the median and edges of the road consistently
User Access	Filling sidewalk gaps and separating the bicycleways; creating new connections to adjacent properties; and improving landscaping and lighting at the edges of the roadway




WOODRIDGE
FAULKNER
HATFIELD
MT. JULIET
OAKHALL
CROSS
A
HILLVIEW
DUE
OAKMONT
CURD
HILL
CALDWELL
INDUSTRIAL
DEVELOPED
MT. JULIET
DIVISION
existing intersection
Existing Signal
Potential Signal
High Quality Intersection*
Proposed Landscape/ Hardscape Median
Proposed Cross Access
Proposed Street Connectivity
15 30 60 120 180
SCALE: 1"=60'

Building to Greatness | "fix it first"

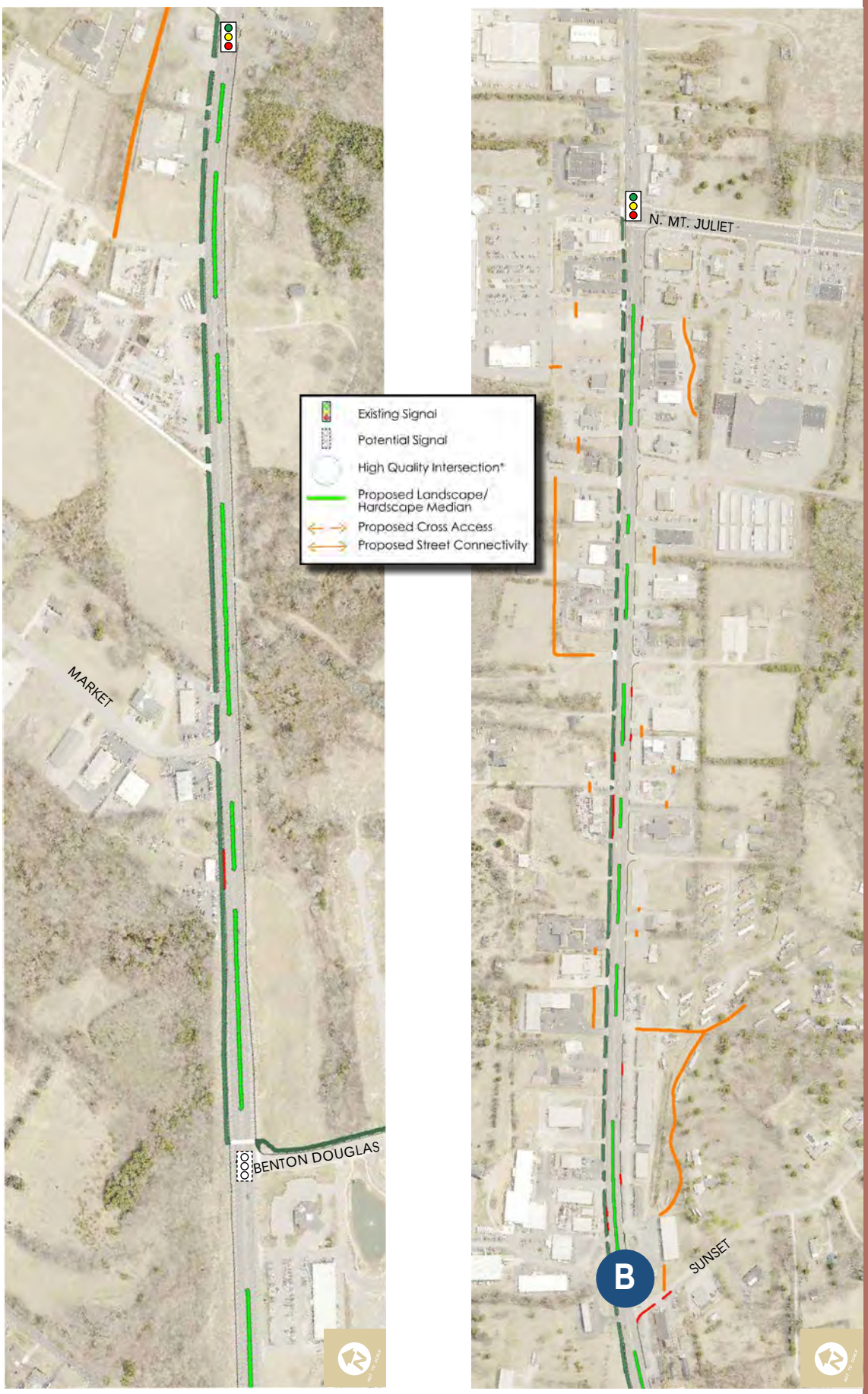
Lebanon Road

N. Greenhill Road to N. Mt. Juliet Road

Lebanon Road provides both a crucial east-west parallel offering to I-40, and also creates important economic opportunities, particularly at its major crossing with North Mt. Juliet Road. Further west, bicycle lanes and greenways connect Mt. Juliet to parks along the Cumberland River and Nashville.

ISSUES	RESPONSES
Better Biking	To take advantage of the long-distance biking destinations, construct a multi-use sidepath on the north side of the roadway
Roadside Appearance	Create a higher-quality and more consistent median treatment throughout
Connectivity Gaps	Creating cross-access paths between adjacent properties prevents quick "in-and-out" movements on and off Lebanon, thereby increasing accessibility and reducing the potential for collisions and vehicular delays




Existing Signal
Potential Signal
High Quality Intersection*
Proposed Landscape/ Hardscape Median
Proposed Cross Access
Proposed Street Connectivity
MARKET
BENTON DOUGLAS
N. MT. JULIET
SUNSET
B

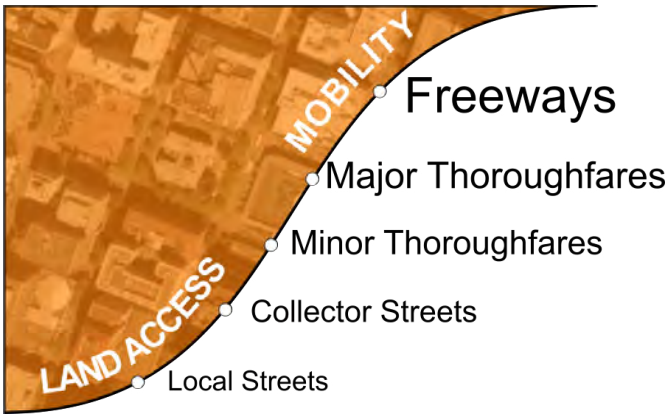
Managing Access

A principle job of transportation professionals is preserving and, where possible, enhancing roadway capacity. Often, roads that start off by accessing quiet residential areas become tense with through traffic. The same happens to large roadways that were designed to carry many cars and trucks quickly over long distances when there are too many driveways and cross-streets that offer opportunities for stopping and turning - and crashes. Many of the issues encountered in Mt. Juliet can be traced back to this issue of roads no longer serving their intended function well.

It is therefore good practice to (a) recognize a hierarchy of streets that preserve their function as mobility carriers of through traffic, and other roads that principally serve adjacent homes, shopping centers, and businesses; and (b) pro-actively manage access to and from these roads to preserve their capacity, reduce crashes, improve safety, and decrease vehicular delay.

The intent of the access management guidelines that follow is to permit reasonably convenient and suitable access to land abutting the road system included in the **Mt. Juliet Comprehensive Transportation Plan** while preserving the regional flow of traffic in terms of safety, capacity, and speed. Appropriate access management will protect the substantial public investment in the City's roadway system and reduce the future need for construction measures that are costly to taxpayers, the environment, and local residents and businesses.

Requests regarding access locations and /or new median openings requested as part of a development application will be coordinated between the City Engineer and Tennessee DOT.



Definitions

For purposes of this guideline, the following definitions will apply. If not defined in the guidelines, the definitions used in Mt. Juliet's zoning or subdivision ordinances or as stipulated by the TDOT Manual for Constructing Driveway Entrances on State Highways and TDOT Region Office.

Access – A public or private roadway used to enter or leave a public highway from adjacent land using an on-road motor vehicle. An access may be a driveway or a street.

Access Point – The intersection of an existing or proposed access with the public right of way.

AADT – Average annual daily traffic volume – The total two-way yearly traffic volume on a section of roadway, divided by 365; often referred to as the average daily traffic (ADT).

Change of Land Use – Any proposed property use that is different from the current use of the property, or current use that is different than the use identified in a preexisting driveway permit.

Connectivity – A term used to infer connections between adjoining properties for vehicular and/or pedestrian usage.

Corner Clearance – The minimum distance, measured parallel to a highway, between the nearest curb, pavement or shoulder line of an intersecting public way and the nearest edge of a driveway excluding its radii.

Cross-Access – A service drive providing vehicular access between two or more continuous properties so that the driver need not enter the public street system to travel between adjacent uses.

Directional Median Opening – An opening in a restrictive median which provides for U-turns and or left-turn ingress or egress movements.

Driveway – An entrance used by vehicular traffic to access property abutting a street. As used in this guideline, the term includes private residential, non-residential, and mixed-use driveways.

Driveway Throat – The portion of a driveway between the public road and the internal circulation system or area where parking maneuvers occur.

Frontage – The length along the street right-of-way line of a single property tract or roadside development area between the edges of the property lines.

Full Median Opening – An opening in a restrictive median that allows all turning and through movements to be made.

ITE – Institute of Transportation Engineers.

Joint Driveway – A single access point connecting two or more contiguous sites to a public roadway that serves more than one property or development, including those in different ownership or in which access rights are provided in legal descriptions.

Major Intersection – An intersection with high volumes exceeding the MUTCD warrants for signalization.

Median – The portion of a divided highway separating the traveled ways for traffic in opposing directions.

MUTCD – Manual on Uniform Traffic Control Devices.

TDOT – Tennessee Department of Transportation

Posted Speed – The speed limit set and maintained by the TDOT or Mt. Juliet.

Sight Distance – This is the area that establishes a clear line of sight for a waiting vehicle to see on-coming traffic and make turning movements into or out of a street or driveway connection safely or for traffic to see entering or waiting vehicles.

Storage Length – Additional lane footage added to a turning lane to hold the maximum number of vehicles likely during a peak period so as not to interfere with through travel lanes.

Throat Length – The distance between the edge of the nearest travel lane to the near edge of an internal drive interior to the site that represents the first opportunity for a car to make a turn into a parking lot.

All connections in Mt. Juliet shall meet or exceed the minimum connection spacing requirements as specified in the table below.

Posted Speed Limit	Signal Spacing	Full Median Spacing	Directional Median Opening	Adjacent Driveway Spacing	Opposite Street Driveway
> 45MPH	2,000 ft	2,000 ft	1,000 ft	500 ft	500 ft
26-44 MPH	1,200 ft	1,200 ft	600 ft	100 ft	100 ft
< 25 MPH	600 ft	600 ft	300 ft	100 ft	100 ft

Spacing between driveways or medians shall be measured along the right-of-way line between the tangent projection of the inside edges of adjacent driveways, opposite street driveways or median openings. The City Engineer may reduce the connection spacing requirements for situations where they prove impractical, but in no case shall the permitted spacing be less than 85% of the standard. Spacing below 85% of the standard will require the issuance of a variance.

For sites with insufficient road frontage to meet minimum spacing requirements, consideration shall first be given to providing access via connection to a side street, utilization of a joint or shared driveway with an adjacent property that meets the recommended spacing requirement, or development of a service road to serve multiple properties.

The City Engineer, in coordination with the Tennessee DOT, may grant access approval for a permanent use not meeting the spacing requirements of these guidelines on an interim basis if an access plan is submitted that demonstrates how spacing requirements will ultimately be met and appropriate assurances in the form of a recordable and enforceable easement of access agreement will be provided insuring future provision of a conforming access. Deviation from these spacing standards may be permitted at the discretion of the City Engineer in cooperation with the Tennessee DOT where the effect would to enhance the safety and operation of the roadway. Examples might include a pair of one-way driveways in lieu of a two-way driveway, or alignment of median openings with existing access connections.

All road and driveway connections to a single parcel shall be brought into compliance with the minimum connection spacing requirements set forth in the guidelines when the lane use(s) on the single parcel is modified or expanded.

The Tennessee DOT may additionally prohibit, restrict, or modify the placement of any connection, at any time, to a single property in the interest of public safety and mobility on state-maintained streets.

Corner Clearances:

Corner clearance is the distance between an intersection and the first point of ingress or egress to a corner property's driveway. The purpose of corner clearance is to remove conflicting movements from the functional area of intersections and provide sufficient stacking space for queued vehicles at intersections so that the driveways are not blocked. No driveway will be permitted to enter directly into an intersection. Driveways must turn traffic into the traffic stream of the highway and/or intersecting road or street before it is permitted to pass through the intersection. Unless an exception is granted, the minimum corner clearance for entrances will be established by a queuing analysis or 100 feet for unsignalized intersections and 125 feet for signalized intersections, whichever is larger. Approved exceptions at intersections without provisions for sight distance or clear vision areas (flared right-of-way) will prohibit driveway connections within 50 feet of the highway, crossroad, or street from the outside shoulder of the adjacent street and access will be a right-in/right-out. Exceptions may be approved if as a result of the City or the Tennessee DOT action the property would become landlocked. No part of a driveway entrance or exit may be permitted within a corner radius.

Near a signalized intersection, the location for a full movement driveway connection may be required to exceed the minimum spacing requirements set forth in the guidelines to avoid interference with the operations of the traffic signal and resulting traffic queues. The radius of a full movement driveway connection shall not encroach on the minimum corner clearance.

The minimum lot size for any new corner lot created through the subdivision process shall be of adequate size to provide for the minimum corner spacing as specified in the guidelines.

Joint and Cross Access:

Non-residential and Mixed-Use Projects

Adjacent land uses classified as major traffic generators shall provide a cross access drive and pedestrian access to allow circulation between sites. Major trip generators attract a minimum of100 additional vehicle trips during the peak of the adjacent roadway or a development.

A system of joint use driveways and cross access easements shall be established if deemed

feasible by the City Engineer and the building site shall incorporate the following:

A continuous service drive or cross access corridor extending the entire length of the property frontage and to provide driveway separation in order to provide the minimum spacing requirements as contained in the guidelines.

A design speed of ten miles per hour and sufficient width to accommodate two-way travel aisles designed to accommodate automobiles, service vehicles, and loading vehicles.

Stub-out connections and other design features that make it visually obvious that the abutting properties may be tied-in to provide cross access via a service drive.

A unified access and circulation system plan that includes coordinated or shared-use parking areas wherever feasible.

The property owner shall record an easement with the deed for the property that allows cross access to and from other properties served by a joint use driveway, cross-access, or service drive.

The property owner shall record a joint maintenance agreement with the deed for the property defining maintenance responsibilities of the adjacent property owners.

Residential Projects

Residential subdivisions with lots fronting along the primary roadway system shall be designed with combined access points, alley access, or otherwise shall derive access from the side streets to the highway. Normally a maximum of two access points shall be allowed regardless of the number of lots served.

The property owner shall enter into a written agreement with the city, recorded with the deed for the property, that pre-existing connections along the frontage will be closed and eliminated after construction of joint use driveways.

The City Engineer may modify or waive the requirements of this section where the characteristics or layout of abutting properties would make implementation of joint use driveways or development of a shared access circulation system impractical, provided that all the following requirements are met:

Joint access driveways and cross access easements are provided wherever feasible.

The site plan incorporates a unified access and circulation system.

Median Openings:

No new median openings shall be allowed along roadways with an existing center median unless it is in conformance with latest edition of the Access Management guidelines published by the Tennessee DOT or in conformance with the City of Mt Juliet Access Management requirement, where applicable. In all circumstances, new median openings shall not encroach on the functional area of an existing median opening or intersection. Approval of any new opening lies ultimately with the Tennessee DOT Traffic Engineering Branch or with the City Engineer, where applicable.

Minimum criteria for evaluating a request for a new median opening may include, but not be limited to, the following:

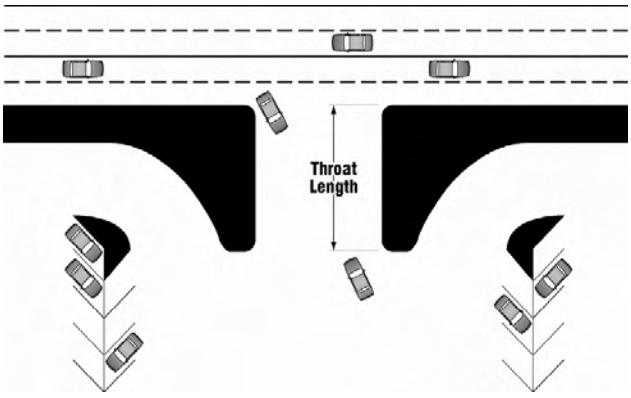
- Median openings shall not be located where intersection sight distance (both vertical and horizontal) cannot meet current design criteria required by the TDOT or AASHTO Green Book.
- Median openings shall not be placed in areas where the grade of the crossover will exceed five percent. Special consideration should be given to the vertical profile of any proposed new median opening that has the potential for future signalization.
- A median opening shall not be provided where the median width is less than sixteen feet.
- Median openings that require a traffic signal, or where one may be expected in the future, should be avoided.
- It is the responsibility of the property owner to provide the justification for new median openings.

Sight Distance Requirements: Driveways shall not be permitted to connect with any highway, road, street or frontage road at a location if it does not meet the minimum

stopping sight distance criteria, based on vertical or horizontal alignment, terrain or other reasons which will cause an undue hazard to the traveling public. Any driveway application that does not provide adequate sight distance as outlined in the Tennessee Roadway Design Guidelines shall be denied. In order to provide adequate sight distance in both directions when entering the highway, driveway entrances and exits should be at a 90 degree angle. Angles less than 90 degrees should not be constructed unless justified by an engineering analysis and in no case shall be less than 60 degrees with the highway.

Additional Design Criteria

Throat Length Distances: The connection depth of a driveway (throat length) as measured from the edge of the abutting roadway to the near edge of the internal circulation road or buffer area shall be of sufficient length to allow a driver to enter the site without interfering with the mainline of traffic. The Figure below shows the minimum throat lengths based on both site activities as well as the category of adjacent roadway (either minor or major thoroughfare).



SITE ACTIVITY	THROAT LENGTHS	
	Minor	Major
Regional Shopping Centers (Malls)	250’	250’
Community Shopping Center (Supermarket, Drug Store)	80’	100’
Small Strip Shopping Center	30’	100’
Regional Office Complex	250’	250’
Office Center	80’	100’
Small Commercial Developments	30’	100’

Offset Access Connections: On undivided roadway segments, access connections on opposing sides of the highway shall be offset at an adequate distance to minimize overlapping left turns and other maneuvers that may result in safety hazards or operational problems.

Auxiliary Lanes: Auxiliary lanes (left or right turn lanes) shall be required for new driveways where they meet the Tennessee DOT or ITE warrants.

Out-Parcel Access: All access to an out-parcel shall be internalized using the shared circulation system of the principle development. Access to out-parcels shall be designed to avoid excessive movement across parking aisles and queuing across surrounding parking and driving aisles.

Minimum On-Site Vehicle Storage Area: Adequate storage must be provided within the internal circulation system for properties that include either a drop-off loop or drive-through facility so that vehicles do not queue onto the highway system. Specific storage areas will be determined by the City Engineer in cooperation with the Tennessee DOT on a case-by-case basis during the development review process. However, the following minimum storage lengths are required for specific development types:

(A) For single-lane drive-in banks, storage to accommodate a minimum queue of six vehicles will be provided. Banks having several drive-in service windows will have storage to accommodate a minimum of four vehicles per service lane.

(B) For single-lane drive-through full service car washes, storage to accommodate a minimum of twelve vehicles will be provided. Automatic or self service car washes having a multi-bay design will have a minimum vehicle storage length of three vehicles per bay.

(C) For fast-food restaurants with drive-in window service, storage within the site to accommodate a minimum of eight vehicles per service lane from the menu board/ ordering station will be provided.

(D) For service stations where the pump islands are parallel to the pavement edge, a minimum setback of 35 feet between the pump islands and the public right-of-way will be provided. For service stations where the

pump islands are not parallel to the pavement edge, minimum vehicle storage of 50 feet in length between the pump islands and the public right-of-way will be provided.

(E) For land uses that require an entry transaction or have service attendants, gates or other entry control devices, the vehicle storage will have an adequate length so that entering vehicles do not queue back on the adjacent right-of-way. No portion of a parking area, attendant booth, gates, signing or parking activity shall encroach on the public right-of-way.

(F) For schools, adequate storage for parental drop-off and pick-up areas should be provided entirely on the school campus site.

Crossroad Access Spacing at Interchanges:

Minimum access spacing on crossroads for freeway interchange areas is critical for avoiding traffic backups and providing safe maneuvering distances for turning and weaving vehicles to enter the appropriate lanes. No driveway, intersection, or median opening will be allowed less than 500 feet from the end of the taper of the ramp furthest from the interchange. If the proposed distances are less than the minimum spacing then a written justification demonstrating why the recommended distances cannot be met shall be submitted to the City Engineer and TDOT for approval as an exception.

Traffic Study: A traffic study may be required by the City Engineer or the TDOT to evaluate one or all access locations proposed in a development application. The estimated trip generation shall be based on the latest edition of the ITE Trip Generation Report. If required by the city, the traffic study shall be completed in conformance with the minimum rules and procedures set forth in the Access Management Guidelines (TDOT) or in the City standards, as applicable.

Variances: The granting of a variance shall be in harmony with the purpose and intent of the Mt. Juliet Access Management Guidelines and shall not be considered until every feasible option for meeting the minimum access management standards is explored.

Applicants for a variance from the standards must provide proof of unique or special conditions that make strict application of the provisions impractical. This shall include proof that:

- Indirect or restricted access cannot be obtained.
- No engineering or construction solutions can be applied to mitigate the conditions.
- No alternative access is available from a side street.
- Under no circumstances shall a variance be granted, unless not granting the variance would deny all reasonable access, endanger public health, welfare or safety, or cause an exceptional and undue hardship on the applicant. No variance shall be granted where such hardship is self-created.

Business Impact Mitigation:

An important aspect of minimizing the impact of access management projects and medians is to maintain open access to businesses during the construction phase. Potential actions to mitigate construction impacts include:

- Clearly sign business entrances from the roadway;
- Provide temporary and/or secondary business access points, where feasible:
- Schedule construction during after business hours or during times of low usage for seasonally oriented businesses;
- Avoid blocking business entrances with construction equipment or construction barriers;
- Provide alternative parking, if possible and avoid taking or blocking parking spaces;
- Establish a single point of contact in the agency about the construction project to communicate with property and business owners; and
- Provide regular project progress reports to business and property owners.



Bicycle, Pedestrian, & Transit Element



Every other mode of travel depends on walking (or moving in a wheelchair, on crutches, etc.). In fact, walking is so obvious that, when asked to record their daily travel for transportation studies, people forget most of the walking trips they make during the day.

Walking, and it's cross-town cousin, bicycling, is conducted in a way that is much more intimate and personal than driving a car. Walking or biking is to driving as driving is to riding in an airplane: a person senses details of the environment that are simply missing and missed when traveling in a car. The Mt. Juliet Comprehensive Transportation Plan therefore had to rely on people telling us about the state of walking and biking across the city, along with crash data, to help understand barriers, concerns, gaps, and necessary improvements. In most cases, biking and walking don't have to compete with the car for trips. Instead, people choose to walk or bike because it rewards them with better health, better attitudes, or as an escape from the more commonplace but less soulful method of traveling in an automobile.

Riding public transportation is also very different from auto travel in that it is, by definition (traditionally) conducted in the presence of strangers. The trade-offs of waiting for buses or trains are at least partially offset by creating personal space to conduct work, read a book, and generally slow down for a few minutes while we are moved to the places we want to be from the places we were. Public transportation works best when it is time-competitive with automobile travel: the closer the time between automobile travel and transit travel the more likely people are to use public transportation as a real choice. For many riders of today's system, the Music City Star represents a benefit that many probably take for granted, but it is a rare gift to Mt. Juliet to have commuter rail transportation both anchoring an emerging downtown core and providing premium transit service to the city's residents.

"The simplest consequence of walking on crutches is that you walk slower. Every step must be a necessary one. When you hurry, you get where you're going, but you get there alone. When you go slow, you get where you're going, but you get there with a community you've built along the way."

—Bruce Feller

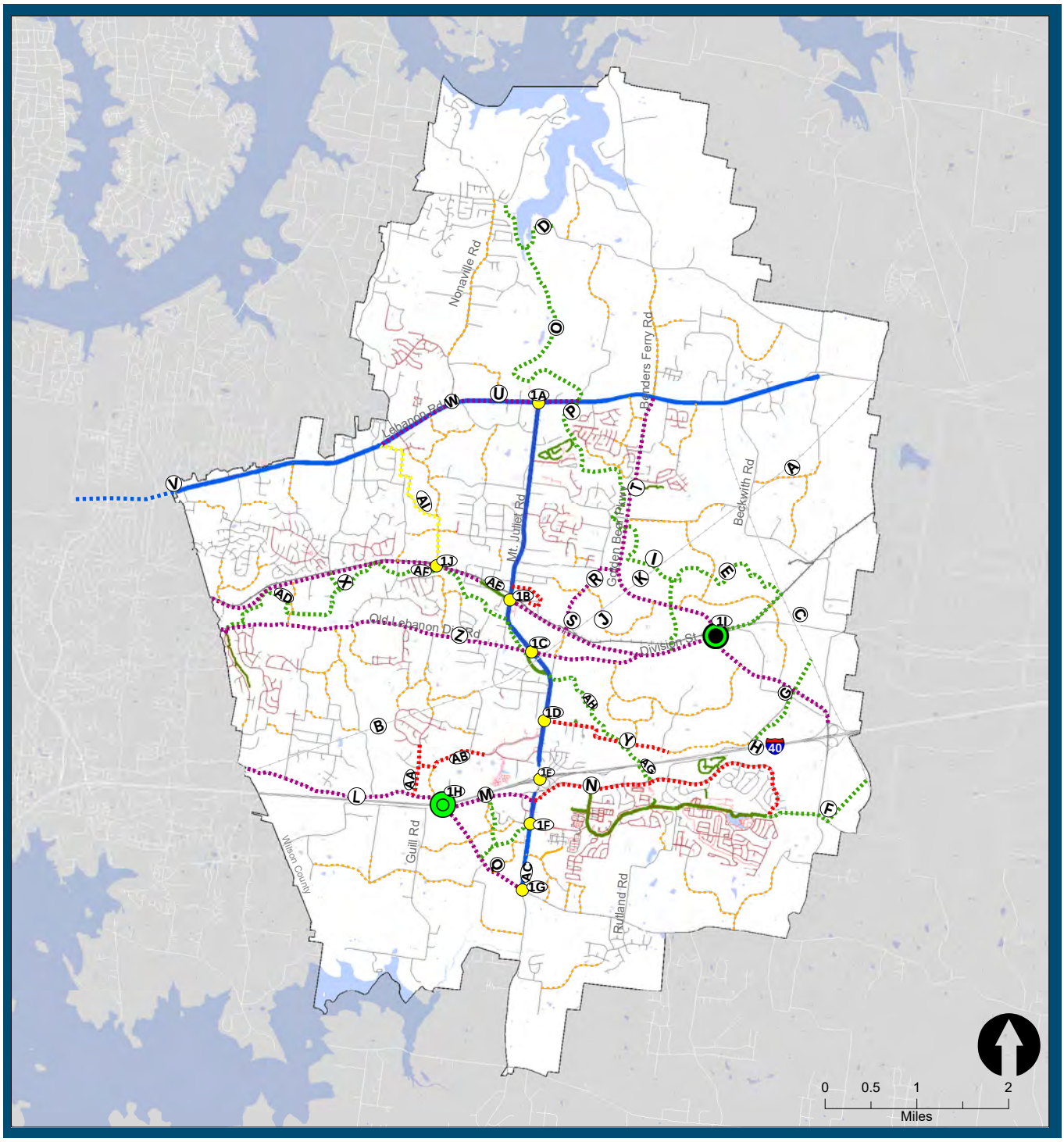


Recommendations

The following pages illustrate the key recommendations for biking, walking, and public transportation that emerged from the planning process. The following map and points and lines correspond to the table on the right-hand side that describe specific improvements.



A Challenging Ride. *The bicycle lane on Lebanon Road sits next to high volumes of fast traffic. Few venture here during rush hours, making the facility an occasionally used treatment for more experienced cyclists and recreational trips.*



Intersections

- High-Priority (I-40/Central Pike)
- Under construction (Golden Bear/Division)
- Recommended Crossing Treatments

Roadway Improvements

- Proposed Road with Sidewalk

Active Mode Recommendations

- Proposed Sidepath
- Proposed Sidewalk
- Proposed Greenway
- Proposed 5' Bike Lane
- Proposed Shared Signage
- Utility Corridor (Future Greenway)

Existing Facilities

- Existing Sidewalks
- Outside or Shared Bike Lane
- Existing Greenways and Trails

Figure 10. Active Mode Recommendations

Intersection and Crossing Recommendations

Map ID	Priority	Type	Location
1A	High	Intersection	Mt. Juliet/Lebanon Road
1B	High	Intersection	Mt. Juliet/Division Street
1C	Medium	Intersection	Mt. Juliet/Old Lebanon Dirt Road
1D	Medium	Intersection	Mt. Juliet/NW Rutland Road
1E	Medium	Interchange	Mt. Juliet/I-40 Interchange
1F	Medium	Intersection	Mt. Juliet/Central Pike
1G	Medium	Intersection	Mt. Juliet/Providence Way
1H	Medium	Interchange	I-40/Central Pike
1I	High	Interchange	Golden Bear/E. Division St (under construction)
1J	Low	Mid-Block	Tate Ln/W. Division St; w/Stoner's Creek Greenway

Trail and Sidewalk Recommendations

Map ID	Priority	On Street	From	To	Length (mi.)	Type
A - K	Vision				variable	Greenway/Util.
L	Vision	Central Pike	County Line	Tillman Road	2.2	10' Sidepath
M	Low	Adams Lane	Mt. Juliet Road	Central Pike	1.1	10' Sidepath
N	High	Belinda	Stoner's Creek	Mt. Juliet Road	1.3	Sidewalk
O	Medium	Cedar Creek	Lebanon Road	Saundersville	3.3	12' Greenway
P	High	Cedar Creek	Golden Bear	Lebanon Road	0.5	12' Greenway
Q	High	Central Pike	S. Mt. Juliet	Tillman Road	1.4	10' Sidepath
R	Medium	Clemmons	Curd Road	East Division	0.8	10' Sidepath
S	Medium	East Division	Clemmons	Music City Star	0.6	10' Sidepath
T	High	Golden Bear	Lebanon Road	South of Stoner's	1.5	10' Sidepath
U	Medium	Lebanon Road	Nonaville Road	Cedar Creek	1.4	10' Sidepath
	Vision	Lebanon Road	Matterhorn	Andrew Jackson	0.8	5' Bike Lane
W	Low	Lebanon Road	Nonaville Road	Tate Lane	0.9	10' Sidepath
X	Medium	New Location	S. Greenhill	Cedar Creek	0.2	10' Greenway
Y	High	NW Rutland	Mt. Juliet Road	Proposed	1.5	Sidewalk
Z	High	Old Lebanon	Kelsey Glen	Moreland Drive	0.8	10' Sidepath
AA	High	Pleasant Grove	Triple Crown Ln	Central Pike	0.6	Sidewalk
AB	Medium	Pleasant Grove	Triple Crown Pl	Old Pleasant	0.8	Sidewalk
AC	High	South Mt. Juliet	Providence	Central Pike	0.7	5' Bike Lane
AD	Low	Stoner's Creek	Greenhill	Cobblestone	2.0	12' Greenway
AE	Low	Stoner's Creek	Existing	Stoner's Creek	1.6	12' Greenway
AF	Medium	Stoner's Creek	Tate Lane	Greenhill	1.3	12' Greenway
AG	Vision	Stoner's Creek	NW Rutland	Belinda Parkway	0.6	12' Greenway
AH	High	Stoner Creek	Mt. Juliet Road	NW Rutledge	1.3	12' Greenway
AI	Medium	Tate Lane	Division Street	Lebanon Road	1.9	Shared



Public transportation enjoys a special place in Mt. Juliet, thanks to the presence of a rail station in the center of town.

Future plans for the city's redeveloped core area intentionally contemplate the role that the transit station plays now and will continue to fulfill in the future. The station is very popular now, with the parking lot servicing the facility at or near capacity on weekdays.

Recommendations

The following page provides information on five key transit recommendations, also supported in the text below.

1. **Create a new circulator connecting Providence area to Music City Star Station (long-term).** Many respondents noted the need for better accessibility to Providence, and connecting new developments at the town center will help articulate the energy from the I-40 / Mt. Juliet interchange inwards to those investments. The service should be considered for route-deviation capabilities, allowing people to call in or use the Internet to create specialized deviated routes for pick-up and drop-off to destinations within three-quarters of a mile of the main route (thereby avoiding the need to provide complimentary paratransit services).

2. **Work with RTA to add more service during the peak periods of travel (medium-term).** The most consistent, transit-related comment received concerned adding more service to the existing station. Currently, only three stops are made in the morning (with the latest being 7:45) and the last afternoon train arriving at 6:12pm from Riverfront station. Additional trains departing Mt. Juliet after 7:45am and Nashville between the current 5:05pm and 5:45pm trains would likely be popular. A mid-day and Saturday service should also be considered.



3. **Construct sidewalk connections to station, including along Industrial Drive (medium-term).** As the core part of the City is further developed, pedestrian connections like sidewalks and new crossing treatments will be crucial to getting people to and from the existing station on foot and by bike, avoiding the need for additional parking spaces.

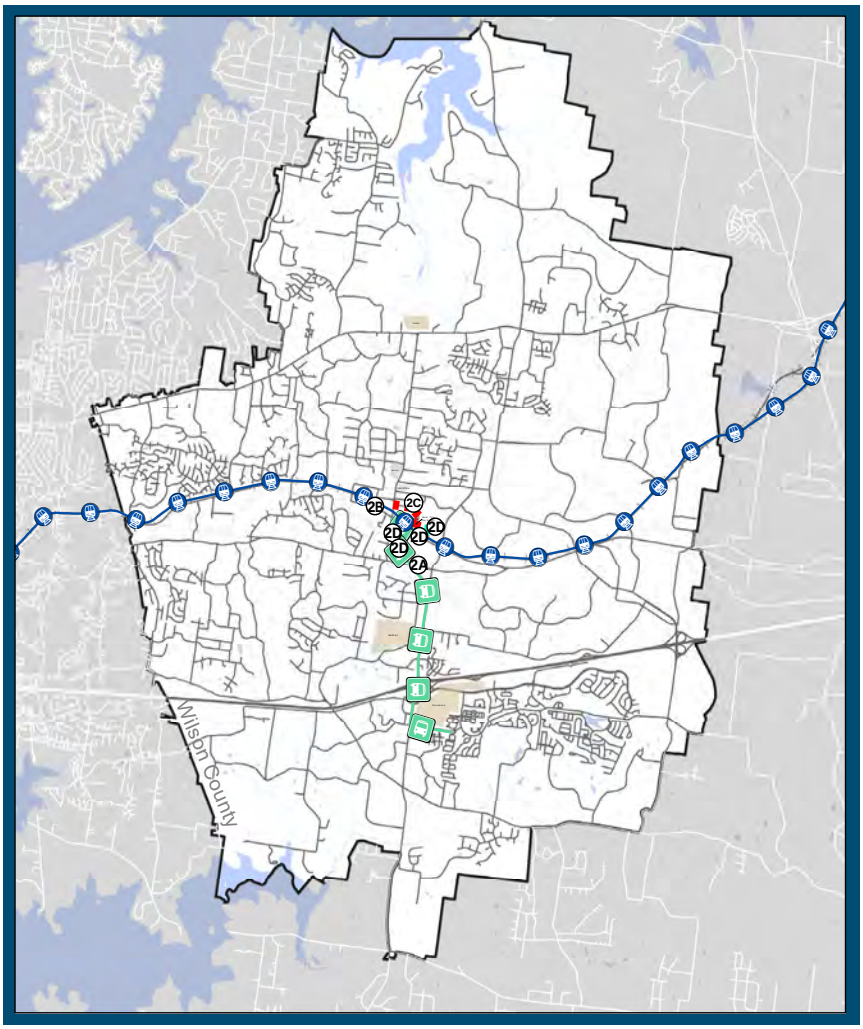
4. **Create park-and-ride lots in the vicinity of the Music City Star station (short-term).** Creating nearby overflow parking coupled with pedestrian crossing treatments will help address the immediate parking capacity concerns at the station.

5. **Subsidize peer-to-peer ridesharing and car sharing services (short-term).** Companies like Uber and Zipcar are changing the face of the way people are accessing shared rides by making them more convenient and cost-effective than traditional, fixed-route transit services. Other cities (e.g., Altamont Springs, FL) have already worked on subsidy programs that have shown in the early going to be effective alternatives to major new transit investments for the majority of users (mobility challenged and those who need access to on-line reservations are segments of the population that this solution may not serve immediately).



Transit Recommendations

Map ID	Priority	Type	Location
2A	Low	Service	Circulator (30-minute headway, 2 vehicles)
2B	Medium	Service	Add 2 additional Music City Star peak-period runs (4 total)
2C	Medium	Sidewalk	Industrial Drive (to Music City Star terminal)
2D	High	Park-and-Ride	Various (south of Music City Star)
N/A	High	Service	Subsidize Peer Ridesharing at Music City Star Station



"...within Providence shopping areas, a shoppers' shuttle would be great and cut down on traffic congestion.... People could park in one place and hop on and hop off as needed."

- survey respondent

Music City Star Transit Line
Circulator (Long-Term)
Sidewalk (Short-Term)
Park and Ride Recommendations

0 0.5 1 2
Miles

Figure 11. Transit Recommendations





Development



Mt. Juliet is an area divided into two very different places in terms of land use. The central portion of the area includes higher density development of commercial and residential. The outer bands of the region are more rural and residential with little commercial.

Included as part of this Plan, two sites were identified in the City of Mt. Juliet by the Steering Committee that are potentially prime for development in the near future. The purpose of identifying these catalyst sites in such a detailed way allows City of Mt. Juliet residents to see what the future might hold for their growing city.

About the Catalyst Sites

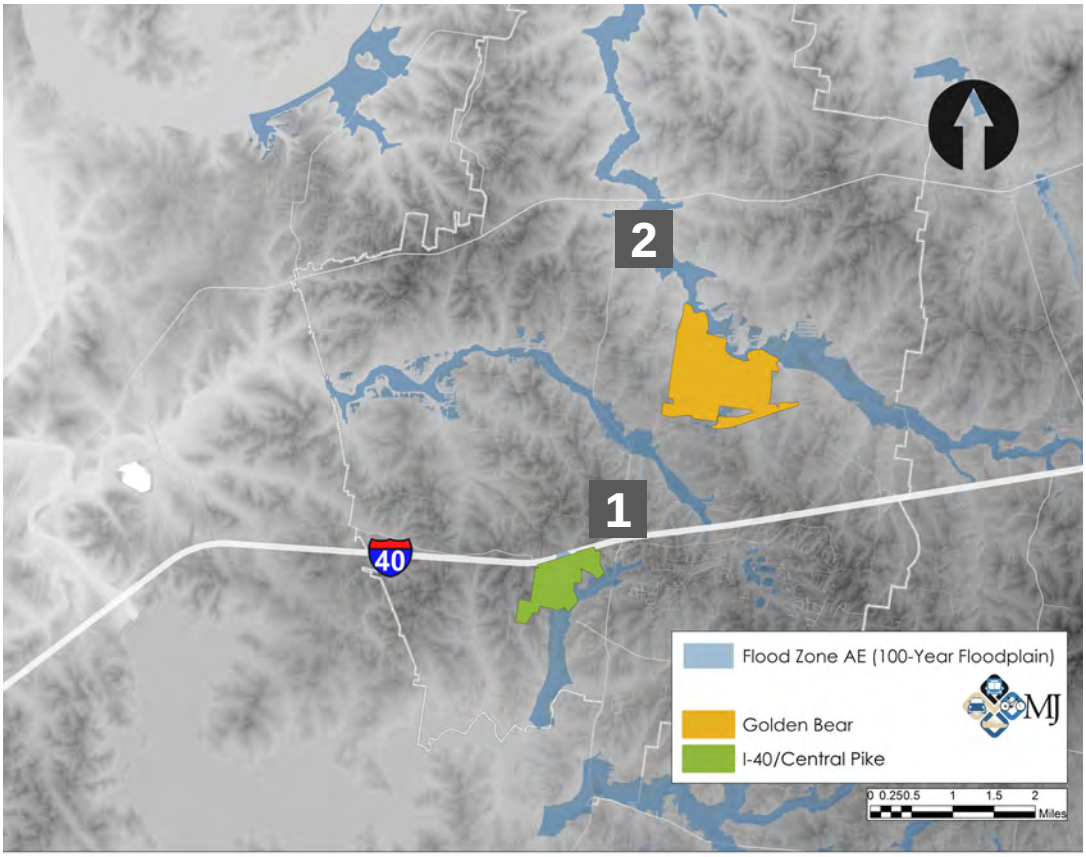
The sites were studied to visualize and illustrate how potential new development can represent some of the best design practices (not specific build out) that demonstrate the recommendations of this plan such as preserve roadway capacity, create interconnected travel, and connectivity.

The plans shown in this section are intended to be conceptual visions for two primarily vacant and significant parcels of land that are prime for development in the near future. The purpose of these conceptual plans is to show general patterns and intensities and potential development/redevelopment opportunities that are consistent with the community's goals. The plans do not consider a specific program and no market analysis was generated.

Future development and redevelopment proposals for these sites reflect the following aspects of the concept plans: the general street network; street connections and rights-of-way; open space areas and usable public spaces; general intensity of development; urban pattern (relationship of buildings to the streets and adjacent properties); building massing; street and pedestrian circulation patterns. Further, developments on these sites should mix uses both horizontally (within sites) and vertically (within buildings), where appropriate.

The proposed plan is designed as a complete community where people can live, work, and play. Residents, visitors, and employees will keep the place vibrant throughout the day. It is designed to be a memorable and unique place, not "Anywhere USA."

Development/Catalyst Sites



Catalyst sites #1 (I-40 at Central Pike) and #2 (at Golden Bear Parkway) are shown here on top of a topographic overlay, floodplains, and roadway system.

- Catalyst Site 1: **I-40/Central Pike**. Area near the new interchange of I-40 at Central Pike.
- Catalyst Site 2: **Golden Bear Parkway**. End of Golden Bear Parkway at Curd Road.

Both sites are ripe for development, as most of the land is vacant and is in close proximity to existing development and main thoroughfares.

The Catalyst sites chosen are ripe for development, primarily vacant and selected for their ample acreage, central locations, proximity to existing development, and main thoroughfares. These sites reflect the prime locations for development based on the Land Suitability analysis discussed previously.

I-40 Interchange (at Central Pike)

The Providence Central Site is generally located at the Southeast and Southwest corners of Central Pike and I-40 in Mt. Juliet. The site is comprised of approximately 231 acres and encompasses multiple parcels.

This site was chosen due to the proposed future I-40 Interchange at Central Pike and the site's close proximity to the Providence Community and Providence Marketplace located east of the site. The site is most likely to develop in the near future. The development potential for the site was explored and the current plan was studied to determine the feasibility of additional and improved development options for the site that incorporate best planning practices.

The future land use designation for the property is Mixed Use and the current zoning on the property is Commercial Mixed Use District and Planned Unit Development (CMU/PUD).

The developer's conceptual site plan proposes approximately 300,000 square feet of commercial square footage (1-2 story), 1.5 million square feet of office (2-6 story) and approximately 310 units (224 multi family units and 88 single family units). The site has not received Final Master Development Plan approval from the City. The Plan is designed with large blocks and consists primarily of office and retail space with surface parking visible from the street which impairs the walkability and connectivity within the development and to adjacent properties.



The "improved" conceptual plan for Central Providence has considered the future Central Pike I-40 interchange and is designed as a compact and walkable development that creates a sense of place. This plan includes a mixed-use neighborhood center that includes ground floor retail with commercial and residential uses on the second floor. More traditional corporate office space is provided on the site as well, taking advantage of freeway visibility and the site's adjacency to I-40. The buildings are anticipated as two-story mixed use, however, if the market were to dictate, the buildings could increase in height and structured parking could be implemented as necessary. The current site design uses surface parking that is predominately screened from pedestrian view along the street.

The street network is designed to be highly walkable by providing pedestrian scaled blocks, smaller blocks. Development with active uses is envisioned to be built up to the sidewalk which helps to activate the street. The entryway from Providence Parkway has been curved down to intersect the neighborhood center area. The streets are designed as "complete" streets, providing access and connectivity for multiple users such as automobiles, bicyclists, and pedestrians and including sidewalks and street trees.

The proposed apartments remain at the entrance from Providence Parkway to be consistent with the existing multi family under construction, however, the overall development becomes more compact and urban as you get closer to the neighborhood center. A variety of housing types are recommended in this site plan including apartments, attached townhomes and detached single family (shown in a variety of lot sizes). The mix of uses and variety of residential offerings will help to make this a complete neighborhood that is desirable to a wide range of citizens, making it more marketable, vibrant and successful over the long term. The proposed buildings are located closer to the streets and the street networks, open space and the buffers all respect natural features and existing topography of the site, making it more sustainable. The plan includes a number of formal and informal parks, neighborhood greens and opens spaces with multiple trail and greenway opportunities.

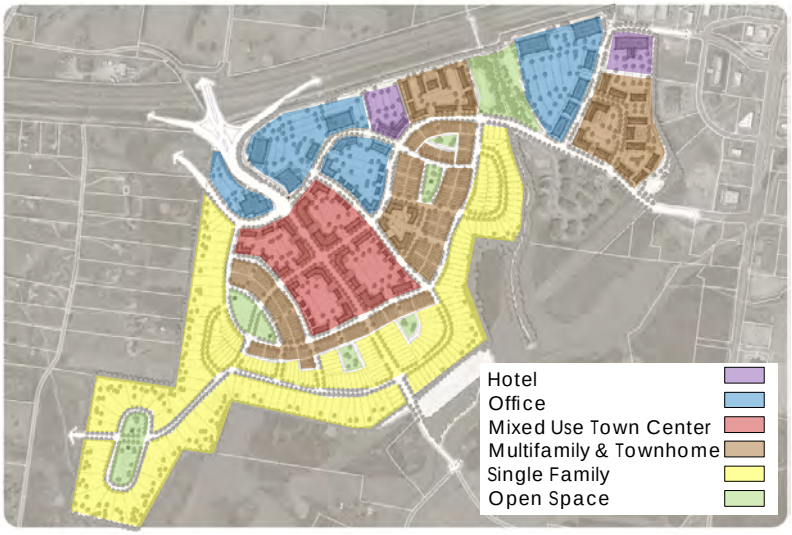
The proposed office square footage takes advantage of freeway visibility near the I-40 interchange and should attract Class A office space. A variety of different scales of commercial space are provided including large and mid size, small office and condo offices are provided near the town center.

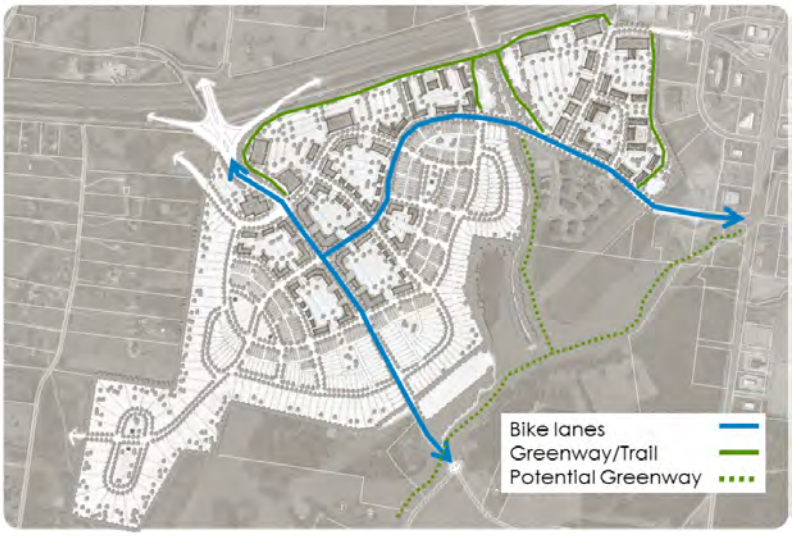
In addition, two hotels are proposed, one along the north property line, providing visibility from I-40 and connecting to the proposed greenway along Adams Lane which has been rerouted to connect to the town center as well to increase walkability. The other is proposed at the eastern

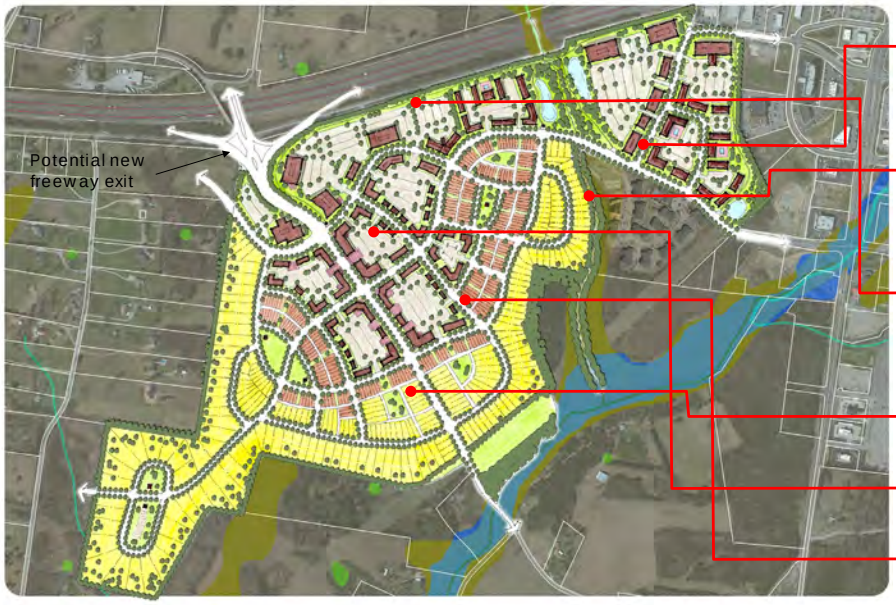
edge of the property near an existing hotel off Providence Parkway.

The plan increases connectivity with the addition of off street trail or greenway opportunities for pedestrians and cyclists. In particular, bike lanes, sidewalks, and multi-use paths are proposed along Providence Parkway and Central Pike in the conceptual plan. A potential greenway is also shown along Adams Lane at the north property line and connecting to the Providence community to the east. Additional greenways are also proposed along the streams and creeks in the projects vicinity. These greenways would connect to the pedestrian, bike, and greenway elements as outlined elsewhere in this plan.

The overall strategy of the proposed plan accommodates a variety of product and allows for flexibility. It can be adjusted for future market demand, but what remains consistent in this design is that it provides a great street network that creates a walkable place where people want to be. The proposed plan is designed as a complete community where people can live, work and play. Residents, visitors and employees will keep the place vibrant throughout the day. It is designed to be a memorable and unique place, not "Anywhere USA."

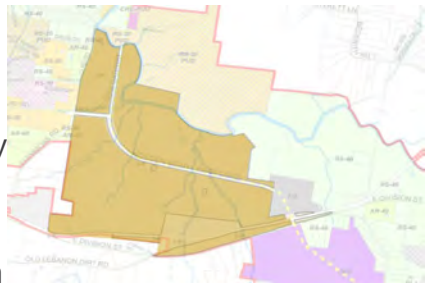






- Streets Respect Natural Features, as Does Open Space / Buffers
- Walkable street network/pedestrian scale block sizes
- Network of formal and informal parks and open space with trail opportunities
- Various lot sizes and housing types
- Highway exposure for Class A office
- Mixed-use Town Center

Golden Bear Gateway



The second catalyst site is comprised of approximately 620 acres located along Golden Bear Parkway which has recently been completed. The current Future Land Use designation is Mixed Use and the property is currently zoned Industrial District Restricted (IR) which generally does not allow residential. No site plan has been approved by the City thus far.

Access to the site is provided via Golden Bear Gateway, but there are several constraints to note. Cedar Creek runs along the property on the north side and a significant portion of land adjacent to the creek is located within the floodplain. Tributaries that feed into Cedar Creek also cut through the center of the site from south to north.

Overhead high voltage and gas transmission lines cut across the eastern and central portions of the property, respectively. Two cemeteries also exists on site and have been preserved in the plan. In addition, there is a future school site on the northeast side of the property. Rail lines serving commuter and freight rail exist along the southern property line.

The proposed plan illustrates a conceptual network of streets and blocks that is walkable with a high degree of connectivity. Typical block size is 300 feet x 300 feet to provide flexibility for a variety of development scenarios. This conceptual network allows for a mix of uses including commercial , retail and residential.

Golden Bear Gateway serves as the primary connection to the existing high school and neighborhoods located to the north of the site, as well as areas to the east and west of the site. While the parkway is the major connector to and through the site, a variety of connected secondary and local roads are also proposed here. In addition, a commuter train station may be possible along the southeastern property line in the future.

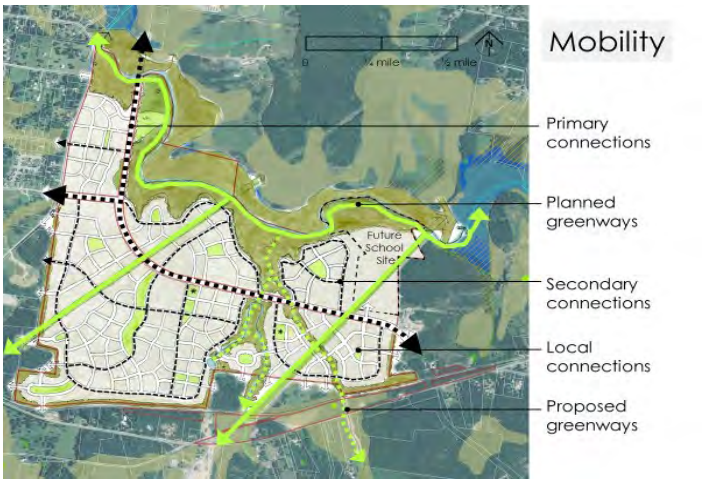
While this site plan does not specify building footprints, only streets and blocks, we have recommended the most appropriate locations for mixed use centers.

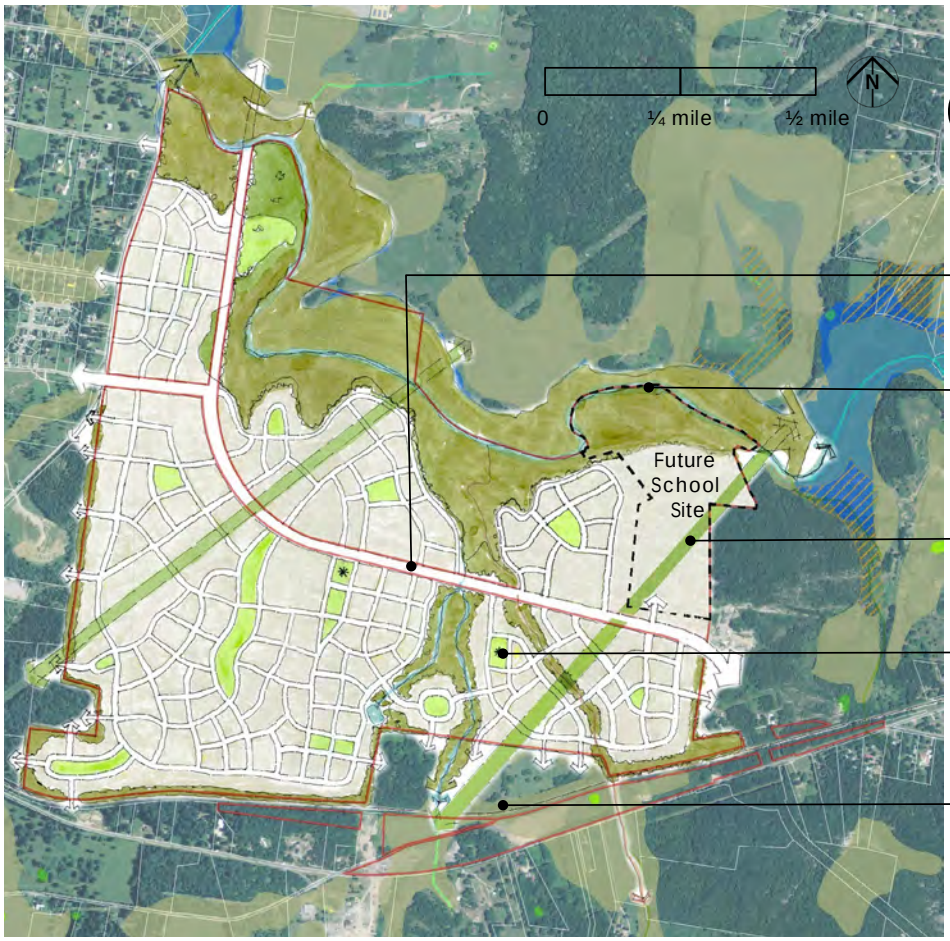
Three potential neighborhood centers are proposed along Golden Bear Parkway, each within a five (5) and ten (10) minute walk from adjacent development on the site. A variety of development types are possible for the site and a thorough market analysis is necessary to determine the most appropriate. Given the vast acreage, the site is likely to develop in phases over time.

A key theme of this conceptual plan is to create value by increasing connectivity not only through the network of streets and blocks, but through the use of formal and informal open spaces and by providing trail opportunities throughout the development.

Preserved open spaces are proposed along the northern property line that are located in the floodplain and along Cedar Creek. The existing cemeteries are also preserved. The proposed trails and greenways provide exceptional amenities for future communities and also extend and connect to the pedestrian, bike, and greenway elements as outlined elsewhere in this plan.

A core principle of the proposed plan is to illustrate how a large site like this can be developed with a high degree of connectivity and walkability while preserving strategic open space and taking into consideration the existing topography, floodplain, and other constraints. This plan provides a framework and development strategy that includes a flexible network of streets and blocks that can accommodate future market conditions while incorporating best design practices including walkability, complete streets, and open space provision and preservation.





Context

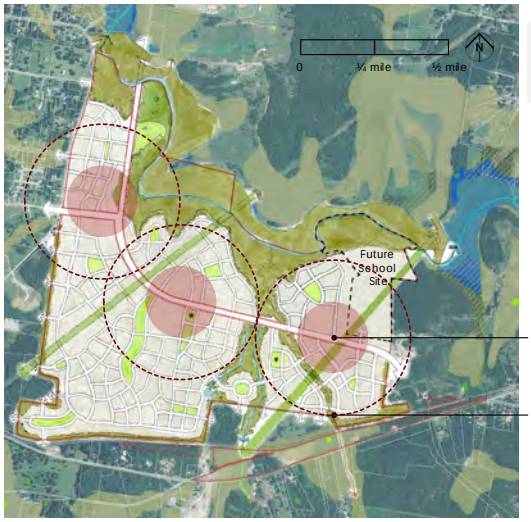
Parkway recently completed

Cedar Creek

Gas Transmission Lines

Existing Cemetery

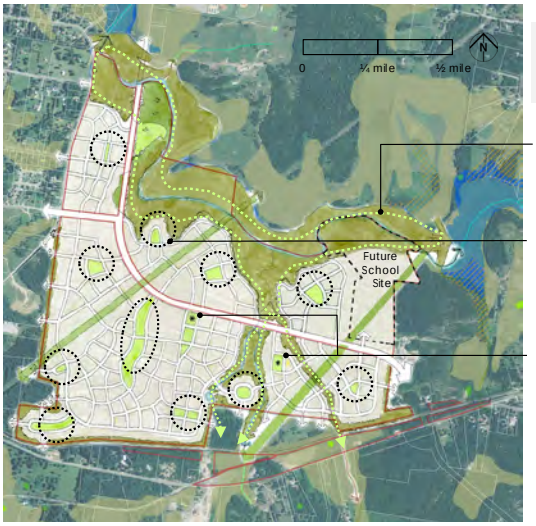
Rail line



Activity Centers

Potential neighborhood center

5-10 minute walkshed



Open Space

Network of connected informal open spaces

Planned formal open spaces – *walkable to each other*

(2) Existing Cemeteries preserved



Action Plan: Recommendations & Priorities

Funding Sources

The core of implementing transportation recommendations is the development of partnerships that will allow Mt. Juliet to finance, design, construct, and maintain projects. The following summary of action items is therefore organized around this principle of shared responsibilities for implementation, being broken out into local government (Mt. Juliet), regional planning (Nashville Metropolitan Planning Organization), state government (TDOT), and private sector responsibilities. The resources and key implementation characteristics of each one are presented. The list of projects contained in prior sections is also reproduced and summarized.



Private Sector

Developers and Property Owners

Mt. Juliet is a desirable place to live and, as more people move in, demand for new development to accommodate, feed, and employ them will increase. This development creates demand for transportation that the new development should fairly pay for through taxes, fees, wages, and other contributions.

Keys: Land development ordinances have to create specific requirements that tie back to the demands that each new development creates.

Projects: Mostly collector streets, sidewalks, intersection improvements, rights-of-way for transit stops.



Local Government

Mt. Juliet, Tennessee

City policy influences nearly every aspect of the demand for transportation services through land use / zoning codes, plans, and individual actions of officials. The ability of any individual city (unless it is a very large city) to construct transportation projects is more limited, a disparity that leads to demand outstripping supply - congestion. Mt. Juliet funding sources follow:

State Street-Aid Fund. Direct distribution to municipalities based on a population proportionate formula.

Property Tax. As property taxes are dependent on economic conditions a separate tax for transit operations and capital can be administered by voter approval.

Sales Tax. The Wilson County sales tax rate of 2.25% could be raised to 2.75%, helping finance transportation improvements.

Wheel Tax. Wilson County's rate of $25/vehicle is low compared to the 59 counties that apply this tax.

Development Impact Fees. Mt. Juliet has both a square footage and per unit impact fee. An impact fee study is expected after the passage of this plan. Raising fees would have to be done carefully and consider impacts to affordable housing.

Keys: Potential for raising the Wheel Tax exists; Mt. Juliet can fund modest improvements, or work with other partners to match funds for larger-scale improvements.

Projects: Regulation changes, intersection improvements, safety improvements, ADA-compliance measures, repairs/resurfacing/striping/signage, and matching funds for larger, more capital-intensive efforts.



Regional Government

Metropolitan Planning Organization

The metropolitan planning organization (MPO) that covers Mt. Juliet and surrounding cities and counties provides some funding options for projects in Mt. Juliet, but also serves as a gatekeeper to state and federal funding. The State Transportation Improvement Program (STIP) and Metropolitan Transportation Improvement Program (Mt.IP) must show the same projects to be compliant with federal requirements. Furthermore, the Mt.IP is a subset of the long-range transportation plan (Regional Transportation Plan, or RTP) that is updated at least every five years by the MPO.

State and federal funding sources and applications are numerous, complex, and sometimes change, as do the project priority mechanisms employed by MPOs. Details should be sought out on the MPO website (**www.nashvillempo.org**) or by contacting their staff.

Keys: Attend technical and policy board meetings regularly; schedule one-on-one coordination meetings with MPO staff at least twice per year; and be aware of the MPO's way of prioritizing projects and planning / funding cycles.

Projects: Nearly every kind of project, including transit, biking, walking, roadway widenings / new location, demand, and programs can be funded by one or more of these programs.



State Government

Tennessee Department of Transportation

In many ways, Mt. Juliet accesses the talents and resources of the State Department of Transportation (TDOT) through the metropolitan planning organization. However, TDOT plays a major role in prioritizing, designing, and maintaining major roadways across the state, and is therefore a critical partner in transportation solutions and regulations. The regulatory aspect is important, since everything from driveway permitting to design standards is managed by the State.

Keys: Maintaining a close working relationship with both the Region (3) and District (37) representatives is important to Mt. Juliet. For example, understanding repaving schedules and minor improvements can help coordinate accessibility, sidewalk, bicycle, aesthetic, access management, and other priorities on Mt. Juliet's major roadways that otherwise could be missed.

Projects: As with the MPO, the state department of transportation affords opportunities for many projects, with the exception of collector street facilities that "fall below the radar" of the state's purview (although their design and connections to major arterials will still involve state officials).

The following is a detailed list of prioritized projects (by tiers) for ALL modes including Roadway, Intersection/ Interchange, Bike, Pedestrian, and Transit. The City of Mt. Juliet and their elected officials should re-prioritize this list of projects on an annual basis. Community priorities may change based on transportation needs, technology, demographics, and public support.

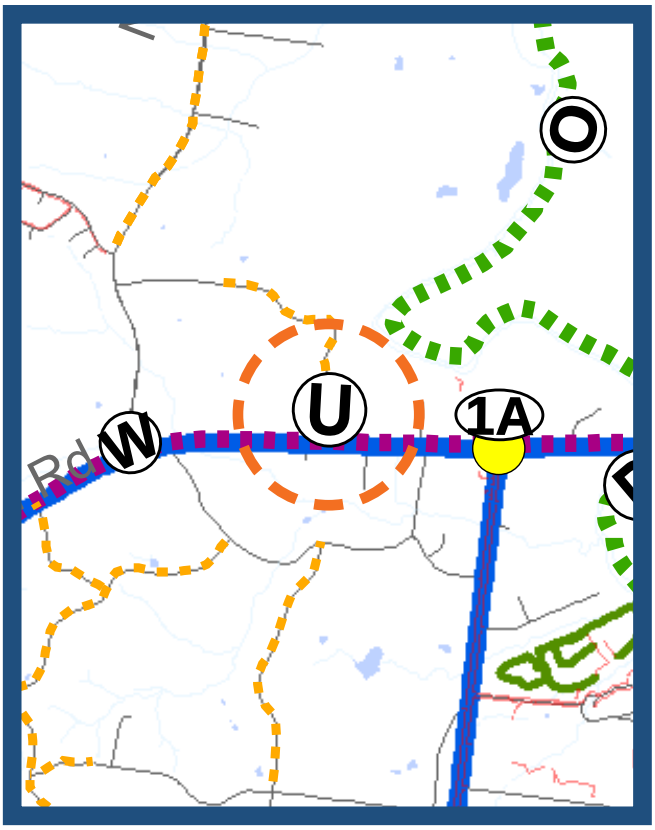
Action Plan: Project Recommendations and Funding

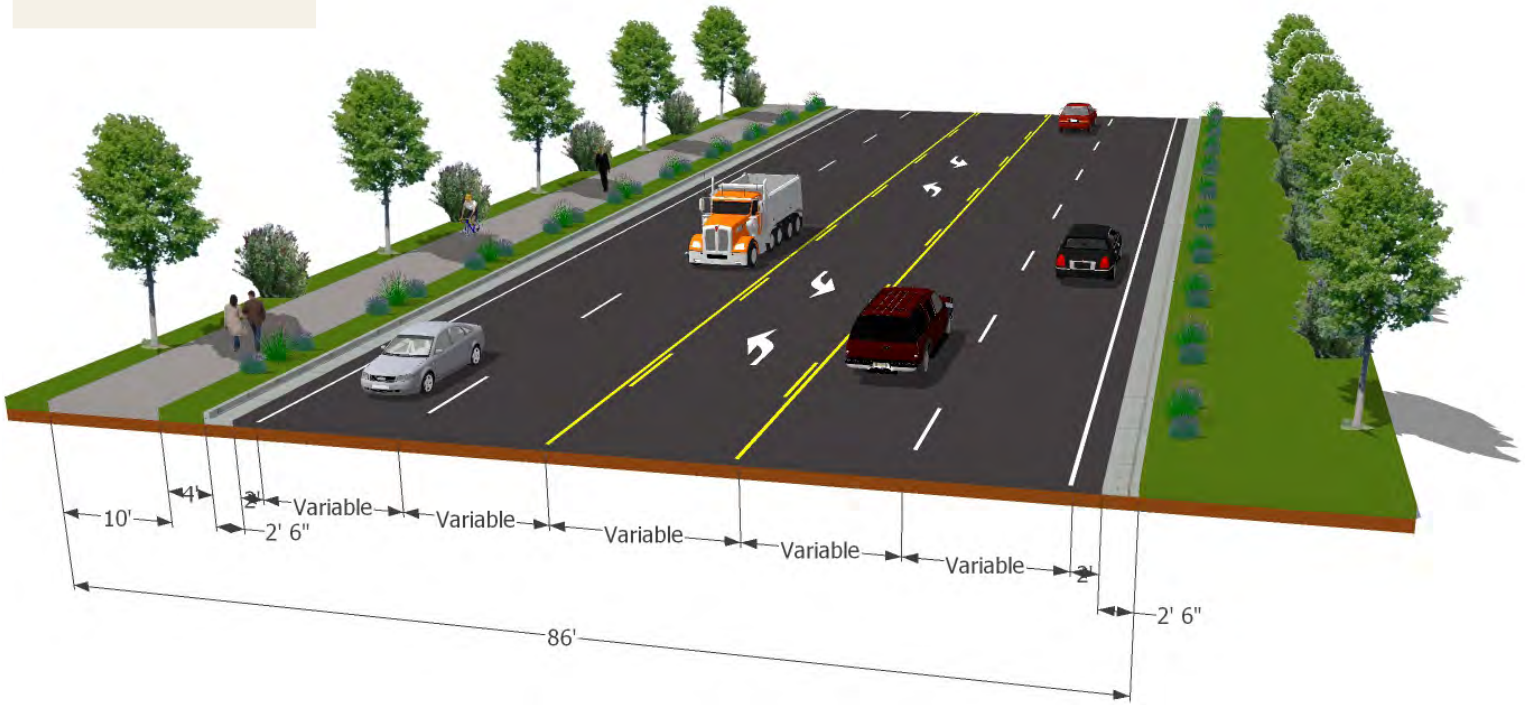
Map ID	Priority	Type	Location	Cost Est.	Funding
A - K	Vision	Greenway	Several locations	Various	
L	Vision	10' Sidepath	Central Pike from County Line to Tillman Rd	$2,570,204	
M	Low	10' Sidepath	Adams Ln from Mt. Juliet Rd to Central Pike	$1,364,000	
N	High	Sidewalk	Belinda Pkwy from Stoner's Creek to Mt. Juliet Rd	$448,000	
O	Medium	12' Greenway	Cedar Creek from Lebanon Rd to Saundersville Rd	$3,821,000	
P	High	12' Greenway	Cedar Creek from Golden Bear Gateway to Lebanon Rd	$1,700,160	
Q	High	10' Sidepath	Central Pike from S. Mt. Juliet Rd to Tillman Rd	$1,543,000	
R	Medium	10' Sidepath	Clemmons Rd from Curd Rd to E. Division St	$882,000	
S	Medium	10' Sidepath	E. Division St from Clemmons Dr to Music City Star station	$661,000	
T	High	10' Sidepath	Golden Bear Gateway from Lebanon Rd to south of Stoner's Creek	$517,000	
U	Medium	10' Sidepath	Lebanon Rd from Benton Douglas Pkwy to Park Glen Dr	$700,000	
V	Vision	5' Bike Lane	Lebanon Rd from Matterhorn Dr to Andrew Jackson Pkwy	$50,000	
W	Low	10' Sidepath	Lebanon Rd from Nonaville Rd to Tate Lane	$992,000	
X	Medium	10' Greenway	New Location from S. Greenhill Rd to Cedar Creek Greenway	$220,000	
Y	High	Sidewalk	NW Rutland Road from Mt. Juliet Rd to Hunting Hills Dr	$500,000	
Z	High	10' Sidepath	Old Lebanon Dirt Rd from Kelsey Glen Rd to Moreland Dr	$882,000	
AA	High	Sidewalk	Pleasant Grove Rd from Triple Crown Ln to Central Pike	$280,000	
AB	Medium	Sidewalk	Pleasant Grove Rd from Triple Crown Pl to Old Pleasant Grove Rd	$276,000	
AC	High	5' Bike Lane	S. Mt. Juliet Rd from Providence Pkwy to Central Pike	$300,000	
AD	Low	12' Greenway	Stoner's Creek Greenway from Greenhill Greenway Stub to Cobblestone Landing	$2,205,000	
AE	Medium	12' Greenway	Stoner's Creek Greenway from Existing Greenway to Stoner's Creek	$1,764,000	
AF	Low	12' Greenway	Stoner's Creek Greenway from Tate Lane Greenway Stub to Greenhill Greenway Stub	$1,433,000	
AG	Vision	12' Greenway	Stoner's Creek Greenway from NW Rutland Rd to Belinda Pkwy	$661,000	
AH	High	12' Greenway	Stoner's Creek Greenway from Mt. Juliet Rd to NW Rutland Rd	$1,433,000	
AI	Medium	Shared	Tate Lane from Division St to Lebanon Rd	$4,000	
1	Low	Widening 2/3 Lanes	Benders Ferry Rd from Lebanon Rd to Mays Chapel Rd	$8,923,000	
2	Low	Widening 2/3 Lanes	Nonaville Rd from Windtree Trace to Saundersville Rd	$9,784,000	
3	Low	Widening 2/3 Lanes	Nonaville Rd from Lebanon Rd to Windtree Trace	$1,846,000	
4	Low	Widening 2/3 Lanes	John Wright Rd from Central Pike to New Collector Street	$8,664,000	
5	High	Access Management	Mt. Juliet Rd from Providence Pkwy to NW Rutland Rd	$9,100,000	

Map ID	Priority	Type	Location	Cost Est.	Funding
6	High	Access Management	N. Mt. Juliet Rd from W. Division St to Lebanon Rd	**$1,900,000**	
7	Medium	Access Management	Lebanon Rd from Devonshire Dr to Nonaville Rd	**$18,644,000**	
8	Low	Access Management	Lebanon Rd from Nonaville Rd to York Rd	**$8,663,000**	
9	High	Widening 4 Lanes	Central Pike from County Line to Tillman Dr	**$5,964,000**	
10	High	Widening 4 Lanes	Central Pike from N. Mt. Juliet Rd to Tillman Dr	**$8,771,000**	
11	High	Widening 4 Lanes	Mt. Juliet Rd from Central Pike to Providence Pkwy	**$4,200,000**	
12	Medium	Widening 4 Lanes	E. Division St from N. Mt. Juliet Rd to Golden Bear Pkwy (future)	**$15,304,000**	
13	Low	Widening 4 Lanes	Lebanon Rd from York Rd to Dogwood Trail	**$13,513,000**	
14	Medium	Widening 4 Lanes	S. Greenhill Rd from Division St to Lebanon Rd	**$8,582,000**	
15	High	Widening 4 Lanes	Central Pike from Mt. Juliet Rd to Stockbridge Way	**$7,438,000**	
16	Low	Widening 4 Lanes	Beckwith Rd from S. Rutland Rd to I-40 EB Ramp	**$3,963,000**	
17	High	New Location 4 Lanes	New Location from Golden Bear Gateway to Eastgate Blvd	**under construction**	
18	High	Widening 4 Lanes	Golden Bear Gateway from Curd Rd to Lebanon Rd	**$12,324,000**	
19	High	Access Management	N. Mt. Juliet Rd from NW Rutland Rd to Division St	**$9,371,000**	
20	Low	Widening 4 Lanes	W. Division St from Greenhill Rd to N. Mt. Juliet Rd	**$13,110,000**	
1A	High	Intersection	Mt. Juliet/Lebanon Road	**$750,000**	
1B	High	Intersection	Mt. Juliet/Division Street	**$250,000**	
1C	High	Intersection	Mt. Juliet/Old Lebanon Dirt Road	**$250,000**	
1D	Medium	Intersection	Mt. Juliet/NW Rutland Road	**$500,000**	
1E	Medium	Interchange	Mt. Juliet/I-40 Interchange	**$250,000**	
1F	Medium	Intersection	Mt. Juliet/Central Pike	**$2,000,000**	
1G	Medium	Intersection	Mt. Juliet/Providence Way	**$250,000**	
1H	Medium	Interchange	I-40/Central Pike	**$30,000,000**	
1I	High	Interchange	Golden Bear/E. Division St (under construction)	**under construction**	
1J	Low	Mid-Block	Tate Ln/W. Division St; w/Stoner's Creek Greenway	**$50,000**	
2A	Low	Transit: Service	Circulator (30-minute headway, 2 vehicles)	**$170,000/$130,000**	
2B	Medium	Transit: Service	Add 2 additional peak-period runs (4 total)	**$1,560,000**	
2C	Medium	Transit: Sidewalk	Industrial Drive (to Music City Star terminal)	**$140,000**	
2D	High	Transit: Park-and-Ride	Various (south of Music City Star)	**$454,000**	
N/A	High	Transit: Service	Subsidize Peer Ridesharing	**$325,000**	

Lebanon Rd from Benton Douglas Pkwy to Park Glen Dr-Map Id U

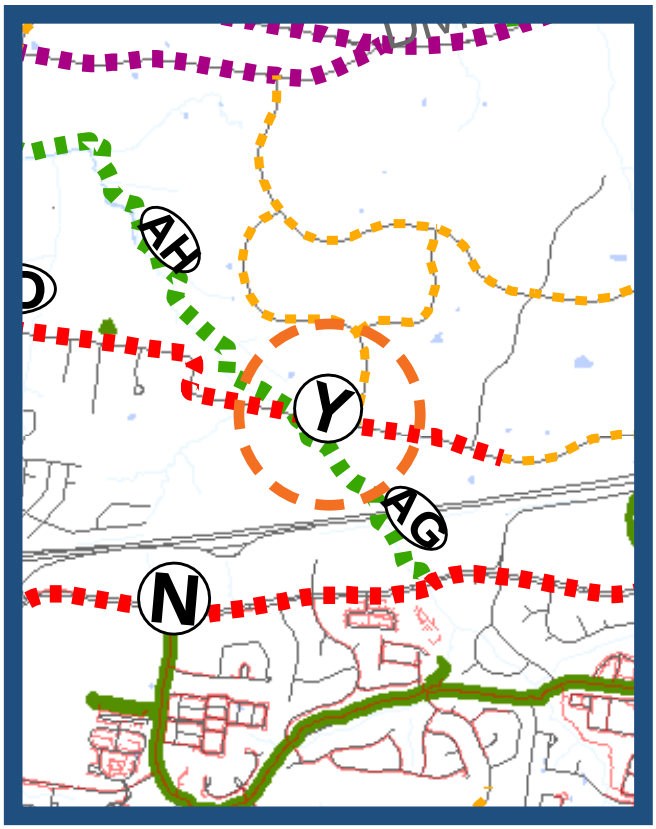
Lead Agency	Mt. Juliet
Type	10’ Sidepath (Multiuse)
Length (miles)	1.4
Estimated Cost to Construct	**$1,100,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Construct a 10’ wide multiuse path (Sidepath) on the north side of Lebanon Road, in back of the curb and gutter. This includes a four (4) foot planting strip (where allowed) and street trees, and curb ramps.
Project Notes	





NW Rutland Road from Mt. Juliet Rd to Hunting Hills Dr–Map Id Y

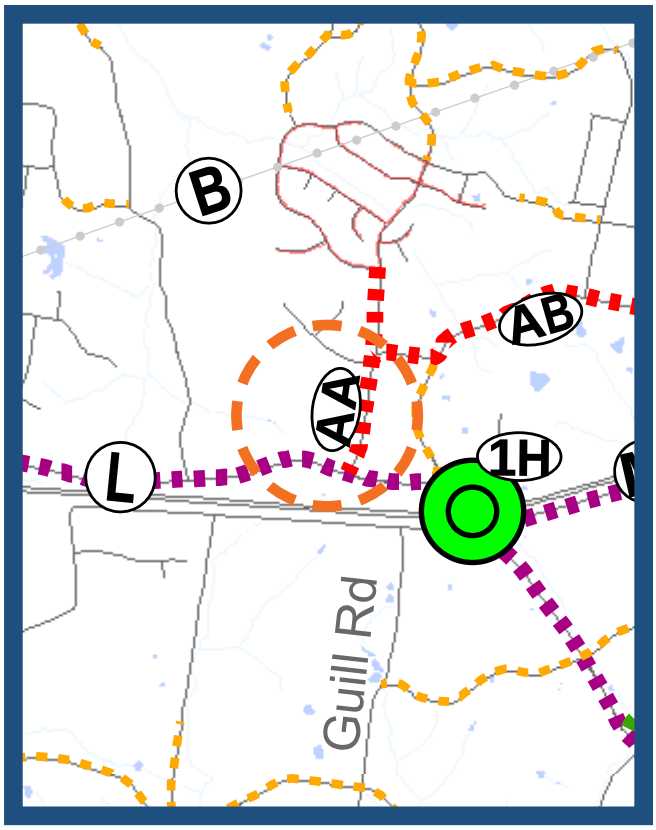
Lead Agency	Mt. Juliet
Type	Sidewalk
Length (miles)	1.5
Estimated Cost to Construct	**$500,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	6’ Sidewalk on both sides of the street
Project Notes	• 6’ sidewalk with planting strip between curb and gutter and sidewalk • Street trees provide shade and extend life of pavement





Pleasant Grove Rd from Triple Crown Ln to Central Pike–Map Id AA

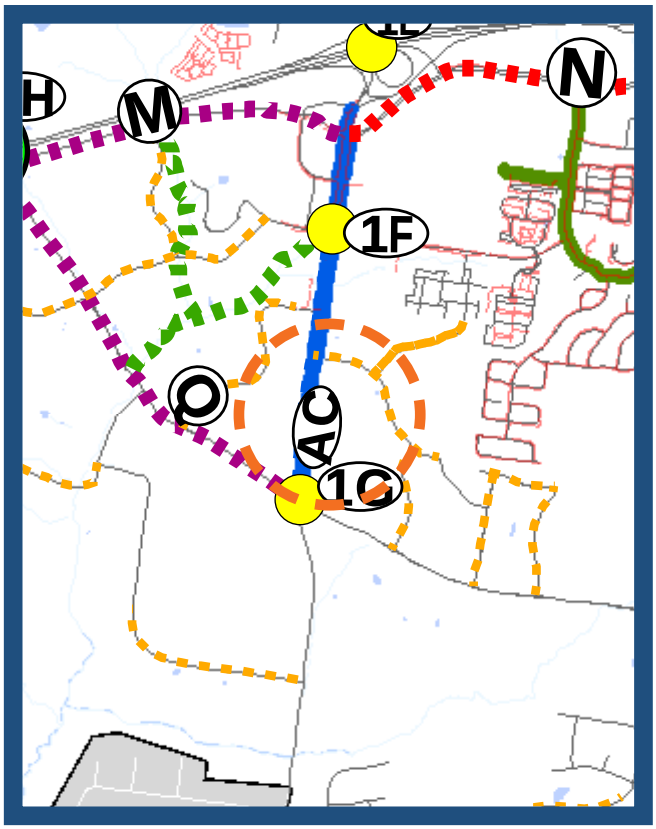
Lead Agency	Mt. Juliet
Type	Sidewalk
Length (miles)	0.6
Estimated Cost to Construct	**$280,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	6’ Sidewalk on one side of the street
Project Notes	• 6’ sidewalk with planting strip between roadway and sidewalk • Street trees provide shade and extend life of pavement

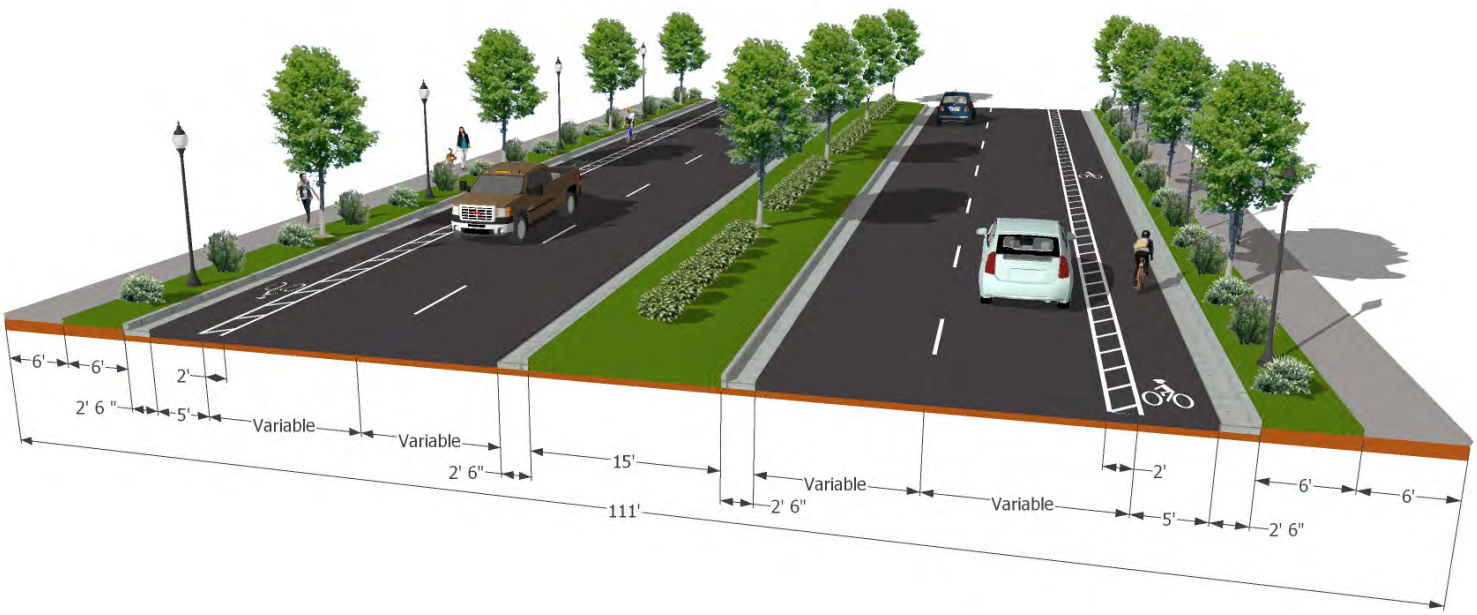




S. Mt. Juliet Rd from Providence Pkwy to Central Pike -Map Id AC

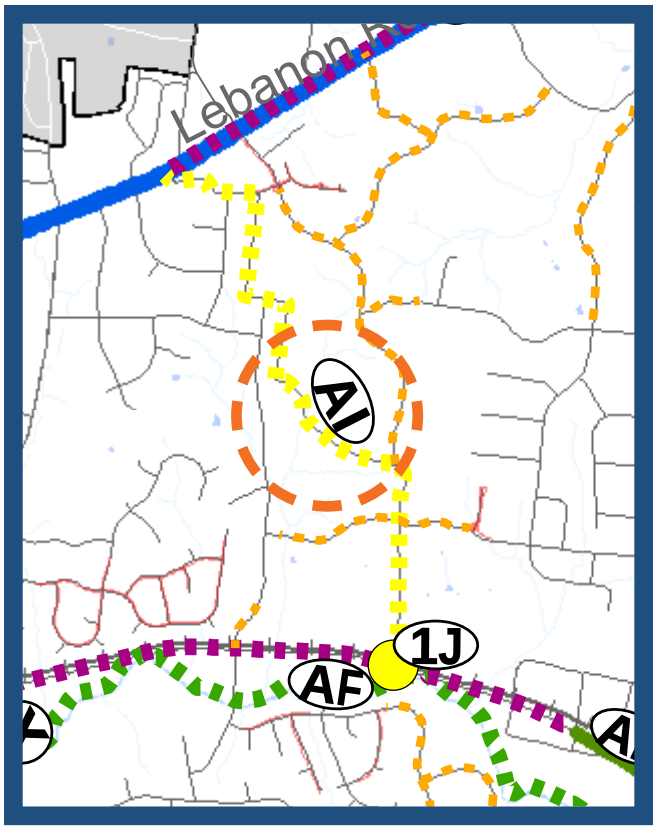
Lead Agency	Mt. Juliet
Type	5’ Bike Lane
Length (miles)	0.7
Estimated Cost to Construct	**$300,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	5’ Buffered Bike Lane on both sides of the street
Project Notes	• Bike lane would connect North Mt. Juliet Road to south side and Providence Development • May require simple widening and restriping • Incorporated with widening project





Tate Lane from Division St to Lebanon Rd- Map Id AI

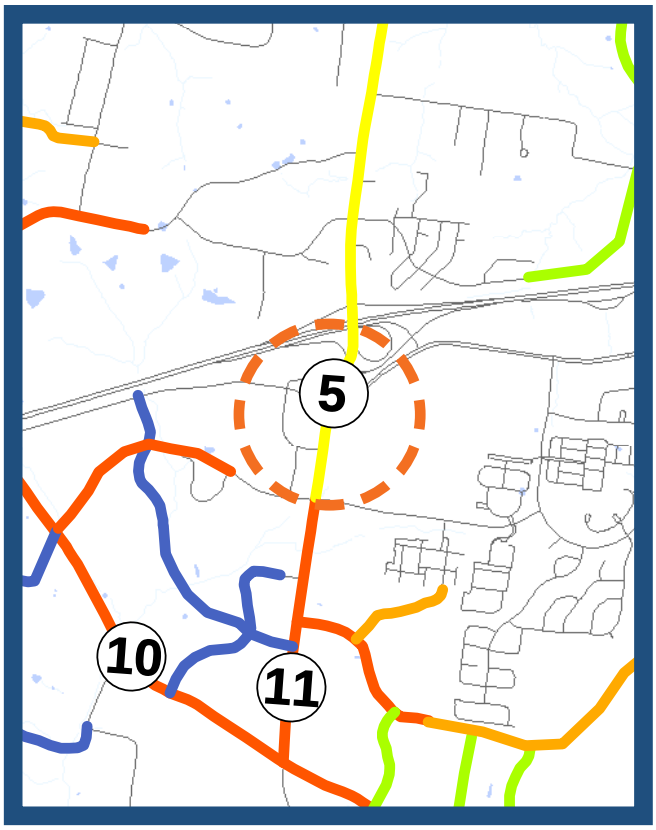
Lead Agency	Mt. Juliet
Type	Shared Bikeway/Road
Length (miles)	1.9
Estimated Cost to Construct	**$560,000**
Air Quality Status	Exempt
Funding Status	Local
Project Description	Bikes share the roadway
Project Notes	• Signage and bike lane stenciling • Sidewalk on one side of roadway

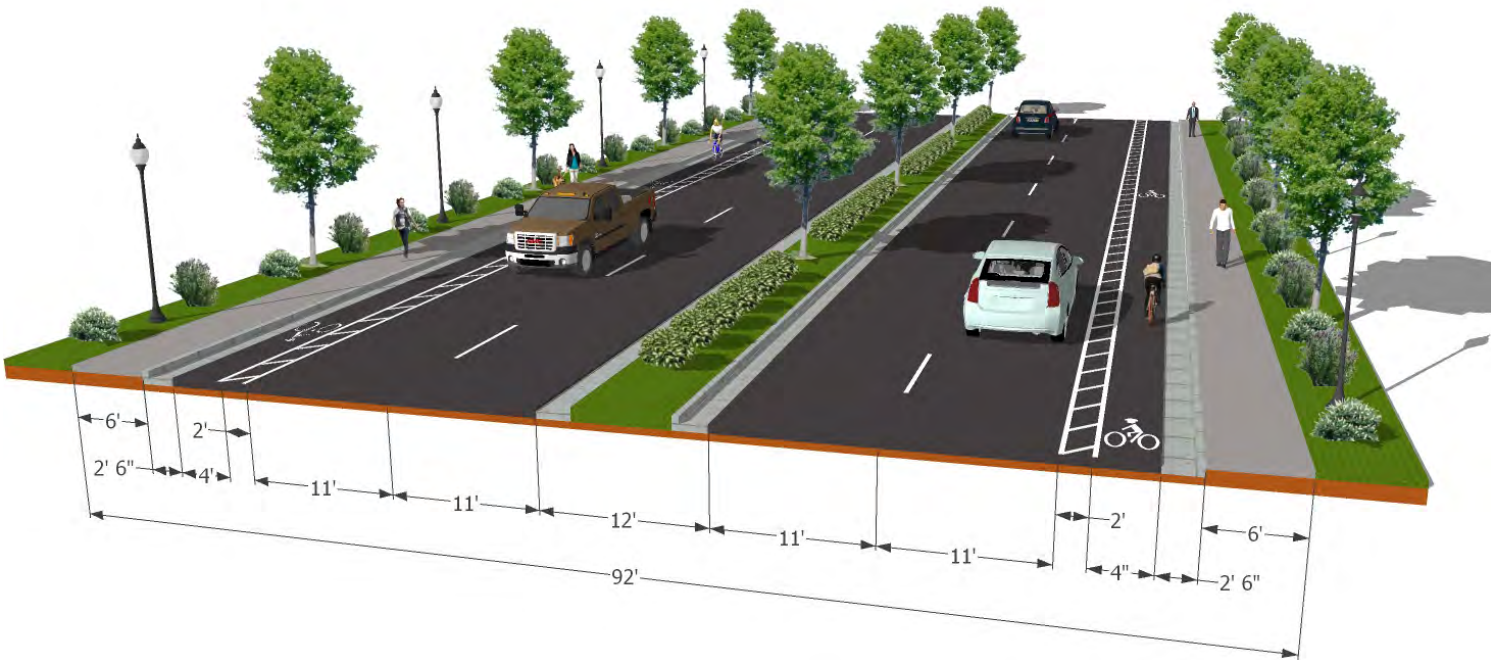




Mt. Juliet Rd from Providence Pkwy to Rutland Rd – Map ID 5

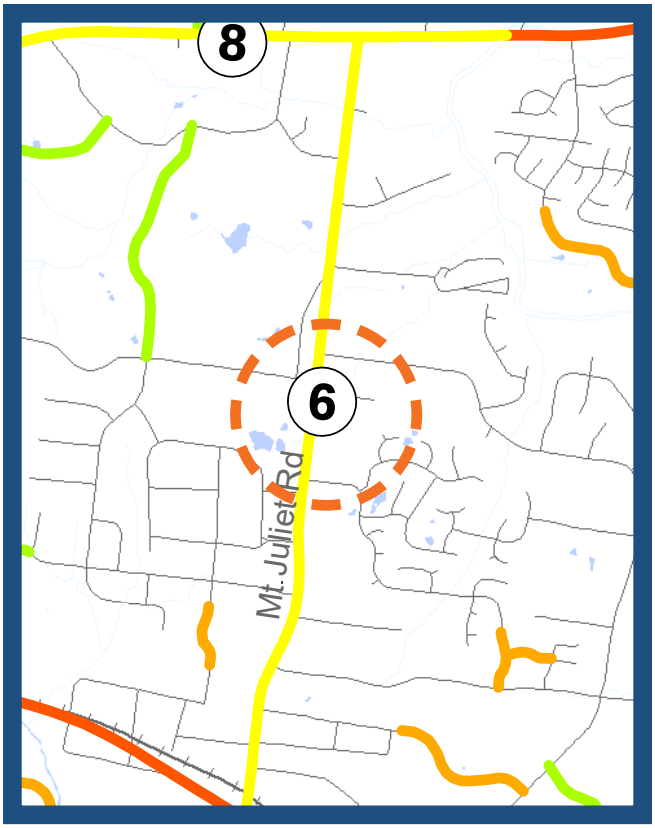
Lead Agency	Mt. Juliet
Type	Access Management
Length (miles)	1.54
Estimated Cost to Construct	**$9,100,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Plantable median pockets with buffered bike lanes and sidewalks on both sides
Project Notes	Assumes a modified or new bridge over I-40. This includes plantable, curbed median pockets along the entire section. Also, this includes driveway consolidation and cross access improvements.

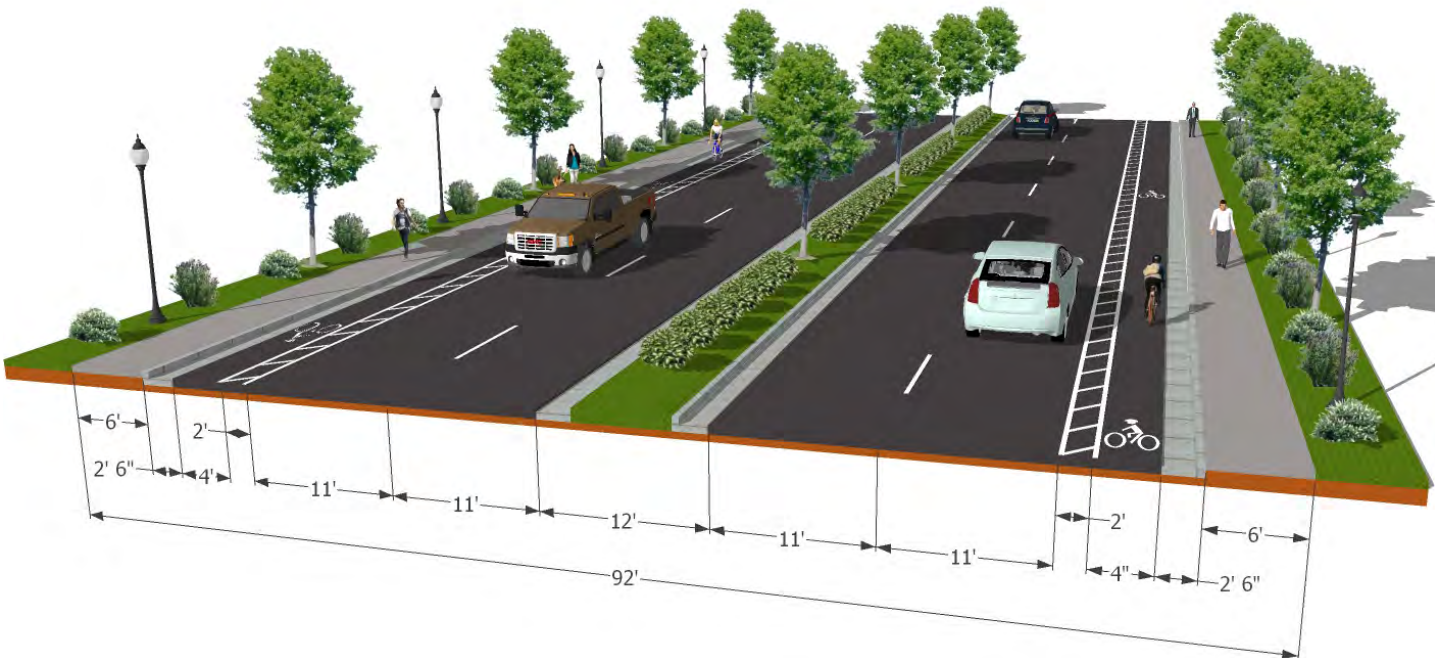




N. Mt. Juliet Rd from W. Division St to Lebanon Rd–Map ID 6

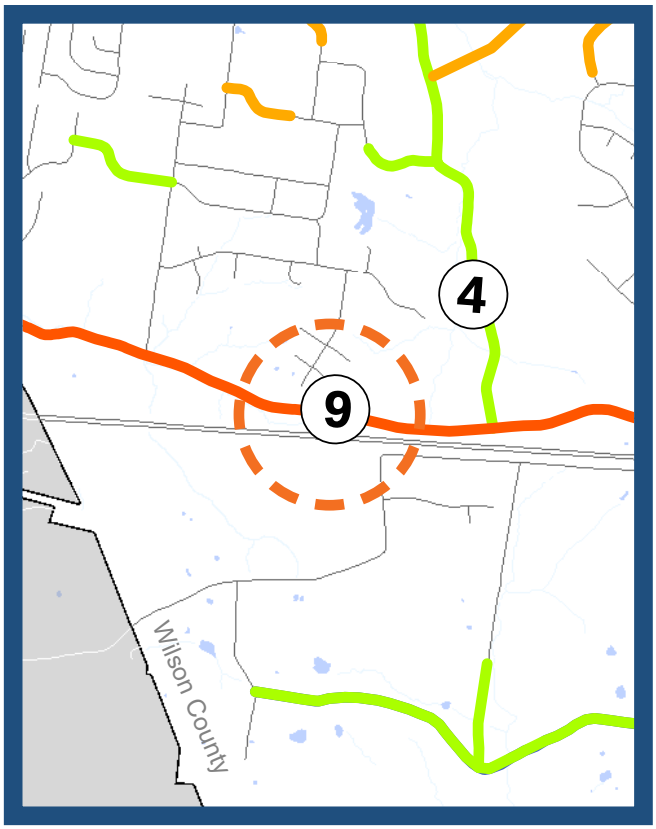
Lead Agency	Mt. Juliet
Type	Access Management
Length (miles)	2.19
Estimated Cost to Construct	**$1,900,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Plantable median pockets with buffered/ protected bike lanes and sidewalks on both sides
Project Notes	• Includes driveway consolidation • Cross access and back-door access

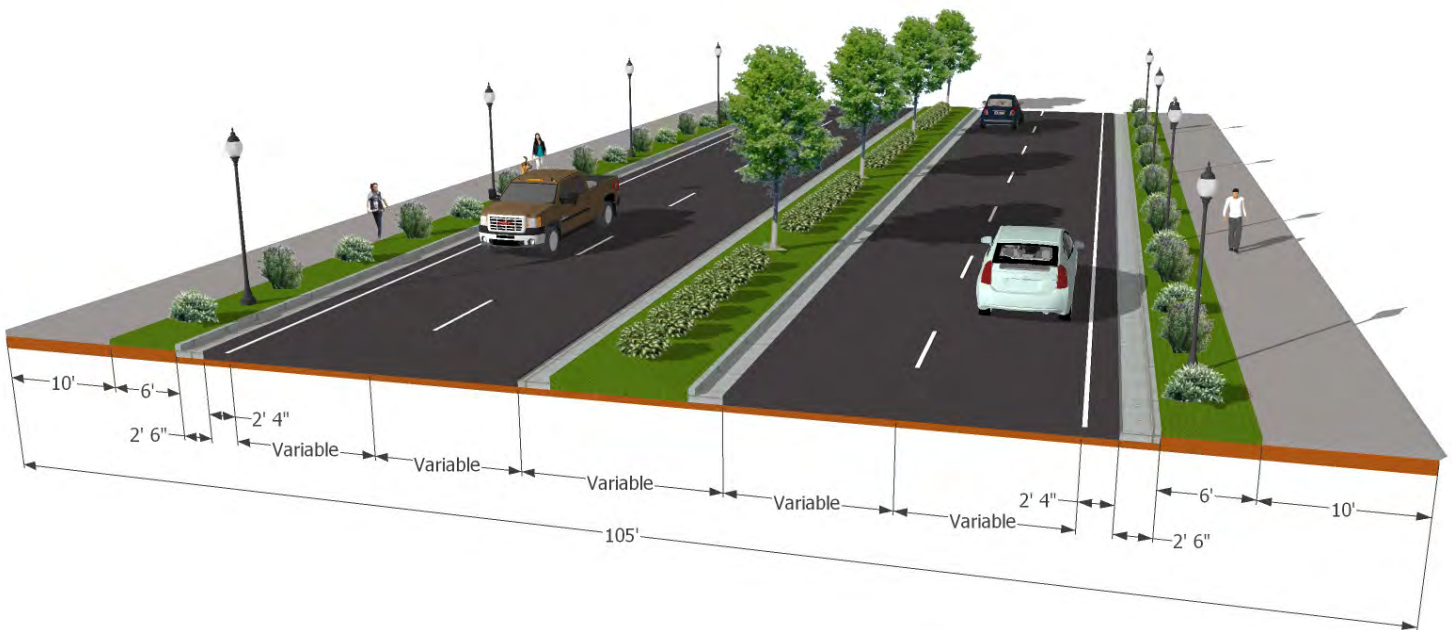




Central Pike from Davidson County Line to Tillman Dr-Map ID 9

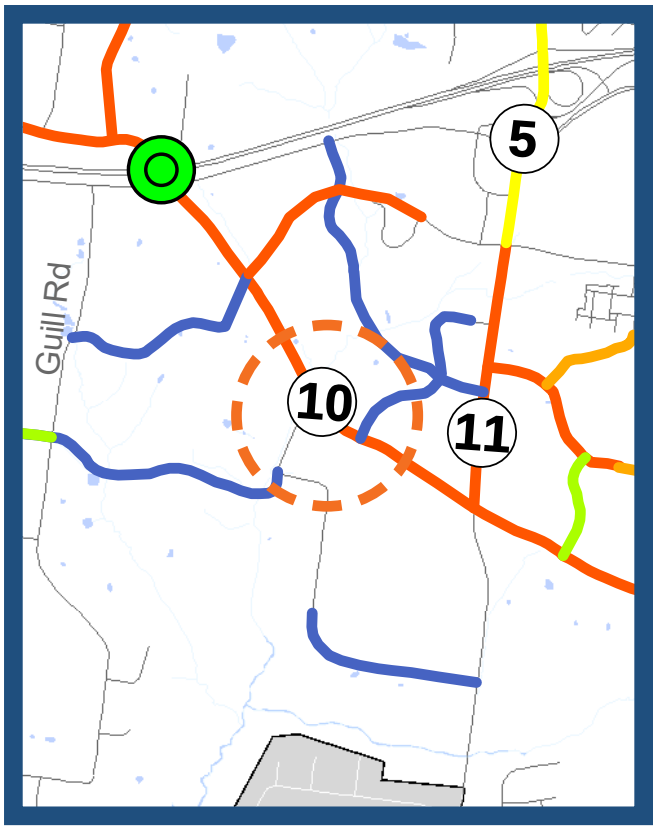
Lead Agency	Mt. Juliet
Type	Widening to 4 lanes divided
Length (miles)	1.73
Estimated Cost to Construct	**$5,964,000**
Air Quality Status	Exempt
Funding Status	IMPROVE Act
Project Description	Minor arterial providing direct access to future I-40/Central Pike Interchange
Project Notes	• Connect residential development to future mixed use node at interchange • Widening should include curb and gutter, sidewalks both sides and street trees.

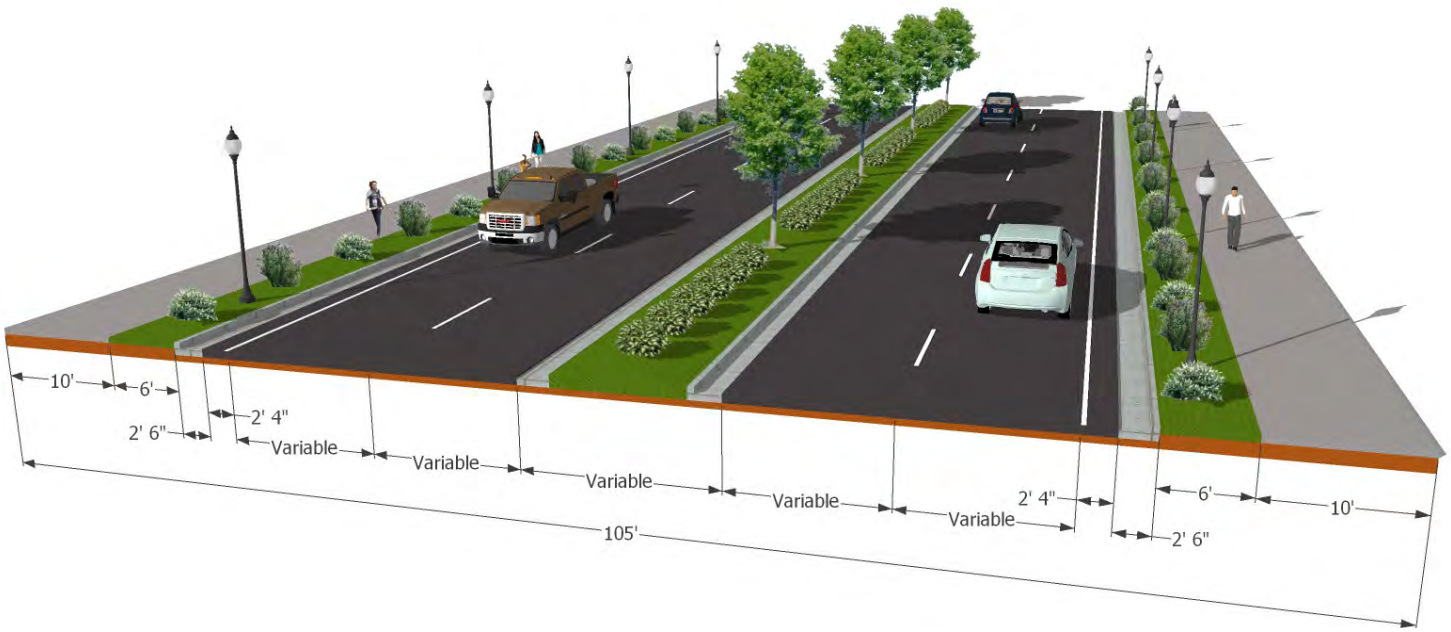




Central Pike from N. Mt. Juliet Rd to Tillman Dr–Map ID 10

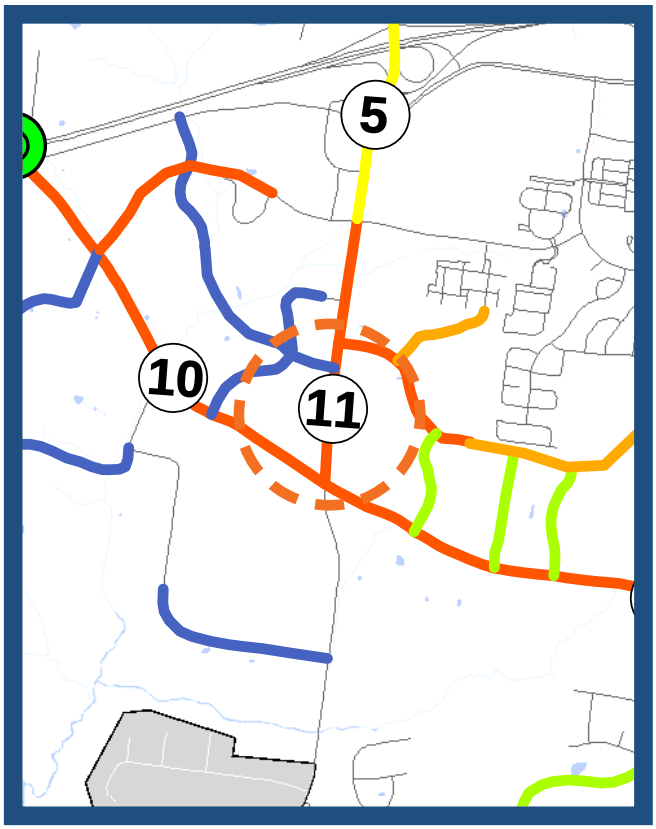
Lead Agency	Mt. Juliet
Type	Widening to 4 Lanes Divided
Length (miles)	1.38
Estimated Cost to Construct	**$8,771,000**
Air Quality Status	Exempt
Funding Status	IMPROVE Act
Project Description	This boulevard will be a vital spine road to the future mixed-use development at the proposed I-40 interchange. Design features should include pedestrian and vehicle lighting, street trees and high quality intersection treatments.
Project Notes	• Limiting or restricting curb cuts should be a priority to protect the mobility and safety of the corridor.

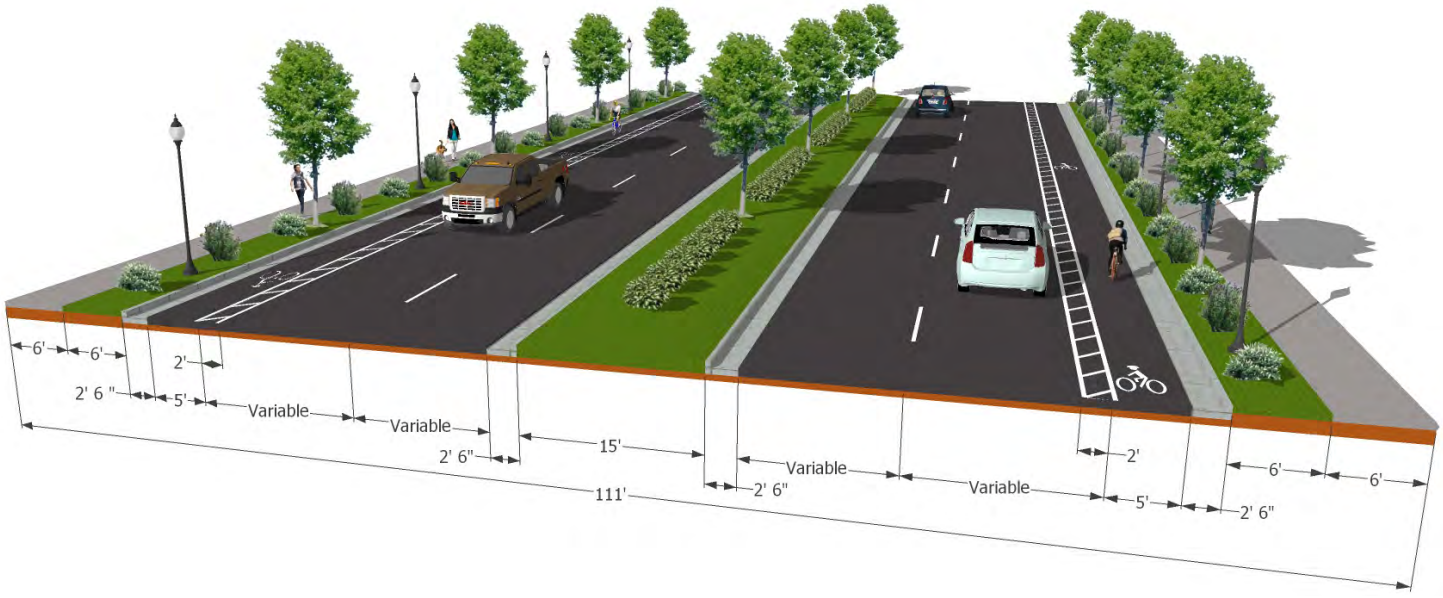




Mt. Juliet Rd from Central Pike to Providence Pkwy- Map Id 11

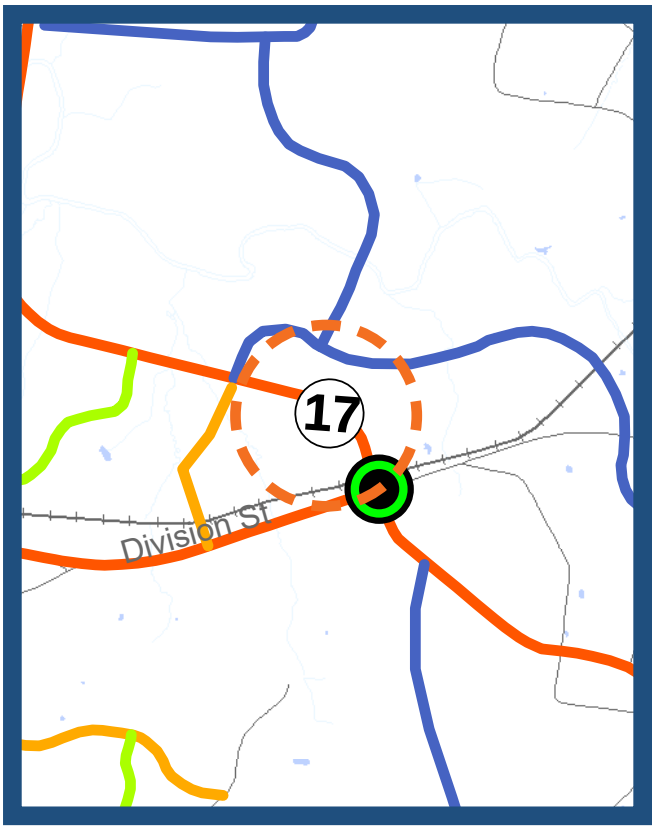
Lead Agency	Mt. Juliet
Type	Widening to 4 Lanes Divided
Length (miles)	0.73
Estimated Cost to Construct	**$4,200,000**
Air Quality Status	Exempt
Funding Status	IMPROVE Act
Project Description	Main North-South mobility corridor
Project Notes	• Connects I-40 to Providence development • Access management will be critical

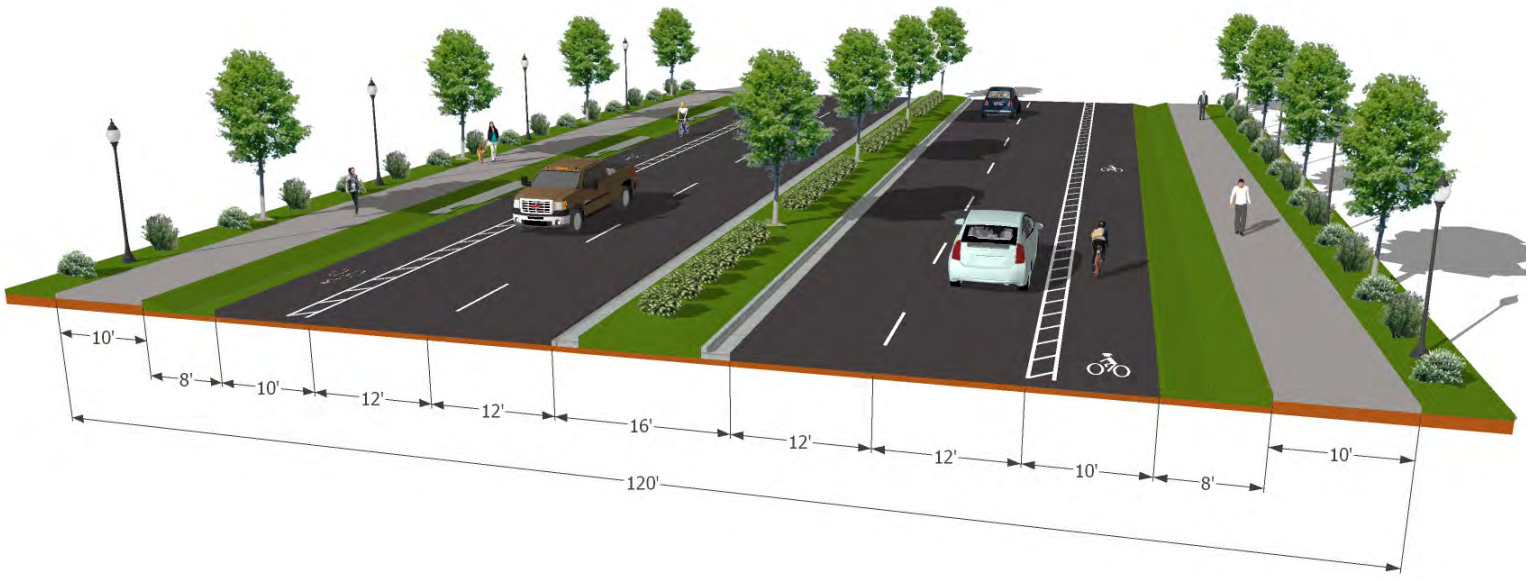




New Location from Golden Bear to Eastgate Blvd–Map Id 17

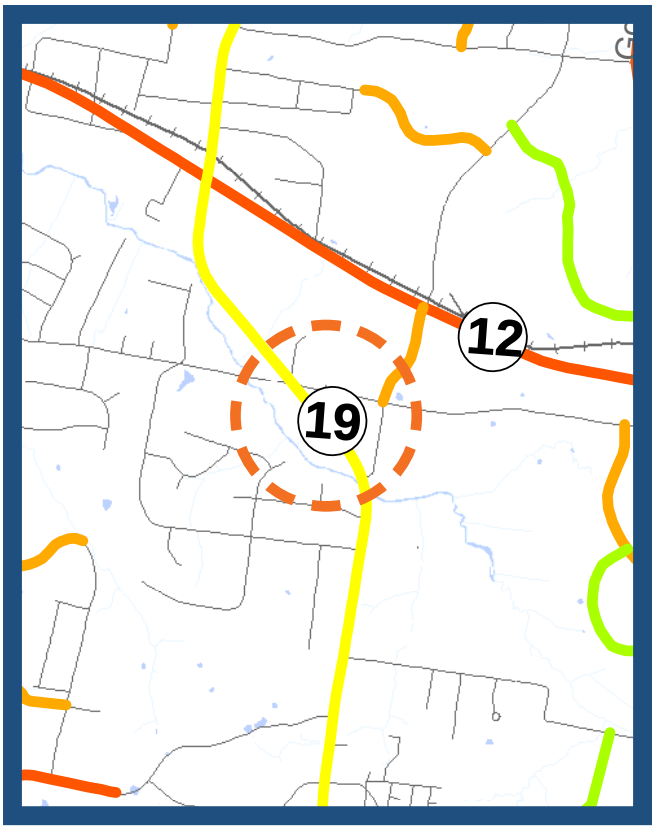
Lead Agency	Mt. Juliet
Type	Widening to 4 Lanes Divided
Length (miles)	2.49
Estimated Cost to Construct	**$18,516,000**
Air Quality Status	Exempt
Funding Status	Funded
Project Description	This boulevard will be a vital spine road through the future Golden Bear Gateway development. Design features should include plantable median pockets, pedestrian and vehicle lighting, street trees and high quality intersection treatments.
Project Notes	• Limiting or restricting curb cuts should be a priority to protect the mobility and safety of the corridor.

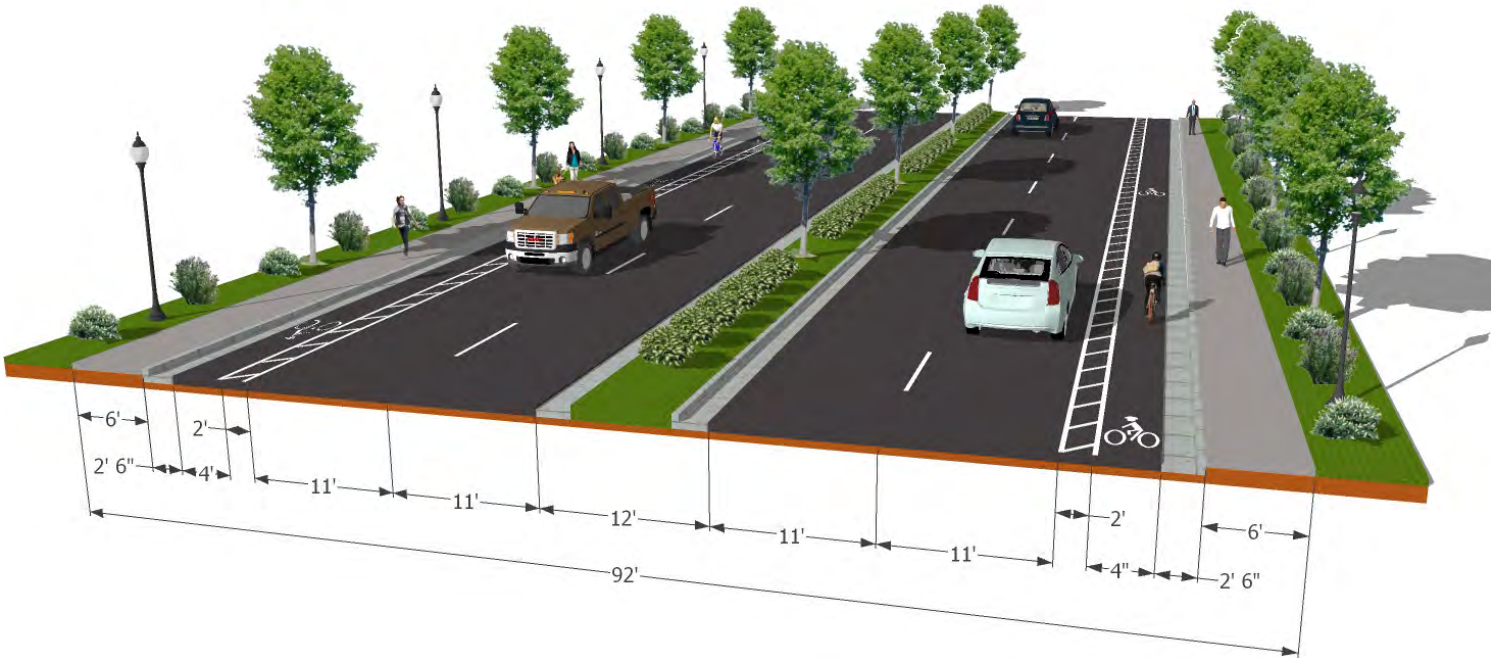




N. Mt. Juliet Rd from NW Rutland Rd to Division St–Map Id 19

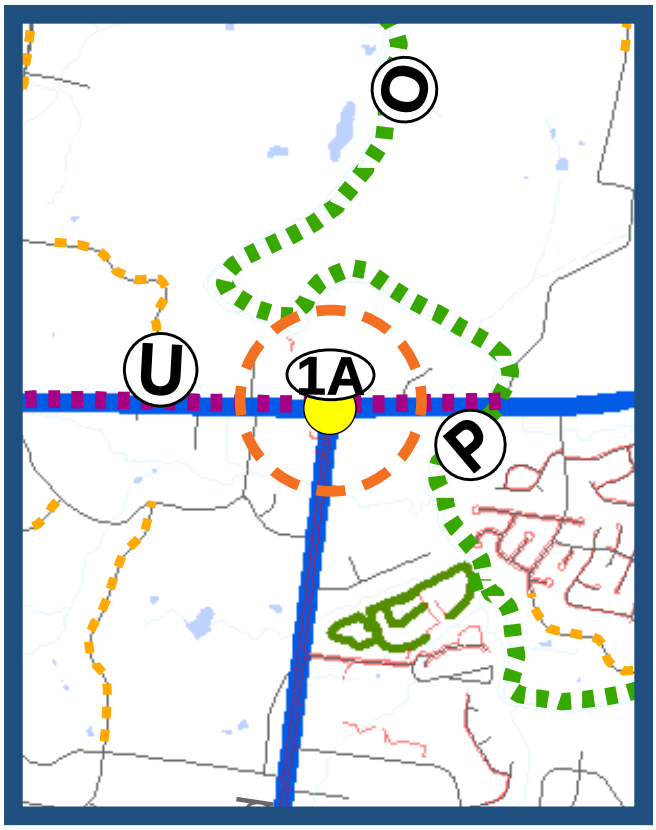
Lead Agency	Mt. Juliet
Type	Access Management
Length (miles)	0.8
Estimated Cost to Construct	**$9,371,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	
Project Notes	

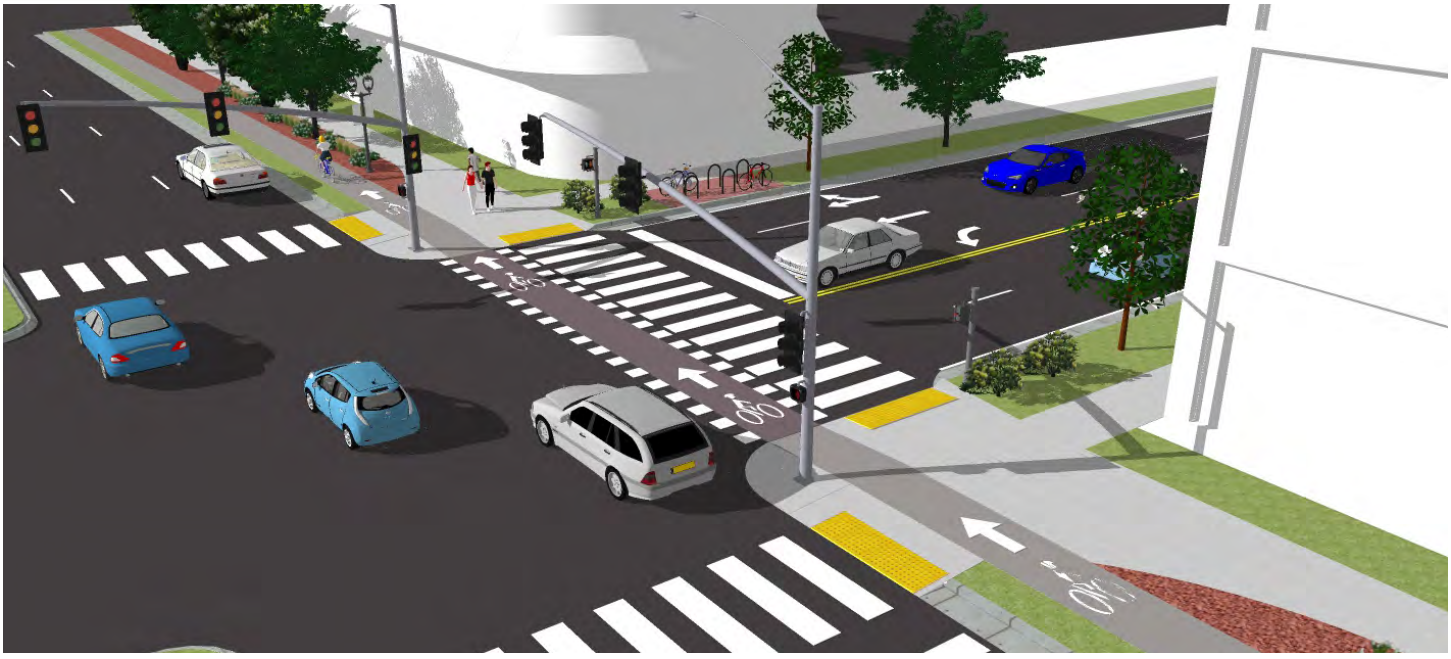




Mt. Juliet & Lebanon Road Intersection-Map Id 1A

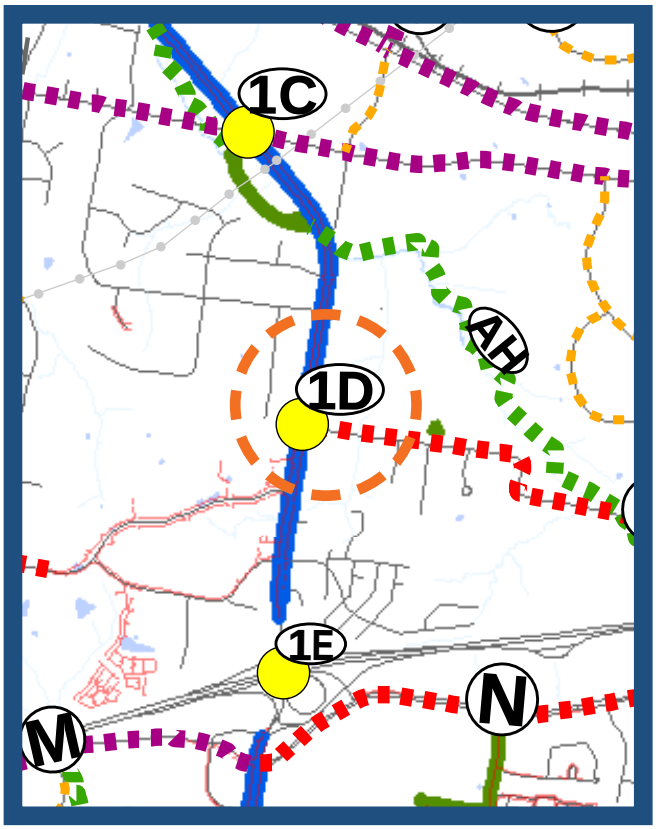
Lead Agency	Mt. Juliet
Type	Intersection
Length (miles)	N/A
Estimated Cost to Construct	**$750,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Intersection is a highly congested, commercial node. Lebanon Road and Mt. Juliet Road both have dedicated bikeways. There is a need to enhance safety and crossings.
Project Notes	• High-Visibility Crosswalks • Pedestrian Countdown Signals • Delineated Bike Boxes and Lane Crossings • Pedestrian-Level Lighting • Street Trees





Mt. Juliet & NW Rutland Road Intersection-Map Id 1D

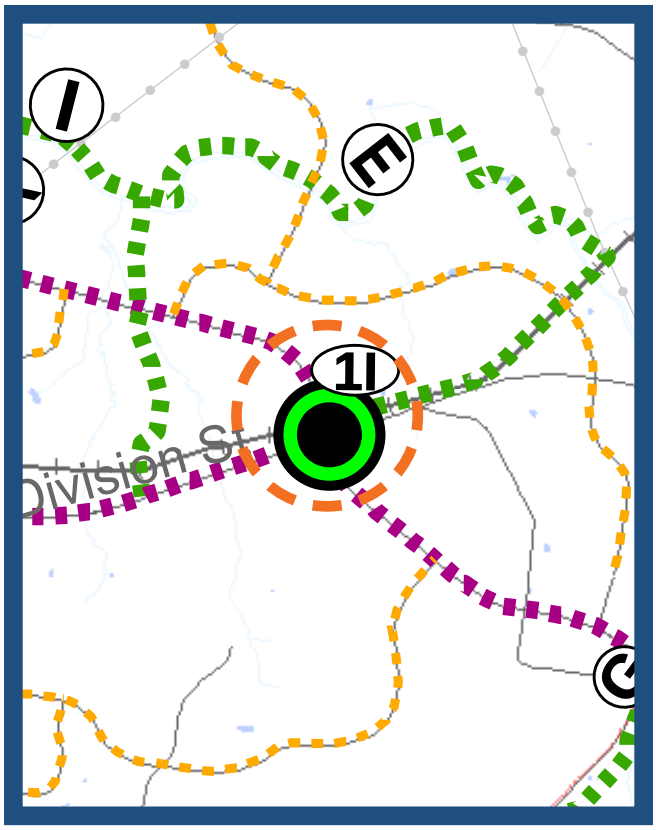
Lead Agency	Mt. Juliet
Type	Intersection
Length (miles)	N/A
Estimated Cost to Construct	**$500,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Crossing improvements, potential signal with extension of Rutland Road.
Project Notes	• Adjacent to Mt. Juliet Christian Academy • High visibility crosswalks • Sidewalk extension along NW Rutland Road • Pedestrian-Level Lighting • Traffic Signal

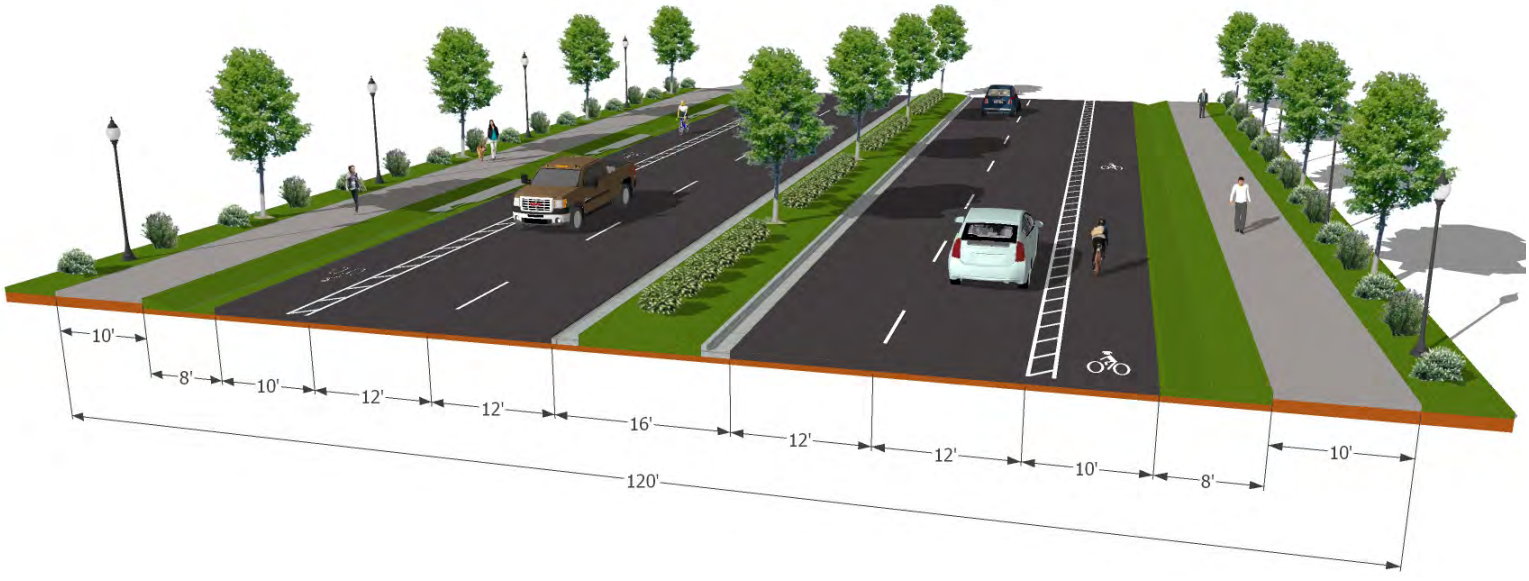




Golden Bear Gateway Interchange-Map Id 1I

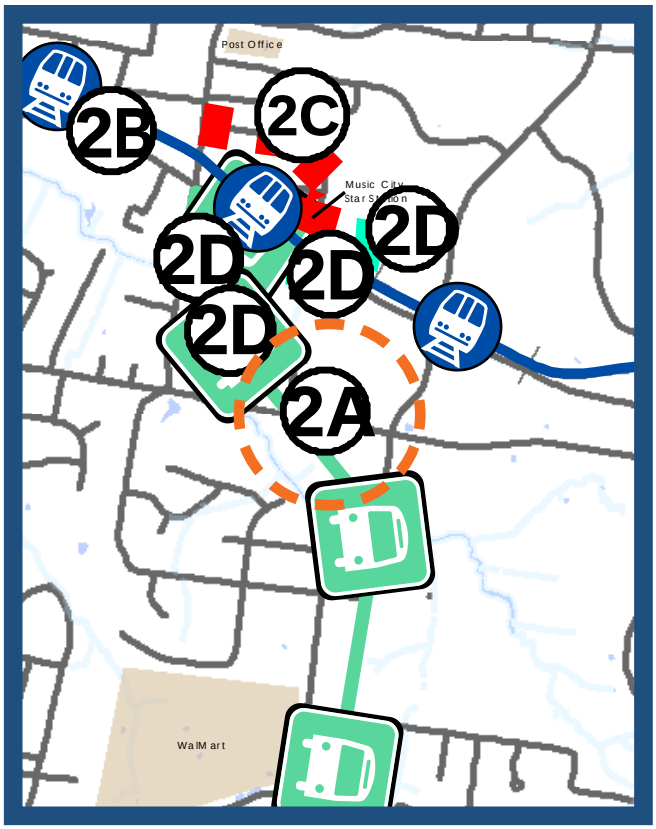
Lead Agency	Mt. Juliet
Type	Interchange
Length (miles)	N/A
Estimated Cost to Construct	-----
Air Quality Status	Exempt
Funding Status	State Government
Project Description	Provides North-South connectivity across railroad
Project Notes	• Currently Under Construction • Need for bicycle and pedestrian amenities across bridge

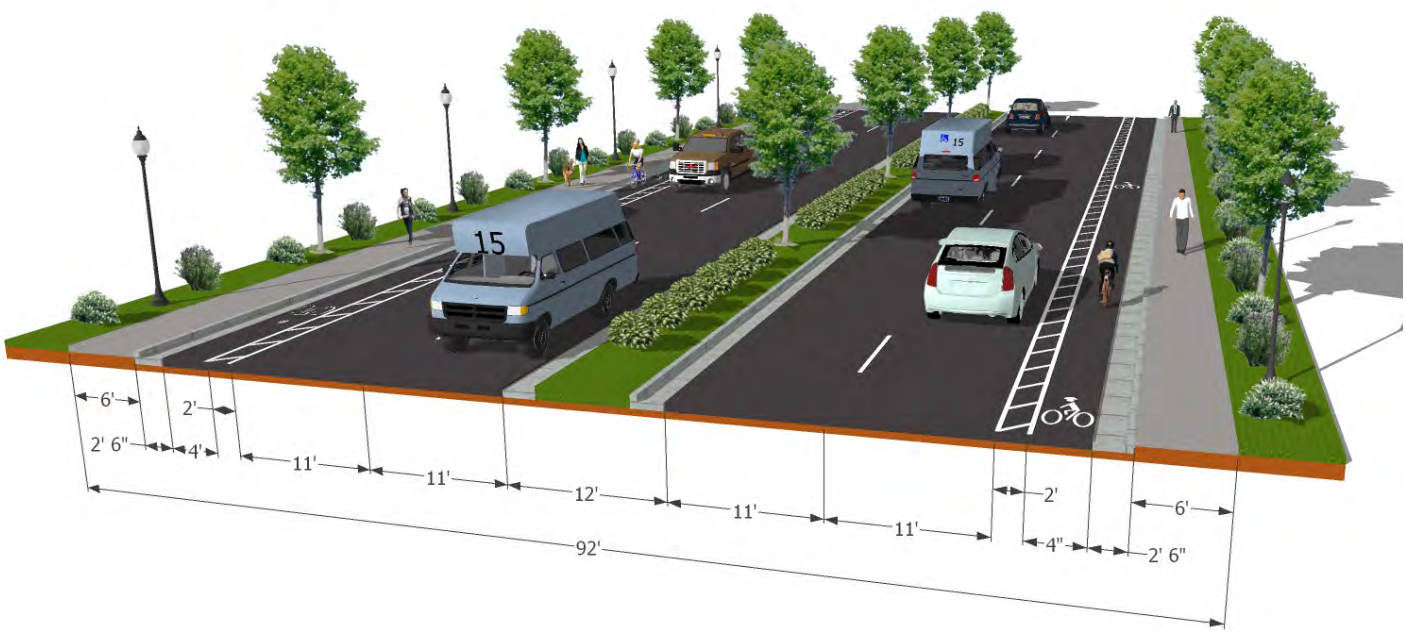




Circulator (30-minute headway, 2 vehicles)–Map Id 2A

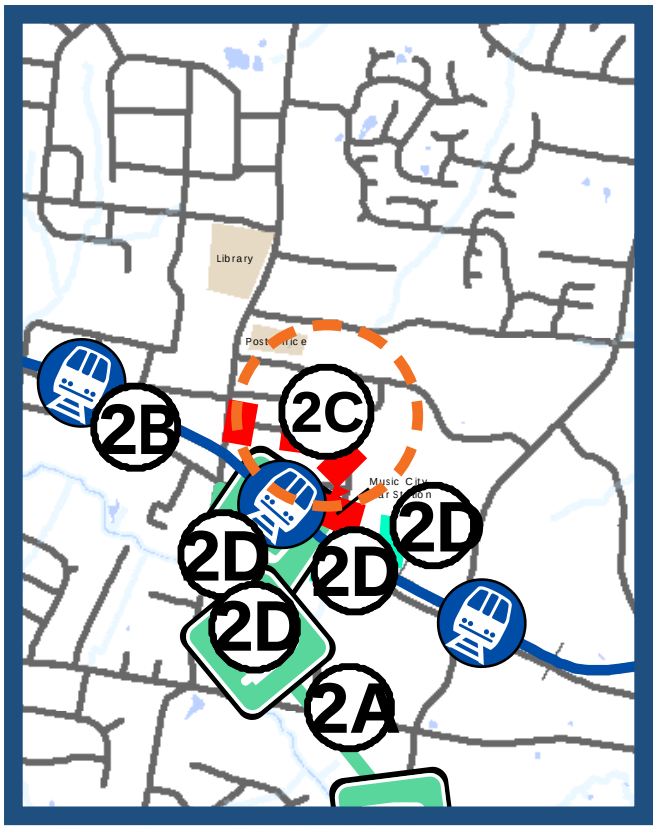
Lead Agency	Mt. Juliet
Type	Transit: Service
Length (miles)	N/A
Estimated Cost to Construct	**$170,000 startup cost; $130,000 annual operational costs**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Provides connectivity from the Providence development to Music City Star along Mt. Juliet Road
Project Notes	• Small Circulator Vehicle (seats 20 persons) • Potential for long term deviated route





Industrial Drive (to Music City Star Terminal)-Map Id 2C

Lead Agency	Mt. Juliet
Type	Transit: Sidewalk
Length (miles)	.42 miles
Estimated Cost to Construct	**$140,000**
Air Quality Status	Exempt
Funding Status	Unfunded
Project Description	Provides pedestrian access to rail station and future transit oriented development
Project Notes	• Improves bicycle and pedestrian connectivity







MJ

APPENDIX B: SR 265 SUBAREA STUDY

Prepared for the City of Mt. Juliet, Tennessee



STATE ROUTE 265 SUBAREA STUDY

Mt. Juliet, Wilson County, TN

Gresham, Smith and Partners
511 Union Street
Suite 1100
Nashville, TN 37219

June 2017

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1.0 INTRODUCTION

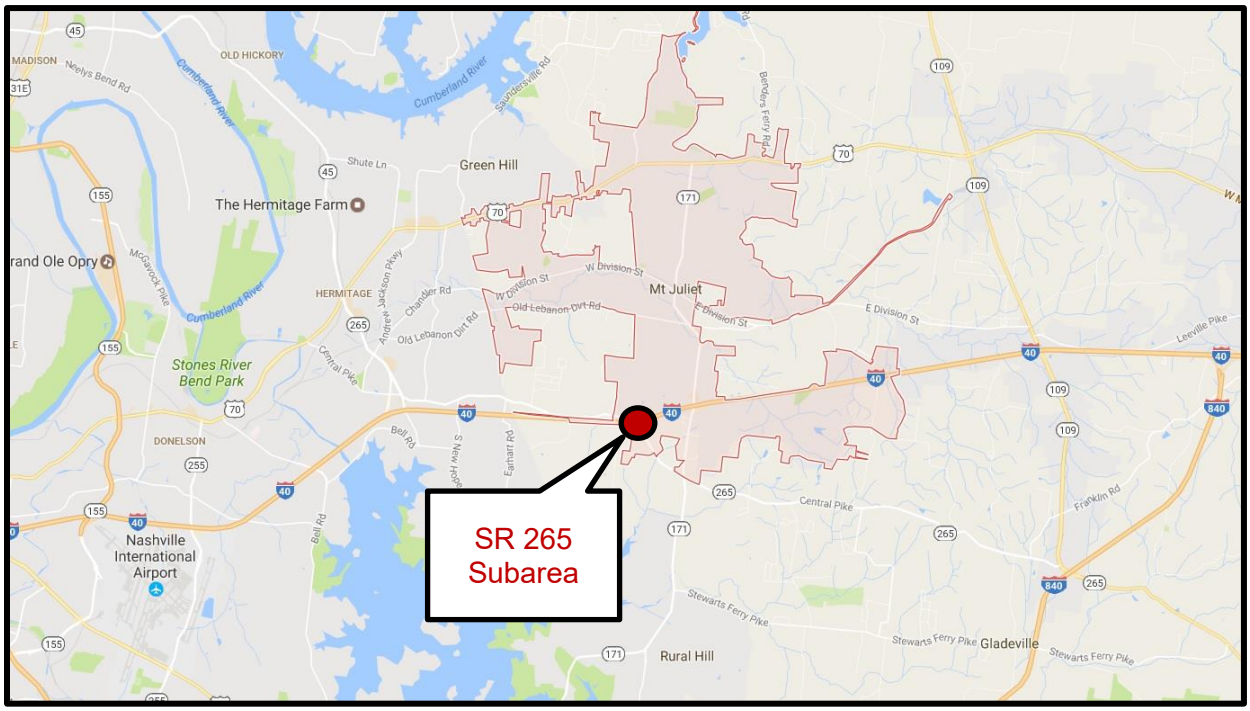
1.1 BACKGROUND

In coordination with the City of Mt. Juliet and the Nashville Area Metropolitan Planning Organization (MPO), it was requested that Gresham, Smith and Partners develop a subarea study for the area of Mt. Juliet located in close proximity to the proposed Central Pike/State Route 265 (SR 265) Interchange with Interstate 40 (I-40). The City of Mt. Juliet has experienced rapid growth in the last 25 years. The Mt. Juliet area has potential for additional development both north and south of the I-40 corridor, particularly surrounding SR 265. This rapid growth, and associated increase in traffic volumes, support the need for transportation network improvements in order to maintain acceptable traffic operations, provide additional connectivity in the area, and permit the proposed interchange to function adequately throughout its design life. This study examines current conditions and future demand on the transportation network within the study area and makes recommendations for projects that will address existing capacity and safety needs and also help manage future congestion due to growth.

1.2 STUDY LOCATION

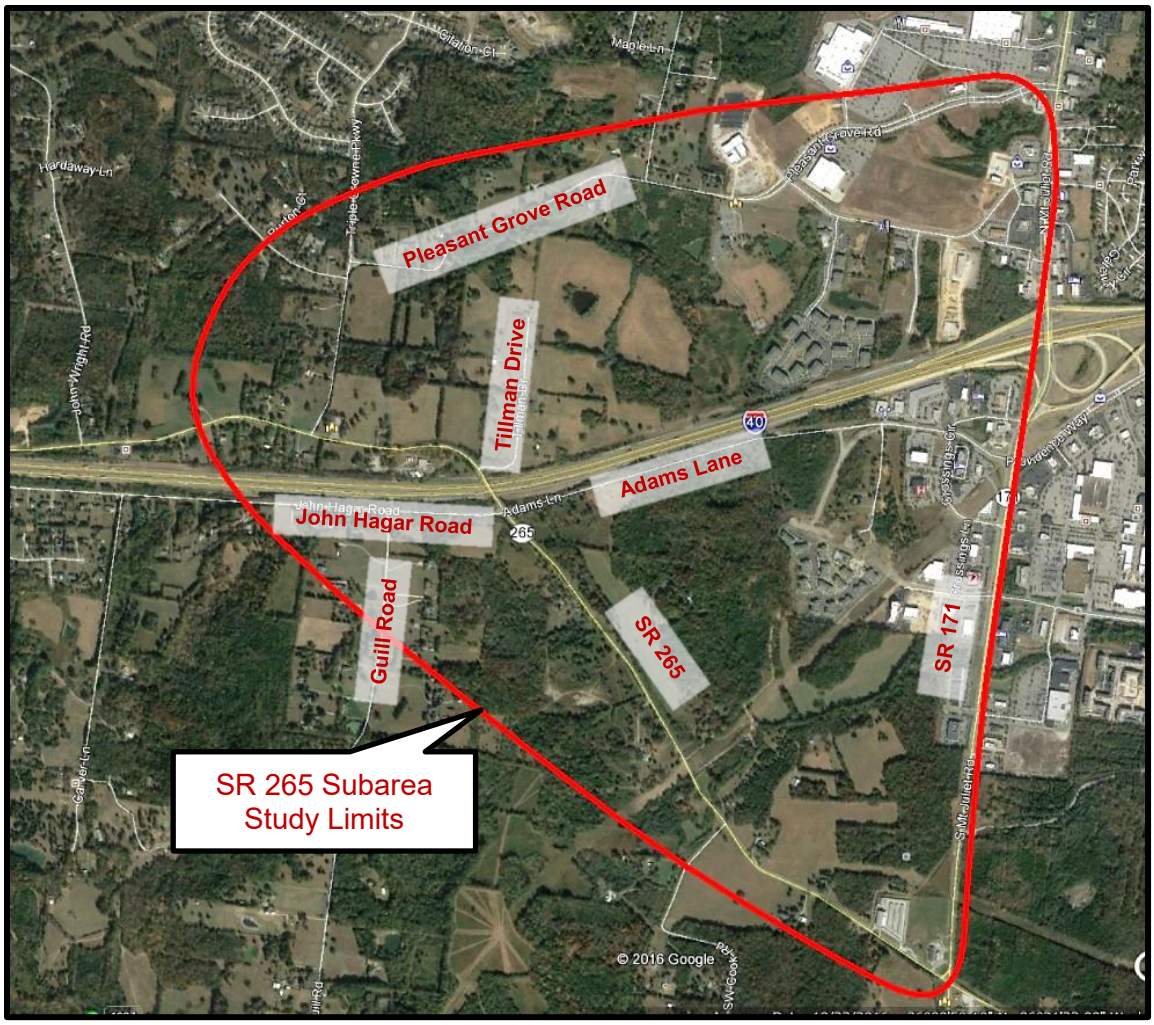
The project location of the SR 265 Subarea Study is shown conceptually in Exhibit 1-1. As shown, the area focuses on the proposed SR 265 interchange with I-40 and the adjacent roadway network and development within the City of Mt. Juliet in Wilson County.

EXHIBIT 1-1 PROJECT LOCATION OF SR 265 SUBAREA STUDY



The study limits of this SR 265 Subarea Study are shown conceptually in Exhibit 1-2. As shown, the area focuses on the proposed SR 265 interchange with I-40 and the adjacent roadway network to the east towards SR 171 and its existing interchange with I-40.

EXHIBIT 1-2 SR 265 SUBAREA STUDY LIMITS



1.3 STUDY OBJECTIVE

The City of Mt. Juliet has developed a future land use plan for the City, which accounts for the proposed SR 265 interchange at I-40. The future land use varies fairly significantly compared to the current zoning within the SR 265 Subarea. In anticipation of the proposed SR 265 interchange, this study will specifically address the existing and future transportation, land use, and multimodal issues, concerns, and opportunities within the Subarea.

This study examines existing and projected traffic volumes, roadway capacity needs, roadway connectivity, existing and planned bicycle and pedestrian facilities, existing land use and zoning, and development trends. Transportation system needs are identified as part of the analysis, and infrastructure improvements are identified to address the needs. Previously completed transportation and land use studies within the City of Mt. Juliet and Wilson County were reviewed and considered as part of this study. The recommended transportation system improvements are discussed and cost estimates developed.

2.0 EXISTING CONDITIONS

To establish a baseline for analysis, existing conditions within the SR 265 Subarea were inventoried. Existing roadways, bicycle and pedestrian facilities, public transit, railways, land use and zoning within the study area have been identified and described as follows.

2.1 ROADWAY NETWORK

Interstate 40 is classified by the Mt. Juliet Major Thoroughfare Plan (MTP) as an interstate. I-40, shown in Exhibit 2-1, generally travels in an east-west direction and provides local connectivity between Metro Nashville and Wilson County and regional access between Little Rock, Arkansas and Asheville, North Carolina. Within the study area, I-40 is an eight-lane, controlled access facility with eastbound and westbound traffic divided by a concrete median.

EXHIBIT 2-1 EASTBOUND I-40



EXHIBIT 2-2 WESTBOUND SR 265 NEAR S. MT. JULIET ROAD



SR 265 generally travels in an east-west direction and provides access between Highway 70 in Hermitage and Highway 70 in Watertown. The Mt. Juliet MTP classifies SR 265 as a collector. SR 265 is functionally classified as a minor arterial by TDOT's Long Range Planning Division. Within the Subarea, SR 265 is a two-lane roadway with 11-foot travel lanes and minimal shoulder. The speed limit is posted at 35 mph. Currently, there are no sidewalks or bike lanes along SR 265 within the Subarea.

Pleasant Grove Road extends north from SR 265 approximately 1,800 feet west of I-40. At the intersection with Triple Crown Parkway, Pleasant Grove Road turns to the east and provides a connection to N. Mt. Juliet Road (SR 171). Pleasant Grove Road is functionally classified as a major collector by TDOT's Long Range Planning Division and as a local access street in the City of Mt. Juliet's MTP. Pleasant Grove Road, shown in Exhibit 2-3, has 11-foot travel lanes in each direction and minimal shoulder. The speed limit is posted at 35 mph. There are no sidewalks; however, there is a sign posted for drivers to give adequate distance for cyclists. Near N. Mt. Juliet Road, Pleasant Grove Road widens to four-lanes with a median and left turn lanes. There is sidewalk and curb-and-gutter provided, and the speed limit is reduced to 30 mph.

EXHIBIT 2-3 WESTBOUND PLEASANT GROVE ROAD

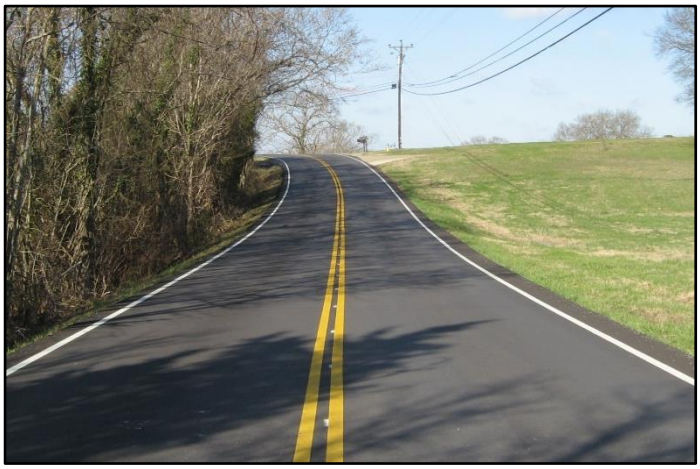


EXHIBIT 2-4 WESTBOUND JOHN HAGAR ROAD



John Hagar Road extends west from SR 265 just south of I-40 and provides access to New Hope Road near Percy Priest Lake in Davidson County. John Hagar Road intersects SR 265 directly across from Adams Lane. John Hagar Road, shown in Exhibit 2-4, has one 11-foot travel lane in each direction with no shoulder. There are no bicycle or pedestrian accommodations along John Hagar Road within the Subarea. It is classified as a local access street according to the Mt. Juliet MTP. The speed limit is posted at 40 mph.

Adams Lane extends east from SR 265 directly across from John Hagar Road and provides access to S. Mt. Juliet Road at Providence Way. The Mt. Juliet MTP classifies Adams Lane as a local access street. Adams Lane has one 11-foot travel lane in each direction with no shoulder. There is a weight limit sign for large trucks. There are no bicycle or pedestrian accommodations. The speed limit is posted at 40 mph. However, near S. Mt. Juliet Road, the speed limit is reduced to 20 mph.

EXHIBIT 2-5 EASTBOUND ADAMS LANE



EXHIBIT 2-6 NORTHBOUND TILLMAN DRIVE



Tillman Drive extends east from SR 265 just north of I-40 and provides access to private residential properties. Tillman Road is very narrow, with a total pavement width of approximately 15-16 feet. Just east of SR 265, Tillman Road turns north and is a gravel road, as shown in Exhibit 2-6. It is classified as a local access street according to the Mt. Juliet MTP. The speed limit is not posted.

EXHIBIT 2-7 SOUTHBOUND GUILL ROAD



Guill Road is a local access street that provides access to residential homes. Guill Road extends south from John Hagar Road just west of SR 265 and provides a connection to Alvin Sperry Road. Guill Road has one travel lane in each direction with a total pavement width of approximately 20 feet. The speed limit is not posted and there are no pedestrian or bicycle facilities.

EXHIBIT 2-8 NORTHBOUND SR 171



SR 171 (Mt. Juliet Road) is functionally classified as a minor arterial by TDOT's Long Range Planning Division and as an arterial in the City of Mt. Juliet's MTP. SR 171 provides a connection between Highway 70 in north Mt. Juliet and I-24 near LaVergne. Near I-40, SR 171 has two travel lanes in each direction with center turn lanes. The speed limit is posted at 30 mph. There is sidewalk, paved shoulder, and curb-and-gutter along this portion of SR 171. South of the Providence Marketplace, SR 171 narrows to one travel lane in each direction and the speed limit increases to 45 mph. Along this portion of SR 171, shown in Exhibit 2-8, there is a wide paved shoulder and it is signed as a route with a bike lane. It should be noted that within the Subarea, SR 171 is designated as N. Mt. Juliet Road north of I-40 and S. Mt. Juliet Road south of I-40.

The **intersection of SR 265 and John Hagar Road/Adams Lane** is a four-legged intersection that is controlled by a stop sign on John Hagar Road and Adams Lane. In addition to the stop signs, there are pavement markings/strips and flashing red lights, shown in Exhibit 2-9, on John Hagar Road and Adams Lane. There are also intersection signs and flashing yellow lights on SR 265. This intersection is located just south of the I-40 overpass. As a result, sight distance when looking toward the overpass is limited, as shown in Exhibit 2-10.

EXHIBIT 2-9 WESTBOUND ADAMS LANE AT SR 265

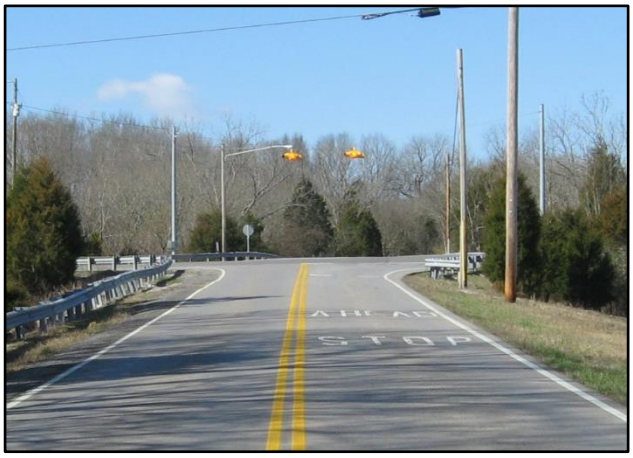


EXHIBIT 2-10 NORTHBOUND VIEW OF SR 265 FROM JOHN HAGAR ROAD



The **intersection of SR 265 and Tillman Drive** is a T-intersection that is controlled by a stop sign on Tillman Drive, shown in Exhibit 2-11. This intersection is located just north of the I-40 overpass. Just north of the intersection, SR 265 curves to the west, as shown in Exhibit 2-12. Sight distance is limited when looking both ways from Tillman Drive.

EXHIBIT 2-11 WESTBOUND TILLMAN DRIVE AT SR 265



EXHIBIT 2-12 NORTHBOUND VIEW OF SR 265 FROM TILLMAN DRIVE



The **intersection of SR 265 and Pleasant Grove Road** is a T-intersection that is controlled by a stop sign on Pleasant Grove Road. In addition to the stop sign, there are flashers on all three approaches. Sight distance is an issue due to Pleasant Grove Road being hidden from view for drivers traveling westbound on SR 265, as shown in Exhibit 2-13. There are no turn lanes provided along SR 265. The southbound approach on Pleasant Grove Road, shown in Exhibit 2-14 includes a shared lane for left and right turns.

EXHIBIT 2-13 WESTBOUND SR 265 AT PLEASANT GROVE ROAD



EXHIBIT 2-14 SOUTHBOUND PLEASANT GROVE ROAD AT SR 265



The **intersection of Pleasant Grove Road and Triple Crowne Parkway** is a T-intersection that is all-way stop controlled. Pleasant Grove Road forms the westbound and northbound approaches. The northbound approach on Pleasant Grove Road, shown in Exhibit 2-15, has a channelized right turn lane, but no storage length. The westbound approach on Pleasant Grove Road, shown in Exhibit 2-16, consists of a shared left and right turn lane. The southbound approach on Triple Crown Parkway has a left turn lane.

EXHIBIT 2-15 NORTHBOUND PLEASANT GROVE ROAD AT TRIPLE CROWN PARKWAY



EXHIBIT 2-16 WESTBOUND PLEASANT GROVE ROAD AT TRIPLE CROWN PARKWAY



EXHIBIT 2-17 EASTBOUND SR 265 AT SR 171



The **intersection of SR 265 and SR 171** is a four-legged intersection that is controlled by a traffic signal. The northbound and southbound approaches on SR 171 include a left turn lane and a shared through and right turn lane. The eastbound and westbound approaches on SR 265 includes a shared left, through, and right turn lane, as shown in Exhibit 2-17.

2.2 BICYCLE & PEDESTRIAN FACILITIES

There are currently very limited bicycle and pedestrian facilities within the SR 265 Subarea. The only sidewalks are located along SR 171 in the vicinity of Providence Marketplace. The only marked bicycle facility is along SR 171 south of I-40. It is signed as a bike lane. However, it is actually just a wide shoulder with no pavement markings.

2.3 PUBLIC TRANSIT

There is no existing fixed-route public transportation within the City of Mt. Juliet. Mid Cumberland Public Transit does offer on-demand van service, but it is not regularly-scheduled and reservations must be made in advance. SR 171 is signed with directions to the Music City Star commuter train stop.

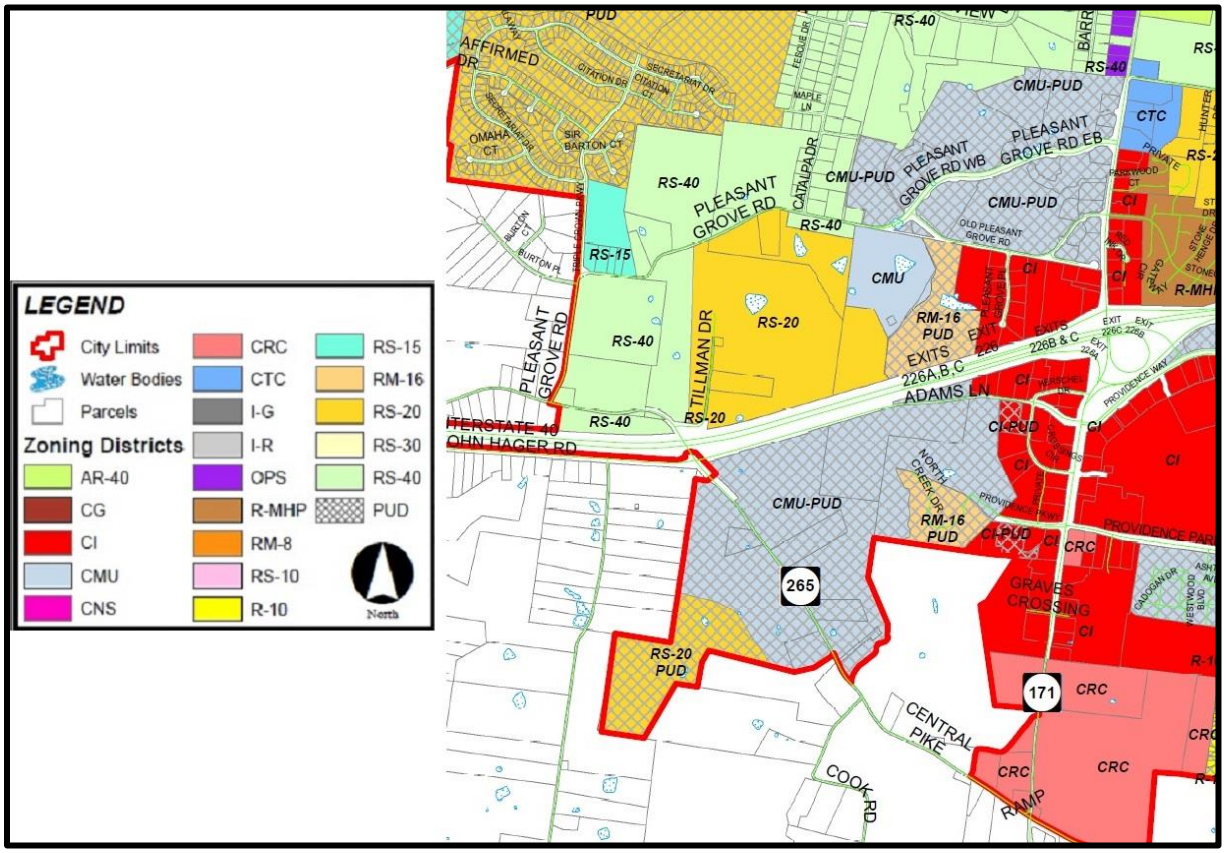
2.4 RAILWAYS

There are no railways within the SR 265 Subarea. However, the Music City Star links Nashville to Mt. Juliet and Lebanon. This service has a stop north of the Subarea near downtown Mt. Juliet. While the Music City Star does not directly impact the SR 265 Subarea, it does represent a rail corridor with potential to generate new population centers within the City.

2.5 LAND USE & ZONING

Currently, there is a mix of residential and commercial and uses within the SR 265 Subarea. North of I-40, the majority of the area is zoned low-density single-family residential. South of I-40, much of the area is currently undeveloped, but zoned as a Planned Unit Development (PUD). There are two newly-constructed multi-family developments within the Subarea. Glass Creek Apartment complex is located on the north side of I-40, and Creekside at Providence is located on the south side of I-40. The commercial development within the Subarea is located along the eastern portion of the study area along SR 171 and concentrated near the SR 171 interchange with I-40. The existing zoning within the SR 265 Subarea is shown in Exhibit 2-18 shows the city's recent growth trend.

EXHIBIT 2-18: SR 265 SUBAREA EXISTING ZONING



The existing land use within the SR 265 Subarea reflects potential to grow and develop, especially as traffic and access accommodations improve. The City of Mt. Juliet has seen high population and development growth over the past 25 years with a special census population of 28,159 in 2015. Exhibit 2-19 shows the city's recent growth trend.

EXHIBIT 2-19: MT. JULIET POPULATION GROWTH TRENDS (1990 – 2015)

Year	Population	Average Change Per Year
1990	5,389	
2000	12,366	12.9%
2010	24,548	9.9%
2015*	28,159	3.3%

Source: U.S. Census Bureau
**Based on Special Census*

Several factors influence this growth trend. As previously mentioned, I-40 is included within the SR 265 Subarea. In addition, SR 840, I-65, and I-24 are all within close proximity to Mt. Juliet. There are several major retail and mixed use developments located within or in close proximity to the study area, including Providence Marketplace, Providence Commons, and The Paddocks. Also, given that Mt. Juliet is seated approximately 12 miles east of Metro Nashville, it is quickly becoming a popular suburb for those relocating to the Nashville area.

3.0 KEY TRANSPORTATION ISSUES

3.1 REVIEW OF RELEVANT STUDIES

A review was performed of relevant planning, traffic, multi-modal, and roadway network studies and reports within the SR 265 Subarea. The following is a summary of the relevant studies reviewed. Key pages from each of the relevant studies are included in the Attachments.

Nashville Area Metropolitan Planning Organization (MPO)

- Tri-County Transportation & Land Use Study, February 2012: This document identifies US 70/SR 24 (Lebanon Road) as a growth corridor, with an associated growth center located between US 70/SR24 and I-40 immediately east of the Davidson/Wilson County line, an area that includes SR 265 Subarea. The growth center is projected to be primarily suburban in character with an activity center located in the southern portion of the study area. Specifically, SR 171 within the SR 265 Subarea is identified as a gateway but with significant transportation issues. The 2030 corridor vision is shown to widen this portion of SR 171 to a four-lane median-divided corridor from I-40 through the intersection with SR 265.
- 2040 Regional Transportation Plan, February 2016: This plan recommends a series of improvements to the SR 265 and Mt. Juliet Road corridors. Proposed improvements include the reconstruction and widening of Central Pike from Old Hickory Boulevard in Nashville to Mt. Juliet Road in Mt. Juliet, with a new interchange at I-40. Mt. Juliet Road is planned to be enhanced from two lanes to five lanes to improve traffic operations and roadway safety for all users including a more appropriate bridge design over I-40 and the extension of progressive signalization technology along the corridor.
- Nashville Area MPO Bicycle and Pedestrian Study, November 2009: The Wilson County Map included in this report shows SR 265 as a route with a future bike lane.
- Transportation Improvement Program (FY 2008-2011), December 2010: The Transportation Improvement Program (TIP) identifies the new interchange at SR 265 and I-40. Construction funds are programmed for Fiscal Year 2016.
- Transportation Improvement Program (FY 2014-2017), December 2013: This TIP identifies one project within the study area: TIP # 2013-77-218; SR 171 (Mt. Juliet Road) Traffic Adaptive Signal Control System Corridor Optimization Project. The project description states that the project involves the "implementation of a fully functioning, reliable adaptive signal control system through the installation of a master signal controller, wireless communication devices, and radar detection for both vehicular and bicycle (self-propelled) traffic." Right-of-way funds were programmed for Fiscal Year 2008.

Nashville Metropolitan Transit Authority (MTA)

- nMotion Transit Plan Recommendations, August 2016: The plan recommends continued Music City Star commuter rail service to Mt. Juliet with expanded weekday operating hours and additional service on Saturdays. The plan recommends local service within the Mt. Juliet area, including the study area, to support the increased service and encourage higher ridership on the rail service.

City of Mt. Juliet

- Mt. Juliet Major Thoroughfare Plan (MTP), 2010: SR 265 is classified as a collector route, while I-40 is shown as Interstate. SR 171 is shown as an arterial route. All other roadways within the SR 265 Subarea are considered local roads, according to the MTP.

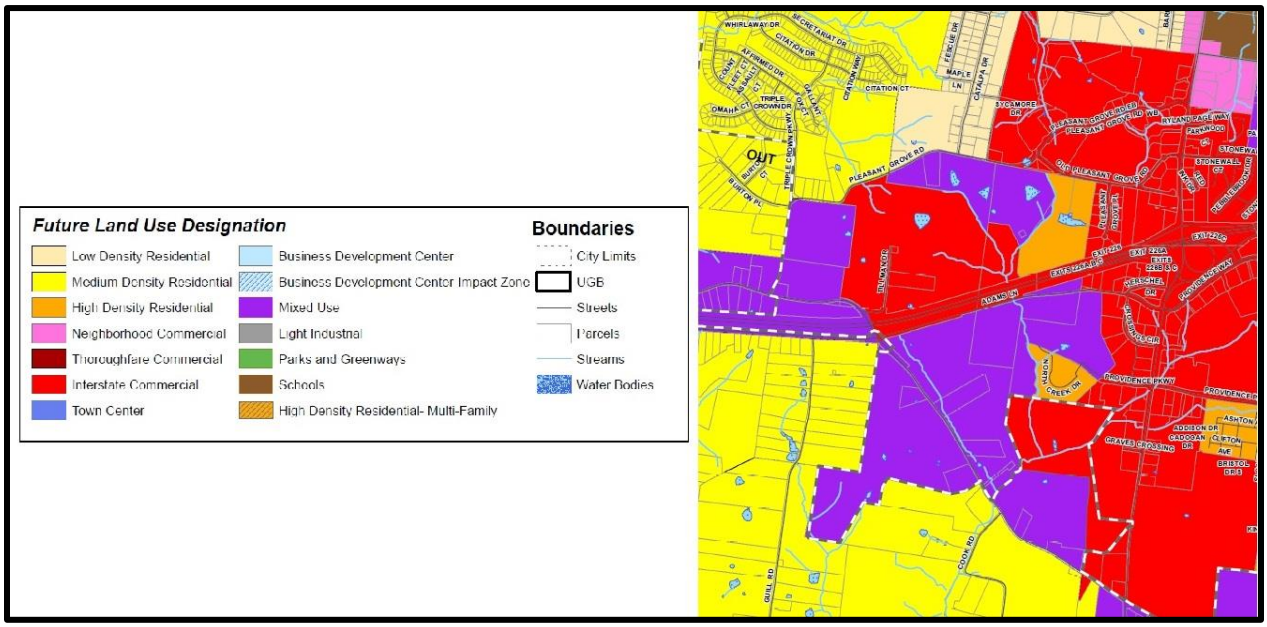
- Mt. Juliet Master Greenway Plan, 2010: Within the SR 265 Subarea, this plan shows a future bike lane along SR 265 as well as SR 171. Additionally, a future greenway trail is shown to extend from the intersection of SR 171 and Adams Lane to the southwest crossing SR 265 and extending on to the southwest towards Davidson County.

The key recommendations from each of the previously listed planning documents indicates a need for improved connectivity, access, safety, and multimodal options within the study area. Not only do they indicate a need, they also specify plans and even funding for improvements to SR 265, including a new interchange at I-40.

3.2 FUTURE GROWTH

The SR 265 Subarea today is characterized by a continuously evolving mix of agricultural and rural land, suburban residences and a strong presence of large scale retail development and commercial uses along SR 171 near the interchange with I-40. The SR 265 Subarea from the City of Mt. Juliet's Future Land Use Map is shown in Exhibit 3-1. Interstate commercial development is shown to extend west from SR 171 to SR 265, and mixed-use development is likely to occur along SR 265 near the proposed interchange at I-40. Two areas of high-density residential development is also planned within the SR 265 Subarea – one north of I-40 and one south of I-40.

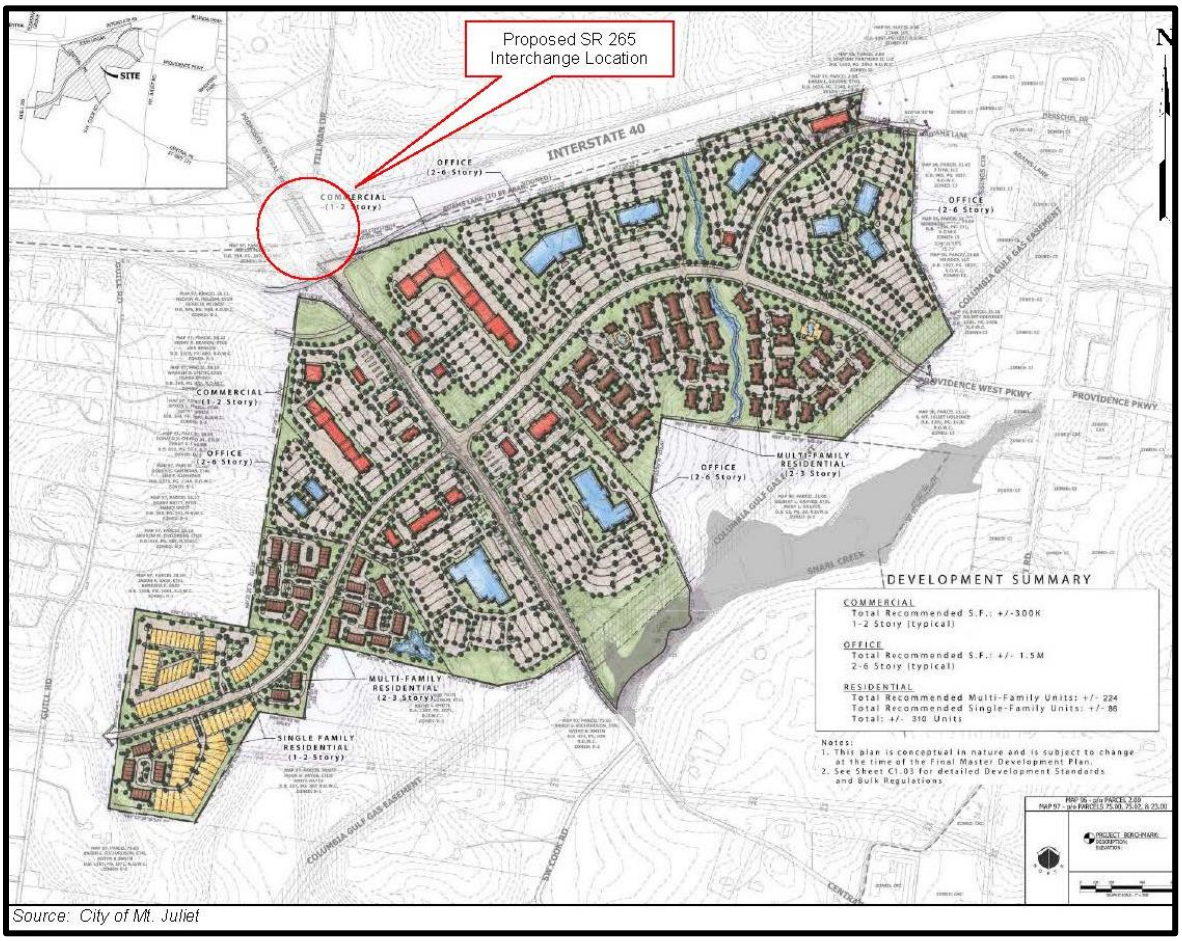
EXHIBIT 3-1 SR 265 SUBAREA FUTURE LAND USE



Providence Central is an approved master development plan in the SR 265 Subarea that will be located west of the existing Providence Marketplace. It will be east of SR 265 and south of Adams Lane. The master plan will include a mix of high end office, retail, and residential uses. The majority of it will be office and retail, which will front SR 265 and along Adams Lane. The ultimate plan is to extend Providence Parkway to the west and eventually connect to Adams Lane. Future phases are planned once the proposed SR 265 interchange at I-40 is constructed.

The proposed development scenario provided by the City of Mt. Juliet is shown in Exhibit 3-2. This development shows the extension of Providence Parkway discussed above and the realignment of Adams Lane. Also shown, a slight realignment of John Hagar Road and new development west of SR 265.

EXHIBIT 3-2 FUTURE DEVELOPMENT ALONG SR 265



Source: City of Mt. Juliet

3.3 TRAFFIC OPERATIONS & NEEDS

Based on the data and the future land use plans for the SR 265 Subarea discussed above, there is a definite need for roadway and access improvements within the Subarea. SR 265 needs additional travel lanes to accommodate the expected traffic from the proposed interchange and future growth. SR 265 is expected to be a major route between Nashville and Mt. Juliet, and one travel lane in each direction will not meet the future capacity needs.

In addition to SR 265, there are several local roads that access SR 265 near I-40 that will need improvements and future realignments. As discussed in Section 2.1 of this Study, the intersections of SR 265 with John Hagar Road/Adams Lane and with Tillman Drive are currently located very close to I-40. In fact, there are existing sight distance issues due to the proximity of the overpass. It is recommended that once the new interchange at SR 265 is constructed that John Hagar Road, Adams Lane, and Tillman Drive all be realigned or rerouted. North of I-40, SR 265 is not currently planned for specific development, but future consideration should be given for the potential commercial growth, especially once the new interchange is present.

4.0 CAPACITY ANALYSIS

GS&P has developed traffic projections and performed traffic analysis for the roadways within the SR 265 Subarea. The projected (2020 and 2040) daily traffic volumes are included in the Attachments. For 2020, the traffic volumes assume roadway conditions and lane configurations will remain as existing – no-build conditions. For 2040, traffic volumes are projected for no-build conditions as well as if a new interchange at I-40 and SR 265 is constructed. For the purposes of this study, an interim condition was used which assumes the interchange is constructed with no major roadway or intersection improvements to SR 265 and the surrounding subarea. The full build condition assumes the new interchange is constructed along with improvements to the entire SR 265 Subarea.

The 2020 and 2040 volumes and lane configurations were analyzed using TDOT Strategic Transportation Investments Division's *Daily Service Volumes Related to Level of Service* to determine the Level of Service (LOS) for each roadway segment. Levels of service range from LOS A (free-flow conditions, no delay) to LOS F (severe congestion and delay). LOS A, B and C generally indicate satisfactory driving conditions. LOS D indicates conditions in which there is a noticeable delay. For the analyses, it was assumed SR 265 is a two-lane urban arterial under no-build and interim conditions and a five-lane urban arterial under build conditions. It was also assumed SR 171 is a five-lane urban arterial near I-40 under both conditions. Near SR 265, it was assumed SR 171 is a two-lane urban arterial under no-build and interim conditions and a five-lane urban arterial under build conditions.

As shown in Exhibit 3-1, SR 265 is expected to operate at LOS C or better in 2020 and LOS D in 2040 under no-build conditions. If the new interchange is constructed, and SR 265 remains as a two-lane arterial, the roadway will operate at LOS F and is not expected to function adequately. If SR 265 is widened to include two travel lanes in each direction, SR 265 south of I-40 is expected to operate at LOS F south of the new interchange. North of the new interchange, SR 265 will operate at LOS C. Near SR 171, SR 265 will operate at LOS D as a five-lane urban arterial. It should be noted that SR 265 within the Subarea is envisioned as a multimodal route that will accommodate all users. As a result, although future volumes may indicate poor levels of service, a six-lane cross section is not desirable. Limiting access near the new interchange will help improve traffic operations and preserve the functionality of the proposed interchange. Also, individual intersections should be analyzed with more detailed analysis as specific construction plans are completed. SR 171 is shown to operate at LOS F under all no-build and interim conditions. This further supports the need for a new interchange at SR 265 to help alleviate some of the traffic on SR 171.

EXHIBIT 4-1: ROADWAY LEVELS OF SERVICE

Route	2020 (No-build) AADT/LOS	2040 (No-build) AADT/LOS	2040 (Interim) AADT/LOS	2040 (Build) AADT/LOS
SR 265 north of I-40	10,090 / C	13,570 / D	19,985 / F	19,985 / C
SR 265 south of I-40	10,090 / C	13,570 / D	40,190 / F	40,190 / F
SR 265 near SR 171	6,690 / B	12,295 / D	22,000 / F	22,000 / D
SR 171 south of I-40	51,400 / F	71,150 / F	44,535 / F	44,535 / F
SR 171 near SR 265	26,015 / F	30,875 / F	28,860 / F	28,860 / E

Source: TDOT STID's *Daily Service Volumes Related to Level of Service* – see Attachments

5.0 RECOMMENDED SYSTEM IMPROVEMENTS

5.1 ROADWAY NETWORK

As discussed throughout this report, a new interchange at I-40 and SR 265 is needed and proposed. Once that new interchange is constructed and open to traffic, the roadways within the SR 265 Subarea will need major improvements to accommodate the expected traffic volume demands. The detailed network improvements are listed below:

- **SR 265** is recommended to include two travel lanes in each direction within the study area. This can include a five-lane cross-section from Pleasant Grove Road to the intersection with SR 171. However, with the new interchange and the associated proposed development, it is recommended SR 265 be a limited access route near I-40. This can be accomplished with a four-lane median divided roadway and limited right-in/right-out access only. This limited access with no major intersections or private driveways is recommended for 1,000 feet on each side of the new interchange. As future development is planned and constructed, it is recommended that the City of Mt. Juliet require individual Traffic Impact Studies to determine the specific access and traffic control necessary.

  It should be noted that making SR 265 a limited access route near I-40 will also provide improved traffic operations, as discussed in Section 3.2. By prohibiting and/or limiting turning movements, it will help move higher traffic volumes without causing significant conflicts and delays.

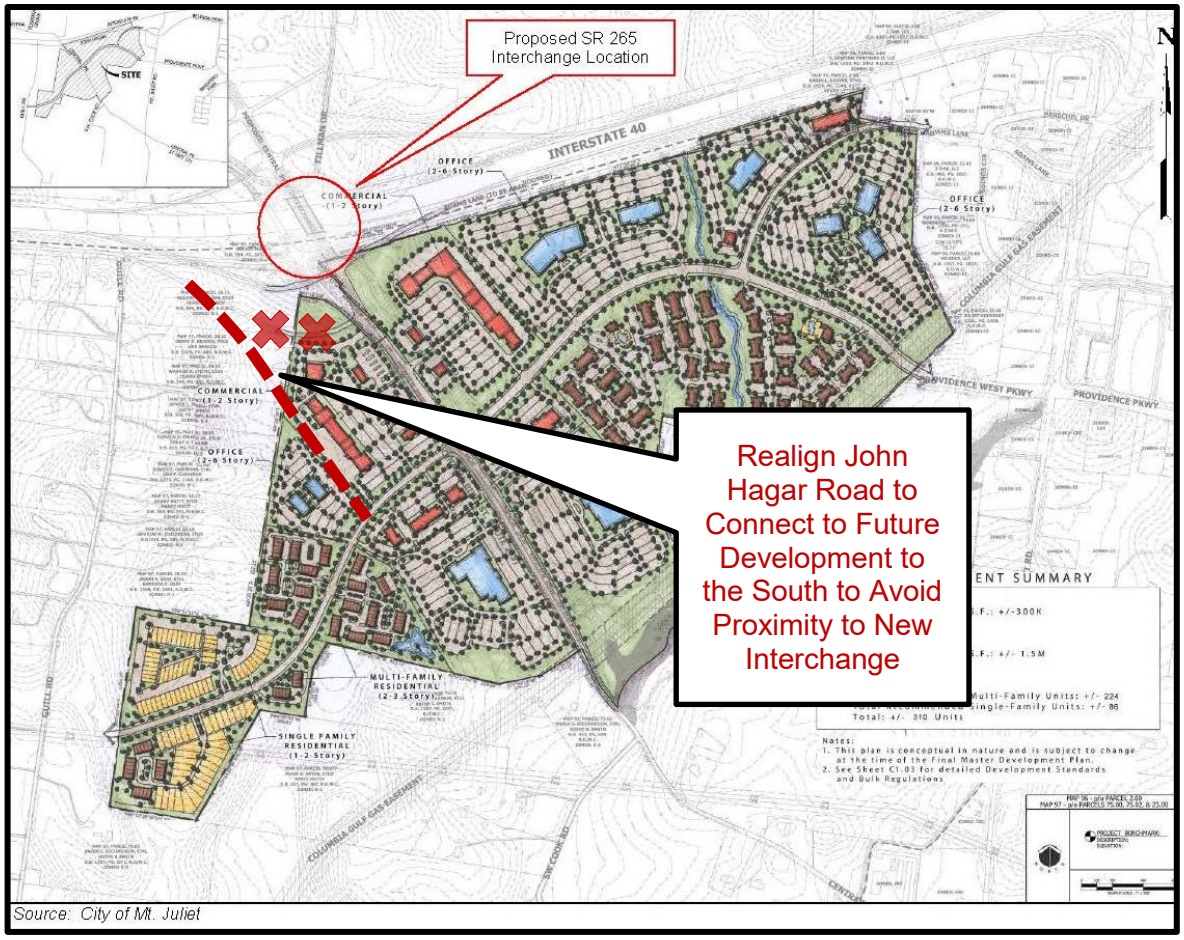
  With the recommended widening of SR 265 and the future widening of SR 171, the existing signalized intersection of SR 265 and SR 171 will need to be modified to accommodate the additional through and turn lanes.

  Sidewalks are recommended along both sides of SR 265. In addition, per the Nashville Area MPO Bicycle and Pedestrian Study, bike lanes and/or a separated shared-use path are recommended for SR 265.

- **John Hagar Road** is recommended to be realigned to the south to connect to future development west of SR 265. Exhibit 3-2 shows John Hagar Road to connect to SR 265 just south of the new interchange. However, as discussed above, the traffic volumes along this segment of SR 265 are expected to be relatively high and limited access is recommended. As a result, it is recommended that John Hagar Road connect to a new road within future development to the south that would then provide access to SR 265, shown conceptually in Figure 5-1.

  All new construction along John Hagar Road is recommended to include sidewalks on both sides of the roadway.

EXHIBIT 5-1 CONCEPTUAL REALIGNMENT OPTION FOR JOHN HAGAR ROAD



Source: City of Mt. Juliet

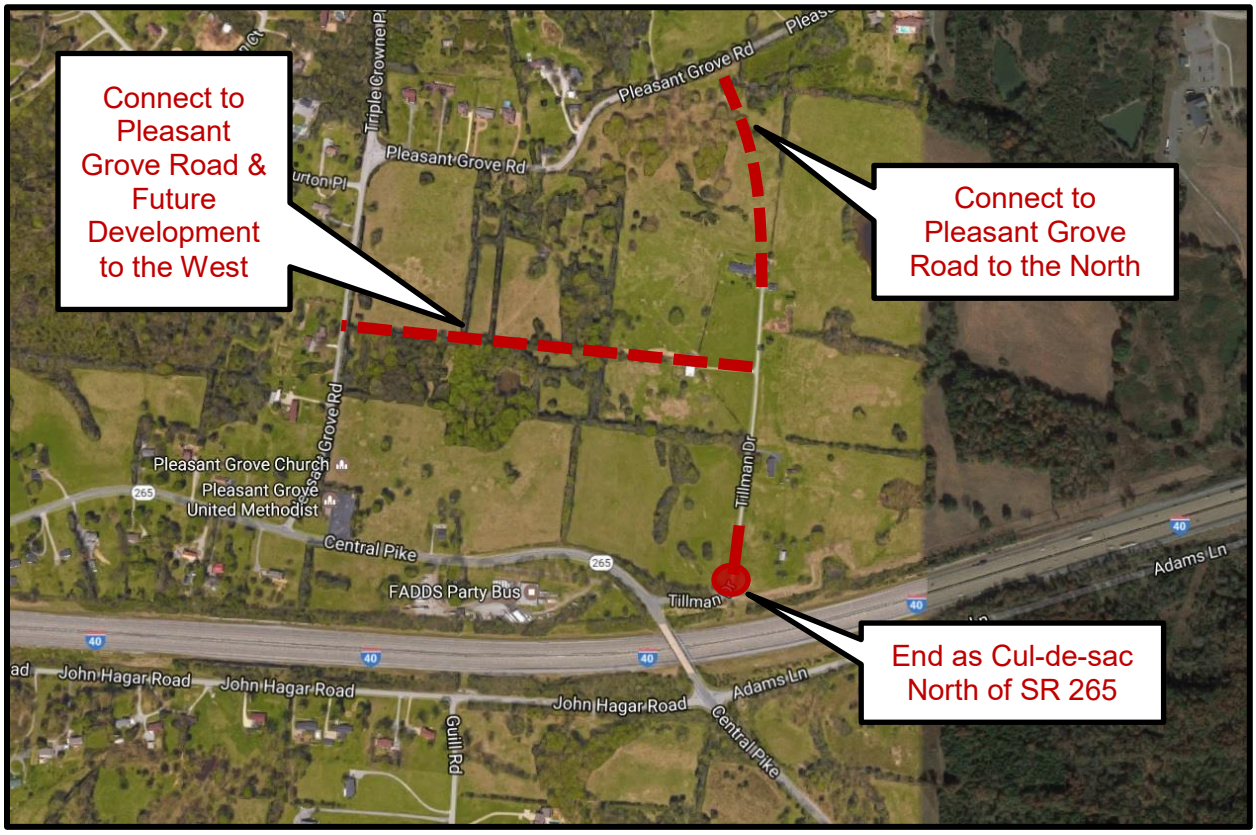
- **Adams Lane** is recommended to be realigned to connect to the extension of Providence Parkway, similar to the concept shown in Exhibit 5-1. The extension of Providence Parkway will be part of future development and is shown to connect to SR 265 at a four-legged intersection. It is recommended that this four-legged intersection be at least 1,000 feet south of I-40, as discussed above.

  All new construction along Adams Lane is recommended to include sidewalks on both sides of the roadway.

- **Tillman Drive** is recommended to be realigned to intersect SR 265 to the north of its current location. Any future development has not been established on a concept-level at this time. However, depending on specific site plans, a conceptual realignment could connect to Pleasant Grove Road to the north or to the west, as shown in Exhibit 5-2. The existing Tillman Drive could end as cul-de-sac just north of SR 265 while still providing access to the current properties and/or future development.

  All new construction along Tillman Drive is recommended to include sidewalks on both sides of the roadway.

EXHIBIT 5-2 CONCEPTUAL REALIGNMENT OPTIONS FOR TILLMAN DRIVE



5.2 PRELIMINARY ENVIRONMENTAL SCREENING

A high-level review of potential environmental impact of projects within the study area was conducted. Based on a desktop review of Geographic Information Systems (GIS) data and state/federal database searches, potential environmental issues are summarized below by topic.

- **Air Quality:** Wilson County is in attainment for all regulated criteria pollutants. A qualitative Mobile Air Toxics Analysis (MSATs) evaluation, conducted in accordance with the Federal Highway Administration's (FHWA) Interim Guidance Update on Air Toxic Analysis in NEPA Documents dated December 2012, will need to be completed for any projects eligible for federal funding.
- **Noise:** Projects consisting of new location construction, roadway widening, or an increase or addition of interchange capacity are likely to cause noise impacts, though the severity of these impacts is unknown. Noise impacts will need to be evaluated and determined on a project-by-project basis.
- **Ecology:** One stream, North Creek is located within the study area. North Creek is listed on the Tennessee Department of Environment and Conservation's (TDEC) 303d list for loss of biological integrity due to siltation from land development.

  The National Wetland Inventory Mapper identified seven small wetlands distributed throughout the study area. The total acreage of these wetlands combined is approximately 5.31 acres. There are also numerous freshwater ponds identified in the area.

A review of the Tennessee Department of Environment and Conservation (TDEC) database for threatened and endangered species was conducted for the Hermitage Quadrangle, which contains the project area. The database lists nine flowering plants, one fish, and one reptile species. Presence of the potential habitat for these species will be determined during the ecological review during the NEPA phase of any projects proposed within the study area.

- **Archaeology:** The presence of archaeological resources located within the project area is unknown. Archaeological review and Native American coordination will be conducted prior to any construction activities receiving state or federal funding.
- **Historic/Parks:** A search of the National Park Service database did not indicate the presence of any National Register of Historic Places (NRHP) sites within the project area.

  Historic resources within Wilson County that have been previously surveyed were reviewed on a Tennessee Historical Commission map. Three sites that are potentially eligible for listing are within or near the project area. A review of these resources will be required during the NEPA phase of any proposed projects.

  No parks or other recreational resources are currently located within the study area.
- **Social/Environmental Justice:** Using the latest TDOT guidance, dated December 2015, for identifying Environmental Justice (EJ) populations, was applied to the study area. Data was collected from the American Community Survey (ACS) 5-Year Estimates. The study area contains three Census Block Groups. At the Block Group level, no minority or low-income populations were identified that meet TDOT's criteria.

  More detailed EJ analysis will be required at the project impact area level during the NEPA phase of any proposed projects. However, based on the results of this preliminary analysis, the high-level potential for EJ impacts is low.
- **Hazardous Materials:** No EPA National Priorities List (NPL) sites are located within the project area. Additional review of other potential hazardous materials sites, such as underground storage tanks (USTs), will be required during the NEPA phase of any proposed project.

5.3 COST ESTIMATES

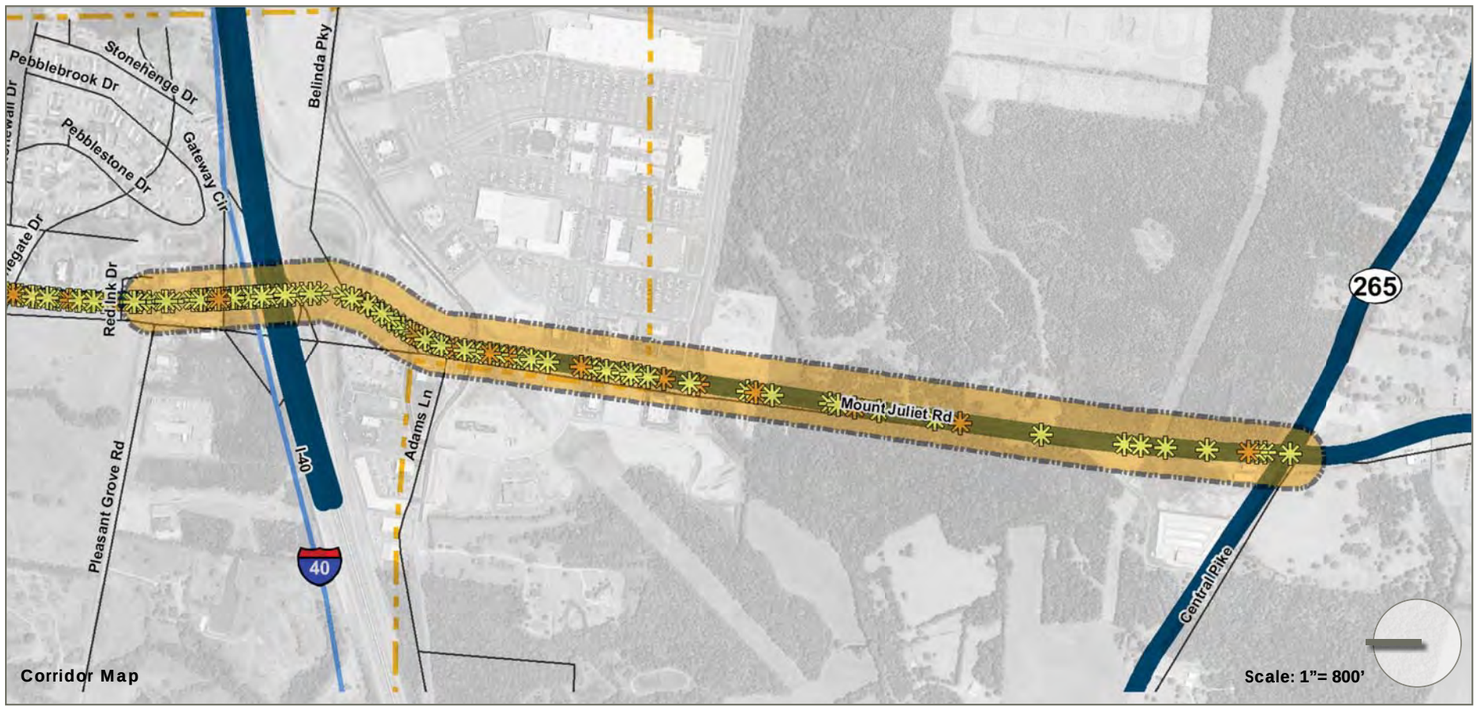
A preliminary cost estimate was developed for the roadway improvements listed in Section 5.1. These preliminary estimates do not include the construction of a new interchange at I-40. The estimated cost of the improvements listed in Section 5.1 is $12,977,000. Specific cost estimate worksheets are included in the Attachments.

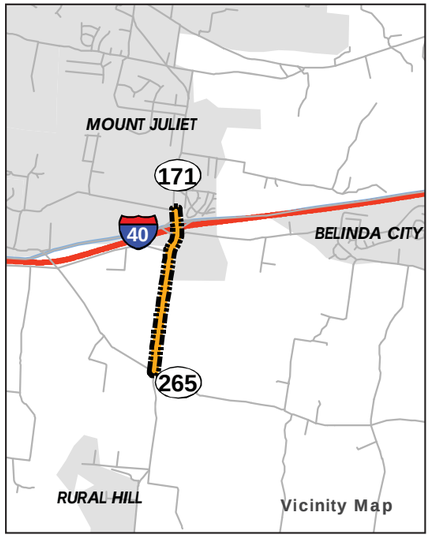
5.4 IMPLEMENTATION

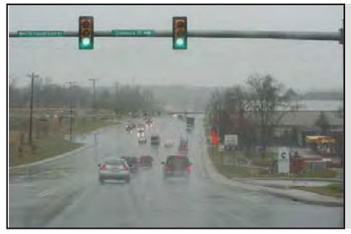
The impetus for the majority of roadway improvements discussed in this Subarea Study are future development and the construction of a new interchange at SR 265 and I-40. Implementation of the roadway improvements are recommended in coordination with a new interchange and as development is planned, approved, and constructed. SR 265 and nearby roadways and intersections will not function adequately with the traffic volumes expected once the new interchange is constructed. Commitments for improvements should be procured from the City of Mt. Juliet and/or future developers to ensure adequate infrastructure will be in place once traffic capacity is needed due to the new interchange. The improvements listed in this Subarea Study are conceptual in nature. Detailed analyses and comprehensive plans are recommended as specific projects are prepared and approved.

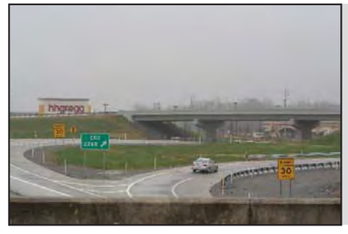
ATTACHMENTS

Relevant Studies, Traffic Projections, Cost Estimates













Tri-County Transportation & Land Use Study

3

Legend

Accident Type

- Fatal
- Injury
- Property Damage Over $400

- Streets
- Major Roadways
- 2030 Road Widening
- Strategic Corridor Limits

Corridor Description and Issues Identified

The corridor runs from Central Pike to Pleasant Grove Road and covers a length of 1.38 miles. The corridor has a 2-lane shoulder with swale section from Central Pike to Providence Parkway and a 5-lane section (with curb and gutter) from Providence Parkway to Pleasant Grove Road. The corridor carried 14,900 vehicles per day (vpd) in 2008. Other roadway characteristics include:

- 45 speed limit
- modified diamond interchange with I-40
- rolling topography
- vertical and horizontal curvature leading to and from the interchange with I-40
- coordinated signals throughout corridor
- high property damage crash volume
- traffic congestion due to lack of turn lanes on Central Pike
- serves as a major gateway into Mount Juliet

Mt. Juliet Road

Central Pike to Pleasant Grove Road - *Wilson County, TN*

Kimley-Horn and Associates, Inc URBAN RESOURCE GROUP

NOT TO SCALE

EXHIBIT 6.3A: CENTRAL PIKE TO PLEASANT GROVE ROAD

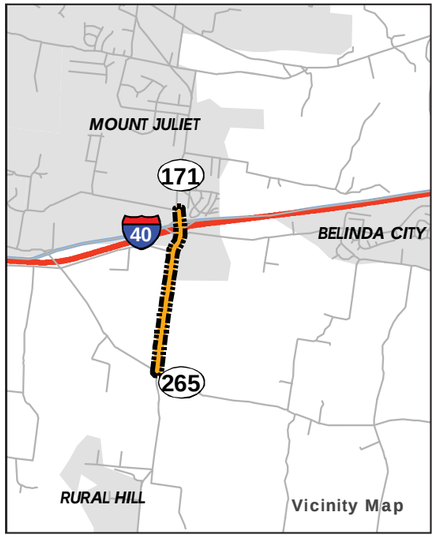
TRI-COUNTY TRANSPORTATION AND LAND USE STUDY

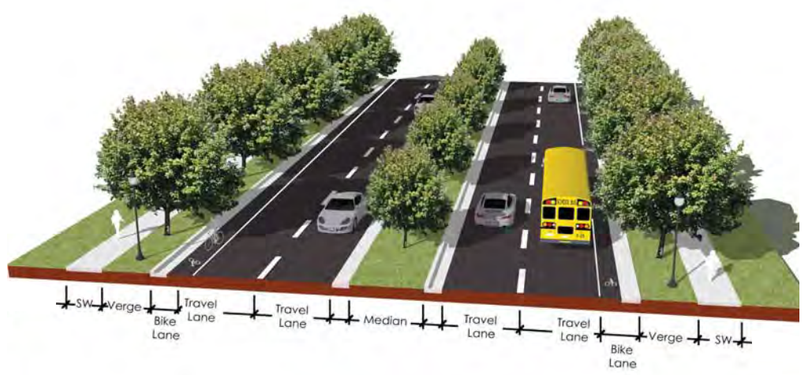
NASHVILLE, TN

NASHVILLE AREA Metropolitan Planning Organization

LandDesign. Kimley-Horn and Associates, Inc. Sterling COMMUNICATION bbpc ASSOCIATES







Tri-County Transportation & Land Use Study

3

Legend

- Major Highways
- 2030 Road Widening
- Streets
- Strategic Corridor Limits

Corridor Vision

Traffic along the corridor is projected to increase to 19,200 vehicles per day (vpd) by 2035. In order to acommodate the projected traffic volumes and ensure that the roadway continues to serve as a primary gateway, the following recommendations are suggested:

- widen roadway to a 4-lane median divided section
- increase gateway features leading into downtown
- provide sidewalks to enhance pedestrian access to commercial development
- limit future and existing driveway access to Mt. Juliet Road
- consolidate driveways where possible
- provide strategic right and left turn lanes throughout the corridor
- include dedicated bike lanes to accomodate cyclists

Mt. Juliet Road

Central Pike to Pleasant Grove Road - *Wilson County, TN*

NOT TO SCALE

EXHIBIT 6.3B: FUTURE CENTRAL PIKE TO PLEASANT GROVE ROAD

TRI-COUNTY TRANSPORTATION AND LAND USE STUDY

NASHVILLE, TN

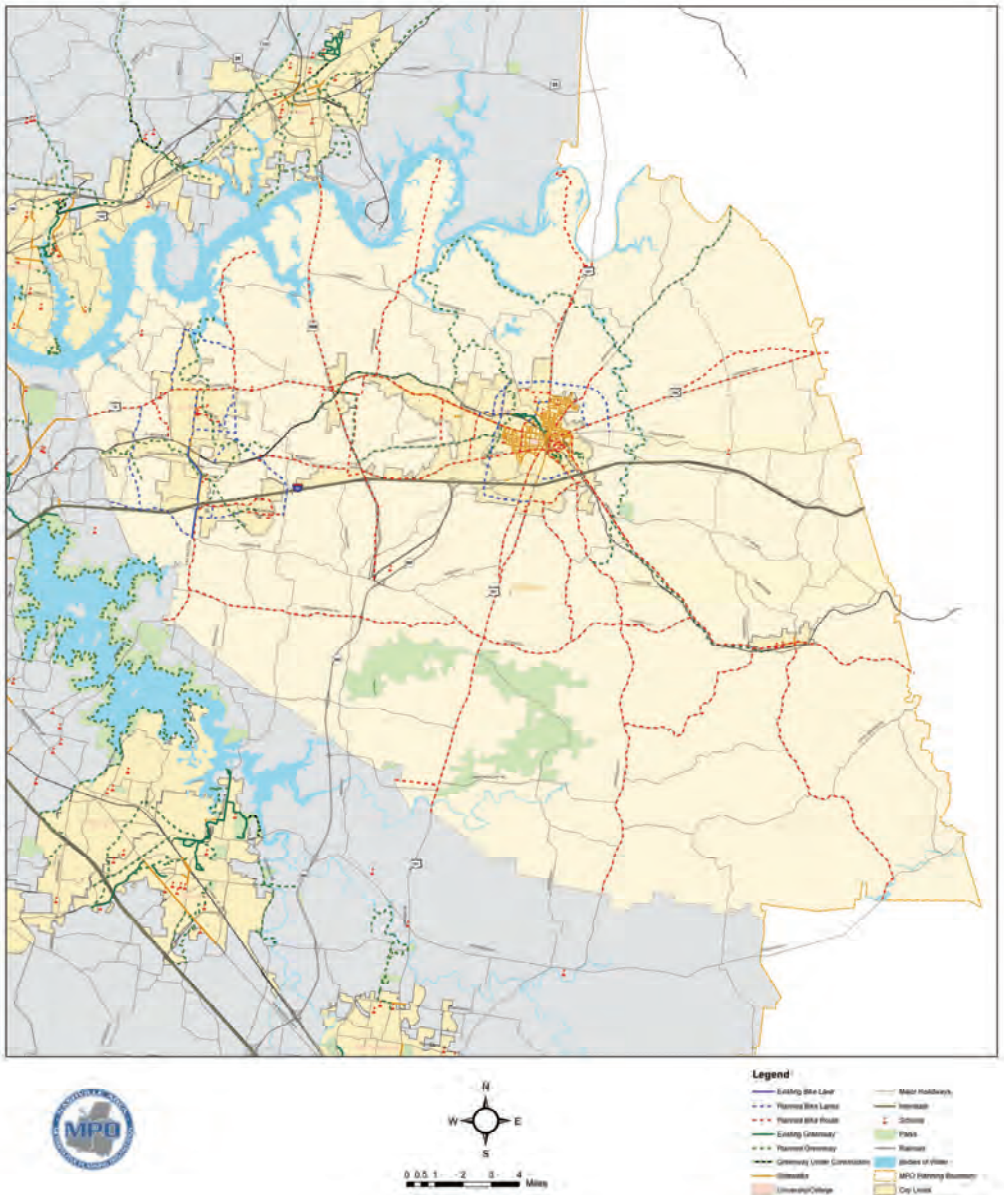
NASHVILLE AREA Metropolitan Planning Organization

LandDesign. Kimley-Horn and Associates, Inc. Sterling COMMUNICATION bbpc ASSOCIATES

Regional Bicycle and Pedestrian Plan

A Strategic Vision for Bicycle and Pedestrian Transportation in the Greater Nashville Region

Existing and Planned Bicycle and Pedestrian Facilities in Wilson County



Wilson County

Existing Facilities

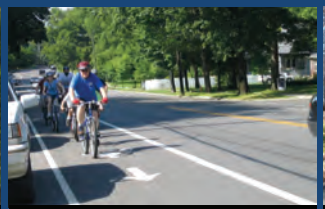
- ❑ 500 Miles of Major Roadways
- ❑ 15 Miles of Signed Bike Routes
- ❑ 3 Miles of Signed Bike Lanes
- ❑ 3 Miles of Greenways & Multi-Use Paths
- ❑ Hundreds of Miles of Sidewalk

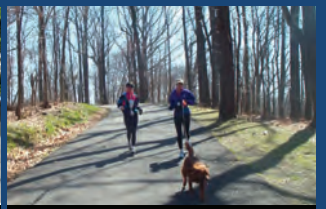
Important Facts

- ❑ 106,000 - Estimated Population
- ❑ 15,000 (14%) Children Between the Age 5 and 14
- ❑ 11,000 (11%) Adults Over 65
- ❑ 1,400 (4.1%) Households Without an Automobile
- ❑ Music City Star – Region's 1st Commuter Rail Line



Bike Route


Bike Lane

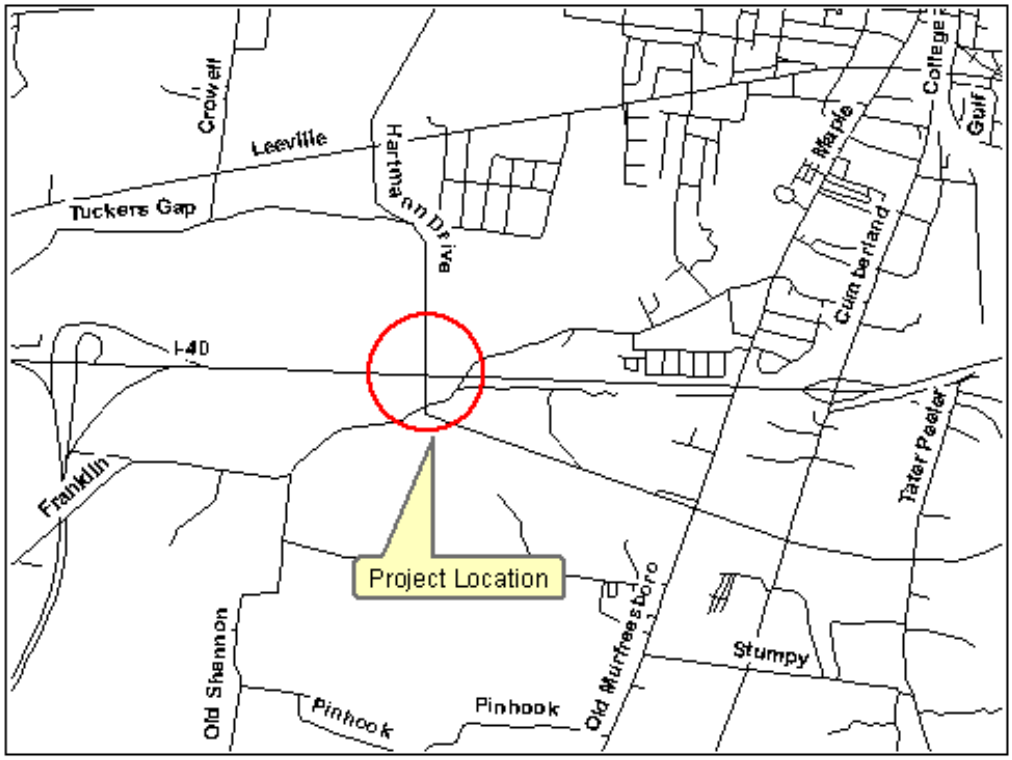

Greenway

Fiscal Years 2008-2011
Transportation Improvement Program

TIP #	2008-74-060	**TDOT PIN #**		**Improvement Type**	Interchange	**Lead Agency**	Lebanon
County	Wilson	**Length**	0.0 mi	**LRTP#**	8004	**Conformity Status**	Non-Exempt
Route/Project Name	I-40 Interchange Lighting					**Total Project Cost**	$312,500
Termini or Intersection	I-40 at S. Hartmann Drive						
Project Description	Interchange Lighting						

Fiscal Year	Type of Work	Funding Type	Total Funds	Fed Funds	State Funds	Local Funds
2008	PE	L-STP	$20,000	$16,000		$4,000
2008	CONST	L-STP	$292,500	$234,000		$58,500

Amendment 1 #		**Adjustment 1 #**		**Remarks**
Amended on		**Adjusted on**		
Amendment 2 #		**Adjustment 2 #**		
Amended on		**Adjusted on**		

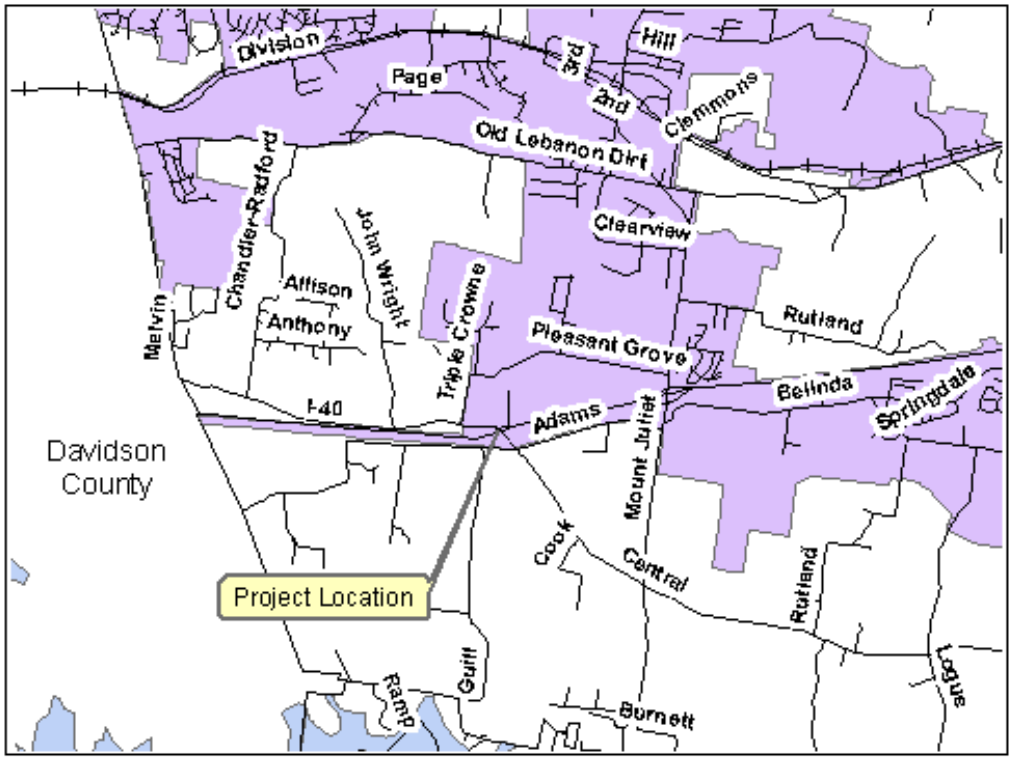


Fiscal Years 2008-2011
Transportation Improvement Program

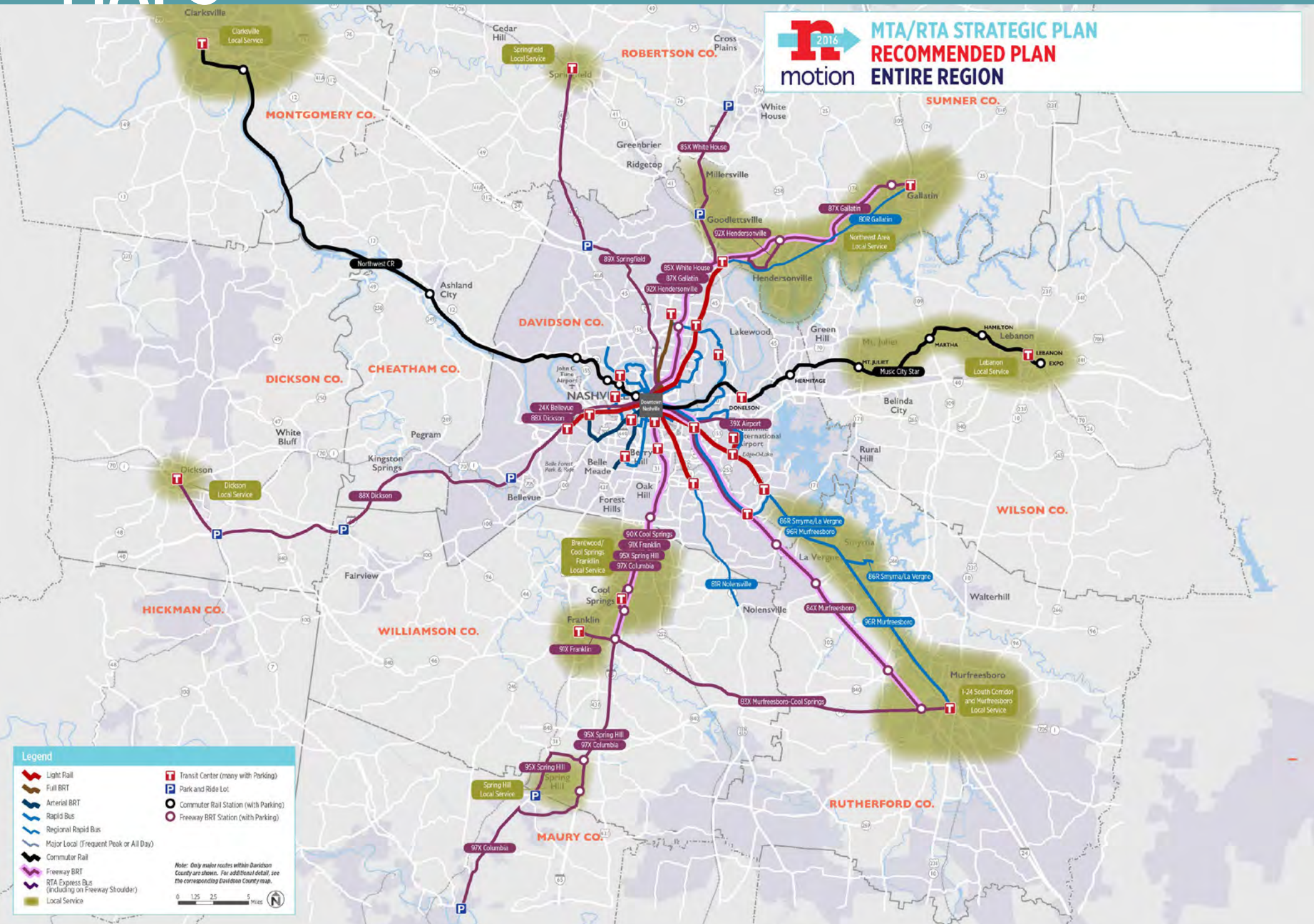
TIP #	2004-059	**TDOT PIN #**		**Improvement Type**	Interchange	**Lead Agency**	Mt. Juliet
County	Wilson	**Length**	0.0 mi	**LRTP#**	7020	**Conformity Status**	Non-Exempt
Route/Project Name	I-40					**Total Project Cost**	$8,000,000
Termini or Intersection	Central Pike						
Project Description	Construct new interchange at I-40 and Central Pike						

Fiscal Year	Type of Work	Funding Type	Total Funds	Fed Funds	State Funds	Local Funds
2008	ROW	LOCAL	$1,600,000			$1,600,000

Amendment 1 #		**Adjustment 1 #**		**Remarks**
Amended on		**Adjusted on**		
Amendment 2 #		**Adjustment 2 #**		
Amended on		**Adjusted on**		



MAPS


MTA/RTA STRATEGIC PLAN
RECOMMENDED PLAN
ENTIRE REGION
2016
motion
Clarksville
Clarksville Local Service
MONTGOMERY CO.
Cedar Hill
Springfield Local Service
Springfield
ROBERTSON CO.
Cross Plains
White House
SUMNER CO.
Greenbrier
Ridgetop
85X White House
Millersville
Gallatin
87X Gallatin
80R Gallatin
Goodlettsville
92X Hendersonville
Northwest Area Local Service
Hendersonville
89X Springfield
85X White House
87X Gallatin
92X Hendersonville
Northwest CR
Ashland City
DAVIDSON CO.
Lakewood
Green Hill
Mt. Juliet
HAMILTON
MARTHA
Lebanon
LEBANON
EXPO
MT. JULIET
Music City Star
Lebanon Local Service
HERMITAGE
DICKSON CO.
CHEATHAM CO.
John C. Tune Airport
NASHVILLE
Downtown Nashville
DONELSON
Belinda City
24X Bellevue
88X Dickson
39X Airport
International Airport
White Bluff
Pegram
Kingston Springs
Belle Meade
Berry Hill
Rural Hill
Dickson
Dickson Local Service
88X Dickson
Bellevue
Forest Hills
Oak Hill
WILSON CO.
86R Smyrna/La Vergne
96R Murfreesboro
Smyrna
La Vergne
Brentwood/ Cool Springs Franklin Local Service
90X Cool Springs
91X Franklin
95X Spring Hill
97X Columbia
Fairview
81R Nolensville
86R Smyrna/La Vergne
Walterhill
Cool Springs
Nolensville
84X Murfreesboro
96R Murfreesboro
HICKMAN CO.
Franklin
WILLIAMSON CO.
91X Franklin
Murfreesboro
I-24 South Corridor and Murfreesboro Local Service
83X Murfreesboro-Cool Springs
95X Spring Hill
97X Columbia
95X Spring Hill
Spring Hill
Spring Hill Local Service
RUTHERFORD CO.
MAURY CO.
97X Columbia
Legend
Light Rail
Full BRT
Arterial BRT
Rapid Bus
Regional Rapid Bus
Major Local (Frequent Peak or All Day)
Commuter Rail
Freeway BRT
RTA Express Bus (including on Freeway Shoulder)
Local Service
Transit Center (many with Parking)
Park and Ride Lot
Commuter Rail Station (with Parking)
Freeway BRT Station (with Parking)
Note: Only major routes within Davidson County are shown. For additional detail, see the corresponding Davidson County map.
0 1.25 2.5 5 Miles
N

Major Thoroughfare Plan

DRAFT COPY ONLY

Currently under Review

LEGEND

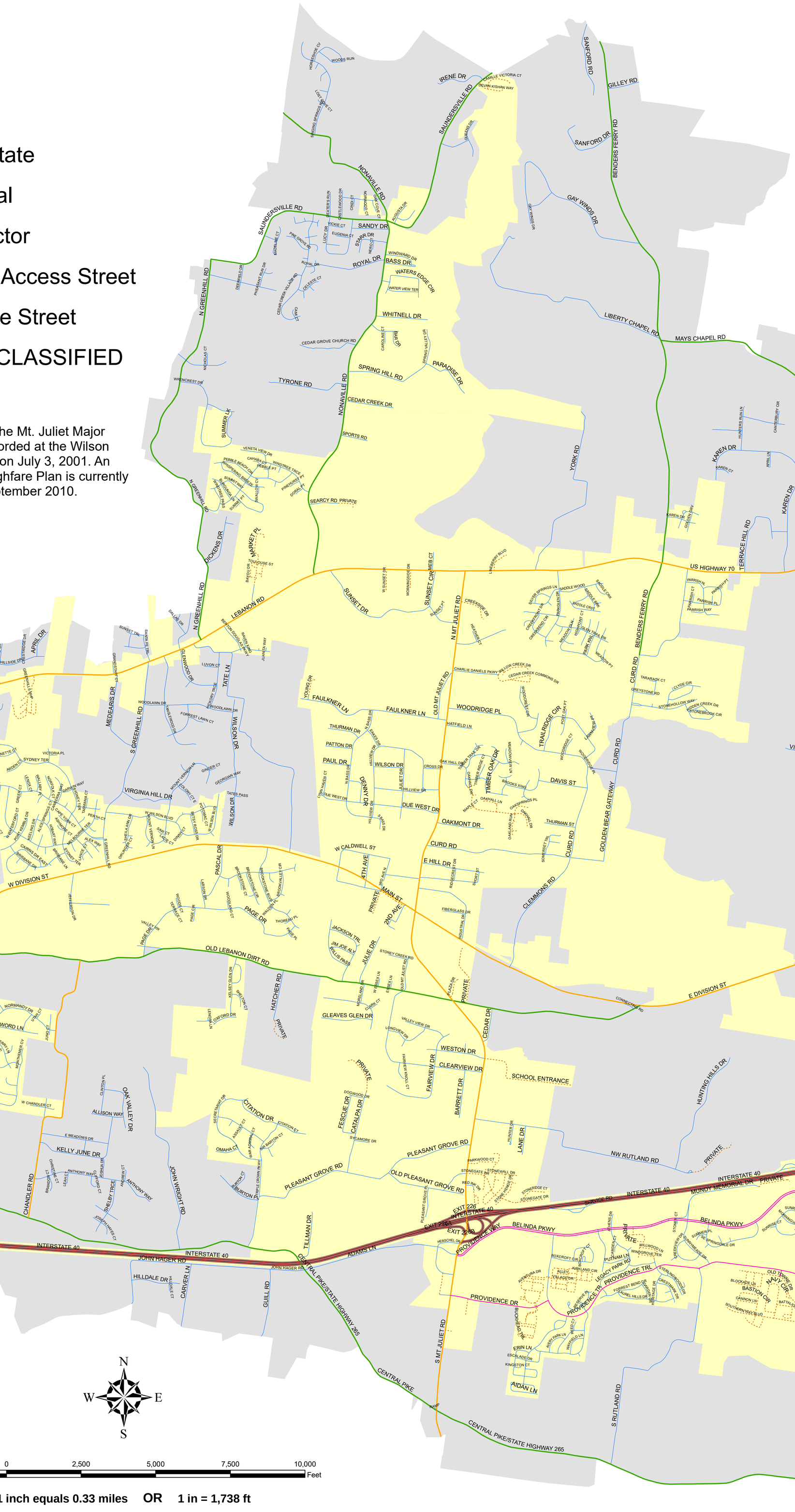
Streets

CLASS

- Interstate
- Arterial
- Collector
- Local Access Street
- Private Street
- NOT CLASSIFIED

PLEASE NOTE:

This map is based on the Mt. Juliet Major Thoroughfare Plan recorded at the Wilson Co. Register of Deeds on July 3, 2001. An updated Major Thoroughfare Plan is currently under review as of September 2010.


IRENE DR
CAMILLE VICTORIA CT
DEVAN KISHAN WAY
SAUNDERSVILLE RD
SANFORD RD
GILLEY RD
BENDERS FERRY RD
SANFORD DR
GAY WINDS DR
NONAVILLE RD
SANDY DR
STARR DR
WINDWARD DR
BASS DR
WATERS EDGE CIR
ROYAL DR
WHITNELL DR
CEDAR GROVE CHURCH RD
SPRING HILL RD
PARADISE DR
TYRONE RD
CEDAR CREEK DR
SPORTS RD
SEARCY RD PRIVATE
N GREENHILL RD
DICKENS DR
MARKET PL
LEBANON RD
US HIGHWAY 70
LIBERTY CHAPEL RD
MAYS CHAPEL RD
KAREN DR
TERRACE HILL RD
COOKS RD
COOKS LN LEBANON RD
EVERETTE RD
BASS LN
SUNSET DR
N MT JULIET RD
CREEKSIDE DR
CURD RD
MAPLE WAY
POPLAR PL
BECKWITH RD
YORK RD
CLEMMONS RD
MUSCOGEE WAY
QUARRY RD
W DIVISION ST
PASCAL DR
PAGE DR
MAIN ST
4TH AVE
2ND AVE
PRIVATE
E HILL DR
W CALDWELL ST
CURD RD
OLD LEBANON DIRT RD
E DIVISION ST
CONNECTOR RD
JULIE DR
JACKSON TRL
JIM JOE ALY
WILLIS PASS
STONEY CREEK RD
HATCHER RD
GLEAVES GLEN DR
CEDAR DR
WESTON DR
CLEARVIEW DR
SCHOOL ENTRANCE
FAIRVIEW DR
BARRETT DR
HUNTING HILLS DR
LANE DR
NW RUTLAND RD
PLEASANT GROVE RD
OLD PLEASANT GROVE RD
FESCUE DR
CATALPA DR
DOGWOOD DR
SYCAMORE DR
CITATION DR
OMAHA CT
ALLISON WAY
OAK VALLEY DR
KELLY JUNE DR
CHANDLER RD
JOHN WRIGHT RD
TILLMAN DR
ADAMS LN
INTERSTATE 40
EXIT 226
EXIT 226A
EXIT 226B
EXIT 229
RAMP
SERVICE RD
MUNDY MEMORIAL DR
BELINDA PKWY
PROVIDENCE WAY
PROVIDENCE TR
PROVIDENCE DR
S SUNSET DR
HILLTOP DR
S RUTLAND RD
POSEY HILL RD
BECKWITH CORRIDOR
RUTLAND DR
EASTGATE BLVD
S MT JULIET RD
OLD MT JULIET RD
FAULKNER LN
WOODRIDGE PL
TRAILRIDGE CIR
TIMBER OAK DR
DAVIS ST
OAKMONT DR
THURMAN ST
GOLDEN BEAR GATEWAY
CHARLIE DANIELS PKWY
WILLOW CREEK DR
CEDAR CREEK COMMONS DR
LEGACY PARK RD
PUTNAM LN
BASTION CIR
NAVY CIR
OLD TOWNE DR
CENTRAL PIKE/STATE HIGHWAY 265
CENTRAL PIKE
JOHN HAGER RD
HILLDALE DR
CARVER LN
GUILL RD
VIRGINIA HILL DR
MEDEARIS DR
DEVONSHIRE DR
APRIL DR
TATE LN
WILSON DR
SILVERSTONE LN
COBBLESTONE LNDG
SWORD LN
OLD HICKORY BLVD
FARMSTEAD LN
GINA CT
SILVER SPRINGS DR
BECKWITH RD
MUSCOGEE WAY
QUARRY RD
WOODS RUN
LOST CAVE CT
SINGING SPRINGS DR
HORSESHOE CV
SAUNDERSVILLE RD
NONAVILLE RD
OAK COVE CT
AUGUSTA DR
DEXTER'S RUN
CASTLEWOOD DR
OLND CT
KNOLLWOOD CT
VICKIE CT
EUGENIA CT
LUCY DR
MADELINE CT
PINE GROVE RD
ROYAL DR
DEERFIELD DR
PHEASANT RUN DR
CELESTE CT
CEDAR CREEK VILLAGE RD
CAROLINE CT
BAR DR
SPRING VALLEY DR
NICHOLAS CT
WRENCREST DR
SUMMER LK
VENETA VIEW DR
CAHABA CT
WINDTREE TRCE
PEBBLE PT
PEBBLE BEACH CIR
WHISPERING BREEZE
SUMMIT WAY
BURNSIDE PL
WINDTREE PL
SUNSET PT
SWALLOW CT
PINEHURST PT
DORAL PT
VALLEY VW
PAGE CIR
WOODS CT
TERRACE CT
WOODLAND CT
LARSON DR
BROOKSTONE CT
BROOKSTONE DR
BROOKSTONE BLVD
WALDEN PL
BROOKVALLEY CIR
THOREAU PL
PAGE PL
W SUNSET DR
MORNINGSIDE DR
SUNSET CIR
MEB CT
LINKSBERRY BLVD
SUNSET PT
SILVER SPRINGS LN
SADDLE WOOD
SADDLE CRK
SADDLE PARK
SADDLE CREST
PARKGLEN DR
CREEKVIEW DR
CREEKSIDE CIR
MEADOW CALL
HIGHPOINT CT
GLEN TRAIL DR
PARK VIEW
MEADOW PT
PARRISH PL
PARRISH PT
PARRISH CT
PARRISH WAY
KAREN CT
APRIL LN
HUNTERS RUN LN
CANTERBURY CIR
GOLDEN RAY
TEDDYS PL
COOKS HILL RD
RUE DR
JO ANNE PT
LEXIE CT
LEXIE LN
COOKS HILL CT
ADELES CRK
DEERWOOD TRL
POLLY HILLS DR
OAK PL
BEECH PL
HOLLY PL
TARARACK CT
GREYSTONE RD
CLYDE CIR
STONEHOLLOW WAY
HIDDEN CREEK DR
STONEBROOK CIR
VIVRETT LN
SILVER SPRINGS DR
MILLWOOD LN
WINDGROVE TER
SUNRISE CIR
SUNRISE CT
MEADOWVIEW DR
SUNNY ACRE DR
OAK CT
SUMMER PL
SUNNYMEADE DR
SPRINGDALE DR
ROLLING MEADOW DR
DIXIE AVE
ADELMONT CT
PRATTSTON CT
STONE MILL RD
OLDE MILL CT
OLDE MILL LN
BATTLE FLAG LN
BUGLER RD
DEL WEBB BLVD
INFANTRY RUN
CANNON LN
SOUTHERN WAY
BLOCKADE LN
BATTALION WAY
CAMPBELL CT
CAMPBELL LN
CAMPBELL PL
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STONEWALL DR
STONEGATE DR
STONERIDGE CT
RED INK DR
STONE HERD DR
PARKWOOD CT
PLEASANT GROVE PL
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WOODRIDGE CT
WOODRIDGE PL
LYNNVIEW PL
POST OAK PT
TIMBER RIDGE CT
THUNDER TRAIL DR
OAKHALL CT
OAKHALL LN
OAKSPRINGS PL
OAKLAND RUN
OAKHALL DR
MAPLE CT
WOODMOOR LN
WOODMOOR PL
SOMERSET TRL
LYNNVIEW CIR
HATFIELD LN
WOODRIDGE DR
WOODRIDGE CT
WOODRIDGE PL
TRAILRIDGE CIR
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THURMAN ST
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2ND AVE
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FIBERGLASS DR
MOSS TRAIL DR
PLAZA DR
PRIVATE
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MUSCOGEE WAY
FARMSTEAD LN
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SILVER SPRINGS DR
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BECKWITH RD
VIVRETT LN
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CLEMMONS RD
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HUNTERS RUN LN
CANTERBURY CIR
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LEXIE LN
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OAK PL
BECKWITH RD
MAPLE WAY
POPLAR PL
COOKS RD
EVERETTE RD
COOKS LN LEBANON RD
BASS LN
BENDERS FERRY RD
SANFORD RD
GILLEY RD
SANFORD DR
GAY WINDS DR
GAY WINDS DR
LIBERTY CHAPEL RD
MAYS CHAPEL RD
MAYS CHAPEL RD
US HIGHWAY 70
LEBANON RD
N GREENHILL RD
SUNSET DR
W SUNSET DR
MORNINGSIDE DR
SUNSET CIR
MEB CT
LINKSBERRY BLVD
SUNSET PT
CREEKSIDE DR
HEATHER CT
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ADELES CRK
DEERWOOD TRL
POLLY HILLS DR
OAK PL
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EVERETTE RD
COOKS LN LEBANON RD
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STONEBROOK CIR
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PRIVATE
PLAZA DR
MOSS TRAIL DR
FIBERGLASS DR
CLEMMONS RD
RIDGECREST DR
SHORT ST
E HILL DR
W CALDWELL ST
CURD RD
4TH AVE
2ND AVE N
PRIVATE
MAIN ST
2ND AVE
PASCAL DR
PAGE DR
BROOKSTONE CT
BROOKSTONE DR
BROOKSTONE BLVD
WALDEN PL
BROOKVALLEY CIR
THOREAU PL
PAGE PL
LARSON DR
WOODS CT
TERRACE CT
WOODLAND CT
PAGE CIR
VALLEY VW
W WILSON BLVD
MOUNT VERNON LN
SAM CT
LACIE CT
DINAH CT
BETSY ROSS DR
POTOMAC CT
WILSON BLVD
SHEILA ANN DR
GRUNDER CT
S GREENHILL RD
ALEX WAY
LACIE LN
SUMMER LK
VENETA VIEW DR
CAHABA CT
WINDTREE TRCE
PEBBLE PT
PEBBLE BEACH CIR
WHISPERING BREEZE
SUMMIT WAY
BURNSIDE PL
WINDTREE PL
SUNSET PT
SWALLOW CT
PINEHURST PT
DORAL PT
SEARCY RD PRIVATE
N GREENHILL RD
DICKENS DR
MARKET PL
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BAYOU DR
W DIVISION ST
JEFFERSON DR
SILVERSTONE LN
COBBLESTONE LNDG
EAGLE TRACE DR
FALCON CT
TRUSH CT
CARDINAL LN
HIGHTHAWK LN
ROBWHITE LN
BLUEBIRD CT
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UPAH CT
JUNO CT
SWORD LN
NEWBERRY LN
CARPHILLY CT
MONTHEMER CV
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OXFORD DR
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WILLIS PASS
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CLEARVIEW DR
SCHOOL ENTRANCE
CEDAR DR
BARRETT DR
PRIVATE
FESCUE DR
CATALPA DR
DOGWOOD DR
SYCAMORE DR
HUNTING HILLS DR
LANE DR
HUNTER DR
NW RUTLAND RD
PRIVATE
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CITATION DR
CITATION CT
SECRETARIAT DR
ASSAULT CT
WAR ADMIRAL CT
SIR BARTON CT
OMAHA CT
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CLINTON PL
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KELLY JUNE DR
VALLEY VIEW DR
TANGLEWOOD CT
LYNN CT
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JOHN WRIGHT RD
BURTON CT
BURTON PL
PURPLE CROWN PKWY
TILLMAN DR
ADAMS LN
INTERSTATE 40
EXIT 226
EXIT 226A
EXIT 226B
EXIT 229
RAMP
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MUNDY MEMORIAL DR
PRIVATE
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PROVIDENCE WAY
PROVIDENCE TR
PROVIDENCE DR
S SUNSET DR
HILLTOP DR
S RUTLAND RD
POSEY HILL RD
BECKWITH CORRIDOR
RUTLAND DR
EASTGATE BLVD
S MT JULIET RD
OLD MT JULIET RD
FAULKNER LN
WOODRIDGE PL
TRAILRIDGE CIR
TIMBER OAK DR
DAVIS ST
OAKMONT DR
THURMAN ST
GOLDEN BEAR GATEWAY
CURD RD
CLEMMONS RD
CHARLIE DANIELS PKWY
WILLOW CREEK DR
CEDAR CREEK COMMONS DR
LEGACY PARK RD
PUTNAM LN
BASTION CIR
NAVY CIR
OLD TOWNE DR
CENTRAL PIKE/STATE HIGHWAY 265
CENTRAL PIKE
JOHN HAGER RD
HILLDALE DR
CARVER LN
GUILL RD
VIRGINIA HILL DR
MEDEARIS DR
DEVONSHIRE DR
APRIL DR
TATE LN
WILSON DR
SILVERSTONE LN
COBBLESTONE LNDG
SWORD LN
OLD HICKORY BLVD
FARMSTEAD LN
GINA CT
SILVER SPRINGS DR
BECKWITH RD
MUSCOGEE WAY
QUARRY RD
WOODS RUN
LOST CAVE CT
SINGING SPRINGS DR
HORSESHOE CV
SAUNDERSVILLE RD
NONAVILLE RD
OAK COVE CT
AUGUSTA DR
DEXTER'S RUN
CASTLEWOOD DR
OLND CT
KNOLLWOOD CT
VICKIE CT
EUGENIA CT
LUCY DR
MADELINE CT
PINE GROVE RD
ROYAL DR
DEERFIELD DR
PHEASANT RUN DR
CELESTE CT
CEDAR CREEK VILLAGE RD
CAROLINE CT
BAR DR
SPRING VALLEY DR
NICHOLAS CT
WRENCREST DR
SUMMER LK
VENETA VIEW DR
CAHABA CT
WINDTREE TRCE
PEBBLE PT
PEBBLE BEACH CIR
WHISPERING BREEZE
SUMMIT WAY
BURNSIDE PL
WINDTREE PL
SUNSET PT
SWALLOW CT
PINEHURST PT
DORAL PT
VALLEY VW
PAGE CIR
WOODS CT
TERRACE CT
WOODLAND CT
LARSON DR
BROOKSTONE CT
BROOKSTONE DR
BROOKSTONE BLVD
WALDEN PL
BROOKVALLEY CIR
THOREAU PL
PAGE PL
W SUNSET DR
MORNINGSIDE DR
SUNSET CIR
MEB CT
LINKSBERRY BLVD
SUNSET PT
SILVER SPRINGS LN
SADDLE WOOD
SADDLE CRK
SADDLE PARK
SADDLE CREST
PARKGLEN DR
CREEKVIEW DR
CREEKSIDE CIR
MEADOW CALL
HIGHPOINT CT
GLEN TRAIL DR
PARK VIEW
MEADOW PT
PARRISH PL
PARRISH PT
PARRISH CT
PARRISH WAY
KAREN CT
APRIL LN
HUNTERS RUN LN
CANTERBURY CIR
GOLDEN RAY

Master Greenway Plan

including Trails, Sidewalks and Bike Routes

Dedicated to Date

Num	Name	Length
1	Silverstone Senior Living	320 FT
2	Cole Preschool	75 FT
3	Cedar Creek Commons	635 FT
4	Willoughby Station, Phases VII, IX, X	3284 FT
5	Providence Marketplace	4576 FT
6	Providence Residential	14048 FT
7	West Division Street, Pedestrian Trail & Bikeway	11090 FT
8	Park Glen Soccer Complex	2600 FT
9	Heatherly Property	831 FT
10	Thompson Property	363 FT

TOTAL - 37,822 Feet / 7.163 Miles

Prepared by City of Mt. Juliet
Planning Department
Bo Logan, GIS Coordinator

C:\Projects\Main\Greenways_10_1105.mxd
Map Created: 29 Sep 2010
Map Updated: 05 Nov 2010
Map Plotted: 05 Nov 2010

N

0 0.125 0.25 0.5 0.75 1
Miles

LEGEND

Streets
Water Bodies
County Roads
City Limits
UGB

EXISTING
Greenway
Sidewalk

ADDITIONS
Trail not included in original plan

FUTURE*
Greenway
Sidewalk
Bike Lane
Bike Route
Trailhead

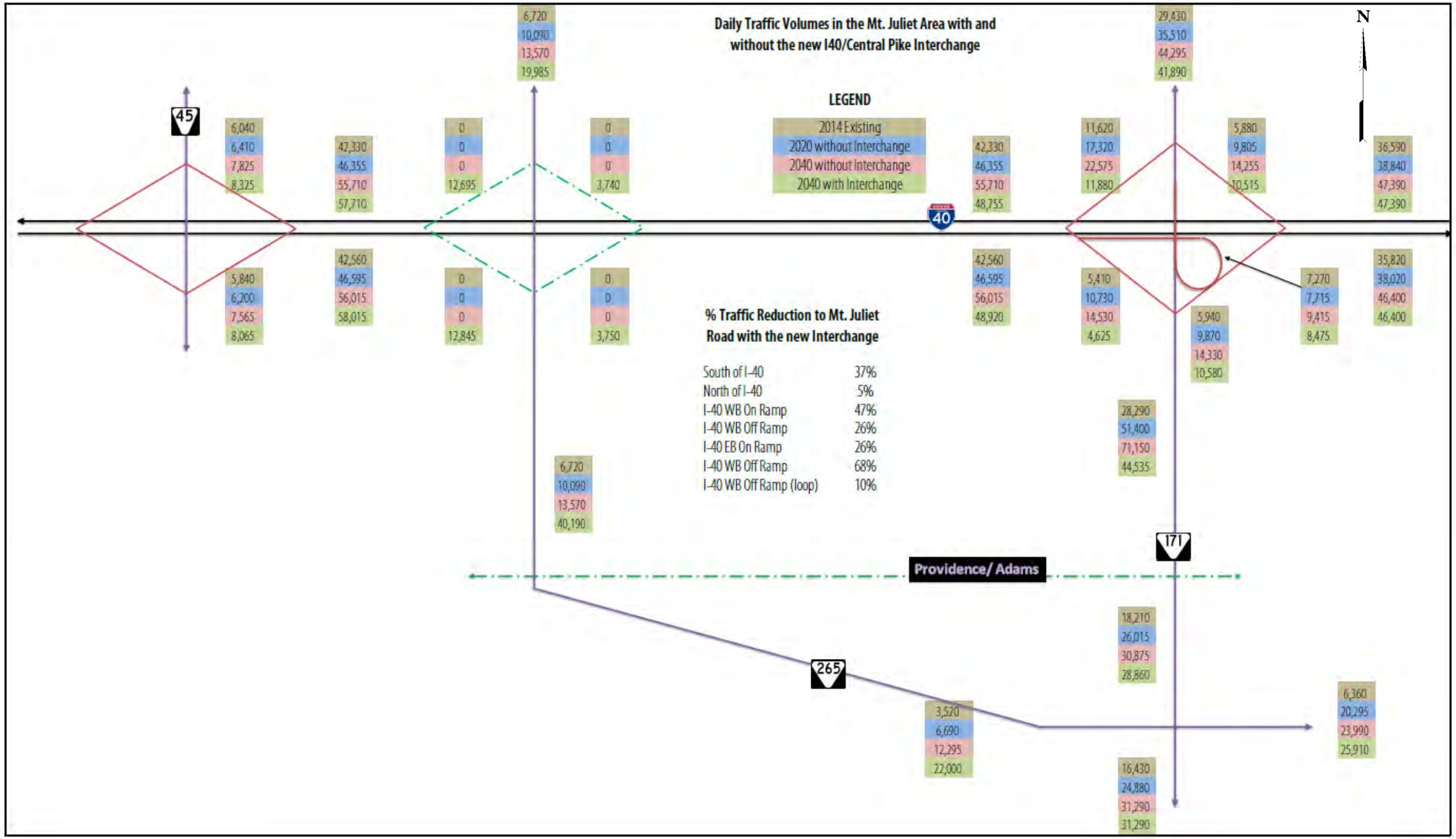
*** All future elements are taken from Greenway, Bike & Pedestrian Master Plan by Fisher & Arnold, Inc., dated April 3, 2003.**

DISCLAIMER: This map was created by the City of Mt. Juliet Planning Department. The City of Mt. Juliet, its employees, agents and personnel, make no warranty to its accuracy, and in particular its accuracy as to labeling, dimensions, contours, property boundaries or placement or location of any map features thereon. The City of Mt. Juliet, its employees, agents and personnel MAKE NO WARRANTY OF MERCHANTABILITY OR WARRANTY FOR FITNESS OF A USE FOR A PARTICULAR PURPOSE EXPRESSED OR IMPLIED WITH RESPECT TO THIS MAP PRODUCT.

Independent verification of all data contained on this map product should be obtained by any user of this map.

November 17, 2010

City of Mt. Juliet
TENNESSEE



Source: Gresham, Smith and Partners Traffic Forecasting Study (Appendix A)

Daily Service Volumes Related To Level of Service															
Road Type	**LOS A**			**LOS B**			**LOS C**			**LOS D**			**LOS E**		
4 Lane Freeway	0	31,700		31,701	45,300		45,301	56,200		56,201	68,000		68,801	90,700	
6 Lane Freeway	0	47,600		47,601	68,000		68,001	84,300		84,301	102,000		102,001	136,000	
8 Lane Freeway	0	63,500		63,501	90,600		90,601	112,400		112,401	136,000		136,001	181,300	
10 Lane Freeway	0	79,300		79,301	113,400		113,401	140,600		140,601	170,000		170,001	226,700	
12 Lane Freeway	0	95,200		95,201	136,000		136,001	168,600		168,601	204,000		204,001	272,000	
4 Lane Expressway	0	23,300		23,301	33,400		33,401	41,400		41,401	50,000		50,001	66,700	
6 Lane Expressway	0	35,000		35,001	50,000		50,001	62,000		62,001	75,000		75,001	100,000	
8 Lane Expressway	0	47,000		47,001	66,000		66,001	82,000		82,001	100,000		100,001	133,000	
2 Lane Arterial Urban	0	6,500		6,501	9,400		9,401	11,600		11,601	14,000		14,001	18,700	
3 Lane Arterial Urban	0	8,200		8,201	11,600		11,601	14,400		14,401	17,500		17,501	23,300	
4 Lane Arterial Urban	0	10,700		10,701	15,400		15,401	19,000		19,001	23,000		23,001	30,700	
5 Lane Arterial Urban	0	12,400		12,401	17,600		17,601	21,900		21,901	28,500		28,501	35,300	
6 Lane Arterial Urban	0	20,500		20,501	29,400		29,401	36,400		36,401	44,000		44,001	58,700	
7 Lane Arterial Urban	0	22,400		22,401	32,000		32,001	39,700		39,701	48,000		48,001	64,000	
8 Lane Arterial Urban	0	25,700		25,701	36,600		36,601	45,400		45,401	55,000		55,001	73,300	
2 Lane Arterial Rural	0	8,400		8,401	12,000		12,001	14,900		14,901	18,000		18,001	24,000	
3 Lane Arterial Rural	0	10,500		10,501	15,000		15,001	18,600		18,601	22,500		22,501	30,000	
4 Lane Arterial Rural	0	13,100		13,101	18,600		18,601	23,100		23,101	28,000		28,001	37,300	
5 Lane Arterial Rural	0	15,200		15,201	21,600		21,601	26,800		26,801	32,500		32,501	43,300	
2 Lane Collector Urban	0	5,100		5,101	7,400		7,401	9,100		9,101	11,000		11,001	14,700	
3 Lane Collector Urban	0	6,400		6,401	9,200		9,201	11,300		11,301	13,700		13,701	18,300	
4 Lane Collector Urban	0	8,400		8,401	12,000		12,001	14,900		14,901	18,000		18,001	24,000	
5 Lane Collertor Urban	0	10,700		10,701	15,400		15,401	19,000		19,001	23,000		23,001	30,700	
2 Lane Collector Rural	0	6,500		6,501	9,400		9,401	11,600		11,601	14,000		14,001	18,700	
3 Lane Collector Rural	0	8,200		8,201	11,600		11,601	14,500		14,501	17,500		17,501	23,300	
2 Lane One-Way Roadway	0	6,500		6,501	9,400		9,401	11,600		11,601	14,000		14,001	18,700	
3 Lane One-Way Roadway	0	8,400		8,401	12,000		12,001	14,900		14,901	18,000		18,001	24,000	
4 Lane One-Way Roadway	0	11,200		11,201	16,000		16,001	19,800		19,801	24,000		24,001	32,000	
1 Lane Ramp One-Way	0	4,200		4,201	6,000		6,001	7,400		7,401	9,000		9,001	12,000	
2 Lane Ramp One-Way	0	6,400		6,401	12,000		12,001	14,900		14,901	18,000		18,001	24,000	
3 Lane Ramp One-Way	0	12,600		12,601	18,000		18,001	22,300		22,301	27,000		27,001	36,000	

COST ESTIMATE SUMMARY

Route:	**State Route 265**
Description:	**SR 265 Subarea Study**
County:	**Wilson**
Length:	**1.9 miles**
Date:	**May 25, 2017**

DESCRIPTION	LOCAL 0%	STATE 100%	FEDERAL 0%	TOTAL
Construction Items				
Pavement Removal	$0	$122,600	$0	$122,600
Asphalt Paving	$0	$1,189,300	$0	$1,189,300
Concrete Pavement	$0	$0	$0	$0
Drainage	$0	$1,101,900	$0	$1,101,900
Appurtenances	$0	$901,800	$0	$901,800
Structures	$0	$0	$0	$0
Fencing	$0	$0	$0	$0
Signalization	$0	$0	$0	$0
Railroad Crossing or Separation	$0	$0	$0	$0
Earthwork	$0	$1,001,900	$0	$1,001,900
Clearing and Grubbing	$0	$0	$0	$0
Seeding & Sodding	$0	$13,600	$0	$13,600
Rip-Rap or Slope Protection	$0	$0	$0	$0
Guardrail	$0	$20,600	$0	$20,600
Signing	$0	$28,500	$0	$28,500
Pavement Markings	$0	$45,500	$0	$45,500
Maintenance of Traffic	$0	$14,900	$0	$14,900
Mobilization (5%)	$0	$222,000	$0	$222,000
Other Items = 25%	$0	$1,165,700	$0	$1,165,700
Const. Contingency = 15%	$0	$874,200	$0	$874,200
Construction Estimate	$0	$6,702,500	$0	$6,702,500
Interchanges & Unique Intersections				
Roundabouts	$0	$0	$0	$0
Interchanges	$0	$0	$0	$0
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 100%**	**TOTAL**
Right-of-Way	$0	$0	$0	$0
Utilities	$0	$0	$0	$0
Preliminary & Construction Engineering and Inspection				
Prelim. Eng. 10%	$0	$670,300	$0	$670,300
Const. Eng. & Inspec. 10%	$0	$670,300	$0	$670,300
Total Project Cost	$0	$8,043,100	$0	$ 8,043,000

COST ESTIMATE SUMMARY

Route:	**John Hagar Road**
Description:	**SR 265 Subarea Study**
County:	**Wilson**
Length:	**0.4 miles**
Date:	**May 25, 2017**

DESCRIPTION	LOCAL 0%	STATE 100%	FEDERAL 0%	TOTAL
Construction Items				
Pavement Removal	$0	$6,300	$0	$6,300
Asphalt Paving	$0	$212,500	$0	$212,500
Concrete Pavement	$0	$0	$0	$0
Drainage	$0	$209,800	$0	$209,800
Appurtenances	$0	$189,900	$0	$189,900
Structures	$0	$0	$0	$0
Fencing	$0	$0	$0	$0
Signalization	$0	$0	$0	$0
Railroad Crossing or Separation	$0	$0	$0	$0
Earthwork	$0	$197,400	$0	$197,400
Clearing and Grubbing	$0	$0	$0	$0
Seeding & Sodding	$0	$2,900	$0	$2,900
Rip-Rap or Slope Protection	$0	$0	$0	$0
Guardrail	$0	$4,900	$0	$4,900
Signing	$0	$6,000	$0	$6,000
Pavement Markings	$0	$5,900	$0	$5,900
Maintenance of Traffic	$0	$3,200	$0	$3,200
Mobilization (5%)	$0	$41,900	$0	$41,900
Other Items = 25%	$0	$220,200	$0	$220,200
Const. Contingency = 15%	$0	$165,100	$0	$165,100
Construction Estimate	$0	$1,266,000	$0	$1,266,000
Interchanges & Unique Intersections				
Roundabouts	$0	$0	$0	$0
Interchanges	$0	$0	$0	$0
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 100%**	**TOTAL**
Right-of-Way	$0	$0	$0	$0
Utilities	$0	$0	$0	$0
Preliminary & Construction Engineering and Inspection				
Prelim. Eng. 10%	$0	$126,600	$0	$126,600
Const. Eng. & Inspec. 10%	$0	$126,600	$0	$126,600
Total Project Cost	$0	$1,519,200	$0	$ 1,519,000

COST ESTIMATE SUMMARY

Route:	**Adams Lane**
Description:	**SR 265 Subarea Study**
County:	**Wilson**
Length:	**0.4 miles**
Date:	**May 25, 2017**

DESCRIPTION	LOCAL 0%	STATE 100%	FEDERAL 0%	TOTAL
Construction Items				
Pavement Removal	$0	$16,300	$0	$16,300
Asphalt Paving	$0	$185,900	$0	$185,900
Concrete Pavement	$0	$0	$0	$0
Drainage	$0	$183,600	$0	$183,600
Appurtenances	$0	$166,200	$0	$166,200
Structures	$0	$0	$0	$0
Fencing	$0	$0	$0	$0
Signalization	$0	$0	$0	$0
Railroad Crossing or Separation	$0	$0	$0	$0
Earthwork	$0	$176,800	$0	$176,800
Clearing and Grubbing	$0	$0	$0	$0
Seeding & Sodding	$0	$2,500	$0	$2,500
Rip-Rap or Slope Protection	$0	$0	$0	$0
Guardrail	$0	$4,700	$0	$4,700
Signing	$0	$5,300	$0	$5,300
Pavement Markings	$0	$5,200	$0	$5,200
Maintenance of Traffic	$0	$2,800	$0	$2,800
Mobilization (5%)	$0	$37,500	$0	$37,500
Other Items = 25%	$0	$196,700	$0	$196,700
Const. Contingency = 15%	$0	$147,500	$0	$147,500
Construction Estimate	$0	$1,131,000	$0	$1,131,000
Interchanges & Unique Intersections				
Roundabouts	$0	$0	$0	$0
Interchanges	$0	$0	$0	$0
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 100%**	**TOTAL**
Right-of-Way	$0	$0	$0	$0
Utilities	$0	$0	$0	$0
Preliminary & Construction Engineering and Inspection				
Prelim. Eng. 10%	$0	$113,100	$0	$113,100
Const. Eng. & Inspec. 10%	$0	$113,100	$0	$113,100
Total Project Cost	$0	$1,357,200	$0	$ 1,357,000

COST ESTIMATE SUMMARY

Route:	**Tillman Drive**
Description:	**SR 265 Subarea Study**
County:	**Wilson**
Length:	**0.55 miles**
Date:	**May 25, 2017**

DESCRIPTION	LOCAL 0%	STATE 100%	FEDERAL 0%	TOTAL
Construction Items				
Pavement Removal	$0	$1,800	$0	$1,800
Asphalt Paving	$0	$292,100	$0	$292,100
Concrete Pavement	$0	$0	$0	$0
Drainage	$0	$288,400	$0	$288,400
Appurtenances	$0	$261,100	$0	$261,100
Structures	$0	$0	$0	$0
Fencing	$0	$0	$0	$0
Signalization	$0	$0	$0	$0
Railroad Crossing or Separation	$0	$0	$0	$0
Earthwork	$0	$259,100	$0	$259,100
Clearing and Grubbing	$0	$0	$0	$0
Seeding & Sodding	$0	$4,000	$0	$4,000
Rip-Rap or Slope Protection	$0	$0	$0	$0
Guardrail	$0	$8,600	$0	$8,600
Signing	$0	$8,300	$0	$8,300
Pavement Markings	$0	$8,100	$0	$8,100
Maintenance of Traffic	$0	$4,400	$0	$4,400
Mobilization (5%)	$0	$56,800	$0	$56,800
Other Items = 25%	$0	$298,200	$0	$298,200
Const. Contingency = 15%	$0	$223,600	$0	$223,600
Construction Estimate	$0	$1,714,500	$0	$1,714,500
Interchanges & Unique Intersections				
Roundabouts	$0	$0	$0	$0
Interchanges	$0	$0	$0	$0
Right-of-Way & Utilties	**LOCAL 0%**	**STATE 0%**	**FEDERAL 100%**	**TOTAL**
Right-of-Way	$0	$0	$0	$0
Utilities	$0	$0	$0	$0
Preliminary & Construction Engineering and Inspection				
Prelim. Eng. 10%	$0	$171,500	$0	$171,500
Const. Eng. & Inspec. 10%	$0	$171,500	$0	$171,500
Total Project Cost	$0	$2,057,500	$0	$ 2,058,000

APPENDIX C: TRAFFIC PROJECTIONS

Supplemented and Revised Traffic Forecasting Study

I-40 at State Route 265 (Central Pike) Interchange Access Request

Supplement to the Revised Traffic Forecasting Study Technical Memorandum

SUPPLMENT INTRODUCTION

Gresham, Smith and Partners (GS&P) previously developed traffic forecasts for the I-40 at SR 265 IAR in Wilson County. TDOT approved the forecasts on April 6, 2016. The forecasts included the following scenarios:

1. 2014 Existing
2. 2020 without Interchange
3. 2040 without Interchange
4. 2040 with Interchange

FHWA reviewed the draft IAR in October 2016. As a result of comments received, the following forecast scenario was developed and included in this supplement:

1. 2020 with Interchange

Also, forecasts (for all scenarios) were needed along two additional roadways within the study area:

1. Pleasant Grove Road
2. Tillman Drive

Lastly, this supplement provides turning movement schematics at the intersections within the study area.

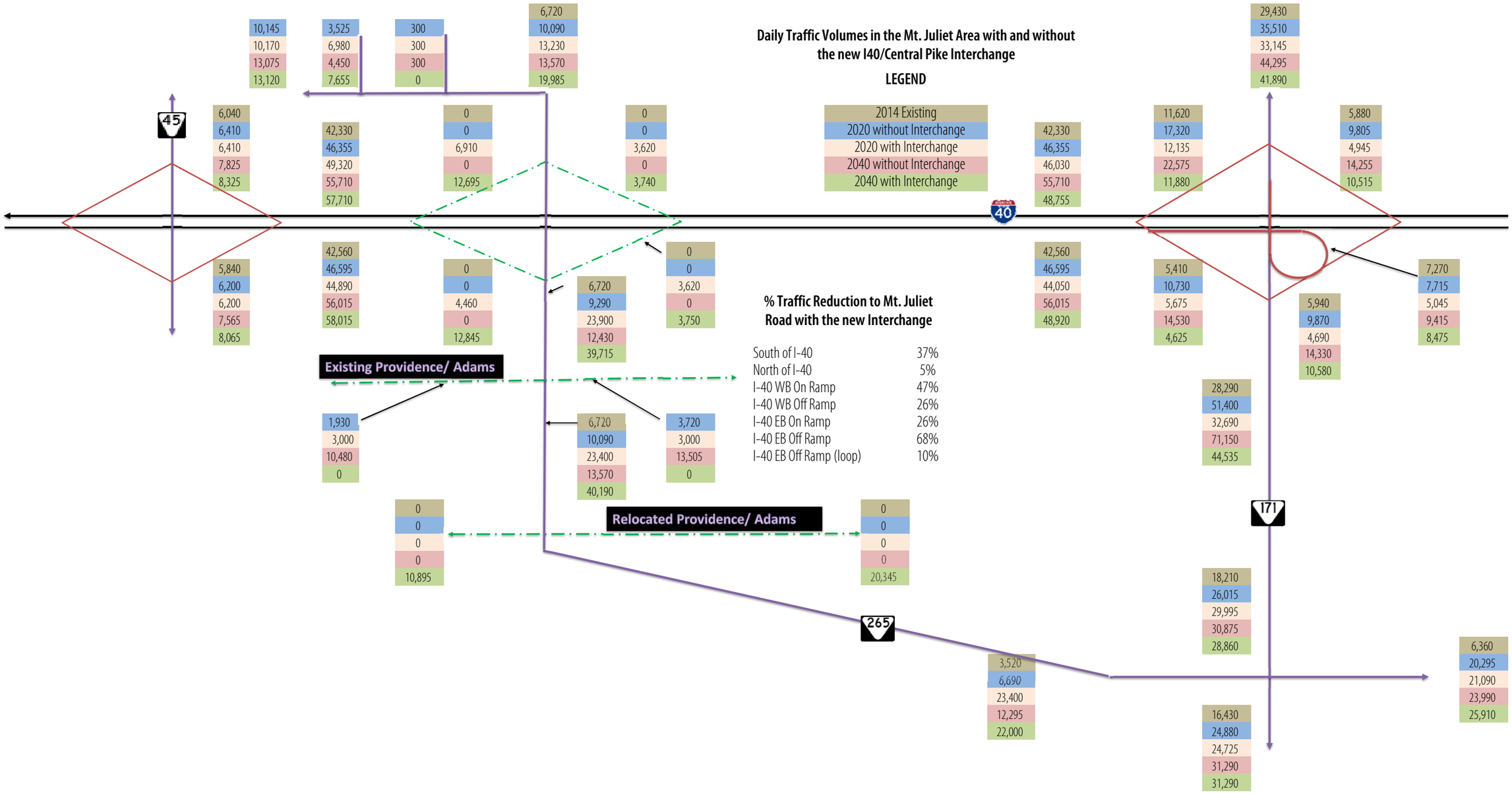
Daily Traffic Volumes in the Mt. Juliet Area with and without the new I40/Central Pike Interchange

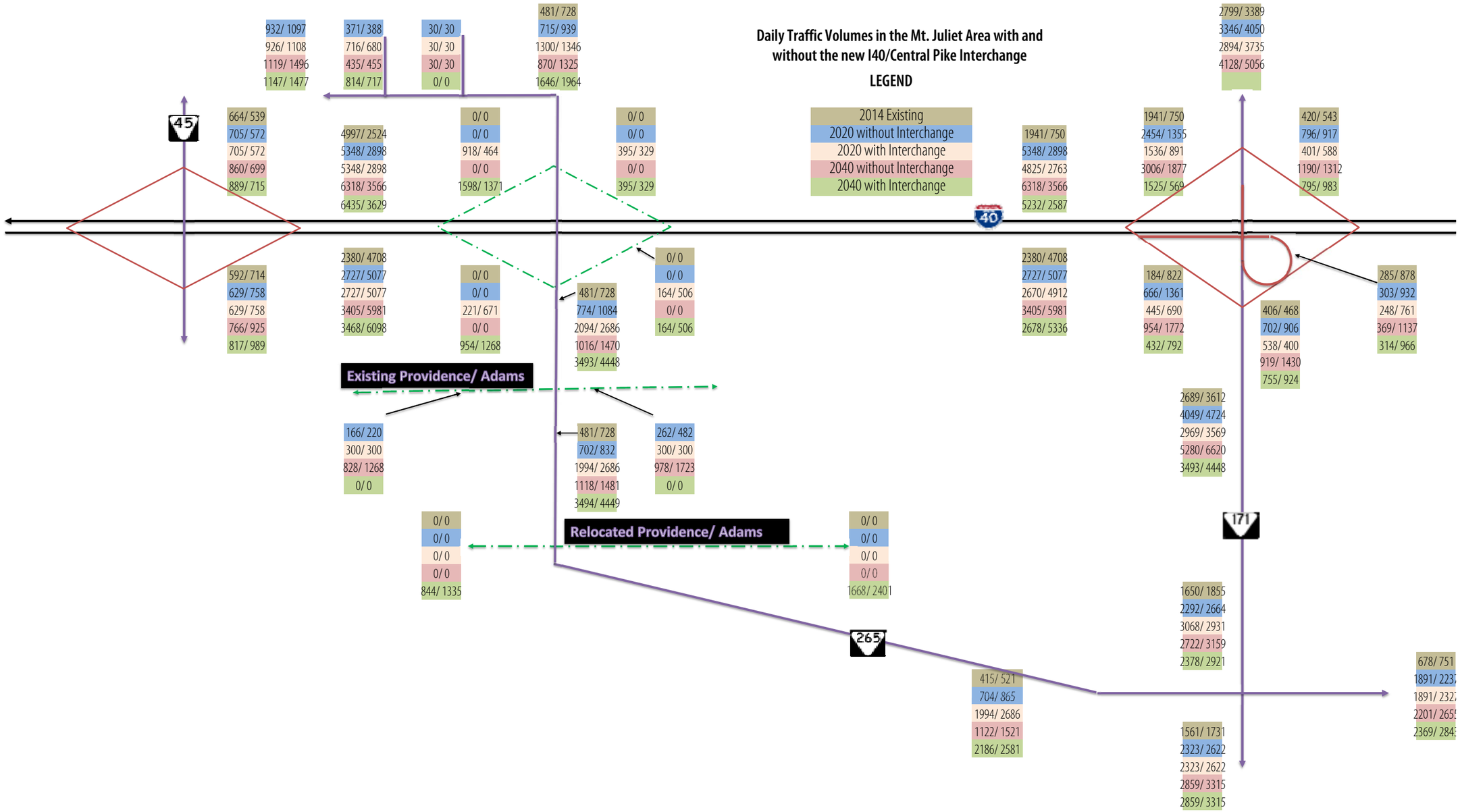
LEGEND

2014 Existing
2020 without Interchange
2020 with Interchange
2040 without Interchange
2040 with Interchange

% Traffic Reduction to Mt. Juliet Road with the new Interchange

South of I-40	37%
North of I-40	5%
I-40 WB On Ramp	47%
I-40 WB Off Ramp	26%
I-40 EB On Ramp	26%
I-40 EB Off Ramp	68%
I-40 EB Off Ramp (loop)	10%

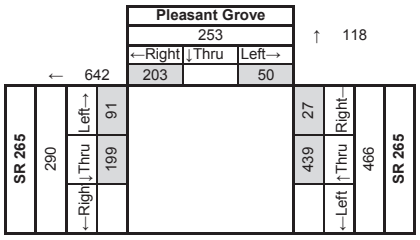



Daily Traffic Volumes in the Mt. Juliet Area with and without the new I40/Central Pike Interchange
LEGEND
2014 Existing
2020 without Interchange
2020 with Interchange
2040 without Interchange
2040 with Interchange
932/ 1097
926/ 1108
1119/ 1496
1147/ 1477
371/ 388
716/ 680
435/ 455
814/ 717
30/ 30
30/ 30
30/ 30
0/ 0
481/ 728
715/ 939
1300/ 1346
870/ 1325
1646/ 1964
2799/ 3389
3346/ 4050
2894/ 3735
4128/ 5056
45
664/ 539
705/ 572
705/ 572
860/ 699
889/ 715
4997/ 2524
5348/ 2898
5348/ 2898
6318/ 3566
6435/ 3629
0/ 0
0/ 0
918/ 464
0/ 0
1598/ 1371
0/ 0
0/ 0
395/ 329
0/ 0
395/ 329
1941/ 750
5348/ 2898
4825/ 2763
6318/ 3566
5232/ 2587
1941/ 750
2454/ 1355
1536/ 891
3006/ 1877
1525/ 569
420/ 543
796/ 917
401/ 588
1190/ 1312
795/ 983
40
592/ 714
629/ 758
629/ 758
766/ 925
817/ 989
2380/ 4708
2727/ 5077
2727/ 5077
3405/ 5981
3468/ 6098
0/ 0
0/ 0
221/ 671
0/ 0
954/ 1268
481/ 728
774/ 1084
2094/ 2686
1016/ 1470
3493/ 4448
0/ 0
0/ 0
164/ 506
0/ 0
164/ 506
2380/ 4708
2727/ 5077
2670/ 4912
3405/ 5981
2678/ 5336
184/ 822
666/ 1361
445/ 690
954/ 1772
432/ 792
406/ 468
702/ 906
538/ 400
919/ 1430
755/ 924
285/ 878
303/ 932
248/ 761
369/ 1137
314/ 966
Existing Providence/ Adams
166/ 220
300/ 300
828/ 1268
0/ 0
481/ 728
702/ 832
1994/ 2686
1118/ 1481
3494/ 4449
262/ 482
300/ 300
978/ 1723
0/ 0
2689/ 3612
4049/ 4724
2969/ 3569
5280/ 6620
3493/ 4448
171
0/ 0
0/ 0
0/ 0
0/ 0
844/ 1335
Relocated Providence/ Adams
0/ 0
0/ 0
0/ 0
0/ 0
1668/ 2401
265
1650/ 1855
2292/ 2664
3068/ 2931
2722/ 3159
2378/ 2921
415/ 521
704/ 865
1994/ 2686
1122/ 1521
2186/ 2581
1561/ 1731
2323/ 2622
2323/ 2622
2859/ 3315
2859/ 3315
678/ 751
1891/ 2237
1891/ 2327
2201/ 2655
2369/ 2843

SR 265 IAR

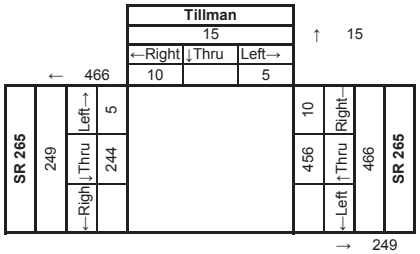
Condition: 2020 AM No Build

Pleasant Grove



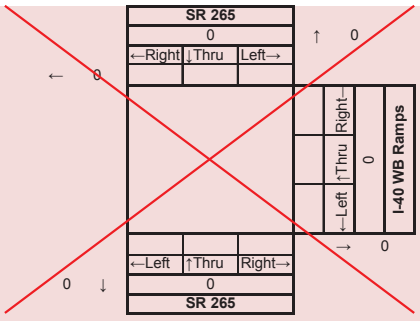
Approach Totals
371 =N
715 =E
0 =S
932 =W

Tillman



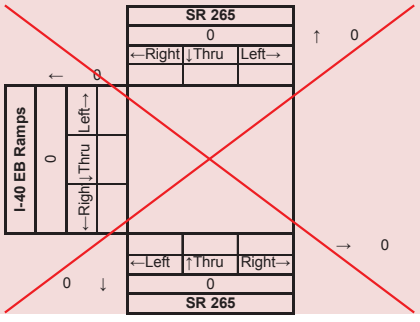
Approach Totals
30 =N
715 =E
0 =S
715 =W

WB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

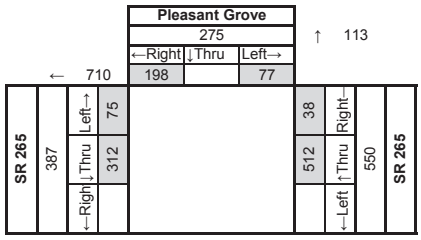
EB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

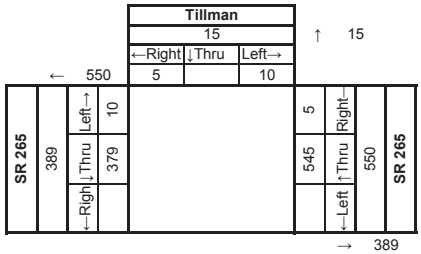
Condition: 2020 PM No Build

Pleasant Grove



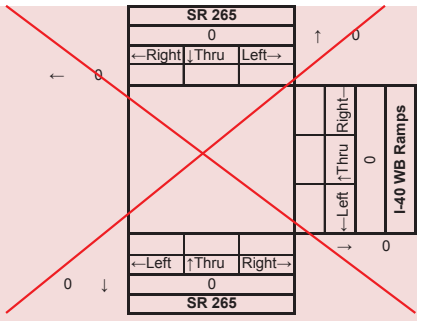
Approach Totals
388 =N
939 =E
0 =S
1097 =W

Tillman



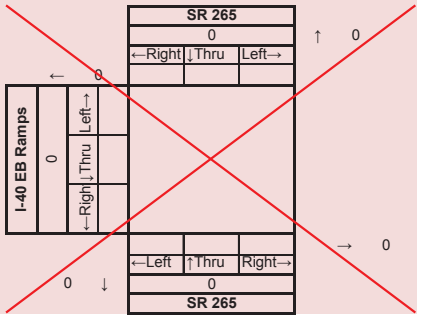
Approach Totals
30 =N
939 =E
0 =S
939 =W

WB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

EB Ramps

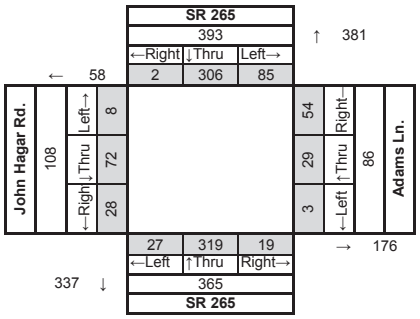


Approach Totals
0 =N
0 =E
0 =S
0 =W

SR 265 IAR

Condition: 2020 AM No Build

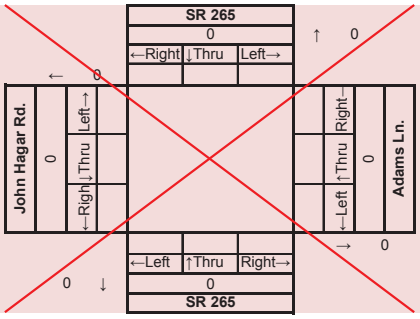
Exist Adams



Approach Totals

774 =N
262 =E
702 =S
166 =W

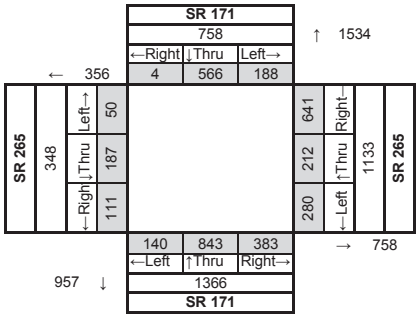
Proposed Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

SR 171



Approach Totals

2292 =N
1891 =E
2323 =S
704 =W

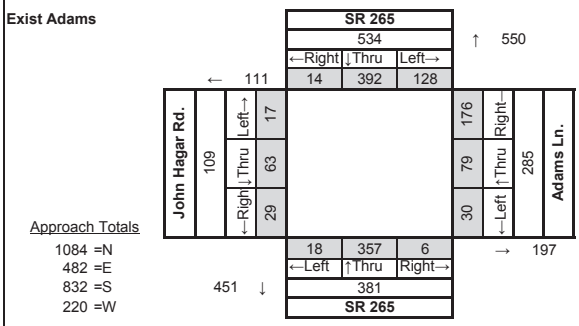
Legend:

N/A for Condition

From previously approved traffic projections

Condition: 2020 PM No Build

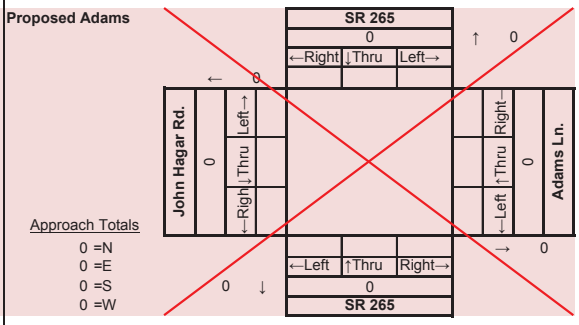
Exist Adams



Approach Totals

1084 =N
482 =E
832 =S
220 =W

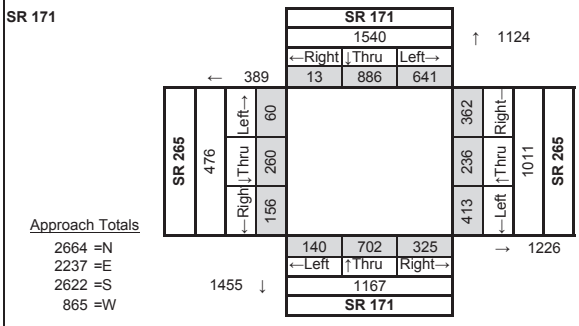
Proposed Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

SR 171



Approach Totals

2664 =N
2237 =E
2622 =S
865 =W

Legend:

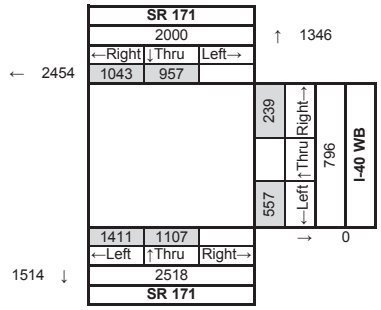
N/A for Condition

From previously approved traffic projections

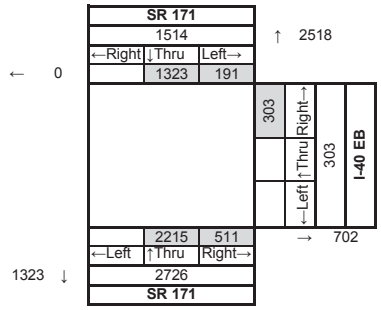
SR 265 IAR

Condition: 2020 AM No Build

I-40 WB at SR 171

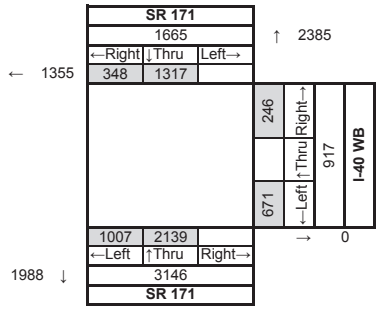


I-40 EB at SR 171

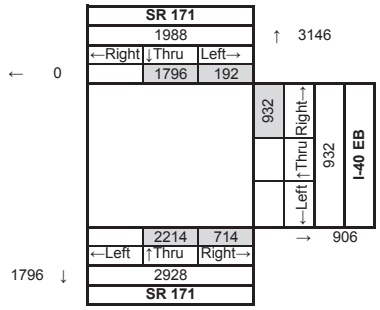


Condition: 2020 PM No Build

I-40 WB at SR 171



I-40 EB at SR 171



Legend:

	N/A for Condition
	From previously approved traffic projections

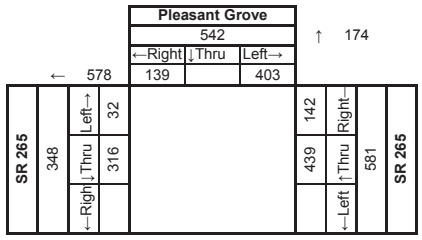
Legend:

	N/A for Condition
	From previously approved traffic projections

SR 265 IAR

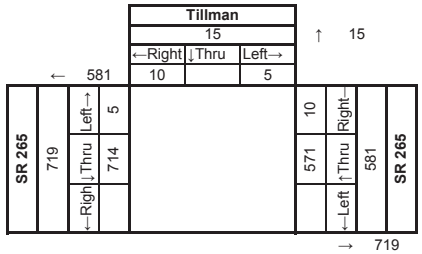
Condition: 2020 AM Build

Pleasant Grove



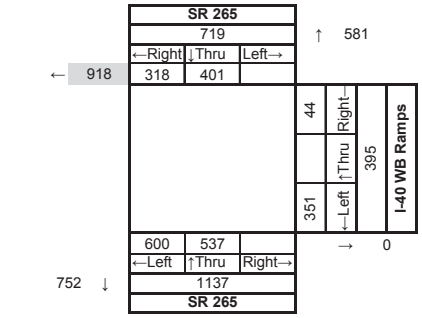
Approach Totals
716 =N
1300 =E
0 =S
926 =W

Tillman



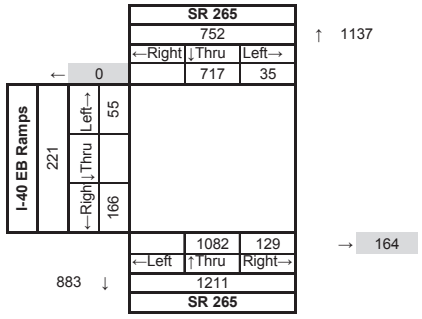
Approach Totals
30 =N
1300 =E
0 =S
1300 =W

WB Ramps



Approach Totals
1300 =N
395 =E
1889 =S
918 =W

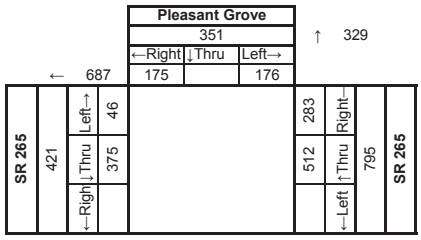
EB Ramps



Approach Totals
1889 =N
164 =E
2094 =S
221 =W

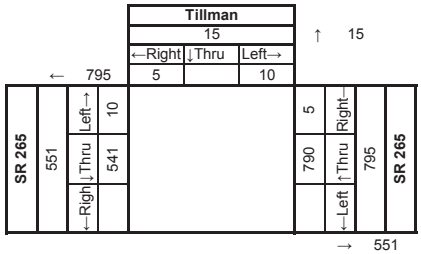
Condition: 2020 PM Build

Pleasant Grove



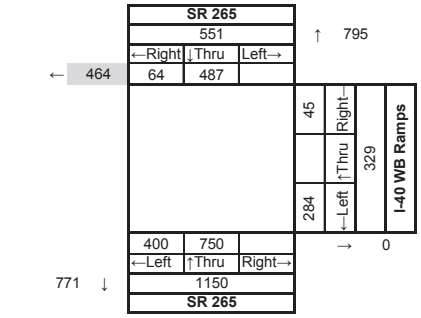
Approach Totals
680 =N
1346 =E
0 =S
1108 =W

Tillman



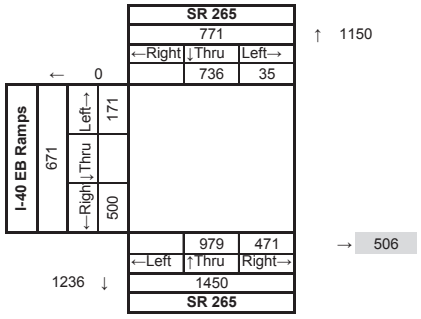
Approach Totals
30 =N
1346 =E
0 =S
1346 =W

WB Ramps



Approach Totals
1346 =N
329 =E
1921 =S
464 =W

EB Ramps

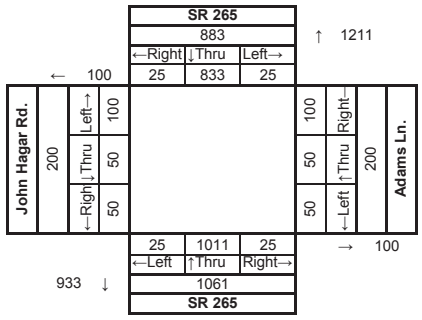


Approach Totals
1921 =N
506 =E
2686 =S
671 =W

SR 265 IAR

Condition: 2020 AM Build

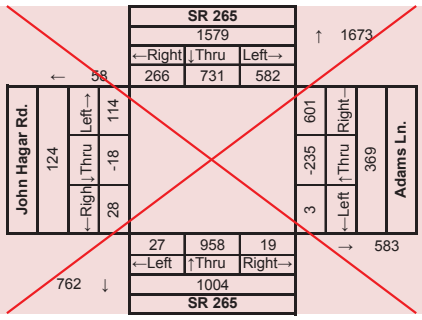
Exist Adams



Approach Totals

2094 =N
300 =E
1994 =S
300 =W

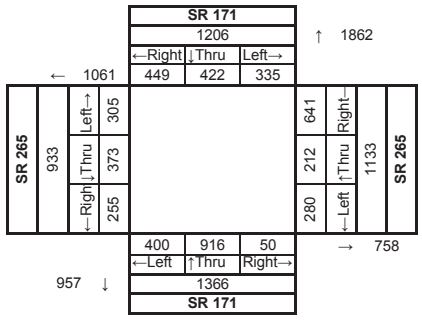
Proposed Adams



Approach Totals

3252 =N
952 =E
1766 =S
182 =W

SR 171



Approach Totals

3068 =N
1891 =E
2323 =S
1994 =W

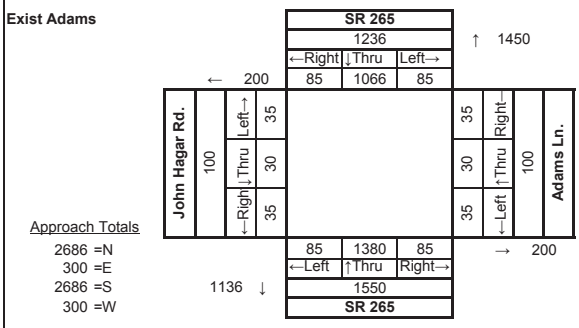
Legend:

N/A for Condition

From previously approved traffic projections

Condition: 2020 PM Build

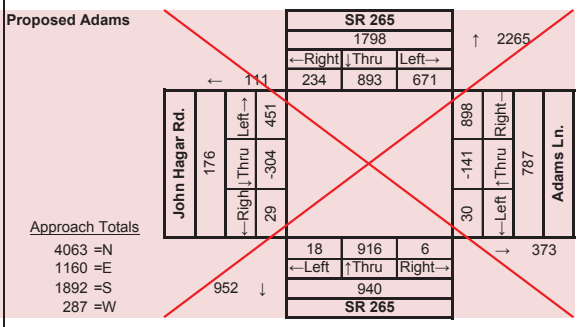
Exist Adams



Approach Totals

2686 =N
300 =E
2686 =S
300 =W

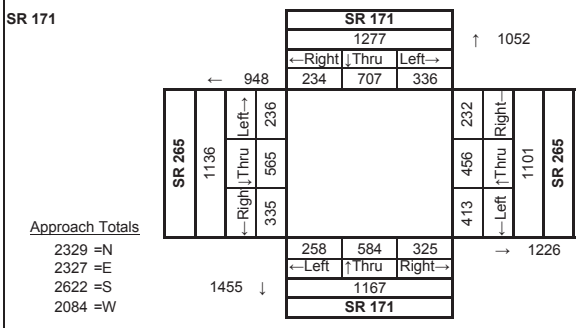
Proposed Adams



Approach Totals

4063 =N
1160 =E
1892 =S
287 =W

SR 171



Approach Totals

2329 =N
2327 =E
2622 =S
2084 =W

Legend:

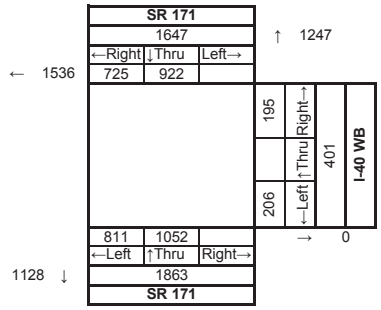
N/A for Condition

From previously approved traffic projections

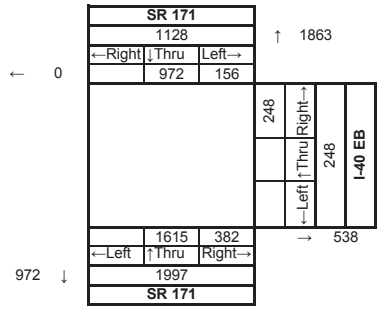
SR 265 IAR

Condition: 2020 AM Build

I-40 WB at SR 171



I-40 EB at SR 171

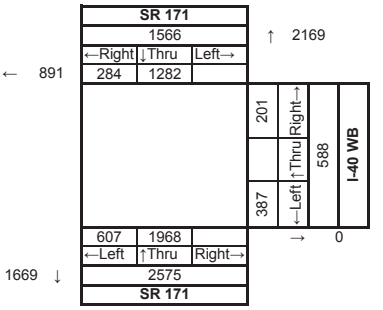


Legend:

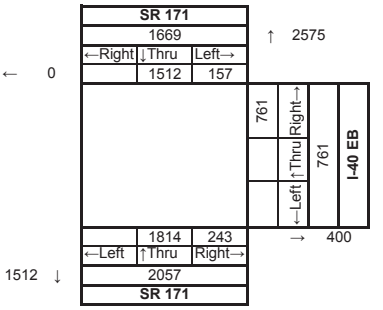
	N/A for Condition
	From previously approved traffic projections

Condition: 2020 PM Build

I-40 WB at SR 171



I-40 EB at SR 171



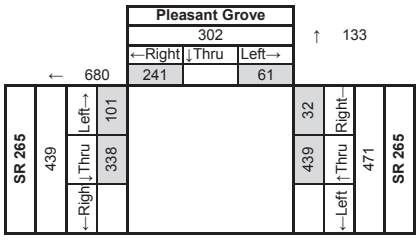
Legend:

	N/A for Condition
	From previously approved traffic projections

SR 265 IAR

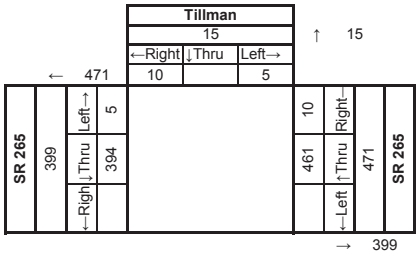
Condition: 2040 AM No Build

Pleasant Grove



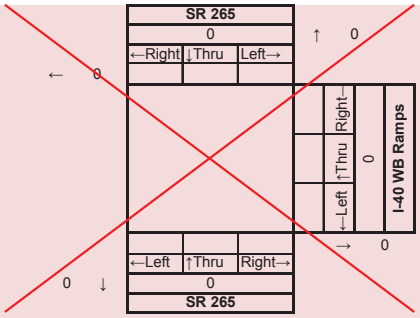
Approach Totals
435 =N
870 =E
0 =S
1119 =W

Tillman



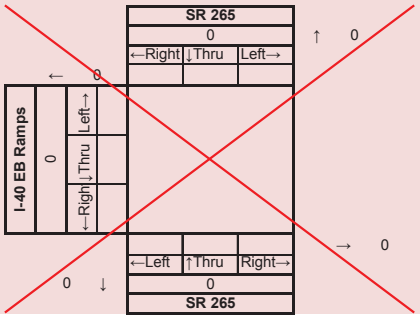
Approach Totals
30 =N
870 =E
0 =S
870 =W

WB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

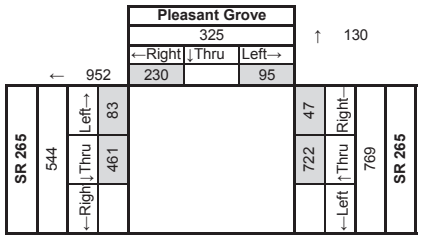
EB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

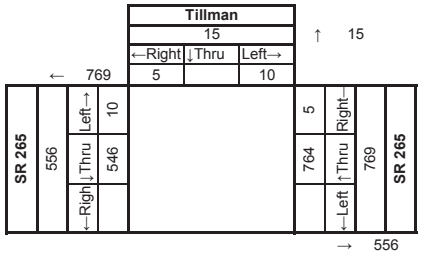
Condition: 2040 PM No Build

Pleasant Grove



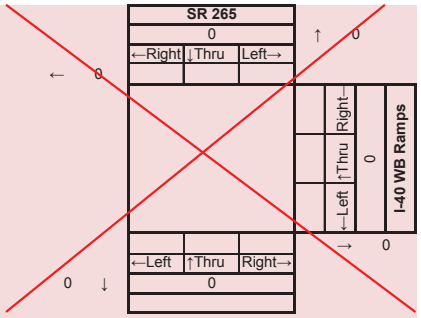
Approach Totals
455 =N
1325 =E
0 =S
1496 =W

Tillman



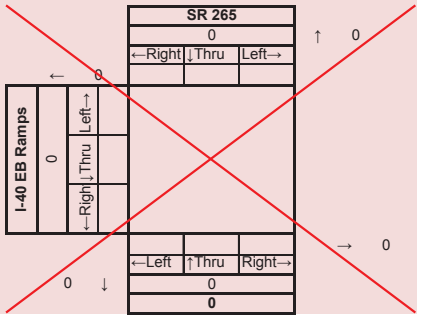
Approach Totals
30 =N
1325 =E
0 =S
1325 =W

WB Ramps



Approach Totals
0 =N
0 =E
0 =S
0 =W

EB Ramps

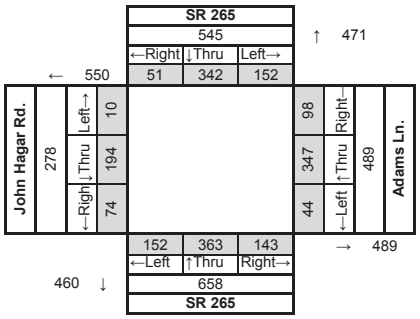


Approach Totals
0 =N
0 =E
0 =S
0 =W

SR 265 IAR

Condition: 2040 AM No Build

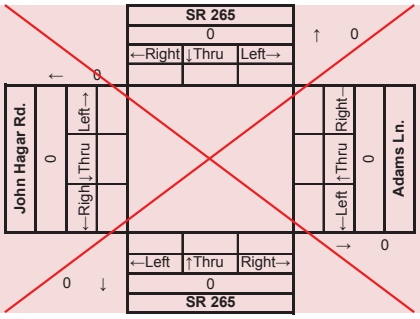
Exist Adams



Approach Totals

1016 =N
978 =E
1118 =S
828 =W

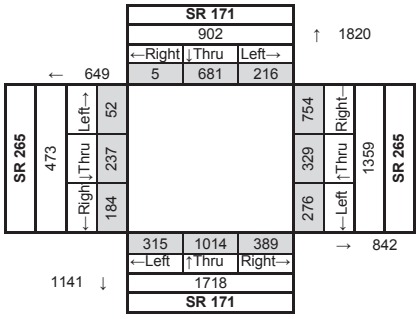
Proposed Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

SR 171

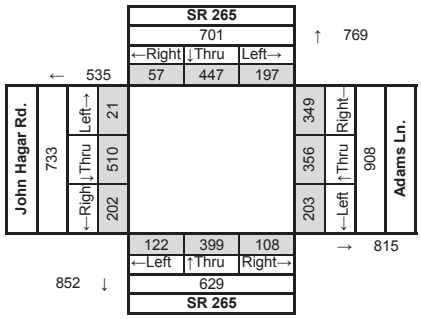


Approach Totals

2722 =N
2201 =E
2859 =S
1122 =W

Condition: 2040 PM No Build

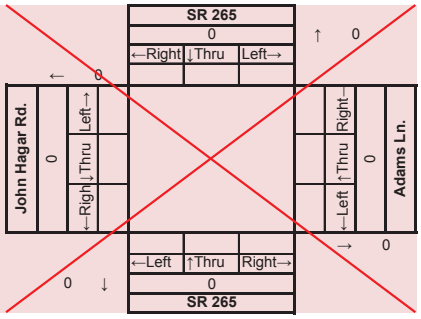
Exist Adams



Approach Totals

1470 =N
1723 =E
1481 =S
1268 =W

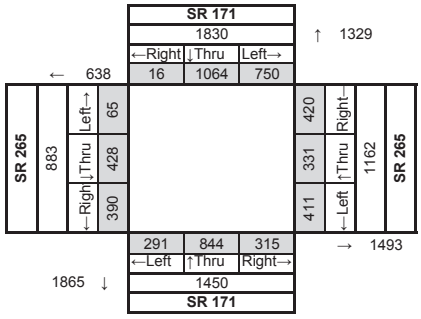
Proposed Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

SR 171



Approach Totals

3159 =N
2655 =E
3315 =S
1521 =W

Legend:

N/A for Condition

From previously approved traffic projections

Legend:

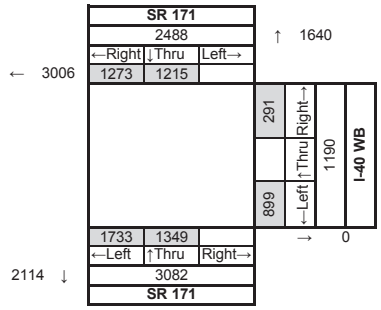
N/A for Condition

From previously approved traffic projections

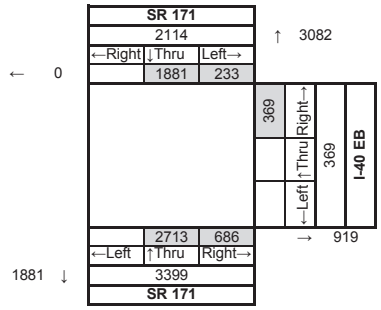
SR 265 IAR

Condition: 2040 AM No Build

I-40 WB at SR 171



I-40 EB at SR 171

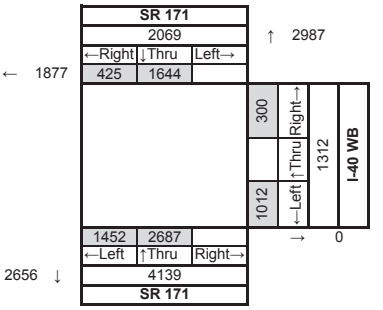


Legend:

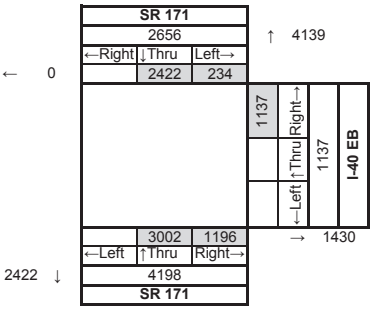
	N/A for Condition
	From previously approved traffic projections

Condition: 2040 PM No Build

I-40 WB at SR 171



I-40 EB at SR 171



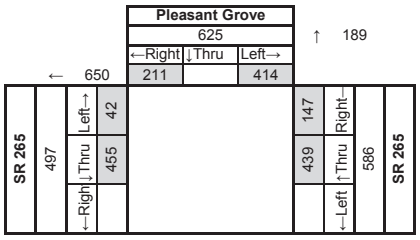
Legend:

	N/A for Condition
	From previously approved traffic projections

SR 265 IAR

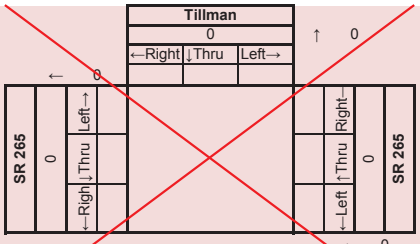
Condition: 2040 AM Build

Pleasant Grove



Approach Totals
814 =N
1455 =E
0 =S
1147 =W

Tillman



Approach Totals
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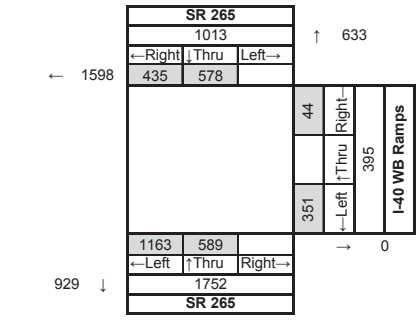
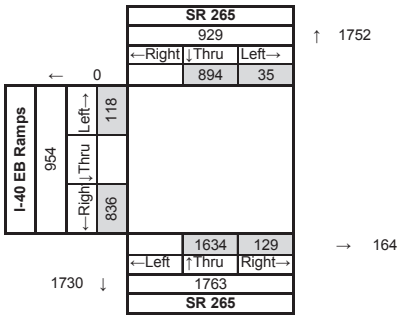
0 =E
0 =S
0 =W

WB Ramps



Approach Totals
1646 =N
395 =E
2681 =S
1598 =W

EB Ramps



Approach Totals
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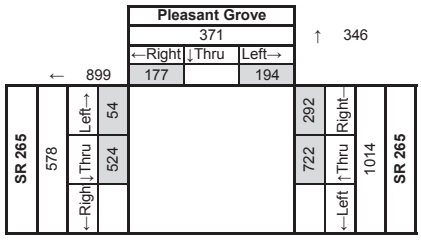
164 =E
3493 =S
954 =W

Condition: 2040 PM Build

Pleasant Grove



Approach Totals
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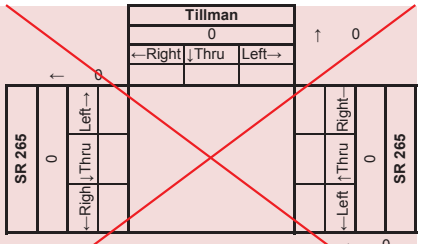
1732 =E
0 =S
1477 =W

Tillman



Approach Totals
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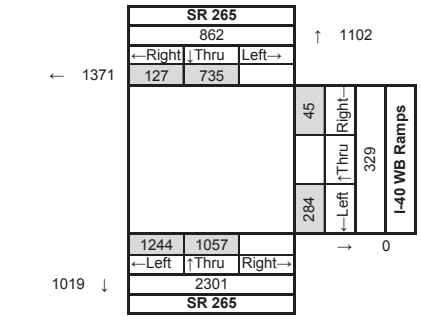
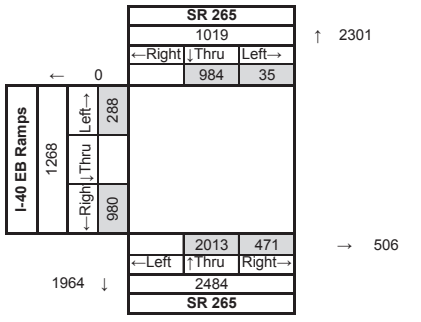
0 =E
0 =S
0 =W

WB Ramps



Approach Totals
1964 =N
329 =E
3320 =S
1371 =W

EB Ramps



Approach Totals
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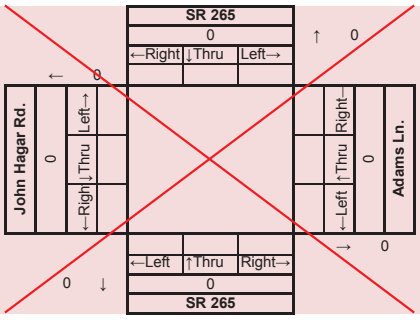
506 =E
4448 =S
1268 =W

SR 265 IAR

Condition: 2040 AM Build

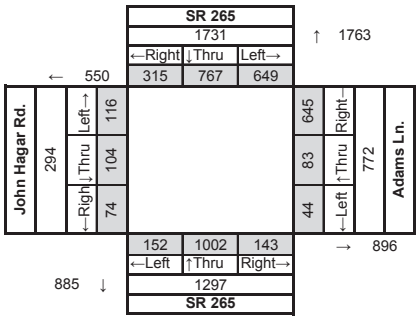
Exist Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

Proposed Adams



Approach Totals

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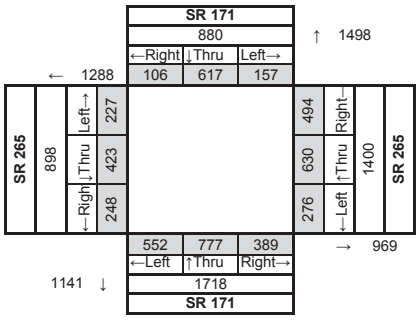
1668 =E
2182 =S
844 =W

SR 171



Approach Totals

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2369 =E
2859 =S
2186 =W

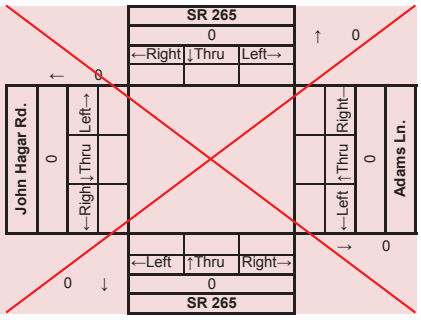
Legend:

N/A for Condition

From previously approved traffic projections

Condition: 2040 PM Build

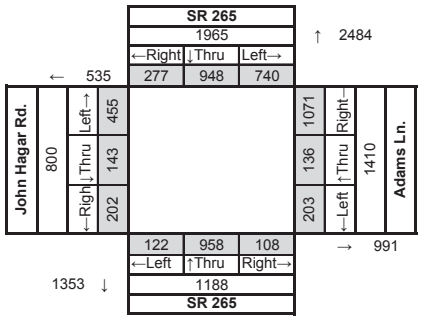
Exist Adams



Approach Totals

0 =N
0 =E
0 =S
0 =W

Proposed Adams



Approach Totals

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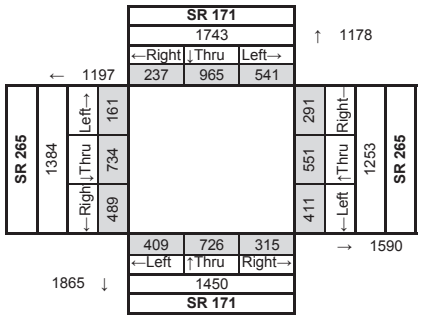
2401 =E
2541 =S
1335 =W

SR 171



Approach Totals

2921 =N
2843 =E
3315 =S
2581 =W

Legend:

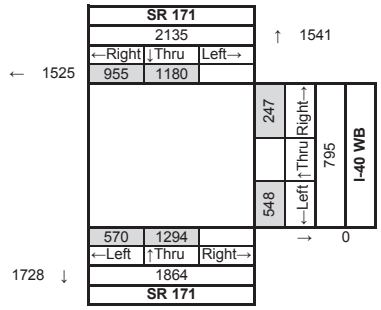
N/A for Condition

From previously approved traffic projections

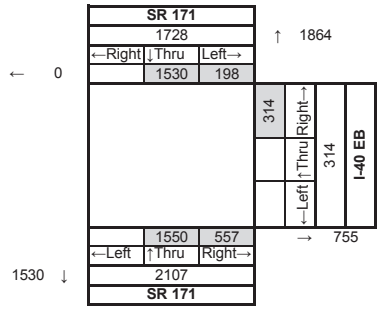
SR 265 IAR

Condition: 2040 AM Build

I-40 WB at SR 171



I-40 EB at SR 171

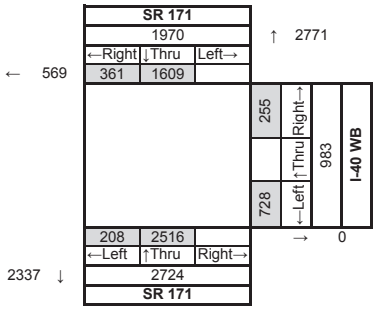


Legend:

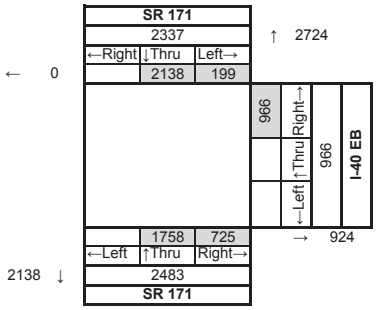
	N/A for Condition
	From previously approved traffic projections

Condition: 2040 PM Build

I-40 WB at SR 171



I-40 EB at SR 171



Legend:

	N/A for Condition
	From previously approved traffic projections

REVISED TRAFFIC FORECASTING STUDY (WITH APPROVAL LETTER)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-2208

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

April 6, 2016

Mr. J. Shap Stiles P.E.
Gresham, Smith and Partners
2095 Lakeside Centre Way, Suite 120
Knoxville TN 37922

RE: Traffic Forecasting Study Technical Memorandum
I-40 @ S.R. 265 [Central Pike] IAR
Mt. Juliet TN, Wilson county County

Dear Mr. Stiles,

Our office has reviewed the revised traffic schematics and methodology you submitted on April 6, 2016 for the subject project. These traffic schematics and volumes have our approval for use in the study. If I can be of futher assisitance, please contact me.

Sincerely,

Tony Armstrong
Transportation Manager 1

cc : Shaun Armstrong
file

I-40 AT STATE ROUTE 265 (CENTRAL PIKE) INTERCHANGE ACCESS REQUEST

REVISED TRAFFIC FORECASTING STUDY TECHNICAL MEMORANDUM

INTRODUCTION

Gresham, Smith and Partners (GS&P) had conducted a preliminary traffic forecasting study to support the I-40 at SR 265 (Central Pike) Interchange Access Request (IAR). This preliminary traffic forecasting study was based on the traffic volumes projected by the Nashville MPO's travel demand model. The preliminary traffic forecasting study was included in the DRAFT IAR document submitted to the Tennessee Department of Transportation (TDOT) on February 2, 2015. Based on additional information received from the City of Mt. Juliet subsequent to the DRAFT IAR submittal, the preliminary traffic forecasting study was revised to reflect the traffic generated by the various approved developments in the area. This Technical Memorandum details the methodology followed by GS&P to prepare the revised traffic forecasting study.

STUDY OBJECTIVES

The objectives of this revised traffic forecasting study are as follows:

1. Establish the existing condition traffic volumes (Year 2014) in the study area.
2. Forecast the future condition traffic volumes (Year 2040) in the study area without the I-40/ Central Pike interchange to represent the "Without Interchange" traffic forecasts.
3. Redistribute/reroute the above forecasted future condition traffic volumes to account for the new I-40/ Central Pike interchange to represent the "With Interchange" traffic forecasts.
4. Evaluate the shift in traffic from Mt. Juliet Road to Central Pike and also the shift in traffic from the I-40/ Mt. Juliet Road interchange to the I-40/ Central Pike interchange.
5. Conduct peak-hour operational analysis at the existing I-40/ Mt. Juliet Road interchange and at the proposed I-40/ Central Pike interchange. The proposed I-40/ Central Pike interchange will be analyzed as both a traditional diamond and a diverging diamond interchange.

STUDY AREA

The study area for the traffic forecasting is shown in **Figure 1**. The study area includes I-40 from west of Central Pike to East of Mt. Juliet Road, Central Pike from north of I-40 to east of Mt. Juliet Road and Mt. Juliet Road from south of Central Pike to north of Providence Parkway. In addition to these roadway sections, the following intersections were also included in the study area,

1. Mt Juliet Rd/ I-40 EB Ramps
2. Mt Juliet Rd/ I-40 WB Ramps
3. Central Pike/ I-40 EB Ramps
4. Central Pike/ I-40 WB Ramps

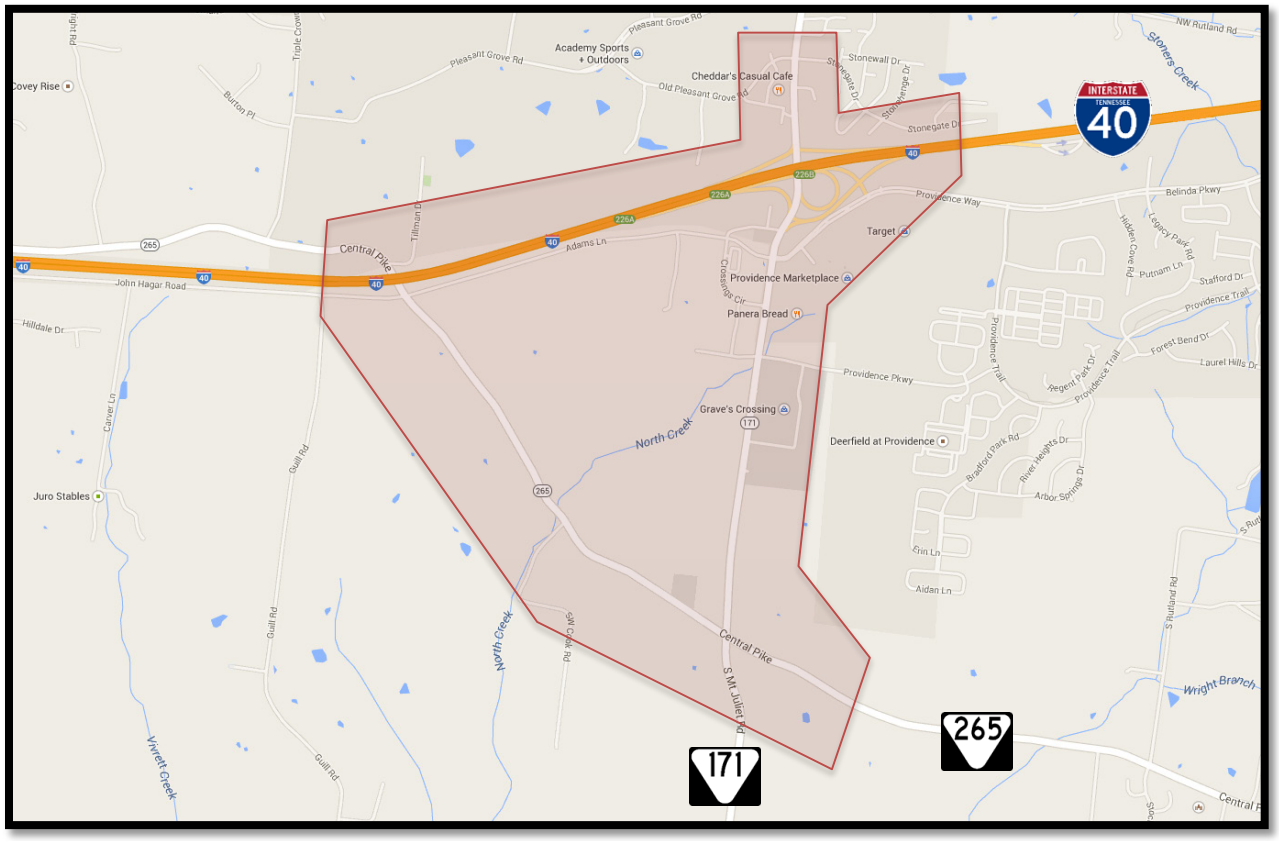


Figure 1. Study Area

EXISTING CONDITION TRAFFIC VOLUMES

The existing condition traffic volumes (Year 2014) along I-40, Mt. Juliet Road and Central Pike was established based on traffic counts collected by GS&P, traffic counts obtained from the approved traffic impact studies in the area (Providence Central, Mt. Juliet, TN), and TDOT's traffic counters in the vicinity of the study area. The raw count worksheets are provided in Appendix A.

The daily and peak hour link volumes along the study area roadway network is presented in Figure 2 and Figure 3 respectively. Though this forecasting study focused on the study area shown in Figure 1, traffic volumes at the Old Hickory Blvd interchange along I-40 is also reported in Figure 2.

Additionally the intersection turning movement volumes at the interchange ramp termini intersections for the Old Hickory Blvd and Mt. Juliet Road interchanges along I-40 is provided in Figure 4.

FUTURE CONDITION TRAFFIC VOLUMES

To evaluate the traffic conditions at the interchanges along I-40 at Mt. Juliet Road and Central Pike and also along Mt. Juliet Road and Central Pike, future year (Year 2040) traffic forecasts were developed for the "without interchange" and "with interchange" scenarios. The methodology followed to develop these traffic forecasts are detailed in the following sections.

"WITHOUT INTERCHANGE" TRAFFIC FORECASTS

The "Without Interchange" traffic forecasts were developed by growing the existing condition traffic volumes based on an expected annual background traffic growth rate and also adding the traffic generated by approved developments in the vicinity of the study area.

The expected annual background traffic growth rate was based on historical trends in traffic growth in the study area. The historical growth rate was calculated based on traffic count data obtained from TDOT at several permanent count stations in the vicinity of the study area. For the purposes of this study, nine count stations (17, 89, 90, 18, 19, 50, 345, 198, and 215) were identified to determine the traffic growth rate. The five-year, ten-year, and fifteen-year growth rates calculated at each of these count stations indicated an average historical growth rate of 3.0% in the study area. Though the calculated historical growth rate in the study area is 3%, GS&P recommends using an annual growth rate of 1% as a background growth rate for the purposes of estimating traffic for the year 2040 conditions because the traffic generated by the identified approved developments in the vicinity of the study area is proposed to be included in this study. GS&P recommends that this 1% background growth rate is adequate to account for all other growth in traffic in the study area due to developments not identified as part of this study. The list of all identified approved developments in the vicinity of the study area is included in **Table 1**. The approximate location of these developments with respect to the study area is presented in Figure 5. The traffic generated by these developments were obtained from the approved Traffic Impact Studies conducted for these developments and were used to develop the traffic forecasts in this study. The growth rate calculations and traffic studies for all the approved developments used in this forecasting study is included in Appendix B.

Table 1. Traffic Generated by Identified Approved Developments the Study Area

		AM Peak			PM Peak		
Development Name	**Daily**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Providence Central - Phase 1	1,482	23	91	114	92	49	141
Providence Central - Phase 2	7,142	414	207	621	295	475	770
Providence Central - Phase 3	19,126	960	323	1,283	800	1,336	2,136
Boyle Retail Center	22,876	775	662	1,437	1,096	1,062	2,158
Baird Farm Residential Development	2,408	47	142	189	159	94	253
Shankle Property Residential Development	4,066	80	240	320	269	158	427
Hamilton Hills - Phase 1	7,926	338	230	568	309	338	647
Hamilton Hills - Phase 2	2,190	239	35	274	52	227	279
Hamilton Hills - Phase 3	1,790	213	54	267	64	196	260
Hamilton Hills - Phase 4	2,372	46	141	187	144	87	231
Hamilton Hills - Phase 5	4,998	391	115	506	206	409	615
Covey Rise Residential Development	2,855	56	168	224	189	111	300
Cowden Property Residential Development	3,008	59	177	236	199	117	316
Total	**82,239**	**3,641**	**2,585**	**6,226**	**3,874**	**4,659**	**8,533**

The trips generated by the approved developments as shown in **Table 1** was added on top of the 1% background growth to calculate the "Without Interchange" traffic forecasts for the year 2040. This "other development" traffic was distributed through the study area roadway network based on the trip distribution patterns identified in the corresponding Traffic Impact Studies and also based on travel patterns identified from the Nashville MPO's travel demand model. The trip distribution percentages utilized in this study is shown in Figure 6.

The "Without Interchange" daily and peak hour link volumes along the study area roadway network is presented in Figure 2 and Figure 3 respectively. Additionally, the intersection turning movement volumes at the interchange ramp termini intersections is shown in Figure 7.

"WITH INTERCHANGE" TRAFFIC FORECASTS

The "With Interchange" traffic forecasts were developed by redistributing the "Without Interchange" traffic volumes by taking into account the traffic diversions expected due to the new I-40/ Central Pike interchange. This traffic diversions are based on travel patterns identified from the Nashville MPO's travel demand model. Several "select-link" and "select-zone" model runs were conducted using the travel demand model to estimate these travel patterns. The "With Interchange" daily and peak hour link volumes along the study area roadway network is presented in Figure 2 and Figure 3 respectively. Additionally, the intersection turning movement volumes at the interchange ramp termini intersections is shown in Figure 8.

As shown in Figure 2, based on Year 2040 Daily traffic volumes under the "With Interchange" condition, there is a **35% reduction in traffic along Mt. Juliet Road South of I-40**, 6% reduction in traffic along Mt. Juliet Road North of I-40, **44% reduction in traffic along I-40 WB On Ramp**, 20% reduction in traffic along I-40 WB Off Ramp, 20% reduction in traffic along I-40 EB On Ramp, **63% reduction in traffic along I-40 WB to Mt. Juliet Road SB Off Ramp**, and 10% reduction in traffic along I-40 WB to Mt. Juliet Road NB Off Ramp.

A detailed investigation of the Nashville MPO's travel demand model showed that the section of I-40 between Old Hickory Blvd and Mt. Juliet Road interchanges showed a modest increase in traffic volumes under the "With Interchange" condition. Based on several "select-link" model runs this increase in traffic volume was estimated to be the shift in traffic from the parallel Central Pike facility on to I-40. Under the "With Interchange" condition, some traffic along Central Pike between Old Hickory Blvd and Mt. Juliet Road shifts onto I-40 to traverse on a higher speed facility (I-40) and thus realizing some travel time savings. As shown in Figure 2, this shift in traffic was estimated to be 2,000 vehicles per day in both direction for the section of I-40 between Old Hickory Blvd and Mt. Juliet Road interchanges. This change is also reflected in the ramp volumes at the Old Hickory Blvd interchange – an increase of 500 vehicles per day along the westbound off-ramp and the eastbound on-ramp; and a decrease of 1,500 vehicles per day along the westbound on-ramp and the eastbound off-ramp. As the westbound on-ramp and the eastbound off-ramp at the Old Hickory Blvd interchange is outside the study area for the IJR, the volumes along these ramps are not shown in Figure 2; but the effect of this decrease in volumes is included in this study and is reflected in the intersection turning movement volumes at the Old Hickory Blvd interchange intersections as shown in Figures 7 and 8.

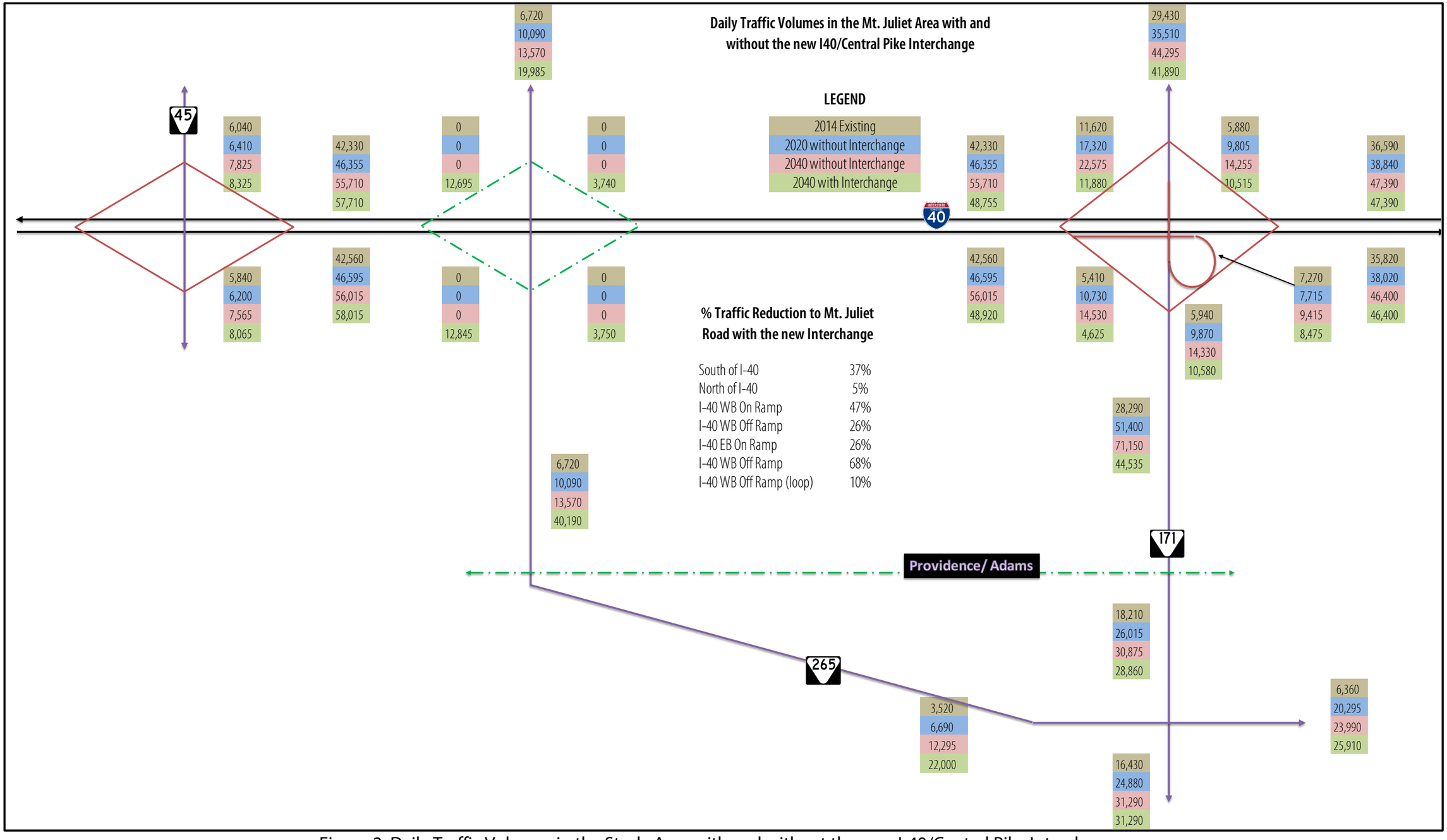


Figure 2. Daily Traffic Volumes in the Study Area with and without the new I-40/Central Pike Interchange

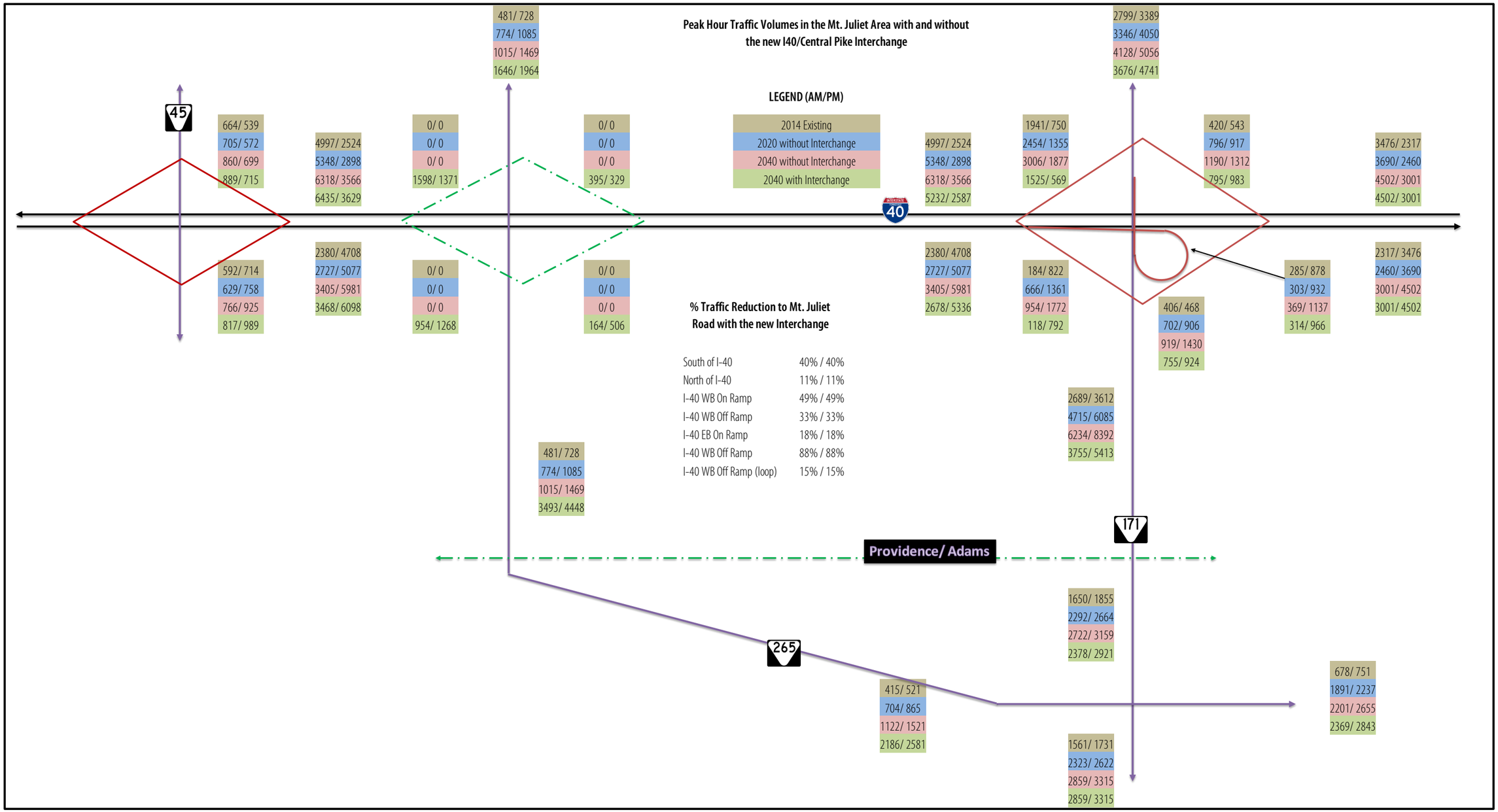


Figure 3. Peak Hour (AM/ PM) Traffic Volumes in the Study Area with and without the new I-40/Central Pike Interchange

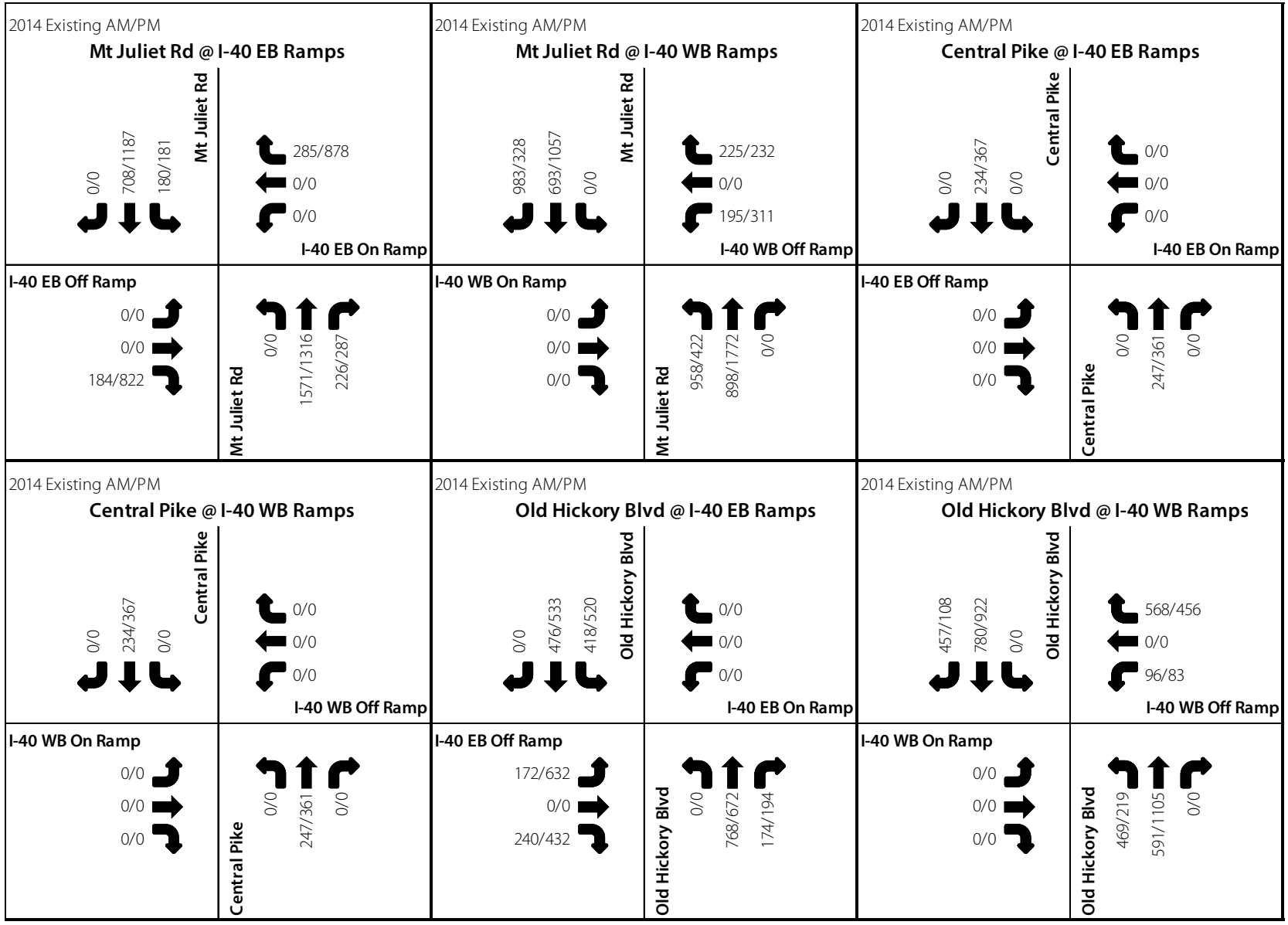


Figure 4. 2014 Existing Year Peak Hour (AM/ PM) Intersection Turning Movement Volumes

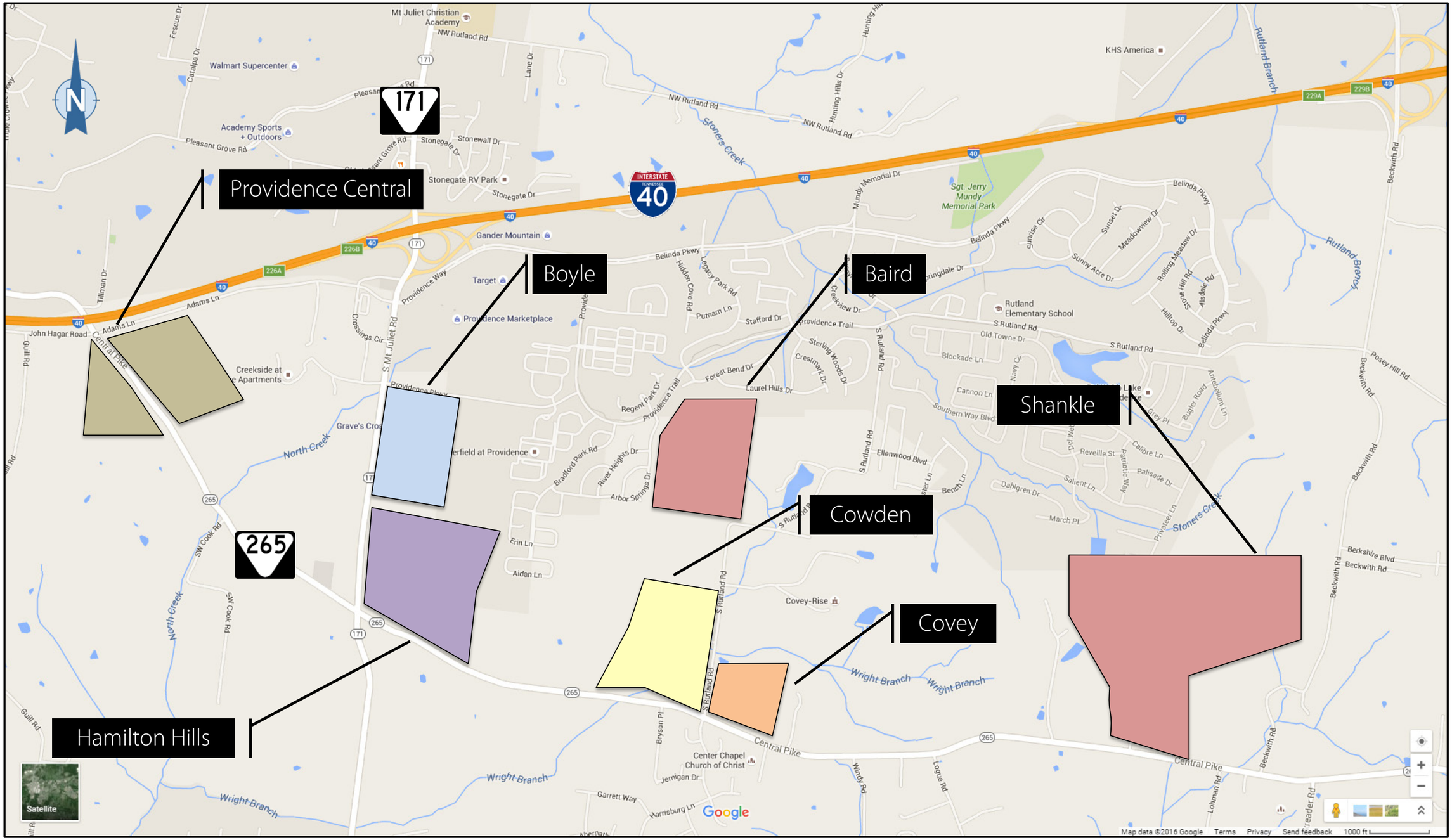


Figure 5. Approved Developments in the Study Area

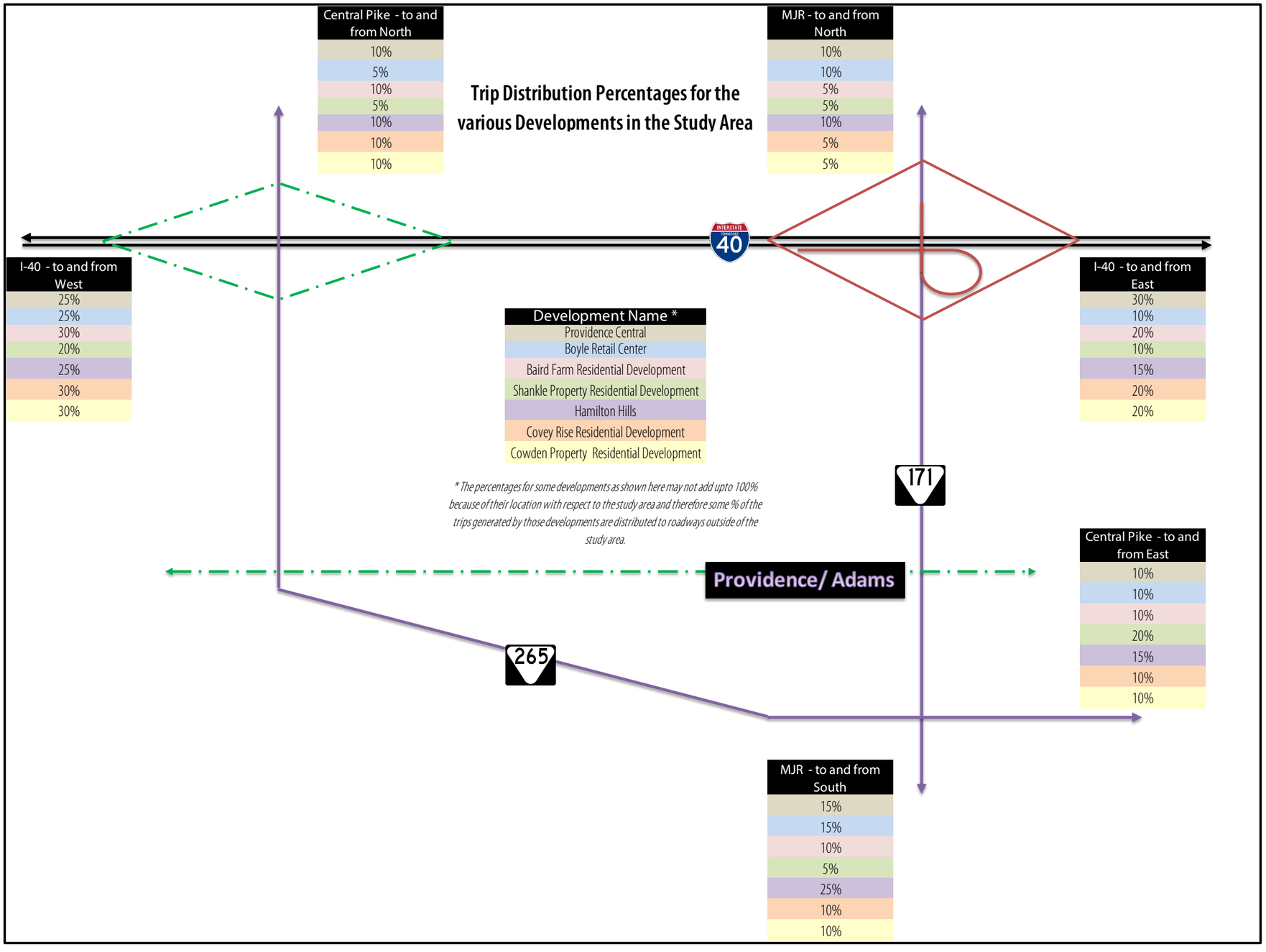


Figure 6. Trip Distribution Percentages for the Approved Developments

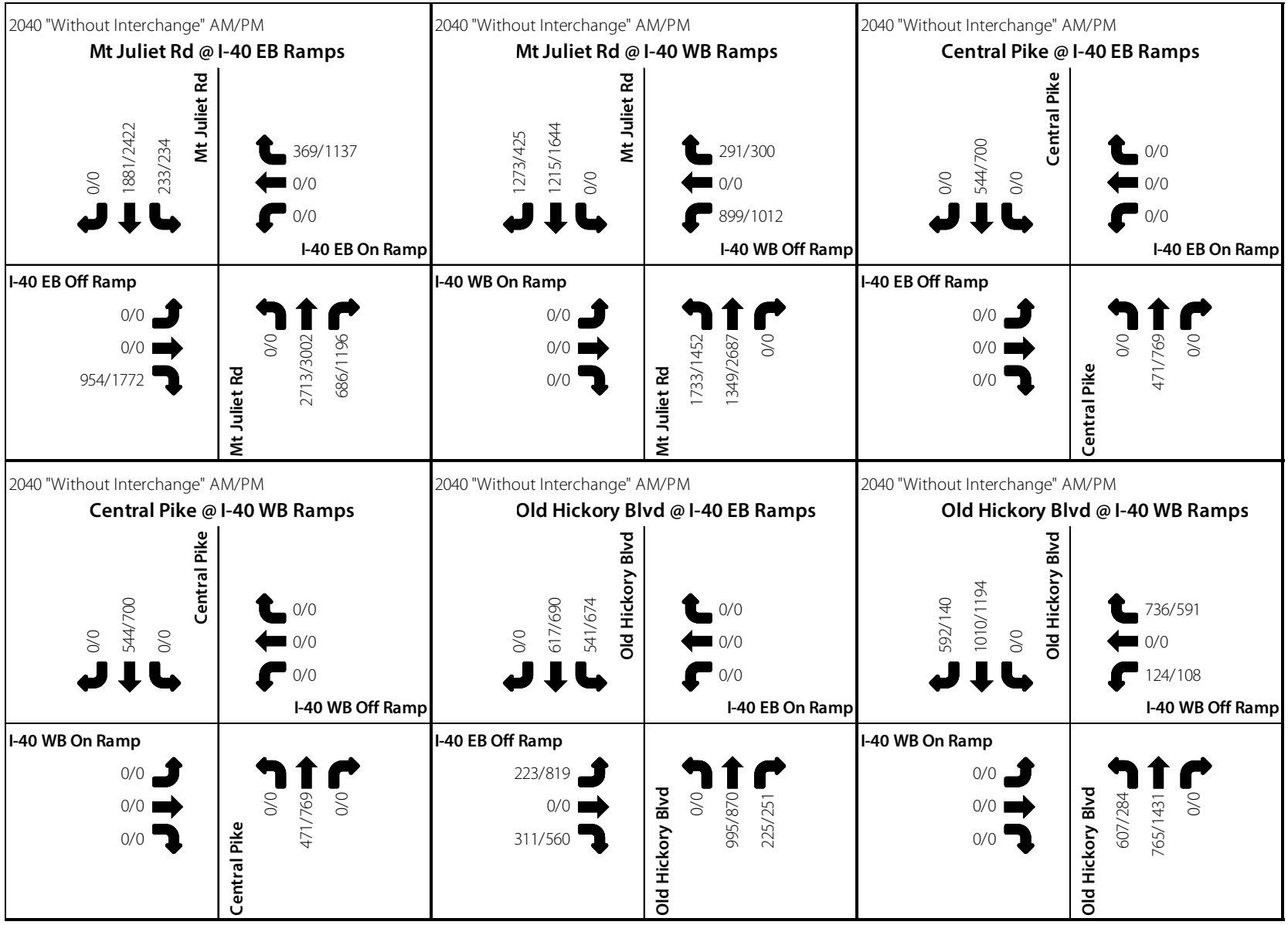


Figure 7. 2040 "Without Interchange" Peak Hour (AM/ PM) Intersection Turning Movement Volumes

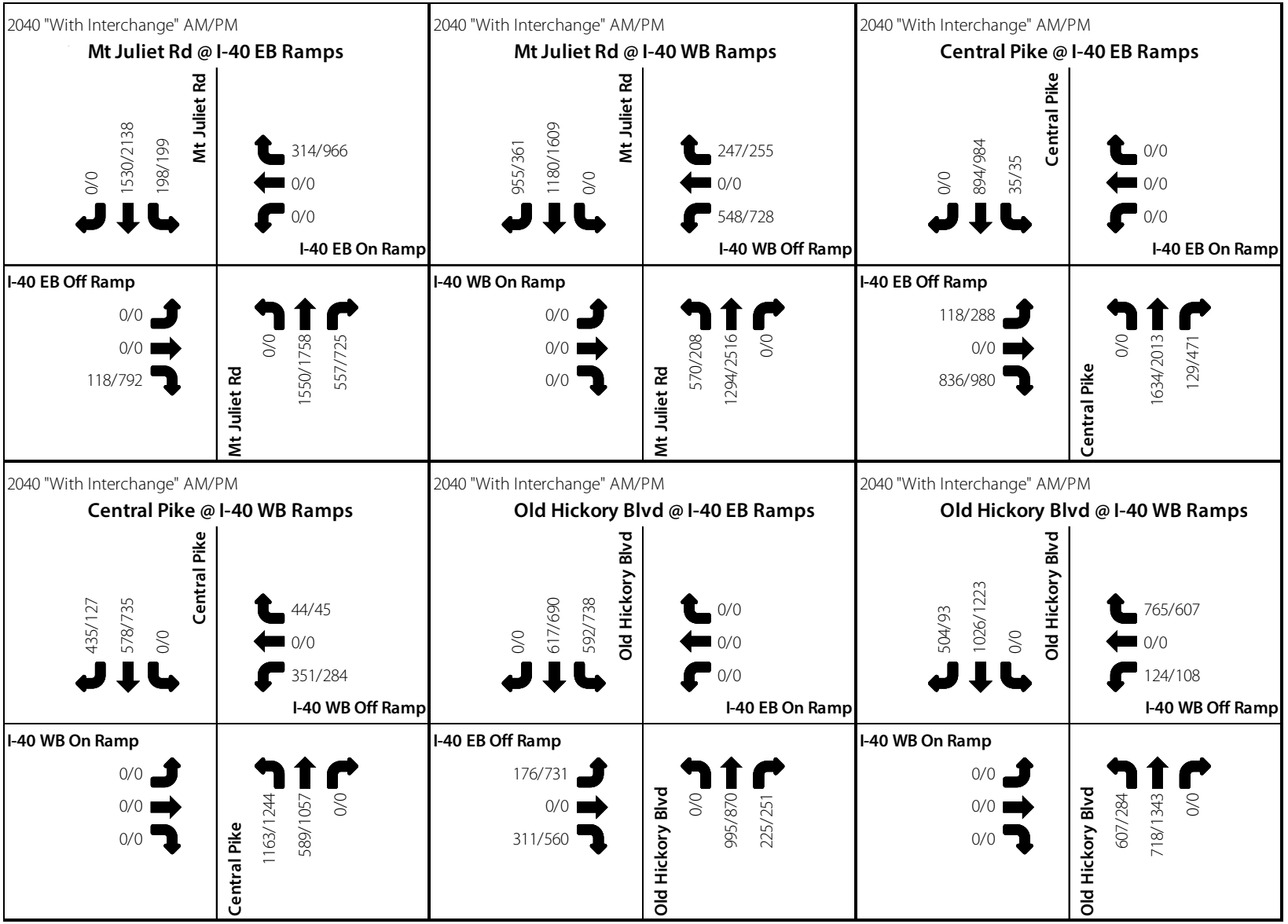


Figure 8. 2040 "With Interchange" Peak Hour (AM/ PM) Intersection Turning Movement Volumes

TRAFFIC ANALYSIS

Based on the traffic forecasts developed as part of this study peak hour traffic operations were analyzed at the interchange intersections along I-40 at Mt. Juliet Road and Central Pike. The traffic analysis was conducted using the methodologies outlined in the 2010 Highway Capacity Manual (HCM) and utilizing the Synchro 8.0 software program. The traffic analysis was conducted for the existing condition (Year 2014) and the future condition (Year 2040, without and with interchange).

The "With Interchange" condition traffic analysis at the I-40/ Central Pike interchange was conducted for both the traditional diamond configuration and the diverging diamond configuration. For the intersections at the I-40/ Central Pike interchange, the traffic analysis was based on the 2000 Highway Capacity Manual instead of the 2010 Highway Capacity Manual, because the 2010 Highway Capacity Manual methodologies does not support analyzing a diverging diamond configuration.

The intersections in this study are evaluated in terms of level of service (LOS), which is a measure of driving conditions and delay. Levels of service ranges from LOS A (free-flow conditions, no delay) to LOS F (severe congestion and delay). LOS A, B and C generally indicate satisfactory driving conditions. LOS D indicates conditions in which there is a noticeable delay. LOS E indicates traffic operating at or close to capacity, producing significant delays. LOS F indicates facilities operating above volume capacity, resulting in severe delays and queuing at signalized intersections. The results of the intersection LOS analysis are summarized in **Tables 2, 3, and 4**. The intersection capacity analysis worksheets are provided in Appendix C.

Table 2. "Without Interchange" (Year 2040) Analysis

	AM Peak Hour	PM Peak Hour
"Without Interchange" Conditions (Year 2040)	LOS	LOS
Signalized Intersections		
Mt Juliet Rd @ I-40 EB Ramps	C	C
Mt Juliet Rd @ I-40 WB Ramps	F	F

LOS = Level of service

Source: Gresham, Smith and Partners

Table 3. "With Interchange" (Year 2040) Analysis – Traditional Diamond

"With Interchange" Conditions (Year 2040)	AM Peak Hour LOS	PM Peak Hour LOS
Signalized Intersections		
Mt Juliet Rd @ I-40 EB Ramps	A	A
Mt Juliet Rd @ I-40 WB Ramps	D	E
Central Pike @ I-40 EB Ramps **– TRADITIONAL DIAMOND**	C	E
Central Pike @ I-40 WB Ramps **– TRADITIONAL DIAMOND**	D	C

LOS = Level of service

Source: Gresham, Smith and Partners

Table 4. "With Interchange" (Year 2040) Analysis – Diverging Diamond

"With Interchange" Conditions (Year 2040)	AM Peak Hour LOS	PM Peak Hour LOS
Signalized Intersections		
Central Pike @ I-40 EB Ramps **– DIVERGING DIAMOND**	C	D
Central Pike @ I-40 WB Ramps **– DIVERGING DIAMOND**	A	B

LOS = Level of service

Source: Gresham, Smith and Partners

FINDINGS AND RECOMMENDATIONS

Based on the traffic forecasting and the traffic analysis conducted as part of this study, the "With Interchange" scenario provides for better operational conditions at the I-40/ Mt. Juliet Road interchange. The **construction of the new interchange at I-40/ Central Pike is recommended** to accommodate the future growth in the study area and also to ensure adequate operation of the I-40/ Mt. Juliet Road interchange and Mt. Juliet Road within the study area. For the "With Interchange" scenario two interchange configurations were analyzed for the I-40/ Central Pike interchange. Based on the traffic analysis, **both interchange configurations provide adequate interchange operation** at the I-40/ Central Pike interchange.

APPENDIX A – TRAFFIC COUNT WORKSHEETS



Prepared by
Tennessee Dept. of Transportation
Long Range Planning Division

Date: 6/19/2014

Davidson County
Interstate 40
Exit No: 221

N
W E
S

Traffic Counter Location
Ramp Interchange Diagram
19I00400010221

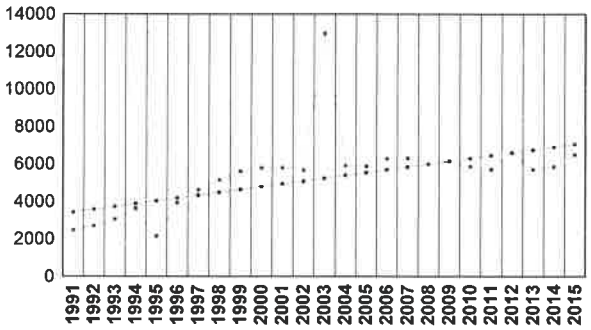
RAMP

County: Davidson **Station Number:** 000089

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: OLD HICKORY PIKE

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
05	1991	3,132	2,944	2,473	0.84	
06	1992	3,572	3,215	2,700	0.84	
06	1993	4,282	3,640	3,058	0.84	
05	1994	3,981	3,702	3,628	0.98	
03	1995	2,281	2,190	2,146	0.98	
04	1996	4,278	4,021	3,941	0.98	
04	1997	5,027	4,725	4,631	0.98	
04	1998	5,716	5,259	5,154	0.98	
05	1999	6,098	5,732	5,617	0.98	
06	2000	6,358	5,913	5,795	0.98	
03	2001	6,578	5,920	5,802	0.98	
03	2002	6,428	5,785	5,669	0.98	
01	2003	6,770	6,770	6,634	0.98	
03	2003	6,679	6,478	6,349	0.98	
02	2004	6,165	6,041	5,920	0.98	
03	2005	6,524	6,002	5,882	0.98	
03	2006	6,966	6,409	6,281	0.98	
04	2007	7,147	6,432	6,304	0.98	
02	2008	6,504	6,114	5,991	0.98	
02	2009	6,668	6,268	6,143	0.98	
02	2010	6,370	5,988	5,868	0.98	
02	2011	6,467	5,820	5,704	0.89	
03	2012	7,116	6,760	6,625	0.89	
02	2013	6,537	6,406	5,702	0.89	
02	2014	6,840	6,566	5,844	0.89	
01	2015	6,758	7,299	6,496	0.89	



Trend Line based on years 1991 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000089 (Ramp)	**County:**	19 Davidson
Start Date:	01 / 26 / 2015	**End Date:**	01 / 27 / 2015
Start Time:	14 : 00	**End Time:**	14 : 00
Direction:	5 (Ramp)		

Time	
14:00 - 15:00	400
15:00 - 16:00	571
16:00 - 17:00	633
17:00 - 18:00	676
18:00 - 19:00	369
19:00 - 20:00	260
20:00 - 21:00	167
21:00 - 22:00	129
22:00 - 23:00	93
23:00 - 24:00	58
24:00 - 01:00	50
01:00 - 02:00	14
02:00 - 03:00	19
03:00 - 04:00	24
04:00 - 05:00	84
05:00 - 06:00	175
06:00 - 07:00	392
07:00 - 08:00	450
08:00 - 09:00	321
09:00 - 10:00	318
10:00 - 11:00	372
11:00- 12:00	392
12:00 - 13:00	376
13:00 - 14:00	415

V.F.

Total: 6,758 X 1.08 X 0.89 = 6496 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
06:45 - 07:45	466	0.90	16:45 - 17:45	711	0.87

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
7	100	11	100	11	100

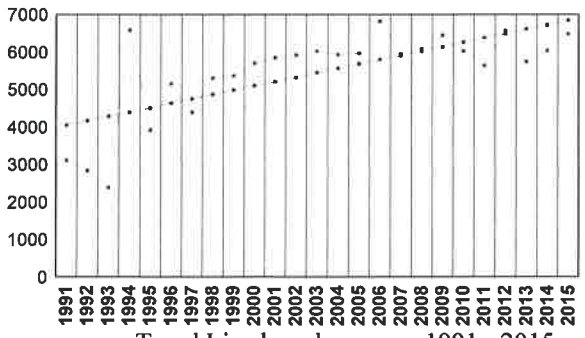
RAMP

County: Davidson **Station Number:** 000090

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: OLD HICKORY BLVD

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
05	1991	2,941	3,705	3,112	0.84	
06	1992	3,668	3,375	2,835	0.84	
06	1993	3,109	2,829	2,377	0.84	
05	1994	7,383	6,719	6,584	0.98	LOOKS HIGH
03	1995	4,161	3,995	3,915	0.98	
04	1996	5,506	5,231	5,156	0.98	
04	1997	4,763	4,477	4,388	0.98	
03	1998	5,579	5,412	5,303	0.98	
04	1999	5,946	5,470	5,361	0.98	
06	2000	6,394	5,819	5,702	0.98	
03	2001	6,149	5,965	5,845	0.98	
03	2002	6,353	6,035	5,915	0.98	
03	2003	6,335	6,144	6,022	0.98	
02	2004	6,173	6,049	5,928	0.98	
03	2005	6,632	6,101	5,979	0.98	
03	2006	7,326	6,960	6,821	0.98	
03	2007	6,984	6,076	5,955	0.98	
02	2008	6,609	6,212	6,088	0.98	
02	2009	7,000	6,580	6,448	0.98	
02	2010	6,542	6,149	6,026	0.98	
02	2011	6,393	5,754	5,639	0.88	
03	2012	7,063	6,710	6,576	0.88	
02	2013	6,660	6,527	5,744	0.88	
02	2014	7,146	6,860	6,037	0.88	
01	2015	6,823	7,369	6,485	0.88	



Trend Line based on years 1991 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

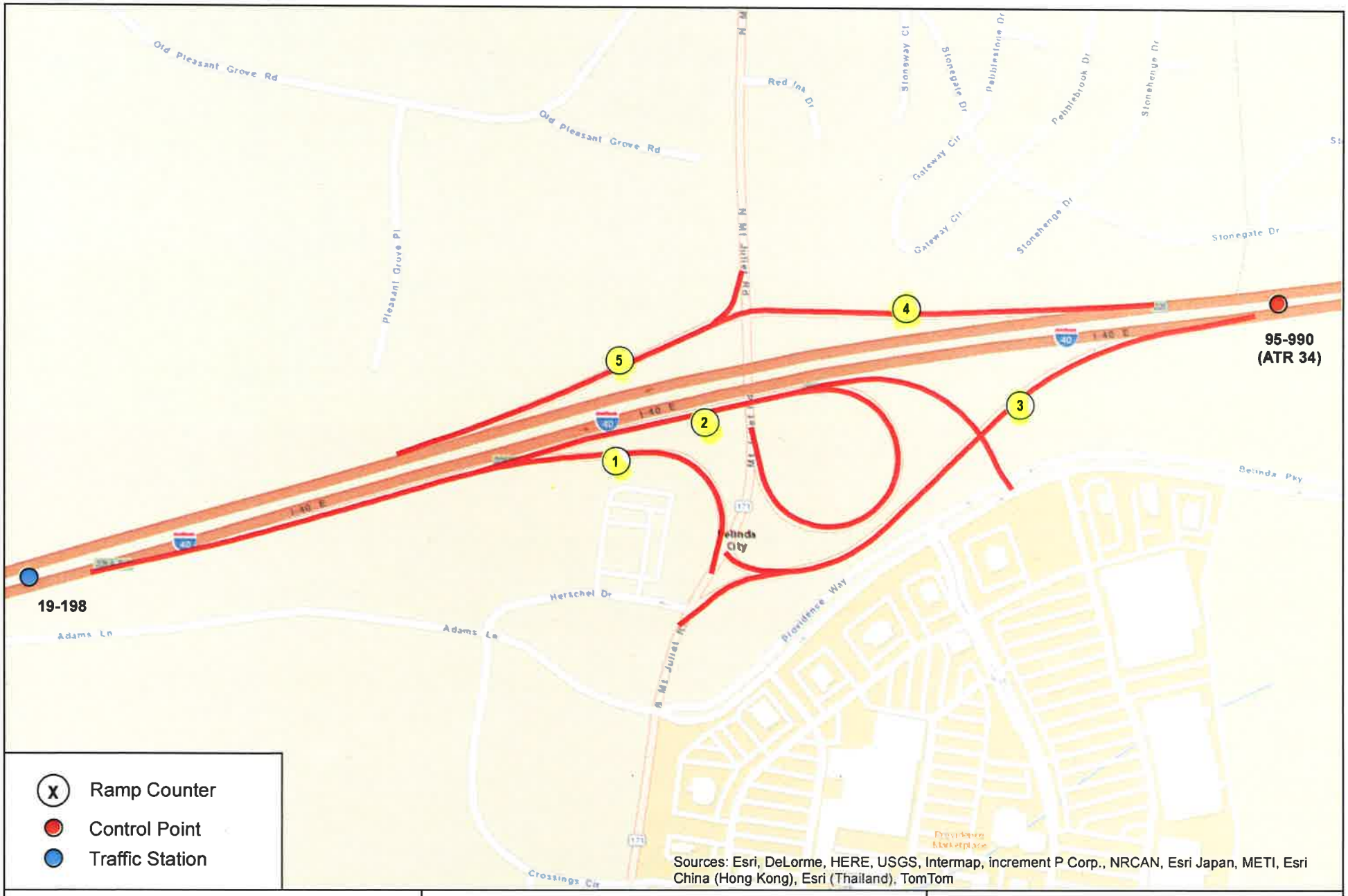
Station Number:	000090 (Ramp)	**County:**	19 Davidson
Start Date:	01 / 26 / 2015	**End Date:**	01 / 27 / 2015
Start Time:	09 : 00	**End Time:**	09 : 00
Direction:	5 (Ramp)		

Time	
09:00 - 10:00	334
10:00 - 11:00	375
11:00 - 12:00	324
12:00 - 13:00	450
13:00 - 14:00	401
14:00 - 15:00	405
15:00 - 16:00	460
16:00 - 17:00	450
17:00 - 18:00	479
18:00 - 19:00	362
19:00 - 20:00	285
20:00 - 21:00	209
21:00 - 22:00	154
22:00 - 23:00	105
23:00 - 24:00	65
24:00 - 01:00	54
01:00 - 02:00	31
02:00 - 03:00	30
03:00 - 04:00	28
04:00 - 05:00	43
05:00 - 06:00	165
06:00 - 07:00	451
07:00 - 08:00	661
08:00 - 09:00	502

		V.F.	T.F.	
Total:	6,823	X 1.08 X	0.88 =	6485 AADT

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
06:45 - 07:45	695	0.95	15:15 - 16:15	498	0.84

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
10	100	7	100	10	100



Prepared by
Tennessee Dept. of Transportation
Long Range Planning Division

Date: 2/10/2015

Wilson County
Interstate 40
Exit No: 226

N
W E
S

Traffic Counter Location
Ramp Interchange Diagram
95I00400010226

Miles

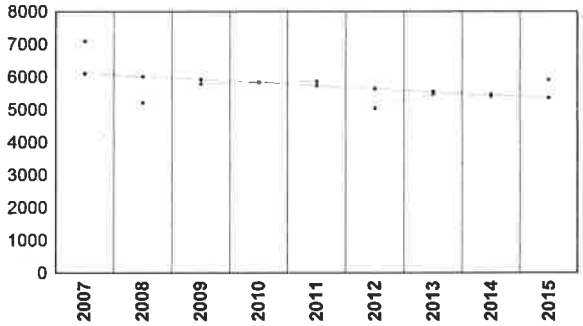
RAMP

County: Wilson **Station Number:** 000001

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: SR-171 MOVED FRON CO.19 #228

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
10	2007	8,046	7,241	7,097	0.98	
09	2008	5,596	5,316	5,210	0.98	
10	2009	6,488	5,904	5,786	0.98	
08	2010	6,386	5,939	5,820	0.98	
08	2011	6,726	5,986	5,866	0.89	
08	2012	6,095	5,668	5,045	0.89	
07	2013	0	0	5,470	0.89	EST - CONST
05	2014	7,236	6,078	5,410	0.89	
08	2015	6,993	6,643	5,913	0.89	



Trend Line based on years 2007 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000001 (Ramp)	**County:**	95 Wilson
Start Date:	08 / 03 / 2015	**End Date:**	08 / 04 / 2015
Start Time:	11 : 00	**End Time:**	11 : 00
Direction:	5 (Ramp)		

Time	
11:00 - 12:00	396
12:00 - 13:00	444
13:00 - 14:00	435
14:00 - 15:00	467
15:00 - 16:00	584
16:00 - 17:00	695
17:00 - 18:00	839
18:00 - 19:00	638
19:00 - 20:00	356
20:00 - 21:00	270
21:00 - 22:00	188
22:00 - 23:00	136
23:00 - 24:00	86
24:00 - 01:00	41
01:00 - 02:00	27
02:00 - 03:00	18
03:00 - 04:00	19
04:00 - 05:00	31
05:00 - 06:00	90
06:00 - 07:00	175
07:00 - 08:00	234
08:00 - 09:00	241
09:00 - 10:00	259
10:00 - 11:00	324

		V.F.		T.F		
Total:	6,993	X 0.95	X	0.89	=	5913 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
11:30 - 12:30	437	0.93	17:00 - 18:00	839	0.89

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
6	100	12	100	12	100

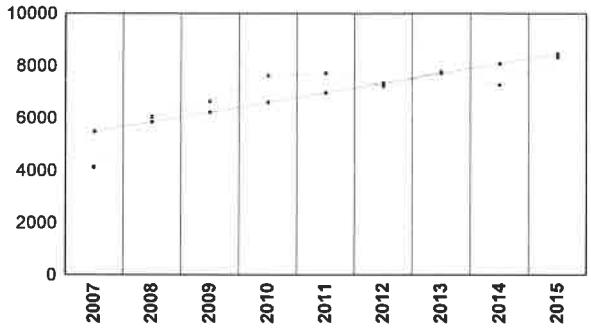
RAMP

County: Wilson **Station Number:** 000002

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: SR-171 MOVED FROM CO.19 #229

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
10	2007	4,630	4,213	4,129	0.98	
09	2008	6,495	6,170	6,047	0.98	
10	2009	7,446	6,776	6,640	0.98	
08	2010	8,361	7,776	7,620	0.98	
08	2011	8,843	7,870	7,713	0.89	
08	2012	8,717	8,107	7,215	0.89	
07	2013	9,705	8,734	7,774	0.89	CONST. IN AREA
05	2014	9,722	8,166	7,268	0.89	
08	2015	9,841	9,349	8,321	0.89	



Trend Line based on years 2007 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000002 (Ramp)	**County:**	95 Wilson
Start Date:	08 / 03 / 2015	**End Date:**	08 / 04 / 2015
Start Time:	11 : 00	**End Time:**	11 : 00
Direction:	5 (Ramp)		

Time	
11:00 - 12:00	426
12:00 - 13:00	497
13:00 - 14:00	580
14:00 - 15:00	631
15:00 - 16:00	875
16:00 - 17:00	1,231
17:00 - 18:00	1,355
18:00 - 19:00	909
19:00 - 20:00	454
20:00 - 21:00	333
21:00 - 22:00	249
22:00 - 23:00	139
23:00 - 24:00	118
24:00 - 01:00	60
01:00 - 02:00	36
02:00 - 03:00	38
03:00 - 04:00	20
04:00 - 05:00	48
05:00 - 06:00	99
06:00 - 07:00	247
07:00 - 08:00	355
08:00 - 09:00	331
09:00 - 10:00	363
10:00 - 11:00	447

		V.F.		T.F.		
Total:	9,841	X 0.95	X	0.89	=	8321 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
11:45 - 12:45	509	0.91	17:00 - 18:00	1355	0.91

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
5	100	14	100	14	100

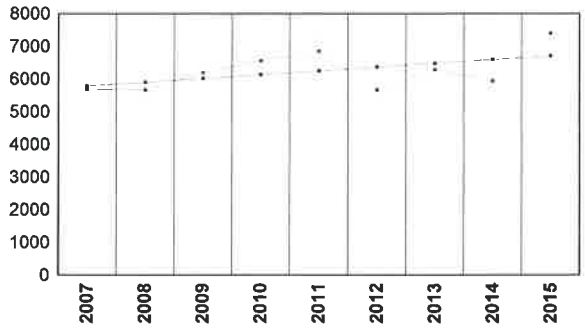
RAMP

County: Wilson **Station Number:** 000003

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: SR-171 MOVED FROM CO.19 #230

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
10	2007	6,383	5,809	5,692	0.98	
09	2008	6,081	5,777	5,661	0.98	
10	2009	6,949	6,324	6,197	0.98	
08	2010	7,200	6,696	6,562	0.98	
08	2011	7,857	6,993	6,853	0.89	
08	2012	6,839	6,360	5,661	0.89	
07	2013	7,847	7,062	6,285	0.89	CONST. IN AREA
05	2014	7,951	6,679	5,944	0.89	
08	2015	8,755	8,317	7,402	0.89	



Trend Line based on years 2007 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000003 (Ramp)	**County:**	95 Wilson
Start Date:	08 / 03 / 2015	**End Date:**	08 / 04 / 2015
Start Time:	11 : 00	**End Time:**	11 : 00
Direction:	5 (Ramp)		

Time	
11:00 - 12:00	477
12:00 - 13:00	605
13:00 - 14:00	562
14:00 - 15:00	585
15:00 - 16:00	669
16:00 - 17:00	618
17:00 - 18:00	645
18:00 - 19:00	549
19:00 - 20:00	449
20:00 - 21:00	363
21:00 - 22:00	270
22:00 - 23:00	182
23:00 - 24:00	99
24:00 - 01:00	56
01:00 - 02:00	56
02:00 - 03:00	43
03:00 - 04:00	55
04:00 - 05:00	126
05:00 - 06:00	172
06:00 - 07:00	405
07:00 - 08:00	537
08:00 - 09:00	443
09:00 - 10:00	379
10:00 - 11:00	410

		V.F.		T.F.		
Total:	8,755	X 0.95	X	0.89	=	7402 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
11:45 - 12:45	587	0.90	14:45 - 15:45	679	0.91

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
7	100	8	100	8	100

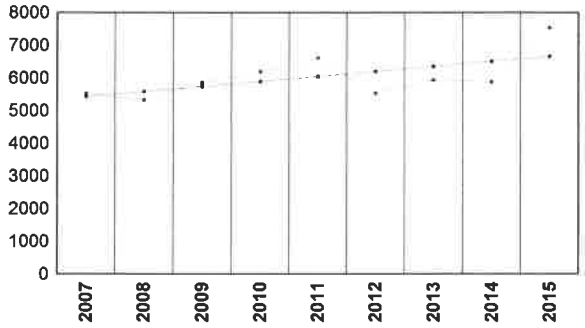
RAMP

County: Wilson **Station Number:** 000004

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: SR-171 MOVED FROM CO.19 #231

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
10	2007	6,260	5,634	5,521	0.98	
10	2008	6,325	5,440	5,331	0.98	
09	2009	6,629	5,966	5,847	0.98	
08	2010	6,787	6,312	6,186	0.98	
08	2011	7,580	6,746	6,611	0.89	
08	2012	6,685	6,217	5,533	0.89	
07	2013	7,407	6,666	5,933	0.89	CONST. IN AREA
05	2014	7,867	6,608	5,881	0.89	
08	2015	8,918	8,472	7,540	0.89	



Trend Line based on years 2007 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000004 (Ramp)	**County:**	95 Wilson
Start Date:	08 / 03 / 2015	**End Date:**	08 / 04 / 2015
Start Time:	09 : 00	**End Time:**	09 : 00
Direction:	5 (Ramp)		

Time	
09:00 - 10:00	519
10:00 - 11:00	487
11:00 - 12:00	618
12:00 - 13:00	585
13:00 - 14:00	549
14:00 - 15:00	544
15:00 - 16:00	627
16:00 - 17:00	711
17:00 - 18:00	666
18:00 - 19:00	497
19:00 - 20:00	310
20:00 - 21:00	237
21:00 - 22:00	182
22:00 - 23:00	122
23:00 - 24:00	76
24:00 - 01:00	75
01:00 - 02:00	49
02:00 - 03:00	65
03:00 - 04:00	83
04:00 - 05:00	111
05:00 - 06:00	234
06:00 - 07:00	415
07:00 - 08:00	603
08:00 - 09:00	553

		V.F.		T.F.		
Total:	8,918	X 0,95	X	0.89	=	7540 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
11:15 - 12:15	669	0.86	15:45 - 16:45	723	0.89

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
8	100	8	100	8	100

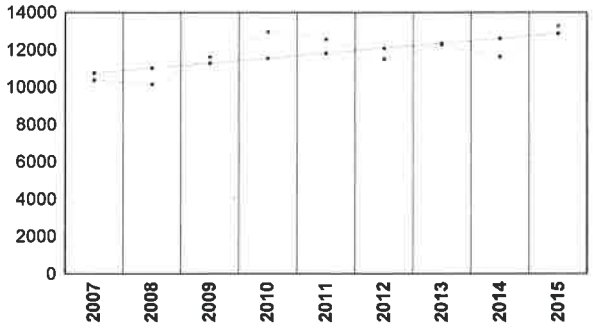
RAMP

County: Wilson **Station Number:** 000005

Route: I-40 **Station Type:** Urban **Station Out:** NO

Location: SR-171 MOVED FROM CO.19 #232

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
10	2007	11,762	10,586	10,374	0.98	
10	2008	12,053	10,366	10,158	0.98	
09	2009	13,169	11,852	11,615	0.98	
08	2010	14,222	13,226	12,962	0.98	
08	2011	14,403	12,819	12,562	0.89	
08	2012	13,899	12,926	11,504	0.89	
07	2013	15,316	13,784	12,268	0.89	
05	2014	15,549	13,061	11,624	0.89	
08	2015	15,706	14,921	13,279	0.89	



Trend Line based on years 2007 - 2015

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

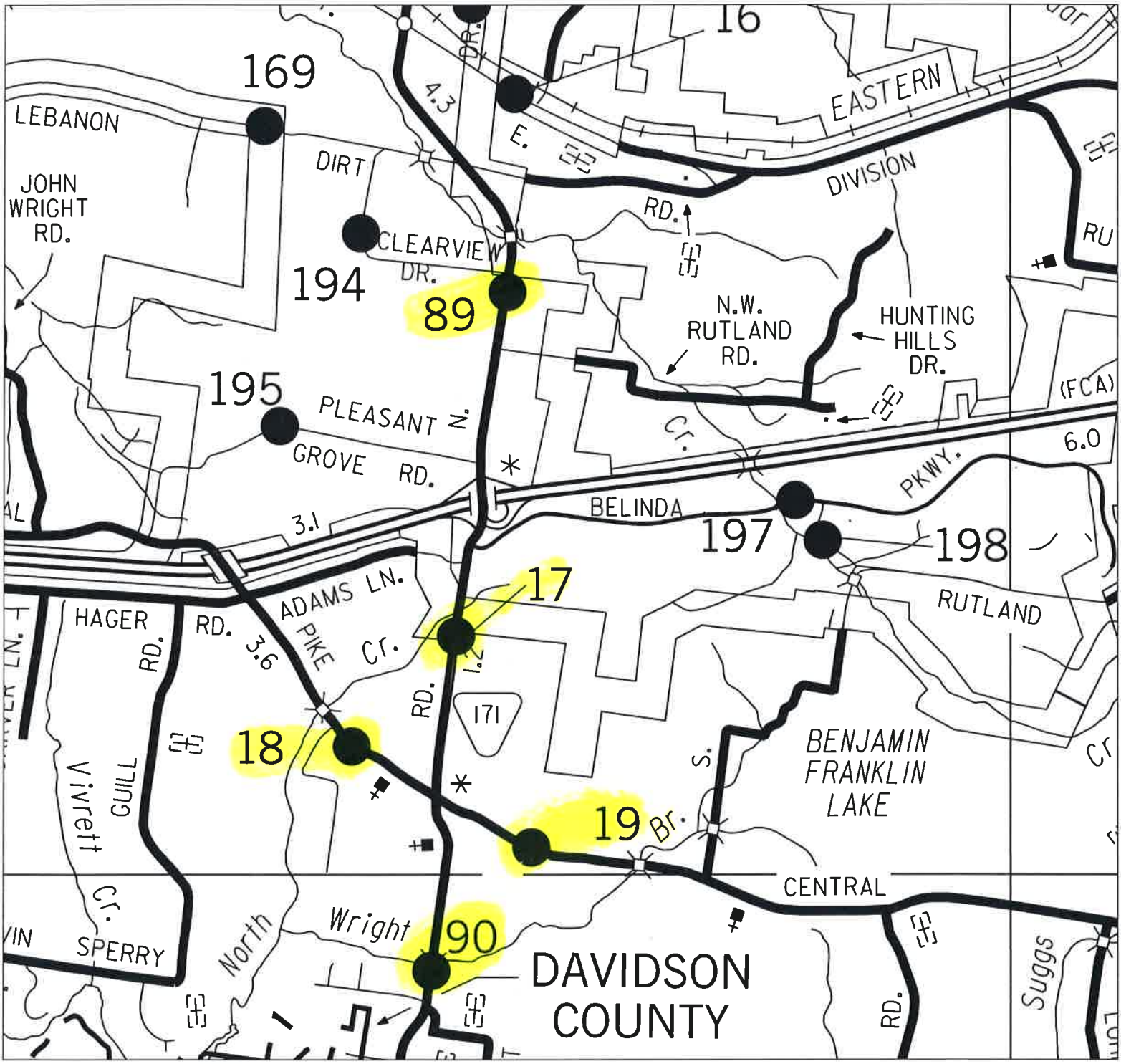
Station Number:	000005 (Ramp)	**County:**	95 Wilson
Start Date:	08 / 03 / 2015	**End Date:**	08 / 04 / 2015
Start Time:	11 : 00	**End Time:**	11 : 00
Direction:	5 (Ramp)		

Time	
11:00 - 12:00	788
12:00 - 13:00	844
13:00 - 14:00	822
14:00 - 15:00	807
15:00 - 16:00	770
16:00 - 17:00	753
17:00 - 18:00	753
18:00 - 19:00	670
19:00 - 20:00	519
20:00 - 21:00	472
21:00 - 22:00	357
22:00 - 23:00	214
23:00 - 24:00	104
24:00 - 01:00	58
01:00 - 02:00	48
02:00 - 03:00	50
03:00 - 04:00	73
04:00 - 05:00	189
05:00 - 06:00	650
06:00 - 07:00	1,958
07:00 - 08:00	1,736
08:00 - 09:00	1,257
09:00 - 10:00	943
10:00 - 11:00	871

		V.F.		T.F.		
Total:	15,706	X 0.95	X	0.89	=	13,279 AADT

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
06:15 - 07:15	2069	0.97	12:30 - 13:30	884	0.97

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
13	100	6	100	13	100


16
169
LEBANON
JOHN WRIGHT RD.
DIRT
4.3
E.
EASTERN
DIVISION
RD.
CLEARVIEW DR.
194
89
N.W. RUTLAND RD.
HUNTING HILLS DR.
195
PLEASANT N.
GROVE RD.
Cr.
(FCA)
6.0
PKWY.
BELINDA
3.1
197
198
RUTLAND
ADAMS LN.
17
HAGER
RD.
3.6
PIKE
Cr.
1.2
171
18
Vivrett
GUILL
Cr.
BENJAMIN FRANKLIN LAKE
19
Br.
CENTRAL
SPERRY
North
Wright
90
DAVIDSON COUNTY
Suggs
RD.

County: Wilson **Station Number:** 000017

Route: SR171 **Station Type:** Urban **Station Out:** NO

Location: S. OF MT. JULIET AND I-40

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
03	1985	8,254	8,750	8,574	0.97	
11	1986	9,306	9,213	8,937	0.97	
12	1987	10,877		10,867	0.97	
10	1988	10,134		9,830	0.97	
10	1989	12,071		11,592	0.97	
07	1990	6,860	0	11,200	0.97	ACTUAL = 6454
10	1991	12,828	13,212	12,816	0.97	
08	1992	14,212	13,928	13,510	0.97	
11	1993	14,682	14,829	14,384	0.97	
11	1994	16,068	15,907	15,430	0.97	
11	1995	15,588	15,120	14,666	0.97	
10	1996	15,244	14,787	14,343	0.97	
09	1997	16,198	15,712	15,241	0.97	
09	1998	16,951	16,103	15,620	0.97	
10	1999	16,881	16,375	15,884	0.97	
10	2000	17,123	16,609	16,111	0.97	
09	2001	16,271	15,457	14,993	0.97	
08	2002	16,513	15,852	15,376	0.97	
10	2003	16,391	16,063	15,581	0.97	
09	2004	16,583	15,422	14,959	0.97	
09	2005	17,839	16,590	16,093	0.97	
11	2006	17,272	16,927	16,419	0.97	
10	2007	17,532	16,655	16,156	0.97	
09	2008	18,325	17,409	16,886	0.97	
09	2009	18,789	16,722	16,221	0.97	
08	2010	19,790	19,394	18,812	0.97	NEW SHOPPING CENTER
09	2011	0	0	18,354	0.94	EST
08	2012	0	0	18,110	0.94	USED CLASS COUNT
09	2013	21,088	19,823	18,633	0.94	
05	2014	23,066	19,375	18,213	0.94	
05	2015	23,183	21,560	20,267	0.94	

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000017	**County:**	95 Wilson
Start Date:	05 / 26 / 2015	**End Date:**	05 / 27 / 2015
Start Time:	12 : 00	**End Time:**	12 : 00
Direction:	0 (Coverage)		

Time	
12:00 - 13:00	1,314
13:00 - 14:00	1,251
14:00 - 15:00	1,335
15:00 - 16:00	1,527
16:00 - 17:00	1,797
17:00 - 18:00	1,917
18:00 - 19:00	1,482
19:00 - 20:00	1,190
20:00 - 21:00	836
21:00 - 22:00	610
22:00 - 23:00	377
23:00 - 24:00	251
24:00 - 01:00	150
01:00 - 02:00	138
02:00 - 03:00	111
03:00 - 04:00	106
04:00 - 05:00	215
05:00 - 06:00	657
06:00 - 07:00	1,390
07:00 - 08:00	1,641
08:00 - 09:00	1,302
09:00 - 10:00	1,162
10:00 - 11:00	1,130
11:00 - 12:00	1,294

Total: 23,183 x Variation Factor: 0.93 = 21,560 x Truck Factor: 0.94 = AADT: 20,266.5

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
07:00 - 08:00	1641	0.98	16:45 - 17:45	1929	0.97

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
7	65	8	65	8	65

County: Wilson **Station Number:** 000018

Route: SR265 **Station Type:** Urban **Station Out:** NO

Location: S. OF MT. JULIET AND I-40

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
03	1985	987	1,050	1,025	0.97	
11	1986	1,052	1,041	1,021	0.97	
12	1987	1,258		1,257	0.97	
10	1988	1,782		1,729	0.97	
10	1989	2,257		2,167	0.97	LOOKS HIGH
07	1990	1,564		1,471	0.97	
10	1991	1,638	1,687	1,637	0.97	
08	1992	1,783	1,747	1,695	0.97	
11	1993	1,512	1,527	1,481	0.97	
11	1994	1,871	1,852	1,796	0.97	
11	1995	2,753	2,670	1,800	0.97	ACTUAL = 2590
10	1996	1,910	1,853	1,797	0.97	
09	1997	3,046	2,894	2,807	0.97	
09	1998	2,910	2,765	2,682	0.97	
10	1999	2,624	2,545	2,469	0.97	
10	2000	2,508	2,433	2,360	0.97	
09	2001	2,630	2,499	2,424	0.97	
08	2002	2,566	2,489	2,414	0.97	
10	2003	2,425	2,376	2,305	0.97	
09	2004	2,727	2,427	2,354	0.97	
09	2005	2,838	2,639	2,560	0.97	
11	2006	4,351	4,264	2,666	0.97	ACTUAL = 4136
10	2007	3,921	3,725	3,613	0.97	LAST 2 YRS HIGH
09	2008	3,436	3,264	3,166	0.97	
09	2009	3,054	2,718	2,637	0.97	SEE PREVIOUS YRS
08	2010	3,211	3,147	3,052	0.99	LAST YEAR LOW
08	2011	3,079	3,017	2,987	0.99	
08	2012	3,821	3,630	3,594	0.99	TRAFFIC UP AND DOWN, HIGH THIS YEAR
09	2013	3,754	3,566	3,531	0.99	
05	2014	4,129	3,551	3,515	0.99	
05	2015	4,303	3,916	3,877	0.99	

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000018	**County:**	95 Wilson
Start Date:	05 / 26 / 2015	**End Date:**	05 / 27 / 2015
Start Time:	12 : 00	**End Time:**	12 : 00
Direction:	0 (Coverage)		

Time	
12:00 - 13:00	235
13:00 - 14:00	196
14:00 - 15:00	262
15:00 - 16:00	323
16:00 - 17:00	395
17:00 - 18:00	489
18:00 - 19:00	289
19:00 - 20:00	157
20:00 - 21:00	110
21:00 - 22:00	73
22:00 - 23:00	61
23:00 - 24:00	38
24:00 - 01:00	19
01:00 - 02:00	11
02:00 - 03:00	11
03:00 - 04:00	9
04:00 - 05:00	29
05:00 - 06:00	88
06:00 - 07:00	265
07:00 - 08:00	460
08:00 - 09:00	213
09:00 - 10:00	194
10:00 - 11:00	159
11:00 - 12:00	217

Total: 4,303 x Variation Factor: 0.91 = 3,916 x Truck Factor: 0.99 = AADT: 3,876.57

Peak AM	**Peak Total**	**Peak Hour Factor**	**Peak PM**	**Peak Total**	**Peak Hour Factor**
06:45 - 07:45	464	0.90	17:00 - 18:00	489	0.93

Peak AM %	**Dir Dist AM %**	**Peak PM %**	**Dir Dist PM %**	**Daily Peak %**	**Daily Dir Dist %**
11	65	11	65	11	65

County: Wilson **Station Number:** 000019

Route: SR265 **Station Type:** Urban **Station Out:** NO

Location: S. OF MT. JULIET AND I-40

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
03	1985	2,005	2,130	2,083	0.97	
11	1986	2,248	2,225	2,159	0.97	
12	1987	2,611		2,611	0.97	
10	1988	2,872		2,786	0.97	
10	1989	3,715		3,568	0.97	NEW MRKT
07	1990	2,912		2,740	0.97	LOOKS LOW
10	1991	3,563	3,670	3,560	0.97	
08	1992	3,208	3,144	3,050	0.97	
11	1993	3,031	3,061	2,969	0.97	
11	1994	3,487	3,452	3,348	0.97	
11	1995	3,624	3,515	3,410	0.97	
10	1996	3,233	3,136	3,042	0.97	
09	1997	3,750	3,638	3,529	0.97	
09	1998	3,799	3,609	3,501	0.97	
10	1999	4,025	3,905	3,788	0.97	
10	2000	4,261	4,133	4,009	0.97	
09	2001	4,072	3,868	3,752	0.97	
08	2002	0	0	4,002	0.97	EST
10	2003	3,838	3,761	3,648	0.97	
09	2004	4,129	3,839	3,724	0.97	
11	2005	0	0	4,100	0.97	EST
11	2006	5,927	5,808	4,124	0.97	ACTUAL = 5634
10	2007	5,719	5,433	5,270	0.97	LAST 2 YRS HIGH
09	2008	6,310	5,994	5,815	0.97	
09	2009	6,095	5,425	5,262	0.97	
08	2010	0	0	5,600	0.95	USED CLASS COUNT
08	2011	6,450	6,321	6,005	0.95	
08	2012	8,371	7,952	6,185	0.95	ACTUAL = 7555
09	2013	7,163	6,805	6,465	0.95	
05	2014	7,787	6,697	6,362	0.95	
05	2015	0	0	6,770	0.95	USED CLASS COUNT

CLASS CT. 19 N.B.

Basic Axle Classification Report: X9500191

Station ID : X9500191
Info Line 1 : STA.19N SR.265
Info Line 2 : WILSON CO.
GPS Lat/Lon :
DB File : X9500191.DB

Last Connected Device Type : Unic-L
Version Number : 1.50
Serial Number : 91880
Number of Lanes : 1
Posted Speed Limit :

Lane #1 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
1.			Ax-Ax	10.0 ft	6.0 ft	

Lane #1 Basic Axle Classification Data From: 12:00 - 05/26/2015 To: 11:59 - 05/27/2015

(DEFAULTB) Date	Time	#1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
5/26/201	12:00	2	123	63	0	2	1	0	2	0	0	0	0	0	193
Tue	13:00	0	151	49	0	1	0	0	2	1	0	0	0	0	204
	14:00	0	139	64	0	1	0	0	2	1	0	0	0	0	207
	15:00	0	142	57	0	5	3	1	4	0	0	2	0	5	219
	16:00	0	153	39	0	2	0	0	1	2	0	0	0	0	197
	17:00	0	163	49	0	2	0	0	3	0	0	0	0	1	218
	18:00	0	152	31	0	0	1	0	1	0	0	1	0	2	188
	19:00	1	103	46	0	1	0	0	0	0	0	0	0	0	151
	20:00	1	74	28	0	0	0	0	0	0	0	0	0	0	103
	21:00	0	61	13	0	0	0	0	0	0	0	0	0	0	74
	22:00	0	32	3	0	0	0	0	0	0	0	0	0	0	35
	23:00	0	8	2	0	0	0	0	0	0	0	0	0	0	10
Daily Total :		4	1301	444	0	14	5	1	15	4	0	3	0	8	1799
Percent :		0%	72%	25%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	
Average :		0	108	37	0	1	0	0	1	0	0	0	0	1	148

CLASS CT. 19 N.B.

Date	Time	(DEFAULTB) #1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
5/27/201	00:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
Wed	01:00	0	3	4	0	0	0	0	0	0	0	0	0	0	7
	02:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	03:00	0	9	4	0	0	0	0	0	0	0	0	0	0	13
	04:00	0	34	6	0	0	0	0	0	1	0	0	0	0	41
	05:00	0	84	36	0	0	1	0	0	0	0	0	0	0	121
	06:00	0	269	90	0	1	0	0	4	0	0	1	0	0	365
	07:00	0	245	80	0	3	0	0	3	0	1	6	0	6	344
	08:00	0	210	53	0	2	0	0	1	0	0	0	0	0	266
	09:00	0	150	52	0	1	1	0	0	0	1	0	0	0	205
	10:00	1	136	47	0	1	1	0	1	0	1	0	0	0	188
	11:00	2	167	80	0	3	0	0	1	1	1	0	0	0	255
Daily Total :		3	1322	453	0	11	3	0	10	2	4	7	0	6	1821
Percent :		0%	73%	25%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	
Average :		0	110	38	0	1	0	0	1	0	0	1	0	1	152

CLASS CT. N.B

Basic Axle Class Summary: X9500191

(DEFAULTB) Description	Lane	#1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
TOTAL COUNT :	#1	7	2623	897	0	25	8	1	25	6	4	10	0	14	3620
		7	2623	897	0	25	8	1	25	6	4	10	0	14	3620
Percents :	#1	0%	72%	25%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	100%
		0%	72%	25%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	
Average :	#1	0	109	37	0	1	0	0	1	0	0	0	0	1	149
		0	109	37	0	1	0	0	1	0	0	0	0	1	149
Days & ADT :	#1	1.0	3620												
		1.0	3620												

CLASS CT, 19 S.B.

Basic Axle Classification Report: X9500192

Station ID : X9500192
Info Line 1 : STA. 19S SR.265
Info Line 2 : WILSON CO.
GPS Lat/Lon :
DB File : X9500192.DB

Last Connected Device Type : Unic-L
Version Number : 1.41
Serial Number :
Number of Lanes : 1
Posted Speed Limit :

Lane #1 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
1.			Ax-Ax	10.0 ft	6.0 ft	

Lane #1 Basic Axle Classification Data From: 12:00 - 05/26/2015 To: 11:59 - 05/27/2015

(DEFAULTB) Date	Time	#1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
5/26/201	12:00	1	133	57	0	1	0	0	0	1	0	0	0	0	193
Tue	13:00	1	141	47	0	1	0	0	2	0	0	0	0	0	192
	14:00	0	167	69	0	3	0	0	2	0	0	0	0	0	241
	15:00	1	200	44	0	2	2	0	0	1	0	0	0	0	250
	16:00	1	271	75	0	2	0	0	2	0	1	0	0	0	352
	17:00	1	324	92	0	1	0	0	4	0	0	0	0	0	422
	18:00	1	284	56	0	2	1	0	1	1	0	0	0	0	346
	19:00	1	186	61	0	1	0	0	0	0	0	0	0	0	249
	20:00	0	149	49	0	0	0	0	2	0	0	0	0	0	200
	21:00	1	84	18	0	0	0	0	0	0	0	0	0	0	103
	22:00	0	60	15	0	0	0	0	0	0	0	0	0	0	75
	23:00	0	30	11	0	0	0	0	0	0	0	0	0	0	41
Daily Total :		8	2029	594	0	13	3	0	13	3	1	0	0	0	2664
Percent :		0%	76%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Average :		1	169	50	0	1	0	0	1	0	0	0	0	0	222

CLASS CT. 19 S.B.

Station: X9500192 — Lane #1 Axle Data From 12:00 - 05/26/2015 To: 11:59 - 05/27/2015

Date (DEFAULTB)	Time	#1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
5/27/201	00:00	0	19	5	0	0	0	0	0	0	0	0	0	0	24
Wed	01:00	0	11	5	0	0	0	0	0	0	0	0	0	0	16
	02:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	03:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
	04:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
	05:00	0	21	1	0	1	0	0	0	0	0	0	0	0	23
	06:00	0	86	38	0	2	0	0	0	0	0	0	0	0	126
	07:00	0	102	46	0	3	1	0	1	0	0	1	0	1	155
	08:00	1	88	35	0	0	1	0	0	0	0	0	0	1	126
	09:00	1	80	56	0	1	0	1	0	0	0	0	0	0	139
	10:00	1	114	60	0	2	1	0	1	0	0	0	0	0	179
	11:00	0	133	48	0	2	0	0	2	0	0	0	0	0	185
Daily Total :		3	670	297	0	11	3	1	4	0	0	1	0	2	992
	Percent :	0%	68%	30%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	
	Average :	0	56	25	0	1	0	0	0	0	0	0	0	0	82

CLASS CT. 19 S.B.

Basic Axle Class Summary: X9500192

(DEFAULTB) Description	Lane	#1 Cycle	#2 Cars	#3 2A-4T	#4 Buses	#5 2A-SU	#6 3A-SU	#7 4A-SU	#8 4A-ST	#9 5A-ST	#10 6A-ST	#11 5A-MT	#12 6A-MT	#13 Other	Total
TOTAL COUNT :	#1.	11	2699	891	0	24	6	1	17	3	1	1	0	2	3656
		11	2699	891	0	24	6	1	17	3	1	1	0	2	3656
Percents :	#1.	0%	74%	24%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	100%
		0%	74%	24%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	
Average :	#1.	0	112	37	0	1	0	0	1	0	0	0	0	0	151
		0	112	37	0	1	0	0	1	0	0	0	0	0	151
Days & ADT :	#1.	1.0	3656												
		1.0	3656												

County: Wilson **Station Number:** 000089

Route: SR171 **Station Type:** Urban **Station Out:** NO

Location: S. OF MT. JULIET

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
03	1985	11,650	12,350	12,103	0.97	
12	1986	11,603	11,835	11,480	0.97	
12	1987	12,612		12,478	0.97	
10	1988	14,553		14,117	0.97	
10	1989	14,287		13,720	0.97	
08	1990			13,800	0.97	EST-CONSTR
10	1991	16,139	16,623	16,124	0.97	
08	1992	16,908	16,570	16,073	0.97	
11	1993	18,171	18,353	17,802	0.97	
11	1994	18,542	18,502	17,986	0.97	
12	1995	19,498	20,083	19,481	0.97	
10	1996	21,327	20,688	20,067	0.97	
08	1997	23,718	22,769	22,086	0.97	
09	1998	21,248	20,190	19,580	0.97	
10	1999	21,898	22,336	21,666	0.97	
09	2000	21,168	20,533	19,917	0.97	
09	2001	21,544	20,467	19,853	0.97	
08	2002	20,314	19,501	18,916	0.97	
10	2003	23,614	23,141	22,447	0.97	
12	2004	0	0	23,132	0.97	EST
09	2005	24,679	22,951	22,263	0.97	
11	2006	27,522	26,972	26,162	0.97	HIGH THIS YEAR
09	2007	27,631	26,249	25,462	0.97	
09	2008	27,504	26,129	25,345	0.97	
09	2009	0	0	25,539	0.97	EST
08	2010	31,207	30,583	29,665	0.97	THIS YEAR HIGH
05	2011	31,273	29,397	28,515	0.95	
08	2012	32,520	30,894	29,349	0.95	
08	2013	34,850	32,759	31,121	0.95	
05	2014	0	0	29,431	0.95	24950 - CLASS CT.
07	2015	35,485	33,711	32,025	0.95	

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000089 **County:** 95 Wilson
Start Date: 07 / 27 / 2015 **End Date:** 07 / 28 / 2015
Start Time: 12 : 00 **End Time:** 12 : 00
Direction: 1 (Coverage)
NORTH BOUND

Time	
12:00 - 13:00	1,210
13:00 - 14:00	1,166
14:00 - 15:00	1,212
15:00 - 16:00	1,365
16:00 - 17:00	1,642
17:00 - 18:00	1,658
18:00 - 19:00	1,289
19:00 - 20:00	968
20:00 - 21:00	814
21:00 - 22:00	478
22:00 - 23:00	278
23:00 - 24:00	188
24:00 - 01:00	101
01:00 - 02:00	49
02:00 - 03:00	40
03:00 - 04:00	30
04:00 - 05:00	53
05:00 - 06:00	175
06:00 - 07:00	470
07:00 - 08:00	841
08:00 - 09:00	760
09:00 - 10:00	838
10:00 - 11:00	932
11:00 - 12:00	1,092

Total: 17,649

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
11:30 - 12:30	2476	0.92	16:45 - 17:45	3136	0.93

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
7	52	9	55	9	55

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000089 **County:** 95 Wilson
Start Date: 07 / 27 / 2015 **End Date:** 07 / 28 / 2015
Start Time: 12 : 00 **End Time:** 12 : 00
Direction: 2 (Coverage)

SOUTHBOUND

Time	
12:00 - 13:00	1,256
13:00 - 14:00	1,160
14:00 - 15:00	1,019
15:00 - 16:00	1,248
16:00 - 17:00	1,272
17:00 - 18:00	1,410
18:00 - 19:00	1,112
19:00 - 20:00	795
20:00 - 21:00	528
21:00 - 22:00	331
22:00 - 23:00	167
23:00 - 24:00	89
24:00 - 01:00	57
01:00 - 02:00	31
02:00 - 03:00	35
03:00 - 04:00	55
04:00 - 05:00	118
05:00 - 06:00	425
06:00 - 07:00	1,067
07:00 - 08:00	1,190
08:00 - 09:00	1,048
09:00 - 10:00	1,061
10:00 - 11:00	1,099
11:00 - 12:00	1,263

Total: 17,836

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
11:30 - 12:30	2476	0.92	16:45 - 17:45	3136	0.93

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
7	52	9	55	9	55

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number: 000089 **County:** 95 Wilson
Start Date: 07 / 27 / 2015 **End Date:** 07 / 28 / 2015
Start Time: 12 : 00 **End Time:** 12 : 00
Direction: 6 (Coverage)

TOTALS

Time	
12:00 - 13:00	2,466
13:00 - 14:00	2,326
14:00 - 15:00	2,231
15:00 - 16:00	2,613
16:00 - 17:00	2,914
17:00 - 18:00	3,068
18:00 - 19:00	2,401
19:00 - 20:00	1,763
20:00 - 21:00	1,342
21:00 - 22:00	809
22:00 - 23:00	445
23:00 - 24:00	277
24:00 - 01:00	158
01:00 - 02:00	80
02:00 - 03:00	75
03:00 - 04:00	85
04:00 - 05:00	171
05:00 - 06:00	600
06:00 - 07:00	1,537
07:00 - 08:00	2,031
08:00 - 09:00	1,808
09:00 - 10:00	1,899
10:00 - 11:00	2,031
11:00 - 12:00	2,355

Total: 35,485 x Variation Factor: 0.95 = 33,711 x Truck Factor: 0.95 = AADT: 32,025.2

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
11:30 - 12:30	2476	0.92	16:45 - 17:45	3136	0.93

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
7	52	9	55	9	55

County: Wilson **Station Number:** 000090

Route: SR171 **Station Type:** Other Rural **Station Out:** NO

Location: S. OF I-40

Month	Year	Average Weekday Traffic	Average Daily Traffic	Annual Average Daily	Axle Adjustment Factor	Remarks
03	1985	7,090	7,520	7,369	0.97	
11	1986	8,423	8,339	8,089	0.97	
12	1987	10,068		10,059	0.97	
10	1988	9,785		9,492	0.97	
10	1989	7,813	0	9,500	0.97	ACTUAL = 7502
07	1990	9,487		8,926	0.97	
10	1991			9,400	0.97	EST
08	1992	13,794	13,518	13,113	0.97	
11	1993	12,994	13,124	12,730	0.97	
11	1994	14,515	14,370	13,939	0.97	
11	1995	14,689	14,248	13,821	0.97	
10	1996	14,805	14,213	13,786	0.97	
09	1997	15,455	14,991	14,541	0.97	
09	1998	16,302	15,487	15,022	0.97	
10	1999	15,789	15,315	14,856	0.97	
10	2000	16,410	15,918	15,440	0.97	
09	2001	15,508	14,733	14,291	0.97	
08	2002	14,265	13,694	13,283	0.97	
10	2003	15,543	15,232	14,775	0.97	
09	2004	16,009	14,888	14,441	0.97	
09	2005	16,258	15,120	14,666	0.97	
11	2006	16,656	16,323	15,833	0.97	
10	2007	16,237	15,425	14,962	0.97	
09	2008	16,135	15,328	14,868	0.97	
09	2009	15,549	13,840	13,840	0.97	USED CLASS COUNT
08	2010	17,064	16,723	16,221	0.97	LAST YEAR LOW
08	2011	20,564	20,153	19,548	0.96	NEW DEVELOPMENT
08	2012	18,271	17,357	16,663	0.96	TRAFFIC UP AND DOWN,
09	2013	17,931	17,034	16,353	0.96	
05	2014	0	0	16,430	0.96	USED CLASS COUNT
05	2015	20,399	18,563	17,821	0.96	

COVERAGE COUNT DATA WITH 24 HOUR TOTALS

Station Number:	000090	**County:**	95 Wilson
Start Date:	05 / 26 / 2015	**End Date:**	05 / 27 / 2015
Start Time:	13 : 00	**End Time:**	13 : 00
Direction:	0 (Coverage)		

Time	
13:00 - 14:00	1,043
14:00 - 15:00	1,156
15:00 - 16:00	1,355
16:00 - 17:00	1,656
17:00 - 18:00	1,767
18:00 - 19:00	1,270
19:00 - 20:00	948
20:00 - 21:00	654
21:00 - 22:00	501
22:00 - 23:00	325
23:00 - 24:00	239
24:00 - 01:00	132
01:00 - 02:00	126
02:00 - 03:00	101
03:00 - 04:00	95
04:00 - 05:00	212
05:00 - 06:00	610
06:00 - 07:00	1,321
07:00 - 08:00	1,625
08:00 - 09:00	1,147
09:00 - 10:00	1,012
10:00- 11:00	985
11:00 - 12:00	1,076
12:00 - 13:00	1,043

Total: 20,399 x Variation Factor: 0.91 = 18,563 x Truck Factor: 0.96 = AADT: 17,820.5

Peak AM	Peak Total	Peak Hour Factor	Peak PM	Peak Total	Peak Hour Factor
06:45 - 07:45	1639	0.89	16:45 - 17:45	1770	0.99

Peak AM %	Dir Dist AM %	Peak PM %	Dir Dist PM %	Daily Peak %	Daily Dir Dist %
8	65	9	65	9	65

55,080 2040 W/INT.

54,210 2040 W/OUT.

44950 2020 W/OUT.

ADT in the Mt. Juliet Area with and without the new I40/Central Pike Interchange

LEGEND

2014 Existing
2020 without Interchange
2040 without Interchange
2040 with Interchange

% Traffic Reduction to Mt. Juliet Road with the new Interchange

South of I-40	33%
North of I-40	6%
I-40 WB On Ramp	40%
I-40 WB Off Ramp	22%
I-40 EB On Ramp	22%
I-40 EB Off Ramp	59%
I-40 EB Off Ramp (loop)	10%

45

2014 RAMP CT. 6040

6,975
7,400
9,025
9,525

2014 RAMP CT. 5840

6,975
7,400
9,025
9,525

42,330 2014

AM	PM
50,936	33,958
54,072	36,048
65,976	43,984
66,276	44,184

AM	PM
33,958	50,936
36,048	54,072
43,984	65,976
44,184	66,276

42,560 2014

45,180 2020 W/OUT

55,130 2040 W/OUT.

55,380 2040W/INT.

2014 TOTAL 84,890

0
0
0
13,025

0
0
0
13,025

6,700
10,100
13,550
20,650

6,700
10,100
13,550
40,400

0
0
0
3,900

0
0
0
3,900

40

AM	PM
50,936	33,958
54,072	36,048
65,976	43,984
60,801	40,534

AM	PM
33,958	50,936
36,048	54,072
43,984	65,976
40,534	60,801

2014 RAMP CT. 11,620

15,200
21,125
27,225
16,200

7,225
12,650
16,900
6,900

35,100
41,500
51,650
48,550

35,500
59,075
80,575
53,725

2014 RAMP CT. 5880

8,750
12,850
18,000
14,075

8,750
12,850
18,000
14,075

2014 RAMP CT. 5410

2014 RAMP CT. 5940

7,975
8,475
10,325
9,300

2014 RAMP CT. 7270

AM	PM
47,066	31,378
49,107	32,738
60,441	40,294
59,526	39,684

AM	PM
31,378	47,066
32,738	49,107
40,294	60,441
39,684	59,526

2014 STA. 89 (29,430)

← 36,590 2014
72,410 TOTAL
35,820 2014 →

171

Providence/ Adams

STA. 17 2014 18,210

265

STA. 18 2014 3520

4,800
8,050
13,900
23,850

2014 STA. 19 6360

6,950
20,925
24,775
26,700

19,000
27,700
34,650
34,650

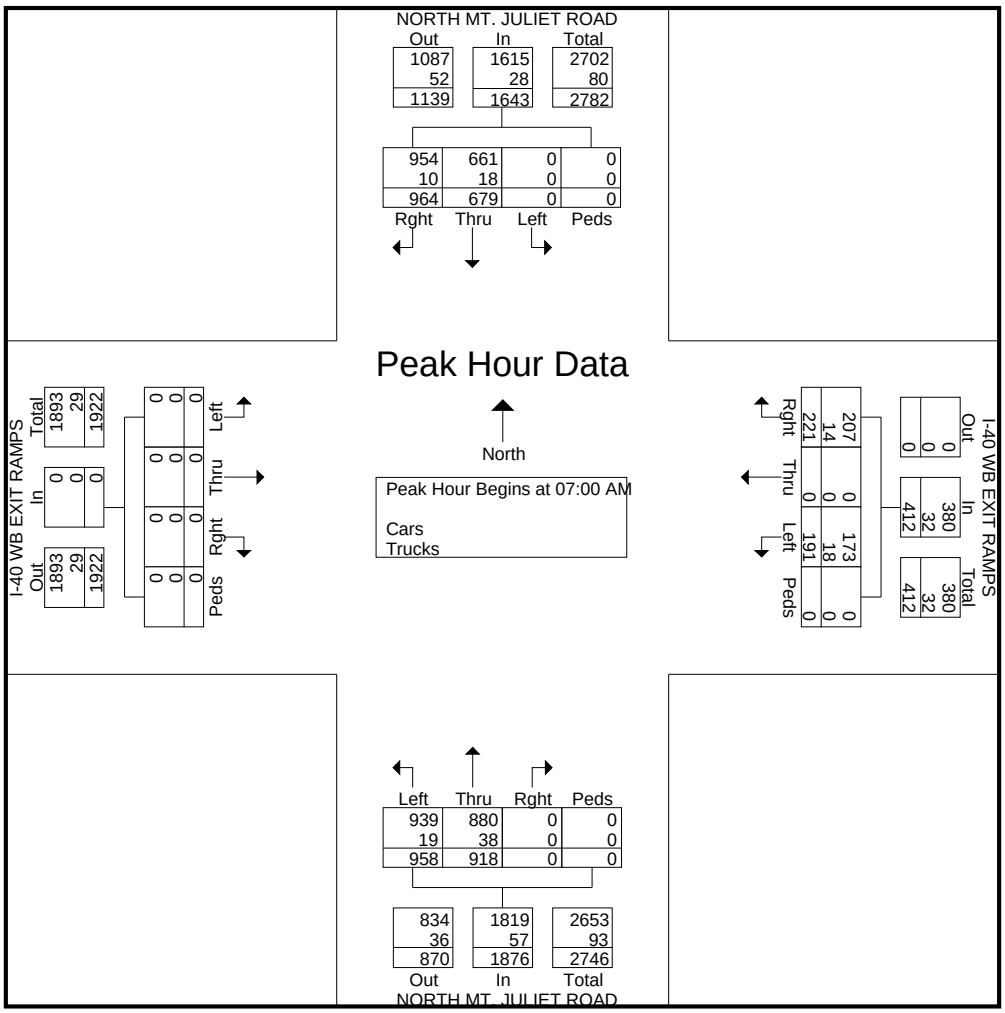
2014 STA. 90 16,430

WHERE DID RAMP ADT's COME FROM?

All Traffic Data Services, Inc
1336 Farmer Road
Conyers, Ga 30012
404-374-1283

File Name : #3 N.MtJulietRd@I-40WBRampsAM
Site Code :
Start Date : 8/29/2012
Page No : 3

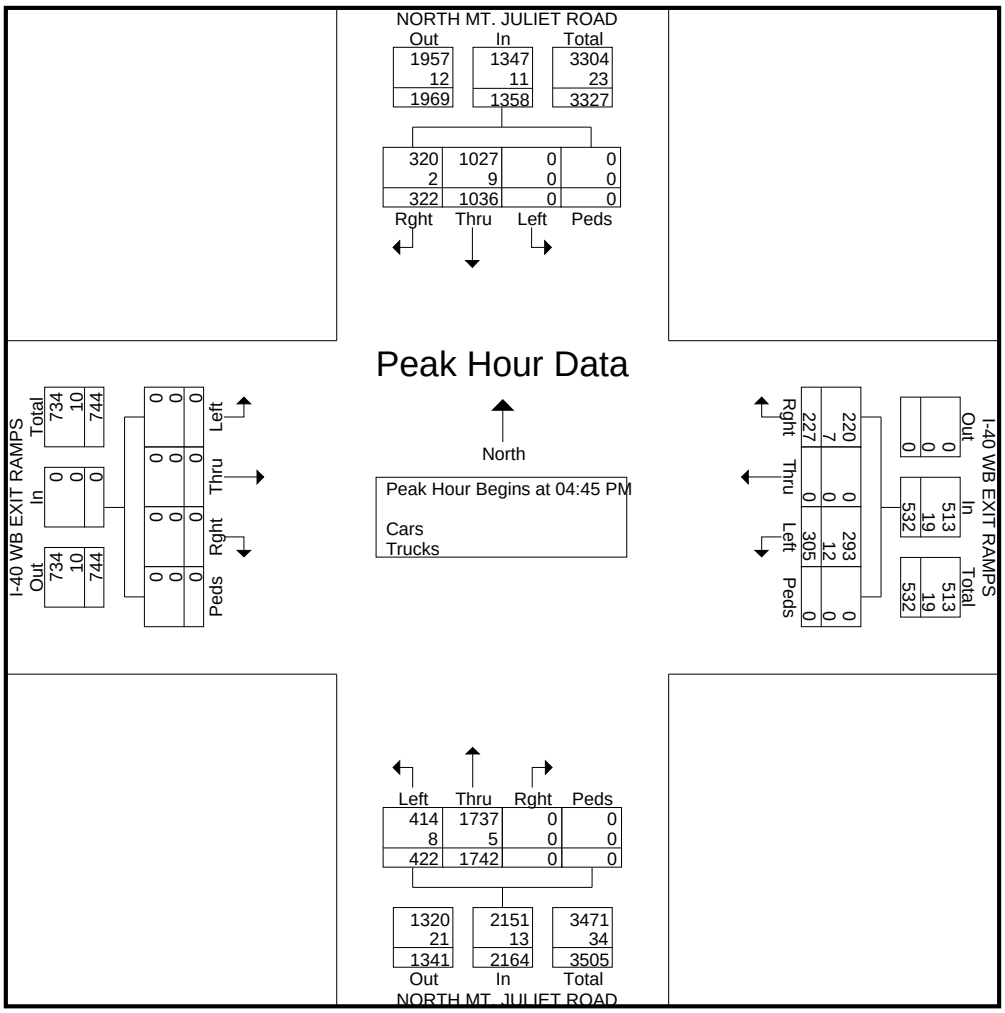
	NORTH MT. JULIET ROAD Southbound					I-40 WB EXIT RAMPS Westbound					NORTH MT. JULIET ROAD Northbound					I-40 WB EXIT RAMPS Eastbound					
Start Time	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	133	**277**	0	410	41	0	37	0	78	**272**	173	0	0	445	0	0	0	0	0	933
07:15 AM	0	172	274	0	**446**	50	0	49	0	99	253	214	0	0	467	0	0	0	0	0	**1012**
07:30 AM	0	**194**	227	0	421	42	0	58	0	100	225	253	0	0	478	0	0	0	0	0	999
07:45 AM	0	180	186	0	366	**58**	0	**77**	0	**135**	208	**278**	0	0	**486**	0	0	0	0	0	987
Total Volume	0	679	964	0	1643	191	0	221	0	412	958	918	0	0	1876	0	0	0	0	0	3931
% App. Total	0	41.3	58.7	0		46.4	0	53.6	0		51.1	48.9	0	0		0	0	0	0		
PHF	.000	.875	.870	.000	.921	.823	.000	.718	.000	.763	.881	.826	.000	.000	.965	.000	.000	.000	.000	.000	.971
Cars	0	661	954	0	1615	173	0	207	0	380	939	880	0	0	1819	0	0	0	0	0	3814
% Cars	0	97.3	99.0	0	98.3	90.6	0	93.7	0	92.2	98.0	95.9	0	0	97.0	0	0	0	0	0	97.0
Trucks	0	18	10	0	28	18	0	14	0	32	19	38	0	0	57	0	0	0	0	0	117
% Trucks	0	2.7	1.0	0	1.7	9.4	0	6.3	0	7.8	2.0	4.1	0	0	3.0	0	0	0	0	0	3.0



All Traffic Data Services, Inc
1336 Farmer Road
Conyers, Ga 30012
404-374-1283

File Name : #3 N.MtJulietRd@I-40WBRampsPM
Site Code :
Start Date : 8/29/2012
Page No : 3

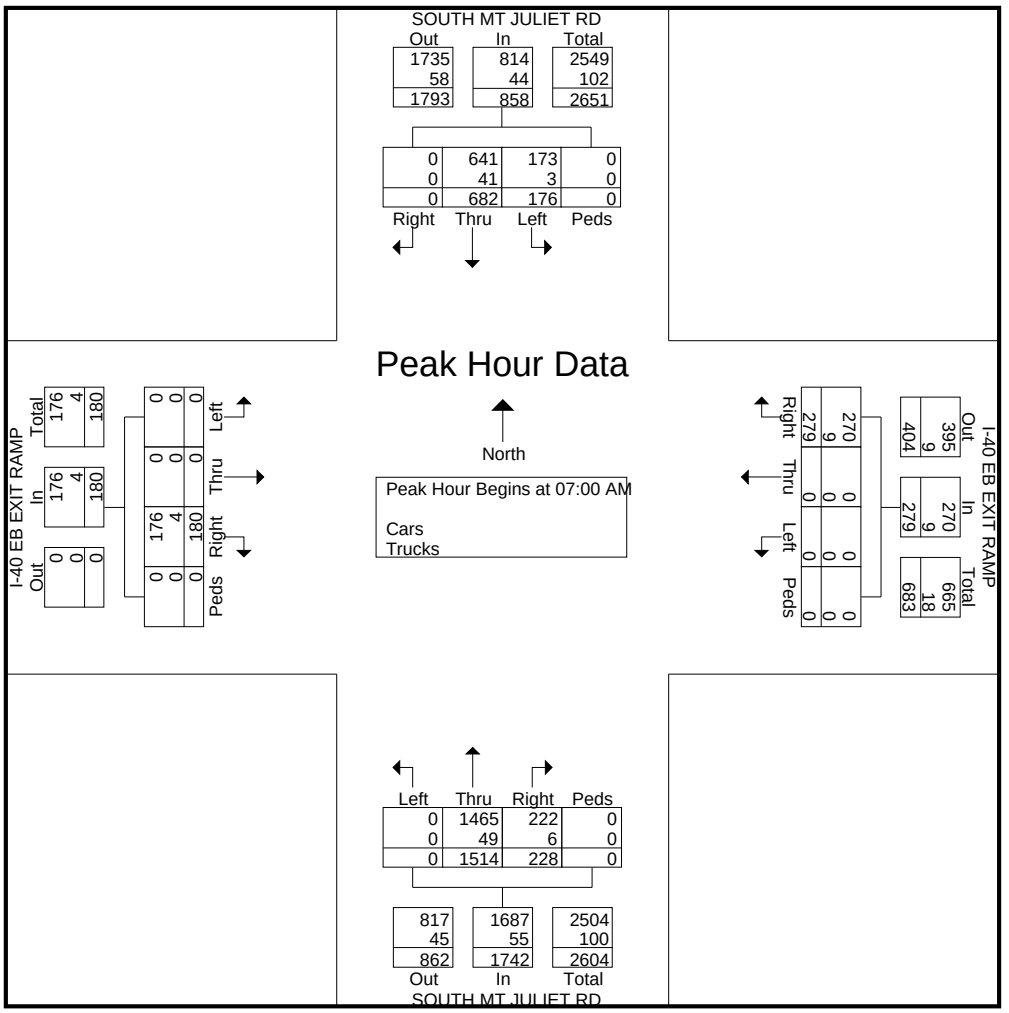
	NORTH MT. JULIET ROAD Southbound					I-40 WB EXIT RAMPS Westbound					NORTH MT. JULIET ROAD Northbound					I-40 WB EXIT RAMPS Eastbound					
Start Time	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Left	Thru	Rght	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	**285**	73	0	358	72	0	57	0	129	105	439	0	0	**544**	0	0	0	0	0	1031
05:00 PM	0	209	**87**	0	296	73	0	57	0	130	**116**	428	0	0	544	0	0	0	0	0	970
05:15 PM	0	274	86	0	**360**	**81**	0	**61**	0	**142**	87	**447**	0	0	534	0	0	0	0	0	**1036**
05:30 PM	0	268	76	0	344	79	0	52	0	131	114	428	0	0	542	0	0	0	0	0	1017
Total Volume	0	1036	322	0	1358	305	0	227	0	532	422	1742	0	0	2164	0	0	0	0	0	4054
% App. Total	0	76.3	23.7	0		57.3	0	42.7	0		19.5	80.5	0	0		0	0	0	0		
PHF	.000	.909	.925	.000	.943	.941	.000	.930	.000	.937	.909	.974	.000	.000	.994	.000	.000	.000	.000	.000	.978
Cars	0	1027										1737									
% Cars	0	99.1	99.4	0	99.2	96.1	0	96.9	0	96.4	98.1	99.7	0	0	99.4	0	0	0	0	0	98.9
Trucks	0	9	2	0	11	12	0	7	0	19	8	5	0	0	13	0	0	0	0	0	43
% Trucks	0	0.9	0.6	0	0.8	3.9	0	3.1	0	3.6	1.9	0.3	0	0	0.6	0	0	0	0	0	1.1



All Traffic Data Services, Inc
1336 Farmer Road
Conyers, Ga 30012
404-374-1283

File Name : #4 SouthMtJulietRd@I-40EBExitRampAM
Site Code : 00000000
Start Date : 8/29/2012
Page No : 3

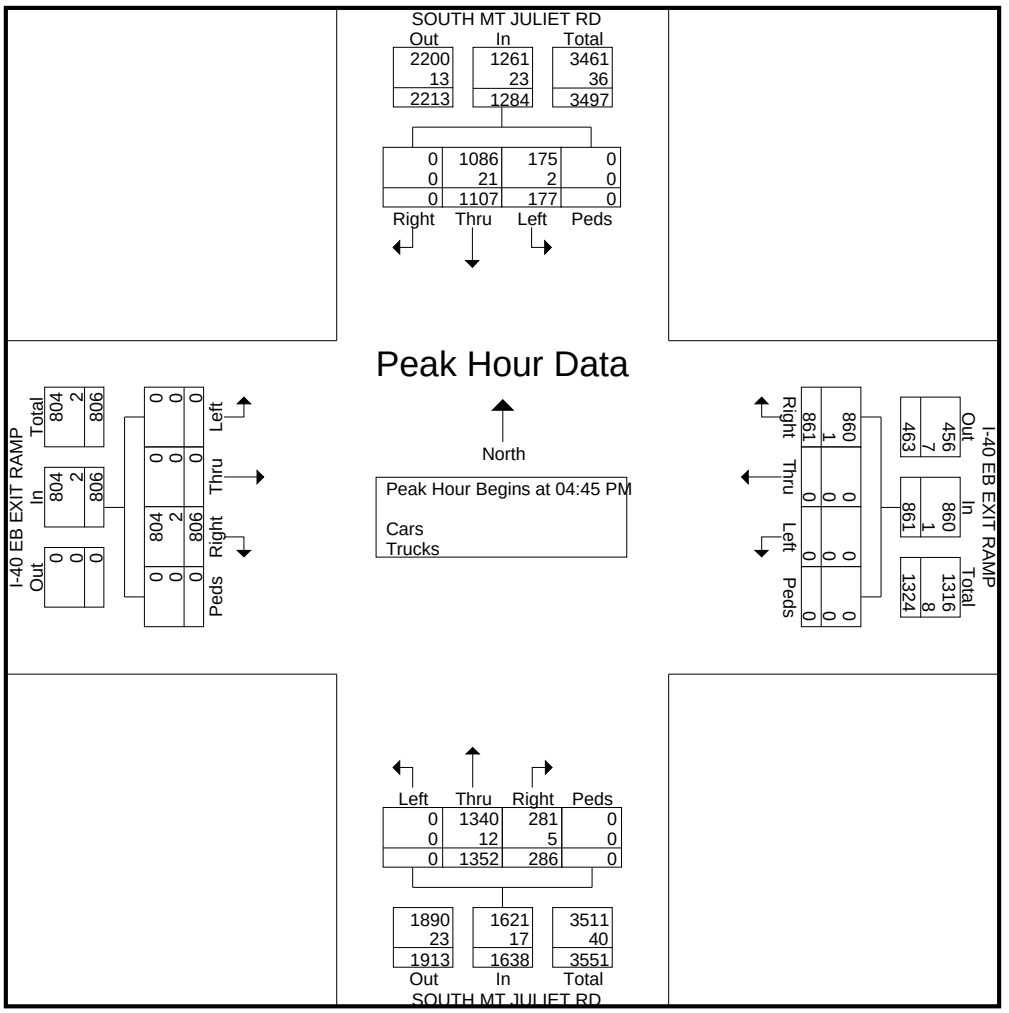
	SOUTH MT JULIET RD Southbound					I-40 EB EXIT RAMP Westbound					SOUTH MT JULIET RD Northbound					I-40 EB EXIT RAMP Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	29	147	0	0	176	0	0	53	0	53	0	**399**	45	0	444	0	0	46	0	46	719
07:15 AM	48	167	0	0	215	0	0	**81**	0	**81**	0	386	53	0	439	0	0	43	0	43	778
07:30 AM	**60**	**190**	0	0	**250**	0	0	73	0	73	0	382	**77**	0	**459**	0	0	**49**	0	**49**	**831**
07:45 AM	39	178	0	0	217	0	0	72	0	72	0	347	53	0	400	0	0	42	0	42	731
Total Volume	176	682	0	0	858	0	0	279	0	279	0	1514	228	0	1742	0	0	180	0	180	3059
% App. Total	20.5	79.5	0	0		0	0	100	0		0	86.9	13.1	0		0	0	100	0		
PHF	.733	.897	.000	.000	.858	.000	.000	.861	.000	.861	.000	.949	.740	.000	.949	.000	.000	.918	.000	.918	.920
Cars	173	641	0	0	814	0	0	270	0	270	0	1465									
% Cars	98.3	94.0	0	0	94.9	0	0	96.8	0	96.8	0	96.8	97.4	0	96.8	0	0	97.8	0	97.8	96.3
Trucks	3	41	0	0	44	0	0	9	0	9	0	49	6	0	55	0	0	4	0	4	112
% Trucks	1.7	6.0	0	0	5.1	0	0	3.2	0	3.2	0	3.2	2.6	0	3.2	0	0	2.2	0	2.2	3.7



All Traffic Data Services, Inc
1336 Farmer Road
Conyers, Ga 30012
404-374-1283

File Name : #4 SouthMtJulietRd@I-40EBExitRampPM
Site Code : 00000000
Start Date : 8/29/2012
Page No : 3

	SOUTH MT JULIET RD Southbound					I-40 EB EXIT RAMP Westbound					SOUTH MT JULIET RD Northbound					I-40 EB EXIT RAMP Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	44	287	0	0	331	0	0	**264**	0	**264**	0	307	63	0	370	0	0	193	0	193	1158
05:00 PM	42	253	0	0	295	0	0	188	0	188	0	**395**	74	0	**469**	0	0	182	0	182	1134
05:15 PM	**49**	245	0	0	294	0	0	243	0	243	0	326	**79**	0	405	0	0	**232**	0	**232**	**1174**
05:30 PM	42	**322**	0	0	**364**	0	0	166	0	166	0	324	70	0	394	0	0	199	0	199	1123
Total Volume	177	1107	0	0	1284	0	0	861	0	861	0	1352	286	0	1638	0	0	806	0	806	4589
% App. Total	13.8	86.2	0	0		0	0	100	0		0	82.5	17.5	0		0	0	100	0		
PHF	.903	.859	.000	.000	.882	.000	.000	.815	.000	.815	.000	.856	.905	.000	.873	.000	.000	.869	.000	.869	.977
Cars	175	1086										1340									
% Cars	98.9	98.1	0	0	98.2	0	0	99.9	0	99.9	0	99.1	98.3	0	99.0	0	0	99.8	0	99.8	99.1
Trucks	2	21	0	0	23	0	0	1	0	1	0	12	5	0	17	0	0	2	0	2	43
% Trucks	1.1	1.9	0	0	1.8	0	0	0.1	0	0.1	0	0.9	1.7	0	1.0	0	0	0.2	0	0.2	0.9



APPENDIX B – APPROVED DEVELOPMENT TRAFFIC IMPACT STUDIES

Historical Growth Rate in the Study Area

Year	SR 171 S. of I-40 (Sta. 000017)	SR 171 N. of I-40 (Sta. 000089)	SR 171 S. of 265 (Sta. 000090)	SR 265 W. of 171 (Sta. 000018)	SR 265 E. of 171 (Sta. 000019)	SR 265 N. of I-40 (Sta. 000050)	I-40 W. of OHB Ramp (000345)	I-40 E. of OHB Ramp (000198)	OHB S. of I-40 (Sta. 000215)	
1986	8937	11480	8089	1021	2159	22753	48988	31275	2599	
1987	10867	12478	10059	1257	2611	24216	54000	35000	2955	
1988	9830	14117	9492	1729	2786	29271	58000	40000	3468	
1989	11592	13720	9500	2167	3568	25522	55746	42898	3702	
1990	11200	13800	8926	1471	2740	27918	53211	40294	3751	
1991	12816	16124	9400	1637	3560	12215	66872	43182	3258	
1992	13510	16073	13113	1695	3050	40810	64870	41586	2805	
1993	14384	17802	12730	1481	2969	46744	72889	46325	4042	
1994	15430	17986	13939	1796	3348	39639	79234	51927	4196	
1995	14666	19481	13821	1800	3410	52782	76622	52000	4056	
1996	14343	20067	13786	1797	3042	63132	73388	39655	4805	
1997	15241	22086	14541	2807	3529	60124	86133	55026	4704	
1998	15620	19580	15022	2682	3501	43532	90840	56436	4440	
1999	15884	21666	14856	2469	3788	44115	92759	59260	5332	
2000	16111	19917	15440	2360	4009	42687	97809	64137	6045	
2001	14993	19853	14291	2424	3752	44940	93026	59792	6232	
2002	15376	18916	13283	2414	4002	45313	96714	62246	5918	
2003	15581	22447	14775	2305	3648	43557	102564	66577	5794	
2004	14959	23132	14441	2354	3724	48284	100861	63507	6057	
2005	16093	22263	14666	2560	4100	46739	101325	66462	6381	
2006	16419	26162	15833	2666	4124	44842	102613	67223	6426	
2007	16156	25462	14962	3613	5270	45625	116193	80174	6797	
2008	16886	25345	14868	3166	5815	45065	108224	71376	6739	
2009	16221	25539	13840	2637	5262	45901	94725	82040	6239	
2010	18812	29665	16221	3052	5600	44677	93820	80870	6673	
2011	18354	28515	19548	2987	6005	47239	99764	82083	6809	
2012	18110	29349	16663	3594	6185	46503	102282	82493	6626	
2013	18633	31121	16353	3531	6465	46874	111356	82910	6814	
5 Year Growth Rate										Average
	2.1%	3.2%	2.2%	3.6%	3.2%	2.4%	2.8%	3.4%	3.5%	3.0%
10 Year Growth Rate										
	2.1%	3.2%	2.2%	3.6%	3.2%	2.4%	2.8%	3.4%	3.5%	3.0%
15 Year Growth Rate										
	2.1%	3.2%	2.2%	3.6%	3.2%	2.4%	2.8%	3.4%	3.5%	3.0%
Average	2.1%	3.2%	2.2%	3.6%	3.2%	2.4%	2.8%	3.4%	3.5%	3.0%

F i s c h b a c h
Transportation Group, Inc.
Traffic Engineering and Planning

Traffic Impact Analysis

Providence Central
S. Mt. Juliet Road and Central Pike
Mt. Juliet, Tennessee

Prepared October 2012

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Traffic Impact Study

Providence Central
S. Mt. Juliet Road and Central Pike

Mt. Juliet, Tennessee

Prepared October 2012

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5. IMPACTS OF PROPOSED DEVELOPMENT – PHASE 1

5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by Phase 1 of the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Eighth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2008. Table 6 presents the daily and peak hour trip generations for proposed project, and these trip generation calculations are included in Appendix B.

TABLE 6. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multi-Family (LUC 220)	224 units	1,482	23	91	92	49

6. IMPACTS OF PROPOSED DEVELOPMENT – PHASE 2

6.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by Phase 2 of the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Eighth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2008. Table 8 presents the daily and peak hour trip generations for proposed project, and these trip generation calculations are included in Appendix B.

TABLE 8. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multi-Family (LUC 220)	384 units	2,450	38	154	149	80
Office (LUC 710)	287,000 sq.ft	3,004	384	52	68	332
Retail (LUC 820)	21,250 sq.ft.	2,482	38	24	110	115
TOTAL		**7,936**	**460**	**230**	**327**	**527**
90% OF TOTAL		**7,142**	**414**	**207**	**295**	**475**

For the purposes of this study, it was estimated that none of the traffic generated by the proposed development will be captured, or "pass-by" trips from the adjacent street system. However, studies have shown that it is common for a portion of the trips generated by mixed-use developments will be internal to the site. Therefore, for the purposes of this study, it was assumed that 10% of the traffic generated by the proposed project will be internal, and the total trip generation calculations were reduced by this amount.

7. IMPACTS OF PROPOSED DEVELOPMENT – PHASE 3

Trip generation calculations were conducted in order to identify how much traffic will be generated by Phase 3 of the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Eighth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2008. Table 10 presents the daily and peak hour trip generations for proposed project, and these trip generation calculations are included in Appendix B.

TABLE 10. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	787,000 sq.ft	6,532	860	117	163	797
Retail (LUC 820)	249,500 sq.ft.	12,304	161	103	575	599
Single-Family (LUC 210)	250 units	2,416	46	139	151	89
TOTAL		**21,252**	**1,067**	**359**	**889**	**1,485**
90% OF TOTAL		**19,126**	**960**	**323**	**800**	**1,336**

As previously mentioned, no design year has been established for Phase 3 of the proposed project. Therefore, the impact of the land uses in this phase should be identified as site plans are submitted to the City of Franklin. In particular, the trip generation calculations shown in Table 10 suggest that the approved interchange on I-40 at Central Pike will need to be funded and constructed in order to accommodate the traffic generated by Phase 3 of the proposed project. Also, an improvement of Central Pike from I-40 to S. Mt. Juliet Road will be warranted.

F i s c h b a c h
Transportation Group, Inc.
Traffic Engineering and Planning

Traffic Impact Study

Boyle Retail Center
S. Mt. Juliet Road at Providence Parkway
Mt. Juliet, Tennessee

Prepared February 2008
for Land Design

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Traffic Impact Analysis

Boyle Retail Center
S. Mt. Juliet Road at Providence Parkway

Mt. Juliet, Tennessee

Prepared February 2008

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FTG Project Number: 10421



4. IMPACTS OF THE PROPOSED PROJECT

4.1 TRIP GENERATION

In order to identify how much traffic will be generated by the proposed project, trip generation calculations were conducted. Trip generation data for daily and peak hour trips were identified from Trip Generation, Seventh Edition, which was published by the Institute of Transportation Engineers (ITE) in 2003. Table 4 presents the daily and peak hour trip generations for the proposed project, and Appendix B includes the trip generation calculations.

TABLE 4. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Supermarket (LUC 850)	54,817 sq.ft.	5,062	133	85	296	284
Retail (LUC 820)	136,100 sq.ft.	8,298	115	73	368	399
Sit-Down Rest. (LUC 932)	8,000 sq.ft.	1,018	48	44	53	34
Sit-Down Rest. (LUC 932)	6,000 sq.ft.	762	36	33	40	26
Fast Food Rest. (LUC 934)	4,500 sq.ft.	2,232	122	117	81	75
Fast Food Rest. (LUC 934)	4,500 sq.ft.	2,232	122	117	81	75
Fast Food Rest. (LUC 934)	4,500 sq.ft.	2,232	122	117	81	75
Fast Food Rest. (LUC 934)	4,500 sq.ft.	2,232	122	117	81	75
Bank (LUC 912)	6,000 sq.ft.	1,350	41	33	137	137
TOTAL	**228,917 sq.ft.**	**25,418**	**861**	**736**	**1,218**	**1,180**
90% OF TOTAL		**22,876**	**775**	**662**	**1,096**	**1,062**

For the purposes of this study, it was estimated that none of the traffic generated by the proposed development will be captured, or "pass-by" trips from the adjacent street system. However, studies have shown that it is common for a portion of the trips generated by mixed-use developments will be internal to the site. Therefore, it was assumed that 10% of the traffic will be internal to the site, and so the total traffic volumes generated by land uses were reduced by this amount.

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

Traffic Impact Study

Baird Farm Residential Development
Providence Trail
Mt. Juliet, TN

Prepared May 2014
(Revised January 2015)
For Civil Site Design Group

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Traffic Impact Study

Baird Farm Residential Development
Providence Trail

Mt. Juliet, Tennessee

Prepared May 2014
(Revised January 2015)

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5. IMPACTS OF PROPOSED DEVELOPMENT

5.1 TRIP GENERATION

In order to identify how much traffic will be generated by the proposed project, trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations for proposed project, and these trip generation calculations are included in Appendix C.

TABLE 5. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Single-Family (LUC 210)	253 units	2,408	47	142	159	94

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

Traffic Impact Study

Shankle Property
Central Pike and Beckwith Road
Mt. Juliet, TN

Prepared November 2014
(Revised January 2015)
For Civil Site Design Group

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Traffic Impact Study

Shankle Property
Central Pike and Beckwith Road

Mt. Juliet, Tennessee

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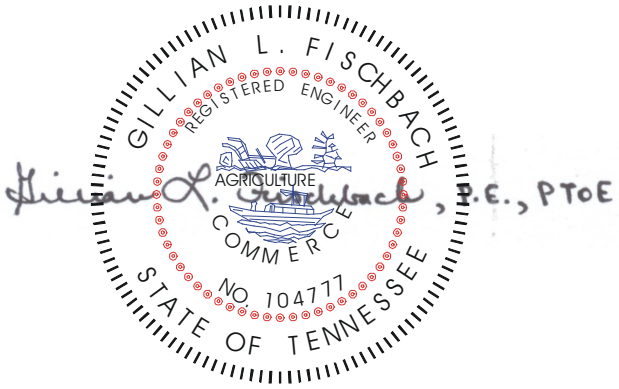

5. IMPACTS OF PROPOSED DEVELOPMENT

5.1 TRIP GENERATION

Trip generation calculations were conducted in order to identify how much traffic will be generated by the proposed project. Trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations for proposed project, and these trip generation calculations are included in Appendix C.

TABLE 5. TRIP GENERATION

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Single-Family (LUC 210)	427 units	4,066	80	240	269	158

F i s c h b a c h
Transportation Group, LLC
Traffic Engineering and Planning

Traffic Impact Study

Hamilton Hills - McCulloch Property
Mixed-Use Development
S. Mt. Juliet Road and Central Pike
Mt. Juliet, TN

Prepared February 2015
For Civil Site Design Group

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Traffic Impact Study

Hamilton Hills – McCulloch Property
Mixed-Use Development

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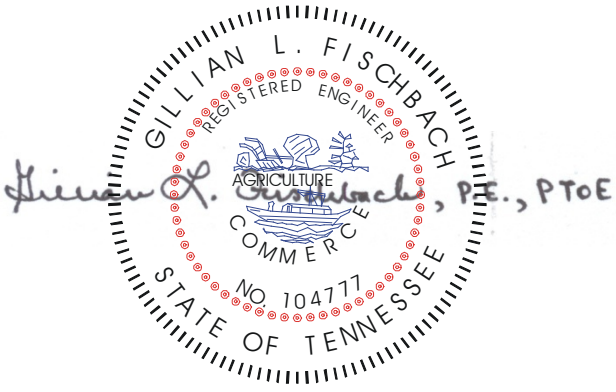

6. IMPACTS OF THE PROPOSED DEVELOPMENT

6.1 TRIP GENERATION

In order to identify how much traffic will be generated by the proposed project, trip generation data for daily and peak hour trips were identified from Trip Generation, Ninth Edition, which was published by the Institute of Transportation Engineers (ITE) in 2012. Table 5 presents the daily and peak hour trip generations for each phase of the proposed project, and these trip generation calculations are included in Appendix C.

TABLE 5A. TRIP GENERATION – PHASE 1

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	60,400 sq.ft.	666	83	11	15	75
Retail (LUC 820)	60,400 sq.ft.	2,580	36	22	108	117
Sit-Down Restaurant (LUC 932)	16,600 sq.ft.	2,110	99	81	98	65
Fast Food Restaurant (LUC 934)	4,800 sq.ft.	2,382	111	107	81	75
Hotel (LUC 310)	120 rooms	1,070	47	34	41	43
TOTAL		**8,808**	**376**	**255**	**343**	**375**
TOTAL WITH 10% REDUCTION FOR INTERNAL TRIPS		**7,926**	**338**	**230**	**309**	**338**

TABLE 5B. TRIP GENERATION – PHASE 2

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	173,500 sq.ft.	1,914	238	32	44	215
Medical Office Building (LUC 720)	14,400 sq.ft.	520	27	7	14	37
TOTAL		**2,434**	**265**	**39**	**58**	**252**
TOTAL WITH 10% REDUCTION FOR INTERNAL TRIPS		**2,190**	**239**	**35**	**52**	**227**

TABLE 5C. TRIP GENERATION – PHASE 3

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	145,400 sq.ft.	1,604	200	27	37	180
Day Care Center (LUC 565)	5,200 sq.ft.	386	37	33	34	38
TOTAL		**1,990**	**237**	**60**	**71**	**218**
TOTAL WITH 10% REDUCTION FOR INTERNAL TRIPS		**1,790**	**213**	**54**	**64**	**196**

TABLE 5D. TRIP GENERATION – PHASE 4

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Multi-Family (LUC 220)	276 homes	1,796	28	111	110	59
Townhomes (LUC 230)	91 homes	592	8	40	37	18
Assisted Living (LUC 254)	90 beds	246	15	6	13	20
TOTAL		**2,634**	**51**	**157**	**160**	**97**
TOTAL WITH 10% REDUCTION FOR INTERNAL TRIPS		**2,372**	**46**	**141**	**144**	**87**

TABLE 5E. TRIP GENERATION – PHASE 5

LAND USE	SIZE	DAILY TRAFFIC	GENERATED TRAFFIC			
			AM PEAK HOUR		PM PEAK HOUR	
			ENTER	EXIT	ENTER	EXIT
Office (LUC 710)	242,100 sq.ft.	2,670	332	45	61	299
Sit-Down Restaurant (LUC 932)	7,000 sq.ft.	890	42	34	41	28
Pharmacy (LUC 881)	12,000 sq.ft.	1,162	22	20	59	59
Bank (LUC 912)	5,600 sq.ft.	830	39	29	68	68
TOTAL		**5,552**	**435**	**128**	**229**	**454**
TOTAL WITH 10% REDUCTION FOR INTERNAL TRIPS		**4,998**	**391**	**115**	**206**	**409**

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No Scale

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

Figure 5B.
Peak Hour Traffic Volumes Generated by the Covey Rise Residential and Retail Project

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No Scale

XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

Figure 5C.
Peak Hour Traffic Volumes Generated by the Cowden Property Residential Project

APPENDIX C – INTERSECTION CAPACITY ANALYSIS WORKSHEETS



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	369	2713	686	233	1881
Number			2	12	1	6
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)				1.00	1.00	
Parking Bus, Adj			1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln			1827	1827	1827	1827
Adj Flow Rate, veh/h			2949	0	253	2045
Adj No. of Lanes			2	1	1	2
Peak Hour Factor			0.92	0.92	0.92	0.92
Percent Heavy Veh, %			4	4	4	4
Cap, veh/h			2916	1304	234	3379
Arrive On Green			0.84	0.00	0.11	0.97
Sat Flow, veh/h			3563	1553	1740	3563
Grp Volume(v), veh/h			2949	0	253	2045
Grp Sat Flow(s),veh/h/ln			1736	1553	1740	1736
Q Serve(g_s), s			126.0	0.0	16.0	5.7
Cycle Q Clear(g_c), s			126.0	0.0	16.0	5.7
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			2916	1304	234	3379
V/C Ratio(X)			1.01	0.00	1.08	0.61
Avail Cap(c_a), veh/h			2916	1304	234	3379
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh			12.0	0.0	64.1	0.1
Incr Delay (d2), s/veh			19.5	0.0	82.8	0.8
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln			66.2	0.0	15.0	2.7
LnGrp Delay(d),s/veh			31.5	0.0	146.9	0.9
LnGrp LOS			F		F	A
Approach Vol, veh/h			2949			2298
Approach Delay, s/veh			31.5			17.0
Approach LOS			C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		
Phs Duration (G+Y+Rc), s	20.0	130.0				150.0		
Change Period (Y+Rc), s	4.0	4.0				4.0		
Max Green Setting (Gmax), s	16.0	126.0				146.0		
Max Q Clear Time (g_c+I1), s	18.0	128.0				7.7		
Green Ext Time (p_c), s	0.0	0.0				126.6		

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	899	0	291	1733	1349	0	0	1215	1273
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1827	0	1827	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				977	0	316	1884	1466	0	0	1321	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				4	0	4	4	4	0	0	4	4
Cap, veh/h				608	0	280	1058	2569	0	0	1342	600
Arrive On Green				0.18	0.00	0.18	0.31	0.74	0.00	0.00	0.39	0.00
Sat Flow, veh/h				3375	0	1553	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				977	0	316	1884	1466	0	0	1321	0
Grp Sat Flow(s),veh/h/ln				1688	0	1553	1688	1736	0	0	1736	1553
Q Serve(g_s), s				27.0	0.0	27.0	47.0	28.5	0.0	0.0	56.5	0.0
Cycle Q Clear(g_c), s				27.0	0.0	27.0	47.0	28.5	0.0	0.0	56.5	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				608	0	280	1058	2569	0	0	1342	600
V/C Ratio(X)				1.61	0.00	1.13	1.78	0.57	0.00	0.00	0.98	0.00
Avail Cap(c_a), veh/h				608	0	280	1058	2569	0	0	1342	600
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				61.5	0.0	61.5	51.5	8.8	0.0	0.0	45.5	0.0
Incr Delay (d2), s/veh				281.2	0.0	93.7	355.4	0.9	0.0	0.0	21.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln				36.3	0.0	18.8	74.1	13.8	0.0	0.0	30.9	0.0
LnGrp Delay(d),s/veh				342.7	0.0	155.2	406.9	9.7	0.0	0.0	66.6	0.0
LnGrp LOS				F		F	F	A			E	
Approach Vol, veh/h					1293			3350			1321	
Approach Delay, s/veh					296.9			233.1			66.6	
Approach LOS					F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		117.0			53.0	64.0		33.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		111.0			47.0	58.0		27.0
Max Q Clear Time (g_c+I1), s		30.5			49.0	58.5		29.0
Green Ext Time (p_c), s		31.4			0.0	0.0		0.0

Intersection Summary		
HCM 2010 Ctrl Delay		210.1
HCM 2010 LOS		F



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	1137	3002	1196	234	2422
Number			2	12	1	6
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)				1.00	1.00	
Parking Bus, Adj			1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln			1827	1827	1827	1827
Adj Flow Rate, veh/h			3160	0	246	2549
Adj No. of Lanes			2	1	1	2
Peak Hour Factor			0.95	0.95	0.95	0.95
Percent Heavy Veh, %			4	4	4	4
Cap, veh/h			3000	1342	188	3372
Arrive On Green			0.86	0.00	0.08	0.97
Sat Flow, veh/h			3563	1553	1740	3563
Grp Volume(v), veh/h			3160	0	246	2549
Grp Sat Flow(s),veh/h/ln			1736	1553	1740	1736
Q Serve(g_s), s			121.0	0.0	11.0	11.1
Cycle Q Clear(g_c), s			121.0	0.0	11.0	11.1
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			3000	1342	188	3372
V/C Ratio(X)			1.05	0.00	1.31	0.76
Avail Cap(c_a), veh/h			3000	1342	188	3372
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh			9.5	0.0	61.4	0.2
Incr Delay (d2), s/veh			32.7	0.0	171.3	1.6
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln			69.0	0.0	16.2	5.0
LnGrp Delay(d),s/veh			42.2	0.0	232.6	1.8
LnGrp LOS			F		F	A
Approach Vol, veh/h			3160			2795
Approach Delay, s/veh			42.2			22.2
Approach LOS			D			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		
Phs Duration (G+Y+Rc), s	15.0	125.0				140.0		
Change Period (Y+Rc), s	4.0	4.0				4.0		
Max Green Setting (Gmax), s	11.0	121.0				136.0		
Max Q Clear Time (g_c+I1), s	13.0	123.0				13.1		
Green Ext Time (p_c), s	0.0	0.0				120.1		

Intersection Summary	
HCM 2010 Ctrl Delay	32.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	1012	0	300	1452	2687	0	0	1644	425
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1827	0	1827	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				1065	0	316	1528	2828	0	0	1731	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				4	0	4	4	4	0	0	4	4
Cap, veh/h				699	0	322	1085	2455	0	0	1190	532
Arrive On Green				0.21	0.00	0.21	0.32	0.71	0.00	0.00	0.34	0.00
Sat Flow, veh/h				3375	0	1553	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				1065	0	316	1528	2828	0	0	1731	0
Grp Sat Flow(s),veh/h/ln				1688	0	1553	1688	1736	0	0	1736	1553
Q Serve(g_s), s				29.0	0.0	28.4	45.0	99.0	0.0	0.0	48.0	0.0
Cycle Q Clear(g_c), s				29.0	0.0	28.4	45.0	99.0	0.0	0.0	48.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				699	0	322	1085	2455	0	0	1190	532
V/C Ratio(X)				1.52	0.00	0.98	1.41	1.15	0.00	0.00	1.45	0.00
Avail Cap(c_a), veh/h				699	0	322	1085	2455	0	0	1190	532
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				55.5	0.0	55.2	47.5	20.5	0.0	0.0	46.0	0.0
Incr Delay (d2), s/veh				242.7	0.0	45.2	189.3	73.6	0.0	0.0	209.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln				37.1	0.0	16.2	49.5	71.8	0.0	0.0	57.6	0.0
LnGrp Delay(d),s/veh				298.2	0.0	100.5	236.8	94.1	0.0	0.0	255.3	0.0
LnGrp LOS				F		F	F	F			F	
Approach Vol, veh/h					1381			4356			1731	
Approach Delay, s/veh					253.0			144.2			255.3	
Approach LOS					F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		105.0			51.0	54.0		35.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		99.0			45.0	48.0		29.0
Max Q Clear Time (g_c+I1), s		101.0			47.0	50.0		31.0
Green Ext Time (p_c), s		0.0			0.0	0.0		0.0

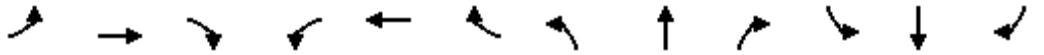
Intersection Summary	
HCM 2010 Ctrl Delay	190.0
HCM 2010 LOS	F



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	314	1550	557	198	1530
Number			2	12	1	6
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)				1.00	1.00	
Parking Bus, Adj			1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln			1827	1827	1827	1827
Adj Flow Rate, veh/h			1685	0	215	1663
Adj No. of Lanes			2	1	1	2
Peak Hour Factor			0.92	0.92	0.92	0.92
Percent Heavy Veh, %			4	4	4	4
Cap, veh/h			2855	1277	344	3240
Arrive On Green			0.82	0.00	0.04	0.93
Sat Flow, veh/h			3563	1553	1740	3563
Grp Volume(v), veh/h			1685	0	215	1663
Grp Sat Flow(s),veh/h/ln			1736	1553	1740	1736
Q Serve(g_s), s			15.1	0.0	1.4	5.5
Cycle Q Clear(g_c), s			15.1	0.0	1.4	5.5
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			2855	1277	344	3240
V/C Ratio(X)			0.59	0.00	0.62	0.51
Avail Cap(c_a), veh/h			2855	1277	577	3240
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh			2.8	0.0	7.2	0.4
Incr Delay (d2), s/veh			0.9	0.0	1.9	0.6
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln			7.4	0.0	4.1	2.6
LnGrp Delay(d),s/veh			3.7	0.0	9.0	1.0
LnGrp LOS			A		A	A
Approach Vol, veh/h			1685			1878
Approach Delay, s/veh			3.7			1.9
Approach LOS			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		
Phs Duration (G+Y+Rc), s	10.0	80.0				90.0		
Change Period (Y+Rc), s	6.0	6.0				6.0		
Max Green Setting (Gmax), s	16.0	62.0				84.0		
Max Q Clear Time (g_c+I1), s	3.4	17.1				7.5		
Green Ext Time (p_c), s	0.6	32.3				45.3		

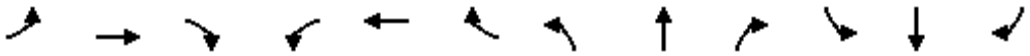
Intersection Summary	
HCM 2010 Ctrl Delay	2.7
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	548	0	247	570	1294	0	0	1180	955
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1827	0	1827	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				596	0	268	620	1407	0	0	1283	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				4	0	4	4	4	0	0	4	4
Cap, veh/h				600	0	276	600	2391	0	0	1543	690
Arrive On Green				0.18	0.00	0.18	0.18	0.69	0.00	0.00	0.44	0.00
Sat Flow, veh/h				3375	0	1553	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				596	0	268	620	1407	0	0	1283	0
Grp Sat Flow(s),veh/h/ln				1688	0	1553	1688	1736	0	0	1736	1553
Q Serve(g_s), s				15.9	0.0	15.4	16.0	19.1	0.0	0.0	29.3	0.0
Cycle Q Clear(g_c), s				15.9	0.0	15.4	16.0	19.1	0.0	0.0	29.3	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				600	0	276	600	2391	0	0	1543	690
V/C Ratio(X)				0.99	0.00	0.97	1.03	0.59	0.00	0.00	0.83	0.00
Avail Cap(c_a), veh/h				600	0	276	600	2391	0	0	1543	690
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				36.9	0.0	36.8	37.0	7.3	0.0	0.0	22.0	0.0
Incr Delay (d2), s/veh				34.9	0.0	46.0	45.6	1.1	0.0	0.0	5.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln				10.3	0.0	10.2	11.2	9.3	0.0	0.0	15.1	0.0
LnGrp Delay(d),s/veh				71.9	0.0	82.7	82.6	8.4	0.0	0.0	27.4	0.0
LnGrp LOS				E		F	F	A			C	
Approach Vol, veh/h					864			2027			1283	
Approach Delay, s/veh					75.2			31.1			27.4	
Approach LOS					E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		68.0			22.0	46.0		22.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		62.0			16.0	40.0		16.0
Max Q Clear Time (g_c+I1), s		21.1			18.0	31.3		17.9
Green Ext Time (p_c), s		22.4			0.0	7.2		0.0

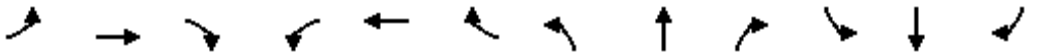
Intersection Summary	
HCM 2010 Ctrl Delay	39.1
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	0	836	0	0	0	0	1634	129	35	894	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00		0.88					0.95	1.00	1.00	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736		2733					3471	1553	1736	3471	
Flt Permitted	0.95		1.00					1.00	1.00	0.08	1.00	
Satd. Flow (perm)	1736		2733					3471	1553	139	3471	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	0	909	0	0	0	0	1776	140	38	972	0
RTOR Reduction (vph)	0	0	176	0	0	0	0	0	64	0	0	0
Lane Group Flow (vph)	128	0	733	0	0	0	0	1776	76	38	972	0
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot		Prot					NA	Perm	pm+pt	NA	
Protected Phases	4		4					2		1	6	
Permitted Phases									2	6		
Actuated Green, G (s)	23.0		23.0					46.6	46.6	55.0	55.0	
Effective Green, g (s)	23.0		23.0					46.6	46.6	55.0	55.0	
Actuated g/C Ratio	0.26		0.26					0.52	0.52	0.61	0.61	
Clearance Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	443		698					1797	804	127	2121	
v/s Ratio Prot	0.07		c0.27					c0.51		0.01	c0.28	
v/s Ratio Perm									0.05	0.17		
v/c Ratio	0.29		1.05					0.99	0.09	0.30	0.46	
Uniform Delay, d1	26.9		33.5					21.4	11.0	19.5	9.5	
Progression Factor	1.00		1.00					0.59	0.65	0.44	0.89	
Incremental Delay, d2	0.4		48.1					13.6	0.1	0.3	0.2	
Delay (s)	27.3		81.6					26.2	7.3	8.9	8.5	
Level of Service	C		F					C	A	A	A	
Approach Delay (s)		74.9			0.0			24.8			8.6	
Approach LOS		E			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	351	0	44	1163	589	0	0	578	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				1.00		1.00	0.97	0.95			0.95	1.00
Frt				1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1736		1553	3367	3471			3471	1553
Flt Permitted				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1736		1553	3367	3471			3471	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	382	0	48	1264	640	0	0	628	473
RTOR Reduction (vph)	0	0	0	0	0	37	0	0	0	0	0	326
Lane Group Flow (vph)	0	0	0	382	0	11	1264	640	0	0	628	147
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				20.0		20.0	35.6	58.0			16.4	16.4
Effective Green, g (s)				20.0		20.0	35.6	58.0			16.4	16.4
Actuated g/C Ratio				0.22		0.22	0.40	0.64			0.18	0.18
Clearance Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				385		345	1331	2236			632	282
v/s Ratio Prot				c0.22			c0.38	0.18			c0.18	
v/s Ratio Perm						0.01						0.09
v/c Ratio				0.99		0.03	0.95	0.29			0.99	0.52
Uniform Delay, d1				34.9		27.4	26.3	7.0			36.7	33.2
Progression Factor				1.00		1.00	0.46	0.53			1.00	1.00
Incremental Delay, d2				43.6		0.0	7.3	0.1			34.3	6.7
Delay (s)				78.5		27.4	19.5	3.9			71.0	40.0
Level of Service				E		C	B	A			E	D
Approach Delay (s)		0.0			72.8			14.3			57.7	
Approach LOS		A			E			B			E	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	966	1758	725	199	2138
Number			2	12	1	6
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)				1.00	1.00	
Parking Bus, Adj			1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln			1827	1827	1827	1827
Adj Flow Rate, veh/h			1851	0	209	2251
Adj No. of Lanes			2	1	1	2
Peak Hour Factor			0.95	0.95	0.95	0.95
Percent Heavy Veh, %			4	4	4	4
Cap, veh/h			2966	1327	296	3282
Arrive On Green			0.85	0.00	0.04	0.95
Sat Flow, veh/h			3563	1553	1740	3563
Grp Volume(v), veh/h			1851	0	209	2251
Grp Sat Flow(s),veh/h/ln			1736	1553	1740	1736
Q Serve(g_s), s			18.3	0.0	1.4	11.1
Cycle Q Clear(g_c), s			18.3	0.0	1.4	11.1
Prop In Lane				1.00	1.00	
Lane Grp Cap(c), veh/h			2966	1327	296	3282
V/C Ratio(X)			0.62	0.00	0.71	0.69
Avail Cap(c_a), veh/h			2966	1327	518	3282
HCM Platoon Ratio			1.00	1.00	1.00	1.00
Upstream Filter(I)			1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh			2.5	0.0	12.1	0.5
Incr Delay (d2), s/veh			1.0	0.0	3.1	1.2
Initial Q Delay(d3),s/veh			0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln			8.9	0.0	5.8	5.2
LnGrp Delay(d),s/veh			3.5	0.0	15.1	1.7
LnGrp LOS			A		B	A
Approach Vol, veh/h			1851			2460
Approach Delay, s/veh			3.5			2.8
Approach LOS			A			A

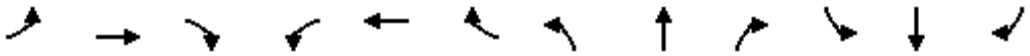
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		
Phs Duration (G+Y+Rc), s	10.0	100.0				110.0		
Change Period (Y+Rc), s	6.0	6.0				6.0		
Max Green Setting (Gmax), s	18.0	80.0				104.0		
Max Q Clear Time (g_c+I1), s	3.4	20.3				13.1		
Green Ext Time (p_c), s	0.6	50.7				71.4		

Intersection Summary	
HCM 2010 Ctrl Delay	3.1
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	728	0	255	208	2516	0	0	1609	361
Number				3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln				1827	0	1827	1827	1827	0	0	1827	1827
Adj Flow Rate, veh/h				766	0	268	219	2648	0	0	1694	0
Adj No. of Lanes				2	0	1	2	2	0	0	2	1
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				4	0	4	4	4	0	0	4	4
Cap, veh/h				675	0	311	276	2398	0	0	1925	861
Arrive On Green				0.20	0.00	0.20	0.08	0.69	0.00	0.00	0.55	0.00
Sat Flow, veh/h				3375	0	1553	3375	3563	0	0	3563	1553
Grp Volume(v), veh/h				766	0	268	219	2648	0	0	1694	0
Grp Sat Flow(s),veh/h/ln				1688	0	1553	1688	1736	0	0	1736	1553
Q Serve(g_s), s				22.0	0.0	18.4	7.0	76.0	0.0	0.0	46.7	0.0
Cycle Q Clear(g_c), s				22.0	0.0	18.4	7.0	76.0	0.0	0.0	46.7	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				675	0	311	276	2398	0	0	1925	861
V/C Ratio(X)				1.13	0.00	0.86	0.79	1.10	0.00	0.00	0.88	0.00
Avail Cap(c_a), veh/h				675	0	311	276	2398	0	0	1925	861
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				44.0	0.0	42.5	49.6	17.0	0.0	0.0	21.3	0.0
Incr Delay (d2), s/veh				78.0	0.0	21.3	14.6	53.8	0.0	0.0	6.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln				17.5	0.0	9.7	3.8	53.6	0.0	0.0	23.8	0.0
LnGrp Delay(d),s/veh				122.0	0.0	63.8	64.2	70.8	0.0	0.0	27.5	0.0
LnGrp LOS				F		E	E	F			C	
Approach Vol, veh/h					1034			2867			1694	
Approach Delay, s/veh					107.0			70.3			27.5	
Approach LOS					F			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		82.0			15.0	67.0		28.0
Change Period (Y+Rc), s		6.0			6.0	6.0		6.0
Max Green Setting (Gmax), s		76.0			9.0	61.0		22.0
Max Q Clear Time (g_c+I1), s		78.0			9.0	48.7		24.0
Green Ext Time (p_c), s		0.0			0.0	12.0		0.0

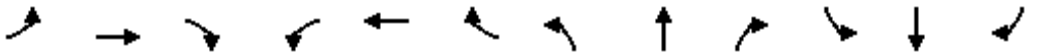
Intersection Summary	
HCM 2010 Ctrl Delay	64.1
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	288	0	980	0	0	0	0	2013	471	35	984	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00		0.88					0.95	1.00	1.00	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736		2733					3471	1553	1736	3471	
Flt Permitted	0.95		1.00					1.00	1.00	0.05	1.00	
Satd. Flow (perm)	1736		2733					3471	1553	99	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	0	1032	0	0	0	0	2119	496	37	1036	0
RTOR Reduction (vph)	0	0	214	0	0	0	0	0	154	0	0	0
Lane Group Flow (vph)	303	0	818	0	0	0	0	2119	342	37	1036	0
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot		Perm					NA	Perm	pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	22.0		22.0					67.6	67.6	76.0	76.0	
Effective Green, g (s)	22.0		22.0					67.6	67.6	76.0	76.0	
Actuated g/C Ratio	0.20		0.20					0.61	0.61	0.69	0.69	
Clearance Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	347		546					2133	954	104	2398	
v/s Ratio Prot	0.17							c0.61		0.01	c0.30	
v/s Ratio Perm			c0.30						0.22	0.24		
v/c Ratio	0.87		1.50					0.99	0.36	0.36	0.43	
Uniform Delay, d1	42.6		44.0					21.0	10.5	27.6	7.5	
Progression Factor	1.00		1.00					0.76	0.79	0.95	1.31	
Incremental Delay, d2	20.7		234.0					8.0	0.2	0.9	0.2	
Delay (s)	63.4		278.0					24.0	8.6	27.0	10.0	
Level of Service	E		F					C	A	C	B	
Approach Delay (s)		229.3			0.0			21.1			10.6	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	74.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	284	0	45	1244	1057	0	0	735	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				1.00		1.00	0.97	0.95			0.95	1.00
Frt				1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1736		1553	3367	3471			3471	1553
Flt Permitted				0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1736		1553	3367	3471			3471	1553
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	299	0	47	1309	1113	0	0	774	134
RTOR Reduction (vph)	0	0	0	0	0	38	0	0	0	0	0	100
Lane Group Flow (vph)	0	0	0	299	0	9	1309	1113	0	0	774	34
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				20.0		20.0	43.9	78.0			28.1	28.1
Effective Green, g (s)				20.0		20.0	43.9	78.0			28.1	28.1
Actuated g/C Ratio				0.18		0.18	0.40	0.71			0.26	0.26
Clearance Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				315		282	1343	2461			886	396
v/s Ratio Prot				c0.17			c0.39	0.32			c0.22	
v/s Ratio Perm						0.01						0.02
v/c Ratio				0.95		0.03	0.97	0.45			0.87	0.09
Uniform Delay, d1				44.5		37.0	32.5	6.9			39.2	31.2
Progression Factor				1.00		1.00	0.65	1.19			1.00	1.00
Incremental Delay, d2				36.9		0.0	9.0	0.2			11.7	0.4
Delay (s)				81.4		37.1	30.0	8.4			50.9	31.6
Level of Service				F		D	C	A			D	C
Approach Delay (s)		0.0			75.4			20.1			48.1	
Approach LOS		A			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	NBT	SET	SER2
Lane Configurations			
Volume (vph)	589	578	435
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00
Frt	1.00	1.00	0.85
Flt Protected	1.00	1.00	1.00
Satd. Flow (prot)	3539	3539	1583
Flt Permitted	1.00	1.00	1.00
Satd. Flow (perm)	3539	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	620	608	458
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	620	608	458
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free
Actuated Green, G (s)	59.9	22.1	90.0
Effective Green, g (s)	59.9	22.1	90.0
Actuated g/C Ratio	0.67	0.25	1.00
Clearance Time (s)	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	2355	869	1583
v/s Ratio Prot	0.18	c0.17	
v/s Ratio Perm			c0.29
v/c Ratio	0.26	0.70	0.29
Uniform Delay, d1	6.1	30.9	0.0
Progression Factor	1.51	1.00	1.00
Incremental Delay, d2	0.2	2.5	0.5
Delay (s)	9.5	33.4	0.5
Level of Service	A	C	A
Approach Delay (s)	9.5	19.3	
Approach LOS	A	B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	351	0	0	0	0	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0					4.0
Lane Util. Factor	1.00					0.95
Frt	1.00					1.00
Flt Protected	0.95					1.00
Satd. Flow (prot)	1770					3539
Flt Permitted	0.95					1.00
Satd. Flow (perm)	1770					3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	369	0	0	0	0	608
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	369	0	0	0	0	608
Turn Type	Prot					NA
Protected Phases	4!					Free!
Permitted Phases						
Actuated Green, G (s)	59.9					90.0
Effective Green, g (s)	59.9					90.0
Actuated g/C Ratio	0.67					1.00
Clearance Time (s)	4.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	1178					3539
v/s Ratio Prot	c0.21					0.17
v/s Ratio Perm						
v/c Ratio	0.31					0.17
Uniform Delay, d1	6.4					0.0
Progression Factor	1.00					1.00
Incremental Delay, d2	0.7					0.1
Delay (s)	7.1					0.1
Level of Service	A					A
Approach Delay (s)	7.1		0.0			0.1
Approach LOS	A		A			A

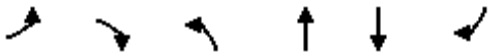
Intersection Summary			
HCM 2000 Control Delay	2.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	NBL	NBT	SBT	SBR	SEL	SER	NEL	NER
Lane Configurations								
Volume (vph)	1634	0	0	894	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0				
Lane Util. Factor	0.97			0.88				
Frt	1.00			0.85				
Flt Protected	0.95			1.00				
Satd. Flow (prot)	3433			2787				
Flt Permitted	0.95			1.00				
Satd. Flow (perm)	3433			2787				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1720	0	0	941	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1720	0	0	941	0	0	0	0
Turn Type	Prot			Prot				
Protected Phases	4			2				
Permitted Phases								
Actuated Green, G (s)	49.6			32.4				
Effective Green, g (s)	49.6			32.4				
Actuated g/C Ratio	0.55			0.36				
Clearance Time (s)	4.0			4.0				
Vehicle Extension (s)	3.0			3.0				
Lane Grp Cap (vph)	1891			1003				
v/s Ratio Prot	c0.50			c0.34				
v/s Ratio Perm								
v/c Ratio	0.91			0.94				
Uniform Delay, d1	18.2			27.8				
Progression Factor	1.00			0.50				
Incremental Delay, d2	8.0			15.4				
Delay (s)	26.2			29.3				
Level of Service	C			C				
Approach Delay (s)		26.2	29.3		0.0		0.0	
Approach LOS		C	C		A		A	

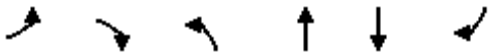
Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	837	0	0	894	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	
Lane Util. Factor		0.88			0.95	
Frt		0.85			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		2787			3539	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		2787			3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	881	0	0	941	0
RTOR Reduction (vph)	0	255	0	0	0	0
Lane Group Flow (vph)	0	626	0	0	941	0
Turn Type		Prot			NA	
Protected Phases		4!			Free!	
Permitted Phases						
Actuated Green, G (s)		49.6			90.0	
Effective Green, g (s)		49.6			90.0	
Actuated g/C Ratio		0.55			1.00	
Clearance Time (s)		4.0				
Vehicle Extension (s)		3.0				
Lane Grp Cap (vph)		1535			3539	
v/s Ratio Prot		c0.22			0.27	
v/s Ratio Perm						
v/c Ratio		0.41			0.27	
Uniform Delay, d1		11.7			0.0	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.8			0.1	
Delay (s)		12.5			0.1	
Level of Service		B			A	
Approach Delay (s)	12.5			0.0	0.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	118	0	0	1634	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	1.00			0.95		
Frt	1.00			1.00		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	1770			3539		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	1770			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	0	0	1776	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	128	0	0	1776	0	0
Turn Type	Prot			NA		
Protected Phases	2!			Free!		
Permitted Phases						
Actuated Green, G (s)	32.4			90.0		
Effective Green, g (s)	32.4			90.0		
Actuated g/C Ratio	0.36			1.00		
Clearance Time (s)	4.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	637			3539		
v/s Ratio Prot	0.07			0.50		
v/s Ratio Perm						
v/c Ratio	0.20			0.50		
Uniform Delay, d1	19.9			0.0		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.2			0.2		
Delay (s)	20.0			0.2		
Level of Service	C			A		
Approach Delay (s)	20.0			0.2	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	NBT	SET	SER2
Lane Configurations			
Volume (vph)	1057	735	127
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00
Frt	1.00	1.00	0.85
Flt Protected	1.00	1.00	1.00
Satd. Flow (prot)	3539	3539	1583
Flt Permitted	1.00	1.00	1.00
Satd. Flow (perm)	3539	3539	1583
Peak-hour factor, PHF	0.95	0.95	0.95
Adj. Flow (vph)	1113	774	134
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	1113	774	134
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free
Actuated Green, G (s)	85.6	36.4	130.0
Effective Green, g (s)	85.6	36.4	130.0
Actuated g/C Ratio	0.66	0.28	1.00
Clearance Time (s)	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	2330	990	1583
v/s Ratio Prot	c0.31	c0.22	
v/s Ratio Perm			0.08
v/c Ratio	0.48	0.78	0.08
Uniform Delay, d1	11.1	43.1	0.0
Progression Factor	0.98	1.00	1.00
Incremental Delay, d2	0.6	4.1	0.1
Delay (s)	11.4	47.2	0.1
Level of Service	B	D	A
Approach Delay (s)	11.4	40.3	
Approach LOS	B	D	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	284	0	0	0	0	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0					4.0
Lane Util. Factor	1.00					0.95
Frt	1.00					1.00
Flt Protected	0.95					1.00
Satd. Flow (prot)	1770					3539
Flt Permitted	0.95					1.00
Satd. Flow (perm)	1770					3539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	299	0	0	0	0	774
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	299	0	0	0	0	774
Turn Type	Prot					NA
Protected Phases	4!					Free!
Permitted Phases						
Actuated Green, G (s)	85.6					130.0
Effective Green, g (s)	85.6					130.0
Actuated g/C Ratio	0.66					1.00
Clearance Time (s)	4.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	1165					3539
v/s Ratio Prot	c0.17					0.22
v/s Ratio Perm						
v/c Ratio	0.26					0.22
Uniform Delay, d1	9.1					0.0
Progression Factor	1.00					1.00
Incremental Delay, d2	0.5					0.1
Delay (s)	9.7					0.1
Level of Service	A					A
Approach Delay (s)	9.7		0.0			0.1
Approach LOS	A		A			A

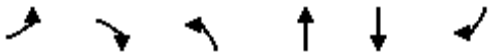
Intersection Summary			
HCM 2000 Control Delay	2.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	NBL	NBT	SBT	SBR	SEL	SER	NEL	NER
Lane Configurations								
Volume (vph)	2013	0	0	984	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0				
Lane Util. Factor	0.97			0.88				
Frt	1.00			0.85				
Flt Protected	0.95			1.00				
Satd. Flow (prot)	3433			2787				
Flt Permitted	0.95			1.00				
Satd. Flow (perm)	3433			2787				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2119	0	0	1036	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	2119	0	0	1036	0	0	0	0
Turn Type	Prot			Prot				
Protected Phases	4			2				
Permitted Phases								
Actuated Green, G (s)	77.0			45.0				
Effective Green, g (s)	77.0			45.0				
Actuated g/C Ratio	0.59			0.35				
Clearance Time (s)	4.0			4.0				
Vehicle Extension (s)	3.0			3.0				
Lane Grp Cap (vph)	2033			964				
v/s Ratio Prot	c0.62			c0.37				
v/s Ratio Perm								
v/c Ratio	1.04			1.07				
Uniform Delay, d1	26.5			42.5				
Progression Factor	1.00			0.43				
Incremental Delay, d2	32.0			51.1				
Delay (s)	58.5			69.5				
Level of Service	E			E				
Approach Delay (s)		58.5	69.5		0.0		0.0	
Approach LOS		E	E		A		A	

Intersection Summary			
HCM 2000 Control Delay	62.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

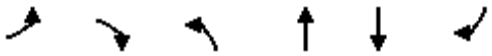


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	980	0	0	984	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	
Lane Util. Factor		0.88			0.95	
Frt		0.85			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		2787			3539	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		2787			3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1032	0	0	1036	0
RTOR Reduction (vph)	0	203	0	0	0	0
Lane Group Flow (vph)	0	829	0	0	1036	0
Turn Type		Prot			NA	
Protected Phases		4!			Free!	
Permitted Phases						
Actuated Green, G (s)		77.0			130.0	
Effective Green, g (s)		77.0			130.0	
Actuated g/C Ratio		0.59			1.00	
Clearance Time (s)		4.0				
Vehicle Extension (s)		3.0				
Lane Grp Cap (vph)		1650			3539	
v/s Ratio Prot		c0.30			0.29	
v/s Ratio Perm						
v/c Ratio		0.50			0.29	
Uniform Delay, d1		15.4			0.0	
Progression Factor		1.00			1.00	
Incremental Delay, d2		1.1			0.0	
Delay (s)		16.5			0.0	
Level of Service		B			A	
Approach Delay (s)	16.5			0.0	0.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

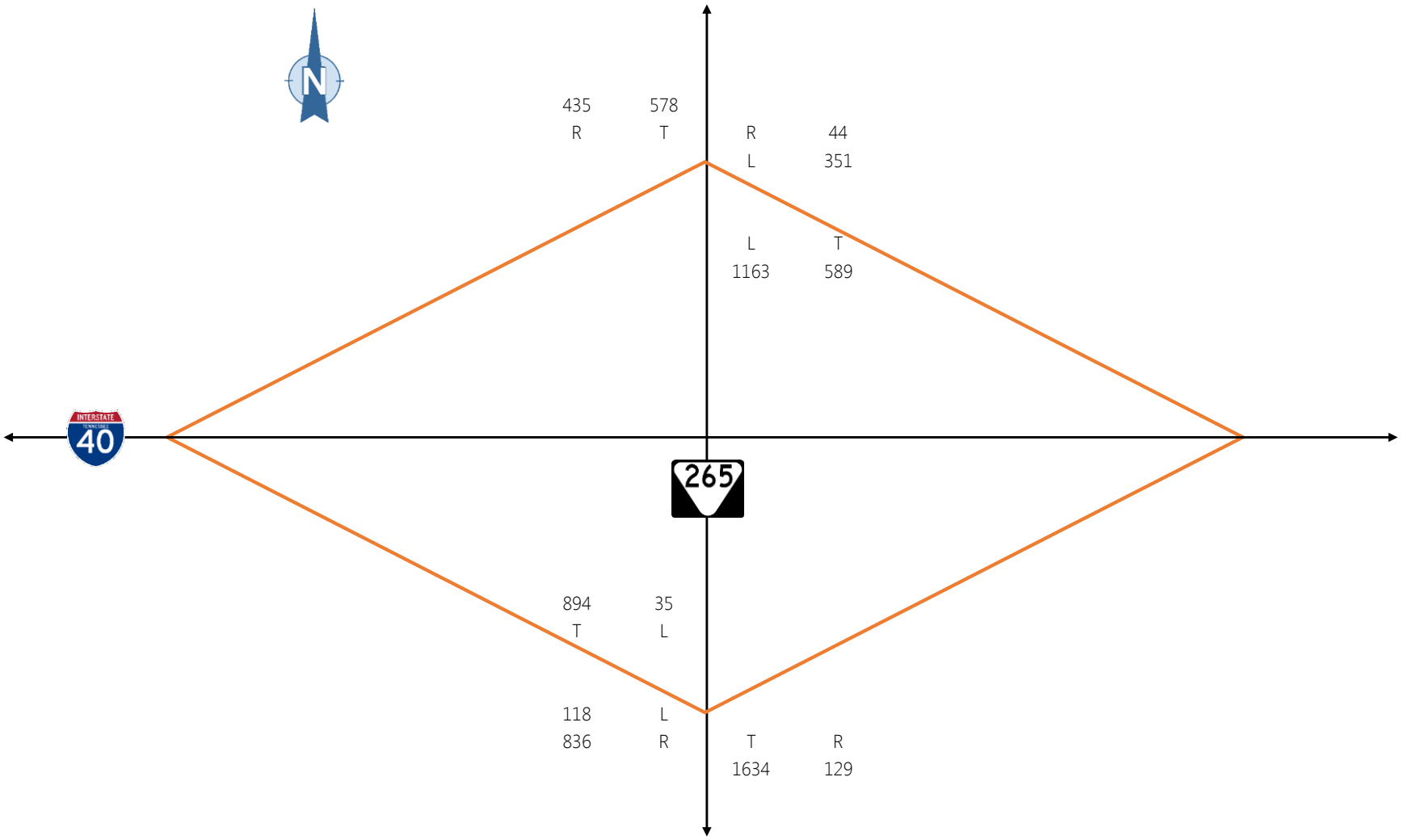


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	288	0	0	2013	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		
Lane Util. Factor	1.00			0.95		
Frt	1.00			1.00		
Flt Protected	0.95			1.00		
Satd. Flow (prot)	1770			3539		
Flt Permitted	0.95			1.00		
Satd. Flow (perm)	1770			3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	313	0	0	2188	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	313	0	0	2188	0	0
Turn Type	Prot			NA		
Protected Phases	2!			Free!		
Permitted Phases						
Actuated Green, G (s)	45.0			130.0		
Effective Green, g (s)	45.0			130.0		
Actuated g/C Ratio	0.35			1.00		
Clearance Time (s)	4.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	612			3539		
v/s Ratio Prot	0.18			0.62		
v/s Ratio Perm						
v/c Ratio	0.51			0.62		
Uniform Delay, d1	33.8			0.0		
Progression Factor	1.00			1.00		
Incremental Delay, d2	0.7			0.1		
Delay (s)	34.5			0.1		
Level of Service	C			A		
Approach Delay (s)	34.5			0.1	0.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

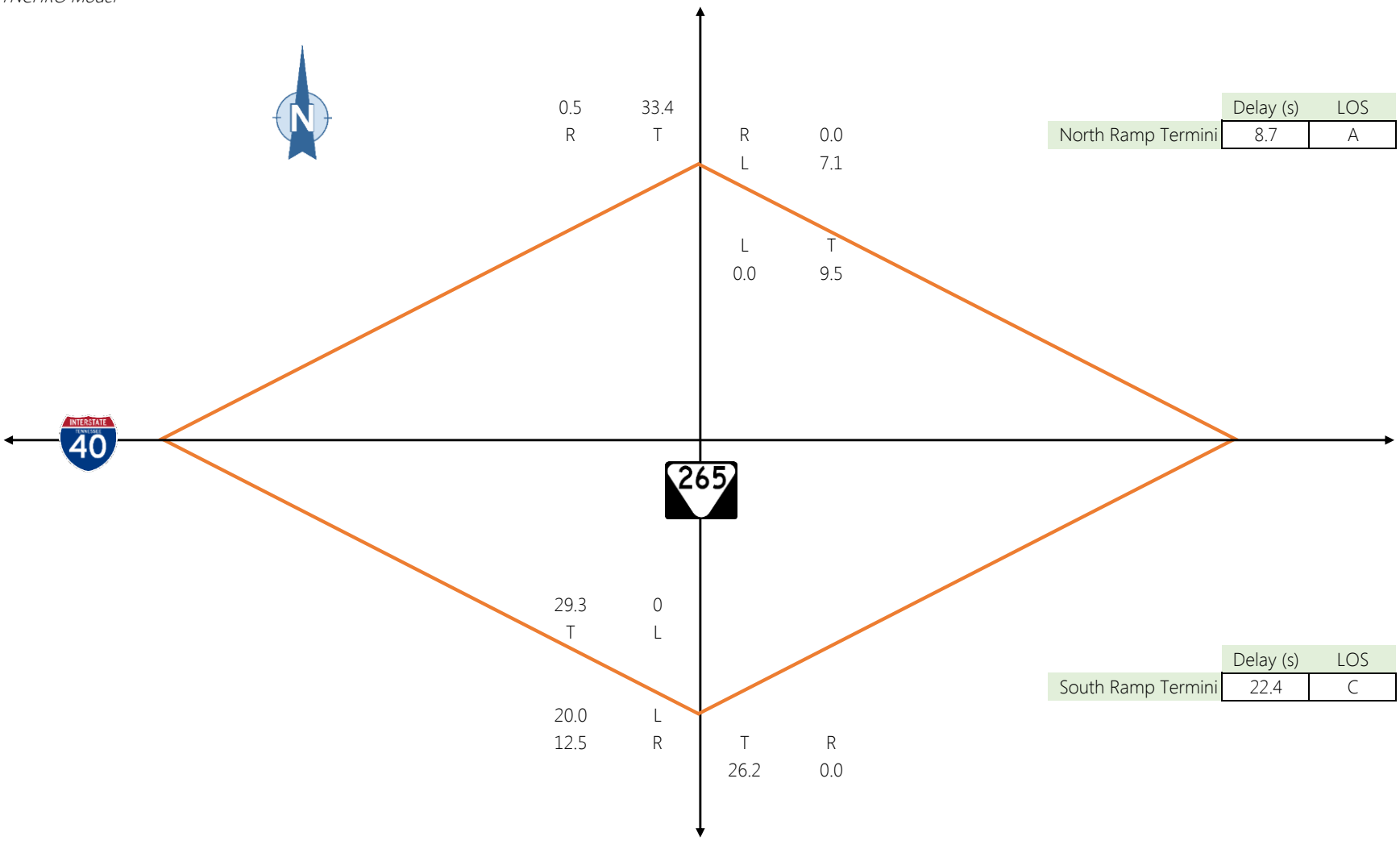
! Phase conflict between lane groups.
c Critical Lane Group

AM Peak Hour Volumes



Peak Hour Delays

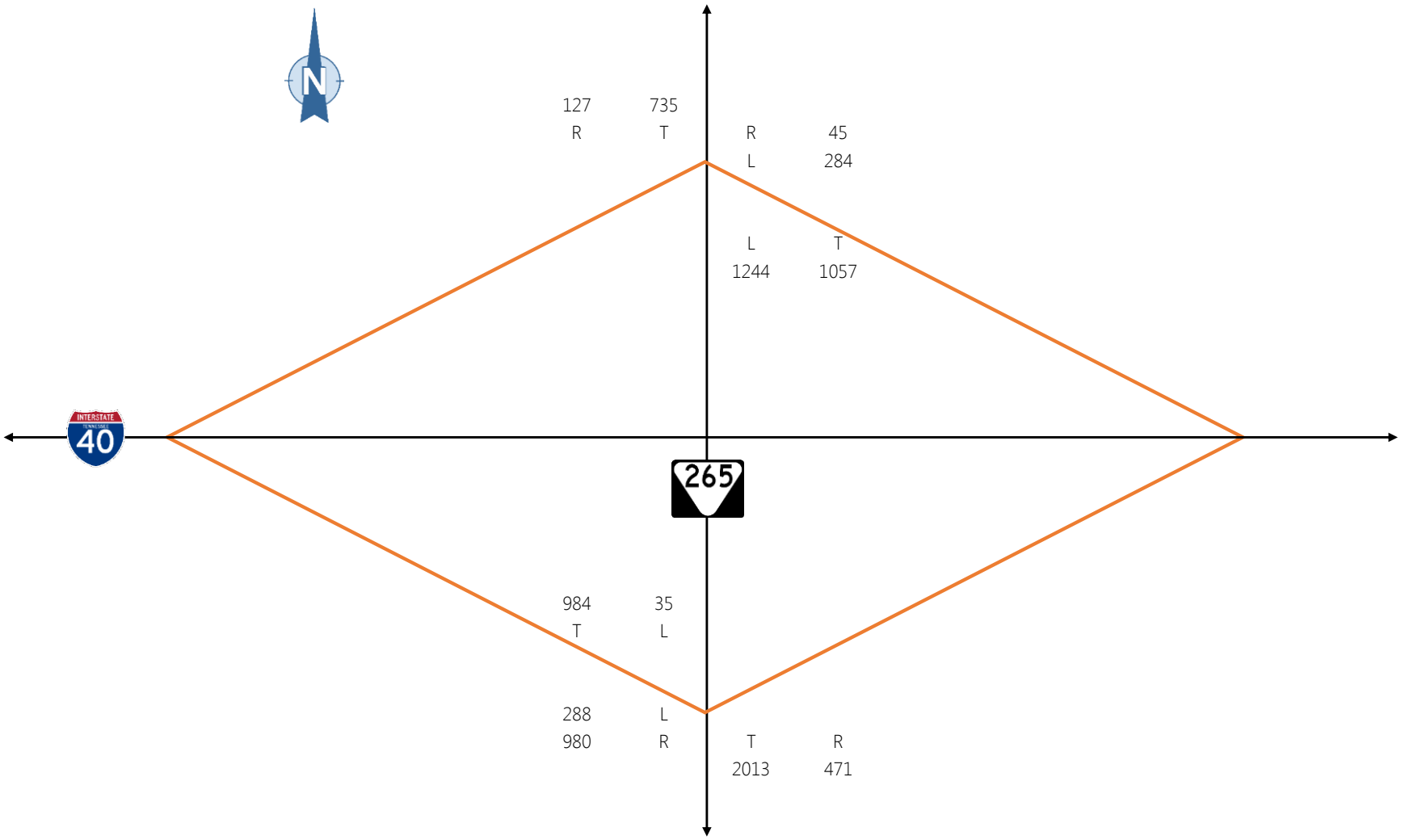
Based on SYNCHRO Model



	Delay (s)	LOS
North Ramp Termini	8.7	A

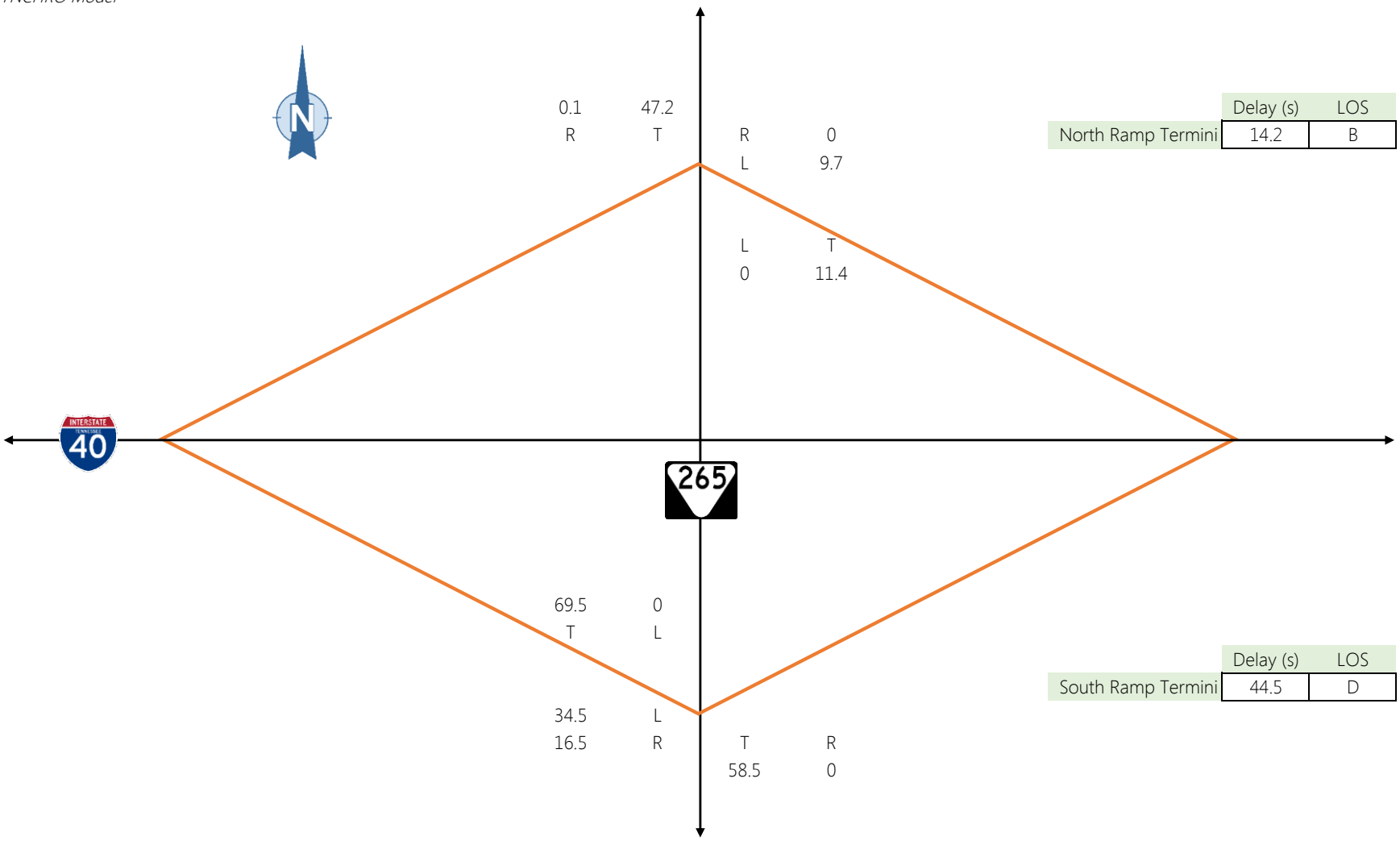
	Delay (s)	LOS
South Ramp Termini	22.4	C

PM Peak Hour Volumes



Peak Hour Delays

Based on SYNCHRO Model



	Delay (s)	LOS
North Ramp Termini	14.2	B

	Delay (s)	LOS
South Ramp Termini	44.5	D

APPENDIX D: ALTERNATIVES EXAMINED

But Not Carried Forward

ROUNDABOUT ALTERNATIVE

TENNESSEE D.O.T.
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
FILE NO. ___

TYPE	YEAR	COUNTY	FIGURE NO.
IAR	2015	WILSON COUNTY	1



0' 200' 400' 600'

N

INTERSTATE ACCESS REQUEST

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

ALTERNATIVE EXAMINED, BUT NOT CARRIED FORWARD

2/1/2015 3:24:16 PM
\\global.gap\data\cadd\ken_projects\2925146\+roundabout.SHT

APPENDIX E: TRAFFIC ANALYSIS

HCS Ramp Analysis

No Build Alternative (2020) SR 45 EB On-Ramp AM
No Build Alternative (2020) SR 45 EB On-Ramp PM
No Build Alternative (2020) SR 45 WB Off-Ramp AM
No Build Alternative (2020) SR 45 WB Off-Ramp PM

No Build Alternative (2020) SR 171 EB Off-Ramp AM
No Build Alternative (2020) SR 171 EB Off-Ramp PM
No Build Alternative (2020) SR 171 EB On-Ramp AM
No Build Alternative (2020) SR 171 EB On-Ramp PM
No Build Alternative (2020) SR 171 WB On-Ramp AM
No Build Alternative (2020) SR 171 WB On-Ramp PM
No Build Alternative (2020) SR 171 WB Off-Ramp AM
No Build Alternative (2020) SR 171 WB Off-Ramp PM

No Build Alternative (2040) SR 45 EB On-Ramp AM
No Build Alternative (2040) SR 45 EB On-Ramp PM
No Build Alternative (2040) SR 45 WB Off-Ramp AM
No Build Alternative (2040) SR 45 WB Off-Ramp PM

No Build Alternative (2040) SR 171 EB Off-Ramp AM
No Build Alternative (2040) SR 171 EB Off-Ramp PM
No Build Alternative (2040) SR 171 EB On-Ramp AM
No Build Alternative (2040) SR 171 EB On-Ramp PM
No Build Alternative (2040) SR 171 WB On-Ramp AM
No Build Alternative (2040) SR 171 WB On-Ramp PM
No Build Alternative (2040) SR 171 WB Off-Ramp AM
No Build Alternative (2040) SR 171 WB Off-Ramp PM

Diamond & DDI Build Alternatives (2020) SR 45 EB On-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 45 EB On-Ramp PM
Diamond & DDI Build Alternatives (2020) SR 45 WB Off-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 45 WB Off-Ramp PM

Diamond & DDI Build Alternatives (2020) SR 265 EB Off-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 265 EB Off-Ramp PM
Diamond & DDI Build Alternatives (2020) SR 265 EB On-Ramp Weave AM
Diamond & DDI Build Alternatives (2020) SR 265 EB On-Ramp Weave PM
Diamond & DDI Build Alternatives (2020) SR 265 WB Off-Ramp Weave AM
Diamond & DDI Build Alternatives (2020) SR 265 WB Off-Ramp Weave PM
Diamond & DDI Build Alternatives (2020) SR 265 WB On-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 265 WB On-Ramp PM

Diamond & DDI Build Alternatives (2020) SR 171 EB On-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 171 EB On-Ramp PM

Diamond & DDI Build Alternatives (2020) SR 171 EB Off-Ramp Weave AM
Diamond & DDI Build Alternatives (2020) SR 171 EB Off-Ramp Weave PM
Diamond & DDI Build Alternatives (2020) SR 171 WB On-Ramp Weave AM
Diamond & DDI Build Alternatives (2020) SR 171 WB On-Ramp Weave PM
Diamond & DDI Build Alternatives (2020) SR 171 WB Off-Ramp AM
Diamond & DDI Build Alternatives (2020) SR 171 WB Off-Ramp PM

Diamond & DDI Build Alternatives (2040) SR 45 EB On-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 45 EB On-Ramp PM
Diamond & DDI Build Alternatives (2040) SR 45 WB Off-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 45 WB Off-Ramp PM

Diamond & DDI Build Alternatives (2040) SR 265 EB Off-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 265 EB Off-Ramp PM
Diamond & DDI Build Alternatives (2040) SR 265 EB On-Ramp Weave AM
Diamond & DDI Build Alternatives (2040) SR 265 EB On-Ramp Weave PM
Diamond & DDI Build Alternatives (2040) SR 265 WB Off-Ramp Weave AM
Diamond & DDI Build Alternatives (2040) SR 265 WB Off-Ramp Weave PM
Diamond & DDI Build Alternatives (2040) SR 265 WB On-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 265 WB On-Ramp PM

Diamond & DDI Build Alternatives (2040) SR 171 EB On-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 171 EB On-Ramp PM

Diamond & DDI Build Alternatives (2040) SR 171 EB Off-Ramp Weave AM
Diamond & DDI Build Alternatives (2040) SR 171 EB Off-Ramp Weave PM
Diamond & DDI Build Alternatives (2040) SR 171 WB On-Ramp Weave AM
Diamond & DDI Build Alternatives (2040) SR 171 WB On-Ramp Weave PM
Diamond & DDI Build Alternatives (2040) SR 171 WB Off-Ramp AM
Diamond & DDI Build Alternatives (2040) SR 171 WB Off-Ramp PM

Synchro Intersection Analysis

Synchro Intersection Analysis – Intersections along SR 45

SR 45 Traffic Volume Adjustments
SR 45 All Alternatives (2020)
SR 45 All Alternatives (2040)

Synchro Intersection Analysis – Intersections along SR 265

SR 265 No Build Alternative (2020)
SR 265 Diamond & DDI Build Alternatives (2020)
SR 265 Diamond Build Alternative (2020)
SR 265 DDI Build Alternative (2020)
SR 265 No Build Alternative (2040)
SR 265 Diamond & DDI Build Alternatives (2040)
SR 265 Diamond Build Alternative (2040)
SR 265 DDI Build Alternative (2040)

Synchro Intersection Analysis – Intersections along SR 171

SR 171 Interchange (2020) No SR 265 Interchange, No Improvements SR 171
SR 171 Interchange (2040) No SR 265 Interchange, No Improvements SR 171
SR 171 Interchange (2020) No SR 265 Interchange, Added NB Lane SR 171
SR 171 Interchange (2040) No SR 265 Interchange, Added NB Lane SR 171
SR 171 Interchange (2020) with SR 265 Interchange, No Improvements SR 171
SR 171 Interchange (2040) with SR 265 Interchange, No Improvements SR 171
SR 171 Interchange (2020) with SR 265 Interchange, Added NB Lane SR 171
SR 171 Interchange (2040) with SR 265 Interchange, Added NB Lane SR 171

HCS RAMP ANALYSIS

No Build Alternative (2020) SR 45 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020
Project Description	I-40/OHB EB On Ramp Merge AM 2020		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2098	
	Ramp Volume, V_R: 629	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2098	0.92	Level	12	0	0.943	1.00	2417
Ramp	629	0.92	Level	1	0	0.995	1.00	687
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.319 using Equation 0 (Exhibit 13-6)

V_{12} = 772 pc/h

V_3 or V_{av34} = 822 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 966 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3104	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1653	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 12.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.240 (Exibit 13-11)

S_R = 59.5 mph (Exhibit 13-11)

S_0 = 64.2 mph (Exhibit 13-11)

S = 61.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 45 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020

Project Description I-40/OHB EB On Ramp Merge PM 2020

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4319	
	Ramp Volume, V_R: 758	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4319	0.92	Level	12	0	0.943	1.00	4976
Ramp	758	0.92	Level	1	0	0.995	1.00	828
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.114 using Equation 0 (Exhibit 13-6)

V_{12} = 569 pc/h

V_3 or V_{av34} 2203 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1990 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5804	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2818	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.285 (Exibit 13-11)

S_R = 58.5 mph (Exhibit 13-11)

S_0 = 61.4 mph (Exhibit 13-11)

S = 59.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 45 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020

Project Description I-40/OHB WB Off Ramp Diverge AM

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 260	V_D = veh/h
	Freeway Volume, V_F: 5348	
	Ramp Volume, V_R:	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5348	0.92	Level	12	0	0.943	1.00	6162
Ramp		0.92	Level	1	0	0.995	1.00	1074
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3292 pc/h

V_3 or V_{av34} 1435 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6162	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5088	Exhibit 13-8	9400	No
V_R	1074	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3292	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 30.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.265 (Exhibit 13-12)

S_R = 58.9 mph (Exhibit 13-12)

S_0 = 69.6 mph (Exhibit 13-12)

S = 63.5 mph (Exhibit 13-13)

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No Build Alternative (2020) SR 45 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020

Project Description I-40/OHB WB Off Ramp Diverge PM

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	260
Freeway Volume, V_F	2898
Ramp Volume, V_R	572
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{down} = ft; V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2898	0.92	Level	12	0	0.943	1.00	3339
Ramp	572	0.92	Level	1	0	0.995	1.00	625
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 1808 pc/h

V_3 or V_{av34} 765 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3339	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2714	Exhibit 13-8	9400	No
V_R	625	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1808	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.224 (Exhibit 13-12)

S_R = 59.8 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 64.6 mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 EB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020
Project Description	I-40/SR 171 EB Off Ramp Diverge AM 2020		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = veh/h
	Freeway Volume, V_F: 2727	
	Ramp Volume, V_R: 969	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2727	0.92	Level	12	0	0.943	1.00	3142
Ramp	969	0.92	Level	1	0	0.995	1.00	1059
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation 0 (Exhibit 13-7)

V_{12} = 1996 pc/h

V_3 or V_{av34} 1146 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3142	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	2083	Exhibit 13-8	7050	No
V_R	1059	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1996	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 14.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.263 (Exhibit 13-12)

S_R = 58.9 mph (Exhibit 13-12)

S_0 = 70.7 mph (Exhibit 13-12)

S = 62.8 mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 EB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020
Project Description	I-40/SR 171 EB Off Ramp Diverge PM 2020		

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	2	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	250	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	5077	V_D =	veh/h
		Ramp Volume, V_R	2293		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5077	0.92	Level	12	0	0.943	1.00	5850
Ramp	2293	0.92	Level	1	0	0.995	1.00	2505
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation 0 (Exhibit 13-7)

V_{12} = 4010 pc/h

V_3 or V_{av34} 1840 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5850	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	3345	Exhibit 13-8	7050	No
V_R	2505	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4010	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.0 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.393 (Exhibit 13-12)

S_R = 56.0 mph (Exhibit 13-12)

S_0 = 68.0 mph (Exhibit 13-12)

S = 59.3 mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020

Project Description I-40/SR 171 EB On Ramp Merge

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1758	
	Ramp Volume, V_R: 702	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1758	0.92	Level	12	0	0.943	1.00	2026
Ramp	702	0.92	Level	1	0	0.995	1.00	767
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 1211 pc/h

V_3 or V_{av34} 815 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1211 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2793	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1978	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.269 (Exibit 13-11)

S_R = 58.8 mph (Exhibit 13-11)

S_0 = 63.9 mph (Exhibit 13-11)

S = 60.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020

Project Description I-40/SR 171 EB On Ramp Merge

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2784	
	Ramp Volume, V_R: 906	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2784	0.92	Level	12	0	0.943	1.00	3208
Ramp	906	0.92	Level	1	0	0.995	1.00	990
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 1918 pc/h

V_3 or V_{av34} 1290 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1918 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4198	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2908	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.313 (Exibit 13-11)

S_R= 57.8 mph (Exhibit 13-11)

S_0= 62.2 mph (Exhibit 13-11)

S = 59.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 WB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020
Project Description	I-40/SR 171 WB On Ramp Merge 2020 AM		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2894	
	Ramp Volume, V_R: 2454	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2894	0.92	Level	12	0	0.943	1.00	3334
Ramp	2454	0.92	Level	1	0	0.995	1.00	2681
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 697 pc/h

V_3 or V_{av34} = 1318 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1333 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6015	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4014	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.377 (Exibit 13-11)

S_R = 56.3 mph (Exhibit 13-11)

S_0 = 63.2 mph (Exhibit 13-11)

S = 58.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 WB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020
Project Description	I-40/SR 171 WB On Ramp Merge 2020 AM		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2894	
	Ramp Volume, V_R: 2454	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2894	0.92	Level	12	0	0.943	1.00	3334
Ramp	2454	0.92	Level	1	0	0.995	1.00	2681
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 697 pc/h

V_3 or V_{av34} = 1318 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1333 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6015	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4014	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.377 (Exibit 13-11)

S_R = 56.3 mph (Exhibit 13-11)

S_0 = 63.2 mph (Exhibit 13-11)

S = 58.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 WB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020
Project Description	I-40/SR 171 WB On Ramp Merge 2020 PM		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1543	
	Ramp Volume, V_R: 1355	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1543	0.92	Level	12	0	0.943	1.00	1778
Ramp	1355	0.92	Level	1	0	0.995	1.00	1480
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 372 pc/h

V_3 or V_{av34} = 703 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 711 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3258	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2191	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 12.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.196 (Exibit 13-11)

S_R = 60.5 mph (Exhibit 13-11)

S_0 = 64.9 mph (Exhibit 13-11)

S = 61.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020

Project Description I-40/SR 171 WB Diverge AM

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 3690	
	Ramp Volume, V_R: 792	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3690	0.92	Level	12	0	0.943	1.00	4252
Ramp	792	0.92	Level	1	0	0.995	1.00	865
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.614 using Equation 9 (Exhibit 13-7)

V_{12} = 2944 pc/h

V_3 or V_{av34} 1308 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4252	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	3387	Exhibit 13-8	7050	No
V_R	865	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2944	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 27.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.246 (Exhibit 13-12)

S_R = 59.3 mph (Exhibit 13-12)

S_0 = 70.1 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

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No Build Alternative (2020) SR 171 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020

Project Description I-40/SR 171 WB Diverge PM

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 2460	
	Ramp Volume, V_R: 917	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2460	0.92	Level	12	0	0.943	1.00	2834
Ramp	917	0.92	Level	1	0	0.995	1.00	1002
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.643 using Equation 9 (Exhibit 13-7)

V_{12} = 2180 pc/h

V_3 or V_{av34} 654 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2834	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	1832	Exhibit 13-8	7050	No
V_R	1002	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2180	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.258 (Exhibit 13-12)

S_R = 59.1 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 61.5 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 45 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/OHB EB On Ramp Merge AM 2040 no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2639	
	Ramp Volume, V_R: 766	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2639	0.92	Level	12	0	0.943	1.00	3041
Ramp	766	0.92	Level	1	0	0.995	1.00	837
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.301 using Equation 0 (Exhibit 13-6)

V_{12} = 914 pc/h

V_3 or V_{av34} = 1063 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1216 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3878	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2053	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.250 (Exibit 13-11)

S_R = 59.3 mph (Exhibit 13-11)

S_0 = 63.5 mph (Exhibit 13-11)

S = 61.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 45 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/OHB EB On Ramp Merge PM 2040 no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 5056	
	Ramp Volume, V_R: 925	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5056	0.92	Level	12	0	0.943	1.00	5825
Ramp	925	0.92	Level	1	0	0.995	1.00	1010
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.092 using Equation 0 (Exhibit 13-6)

V_{12} = 533 pc/h

V_3 or V_{av34} = 2646 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2330 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6835	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3340	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 25.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.329 (Exibit 13-11)

S_R = 57.4 mph (Exhibit 13-11)

S_0 = 60.5 mph (Exhibit 13-11)

S = 59.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 45 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/OHB WB Off Ramp Diverge AM no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 260	V_D = veh/h
	Freeway Volume, V_F: 6318	
	Ramp Volume, V_R: 860	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6318	0.92	Level	12	0	0.943	1.00	7279
Ramp	860	0.92	Level	1	0	0.995	1.00	939
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3703 pc/h

V_3 or V_{av34} 1788 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7279	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	6340	Exhibit 13-8	9400	No
V_R	939	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3703	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 33.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.253 (Exhibit 13-12)

S_R = 59.2 mph (Exhibit 13-12)

S_0 = 68.2 mph (Exhibit 13-12)

S = 63.3 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 45 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/OHB WB Off Ramp Diverge PM no build

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	260	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	3566	V_D =	veh/h
		Ramp Volume, V_R	699		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3566	0.92	Level	12	0	0.943	1.00	4109
Ramp	699	0.92	Level	1	0	0.995	1.00	764
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2222 pc/h

V_3 or V_{av34} 943 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4109	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3345	Exhibit 13-8	9400	No
V_R	764	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2222	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.237 (Exhibit 13-12)

S_R = 59.6 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 64.4 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 EB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040
Project Description	I-40/SR 171 EB Off Ramp Diverge AM 2040 No Build		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = veh/h
	Freeway Volume, V_F: 3405	
	Ramp Volume, V_R: 1323	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3405	0.92	Level	12	0	0.943	1.00	3923
Ramp	1323	0.92	Level	1	0	0.995	1.00	1445
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation 0 (Exhibit 13-7)

V_{12} = 2560 pc/h

V_3 or V_{av34} 1363 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3923	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	2478	Exhibit 13-8	7050	No
V_R	1445	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2560	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.298 (Exhibit 13-12)

S_R = 58.1 mph (Exhibit 13-12)

S_0 = 69.9 mph (Exhibit 13-12)

S = 61.8 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 EB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040
Project Description	I-40/SR 171 EB Off Ramp Diverge PM 2040 no build		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = veh/h
	Freeway Volume, V_F: 5981	
	Ramp Volume, V_R: 2909	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5981	0.92	Level	12	0	0.943	1.00	6891
Ramp	2909	0.92	Level	1	0	0.995	1.00	3178
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation 0 (Exhibit 13-7)

V_{12} = 4849 pc/h

V_3 or V_{av34} 2042 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6891	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	3713	Exhibit 13-8	7050	No
V_R	3178	Exhibit 13-10	4400	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4849	Exhibit 13-8	4400:All	Yes

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 39.2 (pc/mi/ln)

LOS = E (Exhibit 13-2)

Speed Determination

D_s = 0.454 (Exhibit 13-12)

S_R = 54.6 mph (Exhibit 13-12)

S_0 = 67.2 mph (Exhibit 13-12)

S = 57.8 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/SR 171 EB On Ramp Merge No-Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2082	
	Ramp Volume, V_R: 919	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2082	0.92	Level	12	0	0.943	1.00	2399
Ramp	919	0.92	Level	1	0	0.995	1.00	1004
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 1434 pc/h

V_3 or V_{av34} 965 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1434 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3403	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2438	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 19.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.286 (Exibit 13-11)

S_R = 58.4 mph (Exhibit 13-11)

S_0 = 63.3 mph (Exhibit 13-11)

S = 59.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/SR 171 EB On Ramp Merge no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3072	
	Ramp Volume, V_R: 1430	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3072	0.92	Level	12	0	0.943	1.00	3539
Ramp	1430	0.92	Level	1	0	0.995	1.00	1562
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 2116 pc/h

V_3 or V_{av34} 1423 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2116 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5101	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3678	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 28.9 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.396 (Exibit 13-11)

S_R = 55.9 mph (Exhibit 13-11)

S_0 = 61.7 mph (Exhibit 13-11)

S = 57.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 WB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040
Project Description	I-40/SR 171 WB On Ramp Merge 2040 AM No-Build		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3312	
	Ramp Volume, V_R: 3006	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3312	0.92	Level	12	0	0.943	1.00	3816
Ramp	3006	0.92	Level	1	0	0.995	1.00	3284
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 798 pc/h

V_3 or V_{av34} = 1509 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1526 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7100	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4810	Exhibit 13-8	4600:All	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 32.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.639 (Exibit 13-11)

S_R = 50.3 mph (Exhibit 13-11)

S_0 = 62.7 mph (Exhibit 13-11)

S = 53.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 WB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/SR 171 WB On Ramp Merge 2040 PM No-Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1689	
	Ramp Volume, V_R: 1877	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	1689	0.92	Level	12	0	0.943	1.00	1946
Ramp	1877	0.92	Level	1	0	0.995	1.00	2050
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 407 pc/h

V_3 or V_{av34} 769 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 778 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3996	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2828	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.227 (Exibit 13-11)

S_R = 59.8 mph (Exhibit 13-11)

S_0 = 64.7 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/SR 171 WB Diverge AM no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 4502	
	Ramp Volume, V_R: 1190	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4502	0.92	Level	12	0	0.943	1.00	5187
Ramp	1190	0.92	Level	1	0	0.995	1.00	1300
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.571 using Equation 9 (Exhibit 13-7)

V_{12} = 3518 pc/h

V_3 or V_{av34} 1669 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5187	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	3887	Exhibit 13-8	7050	No
V_R	1300	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3518	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.285 (Exhibit 13-12)

S_R = 58.4 mph (Exhibit 13-12)

S_0 = 68.7 mph (Exhibit 13-12)

S = 61.4 mph (Exhibit 13-13)

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No Build Alternative (2040) SR 171 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/SR 171 WB Diverge PM no build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 3001	
	Ramp Volume, V_R: 1312	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3001	0.92	Level	12	0	0.943	1.00	3458
Ramp	1312	0.92	Level	1	0	0.995	1.00	1433
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.608 using Equation 9 (Exhibit 13-7)

V_{12} = 2663 pc/h

V_3 or V_{av34} 795 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3458	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	2025	Exhibit 13-8	7050	No
V_R	1433	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2663	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 25.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.297 (Exhibit 13-12)

S_R = 58.2 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 60.7 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 45 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	9/18/17	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020

Project Description I-40/OHB EB On Ramp Merge AM 2020 Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2098	
	Ramp Volume, V_R: 629	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2098	0.92	Level	12	0	0.943	1.00	2417
Ramp	629	0.92	Level	1	0	0.995	1.00	687
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.319 using Equation (Exhibit 13-6)

V_{12} = 772 pc/h

V_3 or V_{av34} 822 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 966 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3104	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1653	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 12.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.240 (Exibit 13-11)

S_R = 59.5 mph (Exhibit 13-11)

S_0 = 64.2 mph (Exhibit 13-11)

S = 61.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 45 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020 Build

Project Description I-40/OHB EB On Ramp Merge PM 2020

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4319	
	Ramp Volume, V_R: 758	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4319	0.92	Level	12	0	0.943	1.00	4976
Ramp	758	0.92	Level	1	0	0.995	1.00	828
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.114 using Equation (Exhibit 13-6)

V_{12} = 569 pc/h

V_3 or V_{av34} 2203 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1990 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5804	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2818	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.3 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.285 (Exibit 13-11)

S_R = 58.5 mph (Exhibit 13-11)

S_0 = 61.4 mph (Exhibit 13-11)

S = 59.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 45 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020

Project Description I-40/OHB WB Off Ramp Diverge AM Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 260	V_D = veh/h
	Freeway Volume, V_F: 5348	
	Ramp Volume, V_R: 705	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5348	0.92	Level	12	0	0.943	1.00	6162
Ramp	705	0.92	Level	1	0	0.995	1.00	770
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 3121 pc/h

V_3 or V_{av34} 1520 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6162	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5392	Exhibit 13-8	9400	No
V_R	770	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3121	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$

D_R = 28.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.237 (Exhibit 13-12)

S_R = 59.5 mph (Exhibit 13-12)

S_0 = 69.3 mph (Exhibit 13-12)

S = 64.0 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 45 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020 Build

Project Description I-40/OHB WB Off Ramp Diverge PM

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	260	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	2898	V_D =	veh/h
		Ramp Volume, V_R	572		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2898	0.92	Level	12	0	0.943	1.00	3339
Ramp	572	0.92	Level	1	0	0.995	1.00	625
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 1808 pc/h

V_3 or V_{av34} 765 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3339	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2714	Exhibit 13-8	9400	No
V_R	625	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1808	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.224 (Exhibit 13-12)

S_R = 59.8 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 64.6 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 265 EB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2020 AM	Analysis Year	2020 Build AM

Project Description I-40/SR 265 2040 Build AM EB Off Ramp Diverge

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 500	V_D = veh/h
	Freeway Volume, V_F: 2727	
	Ramp Volume, V_R: 221	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2727	0.92	Level	12	0	0.943	1.00	3142
Ramp	221	0.92	Level	1	0	0.995	1.00	241
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 1506 pc/h

V_3 or V_{av34} 818 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3142	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2901	Exhibit 13-8	9400	No
V_R	241	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1506	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 12.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.190 (Exhibit 13-12)

S_R = 60.6 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 65.8 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 265 EB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2020 PM	Analysis Year	2020 Build PM

Project Description I-40/SR 265 2020 Build AM EB Off Ramp Diverge

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	4
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	500
Freeway Volume, V_F	5077
Ramp Volume, V_R	671
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{down} = ft; V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5077	0.92	Level	12	0	0.943	1.00	5850
Ramp	671	0.92	Level	1	0	0.995	1.00	733
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation (Exhibit 13-7)

V_{12} = 2964 pc/h

V_3 or V_{av34} 1443 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5850	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5117	Exhibit 13-8	9400	No
V_R	733	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2964	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 25.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.234 (Exhibit 13-12)

S_R = 59.6 mph (Exhibit 13-12)

S_0 = 69.6 mph (Exhibit 13-12)

S = 64.1 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 265 EB On-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2020 AM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2020 Build

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	1920ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2232	0.92	12	0	1.5	1.2	0.943	1.00	2572
V_{RF}	157	0.92	1	0	1.5	1.2	0.995	1.00	172
V_{FR}	281	0.92	1	0	1.5	1.2	0.995	1.00	307
V_{RR}	7	0.92	1	0	1.5	1.2	0.995	1.00	8
V_{NW}	2580							V =	3059
V_W	479								
VR	0.157								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	344 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1027 lc/h
Minimum RF lane changes, LC_{RF}	2 lc/pc	Non-weaving lane changes, LC_{NW}	609 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	1636 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	495

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2910 veh/h	Weaving intensity factor, W	0.199
Weaving segment capacity, c_w	10863 veh/h	Weaving segment speed, S	59.1 mph
Weaving segment v/c ratio	0.268	Average weaving speed, S_W	56.7 mph
Weaving segment density, D	10.3 pc/mi/ln	Average non-weaving speed, S_{NW}	59.6 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	2531 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 265 EB On-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	8/22/16
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2020 Build

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3030	0.92	12	0	1.5	1.2	0.943	1.00	3491
V_{RF}	431	0.92	1	0	1.5	1.2	0.995	1.00	471
V_{FR}	1376	0.92	1	0	1.5	1.2	0.995	1.00	1503
V_{RR}	75	0.92	1	0	1.5	1.2	0.995	1.00	82
V_{NW}	3573							V =	5547
V_W	1974								
VR	0.356								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	942 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1791 lc/h
Minimum RF lane changes, LC_{RF}	2 lc/pc	Non-weaving lane changes, LC_{NW}	1291 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	3082 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	1000

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5340 veh/h	Weaving intensity factor, W	0.244
Weaving segment capacity, c_w	9278 veh/h	Weaving segment speed, S	53.7 mph
Weaving segment v/c ratio	0.575	Average weaving speed, S_W	55.2 mph
Weaving segment density, D	20.7 pc/mi/ln	Average non-weaving speed, S_{NW}	52.9 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4625 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 265 WB Off-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	Jonathan Smith
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2020 AM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2020 Build

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3009	0.92	12	0	1.5	1.2	0.943	1.00	3467
V_{RF}	1410	0.92	1	0	1.5	1.2	0.995	1.00	1540
V_{FR}	280	0.92	1	0	1.5	1.2	0.995	1.00	306
V_{RR}	115	0.92	1	0	1.5	1.2	0.995	1.00	126
V_{NW}	3593							V =	5439
V_W	1846								
VR	0.339								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	1846 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	2447 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	1295 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	3742 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	302

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5233 veh/h	Weaving intensity factor, W	0.284
Weaving segment capacity, c_w	9729 veh/h	Weaving segment speed, S	48.8 mph
Weaving segment v/c ratio	0.538	Average weaving speed, S_W	53.9 mph
Weaving segment density, D	22.3 pc/mi/ln	Average non-weaving speed, S_{NW}	46.5 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4444 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 265 WB Off-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2020 PM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2020

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1615	0.92	12	0	1.5	1.2	0.943	1.00	1861
V_{RF}	819	0.92	1	0	1.5	1.2	0.995	1.00	895
V_{FR}	257	0.92	1	0	1.5	1.2	0.995	1.00	281
V_{RR}	72	0.92	1	0	1.5	1.2	0.995	1.00	79
V_{NW}	1940							V =	3116
V_W	1176								
VR	0.377								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	1176 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	1777 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	954 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2731 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	163

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	3004 veh/h	Weaving intensity factor, W	0.222
Weaving segment capacity, c_w	8749 veh/h	Weaving segment speed, S	54.4 mph
Weaving segment v/c ratio	0.343	Average weaving speed, S_W	55.9 mph
Weaving segment density, D	11.5 pc/mi/ln	Average non-weaving speed, S_{NW}	53.5 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4863 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 265 WB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 WB
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2020 Build AM	Analysis Year	2020 AM Build

Project Description I-40/SR 265 WB On Ramp Merge AM Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4460	
	Ramp Volume, V_R: 918	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4460	0.92	Level	12	0	0.943	1.00	5139
Ramp	918	0.92	Level	1	0	0.995	1.00	1003
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation (Exhibit 13-6)

V_{12} = 1074 pc/h

V_3 or V_{av34} = 2032 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2055 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6142	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3058	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.184 (Exibit 13-11)

S_R = 60.8 mph (Exhibit 13-11)

S_0 = 61.2 mph (Exhibit 13-11)

S = 61.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 265 WB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 WB
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2020 Build AM	Analysis Year	2020 AM Build

Project Description I-40/SR 265 WB On Ramp Merge PM 040 Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2434	
	Ramp Volume, V_R: 464	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2434	0.92	Level	12	0	0.943	1.00	2804
Ramp	464	0.92	Level	1	0	0.995	1.00	507
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation (Exhibit 13-6)

V_{12} = 586 pc/h

V_3 or V_{av34} 1109 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1121 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3311	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1628	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 5.4 (pc/mi/ln)

LOS = A (Exhibit 13-2)

Speed Determination

M_S = 0.121 (Exibit 13-11)

S_R = 62.2 mph (Exhibit 13-11)

S_0 = 63.8 mph (Exhibit 13-11)

S = 63.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 171 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020 Build

Project Description I-40/SR 171 EB On Ramp Merge

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 1977	
	Ramp Volume, V_R: 248	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	1977	0.92	Level	12	0	0.943	1.00	2278
Ramp	248	0.92	Level	1	0	0.995	1.00	271
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation (Exhibit 13-6)

V_{12} = 1362 pc/h

V_3 or V_{av34} = 916 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1362 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2549	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1633	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 13.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.261 (Exibit 13-11)

S_R = 59.0 mph (Exhibit 13-11)

S_0 = 63.5 mph (Exhibit 13-11)

S = 60.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 171 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020 Build

Project Description I-40/SR 171 EB On Ramp Merge

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3822	
	Ramp Volume, V_R: 400	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3822	0.92	Level	12	0	0.943	1.00	4404
Ramp	400	0.92	Level	1	0	0.995	1.00	437
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation (Exhibit 13-6)

V_{12} = 2633 pc/h

V_3 or V_{av34} = 1771 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2633 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4841	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3070	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.325 (Exibit 13-11)

S_R = 57.5 mph (Exhibit 13-11)

S_0 = 60.4 mph (Exhibit 13-11)

S = 58.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 171 EB Off-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2020 AM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2020 Build

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	1920ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2232	0.92	12	0	1.5	1.2	0.943	1.00	2572
V_{RF}	157	0.92	1	0	1.5	1.2	0.995	1.00	172
V_{FR}	281	0.92	1	0	1.5	1.2	0.995	1.00	307
V_{RR}	7	0.92	1	0	1.5	1.2	0.995	1.00	8
V_{NW}	2580							V =	3059
V_W	479								
VR	0.157								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	344 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1027 lc/h
Minimum RF lane changes, LC_{RF}	2 lc/pc	Non-weaving lane changes, LC_{NW}	609 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	1636 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	495

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2910 veh/h	Weaving intensity factor, W	0.199
Weaving segment capacity, c_w	10863 veh/h	Weaving segment speed, S	59.1 mph
Weaving segment v/c ratio	0.268	Average weaving speed, S_W	56.7 mph
Weaving segment density, D	10.3 pc/mi/ln	Average non-weaving speed, S_{NW}	59.6 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	2531 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 171 EB Off-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	8/22/16
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2020 Build

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3030	0.92	12	0	1.5	1.2	0.943	1.00	3491
V_{RF}	431	0.92	1	0	1.5	1.2	0.995	1.00	471
V_{FR}	1376	0.92	1	0	1.5	1.2	0.995	1.00	1503
V_{RR}	75	0.92	1	0	1.5	1.2	0.995	1.00	82
V_{NW}	3573							V =	5547
V_W	1974								
VR	0.356								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	942 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1791 lc/h
Minimum RF lane changes, LC_{RF}	2 lc/pc	Non-weaving lane changes, LC_{NW}	1291 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	3082 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	1000

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5340 veh/h	Weaving intensity factor, W	0.244
Weaving segment capacity, c_w	9278 veh/h	Weaving segment speed, S	53.7 mph
Weaving segment v/c ratio	0.575	Average weaving speed, S_W	55.2 mph
Weaving segment density, D	20.7 pc/mi/ln	Average non-weaving speed, S_{NW}	52.9 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4625 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 171 WB On-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	Jonathan Smith
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2020 AM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2020 Build

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3009	0.92	12	0	1.5	1.2	0.943	1.00	3467
V_{RF}	1410	0.92	1	0	1.5	1.2	0.995	1.00	1540
V_{FR}	280	0.92	1	0	1.5	1.2	0.995	1.00	306
V_{RR}	115	0.92	1	0	1.5	1.2	0.995	1.00	126
V_{NW}	3593							V =	5439
V_W	1846								
VR	0.339								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	1846 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	2447 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	1295 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	3742 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	302

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5233 veh/h	Weaving intensity factor, W	0.284
Weaving segment capacity, c_w	9729 veh/h	Weaving segment speed, S	48.8 mph
Weaving segment v/c ratio	0.538	Average weaving speed, S_W	53.9 mph
Weaving segment density, D	22.3 pc/mi/ln	Average non-weaving speed, S_{NW}	46.5 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4444 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 171 WB On-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2020 PM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2020

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1615	0.92	12	0	1.5	1.2	0.943	1.00	1861
V_{RF}	819	0.92	1	0	1.5	1.2	0.995	1.00	895
V_{FR}	257	0.92	1	0	1.5	1.2	0.995	1.00	281
V_{RR}	72	0.92	1	0	1.5	1.2	0.995	1.00	79
V_{NW}	1940							V =	3116
V_W	1176								
VR	0.377								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	1176 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	1777 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	954 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2731 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	163

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	3004 veh/h	Weaving intensity factor, W	0.222
Weaving segment capacity, c_w	8749 veh/h	Weaving segment speed, S	54.4 mph
Weaving segment v/c ratio	0.343	Average weaving speed, S_W	55.9 mph
Weaving segment density, D	11.5 pc/mi/ln	Average non-weaving speed, S_{NW}	53.5 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	4863 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2020) SR 171 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	9/18/17	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2020 Build

Project Description I-40/SR 171 WB Diverge AM

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	230
Freeway Volume, V_F	3690
Ramp Volume, V_R	401
Freeway Free-Flow Speed, S_{FF}	65.0
Ramp Free-Flow Speed, S_{FR}	55.0

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{down} = ft; V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3690	0.92	Level	12	0	0.943	1.00	4252
Ramp	401	0.92	Level	1	0	0.995	1.00	438
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.634 using Equation (Exhibit 13-7)

V_{12} = 2854 pc/h

V_3 or V_{av34} 1398 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4252	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	3814	Exhibit 13-8	7050	No
V_R	438	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2854	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.207 (Exhibit 13-12)

S_R = 60.2 mph (Exhibit 13-12)

S_0 = 69.8 mph (Exhibit 13-12)

S = 63.1 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2020) SR 171 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2020 Build

Project Description I-40/SR 171 WB Diverge PM

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	230	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	2460	V_D =	veh/h
		Ramp Volume, V_R	588		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2460	0.92	Level	12	0	0.943	1.00	2834
Ramp	588	0.92	Level	1	0	0.995	1.00	642
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.660 using Equation (Exhibit 13-7)

V_{12} = 2088 pc/h

V_3 or V_{av34} 746 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2834	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	2192	Exhibit 13-8	7050	No
V_R	642	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2088	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.226 (Exhibit 13-12)

S_R = 59.8 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 62.5 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 45 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/OHB EB On Ramp Merge AM 2040 Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2651	
	Ramp Volume, V_R: 817	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2651	0.92	Level	12	0	0.943	1.00	3054
Ramp	817	0.92	Level	1	0	0.995	1.00	892
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.294 using Equation 0 (Exhibit 13-6)

V_{12} = 897 pc/h

V_3 or V_{av34} = 1078 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1221 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3946	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2113	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.252 (Exibit 13-11)

S_R = 59.2 mph (Exhibit 13-11)

S_0 = 63.5 mph (Exhibit 13-11)

S = 61.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 45 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 EB
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/OHB EB On Ramp Merge PM 2040 Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 925	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 5109	
	Ramp Volume, V_R: 989	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5109	0.92	Level	12	0	0.943	1.00	5886
Ramp	989	0.92	Level	1	0	0.995	1.00	1080
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.083 using Equation 0 (Exhibit 13-6)

V_{12} = 487 pc/h

V_3 or V_{av34} = 2699 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2354 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6966	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3434	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.340 (Exibit 13-11)

S_R = 57.2 mph (Exhibit 13-11)

S_0 = 60.4 mph (Exhibit 13-11)

S = 58.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 45 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/OHB WB Off Ramp Diverge AM Build

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	260	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	6435	V_D =	veh/h
		Ramp Volume, V_R	889		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6435	0.92	Level	12	0	0.943	1.00	7414
Ramp	889	0.92	Level	1	0	0.995	1.00	971
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3780 pc/h

V_3 or V_{av34} 1817 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7414	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	6443	Exhibit 13-8	9400	No
V_R	971	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3780	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 34.4 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.255 (Exhibit 13-12)

S_R = 59.1 mph (Exhibit 13-12)

S_0 = 68.1 mph (Exhibit 13-12)

S = 63.2 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 45 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	OHB
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/OHB WB Off Ramp Diverge PM Build

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	260	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	3629	V_D =	veh/h
		Ramp Volume, V_R	715		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3629	0.92	Level	12	0	0.943	1.00	4181
Ramp	715	0.92	Level	1	0	0.995	1.00	781
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2263 pc/h

V_3 or V_{av34} 959 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4181	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	3400	Exhibit 13-8	9400	No
V_R	781	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2263	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.238 (Exhibit 13-12)

S_R = 59.5 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 64.4 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 265 EB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2040 AM	Analysis Year	2040 Build AM
Project Description	I-40/SR 265 2040 AM EB Off Ramp Diverge Build		

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	500	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	3468	V_D =	veh/h
		Ramp Volume, V_R	954		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3468	0.92	Level	12	0	0.943	1.00	3996
Ramp	954	0.92	Level	1	0	0.995	1.00	1042
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 2330 pc/h

V_3 or V_{av34} 833 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3996	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	2954	Exhibit 13-8	9400	No
V_R	1042	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2330	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.262 (Exhibit 13-12)

S_R = 59.0 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 63.6 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 265 EB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2040 PM	Analysis Year	2040 Build PM
Project Description	I-40/SR 265 2040 PM EB Off Ramp Diverge Build		

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	4	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☑ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	500	L_{down} =	ft
V_u =	veh/h	Freeway Volume, V_F	6098	V_D =	veh/h
		Ramp Volume, V_R	1268		
		Freeway Free-Flow Speed, S_{FF}	65.0		
		Ramp Free-Flow Speed, S_{FR}	55.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	6098	0.92	Level	12	0	0.943	1.00	7026
Ramp	1268	0.92	Level	1	0	0.995	1.00	1385
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 using Equation 0 (Exhibit 13-7)

V_{12} = 3844 pc/h

V_3 or V_{av34} 1591 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7026	Exhibit 13-8	9400	No
$V_{FO} = V_F - V_R$	5641	Exhibit 13-8	9400	No
V_R	1385	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3844	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.8 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.293 (Exhibit 13-12)

S_R= 58.3 mph (Exhibit 13-12)

S_0= 69.0 mph (Exhibit 13-12)

S = 62.7 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 265 EB On-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2040 AM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2040

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	1920ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2403	0.92	12	0	1.5	1.2	0.943	1.00	2769
V_{RF}	157	0.92	1	0	1.5	1.2	0.995	1.00	172
V_{FR}	111	0.92	1	0	1.5	1.2	0.995	1.00	121
V_{RR}	7	0.92	1	0	1.5	1.2	0.995	1.00	8
V_{NW}	2777							V =	3070
V_W	293								
VR	0.095								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	172 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	855 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	650 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	1505 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	533

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2911 veh/h	Weaving intensity factor, W	0.186
Weaving segment capacity, c_w	11080 veh/h	Weaving segment speed, S	60.4 mph
Weaving segment v/c ratio	0.263	Average weaving speed, S_W	57.1 mph
Weaving segment density, D	10.2 pc/mi/ln	Average non-weaving speed, S_{NW}	60.8 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	1929 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 265 EB On-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2040

Project Description Weave analysis for SR 265 EB On Ramp Build

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4113	0.92	12	0	1.5	1.2	0.943	1.00	4739
V_{RF}	431	0.92	1	0	1.5	1.2	0.995	1.00	471
V_{FR}	717	0.92	1	0	1.5	1.2	0.995	1.00	783
V_{RR}	75	0.92	1	0	1.5	1.2	0.995	1.00	82
V_{NW}	4821							V =	6075
V_W	1254								
VR	0.206								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	471 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1320 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	1641 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	2961 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	1350

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5800 veh/h	Weaving intensity factor, W	0.236
Weaving segment capacity, c_w	11000 veh/h	Weaving segment speed, S	55.7 mph
Weaving segment v/c ratio	0.527	Average weaving speed, S_W	55.4 mph
Weaving segment density, D	21.8 pc/mi/ln	Average non-weaving speed, S_{NW}	55.8 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	3036 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 265 WB Off-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	Jonathan Smith
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2040 AM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2040

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3427	0.92	12	0	1.5	1.2	0.943	1.00	3949
V_{RF}	1410	0.92	1	0	1.5	1.2	0.995	1.00	1540
V_{FR}	280	0.92	1	0	1.5	1.2	0.995	1.00	306
V_{RR}	115	0.92	1	0	1.5	1.2	0.995	1.00	126
V_{NW}	4075							V =	5921
V_W	1846								
VR	0.312								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	306 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	907 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	1394 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2301 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	342

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5687 veh/h	Weaving intensity factor, W	0.194
Weaving segment capacity, c_w	10591 veh/h	Weaving segment speed, S	57.0 mph
Weaving segment v/c ratio	0.537	Average weaving speed, S_W	56.9 mph
Weaving segment density, D	20.8 pc/mi/ln	Average non-weaving speed, S_{NW}	57.1 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4145 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 265 WB Off-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2040

Project Description SR 171 WB On Ramp Weave

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1761	0.92	12	0	1.5	1.2	0.943	1.00	2029
V_{RF}	497	0.92	1	0	1.5	1.2	0.995	1.00	543
V_{FR}	257	0.92	1	0	1.5	1.2	0.995	1.00	281
V_{RR}	72	0.92	1	0	1.5	1.2	0.995	1.00	79
V_{NW}	2108							V =	2932
V_W	824								
VR	0.281								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	281 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	882 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	989 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1871 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	177

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2812 veh/h	Weaving intensity factor, W	0.164
Weaving segment capacity, c_w	10717 veh/h	Weaving segment speed, S	59.5 mph
Weaving segment v/c ratio	0.262	Average weaving speed, S_W	57.9 mph
Weaving segment density, D	9.9 pc/mi/ln	Average non-weaving speed, S_{NW}	60.2 mph
Level of Service, LOS	A	Maximum weaving length, L_{MAX}	3815 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 265 WB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 WB
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2040 Build AM	Analysis Year	2040 AM Build
Project Description	I-40/SR 265 WB On Ramp Merge AM 040 Build		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 4837	
	Ramp Volume, V_R: 1598	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4837	0.92	Level	12	0	0.943	1.00	5573
Ramp	1598	0.92	Level	1	0	0.995	1.00	1746
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 1165 pc/h

V_3 or V_{av34} = 2204 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2229 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7319	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3975	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.309 (Exibit 13-11)

S_R = 57.9 mph (Exhibit 13-11)

S_0 = 60.8 mph (Exhibit 13-11)

S = 59.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 265 WB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40 WB
Agency or Company	Gresham, Smith & Partners	Junction	SR 265
Date Performed	1/20/2015	Jurisdiction	
Analysis Time Period	2040 Build PM	Analysis Year	2040 PM Build

Project Description I-40/SR 265 WB On Ramp Merge PM 040 Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 4	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 500	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2258	
	Ramp Volume, V_R: 1371	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2258	0.92	Level	12	0	0.943	1.00	2602
Ramp	1371	0.92	Level	1	0	0.995	1.00	1498
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 using Equation 0 (Exhibit 13-6)

V_{12} = 544 pc/h

V_3 or V_{av34} = 1029 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1040 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4100	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2538	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 12.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.150 (Exibit 13-11)

S_R = 61.5 mph (Exhibit 13-11)

S_0 = 64.0 mph (Exhibit 13-11)

S = 62.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 171 EB On-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040

Project Description I-40/SR 171 EB On Ramp Merge Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2246	
	Ramp Volume, V_R: 755	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2246	0.92	Level	12	0	0.943	1.00	2588
Ramp	755	0.92	Level	1	0	0.995	1.00	825
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 1547 pc/h

V_3 or V_{av34} 1041 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1547 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3413	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2372	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 19.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.283 (Exibit 13-11)

S_R= 58.5 mph (Exhibit 13-11)

S_0= 63.1 mph (Exhibit 13-11)

S = 59.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 171 EB On-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/SR 171 EB On Ramp Merge Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A: 725	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3578	
	Ramp Volume, V_R: 924	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3578	0.92	Level	12	0	0.943	1.00	4122
Ramp	924	0.92	Level	1	0	0.995	1.00	1009
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.598 using Equation 3 (Exhibit 13-6)

V_{12} = 2464 pc/h

V_3 or V_{av34} 1658 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2464 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5131	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3473	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 27.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.367 (Exibit 13-11)

S_R= 56.6 mph (Exhibit 13-11)

S_0= 60.8 mph (Exhibit 13-11)

S = 57.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 171 EB Off-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	JHS
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2040 AM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2040

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	1920ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	2403	0.92	12	0	1.5	1.2	0.943	1.00	2769
V_{RF}	157	0.92	1	0	1.5	1.2	0.995	1.00	172
V_{FR}	111	0.92	1	0	1.5	1.2	0.995	1.00	121
V_{RR}	7	0.92	1	0	1.5	1.2	0.995	1.00	8
V_{NW}	2777							V =	3070
V_W	293								
VR	0.095								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	172 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	855 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	650 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	1505 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	533

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2911 veh/h	Weaving intensity factor, W	0.186
Weaving segment capacity, c_w	11080 veh/h	Weaving segment speed, S	60.4 mph
Weaving segment v/c ratio	0.263	Average weaving speed, S_W	57.1 mph
Weaving segment density, D	10.2 pc/mi/ln	Average non-weaving speed, S_{NW}	60.8 mph
Level of Service, LOS	B	Maximum weaving length, L_{MAX}	1929 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 171 EB Off-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/19/2015
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 EB
Weaving Segment Location	I-40/SR 265 EB On Ramp
Analysis Year	2040

Project Description Weave analysis for SR 265 EB On Ramp

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	4113	0.92	12	0	1.5	1.2	0.943	1.00	4739
V_{RF}	431	0.92	1	0	1.5	1.2	0.995	1.00	471
V_{FR}	717	0.92	1	0	1.5	1.2	0.995	1.00	783
V_{RR}	75	0.92	1	0	1.5	1.2	0.995	1.00	82
V_{NW}	4821							V =	6075
V_W	1254								
VR	0.206								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	471 lc/h
Interchange density, ID	1.0 int/mi	Weaving lane changes, LC_W	1320 lc/h
Minimum RF lane changes, LC_{RF}	1 lc/pc	Non-weaving lane changes, LC_{NW}	1641 lc/h
Minimum FR lane changes, LC_{FR}	0 lc/pc	Total lane changes, LC_{ALL}	2961 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	1350

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5800 veh/h	Weaving intensity factor, W	0.236
Weaving segment capacity, c_w	11000 veh/h	Weaving segment speed, S	55.7 mph
Weaving segment v/c ratio	0.527	Average weaving speed, S_W	55.4 mph
Weaving segment density, D	21.8 pc/mi/ln	Average non-weaving speed, S_{NW}	55.8 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	3036 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 171 WB On-Ramp Weave AM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	Jonathan Smith
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2040 AM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2040

Project Description SR 171 WB On Ramp Weave Build

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	3427	0.92	12	0	1.5	1.2	0.943	1.00	3949
V_{RF}	1410	0.92	1	0	1.5	1.2	0.995	1.00	1540
V_{FR}	280	0.92	1	0	1.5	1.2	0.995	1.00	306
V_{RR}	115	0.92	1	0	1.5	1.2	0.995	1.00	126
V_{NW}	4075							V =	5921
V_W	1846								
VR	0.312								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	306 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	907 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	1394 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	2301 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	342

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	5687 veh/h	Weaving intensity factor, W	0.194
Weaving segment capacity, c_w	10591 veh/h	Weaving segment speed, S	57.0 mph
Weaving segment v/c ratio	0.537	Average weaving speed, S_W	56.9 mph
Weaving segment density, D	20.8 pc/mi/ln	Average non-weaving speed, S_{NW}	57.1 mph
Level of Service, LOS	C	Maximum weaving length, L_{MAX}	4145 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 171 WB On-Ramp Weave PM

FREEWAY WEAVING WORKSHEET

General Information

Analyst	
Agency/Company	Gresham, Smith & Partners
Date Performed	1/23/2015
Analysis Time Period	2040 PM

Site Information

Freeway/Dir of Travel	I-40 WB
Weaving Segment Location	SR 171
Analysis Year	2040

Project Description SR 171 WB On Ramp Weave Build

Inputs

Weaving configuration	One-Sided	Segment type	Freeway
Weaving number of lanes, N	5	Freeway minimum speed, S_{MIN}	15
Weaving segment length, L_S	2800ft	Freeway maximum capacity, C_{IFL}	2350
Freeway free-flow speed, FFS	65 mph	Terrain type	Level

Conversions to pc/h Under Base Conditions

	V (veh/h)	PHF	Truck (%)	RV (%)	E_T	E_R	f_{HV}	f_p	v (pc/h)
V_{FF}	1761	0.92	12	0	1.5	1.2	0.943	1.00	2029
V_{RF}	497	0.92	1	0	1.5	1.2	0.995	1.00	543
V_{FR}	257	0.92	1	0	1.5	1.2	0.995	1.00	281
V_{RR}	72	0.92	1	0	1.5	1.2	0.995	1.00	79
V_{NW}	2108							V =	2932
V_W	824								
VR	0.281								

Configuration Characteristics

Minimum maneuver lanes, N_{WL}	3 lc	Minimum weaving lane changes, LC_{MIN}	281 lc/h
Interchange density, ID	0.3 int/mi	Weaving lane changes, LC_W	882 lc/h
Minimum RF lane changes, LC_{RF}	0 lc/pc	Non-weaving lane changes, LC_{NW}	989 lc/h
Minimum FR lane changes, LC_{FR}	1 lc/pc	Total lane changes, LC_{ALL}	1871 lc/h
Minimum RR lane changes, LC_{RR}	lc/pc	Non-weaving vehicle index, I_{NW}	177

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment flow rate, v	2812 veh/h	Weaving intensity factor, W	0.164
Weaving segment capacity, c_w	10717 veh/h	Weaving segment speed, S	59.5 mph
Weaving segment v/c ratio	0.262	Average weaving speed, S_W	57.9 mph
Weaving segment density, D	9.9 pc/mi/ln	Average non-weaving speed, S_{NW}	60.2 mph
Level of Service, LOS	A	Maximum weaving length, L_{MAX}	3815 ft

Notes

a. Weaving segments longer than the calculated maximum length should be treated as isolated merge and diverge areas using the procedures of Chapter 13, "Freeway Merge and Diverge Segments".
b. For volumes that exceed the weaving segment capacity, the level of service is "F".

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Diamond & DDI Build Alternatives (2040) SR 171 WB Off-Ramp AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2040
Project Description	I-40/SR 171 WB Diverge AM Build		

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 4502	
	Ramp Volume, V_R: 795	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4502	0.92	Level	12	0	0.943	1.00	5187
Ramp	795	0.92	Level	1	0	0.995	1.00	868
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.590 using Equation 9 (Exhibit 13-7)

V_{12} = 3418 pc/h

V_3 or V_{av34} 1769 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5187	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	4319	Exhibit 13-8	7050	No
V_R	868	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3418	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 31.6 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.246 (Exhibit 13-12)

S_R = 59.3 mph (Exhibit 13-12)

S_0 = 68.3 mph (Exhibit 13-12)

S = 62.1 mph (Exhibit 13-13)

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Diamond & DDI Build Alternatives (2040) SR 171 WB Off-Ramp PM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	Jonathan Smith	Freeway/Dir of Travel	I-40
Agency or Company	Gresham, Smith & Partners	Junction	SR 171
Date Performed	1/15/2015	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2040

Project Description I-40/SR 171 WB Diverge PM Build

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = ft
V_u = veh/h	Deceleration Lane Length L_D: 230	V_D = veh/h
	Freeway Volume, V_F: 3001	
	Ramp Volume, V_R: 983	
	Freeway Free-Flow Speed, S_{FF}: 65.0	
	Ramp Free-Flow Speed, S_{FR}: 55.0	

Conversion to pc/h Under Base Conditions

	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3001	0.92	Level	12	0	0.943	1.00	3458
Ramp	983	0.92	Level	1	0	0.995	1.00	1074
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.624 using Equation 9 (Exhibit 13-7)

V_{12} = 2562 pc/h

V_3 or V_{av34} 896 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3458	Exhibit 13-8	7050	No
$V_{FO} = V_F - V_R$	2384	Exhibit 13-8	7050	No
V_R	1074	Exhibit 13-10	2200	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2562	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.265 (Exhibit 13-12)

S_R = 58.9 mph (Exhibit 13-12)

S_0 = 71.3 mph (Exhibit 13-12)

S = 61.7 mph (Exhibit 13-13)

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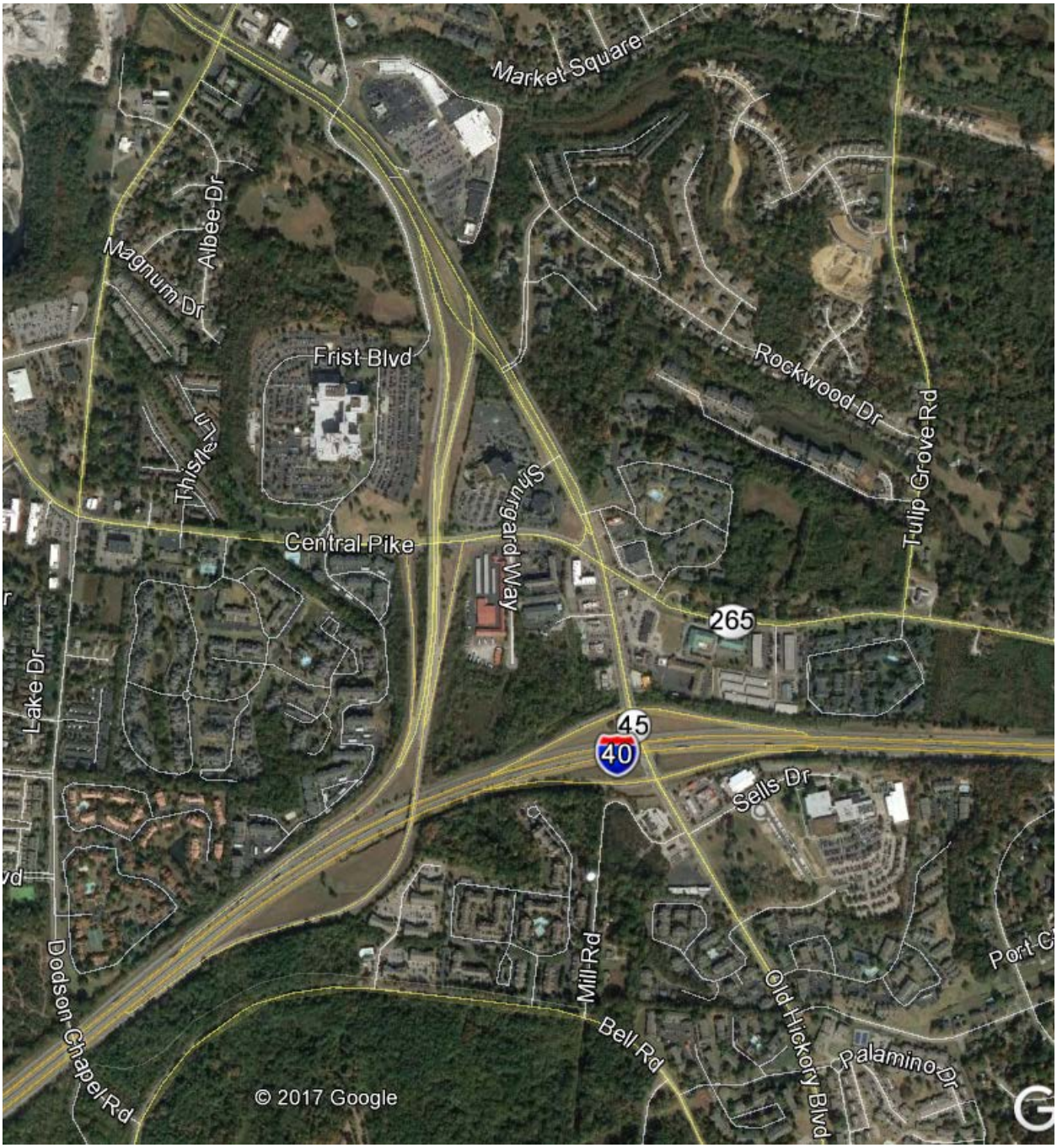
SYNCHRO INTERSECTION ANALYSIS

Synchro Intersection Analysis – Intersections along SR 45

SR 45 Traffic Volume Adjustments

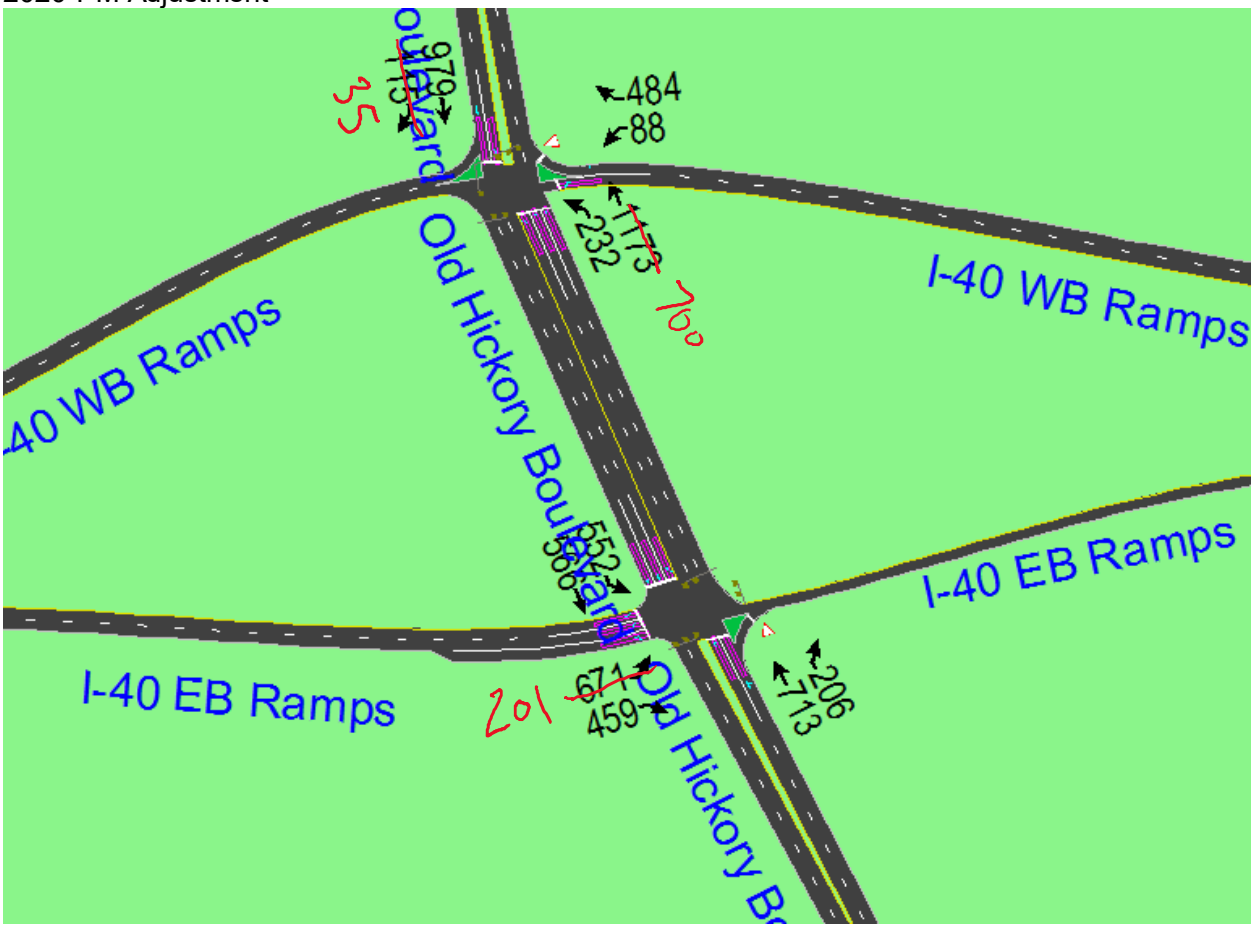
SR 45 traffic projections were schematic (for one interchange), and did not account for the half flyover interchange between I-40 to the west and SR 45 to the north. Estimate conservatively that 2/3 of the traffic between Nashville and SR 45 to the north is accommodated on the flyover ramps. The remaining 1/3 is on the diamond interchange.



2020 AM Adjustment



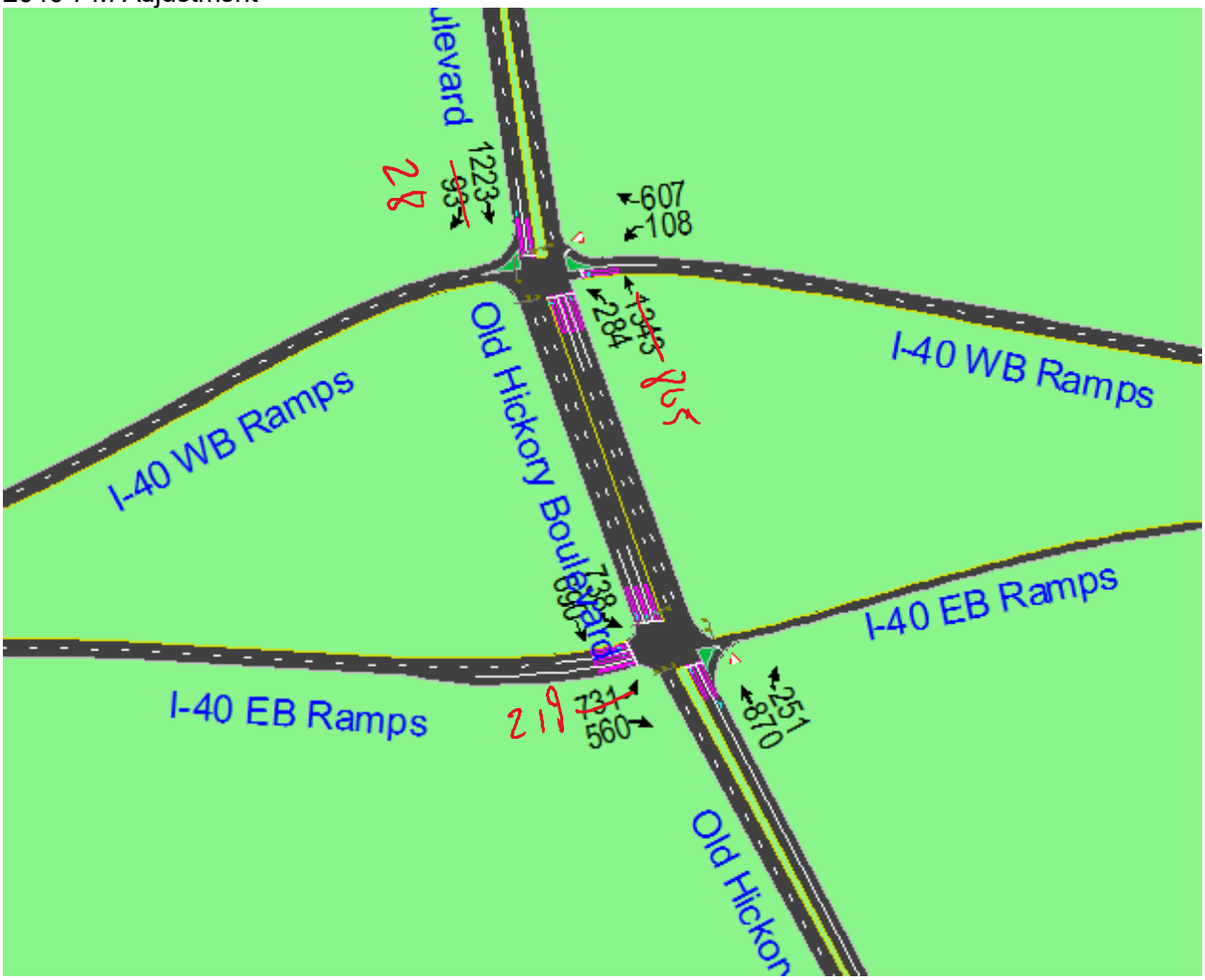
2020 PM Adjustment



2040 AM Adjustment



2040 PM Adjustment



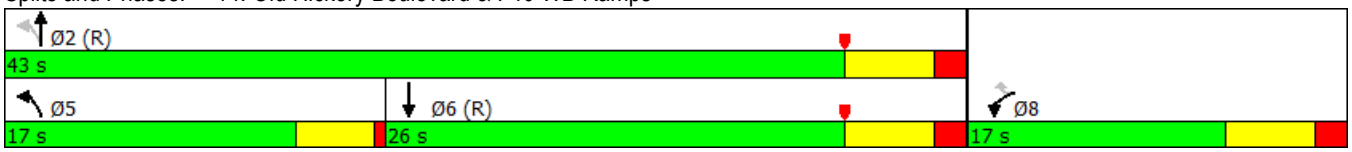
SR 45 All Alternatives (2020)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	102	0	603	498	377	0	0	828	145
Future Volume (vph)	0	0	0	102	0	603	498	377	0	0	828	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			2%			1%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.850					0.978	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1718	0	1537	1727	3454	0	0	3378	0
Flt Permitted				0.950			0.163					
Satd. Flow (perm)	0	0	0	1718	0	1537	296	3454	0	0	3378	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						485					38	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		859			1198			484			509	
Travel Time (s)		19.5			27.2			8.3			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	111	0	655	541	410	0	0	900	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	111	0	655	541	410	0	0	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	1			1	
Detector Template												
Leading Detector (ft)				50		50	50	50			50	
Trailing Detector (ft)				0		0	0	0			0	
Detector 1 Position(ft)				0		0	0	0			0	
Detector 1 Size(ft)				50		50	50	50			50	
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	
Turn Type				Prot		Perm	pm+pt	NA			NA	
Protected Phases				8			5	2			6	
Permitted Phases						8	2					
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				4.0		4.0	4.0	4.0			4.0	
Minimum Split (s)				10.0		10.0	8.0	10.0			10.0	
Total Split (s)				17.0		17.0	17.0	43.0			26.0	
Total Split (%)				28.3%		28.3%	28.3%	71.7%			43.3%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)				11.5		11.5	13.0	37.5			20.5	
Yellow Time (s)				4.0		4.0	3.5	4.0			4.0	
All-Red Time (s)				1.5		1.5	0.5	1.5			1.5	
Lost Time Adjust (s)				-1.5		-1.5	-1.5	-1.5			-1.5	
Total Lost Time (s)				4.0		4.0	2.5	4.0			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				2.5		2.5	3.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				12.7		12.7	40.8	39.3			22.0	
Actuated g/C Ratio				0.21		0.21	0.68	0.66			0.37	
v/c Ratio				0.31		0.93	0.98	0.18			0.84	
Control Delay				22.5		29.4	38.1	1.4			24.6	
Queue Delay				0.0		0.0	0.0	0.0			0.0	
Total Delay				22.5		29.4	38.1	1.4			24.6	
LOS				C		C	D	A			C	
Approach Delay					28.4			22.3			24.6	
Approach LOS					C			C			C	
Queue Length 50th (ft)				34		55	2	1			172	
Queue Length 95th (ft)				72		#256	m#284	m1			#280	
Internal Link Dist (ft)		779			1118			404			429	
Turn Bay Length (ft)												
Base Capacity (vph)				372		712	554	2263			1262	
Starvation Cap Reductn				0		0	0	0			0	
Spillback Cap Reductn				0		0	0	0			0	
Storage Cap Reductn				0		0	0	0			0	
Reduced v/c Ratio				0.30		0.92	0.98	0.18			0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow, Master Intersection			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 24.9		Intersection LOS: C	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 14: Old Hickory Boulevard & I-40 WB Ramps



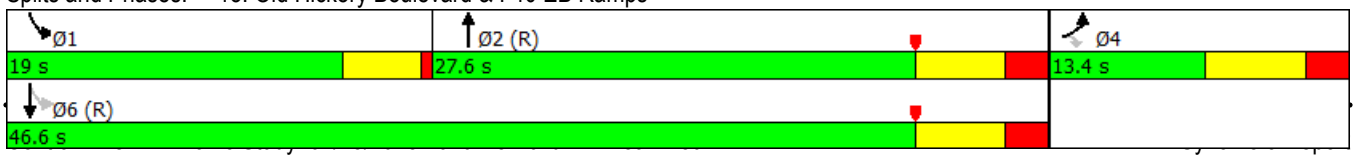
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	0	255	0	0	0	0	815	185	444	505	0
Future Volume (vph)	60	0	255	0	0	0	0	815	185	444	505	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			2%			-1%	
Storage Length (ft)	0		200	0		0	0		500	0		0
Storage Lanes	2		1	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.972				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3350	0	1545	0	0	0	0	3340	0	1744	3489	0
Flt Permitted	0.950									0.143		
Satd. Flow (perm)	3350	0	1545	0	0	0	0	3340	0	263	3489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			277					54				
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		907			752			525			484	
Travel Time (s)		20.6			17.1			8.9			8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	65	0	277	0	0	0	0	886	201	483	549	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	0	277	0	0	0	0	1087	0	483	549	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.01	1.01	1.01	0.99	0.99	0.99
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1		1	1	
Detector Template												
Leading Detector (ft)	50		50					50		50	50	
Trailing Detector (ft)	0		0					0		0	0	
Detector 1 Position(ft)	0		0					0		0	0	
Detector 1 Size(ft)	50		50					50		50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0		0.0	0.0	
Turn Type	Prot		Perm					NA		pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases			4							6		
Detector Phase	4		4					2		1	6	
Switch Phase												
Minimum Initial (s)	4.0		4.0					4.0		4.0	4.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.5		10.5					10.0		8.0	10.0	
Total Split (s)	13.4		13.4					27.6		19.0	46.6	
Total Split (%)	22.3%		22.3%					46.0%		31.7%	77.7%	
Maximum Green (s)	6.9		6.9					21.6		15.0	40.6	
Yellow Time (s)	4.5		4.5					4.0		3.5	4.0	
All-Red Time (s)	2.0		2.0					2.0		0.5	2.0	
Lost Time Adjust (s)	-2.5		-2.5					-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0		4.0					4.0		2.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	2.5		2.5					4.0		3.0	2.5	
Recall Mode	None		None					C-Max		None	C-Max	
Act Effct Green (s)	8.6		8.6					25.9		45.4	43.4	
Actuated g/C Ratio	0.14		0.14					0.43		0.76	0.72	
v/c Ratio	0.14		0.60					0.74		0.83	0.22	
Control Delay	22.9		9.9					18.3		12.5	0.7	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	22.9		9.9					18.3		12.5	0.7	
LOS	C		A					B		B	A	
Approach Delay		12.3						18.3			6.2	
Approach LOS		B						B			A	
Queue Length 50th (ft)	10		0					168		2	1	
Queue Length 95th (ft)	25		56					#245		m2	m1	
Internal Link Dist (ft)		827			672			445			404	
Turn Bay Length (ft)			200									
Base Capacity (vph)	524		475					1472		622	2524	
Starvation Cap Reductn	0		0					0		0	0	
Spillback Cap Reductn	0		0					0		0	0	
Storage Cap Reductn	0		0					0		0	0	
Reduced v/c Ratio	0.12		0.58					0.74		0.78	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 32 (53%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 70.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Old Hickory Boulevard & I-40 EB Ramps

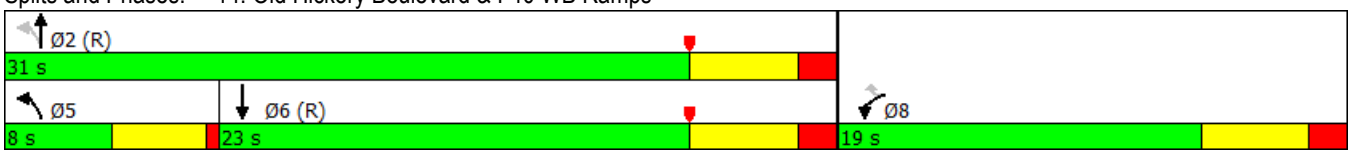


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	88	0	484	232	700	0	0	979	35
Future Volume (vph)	0	0	0	88	0	484	232	700	0	0	979	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			2%			1%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.850					0.995	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1718	0	1537	1727	3454	0	0	3437	0
Flt Permitted				0.950			0.185					
Satd. Flow (perm)	0	0	0	1718	0	1537	336	3454	0	0	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						182					8	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		859			1198			484			509	
Travel Time (s)		19.5			27.2			8.3			8.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	93	0	509	244	737	0	0	1031	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	93	0	509	244	737	0	0	1068	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	1			1	
Detector Template												
Leading Detector (ft)				50		50	50	50			50	
Trailing Detector (ft)				0		0	0	0			0	
Detector 1 Position(ft)				0		0	0	0			0	
Detector 1 Size(ft)				50		50	50	50			50	
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	
Turn Type				Prot		Perm	pm+pt	NA			NA	
Protected Phases				8			5	2			6	
Permitted Phases						8	2					
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				4.0		4.0	4.0	4.0			4.0	
Minimum Split (s)				10.0		10.0	8.0	10.0			10.0	
Total Split (s)				19.0		19.0	8.0	31.0			23.0	
Total Split (%)				38.0%		38.0%	16.0%	62.0%			46.0%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)				13.5		13.5	4.0	25.5			17.5	
Yellow Time (s)				4.0		4.0	3.5	4.0			4.0	
All-Red Time (s)				1.5		1.5	0.5	1.5			1.5	
Lost Time Adjust (s)				-1.5		-1.5	-1.5	-1.5			-1.5	
Total Lost Time (s)				4.0		4.0	2.5	4.0			4.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				2.5		2.5	3.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				14.3		14.3	29.2	27.7			19.1	
Actuated g/C Ratio				0.29		0.29	0.58	0.55			0.38	
v/c Ratio				0.19		0.89	0.67	0.39			0.81	
Control Delay				14.2		32.8	12.8	3.2			20.4	
Queue Delay				0.0		0.0	0.0	0.0			0.0	
Total Delay				14.2		32.8	12.8	3.2			20.4	
LOS				B		C	B	A			C	
Approach Delay					29.9			5.6			20.4	
Approach LOS					C			A			C	
Queue Length 50th (ft)				20		87	5	12			140	
Queue Length 95th (ft)				47		#246	m6	m14			#241	
Internal Link Dist (ft)		779			1118			404			429	
Turn Bay Length (ft)												
Base Capacity (vph)				515		588	364	1911			1318	
Starvation Cap Reductn				0		0	0	0			0	
Spillback Cap Reductn				0		0	0	0			0	
Storage Cap Reductn				0		0	0	0			0	
Reduced v/c Ratio				0.18		0.87	0.67	0.39			0.81	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 50			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow, Master Intersection			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 72.6%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 14: Old Hickory Boulevard & I-40 WB Ramps



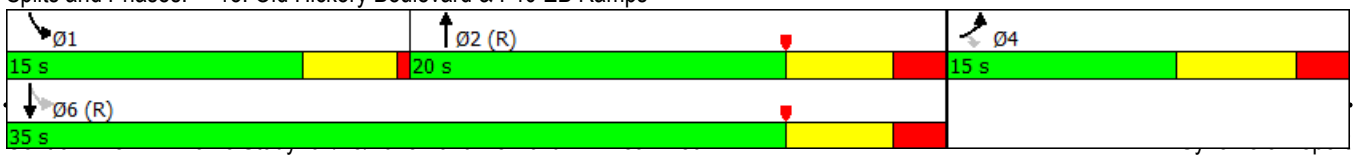
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	0	459	0	0	0	0	713	206	552	566	0
Future Volume (vph)	201	0	459	0	0	0	0	713	206	552	566	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			2%			-1%	
Storage Length (ft)	0		200	0		0	0		500	0		0
Storage Lanes	2		1	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.966				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3350	0	1545	0	0	0	0	3320	0	1744	3489	0
Flt Permitted	0.950									0.222		
Satd. Flow (perm)	3350	0	1545	0	0	0	0	3320	0	408	3489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			314					79				
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		907			752			525			484	
Travel Time (s)		20.6			17.1			8.9			8.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	212	0	483	0	0	0	0	751	217	581	596	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	0	483	0	0	0	0	968	0	581	596	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.01	1.01	1.01	0.99	0.99	0.99
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1		1	1	
Detector Template												
Leading Detector (ft)	50		50					50		50	50	
Trailing Detector (ft)	0		0					0		0	0	
Detector 1 Position(ft)	0		0					0		0	0	
Detector 1 Size(ft)	50		50					50		50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0		0.0	0.0	
Turn Type	Prot		Perm					NA		pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases			4							6		
Detector Phase	4		4					2		1	6	
Switch Phase												
Minimum Initial (s)	4.0		4.0					4.0		4.0	4.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.5		10.5					10.0		8.0	10.0	
Total Split (s)	15.0		15.0					20.0		15.0	35.0	
Total Split (%)	30.0%		30.0%					40.0%		30.0%	70.0%	
Maximum Green (s)	8.5		8.5					14.0		11.0	29.0	
Yellow Time (s)	4.5		4.5					4.0		3.5	4.0	
All-Red Time (s)	2.0		2.0					2.0		0.5	2.0	
Lost Time Adjust (s)	-2.5		-2.5					-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0		4.0					4.0		2.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	2.5		2.5					4.0		3.0	2.5	
Recall Mode	None		None					C-Max		None	C-Max	
Act Effct Green (s)	10.6		10.6					16.0		33.4	31.4	
Actuated g/C Ratio	0.21		0.21					0.32		0.67	0.63	
v/c Ratio	0.30		0.84					0.87		0.92	0.27	
Control Delay	17.7		23.2					25.6		25.7	1.5	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay	17.7		23.2					25.6		25.7	1.5	
LOS	B		C					C		C	A	
Approach Delay		21.5						25.6			13.5	
Approach LOS		C						C			B	
Queue Length 50th (ft)	26		44					126		3	2	
Queue Length 95th (ft)	50		#186					#229		m#190	m2	
Internal Link Dist (ft)		827			672			445			404	
Turn Bay Length (ft)			200									
Base Capacity (vph)	737		584					1116		629	2188	
Starvation Cap Reductn	0		0					0		0	0	
Spillback Cap Reductn	0		0					0		0	0	
Storage Cap Reductn	0		0					0		0	0	
Reduced v/c Ratio	0.29		0.83					0.87		0.92	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 24 (48%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 19.6 Intersection LOS: B
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Old Hickory Boulevard & I-40 EB Ramps



SR 45 All Alternatives (2040)

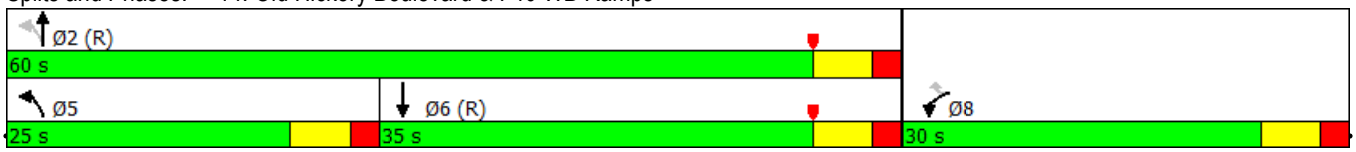
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	124	0	765	607	441	0	0	1026	151
Future Volume (vph)	0	0	0	124	0	765	607	441	0	0	1026	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			2%			1%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.850					0.981	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1718	0	1537	1727	3454	0	0	3388	0
Flt Permitted				0.950			0.114					
Satd. Flow (perm)	0	0	0	1718	0	1537	207	3454	0	0	3388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						400					19	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		859			1198			495			891	
Travel Time (s)		19.5			27.2			8.4			15.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	135	0	832	660	479	0	0	1115	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	135	0	832	660	479	0	0	1279	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	1			1	
Detector Template												
Leading Detector (ft)				50		50	50	50			50	
Trailing Detector (ft)				0		0	0	0			0	
Detector 1 Position(ft)				0		0	0	0			0	
Detector 1 Size(ft)				50		50	50	50			50	
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	
Turn Type				Prot		Perm	pm+pt	NA			NA	
Protected Phases				8			5	2			6	
Permitted Phases						8	2					
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				4.0		4.0	4.0	4.0			4.0	
Minimum Split (s)				10.0		10.0	10.0	10.0			10.0	
Total Split (s)				30.0		30.0	25.0	60.0			35.0	
Total Split (%)				33.3%		33.3%	27.8%	66.7%			38.9%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)				24.0		24.0	19.0	54.0			29.0	
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	
Lost Time Adjust (s)				-1.5		-1.5	-1.5	-1.5			-1.5	
Total Lost Time (s)				4.5		4.5	4.5	4.5			4.5	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				2.5		2.5	3.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				25.5		25.5	55.5	55.5			30.5	
Actuated g/C Ratio				0.28		0.28	0.62	0.62			0.34	
v/c Ratio				0.28		1.15	1.40	0.22			1.10	
Control Delay				27.0		102.2	200.9	4.2			88.7	
Queue Delay				0.0		0.0	0.0	0.0			0.1	
Total Delay				27.0		102.2	200.9	4.2			88.8	
LOS				C		F	F	A			F	
Approach Delay					91.7			118.2			88.8	
Approach LOS					F			F			F	
Queue Length 50th (ft)				60		~387	~441	49			~436	
Queue Length 95th (ft)				108		#615	m#508	m50			#570	
Internal Link Dist (ft)		779			1118			415			811	
Turn Bay Length (ft)												
Base Capacity (vph)				486		722	473	2129			1160	
Starvation Cap Reductn				0		0	0	0			0	
Spillback Cap Reductn				0		0	0	0			23	
Storage Cap Reductn				0		0	0	0			0	
Reduced v/c Ratio				0.28		1.15	1.40	0.22			1.12	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.40
Intersection Signal Delay: 99.5 Intersection LOS: F
Intersection Capacity Utilization 84.9% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Old Hickory Boulevard & I-40 WB Ramps



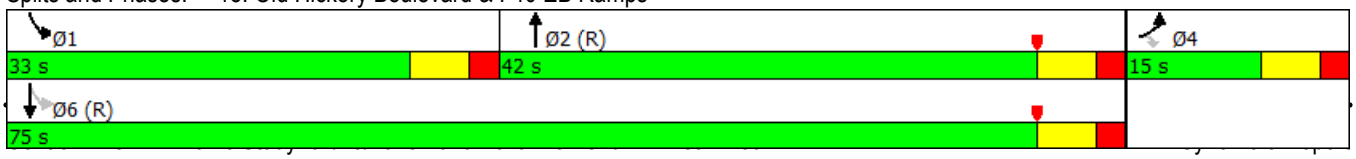
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	0	311	0	0	0	0	995	225	592	617	0
Future Volume (vph)	53	0	311	0	0	0	0	995	225	592	617	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			2%			-1%	
Storage Length (ft)	0		200	0		0	0		500	0		0
Storage Lanes	2		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.972				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3350	0	1545	0	0	0	0	3340	0	1744	3489	0
Flt Permitted	0.950									0.095		
Satd. Flow (perm)	3350	0	1545	0	0	0	0	3340	0	174	3489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			338					37				
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		907			752			892			495	
Travel Time (s)		20.6			17.1			15.2			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	58	0	338	0	0	0	0	1082	245	643	671	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	0	338	0	0	0	0	1327	0	643	671	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.01	1.01	1.01	0.99	0.99	0.99
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1		1	1	
Detector Template												
Leading Detector (ft)	50		50					50		50	50	
Trailing Detector (ft)	0		0					0		0	0	
Detector 1 Position(ft)	0		0					0		0	0	
Detector 1 Size(ft)	50		50					50		50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0		0.0	0.0	
Turn Type	Prot		Perm					NA		pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases			4							6		
Detector Phase	4		4					2		1	6	
Switch Phase												
Minimum Initial (s)	4.0		4.0					4.0		4.0	4.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.5		10.5					10.0		10.0	10.0	
Total Split (s)	15.0		15.0					42.0		33.0	75.0	
Total Split (%)	16.7%		16.7%					46.7%		36.7%	83.3%	
Maximum Green (s)	9.0		9.0					36.0		27.0	69.0	
Yellow Time (s)	4.0		4.0					4.0		4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0		2.0	2.0	
Lost Time Adjust (s)	-2.5		-2.5					-2.0		-2.0	-2.0	
Total Lost Time (s)	3.5		3.5					4.0		4.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	2.5		2.5					4.0		3.0	2.5	
Recall Mode	None		None					C-Max		None	C-Max	
Act Effct Green (s)	9.6		9.6					38.0		72.9	72.9	
Actuated g/C Ratio	0.11		0.11					0.42		0.81	0.81	
v/c Ratio	0.16		0.73					0.93		0.95	0.24	
Control Delay	36.9		14.2					36.7		17.3	0.2	
Queue Delay	0.0		0.0					0.0		4.4	0.0	
Total Delay	36.9		14.2					36.7		21.7	0.2	
LOS	D		B					D		C	A	
Approach Delay		17.5						36.7			10.7	
Approach LOS		B						D			B	
Queue Length 50th (ft)	15		0					358		7	1	
Queue Length 95th (ft)	32		80					#510		m12	m2	
Internal Link Dist (ft)		827			672			812			415	
Turn Bay Length (ft)			200									
Base Capacity (vph)	428		492					1431		680	2827	
Starvation Cap Reductn	0		0					0		21	0	
Spillback Cap Reductn	0		0					0		0	0	
Storage Cap Reductn	0		0					0		0	0	
Reduced v/c Ratio	0.14		0.69					0.93		0.98	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 50 (56%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 23.0 Intersection LOS: C
Intersection Capacity Utilization 84.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Old Hickory Boulevard & I-40 EB Ramps



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	108	0	607	284	805	0	0	1223	28
Future Volume (vph)	0	0	0	108	0	607	284	805	0	0	1223	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			2%			1%			1%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt						0.850					0.997	
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	1718	0	1537	1727	3454	0	0	3443	0
Flt Permitted				0.950			0.083					
Satd. Flow (perm)	0	0	0	1718	0	1537	151	3454	0	0	3443	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						153					2	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		859			1198			495			891	
Travel Time (s)		19.5			27.2			8.4			15.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	114	0	639	299	847	0	0	1287	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	114	0	639	299	847	0	0	1316	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	1			1	
Detector Template												
Leading Detector (ft)				50		50	50	50			50	
Trailing Detector (ft)				0		0	0	0			0	
Detector 1 Position(ft)				0		0	0	0			0	
Detector 1 Size(ft)				50		50	50	50			50	
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	
Turn Type				Prot		Perm	pm+pt	NA			NA	
Protected Phases				8			5	2			6	
Permitted Phases						8	2					
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				4.0		4.0	4.0	4.0			4.0	
Minimum Split (s)				10.0		10.0	10.0	10.0			10.0	
Total Split (s)				43.0		43.0	19.0	67.0			48.0	
Total Split (%)				39.1%		39.1%	17.3%	60.9%			43.6%	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)				37.0		37.0	13.0	61.0			42.0	
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	
Lost Time Adjust (s)				-1.5		-1.5	-1.5	-1.5			-1.5	
Total Lost Time (s)				4.5		4.5	4.5	4.5			4.5	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)				2.5		2.5	3.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				38.5		38.5	62.5	62.5			43.5	
Actuated g/C Ratio				0.35		0.35	0.57	0.57			0.40	
v/c Ratio				0.19		1.00	1.02	0.43			0.97	
Control Delay				26.0		64.6	64.9	4.1			50.6	
Queue Delay				0.0		0.0	0.0	0.5			33.1	
Total Delay				26.0		64.6	64.9	4.6			83.7	
LOS				C		E	E	A			F	
Approach Delay					58.8			20.4			83.7	
Approach LOS					E			C			F	
Queue Length 50th (ft)				56		~370	~139	90			470	
Queue Length 95th (ft)				99		#621	m#178	m88			#628	
Internal Link Dist (ft)		779			1118			415			811	
Turn Bay Length (ft)												
Base Capacity (vph)				601		637	293	1962			1362	
Starvation Cap Reductn				0		0	0	635			0	
Spillback Cap Reductn				39		0	0	0			142	
Storage Cap Reductn				0		0	0	0			0	
Reduced v/c Ratio				0.20		1.00	1.02	0.64			1.08	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 55.3 Intersection LOS: E
Intersection Capacity Utilization 89.2% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Old Hickory Boulevard & I-40 WB Ramps



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	0	560	0	0	0	0	870	251	738	690	0
Future Volume (vph)	219	0	560	0	0	0	0	870	251	738	690	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			2%			-1%	
Storage Length (ft)	0		200	0		0	0		500	0		0
Storage Lanes	2		1	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850					0.966				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3350	0	1545	0	0	0	0	3320	0	1744	3489	0
Flt Permitted	0.950									0.100		
Satd. Flow (perm)	3350	0	1545	0	0	0	0	3320	0	184	3489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			283					36				
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		907			752			892			495	
Travel Time (s)		20.6			17.1			15.2			8.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	231	0	589	0	0	0	0	916	264	777	726	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	0	589	0	0	0	0	1180	0	777	726	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.01	1.01	1.01	0.99	0.99	0.99
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					1		1	1	
Detector Template												
Leading Detector (ft)	50		50					50		50	50	
Trailing Detector (ft)	0		0					0		0	0	
Detector 1 Position(ft)	0		0					0		0	0	
Detector 1 Size(ft)	50		50					50		50	50	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0		0.0	0.0	
Turn Type	Prot		Perm					NA		pm+pt	NA	
Protected Phases	4							2		1	6	
Permitted Phases			4							6		
Detector Phase	4		4					2		1	6	
Switch Phase												
Minimum Initial (s)	4.0		4.0					4.0		4.0	4.0	

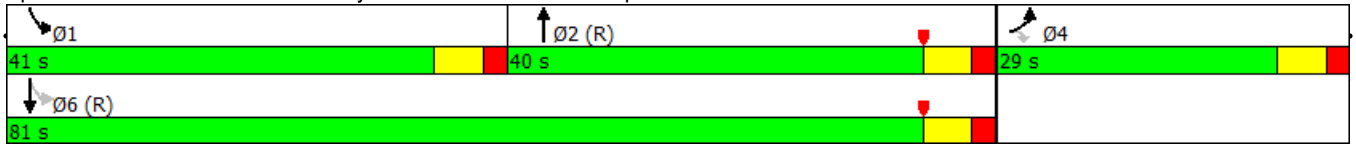
Lanes, Volumes, Timings
13: Old Hickory Boulevard & I-40 EB Ramps 09/26/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	10.5		10.5					10.0		10.0	10.0	
Total Split (s)	29.0		29.0					40.0		41.0	81.0	
Total Split (%)	26.4%		26.4%					36.4%		37.3%	73.6%	
Maximum Green (s)	23.0		23.0					34.0		35.0	75.0	
Yellow Time (s)	4.0		4.0					4.0		4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0		2.0	2.0	
Lost Time Adjust (s)	-2.5		-2.5					-2.0		-2.0	-2.0	
Total Lost Time (s)	3.5		3.5					4.0		4.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	2.5		2.5					4.0		3.0	2.5	
Recall Mode	None		None					C-Max		None	C-Max	
Act Effct Green (s)	25.5		25.5					36.0		77.0	77.0	
Actuated g/C Ratio	0.23		0.23					0.33		0.70	0.70	
v/c Ratio	0.30		1.02					1.06		1.19	0.30	
Control Delay	36.1		66.5					80.7		116.1	11.5	
Queue Delay	0.0		0.0					0.0		0.7	0.0	
Total Delay	36.1		66.5					80.7		116.9	11.5	
LOS	D		E					F		F	B	
Approach Delay		58.0						80.7			66.0	
Approach LOS		E						F			E	
Queue Length 50th (ft)	69		~278					~475		~635	200	
Queue Length 95th (ft)	105		#497					#612		m#700	m210	
Internal Link Dist (ft)		827			672			812			415	
Turn Bay Length (ft)			200									
Base Capacity (vph)	776		575					1110		653	2442	
Starvation Cap Reductn	0		0					0		65	0	
Spillback Cap Reductn	0		0					0		0	0	
Storage Cap Reductn	0		0					0		0	0	
Reduced v/c Ratio	0.30		1.02					1.06		1.32	0.30	

Intersection Summary

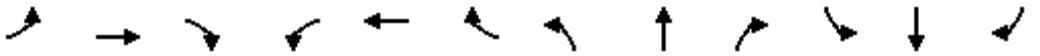
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 64 (58%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 69.1 Intersection LOS: E
Intersection Capacity Utilization 89.2% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 13: Old Hickory Boulevard & I-40 EB Ramps

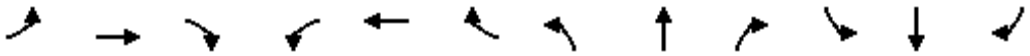


Synchro Intersection Analysis – Intersections along SR 265

SR 265 No Build Alternative (2020)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	187	111	280	212	641	140	843	383	188	566	4
Future Volume (vph)	50	187	111	280	212	641	140	843	383	188	566	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957				0.850		0.953			0.999	
Flt Protected		0.993			0.972		0.950			0.950		
Satd. Flow (prot)	0	1736	0	0	1776	1553	1736	1741	0	1736	1825	0
Flt Permitted		0.429			0.507		0.206			0.057		
Satd. Flow (perm)	0	750	0	0	926	1553	376	1741	0	104	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				116		21				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		547			1559			1697			843	
Travel Time (s)		10.7			30.4			25.7			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	54	203	121	304	230	697	152	916	416	204	615	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	378	0	0	534	697	152	1332	0	204	619	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	10.0	22.0		10.0	22.0	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	14.0	77.0		13.0	76.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%	40.0%	9.3%	51.3%		8.7%	50.7%	
Maximum Green (s)	54.0	54.0		54.0	54.0	54.0	8.0	71.0		7.0	70.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0			0	
Act Effct Green (s)		54.0			54.0	54.0	79.0	71.0		77.0	70.0	
Actuated g/C Ratio		0.36			0.36	0.36	0.53	0.47		0.51	0.47	
v/c Ratio		1.35			1.60	1.10	0.56	1.60		1.58	0.73	
Control Delay		213.3			318.0	103.7	25.1	302.7		321.9	38.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		213.3			318.0	103.7	25.1	302.7		321.9	38.4	
LOS		F			F	F	C	F		F	D	
Approach Delay		213.3			196.7			274.2			108.7	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~472			~745	~696	69	~1857		~234	481	
Queue Length 95th (ft)		#686			#976	#947	108	#2126		#405	637	
Internal Link Dist (ft)		467			1479			1617			763	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		281			333	633	270	835		129	851	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		1.35			1.60	1.10	0.56	1.60		1.58	0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.60			
Intersection Signal Delay: 209.2		Intersection LOS: F	
Intersection Capacity Utilization 144.1%		ICU Level of Service H	
Analysis Period (min) 15			

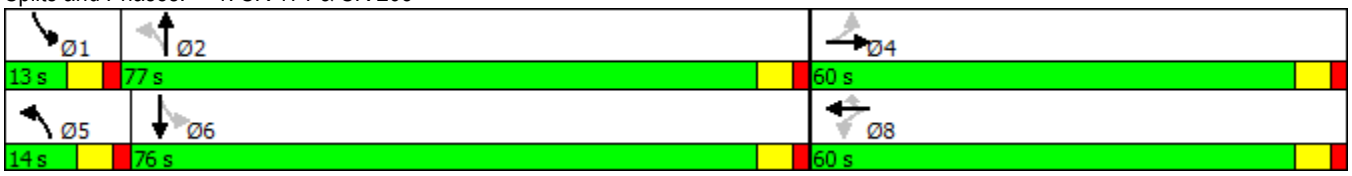
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265



Intersection	
Intersection Delay, s/veh	14.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	72	28	3	29	54	27	319	19	85	306	2
Future Vol, veh/h	8	72	28	3	29	54	27	319	19	85	306	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	9	78	30	3	32	59	29	347	21	92	333	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.7	10.1	15.1	16.5
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	7%	3%	22%
Vol Thru, %	87%	67%	34%	78%
Vol Right, %	5%	26%	63%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	365	108	86	393
LT Vol	27	8	3	85
Through Vol	319	72	29	306
RT Vol	19	28	54	2
Lane Flow Rate	397	117	93	427
Geometry Grp	1	1	1	1
Degree of Util (X)	0.575	0.2	0.155	0.621
Departure Headway (Hd)	5.218	6.125	5.964	5.23
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	583	598	688
Service Time	3.258	4.186	4.028	3.269
HCM Lane V/C Ratio	0.575	0.201	0.156	0.621
HCM Control Delay	15.1	10.7	10.1	16.5
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	3.7	0.7	0.5	4.3

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	199	439	27	50	203
Future Vol, veh/h	91	199	439	27	50	203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	99	216	477	29	54	221

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	507	0	-	0	906	492
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	414	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1048	-	-	-	304	573
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	663	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1048	-	-	-	271	573
Mov Cap-2 Maneuver	-	-	-	-	271	-
Stage 1	-	-	-	-	610	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	22.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1048	-	-	-	470
HCM Lane V/C Ratio	0.094	-	-	-	0.585
HCM Control Delay (s)	8.8	0	-	-	22.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	3.7

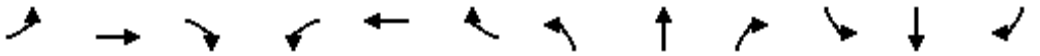
Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	456	10	5	244
Future Vol, veh/h	5	10	456	10	5	244
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	496	11	5	265

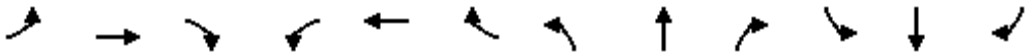
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	777	501	0	0	507	0
Stage 1	501	-	-	-	-	-
Stage 2	276	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	365	570	-	-	1058	-
Stage 1	609	-	-	-	-	-
Stage 2	771	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	363	570	-	-	1058	-
Mov Cap-2 Maneuver	363	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	766	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	479	1058	-
HCM Lane V/C Ratio	-	-	0.034	0.005	-
HCM Control Delay (s)	-	-	12.8	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	260	156	413	236	362	140	702	325	641	886	13
Future Volume (vph)	60	260	156	413	236	362	140	702	325	641	886	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.956				0.850		0.953			0.998	
Flt Protected		0.994			0.969		0.950			0.950		
Satd. Flow (prot)	0	1736	0	0	1770	1553	1736	1741	0	1736	1823	0
Flt Permitted		0.291			0.432		0.087			0.077		
Satd. Flow (perm)	0	508	0	0	789	1553	159	1741	0	141	1823	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				109		16			1	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		547			1559			1697			837	
Travel Time (s)		10.7			30.4			25.7			12.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	65	283	170	449	257	393	152	763	353	697	963	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	518	0	0	706	393	152	1116	0	697	977	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	10.0	22.0		10.0	22.0	
Total Split (s)	70.0	70.0		70.0	70.0	70.0	11.0	52.0		28.0	69.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%	46.7%	7.3%	34.7%		18.7%	46.0%	
Maximum Green (s)	64.0	64.0		64.0	64.0	64.0	5.0	46.0		22.0	63.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0			0	
Act Effct Green (s)		64.0			64.0	64.0	51.0	46.0		74.0	63.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.34	0.31		0.49	0.42	
v/c Ratio		2.27			2.10	0.54	1.43	2.05		2.30	1.28	
Control Delay		608.5			530.2	25.7	266.8	504.9		618.9	170.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		608.5			530.2	25.7	266.8	504.9		618.9	170.9	
LOS		F			F	C	F	F		F	F	
Approach Delay		608.5			349.8			476.3			357.4	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~604			~1091	205	~147	~1715		~1066	~1210	
Queue Length 95th (ft)		#836			#1023	312	#303	#1984		#1317	#1475	
Internal Link Dist (ft)		467			1479			1617			757	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		228			336	725	106	545		303	766	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		2.27			2.10	0.54	1.43	2.05		2.30	1.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 2.30			
Intersection Signal Delay: 417.2		Intersection LOS: F	
Intersection Capacity Utilization 174.1%		ICU Level of Service H	
Analysis Period (min) 15			

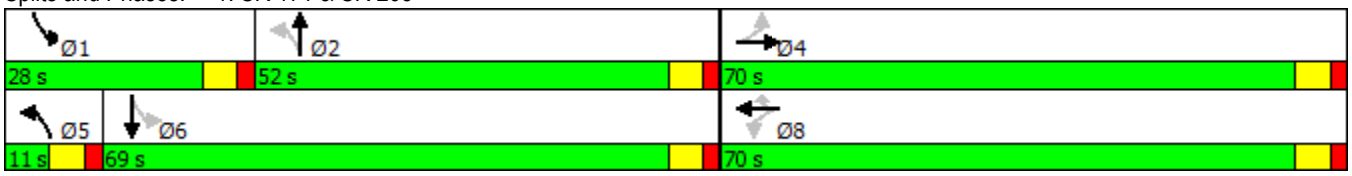
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265



Intersection	
Intersection Delay, s/veh	48.6
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	63	29	30	79	176	18	357	6	128	392	14
Future Vol, veh/h	17	63	29	30	79	176	18	357	6	128	392	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	18	68	32	33	86	191	20	388	7	139	426	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.3	21	30.7	83
HCM LOS	B	C	D	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	16%	11%	24%
Vol Thru, %	94%	58%	28%	73%
Vol Right, %	2%	27%	62%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	381	109	285	534
LT Vol	18	17	30	128
Through Vol	357	63	79	392
RT Vol	6	29	176	14
Lane Flow Rate	414	118	310	580
Geometry Grp	1	1	1	1
Degree of Util (X)	0.781	0.264	0.608	1.066
Departure Headway (Hd)	7.026	8.363	7.297	6.614
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	518	432	499	551
Service Time	5.026	6.363	5.297	4.669
HCM Lane V/C Ratio	0.799	0.273	0.621	1.053
HCM Control Delay	30.7	14.3	21	83
HCM Lane LOS	D	B	C	F
HCM 95th-tile Q	7.1	1	4	17.1

Intersection	
Int Delay, s/veh	10.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	312	512	38	77	198
Future Vol, veh/h	75	312	512	38	77	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	82	339	557	41	84	215

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	598	0	-	0	1079	577
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	502	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	969	-	-	-	240	512
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	604	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	969	-	-	-	215	512
Mov Cap-2 Maneuver	-	-	-	-	215	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	45.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	969	-	-	-	369
HCM Lane V/C Ratio	0.084	-	-	-	0.81
HCM Control Delay (s)	9.1	0	-	-	45.4
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.3	-	-	-	7.1

Intersection	
Int Delay, s/veh	0.4

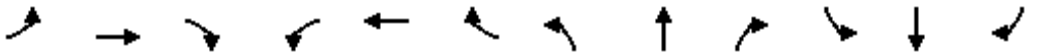
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	5	545	5	10	379
Future Vol, veh/h	10	5	545	5	10	379
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	5	592	5	11	412

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1029	595	0	0	598	0
Stage 1	595	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	259	504	-	-	979	-
Stage 1	551	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	504	-	-	979	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	551	-	-	-	-	-
Stage 2	643	-	-	-	-	-

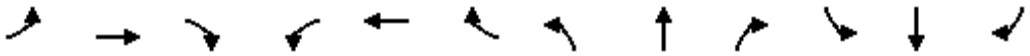
Approach	WB	NB	SB
HCM Control Delay, s	17.5	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	305	979	-
HCM Lane V/C Ratio	-	-	0.053	0.011	-
HCM Control Delay (s)	-	-	17.5	8.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

SR 265 Diamond & DDI Build Alternatives (2020)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	305	373	255	280	212	641	400	916	50	335	422	449
Future Volume (vph)	305	373	255	280	212	641	400	916	50	335	422	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.963				0.850		0.992			0.923	
Flt Protected		0.984			0.972		0.950			0.950		
Satd. Flow (prot)	0	1731	0	0	1776	1553	1736	1812	0	1736	1686	0
Flt Permitted		0.166			0.477		0.950			0.950		
Satd. Flow (perm)	0	292	0	0	871	1553	1736	1812	0	1736	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21				140		4			77	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		2141			1559			1697			862	
Travel Time (s)		41.7			30.4			25.7			13.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	332	405	277	304	230	697	435	996	54	364	459	488
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1014	0	0	534	697	435	1050	0	364	947	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	8 1	5	2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases												
Detector Phase	7	4		3	8	8 1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	10.0	22.0		10.0	22.0		12.0	26.0		12.0	26.0	
Total Split (%)	14.3%	31.4%		14.3%	31.4%		17.1%	37.1%		17.1%	37.1%	
Maximum Green (s)	4.0	16.0		4.0	16.0		6.0	20.0		6.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)		0.0			0.0	28.0	6.0	20.0		6.0	20.0	
Actuated g/C Ratio		0.00			0.00	0.47	0.10	0.33		0.10	0.33	
v/c Ratio		48.29			no cap	0.87	2.51	1.73		2.10	1.54	
Control Delay		21367.0				26.3	717.0	357.8		537.0	274.3	
Queue Delay		0.0				0.0	0.0	0.0		0.0	0.0	
Total Delay		21367.0			Error	26.3	717.0	357.8		537.0	274.3	
LOS		F			F	C	F	F		F	F	
Approach Delay		21367.0			Err			463.0			347.2	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~773			~416	172	~271	~592		~216	~486	
Queue Length 95th (ft)		#979			#580	#385	#424	#808		#358	#694	
Internal Link Dist (ft)		2061			1479			1617			782	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		21			1	799	173	606		173	613	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		48.29			534.00	0.87	2.51	1.73		2.10	1.54	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 60			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: Err			
Intersection Signal Delay: Err		Intersection LOS: F	
Intersection Capacity Utilization 170.6%		ICU Level of Service H	
Analysis Period (min) 15			

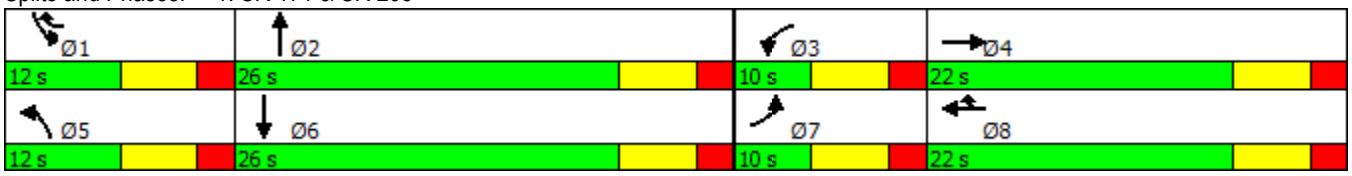
~ Volume exceeds capacity, queue is theoretically infinite.

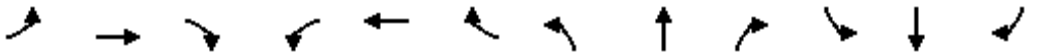
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

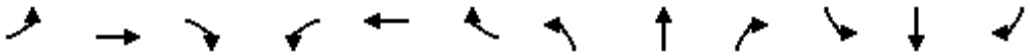
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265





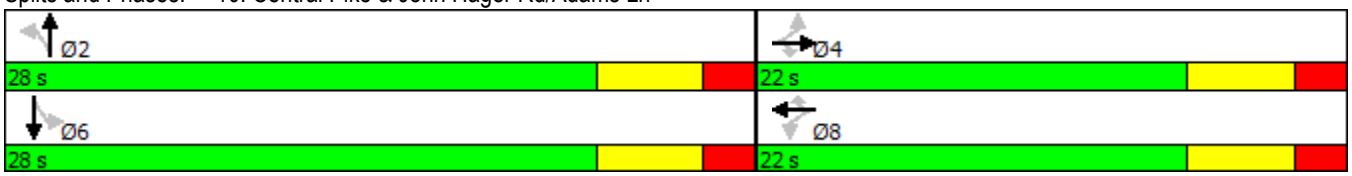
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	50	50	50	50	100	25	1011	25	25	833	25
Future Volume (vph)	100	50	50	50	50	100	25	1011	25	25	833	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.996			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1827	1553	1736	1827	1553	1736	3457	0	1736	3457	0
Flt Permitted	0.722			0.722			0.289			0.212		
Satd. Flow (perm)	1319	1827	1553	1319	1827	1553	528	3457	0	387	3457	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			65		6			7	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		720			602			624			1080	
Travel Time (s)		16.4			13.7			9.5			16.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	109	54	54	54	54	109	27	1099	27	27	905	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	54	54	54	54	109	27	1126	0	27	932	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	28.0	28.0		28.0	28.0	
Total Split (%)	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%		56.0%	56.0%	
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0		22.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	8.9	8.9	8.9	8.9	8.9	8.9	23.7	23.7		23.7	23.7	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.59	0.59		0.59	0.59	
v/c Ratio	0.37	0.13	0.14	0.19	0.13	0.28	0.09	0.55		0.12	0.46	
Control Delay	18.0	13.9	4.8	14.9	13.9	9.1	7.7	9.1		8.6	8.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	18.0	13.9	4.8	14.9	13.9	9.1	7.7	9.1		8.6	8.1	
LOS	B	B	A	B	B	A	A	A		A	A	
Approach Delay		13.7			11.7			9.1			8.1	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)	22	10	0	10	10	8	3	88		3	67	
Queue Length 95th (ft)	55	30	16	31	30	36	15	180		16	137	
Internal Link Dist (ft)		640			522			544			1000	
Turn Bay Length (ft)	200		200	200		200	200			200		
Base Capacity (vph)	534	740	668	534	740	668	325	2131		238	2132	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.20	0.07	0.08	0.10	0.07	0.16	0.08	0.53		0.11	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 40.4			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 10: Central Pike & John Hager Rd/Adams Ln



Intersection	
Int Delay, s/veh	168.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	316	439	142	403	139
Future Vol, veh/h	32	316	439	142	403	139
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	35	343	477	154	438	151

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	632	0	-	0	967	554
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	413	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	941	-	-	-	~ 280	528
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	941	-	-	-	~ 267	528
Mov Cap-2 Maneuver	-	-	-	-	~ 267	-
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	633	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	$ 456.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	941	-	-	-	306
HCM Lane V/C Ratio	0.037	-	-	-	1.925
HCM Control Delay (s)	9	0	-	-	$ 456.3
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	40.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

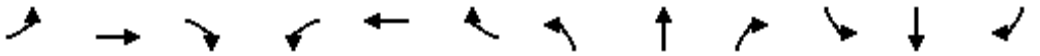
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	714	571	10	5	10
Future Vol, veh/h	5	714	571	10	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	776	621	11	5	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	632	0	-	0	1413	626
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	787	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	951	-	-	-	152	484
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	449	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	951	-	-	-	151	484
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	445	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	951	-	-	-	279
HCM Lane V/C Ratio	0.006	-	-	-	0.058
HCM Control Delay (s)	8.8	0	-	-	18.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	565	335	413	456	232	258	584	325	336	707	234
Future Volume (vph)	236	565	335	413	456	232	258	584	325	336	707	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960				0.850		0.946			0.963	
Flt Protected		0.990			0.977		0.950			0.950		
Satd. Flow (prot)	0	1736	0	0	1785	1553	1736	1728	0	1736	1759	0
Flt Permitted		0.151			0.407		0.950			0.950		
Satd. Flow (perm)	0	265	0	0	744	1553	1736	1728	0	1736	1759	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				151		42			25	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		2141			1559			1697			862	
Travel Time (s)		41.7			30.4			25.7			13.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	257	614	364	449	496	252	280	635	353	365	768	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1235	0	0	945	252	280	988	0	365	1022	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	8 1	5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases												
Detector Phase	7	4		3	8	8 1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	10.0	22.0		10.0	22.0		10.0	23.0		10.0	23.0	
Total Split (%)	15.4%	33.8%		15.4%	33.8%		15.4%	35.4%		15.4%	35.4%	
Maximum Green (s)	4.0	16.0		4.0	16.0		4.0	17.0		4.0	17.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)		0.0			0.0	26.0	4.0	17.0		4.0	17.0	
Actuated g/C Ratio		0.00			0.00	0.47	0.07	0.31		0.07	0.31	
v/c Ratio		49.40			no cap	0.31	2.22	1.75		2.90	1.82	
Control Delay		21854.4				5.0	595.1	367.4		891.5	398.5	
Queue Delay		0.0				0.0	0.0	0.0		0.0	0.0	
Total Delay		21854.4			Error	5.0	595.1	367.4		891.5	398.5	
LOS		F			F	A	F	F		F	F	
Approach Delay		21854.4			Err			417.7			528.2	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~858			~670	17	~154	~501		~214	~532	
Queue Length 95th (ft)		#1069			#864	51	#276	#706		#350	#738	
Internal Link Dist (ft)		2061			1479			1617			782	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		25			1	813	126	563		126	560	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		49.40			945.00	0.31	2.22	1.75		2.90	1.82	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 55			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: Err			
Intersection Signal Delay: Err		Intersection LOS: F	
Intersection Capacity Utilization 199.2%		ICU Level of Service H	
Analysis Period (min) 15			

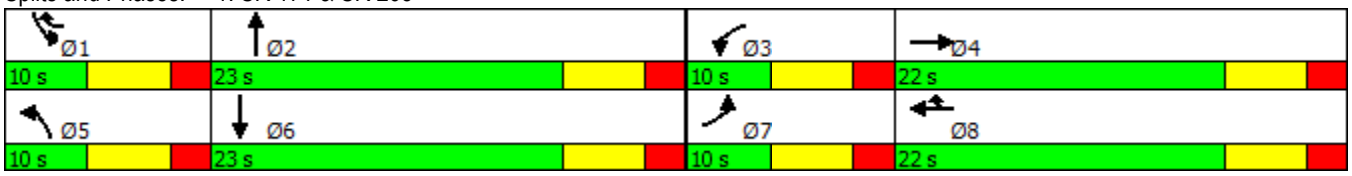
~ Volume exceeds capacity, queue is theoretically infinite.

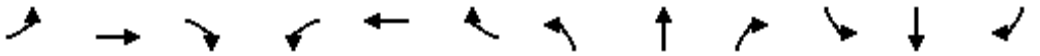
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

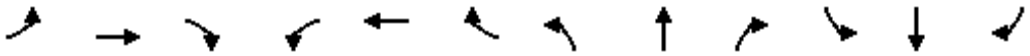
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	30	35	35	30	35	85	1380	85	85	1066	85
Future Volume (vph)	35	30	35	35	30	35	85	1380	85	85	1066	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.991			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1827	1553	1736	1827	1553	1736	3440	0	1736	3433	0
Flt Permitted	0.736			0.736			0.203			0.126		
Satd. Flow (perm)	1345	1827	1553	1345	1827	1553	371	3440	0	230	3433	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			41			41		16			21	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		720			602			624			1080	
Travel Time (s)		16.4			13.7			9.5			16.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	38	33	38	38	33	38	92	1500	92	92	1159	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	33	38	38	33	38	92	1592	0	92	1251	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	58.0	58.0		58.0	58.0	
Total Split (%)	27.5%	27.5%	27.5%	27.5%	27.5%	27.5%	72.5%	72.5%		72.5%	72.5%	
Maximum Green (s)	16.0	16.0	16.0	16.0	16.0	16.0	52.0	52.0		52.0	52.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Min	Min		Min	Min	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	7.7	7.7	7.7	7.7	7.7	7.7	49.4	49.4		49.4	49.4	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.77	0.77		0.77	0.77	
v/c Ratio	0.24	0.15	0.17	0.24	0.15	0.17	0.32	0.60		0.52	0.47	
Control Delay	32.6	30.1	11.6	32.6	30.1	11.6	7.8	6.0		20.0	4.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	32.6	30.1	11.6	32.6	30.1	11.6	7.8	6.0		20.0	4.7	
LOS	C	C	B	C	C	B	A	A		B	A	
Approach Delay		24.5			24.5			6.1			5.8	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	15	13	0	15	13	0	11	143		14	94	
Queue Length 95th (ft)	43	38	24	43	38	24	41	234		#99	154	
Internal Link Dist (ft)		640			522			544			1000	
Turn Bay Length (ft)	200		200	200		200	200			200		
Base Capacity (vph)	355	483	440	355	483	440	294	2733		182	2728	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.07	0.09	0.11	0.07	0.09	0.31	0.58		0.51	0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 64			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Central Pike & John Hager Rd/Adams Ln



Intersection	
Int Delay, s/veh	63.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	46	375	512	283	176	175
Future Vol, veh/h	46	375	512	283	176	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	50	408	557	308	191	190

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	864	0	-	0	1218	710
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	508	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	770	-	-	-	198	430
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	600	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	770	-	-	-	~ 181	430
Mov Cap-2 Maneuver	-	-	-	-	~ 181	-
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	281.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	770	-	-	-	254
HCM Lane V/C Ratio	0.065	-	-	-	1.502
HCM Control Delay (s)	10	0	-	-	281.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	22.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

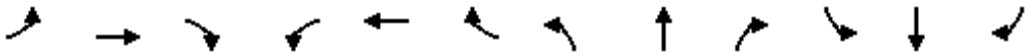
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	541	790	5	10	5
Future Vol, veh/h	10	541	790	5	10	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	588	859	5	11	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	864	0	-	0	1471	861
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	610	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	779	-	-	-	140	355
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	779	-	-	-	137	355
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	531	-

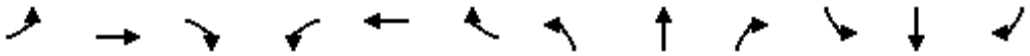
Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	28.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	779	-	-	-	172
HCM Lane V/C Ratio	0.014	-	-	-	0.095
HCM Control Delay (s)	9.7	0	-	-	28.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

SR 265 Diamond Build Alternative (2020)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	0	166	0	0	0	0	1082	129	35	717	0
Future Volume (vph)	55	0	166	0	0	0	0	1082	129	35	717	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		250	150		0
Storage Lanes	1		2	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	*1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1736	0	2733	0	0	0	0	5481	1553	1736	3471	0
Flt Permitted	0.950									0.208		
Satd. Flow (perm)	1736	0	2733	0	0	0	0	5481	1553	380	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180						151			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1380			665			1080			528	
Travel Time (s)		31.4			15.1			16.4			8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	60	0	180	0	0	0	0	1176	140	38	779	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	0	180	0	0	0	0	1176	140	38	779	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	pm+pt	NA	
Protected Phases	4							2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4						2	6		
Detector Phase	4		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0		6.0					8.0	8.0	4.0	8.0	
Minimum Split (s)	22.0		22.0					22.0	22.0	10.0	22.0	
Total Split (s)	23.0		23.0					31.0	31.0	11.0	42.0	
Total Split (%)	35.4%		35.4%					47.7%	47.7%	16.9%	64.6%	
Maximum Green (s)	17.0		17.0					25.0	25.0	5.0	36.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)	5.0		5.0					5.0	5.0		5.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	7.8		7.8					40.2	40.2	45.2	45.2	
Actuated g/C Ratio	0.12		0.12					0.62	0.62	0.70	0.70	
v/c Ratio	0.29		0.37					0.35	0.14	0.10	0.32	
Control Delay	29.0		7.0					7.8	2.2	0.5	0.6	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	29.0		7.0					7.8	2.2	0.5	0.6	
LOS	C		A					A	A	A	A	
Approach Delay		12.5						7.2			0.6	
Approach LOS		B						A			A	
Queue Length 50th (ft)	22		0					47	0	0	0	
Queue Length 95th (ft)	52		26					131	23	m1	0	
Internal Link Dist (ft)		1300			585			1000			448	
Turn Bay Length (ft)			300						250	150		
Base Capacity (vph)	454		847					3388	1017	389	2412	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.13		0.21					0.35	0.14	0.10	0.32	

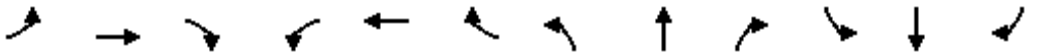
Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 34 (52%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 5.5		Intersection LOS: A	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			

* User Entered Value

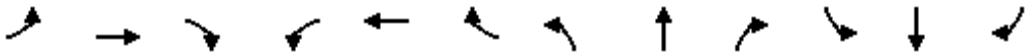
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Central Pike & I-40 EB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	351	0	44	600	537	0	0	401	318
Future Volume (vph)	0	0	0	351	0	44	600	537	0	0	401	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		300	150		0	0		250
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						151						346
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		521			649			528			1018	
Travel Time (s)		11.8			14.8			8.0			15.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	382	0	48	652	584	0	0	436	346
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	382	0	48	652	584	0	0	436	346
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	

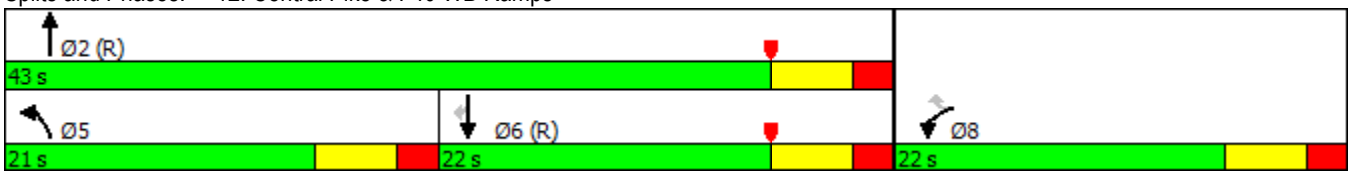


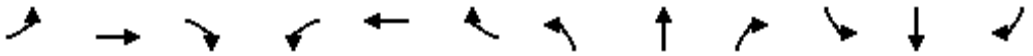
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8						6
Detector Phase				8		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				6.0		6.0	4.0	8.0			8.0	8.0
Minimum Split (s)				22.0		22.0	10.0	22.0			22.0	22.0
Total Split (s)				22.0		22.0	21.0	43.0			22.0	22.0
Total Split (%)				33.8%		33.8%	32.3%	66.2%			33.8%	33.8%
Maximum Green (s)				16.0		16.0	15.0	37.0			16.0	16.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)				5.0		5.0		5.0			5.0	5.0
Flash Dont Walk (s)				11.0		11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)				0		0		0			0	0
Act Effct Green (s)				12.5		12.5	16.0	40.5			18.5	18.5
Actuated g/C Ratio				0.19		0.19	0.25	0.62			0.28	0.28
v/c Ratio				0.59		0.11	0.79	0.27			0.44	0.50
Control Delay				27.4		0.5	24.0	8.6			21.6	5.6
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				27.4		0.5	24.0	8.6			21.6	5.6
LOS				C		A	C	A			C	A
Approach Delay					24.4			16.7			14.6	
Approach LOS					C			B			B	
Queue Length 50th (ft)				71		0	119	66			77	0
Queue Length 95th (ft)				103		0	#209	145			119	57
Internal Link Dist (ft)		441			569			448			938	
Turn Bay Length (ft)				200		300	150					250
Base Capacity (vph)				828		496	842	2161			987	689
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.46		0.10	0.77	0.27			0.44	0.50

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 64 (98%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			

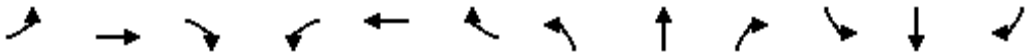
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Central Pike & I-40 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	0	500	0	0	0	0	979	471	35	736	0
Future Volume (vph)	171	0	500	0	0	0	0	979	471	35	736	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		250	150		0
Storage Lanes	1		2	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	*1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1736	0	2733	0	0	0	0	5481	1553	1736	3471	0
Flt Permitted	0.950									0.226		
Satd. Flow (perm)	1736	0	2733	0	0	0	0	5481	1553	413	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303						512			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1380			665			1080			528	
Travel Time (s)		31.4			15.1			16.4			8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	186	0	543	0	0	0	0	1064	512	38	800	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	0	543	0	0	0	0	1064	512	38	800	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	pm+pt	NA	
Protected Phases	4							2		1	6	



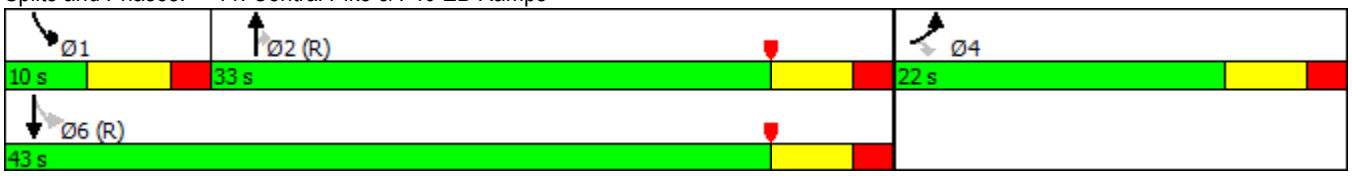
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4						2	6		
Detector Phase	4		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0		6.0					8.0	8.0	4.0	8.0	
Minimum Split (s)	22.0		22.0					22.0	22.0	10.0	22.0	
Total Split (s)	22.0		22.0					33.0	33.0	10.0	43.0	
Total Split (%)	33.8%		33.8%					50.8%	50.8%	15.4%	66.2%	
Maximum Green (s)	16.0		16.0					27.0	27.0	4.0	37.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)	5.0		5.0					5.0	5.0		5.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	12.3		12.3					36.5	36.5	40.7	40.7	
Actuated g/C Ratio	0.19		0.19					0.56	0.56	0.63	0.63	
v/c Ratio	0.57		0.71					0.35	0.47	0.10	0.37	
Control Delay	30.1		15.7					9.8	3.0	0.6	0.7	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	30.1		15.7					9.8	3.0	0.6	0.7	
LOS	C		B					A	A	A	A	
Approach Delay		19.4						7.6			0.7	
Approach LOS		B						A			A	
Queue Length 50th (ft)	67		47					58	0	0	0	
Queue Length 95th (ft)	116		93					128	51	m0	3	
Internal Link Dist (ft)		1300			585			1000			448	
Turn Bay Length (ft)			300						250	150		
Base Capacity (vph)	427		901					3074	1095	365	2172	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.44		0.60					0.35	0.47	0.10	0.37	

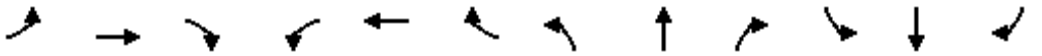
Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 26 (40%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			

* User Entered Value

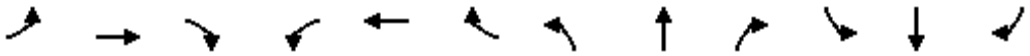
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Central Pike & I-40 EB Ramps





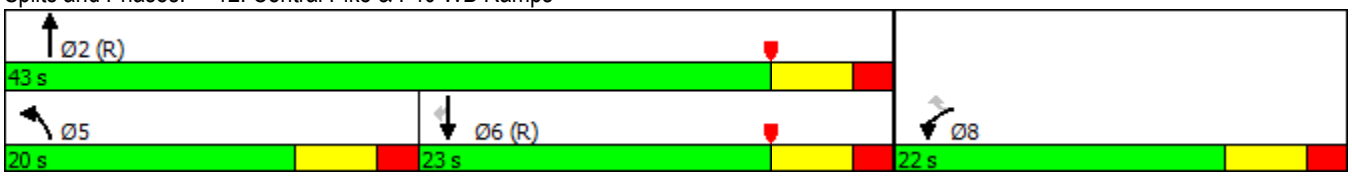
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	284	0	45	400	750	0	0	487	64
Future Volume (vph)	0	0	0	284	0	45	400	750	0	0	487	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		300	150		0	0		250
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						151						151
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		521			649			528			1018	
Travel Time (s)		11.8			14.8			8.0			15.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	309	0	49	435	815	0	0	529	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	309	0	49	435	815	0	0	529	70
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8						6
Detector Phase				8		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				6.0		6.0	4.0	8.0			8.0	8.0
Minimum Split (s)				22.0		22.0	10.0	22.0			22.0	22.0
Total Split (s)				22.0		22.0	20.0	43.0			23.0	23.0
Total Split (%)				33.8%		33.8%	30.8%	66.2%			35.4%	35.4%
Maximum Green (s)				16.0		16.0	14.0	37.0			17.0	17.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)				5.0		5.0		5.0			5.0	5.0
Flash Dont Walk (s)				11.0		11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)				0		0		0			0	0
Act Effct Green (s)				11.2		11.2	13.2	41.8			22.6	22.6
Actuated g/C Ratio				0.17		0.17	0.20	0.64			0.35	0.35
v/c Ratio				0.53		0.12	0.64	0.37			0.44	0.11
Control Delay				27.6		0.6	22.2	8.7			19.0	0.3
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				27.6		0.6	22.2	8.7			19.0	0.3
LOS				C		A	C	A			B	A
Approach Delay					23.9			13.4			16.8	
Approach LOS					C			B			B	
Queue Length 50th (ft)				58		0	86	49			83	0
Queue Length 95th (ft)				87		0	138	194			141	1
Internal Link Dist (ft)		441			569			448			938	
Turn Bay Length (ft)				200		300	150					250
Base Capacity (vph)				828		496	752	2232			1207	638
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.37		0.10	0.58	0.37			0.44	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 12: Central Pike & I-40 WB Ramps



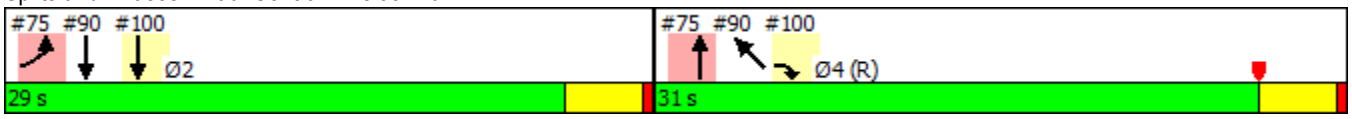
SR 265 DDI Build Alternative (2020)

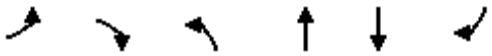
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	717	0	0	0	0	0	1082	0
Future Volume (vph)	0	0	0	0	717	0	0	0	0	0	1082	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		80			147			146			140	
Travel Time (s)		1.8			3.3			3.3			3.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	755	0	0	0	0	0	1139	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	755	0	0	0	0	0	1139	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		3			-24			12			0	
Crosswalk Width(ft)		16			0			0			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					1						2	
Detector Template											Thru	
Leading Detector (ft)					30						100	
Trailing Detector (ft)					0						0	
Detector 1 Position(ft)					0						0	
Detector 1 Size(ft)					30						6	
Detector 1 Type					Cl+Ex						Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)					0.0						0.0	
Detector 1 Queue (s)					0.0						0.0	
Detector 1 Delay (s)					0.0						0.0	
Detector 2 Position(ft)											94	
Detector 2 Size(ft)											6	
Detector 2 Type											Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)											0.0	
Turn Type					NA						NA	
Protected Phases					2						4	
Permitted Phases												
Detector Phase					2						4	
Switch Phase												
Minimum Initial (s)					4.0						4.0	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Split (s)					20.0						20.0	
Total Split (s)					29.0						31.0	
Total Split (%)					48.3%						51.7%	
Maximum Green (s)					25.0						27.0	
Yellow Time (s)					3.5						3.5	
All-Red Time (s)					0.5						0.5	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Min	
Act Effct Green (s)					21.1						30.9	
Actuated g/C Ratio					0.35						0.52	
v/c Ratio					0.61						0.43	
Control Delay					16.4						10.4	
Queue Delay					0.0						0.0	
Total Delay					16.4						10.4	
LOS					B						B	
Approach Delay					16.4						10.4	
Approach LOS					B						B	
Queue Length 50th (ft)					71						89	
Queue Length 95th (ft)					103						134	
Internal Link Dist (ft)		1			67			66			60	
Turn Bay Length (ft)												
Base Capacity (vph)					1474						2622	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.51						0.43	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 47.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 90: Central Plke at I-40 EB



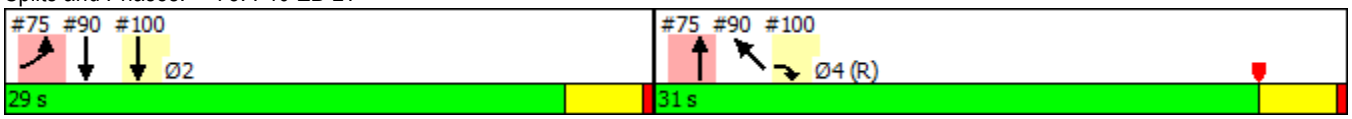


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	55	0	0	1082	0	0
Future Volume (vph)	55	0	0	1082	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Right Turn on Red	No	Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	160			146	301	
Travel Time (s)	3.6			3.3	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	0	0	1176	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	0	1176	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	-3			0	0	
Crosswalk Width(ft)	0			0	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	15			9
Number of Detectors	1			1		
Detector Template	Left					
Leading Detector (ft)	20			20		
Trailing Detector (ft)	0			0		
Detector 1 Position(ft)	0			0		
Detector 1 Size(ft)	20			20		
Detector 1 Type	Cl+Ex			Cl+Ex		
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0		
Detector 1 Queue (s)	0.0			0.0		
Detector 1 Delay (s)	0.0			0.0		
Turn Type	Prot			NA		
Protected Phases	2			4		
Permitted Phases						
Detector Phase	2			4		
Switch Phase						
Minimum Initial (s)	4.0			4.0		
Minimum Split (s)	20.0			20.0		
Total Split (s)	29.0			31.0		
Total Split (%)	48.3%			51.7%		
Maximum Green (s)	25.0			27.0		
Yellow Time (s)	3.5			3.5		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
All-Red Time (s)	0.5			0.5		
Lost Time Adjust (s)	0.0			0.0		
Total Lost Time (s)	4.0			4.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0		
Recall Mode	Min			C-Min		
Act Effct Green (s)	21.1			30.9		
Actuated g/C Ratio	0.35			0.52		
v/c Ratio	0.10			0.45		
Control Delay	11.9			2.3		
Queue Delay	0.0			0.0		
Total Delay	11.9			2.3		
LOS	B			A		
Approach Delay	11.9			2.3		
Approach LOS	B			A		
Queue Length 50th (ft)	14			12		
Queue Length 95th (ft)	31			15		
Internal Link Dist (ft)	80			66	221	
Turn Bay Length (ft)						
Base Capacity (vph)	737			2622		
Starvation Cap Reductn	0			150		
Spillback Cap Reductn	0			0		
Storage Cap Reductn	0			0		
Reduced v/c Ratio	0.08			0.48		

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 2.8		Intersection LOS: A	
Intersection Capacity Utilization 30.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 75: I-40 EB LT

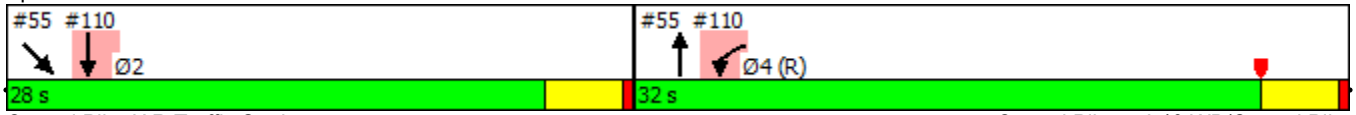


Lane Group	NBT	SET	SER2
Lane Configurations			
Traffic Volume (vph)	537	401	318
Future Volume (vph)	537	401	318
Ideal Flow (vphpl)	1900	1900	1900
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor	0.95	0.95	1.00
Frt			0.850
Flt Protected			
Satd. Flow (prot)	3539	3539	1583
Flt Permitted			
Satd. Flow (perm)	3539	3539	1583
Right Turn on Red			Yes
Satd. Flow (RTOR)			335
Link Speed (mph)	30	30	
Link Distance (ft)	160	301	
Travel Time (s)	3.6	6.8	
Peak Hour Factor	0.95	0.95	0.95
Adj. Flow (vph)	565	422	335
Shared Lane Traffic (%)			
Lane Group Flow (vph)	565	422	335
Enter Blocked Intersection	No	No	No
Lane Alignment	Left	Left	Right
Median Width(ft)	0	0	
Link Offset(ft)	-12	-12	
Crosswalk Width(ft)	16	16	
Two way Left Turn Lane			
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)			9
Number of Detectors	1	2	1
Detector Template		Thru	Right
Leading Detector (ft)	50	100	20
Trailing Detector (ft)	0	0	0
Detector 1 Position(ft)	0	0	0
Detector 1 Size(ft)	50	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel			
Detector 1 Extend (s)	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0
Detector 2 Position(ft)		94	
Detector 2 Size(ft)		6	
Detector 2 Type		Cl+Ex	
Detector 2 Channel			
Detector 2 Extend (s)		0.0	
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free

Lane Group	NBT	SET	SER2
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	4.0	4.0	
Minimum Split (s)	20.0	25.5	
Total Split (s)	32.0	28.0	
Total Split (%)	53.3%	46.7%	
Maximum Green (s)	28.0	24.0	
Yellow Time (s)	3.5	3.5	
All-Red Time (s)	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	4.0	4.0	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	C-Max	Min	
Act Effct Green (s)	36.6	15.4	60.0
Actuated g/C Ratio	0.61	0.26	1.00
v/c Ratio	0.26	0.46	0.21
Control Delay	4.4	19.6	0.3
Queue Delay	0.0	0.0	0.0
Total Delay	4.4	19.6	0.3
LOS	A	B	A
Approach Delay	4.4	11.0	
Approach LOS	A	B	
Queue Length 50th (ft)	27	67	0
Queue Length 95th (ft)	41	86	0
Internal Link Dist (ft)	80	221	
Turn Bay Length (ft)			200
Base Capacity (vph)	2156	1415	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.26	0.30	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 32.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 55: Central Pike at I-40 WB/Central Pike





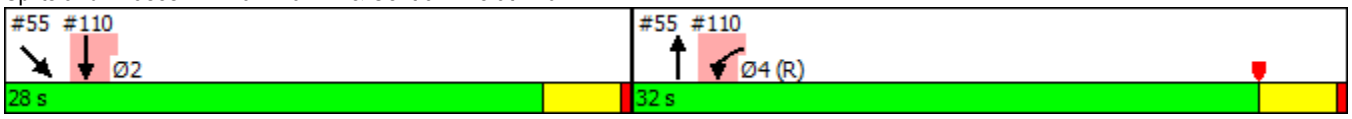
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	351	0	0	0	0	401
Future Volume (vph)	351	0	0	0	0	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	0	0	3539
Right Turn on Red	No	Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	98		276			203
Travel Time (s)	2.2		6.3			4.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	369	0	0	0	0	422
Shared Lane Traffic (%)						
Lane Group Flow (vph)	369	0	0	0	0	422
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9		9	15	
Number of Detectors	1					2
Detector Template	Left					Thru
Leading Detector (ft)	20					100
Trailing Detector (ft)	0					0
Detector 1 Position(ft)	0					0
Detector 1 Size(ft)	20					6
Detector 1 Type	Cl+Ex					Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0					0.0
Detector 1 Queue (s)	0.0					0.0
Detector 1 Delay (s)	0.0					0.0
Detector 2 Position(ft)						94
Detector 2 Size(ft)						6
Detector 2 Type						Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)						0.0
Turn Type	Prot					NA
Protected Phases	4					2
Permitted Phases						
Detector Phase	4					2
Switch Phase						
Minimum Initial (s)	4.0					4.0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Split (s)	20.0					25.5
Total Split (s)	32.0					28.0
Total Split (%)	53.3%					46.7%
Maximum Green (s)	28.0					24.0
Yellow Time (s)	3.5					3.5
All-Red Time (s)	0.5					0.5
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	4.0					4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	C-Max					Min
Act Effct Green (s)	36.6					15.4
Actuated g/C Ratio	0.61					0.26
v/c Ratio	0.34					0.46
Control Delay	8.1					4.8
Queue Delay	0.0					0.0
Total Delay	8.1					4.9
LOS	A					A
Approach Delay	8.1					4.9
Approach LOS	A					A
Queue Length 50th (ft)	56					7
Queue Length 95th (ft)	135					10
Internal Link Dist (ft)	18		196			123
Turn Bay Length (ft)						
Base Capacity (vph)	1078					1415
Starvation Cap Reductn	0					112
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.34					0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 6.4		Intersection LOS: A	
Intersection Capacity Utilization 37.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 110: I-40 WB & Central Pike at I-40 WB

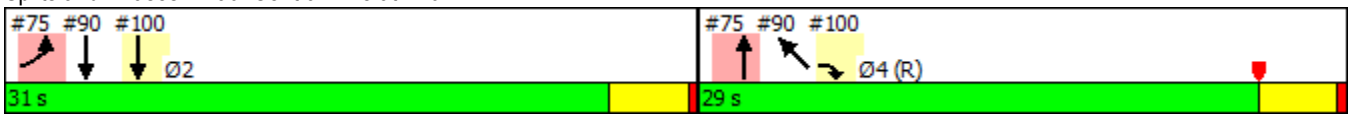


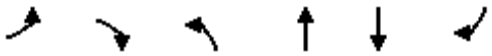
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	736	0	0	0	0	0	979	0
Future Volume (vph)	0	0	0	0	736	0	0	0	0	0	979	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		80			147			146			140	
Travel Time (s)		1.8			3.3			3.3			3.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	775	0	0	0	0	0	1031	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	775	0	0	0	0	0	1031	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		3			-24			12			0	
Crosswalk Width(ft)		16			0			0			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					1						2	
Detector Template											Thru	
Leading Detector (ft)					30						100	
Trailing Detector (ft)					0						0	
Detector 1 Position(ft)					0						0	
Detector 1 Size(ft)					30						6	
Detector 1 Type					Cl+Ex						Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)					0.0						0.0	
Detector 1 Queue (s)					0.0						0.0	
Detector 1 Delay (s)					0.0						0.0	
Detector 2 Position(ft)											94	
Detector 2 Size(ft)											6	
Detector 2 Type											Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)											0.0	
Turn Type					NA						NA	
Protected Phases					2						4	
Permitted Phases												
Detector Phase					2						4	
Switch Phase												
Minimum Initial (s)					4.0						4.0	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Split (s)					20.0						20.0	
Total Split (s)					31.0						29.0	
Total Split (%)					51.7%						48.3%	
Maximum Green (s)					27.0						25.0	
Yellow Time (s)					3.5						3.5	
All-Red Time (s)					0.5						0.5	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Min	
Act Effct Green (s)					22.5						29.5	
Actuated g/C Ratio					0.38						0.49	
v/c Ratio					0.58						0.41	
Control Delay					13.4						11.3	
Queue Delay					0.0						0.0	
Total Delay					13.4						11.3	
LOS					B						B	
Approach Delay					13.4						11.3	
Approach LOS					B						B	
Queue Length 50th (ft)					60						84	
Queue Length 95th (ft)					88						128	
Internal Link Dist (ft)		1			67			66			60	
Turn Bay Length (ft)												
Base Capacity (vph)					1592						2498	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.49						0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 45.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 90: Central Plke at I-40 EB



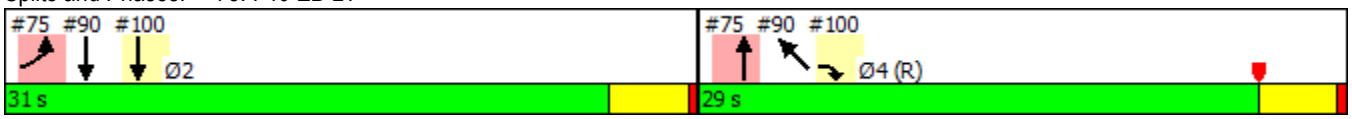


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	171	0	0	979	0	0
Future Volume (vph)	171	0	0	979	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Right Turn on Red	No	Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	160			146	301	
Travel Time (s)	3.6			3.3	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	186	0	0	1064	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	186	0	0	1064	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	-3			0	0	
Crosswalk Width(ft)	0			0	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	15			9
Number of Detectors	1			1		
Detector Template	Left					
Leading Detector (ft)	20			20		
Trailing Detector (ft)	0			0		
Detector 1 Position(ft)	0			0		
Detector 1 Size(ft)	20			20		
Detector 1 Type	Cl+Ex			Cl+Ex		
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0		
Detector 1 Queue (s)	0.0			0.0		
Detector 1 Delay (s)	0.0			0.0		
Turn Type	Prot			NA		
Protected Phases	2			4		
Permitted Phases						
Detector Phase	2			4		
Switch Phase						
Minimum Initial (s)	4.0			4.0		
Minimum Split (s)	20.0			20.0		
Total Split (s)	31.0			29.0		
Total Split (%)	51.7%			48.3%		
Maximum Green (s)	27.0			25.0		
Yellow Time (s)	3.5			3.5		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
All-Red Time (s)	0.5			0.5		
Lost Time Adjust (s)	0.0			0.0		
Total Lost Time (s)	4.0			4.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0		
Recall Mode	Min			C-Min		
Act Effct Green (s)	22.5			29.5		
Actuated g/C Ratio	0.38			0.49		
v/c Ratio	0.28			0.43		
Control Delay	13.1			2.4		
Queue Delay	0.0			0.0		
Total Delay	13.1			2.4		
LOS	B			A		
Approach Delay	13.1			2.4		
Approach LOS	B			A		
Queue Length 50th (ft)	44			10		
Queue Length 95th (ft)	74			13		
Internal Link Dist (ft)	80			66	221	
Turn Bay Length (ft)						
Base Capacity (vph)	796			2498		
Starvation Cap Reductn	0			194		
Spillback Cap Reductn	0			0		
Storage Cap Reductn	0			0		
Reduced v/c Ratio	0.23			0.46		

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 4.0		Intersection LOS: A	
Intersection Capacity Utilization 35.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 75: I-40 EB LT

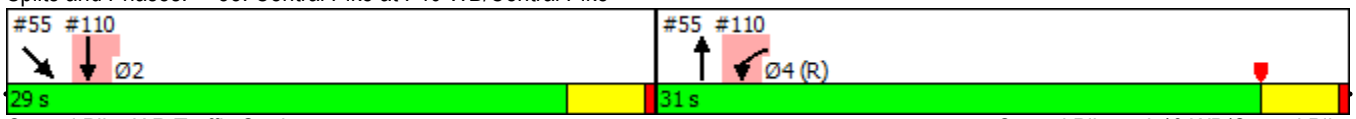


Lane Group	NBT	SET	SER2
Lane Configurations			
Traffic Volume (vph)	750	487	64
Future Volume (vph)	750	487	64
Ideal Flow (vphpl)	1900	1900	1900
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor	0.95	0.95	1.00
Frt			0.850
Flt Protected			
Satd. Flow (prot)	3539	3539	1583
Flt Permitted			
Satd. Flow (perm)	3539	3539	1583
Right Turn on Red			Yes
Satd. Flow (RTOR)			91
Link Speed (mph)	30	30	
Link Distance (ft)	160	301	
Travel Time (s)	3.6	6.8	
Peak Hour Factor	0.95	0.95	0.95
Adj. Flow (vph)	789	513	67
Shared Lane Traffic (%)			
Lane Group Flow (vph)	789	513	67
Enter Blocked Intersection	No	No	No
Lane Alignment	Left	Left	Right
Median Width(ft)	0	0	
Link Offset(ft)	-12	-12	
Crosswalk Width(ft)	16	16	
Two way Left Turn Lane			
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)			9
Number of Detectors	1	2	1
Detector Template		Thru	Right
Leading Detector (ft)	50	100	20
Trailing Detector (ft)	0	0	0
Detector 1 Position(ft)	0	0	0
Detector 1 Size(ft)	50	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel			
Detector 1 Extend (s)	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0
Detector 2 Position(ft)		94	
Detector 2 Size(ft)		6	
Detector 2 Type		Cl+Ex	
Detector 2 Channel			
Detector 2 Extend (s)		0.0	
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free

Lane Group	NBT	SET	SER2
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	4.0	4.0	
Minimum Split (s)	20.0	25.5	
Total Split (s)	31.0	29.0	
Total Split (%)	51.7%	48.3%	
Maximum Green (s)	27.0	25.0	
Yellow Time (s)	3.5	3.5	
All-Red Time (s)	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	4.0	4.0	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	C-Max	Min	
Act Effct Green (s)	33.9	18.1	60.0
Actuated g/C Ratio	0.56	0.30	1.00
v/c Ratio	0.39	0.48	0.04
Control Delay	6.5	17.8	0.0
Queue Delay	0.0	0.0	0.0
Total Delay	6.5	17.8	0.0
LOS	A	B	A
Approach Delay	6.5	15.7	
Approach LOS	A	B	
Queue Length 50th (ft)	53	78	0
Queue Length 95th (ft)	85	96	0
Internal Link Dist (ft)	80	221	
Turn Bay Length (ft)			200
Base Capacity (vph)	1998	1474	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.39	0.35	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 10.4		Intersection LOS: B	
Intersection Capacity Utilization 40.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 55: Central Pike at I-40 WB/Central Pike





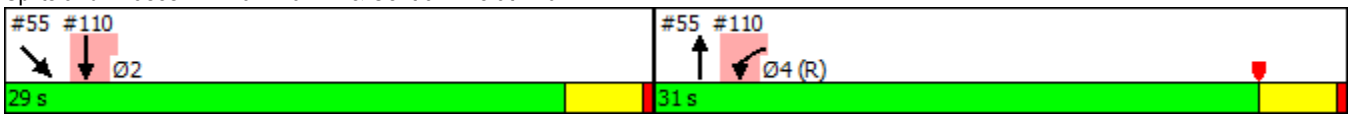
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	284	0	0	0	0	487
Future Volume (vph)	284	0	0	0	0	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	0	0	3539
Right Turn on Red	No	Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	98		276			203
Travel Time (s)	2.2		6.3			4.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	299	0	0	0	0	513
Shared Lane Traffic (%)						
Lane Group Flow (vph)	299	0	0	0	0	513
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9		9	15	
Number of Detectors	1					2
Detector Template	Left					Thru
Leading Detector (ft)	20					100
Trailing Detector (ft)	0					0
Detector 1 Position(ft)	0					0
Detector 1 Size(ft)	20					6
Detector 1 Type	Cl+Ex					Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0					0.0
Detector 1 Queue (s)	0.0					0.0
Detector 1 Delay (s)	0.0					0.0
Detector 2 Position(ft)						94
Detector 2 Size(ft)						6
Detector 2 Type						Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)						0.0
Turn Type	Prot					NA
Protected Phases	4					2
Permitted Phases						
Detector Phase	4					2
Switch Phase						
Minimum Initial (s)	4.0					4.0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Split (s)	20.0					25.5
Total Split (s)	31.0					29.0
Total Split (%)	51.7%					48.3%
Maximum Green (s)	27.0					25.0
Yellow Time (s)	3.5					3.5
All-Red Time (s)	0.5					0.5
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	4.0					4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	C-Max					Min
Act Effct Green (s)	33.9					18.1
Actuated g/C Ratio	0.56					0.30
v/c Ratio	0.30					0.48
Control Delay	9.3					4.5
Queue Delay	0.0					0.0
Total Delay	9.3					4.5
LOS	A					A
Approach Delay	9.3					4.5
Approach LOS	A					A
Queue Length 50th (ft)	51					8
Queue Length 95th (ft)	119					12
Internal Link Dist (ft)	18		196			123
Turn Bay Length (ft)						
Base Capacity (vph)	999					1474
Starvation Cap Reductn	0					118
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.30					0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 6.3		Intersection LOS: A	
Intersection Capacity Utilization 35.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 110: I-40 WB & Central Pike at I-40 WB



SR 265 No Build Alternative (2040)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	237	184	276	329	754	315	1014	389	216	681	5
Future Volume (vph)	52	237	184	276	329	754	315	1014	389	216	681	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.948				0.850		0.958			0.999	
Flt Protected		0.994			0.978		0.950			0.950		
Satd. Flow (prot)	0	1722	0	0	1787	1553	1736	1750	0	1736	1825	0
Flt Permitted		0.346			0.489		0.062			0.067		
Satd. Flow (perm)	0	599	0	0	893	1553	113	1750	0	122	1825	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				119		16				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		547			1559			1697			839	
Travel Time (s)		10.7			30.4			25.7			12.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	57	258	200	300	358	820	342	1102	423	235	740	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	515	0	0	658	820	342	1525	0	235	745	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	10.0	22.0		10.0	22.0	
Total Split (s)	67.0	67.0		67.0	67.0	67.0	17.0	70.0		13.0	66.0	
Total Split (%)	44.7%	44.7%		44.7%	44.7%	44.7%	11.3%	46.7%		8.7%	44.0%	
Maximum Green (s)	61.0	61.0		61.0	61.0	61.0	11.0	64.0		7.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0			0	
Act Effct Green (s)		61.0			61.0	61.0	75.0	64.0		67.0	60.0	
Actuated g/C Ratio		0.41			0.41	0.41	0.50	0.43		0.45	0.40	
v/c Ratio		1.99			1.81	1.17	1.95	2.02		1.82	1.02	
Control Delay		483.5			404.8	124.9	474.8	488.9		422.7	82.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		483.5			404.8	124.9	474.8	488.9		422.7	82.6	
LOS		F			F	F	F	F		F	F	
Approach Delay		483.5			249.5			486.3			164.1	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~773			~966	~881	~470	~2338		~297	~771	
Queue Length 95th (ft)		#768			#1212	#1140	#676	#2608		#478	#1022	
Internal Link Dist (ft)		467			1479			1617			759	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		259			363	702	175	755		129	730	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		1.99			1.81	1.17	1.95	2.02		1.82	1.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 2.02			
Intersection Signal Delay: 348.5		Intersection LOS: F	
Intersection Capacity Utilization 168.2%		ICU Level of Service H	
Analysis Period (min) 15			

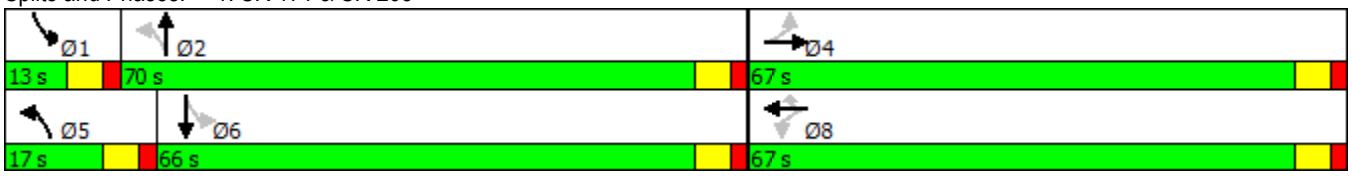
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265



Intersection	
Intersection Delay, s/veh	265.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	194	74	44	347	98	152	363	143	152	342	51
Future Vol, veh/h	10	194	74	44	347	98	152	363	143	152	342	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	11	211	80	48	377	107	165	395	155	165	372	55
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	58.3	202.7	395.2	272
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	4%	9%	28%
Vol Thru, %	55%	70%	71%	63%
Vol Right, %	22%	27%	20%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	658	278	489	545
LT Vol	152	10	44	152
Through Vol	363	194	347	342
RT Vol	143	74	98	51
Lane Flow Rate	715	302	532	592
Geometry Grp	1	1	1	1
Degree of Util (X)	1.792	0.798	1.329	1.498
Departure Headway (Hd)	11.476	14.828	12.316	12.381
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	322	248	298	302
Service Time	9.476	12.828	10.316	10.381
HCM Lane V/C Ratio	2.22	1.218	1.785	1.96
HCM Control Delay	395.2	58.3	202.7	272
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	36.8	6	19.5	24.7

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	101	338	439	32	61	241
Future Vol, veh/h	101	338	439	32	61	241
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	110	367	477	35	66	262

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	512	0	-	0	1082	495
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	587	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1043	-	-	-	239	571
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	552	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1043	-	-	-	207	571
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	479	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	37.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1043	-	-	-	421
HCM Lane V/C Ratio	0.105	-	-	-	0.78
HCM Control Delay (s)	8.9	0	-	-	37.9
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.4	-	-	-	6.7

Intersection	
Int Delay, s/veh	0.3

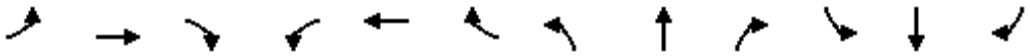
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	461	10	5	394
Future Vol, veh/h	5	10	461	10	5	394
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	501	11	5	428

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	946	507	0	0	512	0
Stage 1	507	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	290	566	-	-	1053	-
Stage 1	605	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	288	566	-	-	1053	-
Mov Cap-2 Maneuver	288	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	646	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	428	1053	-
HCM Lane V/C Ratio	-	-	0.038	0.005	-
HCM Control Delay (s)	-	-	13.7	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	428	390	411	331	420	291	844	315	750	1064	16
Future Volume (vph)	65	428	390	411	331	420	291	844	315	750	1064	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		34	81		0	196		0
Storage Lanes	0		0	0		1	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.940				0.850		0.959			0.998	
Flt Protected		0.996			0.973		0.950			0.950		
Satd. Flow (prot)	0	1710	0	0	1778	1553	1736	1752	0	1736	1823	0
Flt Permitted		0.153			0.264		0.085			0.075		
Satd. Flow (perm)	0	263	0	0	482	1553	155	1752	0	137	1823	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33				109		13			1	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		547			1559			1697			836	
Travel Time (s)		10.7			30.4			25.7			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	68	451	411	433	348	442	306	888	332	789	1120	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	930	0	0	781	442	306	1220	0	789	1137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0		22.0	22.0	22.0	10.0	22.0		10.0	22.0	
Total Split (s)	70.0	70.0		70.0	70.0	70.0	14.0	53.0		27.0	66.0	
Total Split (%)	46.7%	46.7%		46.7%	46.7%	46.7%	9.3%	35.3%		18.0%	44.0%	
Maximum Green (s)	64.0	64.0		64.0	64.0	64.0	8.0	47.0		21.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0			0	
Act Effct Green (s)		64.0			64.0	64.0	55.0	47.0		74.0	60.0	
Actuated g/C Ratio		0.43			0.43	0.43	0.37	0.31		0.49	0.40	
v/c Ratio		7.10			3.81	0.61	2.17	2.19		2.71	1.56	
Control Delay		2768.5			1290.8	28.6	571.7	566.9		800.0	290.8	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		2768.5			1290.8	28.6	571.7	566.9		800.0	290.8	
LOS		F			F	C	F	F		F	F	
Approach Delay		2768.5			834.6			567.8			499.4	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)		~1646			~1190	252	~432	~1918		~1268	~1577	
Queue Length 95th (ft)		#1909			#1445	372	#629	#2187		#1525	#1846	
Internal Link Dist (ft)		467			1479			1617			756	
Turn Bay Length (ft)						34	81			196		
Base Capacity (vph)		131			205	725	141	557		291	729	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		7.10			3.81	0.61	2.17	2.19		2.71	1.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 7.10			
Intersection Signal Delay: 967.7		Intersection LOS: F	
Intersection Capacity Utilization 215.3%		ICU Level of Service H	
Analysis Period (min) 15			

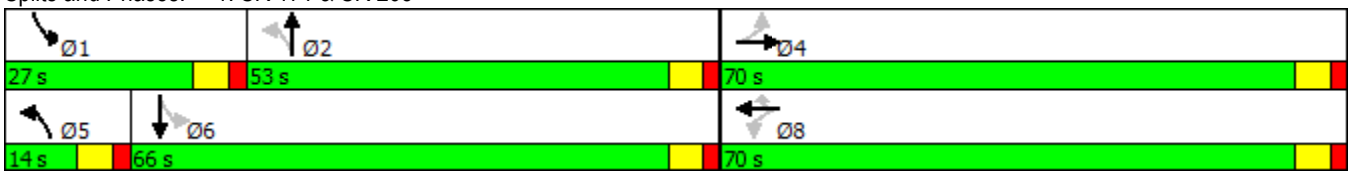
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265



Intersection	
Intersection Delay, s/veh	567.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	510	202	203	356	349	122	399	108	197	447	57
Future Vol, veh/h	21	510	202	203	356	349	122	399	108	197	447	57
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	22	537	213	214	375	367	128	420	114	207	471	60
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	535.1	738.7	421.8	510.7
HCM LOS	F	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	3%	22%	28%
Vol Thru, %	63%	70%	39%	64%
Vol Right, %	17%	28%	38%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	629	733	908	701
LT Vol	122	21	203	197
Through Vol	399	510	356	447
RT Vol	108	202	349	57
Lane Flow Rate	662	772	956	738
Geometry Grp	1	1	1	1
Degree of Util (X)	1.766	2.037	2.517	1.983
Departure Headway (Hd)	24.588	23.362	20.545	22.99
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	159	162	191	170
Service Time	22.588	21.362	18.545	20.99
HCM Lane V/C Ratio	4.164	4.765	5.005	4.341
HCM Control Delay	421.8	535.1	738.7	510.7
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	19.1	24.7	37.6	24.1

Intersection	
Int Delay, s/veh	51.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	461	722	47	95	230
Future Vol, veh/h	83	461	722	47	95	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	87	485	760	49	100	242

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	809	0	-	0	1445	785
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	660	-
Critical Hdwy	4.14	-	-	-	6.44	6.24
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.236	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	808	-	-	-	144	390
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	510	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	808	-	-	-	123	390
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	435	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	255.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	808	-	-	-	239
HCM Lane V/C Ratio	0.108	-	-	-	1.431
HCM Control Delay (s)	10	0	-	-	255.4
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	19.5

Intersection	
Int Delay, s/veh	0.4

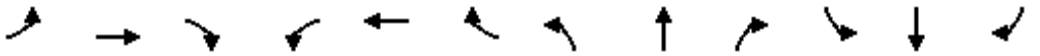
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	5	764	5	10	546
Future Vol, veh/h	10	5	764	5	10	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	5	830	5	11	593

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1448	833	0	0	836	0
Stage 1	833	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	145	369	-	-	798	-
Stage 1	427	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	142	369	-	-	798	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	528	-	-	-	-	-

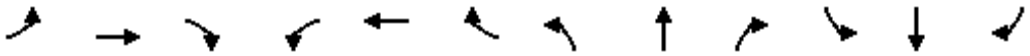
Approach	WB	NB	SB
HCM Control Delay, s	27.1	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	179	798	-
HCM Lane V/C Ratio	-	-	0.091	0.014	-
HCM Control Delay (s)	-	-	27.1	9.6	0
HCM Lane LOS	-	-	D	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

SR 265 Diamond & DDI Build Alternatives (2040)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	423	248	276	630	494	552	777	389	157	617	106
Future Volume (vph)	227	423	248	276	630	494	552	777	389	157	617	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	3471	1553	3367	3471	1553	3367	3471	1553	3367	3471	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3471	1553	3367	3471	1553	3367	3471	1553	3367	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123			205			123			205
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		2141			1559			1697			859	
Travel Time (s)		41.7			30.4			25.7			13.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	247	460	270	300	685	537	600	845	423	171	671	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	247	460	270	300	685	537	600	845	423	171	671	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	8 1	5	2	2 3	1	6	7



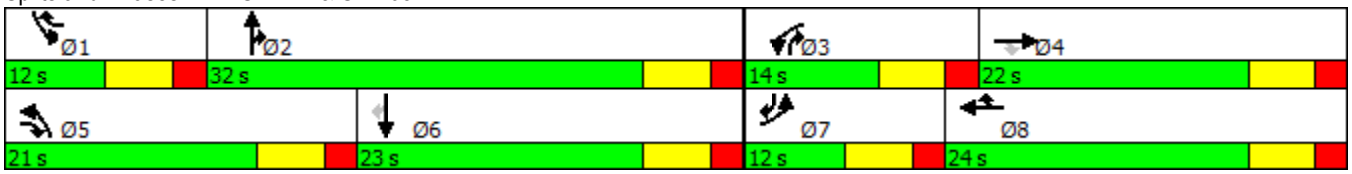
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4									6
Detector Phase	7	4	5	3	8	8 1	5	2	2 3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	10.0
Total Split (s)	12.0	22.0	21.0	14.0	24.0		21.0	32.0		12.0	23.0	12.0
Total Split (%)	15.0%	27.5%	26.3%	17.5%	30.0%		26.3%	40.0%		15.0%	28.8%	15.0%
Maximum Green (s)	6.0	16.0	15.0	8.0	18.0		15.0	26.0		6.0	17.0	6.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	None
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	16.0	37.0	8.0	18.0	30.0	15.0	26.0	40.0	6.0	17.0	29.0
Actuated g/C Ratio	0.08	0.20	0.46	0.10	0.22	0.38	0.19	0.32	0.50	0.08	0.21	0.36
v/c Ratio	0.98	0.66	0.34	0.89	0.88	0.76	0.95	0.75	0.50	0.68	0.91	0.17
Control Delay	91.9	34.8	8.6	65.9	44.4	21.3	59.6	29.1	11.6	50.9	49.5	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.9	34.8	8.6	65.9	44.4	21.3	59.6	29.1	11.6	50.9	49.5	0.6
LOS	F	C	A	E	D	C	E	C	B	D	D	A
Approach Delay		42.0			40.5			34.9			43.9	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	64	112	42	77	174	142	154	195	91	43	173	0
Queue Length 95th (ft)	#137	162	92	#148	#270	#276	#254	263	167	#86	#273	2
Internal Link Dist (ft)		2061			1479			1617			779	
Turn Bay Length (ft)	200		200	200		200	200		200	200		200
Base Capacity (vph)	252	694	784	336	780	710	631	1128	838	252	737	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.66	0.34	0.89	0.88	0.76	0.95	0.75	0.50	0.68	0.91	0.17

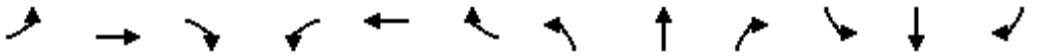
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 39.4		Intersection LOS: D	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

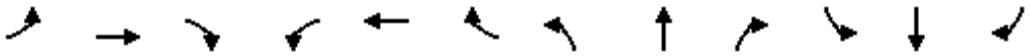
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	104	74	44	83	645	152	1002	143	649	767	315
Future Volume (vph)	116	104	74	44	83	645	152	1002	143	649	767	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	1827	1553	3367	1827	2733	1736	3471	1553	3367	3471	1553
Flt Permitted	0.950			0.950			0.338			0.950		
Satd. Flow (perm)	3367	1827	1553	3367	1827	2733	617	3471	1553	3367	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			109			182			342
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		720			602			957			1493	
Travel Time (s)		16.4			13.7			14.5			22.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	126	113	80	48	90	701	165	1089	155	705	834	342
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	113	80	48	90	701	165	1089	155	705	834	342
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2		2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	10.0	22.0	10.0	10.0	22.0	10.0	10.0	22.0	10.0
Total Split (s)	10.0	22.0	15.0	10.0	22.0	24.0	15.0	34.0	10.0	24.0	43.0	10.0
Total Split (%)	11.1%	24.4%	16.7%	11.1%	24.4%	26.7%	16.7%	37.8%	11.1%	26.7%	47.8%	11.1%
Maximum Green (s)	4.0	16.0	9.0	4.0	16.0	18.0	9.0	28.0	4.0	18.0	37.0	4.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Act Effct Green (s)	4.0	10.8	22.9	4.0	10.7	37.6	39.0	30.4	40.4	23.3	45.1	55.1
Actuated g/C Ratio	0.04	0.12	0.25	0.04	0.12	0.42	0.43	0.34	0.45	0.26	0.50	0.61
v/c Ratio	0.85	0.51	0.15	0.32	0.41	0.58	0.44	0.93	0.19	0.81	0.48	0.32
Control Delay	86.4	44.8	0.6	47.7	41.5	18.5	13.7	44.8	2.3	41.3	17.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	44.8	0.6	47.7	41.5	18.5	13.7	44.8	2.3	41.3	17.7	2.1
LOS	F	D	A	D	D	B	B	D	A	D	B	A
Approach Delay		50.1			22.6			36.5			23.7	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	37	61	0	13	48	134	34	~328	0	194	167	0
Queue Length 95th (ft)	#88	109	0	31	90	193	68	#471	25	#323	248	39
Internal Link Dist (ft)		640			522			877			1413	
Turn Bay Length (ft)	200		200	200		200	200		200	200		200
Base Capacity (vph)	149	324	543	149	324	1204	390	1173	797	870	1740	1083
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.35	0.15	0.32	0.28	0.58	0.42	0.93	0.19	0.81	0.48	0.32

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 83 (92%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 29.5 Intersection LOS: C
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Central Pike & John Hager Rd/Adams Ln

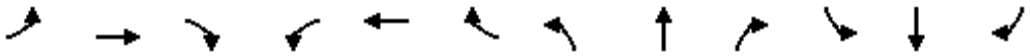


Intersection	
Intersection Delay, s/veh	14.6
Intersection LOS	B

Approach	EB	WB	SB
Entry Lanes	2	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	541	637	679
Demand Flow Rate, veh/h	563	662	706
Vehicles Circulating, veh/h	468	48	496
Vehicles Exiting, veh/h	496	983	48
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	20.4	7.7	16.4
Approach LOS	C	A	C

Lane	Left	Right	Left	Bypass	Left	Bypass
Designated Moves	L	TR	T	R	L	R
Assumed Moves	L	TR	T	R	L	R
RT Channelized				Yield		Yield
Lane Util	0.085	0.915	1.000		1.000	
Critical Headway, s	5.193	5.193	5.193		5.193	
Entry Flow, veh/h	48	515	496	166	468	238
Cap Entry Lane, veh/h	708	708	1077	1077	688	688
Entry HV Adj Factor	0.958	0.962	0.962	0.962	0.962	0.962
Flow Entry, veh/h	46	495	477	160	450	229
Cap Entry, veh/h	678	680	1036	1036	662	662
V/C Ratio	0.068	0.728	0.461	0.155	0.680	0.346
Control Delay, s/veh	6.0	21.7	8.7	4.9	19.6	10.0
LOS	A	C	A	A	C	B
95th %tile Queue, veh	0	6	2	1	5	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	734	489	411	551	291	409	726	315	541	965	237
Future Volume (vph)	161	734	489	411	551	291	409	726	315	541	965	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	3471	1553	3367	3471	1553	3367	3471	1553	3367	3471	1553
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3471	1553	3367	3471	1553	3367	3471	1553	3367	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			98			98			98			98
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		547			1559			1697			851	
Travel Time (s)		10.7			30.4			25.7			12.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	169	773	515	433	580	306	431	764	332	569	1016	249
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	773	515	433	580	306	431	764	332	569	1016	249
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	8 1	5	2	2 3	1	6	7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4									6
Detector Phase	7	4	5	3	8	8 1	5	2	2 3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	10.0
Total Split (s)	15.0	27.0	19.0	18.0	30.0		19.0	32.0		23.0	36.0	15.0
Total Split (%)	15.0%	27.0%	19.0%	18.0%	30.0%		19.0%	32.0%		23.0%	36.0%	15.0%
Maximum Green (s)	9.0	21.0	13.0	12.0	24.0		13.0	26.0		17.0	30.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	None
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	8.7	21.0	40.0	12.0	24.3	47.3	13.0	26.0	44.0	17.0	30.0	44.7
Actuated g/C Ratio	0.09	0.21	0.40	0.12	0.24	0.47	0.13	0.26	0.44	0.17	0.30	0.45
v/c Ratio	0.58	1.06	0.76	1.07	0.69	0.39	0.99	0.85	0.45	0.99	0.98	0.33
Control Delay	52.2	89.9	29.1	108.1	39.4	13.0	84.4	45.4	15.6	78.9	58.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	89.9	29.1	108.1	39.4	13.0	84.4	45.4	15.6	78.9	58.2	11.8
LOS	D	F	C	F	D	B	F	D	B	E	E	B
Approach Delay		64.1			55.8			49.9			58.3	
Approach LOS		E			E			D			E	
Queue Length 50th (ft)	54	~286	228	~158	178	80	143	243	98	188	336	57
Queue Length 95th (ft)	88	#405	365	#255	238	145	#242	#338	174	#301	#475	114
Internal Link Dist (ft)		467			1479			1617			771	
Turn Bay Length (ft)	200		200	200		200	200		200	200		200
Base Capacity (vph)	303	728	680	404	844	786	437	902	738	572	1041	752
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	1.06	0.76	1.07	0.69	0.39	0.99	0.85	0.45	0.99	0.98	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 57.1		Intersection LOS: E	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

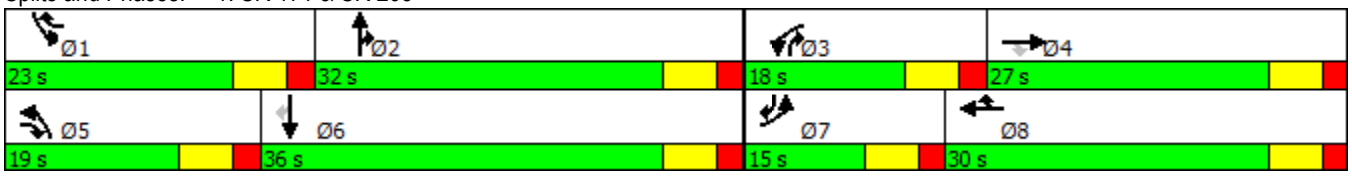
~ Volume exceeds capacity, queue is theoretically infinite.

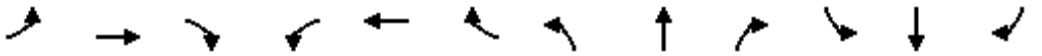
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

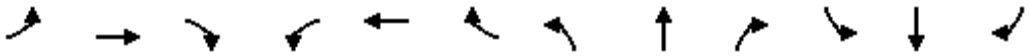
Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 171 & SR 265





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	455	143	202	203	136	1071	122	958	108	740	948	277
Future Volume (vph)	455	143	202	203	136	1071	122	958	108	740	948	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	200		200	200		200
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	0.88	1.00	0.95	1.00	0.97	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3367	1827	1553	3367	1827	2733	1736	3471	1553	3367	3471	1553
Flt Permitted	0.950			0.950			0.239			0.950		
Satd. Flow (perm)	3367	1827	1553	3367	1827	2733	437	3471	1553	3367	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			89			149			292
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		720			602			957			1493	
Travel Time (s)		16.4			13.7			14.5			22.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	479	151	213	214	143	1127	128	1008	114	779	998	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	479	151	213	214	143	1127	128	1008	114	779	998	292
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pt+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	8 1	5	2	3	1	6	7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4				2		2			6
Detector Phase	7	4	5	3	8	8 1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	10.0	10.0	22.0		10.0	22.0	10.0	10.0	22.0	10.0
Total Split (s)	21.0	25.0	16.0	18.0	22.0		16.0	37.0	18.0	30.0	51.0	21.0
Total Split (%)	19.1%	22.7%	14.5%	16.4%	20.0%		14.5%	33.6%	16.4%	27.3%	46.4%	19.1%
Maximum Green (s)	15.0	19.0	10.0	12.0	16.0		10.0	31.0	12.0	24.0	45.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max	None	None	C-Max	None
Act Effct Green (s)	15.0	19.8	34.7	11.2	16.0	46.0	39.9	31.0	48.2	24.0	46.1	67.1
Actuated g/C Ratio	0.14	0.18	0.32	0.10	0.15	0.42	0.36	0.28	0.44	0.22	0.42	0.61
v/c Ratio	1.04	0.46	0.36	0.63	0.54	0.94	0.49	1.03	0.15	1.06	0.69	0.28
Control Delay	100.3	45.9	11.3	55.9	51.9	44.6	21.3	76.2	1.7	92.5	29.3	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.3	45.9	11.3	55.9	51.9	44.6	21.3	76.2	1.7	92.5	29.3	1.8
LOS	F	D	B	E	D	D	C	E	A	F	C	A
Approach Delay		68.1			47.0			63.8			49.2	
Approach LOS		E			D			E			D	
Queue Length 50th (ft)	~189	97	32	75	95	400	41	~402	0	~312	298	0
Queue Length 95th (ft)	#294	163	92	115	161	#566	72	#532	17	#433	378	33
Internal Link Dist (ft)		640			522			877			1413	
Turn Bay Length (ft)	200		200	200		200	200		200	200		200
Base Capacity (vph)	459	329	606	367	265	1194	280	978	774	734	1454	1061
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.46	0.35	0.58	0.54	0.94	0.46	1.03	0.15	1.06	0.69	0.28

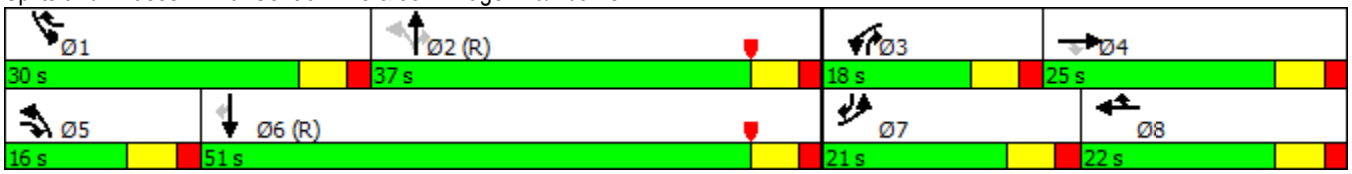
Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 82 (75%), Referenced to phase 2:NBTL and 6:SBT, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 54.7 Intersection LOS: D
Intersection Capacity Utilization 91.9% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Central Pike & John Hager Rd/Adams Ln

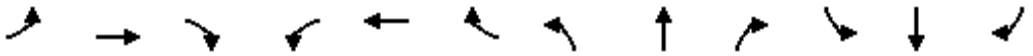


Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

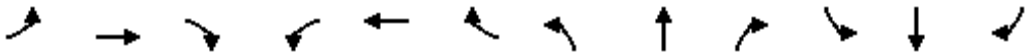
Approach	EB	WB	SB
Entry Lanes	2	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	609	1067	390
Demand Flow Rate, veh/h	633	1109	405
Vehicles Circulating, veh/h	212	59	790
Vehicles Exiting, veh/h	790	786	59
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	13.0	13.7	14.0
Approach LOS	B	B	B

Lane	Left	Right	Left	Bypass	Left	Bypass
Designated Moves	L	TR	T	R	L	R
Assumed Moves	L	TR	T	R	L	R
RT Channelized				Yield		Yield
Lane Util	0.093	0.907	1.000		1.000	
Critical Headway, s	5.193	5.193	5.193		5.193	
Entry Flow, veh/h	59	574	790	319	212	193
Cap Entry Lane, veh/h	914	914	1065	1065	513	513
Entry HV Adj Factor	0.966	0.962	0.962	0.962	0.962	0.962
Flow Entry, veh/h	57	552	760	307	204	186
Cap Entry, veh/h	883	879	1024	1024	493	493
V/C Ratio	0.065	0.628	0.742	0.300	0.413	0.377
Control Delay, s/veh	4.7	13.9	16.6	6.5	14.4	13.5
LOS	A	B	C	A	B	B
95th %tile Queue, veh	0	5	7	1	2	2

SR 265 Diamond Build Alternative (2040)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	0	836	0	0	0	0	1634	129	35	894	0
Future Volume (vph)	118	0	836	0	0	0	0	1634	129	35	894	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		250	150		0
Storage Lanes	1		2	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	*1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1736	0	2733	0	0	0	0	5481	1553	1736	3471	0
Flt Permitted	0.950									0.099		
Satd. Flow (perm)	1736	0	2733	0	0	0	0	5481	1553	181	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164						140			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1380			665			636			528	
Travel Time (s)		31.4			15.1			9.6			8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	128	0	909	0	0	0	0	1776	140	38	972	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	0	909	0	0	0	0	1776	140	38	972	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Perm					NA	Perm	pm+pt	NA	
Protected Phases	4							2		1	6	

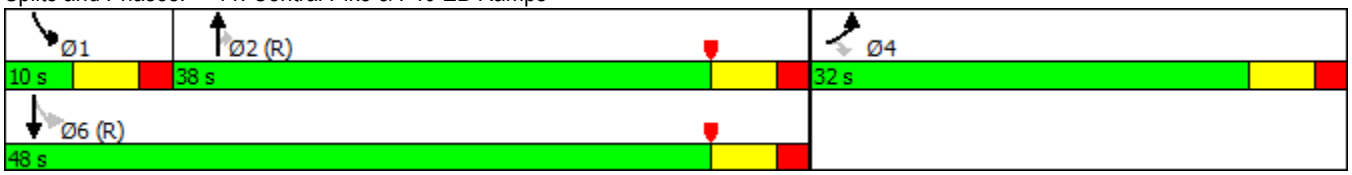


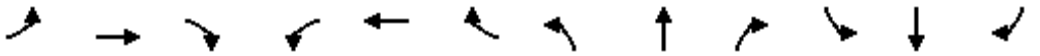
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4						2	6		
Detector Phase	4		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0		6.0					8.0	8.0	4.0	8.0	
Minimum Split (s)	22.0		22.0					22.0	22.0	10.0	22.0	
Total Split (s)	32.0		32.0					38.0	38.0	10.0	48.0	
Total Split (%)	40.0%		40.0%					47.5%	47.5%	12.5%	60.0%	
Maximum Green (s)	26.0		26.0					32.0	32.0	4.0	42.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)	5.0		5.0					5.0	5.0		5.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	25.2		25.2					36.8	36.8	42.8	42.8	
Actuated g/C Ratio	0.32		0.32					0.46	0.46	0.54	0.54	
v/c Ratio	0.23		0.93					0.71	0.18	0.21	0.52	
Control Delay	21.2		39.4					20.3	3.6	10.5	12.9	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	21.2		39.4					20.3	3.6	10.5	12.9	
LOS	C		D					C	A	B	B	
Approach Delay		37.2						19.1			12.8	
Approach LOS		D						B			B	
Queue Length 50th (ft)	46		205					256	0	15	278	
Queue Length 95th (ft)	87		#338					310	33	m16	m324	
Internal Link Dist (ft)		1300			585			556			448	
Turn Bay Length (ft)			300						250	150		
Base Capacity (vph)	564		998					2518	789	180	1855	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.23		0.91					0.71	0.18	0.21	0.52	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 50 (63%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 22.2		Intersection LOS: C	
Intersection Capacity Utilization 85.1%		ICU Level of Service E	
Analysis Period (min) 15			

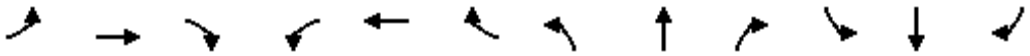
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Central Pike & I-40 EB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	351	0	44	1163	589	0	0	578	435
Future Volume (vph)	0	0	0	351	0	44	1163	589	0	0	578	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		300	150		0	0		250
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						123						386
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		521			649			528			993	
Travel Time (s)		11.8			14.8			8.0			15.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	382	0	48	1264	640	0	0	628	473
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	382	0	48	1264	640	0	0	628	473
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	

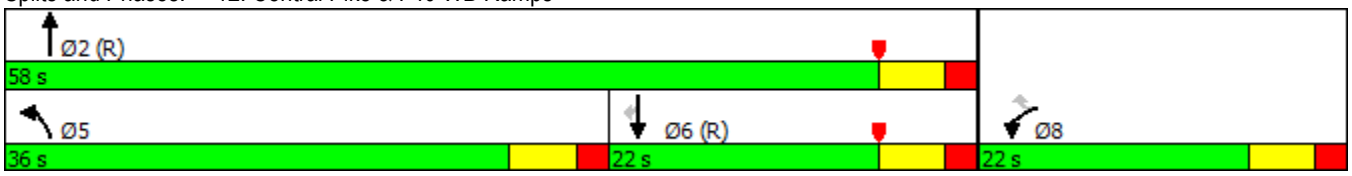


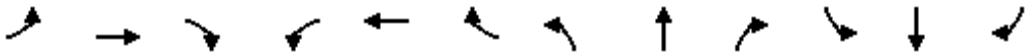
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8						6
Detector Phase				8		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				6.0		6.0	4.0	8.0			8.0	8.0
Minimum Split (s)				22.0		22.0	10.0	22.0			22.0	22.0
Total Split (s)				22.0		22.0	36.0	58.0			22.0	22.0
Total Split (%)				27.5%		27.5%	45.0%	72.5%			27.5%	27.5%
Maximum Green (s)				16.0		16.0	30.0	52.0			16.0	16.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)				5.0		5.0		5.0			5.0	5.0
Flash Dont Walk (s)				11.0		11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)				0		0		0			0	0
Act Effct Green (s)				13.8		13.8	32.2	54.2			16.0	16.0
Actuated g/C Ratio				0.17		0.17	0.40	0.68			0.20	0.20
v/c Ratio				0.66		0.13	0.93	0.27			0.90	0.76
Control Delay				36.4		0.7	17.9	1.6			49.9	16.0
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				36.4		0.7	17.9	1.6			49.9	16.0
LOS				D		A	B	A			D	B
Approach Delay					32.5			12.4			35.4	
Approach LOS					C			B			D	
Queue Length 50th (ft)				92		0	2	4			162	37
Queue Length 95th (ft)				132		0	#450	5			#260	#180
Internal Link Dist (ft)		441			569			448			913	
Turn Bay Length (ft)				200		300	150					250
Base Capacity (vph)				673		409	1353	2351			696	620
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.57		0.12	0.93	0.27			0.90	0.76

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 85.1%		ICU Level of Service E	
Analysis Period (min) 15			

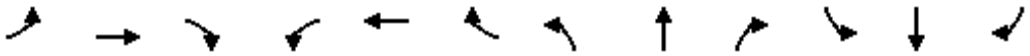
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Central Pike & I-40 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	288	0	980	0	0	0	0	2013	471	35	984	0
Future Volume (vph)	288	0	980	0	0	0	0	2013	471	35	984	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	0		250	150		0
Storage Lanes	1		2	0		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	*1.00	1.00	1.00	0.95	1.00
Frt			0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1736	0	2733	0	0	0	0	5481	1553	1736	3471	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	1736	0	2733	0	0	0	0	5481	1553	1736	3471	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			157						496			
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		1380			665			636			528	
Travel Time (s)		31.4			15.1			9.6			8.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	303	0	1032	0	0	0	0	2119	496	37	1036	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	0	1032	0	0	0	0	2119	496	37	1036	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1					2	1	1	2	
Detector Template	Left		Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20		20					100	20	20	100	
Trailing Detector (ft)	0		0					0	0	0	0	
Detector 1 Position(ft)	0		0					0	0	0	0	
Detector 1 Size(ft)	20		20					6	20	20	6	
Detector 1 Type	Cl+Ex		Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type	Prot		Prot					NA	Perm	Prot	NA	
Protected Phases	4		4					2		1	6	



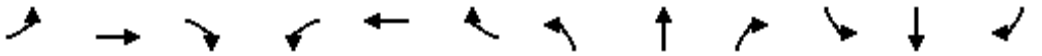
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases									2			
Detector Phase	4		4					2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0		6.0					8.0	8.0	4.0	8.0	
Minimum Split (s)	22.0		22.0					22.0	22.0	10.0	22.0	
Total Split (s)	39.0		39.0					51.0	51.0	10.0	61.0	
Total Split (%)	39.0%		39.0%					51.0%	51.0%	10.0%	61.0%	
Maximum Green (s)	33.0		33.0					45.0	45.0	4.0	55.0	
Yellow Time (s)	4.0		4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0					2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0					6.0	6.0	6.0	6.0	
Lead/Lag								Lag	Lag	Lead		
Lead-Lag Optimize?								Yes	Yes	Yes		
Vehicle Extension (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Recall Mode	None		None					C-Max	C-Max	None	C-Max	
Walk Time (s)	5.0		5.0					5.0	5.0		5.0	
Flash Dont Walk (s)	11.0		11.0					11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0		0					0	0		0	
Act Effct Green (s)	33.0		33.0					49.0	49.0	4.0	55.0	
Actuated g/C Ratio	0.33		0.33					0.49	0.49	0.04	0.55	
v/c Ratio	0.53		1.02					0.79	0.49	0.54	0.54	
Control Delay	31.3		64.0					24.7	3.4	34.3	22.7	
Queue Delay	0.0		0.0					0.1	0.0	0.0	2.0	
Total Delay	31.3		64.0					24.9	3.4	34.3	24.6	
LOS	C		E					C	A	C	C	
Approach Delay		56.6						20.8			25.0	
Approach LOS		E						C			C	
Queue Length 50th (ft)	156		~359					391	0	23	378	
Queue Length 95th (ft)	241		#500					455	56	m25	445	
Internal Link Dist (ft)		1300			585			556			448	
Turn Bay Length (ft)			300						250	150		
Base Capacity (vph)	572		1007					2685	1013	69	1909	
Starvation Cap Reductn	0		0					0	0	0	683	
Spillback Cap Reductn	0		0					70	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.53		1.02					0.81	0.49	0.54	0.85	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 62 (62%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

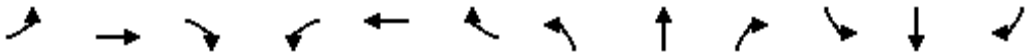
* User Entered Value
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Central Pike & I-40 EB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	284	0	45	1244	1057	0	0	735	127
Future Volume (vph)	0	0	0	284	0	45	1244	1057	0	0	735	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		300	150		0	0		250
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3367	0	1553	3367	3471	0	0	3471	1553
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						98						134
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		521			649			528			993	
Travel Time (s)		11.8			14.8			8.0			15.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	0	0	0	299	0	47	1309	1113	0	0	774	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	299	0	47	1309	1113	0	0	774	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Prot		Perm	Prot	NA			NA	Perm
Protected Phases				8			5	2			6	

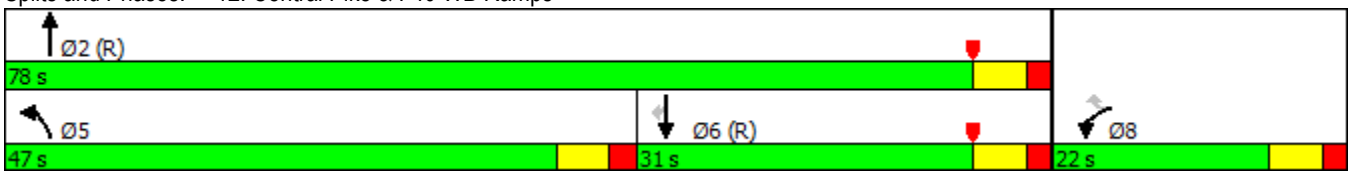


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8						6
Detector Phase				8		8	5	2			6	6
Switch Phase												
Minimum Initial (s)				6.0		6.0	4.0	8.0			8.0	8.0
Minimum Split (s)				22.0		22.0	10.0	22.0			22.0	22.0
Total Split (s)				22.0		22.0	47.0	78.0			31.0	31.0
Total Split (%)				22.0%		22.0%	47.0%	78.0%			31.0%	31.0%
Maximum Green (s)				16.0		16.0	41.0	72.0			25.0	25.0
Yellow Time (s)				4.0		4.0	4.0	4.0			4.0	4.0
All-Red Time (s)				2.0		2.0	2.0	2.0			2.0	2.0
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				6.0		6.0	6.0	6.0			6.0	6.0
Lead/Lag							Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				3.0		3.0	3.0	3.0			3.0	3.0
Recall Mode				None		None	None	C-Max			C-Max	C-Max
Walk Time (s)				5.0		5.0		5.0			5.0	5.0
Flash Dont Walk (s)				11.0		11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)				0		0		0			0	0
Act Effct Green (s)				13.7		13.7	41.5	74.3			26.8	26.8
Actuated g/C Ratio				0.14		0.14	0.42	0.74			0.27	0.27
v/c Ratio				0.65		0.16	0.94	0.43			0.83	0.26
Control Delay				47.5		1.4	17.0	1.8			44.4	6.8
Queue Delay				0.6		0.0	0.0	0.3			0.0	0.0
Total Delay				48.2		1.4	17.0	2.1			44.4	6.8
LOS				D		A	B	A			D	A
Approach Delay					41.8			10.2			38.9	
Approach LOS					D			B			D	
Queue Length 50th (ft)				93		0	11	9			251	0
Queue Length 95th (ft)				135		3	#529	11			#358	45
Internal Link Dist (ft)		441			569			448			913	
Turn Bay Length (ft)				200		300	150					250
Base Capacity (vph)				538		330	1411	2579			929	513
Starvation Cap Reductn				0		0	1	773			0	0
Spillback Cap Reductn				59		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.62		0.14	0.93	0.62			0.83	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 12: Central Pike & I-40 WB Ramps



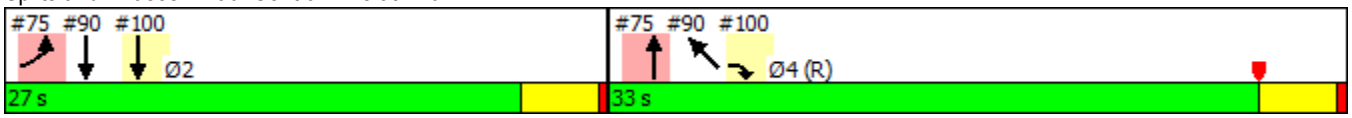
SR 265 DDI Build Alternative (2040)

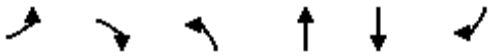
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	894	0	0	0	0	0	1634	0
Future Volume (vph)	0	0	0	0	894	0	0	0	0	0	1634	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		80			147			146			140	
Travel Time (s)		1.8			3.3			3.3			3.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	941	0	0	0	0	0	1720	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	941	0	0	0	0	0	1720	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		3			-24			12			0	
Crosswalk Width(ft)		16			0			0			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					1						2	
Detector Template											Thru	
Leading Detector (ft)					30						100	
Trailing Detector (ft)					0						0	
Detector 1 Position(ft)					0						0	
Detector 1 Size(ft)					30						6	
Detector 1 Type					Cl+Ex						Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)					0.0						0.0	
Detector 1 Queue (s)					0.0						0.0	
Detector 1 Delay (s)					0.0						0.0	
Detector 2 Position(ft)											94	
Detector 2 Size(ft)											6	
Detector 2 Type											Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)											0.0	
Turn Type					NA						NA	
Protected Phases					2						4	
Permitted Phases												
Detector Phase					2						4	
Switch Phase												
Minimum Initial (s)					4.0						4.0	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Split (s)					20.0						20.0	
Total Split (s)					27.0						33.0	
Total Split (%)					45.0%						55.0%	
Maximum Green (s)					23.0						29.0	
Yellow Time (s)					3.5						3.5	
All-Red Time (s)					0.5						0.5	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Min	
Act Effct Green (s)					22.1						29.9	
Actuated g/C Ratio					0.37						0.50	
v/c Ratio					0.72						0.68	
Control Delay					13.4						13.4	
Queue Delay					0.0						0.0	
Total Delay					13.4						13.4	
LOS					B						B	
Approach Delay					13.4						13.4	
Approach LOS					B						B	
Queue Length 50th (ft)					81						165	
Queue Length 95th (ft)					114						213	
Internal Link Dist (ft)		1			67			66			60	
Turn Bay Length (ft)												
Base Capacity (vph)					1356						2535	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.69						0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 63.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 90: Central Plke at I-40 EB



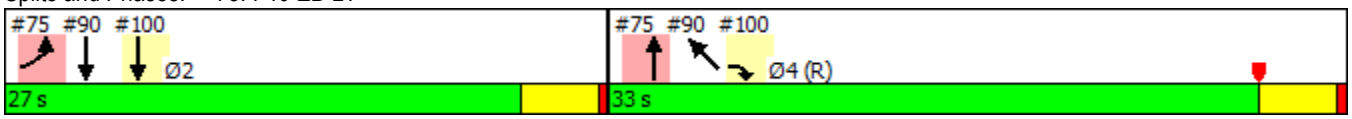


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	118	0	0	1634	0	0
Future Volume (vph)	118	0	0	1634	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Right Turn on Red	No	Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	160			146	301	
Travel Time (s)	3.6			3.3	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	0	0	1776	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	0	0	1776	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	-3			0	0	
Crosswalk Width(ft)	0			0	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	15			9
Number of Detectors	1			1		
Detector Template	Left					
Leading Detector (ft)	20			20		
Trailing Detector (ft)	0			0		
Detector 1 Position(ft)	0			0		
Detector 1 Size(ft)	20			20		
Detector 1 Type	Cl+Ex			Cl+Ex		
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0		
Detector 1 Queue (s)	0.0			0.0		
Detector 1 Delay (s)	0.0			0.0		
Turn Type	Prot			NA		
Protected Phases	2			4		
Permitted Phases						
Detector Phase	2			4		
Switch Phase						
Minimum Initial (s)	4.0			4.0		
Minimum Split (s)	20.0			20.0		
Total Split (s)	27.0			33.0		
Total Split (%)	45.0%			55.0%		
Maximum Green (s)	23.0			29.0		
Yellow Time (s)	3.5			3.5		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
All-Red Time (s)	0.5			0.5		
Lost Time Adjust (s)	0.0			0.0		
Total Lost Time (s)	4.0			4.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0		
Recall Mode	Min			C-Min		
Act Effct Green (s)	22.1			29.9		
Actuated g/C Ratio	0.37			0.50		
v/c Ratio	0.20			0.70		
Control Delay	13.4			3.1		
Queue Delay	0.0			0.0		
Total Delay	13.4			3.1		
LOS	B			A		
Approach Delay	13.4			3.1		
Approach LOS	B			A		
Queue Length 50th (ft)	30			18		
Queue Length 95th (ft)	61			21		
Internal Link Dist (ft)	80			66	221	
Turn Bay Length (ft)						
Base Capacity (vph)	678			2535		
Starvation Cap Reductn	0			0		
Spillback Cap Reductn	0			0		
Storage Cap Reductn	0			0		
Reduced v/c Ratio	0.19			0.70		

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 3.8		Intersection LOS: A	
Intersection Capacity Utilization 44.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 75: I-40 EB LT

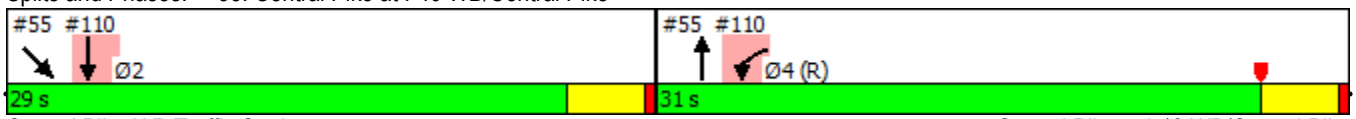


Lane Group	NBT	SET	SER2
Lane Configurations			
Traffic Volume (vph)	589	578	435
Future Volume (vph)	589	578	435
Ideal Flow (vphpl)	1900	1900	1900
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor	0.95	0.95	1.00
Frt			0.850
Flt Protected			
Satd. Flow (prot)	3539	3539	1583
Flt Permitted			
Satd. Flow (perm)	3539	3539	1583
Right Turn on Red			Yes
Satd. Flow (RTOR)			458
Link Speed (mph)	30	30	
Link Distance (ft)	160	492	
Travel Time (s)	3.6	11.2	
Peak Hour Factor	0.95	0.95	0.95
Adj. Flow (vph)	620	608	458
Shared Lane Traffic (%)			
Lane Group Flow (vph)	620	608	458
Enter Blocked Intersection	No	No	No
Lane Alignment	Left	Left	Right
Median Width(ft)	0	0	
Link Offset(ft)	-12	-12	
Crosswalk Width(ft)	16	16	
Two way Left Turn Lane			
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)			9
Number of Detectors	1	2	1
Detector Template		Thru	Right
Leading Detector (ft)	50	100	20
Trailing Detector (ft)	0	0	0
Detector 1 Position(ft)	0	0	0
Detector 1 Size(ft)	50	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel			
Detector 1 Extend (s)	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0
Detector 2 Position(ft)		94	
Detector 2 Size(ft)		6	
Detector 2 Type		Cl+Ex	
Detector 2 Channel			
Detector 2 Extend (s)		0.0	
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free

Lane Group	NBT	SET	SER2
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	4.0	4.0	
Minimum Split (s)	20.0	25.5	
Total Split (s)	31.0	29.0	
Total Split (%)	51.7%	48.3%	
Maximum Green (s)	27.0	25.0	
Yellow Time (s)	3.5	3.5	
All-Red Time (s)	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	4.0	4.0	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	C-Max	Min	
Act Effct Green (s)	31.5	20.5	60.0
Actuated g/C Ratio	0.52	0.34	1.00
v/c Ratio	0.33	0.50	0.29
Control Delay	11.2	16.6	0.5
Queue Delay	0.0	0.0	0.0
Total Delay	11.2	16.6	0.5
LOS	B	B	A
Approach Delay	11.2	9.6	
Approach LOS	B	A	
Queue Length 50th (ft)	62	87	0
Queue Length 95th (ft)	104	115	0
Internal Link Dist (ft)	80	412	
Turn Bay Length (ft)			200
Base Capacity (vph)	1857	1474	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	0.41	0.29

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 56 (93%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 10.2		Intersection LOS: B	
Intersection Capacity Utilization 38.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 55: Central Pike at I-40 WB/Central Pike





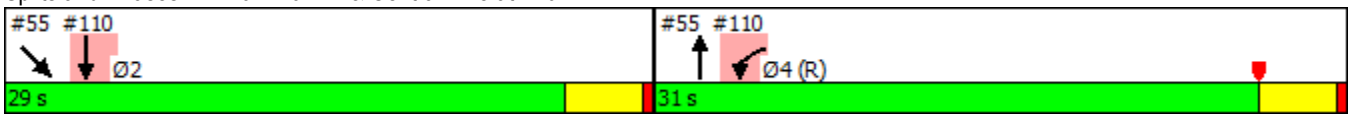
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	351	0	0	0	0	578
Future Volume (vph)	351	0	0	0	0	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	0	0	3539
Right Turn on Red	No	Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	98		276			203
Travel Time (s)	2.2		6.3			4.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	369	0	0	0	0	608
Shared Lane Traffic (%)						
Lane Group Flow (vph)	369	0	0	0	0	608
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9		9	15	
Number of Detectors	1					2
Detector Template	Left					Thru
Leading Detector (ft)	20					100
Trailing Detector (ft)	0					0
Detector 1 Position(ft)	0					0
Detector 1 Size(ft)	20					6
Detector 1 Type	Cl+Ex					Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0					0.0
Detector 1 Queue (s)	0.0					0.0
Detector 1 Delay (s)	0.0					0.0
Detector 2 Position(ft)						94
Detector 2 Size(ft)						6
Detector 2 Type						Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)						0.0
Turn Type	Prot					NA
Protected Phases	4					2
Permitted Phases						
Detector Phase	4					2
Switch Phase						
Minimum Initial (s)	4.0					4.0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Split (s)	20.0					25.5
Total Split (s)	31.0					29.0
Total Split (%)	51.7%					48.3%
Maximum Green (s)	27.0					25.0
Yellow Time (s)	3.5					3.5
All-Red Time (s)	0.5					0.5
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	4.0					4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	C-Max					Min
Act Effct Green (s)	31.5					20.5
Actuated g/C Ratio	0.52					0.34
v/c Ratio	0.40					0.50
Control Delay	11.5					4.2
Queue Delay	0.0					0.0
Total Delay	11.5					4.2
LOS	B					A
Approach Delay	11.5					4.2
Approach LOS	B					A
Queue Length 50th (ft)	75					10
Queue Length 95th (ft)	151					14
Internal Link Dist (ft)	18		196			123
Turn Bay Length (ft)						
Base Capacity (vph)	929					1474
Starvation Cap Reductn	0					72
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.40					0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 56 (93%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 7.0		Intersection LOS: A	
Intersection Capacity Utilization 42.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 110: I-40 WB & Central Pike at I-40 WB

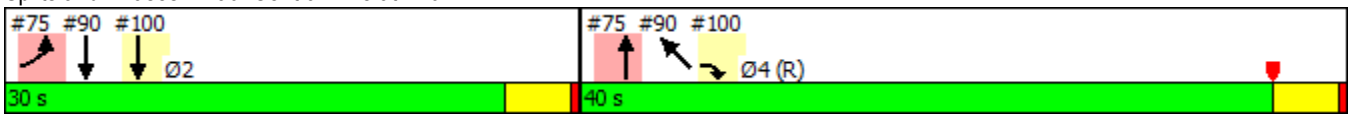


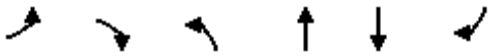
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	984	0	0	0	0	0	2013	0
Future Volume (vph)	0	0	0	0	984	0	0	0	0	0	2013	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	3539	0	0	0	0	0	5085	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	0	0	0	5085	0
Right Turn on Red			Yes			Yes			Yes	Yes		Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		80			147			146			140	
Travel Time (s)		1.8			3.3			3.3			3.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	1036	0	0	0	0	0	2119	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1036	0	0	0	0	0	2119	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		3			-24			12			0	
Crosswalk Width(ft)		16			0			0			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors					1						2	
Detector Template											Thru	
Leading Detector (ft)					30						100	
Trailing Detector (ft)					0						0	
Detector 1 Position(ft)					0						0	
Detector 1 Size(ft)					30						6	
Detector 1 Type					Cl+Ex						Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)					0.0						0.0	
Detector 1 Queue (s)					0.0						0.0	
Detector 1 Delay (s)					0.0						0.0	
Detector 2 Position(ft)											94	
Detector 2 Size(ft)											6	
Detector 2 Type											Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)											0.0	
Turn Type					NA						NA	
Protected Phases					2						4	
Permitted Phases												
Detector Phase					2						4	
Switch Phase												
Minimum Initial (s)					4.0						4.0	

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Minimum Split (s)					20.0						20.0	
Total Split (s)					30.0						40.0	
Total Split (%)					42.9%						57.1%	
Maximum Green (s)					26.0						36.0	
Yellow Time (s)					3.5						3.5	
All-Red Time (s)					0.5						0.5	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)					3.0						3.0	
Recall Mode					Min						C-Min	
Act Effct Green (s)					25.7						36.3	
Actuated g/C Ratio					0.37						0.52	
v/c Ratio					0.80						0.80	
Control Delay					14.1						17.0	
Queue Delay					0.3						0.0	
Total Delay					14.4						17.0	
LOS					B						B	
Approach Delay					14.4						17.0	
Approach LOS					B						B	
Queue Length 50th (ft)					80						258	
Queue Length 95th (ft)					98						322	
Internal Link Dist (ft)		1			67			66			60	
Turn Bay Length (ft)												
Base Capacity (vph)					1314						2638	
Starvation Cap Reductn					0						0	
Spillback Cap Reductn					35						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.81						0.80	

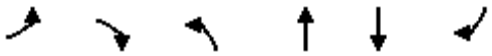
Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 72.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 90: Central Plke at I-40 EB





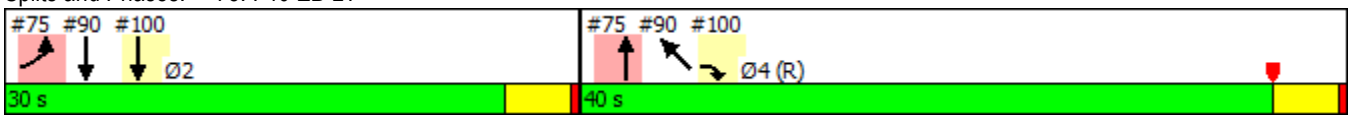
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	288	0	0	2013	0	0
Future Volume (vph)	288	0	0	2013	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	5085	0	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	5085	0	0
Right Turn on Red	No	Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	160			146	301	
Travel Time (s)	3.6			3.3	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	313	0	0	2188	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	313	0	0	2188	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	-3			0	0	
Crosswalk Width(ft)	0			0	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9	15			9
Number of Detectors	1			1		
Detector Template	Left					
Leading Detector (ft)	20			20		
Trailing Detector (ft)	0			0		
Detector 1 Position(ft)	0			0		
Detector 1 Size(ft)	20			20		
Detector 1 Type	Cl+Ex			Cl+Ex		
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0		
Detector 1 Queue (s)	0.0			0.0		
Detector 1 Delay (s)	0.0			0.0		
Turn Type	Prot			NA		
Protected Phases	2			4		
Permitted Phases						
Detector Phase	2			4		
Switch Phase						
Minimum Initial (s)	4.0			4.0		
Minimum Split (s)	20.0			20.0		
Total Split (s)	30.0			40.0		
Total Split (%)	42.9%			57.1%		
Maximum Green (s)	26.0			36.0		
Yellow Time (s)	3.5			3.5		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
All-Red Time (s)	0.5			0.5		
Lost Time Adjust (s)	0.0			0.0		
Total Lost Time (s)	4.0			4.0		
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0		
Recall Mode	Min			C-Min		
Act Effct Green (s)	25.7			36.3		
Actuated g/C Ratio	0.37			0.52		
v/c Ratio	0.48			0.83		
Control Delay	20.0			4.2		
Queue Delay	0.0			0.0		
Total Delay	20.0			4.2		
LOS	C			A		
Approach Delay	20.0			4.2		
Approach LOS	C			A		
Queue Length 50th (ft)	100			23		
Queue Length 95th (ft)	169			33		
Internal Link Dist (ft)	80			66	221	
Turn Bay Length (ft)						
Base Capacity (vph)	657			2638		
Starvation Cap Reductn	0			0		
Spillback Cap Reductn	0			0		
Storage Cap Reductn	0			0		
Reduced v/c Ratio	0.48			0.83		

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Yellow, Master Intersection			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 6.1		Intersection LOS: A	
Intersection Capacity Utilization 61.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 75: I-40 EB LT

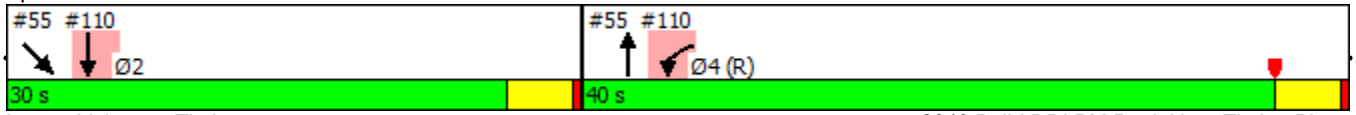


Lane Group	NBT	SET	SER2
Lane Configurations			
Traffic Volume (vph)	1057	735	127
Future Volume (vph)	1057	735	127
Ideal Flow (vphpl)	1900	1900	1900
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor	0.95	0.95	1.00
Frt			0.850
Flt Protected			
Satd. Flow (prot)	3539	3539	1583
Flt Permitted			
Satd. Flow (perm)	3539	3539	1583
Right Turn on Red			Yes
Satd. Flow (RTOR)			134
Link Speed (mph)	30	30	
Link Distance (ft)	160	492	
Travel Time (s)	3.6	11.2	
Peak Hour Factor	0.95	0.95	0.95
Adj. Flow (vph)	1113	774	134
Shared Lane Traffic (%)			
Lane Group Flow (vph)	1113	774	134
Enter Blocked Intersection	No	No	No
Lane Alignment	Left	Left	Right
Median Width(ft)	0	0	
Link Offset(ft)	-12	-12	
Crosswalk Width(ft)	16	16	
Two way Left Turn Lane			
Headway Factor	1.00	1.00	1.00
Turning Speed (mph)			9
Number of Detectors	1	2	1
Detector Template		Thru	Right
Leading Detector (ft)	50	100	20
Trailing Detector (ft)	0	0	0
Detector 1 Position(ft)	0	0	0
Detector 1 Size(ft)	50	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel			
Detector 1 Extend (s)	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0
Detector 2 Position(ft)		94	
Detector 2 Size(ft)		6	
Detector 2 Type		Cl+Ex	
Detector 2 Channel			
Detector 2 Extend (s)		0.0	
Turn Type	NA	NA	Free
Protected Phases	4	2	
Permitted Phases			Free

Lane Group	NBT	SET	SER2
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	4.0	4.0	
Minimum Split (s)	20.0	25.5	
Total Split (s)	40.0	30.0	
Total Split (%)	57.1%	42.9%	
Maximum Green (s)	36.0	26.0	
Yellow Time (s)	3.5	3.5	
All-Red Time (s)	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	4.0	4.0	
Lead/Lag			
Lead-Lag Optimize?			
Vehicle Extension (s)	3.0	3.0	
Recall Mode	C-Max	Min	
Act Effct Green (s)	37.4	24.6	70.0
Actuated g/C Ratio	0.53	0.35	1.00
v/c Ratio	0.59	0.62	0.08
Control Delay	13.1	21.1	0.1
Queue Delay	0.0	0.0	0.0
Total Delay	13.1	21.1	0.1
LOS	B	C	A
Approach Delay	13.1	18.0	
Approach LOS	B	B	
Queue Length 50th (ft)	150	137	0
Queue Length 95th (ft)	m201	191	0
Internal Link Dist (ft)	80	412	
Turn Bay Length (ft)			200
Base Capacity (vph)	1889	1314	1583
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.59	0.59	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 64 (91%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 55: Central Pike at I-40 WB/Central Pike





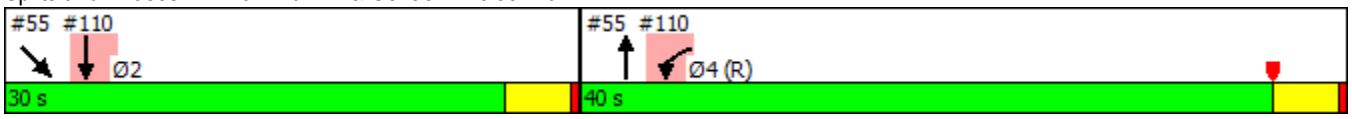
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	284	0	0	0	0	735
Future Volume (vph)	284	0	0	0	0	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.95
Frt						
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	0	0	3539
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	0	0	3539
Right Turn on Red	No	Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	98		276			203
Travel Time (s)	2.2		6.3			4.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	299	0	0	0	0	774
Shared Lane Traffic (%)						
Lane Group Flow (vph)	299	0	0	0	0	774
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	20	9		9	15	
Number of Detectors	1					2
Detector Template	Left					Thru
Leading Detector (ft)	20					100
Trailing Detector (ft)	0					0
Detector 1 Position(ft)	0					0
Detector 1 Size(ft)	20					6
Detector 1 Type	Cl+Ex					Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0					0.0
Detector 1 Queue (s)	0.0					0.0
Detector 1 Delay (s)	0.0					0.0
Detector 2 Position(ft)						94
Detector 2 Size(ft)						6
Detector 2 Type						Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)						0.0
Turn Type	Prot					NA
Protected Phases	4					2
Permitted Phases						
Detector Phase	4					2
Switch Phase						
Minimum Initial (s)	4.0					4.0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Split (s)	20.0					25.5
Total Split (s)	40.0					30.0
Total Split (%)	57.1%					42.9%
Maximum Green (s)	36.0					26.0
Yellow Time (s)	3.5					3.5
All-Red Time (s)	0.5					0.5
Lost Time Adjust (s)	0.0					0.0
Total Lost Time (s)	4.0					4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0					3.0
Recall Mode	C-Max					Min
Act Effct Green (s)	37.4					24.6
Actuated g/C Ratio	0.53					0.35
v/c Ratio	0.32					0.62
Control Delay	10.8					4.8
Queue Delay	0.0					0.0
Total Delay	10.8					4.8
LOS	B					A
Approach Delay	10.8					4.8
Approach LOS	B					A
Queue Length 50th (ft)	70					13
Queue Length 95th (ft)	118					16
Internal Link Dist (ft)	18		196			123
Turn Bay Length (ft)						
Base Capacity (vph)	944					1314
Starvation Cap Reductn	0					0
Spillback Cap Reductn	0					0
Storage Cap Reductn	0					0
Reduced v/c Ratio	0.32					0.59

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 64 (91%), Referenced to phase 4:NBT, Start of Yellow			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 6.4		Intersection LOS: A	
Intersection Capacity Utilization 42.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 110: I-40 WB & Central Pike at I-40 WB



Synchro Intersection Analysis – Intersections along SR 171

SR 171 Interchange (2020) No SR 265 Interchange, No Improvements SR 171



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2215	511	191	1323	0	0	666
Future Volume (vph)	0	0	0	2215	511	191	1323	0	0	666
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.972						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3440	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3440	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				66						165
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2408	555	208	1438	0	0	724
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2963	0	208	1438	0	0	724
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.07		0.98	0.41			0.45
Control Delay				50.7		96.2	0.2			0.9
Queue Delay				12.3		0.0	0.0			0.0
Total Delay				63.0		96.2	0.2			0.9
LOS				E		F	A			A
Approach Delay				63.0			12.3		0.9	
Approach LOS				E			B		A	
Queue Length 50th (ft)				~1699		217	0			0
Queue Length 95th (ft)				m#1511		m204	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2765		212	3539			1611
Starvation Cap Reductn				245		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.18		0.98	0.41			0.45

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 8 (5%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 38.9		Intersection LOS: D	
Intersection Capacity Utilization 98.1%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	557	0	239	1411	1107	0	0	957	1043
Future Volume (vph)	0	0	0	557	0	239	1411	1107	0	0	957	1043
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						128						576
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	605	0	260	1534	1203	0	0	1040	1134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	605	0	260	1534	1203	0	0	1040	1134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

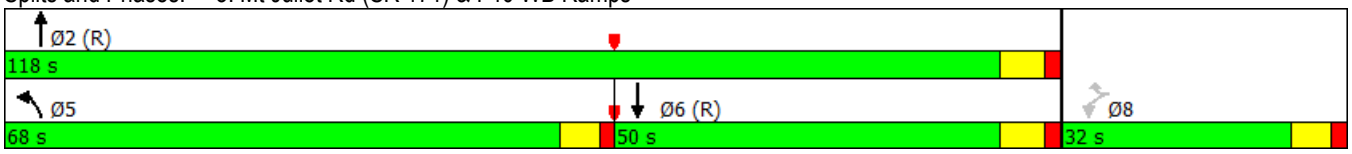
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				32.0		32.0	68.0	118.0			50.0	
Total Split (%)				21.3%		21.3%	45.3%	78.7%			33.3%	
Maximum Green (s)				25.5		25.5	62.0	111.0			43.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				25.5		25.5	62.0	111.0			43.0	150.0
Actuated g/C Ratio				0.17		0.17	0.41	0.74			0.29	1.00
v/c Ratio				1.11		0.71	1.08	0.47			1.04	0.71
Control Delay				127.2		41.1	73.6	10.9			63.5	8.5
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				127.2		41.1	73.6	10.9			63.5	8.5
LOS				F		D	E	B			E	A
Approach Delay					101.3			46.0			34.8	
Approach LOS					F			D			C	
Queue Length 50th (ft)				~346		125	~858	304			~564	674
Queue Length 95th (ft)				#470		231	m#779	m281			#706	786
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				546		365	1418	2568			1004	1599
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.11		0.71	1.08	0.47			1.04	0.71

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 50.1 Intersection LOS: D
Intersection Capacity Utilization 96.8% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Future Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.963						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3408	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3408	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				79						81
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2407	776	209	1952	0	0	1479
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	3183	0	209	1952	0	0	1479
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



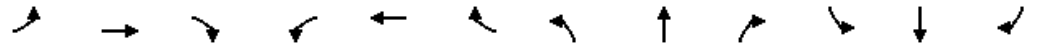
Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				128.0		22.0	150.0			
Total Split (%)				85.3%		14.7%	100.0%			
Maximum Green (s)				122.0		16.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				122.0		16.0	150.0			150.0
Actuated g/C Ratio				0.81		0.11	1.00			1.00
v/c Ratio				1.14		1.11	0.55			0.92
Control Delay				84.3		117.9	0.6			10.8
Queue Delay				0.2		0.0	0.0			1.3
Total Delay				84.5		117.9	0.6			12.0
LOS				F		F	A			B
Approach Delay				84.5			12.0		12.0	
Approach LOS				F			B		B	
Queue Length 50th (ft)				~1927		~239	0			0
Queue Length 95th (ft)				m#1961		m#203	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2786		188	3539			1611
Starvation Cap Reductn				203		0	0			0
Spillback Cap Reductn				36		0	88			40
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.23		1.11	0.57			0.94

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 45.8		Intersection LOS: D	
Intersection Capacity Utilization 125.6%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	671	0	246	1007	2139	0	0	1317	348
Future Volume (vph)	0	0	0	671	0	246	1007	2139	0	0	1317	348
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						229
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	729	0	267	1095	2325	0	0	1432	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	729	0	267	1095	2325	0	0	1432	378
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	

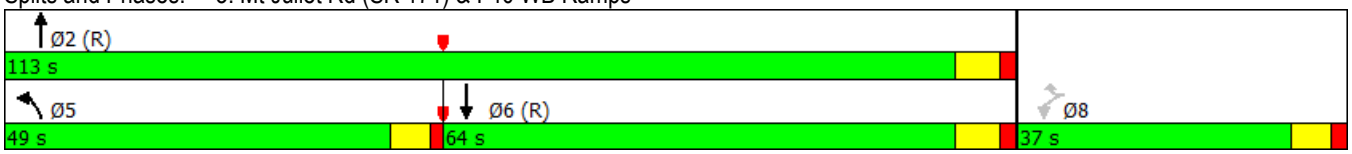


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				37.0		37.0	49.0	113.0			64.0	
Total Split (%)				24.7%		24.7%	32.7%	75.3%			42.7%	
Maximum Green (s)				30.5		30.5	43.0	106.0			57.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				30.5		30.5	43.0	106.0			57.0	150.0
Actuated g/C Ratio				0.20		0.20	0.29	0.71			0.38	1.00
v/c Ratio				1.12		0.73	1.11	0.95			1.08	0.27
Control Delay				124.9		52.6	100.6	30.4			73.3	0.4
Queue Delay				0.0		0.0	0.0	23.0			0.0	0.0
Total Delay				124.9		52.7	100.6	53.4			73.3	0.4
LOS				F		D	F	D			E	A
Approach Delay					105.6			68.5			58.1	
Approach LOS					F			E			E	
Queue Length 50th (ft)				~420		182	~630	915			~822	0
Queue Length 95th (ft)				#549		291	m#569	m833			#949	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				653		368	984	2452			1331	1390
Starvation Cap Reductn				0		0	0	236			0	0
Spillback Cap Reductn				0		1	0	57			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.12		0.73	1.11	1.05			1.08	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 71.4		Intersection LOS: E	
Intersection Capacity Utilization 98.4%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps





Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Future Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.963						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3408	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3408	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				79						81
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2407	776	209	1952	0	0	1479
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	3183	0	209	1952	0	0	1479
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				128.0		22.0	150.0			
Total Split (%)				85.3%		14.7%	100.0%			
Maximum Green (s)				122.0		16.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				122.0		16.0	150.0			150.0
Actuated g/C Ratio				0.81		0.11	1.00			1.00
v/c Ratio				1.14		1.11	0.55			0.92
Control Delay				84.3		117.9	0.6			10.8
Queue Delay				0.2		0.0	0.0			1.3
Total Delay				84.5		117.9	0.6			12.0
LOS				F		F	A			B
Approach Delay				84.5			12.0		12.0	
Approach LOS				F			B		B	
Queue Length 50th (ft)				~1927		~239	0			0
Queue Length 95th (ft)				m#1961		m#203	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2786		188	3539			1611
Starvation Cap Reductn				203		0	0			0
Spillback Cap Reductn				36		0	88			40
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.23		1.11	0.57			0.94

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 45.8		Intersection LOS: D	
Intersection Capacity Utilization 125.6%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	166	80	25	59	582	55	1136	21	530	1641	162
Future Volume (vph)	290	166	80	25	59	582	55	1136	21	530	1641	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		125	250		0	314		0	175		0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.97	0.91	0.91
Frt			0.850			0.850		0.997			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1681	1553	1583	1900	1553	1612	3484	0	3367	4884	0
Flt Permitted	0.643			0.621			0.075			0.950		
Satd. Flow (perm)	1198	1681	1553	1035	1900	1553	127	3484	0	3367	4884	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156			279		1			15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		649			663			672			610	
Travel Time (s)		14.8			15.1			15.3			13.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	13%	4%	14%	0%	4%	12%	3%	20%	4%	5%	3%
Adj. Flow (vph)	315	180	87	27	64	633	60	1235	23	576	1784	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	180	87	27	64	633	60	1258	0	576	1960	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	

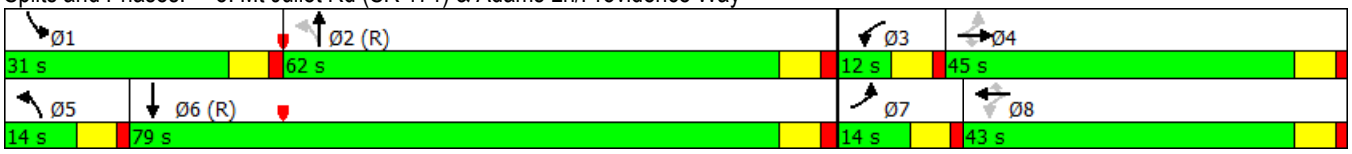
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2					
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	8.0	20.0		8.0	20.0	
Minimum Split (s)	12.0	14.0	14.0	12.0	43.0	43.0	14.0	36.5		14.0	36.5	
Total Split (s)	14.0	45.0	45.0	12.0	43.0	43.0	14.0	62.0		31.0	79.0	
Total Split (%)	9.3%	30.0%	30.0%	8.0%	28.7%	28.7%	9.3%	41.3%		20.7%	52.7%	
Maximum Green (s)	8.0	39.0	39.0	6.0	37.0	37.0	8.0	55.5		25.0	72.5	
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0		1.5	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.5		6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	48.6	43.8	43.8	43.0	37.0	37.0	64.0	55.5		25.0	75.3	
Actuated g/C Ratio	0.32	0.29	0.29	0.29	0.25	0.25	0.43	0.37		0.17	0.50	
v/c Ratio	0.75	0.37	0.15	0.08	0.14	1.07	0.45	0.98		1.03	0.80	
Control Delay	56.3	46.3	0.6	34.3	45.1	85.7	37.4	52.4		118.3	30.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	12.9	0.0	0.5		0.0	2.4	
Total Delay	56.3	46.3	0.6	34.3	45.1	98.7	37.4	52.8		118.3	33.1	
LOS	E	D	A	C	D	F	D	D		F	C	
Approach Delay		44.9			91.5			52.1			52.5	
Approach LOS		D			F			D			D	
Queue Length 50th (ft)	248	147	0	18	49	~464	20	493		~315	465	
Queue Length 95th (ft)	#355	223	0	42	91	#709	m65	#772		m#435	569	
Internal Link Dist (ft)		569			583			592			530	
Turn Bay Length (ft)	150		125	250			314			175		
Base Capacity (vph)	418	491	563	318	468	593	133	1289		561	2459	
Starvation Cap Reductn	0	0	0	0	0	0	0	4		0	358	
Spillback Cap Reductn	0	0	0	0	0	39	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.75	0.37	0.15	0.08	0.14	1.14	0.45	0.98		1.03	0.93	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 32 (21%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 57.0 Intersection LOS: E
Intersection Capacity Utilization 99.6% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Mt Juliet Rd (SR 171) & Adams Ln/Providence Way



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	10	2462	10	10	1698
Future Volume (vph)	25	10	2462	10	10	1698
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.961		0.999			
Flt Protected	0.966				0.950	
Satd. Flow (prot)	1729	0	3536	0	1770	3539
Flt Permitted	0.966				0.950	
Satd. Flow (perm)	1729	0	3536	0	1770	3539
Link Speed (mph)	30		45			45
Link Distance (ft)	461		851			393
Travel Time (s)	10.5		12.9			6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	11	2676	11	11	1846
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	2687	0	11	1846
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		24			24
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.4%		ICU Level of Service D	
Analysis Period (min) 15			

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations	↑↑			↑↑		↱
Traffic Volume (vph)	2214	0	0	1988	0	932
Future Volume (vph)	2214	0	0	1988	0	932
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.865
Flt Protected						
Satd. Flow (prot)	3539	0	0	3539	0	1611
Flt Permitted						
Satd. Flow (perm)	3539	0	0	3539	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	368			586	302	
Travel Time (s)	8.4			13.3	6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2407	0	0	2161	0	1013
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2407	0	0	2161	0	1013
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 125.6%		ICU Level of Service H	
Analysis Period (min) 15			

SR 171 Interchange (2040) No SR 265 Interchange, No Improvements SR 171

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	899	0	291	1733	1349	0	0	1215	1273
Future Volume (vph)	0	0	0	899	0	291	1733	1349	0	0	1215	1273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						623
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	977	0	316	1884	1466	0	0	1321	1384
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	977	0	316	1884	1466	0	0	1321	1384
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				38.0		38.0	62.0	112.0			50.0	
Total Split (%)				25.3%		25.3%	41.3%	74.7%			33.3%	
Maximum Green (s)				31.5		31.5	56.0	105.0			43.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				31.5		31.5	56.0	105.0			43.0	150.0
Actuated g/C Ratio				0.21		0.21	0.37	0.70			0.29	1.00
v/c Ratio				1.45		0.84	1.47	0.60			1.32	0.87
Control Delay				251.6		63.2	252.6	14.4			178.4	18.8
Queue Delay				0.0		0.0	0.0	0.5			0.0	0.0
Total Delay				251.6		63.2	252.6	14.8			178.4	18.8
LOS				F		E	F	B			F	B
Approach Delay					205.5			148.5			96.7	
Approach LOS					F			F			F	
Queue Length 50th (ft)				~669		236	~1306	387			~868	928
Queue Length 95th (ft)				#803		#396	m#1155	m355			#1013	1087
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				674		377	1281	2429			1004	1599
Starvation Cap Reductn				0		0	0	459			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.45		0.84	1.47	0.74			1.32	0.87

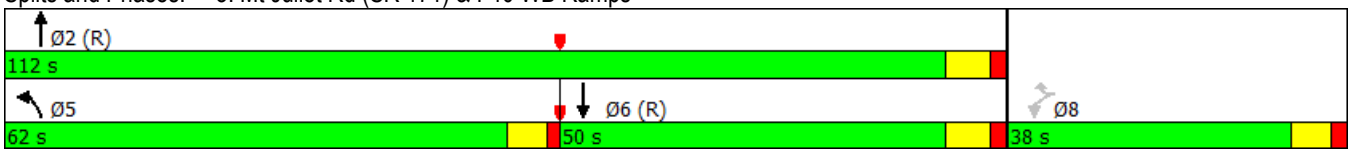
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.47			
Intersection Signal Delay: 139.5		Intersection LOS: F	
Intersection Capacity Utilization 122.8%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2713	686	233	1881	0	0	954
Future Volume (vph)	0	0	0	2713	686	233	1881	0	0	954
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.970						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3433	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3433	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				65						71
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2949	746	253	2045	0	0	1037
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	3695	0	253	2045	0	0	1037
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.34		1.19	0.58			0.64
Control Delay				171.8		125.0	4.3			2.0
Queue Delay				0.2		0.0	0.0			0.0
Total Delay				172.0		125.0	4.3			2.0
LOS				F		F	A			A
Approach Delay				172.0			17.6		2.0	
Approach LOS				F			B		A	
Queue Length 50th (ft)				~2493		~302	90			0
Queue Length 95th (ft)				m#2301		m174	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2759		212	3539			1611
Starvation Cap Reductn				206		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.45		1.19	0.58			0.64

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 112 (75%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.34			
Intersection Signal Delay: 96.4		Intersection LOS: F	
Intersection Capacity Utilization 119.8%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1012	0	300	1452	2687	0	0	1644	425
Future Volume (vph)	0	0	0	1012	0	300	1452	2687	0	0	1644	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	3471	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						224
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	1100	0	326	1578	2921	0	0	1787	462
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	1100	0	326	1578	2921	0	0	1787	462
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	

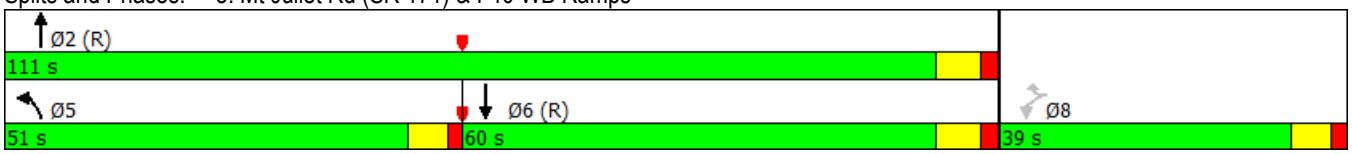
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				39.0		39.0	51.0	111.0			60.0	
Total Split (%)				26.0%		26.0%	34.0%	74.0%			40.0%	
Maximum Green (s)				32.5		32.5	45.0	104.0			53.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				32.5		32.5	45.0	104.0			53.0	150.0
Actuated g/C Ratio				0.22		0.22	0.30	0.69			0.35	1.00
v/c Ratio				1.58		0.84	1.53	1.21			1.44	0.33
Control Delay				305.5		63.2	276.2	124.6			232.2	0.6
Queue Delay				0.2		0.1	0.0	0.2			0.0	0.0
Total Delay				305.7		63.3	276.2	124.8			232.2	0.6
LOS				F		E	F	F			F	A
Approach Delay					250.3			177.9			184.6	
Approach LOS					F			F			F	
Queue Length 50th (ft)				~786		245	~1130	~1836			~1256	0
Queue Length 95th (ft)				#922		#411	m#832	m937			#1378	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				696		387	1029	2406			1238	1390
Starvation Cap Reductn				0		0	0	199			0	0
Spillback Cap Reductn				16		1	0	51			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.62		0.84	1.53	1.32			1.44	0.33

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.58
Intersection Signal Delay: 192.4 Intersection LOS: F
Intersection Capacity Utilization 129.9% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	3002	1196	234	2422	0	0	1772
Future Volume (vph)	0	0	0	3002	1196	234	2422	0	0	1772
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.957						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3387	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3387	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				64						65
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3263	1300	254	2633	0	0	1926
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	4563	0	254	2633	0	0	1926
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.68		1.20	0.74			1.20
Control Delay				324.2		145.9	10.9			102.6
Queue Delay				0.2		0.0	0.1			0.2
Total Delay				324.4		145.9	11.0			102.7
LOS				F		F	B			F
Approach Delay				324.4			22.9		102.7	
Approach LOS				F			C		F	
Queue Length 50th (ft)				~3441		~308	758			~639
Queue Length 95th (ft)				m#3434		m177	m0			#895
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2722		212	3539			1611
Starvation Cap Reductn				53		0	0			0
Spillback Cap Reductn				233		0	177			80
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.83		1.20	0.78			1.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 146 (97%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.68			
Intersection Signal Delay: 186.0		Intersection LOS: F	
Intersection Capacity Utilization 144.2%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



SR 171 Interchange (2020) No SR 265 Interchange, Added NB Lane SR 171

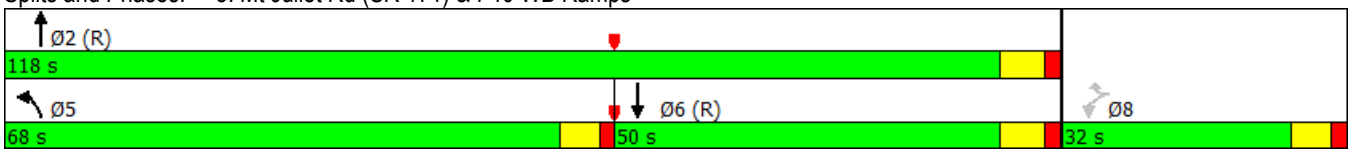
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	557	0	239	1411	1107	0	0	957	1043
Future Volume (vph)	0	0	0	557	0	239	1411	1107	0	0	957	1043
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						128						576
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	605	0	260	1534	1203	0	0	1040	1134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	605	0	260	1534	1203	0	0	1040	1134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				32.0		32.0	68.0	118.0			50.0	
Total Split (%)				21.3%		21.3%	45.3%	78.7%			33.3%	
Maximum Green (s)				25.5		25.5	62.0	111.0			43.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				25.5		25.5	62.0	111.0			43.0	150.0
Actuated g/C Ratio				0.17		0.17	0.41	0.74			0.29	1.00
v/c Ratio				1.11		0.71	1.08	0.33			1.04	0.71
Control Delay				127.2		41.1	75.5	8.9			64.8	7.9
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				127.2		41.1	75.5	8.9			64.8	7.9
LOS				F		D	E	A			E	A
Approach Delay					101.3			46.2			35.2	
Approach LOS					F			D			D	
Queue Length 50th (ft)				~346		125	~858	173			~573	629
Queue Length 95th (ft)				#470		231	m#779	m162			#706	669
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				546		365	1418	3691			1004	1599
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.11		0.71	1.08	0.33			1.04	0.71

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 50.3		Intersection LOS: D	
Intersection Capacity Utilization 96.8%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2215	511	191	1323	0	0	666
Future Volume (vph)	0	0	0	2215	511	191	1323	0	0	666
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.972						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3440	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3440	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				66						165
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2408	555	208	1438	0	0	724
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2963	0	208	1438	0	0	724
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



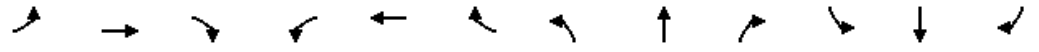
Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.07		0.98	0.41			0.45
Control Delay				51.0		105.2	0.2			0.9
Queue Delay				12.3		0.0	0.0			0.0
Total Delay				63.3		105.2	0.2			0.9
LOS				E		F	A			A
Approach Delay				63.3			13.5		0.9	
Approach LOS				E			B		A	
Queue Length 50th (ft)				~1695		217	0			0
Queue Length 95th (ft)				m#607		m204	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2765		212	3539			1611
Starvation Cap Reductn				256		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.18		0.98	0.41			0.45

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 18 (12%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 39.5		Intersection LOS: D	
Intersection Capacity Utilization 98.1%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	671	0	246	1007	2139	0	0	1317	348
Future Volume (vph)	0	0	0	671	0	246	1007	2139	0	0	1317	348
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						229
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	729	0	267	1095	2325	0	0	1432	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	729	0	267	1095	2325	0	0	1432	378
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	



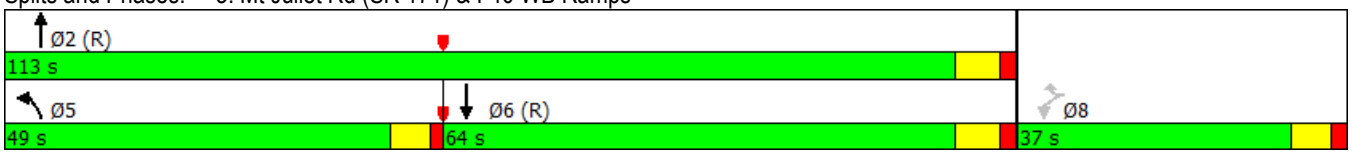
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				37.0		37.0	49.0	113.0			64.0	
Total Split (%)				24.7%		24.7%	32.7%	75.3%			42.7%	
Maximum Green (s)				30.5		30.5	43.0	106.0			57.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				30.5		30.5	43.0	106.0			57.0	150.0
Actuated g/C Ratio				0.20		0.20	0.29	0.71			0.38	1.00
v/c Ratio				1.12		0.73	1.11	0.66			1.08	0.27
Control Delay				124.9		52.6	107.8	6.8			73.6	0.4
Queue Delay				0.0		0.1	0.0	0.4			0.0	0.0
Total Delay				124.9		52.7	107.8	7.2			73.6	0.4
LOS				F		D	F	A			E	A
Approach Delay					105.6			39.4			58.3	
Approach LOS					F			D			E	
Queue Length 50th (ft)				~420		182	~629	299			~822	0
Queue Length 95th (ft)				#549		291	m#569	m255			#964	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				653		368	984	3524			1331	1390
Starvation Cap Reductn				0		0	0	579			0	0
Spillback Cap Reductn				0		2	0	138			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.12		0.73	1.11	0.79			1.08	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 55.5		Intersection LOS: E	
Intersection Capacity Utilization 98.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps





Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Future Volume (vph)	0	0	0	2214	714	192	1796	0	0	1361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.963						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3408	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3408	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				79						81
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2407	776	209	1952	0	0	1479
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	3183	0	209	1952	0	0	1479
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				128.0		22.0	150.0			
Total Split (%)				85.3%		14.7%	100.0%			
Maximum Green (s)				122.0		16.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				122.0		16.0	150.0			150.0
Actuated g/C Ratio				0.81		0.11	1.00			1.00
v/c Ratio				1.14		1.11	0.55			0.92
Control Delay				84.0		120.0	0.6			10.8
Queue Delay				0.1		0.0	0.1			9.5
Total Delay				84.1		120.0	0.7			20.3
LOS				F		F	A			C
Approach Delay				84.1			12.2		20.3	
Approach LOS				F			B		C	
Queue Length 50th (ft)				~1908		~229	0			0
Queue Length 95th (ft)				m#1945		m#188	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2786		188	3539			1611
Starvation Cap Reductn				183		0	0			0
Spillback Cap Reductn				0		0	293			133
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.22		1.11	0.60			1.00

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 60 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 47.5		Intersection LOS: D	
Intersection Capacity Utilization 125.6%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



SR 171 Interchange (2040) No SR 265 Interchange, Added NB Lane SR 171

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	899	0	291	1733	1349	0	0	1215	1273
Future Volume (vph)	0	0	0	899	0	291	1733	1349	0	0	1215	1273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						623
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	977	0	316	1884	1466	0	0	1321	1384
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	977	0	316	1884	1466	0	0	1321	1384
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

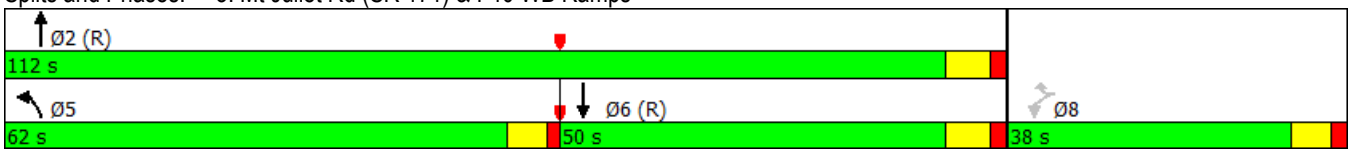
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				38.0		38.0	62.0	112.0			50.0	
Total Split (%)				25.3%		25.3%	41.3%	74.7%			33.3%	
Maximum Green (s)				31.5		31.5	56.0	105.0			43.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				31.5		31.5	56.0	105.0			43.0	150.0
Actuated g/C Ratio				0.21		0.21	0.37	0.70			0.29	1.00
v/c Ratio				1.45		0.84	1.47	0.42			1.32	0.87
Control Delay				251.6		63.2	249.0	7.7			179.1	18.0
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				251.6		63.2	249.0	7.7			179.1	18.0
LOS				F		E	F	A			F	B
Approach Delay					205.5			143.4			96.7	
Approach LOS					F			F			F	
Queue Length 50th (ft)				~669		236	~1305	183			~878	826
Queue Length 95th (ft)				#803		#396	m#1155	m166			#1012	910
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				674		377	1281	3491			1004	1599
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.45		0.84	1.47	0.42			1.32	0.87

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.47
Intersection Signal Delay: 137.1 Intersection LOS: F
Intersection Capacity Utilization 122.8% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	2713	686	233	1881	0	0	954
Future Volume (vph)	0	0	0	2713	686	233	1881	0	0	954
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.970						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3433	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3433	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				65						71
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2949	746	253	2045	0	0	1037
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	3695	0	253	2045	0	0	1037
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.34		1.19	0.58			0.64
Control Delay				171.7		160.4	4.3			2.0
Queue Delay				0.1		0.0	0.0			0.0
Total Delay				171.8		160.4	4.3			2.0
LOS				F		F	A			A
Approach Delay				171.8			21.5		2.0	
Approach LOS				F			C		A	
Queue Length 50th (ft)				~2488		~292	89			0
Queue Length 95th (ft)				m#2297		m166	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2759		212	3539			1611
Starvation Cap Reductn				183		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.43		1.19	0.58			0.64

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 40 (27%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.34			
Intersection Signal Delay: 97.6		Intersection LOS: F	
Intersection Capacity Utilization 119.8%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



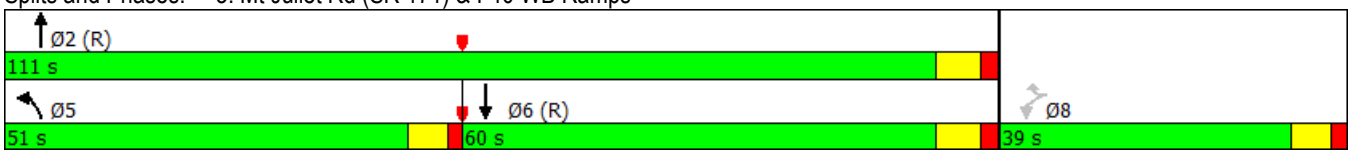
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	1012	0	300	1452	2687	0	0	1644	425
Future Volume (vph)	0	0	0	1012	0	300	1452	2687	0	0	1644	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						224
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	1100	0	326	1578	2921	0	0	1787	462
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	1100	0	326	1578	2921	0	0	1787	462
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				39.0		39.0	51.0	111.0			60.0	
Total Split (%)				26.0%		26.0%	34.0%	74.0%			40.0%	
Maximum Green (s)				32.5		32.5	45.0	104.0			53.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				32.5		32.5	45.0	104.0			53.0	150.0
Actuated g/C Ratio				0.22		0.22	0.30	0.69			0.35	1.00
v/c Ratio				1.58		0.84	1.53	0.84			1.44	0.33
Control Delay				305.5		63.2	278.1	11.6			232.0	0.6
Queue Delay				4.4		0.1	0.0	5.1			0.0	0.0
Total Delay				309.9		63.3	278.1	16.7			232.0	0.6
LOS				F		E	F	B			F	A
Approach Delay					253.5			108.4			184.5	
Approach LOS					F			F			F	
Queue Length 50th (ft)				~786		245	~1116	565			~1256	0
Queue Length 95th (ft)				#922		#411	m#820	m324			#1378	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				696		387	1029	3458			1238	1390
Starvation Cap Reductn				0		0	0	487			0	0
Spillback Cap Reductn				293		1	0	111			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				2.73		0.84	1.53	0.98			1.44	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.58			
Intersection Signal Delay: 154.6		Intersection LOS: F	
Intersection Capacity Utilization 129.9%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps





Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	3002	1196	234	2422	0	0	1772
Future Volume (vph)	0	0	0	3002	1196	234	2422	0	0	1772
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.957						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3387	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3387	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				64						65
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3263	1300	254	2633	0	0	1926
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	4563	0	254	2633	0	0	1926
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				126.0		24.0	150.0			
Total Split (%)				84.0%		16.0%	100.0%			
Maximum Green (s)				120.0		18.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				120.0		18.0	150.0			150.0
Actuated g/C Ratio				0.80		0.12	1.00			1.00
v/c Ratio				1.68		1.20	0.74			1.20
Control Delay				324.5		149.8	10.9			102.6
Queue Delay				0.0		0.0	0.2			0.2
Total Delay				324.6		149.8	11.1			102.8
LOS				F		F	B			F
Approach Delay				324.6			23.3		102.8	
Approach LOS				F			C		F	
Queue Length 50th (ft)				~3465		~296	1311			~639
Queue Length 95th (ft)				m#3453		m153	m0			#895
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2722		212	3539			1611
Starvation Cap Reductn				52		0	0			0
Spillback Cap Reductn				20		0	197			89
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.71		1.20	0.79			1.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 62 (41%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.68			
Intersection Signal Delay: 186.2		Intersection LOS: F	
Intersection Capacity Utilization 144.2%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



SR 171 Interchange (2020) with SR 265 Interchange, Added NB Lane SR 171

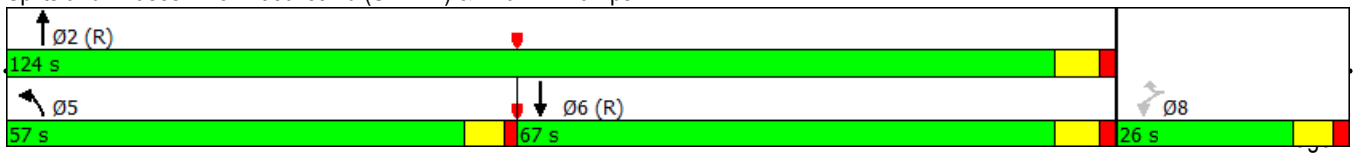
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	206	0	195	811	922	0	0	922	725
Future Volume (vph)	0	0	0	206	0	195	811	922	0	0	922	725
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						203						677
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	224	0	212	882	1002	0	0	1002	788
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	224	0	212	882	1002	0	0	1002	788
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

Lanes, Volumes, Timings
3: Mt Juliet Rd (SR 171) & I-40 WB Ramps 09/18/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				26.0		26.0	57.0	124.0			67.0	
Total Split (%)				17.3%		17.3%	38.0%	82.7%			44.7%	
Maximum Green (s)				19.5		19.5	51.0	117.0			60.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				16.4		16.4	45.5	120.1			68.6	150.0
Actuated g/C Ratio				0.11		0.11	0.30	0.80			0.46	1.00
v/c Ratio				0.64		0.61	0.85	0.25			0.62	0.49
Control Delay				72.4		16.7	44.6	3.4			13.6	0.7
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				72.4		16.7	44.6	3.4			13.6	0.7
LOS				E		B	D	A			B	A
Approach Delay					45.3			22.7			7.9	
Approach LOS					D			C			A	
Queue Length 50th (ft)				109		8	371	36			254	0
Queue Length 95th (ft)				153		89	438	119			425	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				417		374	1167	3995			1604	1599
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.54		0.57	0.76	0.25			0.62	0.49

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 18.7		Intersection LOS: B	
Intersection Capacity Utilization 68.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



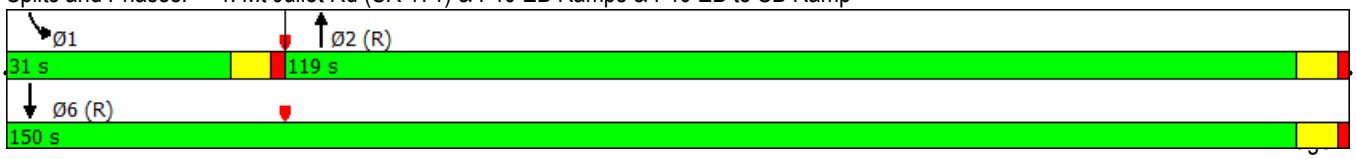
Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	1615	382	156	972	0	0	445
Future Volume (vph)	0	0	0	1615	382	156	972	0	0	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.971						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3437	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3437	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				56						276
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1755	415	170	1057	0	0	484
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2170	0	170	1057	0	0	484
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free

Lanes, Volumes, Timings
4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp 09/18/2017

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				119.0		31.0	150.0			
Total Split (%)				79.3%		20.7%	100.0%			
Maximum Green (s)				113.0		25.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				118.0		20.0	150.0			150.0
Actuated g/C Ratio				0.79		0.13	1.00			1.00
v/c Ratio				0.80		0.72	0.30			0.30
Control Delay				6.7		104.0	0.2			0.5
Queue Delay				2.9		0.0	0.0			0.0
Total Delay				9.7		104.0	0.2			0.5
LOS				A		F	A			A
Approach Delay				9.7			14.6		0.5	
Approach LOS				A			B		A	
Queue Length 50th (ft)				327		177	0			0
Queue Length 95th (ft)				m329		258	0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2714		295	3539			1611
Starvation Cap Reductn				424		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				0.95		0.58	0.30			0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 14 (9%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 10.1		Intersection LOS: B	
Intersection Capacity Utilization 75.5%		ICU Level of Service D	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp

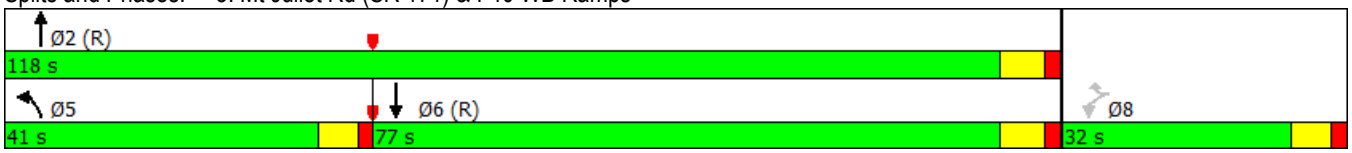


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	387	0	201	607	1968	0	0	1282	284
Future Volume (vph)	0	0	0	387	0	201	607	1968	0	0	1282	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						192
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	421	0	218	660	2139	0	0	1393	309
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	421	0	218	660	2139	0	0	1393	309
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				32.0		32.0	41.0	118.0			77.0	
Total Split (%)				21.3%		21.3%	27.3%	78.7%			51.3%	
Maximum Green (s)				25.5		25.5	35.0	111.0			70.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				23.9		23.9	33.2	112.6			73.4	150.0
Actuated g/C Ratio				0.16		0.16	0.22	0.75			0.49	1.00
v/c Ratio				0.82		0.72	0.87	0.57			0.81	0.22
Control Delay				74.8		53.1	74.6	3.6			19.0	0.3
Queue Delay				0.0		0.0	0.0	0.1			0.0	0.0
Total Delay				74.8		53.2	74.6	3.7			19.0	0.3
LOS				E		D	E	A			B	A
Approach Delay					67.4			20.5			15.6	
Approach LOS					E			C			B	
Queue Length 50th (ft)				205		136	320	191			623	0
Queue Length 95th (ft)				267		232	386	126			645	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				546		319	801	3743			1714	1390
Starvation Cap Reductn				0		0	0	545			0	0
Spillback Cap Reductn				0		1	0	113			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.77		0.69	0.82	0.67			0.81	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 24.7		Intersection LOS: C	
Intersection Capacity Utilization 78.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps

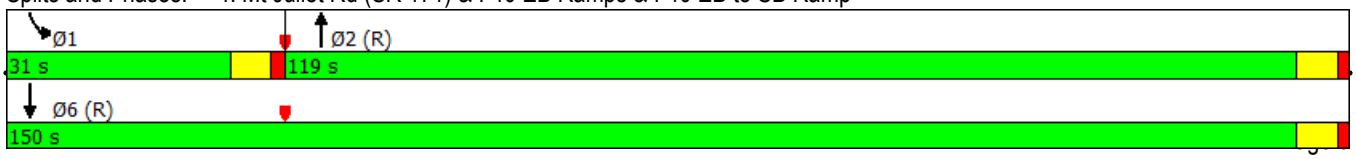


Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	1814	243	157	1512	0	0	690
Future Volume (vph)	0	0	0	1814	243	157	1512	0	0	690
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.982						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3476	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3476	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				28						125
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1972	264	171	1643	0	0	750
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2236	0	171	1643	0	0	750
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				119.0		31.0	150.0			
Total Split (%)				79.3%		20.7%	100.0%			
Maximum Green (s)				113.0		25.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				117.9		20.1	150.0			150.0
Actuated g/C Ratio				0.79		0.13	1.00			1.00
v/c Ratio				0.82		0.72	0.46			0.47
Control Delay				9.8		60.2	0.3			1.0
Queue Delay				2.2		0.0	0.0			0.1
Total Delay				12.0		60.2	0.3			1.1
LOS				B		E	A			A
Approach Delay				12.0			5.9		1.1	
Approach LOS				B			A		A	
Queue Length 50th (ft)				311		144	0			0
Queue Length 95th (ft)				m339		m183	0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2737		295	3539			1611
Starvation Cap Reductn				352		0	0			0
Spillback Cap Reductn				0		0	349			159
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				0.94		0.58	0.52			0.52

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 82 (55%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 8.0		Intersection LOS: A	
Intersection Capacity Utilization 103.9%		ICU Level of Service G	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



SR 171 Interchange (2040) with SR 265 Interchange, Added NB Lane SR 171

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	548	0	247	570	1294	0	0	1180	955
Future Volume (vph)	0	0	0	548	0	247	570	1294	0	0	1180	955
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						701
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	596	0	268	620	1407	0	0	1283	1038
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	596	0	268	620	1407	0	0	1283	1038
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	

Lanes, Volumes, Timings
3: Mt Juliet Rd (SR 171) & I-40 WB Ramps 09/18/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				40.0		40.0	38.0	110.0			72.0	
Total Split (%)				26.7%		26.7%	25.3%	73.3%			48.0%	
Maximum Green (s)				33.5		33.5	32.0	103.0			65.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				32.2		32.2	30.8	104.3			67.4	150.0
Actuated g/C Ratio				0.21		0.21	0.21	0.70			0.45	1.00
v/c Ratio				0.86		0.70	0.88	0.41			0.81	0.65
Control Delay				70.3		49.3	67.4	9.9			19.5	3.6
Queue Delay				0.0		0.0	0.0	0.0			0.0	0.0
Total Delay				70.3		49.3	67.4	9.9			19.5	3.6
LOS				E		D	E	A			B	A
Approach Delay					63.8			27.5			12.4	
Approach LOS					E			C			B	
Queue Length 50th (ft)				289		178	288	205			494	12
Queue Length 95th (ft)				362		285	m355	247			597	7
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				717		397	732	3467			1575	1599
Starvation Cap Reductn				0		0	0	0			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				0.83		0.68	0.85	0.41			0.81	0.65

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 26.8 Intersection LOS: C
Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps

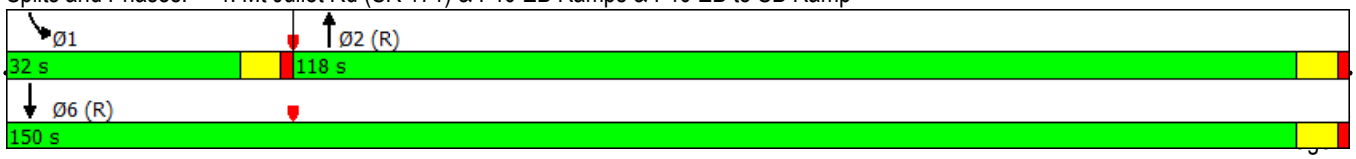


Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	1550	557	198	1530	0	0	118
Future Volume (vph)	0	0	0	1550	557	198	1530	0	0	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.960						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3398	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3398	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				96						121
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1685	605	215	1663	0	0	128
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2290	0	215	1663	0	0	128
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free

Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				118.0		32.0	150.0			
Total Split (%)				78.7%		21.3%	100.0%			
Maximum Green (s)				112.0		26.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				115.2		22.8	150.0			150.0
Actuated g/C Ratio				0.77		0.15	1.00			1.00
v/c Ratio				0.87		0.80	0.47			0.08
Control Delay				9.8		78.9	0.2			0.1
Queue Delay				3.0		0.0	0.0			0.0
Total Delay				12.8		78.9	0.2			0.1
LOS				B		E	A			A
Approach Delay				12.8			9.3		0.1	
Approach LOS				B			A		A	
Queue Length 50th (ft)				437		181	0			0
Queue Length 95th (ft)				m408		m236	0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2632		306	3539			1611
Starvation Cap Reductn				245		0	0			0
Spillback Cap Reductn				0		0	0			0
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				0.96		0.70	0.47			0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 56 (37%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



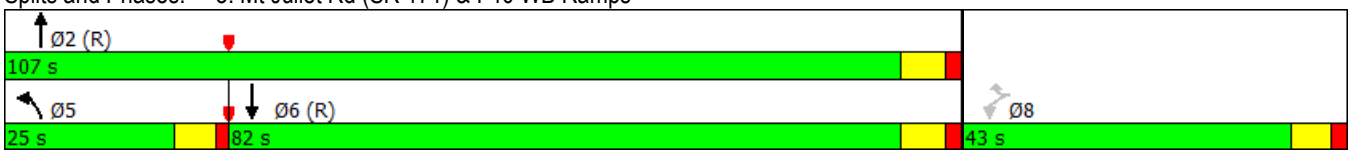
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	728	0	255	208	2516	0	0	1609	361
Future Volume (vph)	0	0	0	728	0	255	208	2516	0	0	1609	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	600		200	450		0	0		450
Storage Lanes	0		0	2		0	2		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	0.97	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor												0.87
Frt						0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1599
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3213	0	1524	3433	4988	0	0	3505	1390
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						73						194
Link Speed (mph)		30			30			30			45	
Link Distance (ft)		574			886			586			851	
Travel Time (s)		13.0			20.1			13.3			12.9	
Confl. Peds. (#/hr)												403
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	9%	2%	6%	2%	4%	2%	2%	3%	1%
Adj. Flow (vph)	0	0	0	791	0	277	226	2735	0	0	1749	392
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	791	0	277	226	2735	0	0	1749	392
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1		1	1	2			2	1
Detector Template				Left		Right	Left	Thru			Thru	Right
Leading Detector (ft)				20		20	20	100			100	20
Trailing Detector (ft)				0		0	0	0			0	0
Detector 1 Position(ft)				0		0	0	0			0	0
Detector 1 Size(ft)				20		20	20	6			6	20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0		0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type				Perm		Perm	Prot	NA			NA	Free
Protected Phases							5	2			6	
Permitted Phases				8		8						Free
Detector Phase				8		8	5	2			6	
Switch Phase												
Minimum Initial (s)				10.0		10.0	15.0	20.0			20.0	
Minimum Split (s)				18.0		18.0	25.0	32.0			32.0	
Total Split (s)				43.0		43.0	25.0	107.0			82.0	
Total Split (%)				28.7%		28.7%	16.7%	71.3%			54.7%	
Maximum Green (s)				36.5		36.5	19.0	100.0			75.0	
Yellow Time (s)				4.5		4.5	4.5	5.0			5.0	
All-Red Time (s)				2.0		2.0	1.5	2.0			2.0	
Lost Time Adjust (s)				0.0		0.0	0.0	0.0			0.0	
Total Lost Time (s)				6.5		6.5	6.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)				4.0		4.0	4.0	4.0			4.0	
Recall Mode				None		None	None	C-Max			C-Max	
Act Effct Green (s)				36.5		36.5	16.6	100.0			77.4	150.0
Actuated g/C Ratio				0.24		0.24	0.11	0.67			0.52	1.00
v/c Ratio				1.01		0.65	0.60	0.82			0.97	0.28
Control Delay				90.8		45.2	75.3	13.1			32.4	0.4
Queue Delay				0.0		0.0	0.0	0.9			0.0	0.0
Total Delay				90.8		45.2	75.3	14.0			32.4	0.4
LOS				F		D	E	B			C	A
Approach Delay					79.0			18.7			26.5	
Approach LOS					E			B			C	
Queue Length 50th (ft)				~410		182	108	510			853	0
Queue Length 95th (ft)				#548		289	m121	m526			#1070	0
Internal Link Dist (ft)		494			806			506			771	
Turn Bay Length (ft)				600		200	450					450
Base Capacity (vph)				781		426	434	3325			1809	1390
Starvation Cap Reductn				0		0	0	310			0	0
Spillback Cap Reductn				0		0	0	0			0	0
Storage Cap Reductn				0		0	0	0			0	0
Reduced v/c Ratio				1.01		0.65	0.52	0.91			0.97	0.28

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 91.9%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Mt Juliet Rd (SR 171) & I-40 WB Ramps



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Volume (vph)	0	0	0	1758	724	199	2138	0	0	792
Future Volume (vph)	0	0	0	1758	724	199	2138	0	0	792
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		0	150		0	0	0
Storage Lanes	0	0	0		0	1		0	0	1
Taper Length (ft)	25		25			25			25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00
Frt				0.956						0.865
Flt Protected						0.950				
Satd. Flow (prot)	0	0	0	3383	0	1770	3539	0	0	1611
Flt Permitted						0.950				
Satd. Flow (perm)	0	0	0	3383	0	1770	3539	0	0	1611
Right Turn on Red					Yes			Yes		Yes
Satd. Flow (RTOR)				129						65
Link Speed (mph)	30			30			30		30	
Link Distance (ft)	635			610			368		351	
Travel Time (s)	14.4			13.9			8.4		8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1911	787	216	2324	0	0	861
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	2698	0	216	2324	0	0	861
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	R NA
Median Width(ft)	0			24			12		0	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15		9	15		9	15	9
Number of Detectors				2		1	2			1
Detector Template				Thru		Left	Thru			Right
Leading Detector (ft)				100		20	100			20
Trailing Detector (ft)				0		0	0			0
Detector 1 Position(ft)				0		0	0			0
Detector 1 Size(ft)				6		20	6			20
Detector 1 Type				Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)				0.0		0.0	0.0			0.0
Detector 1 Queue (s)				0.0		0.0	0.0			0.0
Detector 1 Delay (s)				0.0		0.0	0.0			0.0
Detector 2 Position(ft)				94			94			
Detector 2 Size(ft)				6			6			
Detector 2 Type				Cl+Ex			Cl+Ex			
Detector 2 Channel										
Detector 2 Extend (s)				0.0			0.0			
Turn Type				NA		Prot	NA			Free
Protected Phases				2		1	6			
Permitted Phases										Free



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Detector Phase				2		1	6			
Switch Phase										
Minimum Initial (s)				20.0		10.0	20.0			
Minimum Split (s)				32.0		20.0	32.0			
Total Split (s)				124.0		26.0	150.0			
Total Split (%)				82.7%		17.3%	100.0%			
Maximum Green (s)				118.0		20.0	144.0			
Yellow Time (s)				4.5		4.5	4.5			
All-Red Time (s)				1.5		1.5	1.5			
Lost Time Adjust (s)				0.0		0.0	0.0			
Total Lost Time (s)				6.0		6.0	6.0			
Lead/Lag				Lag		Lead				
Lead-Lag Optimize?										
Vehicle Extension (s)				4.0		4.0	4.0			
Recall Mode				C-Max		None	C-Max			
Act Effct Green (s)				118.1		19.9	150.0			150.0
Actuated g/C Ratio				0.79		0.13	1.00			1.00
v/c Ratio				1.00		0.92	0.66			0.53
Control Delay				23.5		72.2	0.4			1.3
Queue Delay				37.0		0.0	0.1			0.1
Total Delay				60.5		72.2	0.5			1.4
LOS				E		E	A			A
Approach Delay				60.5			6.6		1.4	
Approach LOS				E			A		A	
Queue Length 50th (ft)				~324		206	0			0
Queue Length 95th (ft)				m#1208		m212	m0			0
Internal Link Dist (ft)	555			530			288		271	
Turn Bay Length (ft)						150				
Base Capacity (vph)				2689		236	3539			1611
Starvation Cap Reductn				283		0	0			0
Spillback Cap Reductn				0		0	200			91
Storage Cap Reductn				0		0	0			0
Reduced v/c Ratio				1.12		0.92	0.70			0.57

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 96 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 29.7		Intersection LOS: C	
Intersection Capacity Utilization 115.1%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 4: Mt Juliet Rd (SR 171) & I-40 EB Ramps & I-40 EB to SB Ramp



APPENDIX F: SAFETY ANALYSIS

eTRIMS Crash, Traffic, and Route Feature Reports – SR 265
eTRIMS Crash, Traffic, and Route Feature Reports – SR 171
eTRIMS Crash, Traffic, and Route Feature Reports – I-40 Davidson County
eTRIMS Crash, Traffic, and Route Feature Reports – I-40 Davidson County
Statewide Average Crash Rates
IHSDM Predictive Crash Analysis: Existing Geometry 2016 Adams Lane
IHSDM Predictive Crash Analysis: Existing Geometry 2016 I-40
IHSDM Predictive Crash Analysis: Existing Geometry 2016 SR 171
IHSDM Predictive Crash Analysis: Existing Geometry 2016 SR 265
IHSDM Predictive Crash Analysis: Existing Geometry 2040 Adams Lane
IHSDM Predictive Crash Analysis: Existing Geometry 2040 I-40
IHSDM Predictive Crash Analysis: Existing Geometry 2040 SR 171
IHSDM Predictive Crash Analysis: Existing Geometry 2040 SR 265
IHSDM Predictive Crash Analysis: Proposed Geometry 2040 Adams Lane
IHSDM Predictive Crash Analysis: Proposed Geometry 2040 I-40
IHSDM Predictive Crash Analysis: Proposed Geometry 2040 SR 171
IHSDM Predictive Crash Analysis: Proposed Geometry 2040 SR 265
HSM CMF (Diamond Interchange to DDI Interchange)

ETRIMS CRASH, TRAFFIC, AND ROUTE FEATURE REPORTS – SR 265

Crash Summary Report

County: WILSON **Route:** SR265 **Spcl Cse:** 0-NONE **Cnty Seq:** 1

Log Miles: 1.890 to 3.570 - Crash Dates: 1/1/2014 to 12/31/2016
Vehicle Filter: None - Other Factors Filter: None

Statistics

Fatal Crashes:	0
Total Killed:	0
Incap Injury Crashes:	1
Total Incap Injuries:	1
Other Injury Crashes:	15
Total Other Injuries:	21
Prop Damage Crashes:	34
Total Crashes:	**50**

Crash Location

Along Roadway:	23
At Intersection:	27
Railroad Crossing:	0
Bridge:	0
Underpass:	0
Ramp:	0
Private Property:	0
Other:	0

Crashes Involving

Pedestrians:	0
Hazardous Cargo:	0
Work / Constr Zones:	0
Fixed Objects:	8
Single Unit Trucks	2
Tractor - Trailer Trucks:	0
Bicycles:	0
Motorcycles:	1
Lane Departures:	11
Distracted Drivers:	2

Road Conditions

Ice:	0
Snow or Slush:	0
Sand, Mud, Dirt or Oil:	0
Wet:	6
Dry:	44

First Harmful Event

Pedestrian:	0
Pedalcycle:	0
Railway Train:	0
Deer (Animal):	1
Other Animal:	1
Motor Vehicle in Transport:	35
Motor Vehicle in Transport in Other Roadway:	2
Parked Motor Vehicle:	0
Other Type Non-Motorist:	0
Fixed Object:	8
Other Object (Not Fixed):	0
Non Collision:	2
Overturn:	1
Jackknife:	0
Cross Median:	0
Ran Off Road:	0

Manner of Collision

Rear End:	9
Head On:	5
Rear-to-Side / Rear:	0
Angle:	20
Sideswipe Same Dir:	0
Sideswipe Opp Dir:	1
Unknown:	2

Light Conditions

Dawn:	0
Daylight:	37
Dusk:	2
Dark / Lighted:	2
Dark / Not Lighted:	8
Not Indicated:	1

Weather Conditions

No Adverse Conditions:	45
Rain:	4
Sleet and Hail:	0
Snow:	0
Foggy:	0
Smog, Smoke:	1
Crosswind:	0

Fixed Objects

Boulder:	0	Other Barrier:	0	Ditch:	1
Building:	0	Highway Traffic Sign Post	0	Embankment:	1
Impact Attenuator:	0	Overhead Sign Support:	0	Fence:	0
Overhead Structure:	0	Luminaire/Light Support:	0	Wall:	0
Bridge Pier/Abutment/End:	0	Traffic Signal Support:	0	Mail Box:	1
Bridge Rail:	0	Utility Pole:	0	Shrubbery:	0
Guardrail:	1	Other Post, Pole Supports:	0	Tree:	1
Cable Barrier:	0	Culvert:	2	Fire Hydrant:	0
		Curb:	1	Other Fixed Object:	0

This report was generated by E-TRIMS

Route Feature Description Listing

Wilson County (95) - Route: SR265, Special Case: 0-None , Log Mile 1.8 to 4.9

COUNTY: WILSON **COUNTY NO:** 95

ROUTE: SR265 **SPECIAL CASE:** 0-NONE **CTY SEQ:** 1

LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
1.880	1	ENTER MT. JULIET CITY LIMITS	130
1.890	9	FLASHING YELLOW LIGHT	907
1.890	4	4851 PLEASANT GROVE RD. LT.	430
1.920	9	PLEASANT GROVE UNITED METHODIST CHURCH LT.	912
1.970	9	FLASHING YELLOW LIGHTS LT.	907
2.219	5	A653 TILLMAN DR. LT.	530
2.240	2	OVERHEAD [95I00400001]: I-40	221
2.260	3	I-40 RT. & LT. / CENTER OF OVERHEAD	360
2.305	1	LEAVE MT. JULIET CITY LIMITS	135
2.315	5	A556 JOHN HAGER RD. RT. & A556 ADAMS LN. LT.	510
2.315	9	FLASHING YELLOW LIGHTS	907
2.388	1	ENTER MT. JULIET CITY LIMITS	130
2.892	1	LEAVE MT. JULIET CITY LIMITS	135
2.990	2	BRIDGE [95S61590001]: NORTH CREEK	211
3.043	5	A560 S.W. COOKS RD. RT.	520
3.161	9	TRAFFIC COUNT STATION 18	959
3.280	9	CULVERT: DRAINAGE	980
3.360	9	SPOKEN WORD MISSION CHURCH RT.	912
3.570	9	TRAFFIC SIGNAL	905
3.570	3	SR-171 S. MT. JULIET RD. RT. & LT.	310
3.930	9	CEMETERY RT.	913
4.008	9	TRAFFIC COUNT STATION 19	959
4.040	9	CULVERT: DRAINAGE	980
4.450	9	CULVERT [95CULV09003]: BRANCH	980
4.490	2	BRIDGE [95S61590003]: WRIGHT BRANCH	221
4.600	5	C170 BRYSON PLACE RT.	520
4.741	5	B798 STOCKBRIDGE WAY RT.	520
4.741	4	6100 S. RUTLAND RD. LT.	430

Route Feature Description Listing

Wilson County (95) - Route: SR265, Special Case: 0-None , Log Mile 1.8 to 4.9

COUNTY: WILSON **COUNTY NO:** 95

ROUTE: SR265 **SPECIAL CASE:** 0-NONE **CTY SEQ:** 1

LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
4.900	9	CENTER CHAPEL CHURCH OF CHRIST CHURCT RT.	912

Traffic Report

Wilson County (95) - Route: SR265, Special Case: 0-None , Log Mile 1.89 to 3.57

COUNTY: WILSON

ROUTE	SC	CO SQ	BEG LOG MILE	END LOG MILE	YR OF TRAFFIC	ANNUAL AVERAGE DAILY TRAFFIC	PEAK HOUR %	DESIGN HOUR VOLUME	DIRECT DIST %	% PASS CARS	% SINGLE UNIT TRUCKS	% MULTI UNIT TRUCKS	CYCLE COUNTS STATION NBR	CYCLE COUNTS STATION COUNTY	CLASS COUNTS STATION NBR	CLASS COUNTS STATION COUNTY	IS CLASS COUNT?
SR265	0	1	0.000	1.890	2016	7040	10	12	65	99	1	0	247 @	19	247C	19	NO
SR265	0	1	1.890	3.570	2016	3960	11	13	65	98	2	0	18	95	247C	19	NO
SR265	0	1	3.570	6.730	2016	7050	9	11	65	98	1	1	19	95	019C	95	YES

ETRIMS CRASH, TRAFFIC, AND ROUTE FEATURE REPORTS – SR 171

Crash Summary Report

County: WILSON **Route:** SR171 **Spcl Cse:** 0-NONE **Cnty Seq:** 1

Log Miles: 3.570 to 4.850 - Crash Dates: 1/1/2014 to 12/31/2016
Vehicle Filter: None - Other Factors Filter: None

Statistics

Fatal Crashes:	0
Total Killed:	0
Incap Injury Crashes:	3
Total Incap Injuries:	3
Other Injury Crashes:	50
Total Other Injuries:	65
Prop Damage Crashes:	200
Total Crashes:	**253**

Crash Location

Along Roadway:	113
At Intersection:	122
Railroad Crossing:	0
Bridge:	8
Underpass:	0
Ramp:	10
Private Property:	0
Other:	0

Crashes Involving

Pedestrians:	0
Hazardous Cargo:	0
Work / Constr Zones:	0
Fixed Objects:	6
Single Unit Trucks	6
Tractor - Trailer Trucks:	4
Bicycles:	0
Motorcycles:	1
Lane Departures:	8
Distracted Drivers:	25

Road Conditions

Ice:	3
Snow or Slush:	1
Sand, Mud, Dirt or Oil:	0
Wet:	37
Dry:	208

First Harmful Event

Pedestrian:	0
Pedalcycle:	0
Railway Train:	0
Deer (Animal):	2
Other Animal:	1
Motor Vehicle in Transport:	233
Motor Vehicle in Transport in Other Roadway:	2
Parked Motor Vehicle:	0
Other Type Non-Motorist:	0
Fixed Object:	6
Other Object (Not Fixed):	0
Non Collision:	3
Overturn:	2
Jackknife:	0
Cross Median:	0
Ran Off Road:	0

Manner of Collision

Rear End:	158
Head On:	8
Rear-to-Side / Rear:	2
Angle:	30
Sideswipe Same Dir:	33
Sideswipe Opp Dir:	2
Unknown:	2

Light Conditions

Dawn:	4
Daylight:	178
Dusk:	5
Dark / Lighted:	49
Dark / Not Lighted:	13
Not Indicated:	0

Weather Conditions

No Adverse Conditions:	218
Rain:	26
Sleet and Hail:	2
Snow:	3
Foggy:	0
Smog, Smoke:	0
Crosswind:	0

Fixed Objects

Boulder:	0	Other Barrier:	0	Ditch:	1
Building:	0	Highway Traffic Sign Post	0	Embankment:	0
Impact Attenuator:	0	Overhead Sign Support:	1	Fence:	0
Overhead Structure:	0	Luminaire/Light Support:	0	Wall:	0
Bridge Pier/Abutment/End:	0	Traffic Signal Support:	0	Mail Box:	0
Bridge Rail:	1	Utility Pole:	0	Shrubbery:	0
Guardrail:	1	Other Post, Pole Supports:	0	Tree:	0
Cable Barrier:	0	Culvert:	0	Fire Hydrant:	0
		Curb:	0	Other Fixed Object:	2

This report was generated by E-TRIMS

Route Feature Description Listing

Wilson County (95) - Route: SR171, Special Case: 0-None , Log Mile 3.57 to 4.85

COUNTY: WILSON **COUNTY NO:** 95

ROUTE: SR171 **SPECIAL CASE:** 0-NONE **CTY SEQ:** 1

LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
3.570	7	RAMP TO SR-265 CENTRAL PK. LT.	712
3.571	1	ENTER MT. JULIET CITY LIMITS	130
4.075	9	TRAFFIC SIGNAL / ENTRANCE TO PROVIDENCE COMMONS RT.	905
4.150	9	CULVERT: DRAINAGE	980
4.230	9	BEGIN 30 MPH	932
4.231	9	TRAFFIC COUNT STATION 17	959
4.302	9	TRAFFIC SIGNAL	905
4.302	4	6103 PROVIDENCE PKWY. RT.	420
4.302	5	B705 PROVIDENCE W. PKWY. LT.	530
4.302	9	BEGIN ILLUMINATION	930
4.310	9	CULVERT [95CULV08001]: BRANCH	980
4.434	9	TRAFFIC SIGNAL	905
4.434	5	B237 CROSSINGS CIR. RT. & LT.	510
4.560	9	TRAFFIC SIGNAL	905
4.560	4	4855 BELINDA PKWY. RT.	420
4.560	5	A556 ADAMS LN. LT.	530
4.635	5	B237 HERSCHEL DR. LT.	530
4.640	7	RAMP TO I-40 EB LNS. RT.	702
4.680	9	TRAFFIC SIGNAL	905
4.680	7	RAMP TO I-40 EB LNS. RT.	702
4.680	7	RAMP FROM I-40 EB LNS. LT.	706
4.750	7	RAMP FROM I-40 EB LNS. RT.	705
4.790	2	OVERHEAD [95I00400003]: I-40	221
4.810	3	I-40 / CENTER OF OVERHEAD	360
4.810	0	BEGIN N. MT. JULIET RD.	920
4.850	9	TRAFFIC SIGNAL	905
4.850	7	RAMP FROM I-40 WB LNS. RT.	705
4.850	7	RAMP TO I-40 WB LNS. LT.	703

Traffic Report

Wilson County (95) - Route: SR171, Special Case: 0-None , Log Mile 3.57 to 4.85

COUNTY: WILSON

ROUTE	SC	CO SQ	BEG LOG MILE	END LOG MILE	YR OF TRAFFIC	ANNUAL AVERAGE DAILY TRAFFIC	PEAK HOUR %	DESIGN HOUR VOLUME	DIRECT DIST %	% PASS CARS	% SINGLE UNIT TRUCKS	% MULTI UNIT TRUCKS	CYCLE COUNTS STATION NBR	CYCLE COUNTS STATION COUNTY	CLASS COUNTS STATION NBR	CLASS COUNTS STATION COUNTY	IS CLASS COUNT?
SR171	0	1	3.560	4.810	2016	19910	8	10	65	96	1	3	17	95	017C	95	YES
SR171	0	1	4.810	6.920	2016	25820	9	11	55	86	4	10	89	95	089C	95	YES

ETRIMS CRASH, TRAFFIC, AND ROUTE FEATURE REPORTS – I-40 DAVIDSON COUNTY

Crash Summary Report

County: DAVIDSON **Route:** I0040 **Spcl Cse:** 0-NONE **Cnty Seq:** 1

Log Miles: 29.500 to 31.220 - Crash Dates: 1/1/2014 to 12/31/2016
Vehicle Filter: None - Other Factors Filter: None

Statistics

Fatal Crashes:	1
Total Killed:	1
Incap Injury Crashes:	6
Total Incap Injuries:	7
Other Injury Crashes:	51
Total Other Injuries:	66
Prop Damage Crashes:	110
Total Crashes:	**168**

Crash Location

Along Roadway:	165
At Intersection:	0
Railroad Crossing:	0
Bridge:	0
Underpass:	1
Ramp:	2
Private Property:	0
Other:	0

Crashes Involving

Pedestrians:	1
Hazardous Cargo:	0
Work / Constr Zones:	1
Fixed Objects:	31
Single Unit Trucks	4
Tractor - Trailer Trucks:	15
Bicycles:	0
Motorcycles:	0
Lane Departures:	36
Distracted Drivers:	7

Road Conditions

Ice:	4
Snow or Slush:	7
Sand, Mud, Dirt or Oil:	0
Wet:	25
Dry:	119

First Harmful Event

Pedestrian:	1
Pedalcycle:	0
Railway Train:	0
Deer (Animal):	3
Other Animal:	1
Motor Vehicle in Transport:	106
Motor Vehicle in Transport in Other Roadway:	0
Parked Motor Vehicle:	0
Other Type Non-Motorist:	0
Fixed Object:	31
Other Object (Not Fixed):	11
Non Collision:	0
Overturn:	0
Jackknife:	0
Cross Median:	0
Ran Off Road:	0

Manner of Collision

Rear End:	76
Head On:	0
Rear-to-Side / Rear:	0
Angle:	5
Sideswipe Same Dir:	23
Sideswipe Opp Dir:	1
Unknown:	3

Light Conditions

Dawn:	1
Daylight:	114
Dusk:	3
Dark / Lighted:	9
Dark / Not Lighted:	28
Not Indicated:	0

Weather Conditions

No Adverse Conditions:	121
Rain:	24
Sleet and Hail:	3
Snow:	6
Foggy:	1
Smog, Smoke:	0
Crosswind:	0

Fixed Objects

Boulder:	0	Other Barrier:	19	Ditch:	1
Building:	0	Highway Traffic Sign Post	0	Embankment:	2
Impact Attenuator:	0	Overhead Sign Support:	0	Fence:	0
Overhead Structure:	0	Luminaire/Light Support:	0	Wall:	2
Bridge Pier/Abutment/End:	0	Traffic Signal Support:	0	Mail Box:	0
Bridge Rail:	0	Utility Pole:	0	Shrubbery:	0
Guardrail:	6	Other Post, Pole Supports:	0	Tree:	1
Cable Barrier:	0	Culvert:	0	Fire Hydrant:	0
		Curb:	0	Other Fixed Object:	0

This report was generated by E-TRIMS

Route Feature Description Listing

Davidson County (19) - Route: I0040, Special Case: 0-None , Log Mile 28.9 to 31.22

COUNTY: DAVIDSON **COUNTY NO:** 19

ROUTE: I0040 **SPECIAL CASE:** 0-NONE **CTY SEQ:** 1

LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
28.900	9	CULVERT: DRAINAGE	980
29.020	2	OVERHEAD [19I00400161]: RAMP OVER I-40	241
29.030	2	UNDERPASS [19I00400161]: RAMP FROM I-40 TO SR-45 OLD HICKORY BLVD.	242
29.040	9	ITS CAMERA # 112 / WB LNS.	967
29.100	0	EXIT 221B: OLD HICKORY BLVD.	990
29.100	7	RAMP 221-B TO 1004 OLD HICKORY BLVD. RT.	721
29.180	7	RAMP 221-E FROM SR-45 OLD HICKORY BLVD. LT.	715
29.330	9	ITS CAMERA # 113 / WB LNS.	967
29.340	2	UNDERPASS [19I00400141]: 1004 OLD HICKORY BLVD. RT. & SR-45 OLD HICKORY BLVD. LT.	242
29.350	4	1004 OLD HICKORY BLVD. / CENTER OF UNDERPASS	480
29.350	3	SR-45 OLD HICKORY BLVD. / CENTER OF UNDERPASS	380
29.350	0	INTERCHANGE 0221	939
29.530	7	RAMP 221-C FROM 1004 OLD HICKORY BLVD. RT.	724
29.530	0	MILE POST # 221	963
29.560	7	RAMP 221-D TO SR-45 OLD HICKORY BLVD. LT.	712
29.826	9	TRAFFIC COUNT STATION 198	959
29.890	9	CULVERT: BRANCH	980
30.240	2	UNDERPASS [19I00400143]: 1004 NEW HOPE RD.	222
30.250	9	ITS CAMERA # 114 / WB LNS.	967
30.550	0	MILE POST # 222	963
31.020	2	OVERHEAD [19I00400145]: G006 EARHART RD.	221
31.090	9	ITS MESSAGE SIGN # 42 / WB LNS.	966
31.190	9	ITS CAMERA # 115 / WB LNS.	967
31.220	1	DAVIDSON-WILSON COUNTY LINE	125

Traffic Report

Davidson County (19) - Route: I0040, Special Case: 0-None , Log Mile 28.9 to 31.22

COUNTY: DAVIDSON

ROUTE	SC	CO SQ	BEG LOG MILE	END LOG MILE	YR OF TRAFFIC	ANNUAL AVERAGE DAILY TRAFFIC	PEAK HOUR %	DESIGN HOUR VOLUME	DIRECT DIST %	% PASS CARS	% SINGLE UNIT TRUCKS	% MULTI UNIT TRUCKS	CYCLE COUNTS STATION NBR	CYCLE COUNTS STATION COUNTY	CLASS COUNTS STATION NBR	CLASS COUNTS STATION COUNTY	IS CLASS COUNT?
I0040	0	1	27.480	29.350	2016	132000	9	11	65	92	2	6	345	19	431S	19	NO
I0040	0	1	29.350	31.220	2016	93120	9	11	60	86	2	12	198	19	174C	95	NO

ETRIMS CRASH, TRAFFIC, AND ROUTE FEATURE REPORTS – I-40 WILSON COUNTY

Crash Summary Report

County: WILSON **Route:** I0040 **Spcl Cse:** 0-NONE **Cnty Seq:** 1

Log Miles: 0.000 to 3.400 - Crash Dates: 1/1/2014 to 12/31/2016
Vehicle Filter: None - Other Factors Filter: None

Statistics

Fatal Crashes:	0
Total Killed:	0
Incap Injury Crashes:	7
Total Incap Injuries:	8
Other Injury Crashes:	58
Total Other Injuries:	80
Prop Damage Crashes:	146
Total Crashes:	**211**

Crash Location

Along Roadway:	194
At Intersection:	1
Railroad Crossing:	0
Bridge:	0
Underpass:	0
Ramp:	16
Private Property:	0
Other:	0

Crashes Involving

Pedestrians:	0
Hazardous Cargo:	0
Work / Constr Zones:	4
Fixed Objects:	74
Single Unit Trucks	3
Tractor - Trailer Trucks:	17
Bicycles:	0
Motorcycles:	1
Lane Departures:	87
Distracted Drivers:	6

Road Conditions

Ice:	2
Snow or Slush:	5
Sand, Mud, Dirt or Oil:	0
Wet:	86
Dry:	117

First Harmful Event

Pedestrian:	0
Pedalcycle:	0
Railway Train:	0
Deer (Animal):	7
Other Animal:	1
Motor Vehicle in Transport:	107
Motor Vehicle in Transport in Other Roadway:	0
Parked Motor Vehicle:	1
Other Type Non-Motorist:	0
Fixed Object:	74
Other Object (Not Fixed):	7
Non Collision:	4
Overturn:	7
Jackknife:	1
Cross Median:	0
Ran Off Road:	0

Manner of Collision

Rear End:	47
Head On:	2
Rear-to-Side / Rear:	1
Angle:	13
Sideswipe Same Dir:	38
Sideswipe Opp Dir:	0
Unknown:	8

Light Conditions

Dawn:	5
Daylight:	128
Dusk:	8
Dark / Lighted:	19
Dark / Not Lighted:	46
Not Indicated:	4

Weather Conditions

No Adverse Conditions:	123
Rain:	79
Sleet and Hail:	2
Snow:	3
Foggy:	1
Smog, Smoke:	1
Crosswind:	0

Fixed Objects

Boulder:	0	Other Barrier:	50	Ditch:	2
Building:	0	Highway Traffic Sign Post	0	Embankment:	3
Impact Attenuator:	1	Overhead Sign Support:	0	Fence:	0
Overhead Structure:	0	Luminaire/Light Support:	0	Wall:	9
Bridge Pier/Abutment/End:	0	Traffic Signal Support:	0	Mail Box:	0
Bridge Rail:	0	Utility Pole:	0	Shrubbery:	0
Guardrail:	8	Other Post, Pole Supports:	0	Tree:	1
Cable Barrier:	0	Culvert:	0	Fire Hydrant:	0
		Curb:	0	Other Fixed Object:	0

This report was generated by E-TRIMS

Route Feature Description Listing

Wilson County (95) - Route: I0040, Special Case: 0-None , Log Mile 0 to 3.4

COUNTY: WILSON **COUNTY NO:** 95

ROUTE: I0040 **SPECIAL CASE:** 0-NONE **CTY SEQ:** 1

LOG MILE	ITEM CODE	ROUTE FEATURE	DESC CODE
0.000	1	DAVIDSON-WILSON COUNTY LINE	120
0.000	0	BEGIN I-40	920
0.000	9	BEGIN 70 MPH	932
0.340	0	MILE POST # 223	963
0.360	9	CULVERT [95CULV01001]: BRANCH	980
1.370	0	MILE POST # 224	963
2.020	2	UNDERPASS [95I00400001]: SR-265 CENTRAL PK.	222
2.360	0	MILE POST # 225	963
2.520	9	CULVERT [95CULV01003]: BRANCH	980
2.720	0	EXIT 226 A-B SR-171 MT. JULIET / BELINDA PKWY. / PROVIDENCE WAY	990
2.720	9	BEGIN ILLUMINATION	930
2.720	7	RAMP 226-A TO SR-171 S. MT. JULIET RD. & RAMP 226-B TO SR-171 N. MT. JULIET RD. RT.	711
2.880	7	RAMP 226-E FROM SR-171 N. MT. JULIET RD. LT.	715
3.110	2	UNDERPASS [95I00400003]: SR-171 S. MT. JULIET RD. RT. & SR-171 N. MT. JULIET RD. LT.	222
3.120	3	SR-171 S. MT. JULIET RD. & SR-171 N. MT. JULIET RD. / CENTER OF UNDERPASS	380
3.120	0	INTERCHANGE 0226	939
3.350	0	MILE POST # 226	963
3.350	7	RAMP 226-D TO SR-171 N. MT. JULIET RD. LT.	712
3.400	7	RAMP 226-C FROM SR-171 S. MT. JULIET RD. RT.	714

Traffic Report

Wilson County (95) - Route: I0040, Special Case: 0-None , Log Mile 0 to 3.4

COUNTY: WILSON

ROUTE	SC	CO SQ	BEG LOG MILE	END LOG MILE	YR OF TRAFFIC	ANNUAL AVERAGE DAILY TRAFFIC	PEAK HOUR %	DESIGN HOUR VOLUME	DIRECT DIST %	% PASS CARS	% SINGLE UNIT TRUCKS	% MULTI UNIT TRUCKS	CYCLE COUNTS STATION NBR	CYCLE COUNTS STATION COUNTY	CLASS COUNTS STATION NBR	CLASS COUNTS STATION COUNTY	IS CLASS COUNT?
I0040	0	1	0.000	3.120	2016	93120	9	11	60	86	2	12	198 @	19	174C	95	NO
I0040	0	1	3.120	6.280	2016	80990	8	10	51	84	2	14	990	95	174C	95	NO

STATEWIDE AVERAGE CRASH RATES

Tennessee Department of Transportation

Statewide Average Crash Rates for Sections and Spots

Study: 2012 - 2014 HSIP LIST

Begin Date: 1/1/2012 End Date: 12/31/2014

Route Type	Rural / Urban	Location Type	Highway Type	Fatal Rate	Incap. Rate	Other Inj. Rate	Pd. Rate	Total Rate	Severe Crash Rate	Total Veh. Miles (in millions)
Interstates and State Routes										
IS & SR	Rural	Section	2 OR 3 LN	0.026	0.125	0.442	1.117	**1.709**	0.150	22,710
IS & SR	Rural	Section	2 OR 3 LN W/TL	0.019	0.088	0.457	1.541	**2.104**	0.106	751
IS & SR	Rural	Section	4 OR MORE UNDIV	0.016	0.096	0.398	1.128	**1.638**	0.112	429
IS & SR	Rural	Section	4 OR MORE DIV	0.013	0.049	0.183	0.524	**0.768**	0.062	7,362
IS & SR	Rural	Section	4 OR MORE W TL	0.015	0.056	0.231	0.739	**1.041**	0.071	2,646
IS & SR	Rural	Section	FREEWAY	0.005	0.027	0.105	0.376	**0.512**	0.032	26,240
IS & SR	Rural	Spot	2 OR 3 LN	0.007	0.035	0.124	0.315	**0.482**	0.042	82,468
IS & SR	Rural	Spot	2 OR 3 LN W/TL	0.003	0.014	0.079	0.267	**0.363**	0.017	4,587
IS & SR	Rural	Spot	4 OR MORE UNDIV	0.003	0.015	0.069	0.207	**0.295**	0.018	2,622
IS & SR	Rural	Spot	4 OR MORE DIV	0.004	0.012	0.048	0.139	**0.203**	0.016	28,455
IS & SR	Rural	Spot	4 OR MORE W TL	0.004	0.013	0.054	0.175	**0.246**	0.016	11,691
IS & SR	Rural	Spot	FREEWAY	0.001	0.005	0.017	0.062	**0.085**	0.005	158,735
IS & SR	Urban	Section	2 OR 3 LN	0.015	0.099	0.604	1.838	**2.556**	0.114	9,257
IS & SR	Urban	Section	2 OR 3 LN W/TL	0.009	0.095	0.580	2.078	**2.762**	0.104	1,701
IS & SR	Urban	Section	4 OR MORE UNDIV	0.013	0.100	0.821	2.804	**3.738**	0.113	2,876
IS & SR	Urban	Section	4 OR MORE DIV	0.009	0.058	0.439	1.538	**2.044**	0.067	15,295
IS & SR	Urban	Section	4 OR MORE W TL	0.013	0.069	0.660	2.257	**2.999**	0.082	13,160
IS & SR	Urban	Section	FREEWAY	0.005	0.024	0.226	0.781	**1.036**	0.029	45,182
IS & SR	Urban	Spot	2 OR 3 LN	0.002	0.015	0.094	0.296	**0.408**	0.017	65,044
IS & SR	Urban	Spot	2 OR 3 LN W/TL	0.001	0.013	0.078	0.281	**0.373**	0.014	13,374
IS & SR	Urban	Spot	4 OR MORE UNDIV	0.001	0.010	0.093	0.339	**0.443**	0.011	34,220
IS & SR	Urban	Spot	4 OR MORE DIV	0.001	0.008	0.062	0.218	**0.288**	0.009	119,884
IS & SR	Urban	Spot	4 OR MORE W TL	0.002	0.008	0.080	0.274	**0.364**	0.010	113,972
IS & SR	Urban	Spot	FREEWAY	0.001	0.003	0.027	0.094	**0.125**	0.004	377,023

Note: Section rates are crashes per million vehicle miles

Note: Spot rates are crashes per million vehicles. Spots are sections of roadways less than or equal to .10 miles

Note: Severe crash rates are the sum of rates for fatal and incapacitating injury crashes

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2016 ADAMS LANE

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

Adams Lane
Existing Geometry
2016

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 4:16 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 14:43:29 CDT 2017
IHSDM Version: v12.1.0 (Mar 24, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2016 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: Adams Lane
Site Set Comment: Created Thu Sep 21 14:39:57 CDT 2017
Site Set Version: v1

Evaluation Title: Adams Lane
Evaluation Comment: Created Thu Sep 21 14:43:08 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2016
Last Year of Analysis: 2016
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	Adams Lane		1.0000	2016: 3000	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.0	3	no	None (0)	no	no	0.00	0.0000	0	0.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	Adams Lane	1.0000	1.21	1.2092	1.10

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.01	1.2	0.15	12.5	0.15	12.1
Highway Segment	Collision with Bicycle	0.00	0.1	0.00	0.1	0.00	0.2
Highway Segment	Other Single-vehicle Collision	0.00	0.2	0.02	2.0	0.03	2.1
Highway Segment	Overturned	0.01	1.2	0.01	1.0	0.03	2.5
Highway Segment	Collision with Pedestrian	0.00	0.2	0.00	0.1	0.00	0.3
Highway Segment	Run Off Road	0.21	17.5	0.41	34.3	0.63	52.1
Highway Segment	Total Single Vehicle Crashes	0.25	20.5	0.60	49.9	0.84	69.3
Highway Segment	Angle Collision	0.04	3.2	0.06	4.9	0.10	8.5
Highway Segment	Head-on Collision	0.01	1.1	0.00	0.2	0.02	1.6
Highway Segment	Other Multiple-vehicle Collision	0.01	0.8	0.03	2.0	0.03	2.7
Highway Segment	Rear-end Collision	0.06	5.3	0.10	8.3	0.17	14.2
Highway Segment	Sideswipe	0.01	1.2	0.03	2.6	0.04	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.14	11.7	0.22	18.0	0.37	30.7
Highway Segment	Total Highway Segment Crashes	0.39	32.2	0.82	67.9	1.21	100.0
	Total Crashes	0.39	32.2	0.82	67.9	1.21	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2016 I-40

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

I-40
Existing Geometry
2016

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 4:17 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 16:00:00 CDT 2017
IHSDM Version: v12.1.0 (Mar 24, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2016 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: I-40 Existing
Site Set Comment: Created Thu Sep 21 14:44:31 CDT 2017
Site Set Version: v1

Evaluation Title: I-40 Existing Geometry 2016
Evaluation Comment: Created Thu Sep 21 15:59:39 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2016
Last Year of Analysis: 2016
Empirical-Bayes Analysis: None

Freeway Segment Site Set CPM Evaluation

Type: Freeway
Calibration Factor: FI_MV=1.0, PDO_MV=1.0, FI_SV=1.0, PDO_SV=1.0

Table 1. Evaluation Freeway Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway	I40	SR 45 to SR 171	5.7200	2016: 93120

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway	I40	SR 45 to SR 171	5.7200	96.35	16.8446	0.50

Table 3. Expected Freeway Freeway Sites Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.6446	1.7039	9.2192	19.9883	64.7951
Total	0.6446	1.7039	9.2192	19.9883	64.7951

Table 4. Expected Freeway Site Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.04	0.0	0.56	0.6	0.60	0.6
Highway Segment	Collision with Fixed Object	7.78	8.1	18.28	19.0	26.06	27.0
Highway Segment	Collision with Other Object	0.55	0.6	3.55	3.7	4.10	4.3
Highway Segment	Other Single-vehicle Collision	2.24	2.3	2.73	2.8	4.97	5.2
Highway Segment	Collision with Parked Vehicle	0.16	0.2	0.41	0.4	0.57	0.6
Highway Segment	Total Single Vehicle Crashes	10.77	11.2	25.54	26.5	36.30	37.7
Highway Segment	Right-Angle Collision	0.64	0.7	0.71	0.7	1.35	1.4
Highway Segment	Head-on Collision	0.17	0.2	0.08	0.1	0.24	0.3
Highway Segment	Other Multi-vehicle Collision	0.64	0.7	0.94	1.0	1.59	1.6
Highway Segment	Rear-end Collision	15.59	16.2	27.09	28.1	42.68	44.3
Highway Segment	Sideswipe, Same Direction Collision	3.74	3.9	10.44	10.8	14.19	14.7
Highway Segment	Total Multiple Vehicle Crashes	20.79	21.6	39.26	40.7	60.05	62.3
Highway Segment	Total Highway Segment Crashes	31.56	32.8	64.80	67.2	96.35	100.0
	Total Crashes	31.56	32.8	64.80	67.2	96.35	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Speed Change Site Set CPM Evaluation

Type: Ramp Exit Speed Change
Calibration Factor: FI_EX=1.0, PDO_EX=1.0

Table 5. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	0.2000	2016: 93120
2	Eight-lane Freeway Speed Change	I-40	SR 171 Off Ramp	0.2000	2016: 93120

Table 6. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	2.26	11.3104	0.67
2	Eight-lane Freeway Speed Change	I-40	SR 171 Off Ramp	2.26	11.3104	0.67

Table 7. Expected Exit Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0182	0.0482	0.2624	0.5797	1.3535
2	0.0182	0.0482	0.2624	0.5797	1.3535
Total	0.0363	0.0965	0.5249	1.1595	2.7070

Table 8. Expected Exit Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.02	0.4	0.02	0.4
Highway Segment	Collision with Fixed Object	0.36	7.9	0.56	12.4	0.92	20.3
Highway Segment	Collision with Other Object	0.03	0.6	0.08	1.8	0.11	2.4
Highway Segment	Other Single-vehicle Collision	0.09	2.0	0.06	1.4	0.15	3.3
Highway Segment	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Total Single Vehicle Crashes	0.47	10.5	0.72	16.0	1.20	26.5
Highway Segment	Right-Angle Collision	0.02	0.4	0.03	0.7	0.05	1.2
Highway Segment	Head-on Collision	0.01	0.2	0.01	0.1	0.01	0.3
Highway Segment	Other Multi-vehicle Collision	0.03	0.6	0.04	1.0	0.07	1.6
Highway Segment	Rear-end Collision	1.00	22.1	1.53	33.8	2.53	55.9
Highway Segment	Sideswipe, Same Direction Collision	0.29	6.3	0.37	8.3	0.66	14.6
Highway Segment	Total Multiple Vehicle Crashes	1.34	29.7	1.98	43.9	3.33	73.5
Highway Segment	Total Highway Segment Crashes	1.82	40.2	2.71	59.8	4.52	100.0
	Total Crashes	1.82	40.2	2.71	59.8	4.52	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance Speed Change
Calibration Factor: FI_EN=1.0, PDO_EN=1.0

Table 9. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	0.2000	2016: 93120
2	Eight-lane Freeway Speed Change	I-40	SR 171 On Ramp	0.2000	2016: 93120

Table 10. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	2.81	14.0313	0.83
2	Eight-lane Freeway Speed Change	I-40	SR 171 On Ramp	2.94	14.7258	0.87

Table 11. Expected Entrance Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0190	0.0505	0.2749	0.6073	1.8545
2	0.0218	0.0579	0.3150	0.6959	1.8545
Total	0.0408	0.1084	0.5899	1.3032	3.7091

Table 12. Expected Entrance Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.01	0.1	0.01	0.1
Highway Segment	Collision with Fixed Object	0.40	6.9	0.48	8.3	0.88	15.2
Highway Segment	Collision with Other Object	0.04	0.7	0.13	2.3	0.17	3.0
Highway Segment	Other Single-vehicle Collision	0.14	2.4	0.06	1.0	0.20	3.4
Highway Segment	Collision with Parked Vehicle	0.01	0.1	0.01	0.2	0.02	0.3
Highway Segment	Total Single Vehicle Crashes	0.58	10.1	0.69	12.0	1.27	22.1
Highway Segment	Right-Angle Collision	0.04	0.7	0.06	1.0	0.10	1.7
Highway Segment	Head-on Collision	0.01	0.1	0.00	0.1	0.01	0.2
Highway Segment	Other Multi-vehicle Collision	0.04	0.6	0.06	1.0	0.09	1.6
Highway Segment	Rear-end Collision	1.11	19.3	1.97	34.2	3.08	53.5
Highway Segment	Sideswipe, Same Direction Collision	0.27	4.7	0.94	16.3	1.21	21.0
Highway Segment	Total Multiple Vehicle Crashes	1.46	25.4	3.02	52.5	4.48	77.9
Highway Segment	Total Highway Segment Crashes	2.04	35.5	3.71	64.5	5.75	100.0
	Total Crashes	2.04	35.5	3.71	64.5	5.75	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Ramp Site Set CPM Evaluation

Type: Ramp Exit
Calibration Factor: EX_RAMP_MV_FI=1.0, EX_RAMP_MV_PDO=1.0, EX_RAMP_SV_FI=1.0, EX_RAMP_SV_PDO=1.0

Table 13. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	2016: 6040
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	2016: 5410

Table 14. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	0.36	1.6522	0.75
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	0.45	1.8016	0.91

Table 15. Expected Exit Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0045	0.0138	0.0587	0.0889	0.1976
2	0.0039	0.0118	0.0418	0.1148	0.2781
Total	0.0084	0.0256	0.1005	0.2037	0.4757

Table 16. Expected Exit Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.2	0.01	1.1	0.01	1.3
Highway Segment	Collision with Fixed Object	0.23	28.5	0.30	37.0	0.53	65.6
Highway Segment	Collision with Other Object	0.02	2.0	0.06	7.2	0.07	9.2
Highway Segment	Other Single-vehicle Collision	0.07	8.2	0.04	5.5	0.11	13.8
Highway Segment	Collision with Parked Vehicle	0.01	0.6	0.01	0.8	0.01	1.4
Highway Segment	Total Single Vehicle Crashes	0.32	39.5	0.42	51.7	0.74	91.2
Highway Segment	Right-Angle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Highway Segment	Head-on Collision	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Multi-vehicle Collision	0.00	0.1	0.00	0.2	0.00	0.2
Highway Segment	Rear-end Collision	0.01	1.5	0.04	4.7	0.05	6.2
Highway Segment	Sideswipe, Same Direction Collision	0.00	0.4	0.01	1.8	0.02	2.2
Highway Segment	Total Multiple Vehicle Crashes	0.02	2.0	0.06	6.8	0.07	8.8
Highway Segment	Total Highway Segment Crashes	0.34	41.5	0.48	58.5	0.81	100.0
	Total Crashes	0.34	41.5	0.48	58.5	0.81	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance
Calibration Factor: ENT_RAMP_MV_FI=1.0, ENT_RAMP_MV_PDO=1.0, ENT_RAMP_SV_FI=1.0, ENT_RAMP_SV_PDO=1.0

Table 17. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	2016: 5840
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	2016: 11620

Table 18. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	0.22	1.4725	0.69
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	0.89	3.5394	0.83

Table 19. Expected Entrance Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0020	0.0060	0.0384	0.0468	0.1277
2	0.0051	0.0156	0.0826	0.1932	0.5883
Total	0.0071	0.0216	0.1210	0.2400	0.7160

Table 20. Expected Entrance Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.1	0.01	0.8	0.01	0.9
Highway Segment	Collision with Fixed Object	0.20	17.8	0.30	27.1	0.50	44.9
Highway Segment	Collision with Other Object	0.01	1.3	0.06	5.3	0.07	6.5
Highway Segment	Other Single-vehicle Collision	0.06	5.1	0.04	4.0	0.10	9.2
Highway Segment	Collision with Parked Vehicle	0.00	0.4	0.01	0.6	0.01	1.0
Highway Segment	Total Single Vehicle Crashes	0.27	24.7	0.42	37.8	0.69	62.5
Highway Segment	Right-Angle Collision	0.00	0.3	0.01	0.5	0.01	0.8
Highway Segment	Head-on Collision	0.00	0.1	0.00	0.1	0.00	0.1
Highway Segment	Other Multi-vehicle Collision	0.00	0.3	0.01	0.6	0.01	1.0
Highway Segment	Rear-end Collision	0.09	7.9	0.20	18.6	0.29	26.5
Highway Segment	Sideswipe, Same Direction Collision	0.02	1.9	0.08	7.2	0.10	9.1
Highway Segment	Total Multiple Vehicle Crashes	0.12	10.5	0.30	26.9	0.41	37.5
Highway Segment	Total Highway Segment Crashes	0.39	35.2	0.72	64.8	1.11	100.0
	Total Crashes	0.39	35.2	0.72	64.8	1.11	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2016 SR 171

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 171
Existing Geometry
2016

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 4:15 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 14:21:46 CDT 2017
IHSDM Version: v12.1.0 (Mar 24, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2016 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: SR 171 Existing
Site Set Comment: Created Thu Sep 21 13:30:58 CDT 2017
Site Set Version: v1

Evaluation Title: SR 171 Existing Condition 2016
Evaluation Comment: Created Thu Sep 21 14:20:54 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2016
Last Year of Analysis: 2016
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	SR 171	TriStar to SR 265	0.4800	2016: 19910	12.00	12.00	8.00	8.00	0.00	0.00	0.00	0.00	0.00	6.0	3	no	None (0)	no	no	0.00	0.0000	0	0.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	SR 171	TriStar to SR 265	0.4800	2.37	4.9301	0.68

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.03	1.2	0.30	12.5	0.29	12.1
Highway Segment	Collision with Bicycle	0.00	0.1	0.00	0.1	0.01	0.2
Highway Segment	Other Single-vehicle Collision	0.01	0.2	0.05	2.0	0.05	2.1
Highway Segment	Overturned	0.03	1.2	0.02	1.0	0.06	2.5
Highway Segment	Collision with Pedestrian	0.01	0.2	0.00	0.1	0.01	0.3
Highway Segment	Run Off Road	0.41	17.5	0.81	34.3	1.23	52.1
Highway Segment	Total Single Vehicle Crashes	0.48	20.5	1.18	49.9	1.64	69.3
Highway Segment	Angle Collision	0.08	3.2	0.12	4.9	0.20	8.5
Highway Segment	Head-on Collision	0.03	1.1	0.01	0.2	0.04	1.6
Highway Segment	Other Multiple-vehicle Collision	0.02	0.8	0.05	2.0	0.06	2.7
Highway Segment	Rear-end Collision	0.12	5.3	0.20	8.3	0.34	14.2
Highway Segment	Sideswipe	0.03	1.2	0.06	2.6	0.09	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.28	11.7	0.43	18.0	0.73	30.7
Highway Segment	Total Highway Segment Crashes	0.76	32.2	1.61	67.9	2.37	100.0
	Total Crashes	0.76	32.2	1.61	67.9	2.37	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Urban Arterial Site Set CPM Evaluation

Type: 3T
Calibration Factor: 1

Table 4. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	3T	SR 171	Providence toTriStar	0.2000	2016: 19910	3	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	3T	SR 171	Providence toTriStar	0.2000	2.11	10.5419	1.45

Table 6. Expected 3T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Collision with Bicycle	0.05	2.5	0.00	0.0	0.05	2.5
Highway Segment	Collision with Fixed Object	0.03	1.6	0.12	5.9	0.16	7.5
Highway Segment	Collision with Other Object	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Single-vehicle Collision	0.01	0.7	0.01	0.2	0.02	0.9
Highway Segment	Collision with Pedestrian	0.08	3.8	0.00	0.0	0.08	3.8
Highway Segment	Total Segment Single Vehicle Crashes	0.18	8.7	0.13	6.1	0.31	14.8
Highway Segment	Angle Collision	0.02	1.2	0.02	0.9	0.04	2.0
Highway Segment	Driveway-related Collision	0.13	6.2	0.41	19.3	0.54	25.5
Highway Segment	Head-on Collision	0.01	0.6	0.02	0.9	0.03	1.4
Highway Segment	Other Multi-vehicle Collision	0.01	0.6	0.02	0.9	0.03	1.4
Highway Segment	Rear-end Collision	0.30	14.2	0.76	36.1	1.06	50.3
Highway Segment	Sideswipe, Opposite Direction Collision	0.01	0.3	0.02	0.9	0.02	1.1
Highway Segment	Sideswipe, Same Direction Collision	0.00	0.0	0.07	3.3	0.07	3.4
Highway Segment	Total Segment Multiple Vehicle Crashes	0.48	23.0	1.31	62.2	1.80	85.2
Highway Segment	Total Highway Segment Crashes	0.67	31.7	1.44	68.3	2.11	100.0
	Total Crashes	0.67	31.7	1.44	68.3	2.11	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 5T
Calibration Factor: 1

Table 7. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	5T	SR 171	I-40 to Providence	0.6000	2016: 19910	1	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	5T	SR 171	I-40 to Providence	0.6000	6.30	10.5017	1.45

Table 9. Expected 5T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.1	0.04	0.7	0.05	0.7
Highway Segment	Collision with Bicycle	0.29	4.6	0.00	0.0	0.29	4.6
Highway Segment	Collision with Fixed Object	0.11	1.7	0.67	10.6	0.78	12.3
Highway Segment	Collision with Other Object	0.00	0.0	0.05	0.8	0.06	0.9
Highway Segment	Other Single-vehicle Collision	0.16	2.5	0.11	1.7	0.26	4.2
Highway Segment	Collision with Pedestrian	0.17	2.8	0.00	0.0	0.17	2.8
Highway Segment	Total Segment Single Vehicle Crashes	0.74	11.7	0.87	13.8	1.61	25.5
Highway Segment	Angle Collision	0.06	0.9	0.19	3.0	0.25	4.0
Highway Segment	Driveway-related Collision	0.07	1.1	0.19	3.0	0.26	4.1
Highway Segment	Head-on Collision	0.03	0.4	0.01	0.2	0.04	0.6
Highway Segment	Other Multi-vehicle Collision	0.02	0.3	0.09	1.5	0.12	1.8
Highway Segment	Rear-end Collision	1.01	16.1	2.11	33.4	3.12	49.5
Highway Segment	Sideswipe, Opposite Direction Collision	0.01	0.1	0.03	0.5	0.03	0.5
Highway Segment	Sideswipe, Same Direction Collision	0.07	1.2	0.80	12.7	0.88	13.9
Highway Segment	Total Segment Multiple Vehicle Crashes	1.27	20.1	3.43	54.4	4.69	74.5
Highway Segment	Total Highway Segment Crashes	2.00	31.8	4.30	68.2	6.30	100.0
	Total Crashes	2.00	31.8	4.30	68.2	6.30	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4SG
Calibration Factor: 1

Table 10. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/ Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 171 at I40 WB		2016: 19910	2016: 11000	2	2	yes	false	0	0	2	2	no	50	6	0	0	4
2	4SG2x2le5	SR 171 at I40 EB		2016: 19910	2016: 5500	1	1	yes	false	0	1	0	1	no	50	5	0	0	6
3	4SG2x2le5	SR 171 at Belinda		2016: 19910	2016: 10000	4	3	yes	false	0	2	2	4	no	50	7	0	0	6
4	4SG2x2le5	SR 171 at Crossings		2016: 19910	2016: 10000	3	2	yes	false	2	2	0	4	no	50	6	0	0	9
6	4SG2x2le5	SR 171 at Providence W		2016: 19910	2016: 10000	4	3	yes	false	0	4	0	4	no	50	5	0	0	4
7	4SG2x2le5	SR 171 at TriStar		2016: 19910	2016: 10000	3	2	yes	false	1	3	0	4	no	50	4	0	0	3
8	4SG2x2le5	SR 171 at SR 265		2016: 19910	2016: 3960	2	0	no	false	2	2	0	4	no	50	3	0	0	1

Table 11. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 171 at I40 WB	3.59	0.32	3.5924
2	4SG	SR 171 at I40 EB	4.04	0.44	4.0408
3	4SG	SR 171 at Belinda	2.59	0.24	2.5869
4	4SG	SR 171 at Crossings	3.39	0.31	3.3863
6	4SG	SR 171 at Providence W	2.86	0.26	2.8634
7	4SG	SR 171 at TriStar	3.34	0.31	3.3383
8	4SG	SR 171 at SR 265	3.59	0.41	3.5895

Table 12. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Bicycle	0.34	1.5	0.00	0.0	0.34	1.5
Highway Segment	Collision with Pedestrian	0.21	0.9	0.00	0.0	0.21	0.9
Highway Segment		0.55	2.4	0.00	0.0	0.55	2.4
Highway Segment	Total Highway Segment Crashes	0.55	2.4	0.00	0.0	0.55	2.4
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Fixed Object	0.28	1.2	0.90	3.8	1.18	5.0
Intersection	Non-Collision	0.05	0.2	0.04	0.1	0.09	0.4
Intersection	Collision with Other Object	0.03	0.1	0.07	0.3	0.10	0.4
Intersection	Other Single-vehicle Collision	0.01	0.1	0.02	0.1	0.04	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Total Intersection Single Vehicle Crashes	0.38	1.6	1.03	4.4	1.41	6.0
Intersection	Angle Collision	2.44	10.4	3.51	15.0	5.96	25.5
Intersection	Head-on Collision	0.34	1.5	0.43	1.8	0.78	3.3
Intersection	Other Multi-vehicle Collision	0.39	1.7	3.04	13.0	3.42	14.6
Intersection	Rear-end Collision	3.17	13.5	6.95	29.7	10.12	43.3
Intersection	Sideswipe	0.70	3.0	0.46	2.0	1.16	4.9
Intersection	Total Intersection Multiple Vehicle Crashes	7.04	30.1	14.40	61.5	21.43	91.6
Intersection	Total Intersection Crashes	7.41	31.7	15.43	66.0	22.84	97.6
	Total Crashes	7.96	34.0	15.43	66.0	23.40	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2016 SR 265

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 265
Existing Geometry
2016

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 4:14 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 13:12:59 CDT 2017
IHSDM Version: v12.1.0 (Mar 24, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2016 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: SR 265 Existing
Site Set Comment: Created Thu Sep 21 09:25:02 CDT 2017
Site Set Version: v1

Evaluation Title: SR 265 Existing Geometry 2016
Evaluation Comment: Created Thu Sep 21 13:12:28 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2016
Last Year of Analysis: 2016
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	SR 265	Existing Geometry	1.5200	2016: 3960	10.00	10.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	10.0	4	no	None (0)	no	no	0.00	0.0000	0	0.00	no
2	2U	SR 265	Existing Geometry	0.1600	2016: 3960	10.00	10.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	6.0	4	no	None (0)	no	no	550.00	0.1600	0	1.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	SR 265	Existing Geometry	1.5200	2.77	1.8220	1.26
2	2U	SR 265	Existing Geometry	0.1600	0.42	2.6497	1.83

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.04	1.2	0.40	12.5	0.39	12.1
Highway Segment	Collision with Bicycle	0.00	0.1	0.00	0.1	0.01	0.2
Highway Segment	Other Single-vehicle Collision	0.01	0.2	0.06	2.0	0.07	2.1
Highway Segment	Overturned	0.04	1.2	0.03	1.0	0.08	2.5
Highway Segment	Collision with Pedestrian	0.01	0.2	0.00	0.1	0.01	0.3
Highway Segment	Run Off Road	0.56	17.5	1.09	34.3	1.66	52.1
Highway Segment	Total Single Vehicle Crashes	0.65	20.5	1.59	49.9	2.21	69.3
Highway Segment	Angle Collision	0.10	3.2	0.16	4.9	0.27	8.5
Highway Segment	Head-on Collision	0.04	1.1	0.01	0.2	0.05	1.6
Highway Segment	Other Multiple-vehicle Collision	0.03	0.8	0.07	2.0	0.09	2.7
Highway Segment	Rear-end Collision	0.17	5.3	0.27	8.3	0.45	14.2
Highway Segment	Sideswipe	0.04	1.2	0.08	2.6	0.12	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.37	11.7	0.57	18.0	0.98	30.7
Highway Segment	Total Highway Segment Crashes	1.03	32.2	2.17	67.9	3.19	100.0
	Total Crashes	1.03	32.2	2.17	67.9	3.19	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Urban Arterial Site Set CPM Evaluation

Type: 3ST
Calibration Factor: 1

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout
1	3ST2x2le5	SR 265 at Pleasant Grove	3-leg stop	2016: 3960	2016: 3000	0	0	no	false
2	3ST2x2le5	SR 265 at Tillman	3-leg stop	2016: 3960	2016: 300	0	0	no	false
4	3ST2x2le5	SR 265 at Cook	3-leg stop	2016: 3960	2016: 500	0	0	no	false

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	3ST	SR 265 at Pleasant Grove	3-leg stop	0.69	0.34	0.6846
2	3ST	SR 265 at Tillman	3-leg stop	0.25	0.16	0.2459
4	3ST	SR 265 at Cook	3-leg stop	0.31	0.20	0.3083

Table 6. Expected 3ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Bicycle	0.02	1.5	0.00	0.0	0.02	1.5
Highway Segment	Collision with Pedestrian	0.03	2.0	0.00	0.0	0.03	2.0
Highway Segment		0.04	3.6	0.00	0.0	0.04	3.6
Highway Segment	Total Highway Segment Crashes	0.04	3.6	0.00	0.0	0.04	3.6
Intersection	Collision with Animal	0.00	0.0	0.01	0.4	0.01	0.4
Intersection	Collision with Fixed Object	0.11	8.9	0.23	18.6	0.34	27.5
Intersection	Non-Collision	0.01	1.2	0.01	0.7	0.02	1.9
Intersection	Collision with Other Object	0.01	1.0	0.03	2.1	0.04	3.1
Intersection	Other Single-vehicle Collision	0.01	0.5	0.01	0.5	0.01	1.0
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.1	0.00	0.1
Intersection	Total Intersection Single Vehicle Crashes	0.14	11.6	0.28	22.4	0.42	34.0
Intersection	Angle Collision	0.10	8.4	0.12	10.0	0.23	18.3
Intersection	Head-on Collision	0.01	1.1	0.01	0.9	0.02	2.0
Intersection	Other Multi-vehicle Collision	0.02	1.6	0.11	8.9	0.13	10.5
Intersection	Rear-end Collision	0.13	10.3	0.21	16.7	0.34	27.0
Intersection	Sideswipe	0.04	3.1	0.02	1.5	0.06	4.6
Intersection	Total Intersection Multiple Vehicle Crashes	0.30	24.4	0.47	38.0	0.77	62.4
Intersection	Total Intersection Crashes	0.45	36.1	0.75	60.3	1.20	96.4
	Total Crashes	0.49	39.7	0.75	60.3	1.24	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1

Table 7. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout
1	4ST2x2le5	SR 265 at Adams	4-leg stop	2016: 3960	2016: 3000	0	0	no	false

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4ST	SR 265 at Adams	4-leg stop	1.14	0.45	1.1385

Table 9. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Bicycle	0.02	1.7	0.00	0.0	0.02	1.7
Highway Segment	Collision with Pedestrian	0.02	2.1	0.00	0.0	0.02	2.1
Highway Segment		0.04	3.8	0.00	0.0	0.04	3.8
Highway Segment	Total Highway Segment Crashes	0.04	3.8	0.00	0.0	0.04	3.8
Intersection	Collision with Animal	0.00	0.0	0.00	0.3	0.00	0.3
Intersection	Collision with Fixed Object	0.04	3.5	0.12	10.2	0.15	13.6
Intersection	Non-Collision	0.01	0.9	0.01	0.6	0.02	1.5
Intersection	Collision with Other Object	0.01	0.5	0.01	0.8	0.01	1.3
Intersection	Other Single-vehicle Collision	0.00	0.3	0.00	0.1	0.00	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Total Intersection Single Vehicle Crashes	0.06	5.1	0.14	12.0	0.20	17.1
Intersection	Angle Collision	0.14	11.8	0.20	17.5	0.33	29.3
Intersection	Head-on Collision	0.01	1.1	0.02	1.6	0.03	2.7
Intersection	Other Multi-vehicle Collision	0.02	1.6	0.13	11.3	0.15	12.9
Intersection	Rear-end Collision	0.10	9.1	0.22	19.5	0.33	28.6
Intersection	Sideswipe	0.04	3.2	0.03	2.3	0.06	5.5
Intersection	Total Intersection Multiple Vehicle Crashes	0.31	26.9	0.59	52.2	0.90	79.0
Intersection	Total Intersection Crashes	0.36	32.0	0.73	64.2	1.09	96.2
	Total Crashes	0.41	35.8	0.73	64.2	1.14	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Type: 4SG

Calibration Factor: 1

Table 10. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 265 at SR 171	4-leg signal	2016: 19910	2016: 3960	2	0	yes	false	2	2	0	4	no	50	3	0	0	1

Table 11. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 265 at SR 171	4-leg signal	3.27	0.38	3.2707

Table 12. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Bicycle	0.05	1.5	0.00	0.0	0.05	1.5
Highway Segment	Collision with Pedestrian	0.02	0.6	0.00	0.0	0.02	0.6
Highway Segment		0.07	2.1	0.00	0.0	0.07	2.1
Highway Segment	Total Highway Segment Crashes	0.07	2.1	0.00	0.0	0.07	2.1
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Fixed Object	0.04	1.1	0.12	3.8	0.16	4.9
Intersection	Non-Collision	0.01	0.2	0.01	0.1	0.01	0.4
Intersection	Collision with Other Object	0.00	0.1	0.01	0.3	0.01	0.4
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.1	0.01	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Total Intersection Single Vehicle Crashes	0.05	1.5	0.14	4.4	0.19	5.9
Intersection	Angle Collision	0.35	10.6	0.49	15.0	0.84	25.6
Intersection	Head-on Collision	0.05	1.5	0.06	1.8	0.11	3.3
Intersection	Other Multi-vehicle Collision	0.06	1.7	0.42	13.0	0.48	14.7
Intersection	Rear-end Collision	0.45	13.7	0.97	29.7	1.42	43.4
Intersection	Sideswipe	0.10	3.0	0.06	2.0	0.16	5.0
Intersection	Total Intersection Multiple Vehicle Crashes	1.00	30.5	2.01	61.5	3.01	92.0
Intersection	Total Intersection Crashes	1.05	32.0	2.15	65.9	3.20	97.9
	Total Crashes	1.12	34.1	2.15	65.9	3.27	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2040 ADAMS LANE

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

Adams Lane
Existing Geometry
2040

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 5:11 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 17:11:00 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: Adams Lane
Site Set Comment: Created Thu Sep 21 14:39:57 CDT 2017
Site Set Version: v1

Evaluation Title: Adams Lane Existing 2040
Evaluation Comment: Created Thu Sep 21 17:10:35 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	Adams Lane		1.0000	2040: 13505	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.0	3	no	None (0)	no	no	0.00	0.0000	0	0.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	Adams Lane	1.0000	5.44	5.4434	1.10

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.07	1.2	0.68	12.5	0.66	12.1
Highway Segment	Collision with Bicycle	0.01	0.1	0.00	0.1	0.01	0.2
Highway Segment	Other Single-vehicle Collision	0.01	0.2	0.11	2.0	0.11	2.1
Highway Segment	Overturned	0.07	1.2	0.06	1.0	0.14	2.5
Highway Segment	Collision with Pedestrian	0.01	0.2	0.00	0.1	0.02	0.3
Highway Segment	Run Off Road	0.95	17.5	1.87	34.3	2.84	52.1
Highway Segment	Total Single Vehicle Crashes	1.11	20.5	2.72	49.9	3.77	69.3
Highway Segment	Angle Collision	0.18	3.2	0.27	4.9	0.46	8.5
Highway Segment	Head-on Collision	0.06	1.1	0.01	0.2	0.09	1.6
Highway Segment	Other Multiple-vehicle Collision	0.04	0.8	0.11	2.0	0.15	2.7
Highway Segment	Rear-end Collision	0.29	5.3	0.45	8.3	0.77	14.2
Highway Segment	Sideswipe	0.07	1.2	0.14	2.6	0.20	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.64	11.7	0.98	18.0	1.67	30.7
Highway Segment	Total Highway Segment Crashes	1.75	32.2	3.70	67.9	5.44	100.0
	Total Crashes	1.75	32.2	3.70	67.9	5.44	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2040 I-40

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

I-40
Existing Geometry
2040

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 5:20 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 17:19:30 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: I-40 Existing
Site Set Comment: Created Thu Sep 21 14:44:31 CDT 2017
Site Set Version: v1

Evaluation Title: I-40 Existing 2040
Evaluation Comment: Created Thu Sep 21 17:19:09 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Freeway Segment Site Set CPM Evaluation

Type: Freeway
Calibration Factor: FI_MV=1.0, PDO_MV=1.0, FI_SV=1.0, PDO_SV=1.0

Table 1. Evaluation Freeway Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway	I40	SR 45 to SR 171	5.7200	2040: 111725

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway	I40	SR 45 to SR 171	5.7200	125.03	21.8583	0.54

Table 3. Expected Freeway Freeway Sites Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.8034	2.1238	11.4911	24.9141	85.6968
Total	0.8034	2.1238	11.4911	24.9141	85.6968

Table 4. Expected Freeway Site Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.05	0.0	0.66	0.5	0.71	0.6
Highway Segment	Collision with Fixed Object	8.75	7.0	21.45	17.2	30.19	24.1
Highway Segment	Collision with Other Object	0.62	0.5	4.16	3.3	4.78	3.8
Highway Segment	Other Single-vehicle Collision	2.52	2.0	3.21	2.6	5.72	4.6
Highway Segment	Collision with Parked Vehicle	0.18	0.1	0.48	0.4	0.66	0.5
Highway Segment	Total Single Vehicle Crashes	12.11	9.7	29.95	24.0	42.07	33.6
Highway Segment	Right-Angle Collision	0.84	0.7	1.00	0.8	1.85	1.5
Highway Segment	Head-on Collision	0.22	0.2	0.11	0.1	0.33	0.3
Highway Segment	Other Multi-vehicle Collision	0.84	0.7	1.34	1.1	2.18	1.7
Highway Segment	Rear-end Collision	20.41	16.3	38.46	30.8	58.88	47.1
Highway Segment	Sideswipe, Same Direction Collision	4.90	3.9	14.83	11.9	19.73	15.8
Highway Segment	Total Multiple Vehicle Crashes	27.22	21.8	55.74	44.6	82.96	66.4
Highway Segment	Total Highway Segment Crashes	39.33	31.5	85.70	68.5	125.03	100.0
	Total Crashes	39.33	31.5	85.70	68.5	125.03	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Speed Change Site Set CPM Evaluation

Type: Ramp Exit Speed Change
Calibration Factor: FI_EX=1.0, PDO_EX=1.0

Table 5. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	0.2000	2040: 111725
2	Eight-lane Freeway Speed Change	I-40	SR 171 Off Ramp	0.2000	2040: 111725

Table 6. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	2.67	13.3748	0.66
2	Eight-lane Freeway Speed Change	I-40	SR 171 Off Ramp	2.67	13.3748	0.66

Table 7. Expected Exit Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0214	0.0569	0.3093	0.6834	1.6039
2	0.0214	0.0569	0.3093	0.6834	1.6039
Total	0.0428	0.1137	0.6187	1.3668	3.2079

Table 8. Expected Exit Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.02	0.4	0.02	0.4
Highway Segment	Collision with Fixed Object	0.42	7.8	0.66	12.4	1.08	20.3
Highway Segment	Collision with Other Object	0.03	0.6	0.10	1.8	0.13	2.4
Highway Segment	Other Single-vehicle Collision	0.10	2.0	0.07	1.4	0.18	3.3
Highway Segment	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Total Single Vehicle Crashes	0.56	10.4	0.86	16.0	1.42	26.5
Highway Segment	Right-Angle Collision	0.02	0.4	0.04	0.7	0.06	1.2
Highway Segment	Head-on Collision	0.01	0.2	0.01	0.1	0.02	0.3
Highway Segment	Other Multi-vehicle Collision	0.03	0.6	0.05	1.0	0.09	1.6
Highway Segment	Rear-end Collision	1.18	22.0	1.81	33.9	2.99	55.9
Highway Segment	Sideswipe, Same Direction Collision	0.34	6.3	0.44	8.3	0.78	14.6
Highway Segment	Total Multiple Vehicle Crashes	1.58	29.6	2.35	44.0	3.93	73.5
Highway Segment	Total Highway Segment Crashes	2.14	40.0	3.21	60.0	5.35	100.0
	Total Crashes	2.14	40.0	3.21	60.0	5.35	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance Speed Change
Calibration Factor: FI_EN=1.0, PDO_EN=1.0

Table 9. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	0.2000	2040: 111725
2	Eight-lane Freeway Speed Change	I-40	SR 171 On Ramp	0.2000	2040: 11725

Table 10. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	3.55	17.7717	0.87
2	Eight-lane Freeway Speed Change	I-40	SR 171 On Ramp	0.26	1.2950	0.60

Table 11. Expected Entrance Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0248	0.0658	0.3583	0.7915	2.3139
2	0.0022	0.0058	0.0316	0.0698	0.1496
Total	0.0270	0.0717	0.3899	0.8613	2.4635

Table 12. Expected Entrance Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.01	0.1	0.01	0.1
Highway Segment	Collision with Fixed Object	0.26	6.9	0.32	8.3	0.58	15.2
Highway Segment	Collision with Other Object	0.03	0.7	0.09	2.3	0.11	3.0
Highway Segment	Other Single-vehicle Collision	0.09	2.4	0.04	1.0	0.13	3.4
Highway Segment	Collision with Parked Vehicle	0.01	0.1	0.01	0.2	0.01	0.3
Highway Segment	Total Single Vehicle Crashes	0.38	10.1	0.46	12.0	0.84	22.1
Highway Segment	Right-Angle Collision	0.03	0.7	0.04	1.0	0.07	1.7
Highway Segment	Head-on Collision	0.01	0.1	0.00	0.1	0.01	0.2
Highway Segment	Other Multi-vehicle Collision	0.02	0.6	0.04	1.0	0.06	1.6
Highway Segment	Rear-end Collision	0.73	19.2	1.31	34.2	2.04	53.5
Highway Segment	Sideswipe, Same Direction Collision	0.18	4.7	0.62	16.3	0.80	21.0
Highway Segment	Total Multiple Vehicle Crashes	0.97	25.3	2.00	52.6	2.97	77.9
Highway Segment	Total Highway Segment Crashes	1.35	35.4	2.46	64.6	3.81	100.0
	Total Crashes	1.35	35.4	2.46	64.6	3.81	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Ramp Site Set CPM Evaluation

Type: Ramp Exit
Calibration Factor: EX_RAMP_MV_FI=1.0, EX_RAMP_MV_PDO=1.0, EX_RAMP_SV_FI=1.0, EX_RAMP_SV_PDO=1.0

Table 13. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	2040: 7825
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	2040: 14530

Table 14. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	0.44	1.9994	0.70
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	0.97	3.8664	0.73

Table 15. Expected Exit Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0055	0.0166	0.0709	0.1074	0.2395
2	0.0082	0.0248	0.0877	0.2411	0.6048
Total	0.0137	0.0415	0.1586	0.3484	0.8443

Table 16. Expected Exit Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.1	0.01	1.1	0.02	1.2
Highway Segment	Collision with Fixed Object	0.38	26.8	0.49	35.2	0.87	61.9
Highway Segment	Collision with Other Object	0.03	1.9	0.10	6.8	0.12	8.7
Highway Segment	Other Single-vehicle Collision	0.11	7.7	0.07	5.3	0.18	13.0
Highway Segment	Collision with Parked Vehicle	0.01	0.6	0.01	0.8	0.02	1.3
Highway Segment	Total Single Vehicle Crashes	0.52	37.1	0.69	49.1	1.21	86.2
Highway Segment	Right-Angle Collision	0.00	0.1	0.00	0.2	0.00	0.3
Highway Segment	Head-on Collision	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Multi-vehicle Collision	0.00	0.1	0.00	0.3	0.01	0.4
Highway Segment	Rear-end Collision	0.03	2.2	0.11	7.5	0.14	9.7
Highway Segment	Sideswipe, Same Direction Collision	0.01	0.5	0.04	2.9	0.05	3.4
Highway Segment	Total Multiple Vehicle Crashes	0.04	2.9	0.15	10.9	0.19	13.8
Highway Segment	Total Highway Segment Crashes	0.56	40.0	0.84	60.0	1.41	100.0
	Total Crashes	0.56	40.0	0.84	60.0	1.41	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance
Calibration Factor: ENT_RAMP_MV_FI=1.0, ENT_RAMP_MV_PDO=1.0, ENT_RAMP_SV_FI=1.0, ENT_RAMP_SV_PDO=1.0

Table 17. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	2040: 7565
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	2040: 22575

Table 18. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	0.27	1.8158	0.66
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	1.74	6.9677	0.85

Table 19. Expected Entrance Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0024	0.0074	0.0468	0.0571	0.1587
2	0.0107	0.0326	0.1728	0.4040	1.1219
Total	0.0132	0.0399	0.2196	0.4611	1.2805

Table 20. Expected Entrance Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.1	0.01	0.7	0.01	0.8
Highway Segment	Collision with Fixed Object	0.29	14.7	0.45	22.2	0.74	36.8
Highway Segment	Collision with Other Object	0.02	1.0	0.09	4.3	0.11	5.3
Highway Segment	Other Single-vehicle Collision	0.09	4.2	0.07	3.3	0.15	7.5
Highway Segment	Collision with Parked Vehicle	0.01	0.3	0.01	0.5	0.02	0.8
Highway Segment	Total Single Vehicle Crashes	0.41	20.3	0.62	31.0	1.03	51.3
Highway Segment	Right-Angle Collision	0.01	0.5	0.01	0.6	0.02	1.1
Highway Segment	Head-on Collision	0.00	0.1	0.00	0.1	0.00	0.2
Highway Segment	Other Multi-vehicle Collision	0.01	0.5	0.02	0.8	0.03	1.3
Highway Segment	Rear-end Collision	0.24	12.1	0.45	22.5	0.70	34.6
Highway Segment	Sideswipe, Same Direction Collision	0.06	2.9	0.17	8.7	0.23	11.6
Highway Segment	Total Multiple Vehicle Crashes	0.33	16.1	0.66	32.6	0.98	48.7
Highway Segment	Total Highway Segment Crashes	0.73	36.4	1.28	63.6	2.01	100.0
	Total Crashes	0.73	36.4	1.28	63.6	2.01	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2040 SR 171

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 171
Existing Geometry
2040

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 5:09 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 17:06:42 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: SR 171 Existing
Site Set Comment: Created Thu Sep 21 13:30:58 CDT 2017
Site Set Version: v1

Evaluation Title: SR 171 Existing 2040
Evaluation Comment: Created Thu Sep 21 17:06:14 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	SR 171	TriStar to SR 265	0.4800	2040: 71150	12.00	12.00	8.00	8.00	0.00	0.00	0.00	0.00	0.00	6.0	3	no	None (0)	no	no	0.00	0.0000	0	0.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	SR 171	TriStar to SR 265	0.4800	8.27	17.2385	0.66

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.10	1.2	1.03	12.5	1.00	12.1
Highway Segment	Collision with Bicycle	0.01	0.1	0.01	0.1	0.02	0.2
Highway Segment	Other Single-vehicle Collision	0.02	0.2	0.16	2.0	0.17	2.1
Highway Segment	Overturned	0.10	1.2	0.08	1.0	0.21	2.5
Highway Segment	Collision with Pedestrian	0.02	0.2	0.01	0.1	0.03	0.3
Highway Segment	Run Off Road	1.45	17.5	2.84	34.3	4.31	52.1
Highway Segment	Total Single Vehicle Crashes	1.70	20.5	4.13	49.9	5.73	69.3
Highway Segment	Angle Collision	0.27	3.2	0.41	4.9	0.70	8.5
Highway Segment	Head-on Collision	0.09	1.1	0.02	0.2	0.13	1.6
Highway Segment	Other Multiple-vehicle Collision	0.07	0.8	0.17	2.0	0.22	2.7
Highway Segment	Rear-end Collision	0.44	5.3	0.69	8.3	1.18	14.2
Highway Segment	Sideswipe	0.10	1.2	0.21	2.6	0.31	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.97	11.7	1.49	18.0	2.54	30.7
Highway Segment	Total Highway Segment Crashes	2.66	32.2	5.62	67.9	8.27	100.0
	Total Crashes	2.66	32.2	5.62	67.9	8.27	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Urban Arterial Site Set CPM Evaluation

Type: 3T
Calibration Factor: 1

Table 4. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	3T	SR 171	Providence toTriStar	0.2000	2040: 71150	3	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	3T	SR 171	Providence toTriStar	0.2000	10.52	52.6167	2.03

Table 6. Expected 3T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Collision with Bicycle	0.27	2.5	0.00	0.0	0.27	2.5
Highway Segment	Collision with Fixed Object	0.06	0.6	0.26	2.4	0.32	3.0
Highway Segment	Collision with Other Object	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Single-vehicle Collision	0.03	0.3	0.01	0.1	0.04	0.4
Highway Segment	Collision with Pedestrian	0.40	3.8	0.00	0.0	0.40	3.8
Highway Segment	Total Segment Single Vehicle Crashes	0.76	7.2	0.27	2.5	1.02	9.7
Highway Segment	Angle Collision	0.20	1.9	0.09	0.9	0.29	2.8
Highway Segment	Driveway-related Collision	0.47	4.4	1.46	13.8	1.92	18.3
Highway Segment	Head-on Collision	0.10	0.9	0.09	0.9	0.19	1.8
Highway Segment	Other Multi-vehicle Collision	0.10	0.9	0.09	0.9	0.19	1.8
Highway Segment	Rear-end Collision	2.45	23.3	3.94	37.4	6.39	60.7
Highway Segment	Sideswipe, Opposite Direction Collision	0.05	0.5	0.09	0.9	0.14	1.4
Highway Segment	Sideswipe, Same Direction Collision	0.00	0.0	0.36	3.5	0.37	3.5
Highway Segment	Total Segment Multiple Vehicle Crashes	3.37	32.0	6.13	58.3	9.50	90.3
Highway Segment	Total Highway Segment Crashes	4.13	39.2	6.40	60.8	10.52	100.0
	Total Crashes	4.13	39.2	6.40	60.8	10.52	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 5T
Calibration Factor: 1

Table 7. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	5T	SR 171	I-40 to Providence	0.6000	2040: 71150	1	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	5T	SR 171	I-40 to Providence	0.6000	24.94	41.5731	1.60

Table 9. Expected 5T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.01	0.0	0.09	0.4	0.10	0.4
Highway Segment	Collision with Bicycle	1.16	4.6	0.00	0.0	1.16	4.6
Highway Segment	Collision with Fixed Object	0.16	0.7	1.43	5.7	1.59	6.4
Highway Segment	Collision with Other Object	0.00	0.0	0.11	0.5	0.12	0.5
Highway Segment	Other Single-vehicle Collision	0.24	1.0	0.23	0.9	0.47	1.9
Highway Segment	Collision with Pedestrian	0.69	2.8	0.00	0.0	0.69	2.8
Highway Segment	Total Segment Single Vehicle Crashes	2.26	9.1	1.86	7.5	4.12	16.5
Highway Segment	Angle Collision	0.25	1.0	0.86	3.5	1.11	4.5
Highway Segment	Driveway-related Collision	0.31	1.2	0.84	3.4	1.15	4.6
Highway Segment	Head-on Collision	0.11	0.4	0.06	0.2	0.17	0.7
Highway Segment	Other Multi-vehicle Collision	0.09	0.4	0.42	1.7	0.52	2.1
Highway Segment	Rear-end Collision	4.29	17.2	9.51	38.1	13.79	55.3
Highway Segment	Sideswipe, Opposite Direction Collision	0.02	0.1	0.13	0.5	0.15	0.6
Highway Segment	Sideswipe, Same Direction Collision	0.31	1.2	3.62	14.5	3.93	15.8
Highway Segment	Total Segment Multiple Vehicle Crashes	5.38	21.6	15.45	61.9	20.82	83.5
Highway Segment	Total Highway Segment Crashes	7.64	30.6	17.31	69.4	24.94	100.0
	Total Crashes	7.64	30.6	17.31	69.4	24.94	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4SG
Calibration Factor: 1

Table 10. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/ Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 171 at I40 WB		2040: 71150	2040: 22575	2	2	yes	false	0	0	2	2	no	50	6	0	0	4
2	4SG2x2le5	SR 171 at I40 EB		2040: 71150	2040: 14500	1	1	yes	false	0	1	0	1	no	50	5	0	0	6
3	4SG2x2le5	SR 171 at Belinda		2040: 71150	2040: 10000	4	3	yes	false	0	2	2	4	no	50	7	0	0	6
4	4SG2x2le5	SR 171 at Crossings		2040: 71150	2040: 10000	3	2	yes	false	2	2	0	4	no	50	6	0	0	9
6	4SG2x2le5	SR 171 at Providence W		2040: 71150	2040: 10000	4	3	yes	false	0	4	0	4	no	50	5	0	0	4
7	4SG2x2le5	SR 171 at TriStar		2040: 71150	2040: 10000	3	2	yes	false	1	3	0	4	no	50	4	0	0	3
8	4SG2x2le5	SR 171 at SR 265		2040: 71150	2040: 14000	2	0	no	false	2	2	0	4	no	50	3	0	0	1

Table 11. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 171 at I40 WB	16.07	0.47	16.0703
2	4SG	SR 171 at I40 EB	19.21	0.61	19.2100
3	4SG	SR 171 at Belinda	9.77	0.33	9.7717
4	4SG	SR 171 at Crossings	12.79	0.43	12.7889
6	4SG	SR 171 at Providence W	10.83	0.37	10.8324
7	4SG	SR 171 at TriStar	12.65	0.43	12.6459
8	4SG	SR 171 at SR 265	18.28	0.59	18.2757

Table 12. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.01	0.0	0.01	0.0
Intersection	Collision with Bicycle	1.47	1.5	0.00	0.0	1.47	1.5
Intersection	Collision with Fixed Object	0.55	0.5	2.70	2.7	3.25	3.3
Intersection	Non-Collision	0.10	0.1	0.11	0.1	0.21	0.2
Intersection	Collision with Other Object	0.05	0.1	0.22	0.2	0.27	0.3
Intersection	Other Single-vehicle Collision	0.03	0.0	0.07	0.1	0.10	0.1
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.26	0.3	0.00	0.0	0.26	0.3
Intersection	Total Intersection Single Vehicle Crashes	2.46	2.5	3.10	3.1	5.56	5.6
Intersection	Angle Collision	12.15	12.2	14.40	14.5	26.55	26.7
Intersection	Head-on Collision	1.72	1.7	1.77	1.8	3.49	3.5
Intersection	Other Multi-vehicle Collision	1.93	1.9	12.45	12.5	14.38	14.4
Intersection	Rear-end Collision	15.76	15.8	28.50	28.6	44.26	44.4
Intersection	Sideswipe	3.47	3.5	1.89	1.9	5.36	5.4
Intersection	Total Intersection Multiple Vehicle Crashes	35.02	35.2	59.01	59.3	94.03	94.4
Intersection	Total Intersection Crashes	37.48	37.6	62.12	62.4	99.59	100.0
	Total Crashes	37.48	37.6	62.12	62.4	99.59	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: EXISTING GEOMETRY 2040 SR 265

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 265
Existing Geometry
2040

September 21, 2017

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Report Overview

Report Generated: Sep 21, 2017 5:08 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Thu Sep 21 17:00:11 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Existing
Project Comment: Existing Conditions
Project Unit System: U.S. Customary

Site Set: SR 265 Existing
Site Set Comment: Created Thu Sep 21 09:25:02 CDT 2017
Site Set Version: v1

Evaluation Title: SR 265 Existing 2040
Evaluation Comment: Created Thu Sep 21 16:59:46 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	SR 265	Existing Geometry	1.5200	2040: 14000	10.00	10.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	10.0	4	no	None (0)	no	no	0.00	0.0000	0	0.00	no
2	2U	SR 265	Existing Geometry	0.1600	2040: 14000	10.00	10.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	6.0	4	no	None (0)	no	no	550.00	0.1600	0	1.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	SR 265	Existing Geometry	1.5200	9.06	5.9596	1.17
2	2U	SR 265	Existing Geometry	0.1600	1.47	9.2148	1.80

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.13	1.2	1.32	12.5	1.27	12.1
Highway Segment	Collision with Bicycle	0.01	0.1	0.01	0.1	0.02	0.2
Highway Segment	Other Single-vehicle Collision	0.02	0.2	0.21	2.0	0.22	2.1
Highway Segment	Overturned	0.12	1.2	0.11	1.0	0.26	2.5
Highway Segment	Collision with Pedestrian	0.02	0.2	0.01	0.1	0.03	0.3
Highway Segment	Run Off Road	1.84	17.5	3.61	34.3	5.49	52.1
Highway Segment	Total Single Vehicle Crashes	2.16	20.5	5.26	49.9	7.30	69.3
Highway Segment	Angle Collision	0.34	3.2	0.52	4.9	0.90	8.5
Highway Segment	Head-on Collision	0.12	1.1	0.02	0.2	0.17	1.6
Highway Segment	Other Multiple-vehicle Collision	0.09	0.8	0.21	2.0	0.28	2.7
Highway Segment	Rear-end Collision	0.56	5.3	0.87	8.3	1.50	14.2
Highway Segment	Sideswipe	0.13	1.2	0.27	2.6	0.39	3.7
Highway Segment	Total Multiple Vehicle Crashes	1.23	11.7	1.90	18.0	3.23	30.7
Highway Segment	Total Highway Segment Crashes	3.39	32.2	7.15	67.9	10.53	100.0
	Total Crashes	3.39	32.2	7.15	67.9	10.53	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Urban Arterial Site Set CPM Evaluation

Type: 3ST
Calibration Factor: 1

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout
1	3ST2x2le5	SR 265 at Pleasant Grove	3-leg stop	2040: 14000	2040: 4450	0	0	no	false
2	3ST2x2le5	SR 265 at Tillman	3-leg stop	2040: 14000	2040: 300	0	0	no	false
4	3ST2x2le5	SR 265 at Cook	3-leg stop	2040: 14000	2040: 500	0	0	no	false

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	3ST	SR 265 at Pleasant Grove	3-leg stop	2.43	0.41	2.4316
2	3ST	SR 265 at Tillman	3-leg stop	0.78	0.15	0.7749
4	3ST	SR 265 at Cook	3-leg stop	0.96	0.18	0.9617

Table 6. Expected 3ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.01	0.2	0.01	0.2
Intersection	Collision with Bicycle	0.06	1.5	0.00	0.0	0.06	1.5
Intersection	Collision with Fixed Object	0.14	3.3	0.33	8.0	0.47	11.3
Intersection	Non-Collision	0.02	0.5	0.01	0.3	0.03	0.7
Intersection	Collision with Other Object	0.02	0.4	0.04	0.9	0.05	1.3
Intersection	Other Single-vehicle Collision	0.01	0.2	0.01	0.2	0.02	0.4
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.08	2.0	0.00	0.0	0.08	2.0
Intersection	Total Intersection Single Vehicle Crashes	0.33	8.0	0.40	9.6	0.73	17.5
Intersection	Angle Collision	0.43	10.3	0.57	13.7	1.00	24.0
Intersection	Head-on Collision	0.06	1.4	0.05	1.2	0.11	2.6
Intersection	Other Multi-vehicle Collision	0.08	2.0	0.51	12.3	0.59	14.3
Intersection	Rear-end Collision	0.53	12.7	0.96	23.0	1.49	35.7
Intersection	Sideswipe	0.16	3.8	0.09	2.1	0.24	5.9
Intersection	Total Intersection Multiple Vehicle Crashes	1.26	30.1	2.18	52.3	3.44	82.5
Intersection	Total Intersection Crashes	1.59	38.1	2.58	61.9	4.17	100.0
	Total Crashes	1.59	38.1	2.58	61.9	4.17	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4ST
Calibration Factor: 1

Table 7. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout
1	4ST2x2le5	SR 265 at Adams	4-leg stop	2040: 14000	2040: 13500	0	0	no	false

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4ST	SR 265 at Adams	4-leg stop	4.21	0.42	4.2072

Table 9. Expected 4ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.01	0.2	0.01	0.2
Intersection	Collision with Bicycle	0.07	1.7	0.00	0.0	0.07	1.7
Intersection	Collision with Fixed Object	0.06	1.4	0.22	5.3	0.28	6.8
Intersection	Non-Collision	0.02	0.4	0.01	0.3	0.03	0.7
Intersection	Collision with Other Object	0.01	0.2	0.02	0.4	0.03	0.6
Intersection	Other Single-vehicle Collision	0.01	0.1	0.00	0.0	0.01	0.2
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.09	2.1	0.00	0.0	0.09	2.1
Intersection	Total Intersection Single Vehicle Crashes	0.25	6.0	0.27	6.3	0.52	12.3
Intersection	Angle Collision	0.66	15.6	0.74	17.5	1.39	33.1
Intersection	Head-on Collision	0.06	1.5	0.07	1.6	0.13	3.0
Intersection	Other Multi-vehicle Collision	0.09	2.1	0.48	11.3	0.57	13.5
Intersection	Rear-end Collision	0.51	12.0	0.82	19.5	1.33	31.5
Intersection	Sideswipe	0.18	4.3	0.10	2.3	0.28	6.6
Intersection	Total Intersection Multiple Vehicle Crashes	1.49	35.5	2.20	52.3	3.69	87.7
Intersection	Total Intersection Crashes	1.74	41.5	2.46	58.5	4.21	100.0
	Total Crashes	1.74	41.5	2.46	58.5	4.21	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4SG
Calibration Factor: 1

Table 10. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 265 at SR 171	4-leg signal	2040: 30875	2040: 14000	2	0	yes	false	2	2	0	4	no	50	3	0	0	1

Table 11. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 265 at SR 171	4-leg signal	6.93	0.42	6.9347

Table 12. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.10	1.5	0.00	0.0	0.10	1.5
Intersection	Collision with Fixed Object	0.07	0.9	0.24	3.5	0.31	4.4
Intersection	Non-Collision	0.01	0.2	0.01	0.1	0.02	0.3
Intersection	Collision with Other Object	0.01	0.1	0.02	0.3	0.03	0.4
Intersection	Other Single-vehicle Collision	0.00	0.1	0.01	0.1	0.01	0.1
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.03	0.5	0.00	0.0	0.03	0.5
Intersection	Total Intersection Single Vehicle Crashes	0.22	3.2	0.28	4.0	0.50	7.2
Intersection	Angle Collision	0.76	11.0	1.03	14.9	1.80	25.9
Intersection	Head-on Collision	0.11	1.6	0.13	1.8	0.23	3.4
Intersection	Other Multi-vehicle Collision	0.12	1.7	0.89	12.9	1.01	14.6
Intersection	Rear-end Collision	0.99	14.3	2.05	29.5	3.04	43.8
Intersection	Sideswipe	0.22	3.1	0.14	2.0	0.35	5.1
Intersection	Total Intersection Multiple Vehicle Crashes	2.20	31.7	4.24	61.1	6.44	92.8
Intersection	Total Intersection Crashes	2.42	34.9	4.52	65.1	6.93	100.0
	Total Crashes	2.42	34.9	4.52	65.1	6.93	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: PROPOSED GEOMETRY 2040 ADAMS LANE

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

Adams Lane
Proposed
2040

September 22, 2017

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Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Fri Sep 22 12:19:11 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Proposed
Project Comment: Proposed Conditions
Project Unit System: U.S. Customary

Site Set: Adams Lane Proposed
Site Set Comment: Created Thu Sep 21 14:39:57 CDT 2017
Site Set Version: v1

Evaluation Title: Proposed Adams 2040
Evaluation Comment: Created Fri Sep 22 12:18:45 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Urban Arterial Site Set CPM Evaluation

Type: 4D
Calibration Factor: 1

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Effective Median Width (ft)	Median Type	Type of Parking/ Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/ Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	4D	Proposed Adams/Providence		1.0000	2040: 20345	0	2	0	0	2	0	0	no	no	5.00	100.0	12.00	Traversable Median	No Parking	0.000	No Parking	0.000	Low

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	Proposed Adams/Providence	1.0000	6.15	6.1522	0.83

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.05	0.8	0.05	0.8
Highway Segment	Collision with Bicycle	0.07	1.2	0.00	0.0	0.07	1.2
Highway Segment	Collision with Fixed Object	0.08	1.4	0.67	10.8	0.75	12.2
Highway Segment	Collision with Other Object	0.01	0.1	0.01	0.2	0.02	0.3
Highway Segment	Other Single-vehicle Collision	0.08	1.3	0.09	1.4	0.17	2.7
Highway Segment	Collision with Pedestrian	0.38	6.2	0.00	0.0	0.38	6.2
Highway Segment	Total Segment Single Vehicle Crashes	0.62	10.1	0.82	13.3	1.44	23.4
Highway Segment	Angle Collision	0.05	0.8	0.12	1.9	0.17	2.8
Highway Segment	Driveway-related Collision	0.03	0.5	0.08	1.4	0.12	1.9
Highway Segment	Head-on Collision	0.03	0.4	0.02	0.4	0.05	0.8
Highway Segment	Other Multi-vehicle Collision	0.06	1.0	0.23	3.8	0.30	4.8
Highway Segment	Rear-end Collision	1.07	17.4	2.19	35.6	3.26	53.0
Highway Segment	Sideswipe, Opposite Direction Collision	0.01	0.2	0.00	0.1	0.02	0.3
Highway Segment	Sideswipe, Same Direction Collision	0.06	1.0	0.74	12.0	0.80	13.0
Highway Segment	Total Segment Multiple Vehicle Crashes	1.32	21.5	3.39	55.1	4.71	76.6
Highway Segment	Total Highway Segment Crashes	1.95	31.6	4.21	68.4	6.15	100.0
	Total Crashes	1.95	31.6	4.21	68.4	6.15	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: PROPOSED GEOMETRY 2040 I-40

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

I-40
Proposed
2040

September 22, 2017

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Report Overview

Report Generated: Sep 22, 2017 2:36 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Fri Sep 22 14:36:23 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
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Project Title: I-40 at SR 265 IAR 2040 Proposed
Project Comment: Proposed Conditions
Project Unit System: U.S. Customary

Site Set: I-40 Proposed 2040
Site Set Comment: Created Thu Sep 21 14:44:31 CDT 2017
Site Set Version: v1

Evaluation Title: I-40 Build 2040
Evaluation Comment: Created Fri Sep 22 14:35:49 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Freeway Segment Site Set CPM Evaluation

Type: Freeway
Calibration Factor: FI_MV=1.0, PDO_MV=1.0, FI_SV=1.0, PDO_SV=1.0

Table 1. Evaluation Freeway Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway	I40	SR 45 to SR 265	3.9200	2040: 115725
2	Eight-lane Freeway	I40	within SR 265 Ramps	0.4000	2040: 90185
3	Ten-lane Freeway	I40	SR 265 to SR 171	1.0000	2040: 97675

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway	I40	SR 45 to SR 265	3.9200	90.63	23.1199	0.55
2	Eight-lane Freeway	I40	within SR 265 Ramps	0.4000	7.25	18.1120	0.55
3	Ten-lane Freeway	I40	SR 265 to SR 171	1.4000	24.73	17.6640	0.50

Table 3. Expected Freeway Freeway Sites Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.5779	1.5278	8.2663	17.9223	62.3357
2	0.0495	0.1308	0.7076	1.5341	4.8228
3	0.1763	0.4660	2.5212	5.4663	16.0998
Total	0.8037	2.1245	11.4951	24.9227	83.2584

Table 4. Expected Freeway Site Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.05	0.0	0.64	0.5	0.69	0.6
Highway Segment	Collision with Fixed Object	8.77	7.2	20.89	17.0	29.66	24.2
Highway Segment	Collision with Other Object	0.62	0.5	4.05	3.3	4.67	3.8
Highway Segment	Other Single-vehicle Collision	2.53	2.1	3.12	2.5	5.65	4.6
Highway Segment	Collision with Parked Vehicle	0.18	0.1	0.47	0.4	0.65	0.5
Highway Segment	Total Single Vehicle Crashes	12.14	9.9	29.17	23.8	41.32	33.7
Highway Segment	Right-Angle Collision	0.84	0.7	0.97	0.8	1.82	1.5
Highway Segment	Head-on Collision	0.22	0.2	0.11	0.1	0.33	0.3
Highway Segment	Other Multi-vehicle Collision	0.84	0.7	1.30	1.1	2.14	1.7
Highway Segment	Rear-end Collision	20.40	16.6	37.32	30.4	57.72	47.1
Highway Segment	Sideswipe, Same Direction Collision	4.90	4.0	14.39	11.7	19.28	15.7
Highway Segment	Total Multiple Vehicle Crashes	27.20	22.2	54.09	44.1	81.29	66.3
Highway Segment	Total Highway Segment Crashes	39.35	32.1	83.26	67.9	122.60	100.0
	Total Crashes	39.35	32.1	83.26	67.9	122.60	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Speed Change Site Set CPM Evaluation

Type: Ramp Exit Speed Change
Calibration Factor: FI_EX=1.0, PDO_EX=1.0

Table 5. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	0.2000	2040: 115725
2	Eight-lane Freeway Speed Change	I-40	SR 265 EB Off Ramp	0.2000	2040: 115725

Table 6. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 Off Ramp	2.76	13.8149	0.65
2	Eight-lane Freeway Speed Change	I-40	SR 265 EB Off Ramp	2.76	13.8149	0.65

Table 7. Expected Exit Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0221	0.0587	0.3193	0.7055	1.6574
2	0.0221	0.0587	0.3193	0.7055	1.6574
Total	0.0442	0.1174	0.6387	1.4109	3.3148

Table 8. Expected Exit Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.02	0.4	0.02	0.4
Highway Segment	Collision with Fixed Object	0.43	7.8	0.69	12.4	1.12	20.3
Highway Segment	Collision with Other Object	0.04	0.6	0.10	1.8	0.14	2.4
Highway Segment	Other Single-vehicle Collision	0.11	2.0	0.08	1.4	0.18	3.3
Highway Segment	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Total Single Vehicle Crashes	0.58	10.4	0.89	16.0	1.46	26.5
Highway Segment	Right-Angle Collision	0.02	0.4	0.04	0.7	0.06	1.2
Highway Segment	Head-on Collision	0.01	0.2	0.01	0.1	0.02	0.3
Highway Segment	Other Multi-vehicle Collision	0.04	0.6	0.05	1.0	0.09	1.6
Highway Segment	Rear-end Collision	1.21	22.0	1.87	33.9	3.09	55.9
Highway Segment	Sideswipe, Same Direction Collision	0.35	6.3	0.46	8.3	0.81	14.6
Highway Segment	Total Multiple Vehicle Crashes	1.63	29.6	2.43	44.0	4.06	73.5
Highway Segment	Total Highway Segment Crashes	2.21	40.0	3.31	60.0	5.53	100.0
	Total Crashes	2.21	40.0	3.31	60.0	5.53	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance Speed Change
Calibration Factor: FI_EN=1.0, PDO_EN=1.0

Table 9. Speed Change Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	0.2000	2040: 115725
3	Eight-lane Freeway Speed Change	I-40	SR 265 WB On Ramp	0.2000	2040: 115725

Table 10. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	Eight-lane Freeway Speed Change	I-40	US 45 On Ramp	3.72	18.6205	0.88
3	Eight-lane Freeway Speed Change	I-40	SR 265 WB On Ramp	3.85	19.2357	0.91

Table 11. Expected Entrance Speed Change Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0262	0.0695	0.3781	0.8353	2.4150
3	0.0286	0.0760	0.4137	0.9139	2.4150
Total	0.0548	0.1455	0.7918	1.7492	4.8299

Table 12. Expected Entrance Speed Change Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.01	0.1	0.01	0.1
Highway Segment	Collision with Fixed Object	0.53	7.0	0.62	8.2	1.16	15.3
Highway Segment	Collision with Other Object	0.05	0.7	0.17	2.3	0.23	3.0
Highway Segment	Other Single-vehicle Collision	0.18	2.4	0.08	1.0	0.26	3.4
Highway Segment	Collision with Parked Vehicle	0.01	0.1	0.01	0.2	0.03	0.3
Highway Segment	Total Single Vehicle Crashes	0.78	10.3	0.90	11.9	1.68	22.1
Highway Segment	Right-Angle Collision	0.05	0.7	0.08	1.0	0.13	1.7
Highway Segment	Head-on Collision	0.01	0.1	0.01	0.1	0.02	0.2
Highway Segment	Other Multi-vehicle Collision	0.05	0.6	0.07	1.0	0.12	1.6
Highway Segment	Rear-end Collision	1.49	19.7	2.56	33.8	4.05	53.5
Highway Segment	Sideswipe, Same Direction Collision	0.36	4.8	1.22	16.1	1.58	20.9
Highway Segment	Total Multiple Vehicle Crashes	1.96	25.9	3.93	51.9	5.89	77.9
Highway Segment	Total Highway Segment Crashes	2.74	36.2	4.83	63.8	7.57	100.0
	Total Crashes	2.74	36.2	4.83	63.8	7.57	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Freeway Ramp Site Set CPM Evaluation

Type: Ramp Exit
Calibration Factor: EX_RAMP_MV_FI=1.0, EX_RAMP_MV_PDO=1.0, EX_RAMP_SV_FI=1.0, EX_RAMP_SV_PDO=1.0

Table 13. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	2040: 8325
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	2040: 4625
3	One-lane Ramp Exit	I-40	SR 265 EB Off Ramp	0.2000	2040: 12845
4	One-lane Ramp Exit	I-40	SR 265 WB Off Ramp	0.2000	2040: 3740

Table 14. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Exit	I-40	US 45 Off Ramp	0.2200	0.46	2.0933	0.69
2	Two-lane Ramp Exit	I-40	SR 171 Off Ramp	0.2500	0.40	1.6020	0.95
3	One-lane Ramp Exit	I-40	SR 265 EB Off Ramp	0.2000	0.62	3.1094	0.66
4	One-lane Ramp Exit	I-40	SR 265 WB Off Ramp	0.2000	0.00	0.0000	0.00

Table 15. Expected Exit Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0057	0.0174	0.0742	0.1123	0.2508
2	0.0035	0.0105	0.0373	0.1024	0.2468
3	0.0097	0.0294	0.1222	0.1491	0.3114
4	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0189	0.0574	0.2337	0.3639	0.8091

Table 16. Expected Exit Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.2	0.02	1.1	0.02	1.2
Highway Segment	Collision with Fixed Object	0.46	31.2	0.51	34.3	0.97	65.5
Highway Segment	Collision with Other Object	0.03	2.2	0.10	6.7	0.13	8.9
Highway Segment	Other Single-vehicle Collision	0.13	9.0	0.08	5.1	0.21	14.1
Highway Segment	Collision with Parked Vehicle	0.01	0.6	0.01	0.8	0.02	1.4
Highway Segment	Total Single Vehicle Crashes	0.64	43.2	0.71	48.0	1.35	91.2
Highway Segment	Right-Angle Collision	0.00	0.1	0.00	0.1	0.00	0.2
Highway Segment	Head-on Collision	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Multi-vehicle Collision	0.00	0.1	0.00	0.2	0.00	0.2
Highway Segment	Rear-end Collision	0.03	1.7	0.07	4.5	0.09	6.2
Highway Segment	Sideswipe, Same Direction Collision	0.01	0.4	0.03	1.8	0.03	2.2
Highway Segment	Total Multiple Vehicle Crashes	0.03	2.2	0.10	6.6	0.13	8.8
Highway Segment	Total Highway Segment Crashes	0.67	45.4	0.81	54.6	1.48	100.0
	Total Crashes	0.67	45.4	0.81	54.6	1.48	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: Ramp Entrance
Calibration Factor: ENT_RAMP_MV_FI=1.0, ENT_RAMP_MV_PDO=1.0, ENT_RAMP_SV_FI=1.0, ENT_RAMP_SV_PDO=1.0

Table 17. Ramp Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	2040: 8065
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	2040: 11880
3	One-lane Ramp Entrance	I-40	SR 265 EB On Ramp	0.2000	2040: 3750
4	Two-lane Ramp Entrance	I-40	SR 265 WB On Ramp	0.2000	2040: 12695

Table 18. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Effective Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	One-lane Ramp Entrance	I-40	US 45 On Ramp	0.1500	0.29	1.9140	0.65
2	Two-lane Ramp Entrance	I-40	SR 171 On Ramp	0.2500	0.90	3.6138	0.83
3	One-lane Ramp Entrance	I-40	SR 265 EB On Ramp	0.2000	0.21	1.0397	0.76
4	Two-lane Ramp Entrance	I-40	SR 265 WB On Ramp	0.2000	0.65	3.2497	0.70

Table 19. Expected Entrance Ramp Crash Severity

Site No.	Fatal (K) Crashes (crashes)	Incapacitating Injury (A) Crashes (crashes)	Non-Incapacitating Injury (B) Crashes (crashes)	Possible Injury (C) Crashes (crashes)	No Injury (O) Crashes (crashes)
1	0.0026	0.0077	0.0492	0.0601	0.1675
2	0.0052	0.0159	0.0843	0.1972	0.6008
3	0.0019	0.0058	0.0368	0.0449	0.1186
4	0.0030	0.0090	0.0465	0.0877	0.5037
Total	0.0127	0.0384	0.2169	0.3899	1.3906

Table 20. Expected Entrance Ramp Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.1	0.02	0.9	0.02	1.0
Highway Segment	Collision with Fixed Object	0.34	16.4	0.58	28.3	0.92	44.7
Highway Segment	Collision with Other Object	0.02	1.2	0.11	5.5	0.14	6.7
Highway Segment	Other Single-vehicle Collision	0.10	4.7	0.09	4.2	0.18	9.0
Highway Segment	Collision with Parked Vehicle	0.01	0.3	0.01	0.6	0.02	1.0
Highway Segment	Total Single Vehicle Crashes	0.47	22.7	0.81	39.6	1.28	62.3
Highway Segment	Right-Angle Collision	0.01	0.3	0.01	0.5	0.02	0.8
Highway Segment	Head-on Collision	0.00	0.1	0.00	0.1	0.00	0.1
Highway Segment	Other Multi-vehicle Collision	0.01	0.3	0.01	0.7	0.02	1.0
Highway Segment	Rear-end Collision	0.14	7.1	0.40	19.5	0.55	26.6
Highway Segment	Sideswipe, Same Direction Collision	0.04	1.7	0.15	7.5	0.19	9.2
Highway Segment	Total Multiple Vehicle Crashes	0.19	9.4	0.58	28.3	0.77	37.7
Highway Segment	Total Highway Segment Crashes	0.66	32.1	1.39	67.9	2.05	100.0
	Total Crashes	0.66	32.1	1.39	67.9	2.05	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: PROPOSED GEOMETRY 2040 SR 171

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 171
Proposed
2040

September 22, 2017

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Report Overview

Report Generated: Sep 22, 2017 12:04 PM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Fri Sep 22 12:04:31 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Proposed
Project Comment: Proposed Conditions
Project Unit System: U.S. Customary

Site Set: SR 171 Proposed
Site Set Comment: Created Thu Sep 21 13:30:58 CDT 2017
Site Set Version: v1

Evaluation Title: SR 171 Proposed 2040
Evaluation Comment: Created Fri Sep 22 12:04:08 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Rural Two Lane Site Set CPM Evaluation

Type: 2U
Calibration Factor: 1

Table 1. Evaluation Segment Site - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Left Side Lane Width (ft)	Right Side Lane Width (ft)	Left Side Paved Shoulder Width (ft)	Right Side Paved Shoulder Width (ft)	Left Side Gravel Shoulder Width (ft)	Right Side Gravel Shoulder Width (ft)	Left Side Turf Shoulder Width (ft)	Right Side Turf Shoulder Width (ft)	Grade (%)	Driveway Density (driveways/mi)	Roadside Hazard Rating	Centerline Rumble Strip	Passing Lanes	TWLT Lane	Lighting	Curve Radius (ft)	Curve Length (mi)	Presence of Spirals	Superelevation Variance (%)	Automated Speed Enforcement
1	2U	SR 171	TriStar to SR 265	0.4800	2040: 71150	12.00	12.00	8.00	8.00	0.00	0.00	0.00	0.00	0.00	6.0	3	no	None (0)	no	no	0.00	0.0000	0	0.00	no

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	2U	SR 171	TriStar to SR 265	0.4800	8.27	17.2385	0.66

Table 3. Expected 2U Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.10	1.2	1.03	12.5	1.00	12.1
Highway Segment	Collision with Bicycle	0.01	0.1	0.01	0.1	0.02	0.2
Highway Segment	Other Single-vehicle Collision	0.02	0.2	0.16	2.0	0.17	2.1
Highway Segment	Overturned	0.10	1.2	0.08	1.0	0.21	2.5
Highway Segment	Collision with Pedestrian	0.02	0.2	0.01	0.1	0.03	0.3
Highway Segment	Run Off Road	1.45	17.5	2.84	34.3	4.31	52.1
Highway Segment	Total Single Vehicle Crashes	1.70	20.5	4.13	49.9	5.73	69.3
Highway Segment	Angle Collision	0.27	3.2	0.41	4.9	0.70	8.5
Highway Segment	Head-on Collision	0.09	1.1	0.02	0.2	0.13	1.6
Highway Segment	Other Multiple-vehicle Collision	0.07	0.8	0.17	2.0	0.22	2.7
Highway Segment	Rear-end Collision	0.44	5.3	0.69	8.3	1.18	14.2
Highway Segment	Sideswipe	0.10	1.2	0.21	2.6	0.31	3.7
Highway Segment	Total Multiple Vehicle Crashes	0.97	11.7	1.49	18.0	2.54	30.7
Highway Segment	Total Highway Segment Crashes	2.66	32.2	5.62	67.9	8.27	100.0
	Total Crashes	2.66	32.2	5.62	67.9	8.27	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

Urban Arterial Site Set CPM Evaluation

Type: 3T
Calibration Factor: 1

Table 4. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length (mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	3T	SR 171	Providence toTriStar	0.2000	2040: 71150	3	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	3T	SR 171	Providence toTriStar	0.2000	10.52	52.6167	2.03

Table 6. Expected 3T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Collision with Bicycle	0.27	2.5	0.00	0.0	0.27	2.5
Highway Segment	Collision with Fixed Object	0.06	0.6	0.26	2.4	0.32	3.0
Highway Segment	Collision with Other Object	0.00	0.0	0.00	0.0	0.00	0.0
Highway Segment	Other Single-vehicle Collision	0.03	0.3	0.01	0.1	0.04	0.4
Highway Segment	Collision with Pedestrian	0.40	3.8	0.00	0.0	0.40	3.8
Highway Segment	Total Segment Single Vehicle Crashes	0.76	7.2	0.27	2.5	1.02	9.7
Highway Segment	Angle Collision	0.20	1.9	0.09	0.9	0.29	2.8
Highway Segment	Driveway-related Collision	0.47	4.4	1.46	13.8	1.92	18.3
Highway Segment	Head-on Collision	0.10	0.9	0.09	0.9	0.19	1.8
Highway Segment	Other Multi-vehicle Collision	0.10	0.9	0.09	0.9	0.19	1.8
Highway Segment	Rear-end Collision	2.45	23.3	3.94	37.4	6.39	60.7
Highway Segment	Sideswipe, Opposite Direction Collision	0.05	0.5	0.09	0.9	0.14	1.4
Highway Segment	Sideswipe, Same Direction Collision	0.00	0.0	0.36	3.5	0.37	3.5
Highway Segment	Total Segment Multiple Vehicle Crashes	3.37	32.0	6.13	58.3	9.50	90.3
Highway Segment	Total Highway Segment Crashes	4.13	39.2	6.40	60.8	10.52	100.0
	Total Crashes	4.13	39.2	6.40	60.8	10.52	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 5T
Calibration Factor: 1

Table 7. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Type of Parking/Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	5T	SR 171	I-40 to Providence	0.6000	2040: 44535	1	0	0	0	0	0	0	yes	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Low
2	5T	SR 171	Providence to SR 265	0.6800	2040: 28860	3	0	0	0	0	0	0	no	no	5.00	100.0	No Parking	0.000	No Parking	0.000	Intermediate/High

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	5T	SR 171	I-40 to Providence	0.6000	14.90	24.8401	1.53
2	5T	SR 171	Providence to SR 265	0.6800	11.60	17.0575	1.62

Table 9. Expected 5T Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.01	0.0	0.13	0.5	0.14	0.5
Highway Segment	Collision with Bicycle	0.82	3.1	0.00	0.0	0.82	3.1
Highway Segment	Collision with Fixed Object	0.29	1.1	2.09	7.9	2.38	9.0
Highway Segment	Collision with Other Object	0.00	0.0	0.17	0.6	0.17	0.6
Highway Segment	Other Single-vehicle Collision	0.42	1.6	0.33	1.3	0.75	2.8
Highway Segment	Collision with Pedestrian	0.67	2.5	0.00	0.0	0.67	2.5
Highway Segment	Total Segment Single Vehicle Crashes	2.22	8.4	2.72	10.3	4.94	18.6
Highway Segment	Angle Collision	0.26	1.0	0.85	3.2	1.11	4.2
Highway Segment	Driveway-related Collision	0.52	2.0	1.42	5.4	1.94	7.3
Highway Segment	Head-on Collision	0.11	0.4	0.06	0.2	0.17	0.6
Highway Segment	Other Multi-vehicle Collision	0.09	0.4	0.42	1.6	0.51	1.9
Highway Segment	Rear-end Collision	4.38	16.5	9.40	35.5	13.78	52.0
Highway Segment	Sideswipe, Opposite Direction Collision	0.02	0.1	0.13	0.5	0.15	0.6
Highway Segment	Sideswipe, Same Direction Collision	0.32	1.2	3.58	13.5	3.90	14.7
Highway Segment	Total Segment Multiple Vehicle Crashes	5.70	21.5	15.86	59.9	21.56	81.4
Highway Segment	Total Highway Segment Crashes	7.92	29.9	18.59	70.1	26.50	100.0
	Total Crashes	7.92	29.9	18.59	70.1	26.50	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4SG
Calibration Factor: 1

Table 10. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/ Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 171 at I40 WB		2040: 44535	2040: 11880	2	2	yes	false	0	0	2	2	no	50	6	0	0	4
2	4SG2x2le5	SR 171 at I40 EB		2040: 44535	2040: 10580	1	1	yes	false	0	1	0	1	no	50	5	0	0	6
3	4SG2x2le5	SR 171 at Belinda		2040: 44535	2040: 10000	4	3	yes	false	0	2	2	4	no	50	7	0	0	6
4	4SG2x2le5	SR 171 at Crossings		2040: 44535	2040: 10000	3	2	yes	false	2	2	0	4	no	50	6	0	0	9
6	4SG2x2le5	SR 171 at Providence W		2040: 44535	2040: 10000	4	3	yes	false	0	4	0	4	no	50	5	0	0	4
7	4SG2x2le5	SR 171 at TriStar		2040: 28860	2040: 10000	3	2	yes	false	1	3	0	4	no	50	4	0	0	3
8	4SG2x2le5	SR 171 at SR 265		2040: 28860	2040: 25910	4	4	no	false	0	0	4	4	no	50	7	0	0	1

Table 11. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 171 at I40 WB	8.47	0.41	8.4663
2	4SG	SR 171 at I40 EB	10.91	0.54	10.9125
3	4SG	SR 171 at Belinda	5.98	0.30	5.9773
4	4SG	SR 171 at Crossings	7.82	0.39	7.8233
6	4SG	SR 171 at Providence W	6.62	0.33	6.6239
7	4SG	SR 171 at TriStar	4.91	0.35	4.9113
8	4SG	SR 171 at SR 265	4.54	0.23	4.5429

Table 12. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.01	0.0
Intersection	Collision with Bicycle	0.72	1.5	0.00	0.0	0.72	1.5
Intersection	Collision with Fixed Object	0.39	0.8	1.57	3.2	1.95	4.0
Intersection	Non-Collision	0.07	0.1	0.06	0.1	0.13	0.3
Intersection	Collision with Other Object	0.04	0.1	0.13	0.3	0.16	0.3
Intersection	Other Single-vehicle Collision	0.02	0.0	0.04	0.1	0.06	0.1
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.25	0.5	0.00	0.0	0.25	0.5
Intersection	Total Intersection Single Vehicle Crashes	1.49	3.0	1.80	3.7	3.29	6.7
Intersection	Angle Collision	5.62	11.4	7.26	14.7	12.88	26.2
Intersection	Head-on Collision	0.79	1.6	0.89	1.8	1.69	3.4
Intersection	Other Multi-vehicle Collision	0.89	1.8	6.28	12.7	7.17	14.6
Intersection	Rear-end Collision	7.29	14.8	14.37	29.2	21.66	44.0
Intersection	Sideswipe	1.60	3.3	0.95	1.9	2.56	5.2
Intersection	Total Intersection Multiple Vehicle Crashes	16.21	32.9	29.75	60.4	45.96	93.3
Intersection	Total Intersection Crashes	17.70	35.9	31.55	64.1	49.26	100.0
	Total Crashes	17.70	35.9	31.55	64.1	49.26	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

IHSDM PREDICTIVE CRASH ANALYSIS: PROPOSED GEOMETRY 2040 SR 265

Interactive Highway Safety Design Model

Crash Prediction Evaluation Report

SR 265
Proposed
2040

September 22, 2017

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Report Overview

Report Generated: Sep 22, 2017 11:04 AM
Report Template: System: Single Page [System] (sscpm3, Sep 21, 2017 4:10 PM)

Evaluation Date: Fri Sep 22 11:03:57 CDT 2017
IHSDM Version: v13.0.0 (Sep 13, 2017)
Site Set Crash Prediction Module: v|ModuleInfo.moduleVersion| (|ModuleInfo.moduleDate|)

User Name: storeyj
Organization Name: Gresham, Smith and Partners
Phone:
E-Mail: jon_storey@gspnet.com

Project Title: I-40 at SR 265 IAR 2040 Proposed
Project Comment: Proposed Conditions
Project Unit System: U.S. Customary

Site Set: SR 265 Proposed
Site Set Comment: Created Thu Sep 21 09:25:02 CDT 2017
Site Set Version: v1

Evaluation Title: SR 265 Proposed 2040
Evaluation Comment: Created Fri Sep 22 11:03:35 CDT 2017
Policy for Superelevation: AASHTO 2011 U.S. Customary
Calibration: HSM Configuration
Crash Distribution: HSM Configuration
Model/CMF: HSM Configuration
First Year of Analysis: 2040
Last Year of Analysis: 2040
Empirical-Bayes Analysis: None

Urban Arterial Site Set CPM Evaluation

Type: 4D
Calibration Factor: 1

Table 1. Evaluation Segment - Homogeneous Sites

Site No.	Type	Highway	Site Description	Length(mi)	AADT	Number of Major Commercial Driveways	Number of Minor Commercial Driveways	Number of Major Industrial/Institutional Driveways	Number of Minor Industrial/Institutional Driveways	Number of Major Residential Driveways	Number of Minor Residential Driveways	Number of Other Driveways	Lighting	Automated Speed Enforcement	Offset to Fixed Objects (ft)	Fixed-Object Density (fixed objects/mi)	Effective Median Width (ft)	Median Type	Type of Parking/ Land Use - Right Side	Proportion of Right Side Curb Length with Parking	Type of Parking/ Land Use - Left Side	Proportion of Left Side Curb Length with Parking	Speed Category
1	4D	SR 265	Pleasant Grove to WB Ramps	0.3600	2040: 19985	0	0	0	0	0	0	0	no	no	20.00	0.0	12.00	Non-Traversable Median	No Parking	0.000	No Parking	0.000	Low
2	4D	SR 265	WB Ramps to Reloc Adams	0.7000	2040: 40000	0	0	0	0	0	0	0	yes	no	20.00	0.0	12.00	Non-Traversable Median	No Parking	0.000	No Parking	0.000	Low
4	4D	SR 265	Reloc Adams to SR 171	0.6200	2040: 22000	0	1	0	1	0	9	0	no	no	20.00	50.0	12.00	Traversable Median	No Parking	0.000	No Parking	0.000	Intermediate/High

Table 2. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Length (mi)	Expected No. Crashes for Evaluation Period	Crash Rate (crashes/mi/yr)	Travel Crash Rate (crashes/million veh-mi)
1	4D	SR 265	Pleasant Grove to WB Ramps	0.3600	1.46	4.0628	0.56
2	4D	SR 265	WB Ramps to Reloc Adams	0.7000	6.13	8.7535	0.60
4	4D	SR 265	Reloc Adams to SR 171	0.6200	2.95	4.7575	0.59

Table 3. Expected 4D Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Highway Segment	Collision with Animal	0.00	0.0	0.07	0.6	0.07	0.6
Highway Segment	Collision with Bicycle	0.11	1.0	0.00	0.0	0.11	1.0
Highway Segment	Collision with Fixed Object	0.12	1.1	0.87	8.3	0.99	9.4
Highway Segment	Collision with Other Object	0.01	0.1	0.02	0.2	0.02	0.2
Highway Segment	Other Single-vehicle Collision	0.11	1.1	0.12	1.1	0.23	2.2
Highway Segment	Collision with Pedestrian	0.53	5.0	0.00	0.0	0.53	5.0
Highway Segment	Total Segment Single Vehicle Crashes	0.87	8.2	1.07	10.2	1.94	18.4
Highway Segment	Angle Collision	0.09	0.9	0.22	2.1	0.32	3.0
Highway Segment	Driveway-related Collision	0.02	0.2	0.05	0.5	0.07	0.7
Highway Segment	Head-on Collision	0.05	0.4	0.04	0.4	0.09	0.9
Highway Segment	Other Multi-vehicle Collision	0.11	1.1	0.44	4.2	0.55	5.2
Highway Segment	Rear-end Collision	1.93	18.3	4.11	39.0	6.04	57.3
Highway Segment	Sideswipe, Opposite Direction Collision	0.02	0.2	0.01	0.1	0.03	0.3
Highway Segment	Sideswipe, Same Direction Collision	0.12	1.1	1.39	13.1	1.50	14.2
Highway Segment	Total Segment Multiple Vehicle Crashes	2.34	22.2	6.26	59.4	8.60	81.6
Highway Segment	Total Highway Segment Crashes	3.21	30.4	7.33	69.6	10.54	100.0
	Total Crashes	3.21	30.4	7.33	69.6	10.54	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 3ST
Calibration Factor: 1

Table 4. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout
1	3ST2x2le5	SR 265 at Pleasant Grove	3-leg stop	2040: 19985	2040: 7655	2	0	no	true
4	3ST2x2le5	SR 265 at Cook	3-leg stop	2040: 22000	2040: 500	2	0	no	false

Table 5. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	3ST	SR 265 at Pleasant Grove	3-leg stop	1.09	0.13	1.0921
4	3ST	SR 265 at Cook	3-leg stop	0.68	0.08	0.6822

Table 6. Expected 3ST Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.1	0.00	0.1
Intersection	Collision with Bicycle	0.03	1.5	0.00	0.0	0.03	1.5
Intersection	Collision with Fixed Object	0.04	2.4	0.11	6.2	0.15	8.6
Intersection	Non-Collision	0.01	0.3	0.00	0.2	0.01	0.6
Intersection	Collision with Other Object	0.01	0.3	0.01	0.7	0.02	1.0
Intersection	Other Single-vehicle Collision	0.00	0.1	0.00	0.2	0.01	0.3
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.04	2.0	0.00	0.0	0.04	2.0
Intersection	Total Intersection Single Vehicle Crashes	0.12	6.8	0.13	7.4	0.25	14.2
Intersection	Angle Collision	0.18	10.0	0.26	14.9	0.44	24.8
Intersection	Head-on Collision	0.02	1.3	0.02	1.3	0.05	2.6
Intersection	Other Multi-vehicle Collision	0.03	1.9	0.24	13.3	0.27	15.2
Intersection	Rear-end Collision	0.22	12.2	0.44	25.0	0.66	37.2
Intersection	Sideswipe	0.07	3.7	0.04	2.3	0.10	5.9
Intersection	Total Intersection Multiple Vehicle Crashes	0.52	29.1	1.01	56.7	1.52	85.8
Intersection	Total Intersection Crashes	0.64	35.9	1.14	64.1	1.77	100.0
	Total Crashes	0.64	35.9	1.14	64.1	1.77	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.
Type: 4SG
Calibration Factor: 1

Table 7. Evaluation Intersection Sites

Site No.	Type	Highway	Site Description	Major AADT	Minor AADT	Number of Approaches with Left-Turn Lanes	Number of Approaches with Right-Turn Lanes	Presence of Lighting	Replaced with Roundabout	Number of Approaches with Permissive Left-Turn Phasing	Number of Approaches with Permissive/ Protected or Protected/Permissive Left-Turn Phasing	Number of Approaches with Protected Left-Turn Phasing	Number of Approaches on which Right Turn on Red is Prohibited	Presence of Red-Light Cameras	Pedestrian Volumes Crossing all Intersection Legs (crossings/day)	Max. Number of Lanes Crossed by Pedestrians	Number of Bus Stops within 1000 ft of Intersection	Number of Schools within 1000 ft of Intersection	Number of Alcohol Sales Establishments within 1000 ft of Intersection
1	4SG2x2le5	SR 265 at SR 171	4-leg signal	2040: 31290	2040: 25910	4	0	yes	false	2	2	0	4	no	50	3	0	0	1
2	4SG2x2le5	SR 265 at Reloc Adams	4-leg signal	2040: 40190	2040: 20345	4	4	yes	false	0	0	2	4	no	240	7	0	0	4
3	4SG2x2le5	SR 265 at I-40 WB	4-leg signal	2040: 39715	2040: 12695	2	2	yes	false	0	0	2	2	no	240	6	0	0	4
4	4SG2x2le5	SR 265 at I-40 EB	4-leg signal	2040: 39175	2040: 12845	2	2	yes	false	0	0	2	2	no	240	6	0	0	4

Table 8. Expected Crash Frequencies and Rates by Site

Site No.	Type	Highway	Site Description	Expected No. Crashes for Evaluation Period	Expected No. Crashes/Year (crashes/million veh)	Expected Crash Rate (crashes/yr)
1	4SG	SR 265 at SR 171	4-leg signal	6.62	0.32	6.6211
2	4SG	SR 265 at Reloc Adams	4-leg signal	6.29	0.28	6.2872
3	4SG	SR 265 at I-40 WB	4-leg signal	7.66	0.40	7.6615
4	4SG	SR 265 at I-40 EB	4-leg signal	7.57	0.40	7.5737

Table 9. Expected 4SG Crash Type Distribution

Element Type	Crash Type	Fatal and Injury		Property Damage Only		Total	
		Crashes	Crashes (%)	Crashes	Crashes (%)	Crashes	Crashes (%)
Intersection	Collision with Animal	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Bicycle	0.41	1.5	0.00	0.0	0.41	1.5
Intersection	Collision with Fixed Object	0.24	0.8	0.93	3.3	1.16	4.1
Intersection	Non-Collision	0.04	0.2	0.04	0.1	0.08	0.3
Intersection	Collision with Other Object	0.02	0.1	0.07	0.3	0.10	0.3
Intersection	Other Single-vehicle Collision	0.01	0.0	0.02	0.1	0.04	0.1
Intersection	Collision with Parked Vehicle	0.00	0.0	0.00	0.0	0.00	0.0
Intersection	Collision with Pedestrian	0.27	1.0	0.00	0.0	0.27	1.0
Intersection	Total Intersection Single Vehicle Crashes	1.00	3.5	1.06	3.8	2.06	7.3
Intersection	Angle Collision	3.15	11.2	4.15	14.8	7.30	25.9
Intersection	Head-on Collision	0.44	1.6	0.51	1.8	0.95	3.4
Intersection	Other Multi-vehicle Collision	0.50	1.8	3.59	12.8	4.09	14.5
Intersection	Rear-end Collision	4.08	14.5	8.22	29.2	12.30	43.7
Intersection	Sideswipe	0.90	3.2	0.54	1.9	1.44	5.1
Intersection	Total Intersection Multiple Vehicle Crashes	9.07	32.2	17.01	60.5	26.08	92.7
Intersection	Total Intersection Crashes	10.07	35.8	18.08	64.2	28.14	100.0
	Total Crashes	10.07	35.8	18.08	64.2	28.14	100.0

Note: *Fatal and Injury Crashes* and *Property Damage Only Crashes* do not necessarily sum up to *Total Crashes* because the distribution of these three crashes had been derived independently.

HSM CMF (DIAMOND INTERCHANGE TO DDI INTERCHANGE)

CMF / CRF Details

CMF ID: 6891

Convert diamond interchange to Diverging Diamond Interchange (DDI) or Double Crossover Diamond (DCD)

Description: Convert a diamond interchange to a Diverging Diamond Interchange (DDI) or a Double Crossover Diamond (DCD)

Prior Condition: Conventional diamond interchange

Category: Interchange design

Study: *Safety Evaluation of Diverging Diamond Interchanges in Missouri*, Edara et al., 2015

Star Quality Rating:	★★★★☆ [View score details]

Crash Modification Factor (CMF)	
Value:	0.592
Adjusted Standard Error:	
Unadjusted Standard Error:	0.029

Crash Reduction Factor (CRF)	
Value:	40.8 *(This value indicates a **decrease** in crashes)*
Adjusted Standard Error:	
Unadjusted Standard Error:	2.9

Applicability	
Crash Type:	All
Crash Severity:	All
Roadway Types:	All
Number of Lanes:	multilane
Road Division Type:	
Speed Limit:	Crossroad 35-40: Freeway 60-65
Area Type:	Not specified
Traffic Volume:	
Time of Day:	All
If countermeasure is intersection-based	
Intersection Type:	Other
Intersection Geometry:	No values chosen.
Traffic Control:	Other

Major Road Traffic Volume:	32604 to 151923 Annual Average Daily Traffic (AADT)
Minor Road Traffic Volume:	16087 to 29275 Annual Average Daily Traffic (AADT)

Development Details

Date Range of Data Used:	2005 to 2013
Municipality:	
State:	MO
Country:	USA
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	

Other Details

Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	
Comments:	This CMF applies to the entire interchange footprint (i.e., ramp terminals, ramp segments, speed-change lanes, crossroad, and freeway segment).

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.

APPENDIX G: COST ESTIMATES

Diamond Interchange Build Alternative
DDI Build Alternative

DIAMOND INTERCHANGE BUILD ALTERNATIVE

Route:	**I-40 with SR 265 (Central Pike)**
Description:	**Proposed Diamond Interchange**
	with Improvements to SR265, Adams Lane, John Hager Rd.
County:	**Wilson**
Length:	**0.34 mile SR 265, 1.06 miles length of interchange improvement along I-40**
Date:	**8/23/2016**

	UNIT	QUANT. - DI		UNIT COST	TOTAL (DI)
RIGHT-OF-WAY COST					
LAND	AC	38		$22,146	$ 841,535
COMMERCIAL	EACH	0		N/A	N/A
RESIDENTIAL	EACH	1		$15,000	$ 15,000
				SUBTOTAL	**$ 856,535**
CONSTRUCTION COST					
CLEAR AND GRUBBING					$ 120,000
EARTHWORK					$ 480,000
PAVEMENT REMOVAL					$ 5,750
DRAINAGE (INCLUDING EROSION CONTROL)					$ 1,087,638
STRUCTURES					$ 3,052,000
RAILROAD CROSSING OR SEPARATION					$ -
PAVING (INCLUDING CURB, GUTTER AND SIDEWALK)					$ 5,851,413
MAINTENANCE OF TRAFFIC					$ 886,146
TOPSOIL					$ 6,500
SEEDING					$ 34,320
SODDING					$ 18,960
SIGNING AND STRIPING					$ 124,781
LIGHTING					$ 650,000
SIGNALIZATION					$ 320,000
FENCE					$ 154,800
GUARDRAIL					$ 62,760
OTHER CONST. ITEMS (15%)					$ 1,928,260
				SUBTOTAL	**$ 14,783,327**
UTILITY COST					
OVERHEAD ELECTRIC	MI.	0.303		$100,000	$ 30,303
TELEPHONE	MI.	0.303		$75,000	$ 22,727
WATER	MI.	0.047		$350,000	$ 16,572
SEWER	MI.	0.047		$165,000	$ 7,813
CABLE	MI.	0.303		$30,000	$ 9,091
GAS	MI.	0.047		$205,000	$ 9,706
				SUBTOTAL	**$ 96,212**
MOBILIZATION (5% OF CONSTRUCTION COST)					
				SUBTOTAL	**$ 739,166**
CONTINGENCY (10% OF CONSTRUCTION COST AND UTILITIES)					**$ 1,561,871**
TOTAL CONSTRUCTION COST					**$ 17,180,577**
PRELIMINARY ENGINEERING (10% OF TOTAL CONSTRUCTION COST)					**$ 1,718,058**
TOTAL COST*					**$ 19,755,169**

**** For estimating future project costs, a compounded inflation rate of 10% per year will be applied from the date of this estimate.***

**** **Note: Assumes 20" water line can remain in place.***

Summary of Detailed Cost Estimates

Diamond Interchange (DI)

	UNIT	QUANTITY	UNIT COST	TOTAL
CLEAR AND GRUBBING				
INTERCHANGE	AC	30	$4,000.00	$120,000
			SUBTOTAL	**$120,000**
EARTHWORK				
INTERCHANGE	CY	80000	$6.00	$480,000
			SUBTOTAL	**$480,000**
PAVEMENT REMOVAL				
LOCAL ROADS AND PORTIONS OF SR 265 (202-03.01)	CY	500	$11.50	$5,750
			SUBTOTAL	**$5,750**
DRAINAGE (INCLUDING EROSION CONTROL)				
CATCH BASINS (611-12.02)	EACH	81	$5,500.00	$445,638
DRAINAGE PIPE (607-03.02)	LF	6000	$92.00	$552,000
SILT FENCE (209-08.03)	LF	9000	$2.00	$18,000
SEDIMENT FILTER TUBES (740-11.02)	LF	1000	$5.00	$5,000
SEDIMENT REMOVAL (209-05)	CY	2500	$20.00	$50,000
CATCH BASIN PROTECTION (209-40.33)	EACH	15	$400.00	$6,000
CHECK DAMS (209-08.08)	EACH	20	$350.00	$7,000
EROSION CONTROL BLANKET (805-12.01)	SY	2000	$2.00	$4,000
			SUBTOTAL	**$1,087,638**
STRUCTURES				
BRIDGE	SF	25100	$120.00	$3,012,000
BRIDGE REMOVAL	LS	1	$40,000.00	$40,000
			SUBTOTAL	**$3,052,000**
RAILROAD CROSSING OR SEPARATION				
NONE	SF	0	$85.00	$0
			SUBTOTAL	**$0**
PAVING (INCLUDES CURB, GUTTER & SIDEWALK)				
(10" SR265, 8" SIDE RDS, 6" RAMPS)MINERAL AGG BASE GRADING "D" (303-01)	TON	66702	$22.00	$1,467,450
(3")AC MIX (PG64-22) GR "A" (307-01.01)	TON	3052	$79.00	$241,082
(2")AC MIX (PG64-22) GR "BM-2" (307-01.08)	TON	1997	$79.00	$157,781
(3.25")AC MIX (PG70-22) GR "A" (307-02.01)	TON	6097	$66.00	$402,431
(3")PERF AC (PG70-22) GR "A-S" (307-01.21)	TON	4405	$60.00	$264,279
(2")AC MIX (PG70-22) GR "B-M2" (307-02.08)	TON	3686	$88.00	$324,390
(4")TREATED PERMEABLE BASE (313-03)	SY	21258	$18.00	$382,643
BITUMINOUS MATERIAL FOR PRIME COAT (402-01)	TON	97	$536.00	$52,109
AGGREGATE FOR COVER MATERIAL (402-02)	TON	385	$35.00	$13,475
BITUMINOUS MATERIAL FOR TACK COAT (403-01)	TON	19	$590.00	$11,488
(1.5")ACS (PG64-22) GR "E" (411-01.07)	TON	542	$85.00	$46,088
(1.25")AC MIX (PG70-22) GR "D" (411-01.10)	TON	1164	$79.00	$91,995
(1.25")AC MIX (PG64-22) GR "D" (411-02.10)	TON	2714	$86.00	$233,393
PORTLAND CEM CON (PLAIN) 10" (501-01.03)	SY	21214	$69.00	$1,463,758
UNDERDRAIN (710-02)	LF	4000	$8.00	$32,000
CURB AND GUTTER (702-03)	CY	1289	$300.00	$386,635
COLD PLANING BITUMINOUS PAVEMENT (415-01.02)	SY	33333	$2.00	$66,666
SIDEWALK (701-01.01)	SF	45000	$4.75	$213,750
			SUBTOTAL	**$5,851,413**
MAINTENANCE OF TRAFFIC				
TRAFFIC CONTROL (5% OF CONSTRUCTION COST)	LS	1	$598,446.06	$598,446
TRAFFIC CONTROL SIGNAGE (712-06)	SF	1000	$8.00	$8,000
PORTABLE BARRIER RAIL (705-04.50)	LF	5000	$28.00	$140,000
PORTABLE IMPACT ATTENUATOR (705-08.11)	EACH	6	$6,000.00	$36,000
REMOVE & RELOCATE BARRIER RAIL (712-02.36)	LF	2500	$20.00	$50,000
FLEXIBLE DRUMS (712-04.02)	EACH	500	$20.00	$10,000
WARNING LIGHTS (712-05.01)	EACH	250	$30.00	$7,500
ARROW BOARD (712-08.03)	EACH	2	$1,100.00	$2,200
CHANGEABLE MESSAGE SIGN UNIT (713-16.01)	EACH	2	$2,000.00	$4,000
TEMPORARY STRIPING	LF	10000	$3.00	$30,000
			SUBTOTAL	**$886,146**
TOPSOIL				
TOPSOIL (203-04)	CY	1000	$6.50	$6,500
			SUBTOTAL	**$6,500**
SEEDING				
SEEDING WITH MULCH (801-01)	UNIT	1200	$27.00	$32,400

WATER (801-03)	M.G.	120	$16.00	$1,920
			SUBTOTAL	**$34,320**
SODDING				
SODDING (803-01)	SY	6000	$3.00	$18,000
WATER (801-03)	M.G.	60	$16.00	$960
			SUBTOTAL	**$18,960**
SIGNING AND STRIPING				
STEEL I-BEAMS & WF-BEAMS(BREAKAWAY) SIGN SUPPORT (713-04.02)	LB.	5888.4	$4.00	$23,554
"U" SECTION STEEL POSTS (713-11.01)	LB.	676	$3.50	$2,366
PERFORATED/KNOCKOUT SQUARE TUBE POST (713-11.02)	LB.	801	$4.50	$3,603
FLAT SHEET ALUMINUM SIGNS (0.080" THICK) (713-13.02)	S.F.	100	$13.00	$1,300
FLAT SHEET ALUMINUM SIGNS (0.100" THICK) (713-13.03)	S.F.	374	$14.50	$5,423
EXTRUDED ALUMINUM PANEL SIGNS (713-14)	S.F.	2415	$24.00	$57,960
PAVEMENT ARROWS/BIKE LANE MARKINGS (716-05.09)	EACH	37	$225.00	$8,325
STRIPING (716-05.01)	LM	8.9	$2,500.00	$22,250
			SUBTOTAL	**$124,781**
LIGHTING				
INTERCHANGE LIGHTING	LS	1	$650,000.00	$650,000
			SUBTOTAL	**$650,000**
SIGNALIZATION				
SR 265@INTERCHANGE RAMPS	LS	2	$160,000.00	$320,000
			SUBTOTAL	**$320,000**
FENCE				
AT INTERCHANGE (707-01.11)	LF	8600	$18.00	$154,800
			SUBTOTAL	**$154,800**
GUARDRAIL				
GUARDRAIL (705-02.01)	LF	2000	$20.00	$40,000
END TERMINALS (705-04.04)	EACH	8	$2,000.00	$16,000
GUARDRAIL AT BRIDGE ENDS (705-01.01)	LF	104	$65.00	$6,760
			SUBTOTAL	**$62,760**

	Land Value	Size	Unit Value
tract 1	431900	95.75	4510.7
tract 2	376500	156	2413.5
tract 3	140300	10	14030.0
tract 4	107700	4.21	25581.9
tract 5	87100	4	21775.0
tract 6	157600	16	9850.0
tract 7			
tract 8			
tract 9			
tract 10			
			$13,027
		ROW Factor 1.7	**$22,145.65**

DDI BUILD ALTERNATIVE

Route:	**I-40 Interchange with SR 265 (Central Pike)**
Description:	**Proposed Diverging Diamond Interchange**
	with Improvements to SR265, Adams Lane, John Hager Rd.
County:	**Wilson**
Length:	**0.34 mile SR 265, 1.06 miles length of interchange improvement along I-40**
Date:	**9/29/2016**

	UNIT	QUANT. - DDI		UNIT COST	TOTAL (DDI)
RIGHT-OF-WAY COST					
LAND	AC	38		$22,146	$ 841,535
COMMERCIAL	EACH	0		N/A	N/A
RESIDENTIAL	EACH	1		$15,000	$ 15,000
				SUBTOTAL	**$ 856,535**
CONSTRUCTION COST					
CLEAR AND GRUBBING					$ 160,000
EARTHWORK					$ 480,000
PAVEMENT REMOVAL					$ 5,750
DRAINAGE (INCLUDING EROSION CONTROL)					$ 1,212,250
STRUCTURES					$ 3,100,000
RAILROAD CROSSING OR SEPARATION					$ -
PAVING (INCLUDING CURB, GUTTER AND SIDEWALK)					$ 6,217,655
MAINTENANCE OF TRAFFIC					$ 922,308
TOPSOIL					$ 9,750
SEEDING					$ 40,740
SODDING					$ 15,800
SIGNING AND STRIPING					$ 147,450
LIGHTING					$ 650,000
SIGNALIZATION					$ 400,000
FENCE					$ 180,000
GUARDRAIL					$ 72,760
OTHER CONST. ITEMS (15%)					$ 2,042,169
				SUBTOTAL	**$ 15,656,632**
UTILITY COST					
OVERHEAD ELECTRIC	MI.	0.3030	0	$100,000	$ 30,303
TELEPHONE	MI.	0.3030	0	$75,000	$ 22,727
WATER	MI.	0.0473	0	$350,000	$ 16,572
SEWER	MI.	0.0473	0	$165,000	$ 7,813
CABLE	MI.	0.3030	0	$30,000	$ 9,091
GAS	MI.	0.0473	0	$205,000	$ 9,706
				SUBTOTAL	**$ 96,212**
MOBILIZATION (5% OF CONSTRUCTION COST)					
				SUBTOTAL	**$ 782,832**
CONTINGENCY (10% OF CONSTRUCTION COST AND UTILITIES)					**$ 1,653,568**
TOTAL CONSTRUCTION COST					**$ 18,189,243**
PRELIMINARY ENGINEERING (10% OF TOTAL CONSTRUCTION COST)					**$ 1,818,924**
TOTAL COST*					**$ 20,864,702**

For estimating future project costs, a compounded inflation rate of 10% per year will be applied from the date of this estimate.

**** **Note: Assumes 20" water line can remain in place.***

Summary of Detailed Cost Estimates

Diverging Diamond Interchange (DDI)

	UNIT	QUANTITY	UNIT COST	TOTAL
CLEAR AND GRUBBING				
Exit xx Interchange Area	AC	40	$4,000.00	$160,000
			SUBTOTAL	**$160,000**
EARTHWORK				
INTERCHANGE	CY	80000	$6.00	$480,000
			SUBTOTAL	**$480,000**
PAVEMENT REMOVAL				
LOCAL ROADS AND PORTIONS OF SR 265 (202-03.01)	CY	500	$11.50	$5,750
			SUBTOTAL	**$5,750**
DRAINAGE (INCLUDING EROSION CONTROL)				
CATCH BASINS (611-12.02)	EACH	94	$5,500.00	$514,250
DRAINAGE PIPE (607-03.02)	LF	6500	$92.00	$598,000
SILT FENCE (209-08.03)	LF	10000	$2.00	$20,000
SEDIMENT FILTER TUBES (740-11.02)	LF	1000	$5.00	$5,000
SEDIMENT REMOVAL (209-05)	CY	3000	$20.00	$60,000
CATCH BASIN PROTECTION (209-40.33)	EACH	10	$400.00	$4,000
CHECK DAMS (209-08.08)	EACH	20	$350.00	$7,000
EROSION CONTROL BLANKET (805-12.01)	SY	2000	$2.00	$4,000
			SUBTOTAL	**$1,212,250**
STRUCTURES				
BRIDGE	SF	25500	$120.00	$3,060,000
BRIDGE REMOVAL	LS	1	$40,000.00	$40,000
			SUBTOTAL	**$3,100,000**
RAILROAD CROSSING OR SEPARATION				
NONE	SF	0	$85.00	$0
			SUBTOTAL	**$0**
PAVING (INCLUDES CURB, GUTTER & SIDEWALK)				
(10" SR265, 8" SIDE RDS, 6" RAMPS)MINERAL AGG BASE GRADING "D" (303-01)	TON	65240	$22.00	$1,435,290
(3")AC MIX (PG64-22) GR "A" (307-01.01)	TON	3086	$79.00	$243,783
(2")AC MIX (PG64-22) GR "BM-2" (307-01.08)	TON	2020	$79.00	$159,555
(3.25")AC MIX (PG70-22) GR "A" (307-02.01)	TON	5430	$66.00	$358,391
(3")PERF AC (PG70-22) GR "A-S" (307-01.21)	TON	3923	$60.00	$235,359
(2")AC MIX (PG70-22) GR "B-M2" (307-02.08)	TON	3283	$88.00	$288,893
(4")TREATED PERMEABLE BASE (313-03)	SY	26391	$18.00	$475,035
BITUMINOUS MATERIAL FOR PRIME COAT (402-01)	TON	90	$536.00	$48,480
AGGREGATE FOR COVER MATERIAL (402-02)	TON	358	$35.00	$12,536
BITUMINOUS MATERIAL FOR TACK COAT (403-01)	TON	18	$590.00	$10,688
(1.5")ACS (PG64-22) GR "E" (411-01.07)	TON	526	$85.00	$44,687
(1.25")AC MIX (PG70-22) GR "D" (411-01.10)	TON	1178	$79.00	$93,050
(1.25")AC MIX (PG64-22) GR "D" (411-02.10)	TON	2407	$86.00	$206,984
PORTLAND CEM CON (PLAIN) 10" (501-01.03)	SY	26346	$69.00	$1,817,843
UNDERDRAIN (710-02)	LF	4000	$8.00	$32,000
CURB AND GUTTER (702-03)	CY	1487	$300.00	$446,163
COLD PLANING BITUMINOUS PAVEMENT (415-01.02)	SY	33333	$2.00	$66,666
SIDEWALK (701-01.01)	SF	51000	$4.75	$242,250
			SUBTOTAL	**$6,217,655**
MAINTENANCE OF TRAFFIC				
TRAFFIC CONTROL (5% OF CONSTRUCTION COST)	LS	1	$634,607.73	$634,608
TRAFFIC CONTROL SIGNAGE (712-06)	SF	1000	$8.00	$8,000
PORTABLE BARRIER RAIL (705-04.50)	LF	5000	$28.00	$140,000
PORTABLE IMPACT ATTENUATOR (705-08.11)	EACH	6	$6,000.00	$36,000
REMOVE & RELOCATE BARRIER RAIL (712-02.36)	LF	2500	$20.00	$50,000
FLEXIBLE DRUMS (712-04.02)	EACH	500	$20.00	$10,000
WARNING LIGHTS (712-05.01)	EACH	250	$30.00	$7,500
ARROW BOARD (712-08.03)	EACH	2	$1,100.00	$2,200
CHANGEABLE MESSAGE SIGN UNIT (713-16.01)	EACH	2	$2,000.00	$4,000
TEMPORARY STRIPING	LF	10000	$3.00	$30,000
			SUBTOTAL	**$922,308**
TOPSOIL				
TOPSOIL (203-04)	CY	1500	$6.50	$9,750
			SUBTOTAL	**$9,750**
SEEDING				
SEEDING WITH MULCH (801-01)	UNIT	1500	$27.00	$40,500

WATER (801-03)	M.G.	15	$16.00	$240
			SUBTOTAL	**$40,740**
SODDING				
SODDING (803-01)	SY	5000	$3.00	$15,000
WATER (801-03)	M.G.	50	$16.00	$800
			SUBTOTAL	**$15,800**
SIGNING AND STRIPING				
STEEL I-BEAMS & WF-BEAMS(BREAKAWAY) SIGN SUPPORT (713-04.02)	LB.	7118	$4.00	$28,474
"U" SECTION STEEL POSTS (713-11.01)	LB.	2067	$3.50	$7,235
PERFORATED/KNOCKOUT SQUARE TUBE POST (713-11.02)	LB.	1588	$4.50	$7,148
FLAT SHEET ALUMINUM SIGNS (0.080" THICK) (713-13.02)	S.F.	227	$13.00	$2,946
FLAT SHEET ALUMINUM SIGNS (0.100" THICK) (713-13.03)	S.F.	654	$14.50	$9,483
EXTRUDED ALUMINUM PANEL SIGNS (713-14)	S.F.	2435	$24.00	$58,440
PAVEMENT ARROWS/BIKE LANE MARKINGS (716-05.09)	EACH	51	$225.00	$11,475
STRIPING (716-05.01)	LM	8.9	$2,500.00	$22,250
			SUBTOTAL	**$147,450**
LIGHTING				
INTERCHANGE LIGHTING	LS	1	$650,000.00	$650,000
			SUBTOTAL	**$650,000**
SIGNALIZATION				
SR 265@INTERCHANGE RAMPS	LS	2	$200,000.00	$400,000
			SUBTOTAL	**$400,000**
FENCE				
AT INTERCHANGE (707-01.11)	LF	10000	$18.00	$180,000
			SUBTOTAL	**$180,000**
GUARDRAIL				
GUARDRAIL (705-02.01)	LF	2500	$20.00	$50,000
END TERMINALS (705-04.04)	EACH	8	$2,000.00	$16,000
GUARDRAIL AT BRIDGE ENDS (705-01.01)	LF	104	$65.00	$6,760
			SUBTOTAL	**$72,760**

	Land Value	Size	Unit Value
tract 1	431900	95.75	4510.7
tract 2	376500	156	2413.5
tract 3	140300	10	14030.0
tract 4	107700	4.21	25581.9
tract 5	87100	4	21775.0
tract 6	157600	16	9850.0
tract 7			
tract 8			
tract 9			
tract 10			
			$13,027
		ROW Factor 1.7	**$22,145.65**

TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
ETSA	2020	WILSON	1

PROPOSED (ROW)

STUDY AREA APPROX. 50 FEET FROM PROPOSED (ROW)

Central Pike - SR 265

STUDY AREA 300 FEET PAST PROJECT LIMITS

STUDY AREA APPROX. 150 FEET FROM PROJECT LIMITS

STUDY AREA APPROX. 50 FEET FROM EXISTING (ROW)

STUDY AREA APPROX. 50 FEET FROM EXISTING (ROW)

APPROX. EXIST. R.O.W.

INTE ST TE

40

John Hagar Rd

APPROX. EXIST. R.O.W.

STUDY AREA APPROX. 50 FEET FROM EXISTING (ROW)

ENVIRONMENTAL TECNICAL STUDY AREA

MATCH LINE SEE FIGURE NO. 2

0′ 200′ 400′ 600′

N

ENVIRONMENTAL TECHNICAL STUDY AREA

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 1
DIVERGING
DIAMOND
INTERCHANGE

4/24/2020 10:27:57 AM
X:\Projects\Wilson\I-40\I-40 @ CentralPike Interchange\Microstation\ETSA\ETSA_DDI_01.sht

TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
ETSA	2020	WILSON	2

PROPOSED (ROW)

STUDY AREA APPROX. 50 FEET FROM PROPOSED (ROW)

STUDY AREA APPROX. 200 FEET FROM END OF PROJECT LIMITS

ENVIRONMENTAL TECNICAL STUDY AREA

APPROX. EXIST. (ROW)

STUDY AREA APPROX. 50 FEET FROM PROPOSED (ROW)

STUDY AREA APPROX. 50 FEET FROM EXISTING (ROW)

STUDY AREA APPROX. 50 FEET FROM EXISTING (ROW)

Central Pike - SR 265

SEE FIGURE NO. 1

MATCH LINE

PROPOSED (ROW)

Tilman

STUDY AREA APPROX. 50 FEET FROM EXIST. - PROP. (ROW)

STUDY AREA APPROX. 50 FEET FROM PROPOSED (ROW)

PROPOSED (ROW)

STUDY AREA APPROX. 50 FEET FROM PROPOSED (ROW)

APPROX. EXIST. (ROW)

APPROX. EXIST. (ROW)

INTE ST TE 40

John Hagar

MATCH LINE

SEE FIGURE NO. 3

Adams

SEE FIGURE NO. 4

MATCH LINE

STUDY AREA APPROX. 60 FEET FROM EXISTING CENTERLINE

STUDY AREA APPROX. 150 FEET FROM END OF SIDE ROAD

APPROX. EXIST. (ROW)

PROPOSED (ROW)

0′ 200′ 400′ 600′

N

ENVIRONMENTAL TECHNICAL STUDY AREA

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 2
DIVERGING
DIAMOND
INTERCHANGE

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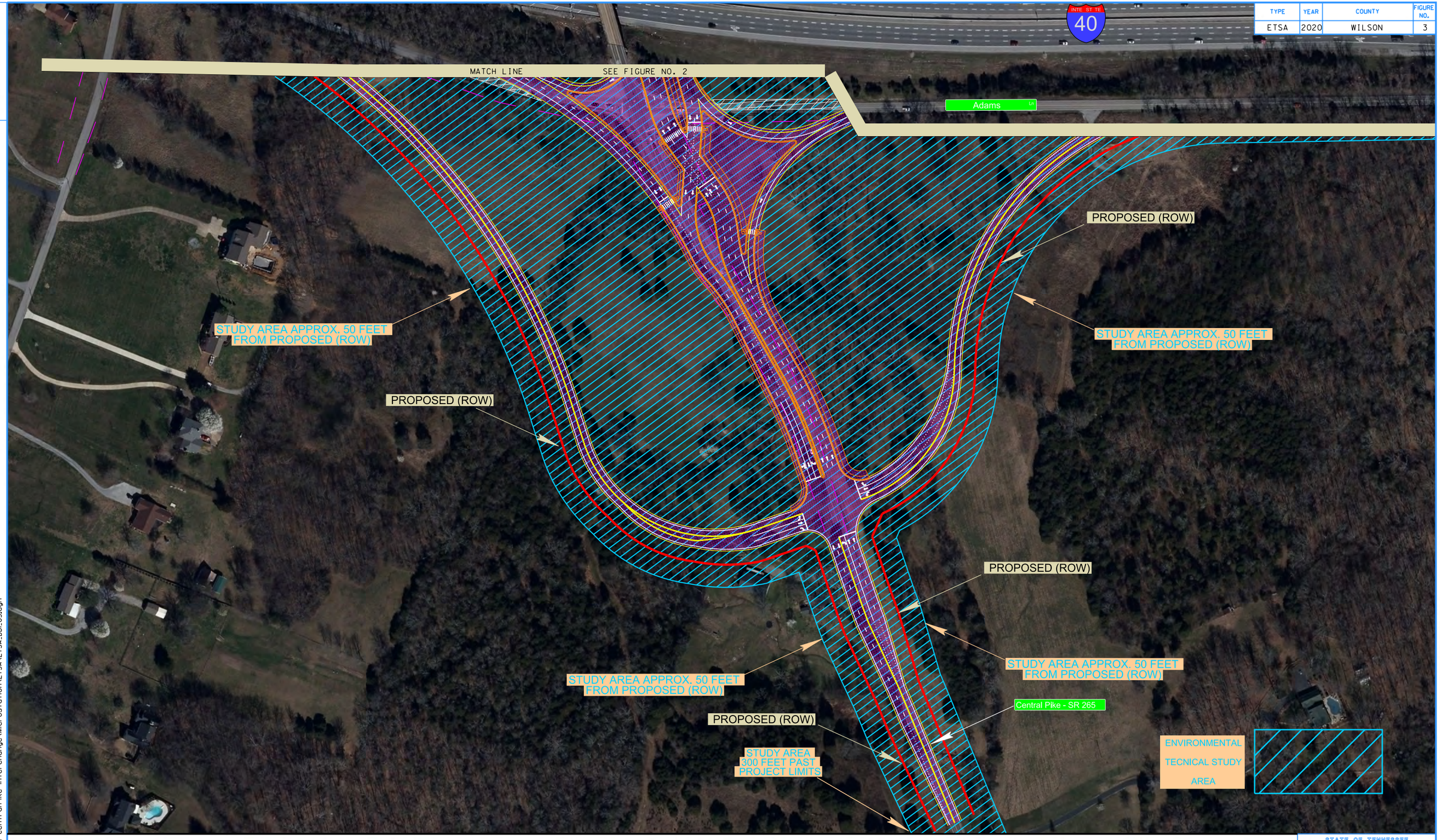
TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
ETSA	2020	WILSON	3



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N

ENVIRONMENTAL TECHNICAL STUDY AREA

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION
INVESTMENTS DIVISION

FIGURE 3
DIVERGING
DIAMOND
INTERCHANGE

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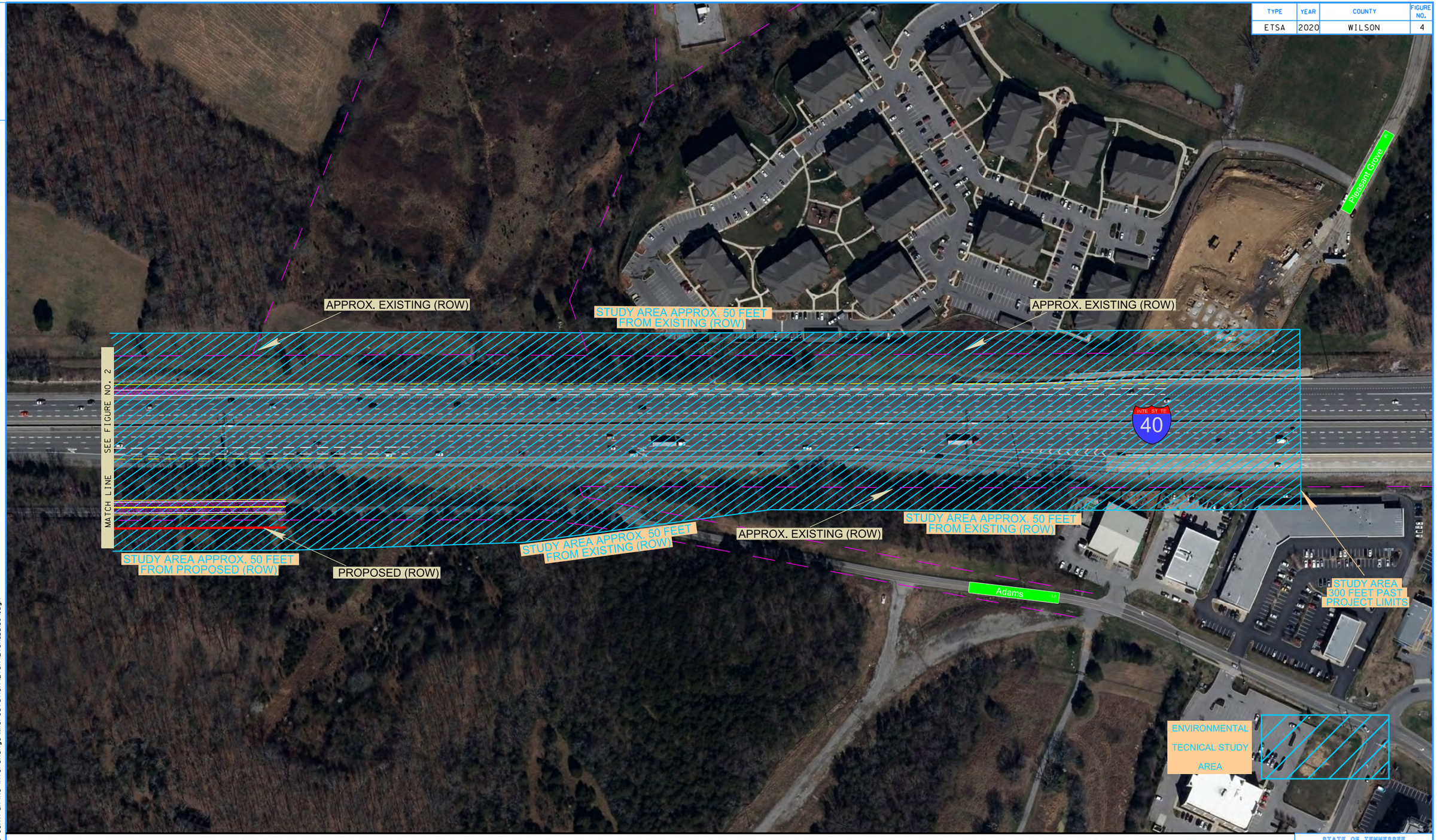
TENNESSEE D.O.T.

STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FILE NO.

TYPE	YEAR	COUNTY	FIGURE NO.
ETSA	2020	WILSON	4



0′ 200′ 400′ 600′

N

ENVIRONMENTAL TECHNICAL STUDY AREA

I-40 AT STATE ROUTE 265
WILSON COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION

FIGURE 4
DIVERGING DIAMOND INTERCHANGE

4/24/2020 11:42:34 AM
X:\Projects\Wilson\I-40\I-40 @ CentralPike Interchange\Microstation\ETSA\ETSA_DDI_04.dgn

Project Design

INITIAL STUDIES REQUEST

TO: **Environmental Tech Studies Request:**
TDOT.Env.AirNoise@tn.gov
TDOT.Env.CulturalResources@tn.gov
TDOT.Env.Ecology@tn.gov
TDOT.Env.HazmatOffice@tn.gov
TDOT.Env.NEPA@tn.gov
TDOT.Env.Permits@tn.gov
Multimodal:
TDOT.MultimodalPlanning@tn.gov
TDOT.MultiModalAdmin@tn.gov
Pavement Design Request:
TDOT.PavementDesign@tn.gov
Railroad Review (if applicable):
HQRailroadCoordinator@tn.gov
Soils and Geology Report:
TDOT.Geotech@tn.gov
Structures Grade Approval:
TDOT.Structures@tn.gov
Traffic Operations:
TDOT.TrafficOps.ITS-Reviews@tn.gov
TDOT.TrafficOps.SNL-Reviews@tn.gov

FROM: **Shane Hester, P.E.**

DATE: 2/17/2023

PROJECT INFORMATION		
County	**Wilson County**	
PIN	**124884.00**	
Federal Project No.	**NH-I-40-5(150)**	
State Project No.	**95100-1113-44**	
Project Description	**New Diverging Diamond Interchange connecting SR-265 (Central Pike) to I-40 from West of Pleasant Grove Road to East of Providence Parkway**	
Project Type	Bridge and Approach ☐ Interchange Modification ☐ Intersection Modification ☐ New Alignment ☐ New Interchange ☒ New Intersection ☐	Ramp Improvement ☐ Railroad ☐ Road Diet/Road Reconfiguration ☐ Road Safety Audit ☐ Widening ☐ Other ☐

Project Scope (Briefly describe the objective of project. Include proposed typical section with lanes, width, shoulders, etc.	Objective is to construct a new Diverging Diamond Interchange (DDI) on I-40 at SR-265 (Central Pike). The new interchange is west of the existing SR-171 (Mt. Juliet Rd) I-40 interchange (Exit 226). The new SR-265 ramps will extend to the SR-171 ramp tapers to create an auxiliary lane between the two interchanges. SR-265 will be widened to five lanes with curb & gutter and a 12' shared-use path. The DDI will consist of two new structures over I-40 constructed to the east of the existing SR-265 overpass so that traffic can be maintained during construction. Side Roads of Pleasant Grove Road, Tillman Drive, John Hagar Road and Providence Parkway will be realigned to accommodate access control for the new interchange.	
Project Design Items	Please check each box for all design items that apply to the project:	
	☐ Bike Lanes ☐ Detour Route ☐ Displacements ☐ Haul Road ☒ Intersecting Roads ☐ New Alignment	☒ Shared-Use Paths ☒ Sidewalks ☒ Traffic to be maintained during construction

Other Comments:
Project requires coordination with the City of Mt. Juliet for adjacent private development, realignement of Adams Lane and proposed improvements to Pleasant Grove Road and Providence Parkway.

Please review the following Initial Study Requests:

☒ **Environmental Technical Studies**

- ☒ This project contains existing buildings, bridges, or other infrastructure inside proposed right-of-way.
- ☒ This project involves bridge replacements on the following bridges: (list the Bridge ID numbers) 951004000011
- ☐ KMZ files are available.

☒ **Multimodal Review**

☒ **Pavement Design Request**

☒ The Traffic Report with ADL's is attached.

☐ The Traffic Report was requested on Click here to enter a date. and will be forwarded upon receipt.

☐ The Soils and Geotech Report will be forwarded upon receipt or notice sent when placed on FileNet.

☐ Railroad Review

☐ Railroad is within the ROW of the project.

☒ Structures Grade Approval

☒ Soils and Geotech Report

A geotechnical site investigation is requested to be conducted to the level necessary for the R.O.W. acquisition and construction of the subject proposed roadway improvement project. Foundation Reports for bridges and retaining walls will be requested separately by the Structures Division.

The geotechnical site investigation report should include but not be limited to recommendations for slope design verification, embankment stabilization, earthwork shrink\swell characteristics, acid producing properties of earthwork, and subgrade evaluation (CBR). We ask that the information be submitted by: 8/31/2023

☒ This project will have a Design Meeting (PPRM Activity #400). The projected date is 9/28/2023

☒ Traffic Operations

☐ Traffic Signals are indicated on the TIR or are suspected.

☒ Traffic Signals are indicated on the TIR or are suspected and signal design will be performed by the Roadway Design Consultant.

☐ Roadway Lighting is indicated on the TIR or is suspected.

☒ Roadway Lighting is indicated on the TIR or is suspected and lighting design will be performed by the Roadway Design Consultant.

☒ ITS is indicated on the TIR or is suspected. (Check this box if the project has signals or the road classification is major arterial or higher).

Plan set has been placed on FileNet on 2/10/2023

PDF Filename: *124884-00-InitialStudies.pdf*
ZIP Filename: *124884-00-InitialStudies.zip*

cc: Project Development Manager

Index Of Sheets

SEE SHEET 1A FOR INDEX OF SHEETS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

DOES THIS PROJECT QUALIFY FOR UTILITY CHAPTER 86	YES X	NO

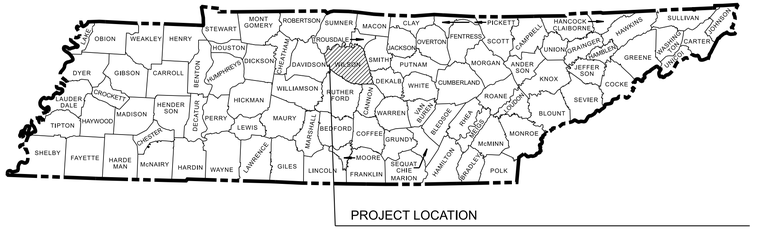
TENN.	YEAR	SHEET NO.
	2023	1
FED. AID PROJ. NO.	NH-I-40-5(150)	
STATE PROJ. NO.	95100-1113-44	

WILSON COUNTY

DIVERGING DIAMOND INTERCHANGE CONNECTING SR 265 TO I-40
FROM WEST OF PLEASENT GROVE RD TO EAST OF PROVIDENCE PARKWAY

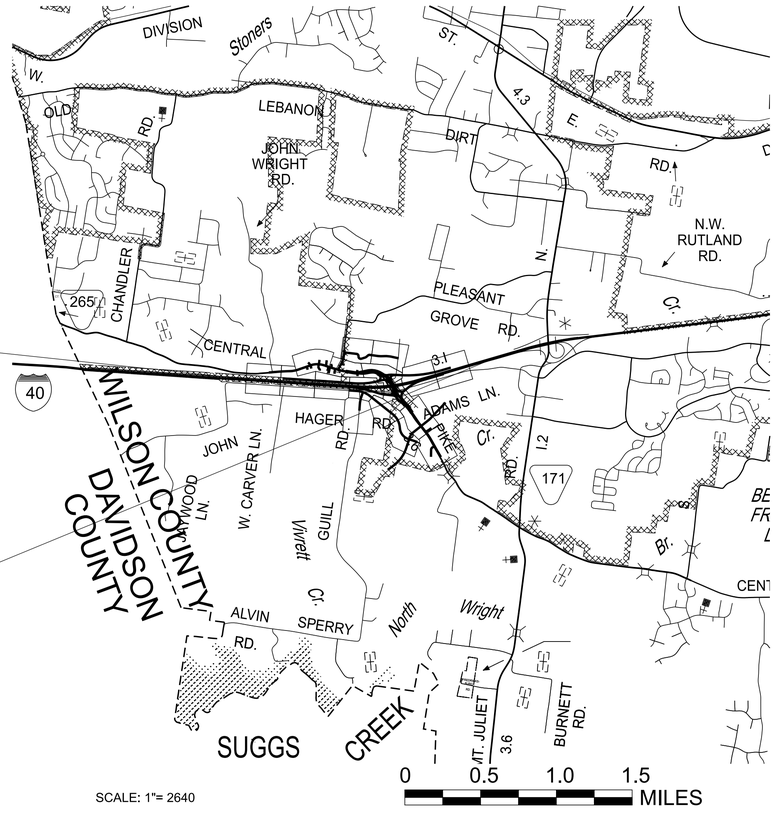
PRELIMINARY

STATE HIGHWAY NO. 265 F.A.H.S. NO. I-40



BRIDGE ID. EX. # 95I00400001
PROP. # SR 265 EB
PROP. # SR 265 WB

NO EXCLUSIONS



SCALE: 1"= 2640

95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 547+69.12 I-40

N 668229.0218 E 1807086.8164

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 615+76.94 I-40

N 668554.1848 E 1813815.3892

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED JANUARY 1, 2021 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 OR
TDOT TRANSPORTATION MANAGER 1 : SHARON M. SCHUTZ, PE

DESIGNED BY : CHRIS REBAR, PE

DESIGNER : HDR ENGINEERING, INC. CHECKED BY BRIAN REYNOLDS, PE

P.E. NO. 95100-0113-04 (NEPA)

PIN NO. 124884.00

R.O.W. LENGTH	MILES
ROADWAY LENGTH	MILES
BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES ▲
PROJECT LENGTH	MILES

▲ Not included in the project length (Non Riding Surface).

INITIAL STUDIES REQUEST

APPROVED: _____
WILL REID, CHIEF ENGINEER

DATE: _____

APPROVED: _____
HOWARD H. ELEY, COMMISSIONER

SURVEY - -

SEE SHEET 1A FOR TRAFFIC DATA.

COORDINATES ARE NAD/83(1995) (2011 ADJUSTMENT) ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 USING GEOID G2012BU7.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

2/4/2023 7:45:46 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1A

SHEET NAME **SHEET NO.**

SIGNATURE SHEETS ..... NOT USED
TITLE SHEET 1
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS 1A
STANDARD ROADWAY DRAWINGS ..... NOT USED
STANDARD STRUCTURE AND TRAFFIC OPERATIONS DRAWINGS ..... NOT USED
INDEX KEY SHEET 1B
SCHEMATIC PLAN AND COORDINATE CONTROL SHEETS ..... 1C - 1C9
PROJECT COMMITMENTS ..... NOT USED
ESTIMATED ROADWAY QUANTITIES ..... NOT USED
ESTIMATED BOX BRIDGE QUANTITIES ..... NOT USED
TYPICAL SECTIONS AND PAVEMENT SCHEDULE ..... 2B - 2B18
GENERAL NOTES ..... NOT USED
SPECIAL NOTES ..... NOT USED
TABULATED QUANTITIES ..... NOT USED
DETAIL SHEETS ..... NOT USED
RIGHT-OF-WAY NOTES, UTILITY NOTES AND UTILITY OWNERS ..... NOT USED
PROPERTY MAP(S) AND RIGHT-OF-WAY ACQUISITION TABLE(S) ..... 3A – 3B
PRESENT LAYOUT(S) ..... 4 – 20
RIGHT OF WAY DETAILS ..... 4A – 20A
PROPOSED LAYOUT(S) ..... 4B – 20B
PROPOSED LAYOUT CONTOURS ..... 4C - 20C
PROPOSED PROFILE(S) .....
- SR 265 ..... 4D – 9D
- SR 265 WB ..... 5E – 8E
- SR 265 EB ..... 5F – 8F
- I 40 ..... 6G, 7G, 10D – 15D

RAMP PROFILE(S) .....
- RAMP A ..... 7H, 11E – 13E
- RAMP AA 7I
- RAMP B ..... 6H, 14E – 15E
- RAMP BB 6I
- RAMP C ..... 7J, 14F – 15F
- RAMP CC 7K
- RAMP D ..... 6J, 11F – 13F
- RAMP DD 6K

SIDE ROADS PROFILE(S) .....
- PLEASANT GROVE RD 5G, 19E
- JOHN HAGAR RD ..... 13G, 16D – 17D
- PROVIDENCE PKWY 8G, 17E
- GUILL RD 13H, 18D

PRIVATE DRIVE, BUSINESS, AND FIELD ENTRANCE PROFILE(S) .....
- TILLMAN DR ..... 19D – 20D

DRAINAGE MAP(S) ..... 21 – 23
CULVERT SECTION(S) ..... NOT USED
EROSION PREVENTION AND SEDIMENT CONTROL PLANS ..... NOT USED
ENVIRONMENTAL MITIGATION PLAN(S) ..... NOT USED
SIGNING AND PAVEMENT MARKING PLAN(S) ..... NOT USED
SIGN SCHEDULE SHEET(S) ..... NOT USED
MISCELLANEOUS SIGNING DETAILS ..... NOT USED
ROADWAY CROSS SECTIONS ..... A1 – A184
SIDE ROAD CROSS SECTIONS ..... A185 – A270
TRAFFIC CONTROL PLANS ..... NOT USED
BRIDGED PLANS ..... NOT USED
GEOTECHNICAL PLANS ..... NOT USED
ITS PLANS ..... NOT USED
LIGHTING PLANS ..... NOT USED
NATURAL STREAM DESIGN PLANS ..... NOT USED
RETAINING WALL PLANS ..... NOT USED

SR 265

TRAFFIC DATA	
ADT (2025)	6,610
ADT (2045)	11,370
DHV (2045)	1,599
D	55 - 45
T (ADT)	2 %
T (DHV)	1 %
V	40 MPH

SR 265 WB

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	1,168
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

SR 265 EB

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	981
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

I-40

TRAFFIC DATA	
ADT (2025)	97,840
ADT (2045)	109,240
DHV (2045)	8628
D	50 - 50
T (ADT)	13 %
T (DHV)	9 %
V	70 MPH

RAMP A

TRAFFIC DATA	
ADT (2025)	4,470
ADT (2045)	7,460
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP AA

TRAFFIC DATA	
ADT (2025)	4,470
ADT (2045)	7,460
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

RAMP B

TRAFFIC DATA	
ADT (2025)	1,390
ADT (2045)	2,320
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP BB

TRAFFIC DATA	
ADT (2025)	1,390
ADT (2045)	2,320
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

RAMP C

TRAFFIC DATA	
ADT (2025)	1,260
ADT (2045)	2,100
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP CC

TRAFFIC DATA	
ADT (2025)	1,260
ADT (2045)	2,100
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

RAMP D

TRAFFIC DATA	
ADT (2025)	4,550
ADT (2045)	4,600
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP DD

TRAFFIC DATA	
ADT (2025)	4,550
ADT (2045)	4,600
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

PLEASANT GROVE RD

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	
D	-
T (ADT)	%
T (DHV)	%
V	40 MPH

JOHN HAGAR RD

TRAFFIC DATA	
ADT (2025)	2,200
ADT (2045)	8,750
DHV (2045)	740
D	-
T (ADT)	3 %
T (DHV)	%
V	40 MPH

PROVIDENCE PKWY

TRAFFIC DATA	
ADT (2025)	6,930
ADT (2045)	8,690
DHV (2045)	1,844
D	-
T (ADT)	3 %
T (DHV)	%
V	40 MPH

GUILL RD

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	
D	-
T (ADT)	%
T (DHV)	%
V	30 MPH

TILLMAN DR

TRAFFIC DATA	
ADT (2025)	20
ADT (2045)	40
DHV (2045)	
D	-
T (ADT)	1 %
T (DHV)	%
V	15 MPH

NOTE: TRAFFIC DATA PER INTERCHANGE ACCESS REQUEST FOR INTERSTATE 40 AT STATE ROUTE-265 (CENTRAL PIKE), MT. JULIET, WILSON COUNTY, PIN 124884.00, DATED NOVEMBER 15, 2017.

INITIAL STUDIES REQUEST

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INDEX SHEET

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1B

REV. ***DATE***
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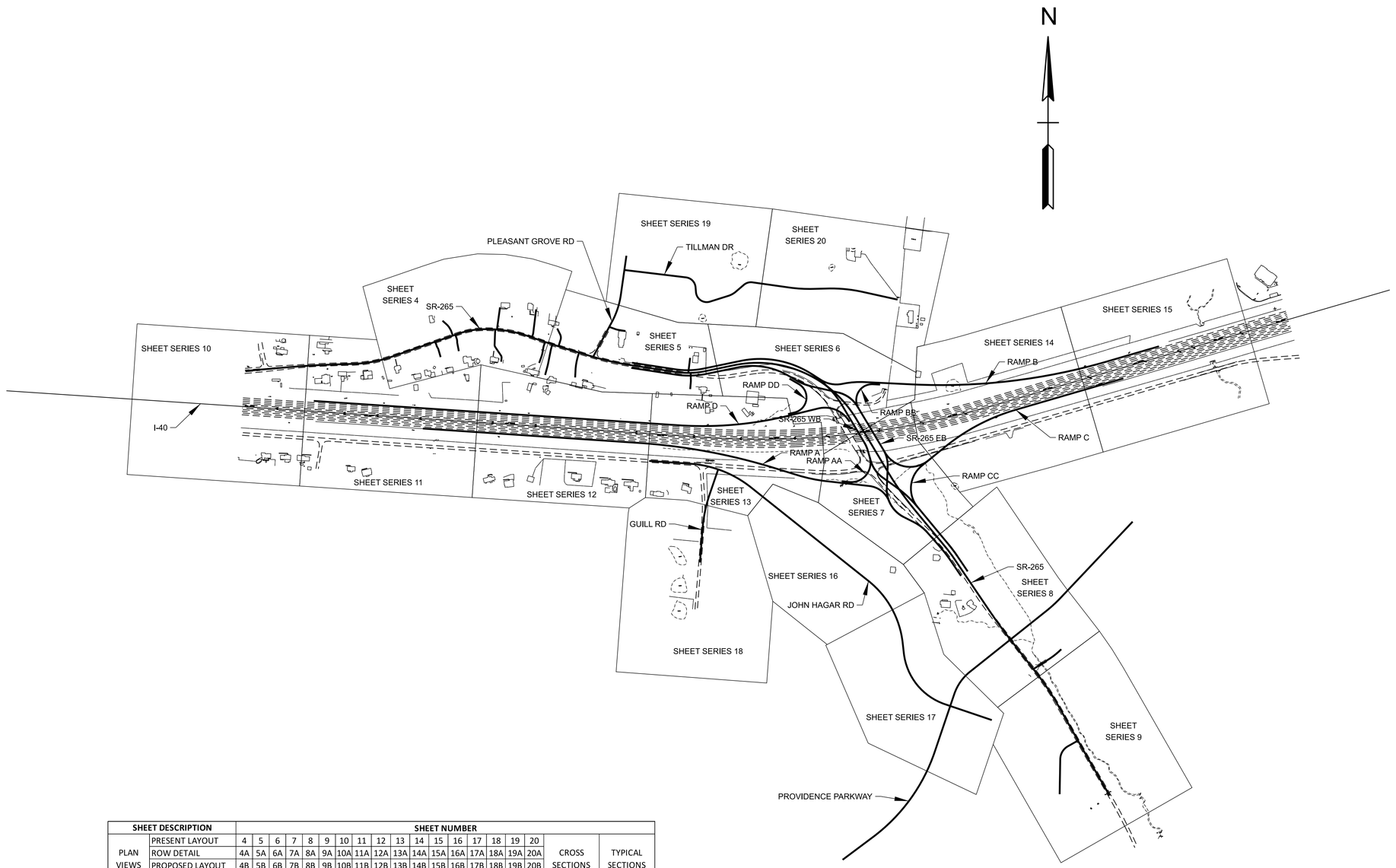

SHEET DESCRIPTION		SHEET NUMBER																	CROSS SECTIONS	TYPICAL SECTIONS
PLAN VIEWS	PRESENT LAYOUT	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	ROW DETAIL	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A	19A	20A		
	PROPOSED LAYOUT	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B	18B	19B	20B		
	CONTOURS	4C	5C	6C	7C	8C	9C	10C	11C	12C	13C	14C	15C	16C	17C	18C	19C	20C		
PROFILES	SR 265	4D	5D	6D	7D	8D	9D												A001 - A053	2B - 2B3
	SR 265 WB		5E	6E	7E	8E														
	SR 265 EB		5F	6F	7F	8F														
	I 40			6G	7G			10D	11D	12D	13D	14D	15D						A054 - A107	2B4
	RAMP A				7H				11E	12E	13E								A108 - A129	2B5
	RAMP AA				7I														A130 - A134	2B6
	RAMP B			6H								14E	15E						A135 - A160	2B7
	RAMP BB			6I															A161 - A166	2B8
	RAMP C				7J							14F	15F						A167 - A181	2B9
	RAMP CC				7K														A182 - A188	2B10
	RAMP D			6J					11F	12F	13F								A189 - A200	2B11
	RAMP DD			6K															A201 - A205	2B12
	PLEASANT GROVE RD		5G														19E		A206 - A210	2B13
	JOHN HAGAR RD										13G			16D	17D				A211 - A249	2B14 - 2B15
	PROVIDENCE PKWY					8G									17E				A250 - A264	2B16
	GUILL RD										13H					18D			A265 - A270	2B17
	TILLMAN DR																19D	20D	A271 - A292	2B18

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INDEX KEY SHEET

SCALE: 1" = 400'

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SR 265
CURVE 1
PI 84+49.57
N 668491.8690
E 1807905.4377
Δ 03°02'34" RT.
D 00°56'44"
R 6060.00'
L 321.81'
T 160.95'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 2
PI 88+84.99
N 668506.3907
E 1808340.6835
Δ 17°08'59" LT.
D 06°21'58"
R 900.00'
L 269.39'
T 135.71'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 3
PI 95+91.07
N 668737.6387
E 1809009.9732
Δ 16°07'28" RT.
D 10°44'59"
R 533.00'
L 150.00'
T 75.50'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 4
PI 98+37.51
N 668750.3134
E 1809257.0878
Δ 22°14'04" RT.
D 06°32'53"
R 875.00'
L 339.55'
T 171.94'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 5
PI 101+80.69
N 668635.4685
E 1809585.0667
Δ 02°37'39" LT.
D 00°57'18"
R 6000.00'
L 275.14'
T 137.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 6
PI 106+05.60
N 668513.5585
E 1809992.1678
Δ 08°02'31" LT.
D 02°51'53"
R 2000.00'
L 280.71'
T 140.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 7
PI 111+63.66
N 668429.7623
E 1810544.3595
Δ 20°22'13" LT.
D 09°46'39"
R 586.00'
L 208.34'
T 105.28'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 8
PI 120+37.63
N 668608.0605
E 1811402.2198
Δ 70°52'22" RT.
D 07°09'43"
R 800.00'
L 989.57'
T 569.30'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265 WB
CURVE 1
PI 211+52.64
N 668448.9058
E 1810538.1821
Δ 20°22'13" LT.
D 10°05'14"
R 568.00'
L 201.94'
T 102.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 2
PI 219+83.80
N 668618.4769
E 1811354.0526
Δ 70°52'22" RT.
D 08°37'44"
R 664.00'
L 821.35'
T 472.52'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 1
PI 311+72.95
N 668410.6188
E 1810550.5368
Δ 20°22'13" LT.
D 09°18'05"
R 616.00'
L 219.00'
T 110.67'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 2
PI 316+88.18
N 668515.9390
E 1811057.2723
Δ 41°53'39" RT.
D 11°33'06"
R 496.00'
L 362.67'
T 189.87'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 3
PI 319+84.76
N 668358.3890
E 1811328.4828
Δ 17°14'43" LT.
D 18°44'26"
R 364.00'
L 109.56'
T 55.20'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 4
PI 323+20.45
N 668283.2162
E 1811656.5026
Δ 46°13'26" RT.
D 26°46'25"
R 214.00'
L 172.65'
T 91.33'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED MPH

I-40
CURVE 1
PI 593+45.73
N 667924.5239
E 1811653.2868
Δ 20°03'07" LT.
D 01°00'00"
R 5729.58'
L 2005.19'
T 1012.95'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 70 MPH

RAMP A
CURVE 1
PI 419+81.12
N 667921.3656
E 1810663.2736
Δ 13°17'22" RT.
D 01°23'14"
R 4130.00'
L 957.92'
T 481.12'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP B
CURVE 1
PI 501+16.74
N 668347.5066
E 1811516.3807
Δ 43°20'24" LT.
D 28°38'52"
R 200.00'
L 151.29'
T 79.47'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP B
CURVE 2
PI 502+75.21
N 668378.7975
E 1811679.5348
Δ 13°36'56" RT.
D 09°24'29"
R 609.00'
L 144.72'
T 72.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP BB
CURVE 1
PI 1502+04.24
N 668370.3579
E 1811605.3585
Δ 123°23'13" RT.
D 52°05'13"
R 110.00'
L 236.89'
T 204.24'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

RAMP D
CURVE 1
PI 829+24.26
N 668049.9141
E 1810847.4915
Δ 17°32'25" LT.
D 02°16'58"
R 2510.00'
L 768.40'
T 387.23'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP D
CURVE 2
PI 836+63.85
N 668226.8306
E 1811571.8436
Δ 72°51'25" RT.
D 28°56'14"
R 198.00'
L 251.78'
T 146.13'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP DD
CURVE 3
PI 1803+13.50
N 668227.8300
E 1811525.3592
Δ 136°07'19" LT.
D 53°32'51"
R 107.00'
L 254.21'
T 265.65'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

PLEASANT GROVE RD
CURVE 1
PI 1103+75.58
N 668881.4429
E 1810046.2002
Δ 20°09'54" LT.
D 10°13'53"
R 560.00'
L 197.09'
T 99.58'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

TILLMAN DR
CURVE 1
PI 1004+92.20
N 669094.6263
E 1810573.6875
Δ 78°17'44" RT.
D 76°23'40"
R 75.00'
L 102.49'
T 61.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 2
PI 1006+62.36
N 668905.5305
E 1810589.7920
Δ 102°37'28" LT.
D 76°23'40"
R 75.00'
L 134.34'
T 93.66'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 3
PI 1008+66.58
N 668982.8377
E 1810835.0932
Δ 22°55'45" LT.
D 38°11'50"
R 150.00'
L 60.03'
T 30.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

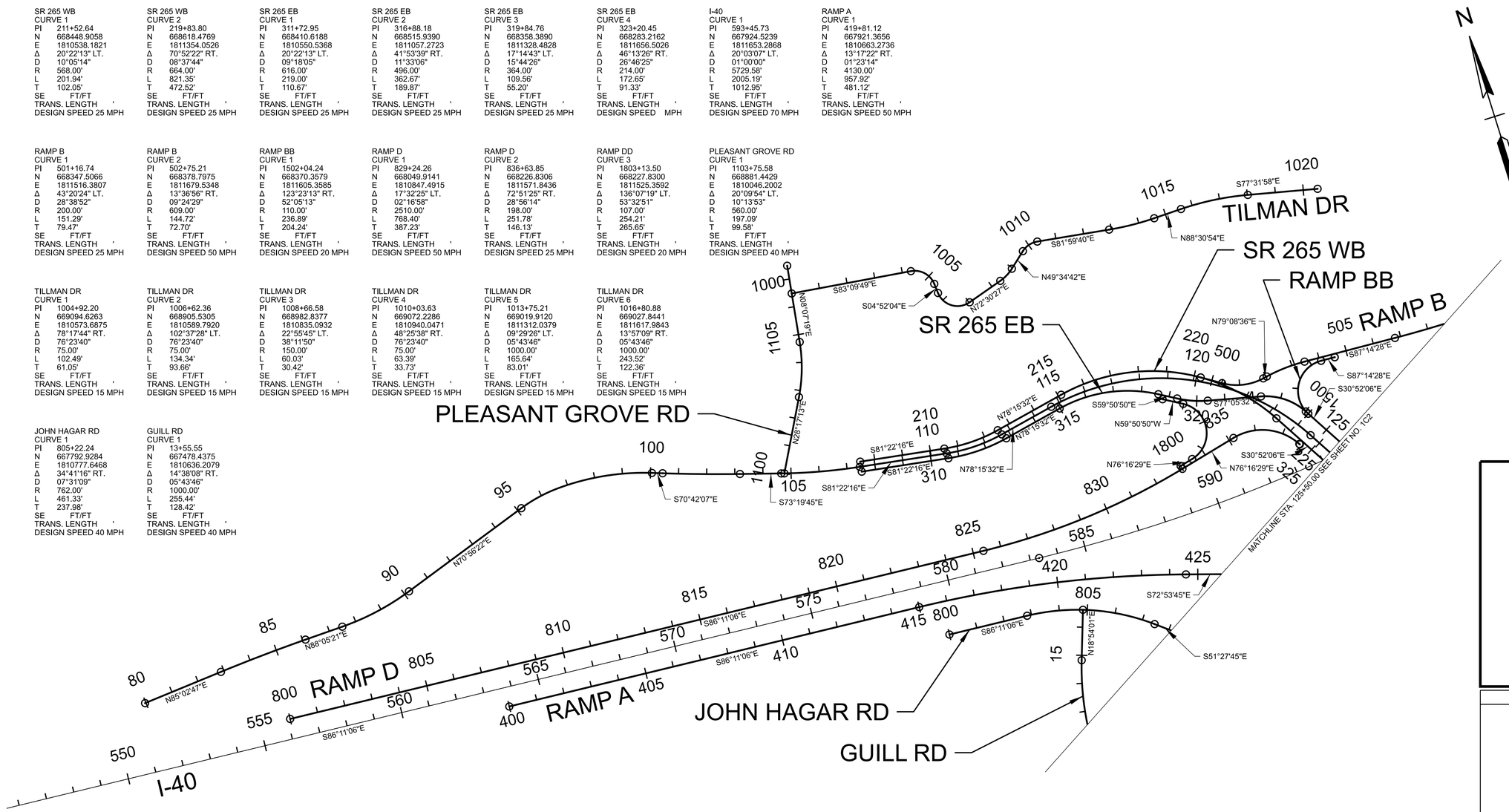
TILLMAN DR
CURVE 4
PI 1010+03.63
N 669072.2286
E 1810940.0471
Δ 48°25'38" RT.
D 76°23'40"
R 75.00'
L 63.39'
T 33.73'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 5
PI 1013+75.21
N 669019.9120
E 1811312.0379
Δ 09°29'26" LT.
D 05°43'46"
R 1000.00'
L 165.64'
T 83.01'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 6
PI 1016+80.88
N 669027.8441
E 1811617.9843
Δ 13°57'09" RT.
D 05°43'46"
R 1000.00'
L 243.52'
T 122.36'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

JOHN HAGAR RD
CURVE 1
PI 805+22.24
N 667792.9284
E 1810777.6468
Δ 34°41'16" RT.
D 07°31'09"
R 762.00'
L 461.33'
T 237.98'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

GUILL RD
CURVE 1
PI 13+55.55
N 667478.4375
E 1810636.2079
Δ 14°38'08" RT.
D 05°43'46"
R 1000.00'
L 255.44'
T 128.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH



THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SCHEMATIC PLAN SHEET

SCALE: 1" = 200'
SHEET 1 OF 2

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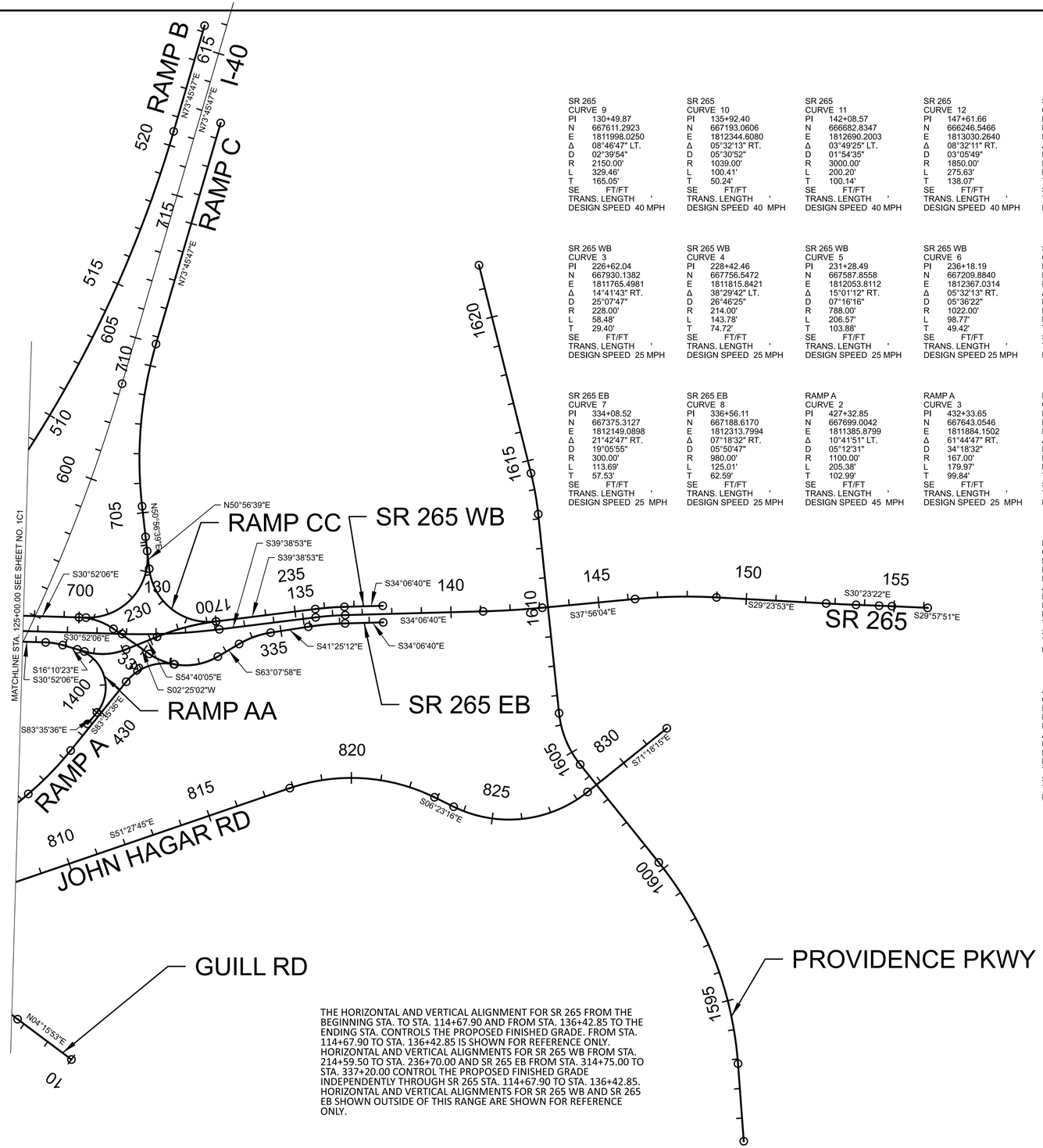

SR 265
CURVE 9
PI 130+49.87
N 667611.2923
E 1811998.0250
Δ 08°46'47" LT.
D 02°39'54"
R 2150.00'
L 329.46'
T 165.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 10
PI 135+92.40
N 667193.0606
E 1812344.6080
Δ 05°32'13" RT.
D 05°30'52"
R 1039.00'
L 100.41'
T 50.24'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 11
PI 142+08.57
N 666682.8347
E 1812690.2003
Δ 03°49'25" LT.
D 01°54'35"
R 3000.00'
L 200.20'
T 100.14'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 12
PI 147+61.66
N 666246.5466
E 1813030.2640
Δ 08°32'11" RT.
D 03°05'49"
R 1850.00'
L 275.63'
T 138.07'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 13
PI 153+20.60
N 665759.1313
E 1813304.8876
Δ 00°59'28" LT.
D 00°58'46"
R 5850.00'
L 101.20'
T 50.60'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 14
PI 154+70.93
N 665629.4539
E 1813380.9364
Δ 00°25'30" RT.
D 00°58'46"
R 5850.00'
L 43.39'
T 21.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265 WB
CURVE 3
PI 226+62.04
N 667930.1382
E 1811765.4981
Δ 14°41'43" RT.
D 25°07'47"
R 228.00'
L 58.48'
T 29.40'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 4
PI 228+42.46
N 667756.5472
E 1811815.8421
Δ 38°29'42" LT.
D 26°46'25"
R 214.00'
L 143.78'
T 74.72'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 5
PI 231+28.49
N 667587.8558
E 1812053.8112
Δ 15°01'12" RT.
D 07°16'16"
R 788.00'
L 206.57'
T 103.88'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 6
PI 236+18.19
N 667209.8840
E 1812367.0314
Δ 05°32'13" RT.
D 05°36'22"
R 1022.00'
L 98.77'
T 49.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 5
PI 328+14.38
N 667850.6510
E 1811915.0629
Δ 33°17'08" RT.
D 26°46'25"
R 214.00'
L 124.32'
T 63.97'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 6
PI 331+60.38
N 667501.3427
E 1811900.3179
Δ 65°33'00" LT.
D 26°46'25"
R 214.00'
L 244.83'
T 137.78'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 7
PI 334+08.52
N 667375.3127
E 1812149.0898
Δ 21°42'47" RT.
D 19°05'55"
R 300.00'
L 113.69'
T 57.53'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 8
PI 336+56.11
N 667188.6170
E 1812313.7994
Δ 07°18'32" RT.
D 05°50'47"
R 980.00'
L 125.01'
T 62.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP A
CURVE 2
PI 427+32.85
N 667699.0042
E 1811385.8799
Δ 10°41'51" LT.
D 05°12'31"
R 1100.00'
L 205.38'
T 102.99'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 45 MPH

RAMP A
CURVE 3
PI 432+33.65
N 667643.0546
E 1811884.1502
Δ 61°44'47" RT.
D 34°18'32"
R 167.00'
L 179.97'
T 99.84'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP AA
CURVE 1
PI 1402+00.85
N 667659.6445
E 1811843.9453
Δ 112°34'47" LT.
D 42°45'29"
R 134.00'
L 263.29'
T 200.85'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

RAMP B
CURVE 3
PI 513+70.74
N 668326.0355
E 1812774.4786
Δ 18°59'45" LT.
D 01°23'14"
R 4130.00'
L 1369.25'
T 690.97'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP C
CURVE 1
PI 702+56.87
N 667685.0758
E 1812014.0334
Δ 98°11'15" LT.
D 28°21'51"
R 202.00'
L 346.17'
T 233.14'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP C
CURVE 2
PI 708+02.69
N 668104.6718
E 1812531.1602
Δ 22°49'08" RT.
D 04°07'19"
R 1390.00'
L 553.59'
T 280.51'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 45 MPH

RAMP CC
CURVE 1
PI 1702+04.10
N 667665.2871
E 1811989.6450
Δ 90°35'32" RT.
D 28°21'51"
R 202.00'
L 319.39'
T 204.10'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

JOHN HAGAR RD
CURVE 2
PI 820+53.37
N 666829.8853
E 1811986.7385
Δ 45°04'29" RT.
D 08°57'57"
R 639.04'
L 502.74'
T 265.19'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

JOHN HAGAR RD
CURVE 3
PI 826+32.89
N 666226.4892
E 1812054.2904
Δ 64°54'59" LT.
D 13°30'44"
R 424.03'
L 480.43'
T 269.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C1

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

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COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SCHEMATIC PLAN SHEET

SCALE: 1" = 200'
SHEET 2 OF 2

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C2

I-40							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	488+14.31	668625.2162	1801145.1989				
PC	583+32.78	667991.9192	1810642.5783				
HPI	593+45.73	667924.5239	1811653.2868	5729.58	2005.19	20°03'07"	Left
PT	603+37.97	668207.7560	1812625.8369				
PC	642+48.87	669301.2846	1816380.7481				
HPI	651+95.37	669565.9361	1817289.4972	11700	1888.89	09°15'00"	Right
PT	661+37.76	669681.0710	1818228.9702				

SR 265							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	79+96.84	668452.7754	1807454.3903				
PC	82+88.63	668477.9715	1807745.0936				
HPI	84+49.57	668491.8690	1807905.4377	6060.00	321.81	03°02'34"	Right
PT	86+10.44	668497.2358	1808066.2934				
PC	87+49.28	668501.8654	1808205.0504				
HPI	88+84.99	668506.3907	1808340.6835	900.00	269.39	17°08'59"	Left
PT	90+18.67	668550.7089	1808468.9516				
PC	95+15.57	668712.9831	1808938.6136				
HPI	95+91.07	668737.6387	1809009.9732	533.00	150.00	16°07'28"	Right
PCC	96+65.57	668741.5060	1809085.3730				
HPI	98+37.51	668750.3134	1809257.0878	875.00	339.55	22°14'04"	Right
PT	100+05.13	668693.4897	1809419.3673				
PC	100+43.10	668680.9413	1809455.2034				
HPI	101+80.69	668635.4685	1809585.0667	6000.00	275.14	02°37'39"	Left
PT	103+18.24	668595.9964	1809716.8780				
PC	104+65.02	668553.8893	1809857.4890				
HPI	106+05.60	668513.5585	1809992.1678	2000.00	280.71	08°02'31"	Left
PT	107+45.73	668492.4655	1810131.1643				
PC	110+58.38	668445.5580	1810440.2707				
HPI	111+63.66	668429.7623	1810544.3595	586.00	208.34	20°22'13"	Left
PT	112+66.71	668451.1860	1810647.4371				
PC	114+68.33	668492.2133	1810844.8346				
HPI	120+37.63	668608.0605	1811402.2198	800.00	989.57	70°52'22"	Right
PT	124+57.90	668119.4054	1811694.3071				
PC	128+84.82	667752.9641	1811913.3425				
HPI	130+49.87	667611.2923	1811998.0250	2150.00	329.46	08°46'47"	Left
PT	132+14.27	667484.2062	1812103.3396				
PC	135+42.15	667231.7469	1812312.5492				
HPI	135+92.40	667193.0606	1812344.6080	1039.00	100.41	05°32'13"	Right
PT	136+42.56	667151.4615	1812372.7845				
PC	141+08.43	666765.7425	1812634.0442				
HPI	142+08.57	666682.8347	1812690.2003	3000.00	200.20	03°49'25"	Left
PT	143+08.63	666603.8561	1812751.7600				
PC	146+23.59	666355.4439	1812945.3843				
HPI	147+61.66	666246.5466	1813030.2640	1850.00	275.63	08°32'11"	Right
PT	148+99.22	666126.2563	1813098.0389				
PT	153+71.20	665715.4822	1813330.4854				
PC	154+49.24	665648.1702	1813369.9603				
HPI	154+70.93	665629.4539	1813380.9364	5850.00	43.39	00°25'30"	Right
PT	154+92.63	665610.6567	1813391.7733				

SR 265 WB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	207+47.97	668509.6212	1810138.0862				
PC	210+50.60	668464.2163	1810437.2906				
HPI	211+52.64	668448.9058	1810538.1821	568.00	201.94	20°22'13"	Left
PT	212+52.54	668469.6715	1810638.0935				
PC	215+11.28	668522.3236	1810891.4229				
HPI	219+83.80	668618.4769	1811354.0526	664.00	821.35	70°52'22"	Right
PT	223+32.63	668212.8931	1811596.4850				
PC	226+32.64	667955.3739	1811750.4137				
HPI	226+62.04	667930.1382	1811765.4981	228.00	58.48	14°41'43"	Right
PT	226+91.12	667901.9014	1811773.6872				
PC	227+67.74	667828.3118	1811795.0292				
HPI	228+42.46	667756.5472	1811815.8421	214.00	143.78	38°29'42"	Left
PT	229+11.52	667713.3347	1811876.8011				
PC	230+24.61	667647.9318	1811969.0634				
HPI	231+28.49	667587.8558	1812053.8112	788.00	206.57	15°01'12"	Right
PT	232+31.18	667507.8696	1812120.0947				
PC	235+68.77	667247.9374	1812335.4971				
HPI	236+18.19	667209.8840	1812367.0314	1022.00	98.77	05°32'13"	Right
PT	236+67.53	667168.9655	1812394.7468				
END	237+97.09	667061.7013	1812467.4003				

SR 265 EB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	307+50.31	668474.0287	1810132.6850				
PC	310+62.28	668427.2232	1810441.1193				
HPI	311+72.95	668410.6188	1810550.5368	616.00	219.00	20°22'13"	Left
PT	312+81.28	668433.1393	1810658.8915				
PC	314+98.31	668477.3018	1810871.3740				
HPI	316+88.18	668515.9390	1811057.2723	496.00	362.67	41°53'39"	Right
PT	318+60.98	668420.5650	1811221.4515				
PC	319+29.56	668386.1149	1811280.7549				
HPI	319+84.76	668358.3890	1811328.4828	364.00	109.56	17°14'43"	Left
PT	320+39.12	668346.0591	1811382.2848				
PC	322+29.11	668303.6179	1811567.4787				
HPI	323+20.45	668283.2162	1811656.5026	214.00	172.65	46°13'26"	Right
PT	324+01.76	668204.8217	1811703.3618				
PC	327+50.41	667905.5595	1811882.2420				
HPI	328+14.38	667850.6510	1811915.0629	214.00	124.32	33°17'08"	Right
PT	328+74.73	667786.7379	1811912.3650				
PC	330+22.60	667639.0015	1811906.1288				
HPI	331+60.38	667501.3427	1811900.3179	214.00	244.83	65°32'60"	Left
PT	332+67.43	667439.0761	1812023.2267				
PC	333+50.99	667401.3140	1812097.7657				
HPI	334+08.52	667375.3127	1812149.0898	300.00	113.69	21°42'47"	Right
PT	334+64.68	667332.1686	1812187.1531				
PC	335+93.52	667235.5528	1812272.3910				
HPI	336+56.11	667188.6170	1812313.7994	980.00	125.01	07°18'32"	Right
PT	337+18.53	667136.7947	1812348.9004				
END	338+47.16	667030.2966	1812421.0350				

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DEPARTMENT OF TRANSPORTATION

COORDINATE CONTROL
MAINLINES

SHEET 1 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C3

PROVIDENCE PKWY							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1590+21.71	665060.5476	1811599.3709				
PC	1592+84.36	665217.8640	1811809.7035				
HPI	1596+66.80	665446.9204	1812115.9527	1231.27	741.60	34°30'35"	Left
PT	1600+25.97	665809.1741	1812238.5401				
PC	1604+50.19	666211.0169	1812374.5245				
HPI	1605+47.89	666303.5588	1812405.8409	332.22	190.04	32°46'29"	Right
PT	1606+40.23	666364.4160	1812482.2681				
PC	1613+16.17	666785.4705	1813011.0479				
HPI	1613+86.56	666829.3176	1813066.1131	997.95	140.55	08°04'10"	Left
PT	1614+56.72	666880.4602	1813114.4783				
END	1621+80.92	667406.6380	1813612.0810				

TILMAN DR							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1000+00.00	669153.2159	1810084.9852				
PC	1004+31.15	669101.8940	1810513.0667				
HPI	1004+92.20	669094.6263	1810573.6875	75.00	102.49	78°17'44"	Right
PT	1005+33.64	669033.7916	1810578.8685				
PC	1005+68.70	668998.8490	1810581.8444				
HPI	1006+62.36	668905.5305	1810589.7920	75.00	134.34	102°37'28"	Left
PT	1007+03.04	668933.6816	1810679.1173				
PC	1008+36.16	668973.6937	1810806.0786				
HPI	1008+66.58	668982.8377	1810835.0932	150.00	60.03	22°55'45"	Left
PT	1008+96.19	669002.5631	1810858.2527				
PC	1009+69.90	669050.3594	1810914.3705				
HPI	1010+03.63	669072.2286	1810940.0471	75.00	63.39	48°25'38"	Right
PT	1010+33.29	669067.5314	1810973.4461				
PC	1012+92.20	669031.4730	1811229.8352				
HPI	1013+75.21	669019.9120	1811312.0379	1000.00	165.64	09°29'26"	Left
PT	1014+57.85	669022.0635	1811395.0217				
PC	1015+58.52	669024.6727	1811495.6620				
HPI	1016+80.88	669027.8441	1811617.9843	1000.00	243.52	13°57'09"	Right
PT	1018+02.04	669001.4279	1811737.4624				
END	1020+51.12	668947.6543	1811980.6756				

PLEASANT GROVE RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1100+00.00	668550.7099	1809868.2153				
PC	1102+76.01	668793.7584	1809999.0125				
HPI	1103+75.58	668881.4429	1810046.2002	560.00	197.09	20°09'54"	Left
PT	1104+73.10	668980.0196	1810060.2682				
END	1107+48.05	669252.2128	1810099.1132				

GUILL RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	10+00.00	667123.8758	1810609.768				
PC	12+27.13	667350.3756	1810626.658				
HPI	13+55.55	667478.4375	1810636.208	1000	255.44	14°38'08"	Right
PT	14+82.57	667599.9313	1810677.805				
END	16+61.84	667769.5407	1810735.876				

JOHN HAGAR RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	800+00.00	667827.9896	1810256.5829				
PC	802+84.26	667808.9052	1810540.2061				
HPI	805+22.24	667792.9284	1810777.6468	762.00	461.33	34°41'16"	Right
PT	807+45.59	667644.6623	1810963.7935				
PC	817+88.18	666995.1040	1811779.3080				
HPI	820+53.37	666829.8853	1811986.7385	639.04	502.74	45°04'29"	Right
PT	822+90.92	666566.3438	1812016.2427				
PC	823+63.19	666494.5162	1812024.2840				
HPI	826+32.89	666226.4892	1812054.2904	424.03	480.43	64°54'59"	Left
PT	828+43.62	666140.0376	1812309.7605				
END	831+86.80	666030.0337	1812634.8292				

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COORDINATE CONTROL
SIDE STREETS

SHEET 2 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C4

RAMP A							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	400+00.00	668053.1765	1808686.5426				
PC	415+00.00	667953.3763	1810183.2189				
HPI	419+81.12	667921.3656	1810663.2736	4130.00	957.92	13°17'22"	Right
PT	424+57.92	667779.8626	1811123.1150				
PC	426+29.86	667729.2941	1811287.4472				
HPI	427+32.85	667699.0042	1811385.8799	1100.00	205.38	10°41'51"	Left
PT	428+35.24	667687.5122	1811488.2244				
PC	431+33.81	667654.1955	1811784.9321				
HPI	432+33.65	667643.0546	1811884.1502	167.00	179.97	61°44'47"	Right
PT	433+13.78	667550.3833	1811921.3037				
END	433+16.11	667548.2214	1811922.1704				

RAMP AA							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1399+50.00	667687.6357	1811594.6644				
PC	1400+00.00	667682.0564	1811644.3521				
HPI	1402+00.85	667659.6445	1811843.9453	134.00	263.29	112°34'47"	Left
PT	1402+63.29	667852.5436	1811788.0017				

RAMP B							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	499+58.79	668432.3323	1811383.1457				
PC	500+37.27	668390.1856	1811449.3452				
HPI	501+16.74	668347.5066	1811516.3807	200.00	151.29	43°20'24"	Left
PT	501+88.55	668362.4749	1811594.4269				
PC	502+02.51	668365.1037	1811608.1335				
HPI	502+75.21	668378.7975	1811679.5348	609.00	144.72	13°36'56"	Right
PT	503+47.23	668375.2982	1811752.1531				
PC	506+79.78	668359.2925	1812084.3130				
HPI	513+70.74	668326.0355	1812774.4786	4130.00	1369.25	18°59'45"	Left
PT	520+49.03	668519.2368	1813437.8848				
END	524+21.25	668623.3130	1813795.2573				

RAMP BB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
PC	1500+00.00	668194.6141	1811709.4097				
HPI	1502+04.24	668370.3579	1811605.3585	110.00	236.89	123°23'13"	Right
PT	1502+36.89	668360.5278	1811809.3582				
END	1502+86.89	668358.1212	1811859.3003				

RAMP C							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	700+00.00	667905.5595	1811882.2420				
PC	700+23.73	667885.1944	1811894.4150				
HPI	702+56.87	667685.0758	1812014.0334	202.00	346.17	98°11'15"	Left
PT	703+69.89	667831.9744	1812195.0770				
PC	705+22.18	667927.9278	1812313.3339				
HPI	708+02.69	668104.6718	1812531.1602	1390.00	553.59	22°49'08"	Right
PT	710+75.77	668183.1056	1812800.4831				
END	718+53.69	668400.6193	1813547.3720				

RAMP CC							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
PC	1700+00.00	667508.1354	1812119.8745				
HPI	1702+04.10	667665.2871	1811989.6450	202.00	319.39	90°35'32"	Right
PT	1703+19.39	667793.8852	1812148.1344				
END	1704+28.19	667862.4392	1812232.6231				

RAMP D							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	800+00.00	668244.4752	1807929.7123				
PC	825+37.03	668075.6777	1810461.1226				
HPI	829+24.26	668049.9141	1810847.4915	2510.00	768.40	17°32'25"	Left
PT	833+05.43	668141.7901	1811223.6608				
PC	835+17.72	668192.1588	1811429.8863				
HPI	836+63.85	668226.8306	1811571.8436	198.00	251.78	72°51'25"	Right
PT	837+69.49	668101.4000	1811646.8181				
END	837+71.58	668099.6086	1811647.8890				

RAMP DD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1800+00.00	668153.4475	1811220.8136				
PC	1800+47.85	668164.8008	1811267.2978				
HPI	1803+13.50	668227.8300	1811525.3592	107.00	254.21	136°07'19"	Left
PT	1803+02.06	668361.2670	1811295.6574				
END	1803+77.43	668399.1247	1811230.4881				

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COORDINATE CONTROL RAMPS

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C5

DR STA 93+40							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668655.5533	1808772.3975				
PC	10+33.53	668623.8585	1808783.3485				
HPI	10+36.20	668621.3369	1808784.2197	25.00	5.32	12°10'55"	Left
PT	10+38.85	668619.0561	1808785.6034				
PC	10+49.50	668609.9482	1808791.1286				
HPI	10+52.82	668607.1086	1808792.8512	25.00	6.60	15°08'06"	Right
PT	10+56.11	668603.9176	1808793.7727				
END	11+13.52	668548.7608	1808809.7009				

DR STA 94+69							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668697.6308	1808894.1802				
PC	10+35.59	668731.2666	1808882.5586				
HPI	10+37.53	668733.1042	1808881.9237	20.00	3.88	11°06'17"	Left
PT	10+39.46	668734.7851	1808880.9467				
PC	10+58.05	668750.8563	1808871.6061				
HPI	10+73.80	668764.4735	1808863.6917	100.00	31.24	17°54'04"	Left
PT	10+89.30	668774.9987	1808851.9750				
END	11+28.37	668801.1116	1808822.9058				

DR STA. 94+87							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668703.7689	1808911.9455				
PC	10+31.40	668674.0907	1808922.1997				
HPI	10+33.97	668671.6637	1808923.0383	25.00	5.12	11°43'43"	Right
PT	10+36.52	668669.1169	1808923.3660				
PC	10+45.02	668660.6855	1808924.4508				
HPI	10+47.05	668658.6656	1808924.7108	25.00	4.06	09°18'53"	Right
PT	10+49.08	668656.6301	1808924.6403				
PC	10+49.35	668656.3652	1808924.6311				
HPI	10+54.92	668650.7989	1808924.4384	50.00	11.09	12°42'45"	Left
PT	10+60.44	668645.3266	1808925.4754				
END	11+16.74	668590.0150	1808935.9564				

DR STA 97+70							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668740.6590	1809189.2572				
PC	10+27.12	668713.6018	1809187.4266				
HPI	10+27.85	668712.8769	1809187.3776	50.00	1.45	01°39'54"	Left
PT	10+28.57	668712.1508	1809187.3496				
PC	11+06.68	668634.1057	1809184.3441				
HPI	11+14.85	668625.9388	1809184.0296	25.00	15.80	36°12'26"	Left
PT	11+22.47	668619.1632	1809188.6001				
PC	11+93.73	668560.0938	1809228.4459				
HPI	12+02.54	668552.7843	1809233.3765	25.00	16.95	38°51'12"	Right
PT	12+10.68	668543.9990	1809232.6308				
END	12+38.09	668516.6873	1809230.3127				

DR STA 97+82							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668739.7413	1809201.5370				
PC	10+16.57	668756.2538	1809202.8879				
HPI	10+19.42	668759.0939	1809203.1202	100.00	5.70	03°15'52"	Right
PT	10+22.27	668761.9160	1809203.5139				
END	11+55.75	668894.1187	1809221.9555				

DR STA 100+31							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668685.0865	1809443.3654				
PC	10+13.61	668697.9356	1809447.8647				
HPI	10+24.40	668708.1117	1809451.4279	100.00	21.48	12°18'27"	Left
PT	10+35.09	668718.8134	1809452.7402				
END	11+97.56	668880.0750	1809472.5138				

DR STA 101+27							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668653.7257	1809534.7074				
PC	10+26.71	668628.3920	1809526.2330				
HPI	10+34.60	668620.9156	1809523.7320	100.00	15.73	09°00'55"	Left
PT	10+42.45	668613.1397	1809522.4335				
PC	10+71.07	668584.9048	1809517.7185				
HPI	10+88.60	668567.6163	1809514.8315	200.00	34.97	10°01'02"	Right
PT	11+06.04	668551.0936	1809508.9813				
END	11+51.78	668507.9743	1809493.7141				

DR STA 101+81							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668636.9493	1809585.6142				
PC	10+12.40	668625.1569	1809581.7863				
HPI	10+30.13	668608.2912	1809576.3115	300.00	35.42	06°45'55"	Left
PT	10+47.82	668590.8979	1809572.8617				
PC	11+30.58	668509.7229	1809556.7613				
HPI	11+47.49	668493.1337	1809553.4709	500.00	33.81	03°52'28"	Right
PT	11+64.39	668476.8049	1809549.0672				
END	12+18.27	668424.7816	1809535.0369				

DR STA 102+26							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668623.4362	1809627.7721				
PC	10+47.54	668668.7587	1809642.1154				
HPI	10+67.59	668687.8789	1809648.1664	50.00	38.15	43°42'40"	Left
PT	10+85.68	668705.8810	1809639.3278				
END	11+31.68	668747.1673	1809619.0572				

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C6

DR STA 103+74							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668579.9748	1809770.3799				
PC	10+28.47	668552.7030	1809762.2132				
HPI	10+76.71	668506.4855	1809748.3729	400.00	96.03	13°45'17"	Left
PT	11+24.50	668458.3026	1809745.9186				
END	11+75.27	668407.5957	1809743.3358				

DR STA 1102+36							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668758.2780	1809979.9187				
PC	10+46.78	668742.4695	1810023.9426				
HPI	10+56.00	668739.3507	1810032.6278	100.00	18.40	10°32'42"	Left
PT	10+65.18	668737.8741	1810041.7371				
END	11+17.05	668729.5744	1810092.9370				

DR STA 111+47							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668438.9250	1810528.5009				
END	11+05.35	668543.5057	1810541.2267				

DR STA 111+63							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668439.1661	1810545.0018				
PC	10+49.70	668389.4849	1810546.4277				
HPI	10+55.31	668383.8808	1810546.5885	100.00	11.20	06°25'04"	Right
PT	10+60.90	668378.2938	1810546.1219				
END	11+12.73	668326.6487	1810541.8089				

DR STA 145+88							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	666383.9009	1812923.2035				
PC	11+28.19	666452.8539	1813031.2734				
HPI	11+74.40	666477.7095	1813070.2296	500.00	92.16	10°33'38"	Left
PT	12+20.35	666509.2838	1813103.9705				
END	12+37.93	666521.2949	1813116.8057				

DR STA 151+74							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	665887.4932	1813232.5648				
PC	10+79.65	665848.3947	1813163.1709				
HPI	11+39.82	665818.8597	1813110.7508	105.00	109.27	59°37'40"	Left
PT	11+88.92	665758.7005	1813109.7280				
END	14+32.05	665515.6087	1813105.5949				

INITIAL STUDIES REQUEST

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C7

CONTROL POINTS-I-40

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	555+88.35	72.13
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	556+60.49	-68.36
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	566+07.19	65.84
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	567+52.02	-68.86
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	574+74.13	-530.82
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	575+94.46	-706.14
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	577+46.13	73.33
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	577+73.85	-68.90
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	583+44.10	268.02
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	583+46.66	546.62
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	587+62.59	-73.53
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	588+05.11	73.41
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	592+97.88	-198.65
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	594+29.37	286.71
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	595+63.77	-69.17
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	596+07.27	-208.77
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	596+84.82	82.67
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	598+78.82	191.58
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	600+02.73	1299.19
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	600+42.49	-74.21
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	601+33.63	1700.51
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	603+75.31	203.72
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	604+67.46	79.16
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	614+10.02	-76.74
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	616+35.42	80.51

CONTROL POINTS-SR 265

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	84+18.24	386.05
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	85+12.16	255.55
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	92+75.17	627.86
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	94+60.97	560.05
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	104+23.09	-13.33
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	105+05.68	-210.66
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	107+48.03	540.45
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	107+63.71	396.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	111+81.17	996.15
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	111+95.33	719.71
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	117+79.10	450.12
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	120+32.93	574.75
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	123+20.67	36.90
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	124+41.86	-229.78
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	125+50.54	-137.62
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	127+07.29	-583.49
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	127+36.49	-193.86
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	128+24.39	127.71
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	129+11.51	-342.56
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	130+35.98	-947.24
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	131+78.88	-817.13
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	133+46.08	-1878.28
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	135+54.98	-2022.87
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	140+08.80	-15.64
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	144+43.89	-13.60

CONTROL POINTS-SR 265 EB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	305+31.79	-325.72
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	286+58.17	2164.84
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	297+45.80	1106.58
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	285+98.08	2263.94
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	304+26.60	-328.65
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	307+48.34	522.46
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	296+12.79	1291.03
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	307+64.03	378.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	311+89.03	977.15
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	312+03.31	700.57
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	319+15.96	393.19
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	319+70.89	503.14
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	322+96.00	84.15
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	324+49.78	-177.98
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	325+63.07	-86.02
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	327+19.82	-531.89
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	327+49.02	-142.26
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	327+83.19	-1874.44
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	327+94.30	-922.43
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	328+18.88	-831.01
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	328+19.65	-318.75
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	329+28.01	137.52
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	336+35.48	-2050.88
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	345+19.75	-675.02
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	340+86.02	-242.81

CONTROL POINTS-SR 265 WB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	185+95.73	2275.36
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	186+55.83	2174.37
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	196+10.45	1308.44
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	197+43.46	1122.16
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	204+24.25	-324.38
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	205+29.44	-299.99
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	207+45.99	558.46
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	207+61.68	414.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	211+71.63	1015.36
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	211+85.77	739.06
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	218+09.18	477.75
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	223+32.79	12.10
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	223+48.95	569.79
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	224+42.41	-265.58
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	225+55.70	-173.62
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	226+54.05	-623.24
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	226+85.93	-242.65
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	228+31.02	58.02
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	230+60.77	-359.17
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	231+88.82	-925.85
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	232+23.98	-789.38
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	233+70.52	-1850.28
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	235+80.83	-1994.85
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	240+35.95	239.18
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	244+69.68	-672.59

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONTROL POINTS
MAINLINES

SHEET 1 OF 3

2/4/2023 7:51:27 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C8

CONTROL POINTS-PLEASANT GROVE RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1086+72.37	-2019.15
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1088+30.13	-1913.20
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1091+00.15	-1079.66
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1092+82.74	-886.26
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1093+83.71	1337.42
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1095+65.14	620.86
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1096+10.02	3612.17
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1096+35.88	1128.84
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1097+06.07	504.02
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1097+98.90	3206.69
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1100+02.33	-54.71
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1100+23.96	1403.85
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1101+31.90	1295.46
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1101+88.02	2061.59
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1102+11.75	-17.82
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1103+24.05	2161.01
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1103+28.04	2386.63
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1103+34.66	1688.24
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1103+37.96	1978.03
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1103+69.63	1947.36
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1103+77.71	2815.84
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1103+87.58	2383.93
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1104+03.33	2825.80
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1105+32.83	3864.10
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1105+83.12	3593.91

CONTROL POINTS-JOHN HAGAR RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	776+29.74	-2373.09
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	777+01.79	-2312.45
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	786+48.57	-1356.98
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	787+93.31	-1233.83
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	795+15.15	-867.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	796+35.37	-966.58
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	797+87.51	-241.99
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	798+15.15	-317.41
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	803+97.00	70.98
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	804+78.31	343.62
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	806+33.52	-399.00
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	807+13.83	-300.46
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	808+82.37	-827.27
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	810+82.65	-1048.64
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	811+56.35	-922.71
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	813+19.37	-578.02
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	813+50.20	-909.95
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	814+59.92	-1284.95
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	815+62.41	-989.21
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	818+01.69	-1536.56
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	818+17.97	-1391.15
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	818+84.78	-2430.97
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	819+32.89	-2571.34
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	821+76.50	-623.83
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	832+34.06	-520.14

CONTROL POINTS-GUILL RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	5+49.64	2319.80
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	8+81.21	1999.24
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	13+20.20	-16.74
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	13+71.08	-2815.07
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	14+10.84	-2767.98
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	14+28.08	-1813.47
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	14+97.09	-1704.51
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	15+86.32	-79.11
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	16+18.53	-707.65
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	17+63.07	-725.00
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	19+14.51	403.85
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	19+69.09	1037.29
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	20+38.69	439.27
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	21+31.06	-1221.25
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	22+71.36	1285.07
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	22+74.70	1489.73
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	23+31.66	-1251.32
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	23+48.53	1174.65
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	23+50.71	956.03
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	24+91.90	1243.53
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	25+43.52	1998.86
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	25+87.68	1645.79
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	26+98.42	2075.03
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	33+68.39	3009.32
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	33+69.51	3240.03

CONTROL POINTS-TILMAN DR

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	979+55.06	2424.98
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	980+19.69	2294.67
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	989+72.14	1613.21
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	991+09.67	1416.12
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	998+06.43	632.21
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	999+17.35	428.48
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1006+38.25	995.01
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1006+40.90	1134.21
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1006+78.45	1485.09
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1006+78.97	1206.65
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1008+10.77	1110.90
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1008+12.54	957.93
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1018+25.93	808.80
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1021+03.12	699.90
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1021+08.93	1226.11
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1021+13.98	845.82
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1022+82.50	968.19
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1025+07.95	1065.13
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1025+45.86	818.06
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1029+71.40	1183.35
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1029+92.41	1111.12
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1030+98.51	2177.95
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1034+22.90	2590.77
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1037+44.25	1693.13
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1040+17.48	1966.59

CONTROL POINTS-PROVIDENCE PKWY

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1578+80.82	-4789.92
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1580+27.03	-4815.61
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1604+99.33	-3908.53
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1605+13.78	-3832.91
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1605+32.92	-2132.37
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1605+45.31	-2890.77
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1605+59.10	-2943.76
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1605+63.68	-2282.19
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1605+78.26	-3455.56
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1605+96.83	-3470.79
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1606+25.18	-2060.05
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1606+33.43	-2200.26
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1609+41.60	-1517.55
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1610+12.40	115.95
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1610+32.22	-317.54
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1610+86.73	-1999.26
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1612+41.07	-1753.58
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1612+72.02	-1561.79
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1615+89.12	-1357.69
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1616+07.66	-1840.76
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1618+75.10	-1484.88
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1620+14.58	-1072.36
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1621+57.05	-1133.26
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1630+49.14	-1174.75
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1631+64.14	-1122.58

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

CONTROL POINTS
SIDE STREETS

SHEET 2 OF 3

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C9

CONTROL POINTS-RAMP A

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	392+11.35	788.66
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	392+83.49	-729.56
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	402+30.19	-3.18
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	403+75.01	-137.88
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	410+97.13	-599.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	412+17.45	-775.16
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	413+69.13	4.31
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	413+96.85	-137.92
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	419+89.00	171.27
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	420+29.64	447.34
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	423+35.58	-247.75
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	424+14.90	-119.15
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	428+74.67	-526.72
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	431+12.18	-83.22
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	431+39.89	-608.18
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	431+40.09	-462.27
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	431+90.26	-378.81
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	432+25.46	-740.39
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	432+52.30	-451.42
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	432+78.23	-1047.11
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	432+89.03	-1996.71
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	432+92.07	-925.03
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	433+03.77	-2186.16
S56	666857.006	1812591.118	577.921	XCP	GPS 95-040-56	442+06.62	-961.91
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	446+27.56	-1392.83

CONTROL POINTS-RAMP B

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	471+93.12	3407.93
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	471+97.23	3499.29
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	480+88.15	2497.56
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	481+50.60	2328.55
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	485+62.57	1568.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	485+84.04	1464.18
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	490+47.15	1336.22
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	490+91.06	1412.88
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	497+09.58	1029.33
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	498+46.18	1246.63
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	498+99.63	490.97
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	500+15.64	587.12
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	501+67.32	153.58
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	503+98.39	634.26
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	504+67.66	259.31
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	504+81.49	114.05
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	506+17.46	383.00
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	508+20.79	445.42
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	509+17.23	149.98
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	511+04.47	1505.92
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	512+66.07	1875.37
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	512+80.52	353.11
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	513+44.71	214.18
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	522+54.33	-4.74
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	524+79.72	163.34

CONTROL POINTS-RAMP C

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	677+12.99	3915.61
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	677+87.47	3987.68
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	682+89.05	2104.32
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	683+33.70	2824.36
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	683+62.05	2968.90
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	683+64.74	2168.23
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	689+15.13	1803.06
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	690+16.31	1830.64
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	694+57.51	824.05
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	695+16.97	1258.87
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	695+89.76	422.18
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	696+05.91	766.46
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	696+99.37	-349.36
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	697+47.97	1342.16
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	698+12.66	-206.14
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	699+98.61	-142.27
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	700+56.69	184.44
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	703+19.68	1044.95
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	703+29.76	1472.87
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	704+37.35	-45.15
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	706+79.71	-219.10
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	709+39.89	125.18
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	710+44.33	6.31
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	719+87.03	-200.14
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	722+12.43	358.83

CONTROL POINTS-RAMP AA

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1362+31.55	3718.45
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1362+97.26	-3655.56
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1372+49.06	-2701.45
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1373+87.65	-2569.65
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1380+88.13	-1984.78
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1382+00.41	-1953.15
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1383+87.17	-1565.80
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1384+08.43	-1560.09
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1389+93.86	958.77
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1390+09.81	1002.94
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1393+89.32	-638.10
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1394+49.68	-526.54
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1401+13.61	1633.10
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1401+18.36	1202.58
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1401+46.43	2.48
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1402+47.84	433.60
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1402+51.38	945.45
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1402+92.02	2201.34
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1402+92.06	1033.60
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1403+25.39	250.36
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1404+49.02	1984.30
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1404+52.48	640.58
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1404+91.00	267.80
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1406+23.91	412.93
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1406+59.50	-407.48

CONTROL POINTS-RAMP BB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1479+67.70	2035.68
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1483+99.80	1602.06
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1494+95.07	583.92
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1495+75.96	-459.69
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1496+65.20	364.34
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1498+50.92	172.45
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1499+09.72	-1320.96
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1500+07.80	-659.51
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1500+12.17	-1170.90
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1500+29.81	-648.78
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1500+36.83	-112.30
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1500+40.58	-1666.03
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1500+49.02	-1611.39
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1500+50.83	-2785.23
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1500+54.63	-3797.44
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1500+55.39	-2625.48
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1500+58.44	-3713.32
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1500+76.84	-1899.87
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1500+87.54	-1806.22
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1503+13.30	105.41
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1507+57.53	488.51
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1511+61.39	922.53
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1512+07.98	932.59
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1520+48.46	-1788.34
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1523+12.77	-2039.23

CONTROL POINTS-RAMP CC

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1687+64.93	-1237.71
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1691+97.96	-803.77
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1701+16.50	-1463.08
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1701+50.46	-1439.13
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1701+61.19	-4198.67
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1701+63.96	-3181.19
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1701+67.86	-4134.48
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1701+68.73	-2044.08
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1701+72.81	-3046.83
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1701+80.33	-310.99
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1701+81.75	-2031.99
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1701+85.91	-988.54
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1702+06.98	-1071.75
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1702+13.79	-2426.71
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1702+29.74	-2371.55
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1702+79.28	-692.08
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1703+11.60	-427.90
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1703+24.29	-235.36
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1704+02.26	-526.47
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1704+47.29	-49.02
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1707+14.10	-354.03
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1709+06.52	511.74
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1710+39.77	620.16
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1719+69.02	1574.66
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1721+15.79	1777.14

CONTROL POINTS-RAMP D

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	799+79.23	145.12
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	800+51.37	3.14
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	809+98.07	137.34
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	811+42.89	2.64
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	818+65.01	-459.32
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	819+85.33	-634.64
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	821+37.01	144.83
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	821+64.73	2.60
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	826+98.76	624.60
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	827+11.58	346.41
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	831+40.07	55.75
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	831+57.00	207.69
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	836+61.46	-35.86
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	837+64.62	-279.72
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	838+71.04	-212.35
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	840+27.79	-683.34
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	840+56.99	-375.40
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	841+44.89	381.31

CONTROL POINTS-RAMP D

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	842+27.75	-601.92
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	842+89.81	-1126.49
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	843+77.05	-2043.35
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	843+87.05	-1073.53
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	845+86.14	-2280.39
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	853+22.10	-1560.05
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	857+54.37	-1993.91

CONTROL POINTS-RAMP DD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1767+61.39	-3321.77
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1768+72.51	-3241.15
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1777+34.75	-2307.12
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1779+13.44	-2150.95
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1788+18.48	-1184.73
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1788+87.77	-1132.71
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1792+49.72	927.62

CONTROL POINTS-RAMP DD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1793+30.48	725.27
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1798+31.09	179.99
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1798+39.38	268.32
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1801+01.19	2276.45
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1801+03.83	1845.79
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1801+06.39	642.71
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1801+51.49	707.71
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1801+52.60	934.04
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1801+63.47	530.99
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1801+71.17	242.85
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1801+72.62	1390.11
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1801+83.26	1426.71
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1801+83.96	976.08
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1801+87.98	532.01
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1801+99.33	2554.62
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1802+04.19	2305.08
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1816+56.21	-1323.77
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1816+86.26	-1420.74

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONTROL POINTS
RAMPS

2/4/2023 7:52:28 AM
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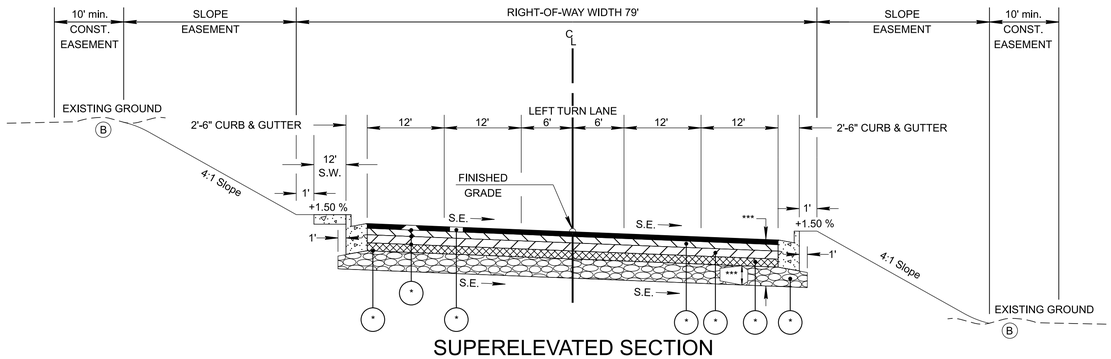
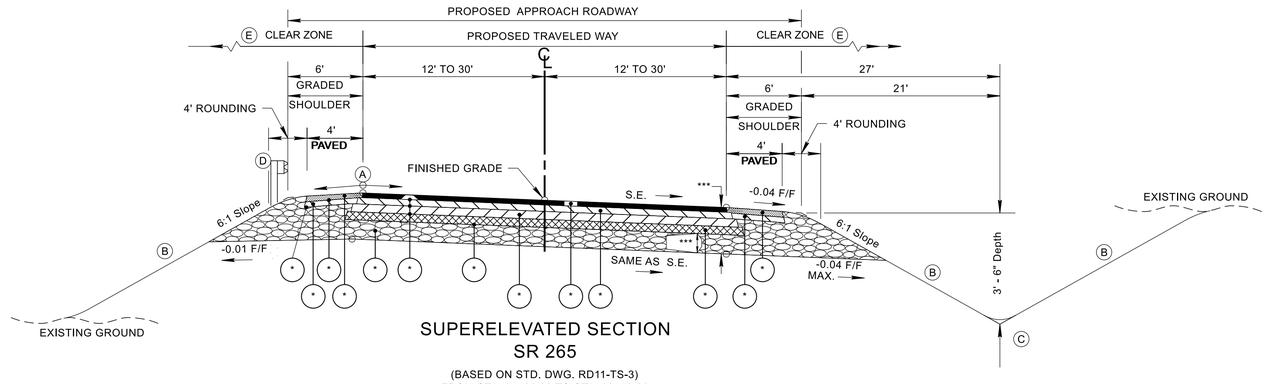
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B



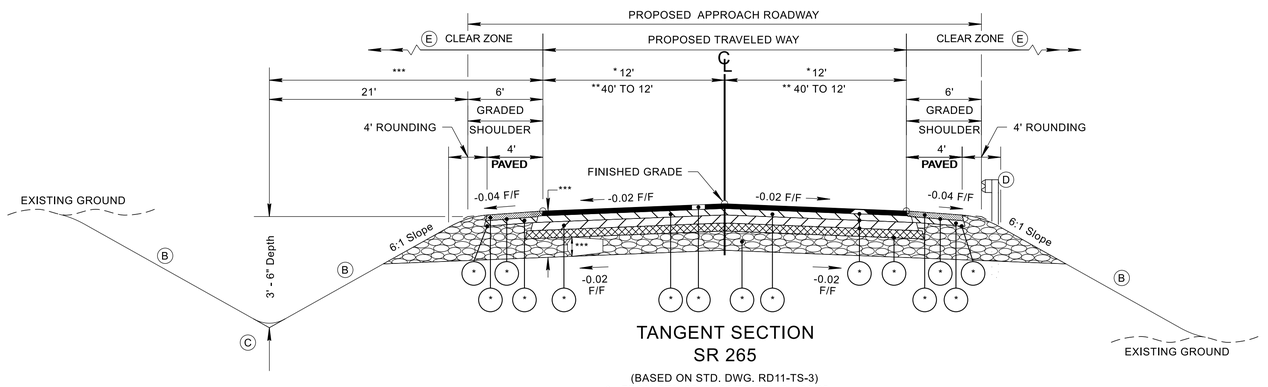
SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 98+59.00 TO STA. 101+09.12



SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
FROM STA. 94+06.82 TO STA. 98+59.00



TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
* FROM STA. 92+00.00 TO STA. 94+06.82
** FROM STA. 147+75.00 TO STA. 155+25.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

2/4/2023 7:53:48 AM
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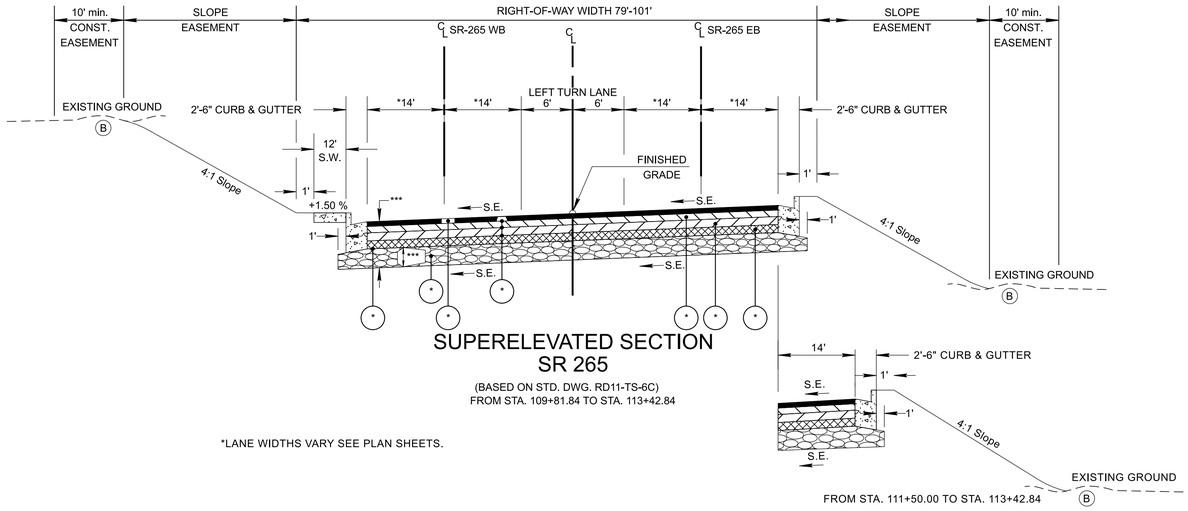
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B1

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

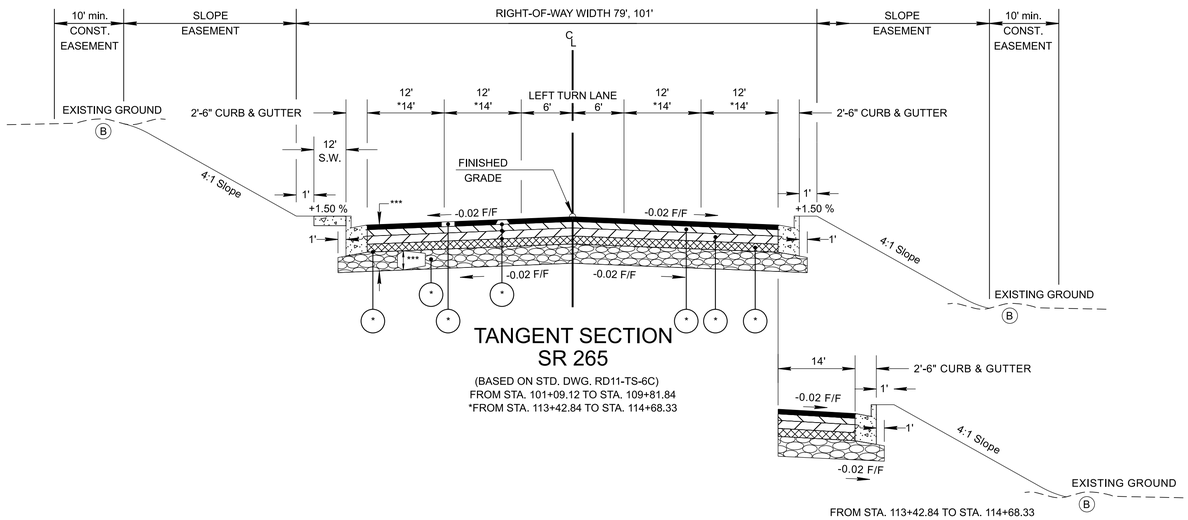


SUPERELEVATED SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 109+81.84 TO STA. 113+42.84

*LANE WIDTHS VARY SEE PLAN SHEETS.

FROM STA. 111+50.00 TO STA. 113+42.84



TANGENT SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 101+09.12 TO STA. 109+81.84
*FROM STA. 113+42.84 TO STA. 114+68.33

FROM STA. 113+42.84 TO STA. 114+68.33

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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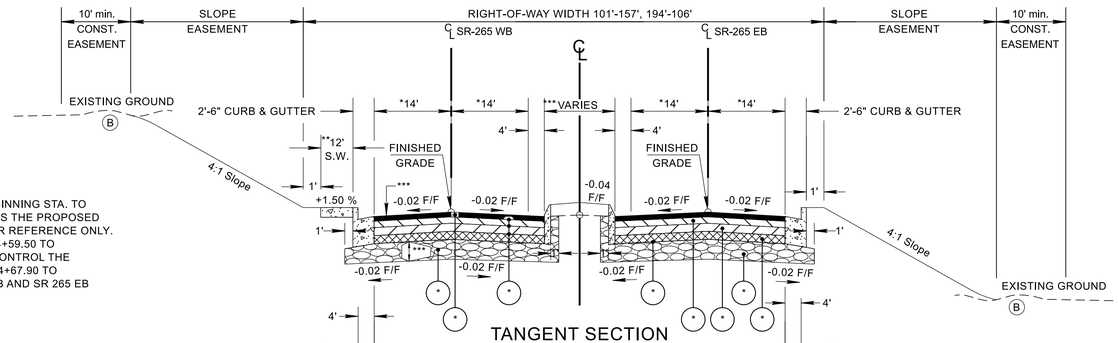
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B2

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



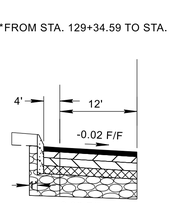
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 114+68.33 TO STA. 121+96.14
*FROM STA. 129+34.59 TO STA. 135+48.26

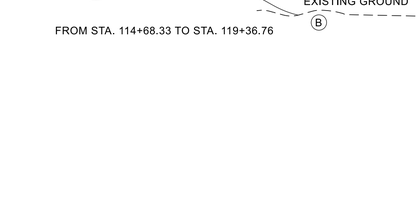
FROM STA. 121+61.86 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 131+10.42

FROM STA. 120+14.97 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 129+68.63

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SIDEWALK LOCATION VARIES SEE PLAN SHEETS.
***MEDIAN WIDTH VARIES SEE PLAN SHEETS.



*FROM STA. 129+34.59 TO STA. 135+48.26



FROM STA. 114+68.33 TO STA. 119+36.76

FROM STA. 135+71.67 TO STA. 135+48.26

B SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
SR 265

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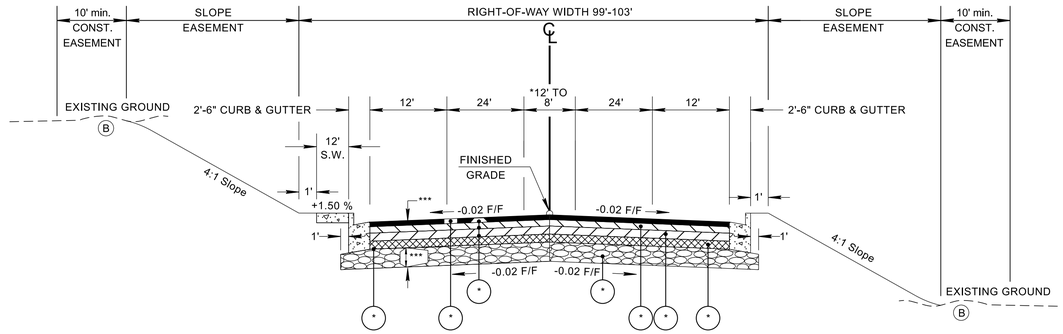
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B3

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

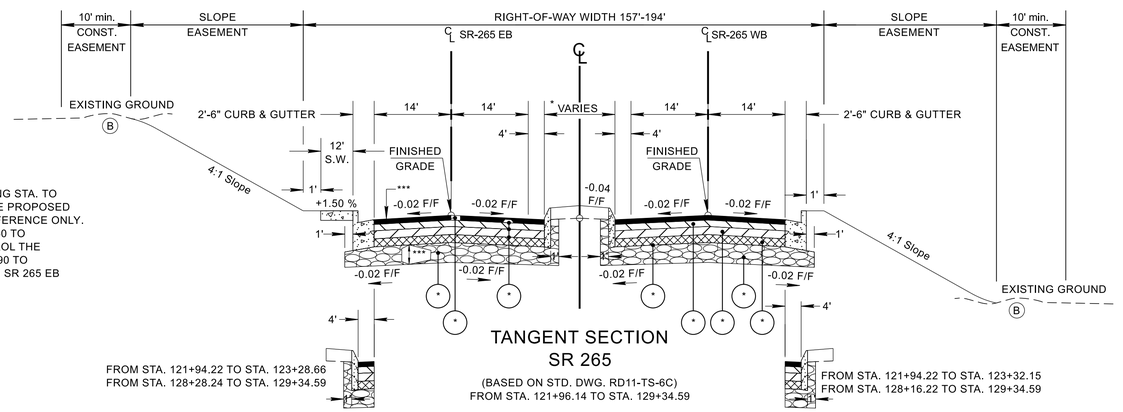


TANGENT SECTION
SR 265

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 135+48.26 TO STA. 147+75.00

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



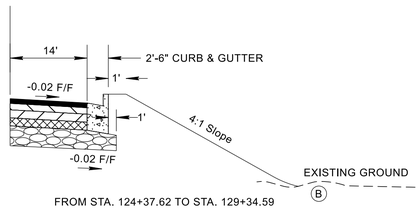
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 121+96.14 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+28.66
FROM STA. 128+28.24 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+32.15
FROM STA. 128+16.22 TO STA. 129+34.59

*MEDIAN WIDTH VARIES SEE PLAN SHEETS.



FROM STA. 124+37.62 TO STA. 129+34.59

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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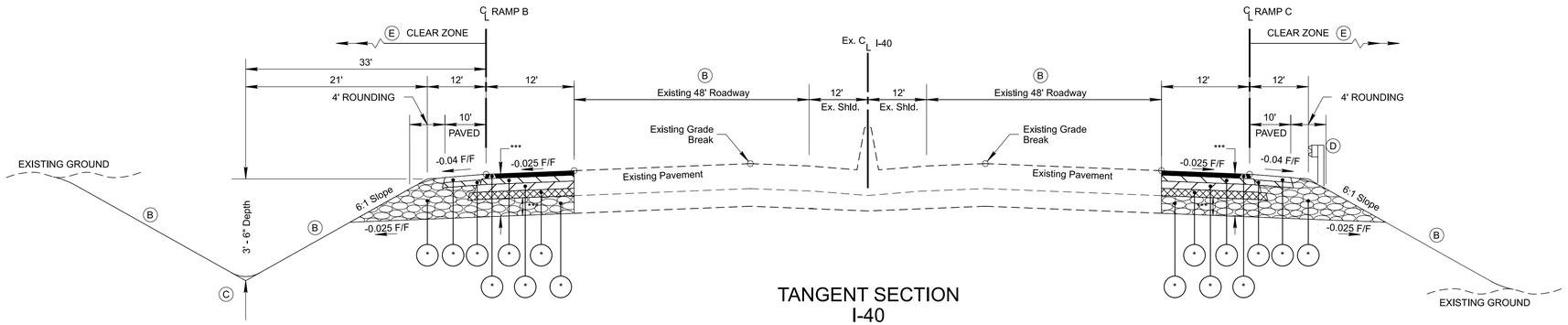
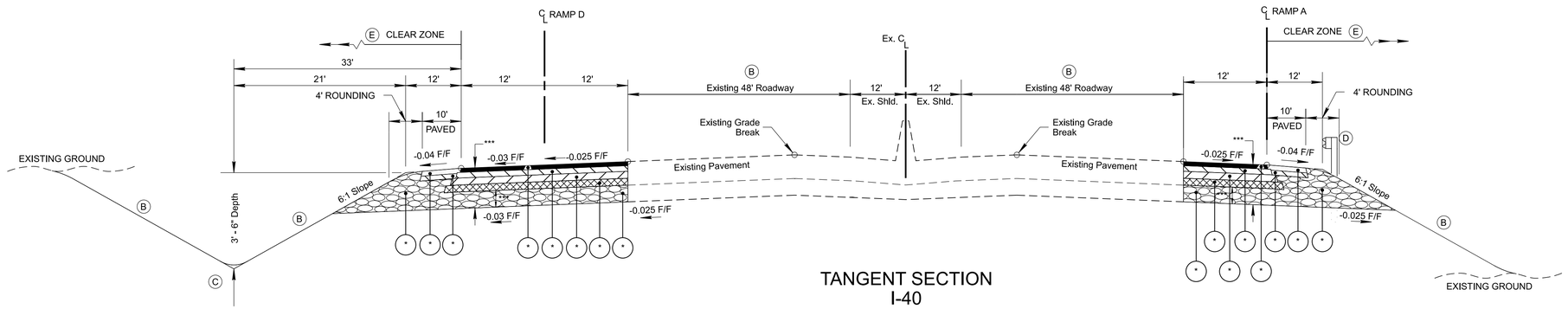
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B4



TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 607+82.14 TO STA. 615+76.94 LT (RAMP B)
FROM STA. 602+83.84 TO STA. 612+76.67 RT (RAMP C)



TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 547+69.12 TO STA. 585+03.52 LT (RAMP D)
FROM STA. 560+00.18 TO STA. 583+87.41 RT (RAMP A)

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-40

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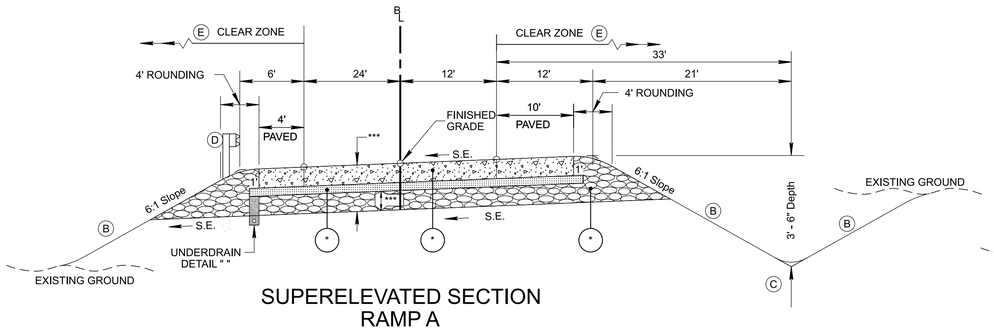
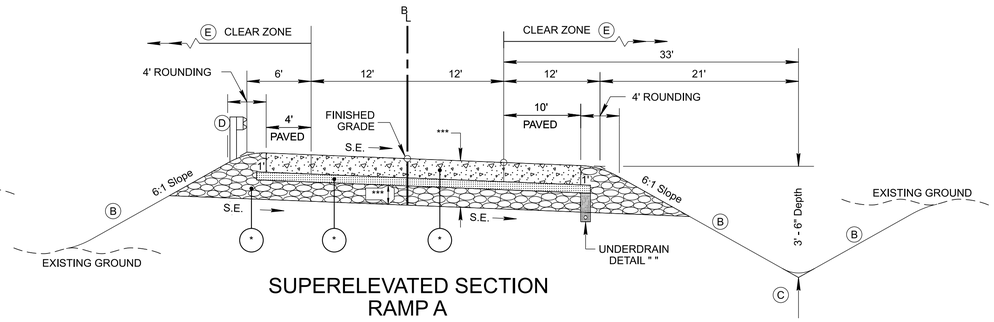
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B5



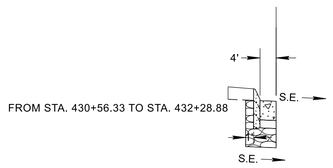
SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 425+30.66 TO STA. 428+10.59

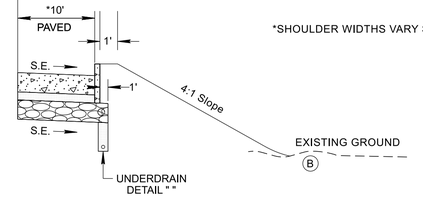


SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 429+91.00 TO STA. 433+13.78

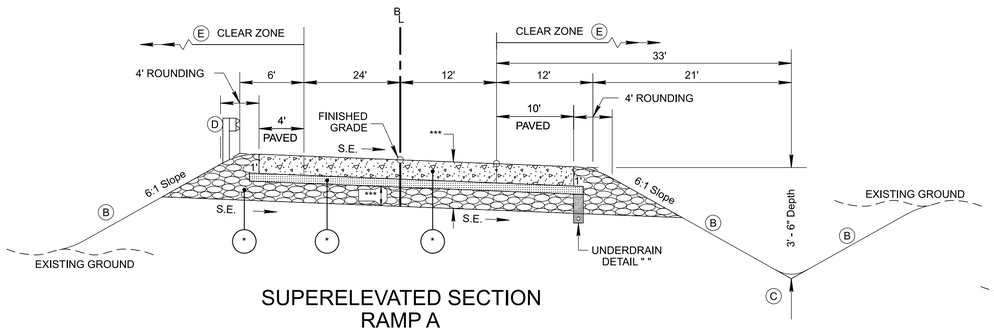


FROM STA. 430+56.33 TO STA. 432+28.88



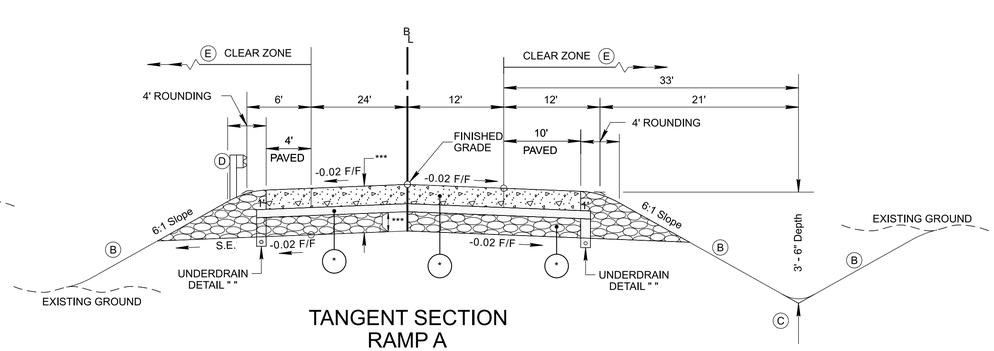
FROM STA. 430+55.47 TO STA. 433+16.11

*SHOULDER WIDTHS VARY SEE PLAN SHEETS.



SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 420+09.48 TO STA. 425+30.66



TANGENT SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 428+10.59 TO STA. 429+91.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS RAMP A

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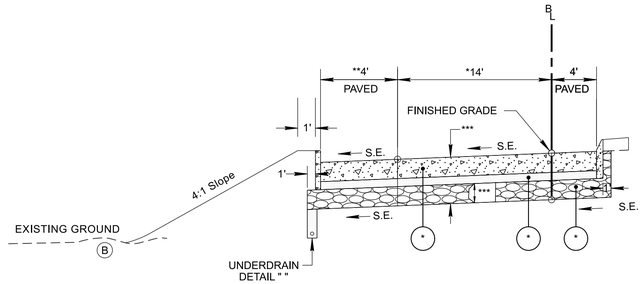
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B6

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP AA

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1400+00.00 TO STA. 1401+83.90

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
RAMP AA

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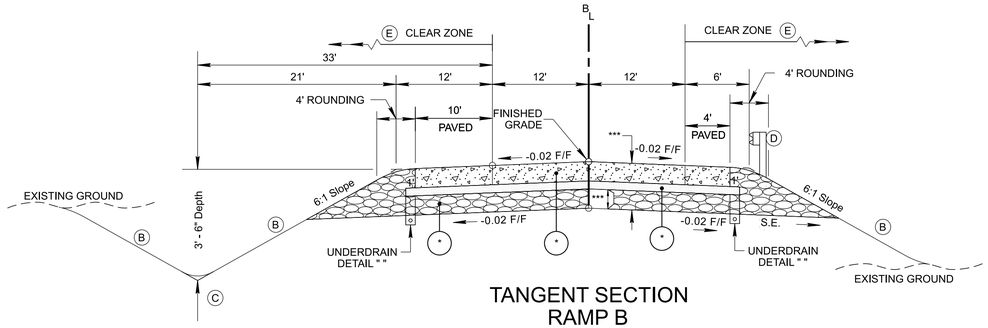
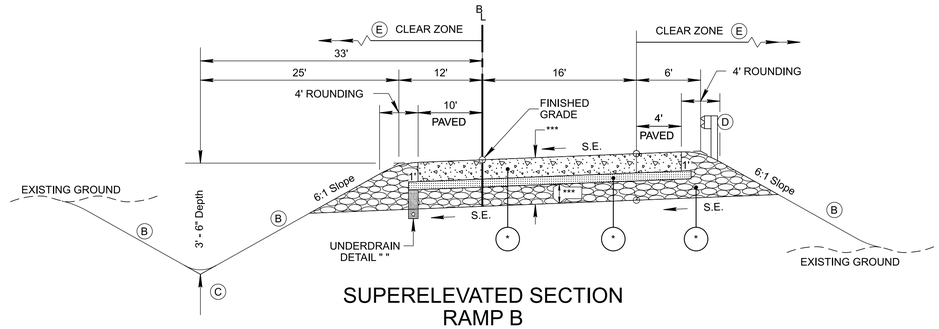
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B7



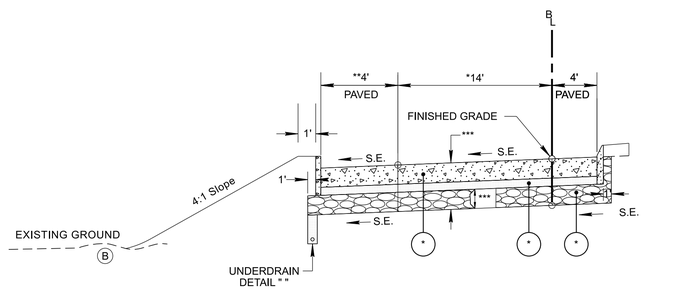
TANGENT SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 503+42.25 TO STA. 505+93.21



SUPERELEVATED SECTION
RAMP B

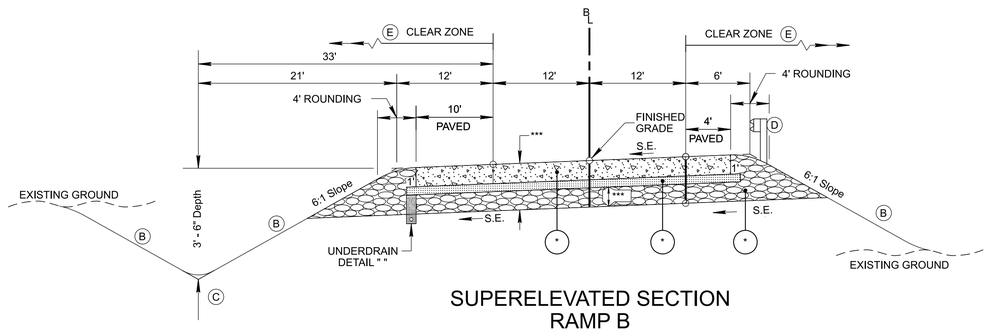
(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 512+65.00 TO STA. 516+27.35



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 499+58.79 TO STA. 503+42.25



SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 505+93.21 TO STA. 512+65.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS RAMP B

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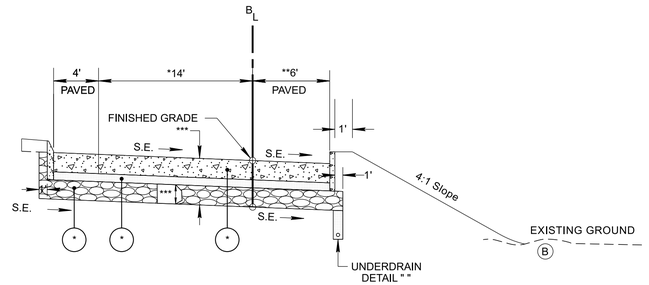
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B8

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP BB

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1500+49.57 TO STA. 1501+80.88

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP BB

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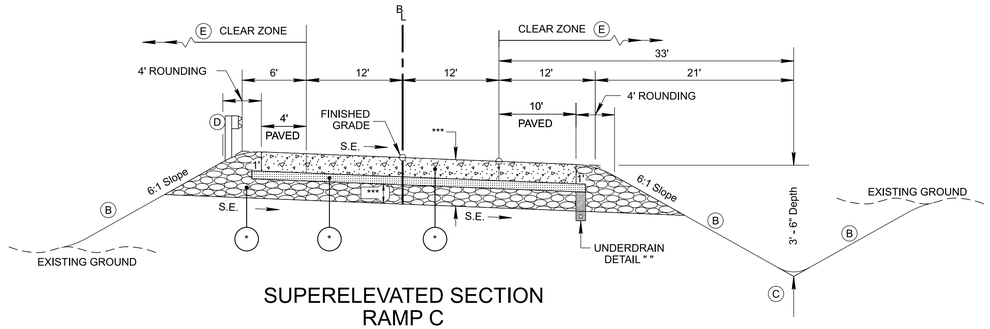
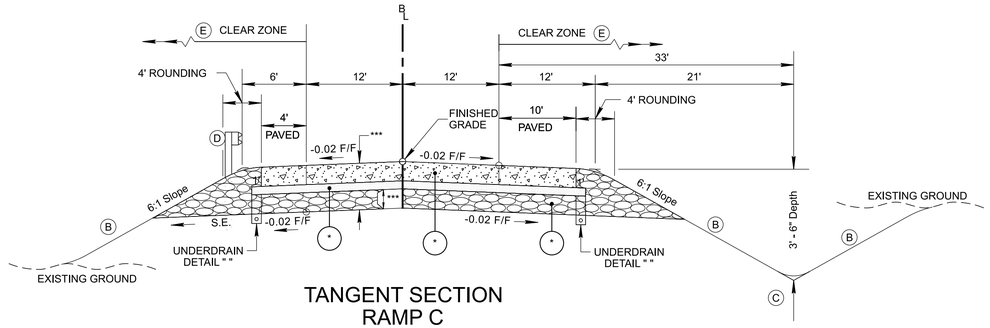
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B9



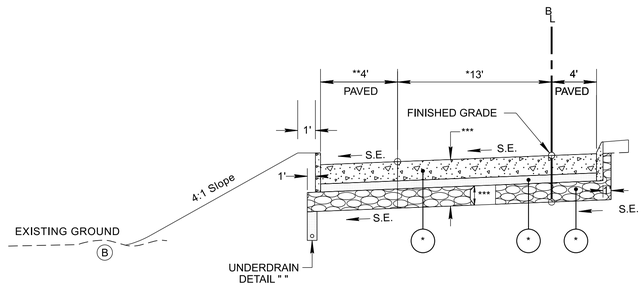
SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 703+95.34 TO STA. 708+61.12



TANGENT SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 702+90.60 TO STA. 703+95.34



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 700+65.85 TO STA. 702+90.60

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS RAMP C

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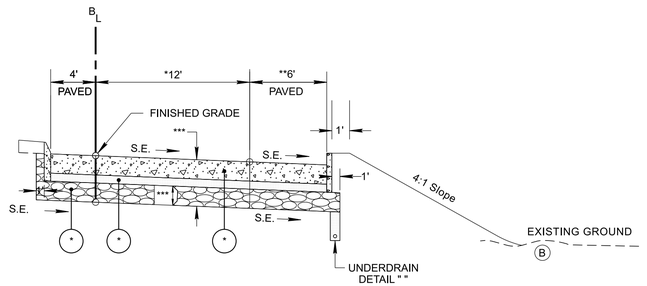
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B10

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP CC

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1700+62.68 TO STA. 1703+01.66

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP CC

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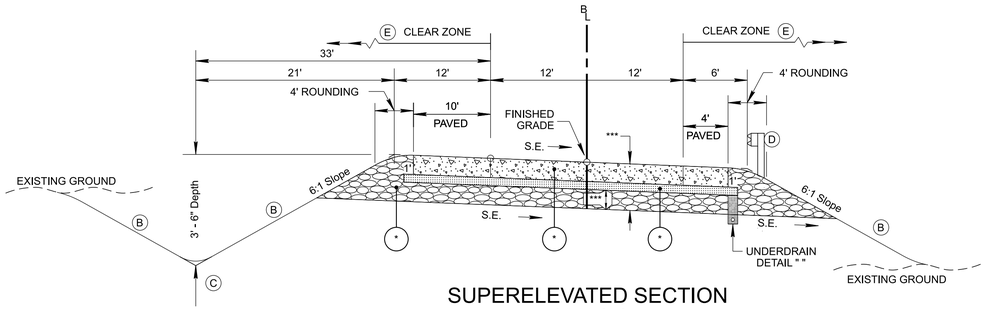
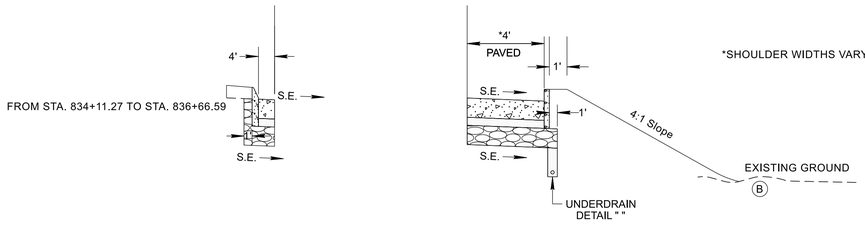
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B11



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 833+29.60 TO STA. 837+71.58



FROM STA. 834+11.27 TO STA. 836+66.59

FROM STA. 834+10.35 TO STA. 837+71.58

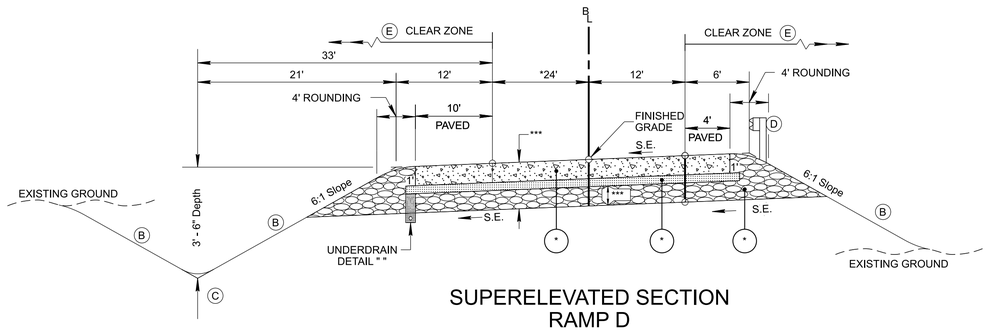
*SHOULDER WIDTHS VARY SEE PLAN SHEETS.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 828+91.41 TO STA. 833+29.60

*LANE WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP D

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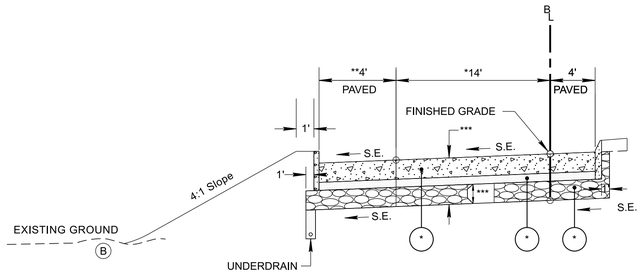
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B12

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP DD

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1800+47.85 TO STA. 1803+02.06

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP DD

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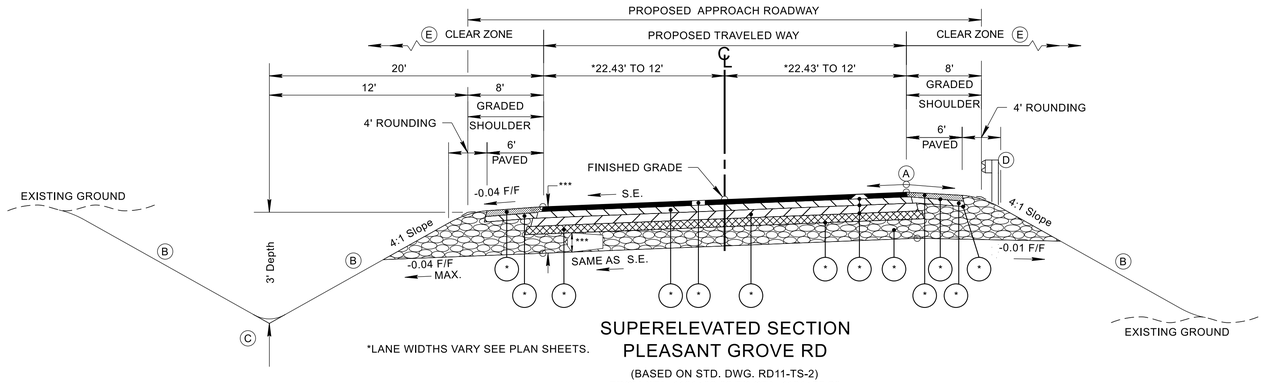
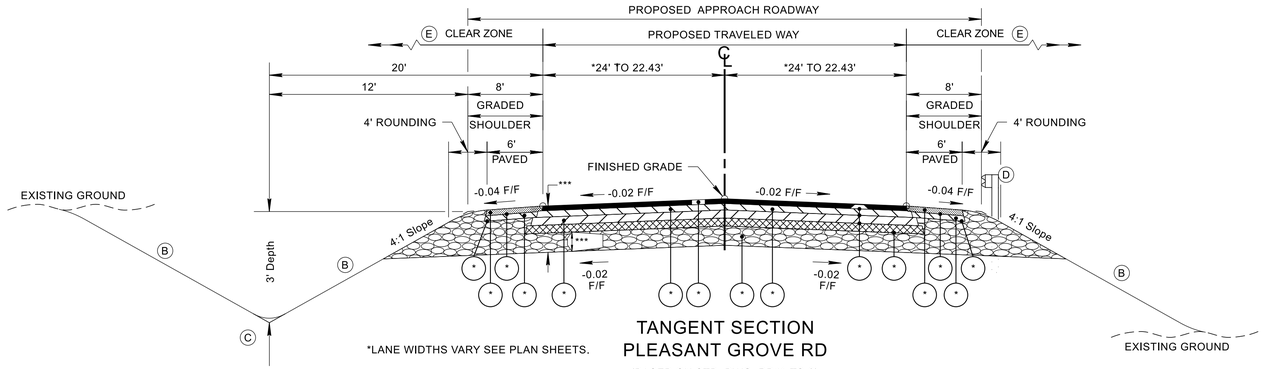
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B13



SUPERELEVATED SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

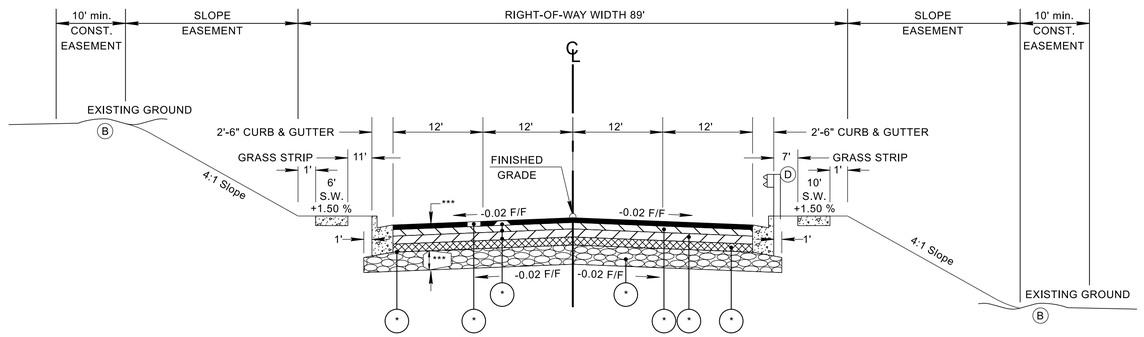
(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+96.00 TO STA. 1104+75.00



TANGENT SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+55.00 TO STA. 1101+96.00



TANGENT SECTION
PLEASANT GROVE RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1100+31.94 TO STA. 1101+55.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL
SECTIONS
PLEASANT GROVE RD

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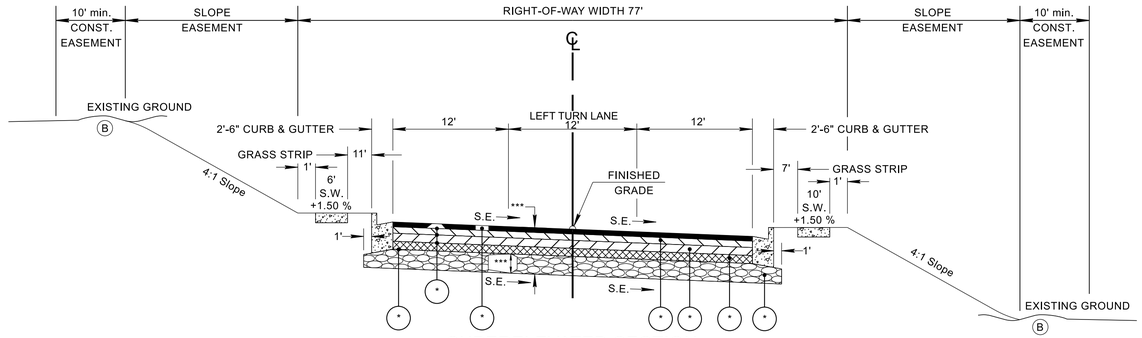
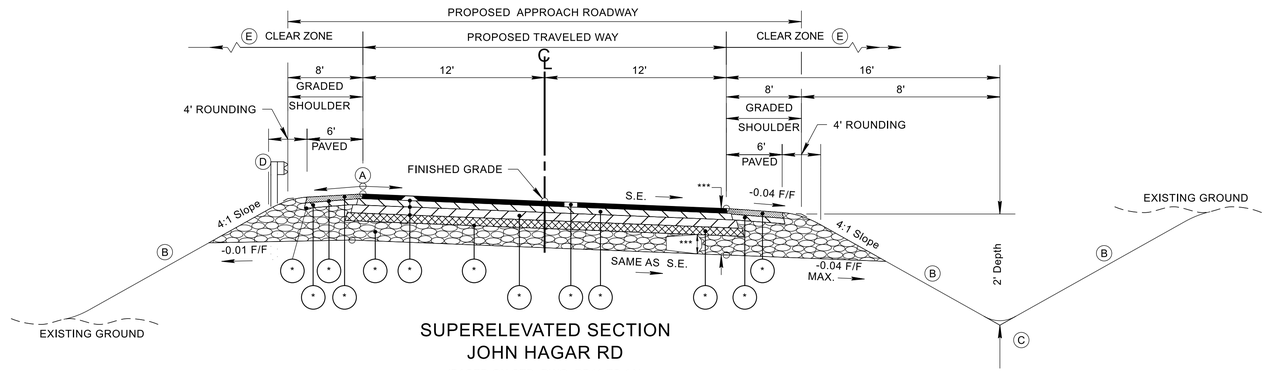
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B14



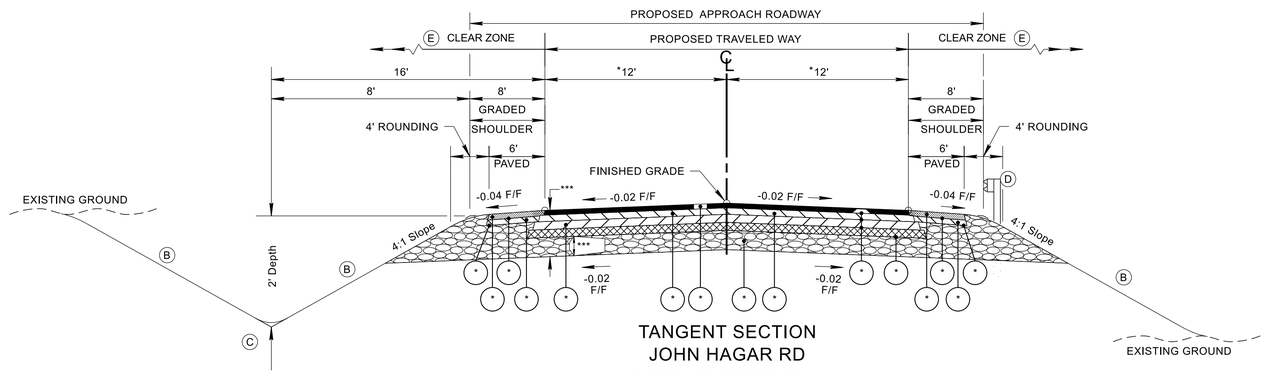
SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 816+88.46 TO STA. 823+37.33



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+93.00 TO STA. 808+37.00



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+75.00 TO STA. 801+93.00
*FROM STA. 808+37.00 TO STA. 816+88.46

*LANE WIDTHS VARY SEE PLAN SHEETS.

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
JOHN HAGAR RD

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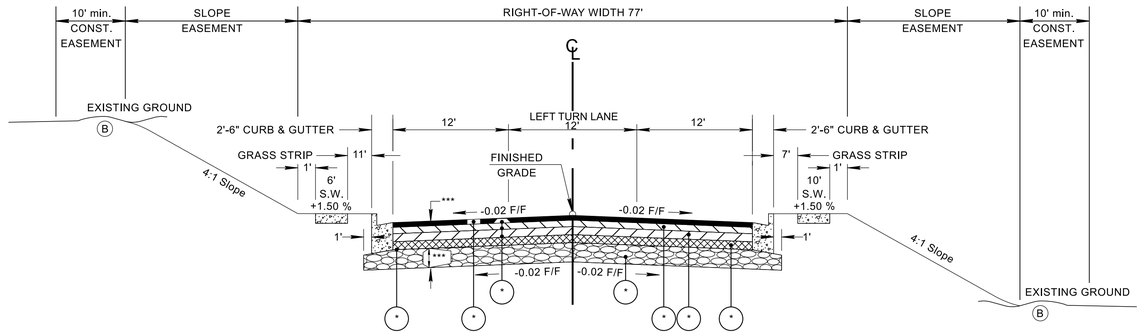
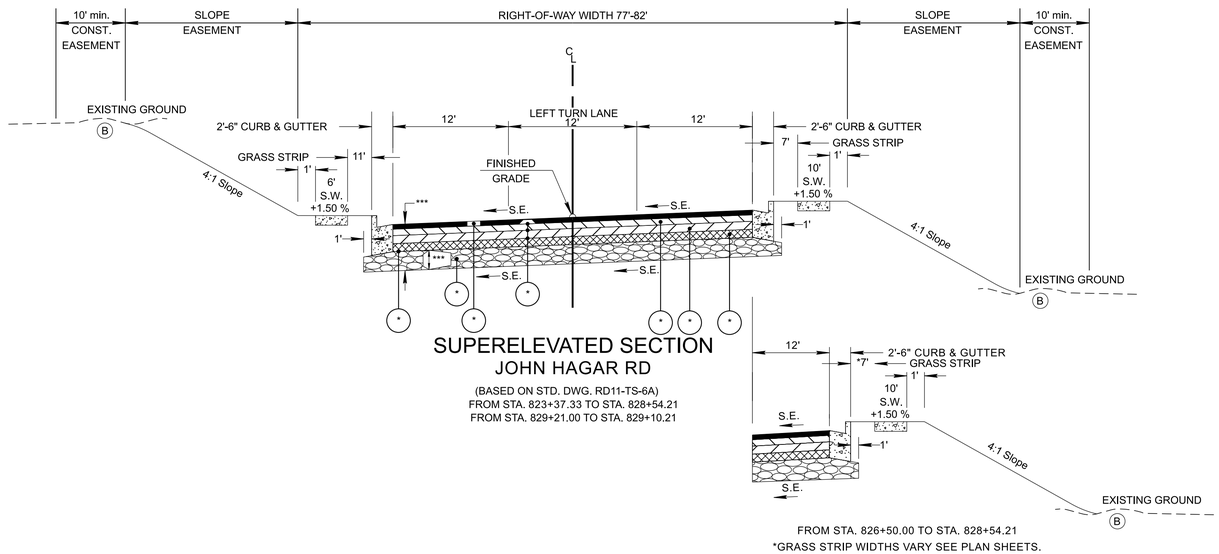
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B15

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 829+21.00 TO STA. 830+00.00



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 823+37.33 TO STA. 828+54.21
FROM STA. 829+21.00 TO STA. 829+10.21

FROM STA. 826+50.00 TO STA. 828+54.21
*GRASS STRIP WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
JOHN HAGAR RD

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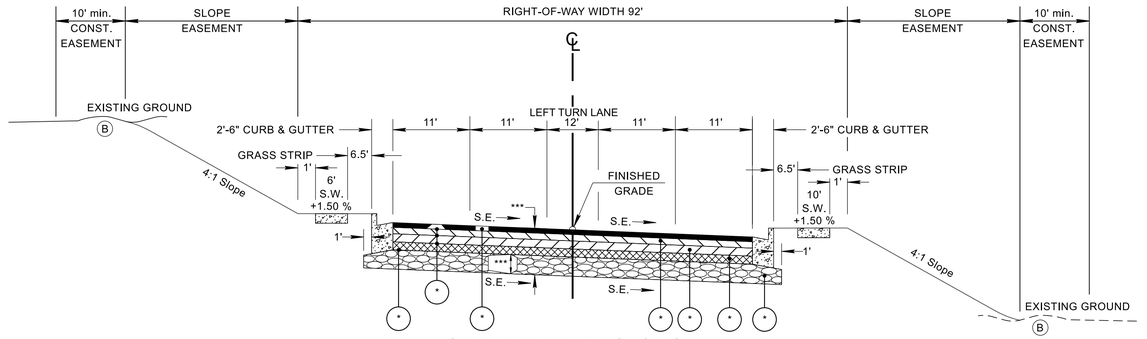
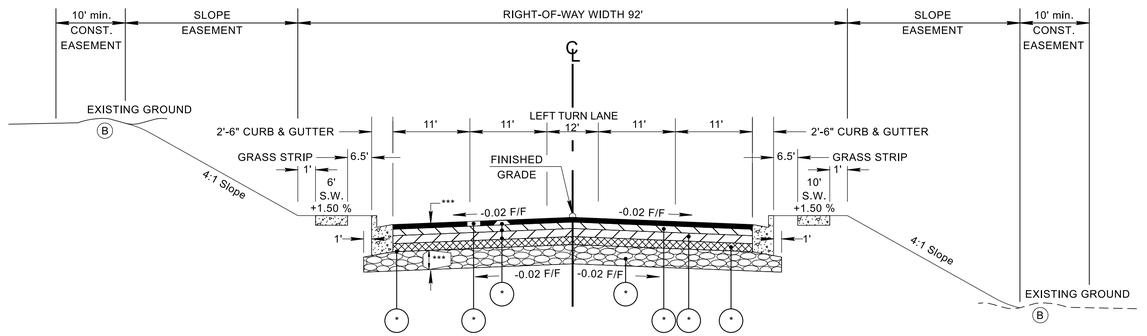
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B16

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1603+40.71 TO STA. 1607+49.71



TANGENT SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1602+70.00 TO STA. 1603+40.71
FROM STA. 1607+49.71 TO STA. 1614+00.00

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INITIAL STUDIES REQUEST

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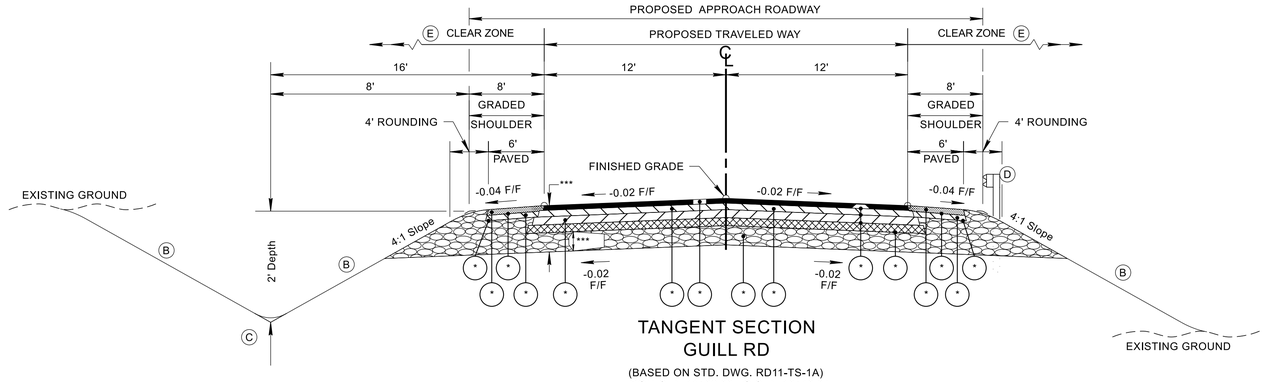
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
PROVIDENCES PKWY

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B17



TANGENT SECTION
GUILL RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 11+00.00 TO STA. 16+49.84

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL
SECTIONS
GUILL RD

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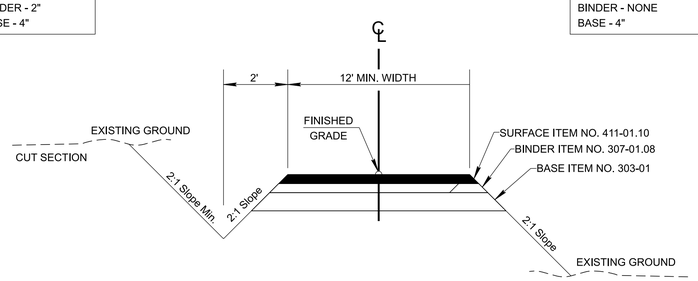
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B18

PROPOSED PAVEMENT SCHEDULE

(*) @ . " THICK (APPROX. LB./S.Y.) - .	(*) @ . " THICK (APPROX. LB./S.Y.) - .
(*) @ . " THICK (APPROX. LB./S.Y.) - . - .	(*) @ . " THICK (APPROX. LB./S.Y.) - . - .

BUSINESS
SURFACE - 1.25"
BINDER - 2"
BASE - 4"

FIELD OR RESIDENTIAL
SURFACE - 1.5"
BINDER - NONE
BASE - 4"



TANGENT SECTION
TILLMAN DRIVE
PRIVATE DRIVE TO BUSINESS,
FIELD, OR RESIDENTIAL PROPERTY

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
AND PAVEMENT SCHEDULE
TILLMAN DR

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (ACRES)			
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE		LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERMANENT	SLOPE	CONSTRUCTION	AIR RIGHTS
				BOOK	PAGE												
1	GARY WISNIEWSKI	97	11.08	1958	772	0.810		0.810				0.810					
2	GARY WISNIEWSKI	97	11.09	809	2298	1.030		1.030				1.030					
3	CASEY GORDON	97	13.01	1856	1644	0.571		0.571				0.571					
4	TOM GOFF & WF, DONNA M. GOFF	97	12.04	1769	1299	0.920		0.920				0.920					
5	MICHAEL PEEK	97	12	464	491	0.740		0.740				0.740					
6	GUANPING ZHENG & WF, JIANKUN WANG	97	12.03	1687	1415	0.850		0.850				0.850					
7	DEBORAH BROWNELL	97	12.01	1923	200	1.030		1.030				1.030					
8	RANDALL FULLER & JOHN BLACKWELL	97	12.02	1415	1808	1.180		1.180				1.180					
9	RONNIE MANGRUM & WF, BRANDI MANGRUM	97	17.04	1672	1066	2.000		2.000				2.000					
10	AMANDA SIMONEAUX CRAWFORD	97	17.03	1931	235	2.000		2.000				2.000					
11	WESLEY C. WALL & WF, DANA JILL WALL	97	17.02	433	772	2.000		2.000				2.000					
12	JAMES C. WALL & WF, KAY T. WALL	97	17	820	433	1.720		1.720				1.720					
13	BILLY ELON EUBANKS & WF, VIRGINIA SUE EUBANKS	97	16.01	1053	1244	4.710		4.710				4.710					
14	JAMES M. HUETT & HEIDI M. HUETT	97	17.01	1693	2254	2.000		2.000				2.000					
15	DAVID MARTIN BUTLER & WF, BETSY CLARE BUTLER	97	29	318	369		1.000	1.000					1.000				
16	DOUGLAS R ANDERSON & WF, ALICIA M ANDERSON	97	28.05	1884	2070		1.000	1.000					1.000				
17	JAMES HUETT	97	18	1626	955	8.210		8.210				8.210					
18	PLEASANT GROVE METHODIST	97	19			1.200		1.200				1.200					
19	CHARLES E. (SONNY) TILLMAN	97	20	830	315	16.000		16.000				16.000					
20	CHARLES E. (SONNY) TILLMAN	97	20	830	315	1.000		1.000				1.000					
21	CHARLES E. (SONNY) TILLMAN	97	22	844	289	1.000		1.000				1.000					
22	MELTON LIVING TRUST	97	28.2	1617	2202		1.000	1.000					1.000				
23	RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY	97	28.21	1840	1642		1.000	1.000					1.000				
24	RAYMOND E. DAVIS JR & WF, PAMELA ANN DAVIS	97	28.08	384	471		1.350	1.350					1.350				
25	MELVIN W NELSON & WF, GENELLE NELSON	97	28.11	406	548		10.090	10.090					10.090				
26	JULIUS M. FULTON	97	27	314	347		0.350	0.350					0.350				
27	CHARLES E. (SONNY) TILLMAN	97	22	844	289	95.750		95.750				95.750					
28	CEMETERY HOLLIS/WRIGHT	97	21			1.000		1.000				1.000					
29	TERRI GENIE MINTON & HS, DAVID H MINTON	97	22.01	959	1876	5.000		5.000				5.000					
30	CHARLES E. (SONNY) TILLMAN	76	40.01	844	293	14.690		14.690				14.690					
31	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
32	PC TOWN CENTER LLC	97	75.07	2124	2162		31.910	31.910					31.910				
33	PHILLIP L SMARTT TRUSTEE	97	25	1081	1100		2.720	2.720					2.720				
34	THE ENCLAVE AT PROVIDENCE PROPERTY LLC	97	23.01	2075	429		26.320	26.320					26.320				
35	ANESKA J DAVIS & PHILLIP L SMARTT	97	75.06	1489	2110		1.050	1.050					1.050				
36	PHILLIP L SMARTT & WF, MARY R. SMARTT	97	75.02	396	366		5.950	5.950					5.950				
37	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
38	A H JOHNSON FAMILY LLC	97	23	2092	21		27.840	27.840					27.840				
39	ALDO A. JACOBOGODOY & ALDO MELISSA JACOBO	97	28.06	2199	783	3.400		3.400				3.400					
40	BRADLEY & KAATJE PITZER	97	28.23	1806	1		5.080	5.080					5.080				
41	JOSEPH & JENNY PEWITT	97	28.22	1038	44	3.460		3.460				3.460					
42	WARREN D. & DEBRA T. SMITH	97	28.13	398	431		5.040	5.040					5.040				
43	PETER J. & PATRICIA L. HICKS	97	28.04	1670	1468	3.490		3.490				3.490					
44	BYRON L. & KATHY T. PRICE	97	28.14	399	897		4.930	4.930					4.930				
45	BEAU D. & KENDRA FLEENOR	97	28.01	1635	1792	4.960		4.960				4.960					
46	THE GAMMONS FAMILY PROTECTION TRUST	97	28.15	1848	153		4.960	4.960					4.960				
47	CHARLES E. TILLMAN	76	51.00	1289	2399	28.480		28.480				28.480					
ACQUISITION TOTALS (ACRES)																	

INITIAL STUDIES REQUEST

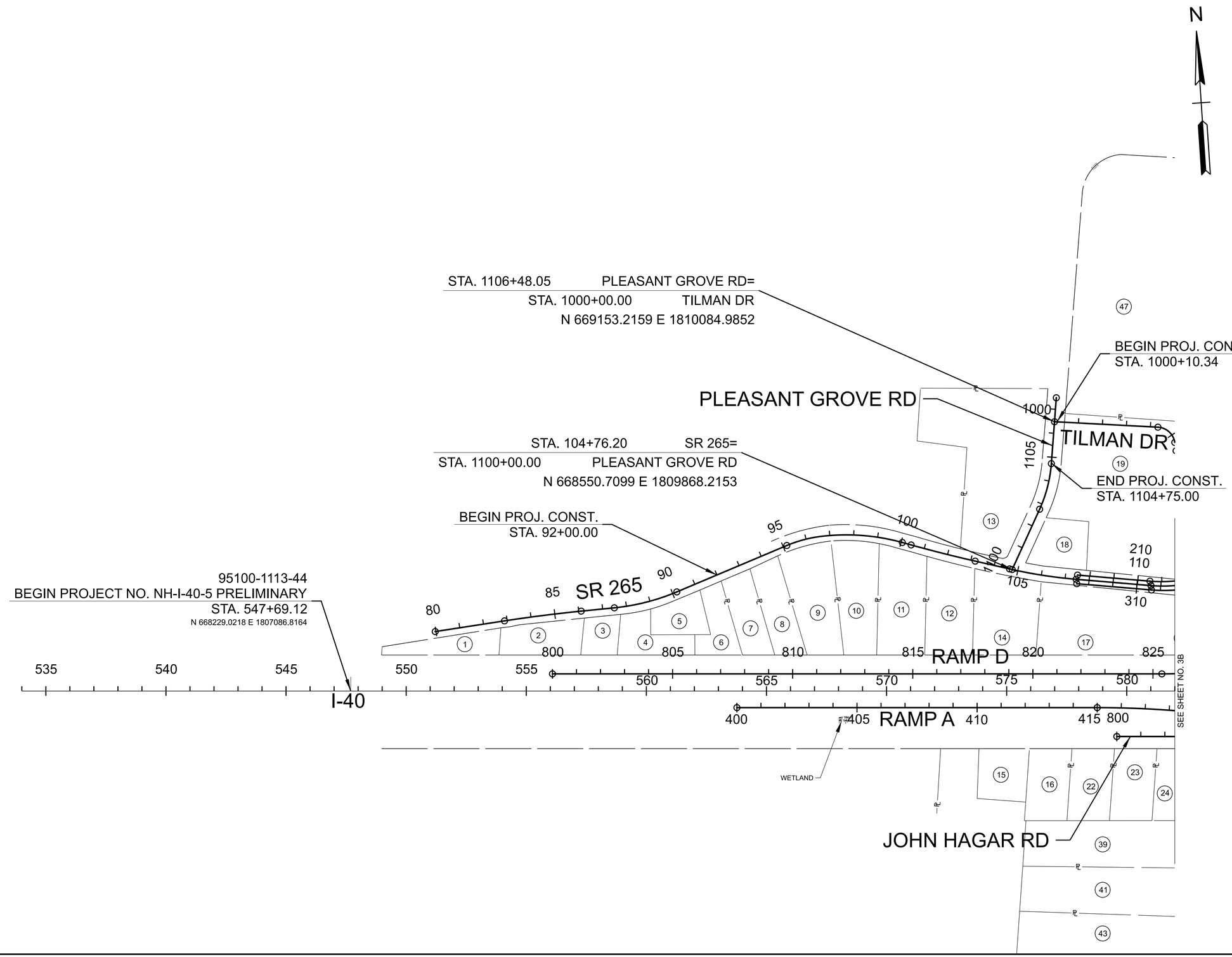
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ACQUISITION TABLE

2/4/2023 7:56:26 AM
C:\PWWORKING\EAST\T01\D2328414\95\I040-SHT-RIGHT OF WAY ACQUISITION TABLE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3A



INITIAL STUDIES REQUEST

SEALED BY

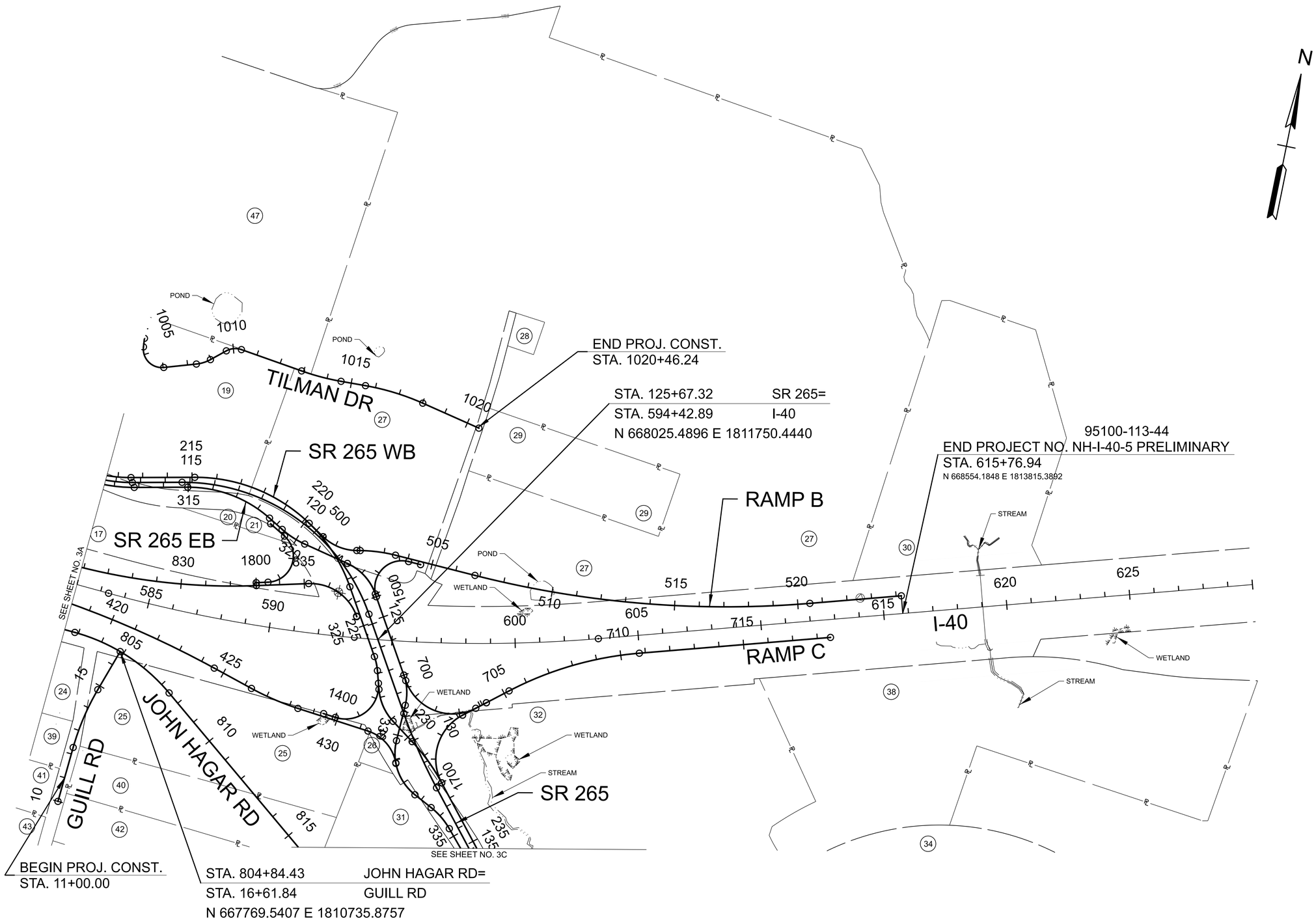
COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:57:53 AM
c:\pwworking\east01\d2328414\95l040-SHT-Property Map.dgn

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3B



INITIAL STUDIES REQUEST

SEALED BY

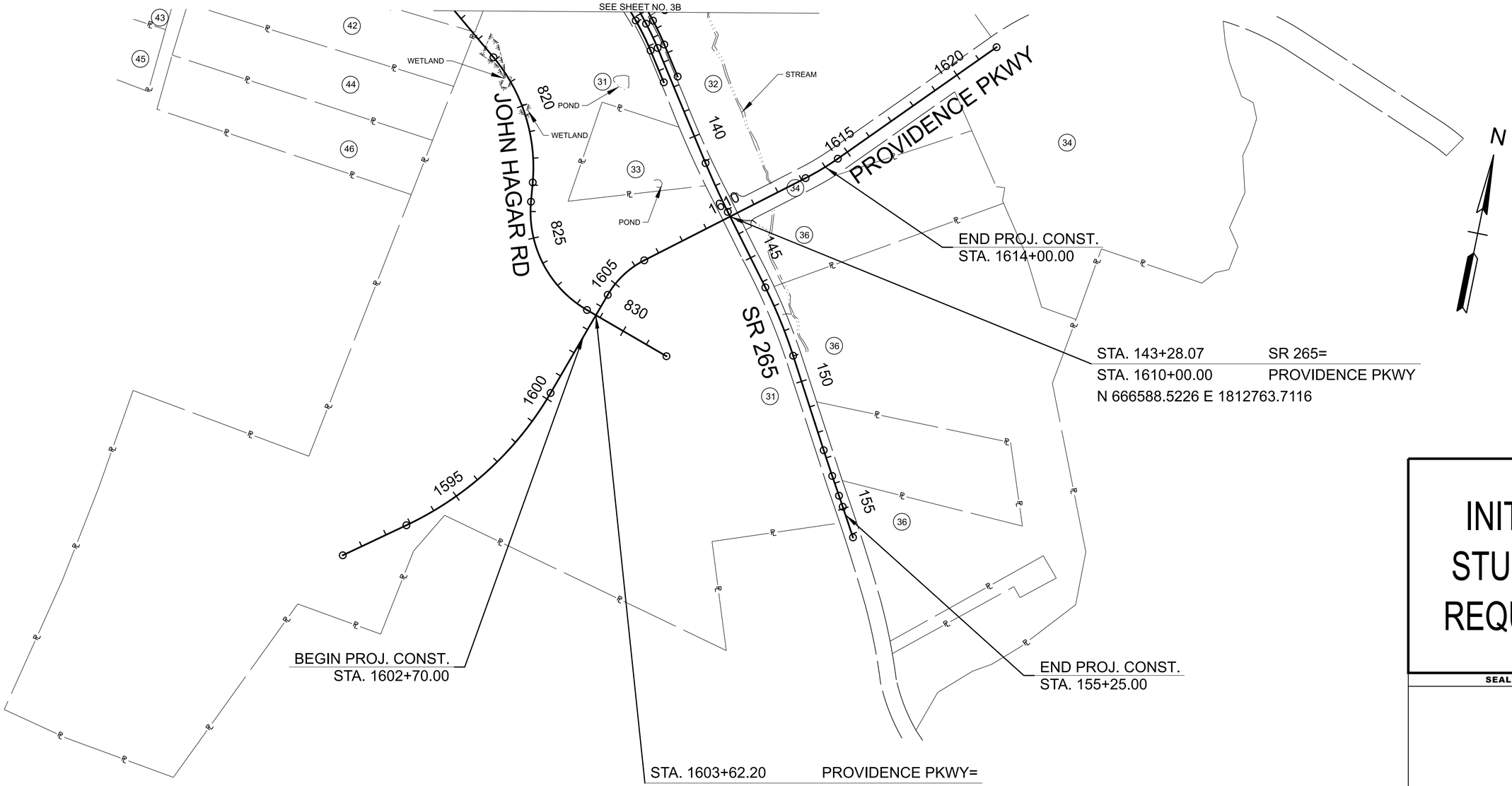
COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:57:56 AM
c:\pwworking\east01\d2328414\95I040-SHT-Property Map.dgn

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3C



INITIAL STUDIES REQUEST

SEALED BY

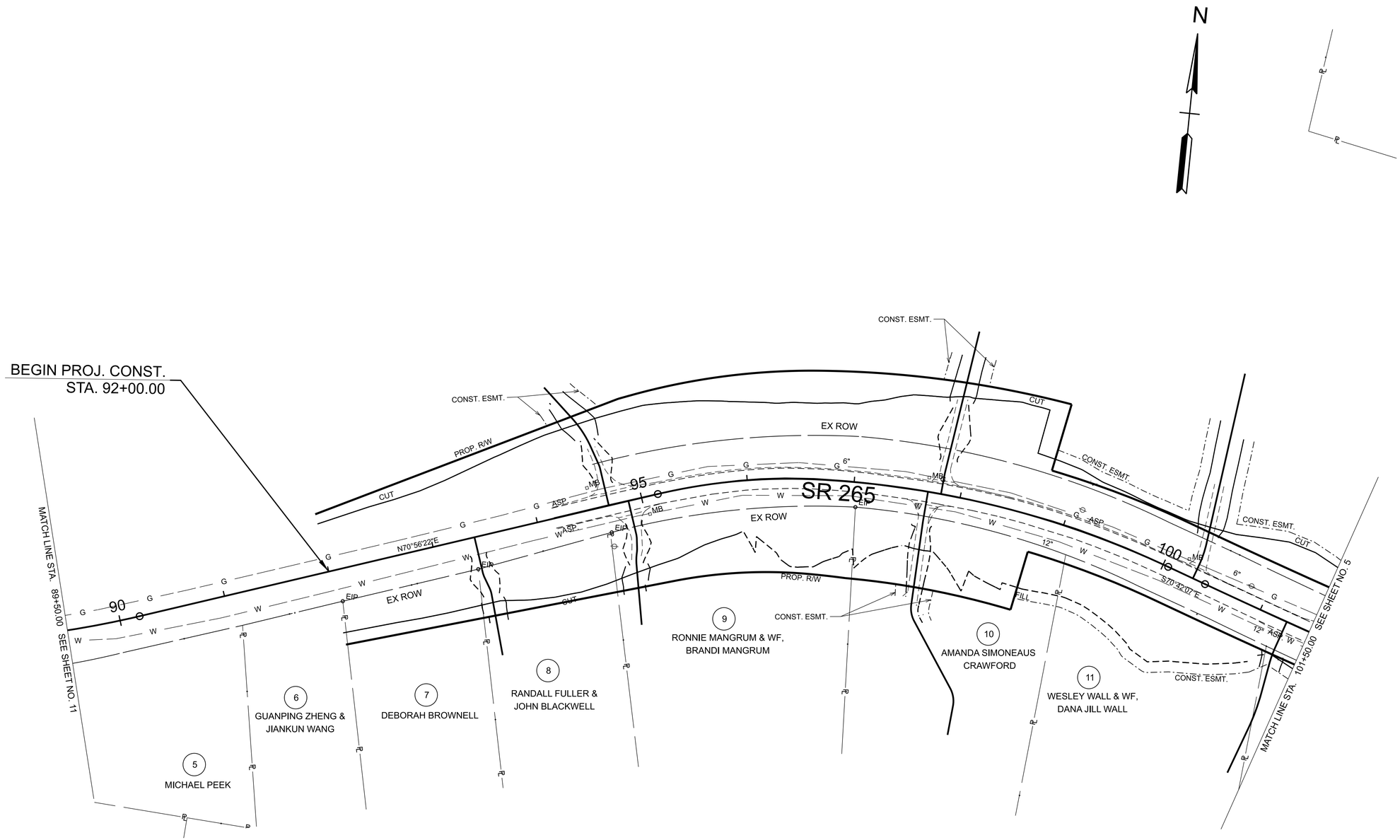
COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:58:14 AM
c:\pwworking\east01\d2328414\95l040-SHT-Property Map.dgn

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

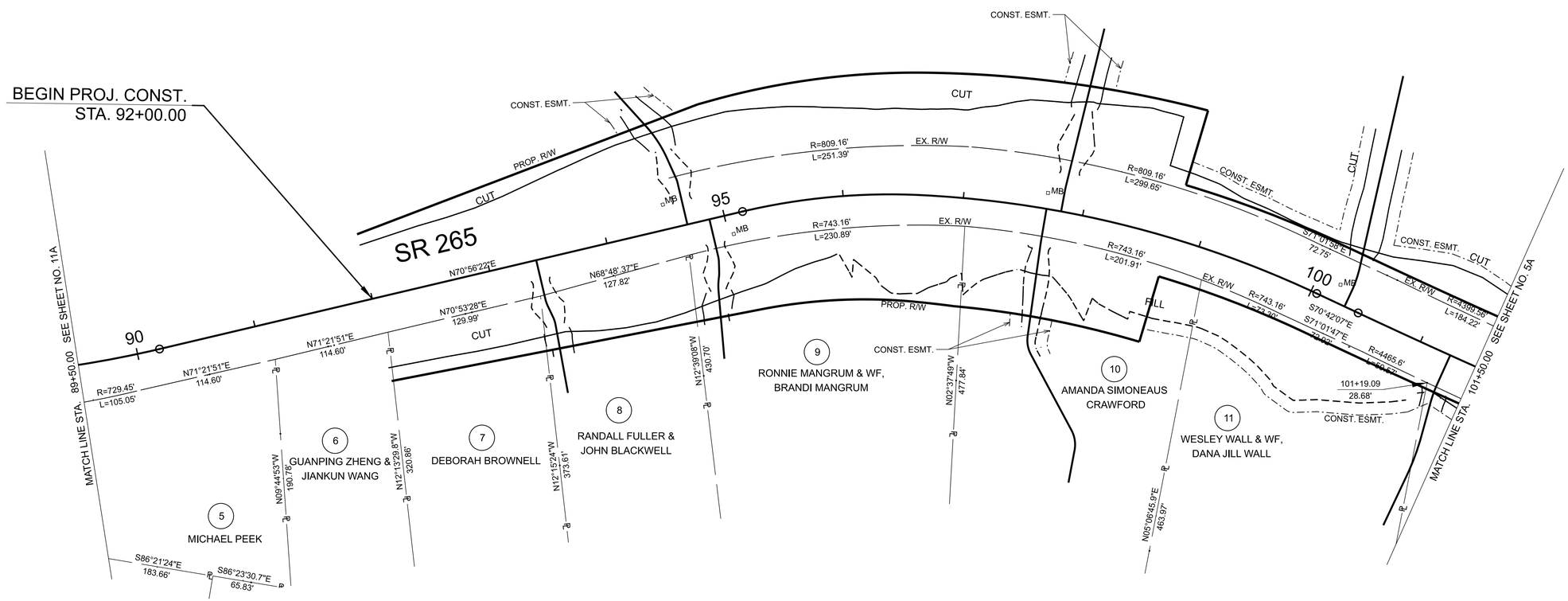
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 89+50 TO STA. 555+50
SCALE: 1" = 50'

2/4/2023 7:58:52 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4A



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

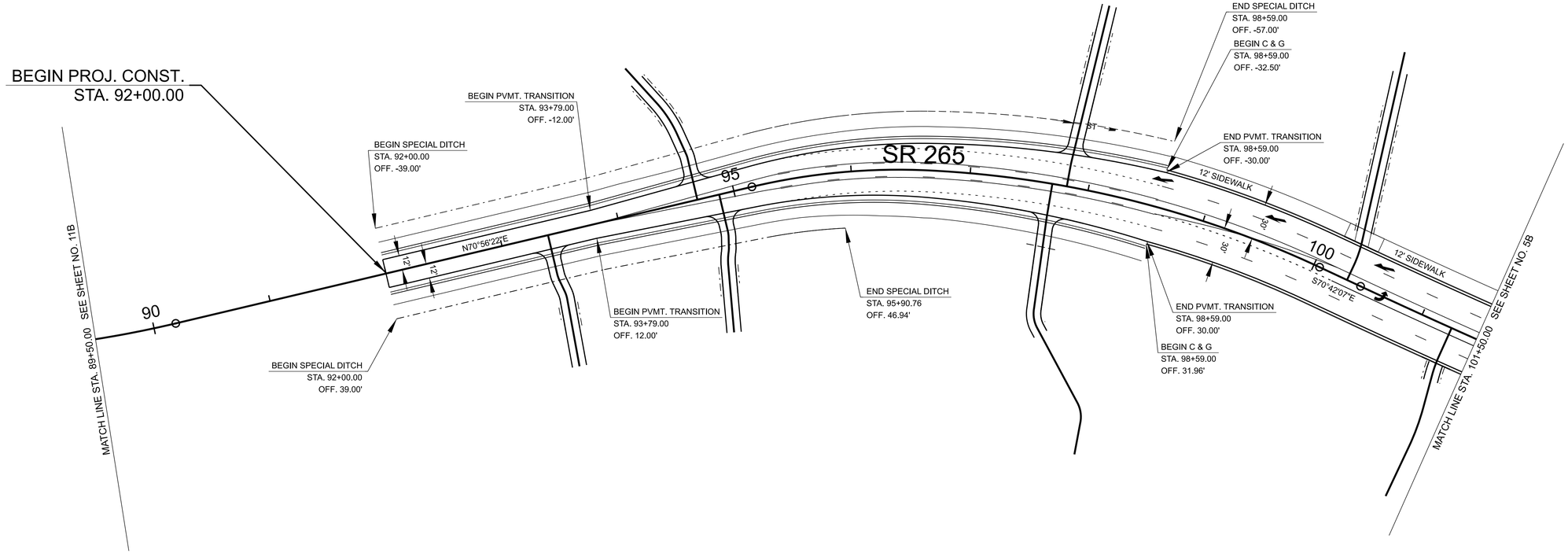
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 89+50 TO STA. 101+25
SCALE: 1" = 50'

2/4/2023 7:59:30 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
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OF 1.00006 AND TIED TO THE TGRN.
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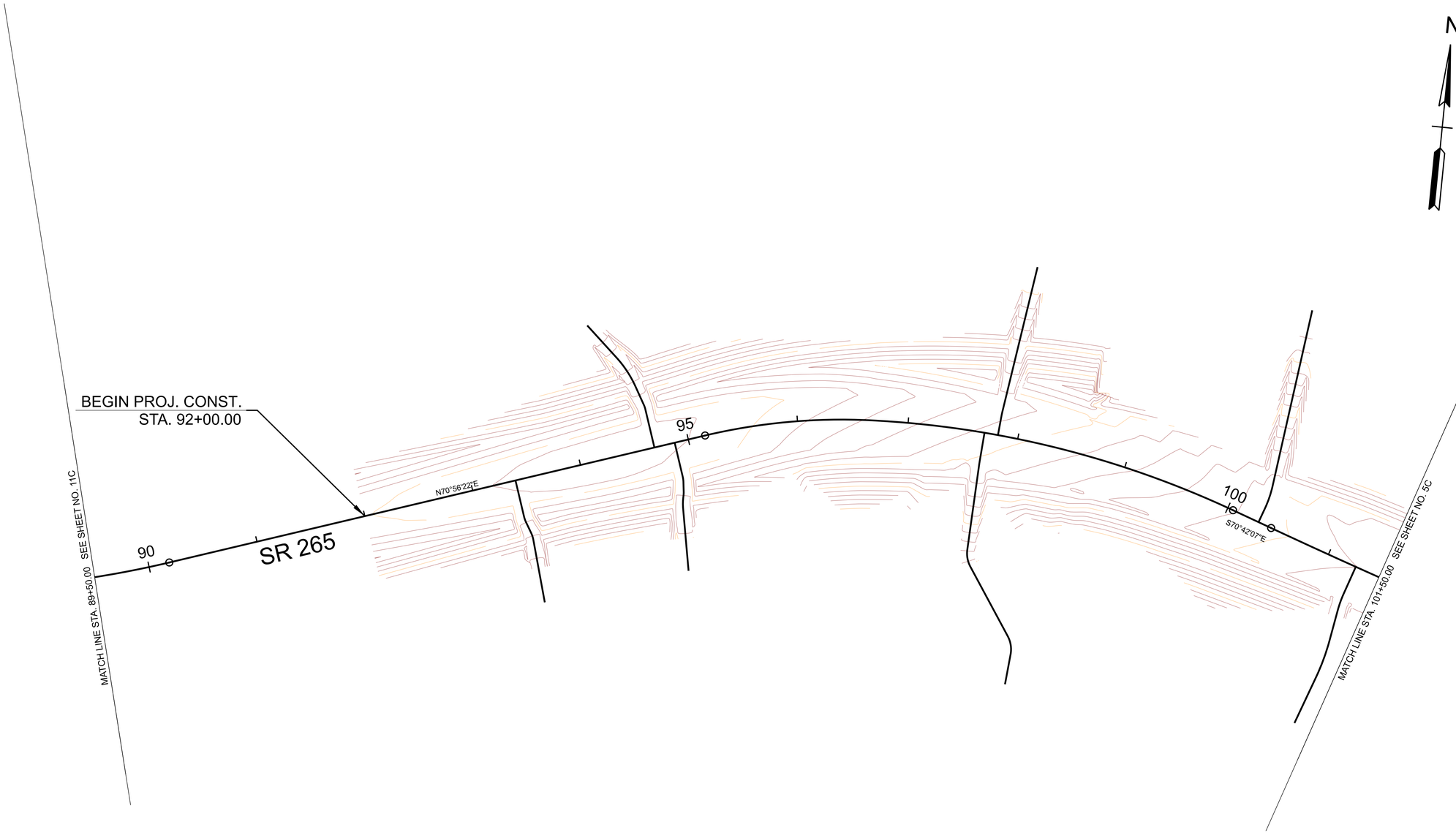
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 92+00 TO STA. 101+50
SCALE: 1" = 50'

2/4/2023 8:00:08 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
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TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

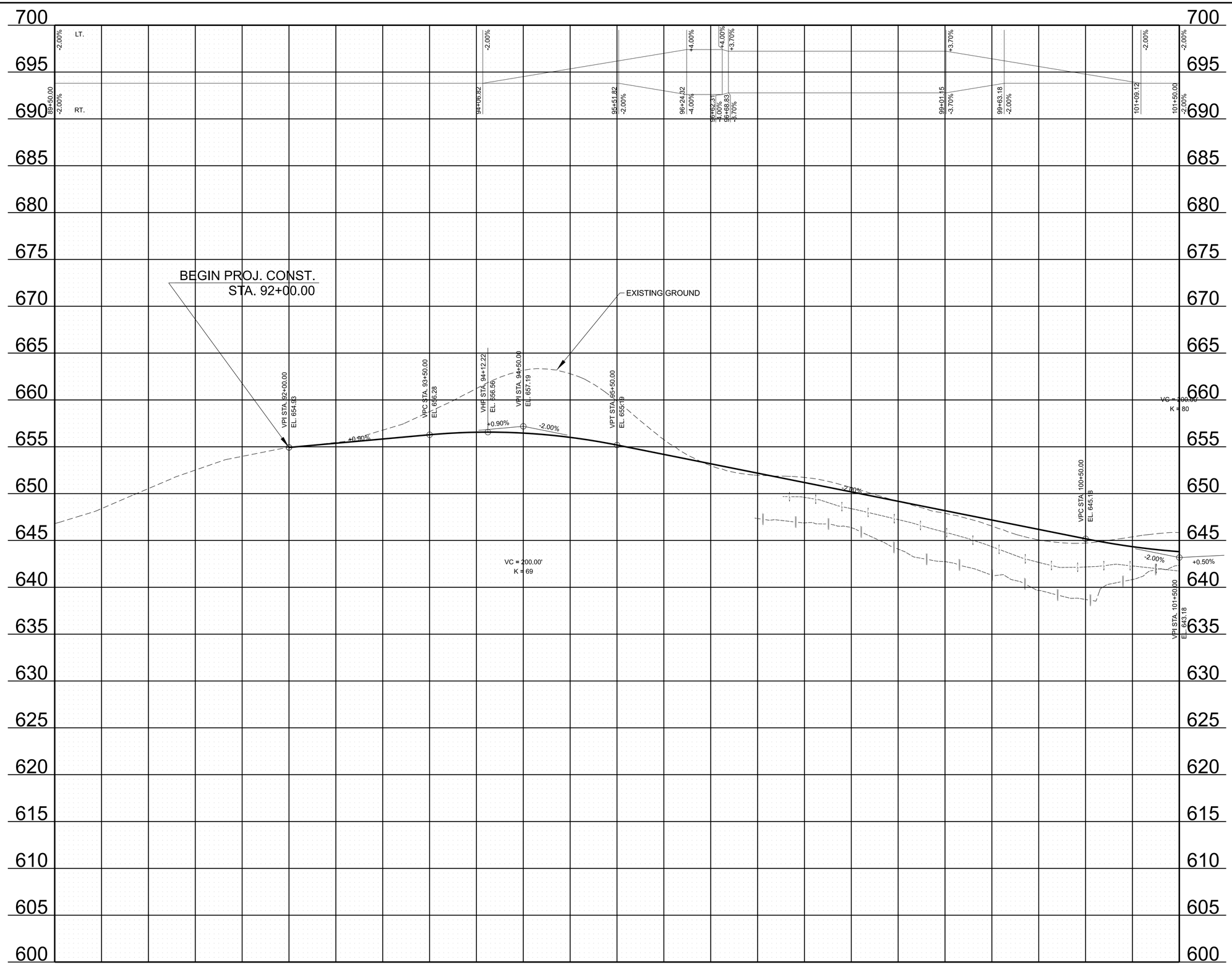
PROPOSED
LAYOUT CONTOURS
SR 265

STA. 92+00 TO STA. 101+50
SCALE: 1" = 50'

2/4/2023 8:00:33 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

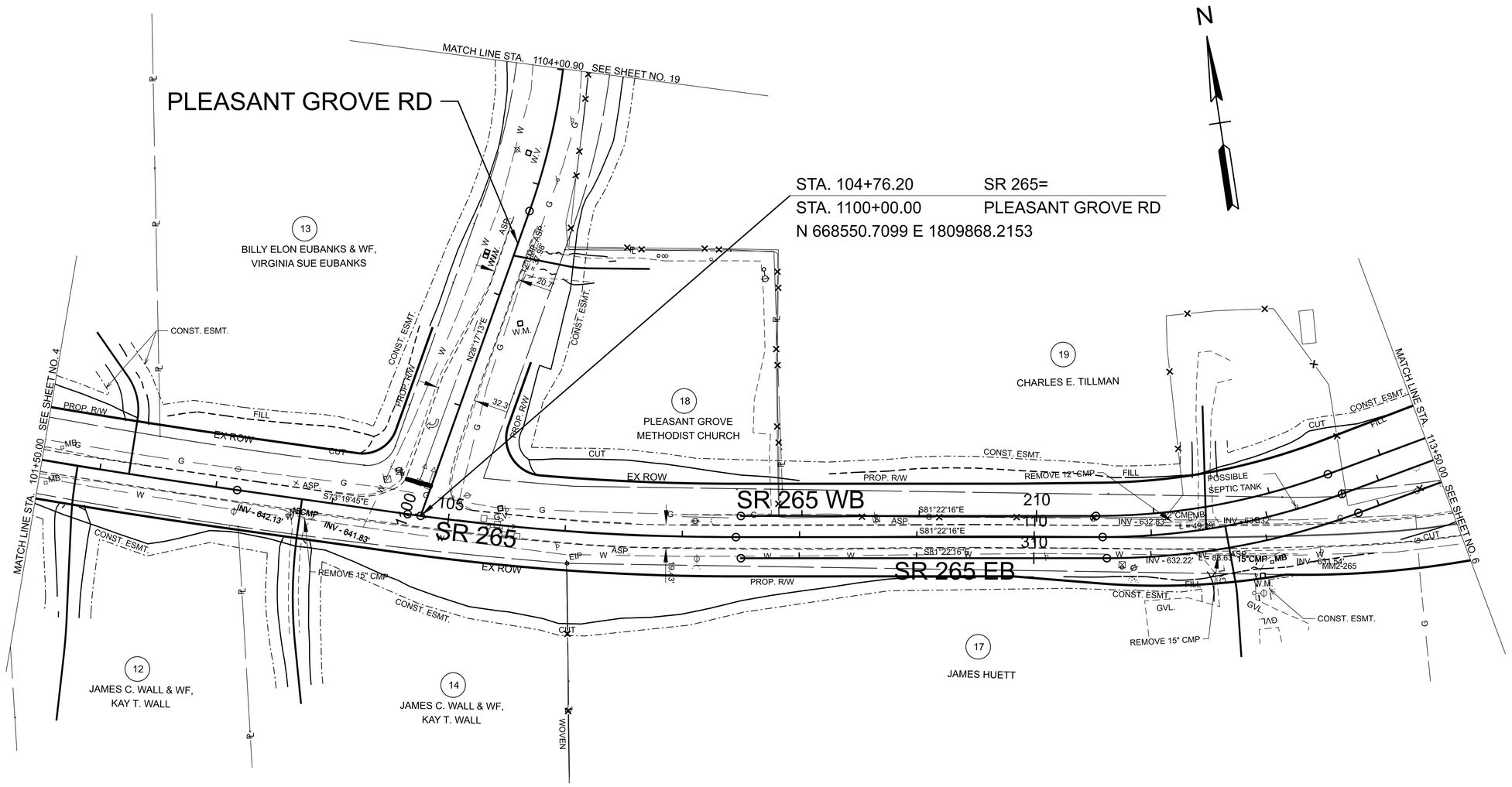
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265
STA. 92+00 TO STA. 101+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:01:06 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-SR 265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
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TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

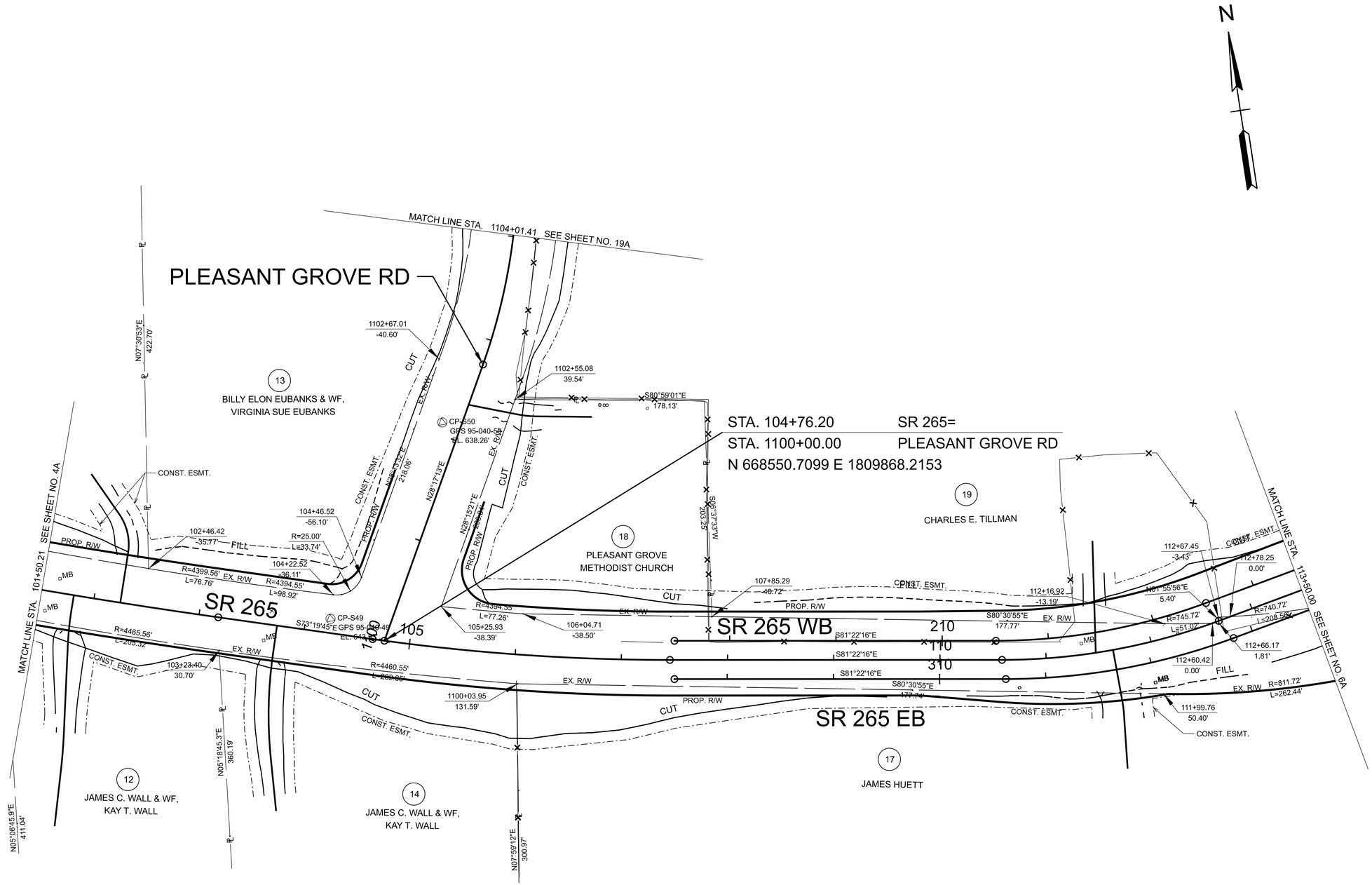
PRESENT LAYOUT
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:01:47 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5A

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

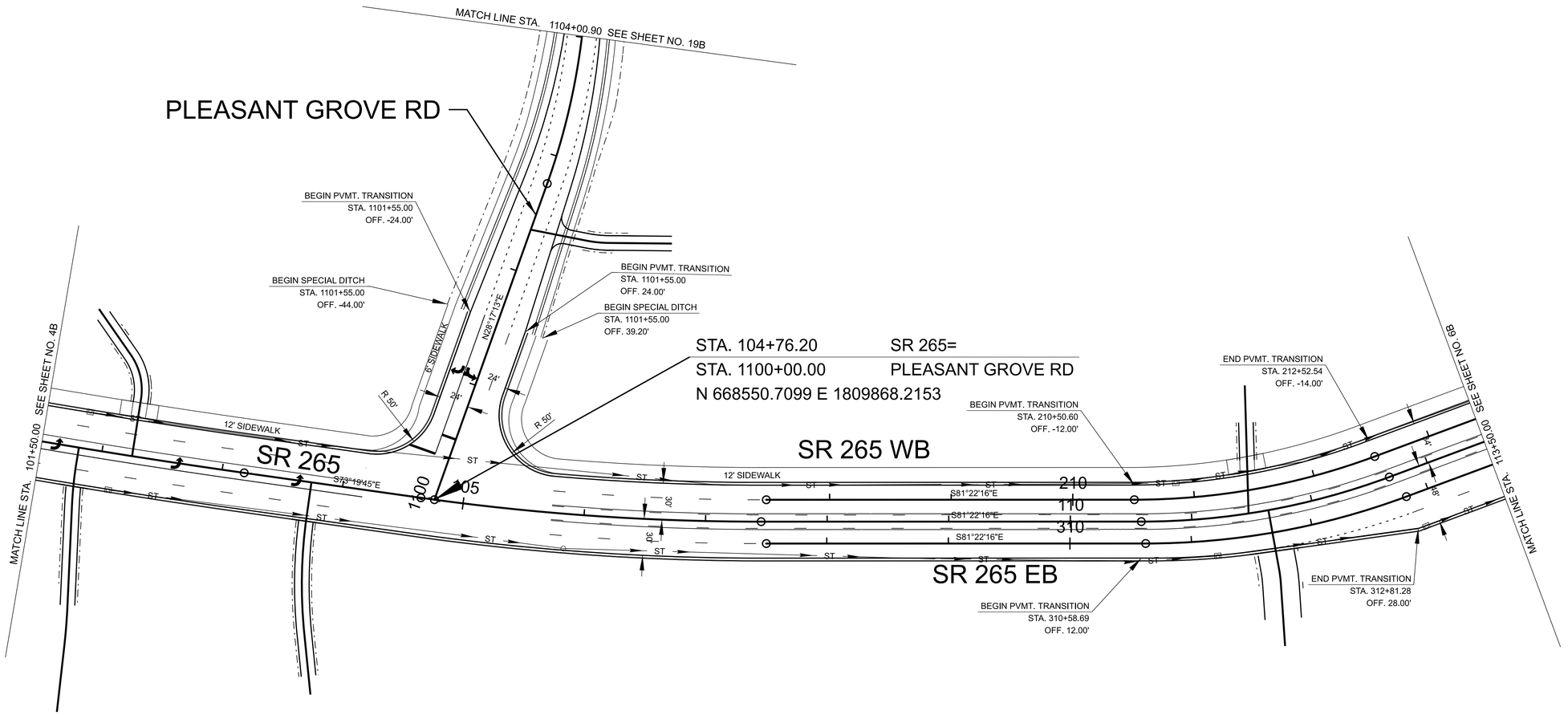
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:02:22 AM
C:\PWWORKING\EAST01\D2328414\950\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

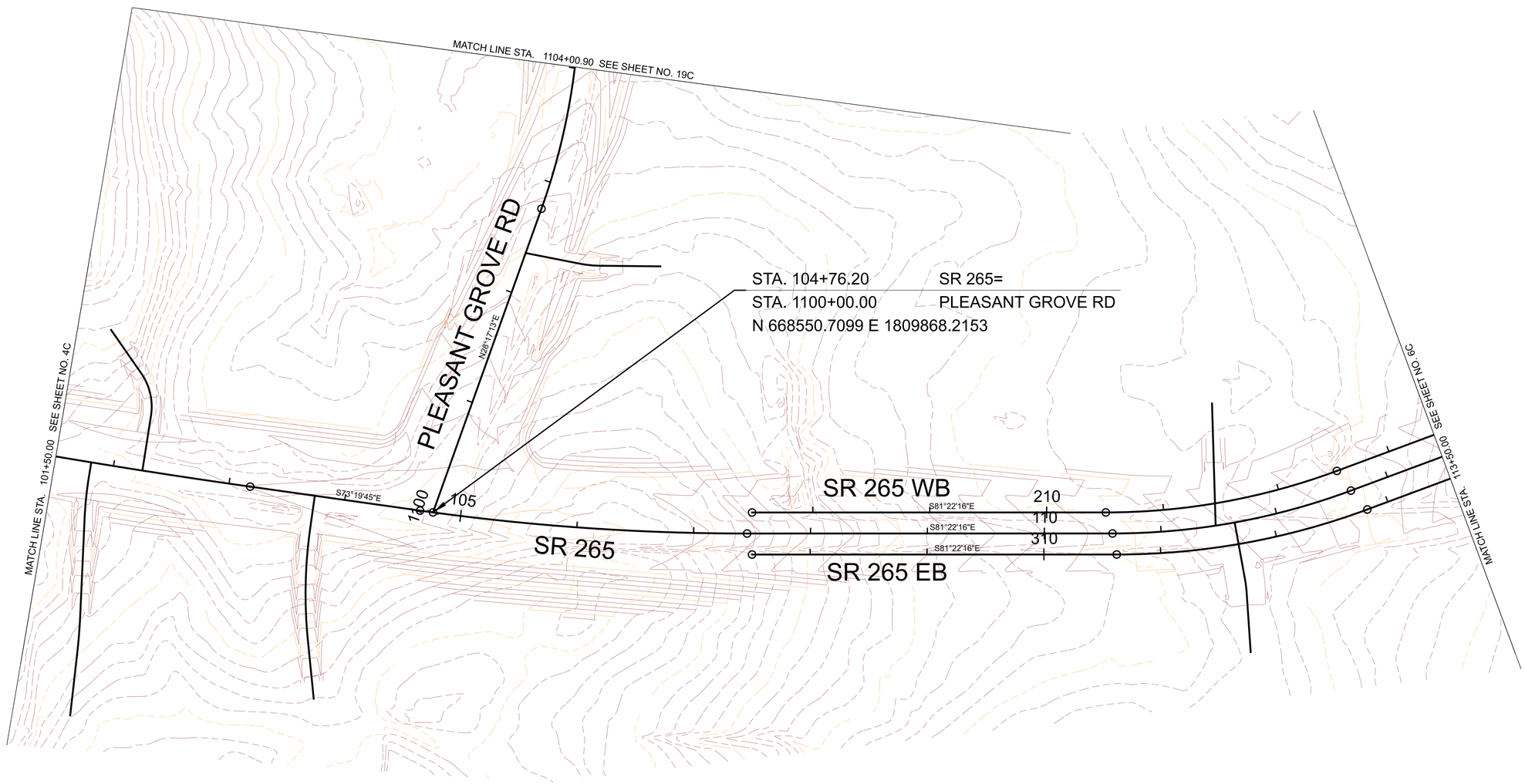
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 101+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:03:02 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

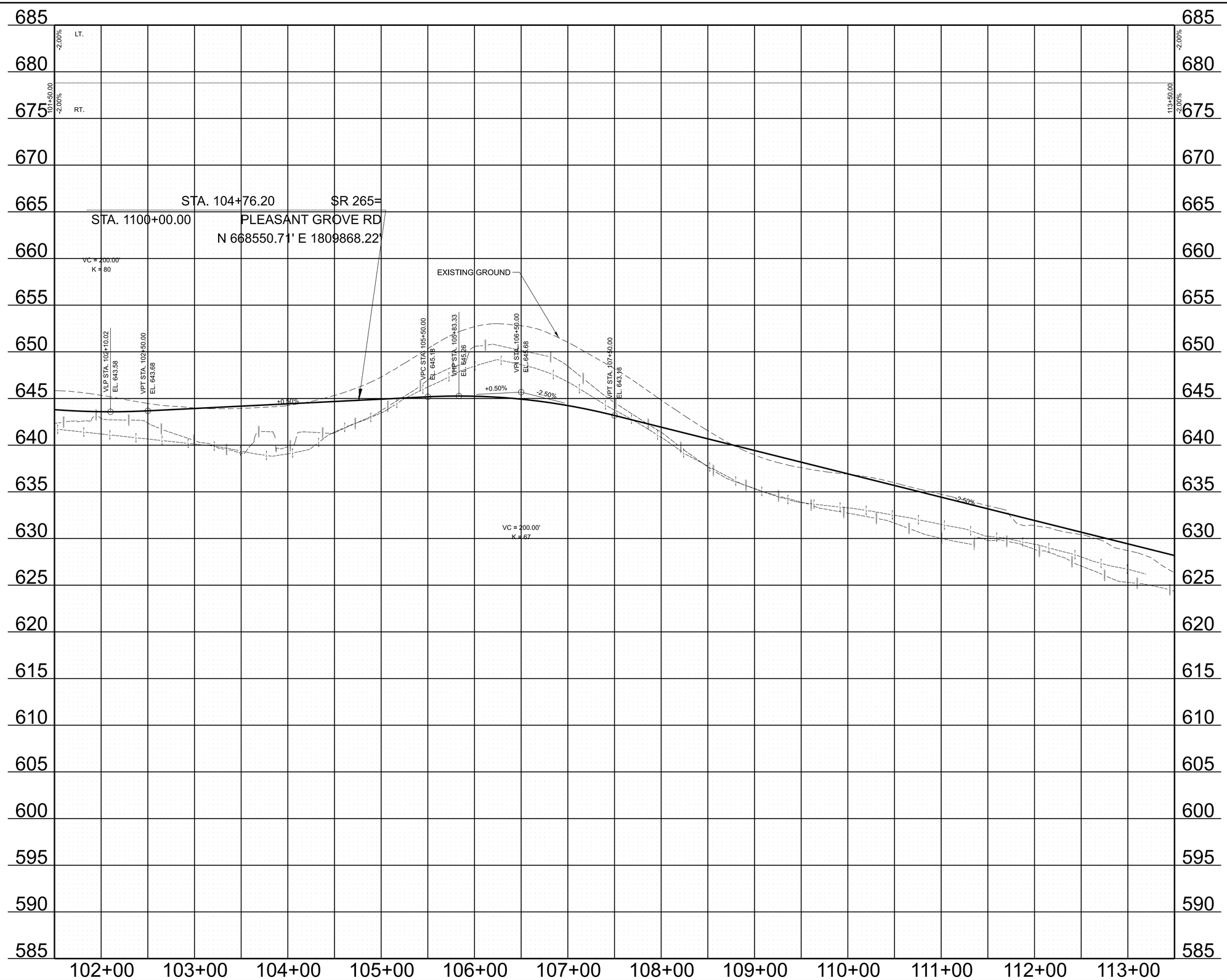
PROPOSED
LAYOUT CONTOURS
SR 265

STA. 101+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:03:27 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

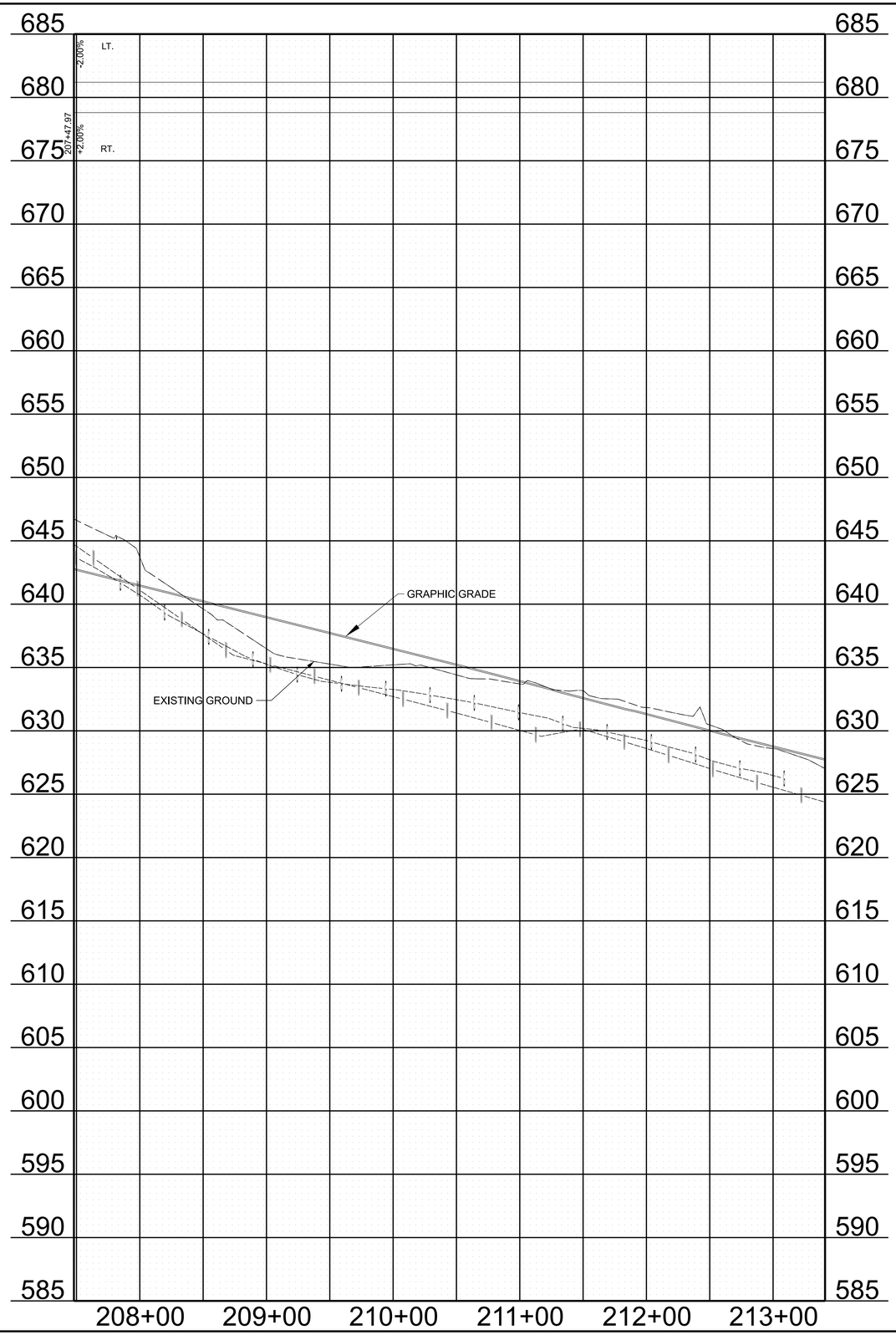
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265
STA. 101+50 TO STA. 113+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:04:00 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5E

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

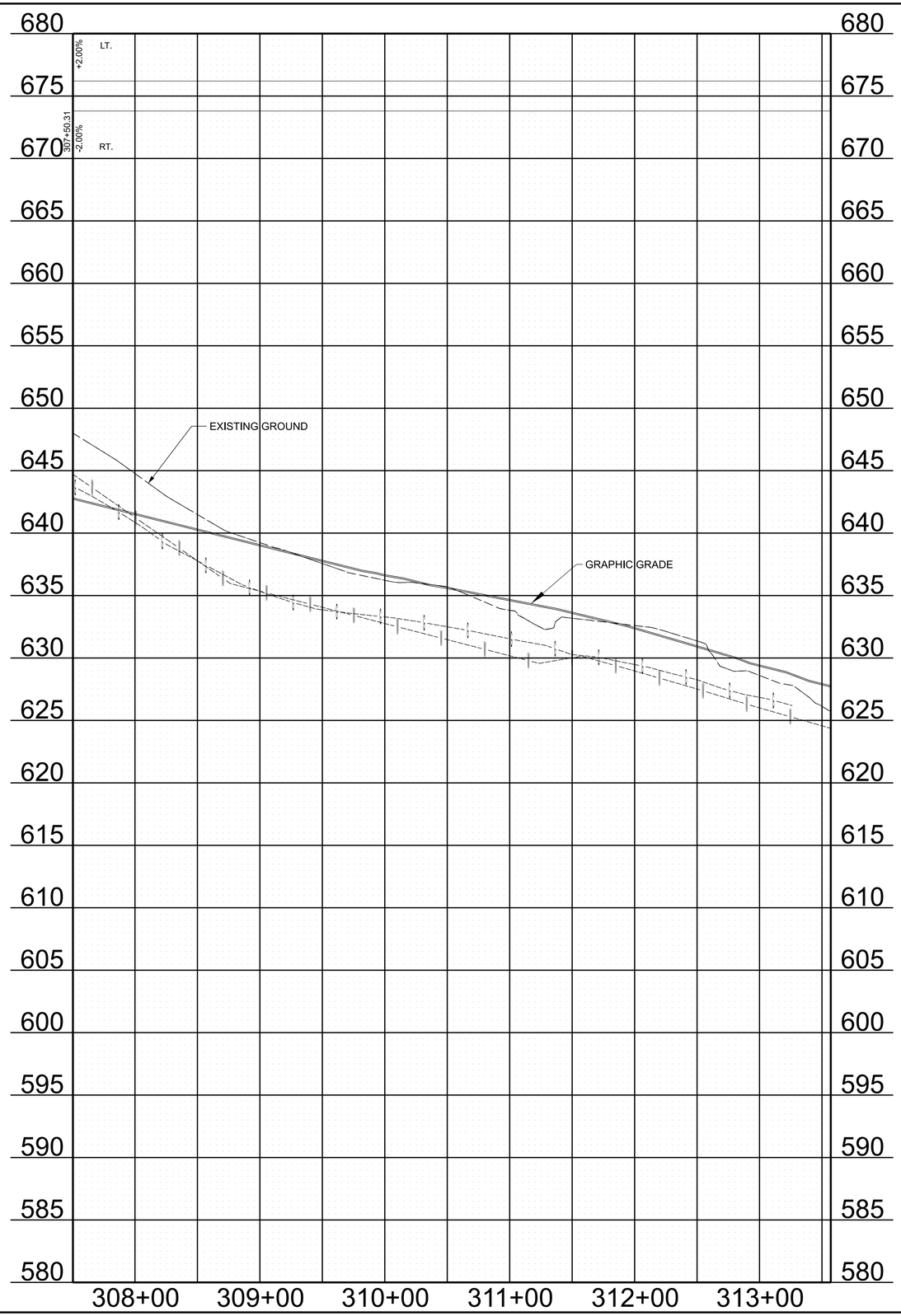
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 WB
STA. 207+48 TO STA. 213+41

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:04:50 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265 WB.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5F

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

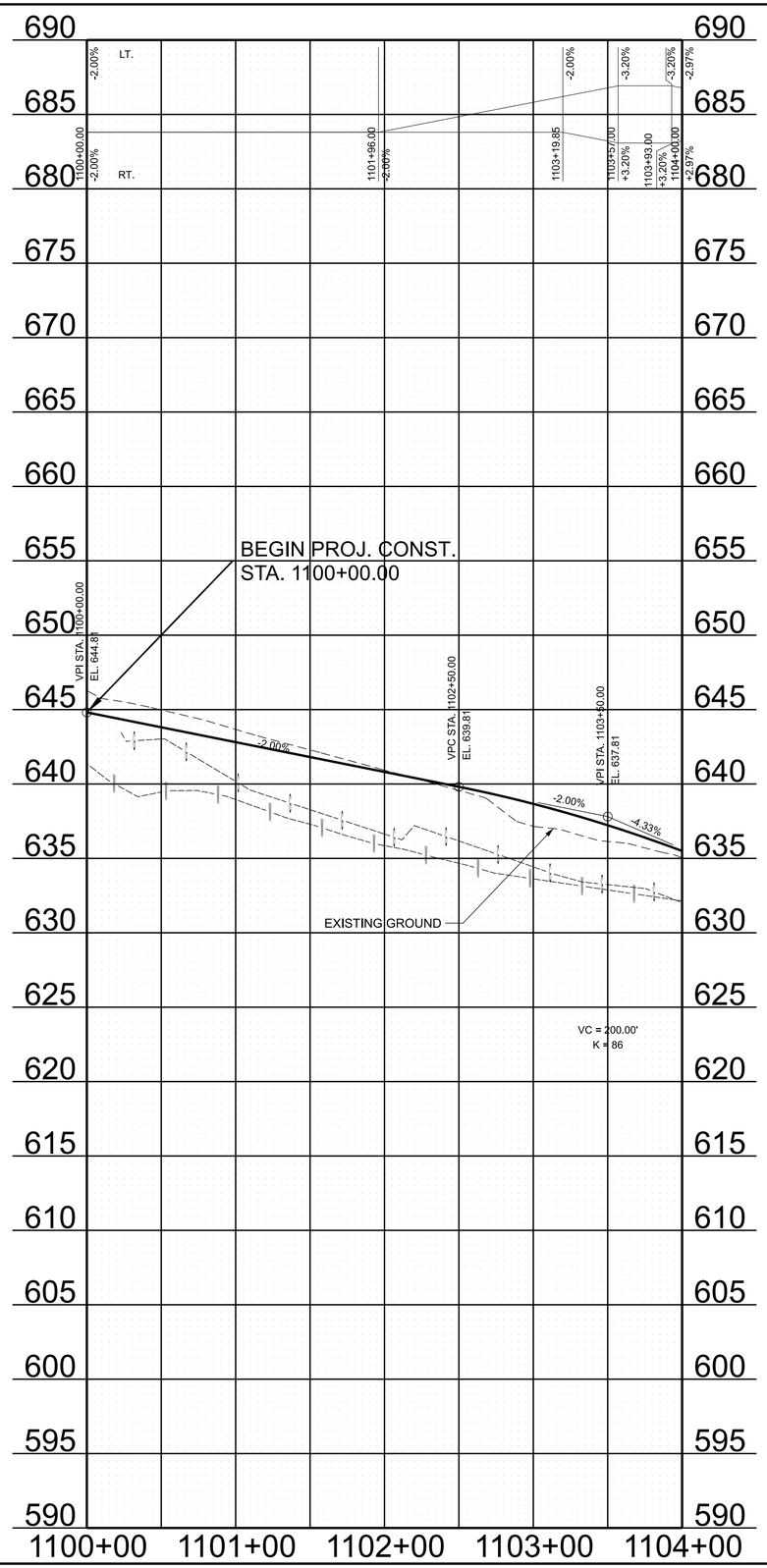
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 EB
STA. 307+50 TO STA. 313+57

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:05:10 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265 EB.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5G

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
PLEASENT GROVE RD
STA. 1100+00 TO STA. 1104+00

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:05:30 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6

STA. 122+06.97 SR 265=
STA. 321+94.93 SR 265 EB
N 668311.2545 E 1811534.1560

STA. 121+53.18 SR 265=
STA. 221+63.84 SR 265 WB
N 668345.2678 E 1811492.5014

STA. 222+07.03 SR 265 WB=
STA. 321+82.73 SR 265 EB
N 668313.9797 E 1811522.2647

N

MATCH LINE STA. 507+00.00 SEE SHEET NO. 14

CUT

PROP. R/W

505 S87°14'28"E

RAMP B

RAMP BB

S87°14'28"E

FILL

W

W.M.

W.V.

WOVEN FENCE WIRE

INV - 592.36'

30" ST

60" CMP

L = 125.58'

TOP - 592.27'
BOT - 592.27'

60" RCP 6.0

POSSIBLE SINKHOLE

1500

325

CONST. ESMT.

PROP. R/W

FILL

19

CHARLES E. TILLMAN

SR 265 WB

220

120

500 S57°31'00"E

N79°08'36"E

27

CHARLES E. TILLMAN

SR 265

EX ROW

ASP.

W

12"

S77°05'32"E

SR 265 EB

215

115

315

S59°50'50"E

320

N59°50'50"W

RAMP DD

24" CMP
L = 109.15'
INV - 593.83'

EP

ASP.

21

CHARLES E. TILLMAN

FILL

REMOVE 24" CMP

INV - 595.82'

12"CMP INV - 601.22'
L = 21.39'
INV - 600.51'

INV - 601.22'

20

CHARLES E. TILLMAN

PROP. R/W

17

JAMES HUETT

MATCH LINE STA. 833+25.00 SEE SHEET NO. 13

N78°15'32"E

N78°15'32"E

N78°15'32"E

MATCH LINE STA. 113+50.00 SEE SHEET NO. 5

VL

pMP

19 L.F.

ASP.

ASP.

ASP.

W

V

TOP - 606.64'
BOT - 599.59'

W

TOP - 604.89'
INV - 600.04'
INV - 598.89'
BOT - 599.04'

N76°16'29"E

835

RAMP D

C.A. FENCE

FILL

INV - 602.30'
INV - 602.30'

INV - 600.31'

MATCH LINE STA. 591+50.00 SEE SHEET NO. 13

CONC

16" CMP

INV - 621.58'

INV - 621.58'

EXIST. BRIDGE B510040000011

INV - 598.77'

S 38°06'06"E

S 38°06'06"E

JERSEY ST

MATCH LINE STA. 125+50.00 SEE SHEET NO. 7

SEE SHEET NO. 7

I-40

V

W

18'

ASP.

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

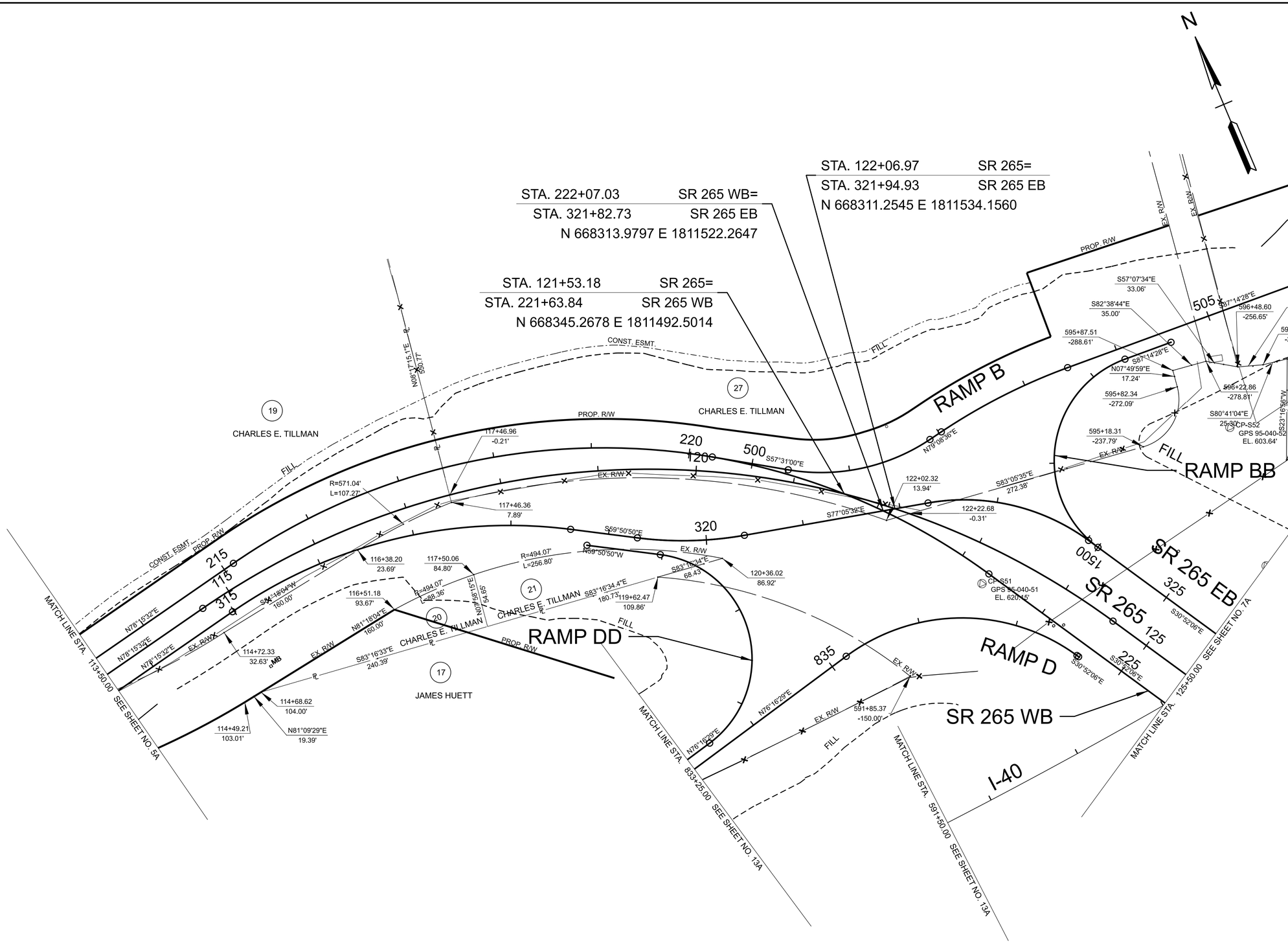
PRESENT LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:06:01 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:06:38 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6B

STA. 321+82.73 SR 265 EB=
STA. 222+07.03 SR 265 WB
N 668313.9797 E 1811522.2647

SR 265 WB
SR 265
SR 265 EB
RAMP B
RAMP BB
RAMP D
RAMP DD
I-40

BEGIN SPECIAL DITCH
STA. 505+75.00
OFF. -45.00'

MATCH LINE STA. 507+00.00 SEE SHEET NO. 14B

END C & G
STA. 503+42.25
OFF. -22.54'

BEGIN PVMT. TRANSITION
STA. 501+78.47
OFF. -12.57'

END PVMT. TRANSITION
STA. 1502+36.89
OFF. -12.00'

END C & G
STA. 1502+36.89
OFF. 4.54'

END Sidewalk
STA. 501+25.95
OFF. -33.93'

END PVMT. TRANSITION
STA. 500+37.27
OFF. -14.00'

END Sidewalk
STA. 322+73.42
OFF. -18.75'

BEGIN PVMT. TRANSITION
STA. 1500+64.36
OFF. -13.00'

CONNECT PROP. RAMP TO EXS. STORM

BEGIN C & G
STA. 1500+16.05
OFF. 14.93'

CURVE DATA SHOWN ON SHEETS 1C1-1C2

MATCH LINE STA. 113+50.00 SEE SHEET NO. 5B

MATCH LINE STA. 833+25.00 SEE SHEET NO. 13B

MATCH LINE STA. 591+50.00 SEE SHEET NO. 13B

MATCH LINE STA. 125+50.00 SEE SHEET NO. 7B

BEGIN PVMT. TRANSITION
STA. 1803+00.00
OFF. -13.80'

END PVMT. TRANSITION
STA. 836+98.42
OFF. -13.45'

BEGIN PVMT. TRANSITION
STA. 835+17.72
OFF. -12.01'

END PVMT. TRANSITION
STA. 1800+44.57
OFF. -12.00'

END C & G
STA. 1800+47.85
OFF. -22.54'

END C & G
STA. 837+46.37
OFF. 15.86'

BEGIN PVMT. TRANSITION
STA. 835+17.72
OFF. 12.00'

END PVMT. TRANSITION
STA. 837+71.58
OFF. 14.00'

BEGIN C & G
STA. 834+79.35
OFF. 16.54'

BEGIN RETAINING WALL
STA. 592+31.00
OFF. -72.00'

GRASS
CURB
12' SIDEWALK

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

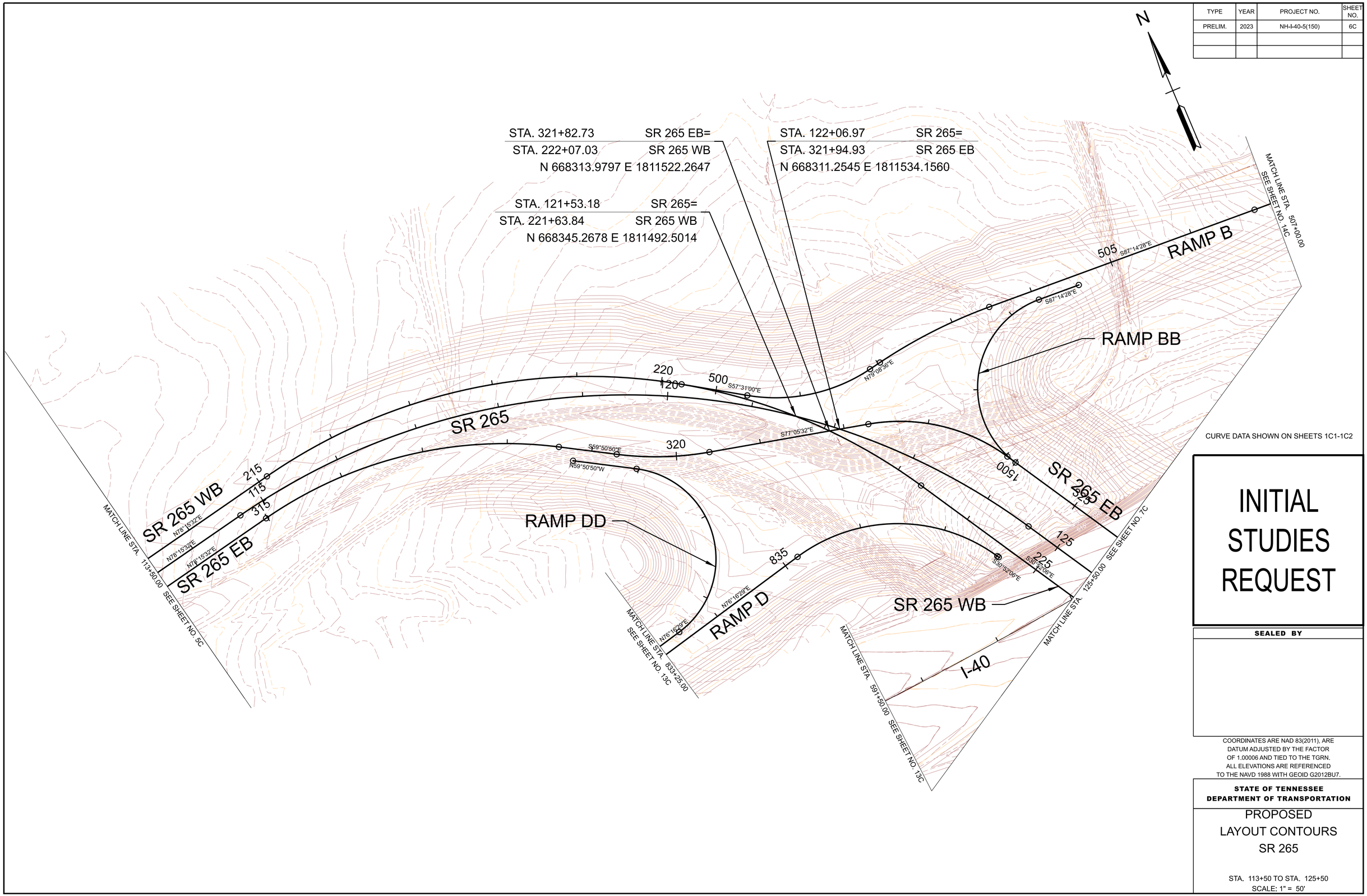
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:07:16 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

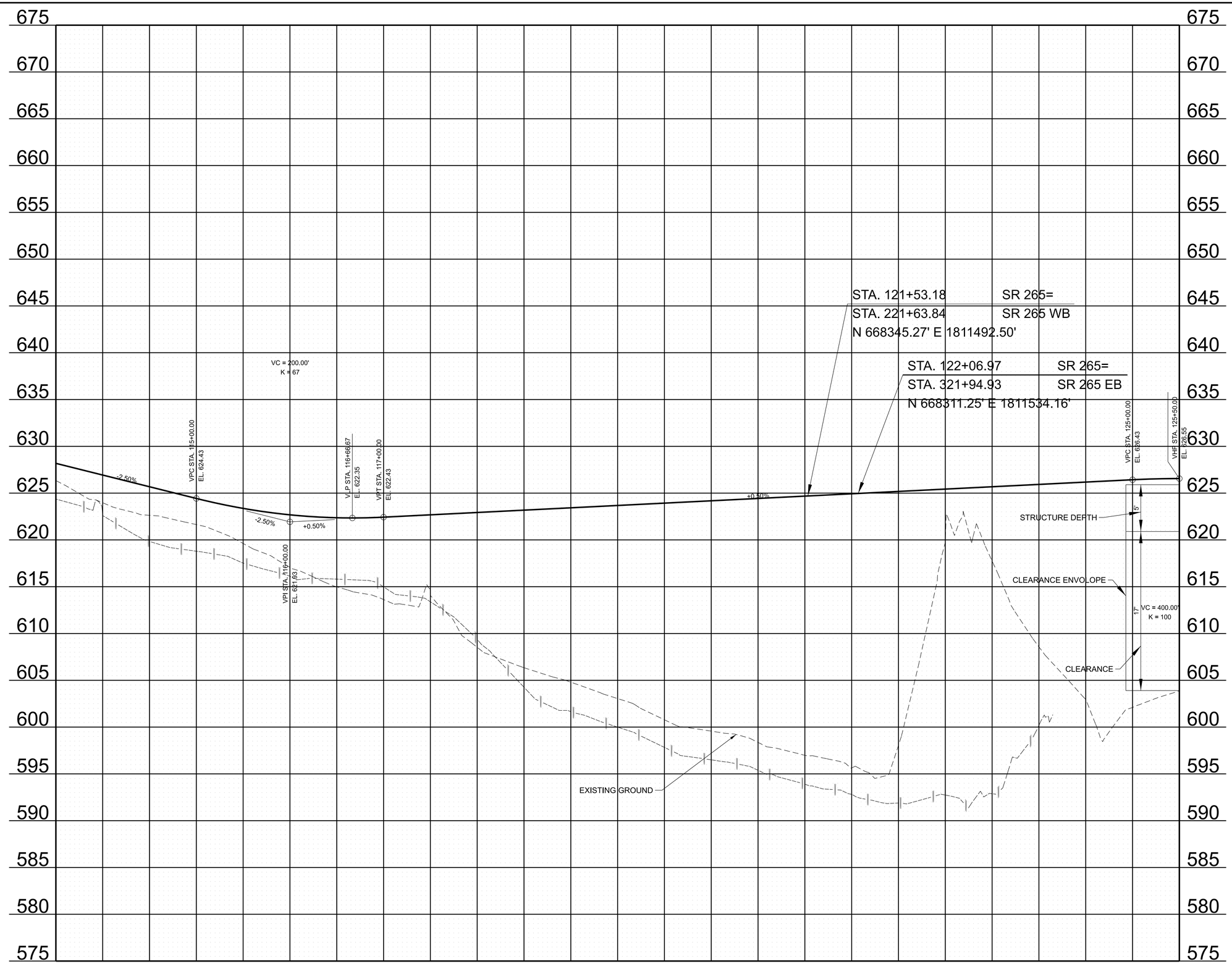
PROPOSED
LAYOUT CONTOURS
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:07:42 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265
STA. 113+50 TO STA. 125+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:08:13 AM
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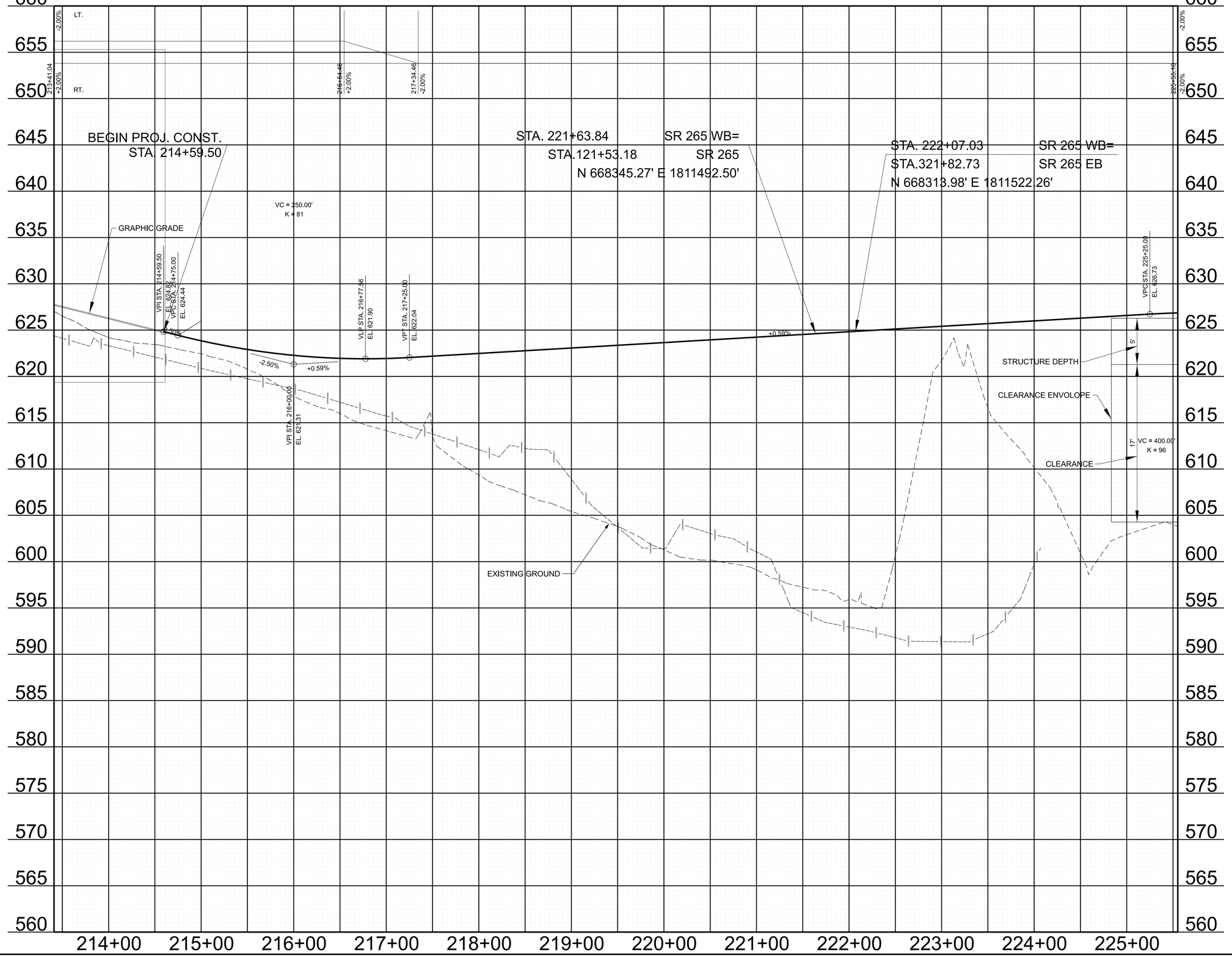
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6E

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

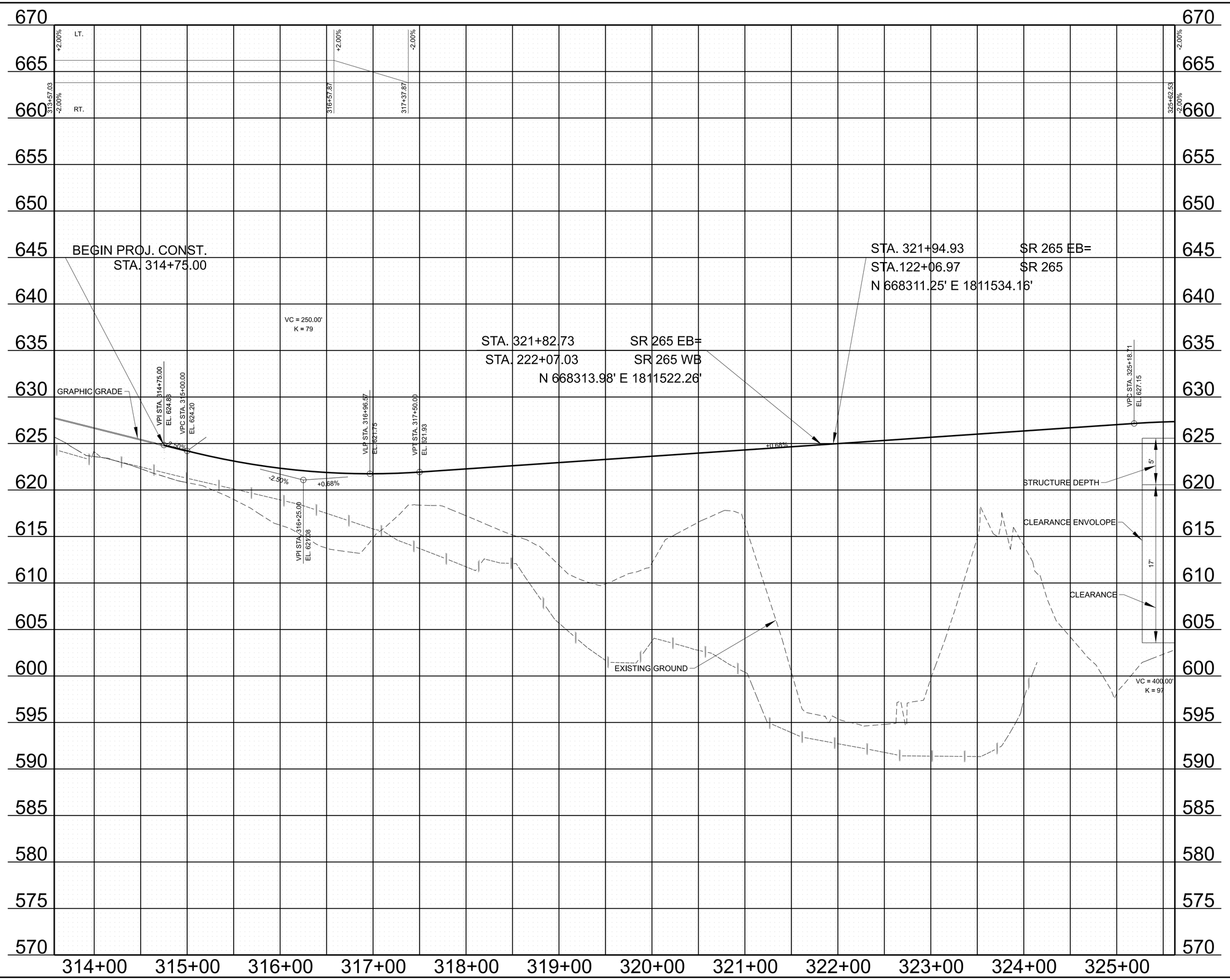
PROPOSED
PROFILE
SR 265 WB
STA. 213+41 TO STA. 225+55

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:09:02 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PROPOSED PROFILE-SR 265 WB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6F

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 EB
STA. 313+57 TO STA. 325+63

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:09:21 AM
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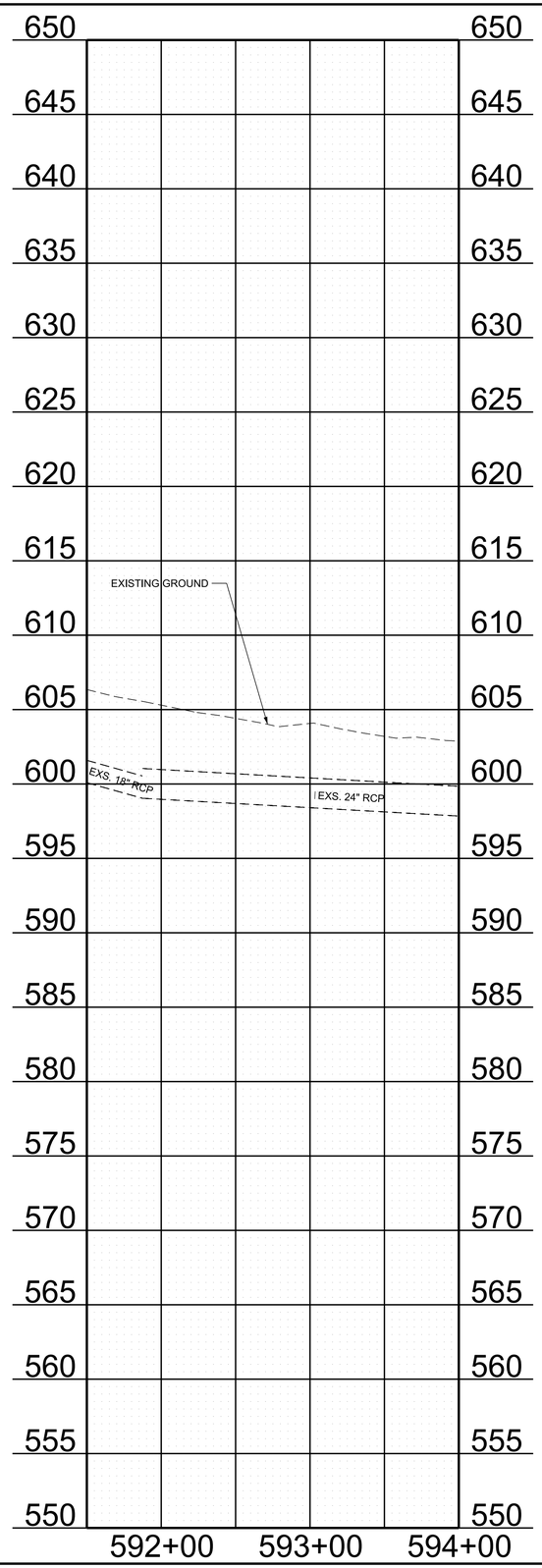

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6G

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

EXISTING
PROFILE
I-40
STA. 591+50 TO STA. 594+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:09:44 AM
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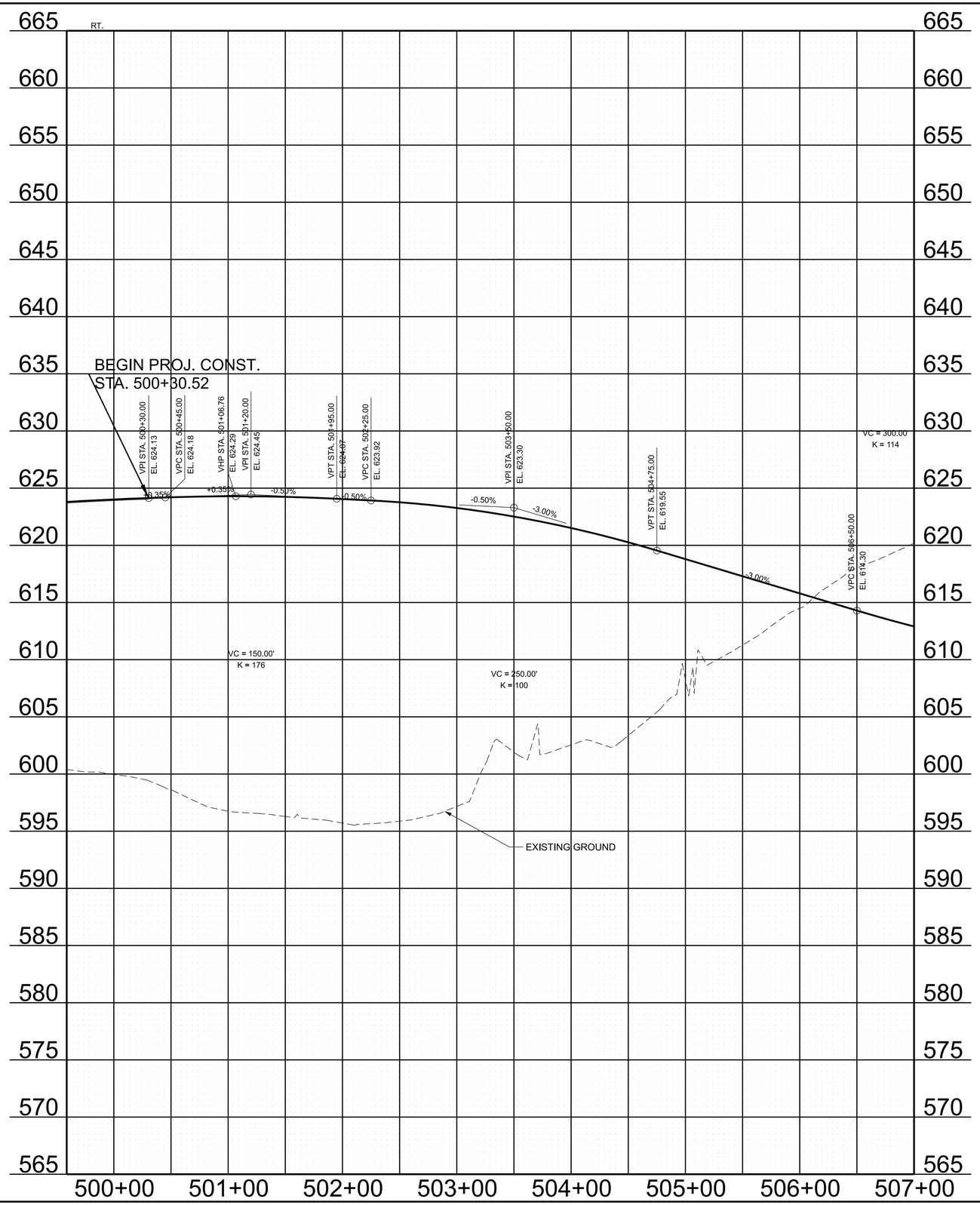


TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6H

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

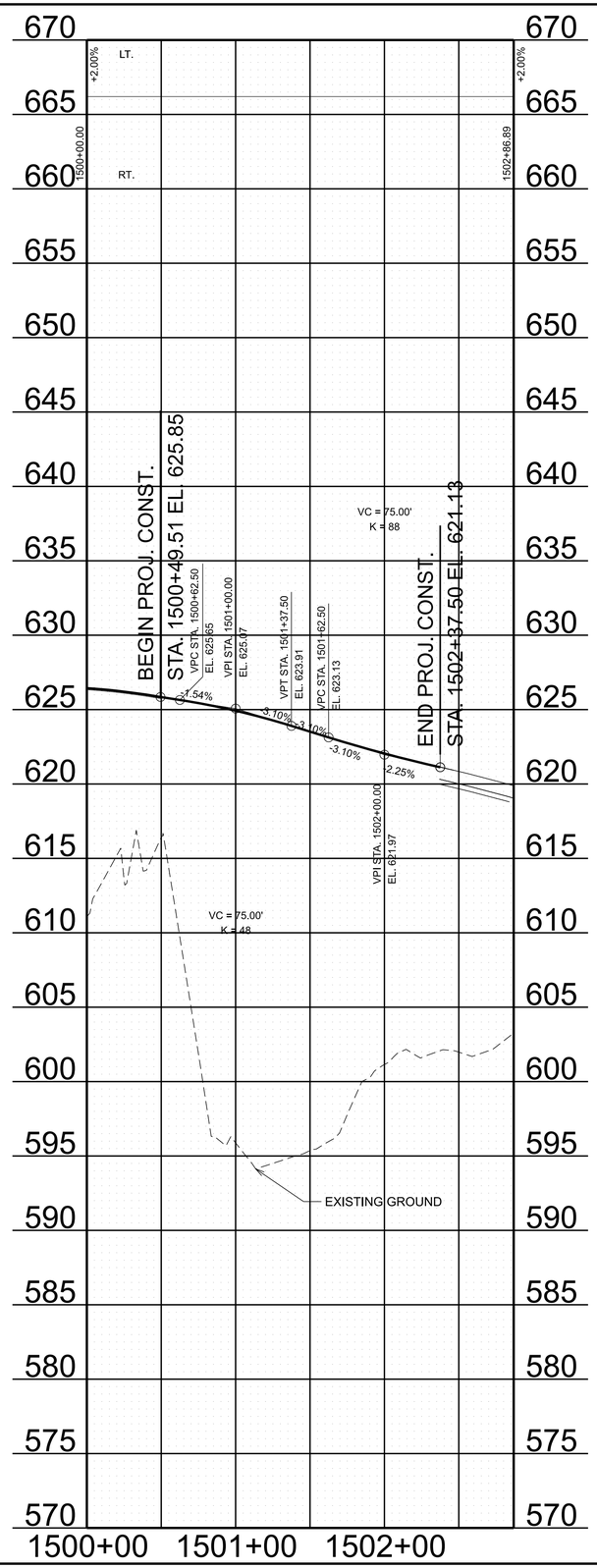
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP B
STA. 499+50 TO STA. 507+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:10:06 AM
C:\PWWORKING\EAST\T01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP B.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6I

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP BB
STA. 1500+00 TO STA. 1502+87

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:10:25 AM
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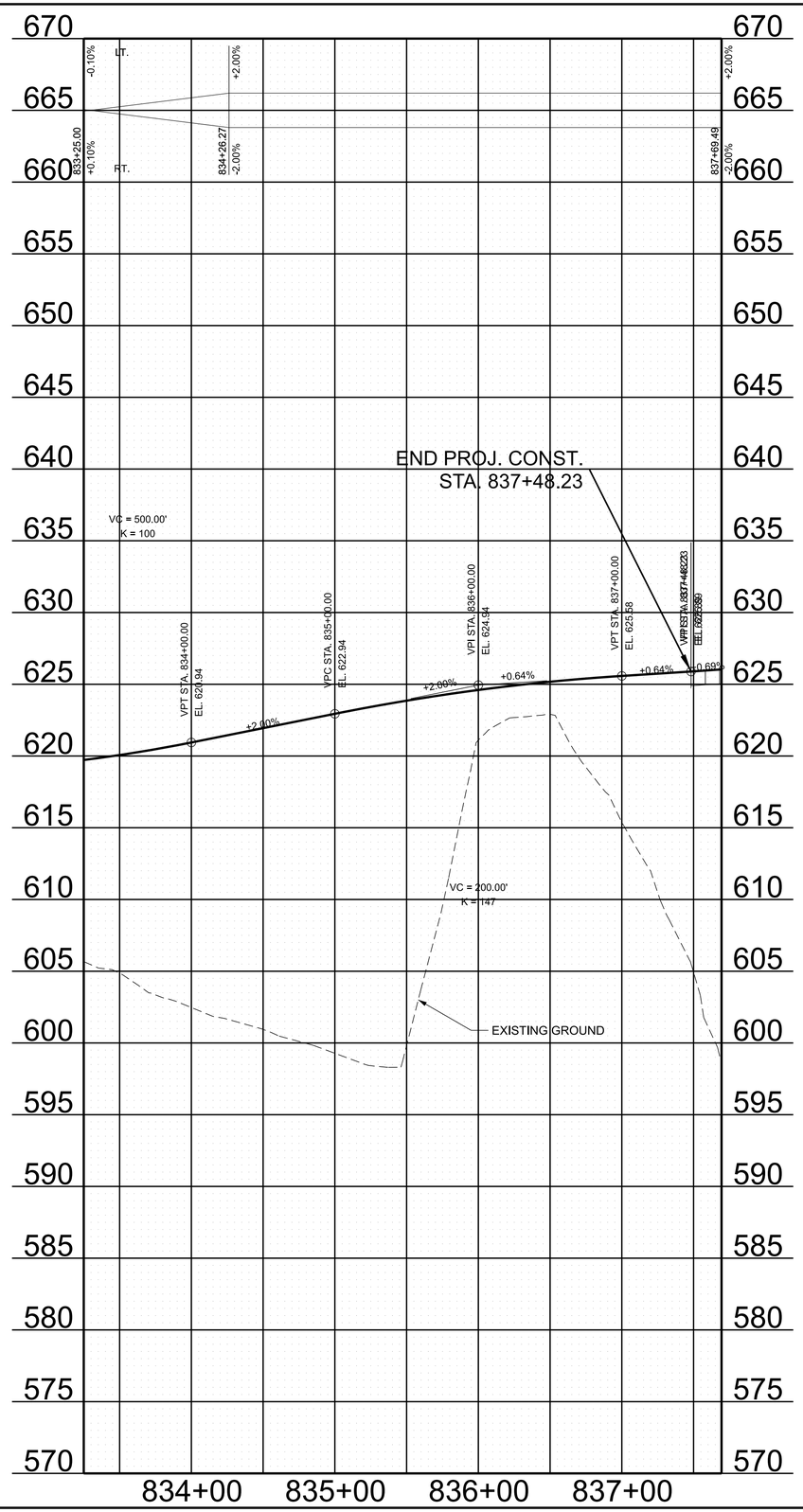


TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6J

INITIAL STUDIES REQUEST

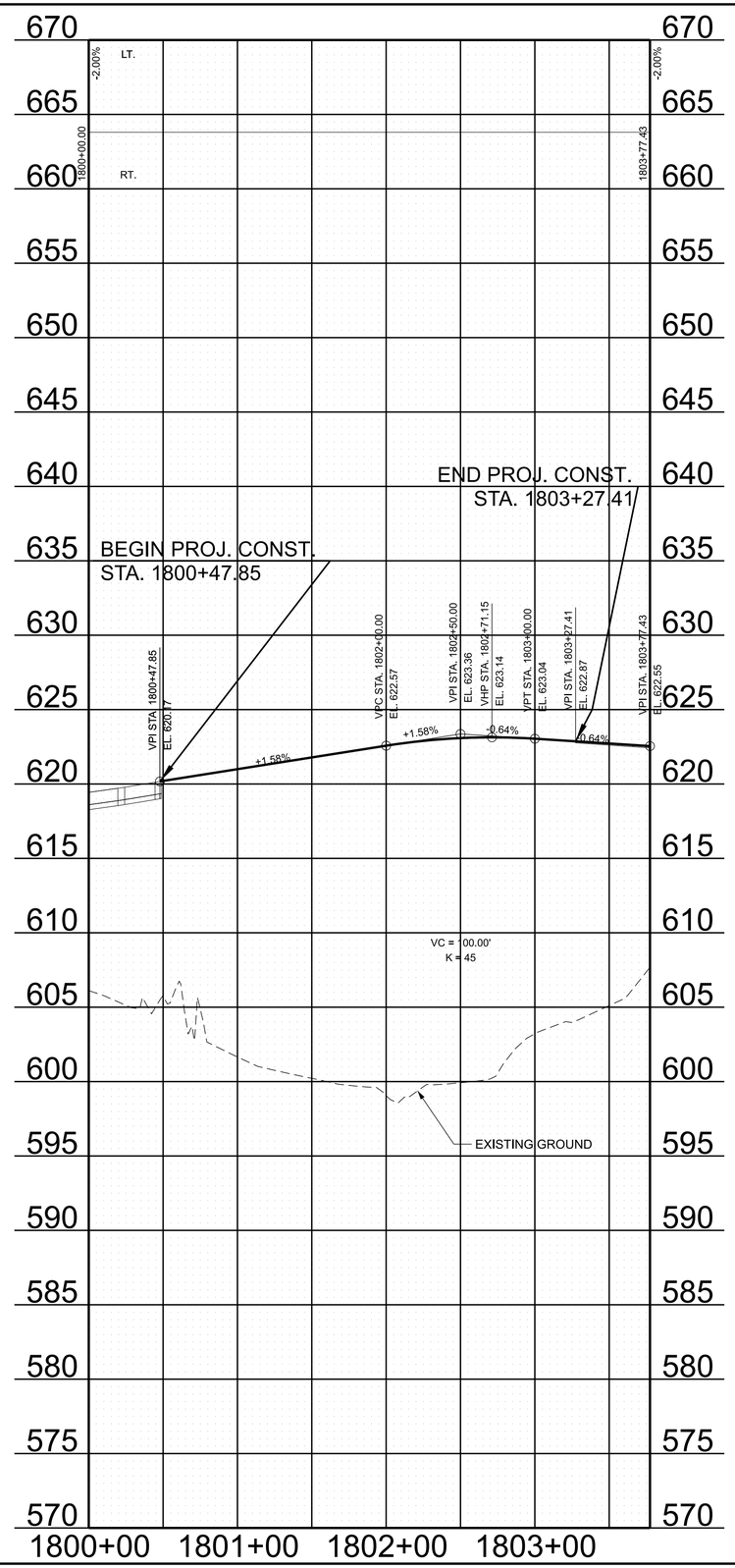
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP D
STA. 833+25 TO STA. 837+70

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:10:44 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP D.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6K

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP

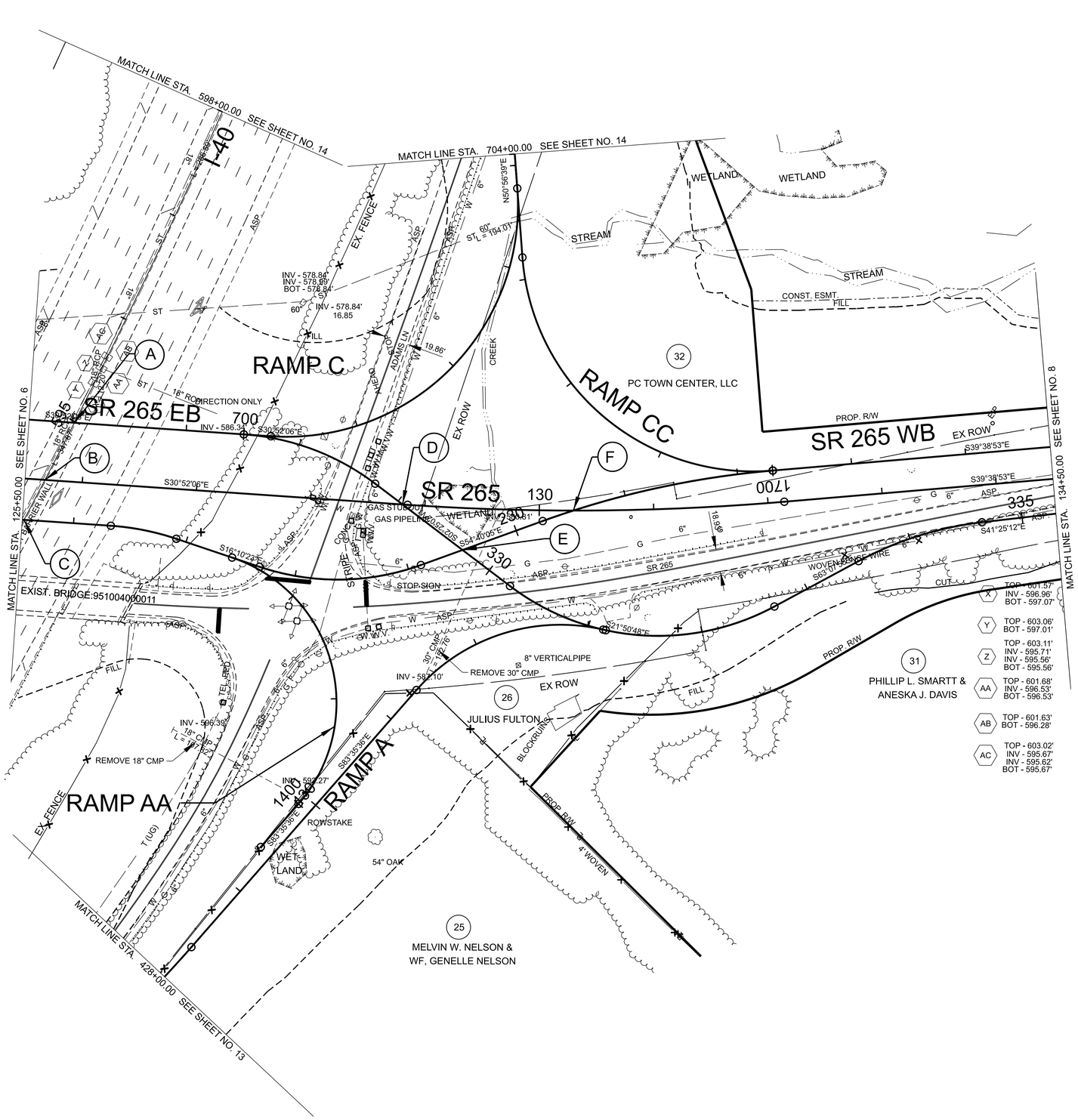
PROFILE

RAMP DD
STA. 1800+00 TO STA. 1803+77

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:11:02 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP DD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 329+70.57 SR 265 EB=
STA. 229+50.16 SR 265 WB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 125+50 TO STA. 335+50
SCALE: 1" = 50'

2/4/2023 8:11:34 AM
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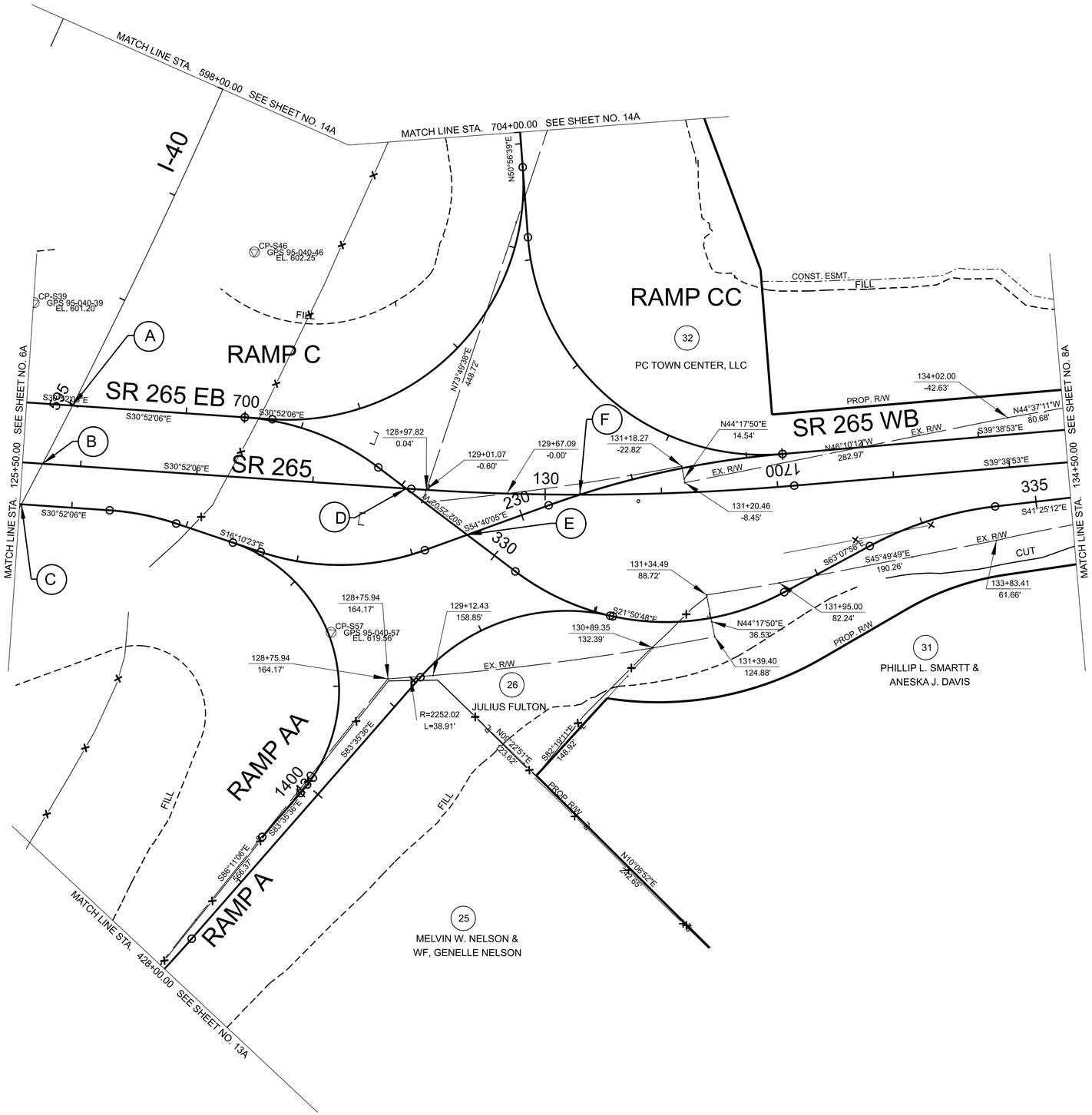
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7A

REV. ***DATE***
TEXT



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 229+50.16 SR 265 WB=
STA. 329+70.57 SR 265 EB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 125+50 TO STA. 134+50
SCALE: 1" = 50'

2/4/2023 8:12:09 AM
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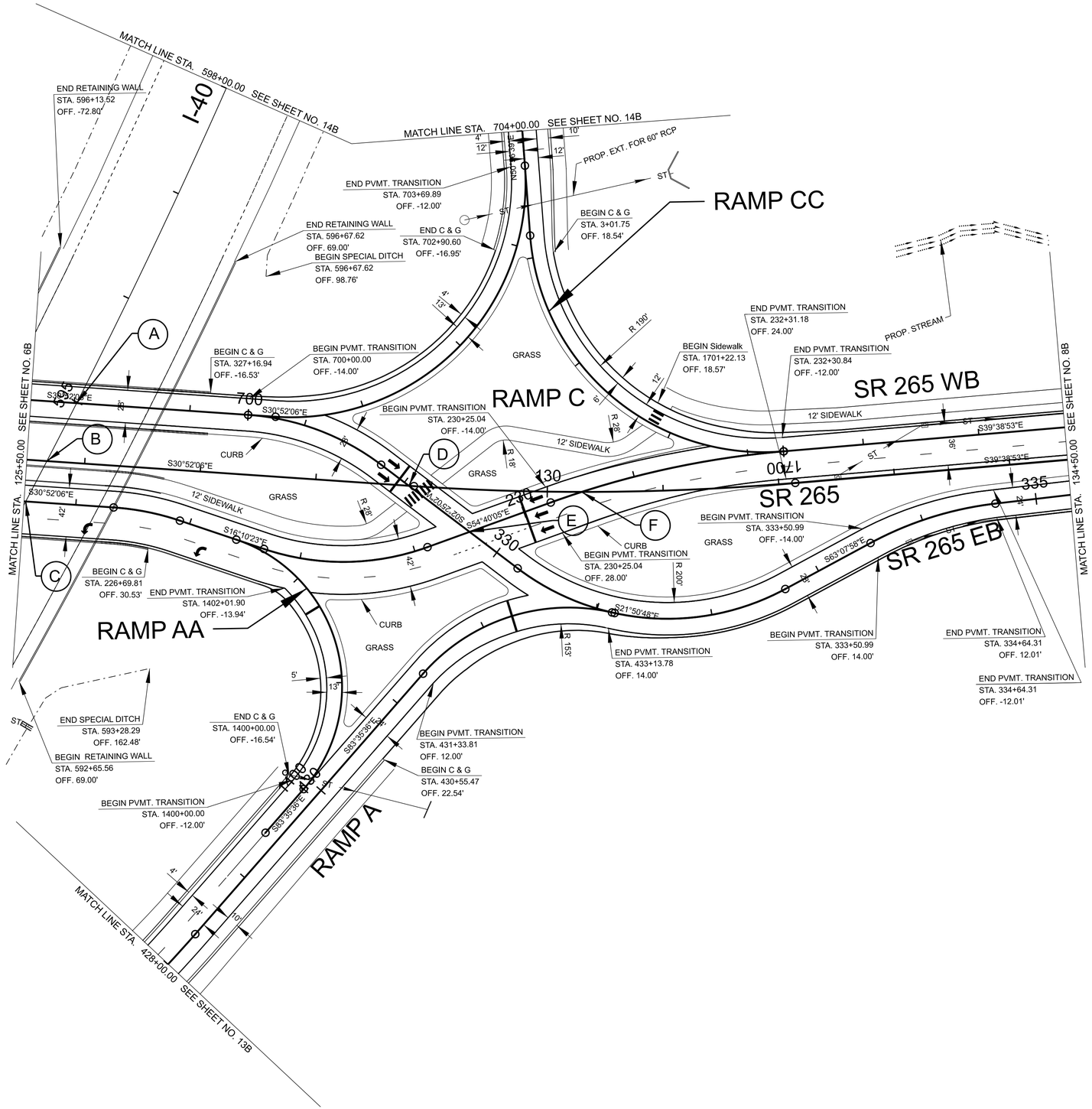
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7B



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 229+50.16 SR 265 WB=
STA. 329+70.57 SR 265 EB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

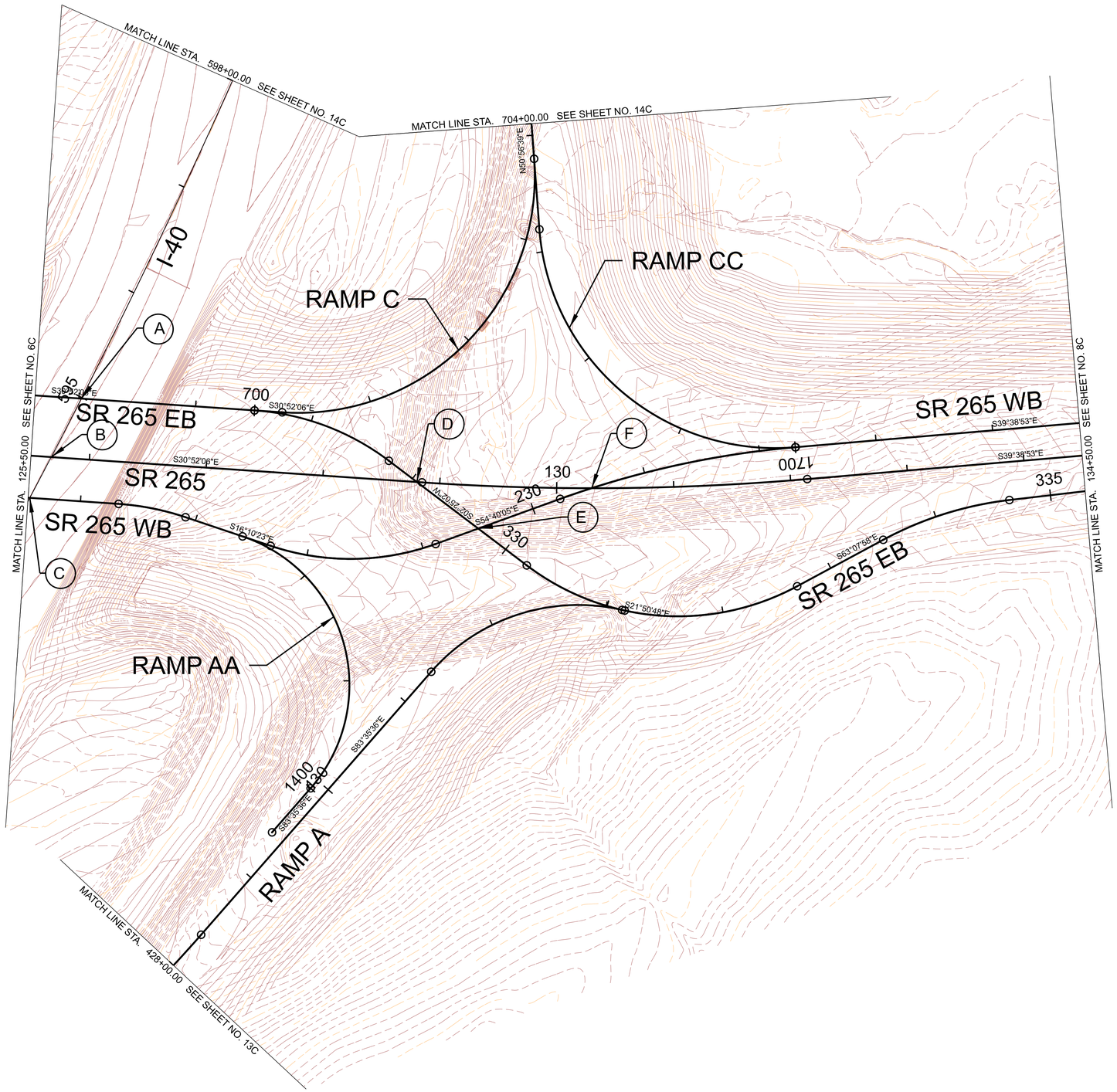
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 125+50 TO STA. 134+50
SCALE: 1" = 50'

2/4/2023 8:12:48 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7C



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 229+50.16 SR 265 WB=
STA. 329+70.57 SR 265 EB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

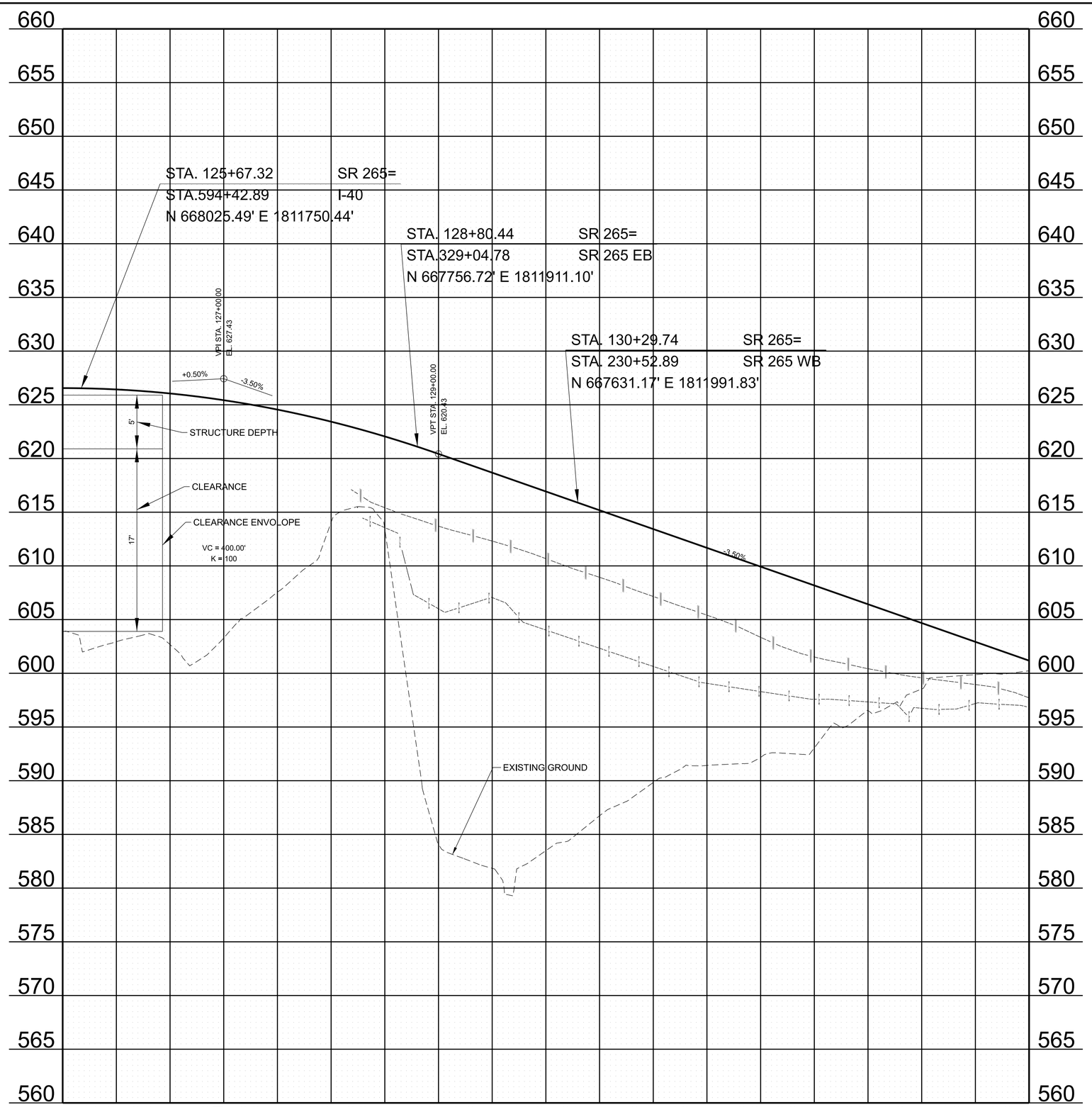
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
SR 265

STA. 125+50 TO STA. 134+50
SCALE: 1" = 50'

2/4/2023 8:13:14 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7D



INITIAL STUDIES REQUEST

SEALED BY

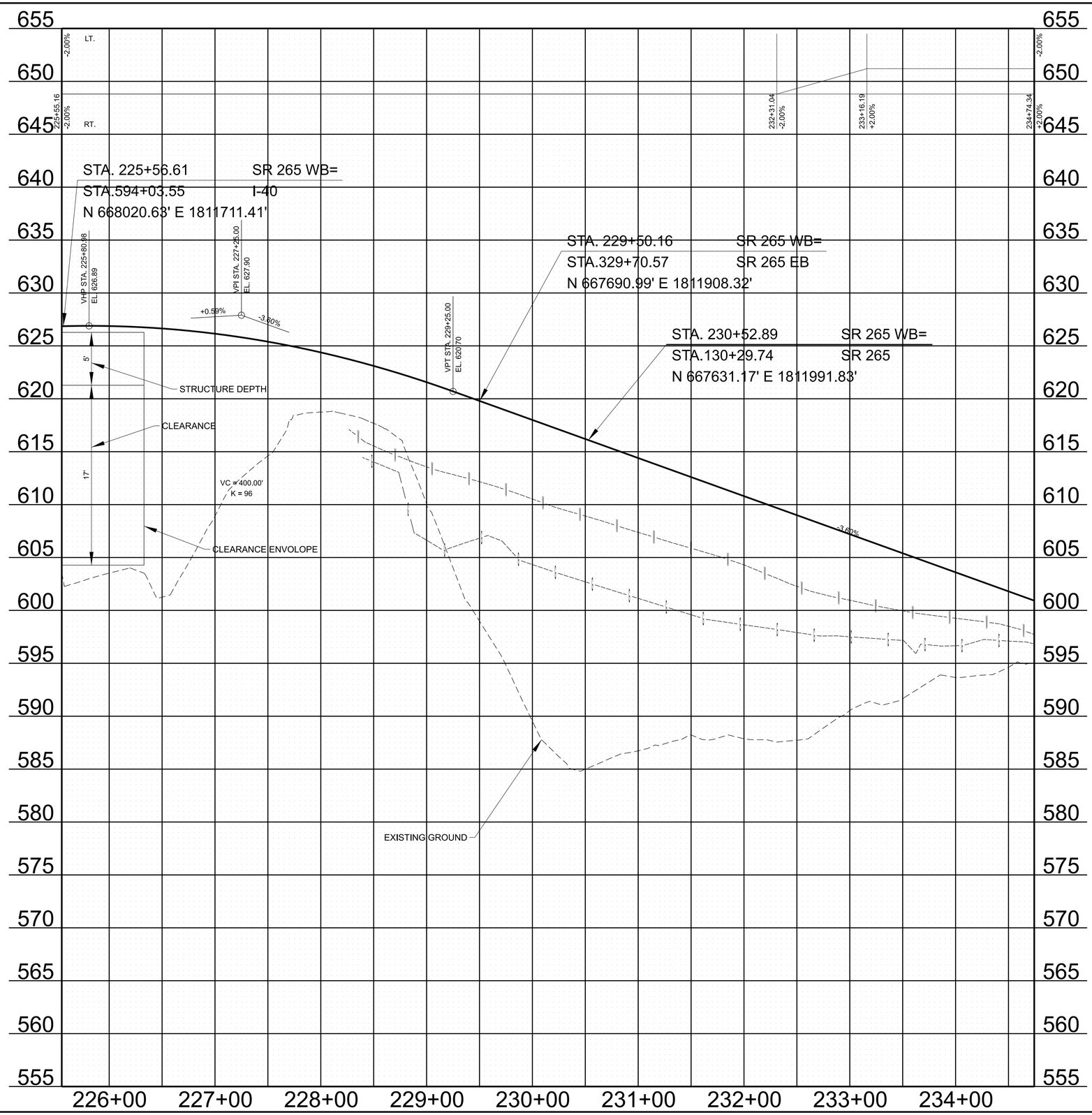
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE

SR 265
STA. 125+50 TO STA. 134+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:13:44 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-PROPOSED PROFILE-SR 265.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7E

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 WB
STA. 225+55 TO STA. 234+74

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:14:32 AM
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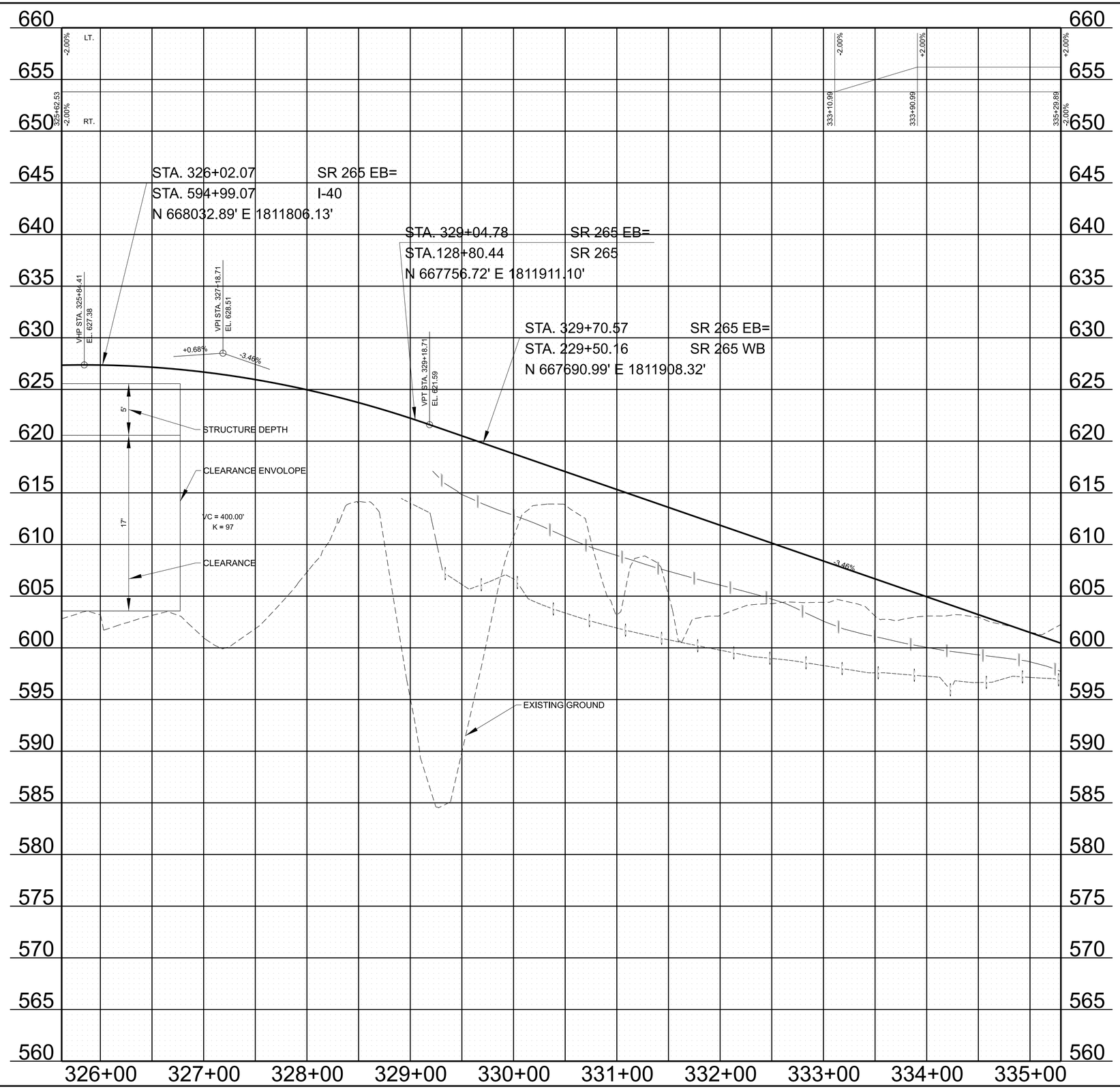

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7F

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 EB
STA. 325+63 TO STA. 335+30

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:14:52 AM
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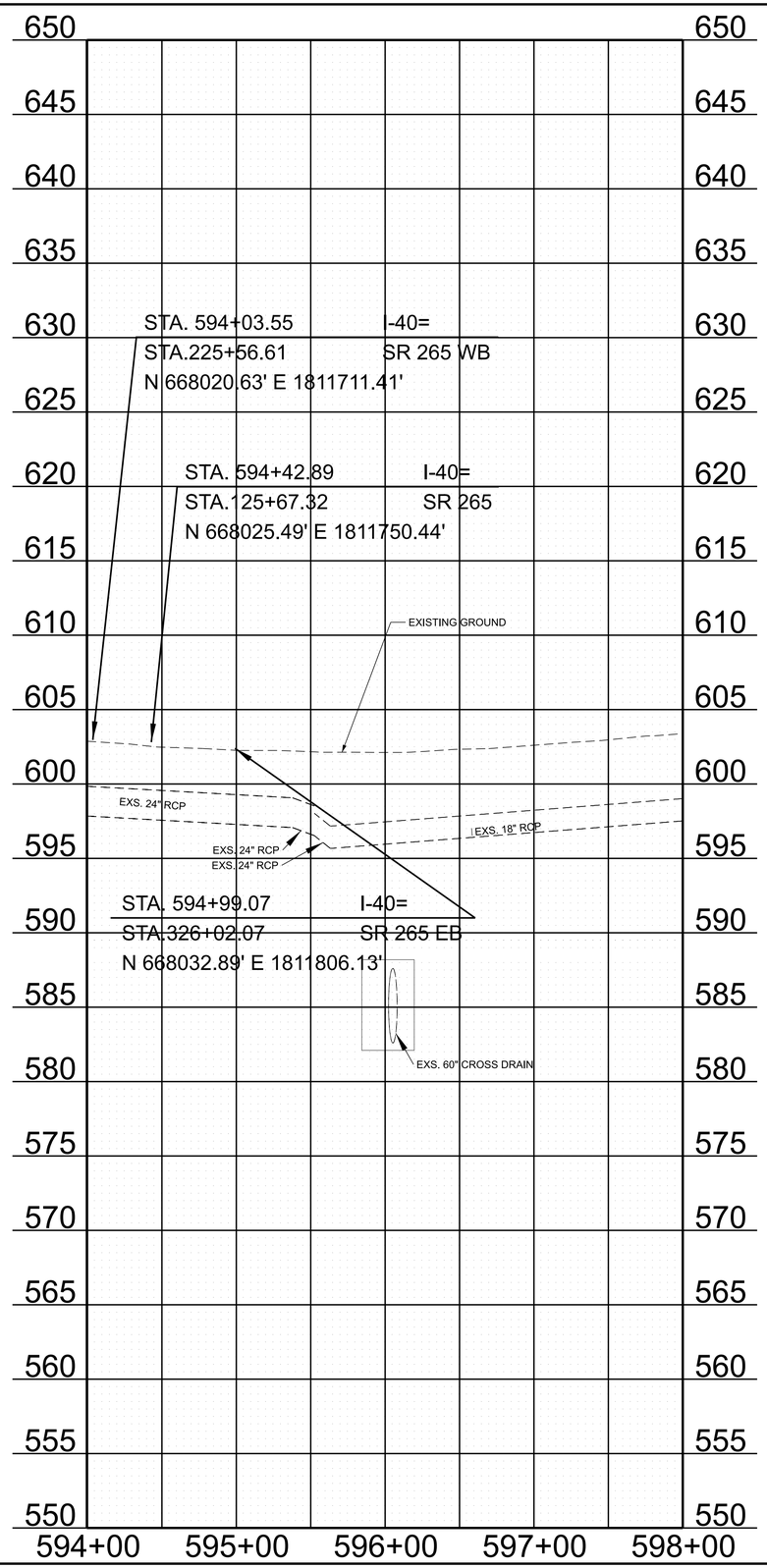

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7G

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

EXISTING
PROFILE
I-40
STA. 594+00 TO STA. 598+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:15:19 AM
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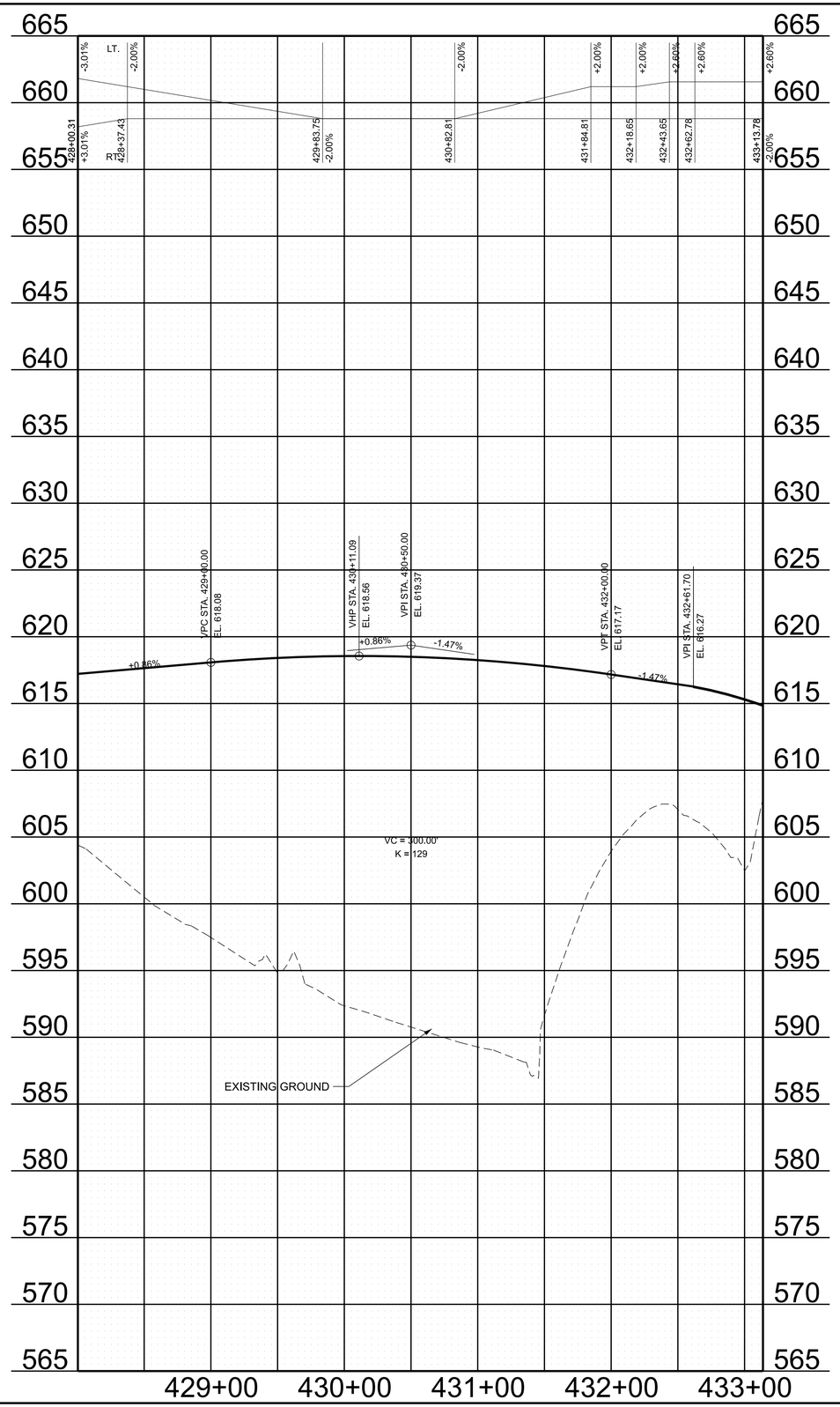

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7H

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP A
STA. 428+00 TO STA. 433+14

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:15:39 AM
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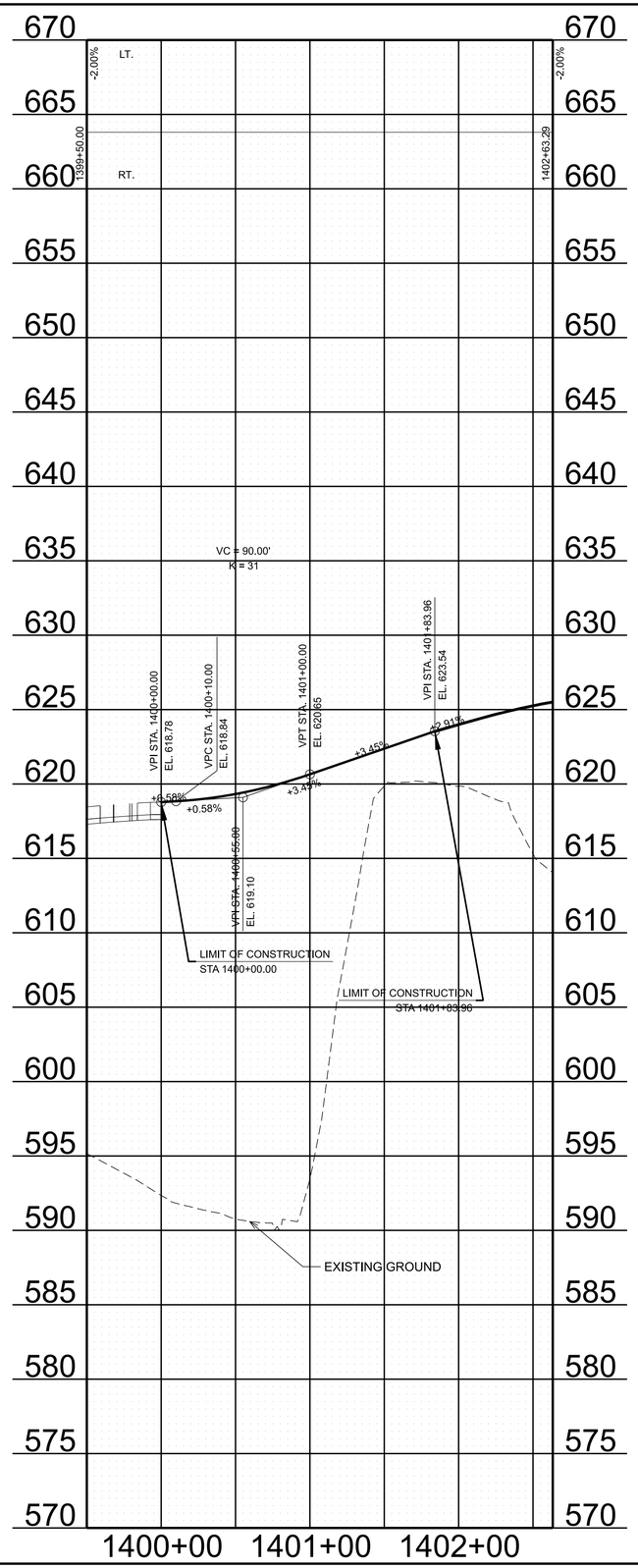


TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7I

INITIAL STUDIES REQUEST

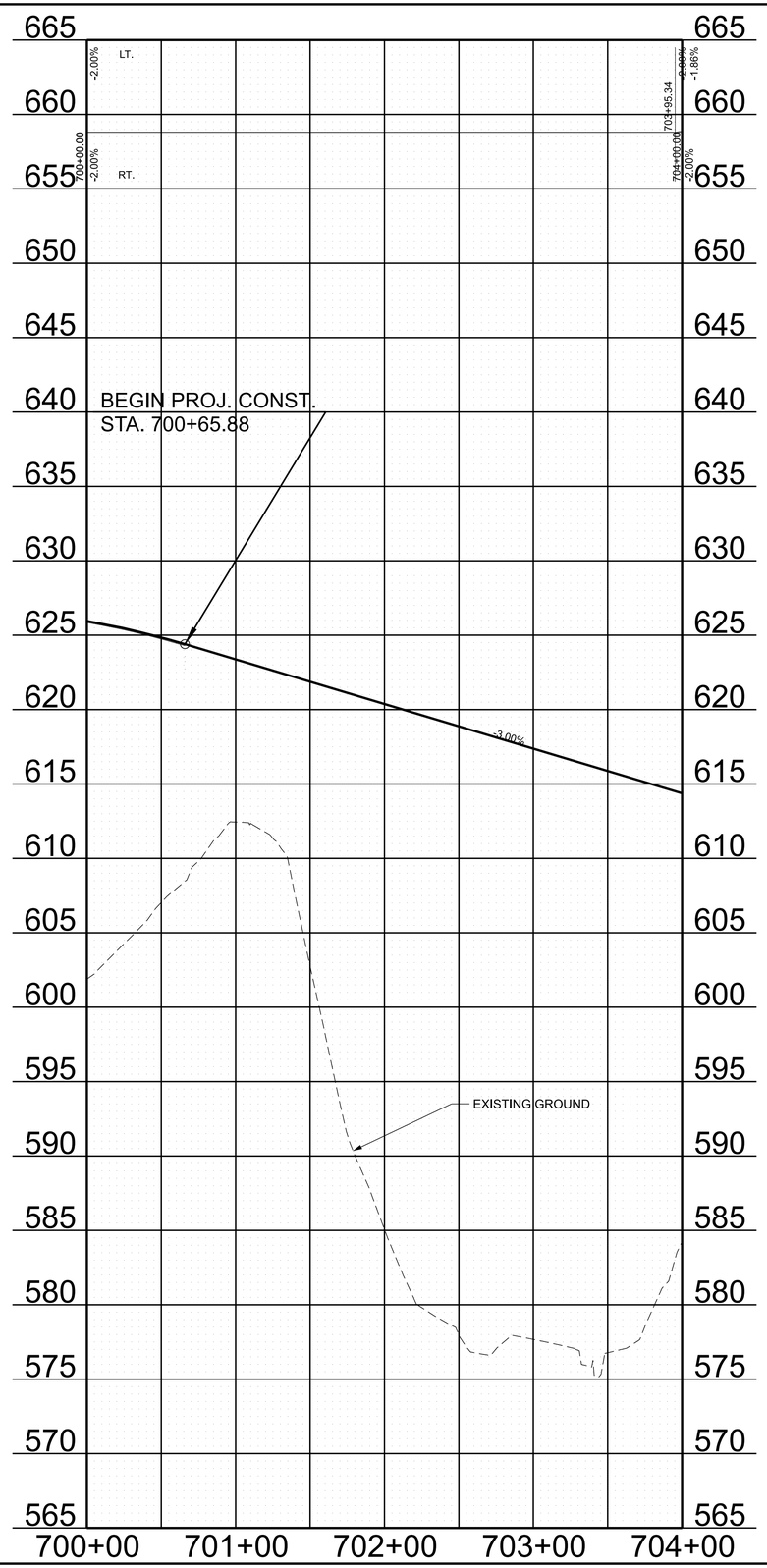
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP AA
STA. 1399+50 TO STA. 1402+63

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:15:59 AM
C:\PWWORKING\EAST01\D2328414195I040-SHT-PROPOSED PROFILE-RAMP AA.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7J

INITIAL STUDIES REQUEST

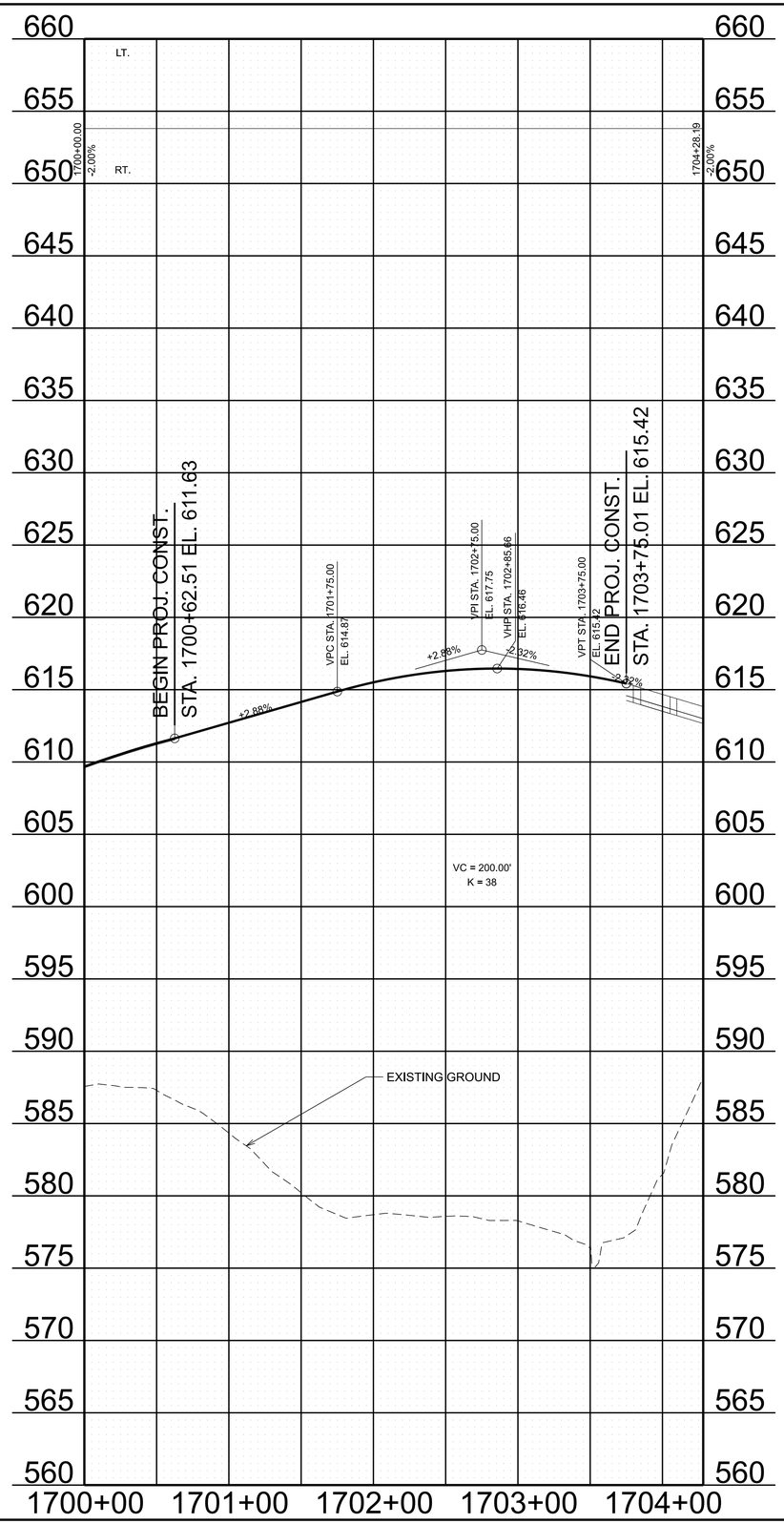
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP C
STA. 700+00 TO STA. 704+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:16:18 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP C.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7K

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP CC
STA. 1700+00 TO STA. 1704+28

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:16:36 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8

END PROJ. CONST.
STA. 1614+00.00

STA. 143+28.07 SR 265=
STA. 1610+00.00 PROVIDENCE PKWY
N 666588.5226 E 1812763.7116

SR 265 WB

SR 265

SR 265 EB

PROVIDENCE PKWY

PC TOWN CENTER, LLC

THE ENCLAVE AT PROVIDENCE PROPERTY, LLC

PHILLIP L. SMARTT & WF, MARY R. SMARTT

PHILLIP L. SMARTT & ANESKA J. DAVIS

PHILLIP L. SMARTT, TRUSTEE

EXTEND 18.5' X5' RCBC

EXTEND 18.5' X 5' RCBC

RELCOATE STREAM

REMOVE 18" CMP

REMOVE EXS. 5.7'X 3.8' BOX CULVERT

REMOVE 15" CMP

REMOVE MULTIPLE 18" CMP PIPES

REMOVE 12" CMP

CONST. ESMT.

PROP. R/W

EX ROW

STREAM

POND

MATCH LINE STA. 134+50.00 SEE SHEET NO. 7

MATCH LINE STA. 146+50.00 SEE SHEET NO. 9

MATCH LINE STA. 1606+00.00 SEE SHEET NO. 17

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:17:07 AM
C:\PW\WORKING\EAST01\D2328414195\l040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8A

REV. ***DATE***
TEXT

PROVIDENCE PKWY

END PROJ. CONST.
STA. 1614+00.00

STA. 143+28.07 SR 265=
STA. 1610+00.00 PROVIDENCE PKWY
N 666588.5226 E 1812763.7116

SR 265

PROVIDENCE PKWY

32 PC TOWN CENTER, LLC

34 THE ENCLAVE AT PROVIDENCE PROPERTY, LLC

36 PHILLIP L. SMARTT & WF, MARY R. SMARTT

31 PHILLIP L. SMARTT & ANESKA J. DAVIS

33 PHILLIP L. SMARTT, TRUSTEE

31 PHILLIP L. SMARTT & ANESKA J. DAVIS

MATCH LINE STA. 134+50.00 SEE SHEET NO. 7A

MATCH LINE STA. 146+50.00 SEE SHEET NO. 9A

MATCH LINE STA. 1606+00.00 SEE SHEET NO. 17A

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

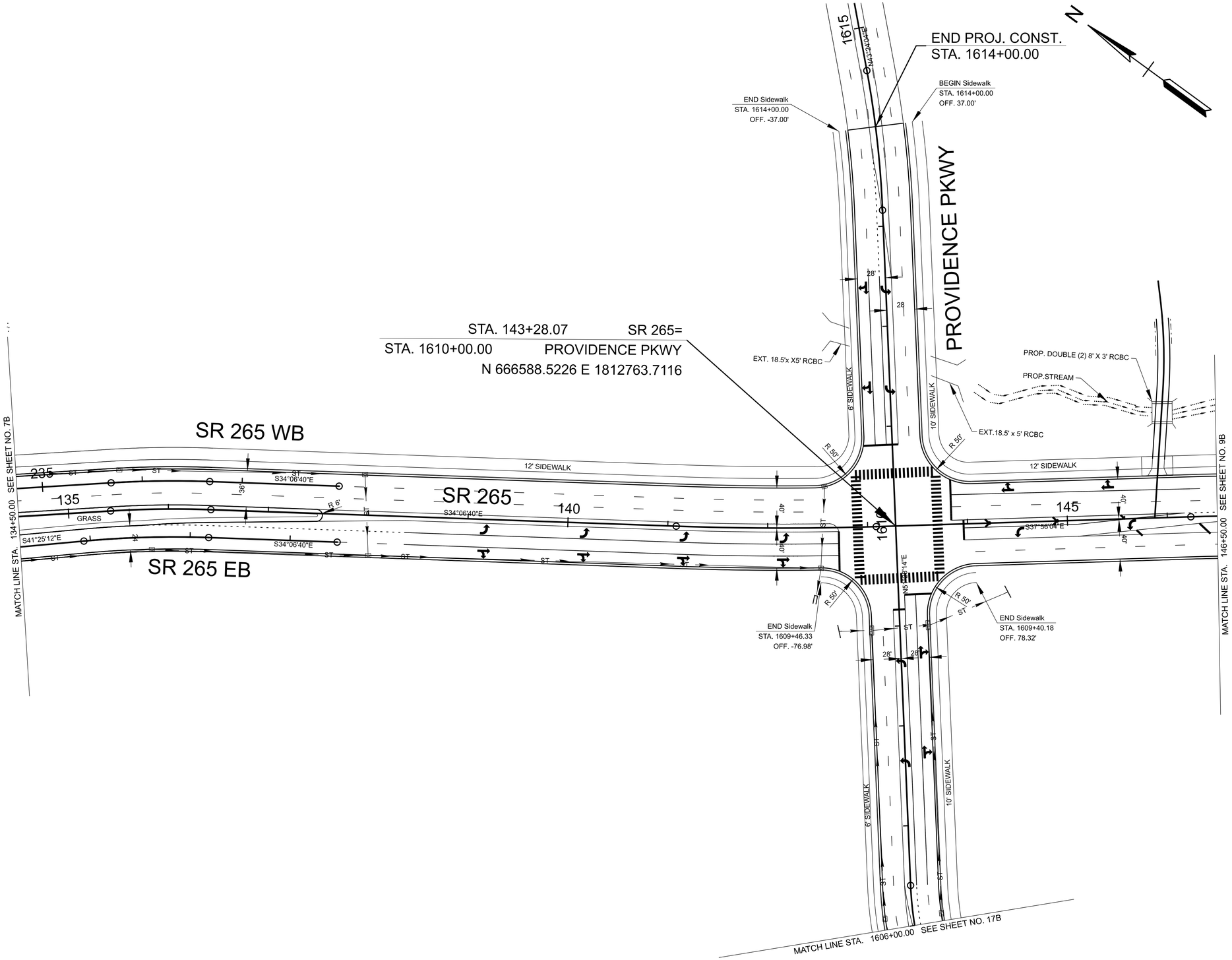
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:17:42 AM
C:\PWWORKINGIEAST01\D2328414\95\0040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

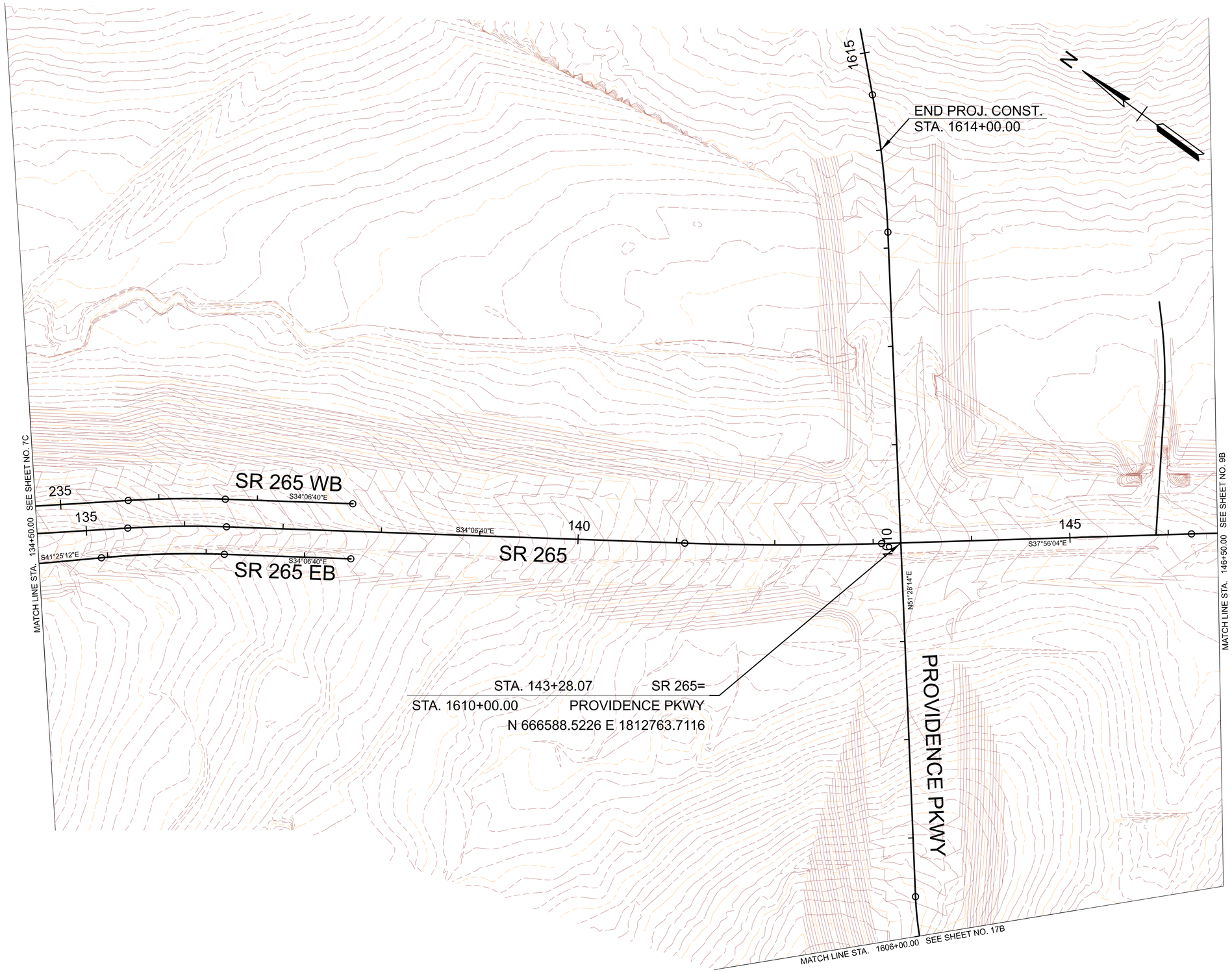
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:18:21 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

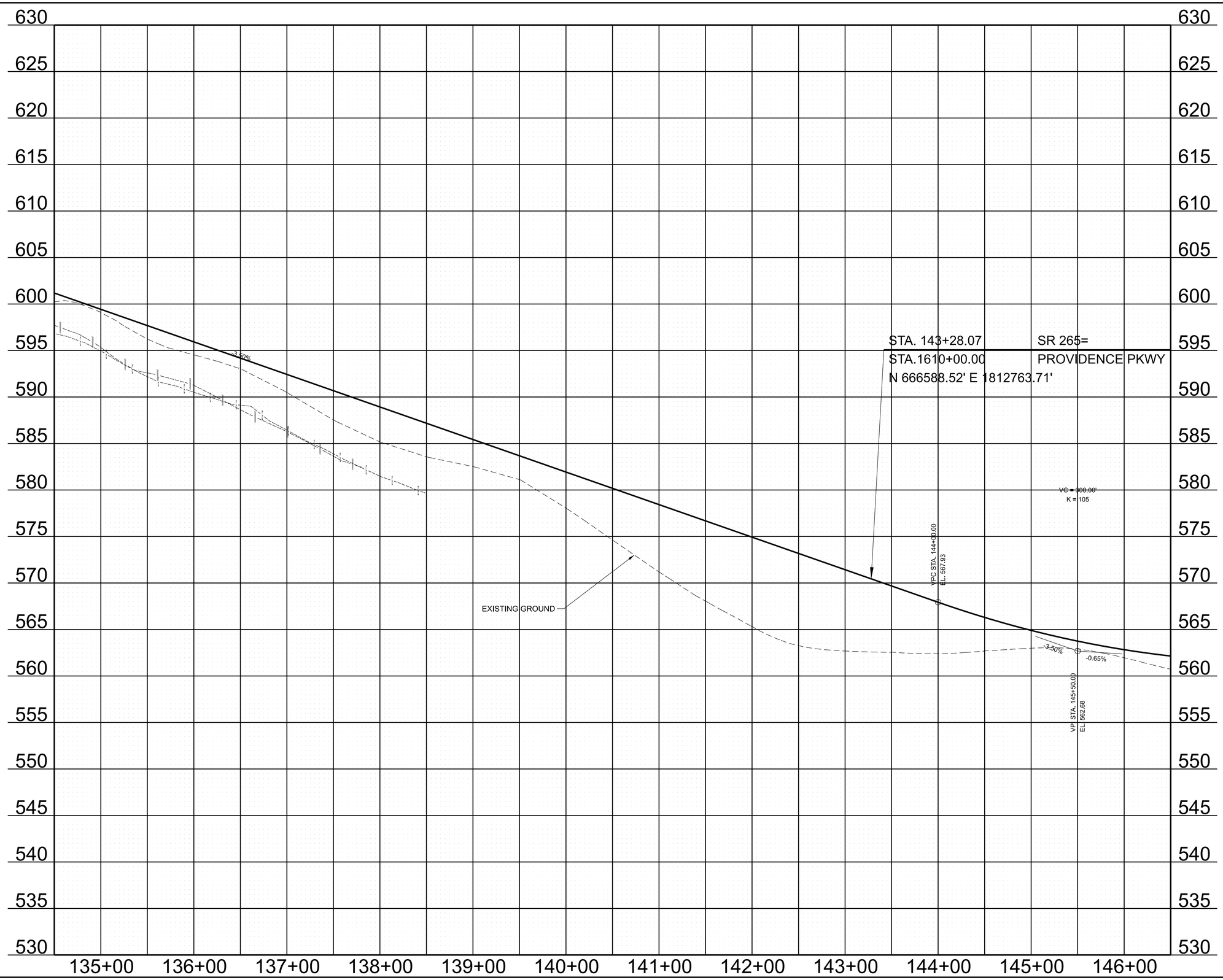
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:18:47 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8D



INITIAL STUDIES REQUEST

SEALED BY

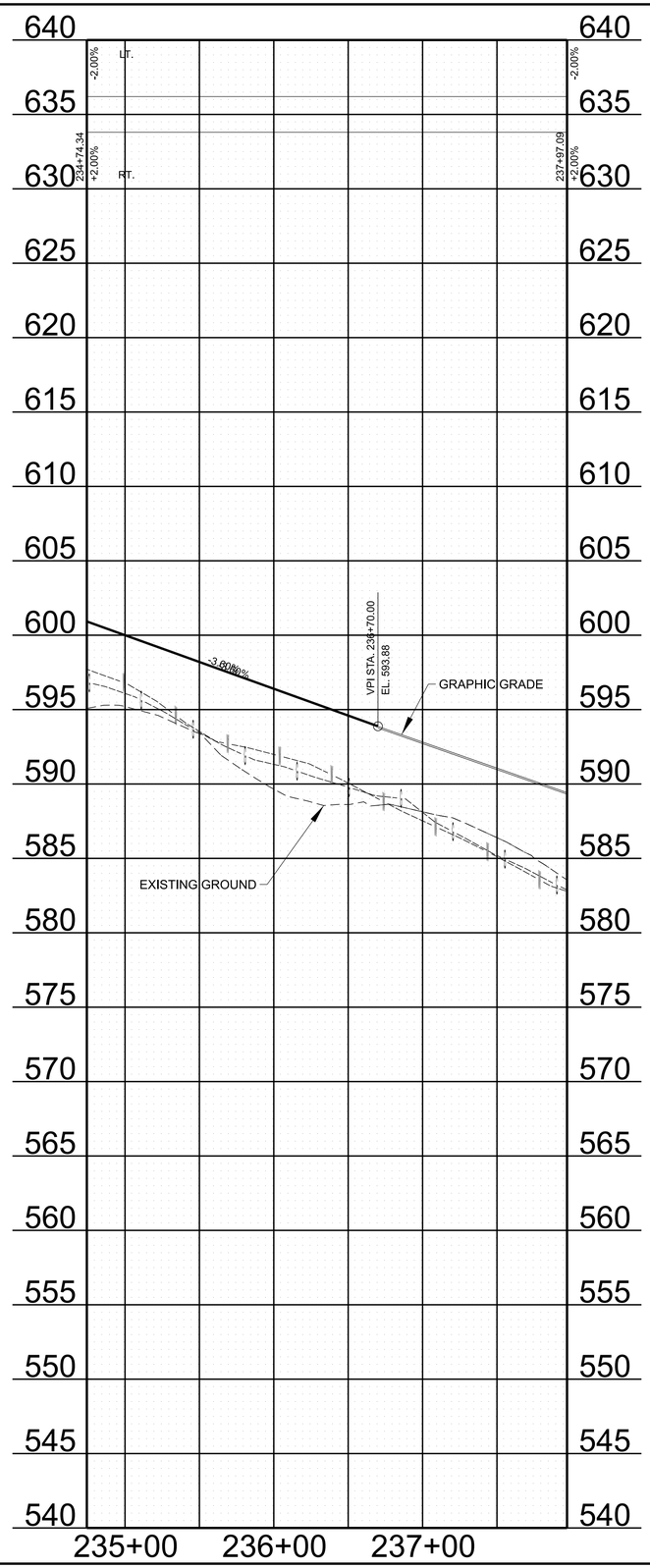
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE

SR 265
STA. 134+50 TO STA. 146+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:19:19 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8E

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

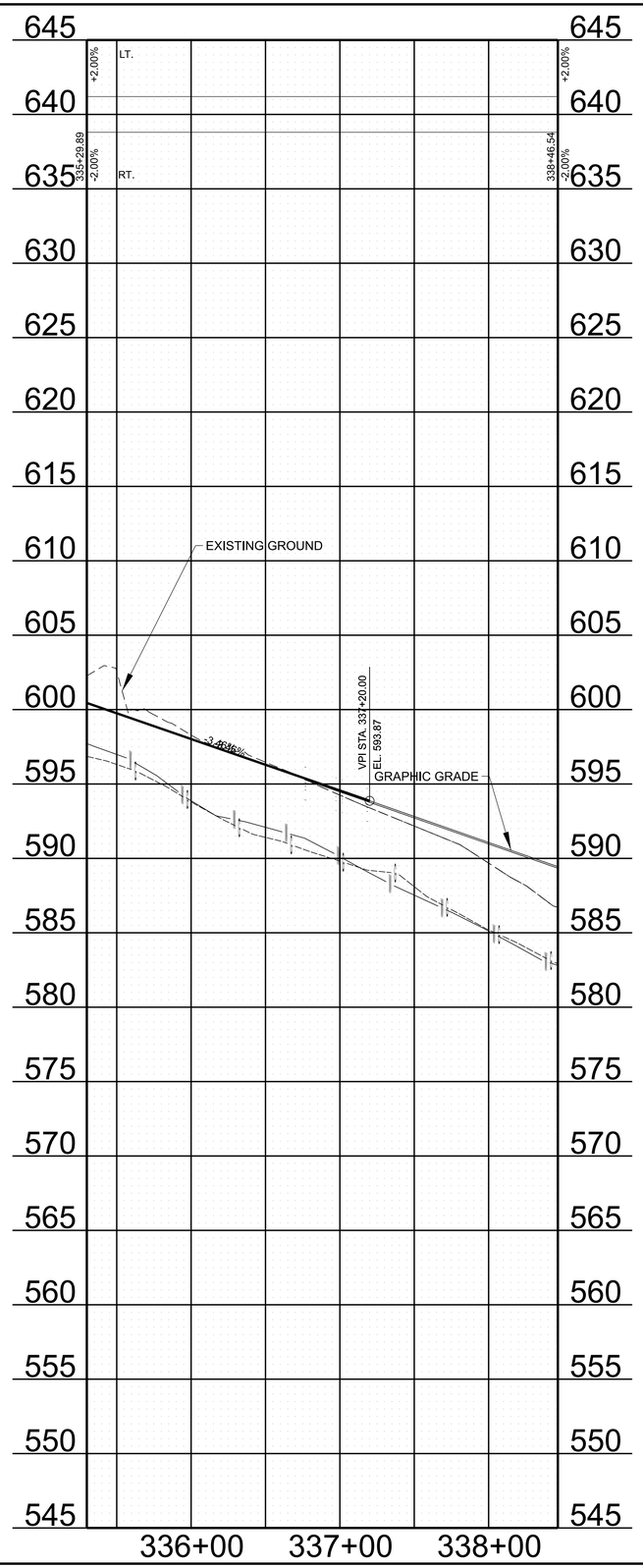
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
SR 265 WB
STA. 234+74 TO STA. 236+70

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:20:06 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265 WB.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8F

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

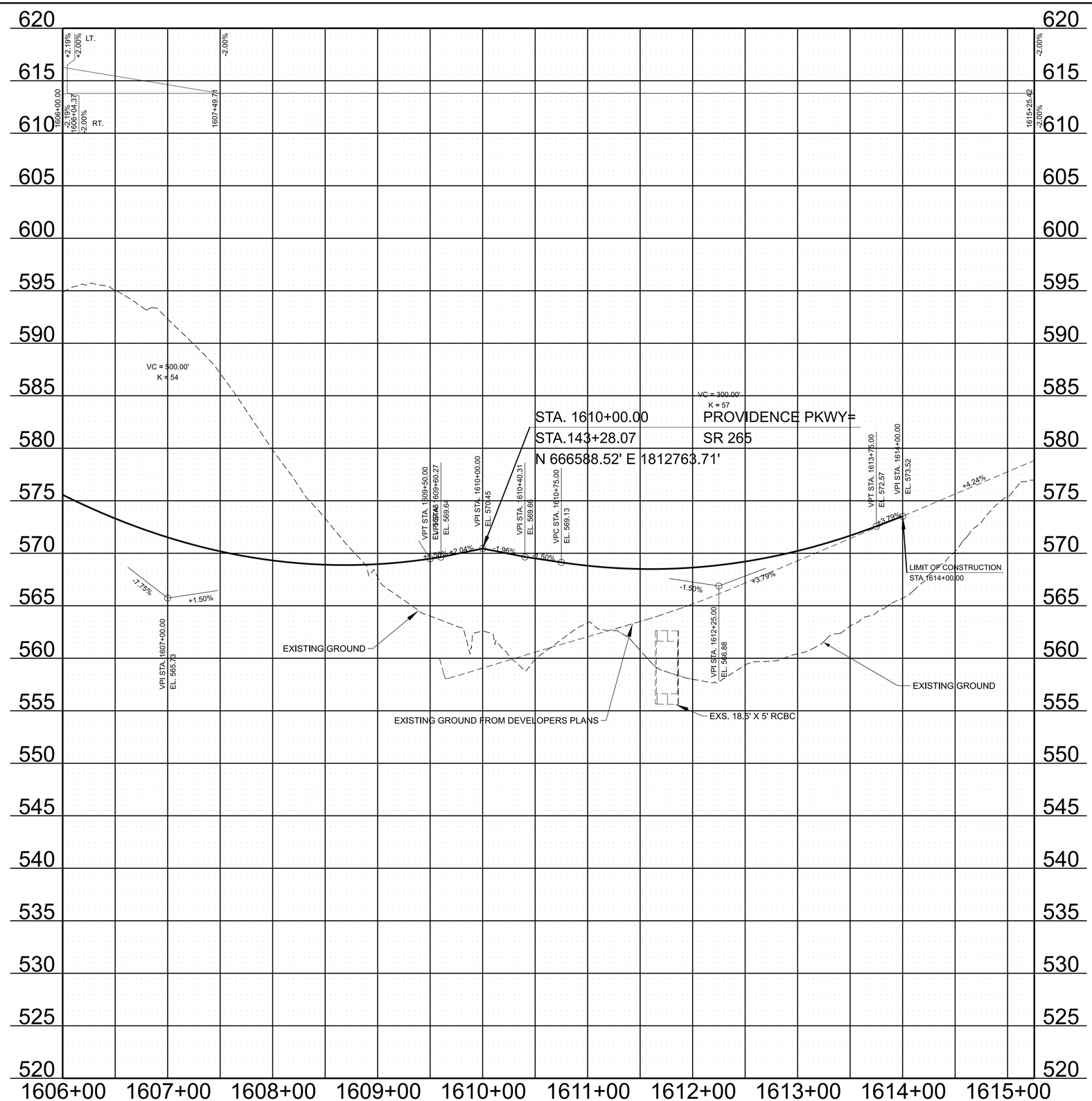
PROPOSED
PROFILE

SR 265 EB
STA. 335+30 TO STA. 337+20

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:20:26 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-SR 265 EB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8G



INITIAL STUDIES REQUEST

SEALED BY

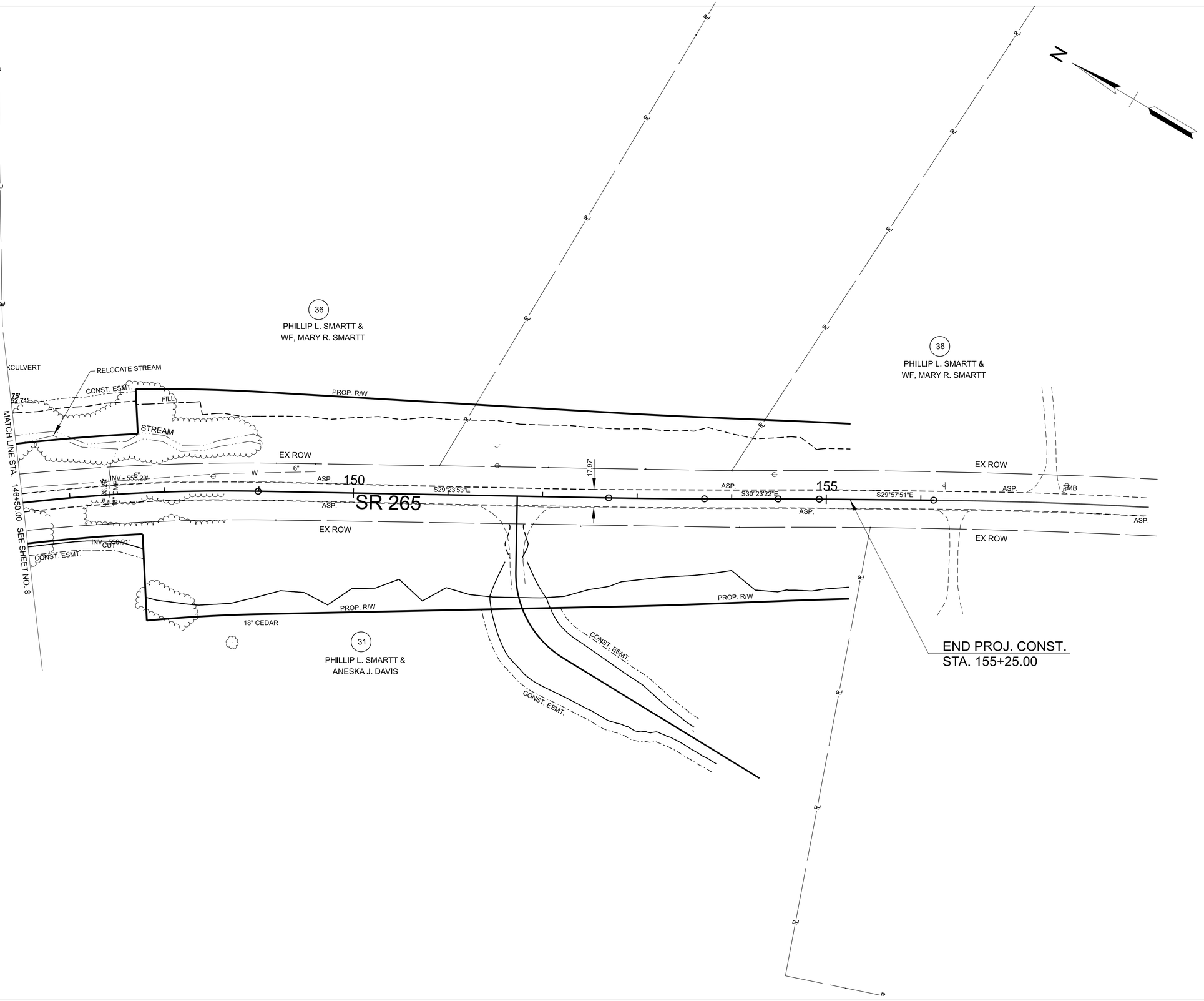
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
PROVIDENCE PKWY
STA. 1606+00 TO STA. 1615+25

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:20:46 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

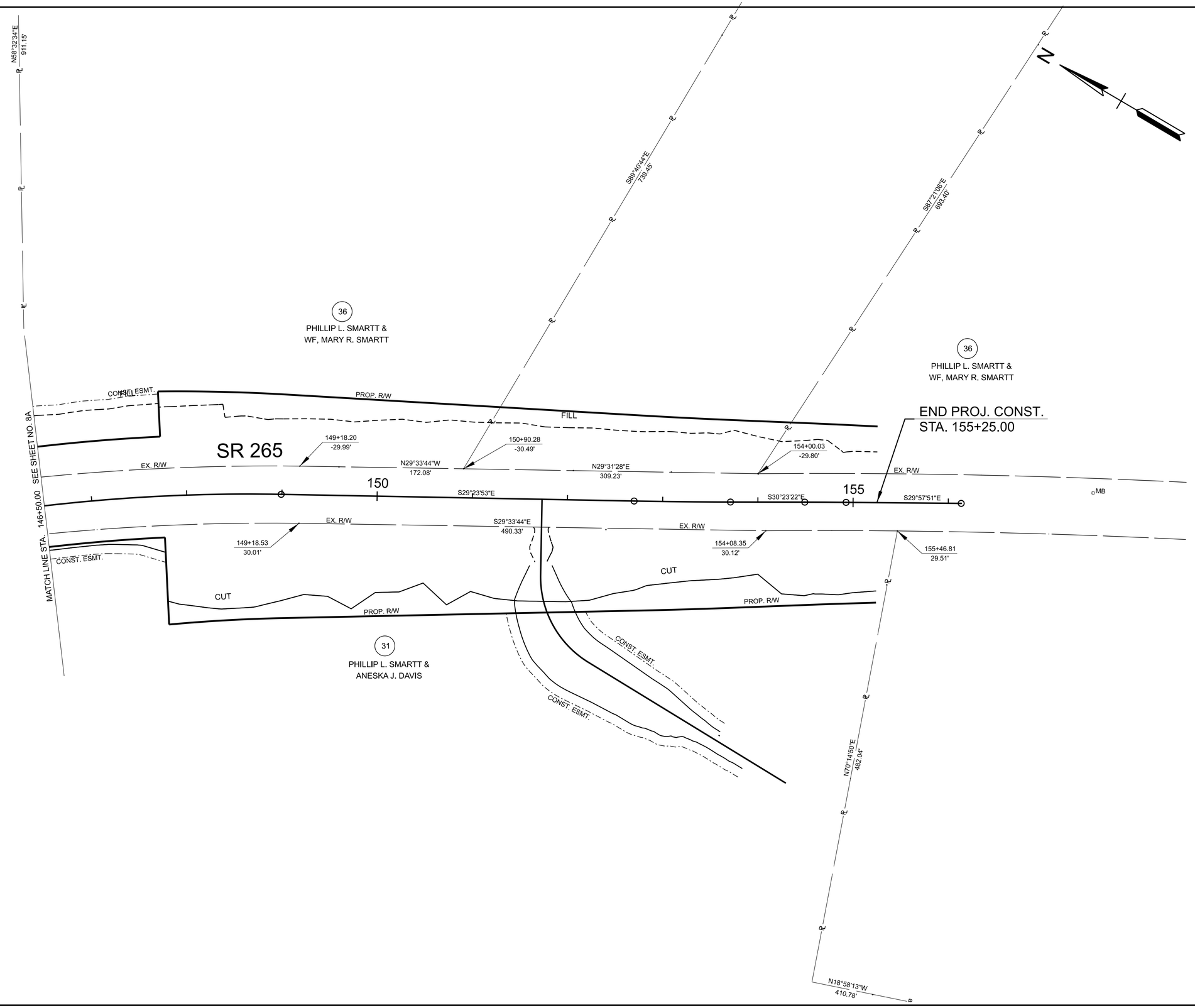
PRESENT LAYOUT
SR 265

STA. 146+50 TO STA. 149+50
SCALE: 1" = 50'

2/4/2023 8:21:16 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

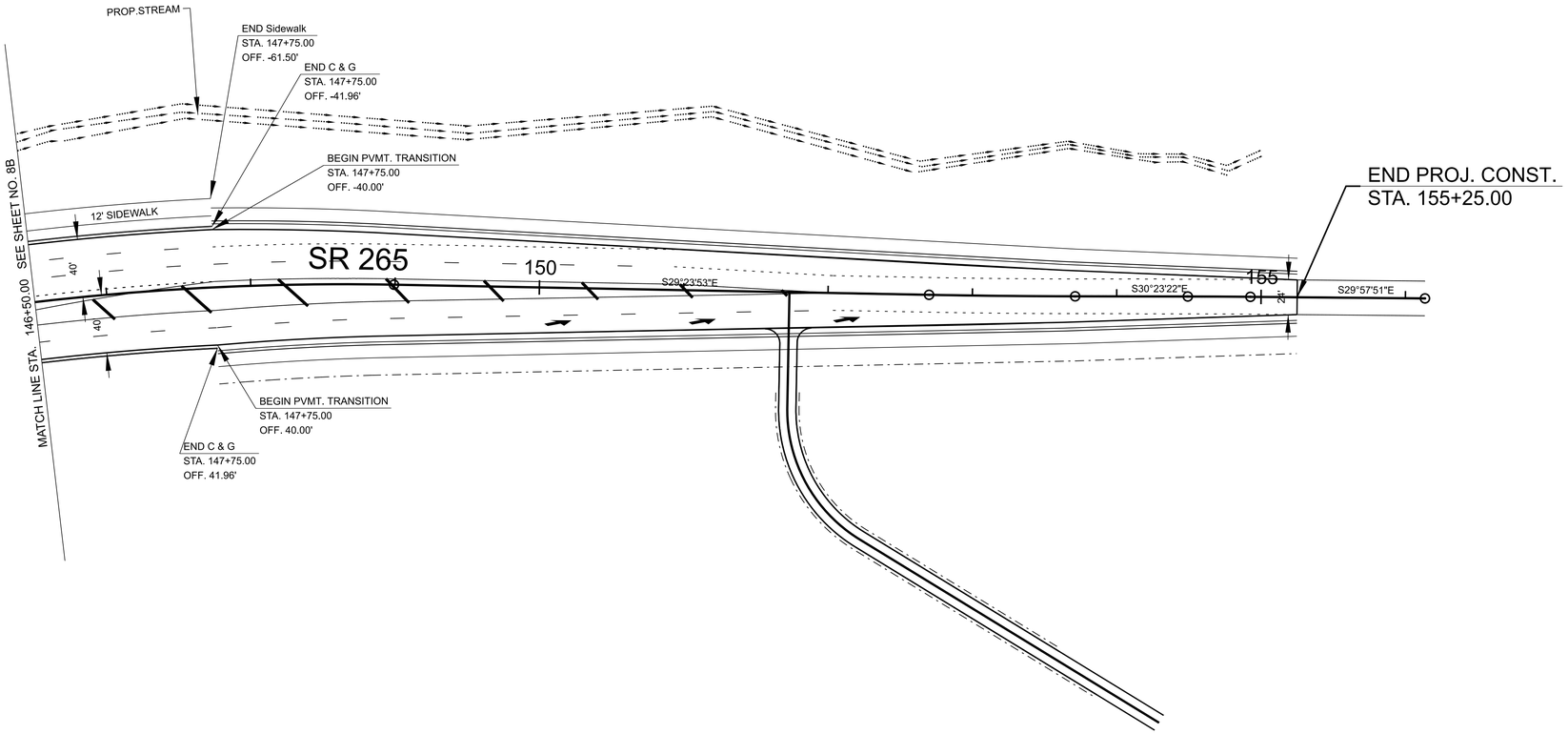
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 146+50 TO STA. 155+25
SCALE: 1" = 50'

2/4/2023 8:21:50 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

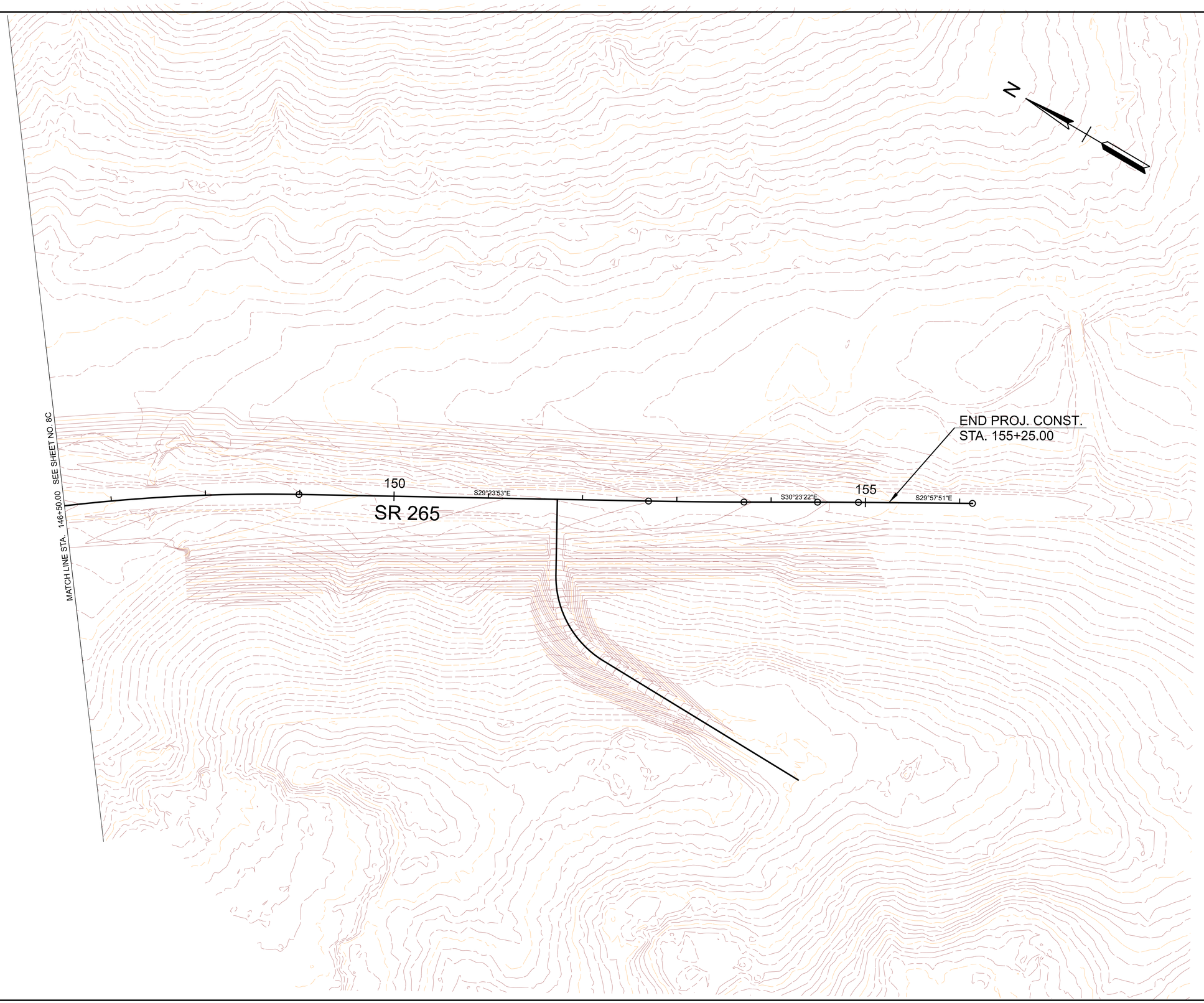
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 146+50 TO STA. 155+25
SCALE: 1" = 50'

2/4/2023 8:22:29 AM
C:\PWWORKING\EAST01\D2328414\95l040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

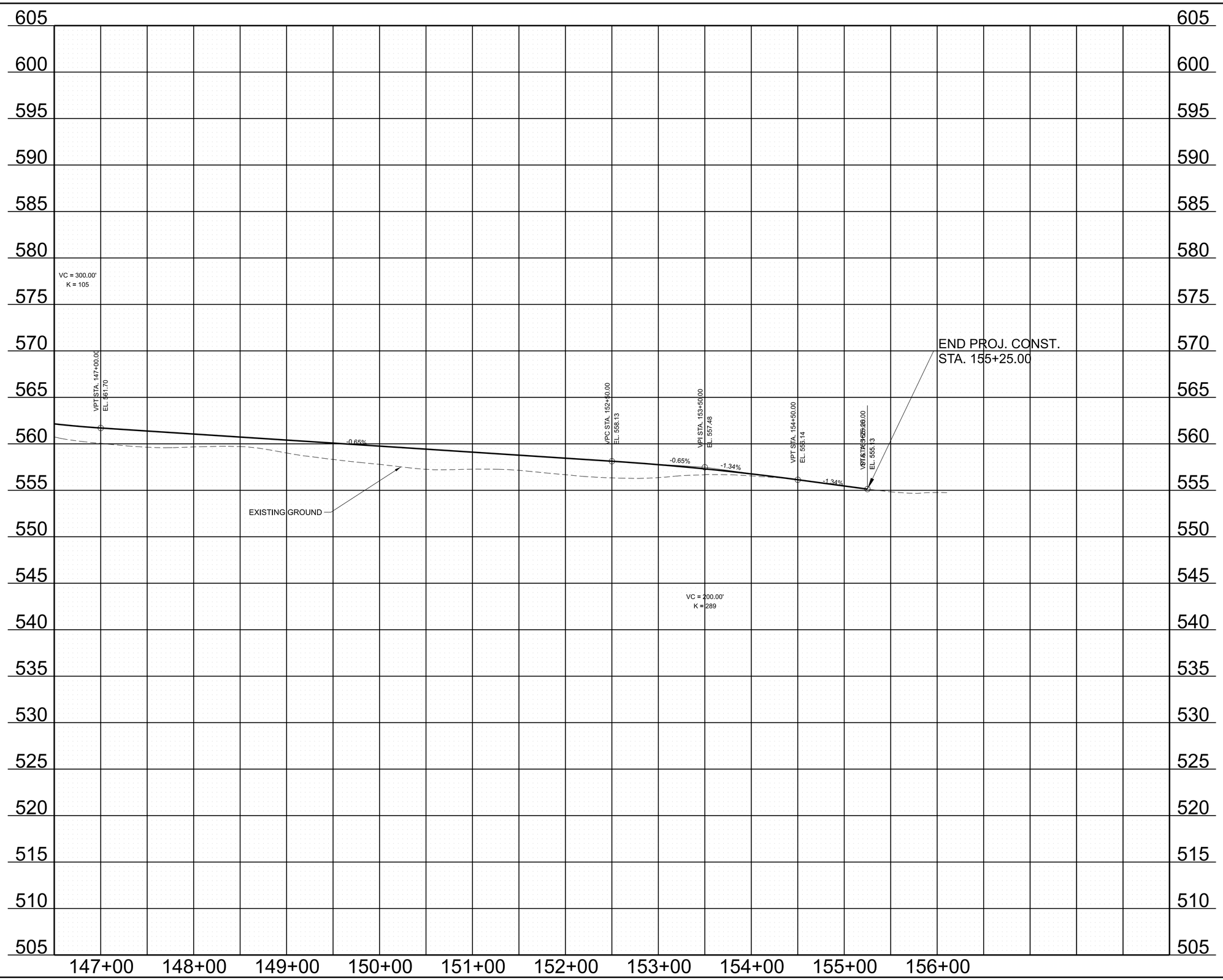
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
SR 265

STA. 146+50 TO STA. 155+25
SCALE: 1" = 50'

2/4/2023 8:22:55 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9D



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

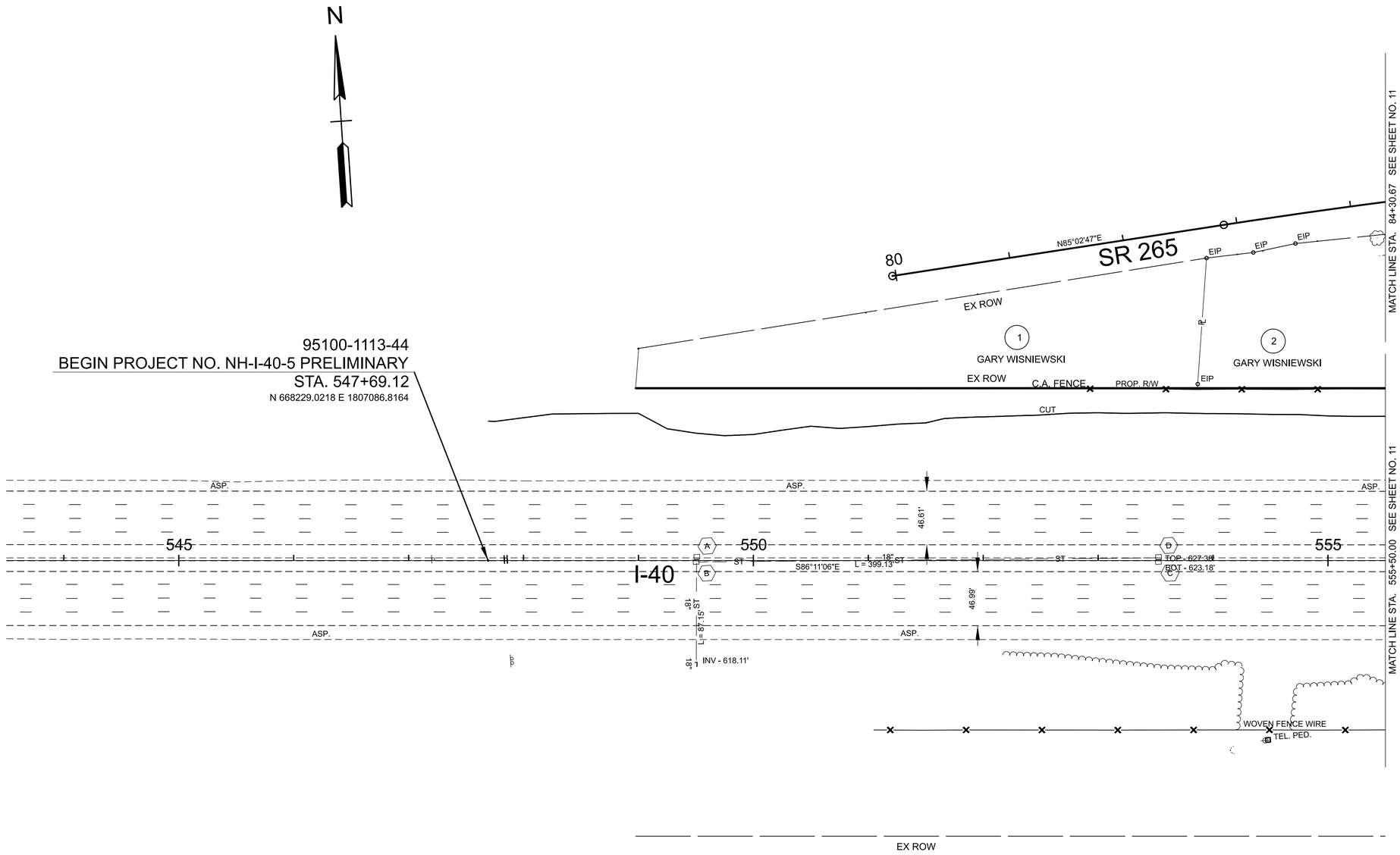
PROPOSED
PROFILE

SR 265
STA. 146+50 TO STA. 155+25

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:23:27 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-SR 265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10



A TOP - 624.23'
BOT - 620.73'

B TOP - 624.33'
INV - 620.68'
INV - 620.48'
BOT - 620.68'

C TOP - 627.38'
BOT - 623.18'

D TOP - 627.42'
INV - 622.67'
BOT - 623.27'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

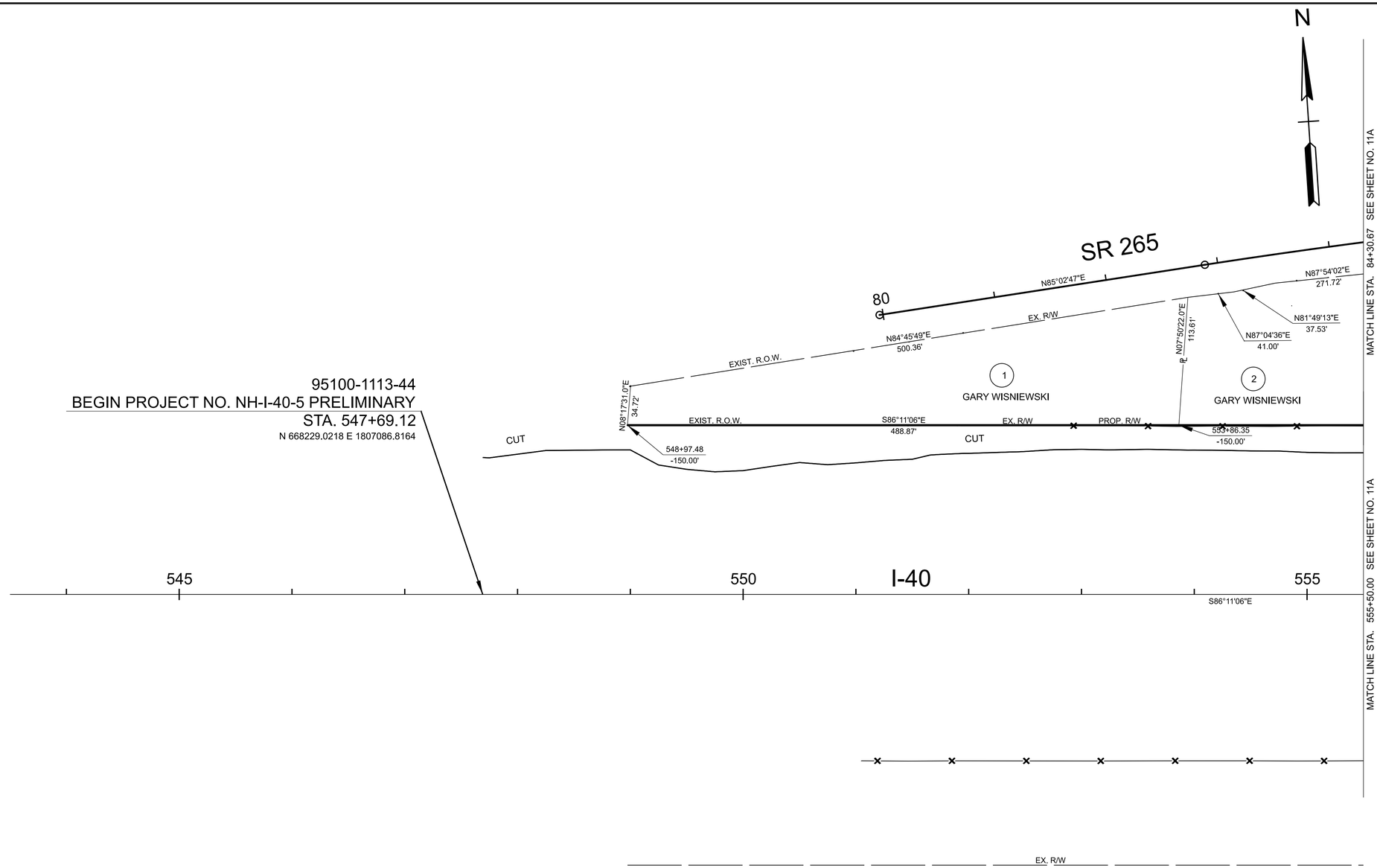
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 542+00 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:24:07 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10A



95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 547+69.12
N 668229.0218 E 1807086.8164

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

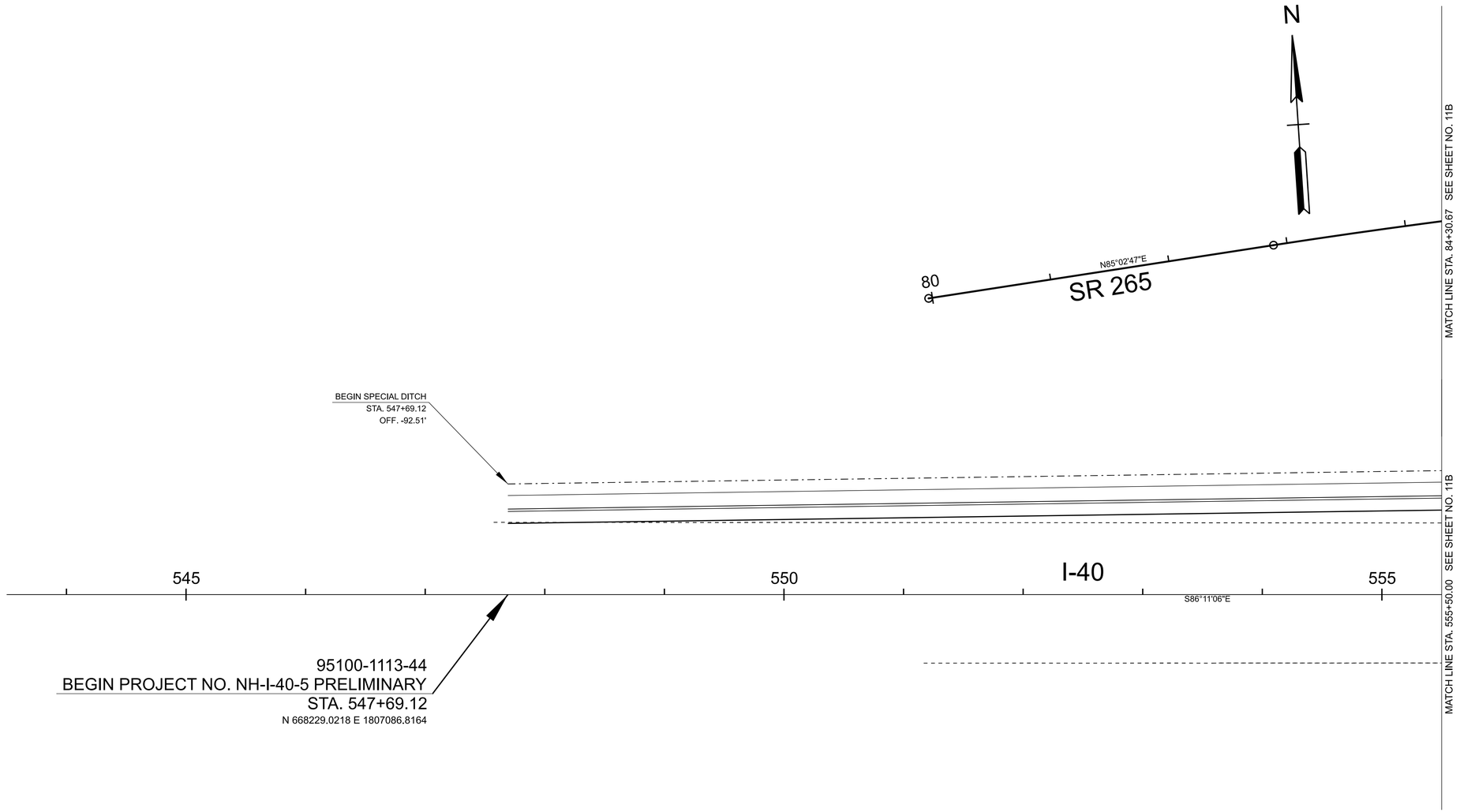
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 547+69 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:24:42 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

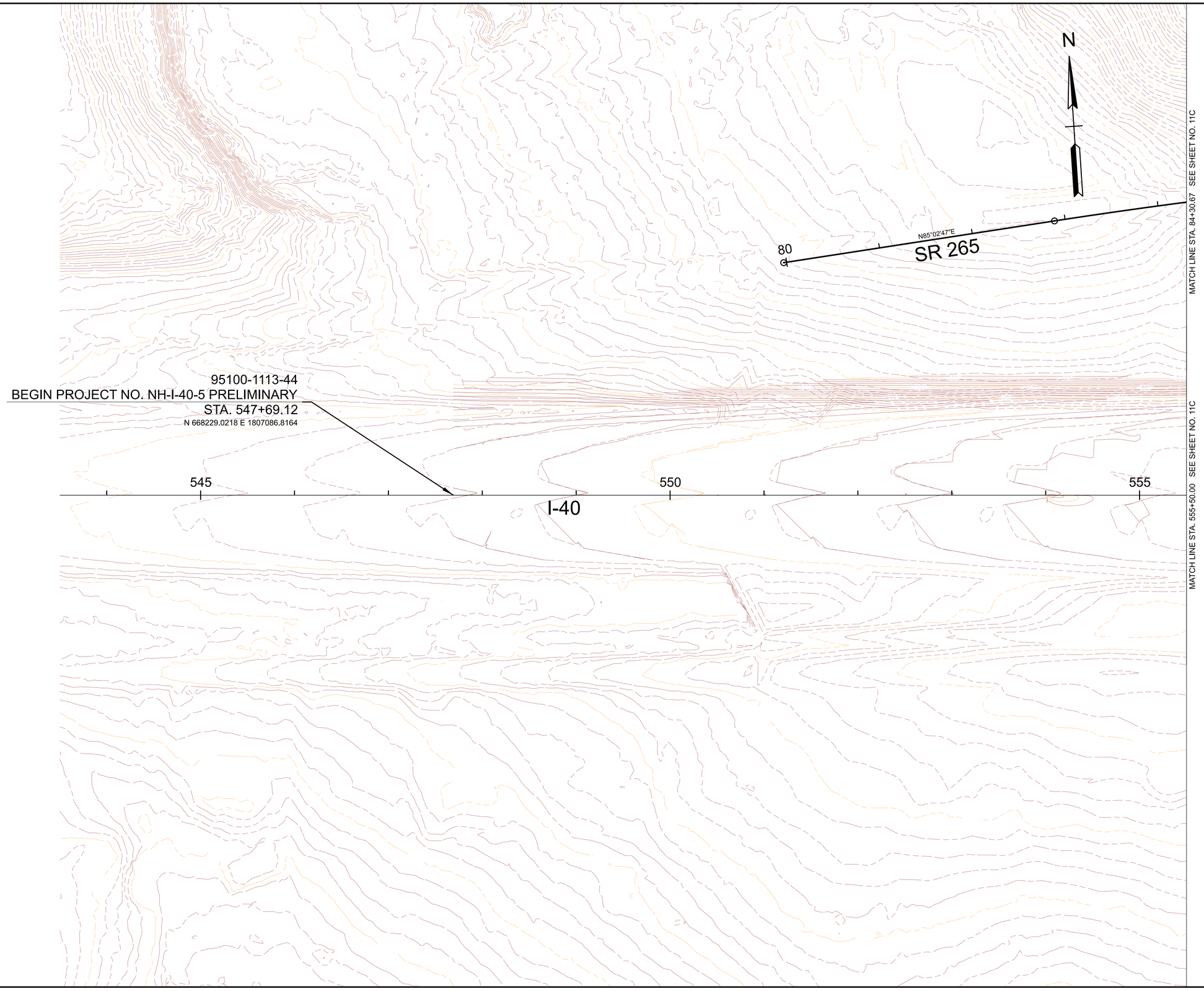
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 547+69 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:25:20 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
I-40

STA. 547+69 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:25:45 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 CONST.
STA. 547+69.12

EXISTING GROUND

670 665 660 655 650 645 640 635 630 625 620 615 610 605 600 595 590 585 580 575 570

544+00 545+00 546+00 547+00 548+00 549+00 550+00 551+00 552+00 553+00 554+00 555+00

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10D

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

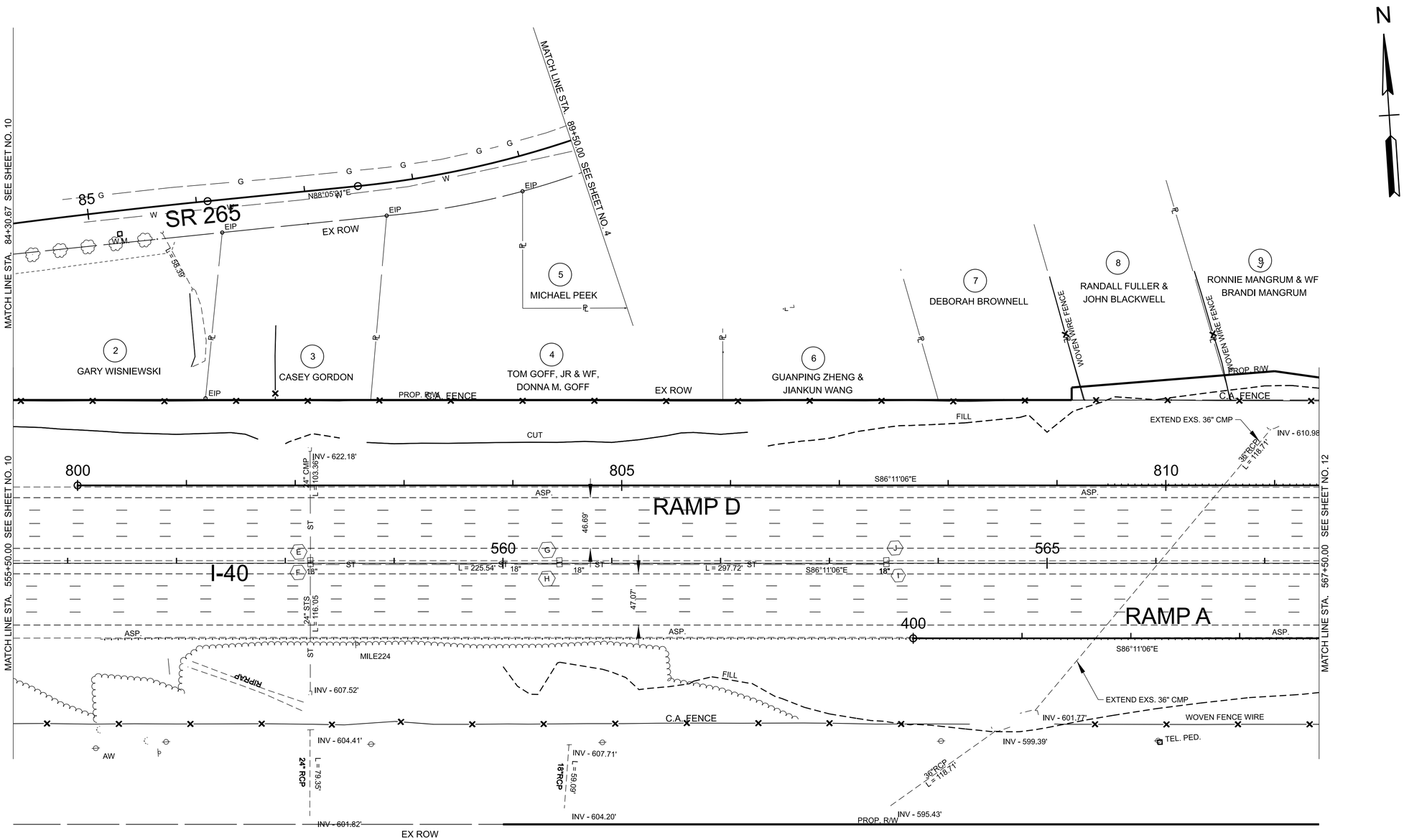
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

EXISTING
PROFILE
I-40
STA. 543+50 TO STA. 555+50

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:26:32 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-EXISTING PROFILE-I40.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 555+00 TO STA. 567+00
SCALE: 1" = 50'

E TOP - 631.06' INV - 615.66' BOT - 615.66'

F TOP - 631.19' INV - 615.64' INV - 615.74' INV - 619.34' BOT - 615.64'

G TOP - 632.95' INV - 627.25' INV - 627.20' BOT - 627.25'

H TOP - 632.99' BOT - 627.59'

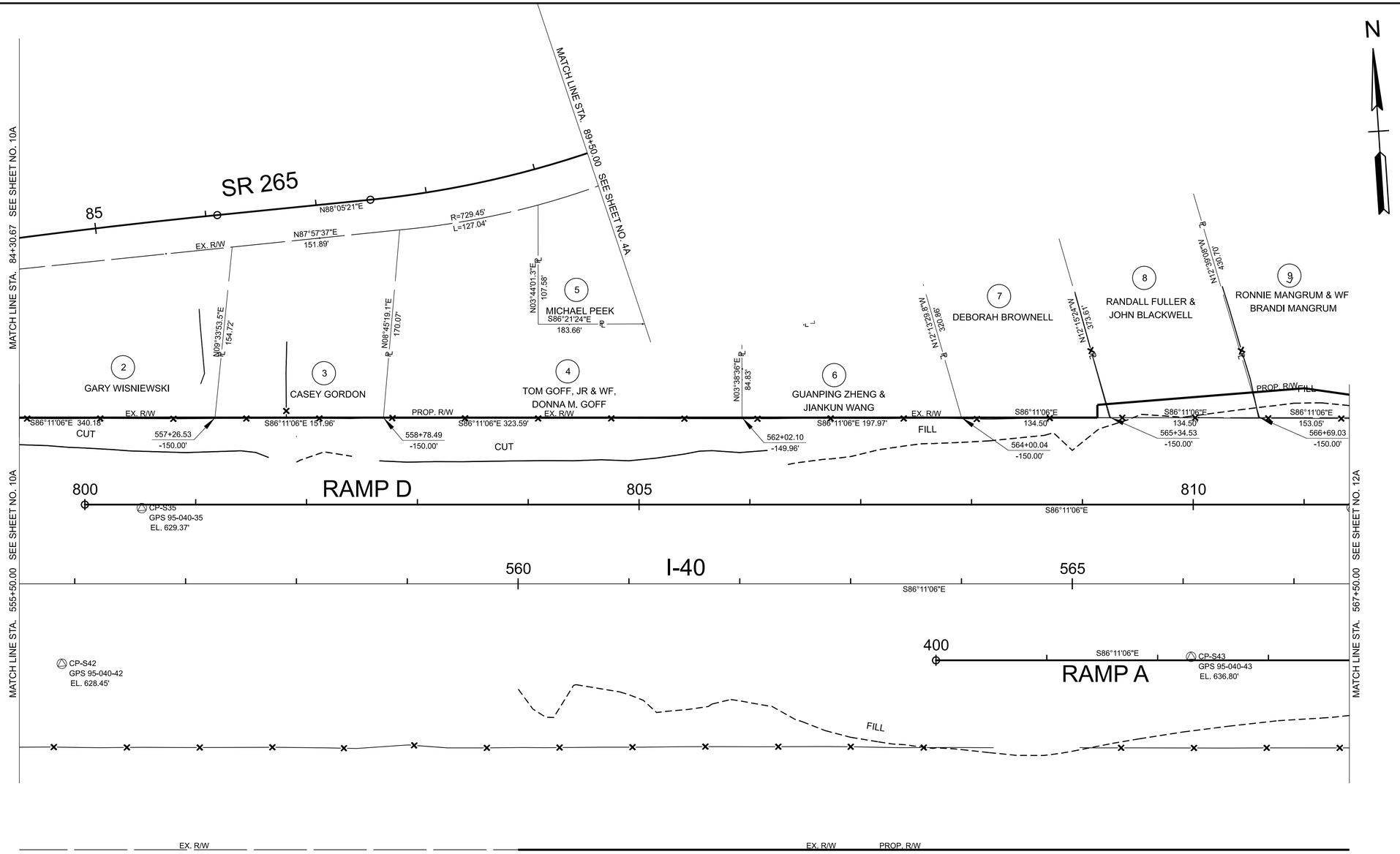
I TOP - 635.42' BOT - 631.12'

J TOP - 635.48' INV - 630.58' BOT - 630.98'

2/4/2023 8:27:02 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

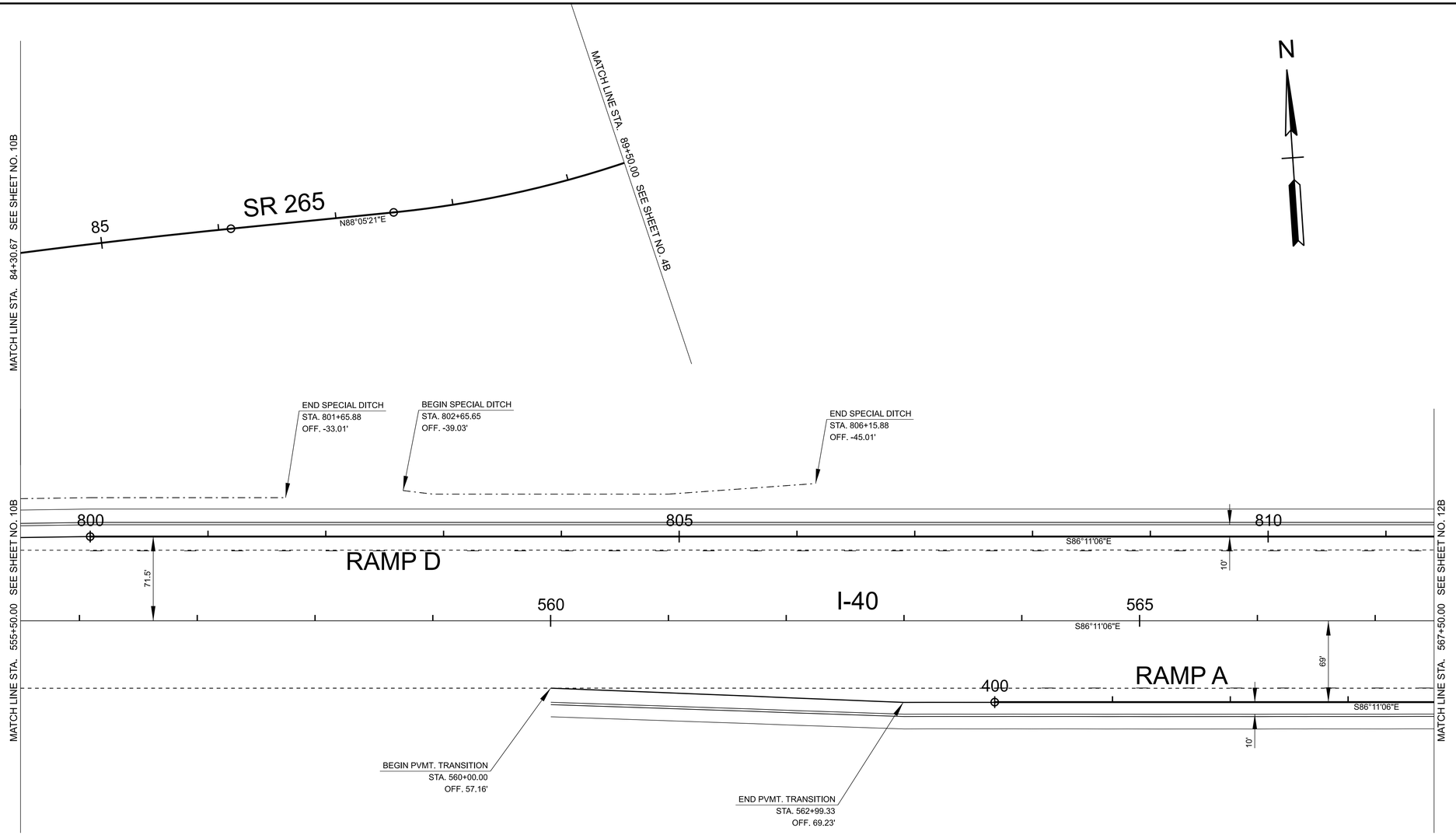
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 555+50 TO STA. 567+50
SCALE: 1" = 50'

2/4/2023 8:27:37 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

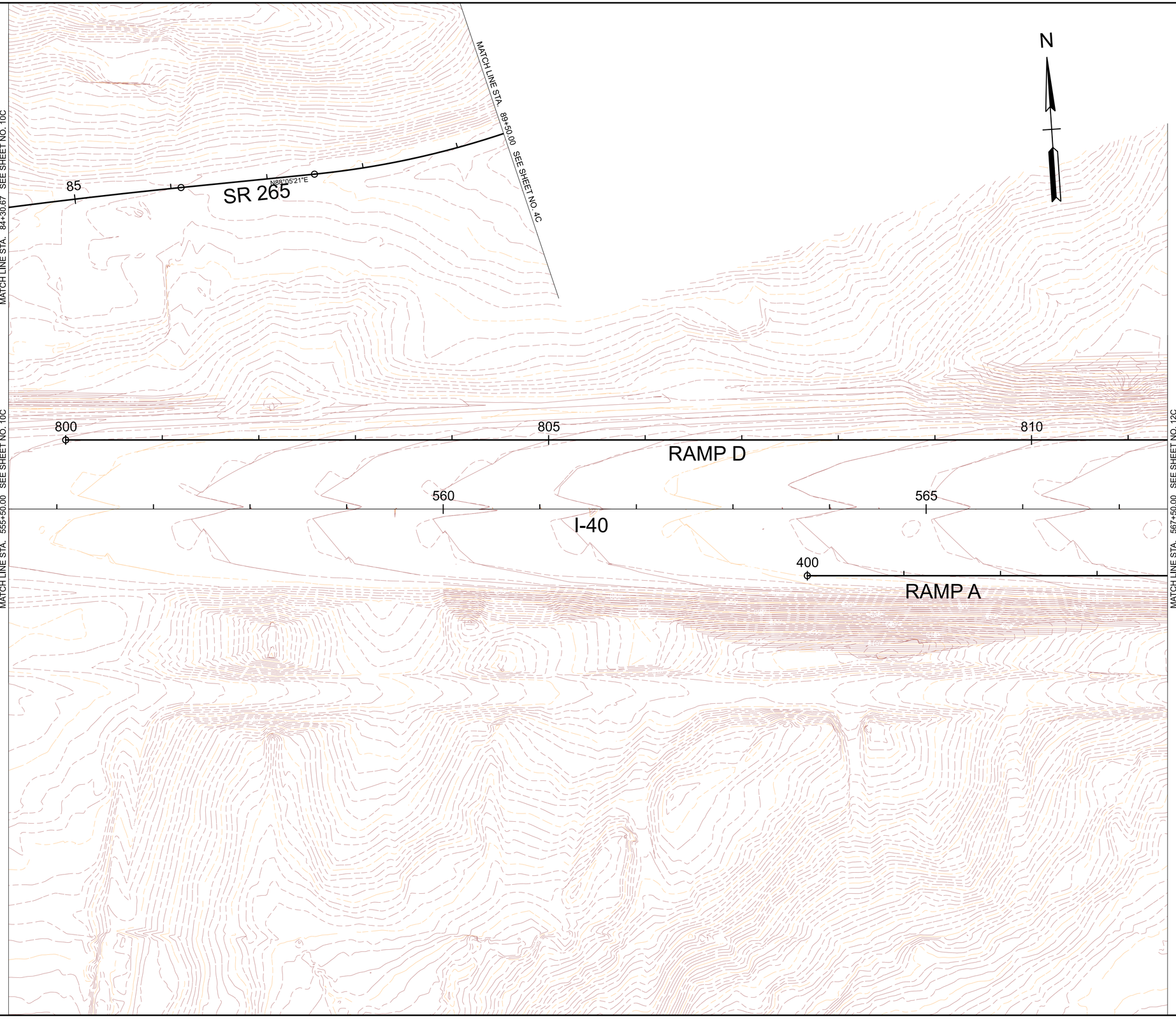
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 555+50 TO STA. 567+50
SCALE: 1" = 50'

2/4/2023 8:28:14 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

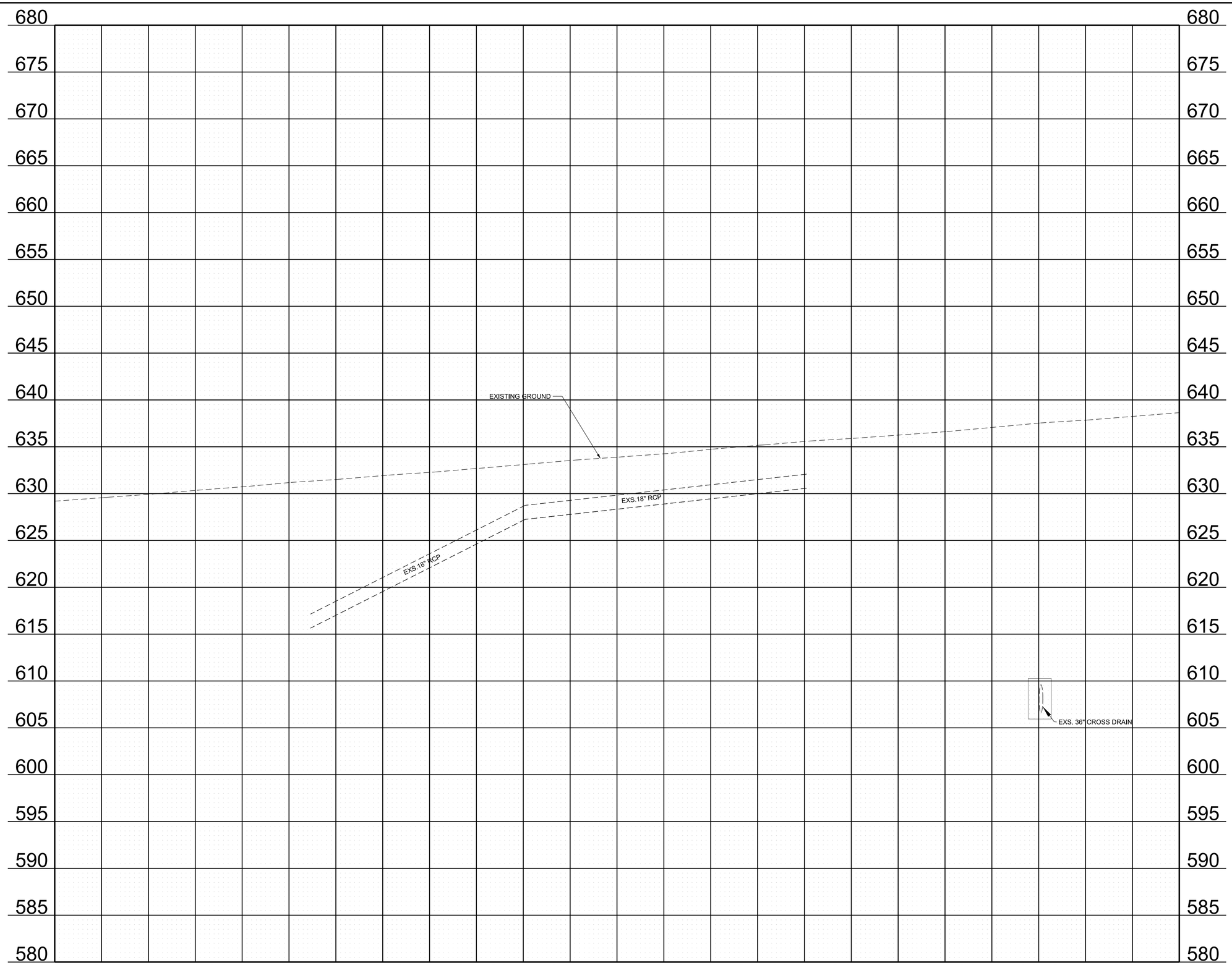
PROPOSED
LAYOUT CONTOURS
I-40

STA. 555+50 TO STA. 567+50
SCALE: 1" = 50'

2/4/2023 8:28:40 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

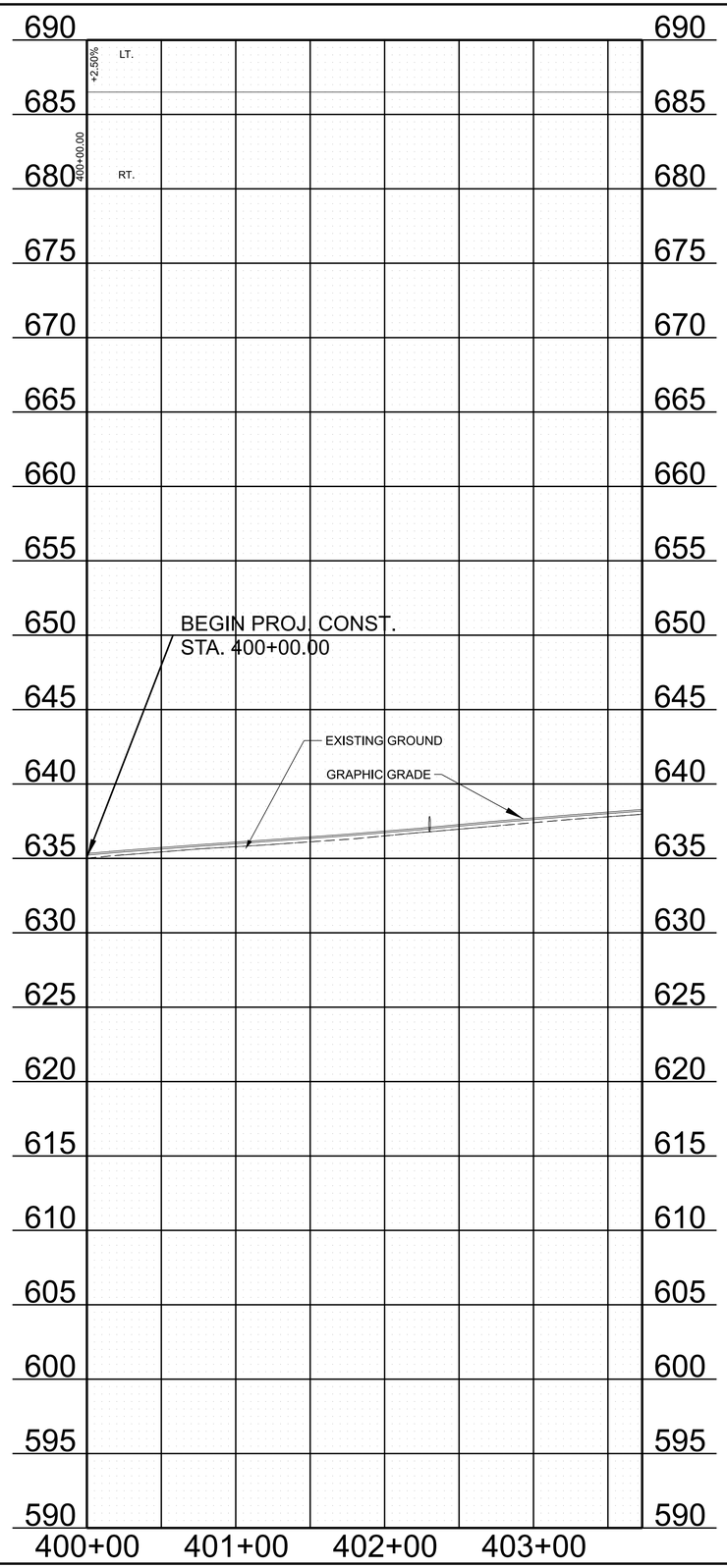
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
I-40
STA. 555+50 TO STA. 567+50

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:29:20 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-EXISTING PROFILE-I40.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11E

INITIAL STUDIES REQUEST

SEALED BY

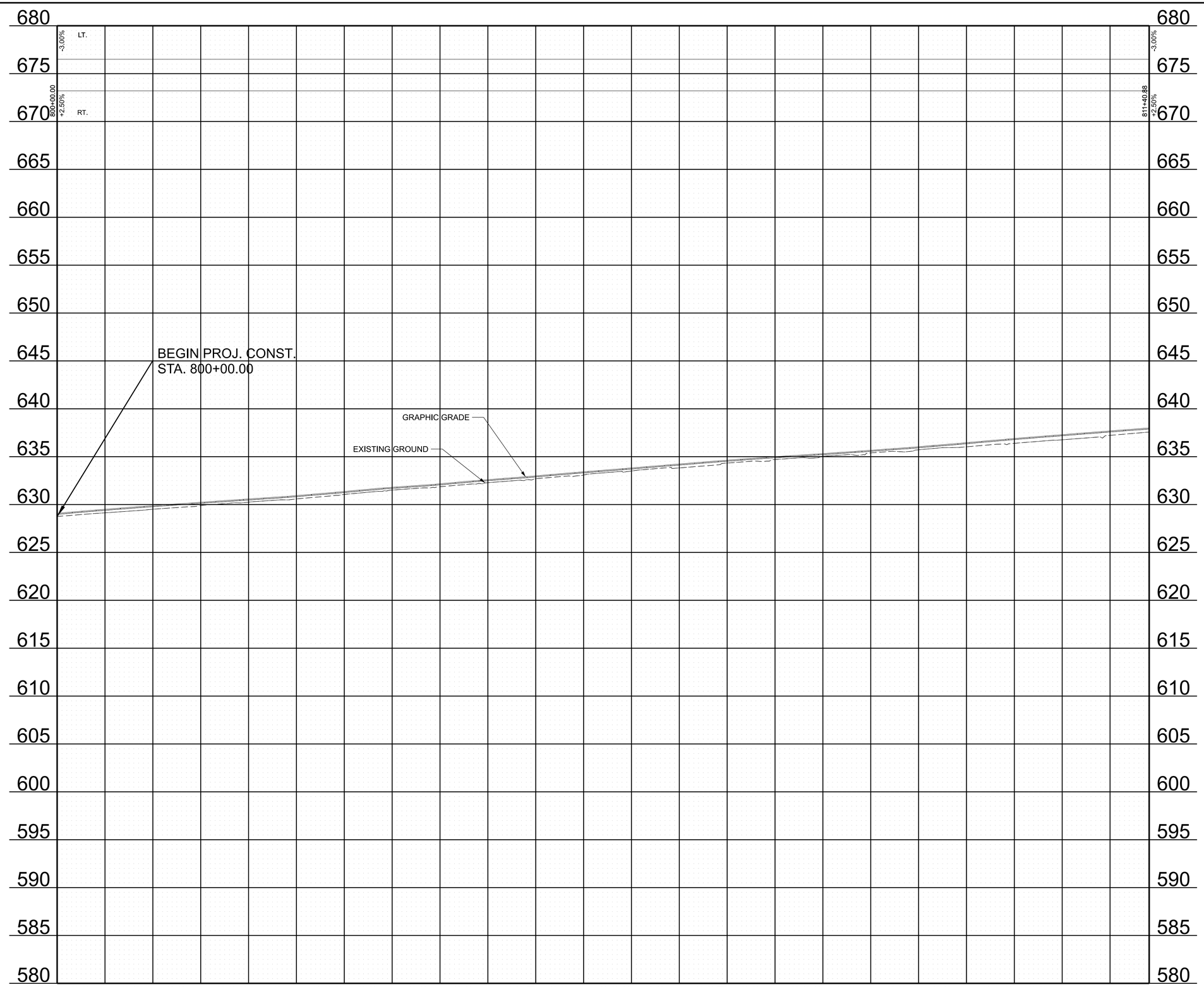
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP A
STA. 400+00 TO STA. 403+73

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:29:40 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11F



INITIAL STUDIES REQUEST

SEALED BY

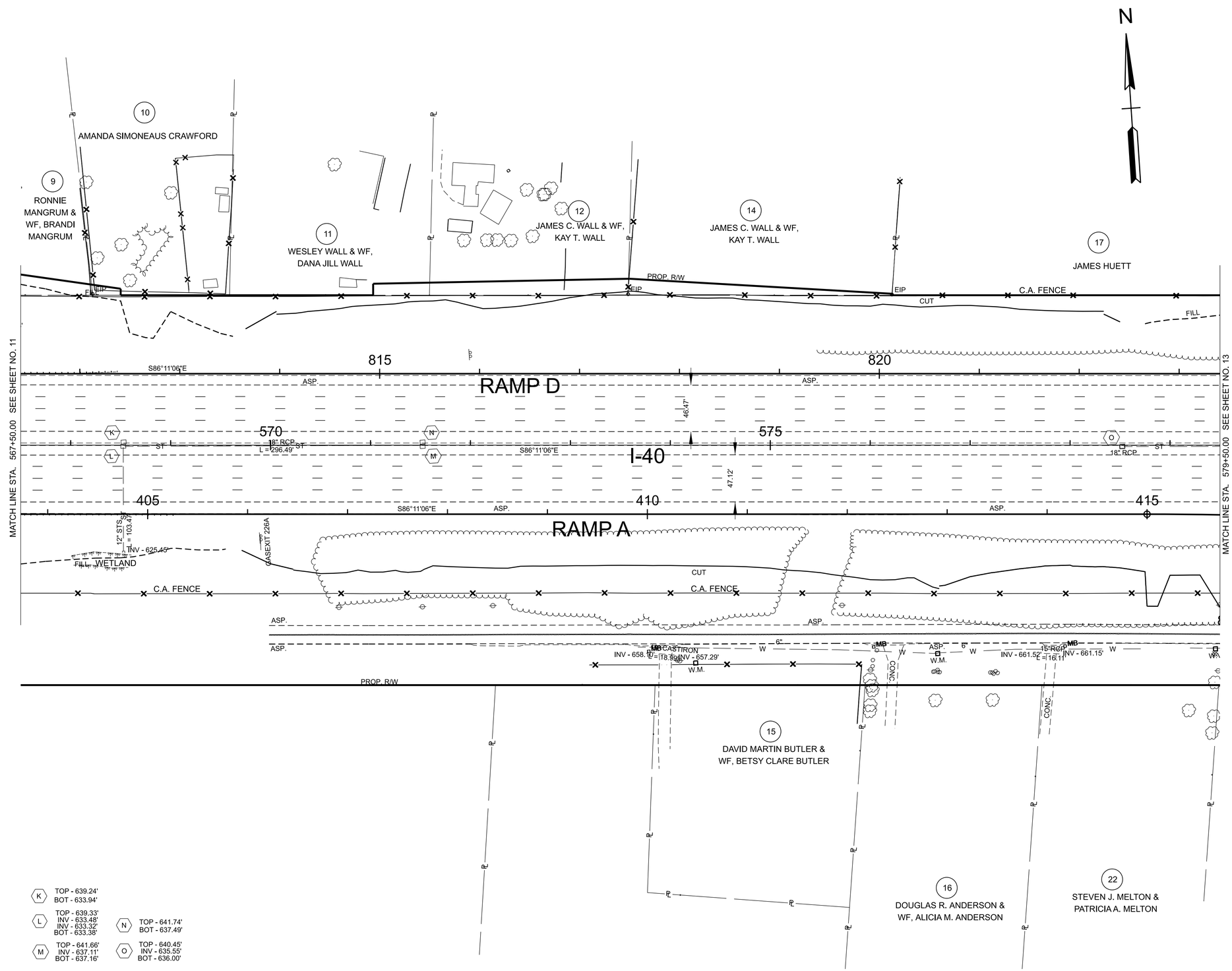
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP D
STA. 800+00 TO STA. 811+41

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:30:00 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

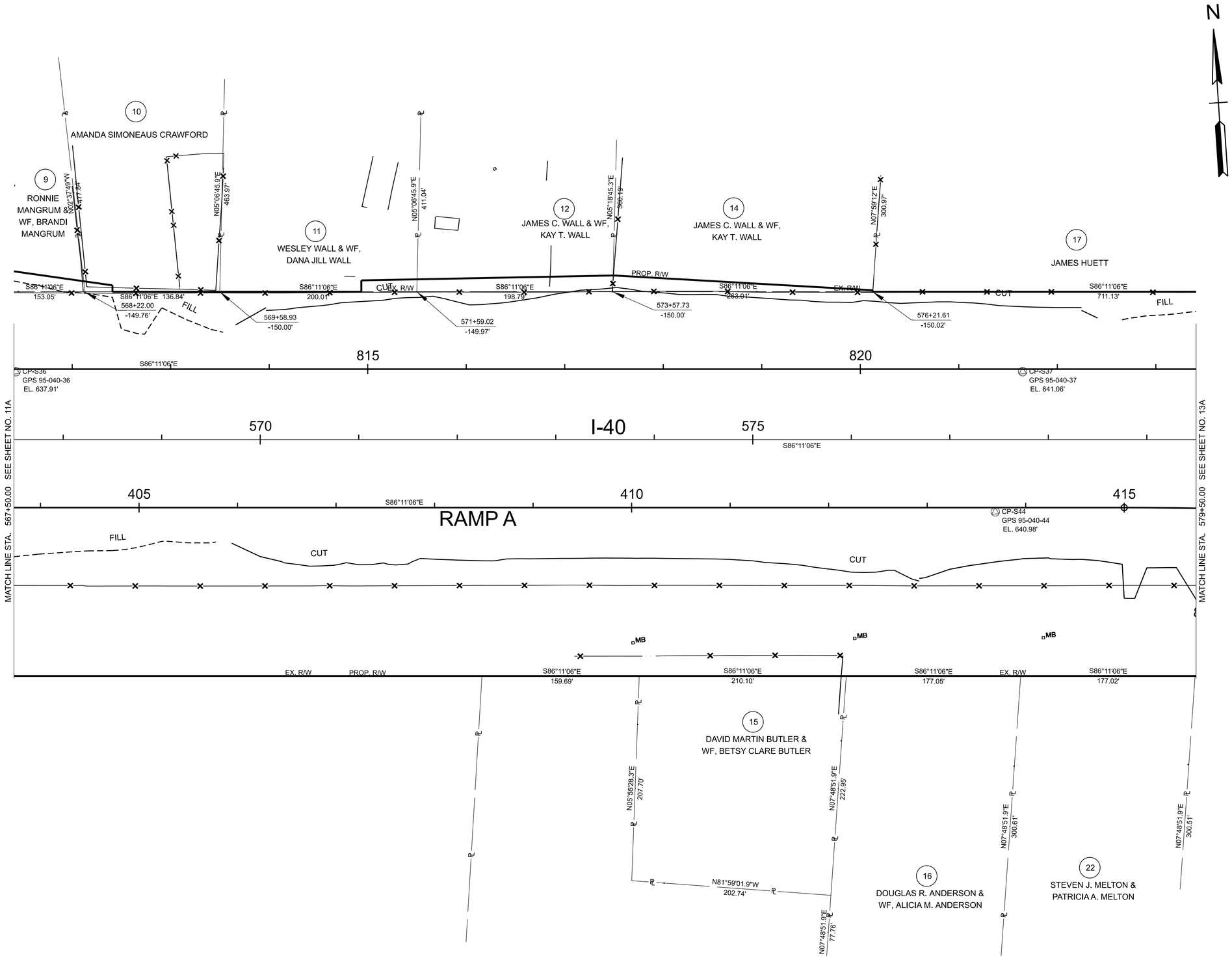
PRESENT LAYOUT
I-40

STA. 403+50 TO STA. 415+50
SCALE: 1" = 50'

2/4/2023 8:30:30 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

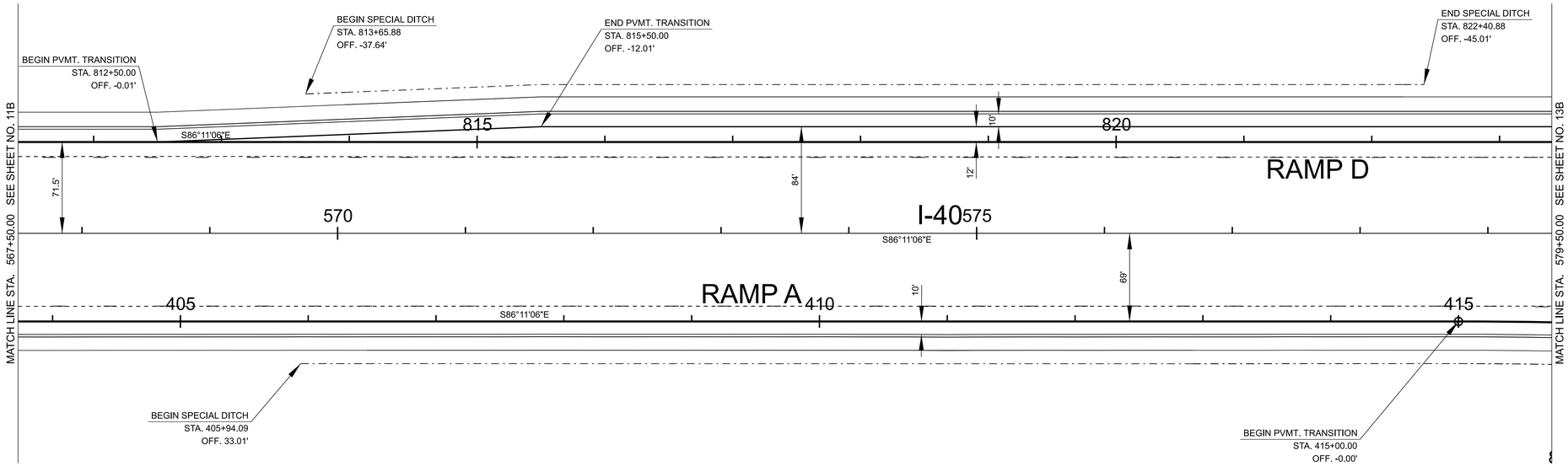
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 567+00 TO STA. 579+50
SCALE: 1" = 50'

2/4/2023 8:31:05 AM
C:\PWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

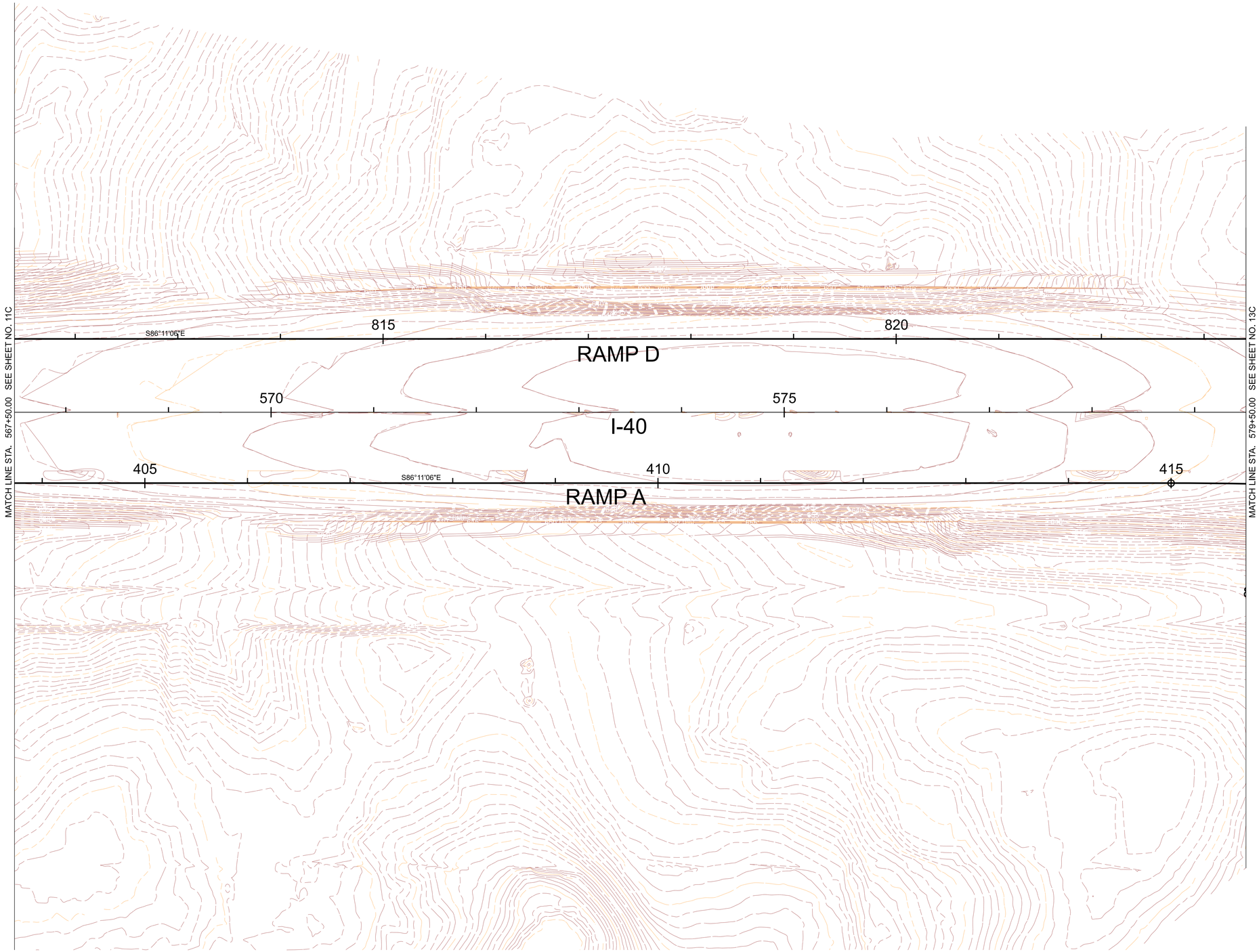
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 567+00 TO STA. 579+00
SCALE: 1" = 50'

2/4/2023 8:31:43 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

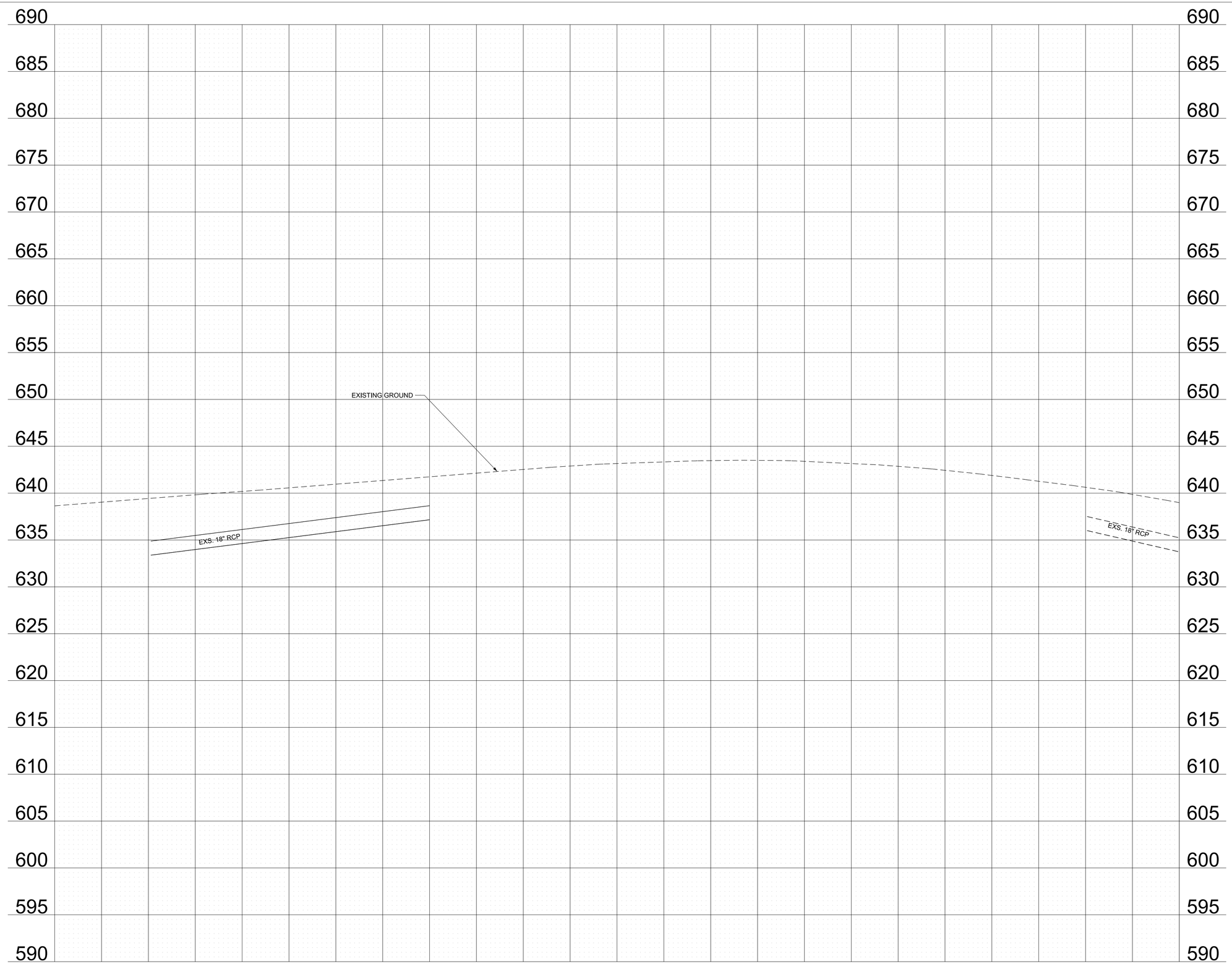
PROPOSED
LAYOUT CONTOURS
I-40

STA. 567+00 TO STA. 579+00
SCALE: 1" = 50'

2/4/2023 8:32:08 AM
C:\PW\WORKING\EAST01\D2328414195I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

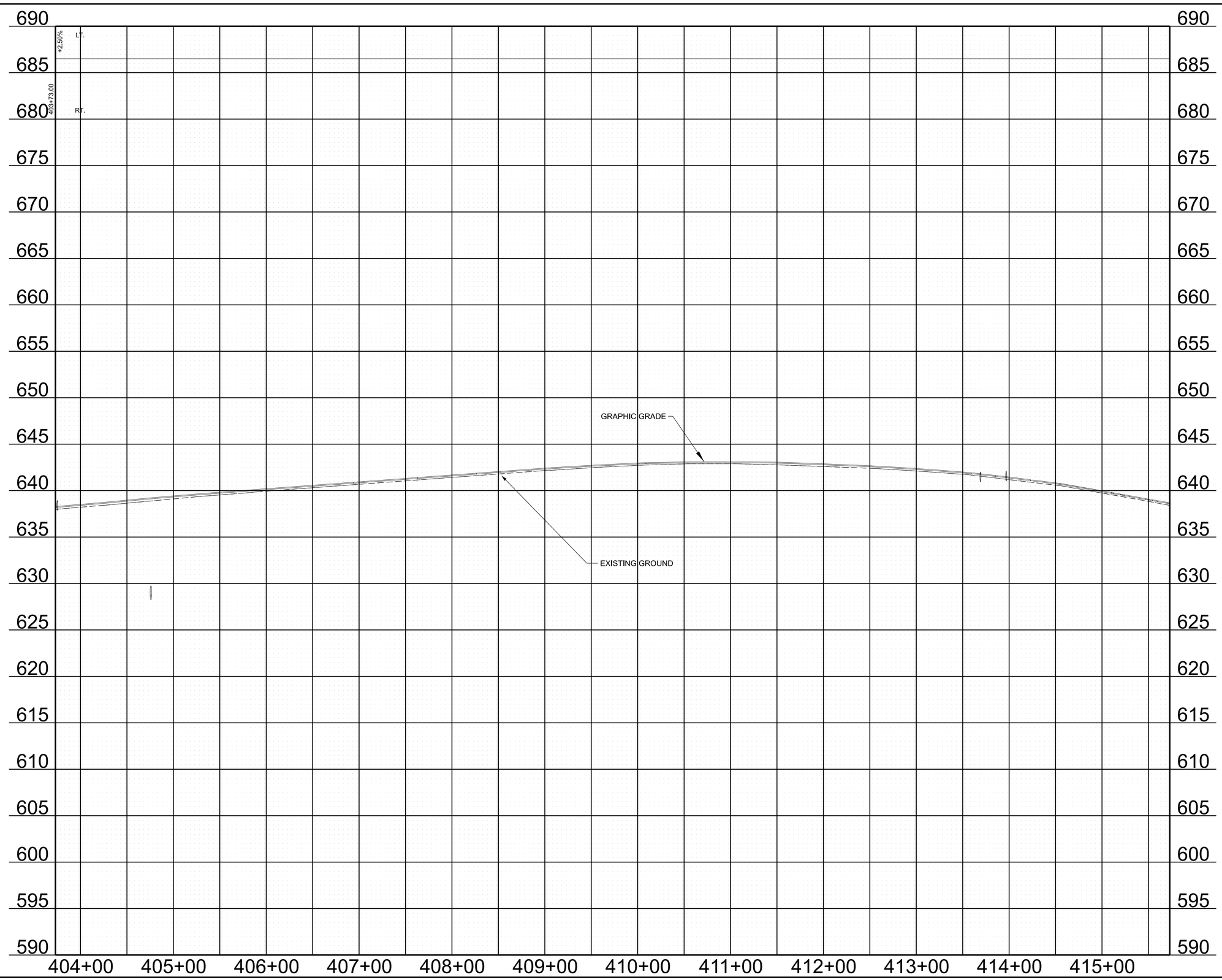
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
I-40
STA. 567+50 TO STA. 579+50

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:32:49 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-EXISTING PROFILE-I40.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12E



INITIAL STUDIES REQUEST

SEALED BY

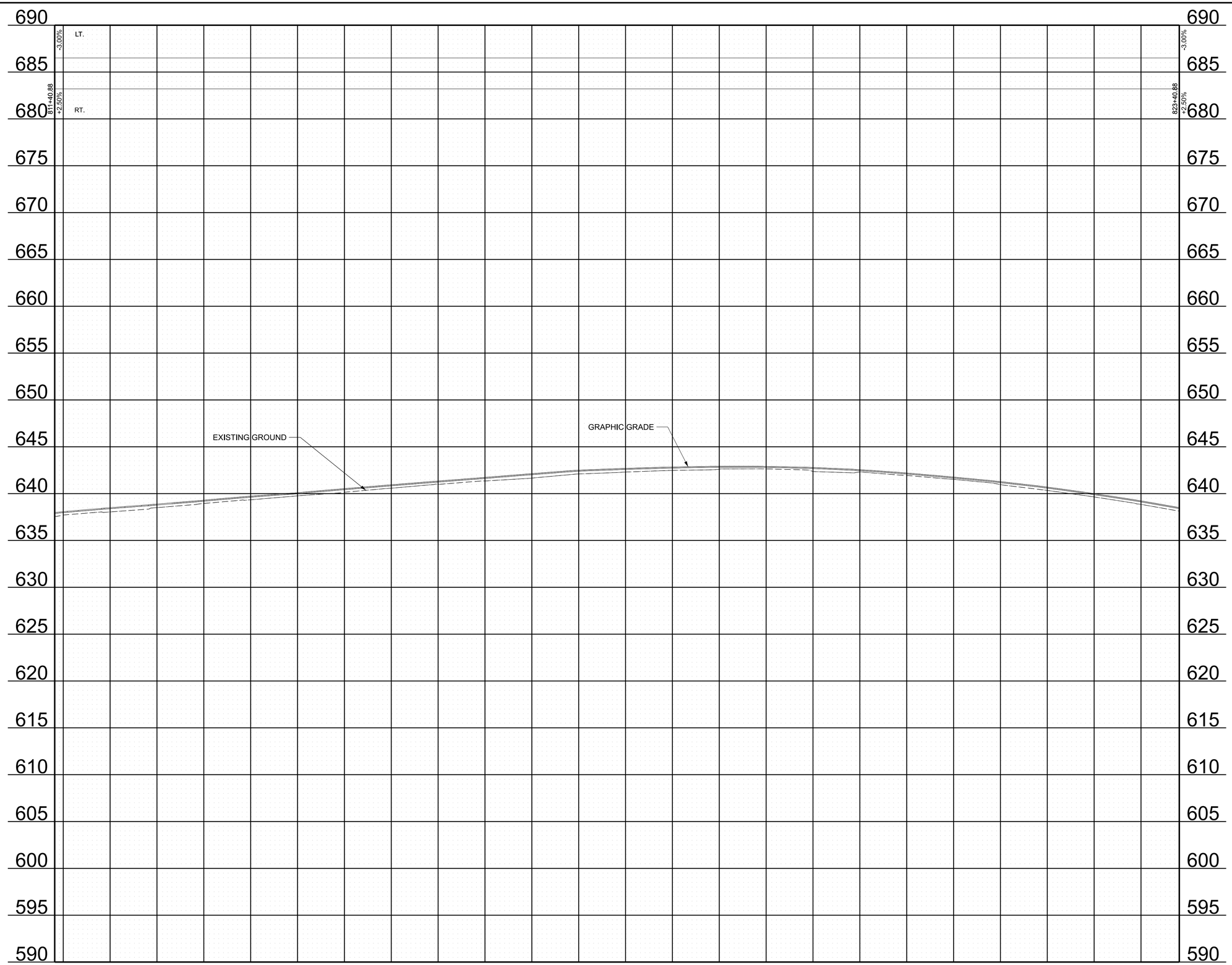
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP A
STA. 403+73 TO STA. 415+73

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:33:09 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12F



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP D
STA. 811+41 TO STA. 823+41

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:33:29 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PREL IM.	2023	NH-I-40-5(150)	13

N

P TOP - 632.11' BOT - 627.56'
R TOP - 622.26' INV - 617.06'
T TOP - 611.18' INV - 605.33' BOT - 605.63'
Q TOP - 631.74' INV - 627.04' INV - 626.44' BOT - 626.74'
S TOP - 623.56' INV - 617.26' BOT - 617.41'
U TOP - 612.66' BOT - 606.01'

17 JAMES HUETT

17 JAMES HUETT

4"WOVEN WOVEN FENCE WIRE FILL

PROP. R/W C.A. FENCE CUT P/T/C

4"WOVEN WOVEN FENCE WIRE

WOVEN FENCE WIRE 4"WOVEN

PROP. R/W FILL

MATCH LINE STA. 833+25.00 SEE SHEET NO. 6

BOARD

180

825 830

ASP. RAMP D P/T/C G

CONC. DITCH INV - 614.57' FILL

ASP.

580 585 590

L = 397.90' S1 S86°11'06"E 18" JERSEY BARRIER WALL 18" L = 322.27' ST

ST L = 112.07' 18" 18" ST L = 322.27' ST

I-40

46.64' 46.91'

ASP. ASP.

MATCH LINE STA. 579+50.00 SEE SHEET NO. 12

MATCH LINE STA. 591+50.00 SEE SHEET NO. 6

6" G 420

CUT C.A. FENCE FILL

RAMP A

300 S86°09'02"E

6" W W.M. L = 20.05' 12"CMP L = 20.13' MB MB ASP. W

T (UG) ASP. T (UG) TEL. PED TEL. PED T (UG) T (UG) ASP.

PT/C PROP. R/W W W.V. G.V. GAS PIPE LINE 805 G W G 6" W W G 6" W W G

425 S72°50'39"E 2.36'

JOHN HAGAR RD EX ROW PROP. R/W ASP. ASP. EX ROW

23 RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY

24 RAYMOND E. DAVIS, JR & WF, PAMELA ANN DAVIS

P/T/C 35 MPH GUILL RD W 4' BARRIER E

FILL N19°54'10"E CUT PROP. R/W

ROWSTAKE 4"WOVEN

BEGIN PROJ. CONST. STA. 801+75.00

18" MAGNOLIA CONC. 2SB CLEANOUT 44" SWEETGUM ASP.

30" SWEETGUM AC 34" SWEETGUM

42" TULIP POPLAR

GUILL RD ×15

CONST. ESMT. CONST. ESMT.

25 MELVIN W. NELSON & WF, GENELLE NELSON

16" HACK

25 MELVIN W. NELSON & WF, GENELLE NELSON FILL

MATCH LINE STA. 14+00.00 SEE SHEET NO. 18

MATCH LINE STA. 808+50.00 SEE SHEET NO. 16

MATCH LINE STA. 428+00.00 SEE SHEET NO. 7

STA. 16+61.84 GUILL RD=
STA. 804+84.43 JOHN HAGAR RD
N 667769.5407 E 1810735.8757

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

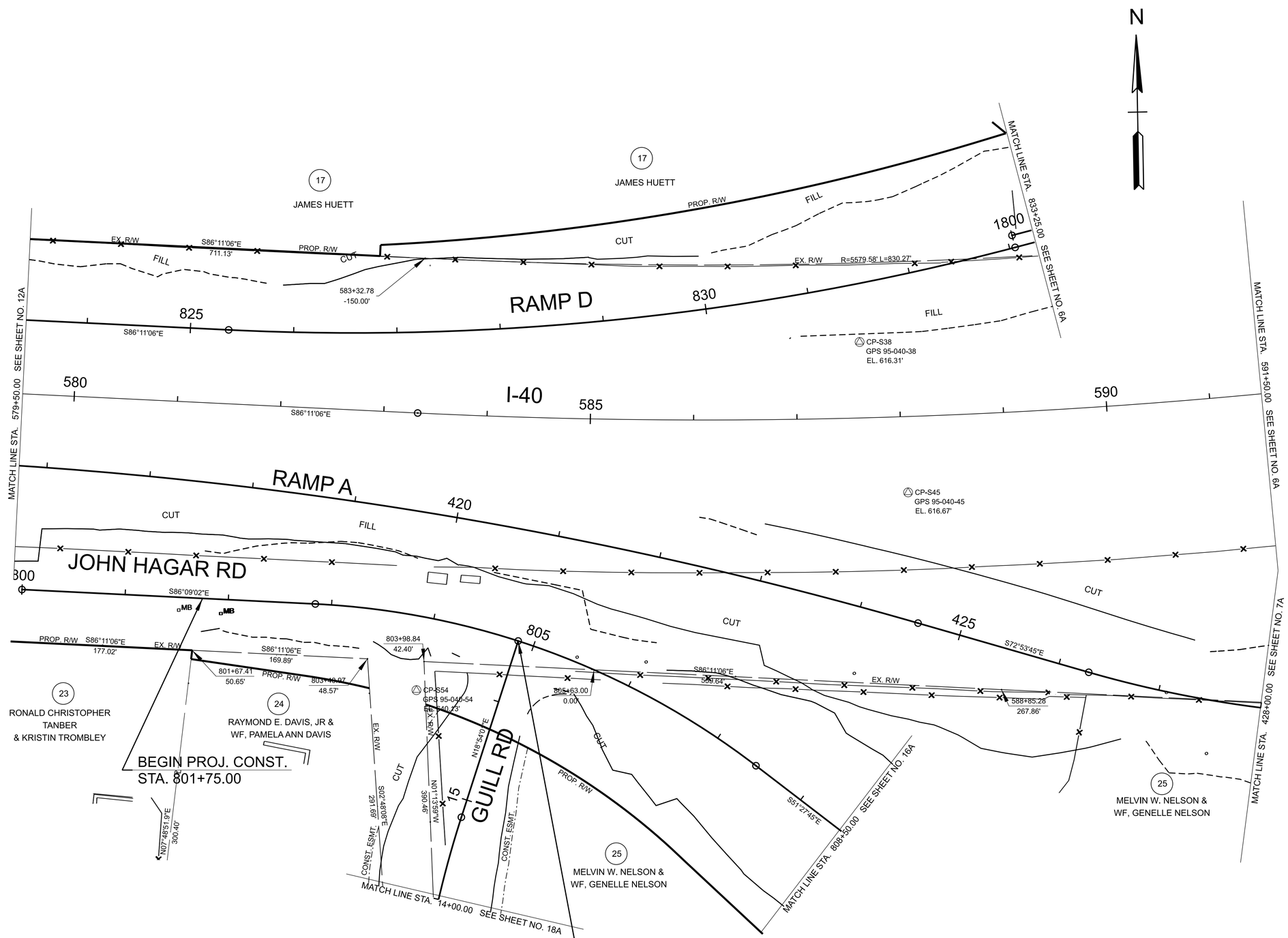
PRESENT LAYOUT
I-40

STA. 579+50 TO STA. 591+50
SCALE: 1" = 50'

2/4/2023 8:33:59 AM
C:\PW\WORKINGIEAST01\D2328414\951040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

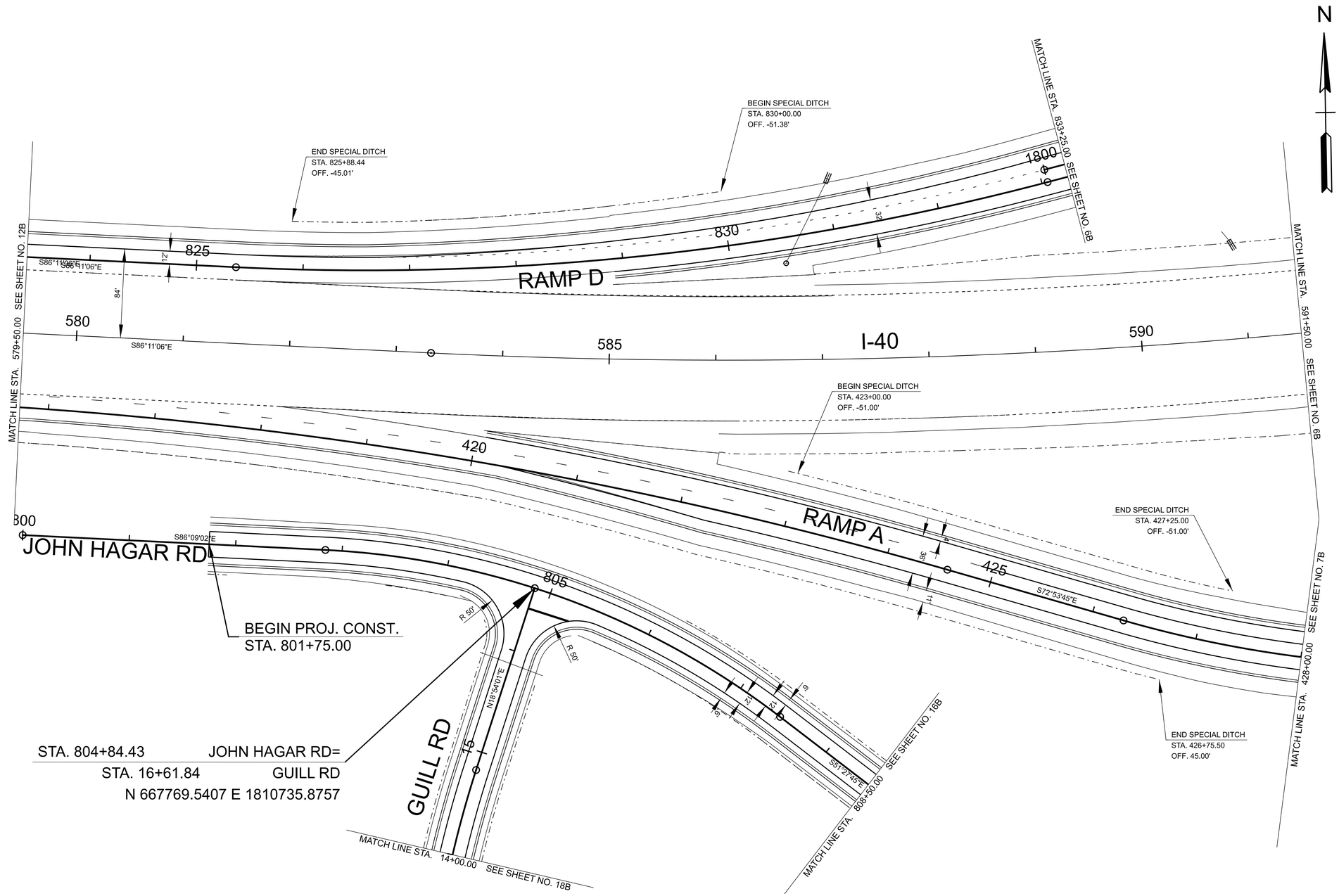
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 579+50 TO STA. 591+00
SCALE: 1" = 50'

2/4/2023 8:34:35 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

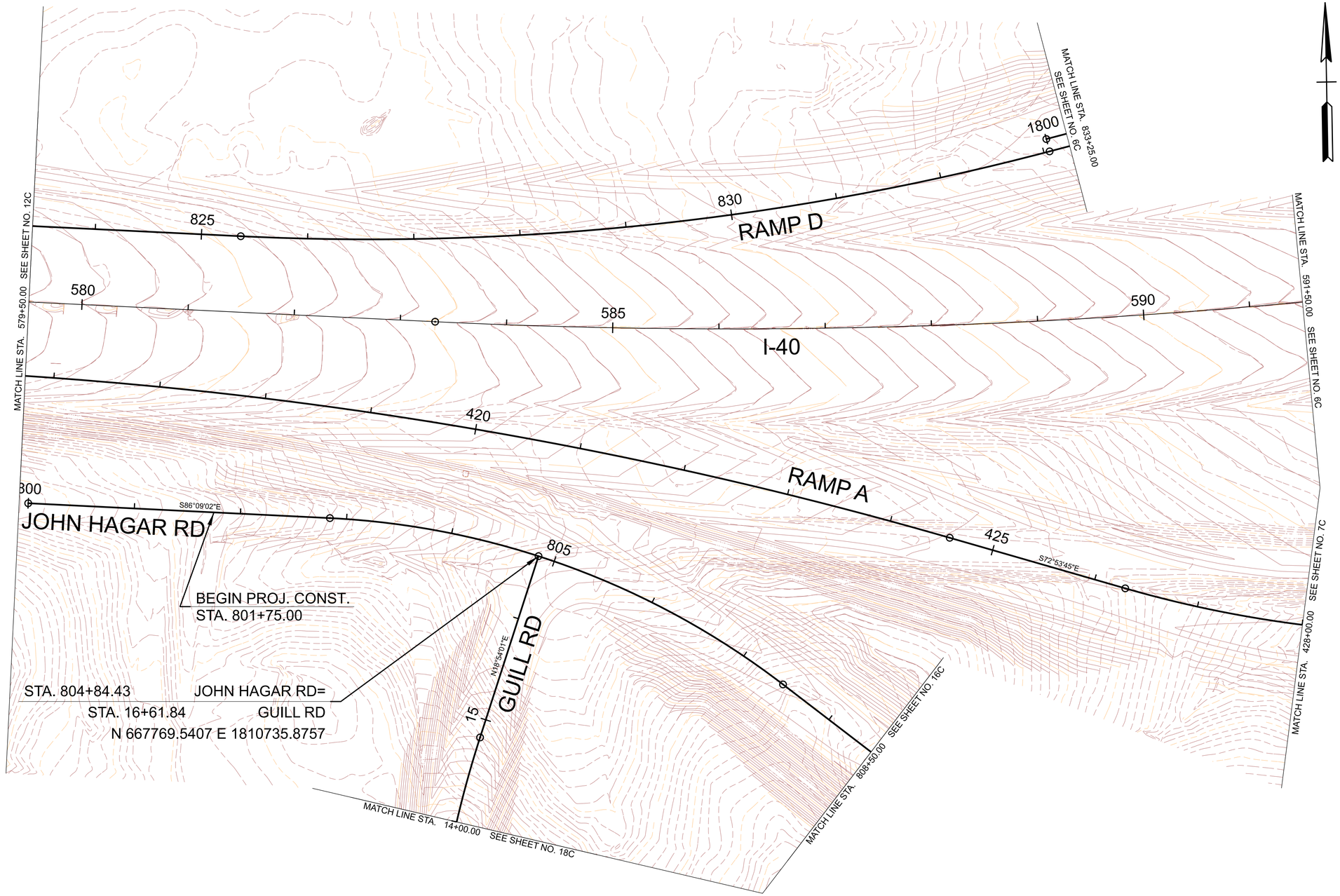
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 579+50 TO STA. 591+50
1" = 50'

2/4/2023 8:35:13 AM
C:\PWWORKING\EAST\01D2328414195\040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

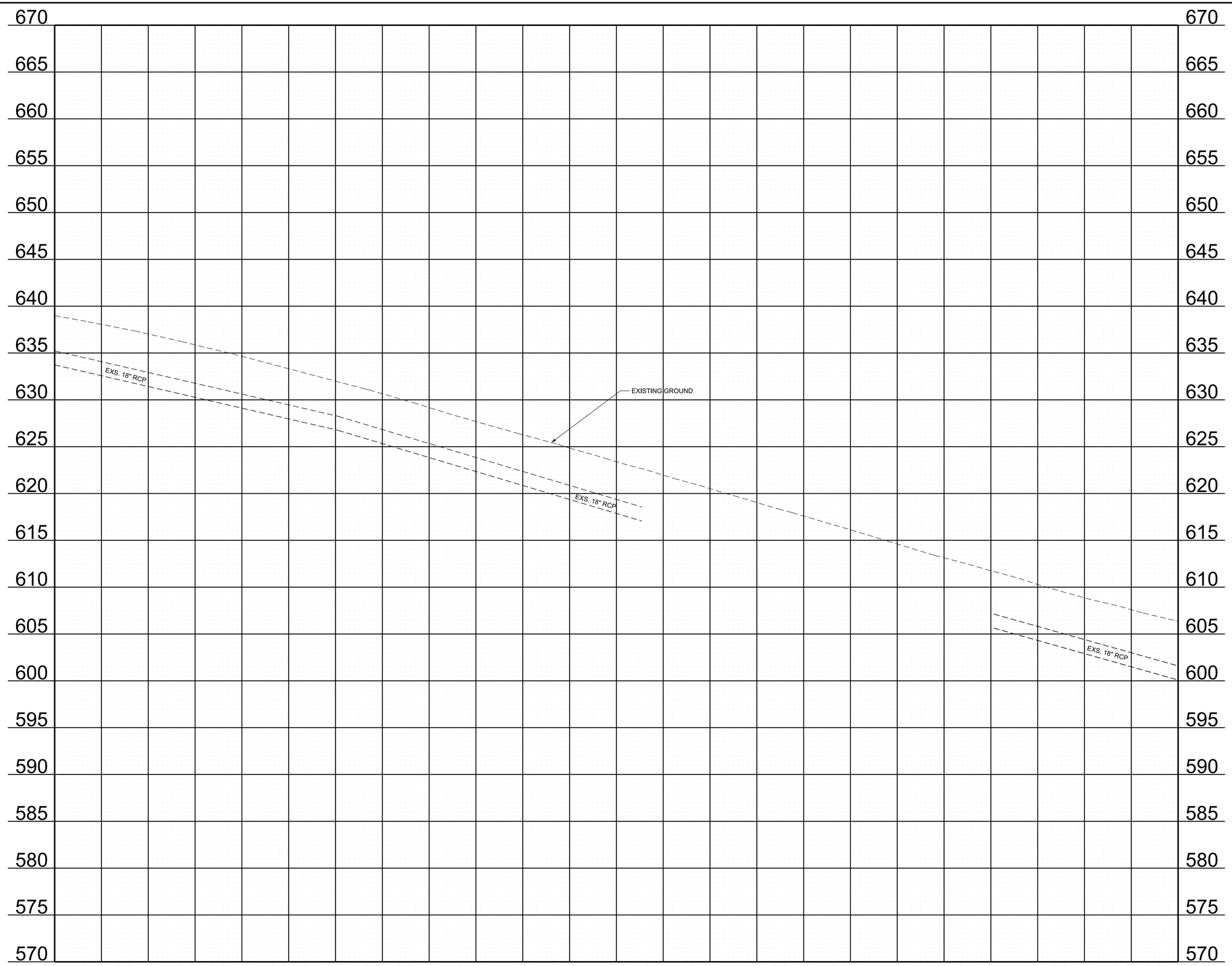
COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
I-40

STA. 579+50 TO STA. 591+50
1" = 50'

2/4/2023 8:35:39 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13D

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

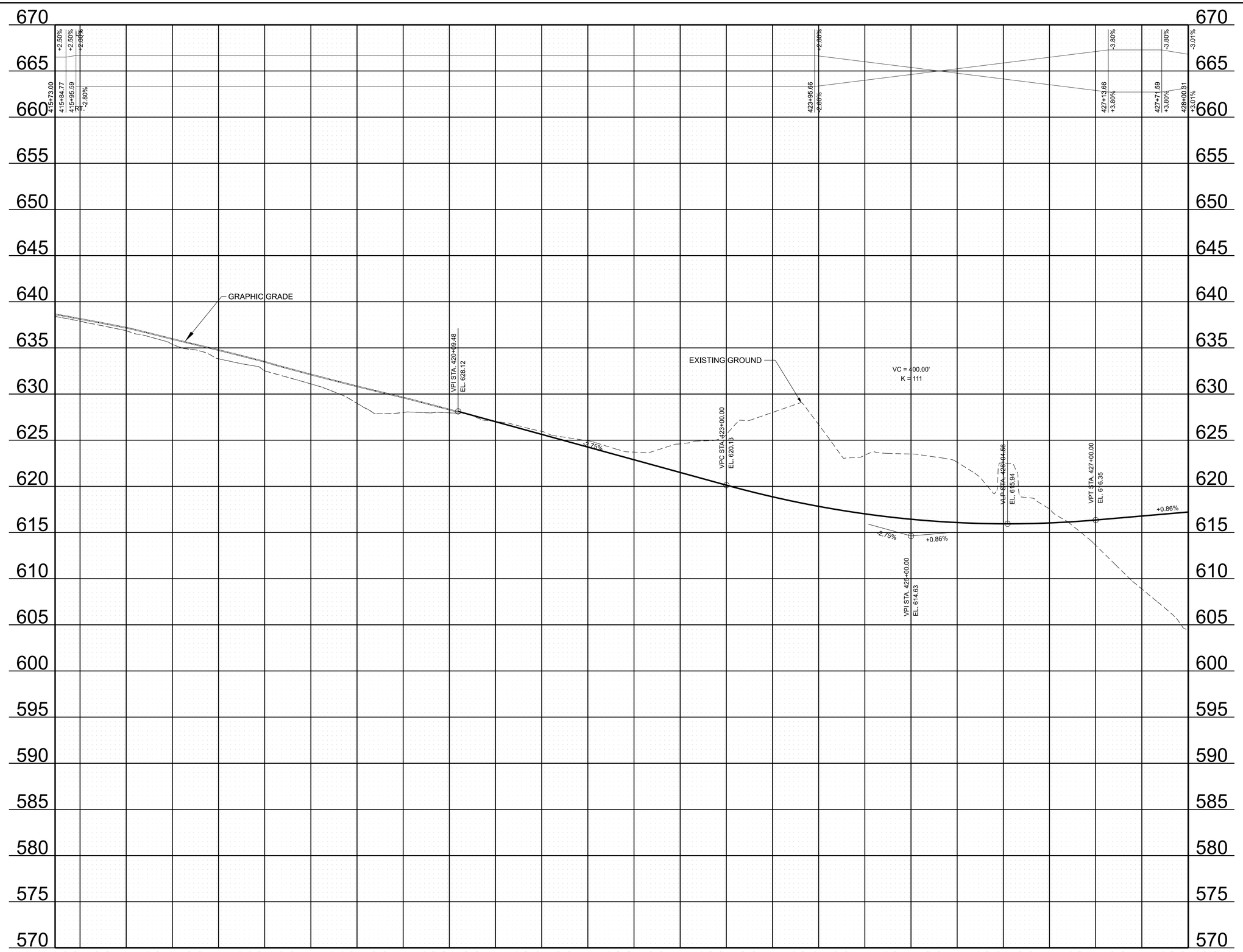
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
PROFILE
I-40
STA. 579+50 TO STA. 591+50

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:36:21 AM
C:\PWWORKING\EAST\T1\D2328414\95I040-SHT-EXISTING PROFILE-I40.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13E



INITIAL STUDIES REQUEST

SEALED BY

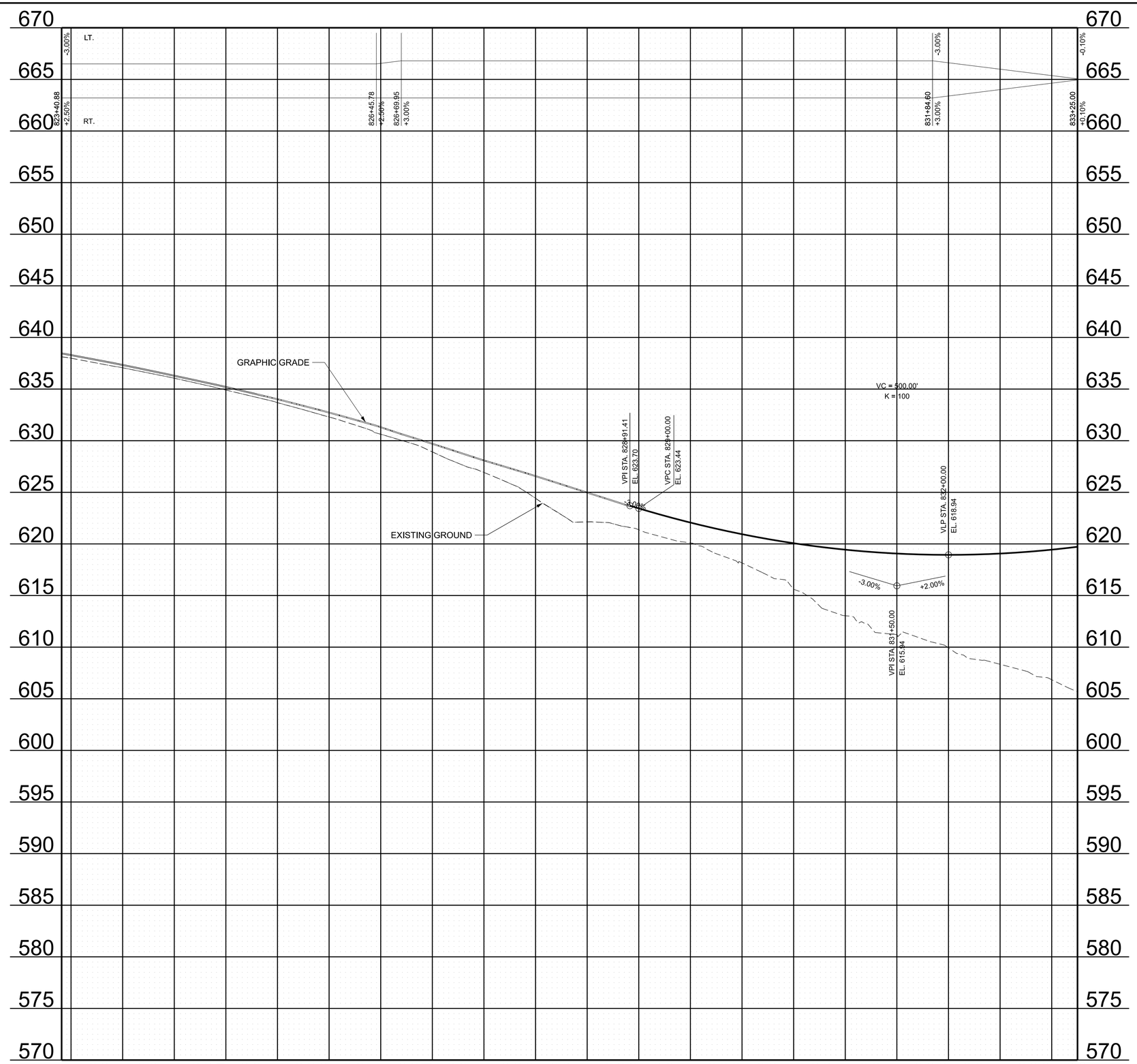
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP A
STA. 415+73 TO STA. 428+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:36:45 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13F



INITIAL STUDIES REQUEST

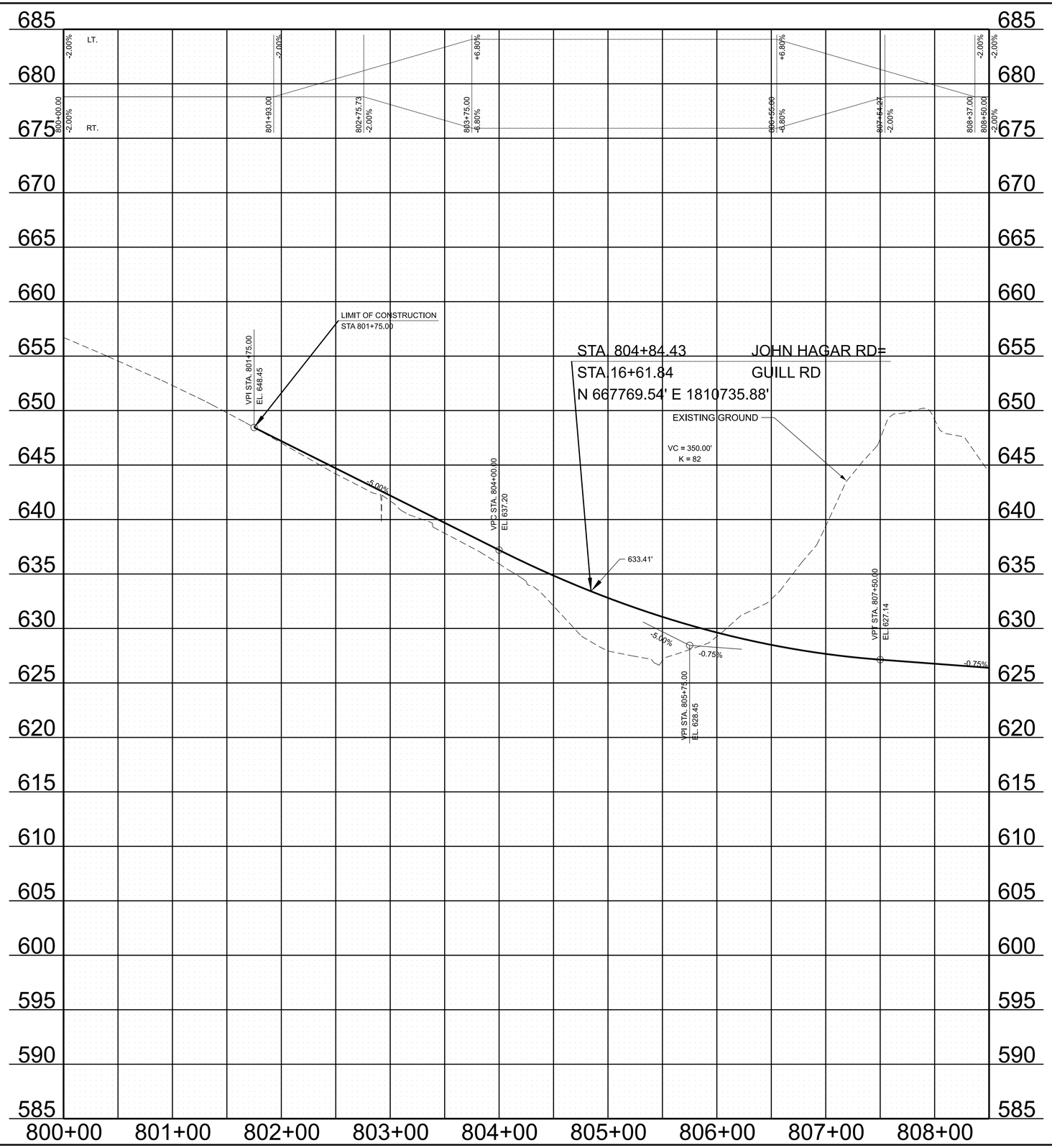
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP D
STA. 823+41 TO STA. 833+25

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:37:04 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-RAMP D.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13G

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

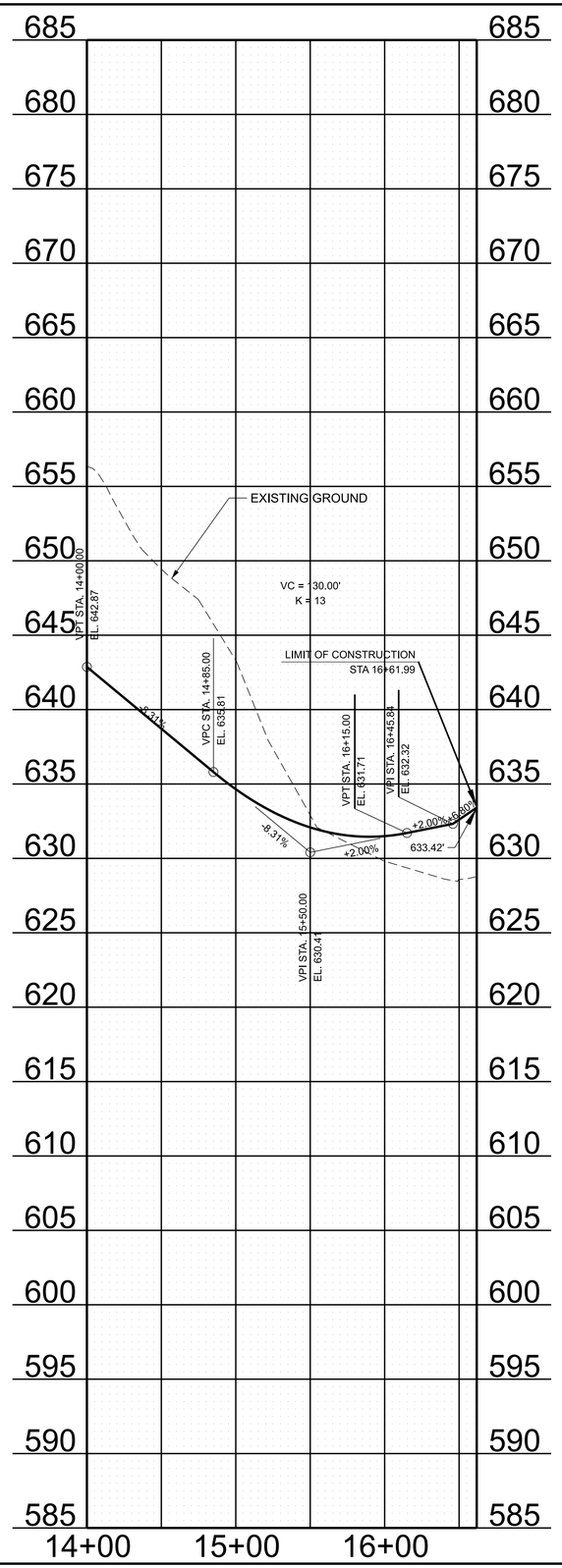
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
JOHN HAGAR RD
STA. 800+00 TO STA. 808+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:37:32 AM
C:\PWWORKING\EAST\01D232841419\I040-SHT-PROPOSED PROFILE-JOHN HAGAR RD.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13H

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

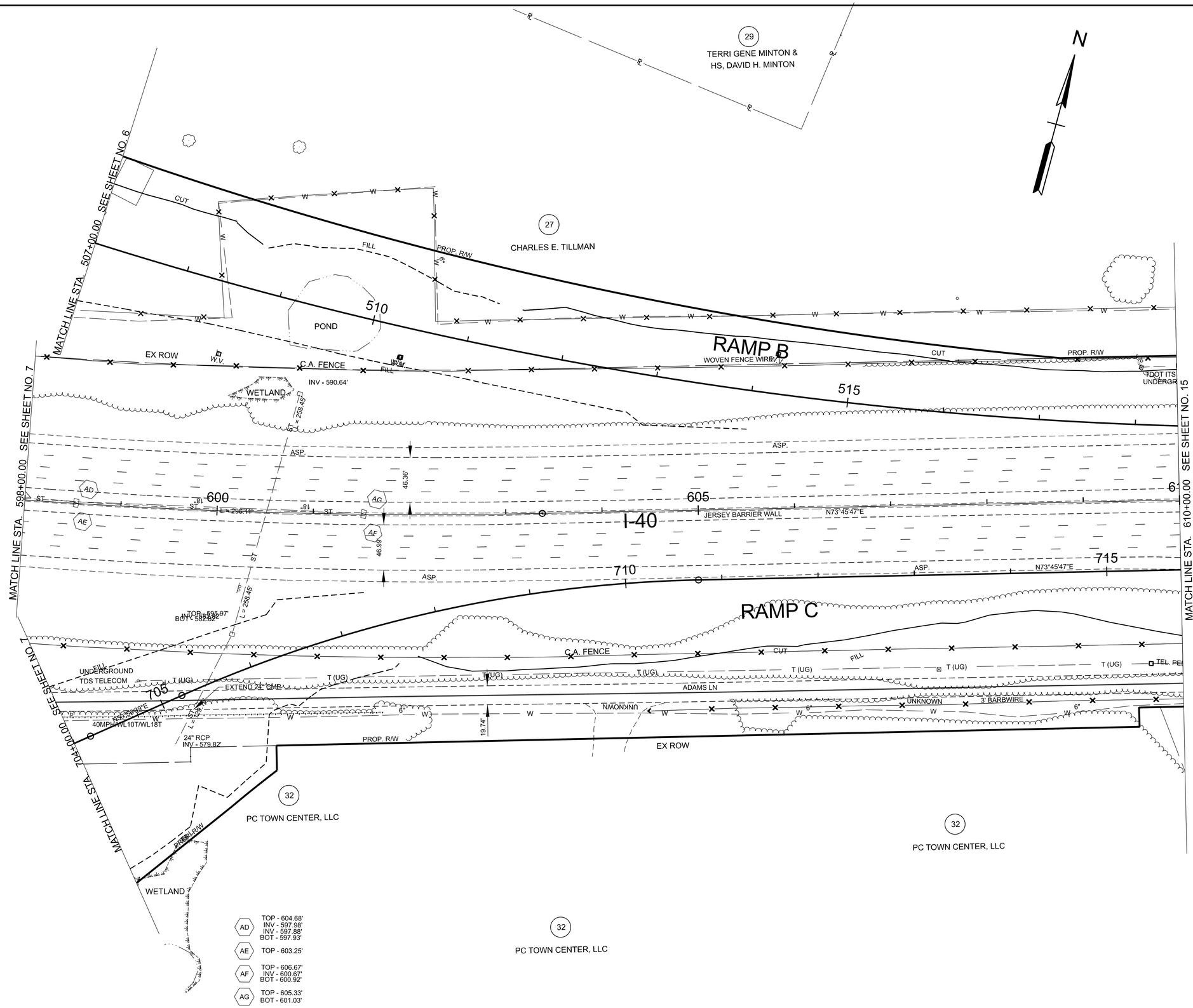
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
GUILL RD
STA. 14+00 TO STA. 16+62

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:37:51 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-GUILL RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:22 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14A

REV. ***DATE***
TEXT

N

29
TERRI GENE MINTON &
HS, DAVID H. MINTON

N62°27'04"W
814.59'

S07°34'06"W
266.99'

27
CHARLES E. TILLMAN

MATCH LINE STA. 507+00.00 SEE SHEET NO. 6A

CUT
FILL
PROP. R/W
RAMP B
510
515
EX. R/W
N73°45'44"E
786.25'
603+37.97
-150.00'

CP-S40
GPS 95-040-40
EL. 603.66'

MATCH LINE STA. 598+00.00 SEE SHEET NO. 7A

600
605
I-40
N73°45'47"E
610+00.00 SEE SHEET NO. 15A

710
715
RAMP C
CP-S47
GPS 95-040-47
EL. 606.90'

MATCH LINE STA. 704+00.00 SEE SHEET NO. 7A

CP-S58
GPS 95-040-58
EL. 600.54'
N50°56'39"E
705

599+82.59
246.99'
599+83.40
261.97'
N15°55'32"W
15.00'

CP-S59
GPS 95-040-59
EL. 615.26'
N73°42'45"E
986.19'

N74°42'48"E
22.14'
609+75.64
215.00'
609+53.51
214.63'
N16°46'57"W
20.00'
609+53.70
234.63'
N36°08'58"W
548.45'

32
PC TOWN CENTER, LLC

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

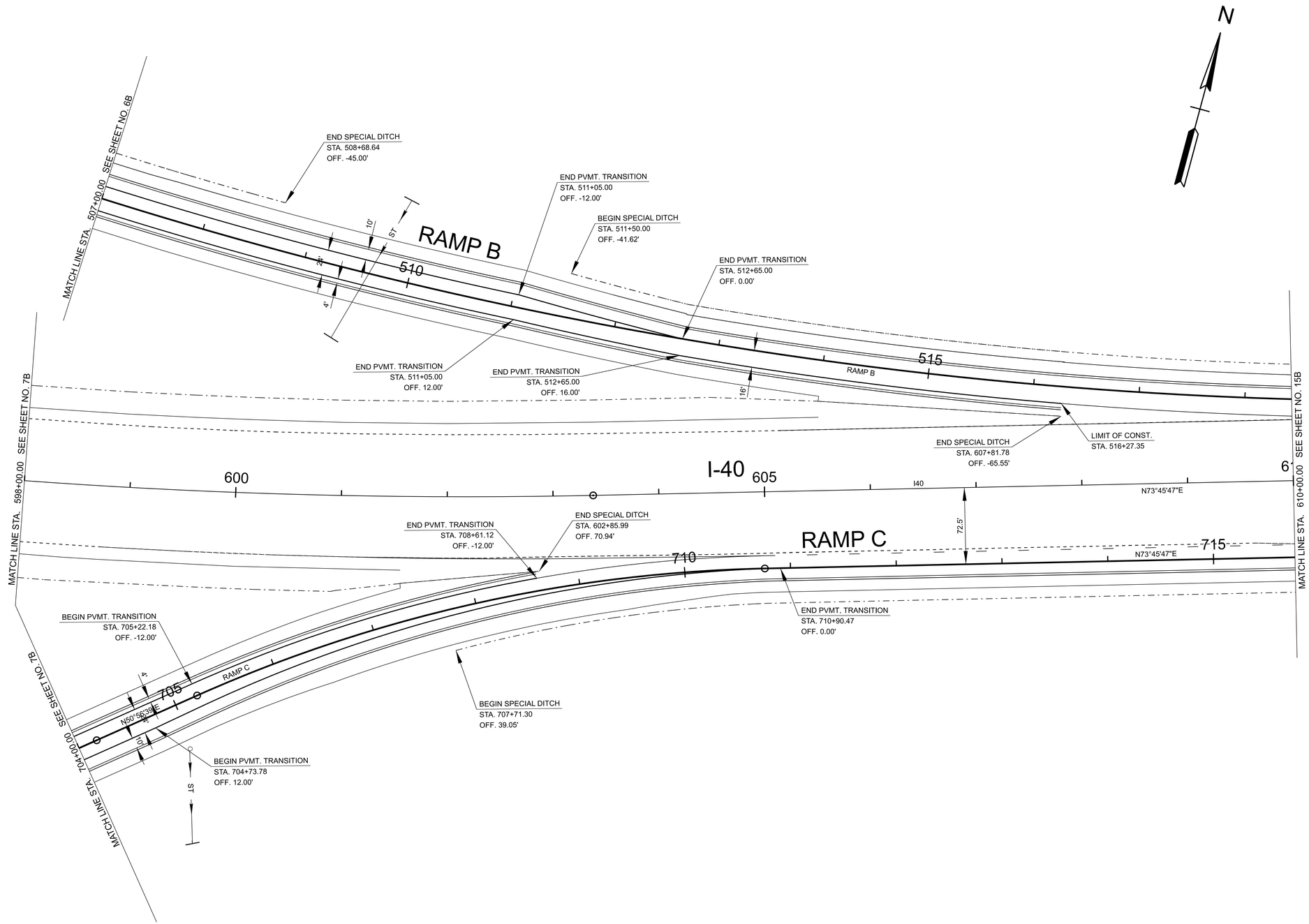
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:57 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

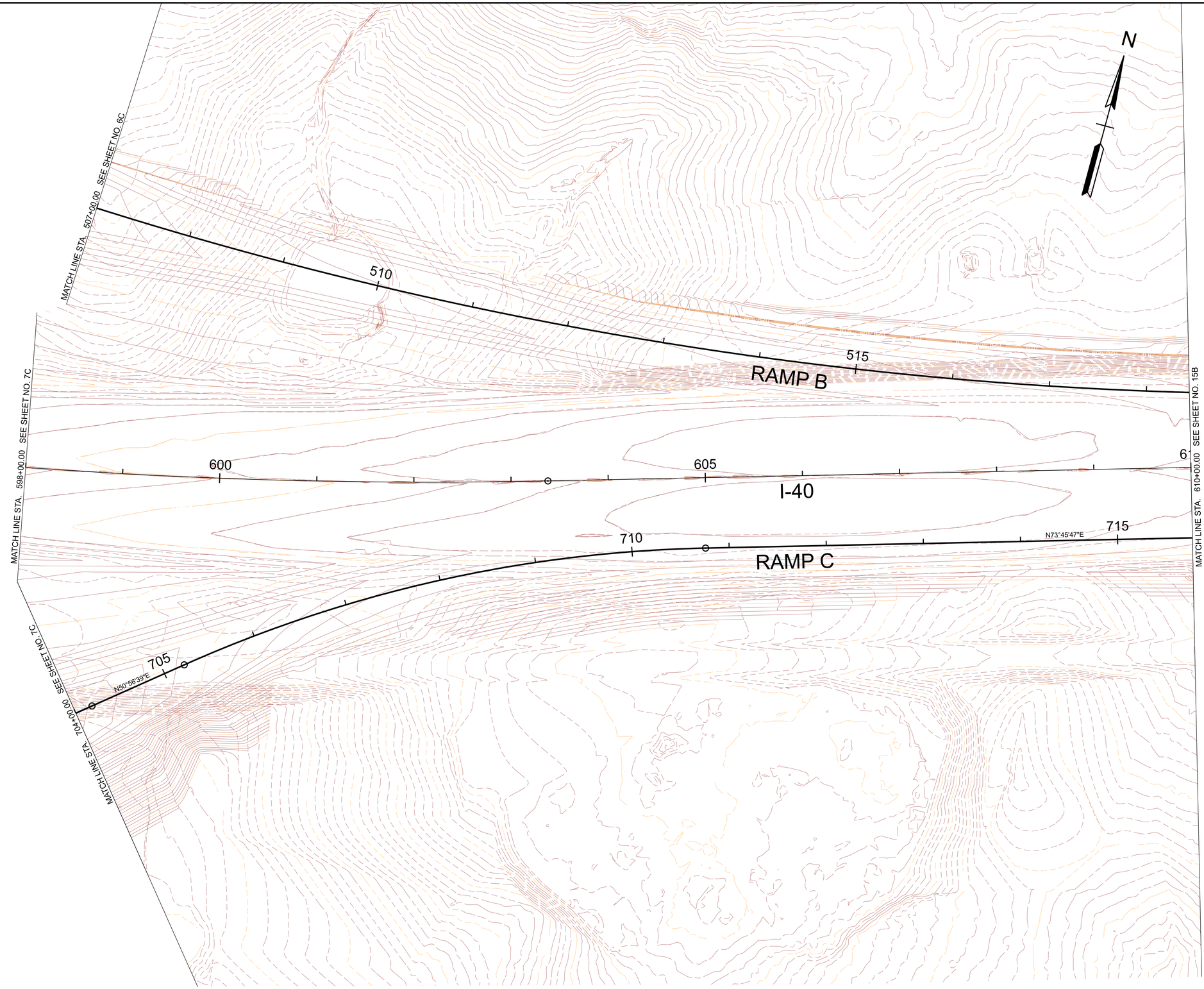
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:41:19 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:41:44 AM
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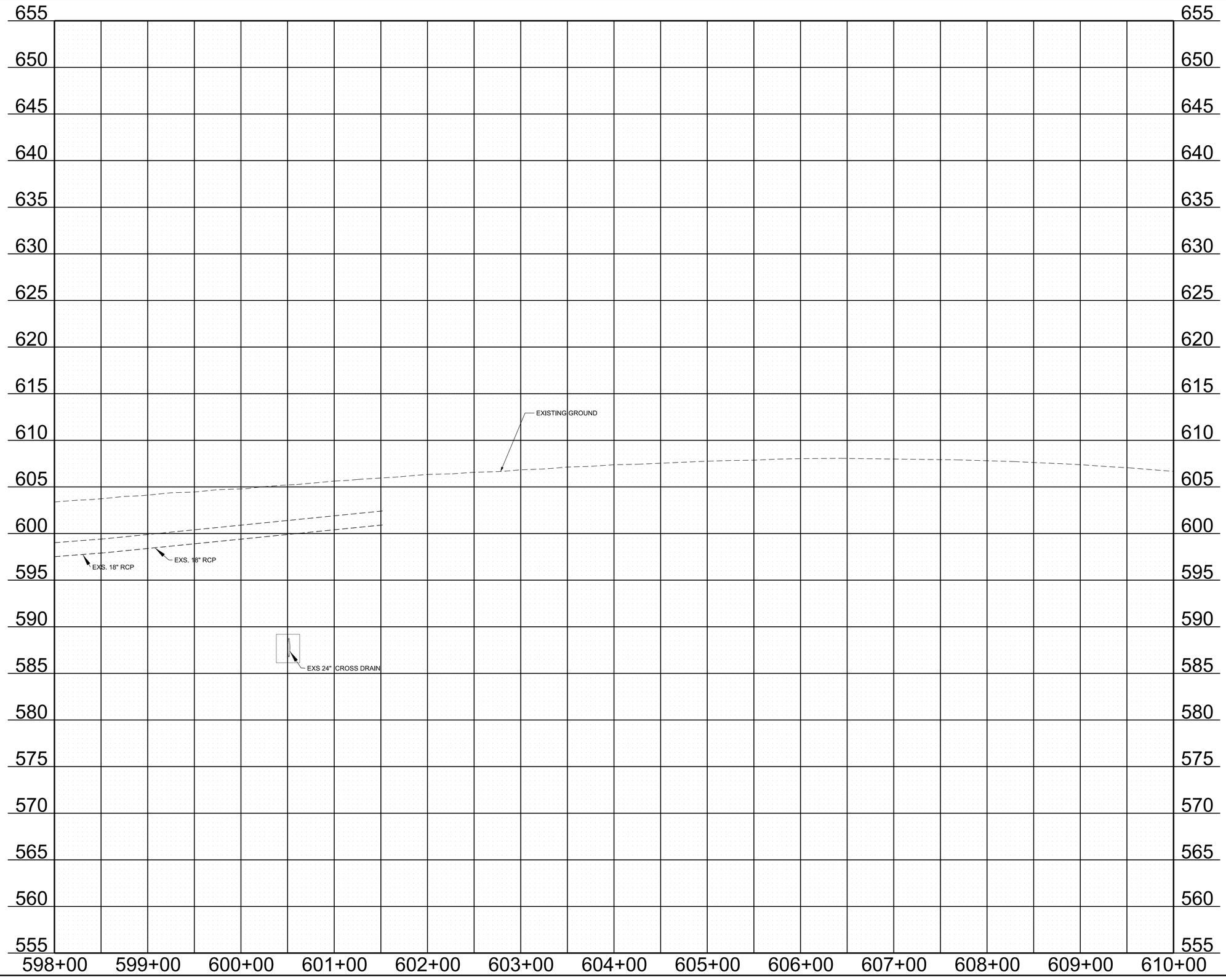
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

EXISTING
PROFILE
I-40
STA. 598+00 TO STA. 610+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:42:25 AM
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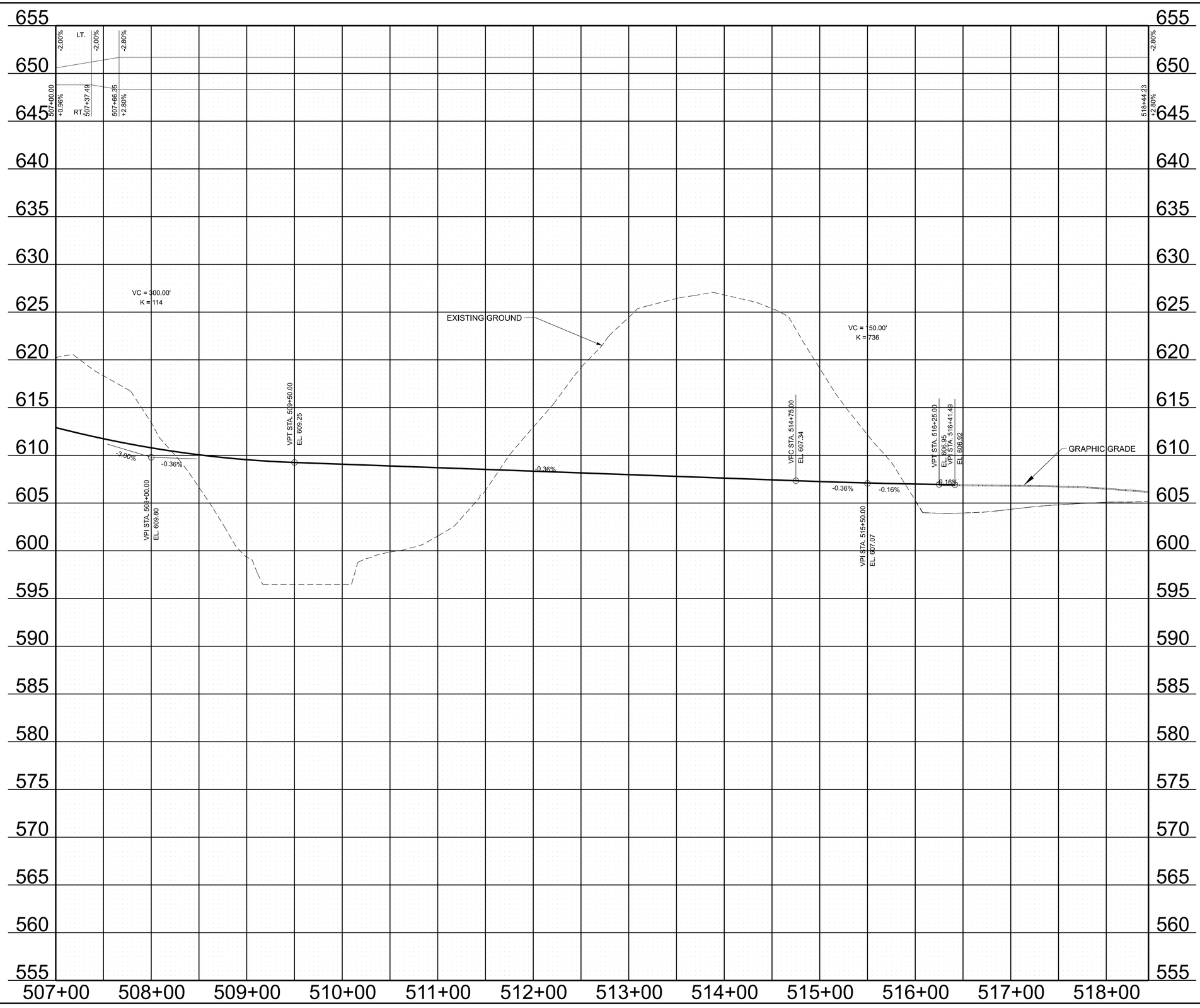
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14E

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

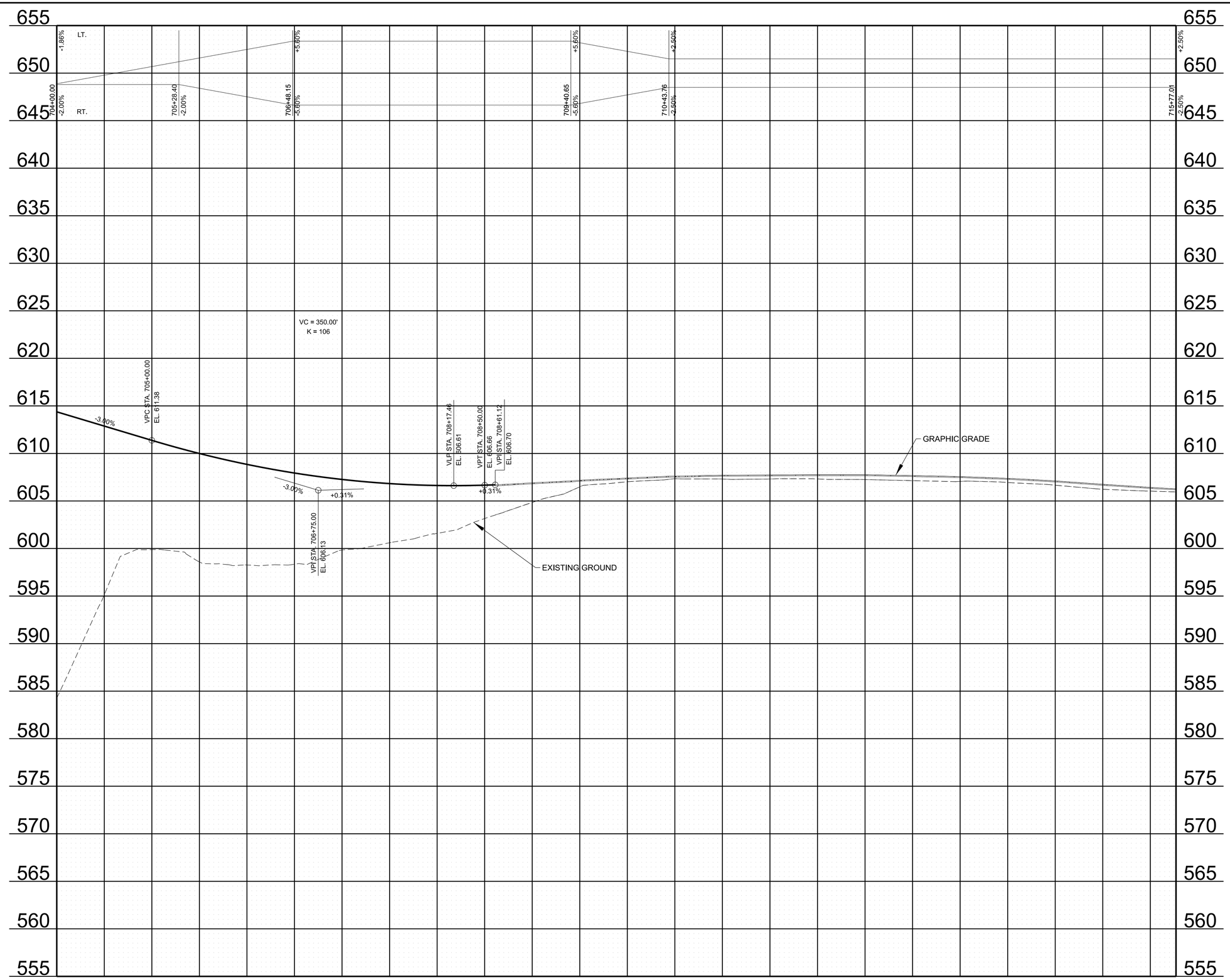
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP B
STA. 507+00 TO STA. 518+44

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:42:47 AM
C:\PWWORKING\EAST\01\D2328414\95\0040-SHT-PROPOSED PROFILE-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14F



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP C
STA. 704+00 TO STA. 715+77

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:43:07 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15

27
CHARLES E. TILLMAN

30
CHARLES E. (SONNY) TILLMAN

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 615+76.94
N 668554.1848 E 1813815.3892

MATCH LINE STA. 610+00.00 SEE SHEET NO. 14

RAMP B

RAMP C

I-40

520 615 620

N73°45'47"E

L = 296.11' L = 247.49' L = 95.61' L = 348.32'

L = 122.57'

60.26' 60.21'

18.95'

ASP.

ST

AH AI AJ AK AL AM AN AO

MM225

C.A. FENCE

PROP. R/W

CUT

FILL

F (UG)

UNDERGROUNDFO

TDOTITS

TDOT ITS

BURIEDFIBEROPTIC

FIBEROPTICMARKER

POSSIBLE SINKHOLE

INV - 581.48'

INV-571.09'

INV-570.10'

STREAM

WATERLINE

W.V. BELOW

EX ROW

E/P

ESA FLAG

GREEN

CHAINLINK

T (UG)

TEL. PED.

CATV PED.

UNKNOWN

W.M.

W.V.

P/T/C

38
A.H. JOHNSON FAMILY, LLC

AH	TOP - 606.25' INV - 601.45' BOT - 601.45'	AL	TOP - 601.61' INV - 595.81' INV - 595.76' BOT - 595.96'
AI	TOP - 606.18' BOT - 601.38'	AM	TOP - 601.69' INV - 595.54' BOT - 601.61'
AJ	TOP - 603.12' BOT - 598.12'	AN	TOP - 602.14' INV - 597.24' INV - 597.14' BOT - 597.39'
AK	TOP - 602.99' INV - 598.09' INV - 597.84' BOT - 597.99'	AO	TOP - 601.97' BOT - 597.17'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

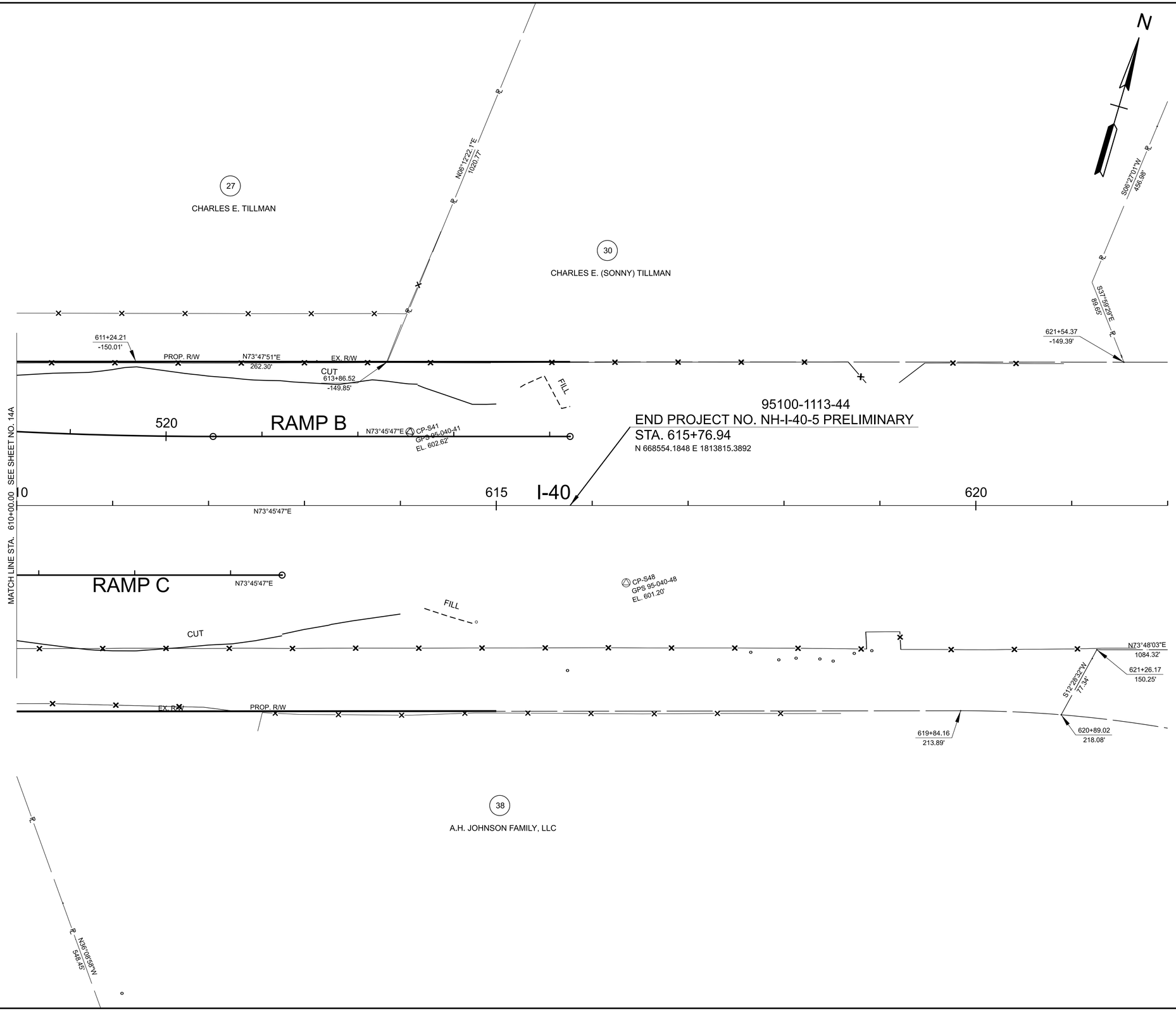
PRESENT LAYOUT
I-40

STA. 610+00 TO STA. 622+00
SCALE: 1" = 50'

2/4/2023 8:43:38 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

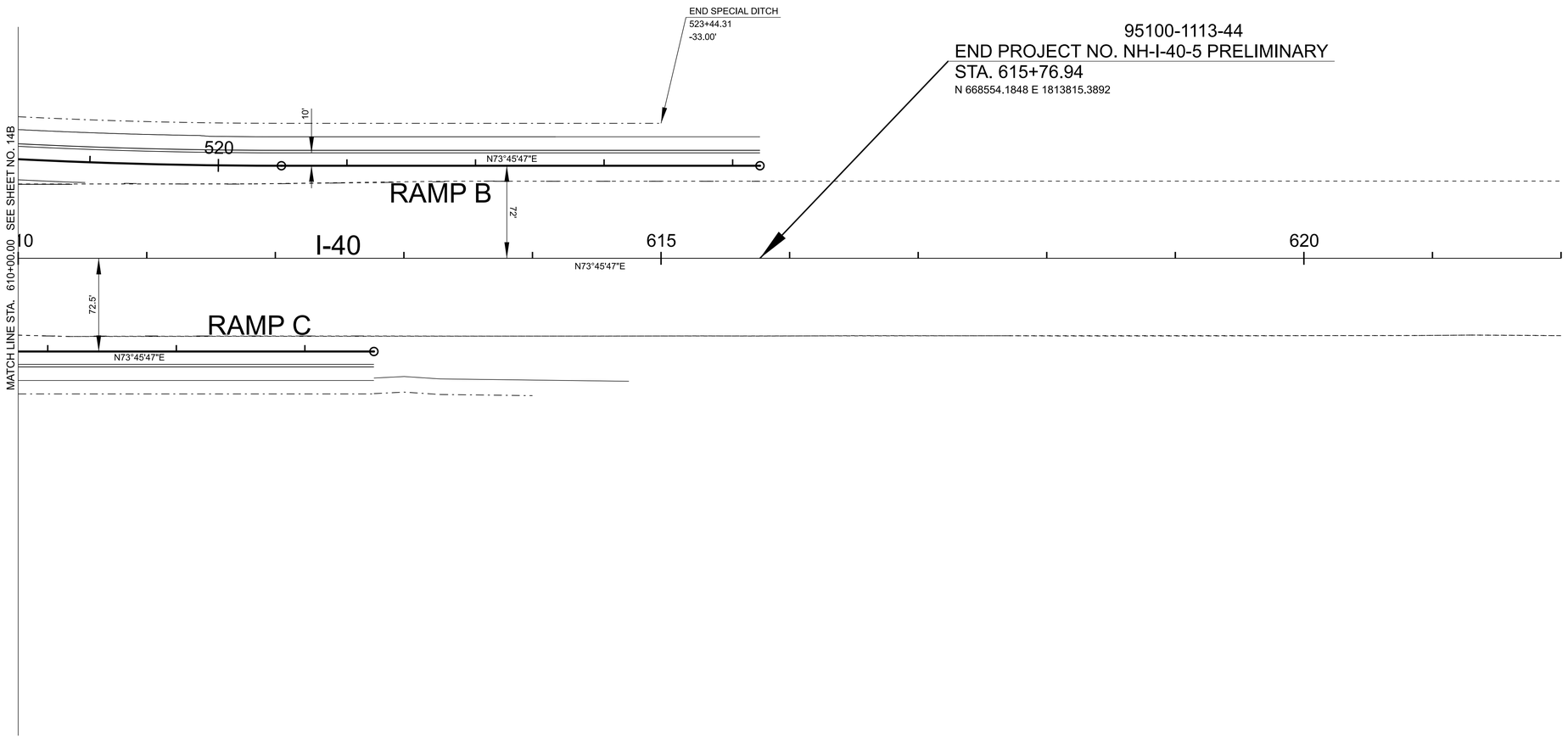
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 610+00 TO STA. 615+76
SCALE: 1" = 50'

2/4/2023 8:44:12 AM
C:\PWWORKING\EAST\T01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

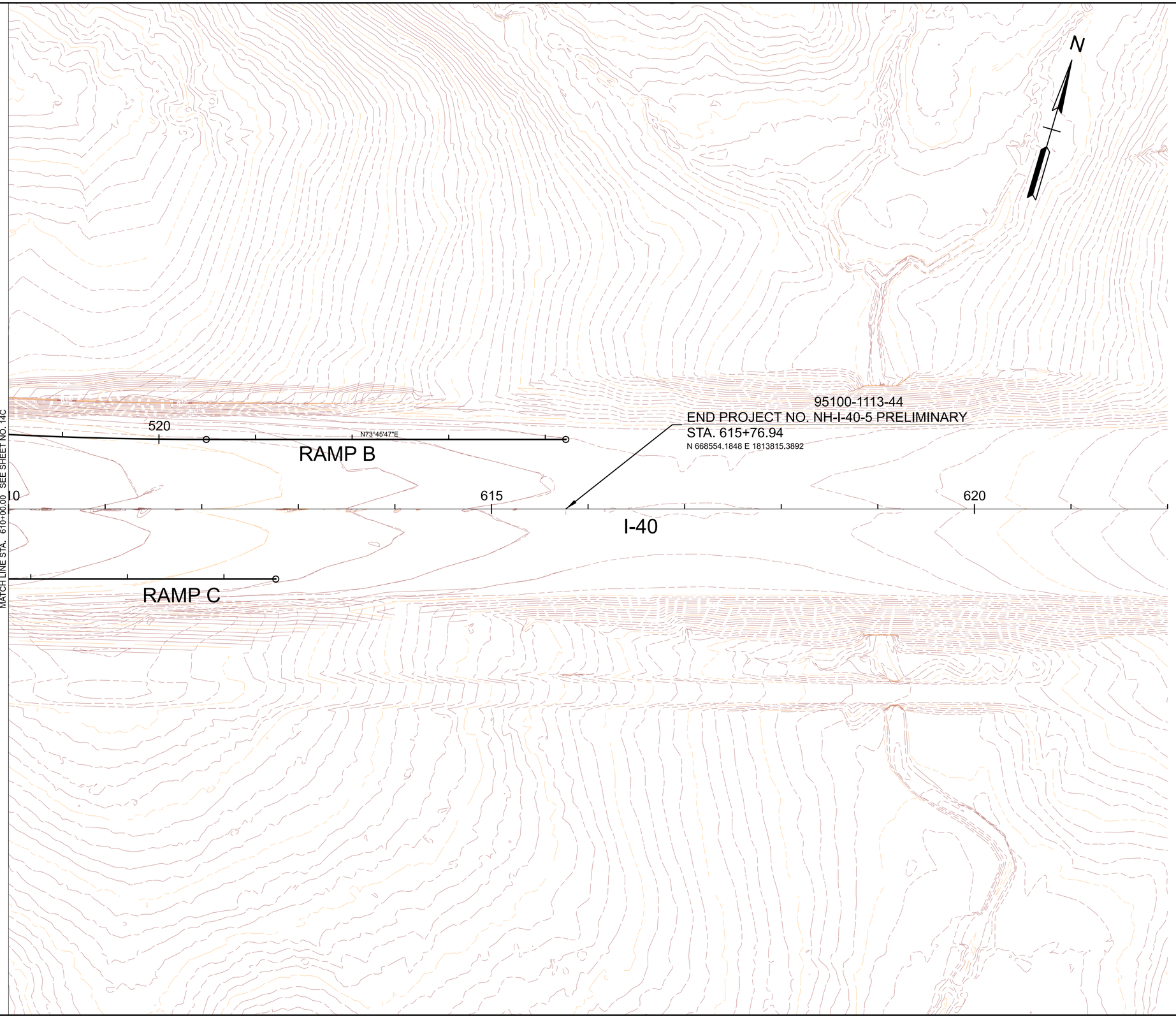
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 610+00 TO STA. 615+76
SCALE: 1" = 50'

2/4/2023 8:44:49 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
I-40

STA. 610+00 TO STA. 615+76
SCALE: 1" = 50'

2/4/2023 8:45:14 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15D

REV. ***DATE***
TEXT

650 645 640 635 630 625 620 615 610 605 600 595 590 585 580 575 570 565 560 555 550

95100-1113-44
END PROJECT NO. NH-I-40-5 CONST.
STA. 615+76.94

EXISTING GROUND

EXS. 18" RCP

EXS. 18" RCP

EXS. 18" RCP

EXS. 8' X 6' RCBC

610+00 611+00 612+00 613+00 614+00 615+00 616+00 617+00 618+00 619+00 620+00 621+00 622+00

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

EXISTING
PROFILE
I-40
STA. 610+00 TO STA. 622+00

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:45:57 AM
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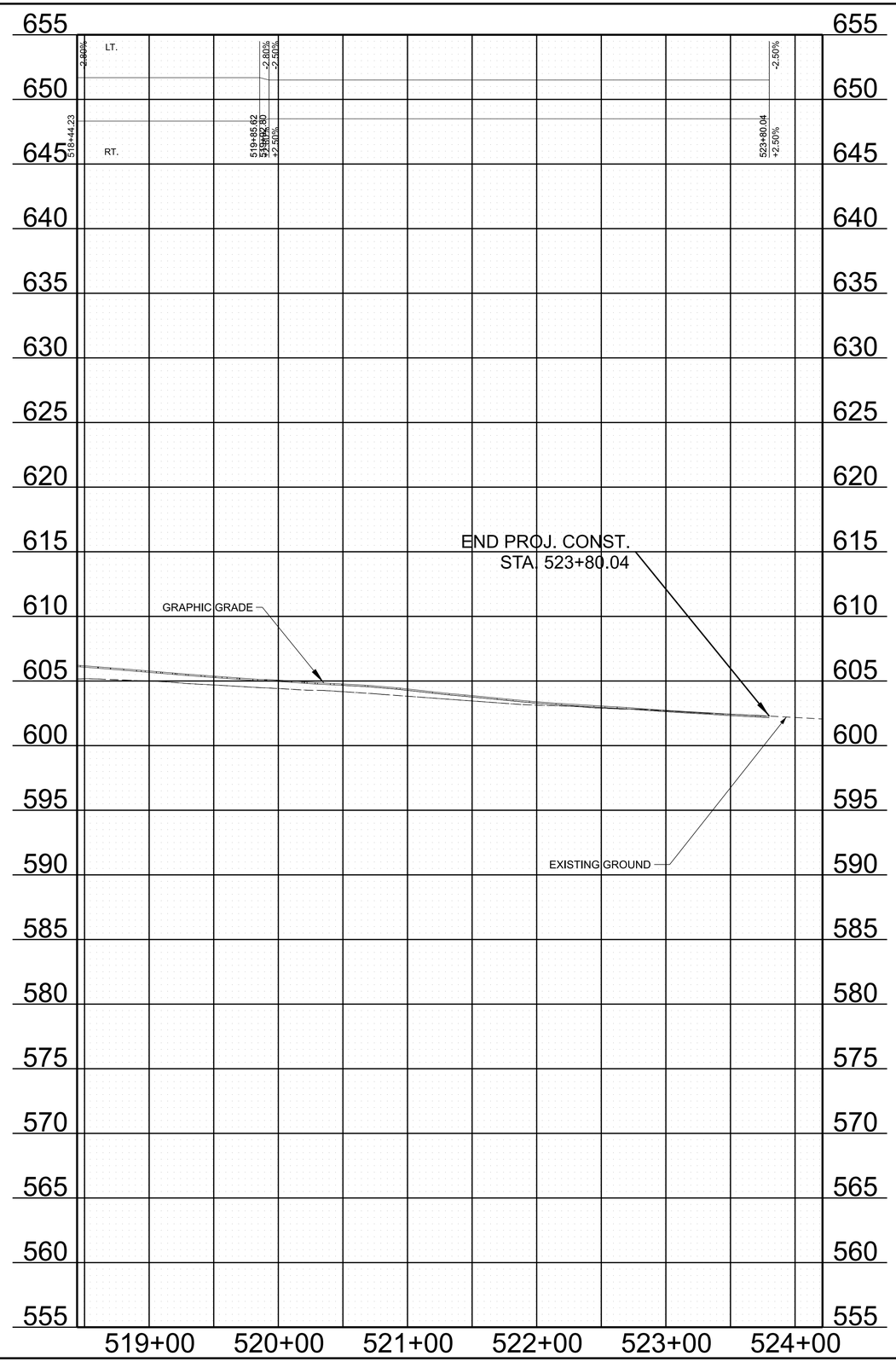

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15E

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP B
STA. 518+44 TO STA. 524+21

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:46:20 AM
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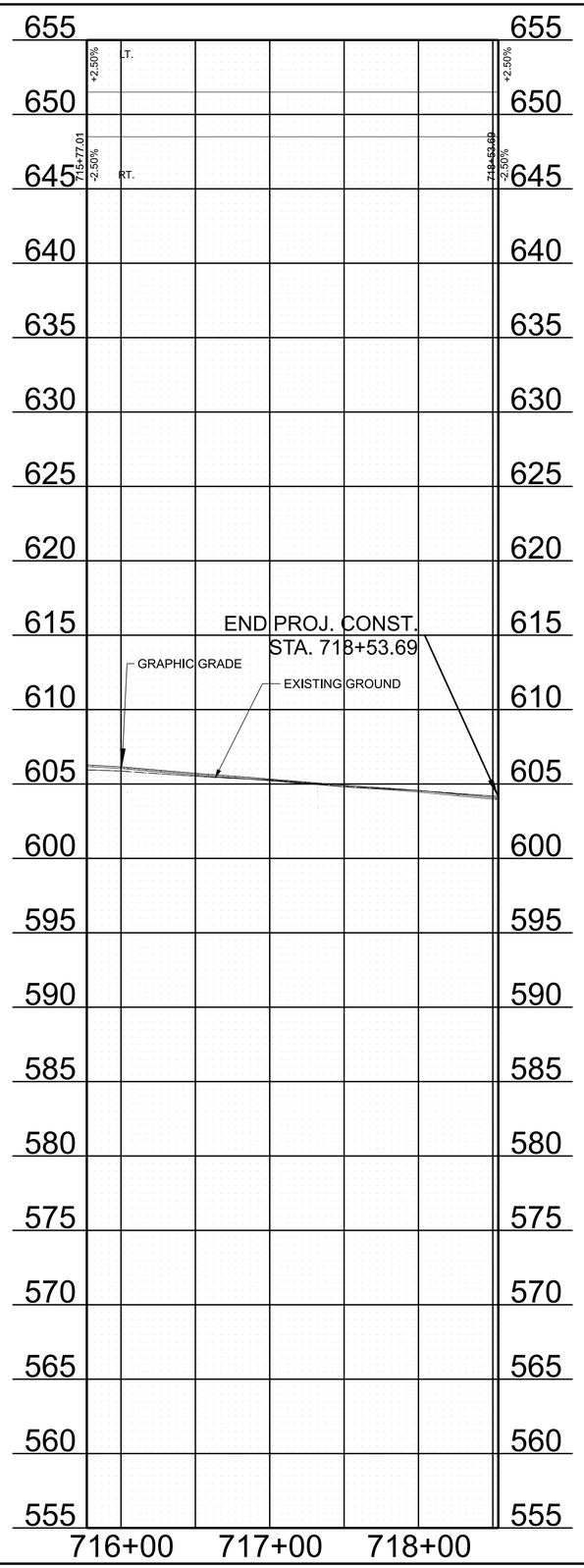


TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15F

INITIAL STUDIES REQUEST

SEALED BY

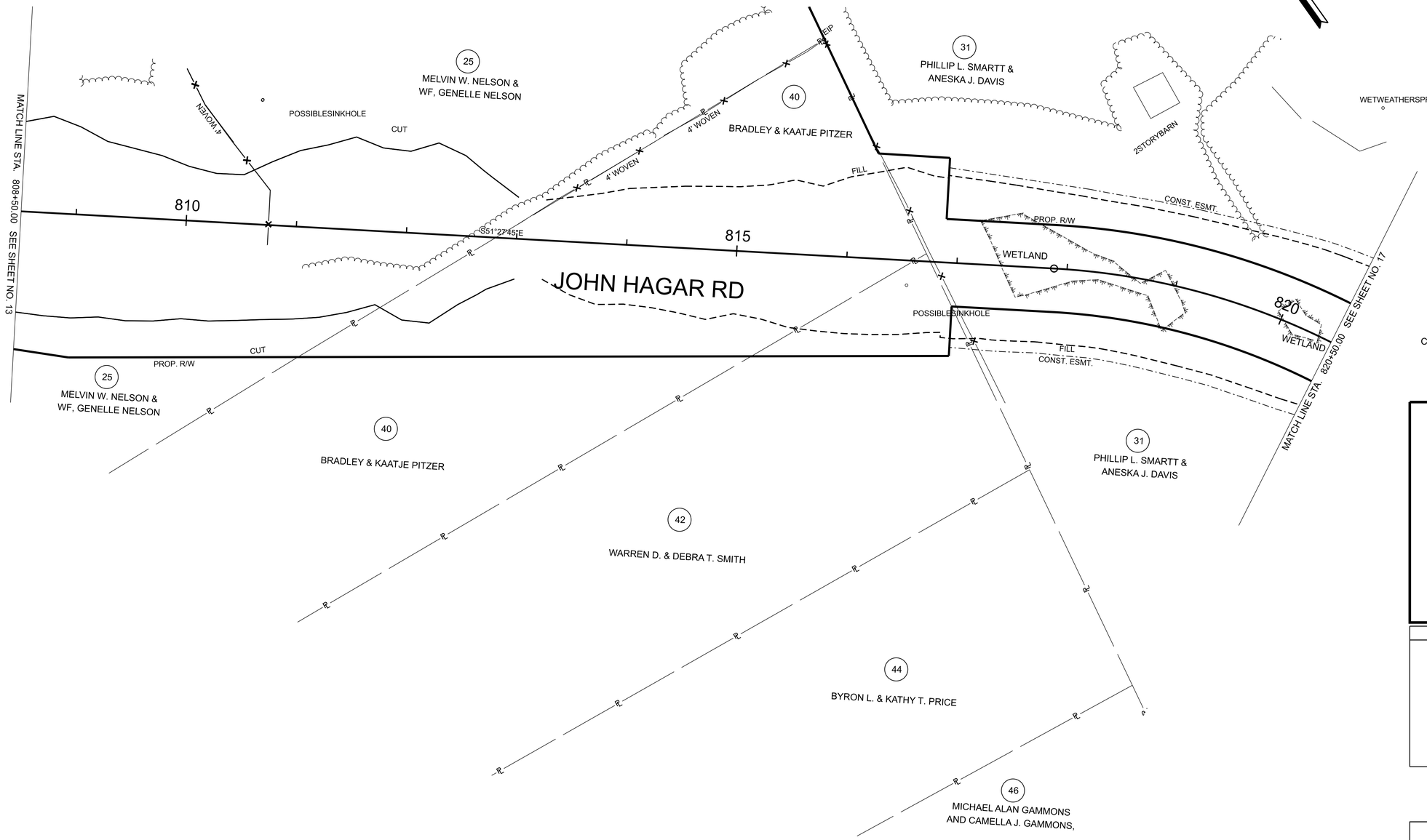
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RAMP
PROFILE
RAMP C
STA. 715+77 TO STA. 718+54

SCALE: 1" = 50' HORIZ.
1" = 5 ' VERT.

2/4/2023 8:46:40 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PROPOSED PROFILE-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

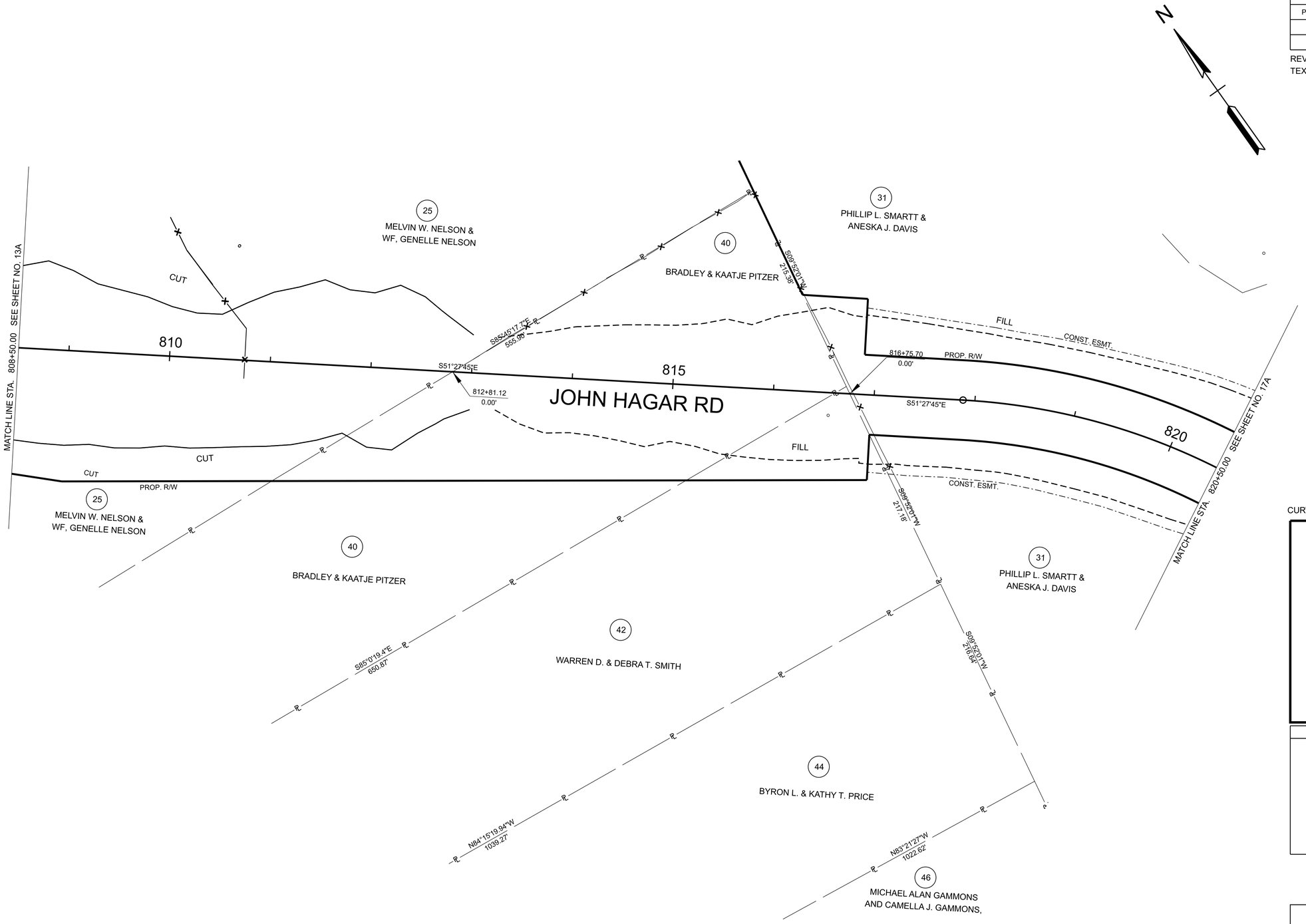
PRESENT LAYOUT
JOHN HAGAR RD

STA. 808+50 TO STA. 820+50
SCALE 1" = 50'

2/4/2023 8:47:10 AM
C:\PWWORKING\EAST\01D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
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TO THE NAVD 1988 WITH GEOID G2012BU7.

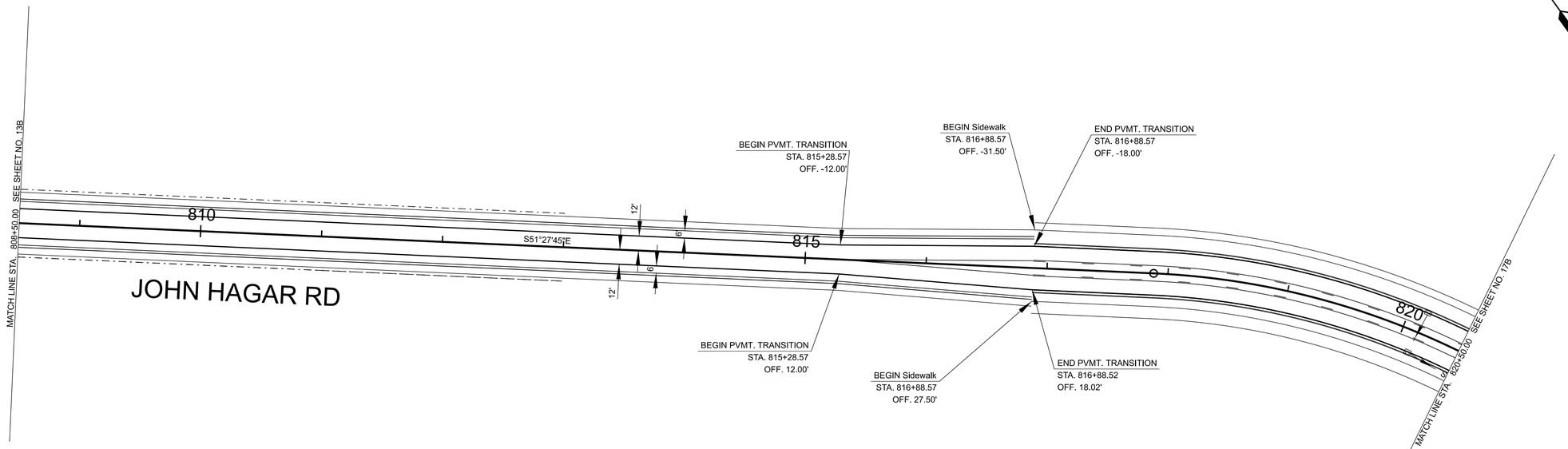
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
JOHN HAGAR RD

STA. 805+50 TO STA. 820+50
SCALE: 1" = 50'

2/4/2023 8:47:45 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
JOHN HAGAR RD

STA. 806+50 TO STA. 820+50
SCALE: 1" = 50

2/4/2023 8:48:23 AM
C:\PWWORKING\EAST\T01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

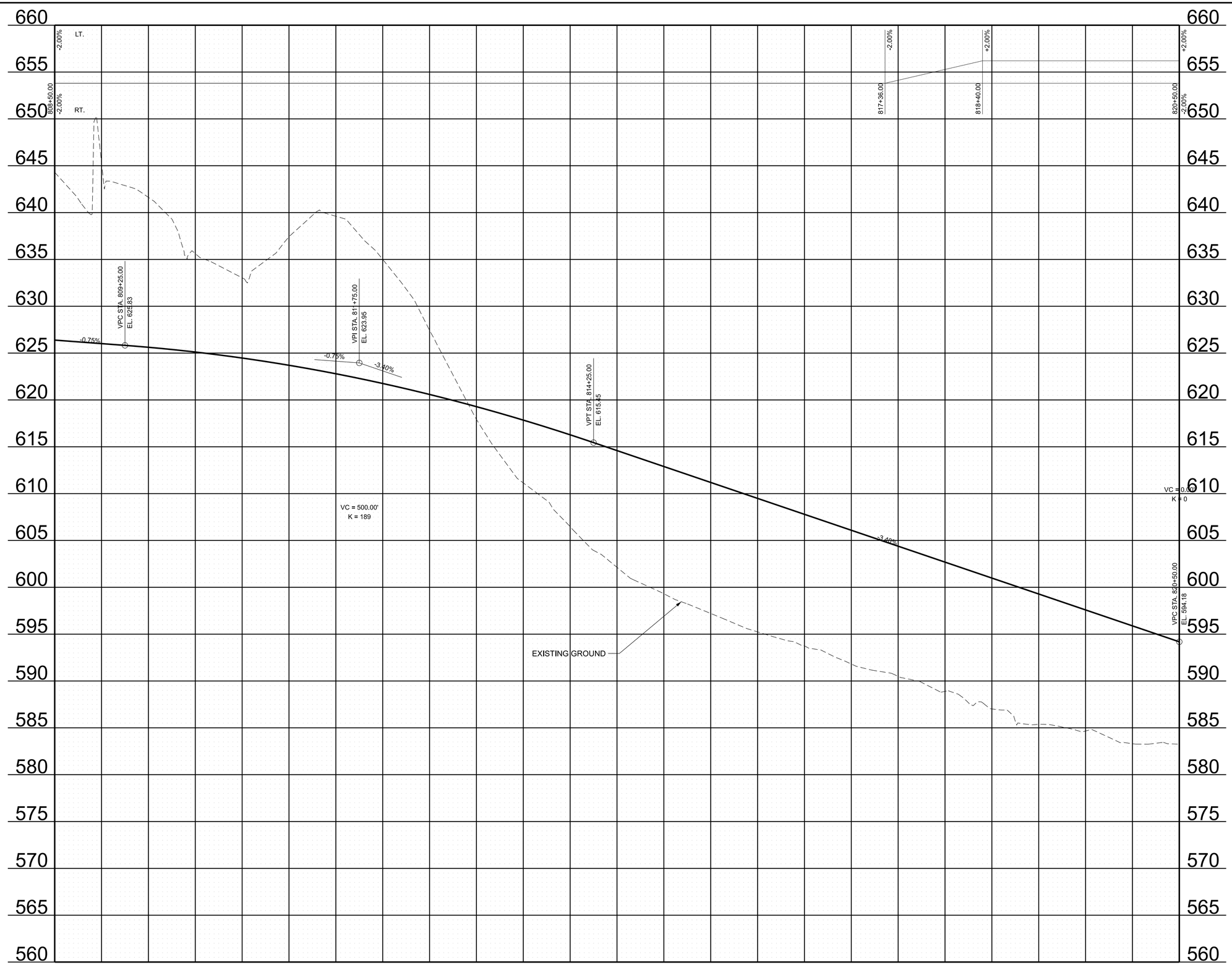
COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
JOHN HAGAR RD

STA. 806+50 TO STA. 820+50
SCALE: 1" = 50

2/4/2023 8:51:51 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16D

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

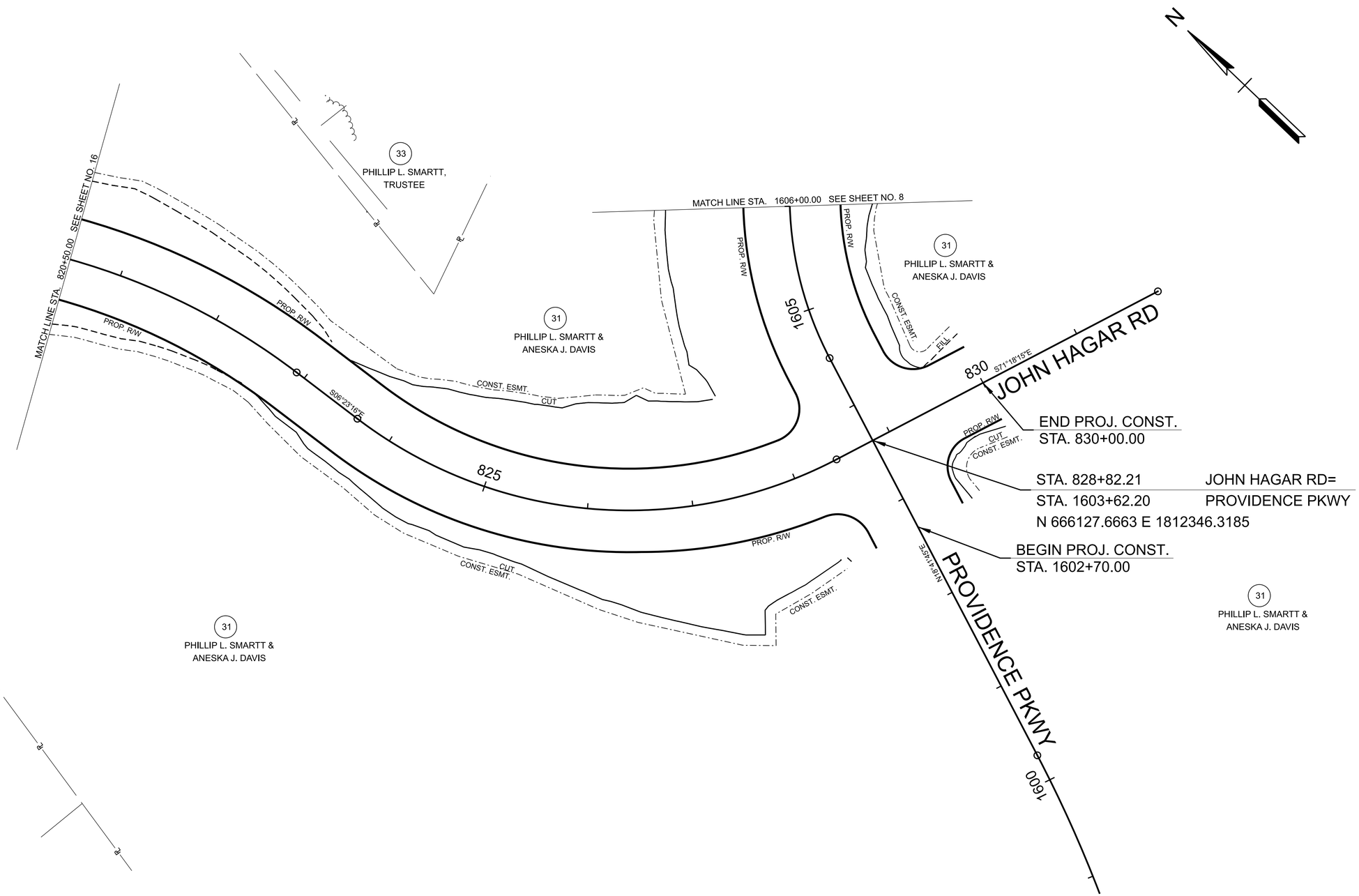
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
JOHN HAGAR RD
STA. 808+50 TO STA. 820+50

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:49:37 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

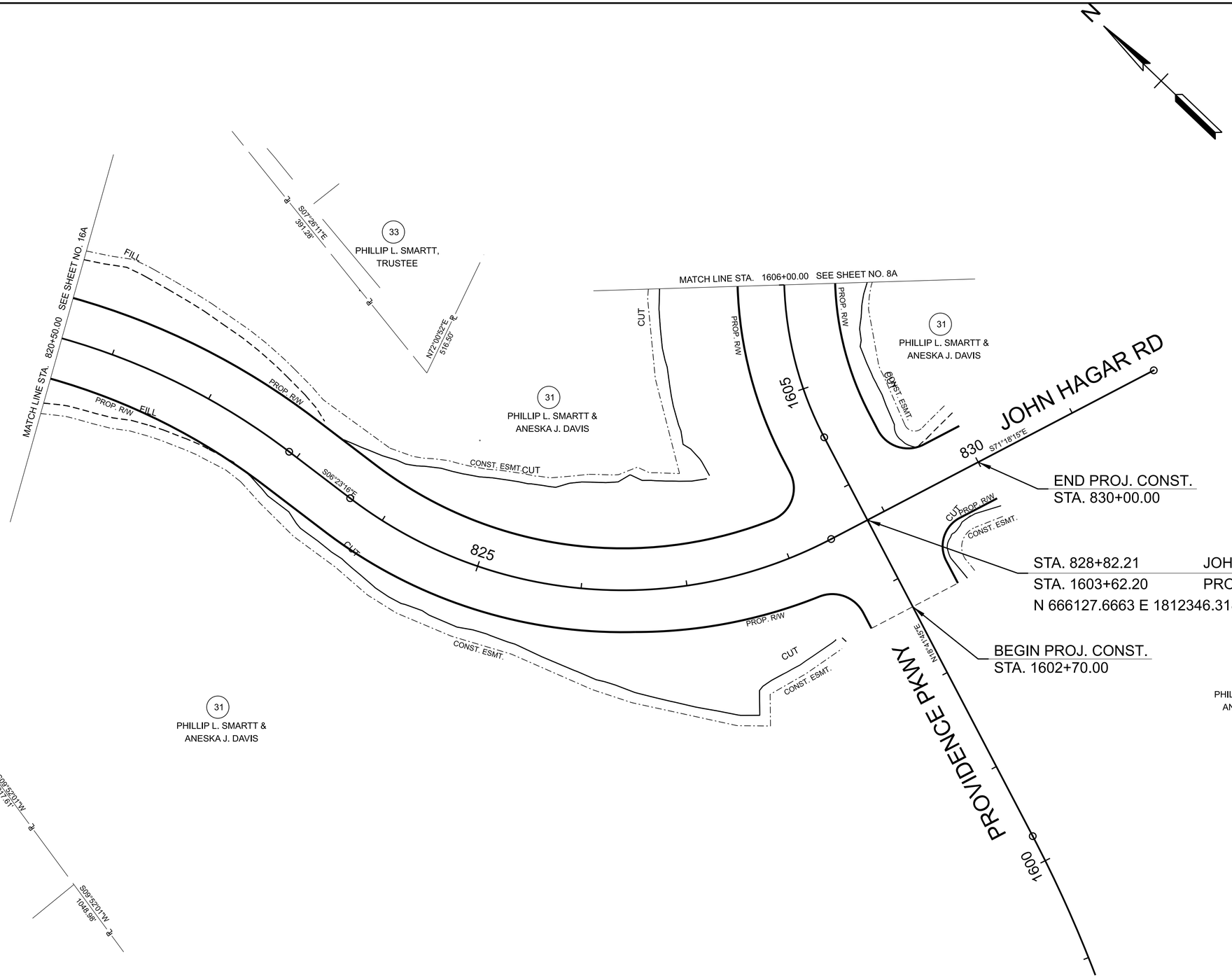
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:07 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17A



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

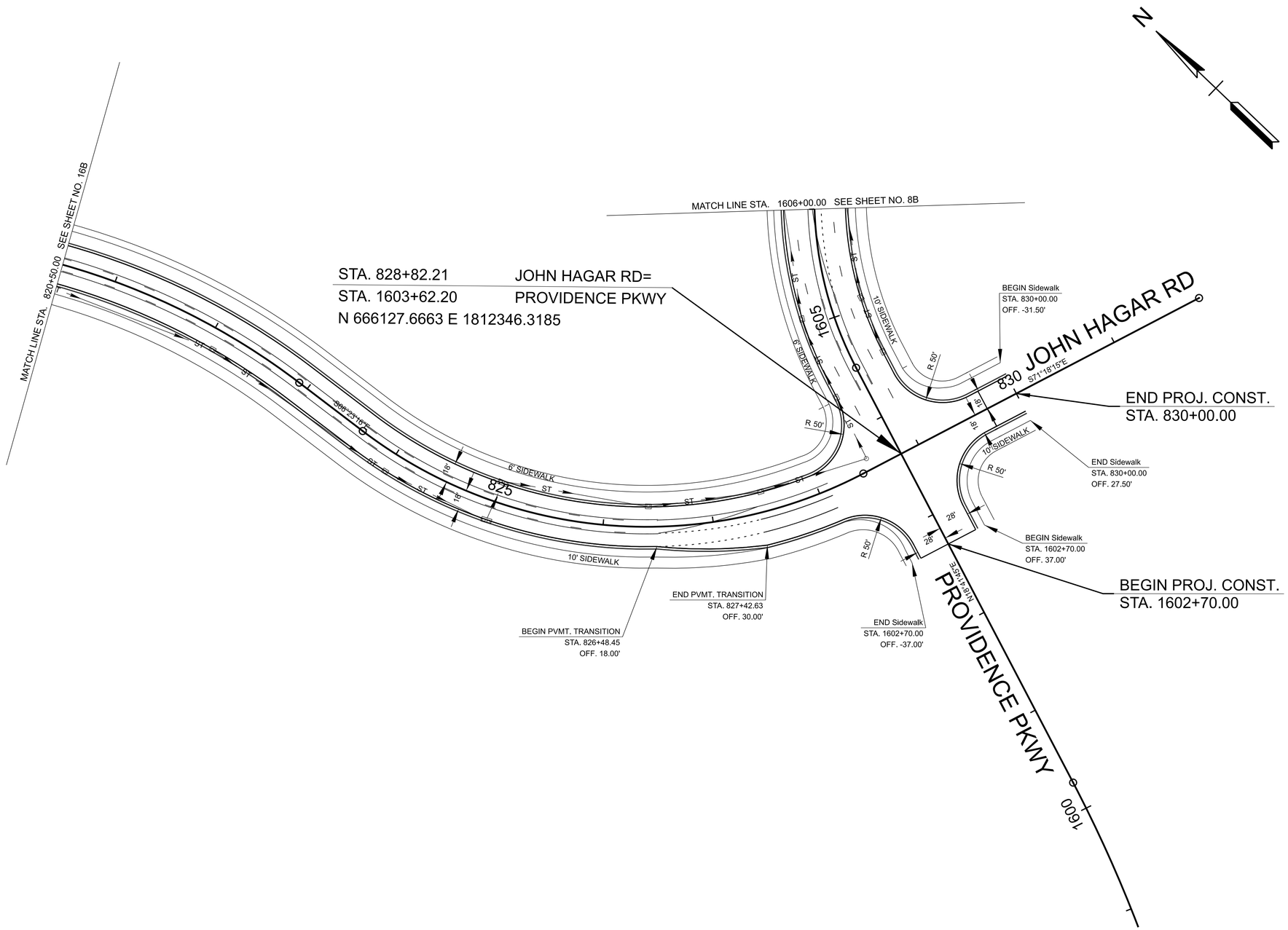
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:43 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

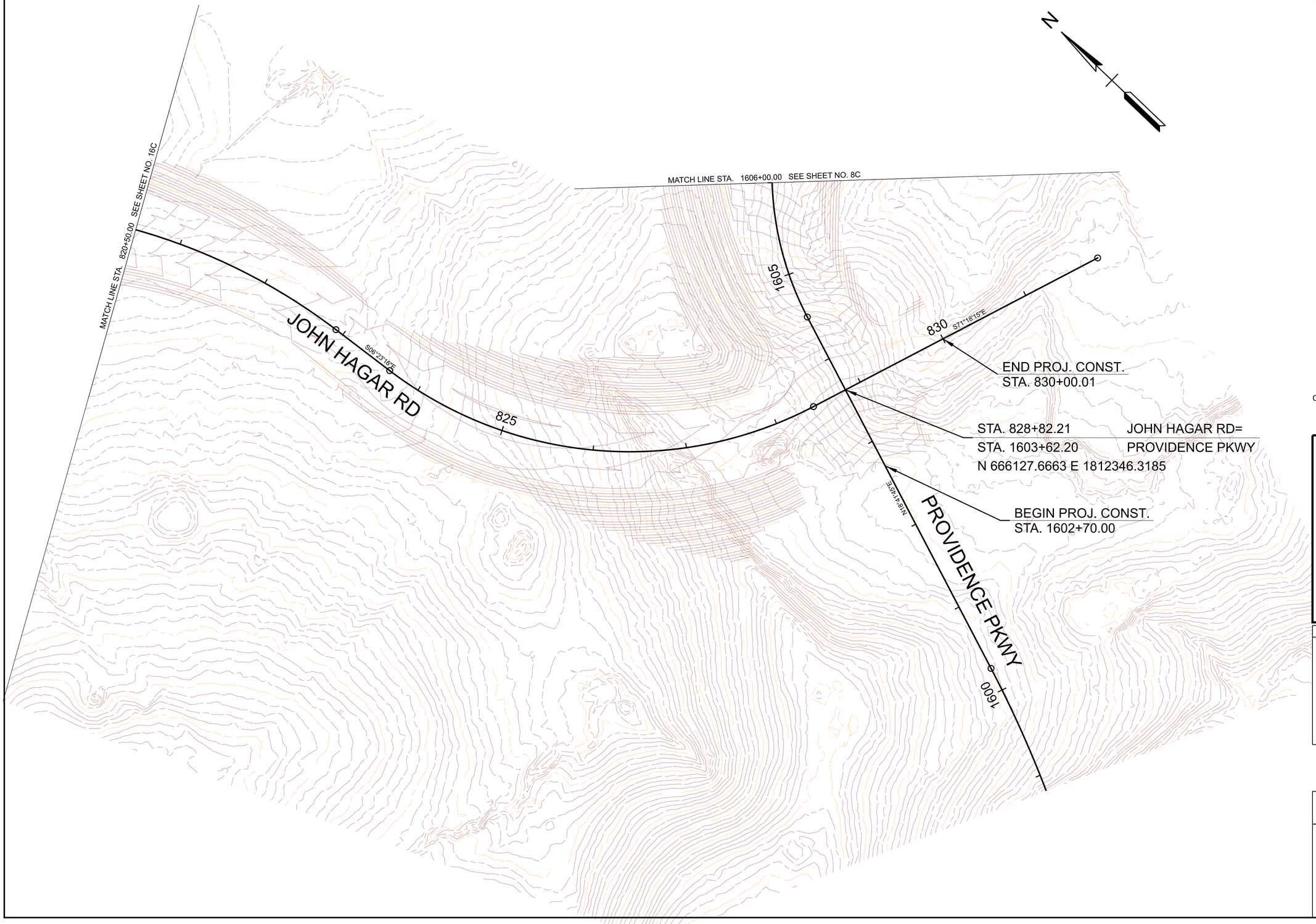
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:51:24 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

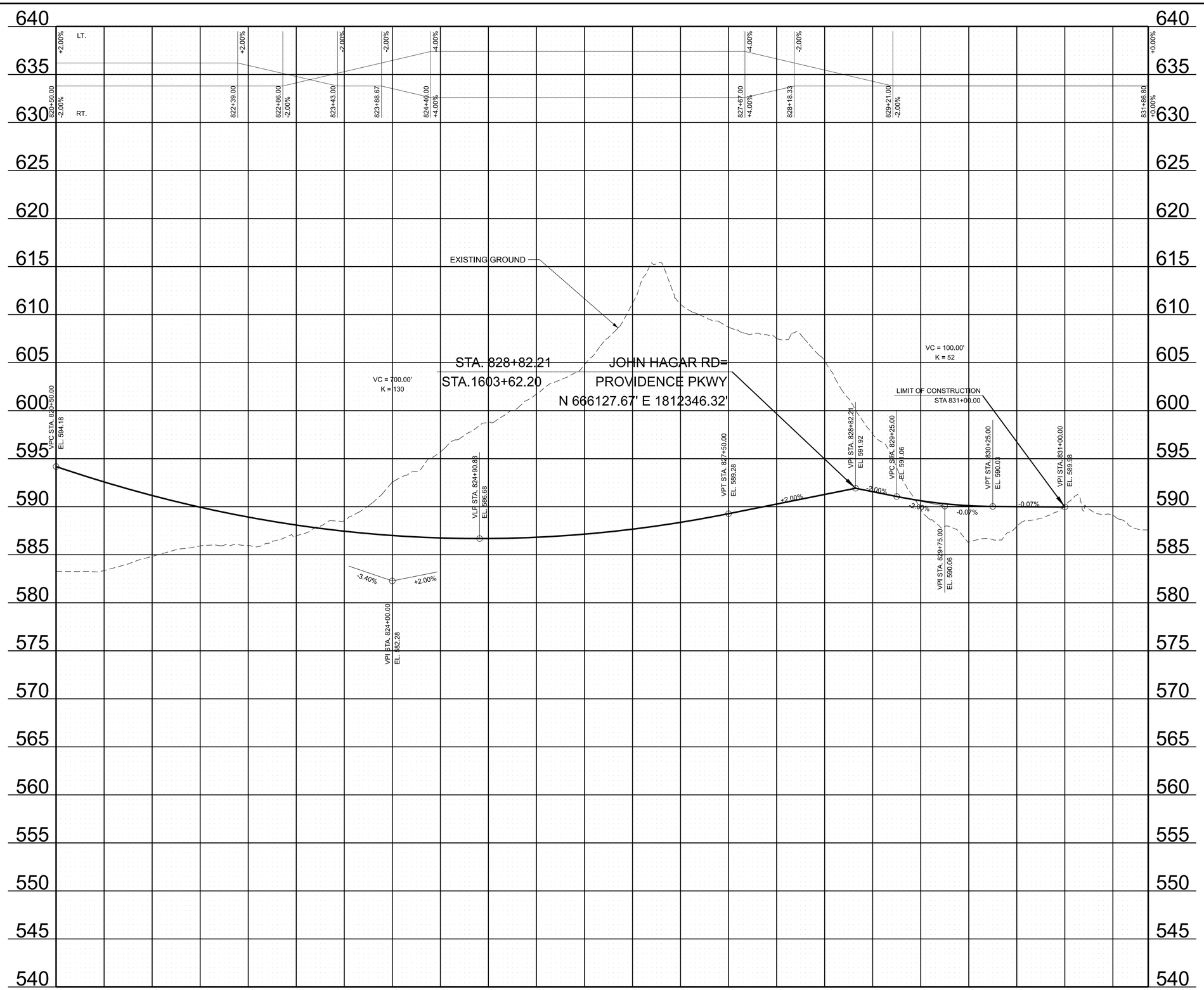
PROPOSED
LAYOUT CONTOURS
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:48:49 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

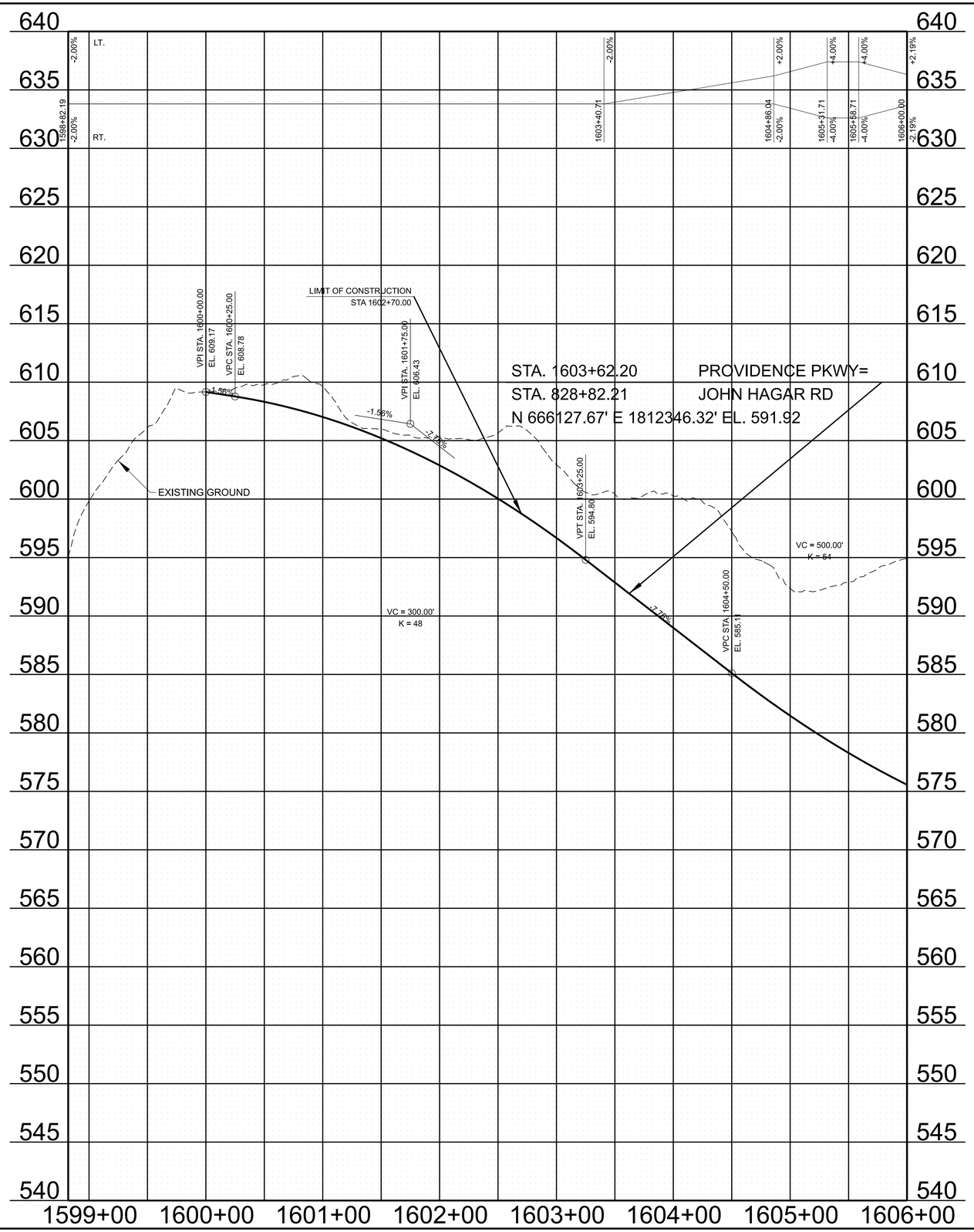
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE

JOHN HAGAR RD
STA. 820+50 TO STA. 831+87

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:52:39 AM
C:\PW\WORKING\EAST01\D2328414195\l040-SHT-PROPOSED PROFILE-JOHN HAGAR RD.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17E

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
PROVIDENCE PKWY
STA. 1598+82 TO STA. 1606+00

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:53:00 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18

N

45
BEAU D. & KENDRA FLEENOR

43
PETER J. & PATRICIA L. HICKS

41
JOSEPH & JENNY PEWITT

39
ALDO A. JACOBOGODOY
& ALDO MELISSA JACOBO

23
RONALD
CHRISTOPHER
TANBER
& KRISTIN TROMBLEY

24
RAYMOND E. DAVIS,
JR & WF,
PAMELA ANN DAVIS

END PROJ. CONST.
STA. 11+00.00

CONST. ESMT.

EX ROW

EIP

10

N04°15'53"E

GUILL RD

6" W

EX ROW

CONST. ESMT.

MATCH LINE STA. 14+00.00 SEE SHEET NO. 13

25
MELVIN W. NELSON &
WF, GENELLE NELSON

46
MICHAEL ALAN GAMMONS
AND CAMELLA J. GAMMONS,

44
BYRON L. & KATHY T. PRICE

42
WARREN D. & DEBRA T. SMITH

40
BRADLEY & KAATJE PITZER

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

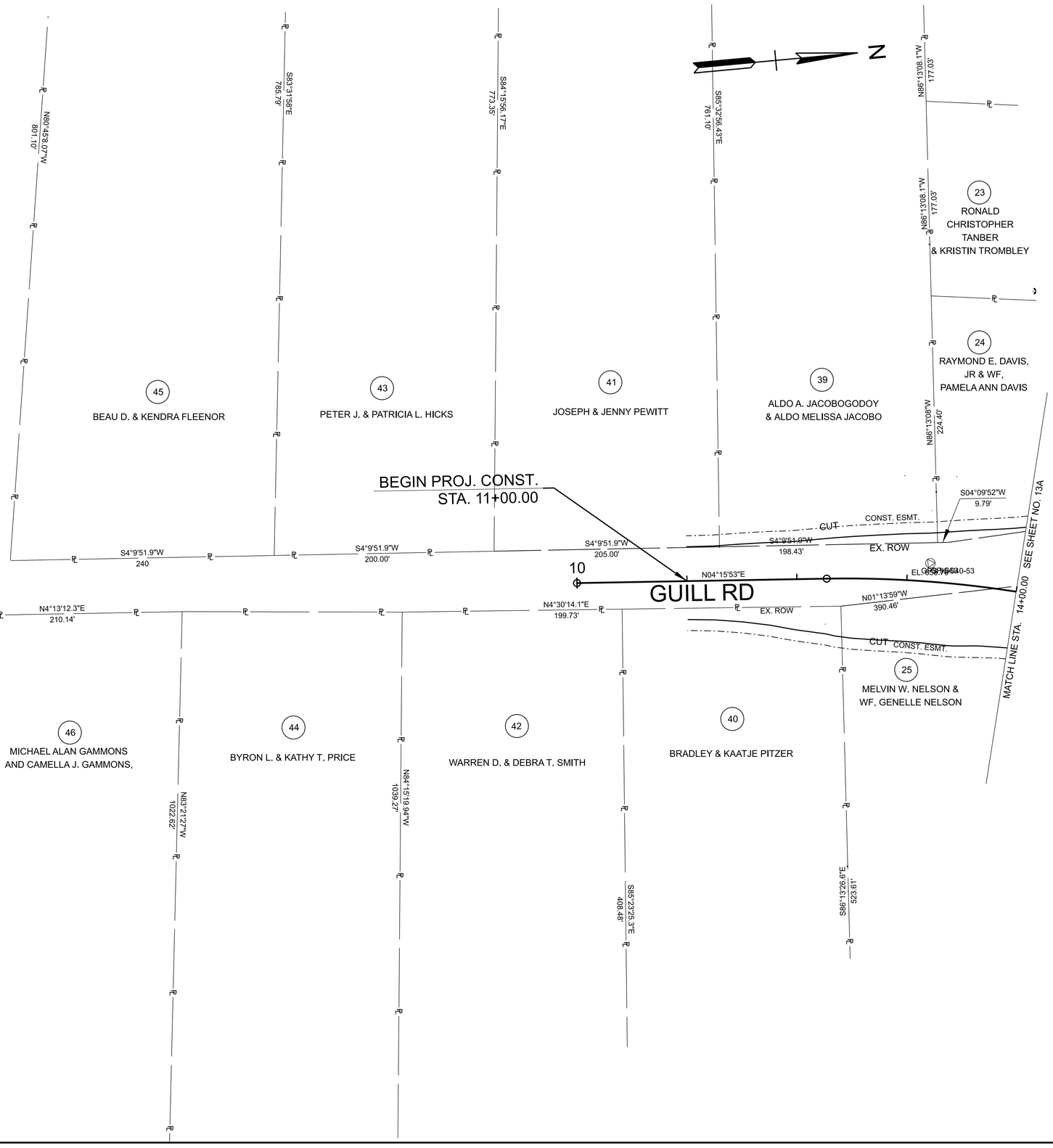
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:53:30 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18A



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83( ), ARE
DATUM ADJUSTED BY THE FACTOR
OF AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID .

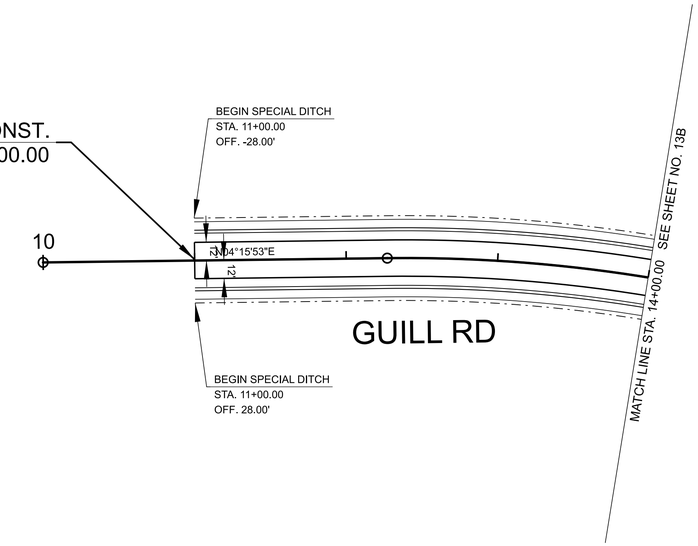
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:54:05 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

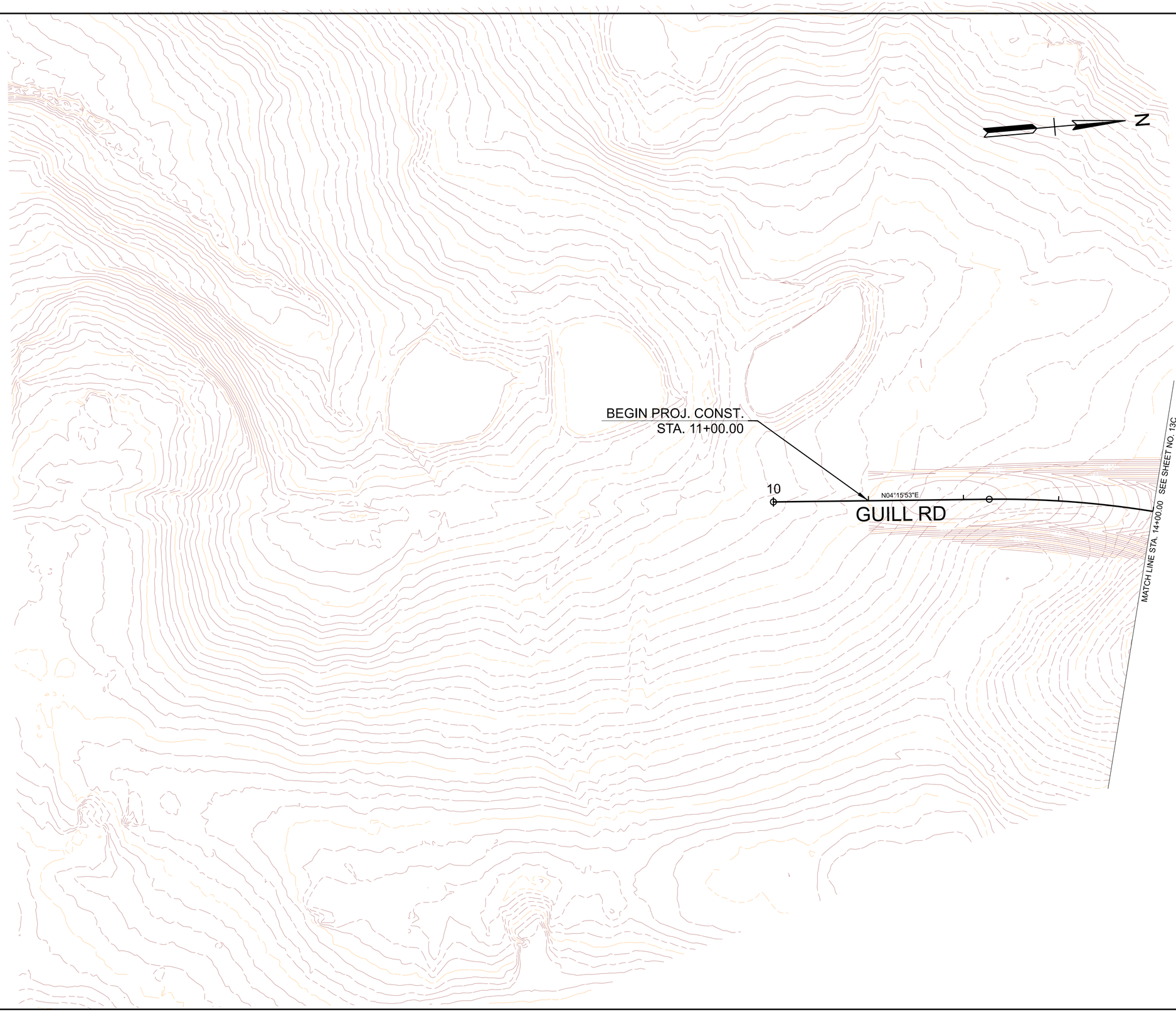
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:54:45 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

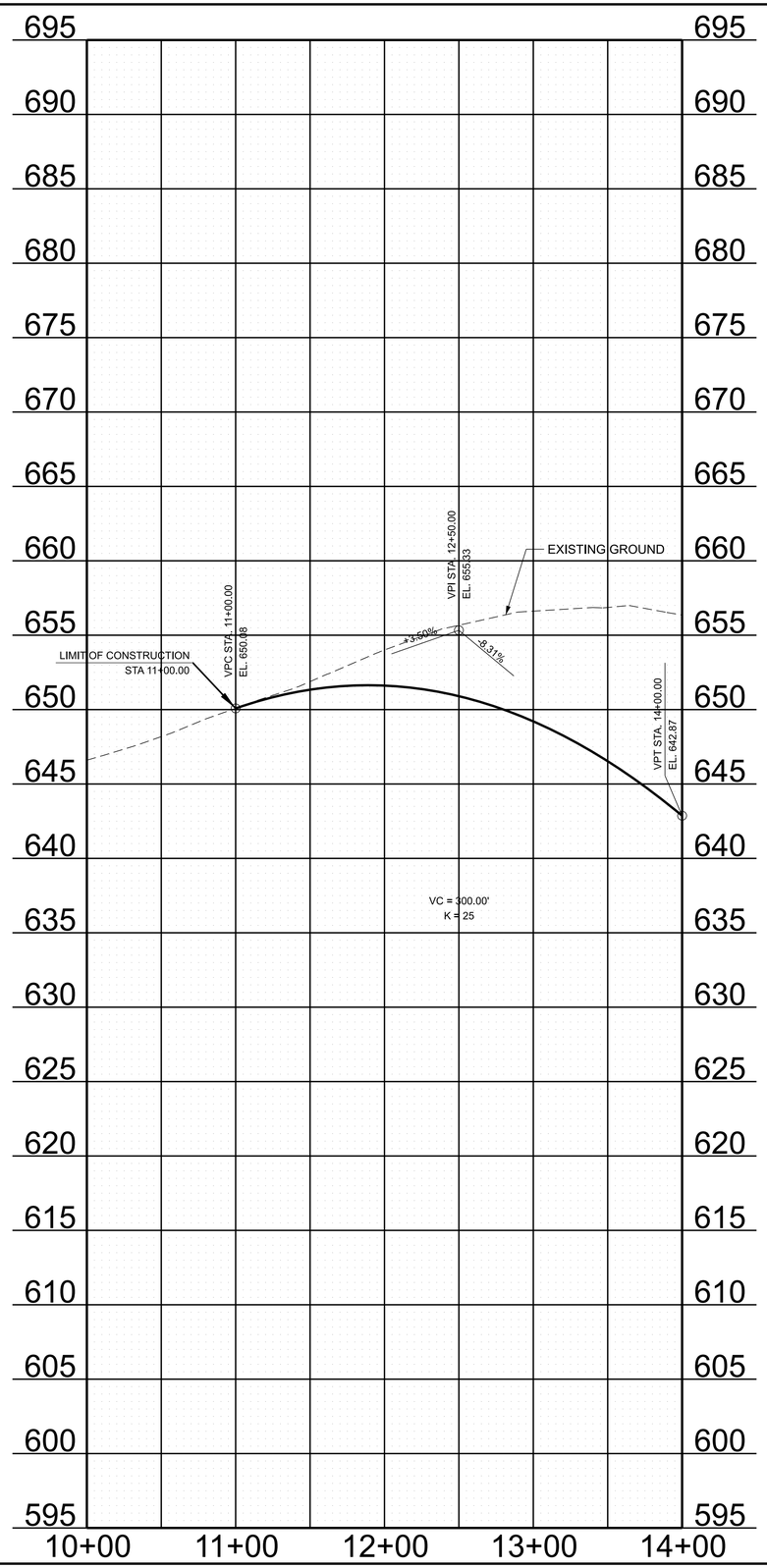
COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT CONTOURS
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:55:12 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18D

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

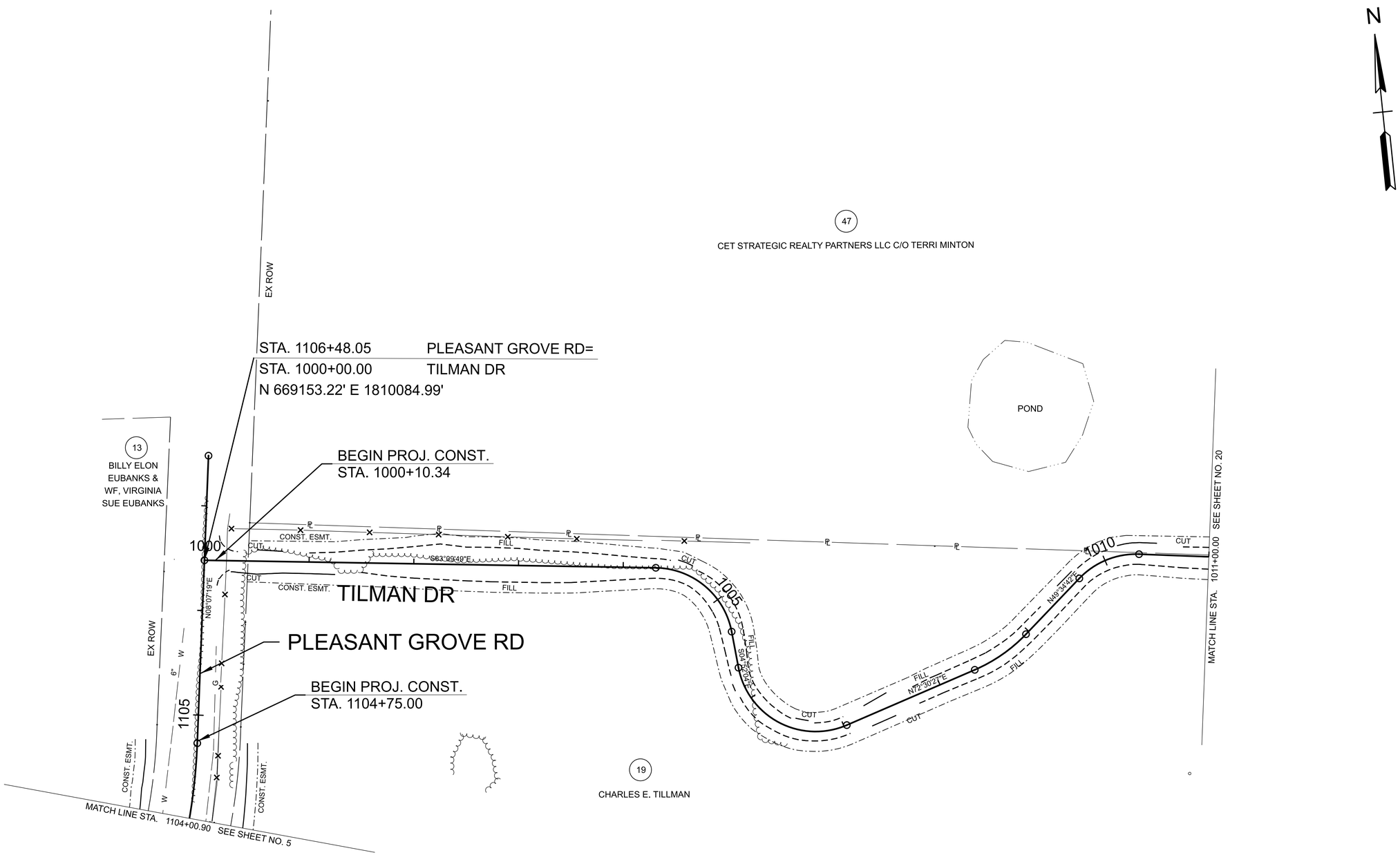
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
GUILL RD
STA. 10+00 TO STA. 14+00

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:56:06 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PROPOSED PROFILE-GUILL RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

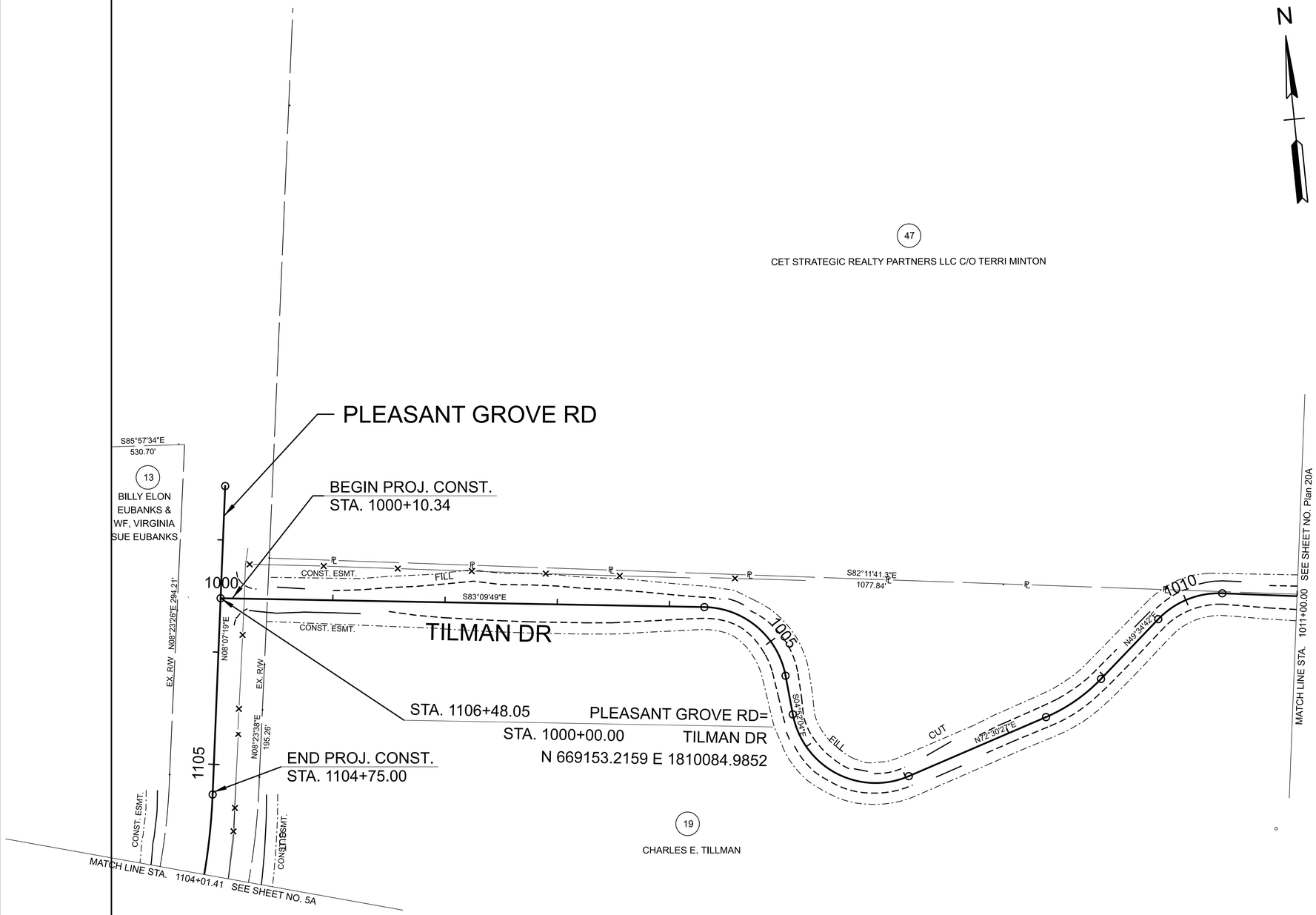
PRESENT LAYOUT
TILMAN DR

STA. 1104+50 TO STA. 1111+00
SCALE: 1" = 50'

2/4/2023 8:56:37 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

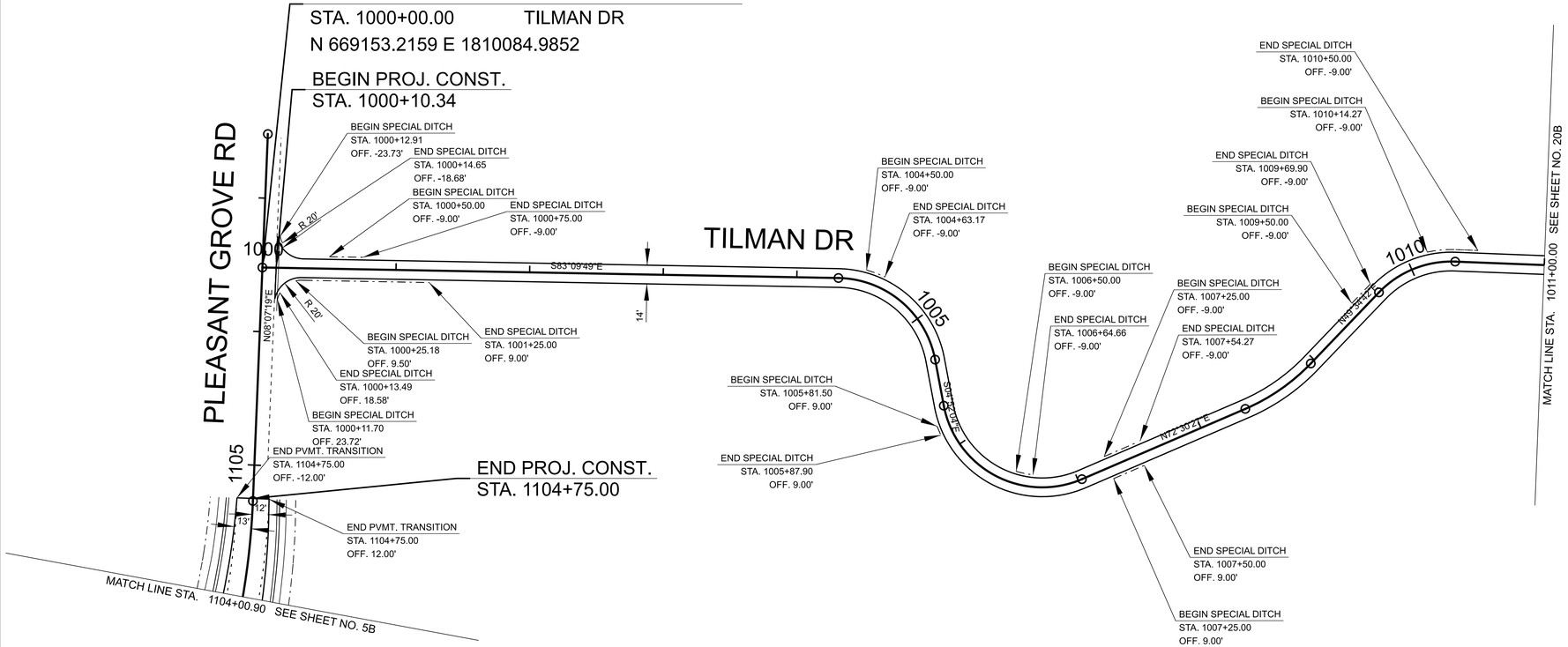
RIGHT OF WAY
DETAILS
TILMAN DR

STA. 1104+25 TO STA. 1011+00
SCALE: 1" = 50'

2/4/2023 8:57:13 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19B





CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

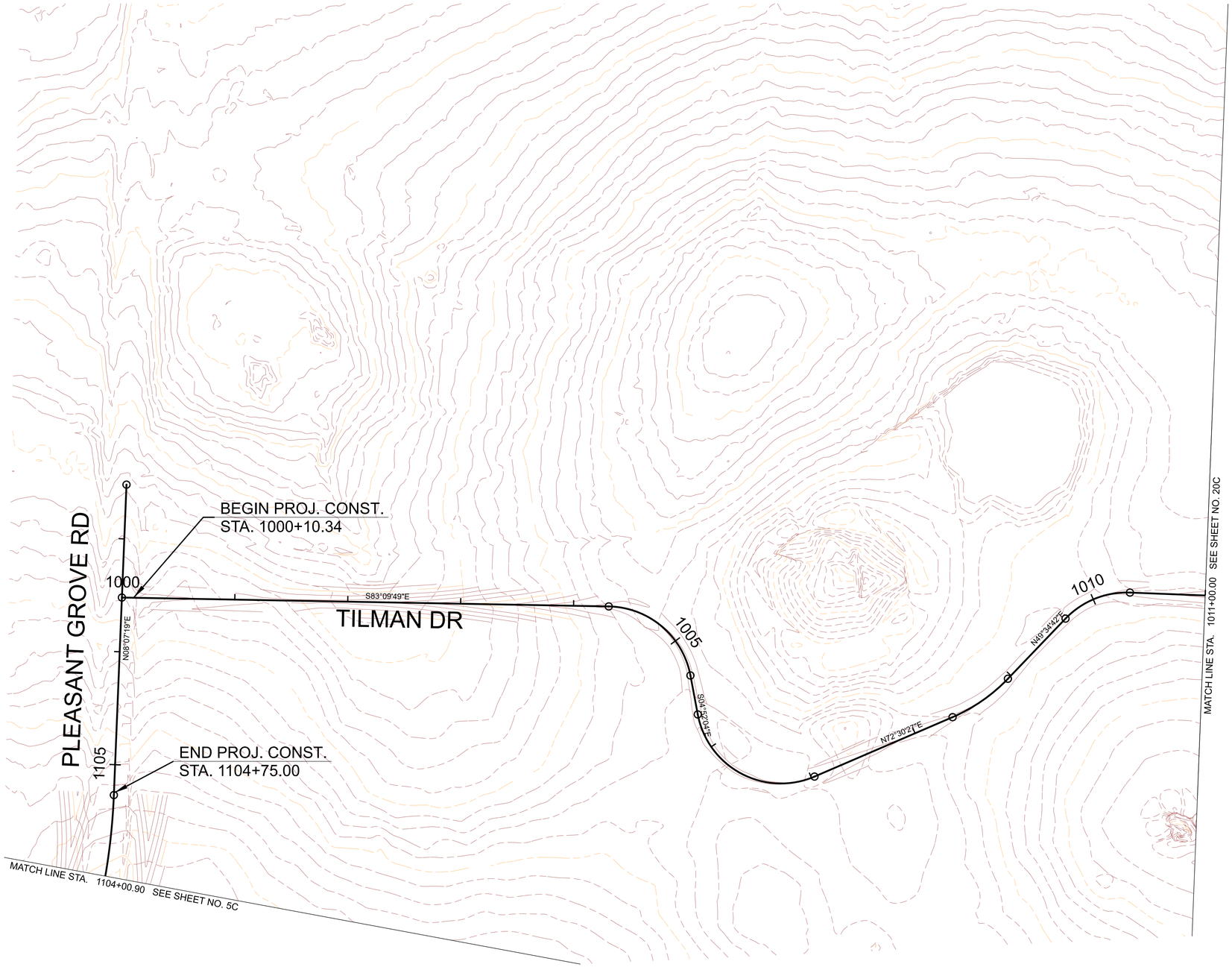
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
TILLMAN DRIVE

STA. 1104+25 TO STA. 1011+00
SCALE: 1" = 50'

2/4/2023 8:57:53 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19C



N

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

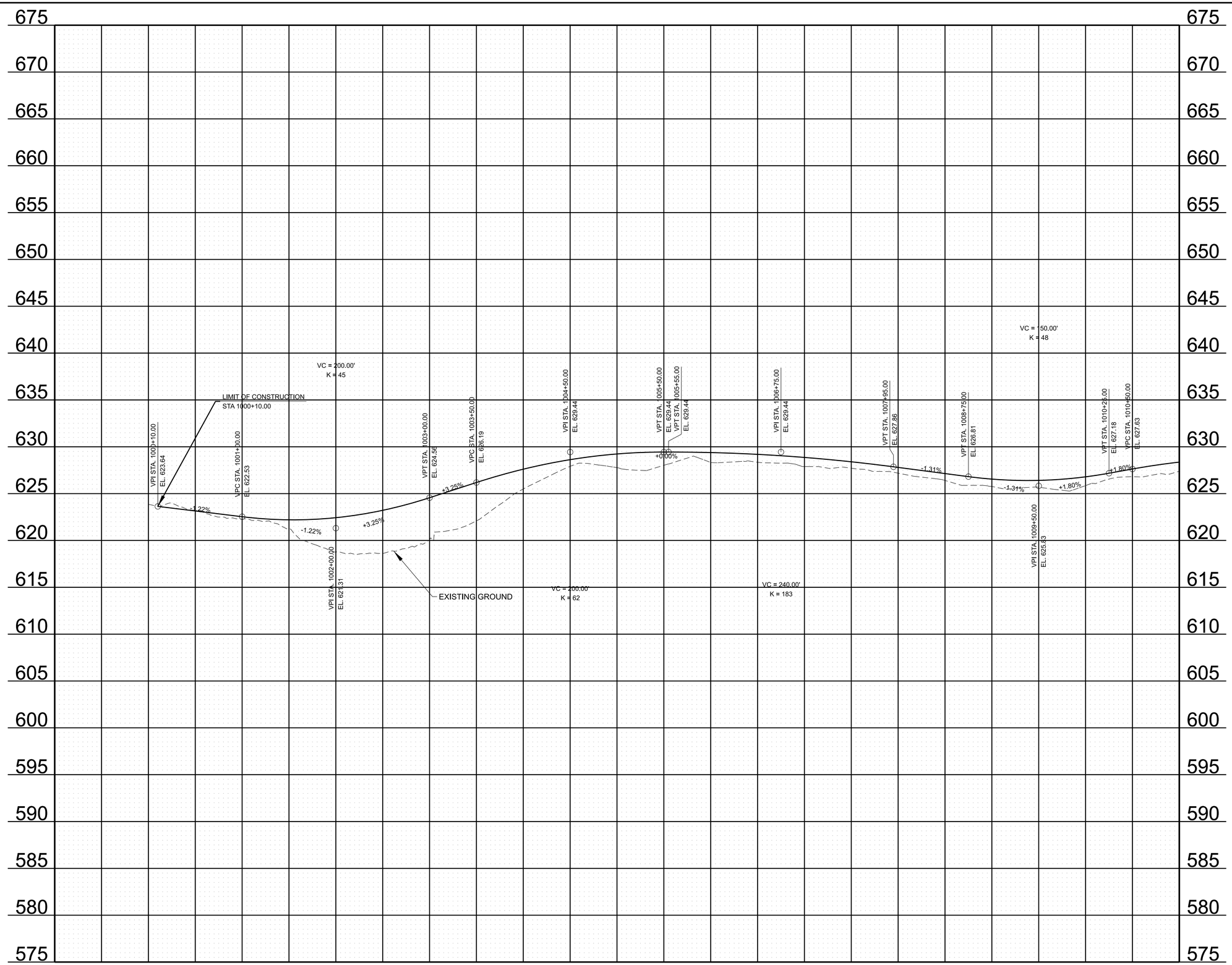
PROPOSED
LAYOUT CONTOURS
TILLMAN DRIVE

STA. 1104+25 TO STA. 1011+00
SCALE: 1" = 50'

2/4/2023 8:58:19 AM
C:\PWWORKING\EAST\01D2328414195\040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

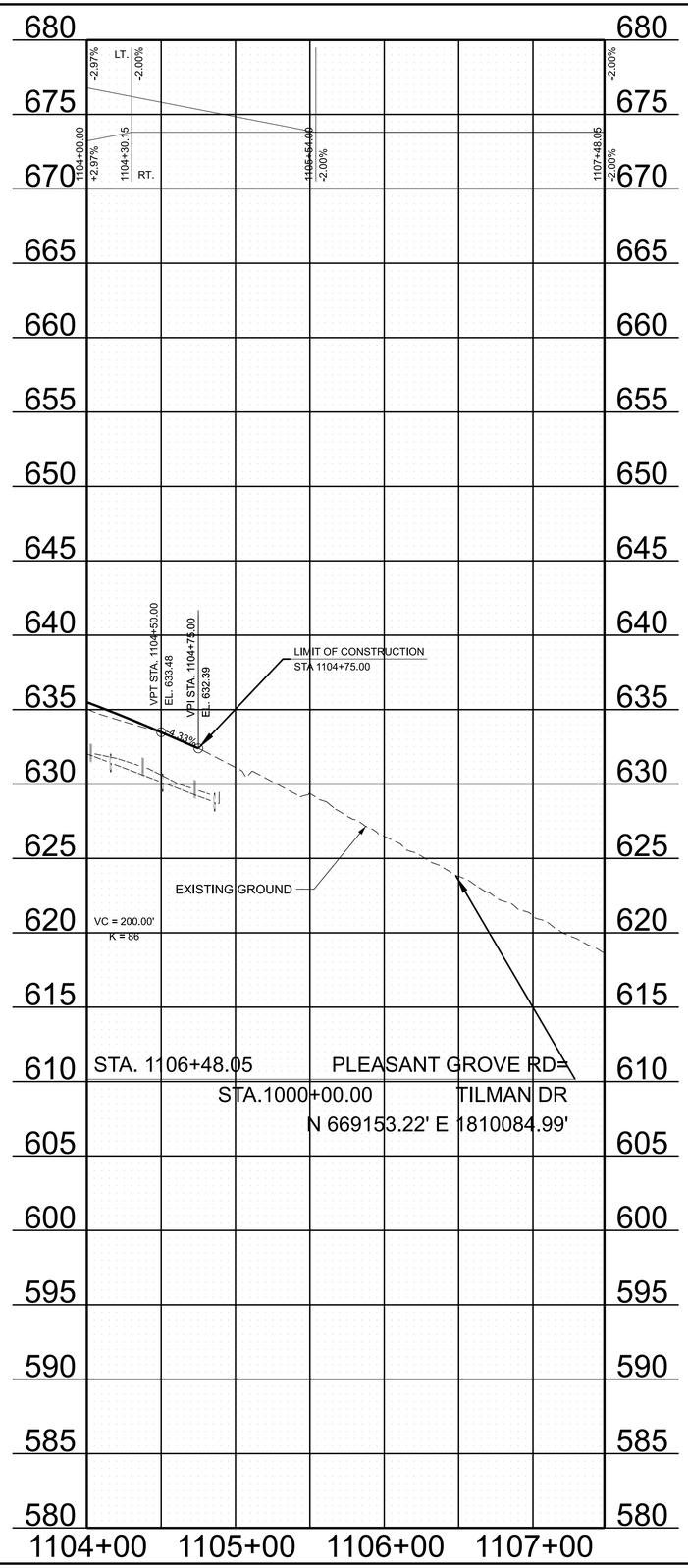
SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
TILLMAN DR
STA. 999+00 TO STA. 1011+00

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:59:11 AM
C:\PWWORKING\EAST\T01\D2328414\95I040-SHT-PROPOSED PROFILE-TILLMAN DRIVEWAY.DGN



TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19E

INITIAL STUDIES REQUEST

SEALED BY

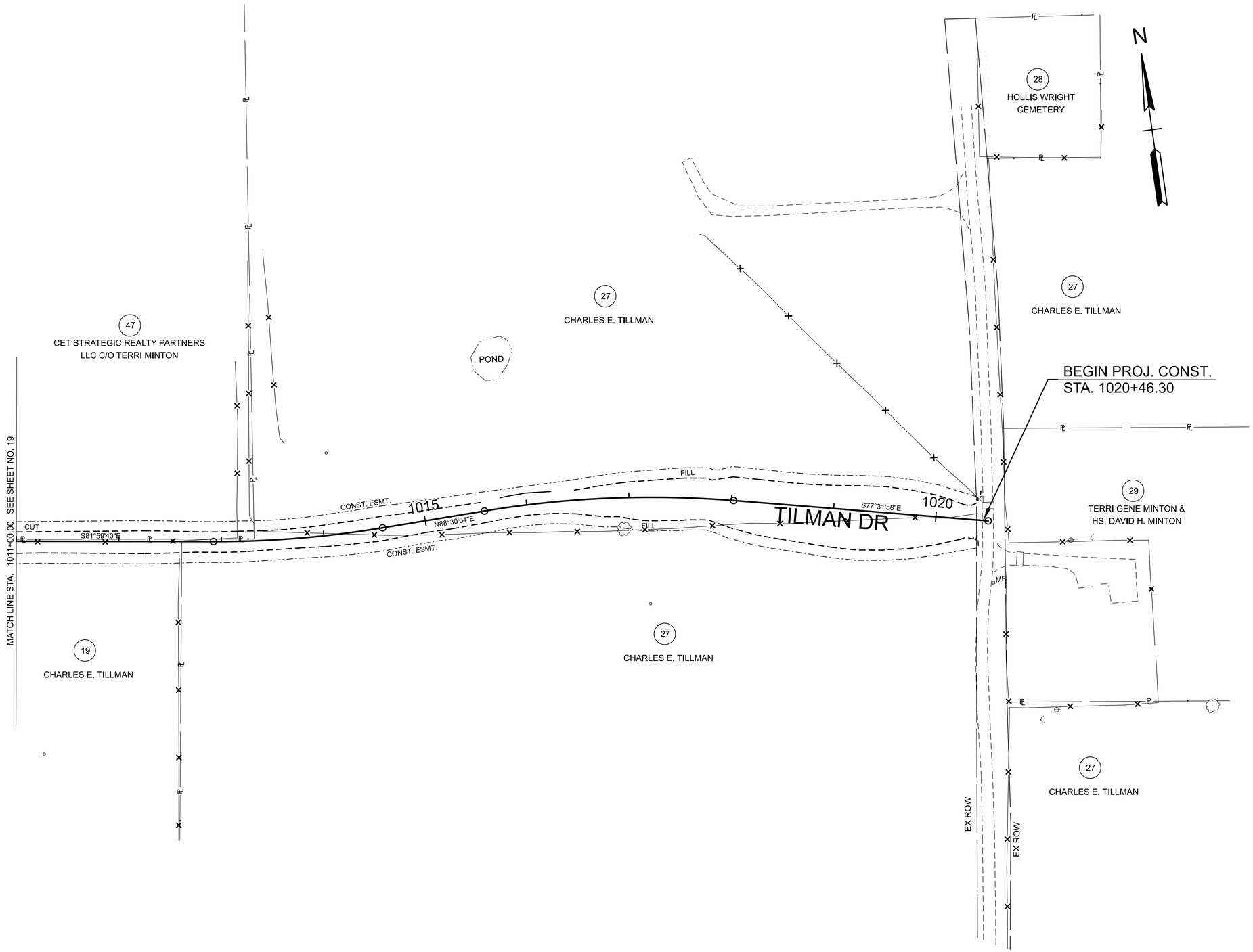
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
PLEASENT GROVE RD
STA. 1104+00 TO STA. 1107+48

SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 8:59:30 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PROPOSED PROFILE-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

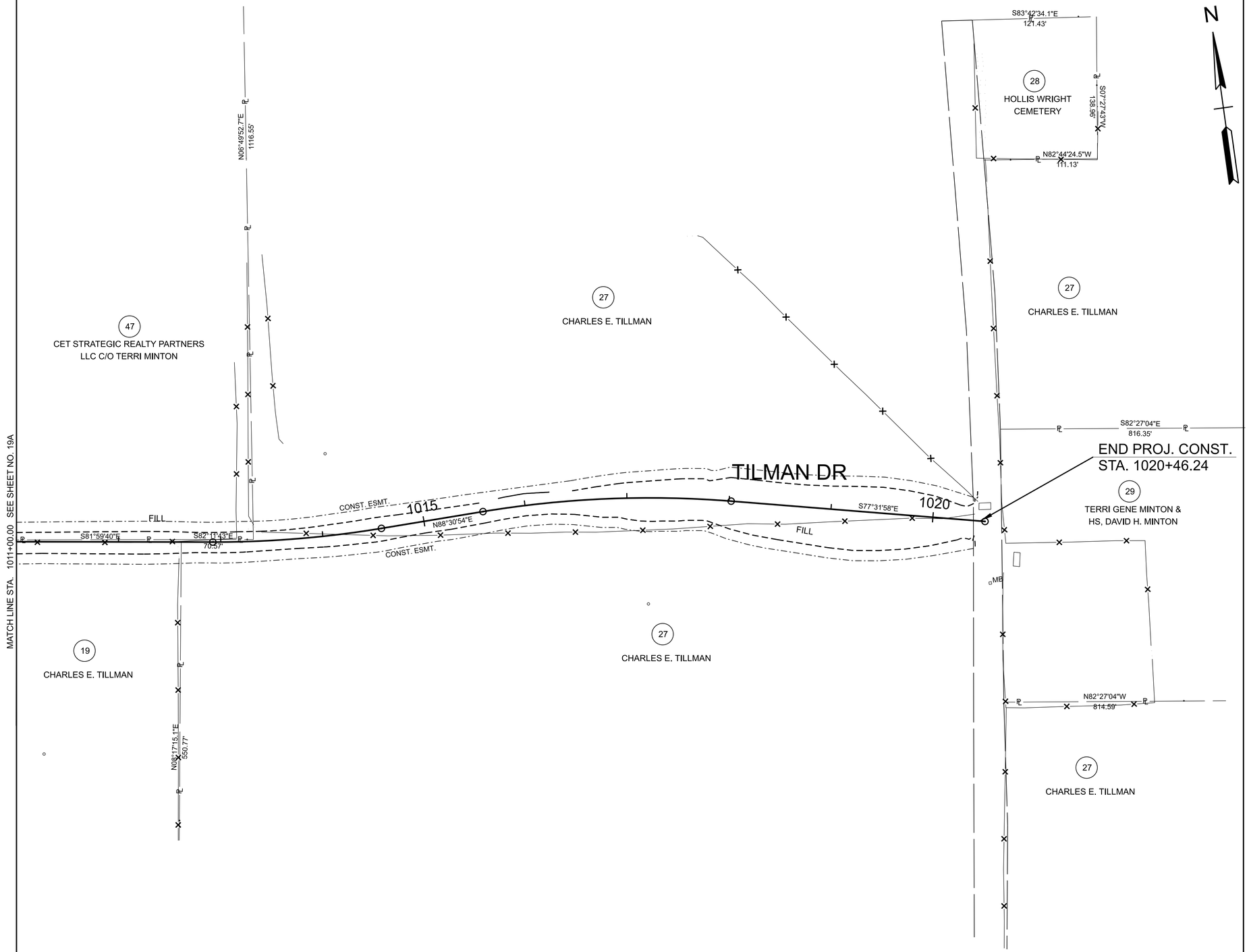
PRESENT LAYOUT
TILMAN DR

STA. 1111+00 TO STA. 1020+50
SCALE: 1" = 50'

2/4/2023 8:59:58 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

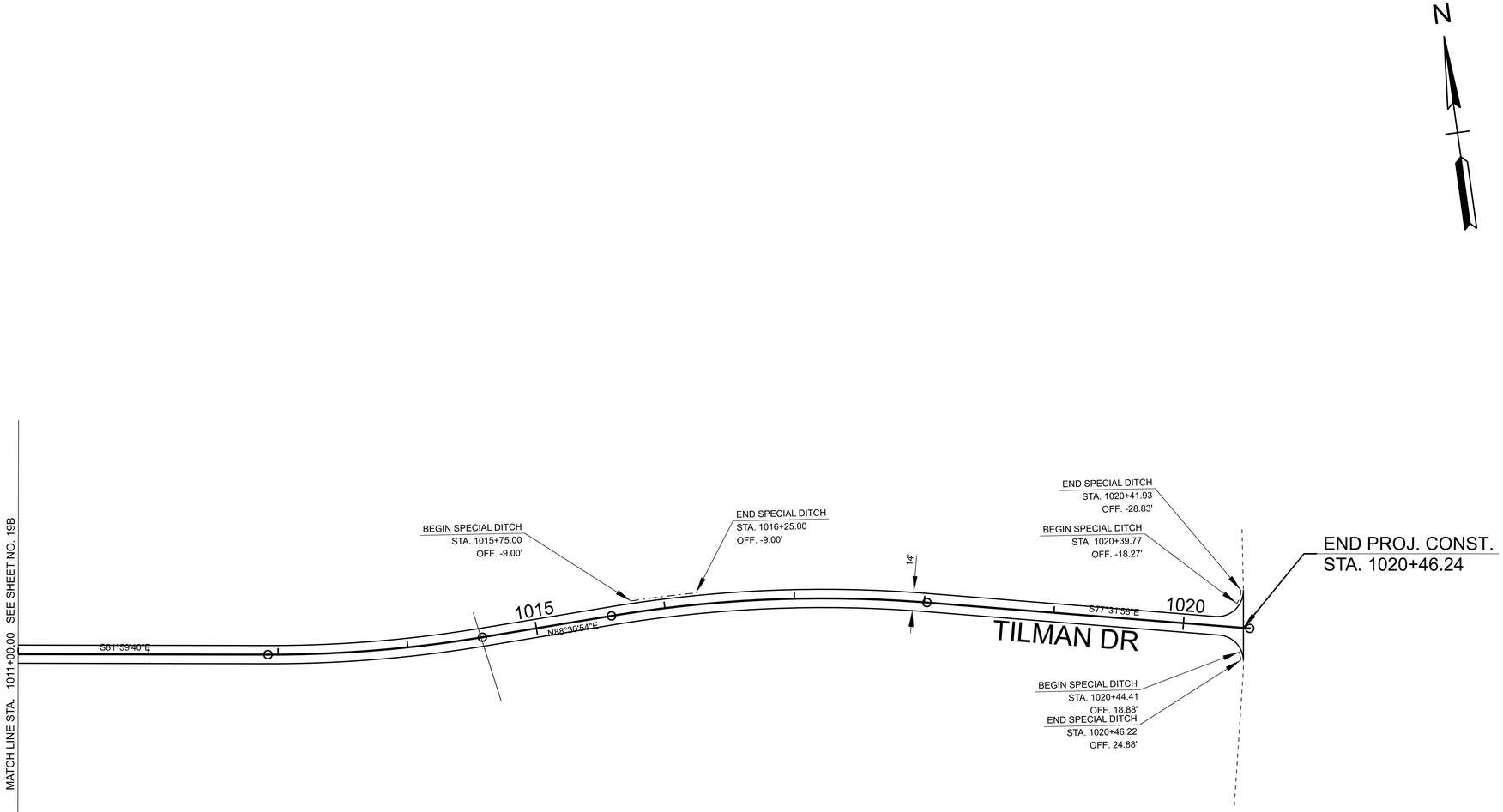
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
TILMAN DR

STA. 1011+00 TO STA. 1020+43
SCALE: 1" = 50'

2/4/2023 9:00:35 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

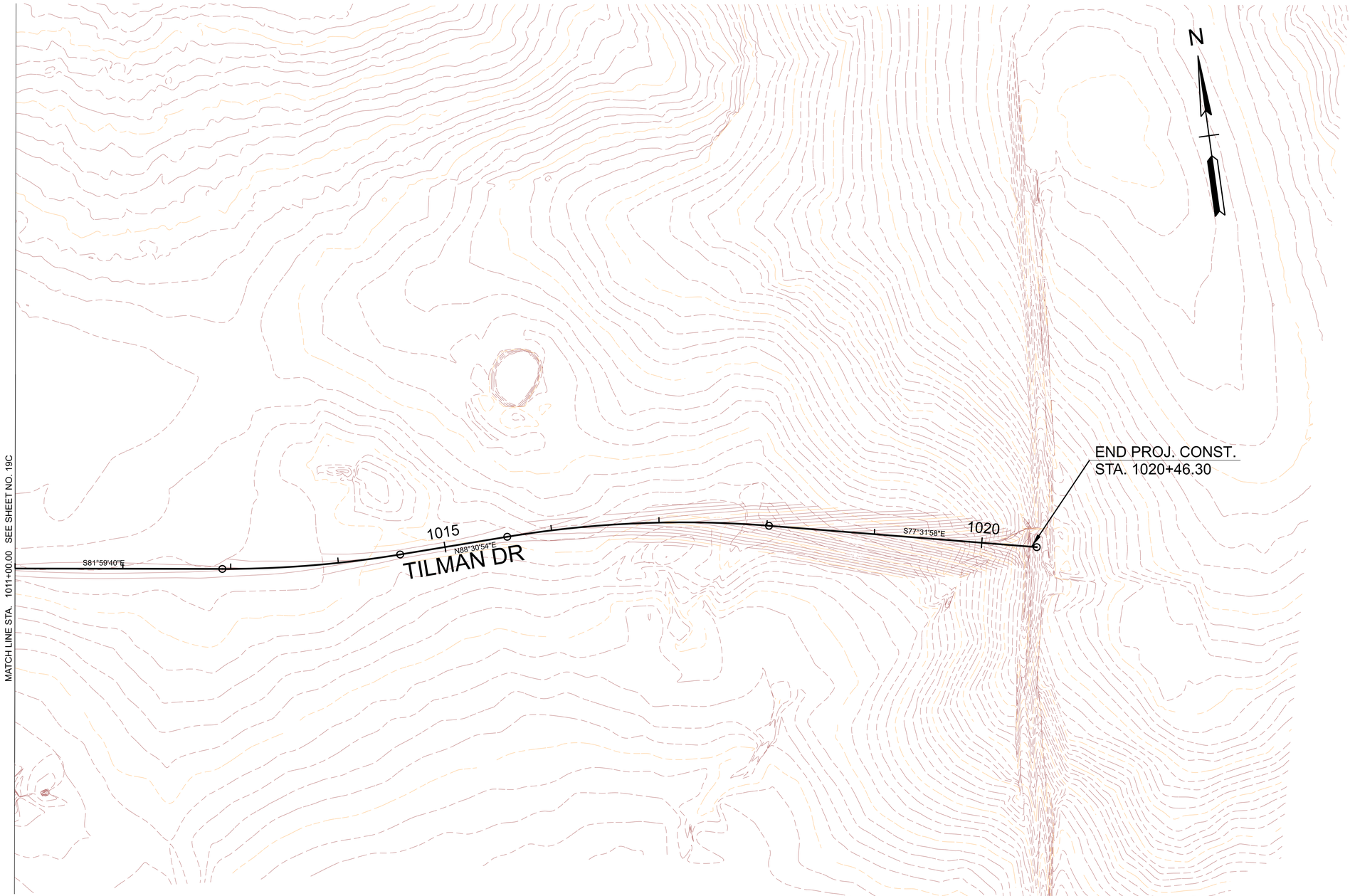
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
TILLMAN DRIVE

STA. 1011+00 TO STA. 1020+43
SCALE: 1" = 50'

2/4/2023 9:01:14 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20C



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

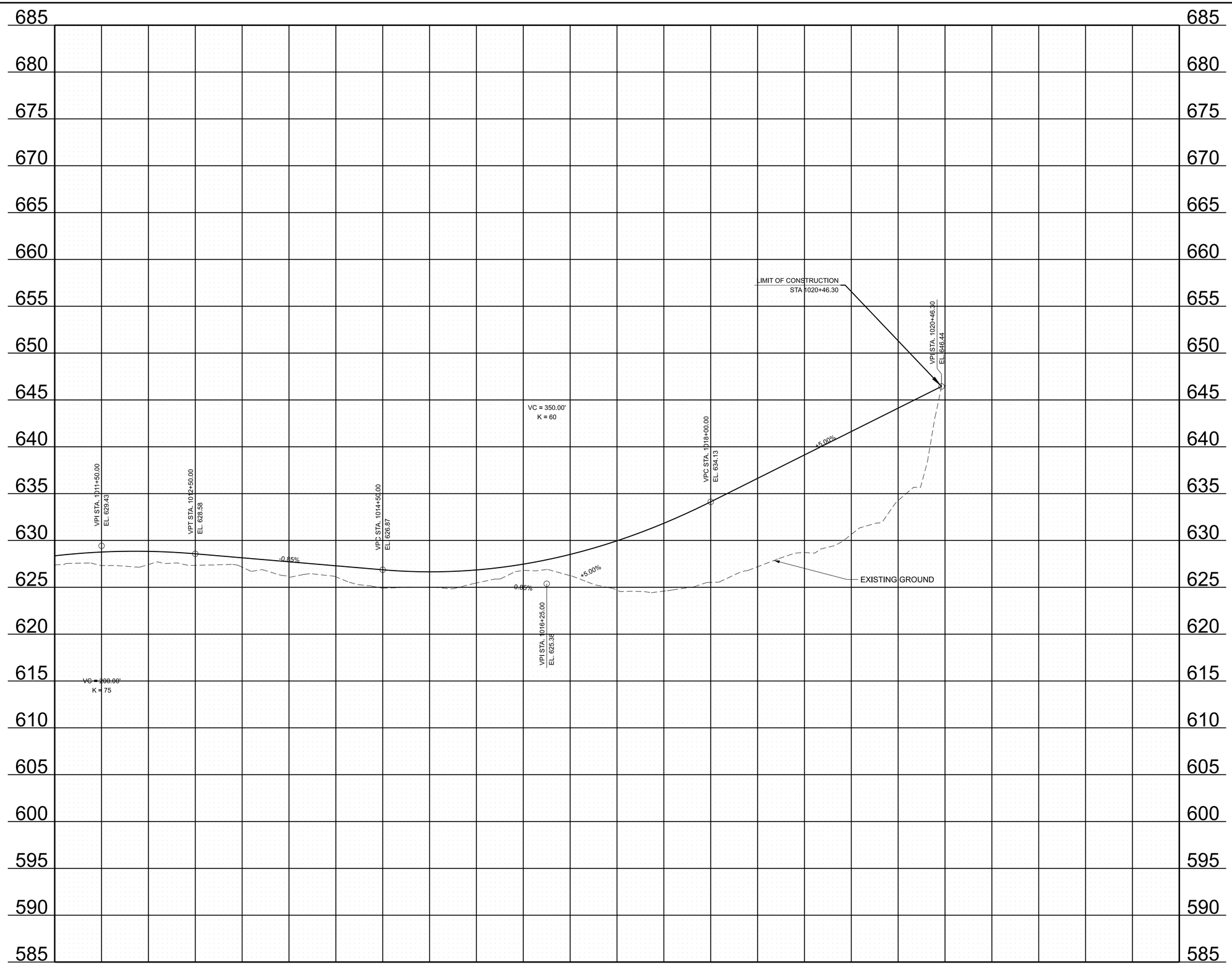
PROPOSED
LAYOUT CONTOURS
TILLMAN DRIVE

STA. 1011+00 TO STA. 1020+43
SCALE: 1" = 50'

2/4/2023 9:01:40 AM
C:\PWWORKINGIEAST01\D2328414\950040-SHT-PLAN PROPOSED LAYOUT_CONTOURS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20D

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIDE ROAD
PROFILE
TILLMAN DR
STA. 1011+00 TO STA. 1020+46

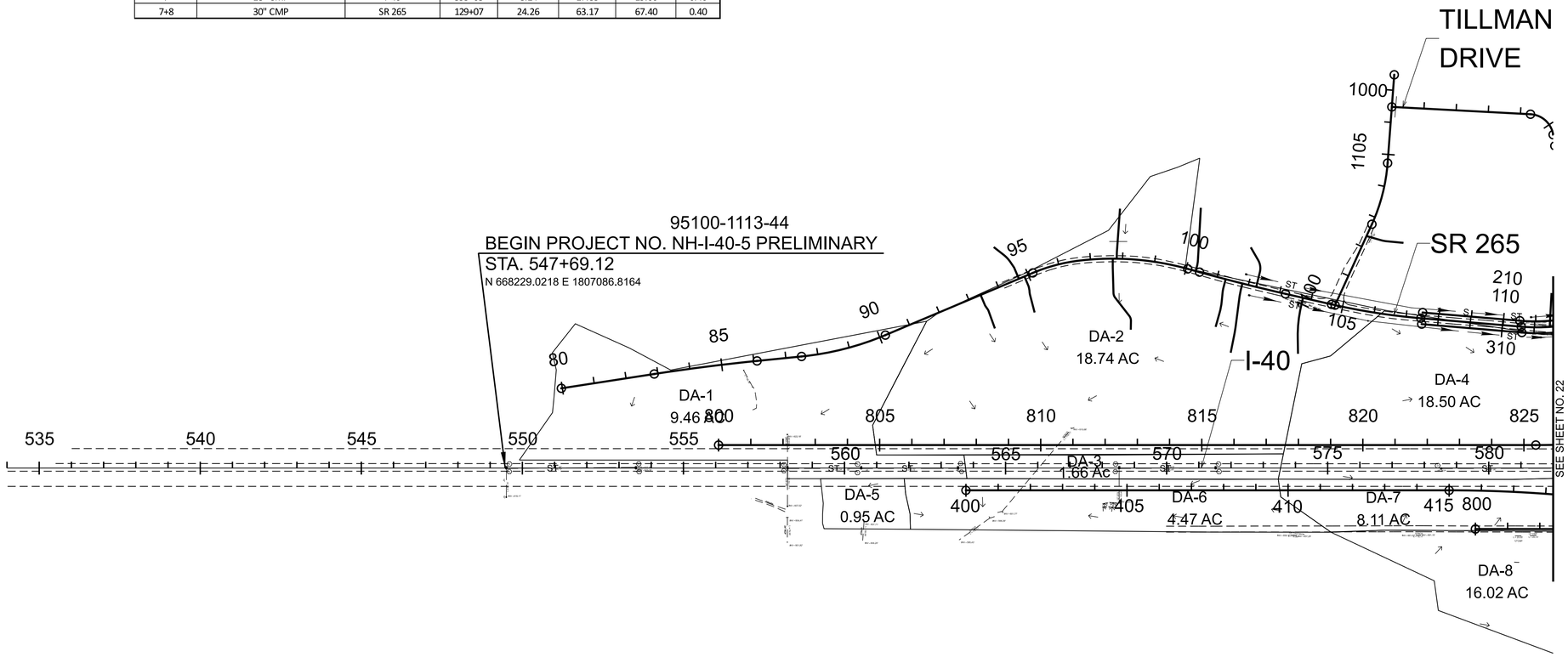
SCALE: 1" = 50' HORIZ.
1" = 5' VERT.

2/4/2023 9:02:03 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PROPOSED PROFILE-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19

DRAINAGE TABLE

DRAINAGE AREA	STRUCTURE	LOCATION	STATION	AREA (AC)	Q50 (CFS)	Q100(CFS)	C
1	24" RCP	I-40	558+07	9.46	23.10	24.63	0.40
2	36" RCP	I-40	567+05	17.70	59.60	63.71	0.40
3	18" RCP	I-40	568+52.56	1.70	12.64	13.51	0.90
4	24" CMP	SR 265	122+07.01	18.50	61.12	65.34	0.40
5	18" RCP	I-40	560+60	0.95	2.10	2.25	0.30
2+3+6	36" RCP (ESTIMATE)	I-40	564+52	23.90	82.00	87.65	0.30
7	18" CMP	I-40	593+05	8.24	17.83	19.00	0.40
7+8	30" CMP	SR 265	129+07	24.26	63.17	67.40	0.40



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DRAINAGE AREA MAP

SCALE: 1" = 200'

SCALE: SHEET 1 OF 3

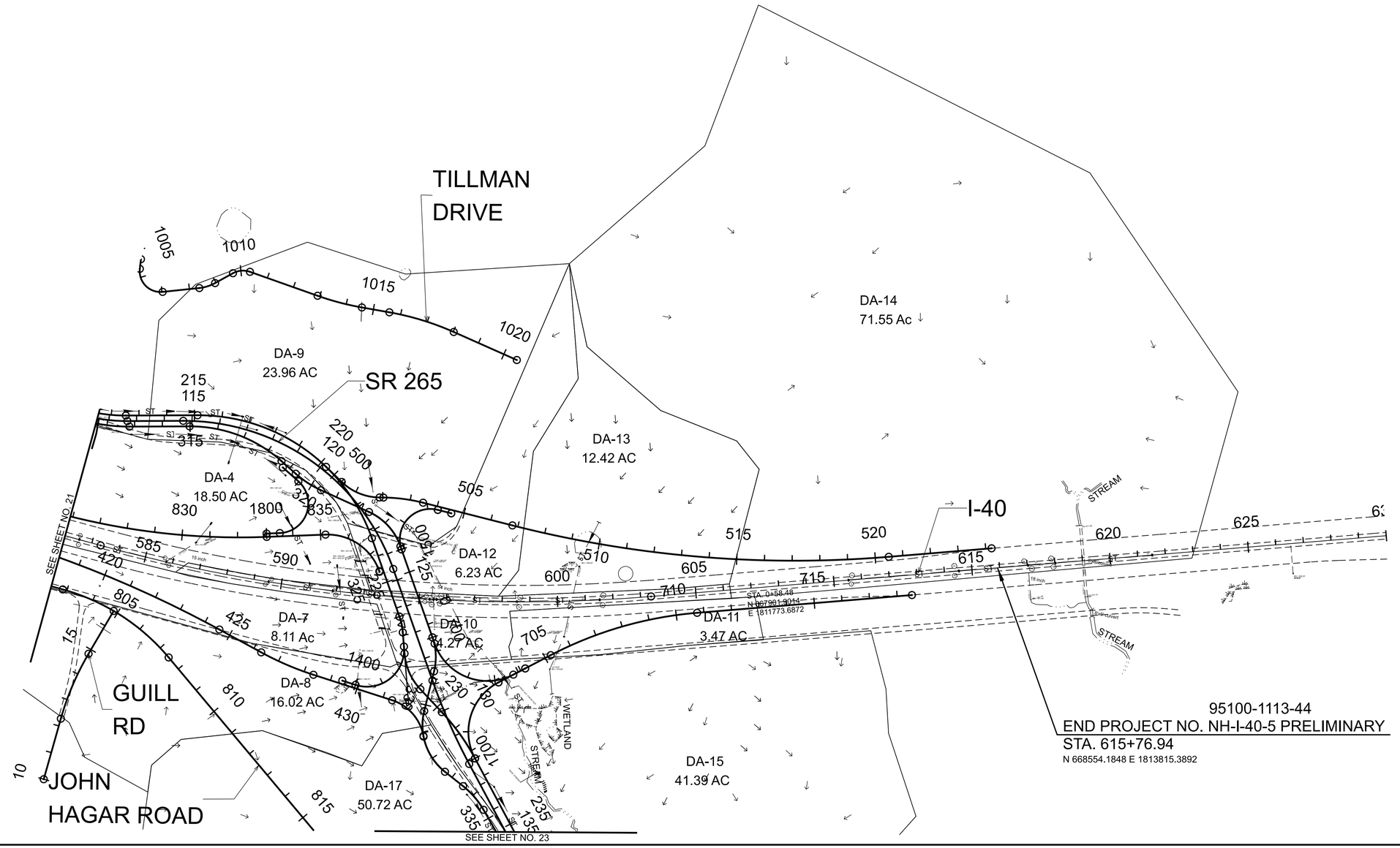
2/4/2023 11:19:47 AM
c:\pw\working\east01\d2328414\95l040-SHT-Drainage Map.dgn

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20

REV. ***DATE***
TEXT

DRAINAGE TABLE

DRAINAGE AREA	STRUCTURE	LOCATION	STATION	AREA (AC)	Q50 (CFS)	Q100(CFS)	C
4+9	30" CMP	SR 265	124+00, 120.7	42.46	105.56	113.17	0.40
4+9+12	60" RCP	I-40	595+28	48.69	118.97	127.46	0.35
4+9+12+10	60" RCP	I-40	596+80	52.97	140.38	150.32	0.70
13+11	24" CMP	I-40	600+20	15.80	49.82	53.21	0.53
13	24"CMP	I-40	600+52.08	12.33	34.99	37.36	0.40
14	EX. 8'X6' CULVERT	I-40	618+98	73.77	156.20	167.62	0.44



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DRAINAGE AREA MAP

SCALE: 1" = 200'

SCALE: SHEET 2 OF 3

2/4/2023 11:19:52 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	21

REV. ***DATE***
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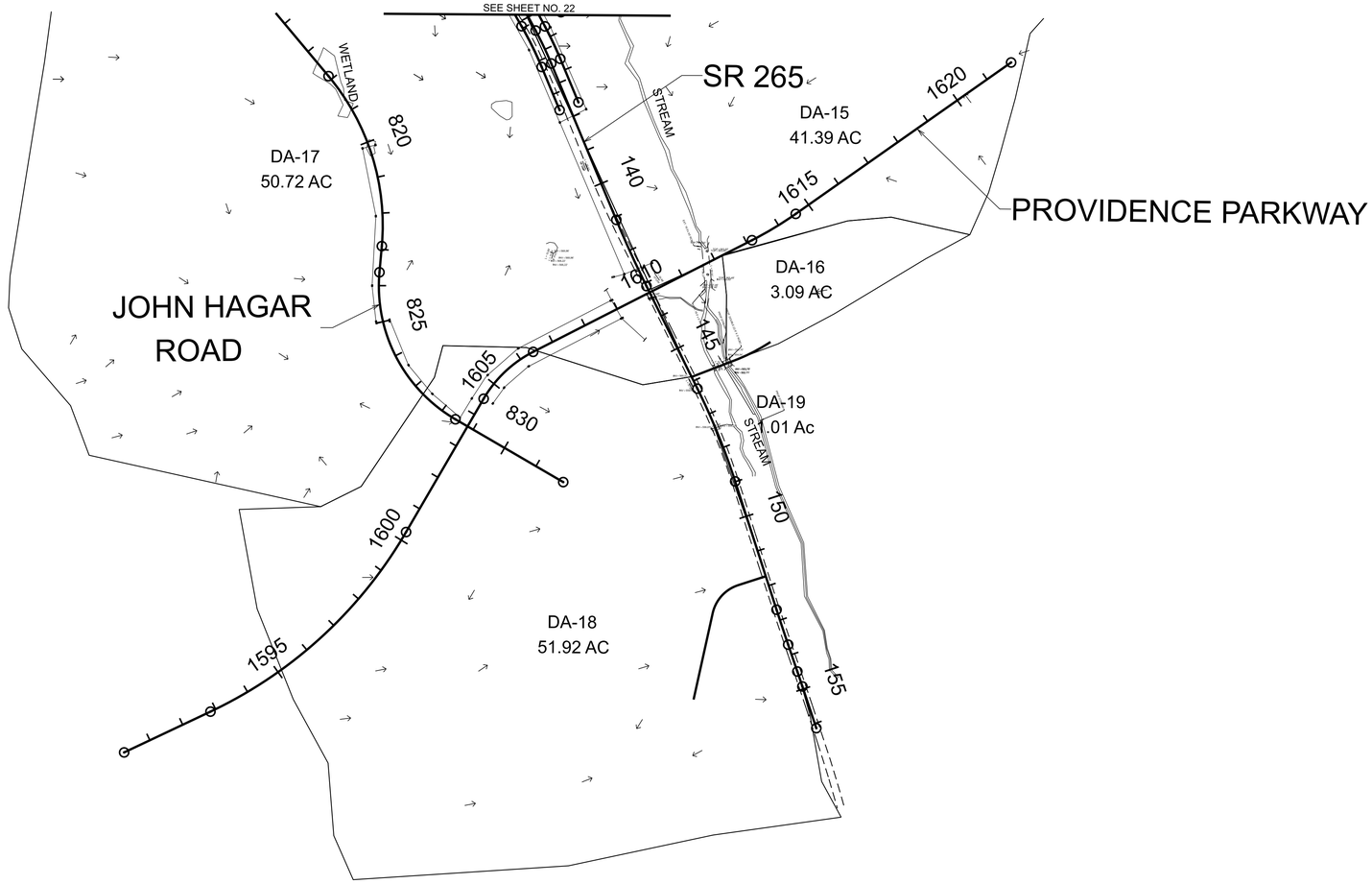

DRAINAGE TABLE

DRAINAGE AREA	STRUCTURE	LOCATION	STATION	AREA (AC)	Q50 (CFS)	Q100(CFS)	C
15	18.5' X5' DOUBLE BOX CULVERT	Providence Parkway	1611+90	41.39	41.08	45.29	0.35
15	5.7' X 3.8' CULVERT	SR 265- DR 145+88	67.52' LT	41.39	41.08	45.29	0.35
16	18" CMP	SR 265- DR 145+88	108.97' LT	3.09	5.85	6.24	0.35
17	4 X 18" CMP	SR 265	143+42	50.72	94.28	100.80	0.40
18	18" CMP	SR 265	147+41.98	38.73	60.39	65.04	0.34
19	24" CMP	SR 265- DR 145+88	79.59' LT	1.01	2.74	2.92	0.42

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DRAINAGE AREA MAP

SCALE: 1" = 200'

SCALE: SHEET 3 OF 3

2/4/2023 11:19:58 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A1

REV. ***DATE***
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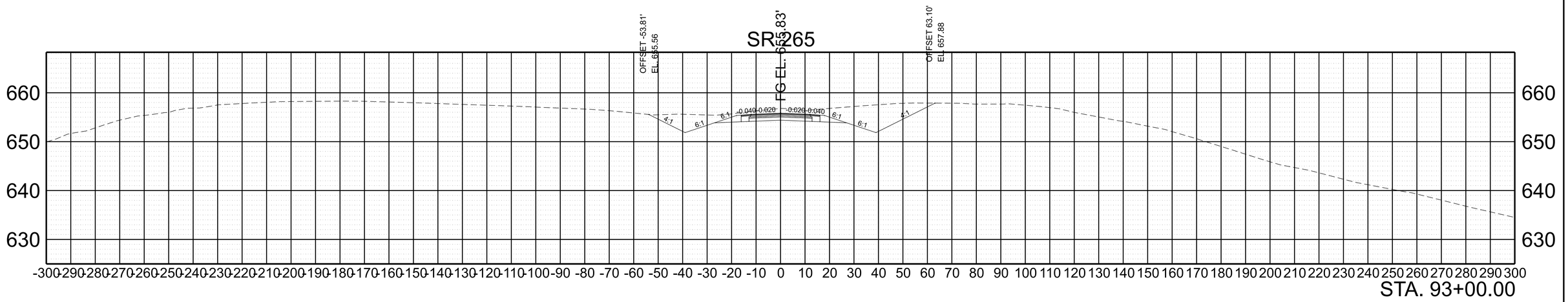

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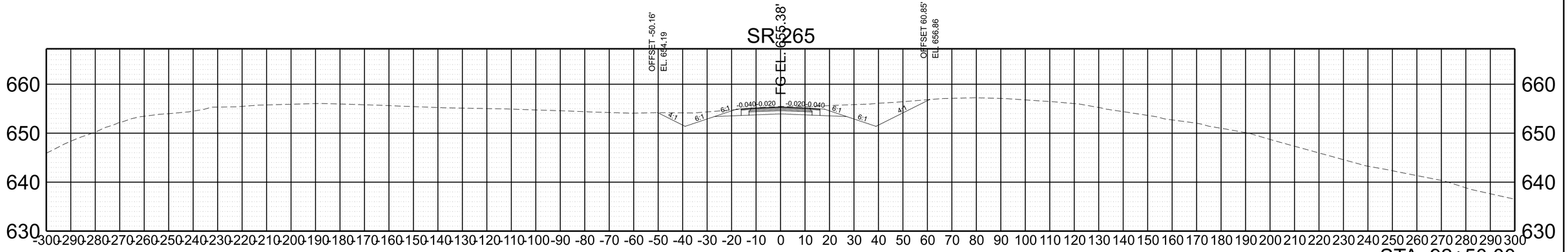

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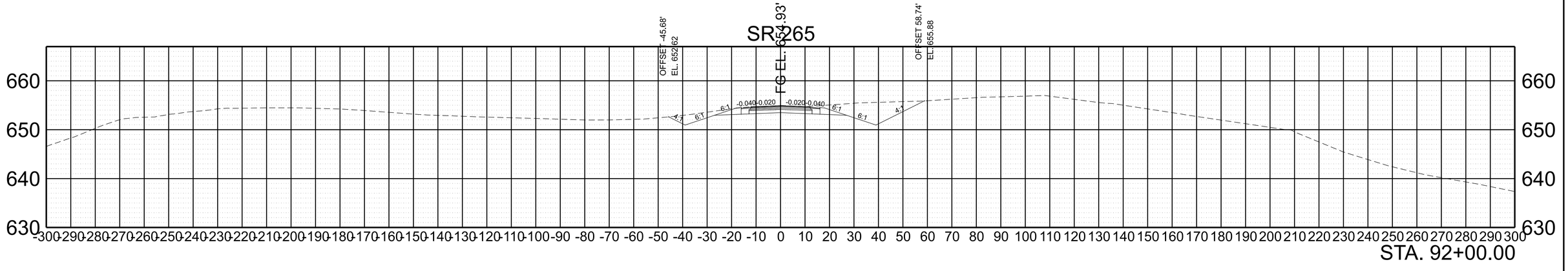

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A2

REV. ***DATE***
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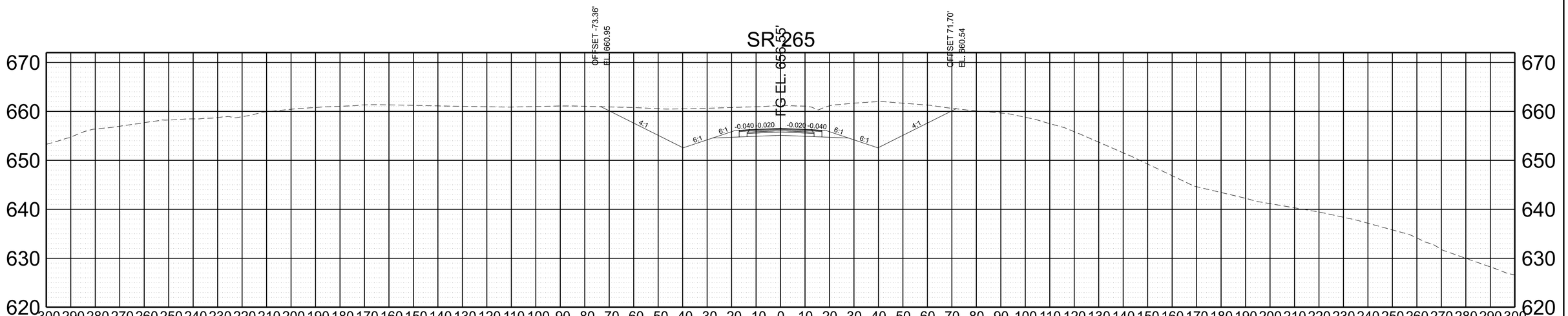

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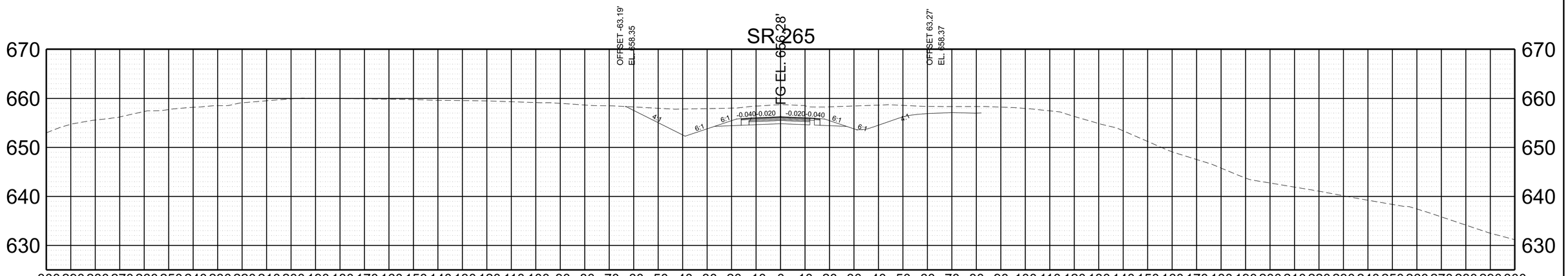

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A3

REV. ***DATE***
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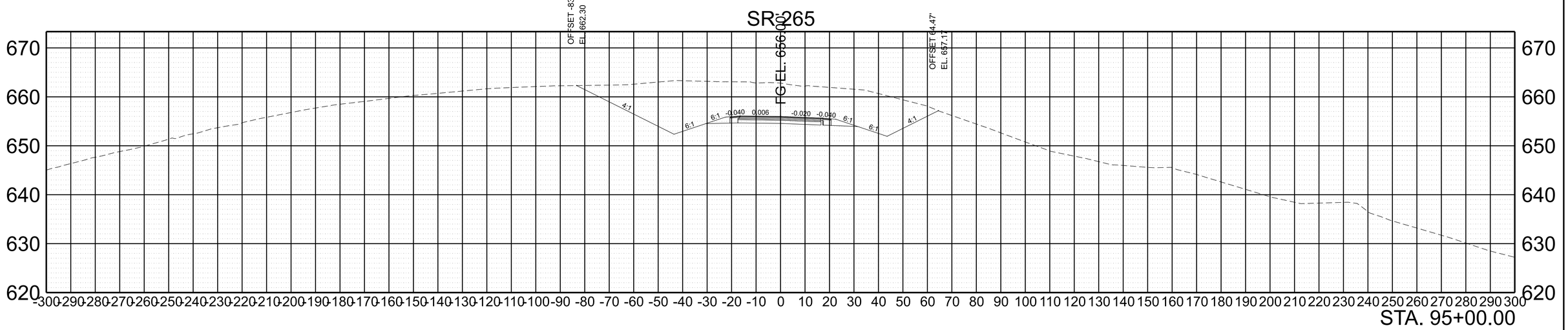

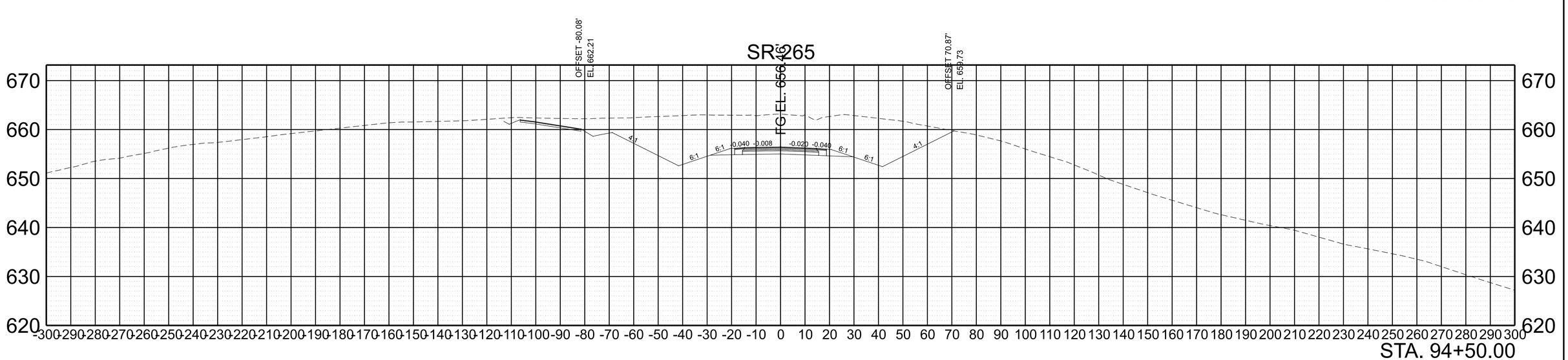

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A4

REV. ***DATE***
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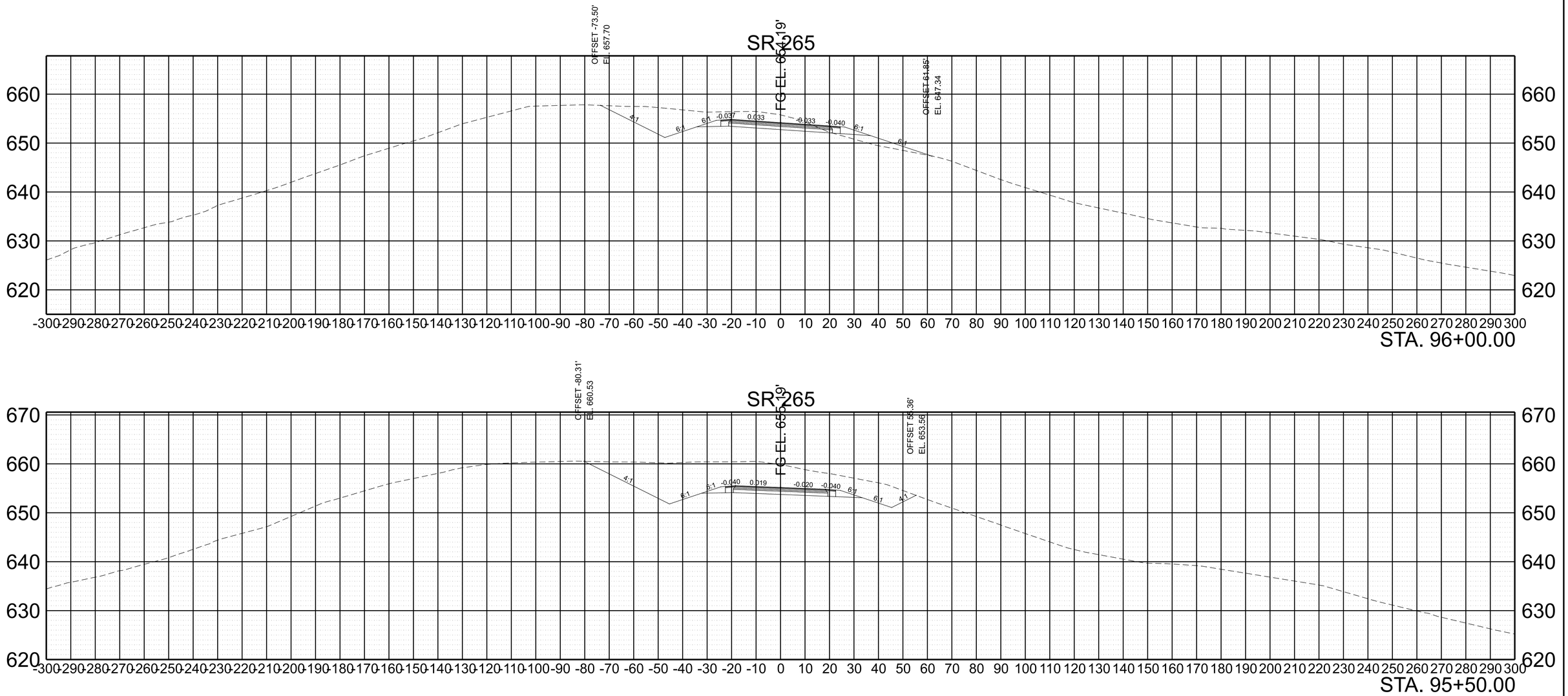

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A5

REV. ***DATE***
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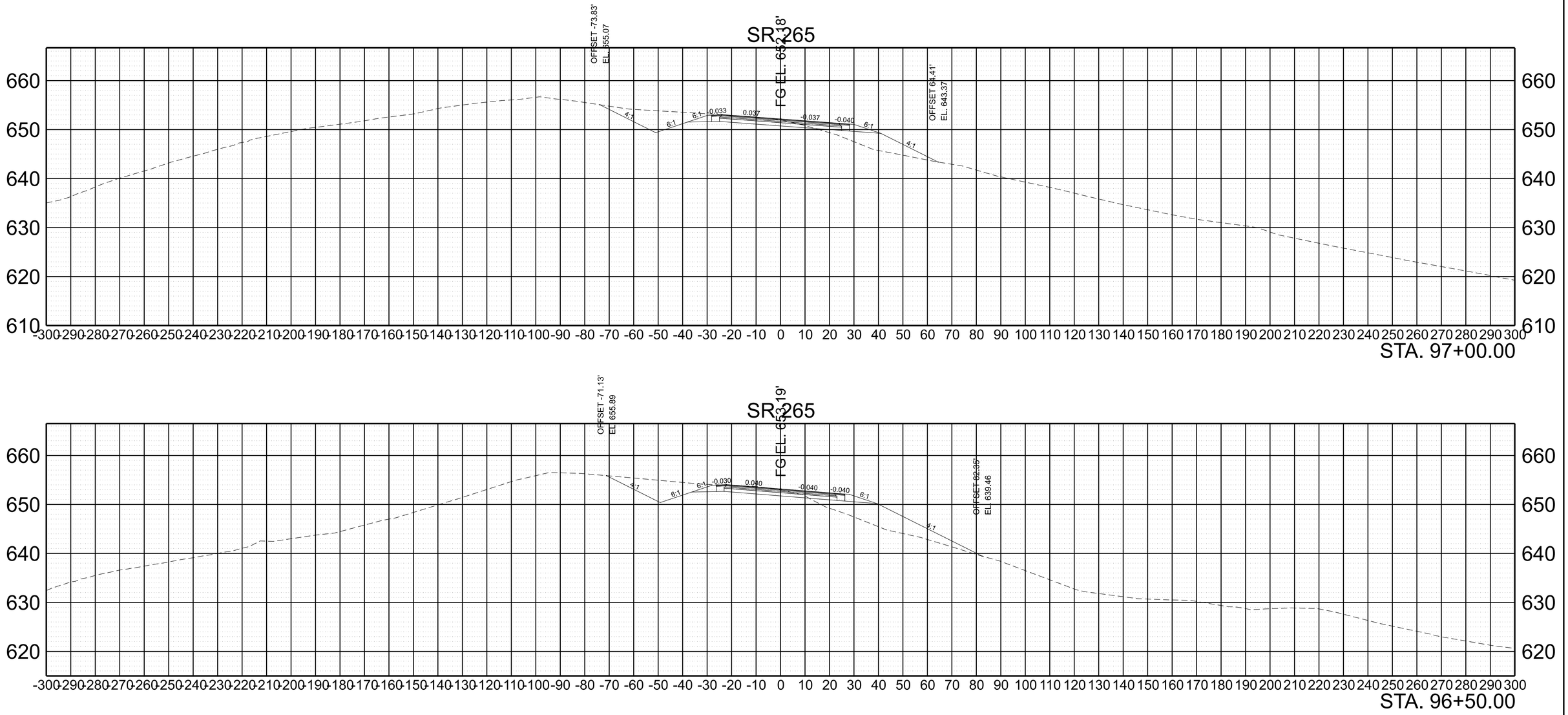

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A6

REV. ***DATE***
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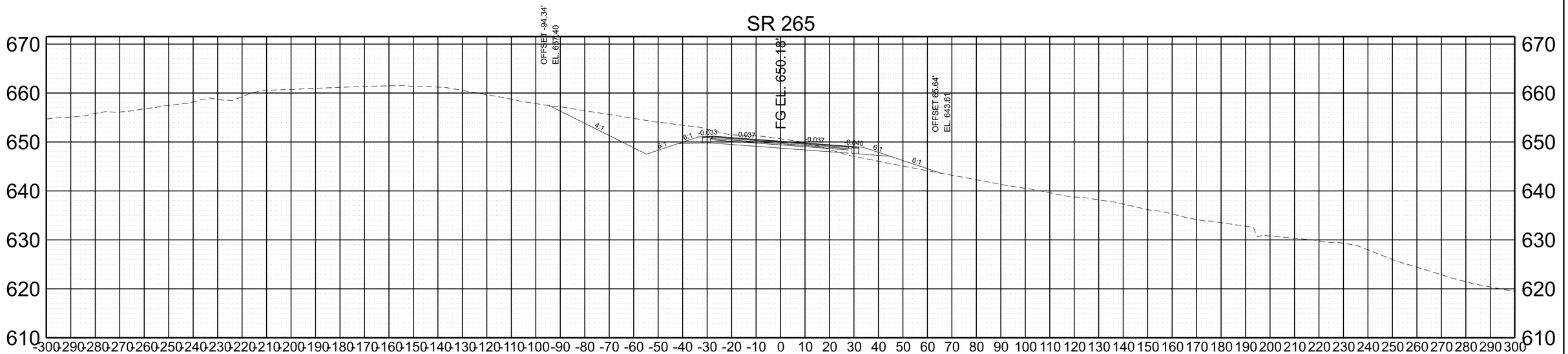

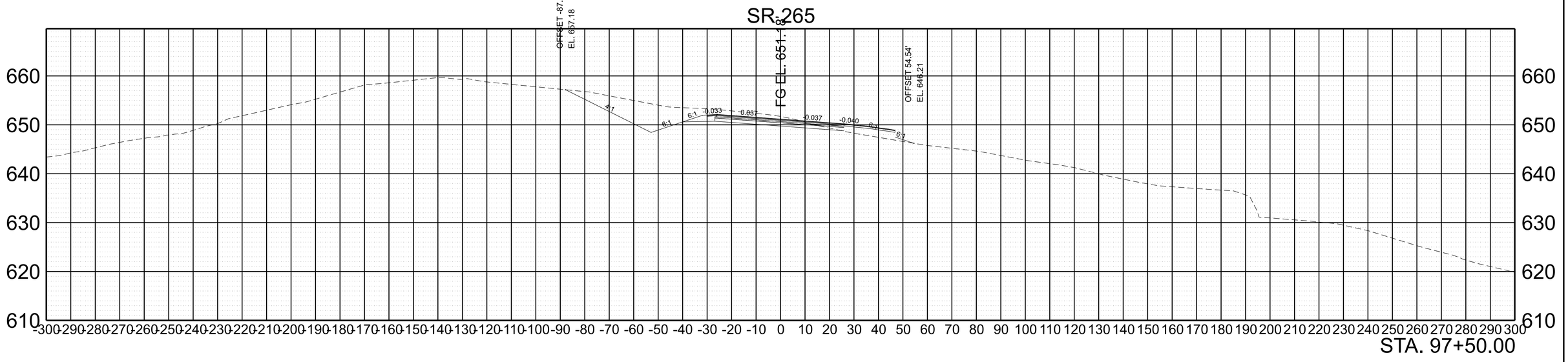

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A7

REV. ***DATE***
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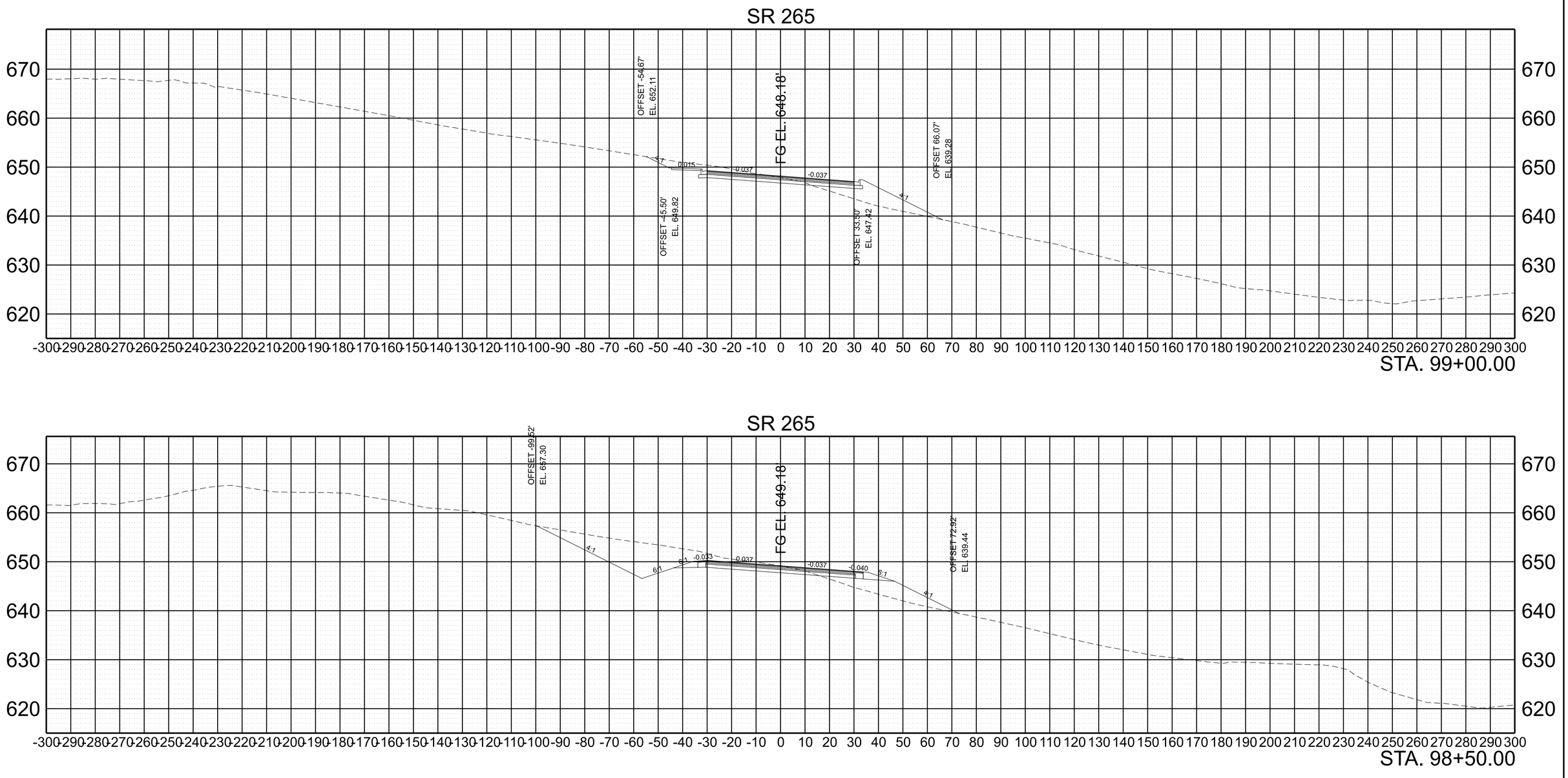

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A8

REV. ***DATE***
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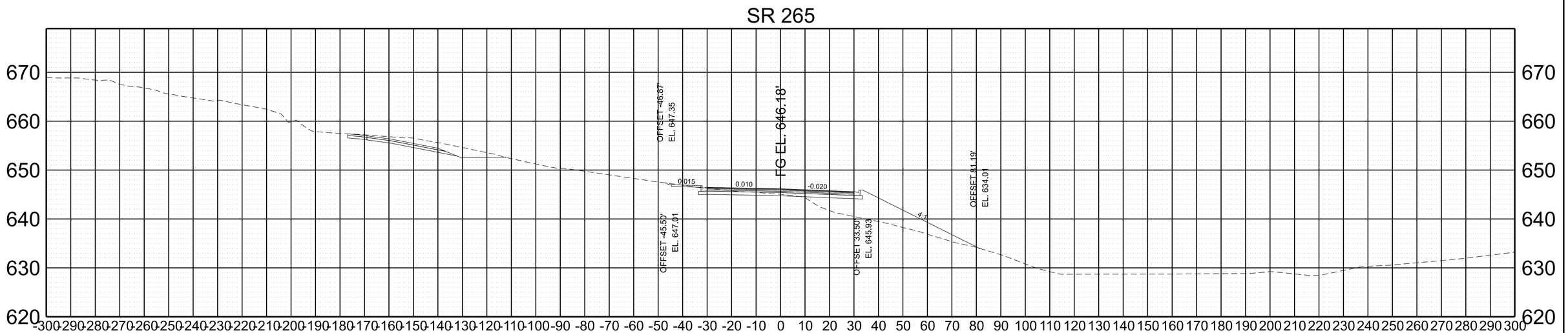

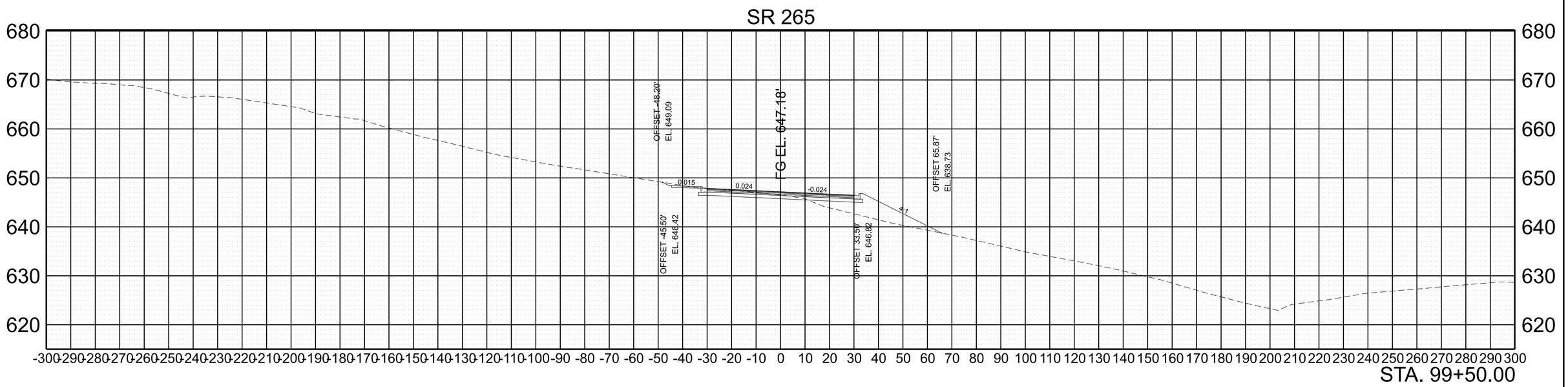

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A9

REV. ***DATE***
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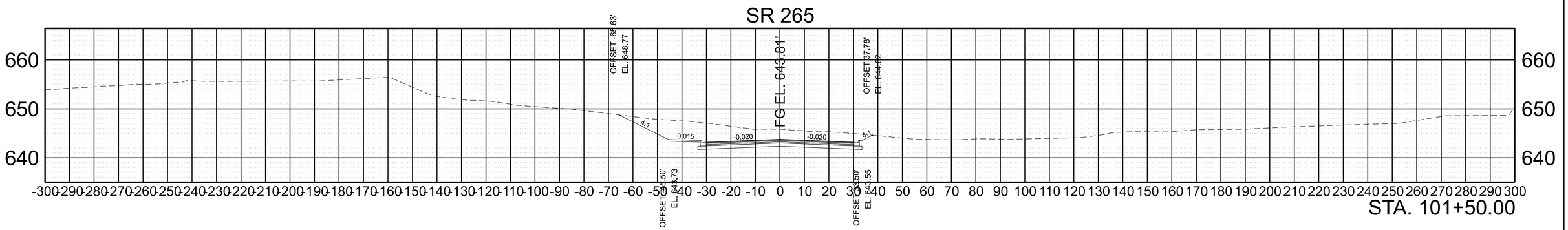

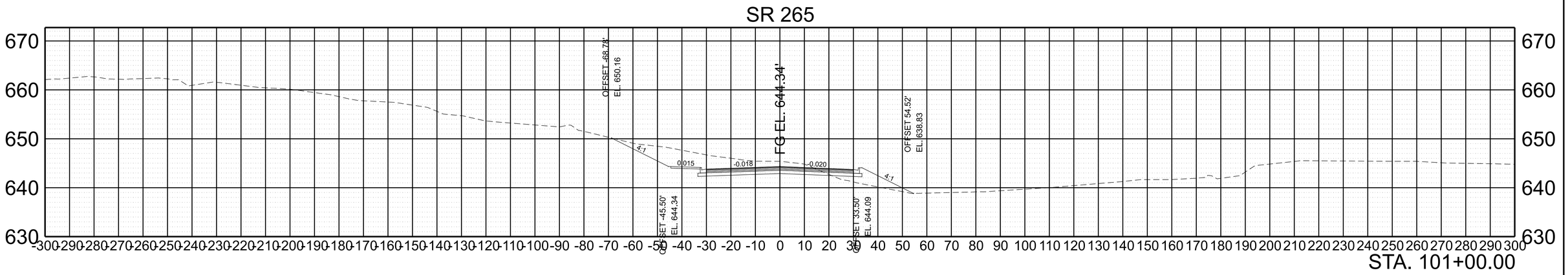

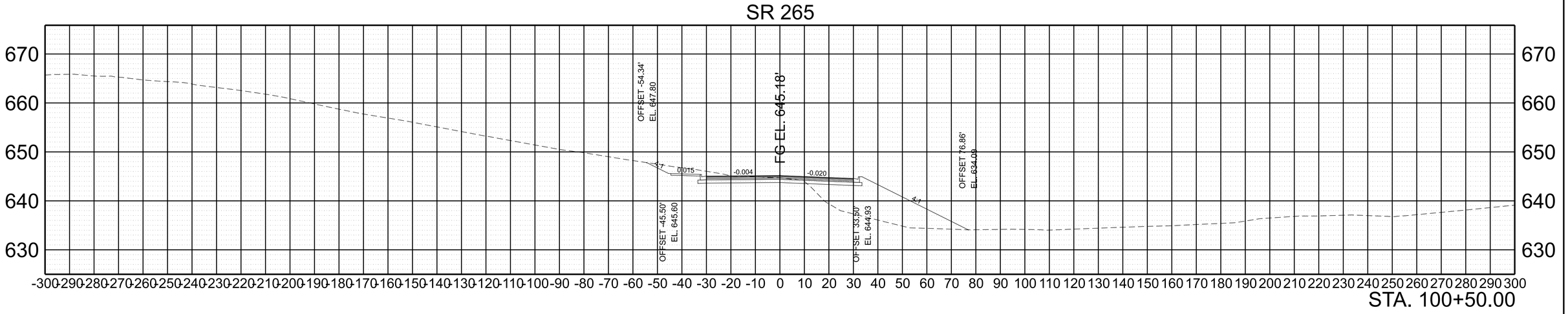

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A10

REV. ***DATE***
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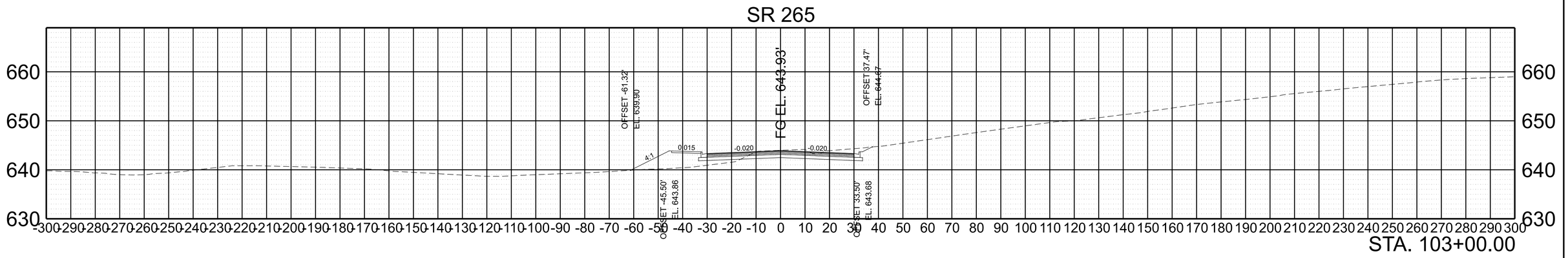

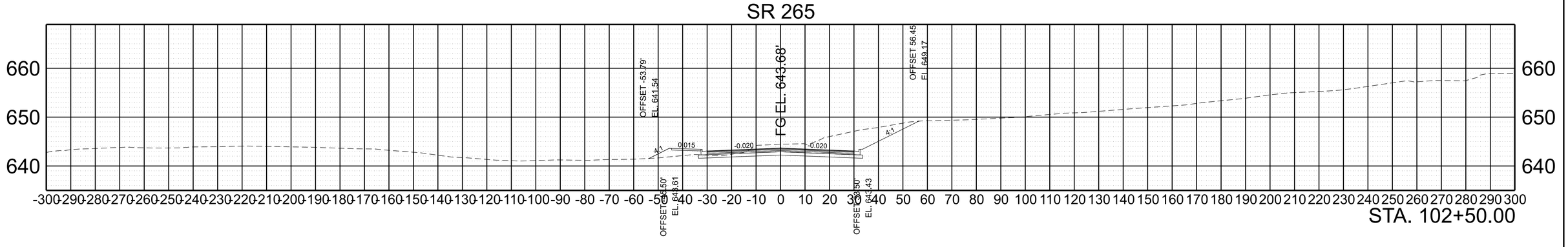

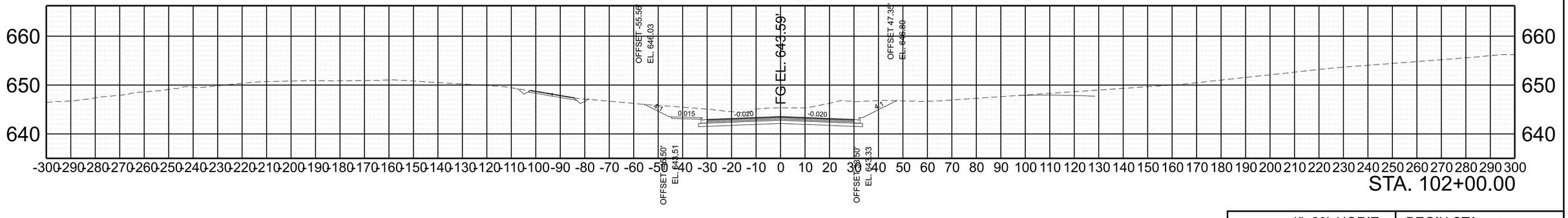

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A11

REV. ***DATE***
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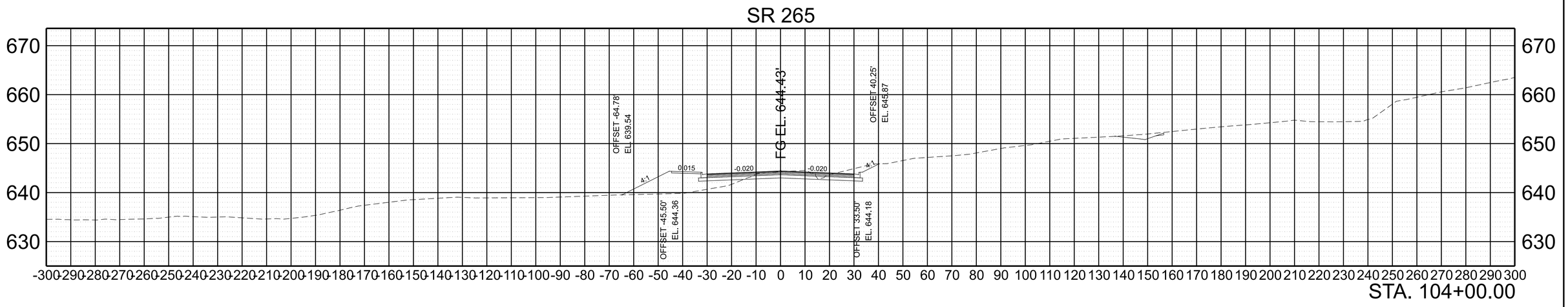

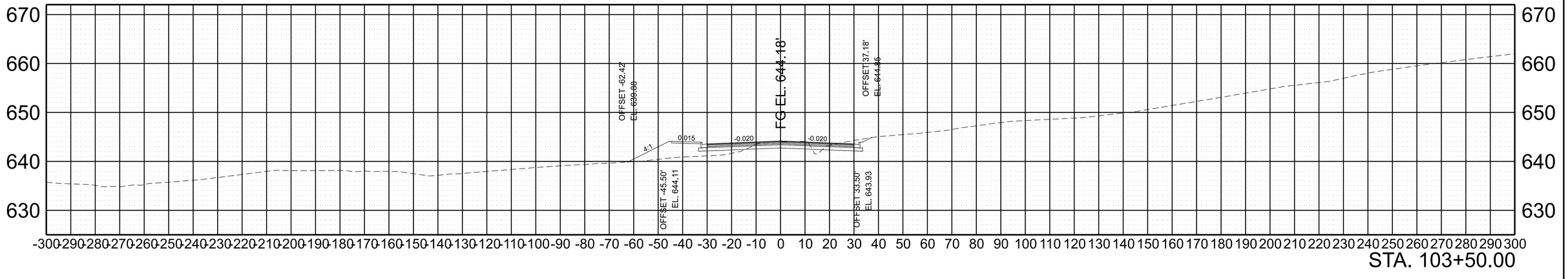

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A12

REV. ***DATE***
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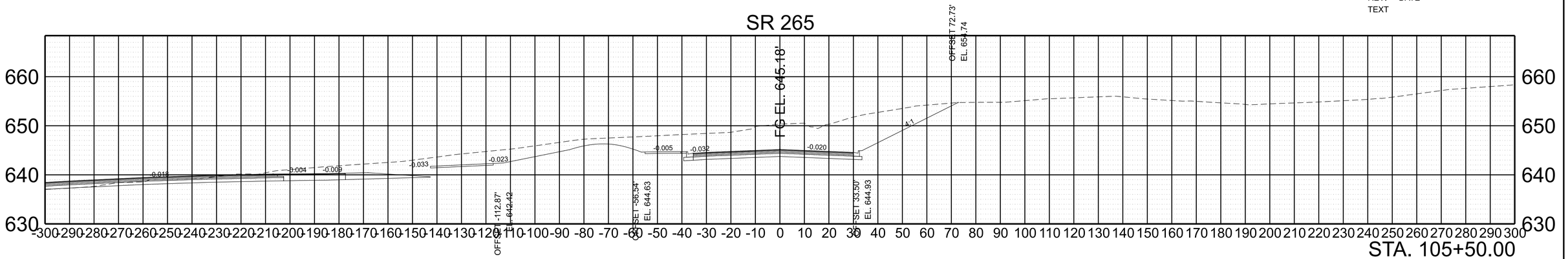

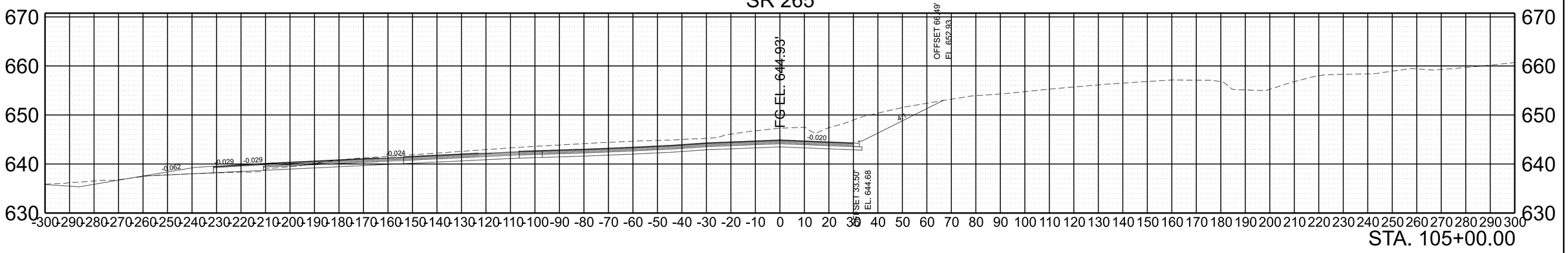

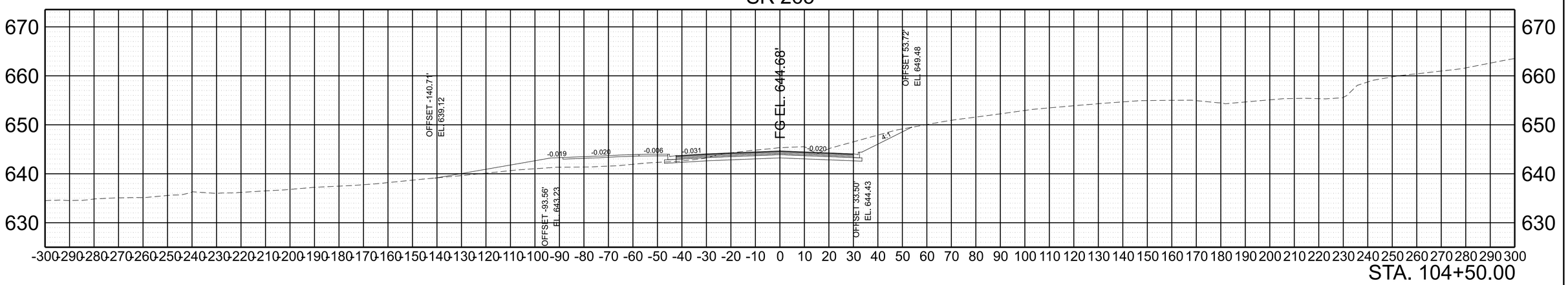

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A13

REV. ***DATE***
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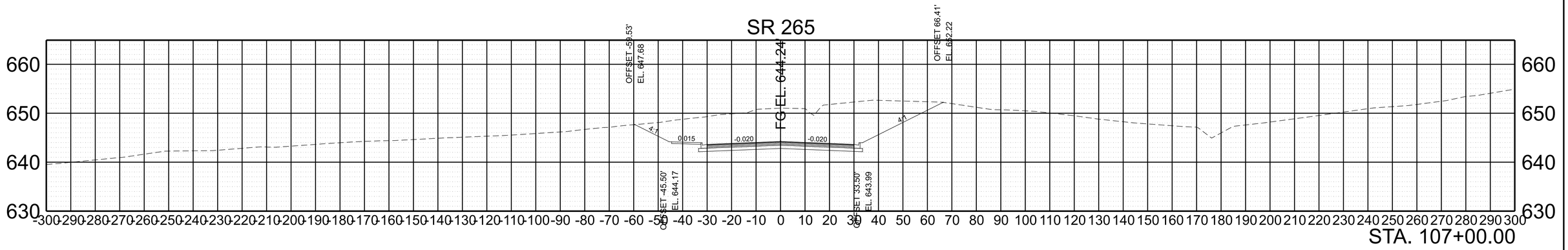

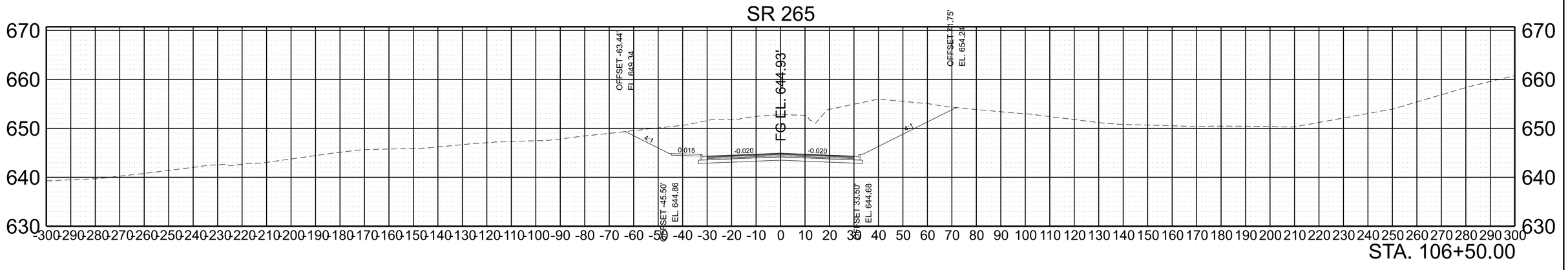

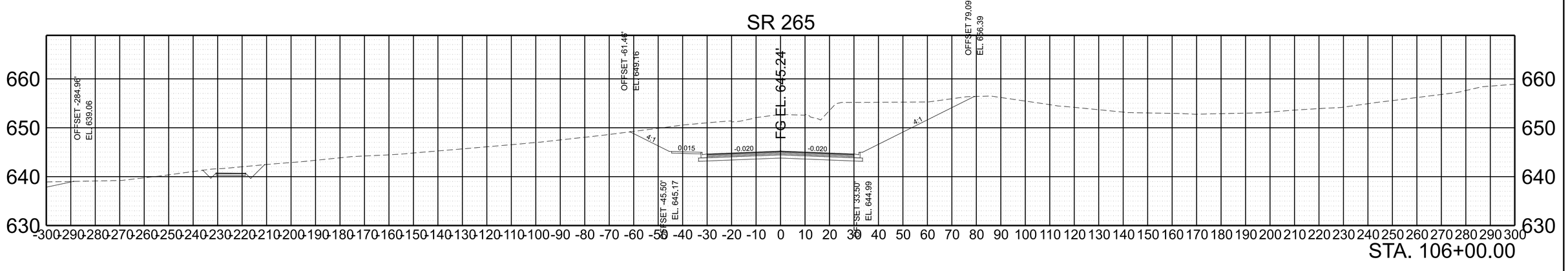

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A14

REV. ***DATE***
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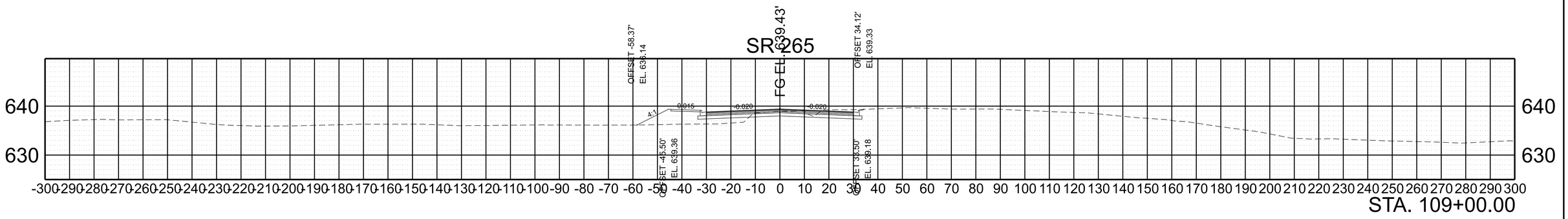

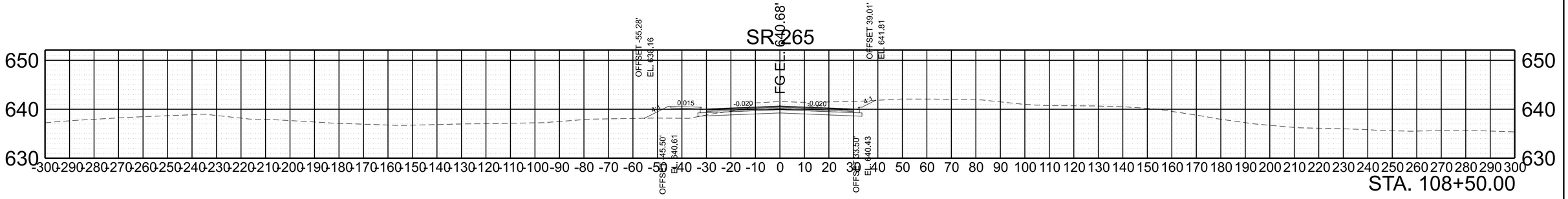

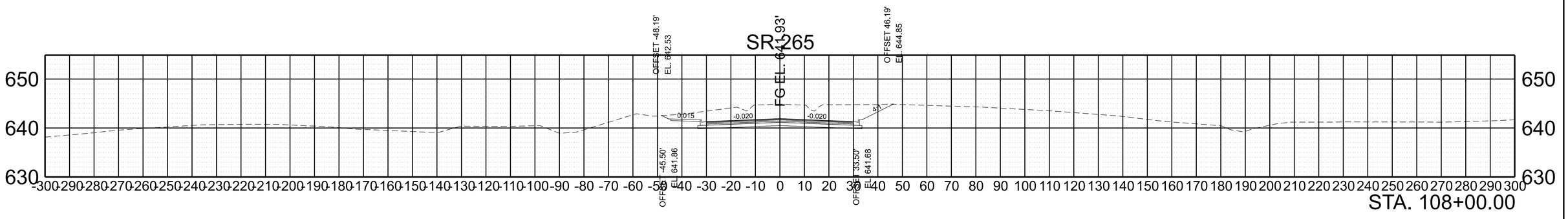

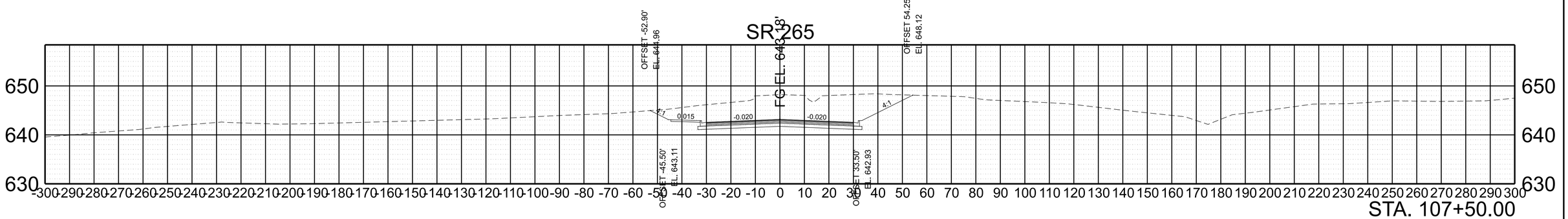

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2/6/2023 8:17:38 AM
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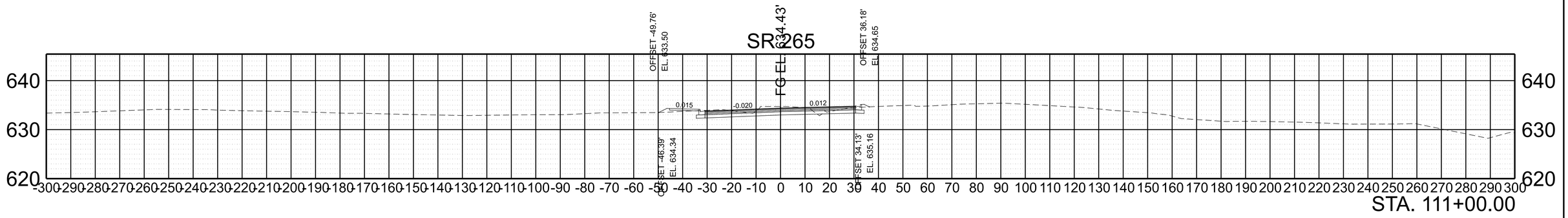
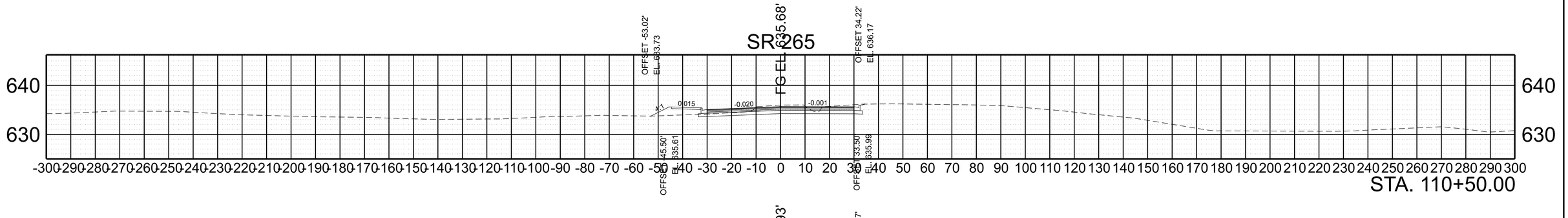
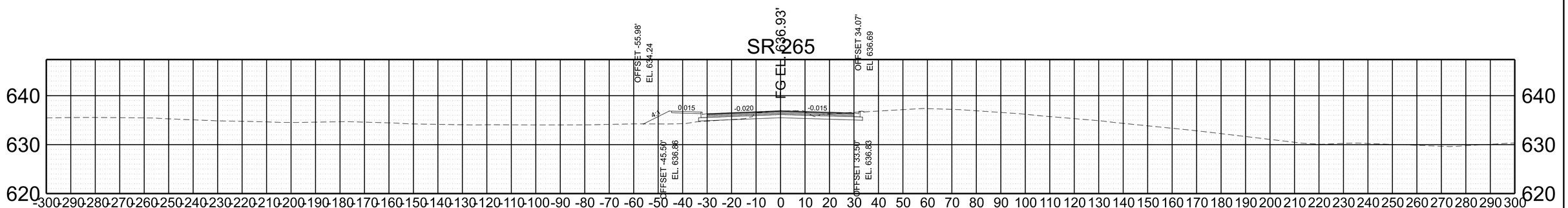
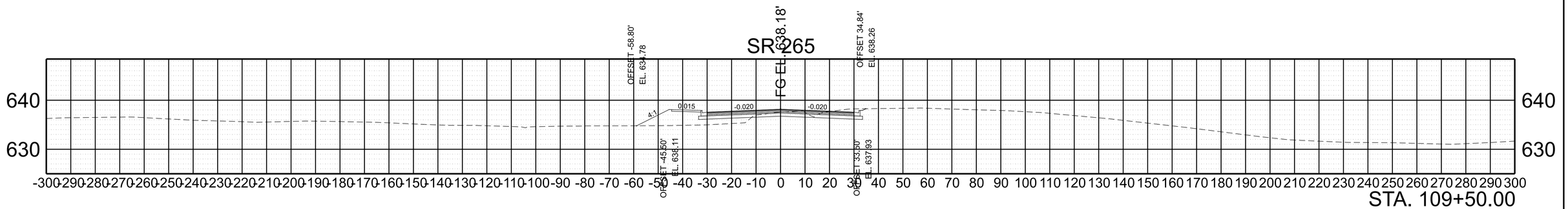
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A15

REV. ***DATE***
TEXT









SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:17:45 AM
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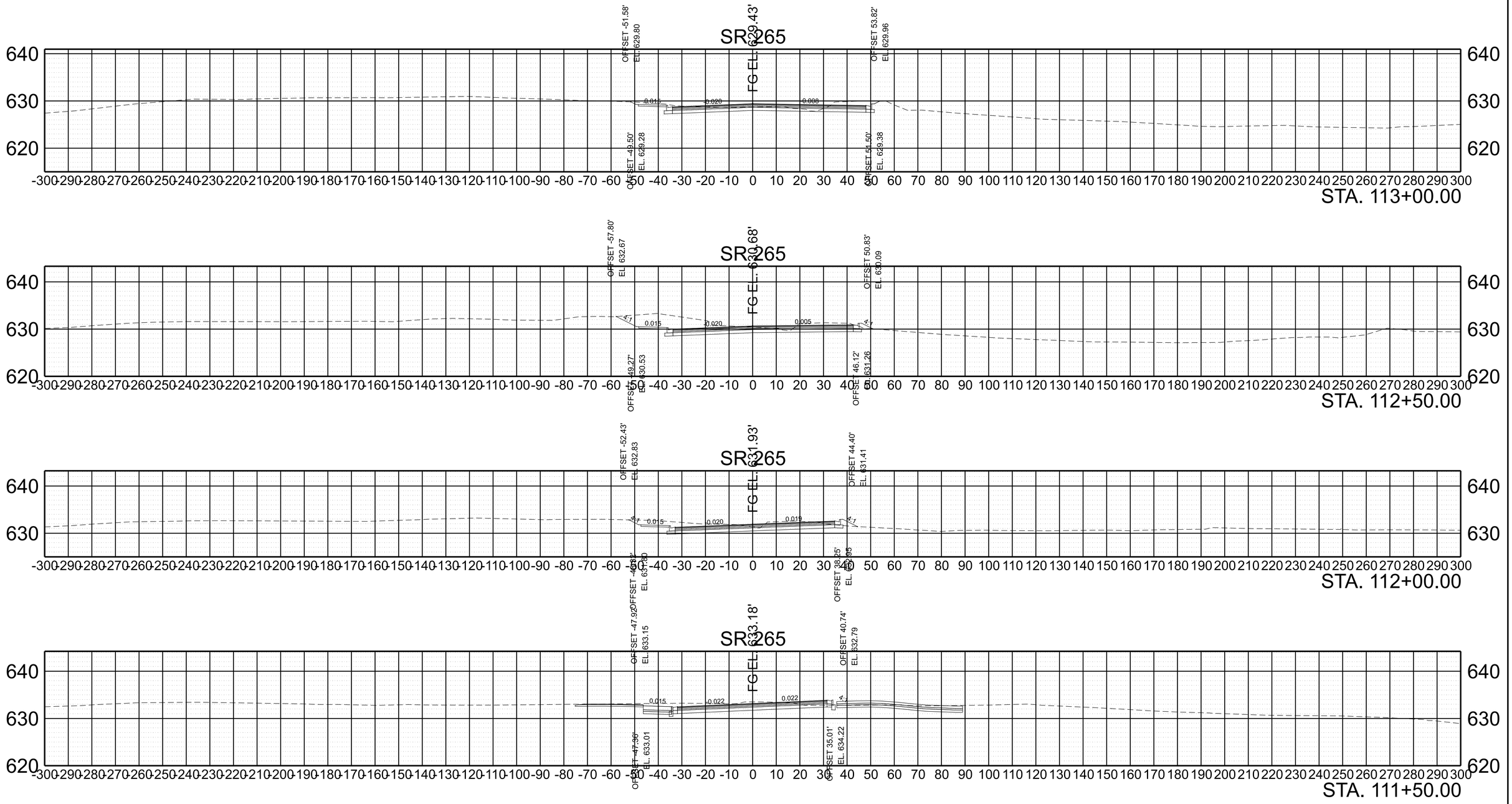
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A16

REV. ***DATE***
TEXT



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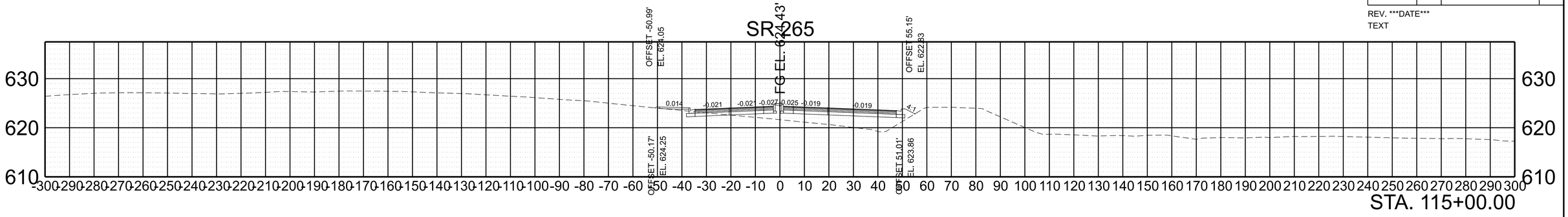
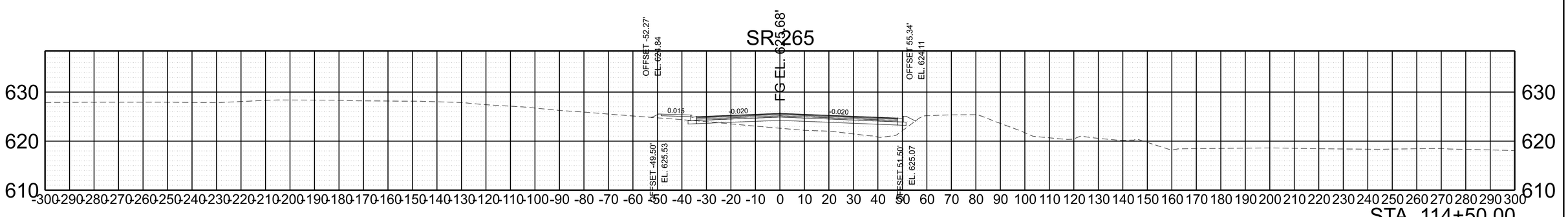
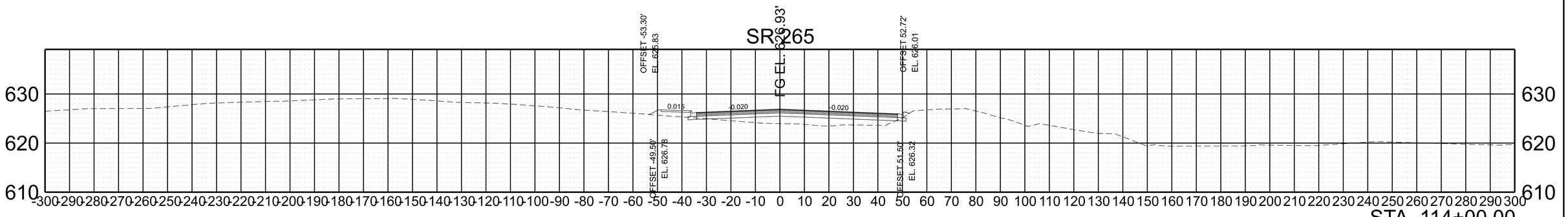
2/6/2023 8:17:52 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

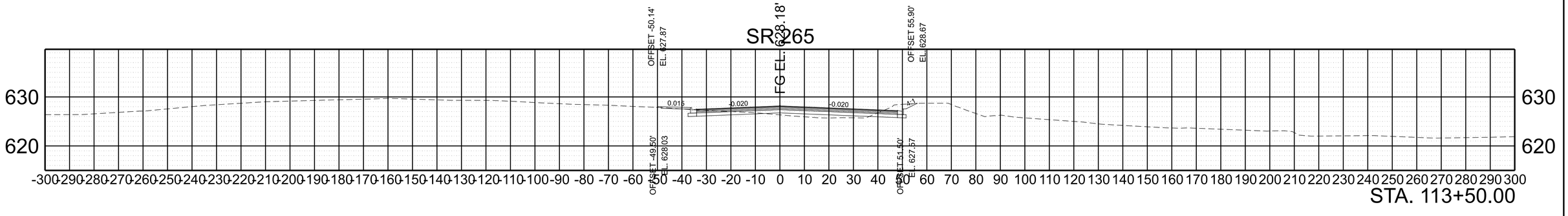
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A17

REV. ***DATE***
TEXT









SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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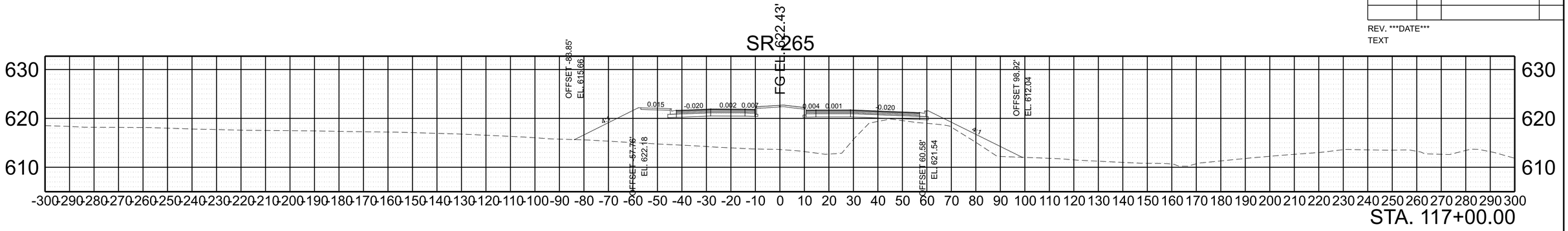
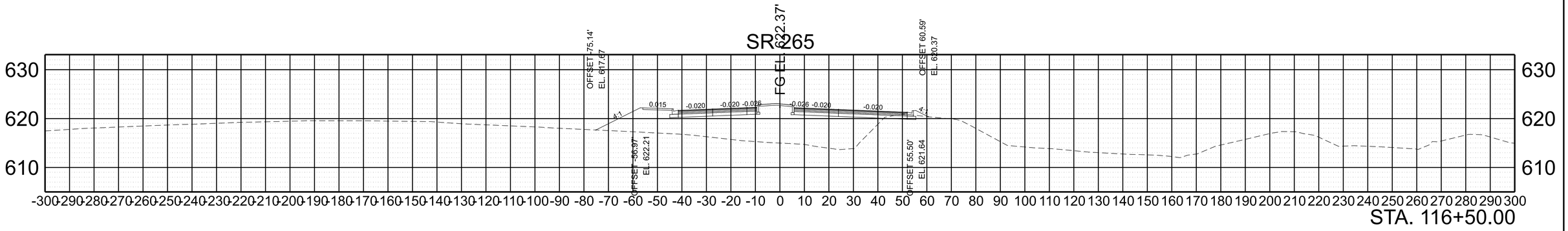
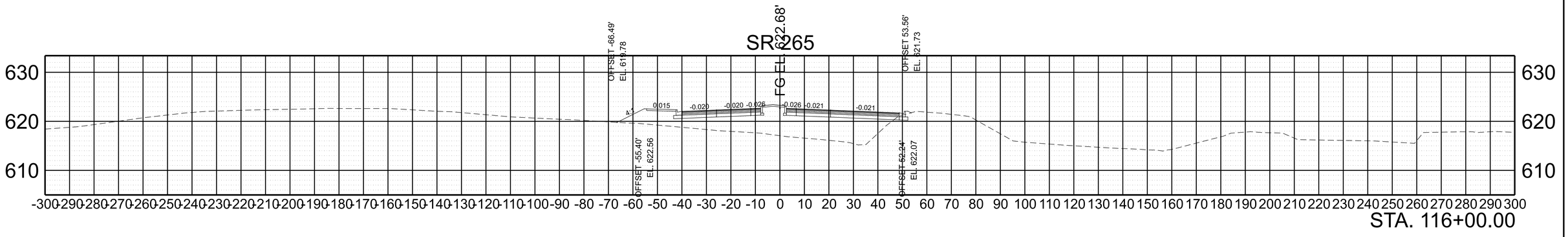
2/6/2023 8:17:59 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

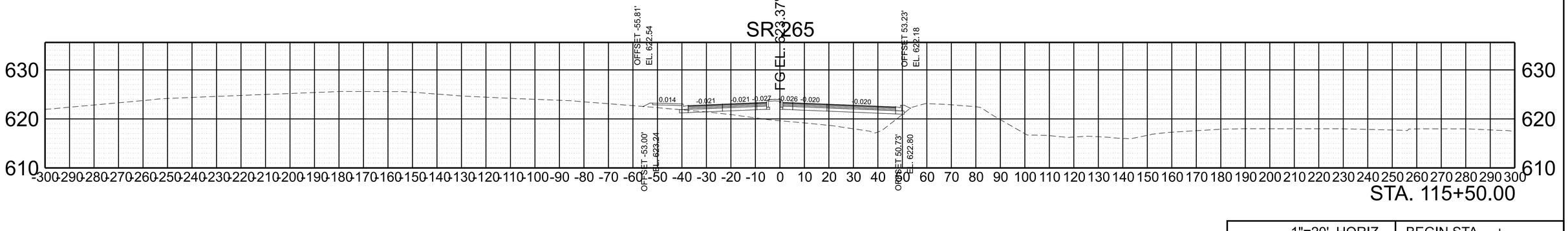
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A18

REV. ***DATE***
TEXT







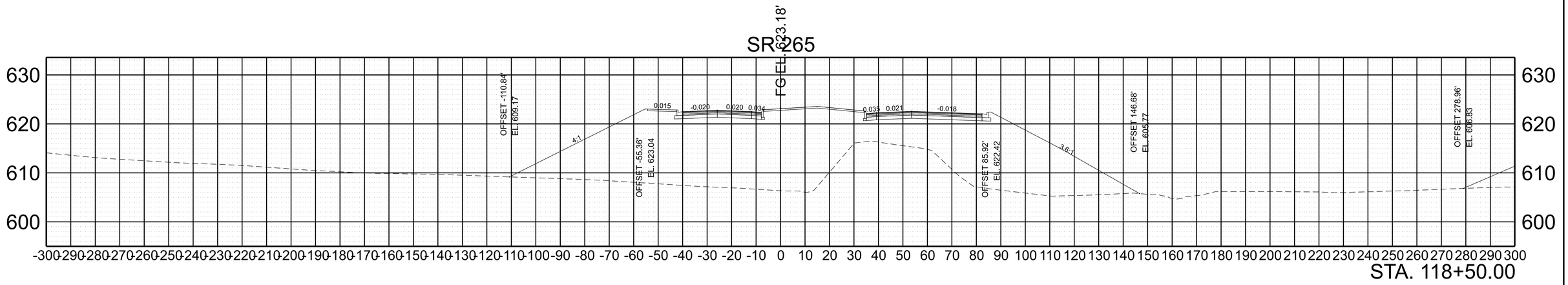


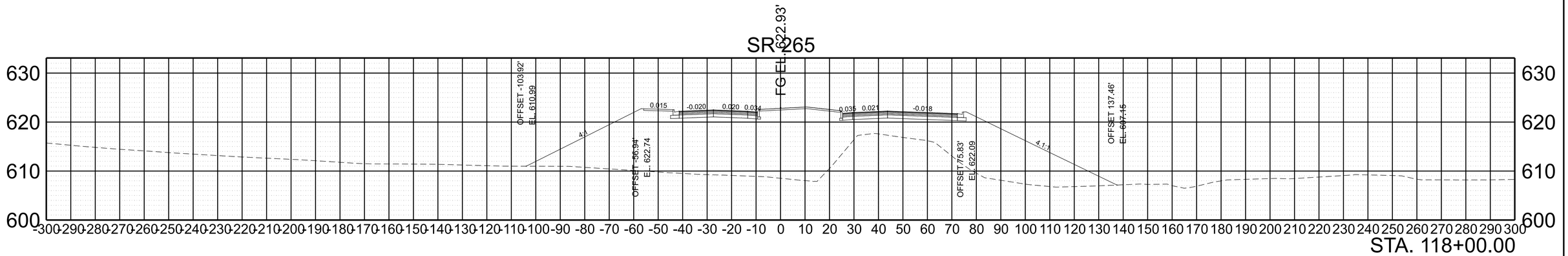
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

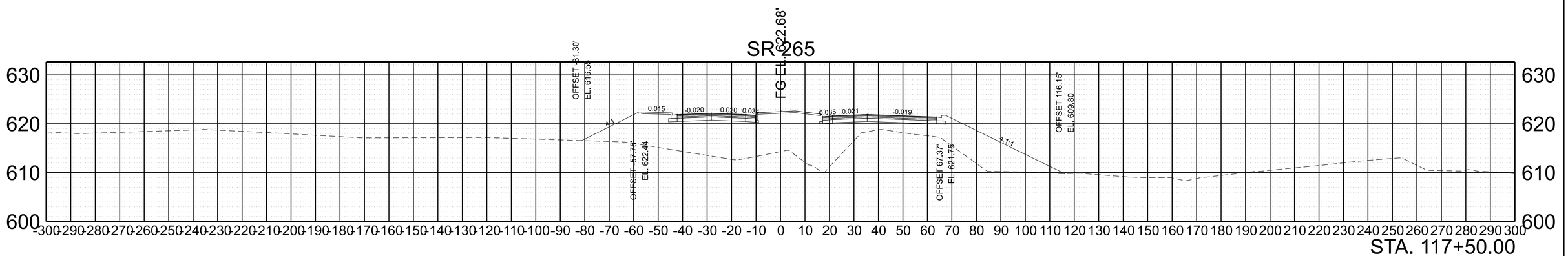
2/6/2023 8:18:06 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A19

REV. ***DATE***
TEXT







SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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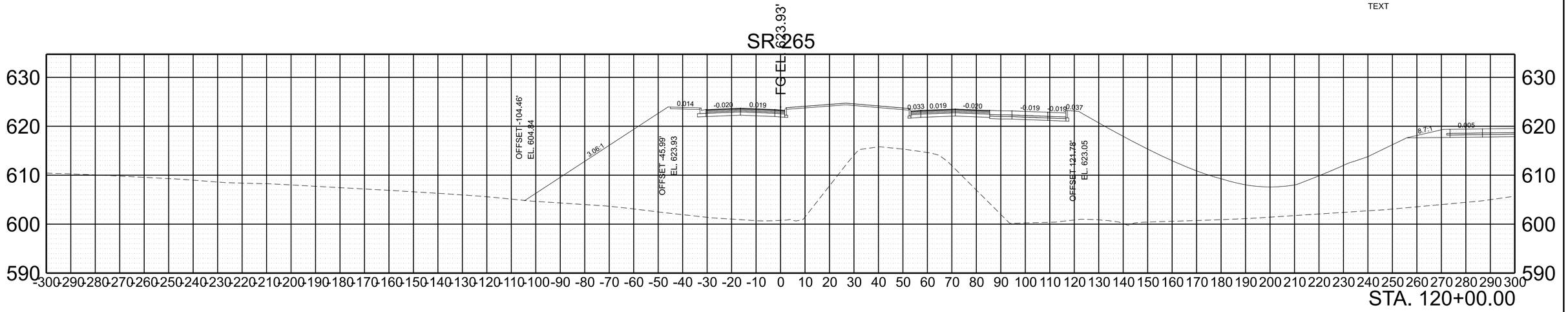
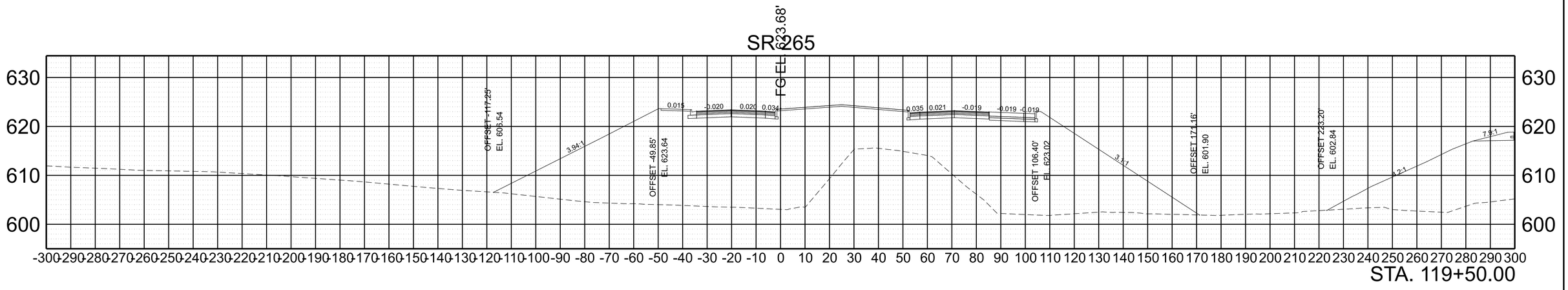
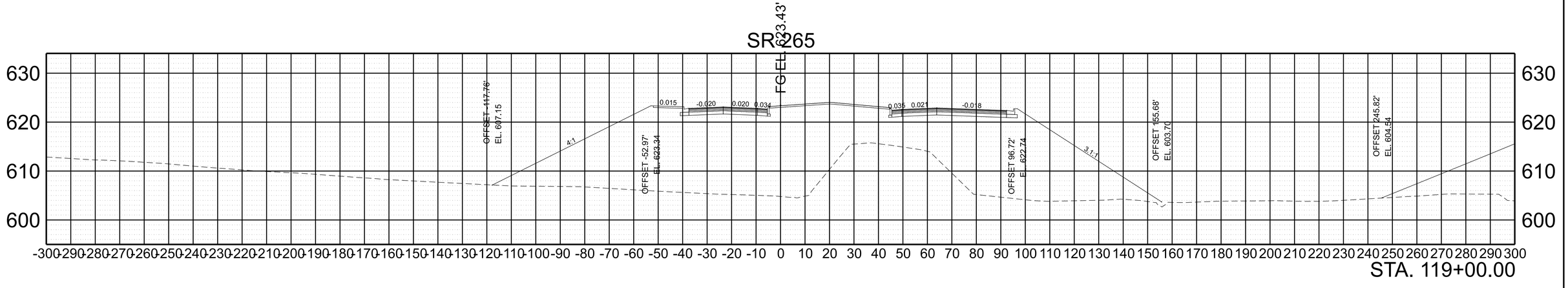
2/6/2023 8:18:12 AM
C:\PWWORKINGIEAST01\D2328414\95\0040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A20

REV. ***DATE***
TEXT







SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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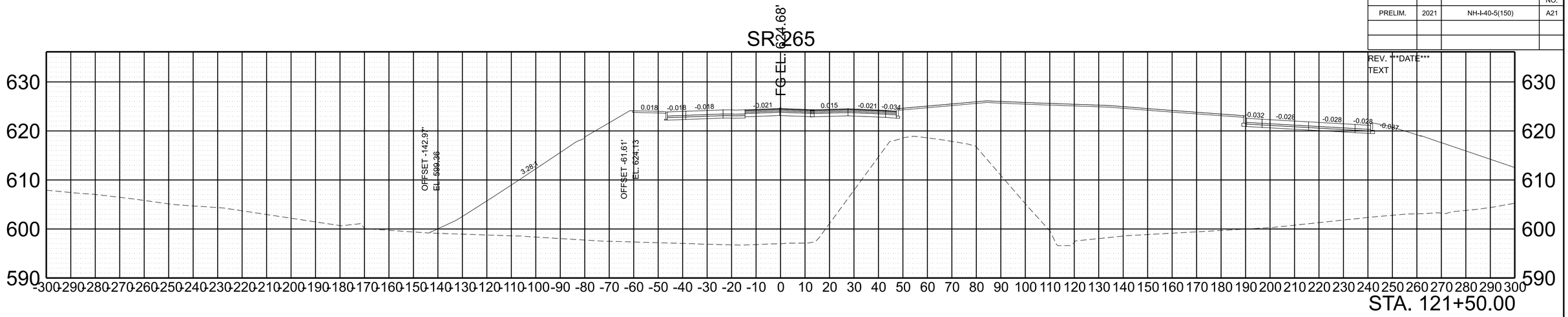
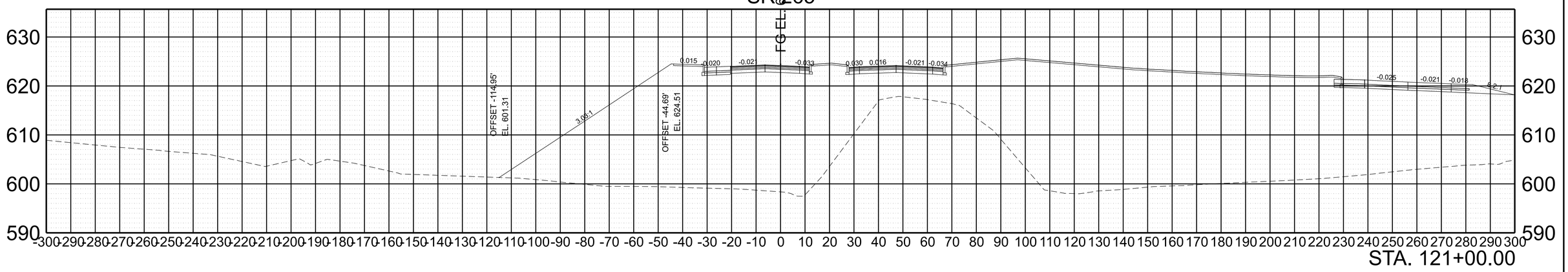
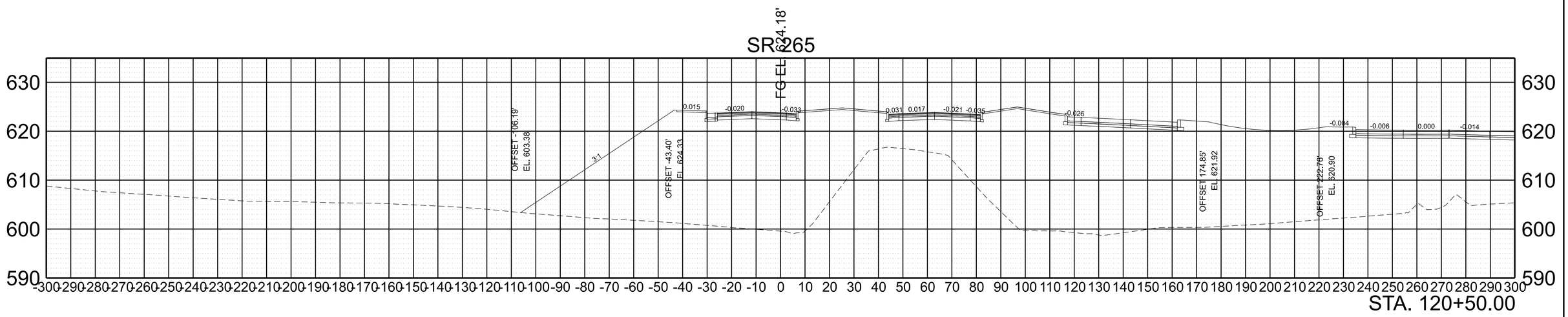
2/6/2023 8:18:19 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A21

REV. ***DATE***
TEXT





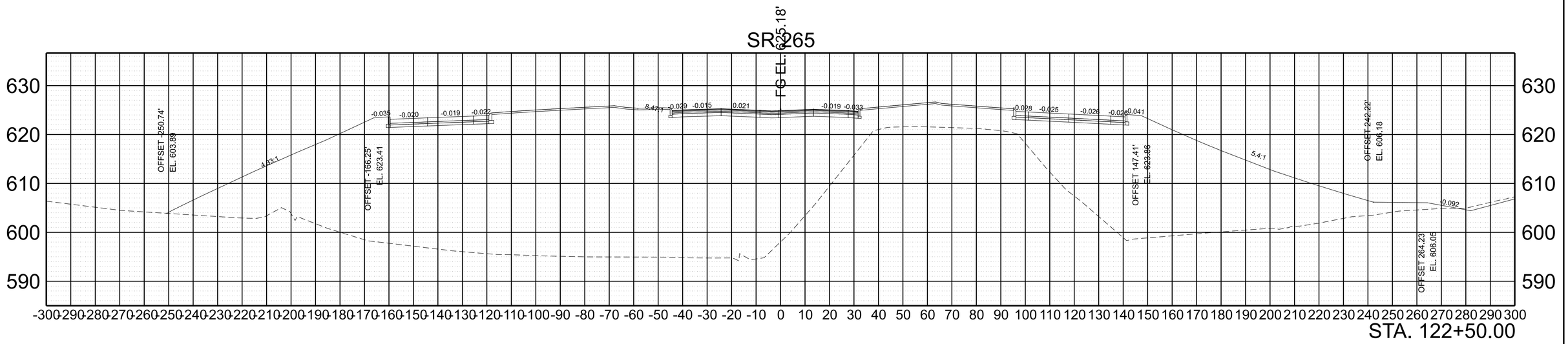


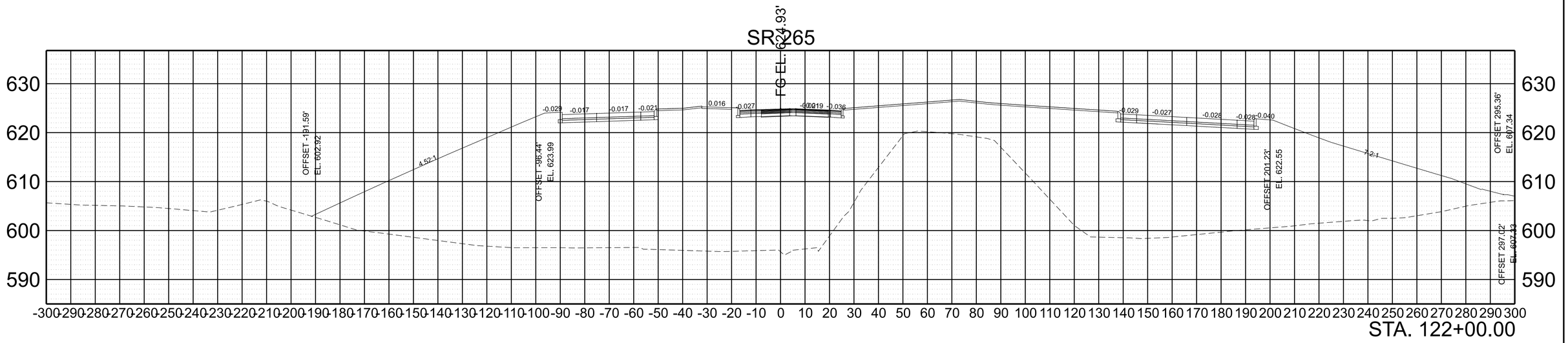
SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:18:28 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A22

REV. ***DATE***
TEXT



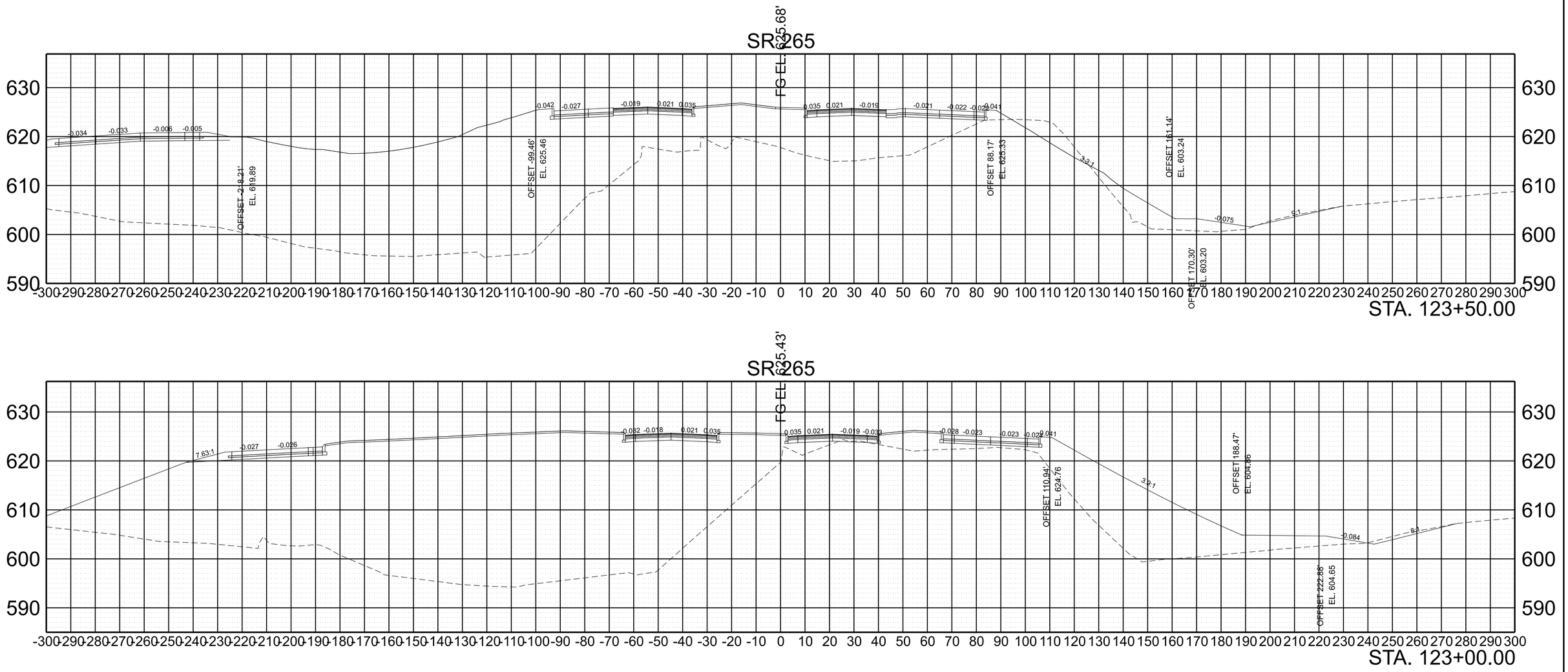


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:18:36 AM
C:\PW\WORKINGEAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A23

REV. ***DATE***
TEXT

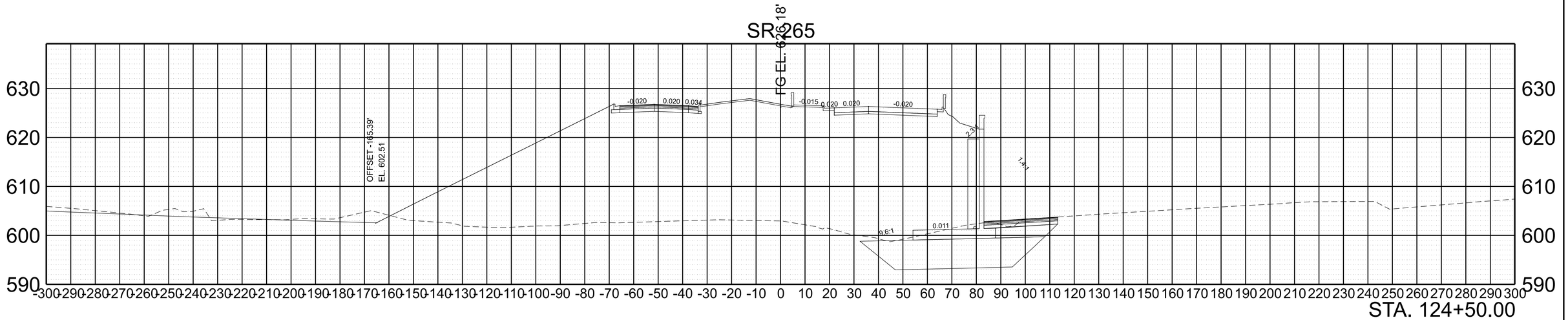


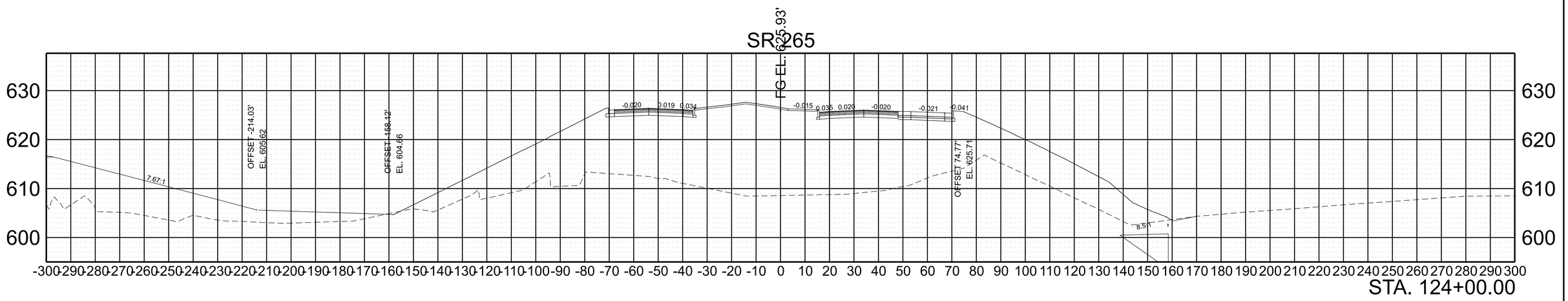
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:18:45 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A24

REV. ***DATE***
TEXT





SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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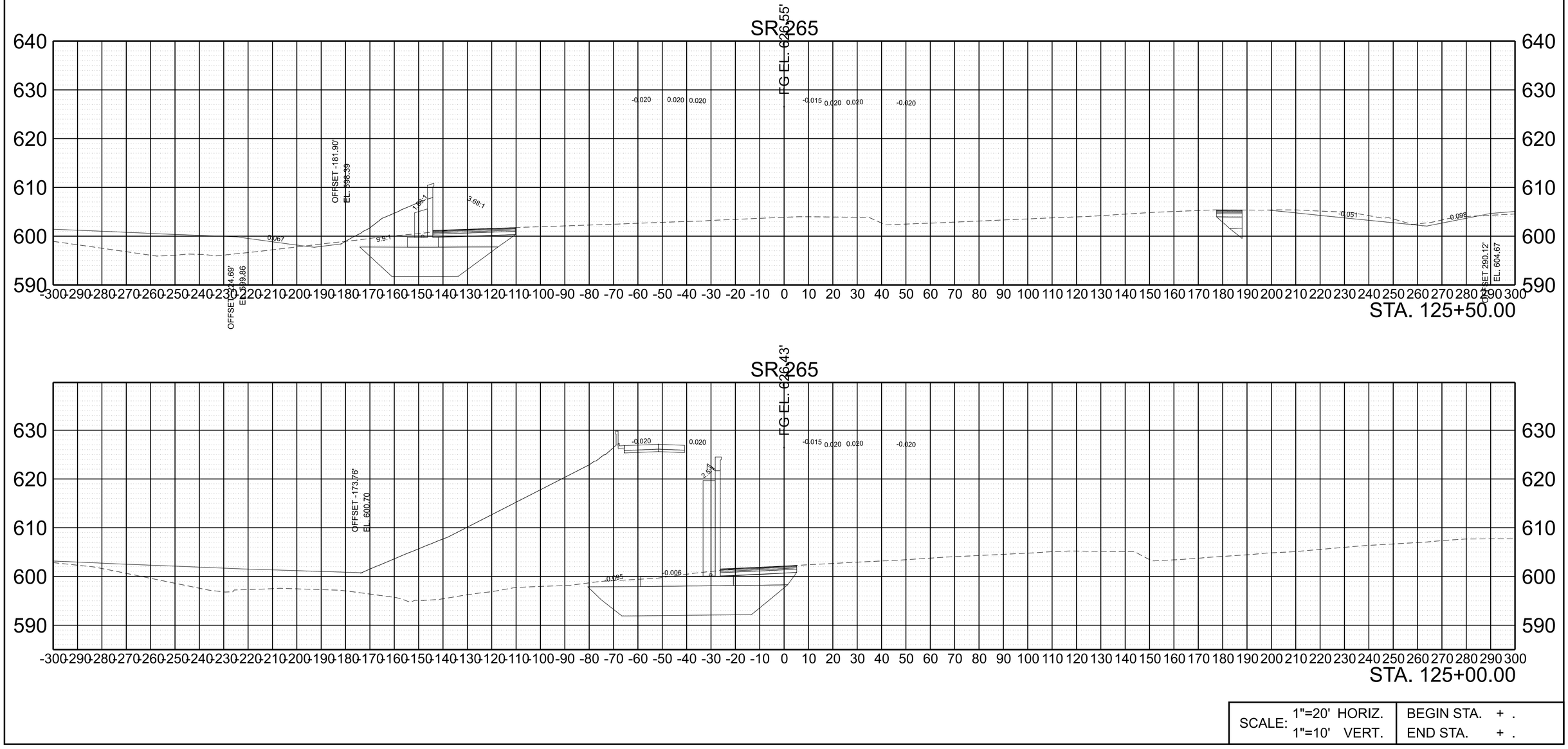
2/6/2023 8:18:51 AM
C:\PW\WORKINGIEAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A25

REV. ***DATE***
TEXT



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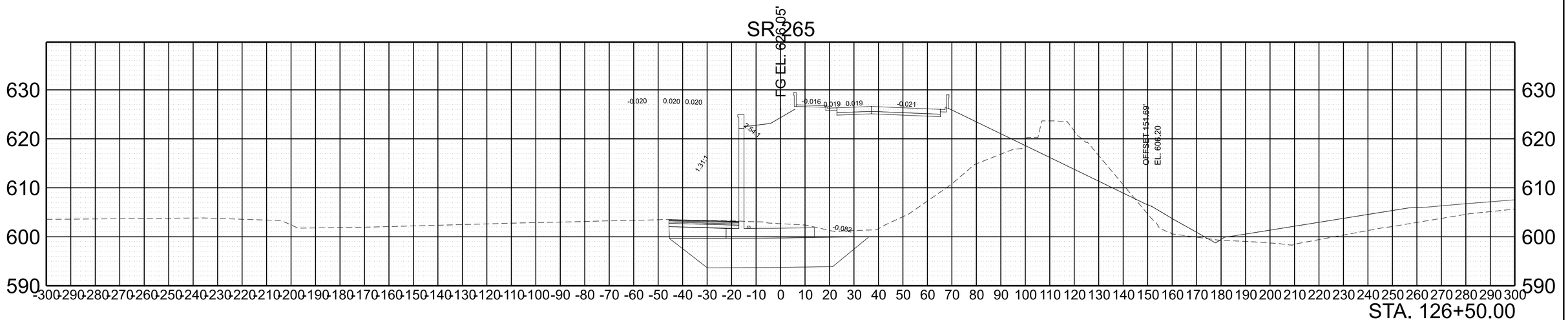
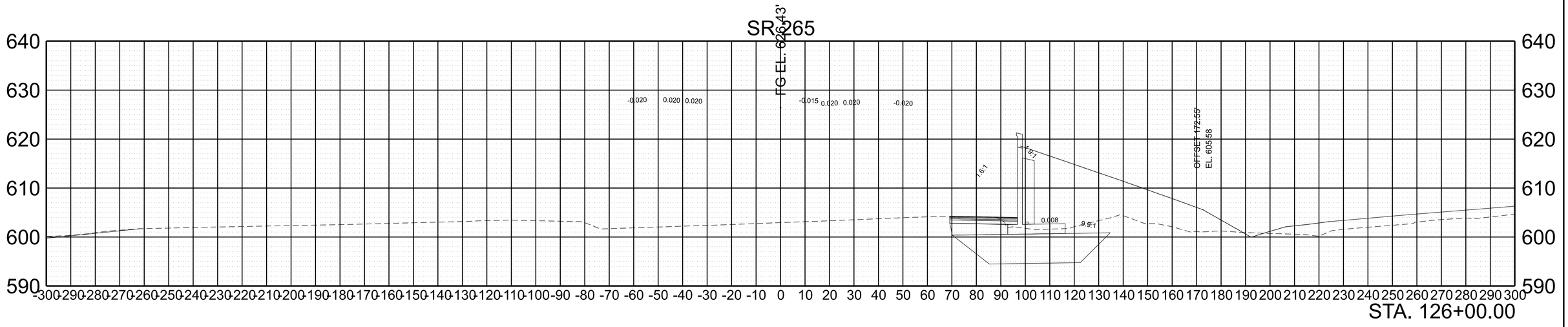
2/6/2023 8:18:57 AM
C:\PWWORKINGE\AST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A26

REV. ***DATE***
TEXT



STA. 126+50.00



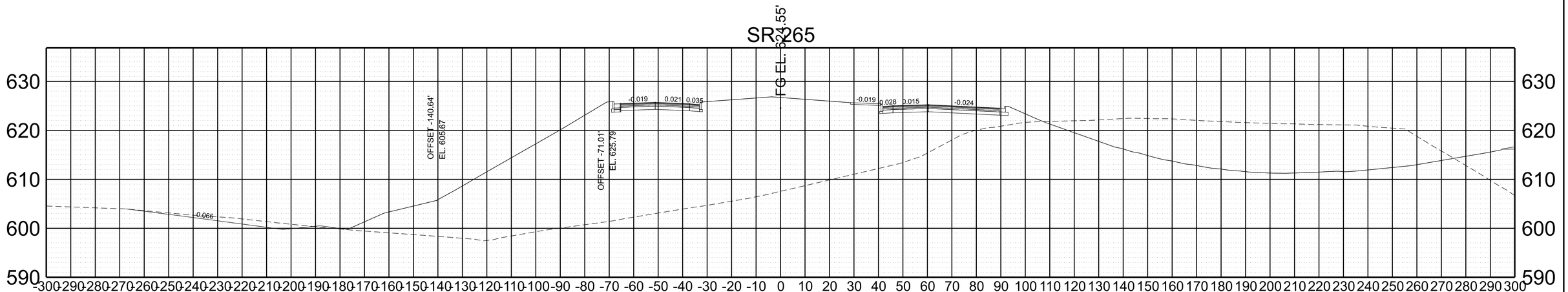
STA. 126+00.00

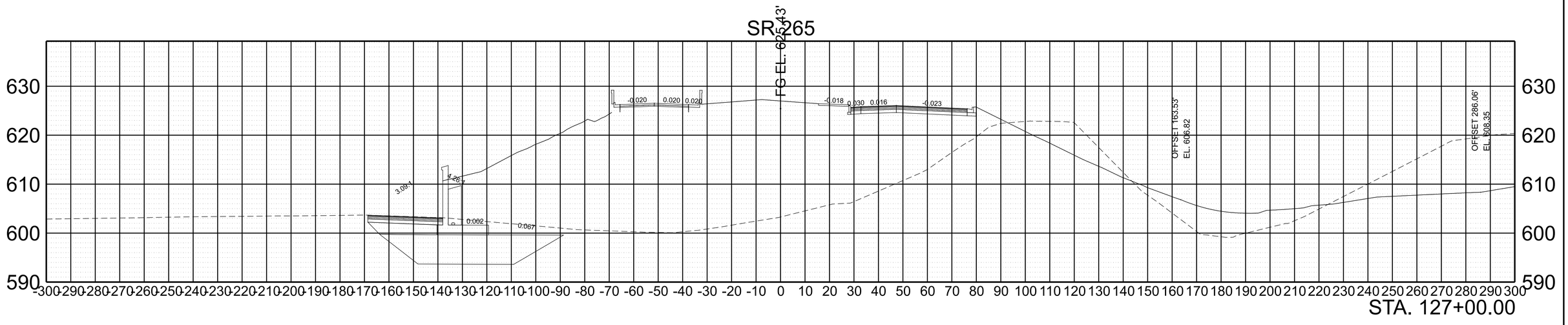
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:20:27 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A27

REV. ***DATE***
TEXT





SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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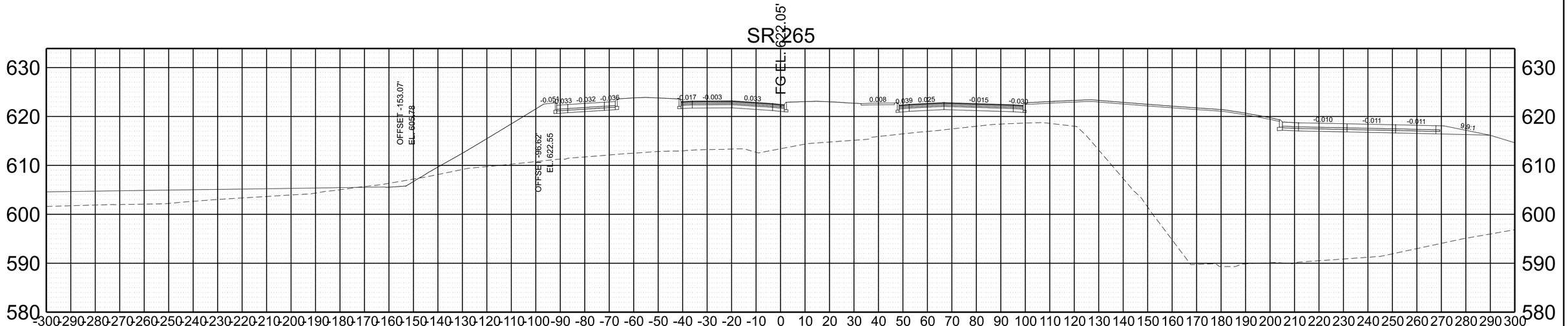
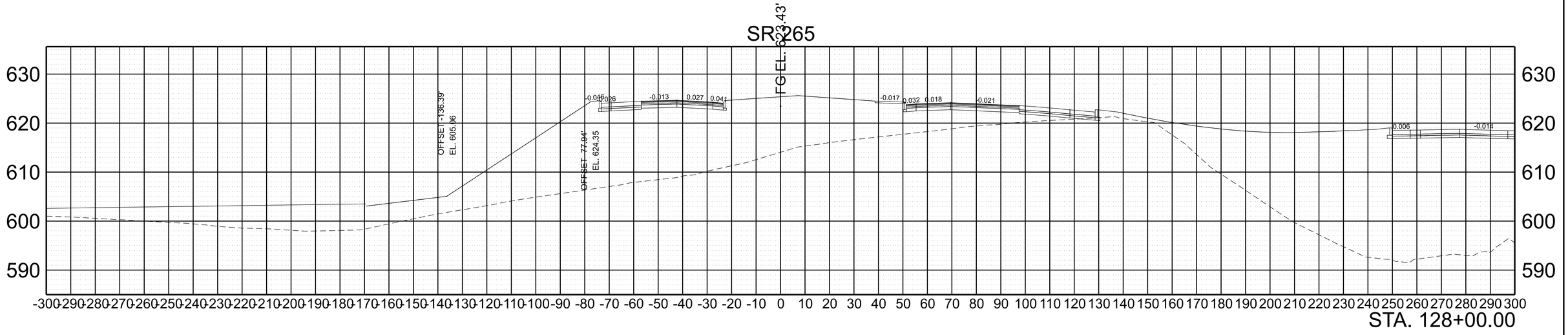
2/6/2023 8:20:33 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A28

REV. ***DATE***
TEXT





SCALE:	1"=20' HORIZ.	BEGIN STA. + .
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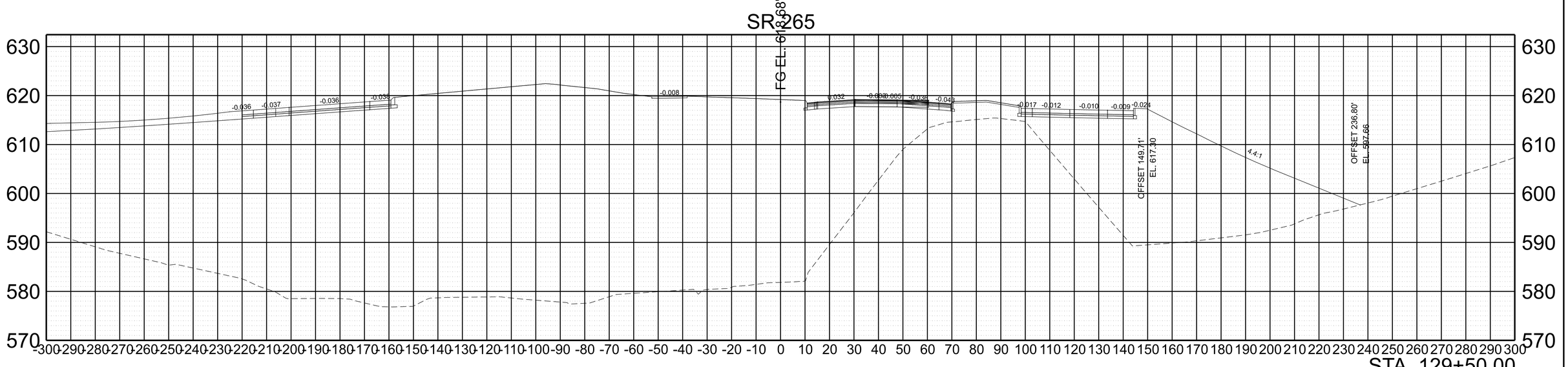
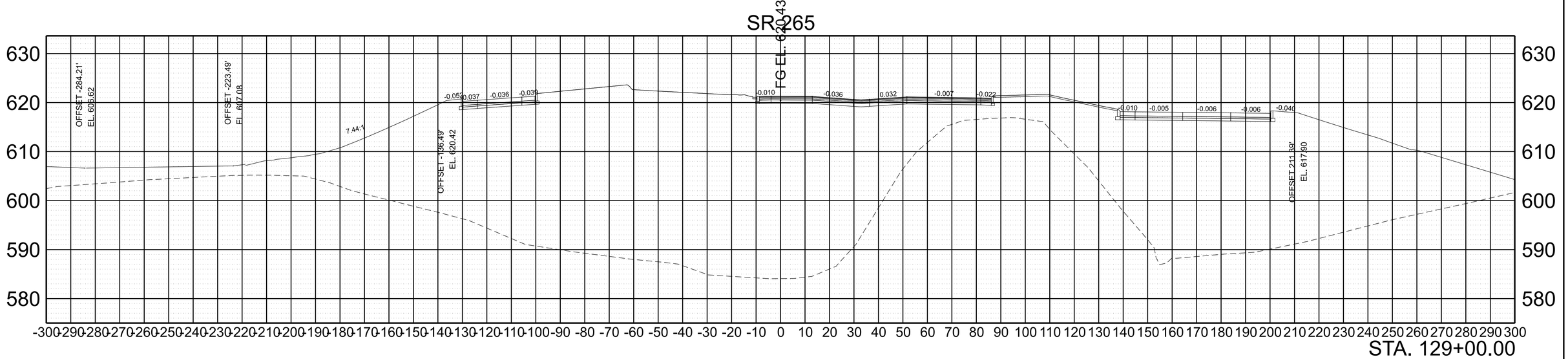
2/6/2023 8:20:42 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A29

REV. ***DATE***
TEXT



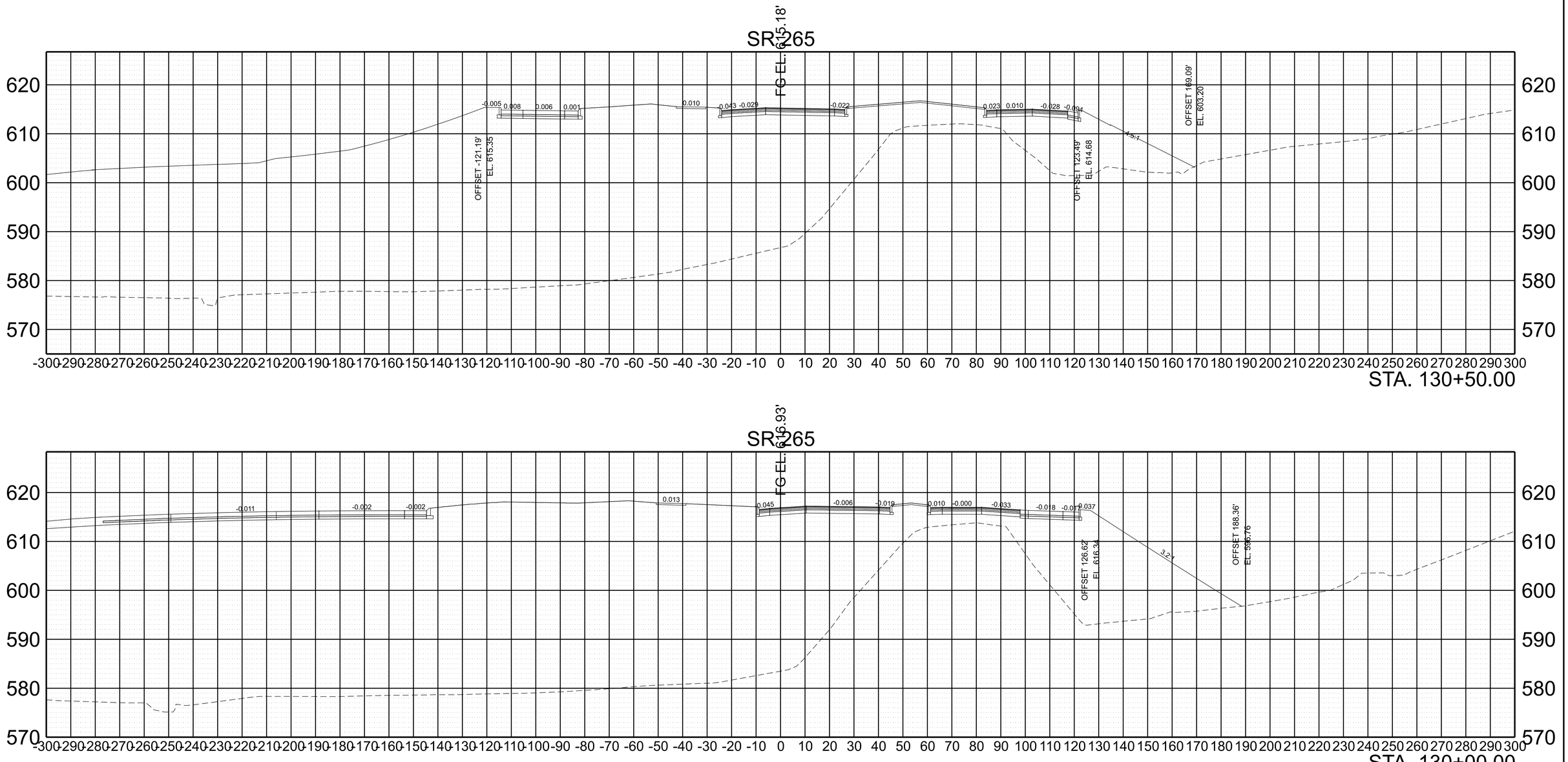


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:20:50 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A30

REV. ***DATE***
TEXT

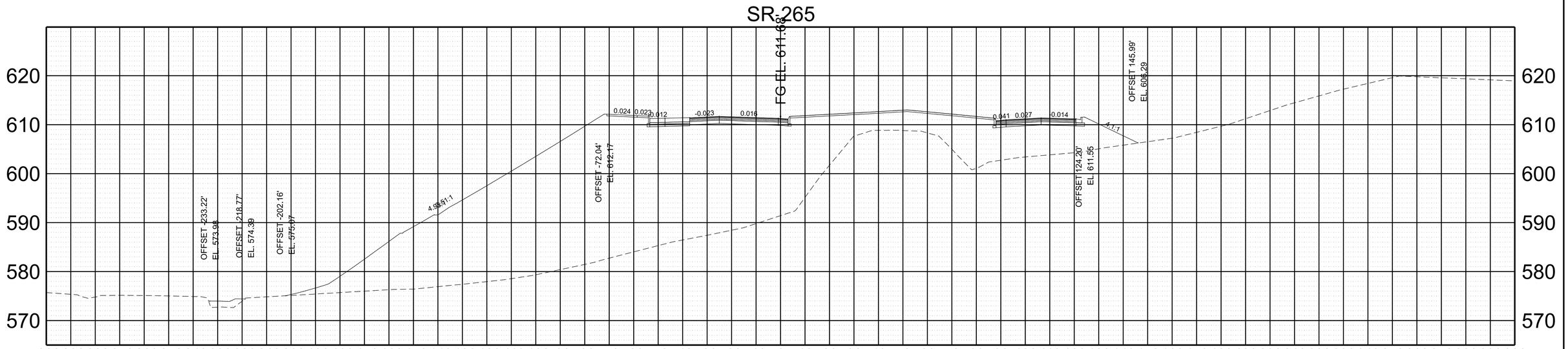


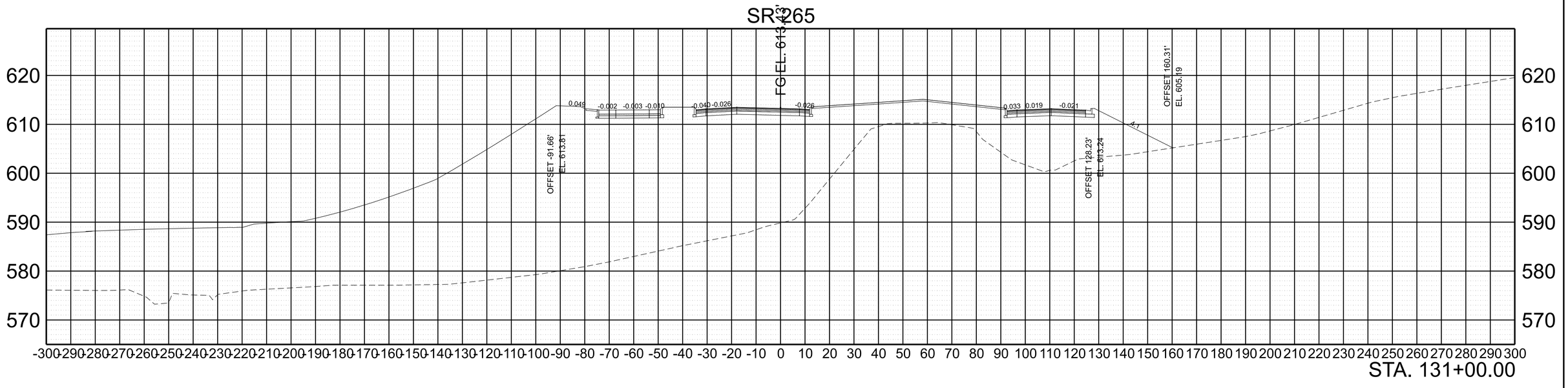
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:20:59 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A31

REV. ***DATE***
TEXT



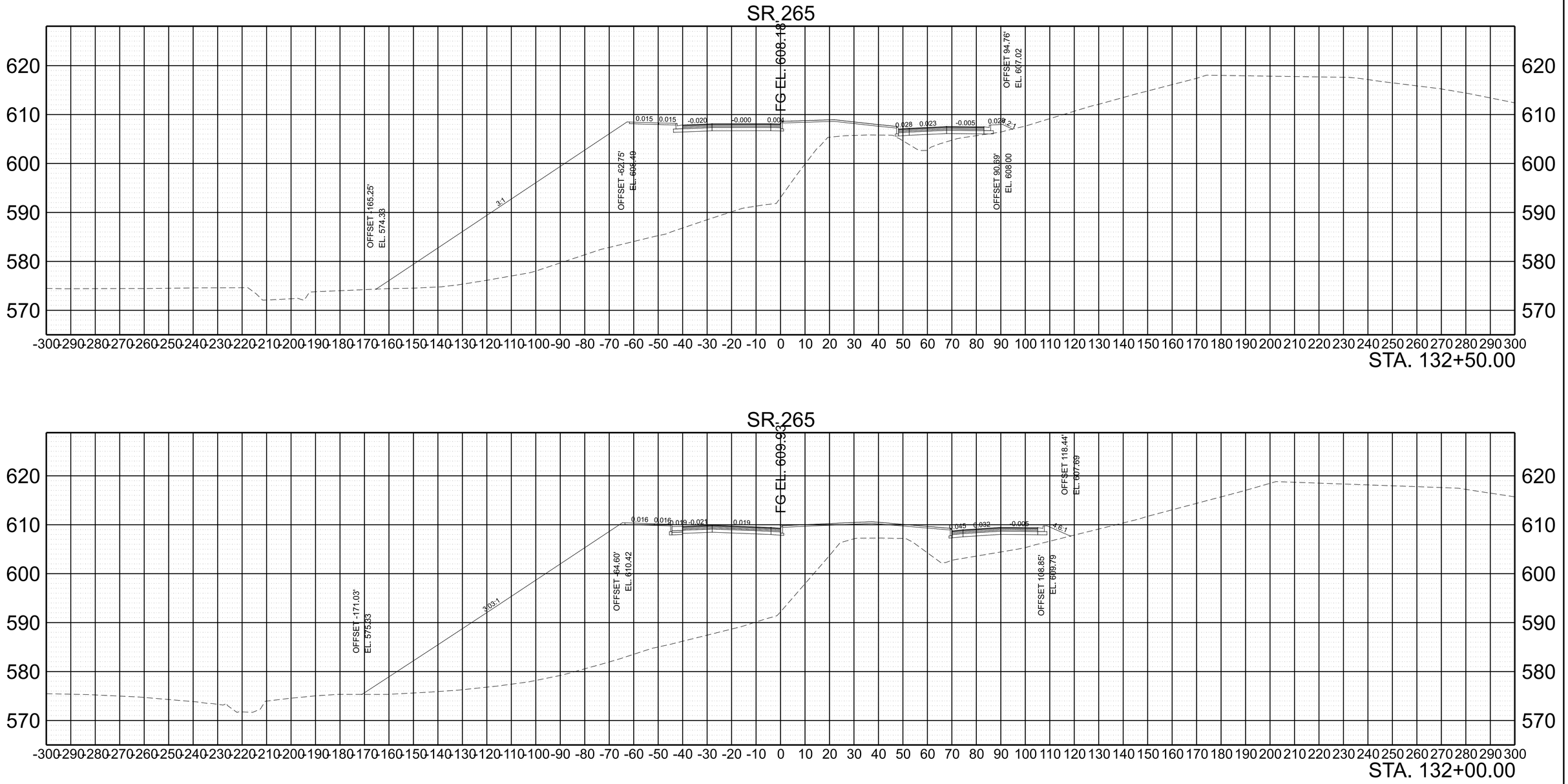


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:05 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A32

REV. ***DATE***
TEXT

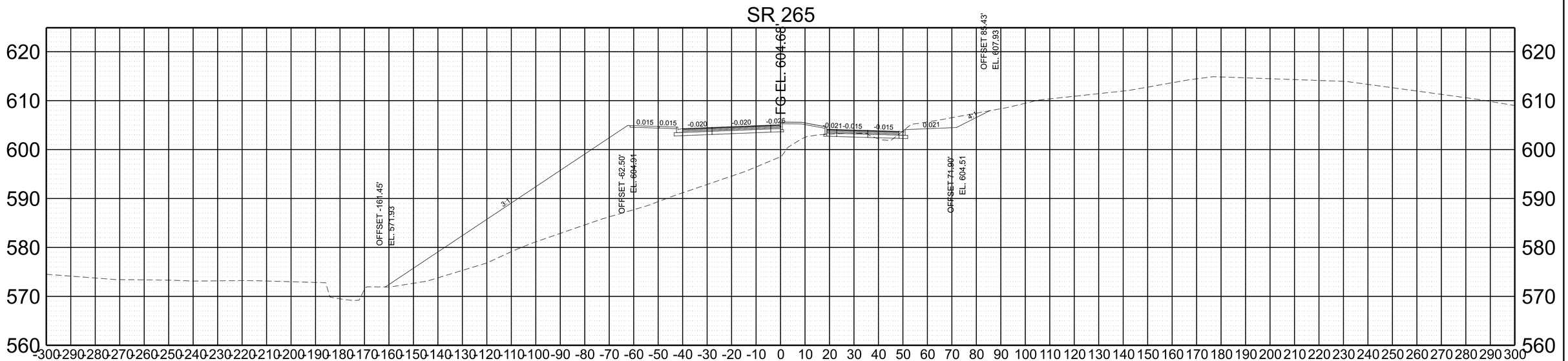


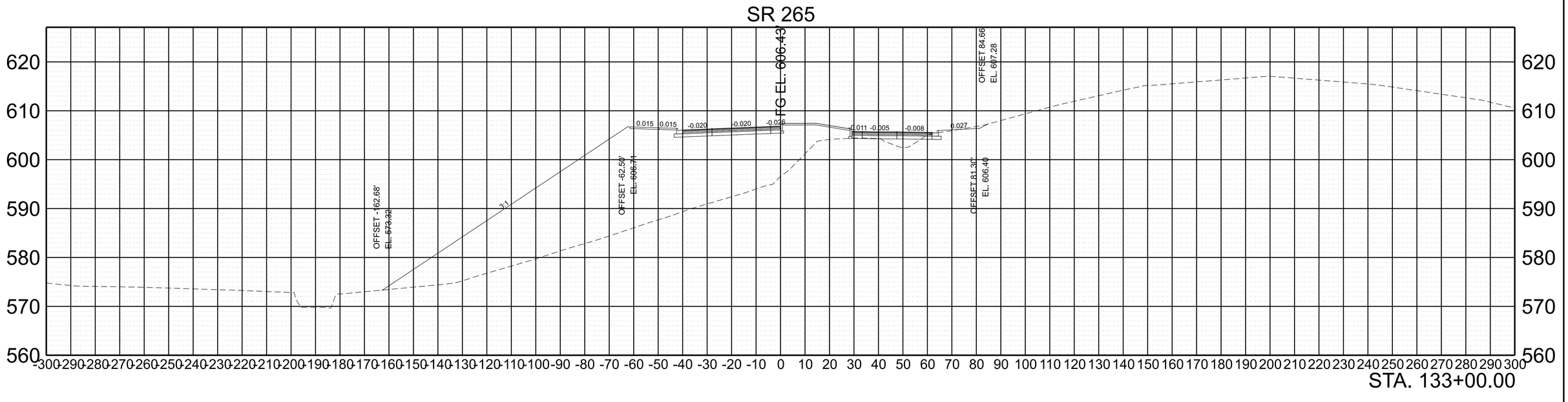
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:11 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A33

REV. ***DATE***
TEXT



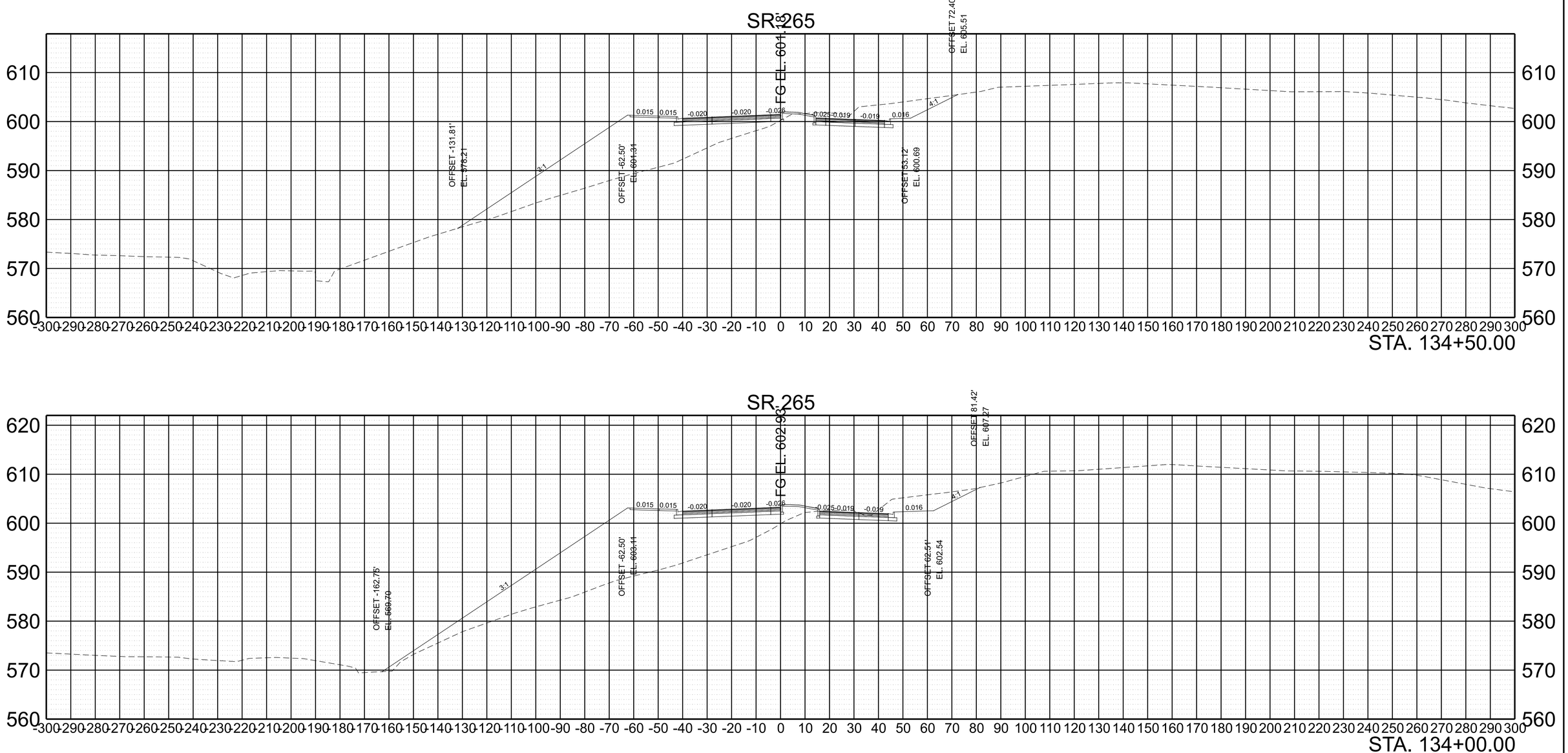


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:17 AM
C:\PWWORKINGIEAST01\D2328414\05\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A34

REV. ***DATE***
TEXT

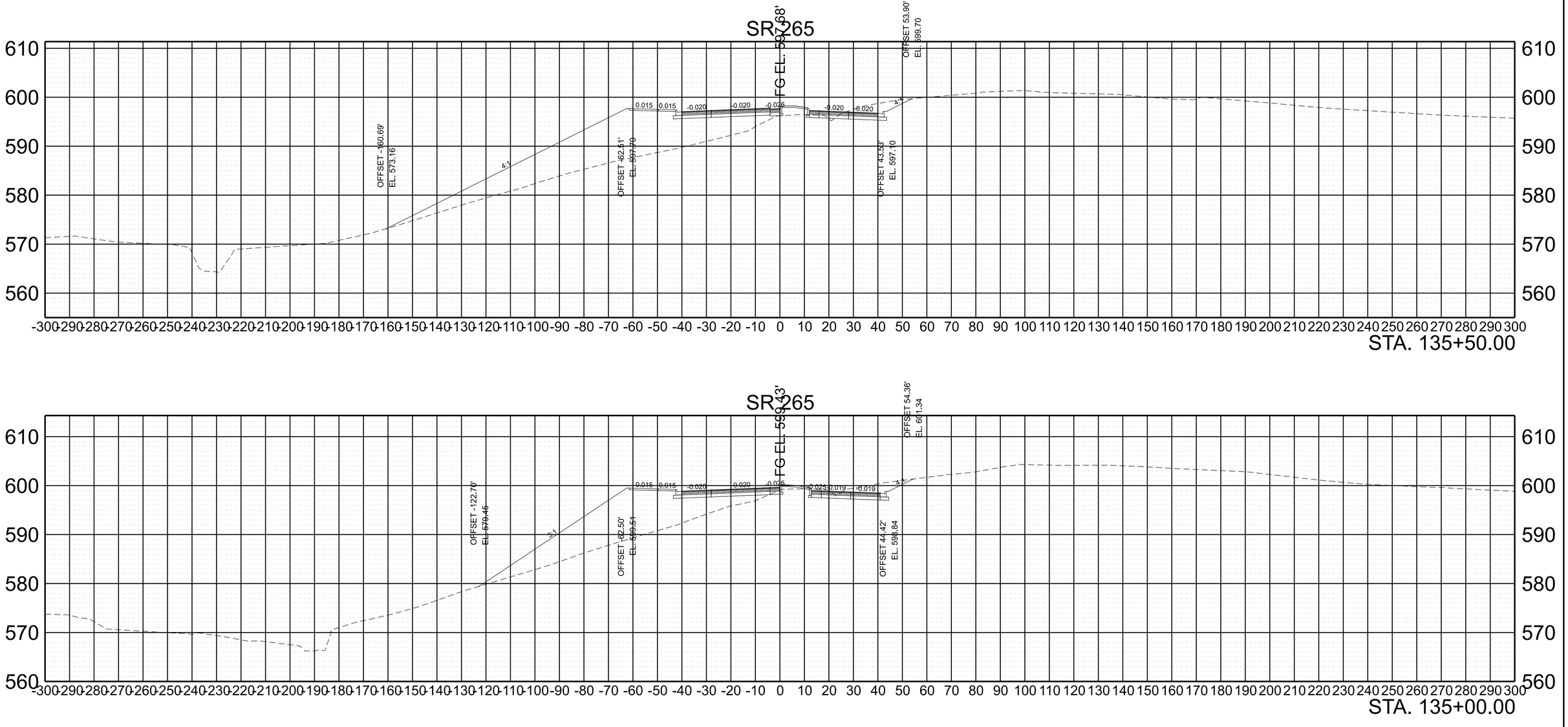


SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:21:23 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A35

REV. ***DATE***
TEXT

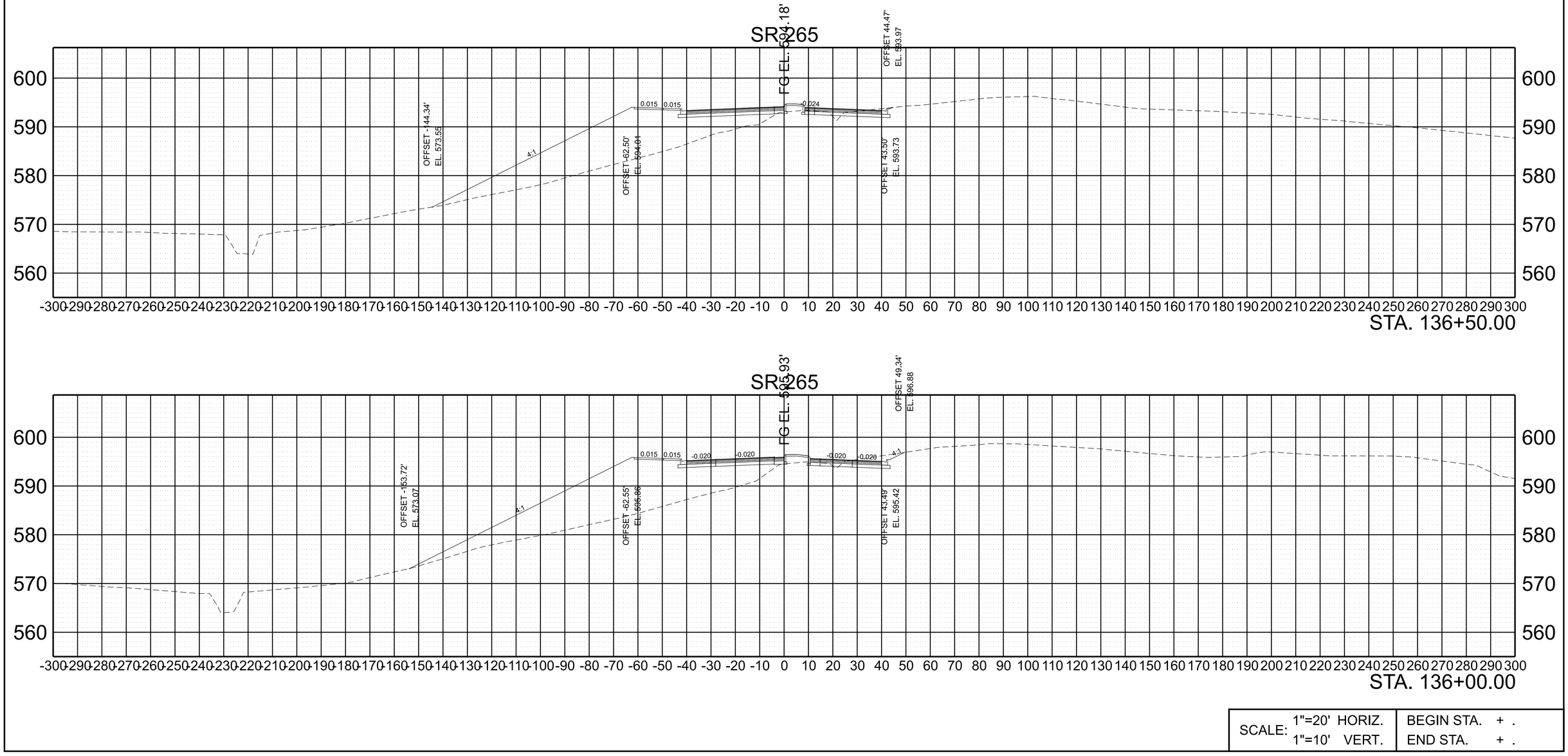


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:29 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A36

REV. ***DATE***
TEXT



SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:35 AM
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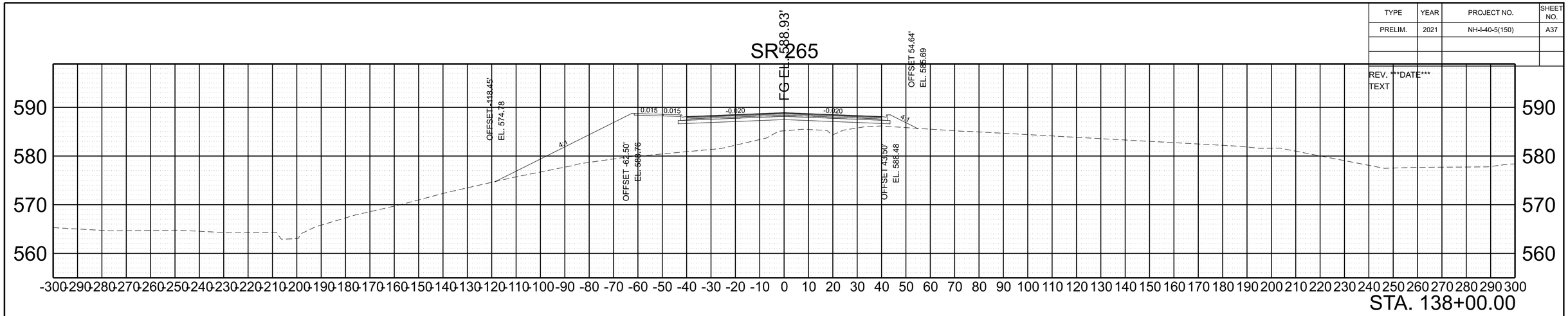
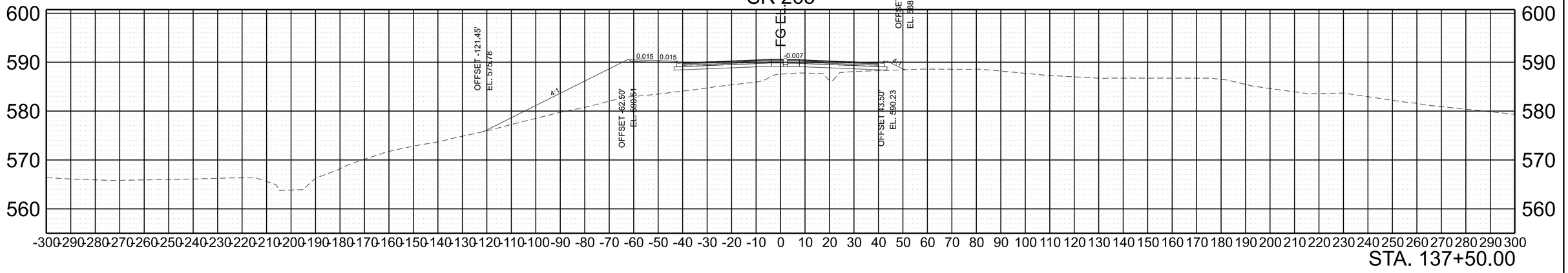
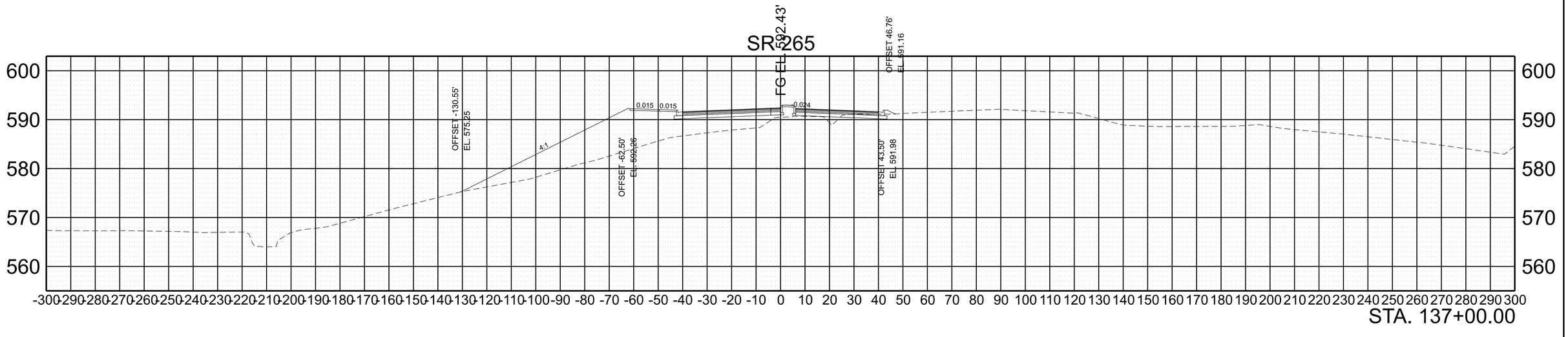
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A37

REV. ***DATE***
TEXT





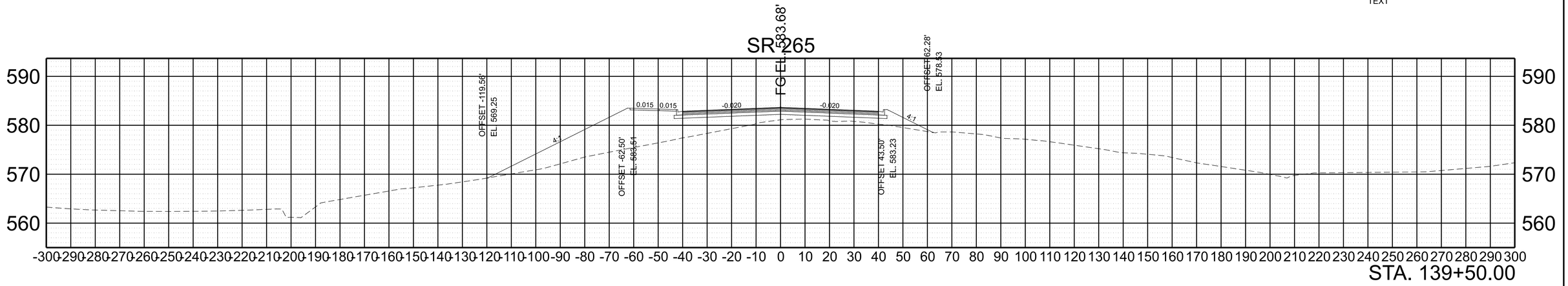


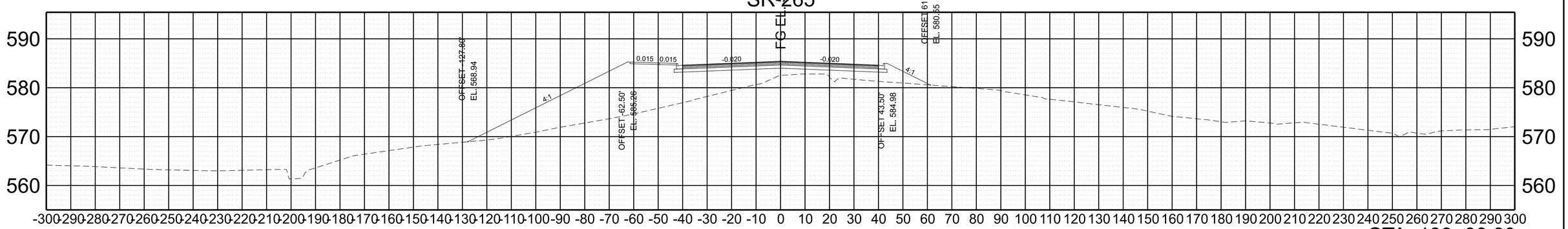
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

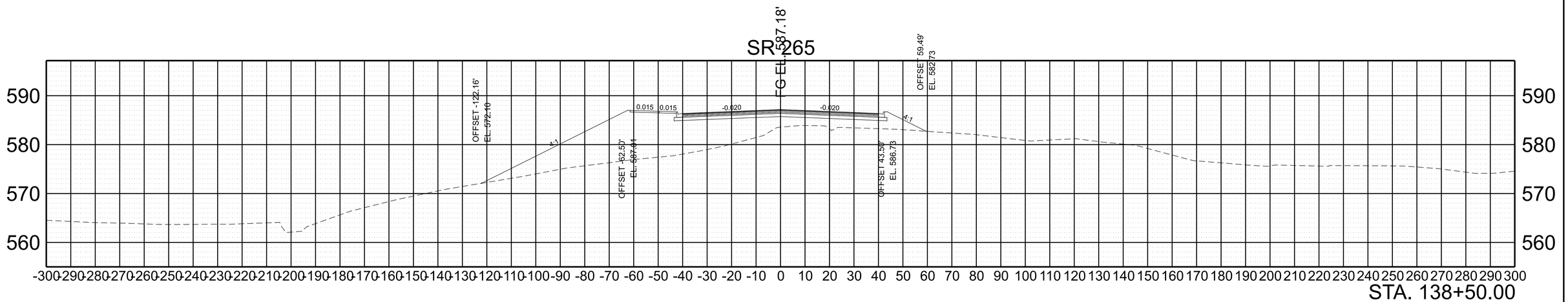
2/6/2023 8:21:42 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A38

REV. ***DATE***
TEXT





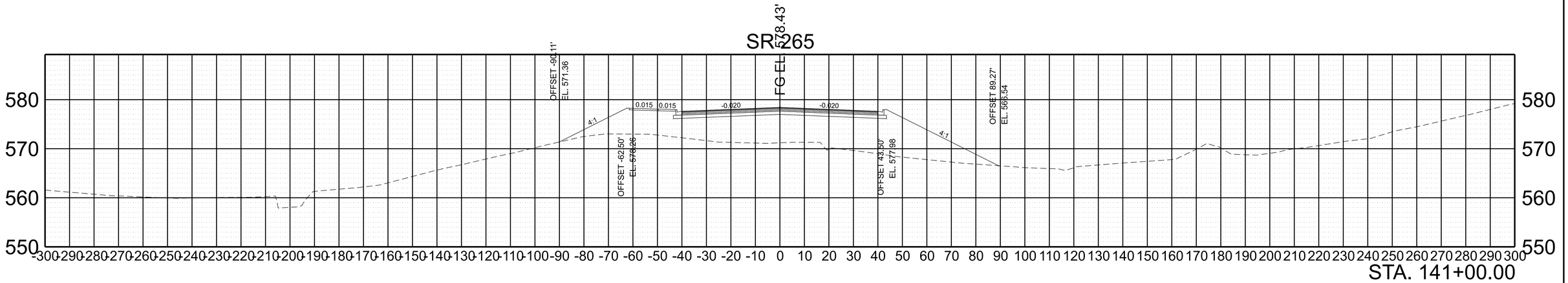


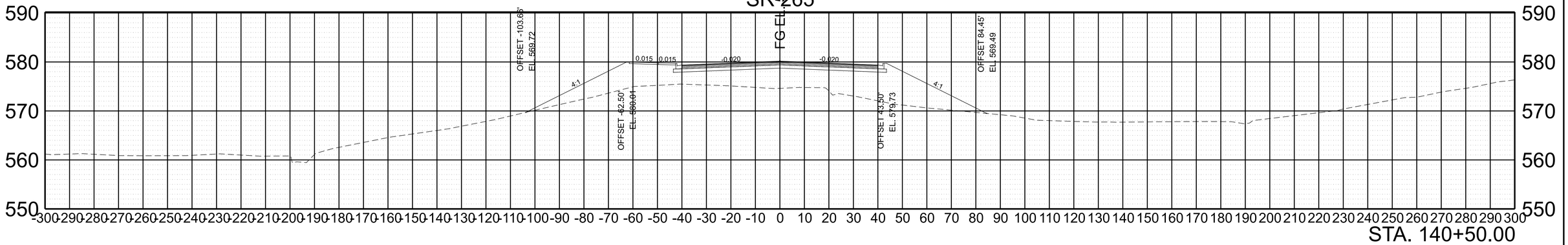
SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

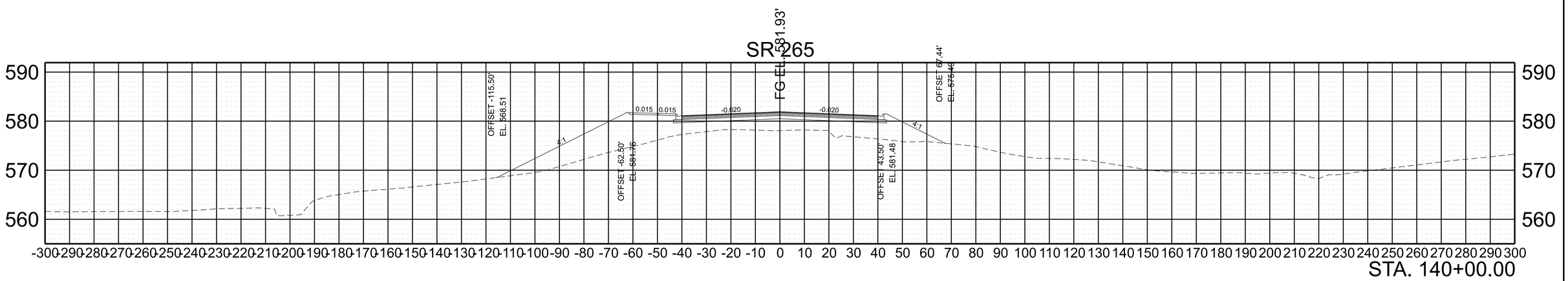
2/6/2023 8:21:49 AM
C:\PWWORKING\EAST01\D2328414\950\40-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A39

REV. ***DATE***
TEXT





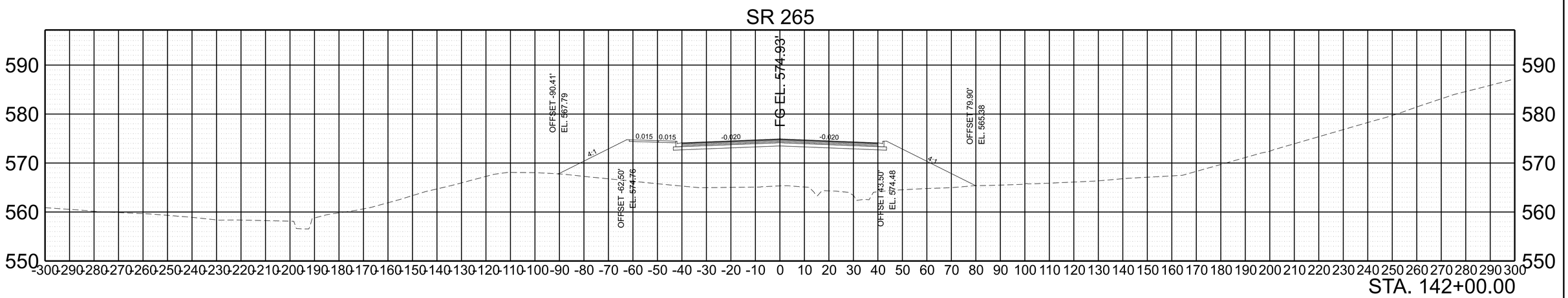


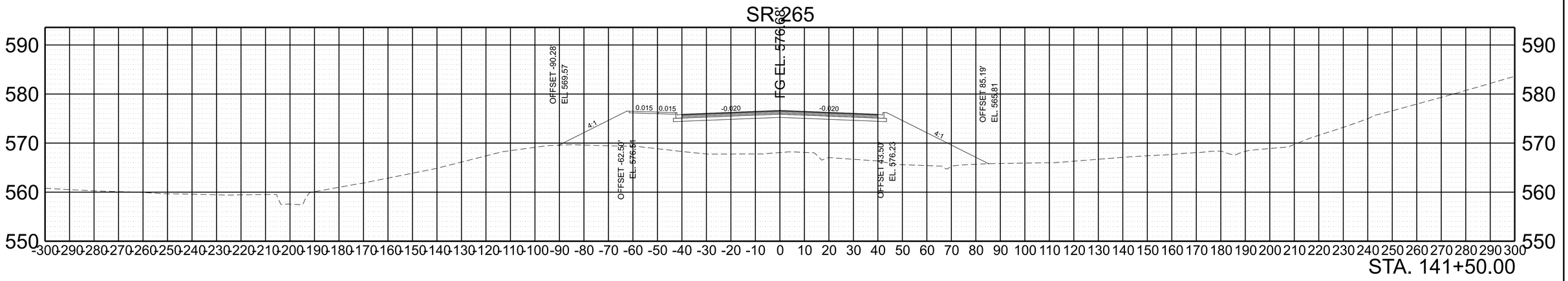
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:21:56 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A40

REV. ***DATE***
TEXT



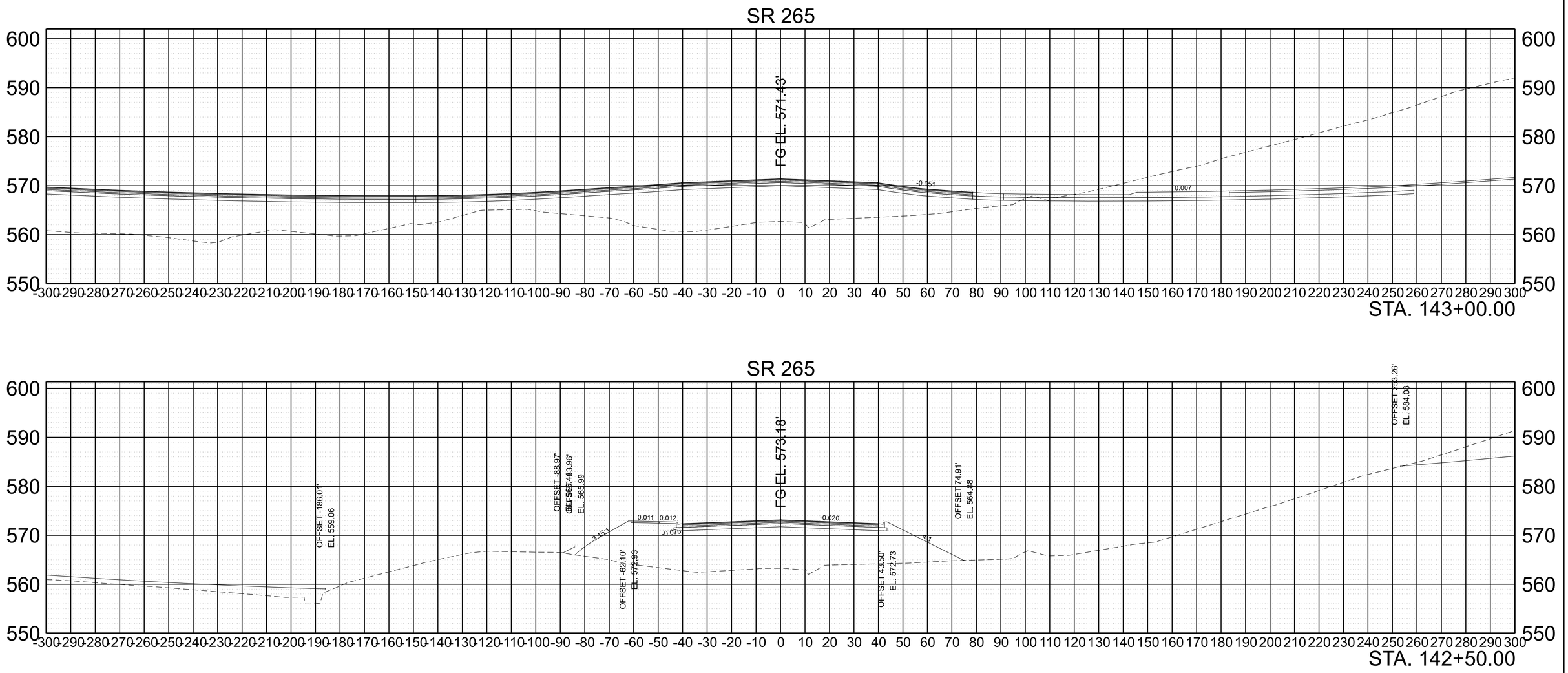


SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:22:02 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A41

REV. ***DATE***
TEXT

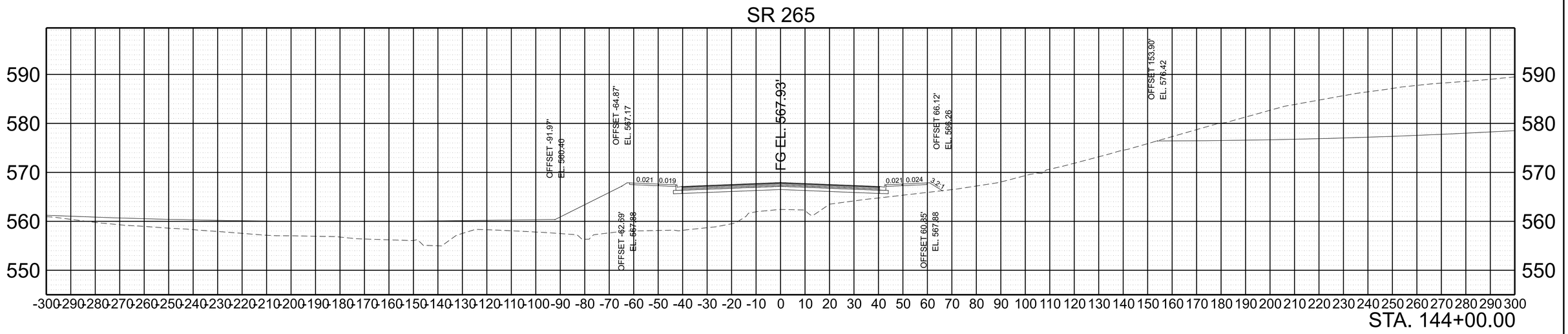


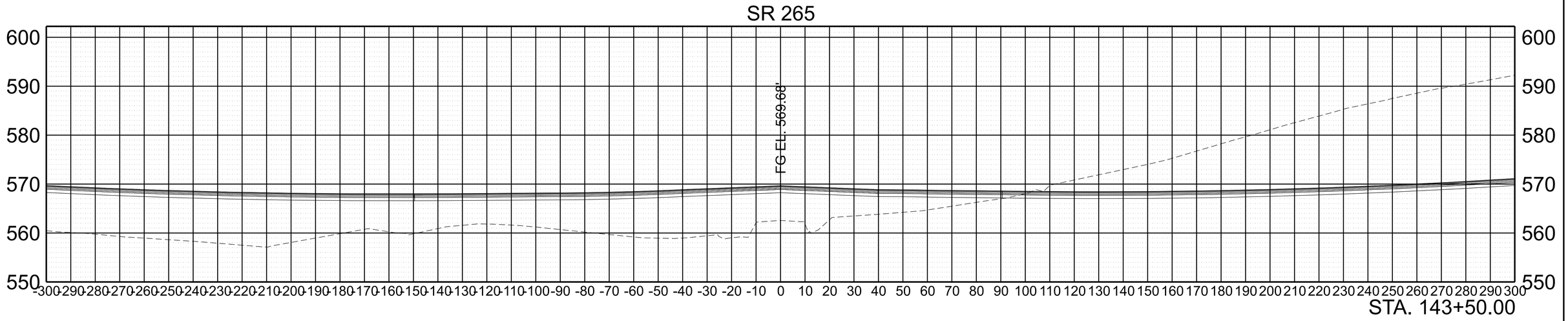
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:08 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A42

REV. ***DATE***
TEXT



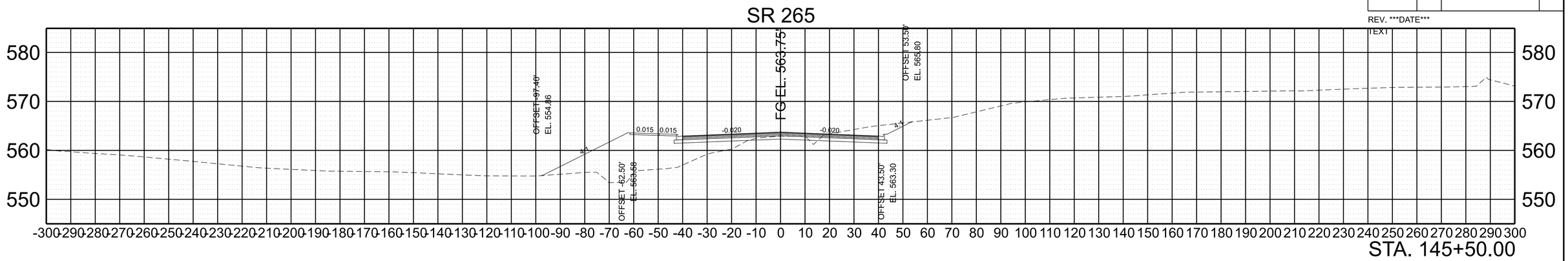


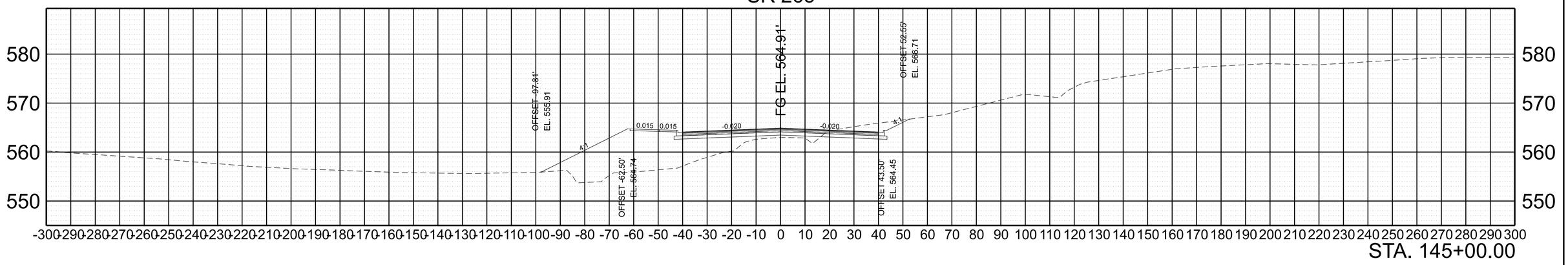
SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

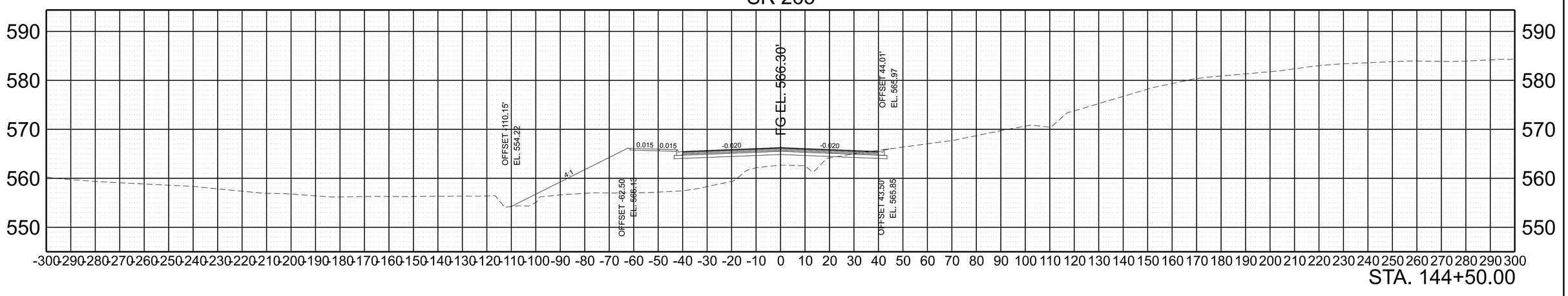
2/6/2023 8:22:14 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A43

REV. ***DATE***
TEXT





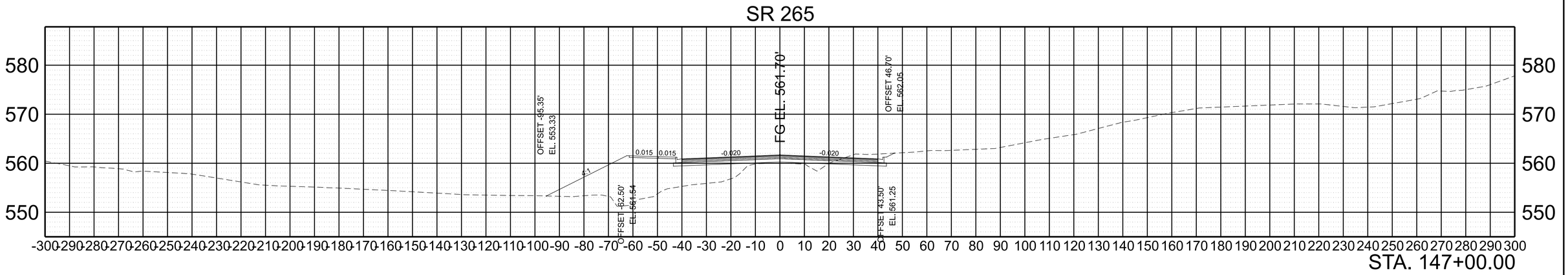


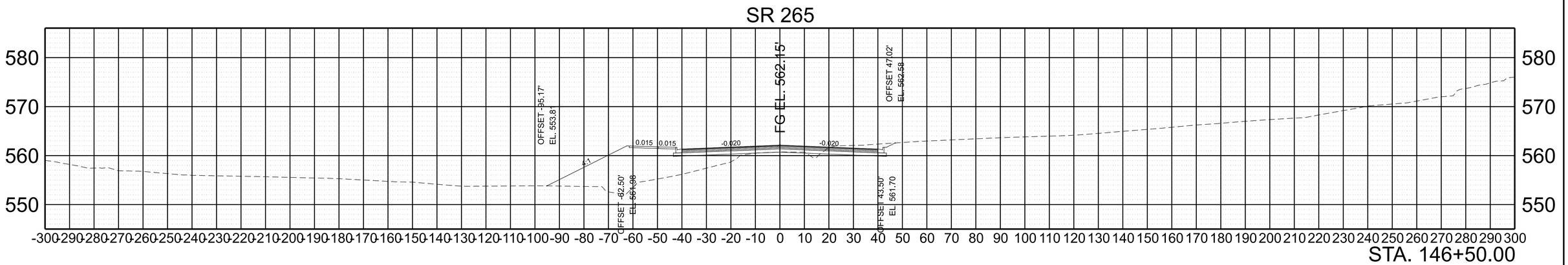
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

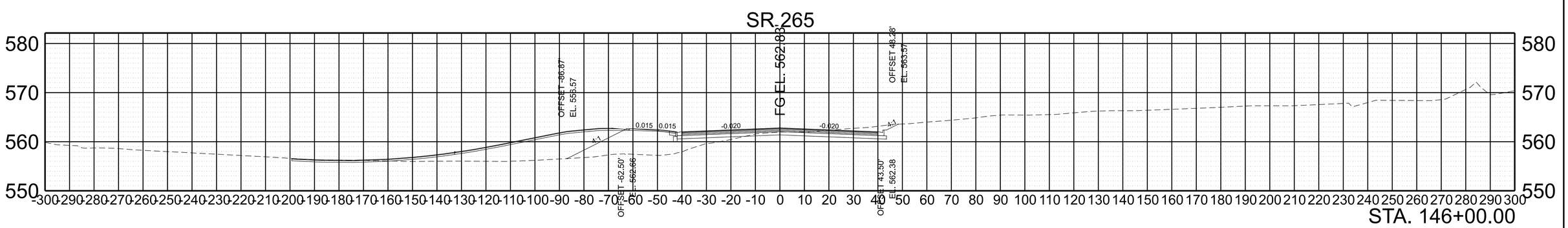
2/6/2023 8:22:21 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A44

REV. ***DATE***
TEXT







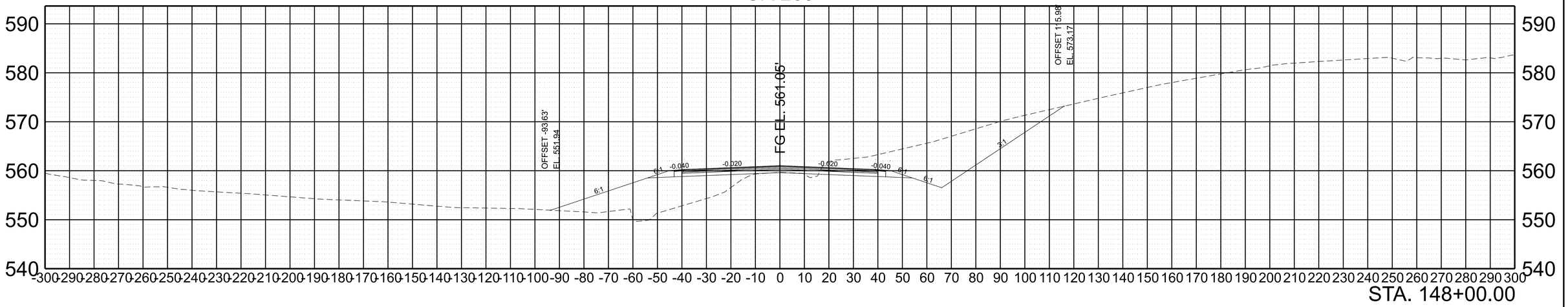
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:28 AM
C:\PWWORKINGIEAST01\D2328414\95\0040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A45

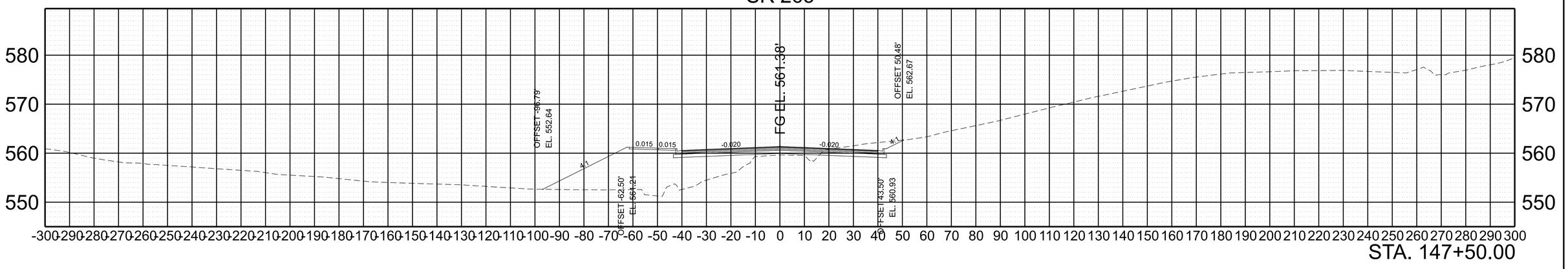
REV. ***DATE***
TEXT

SR 265



STA. 148+00.00

SR 265



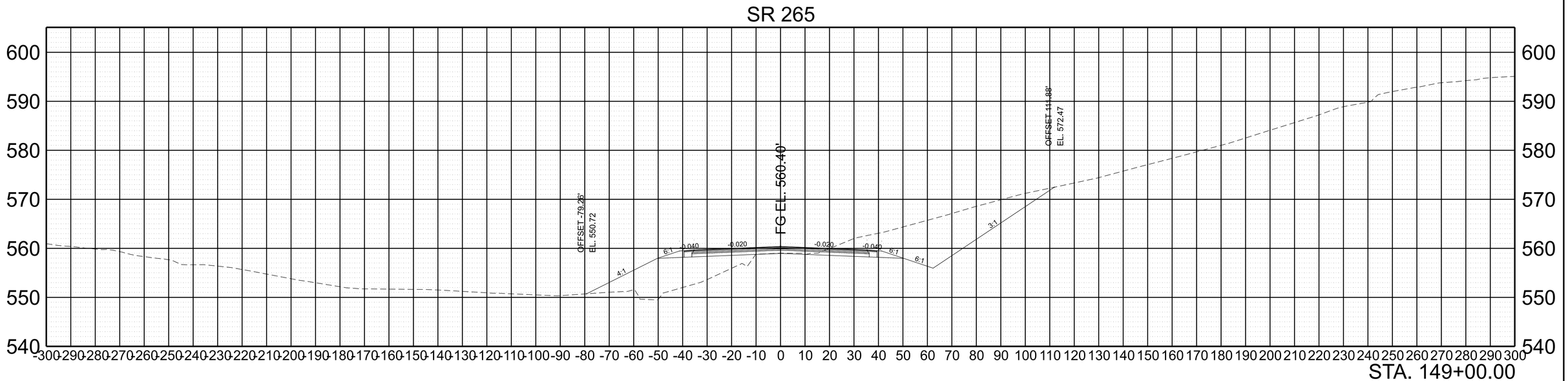
STA. 147+50.00

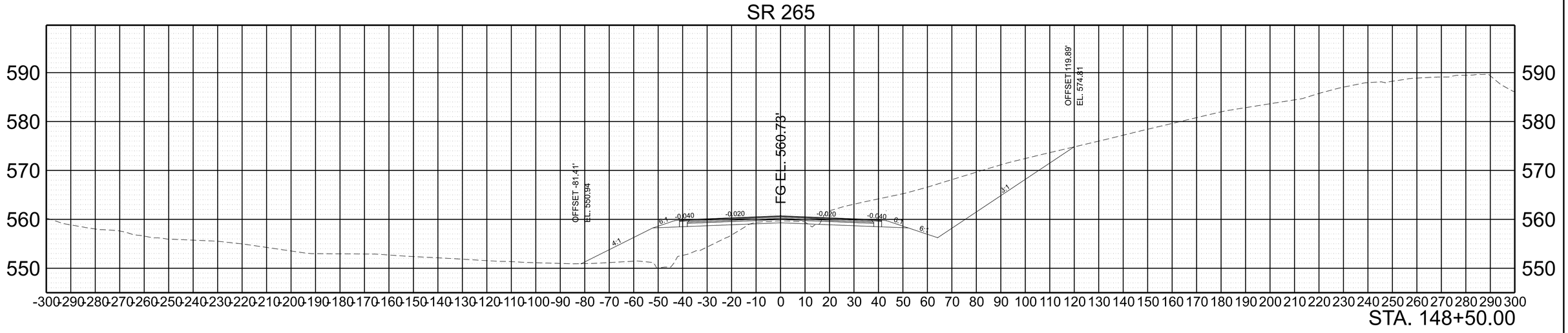
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:34 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A46

REV. ***DATE***
TEXT



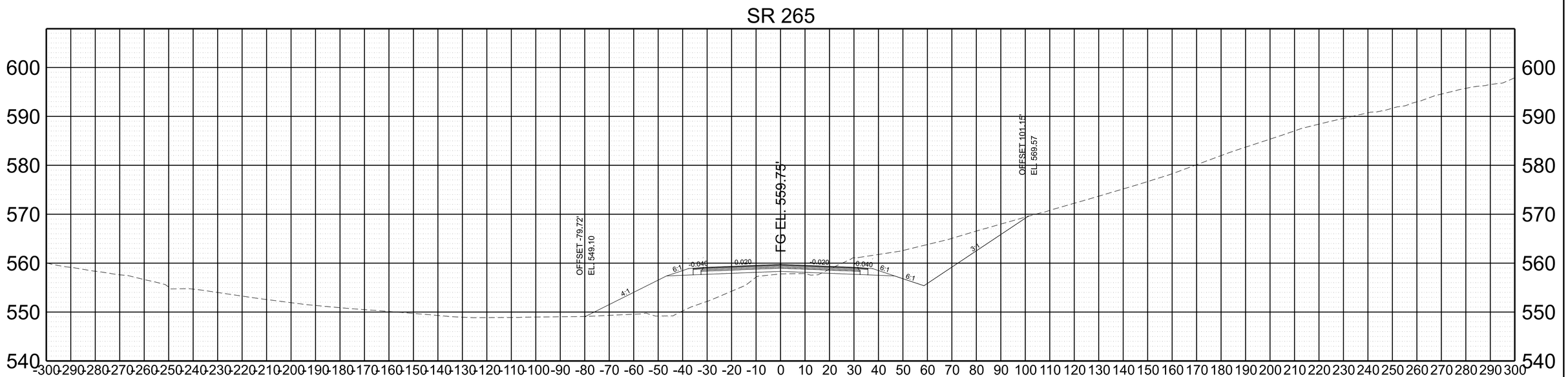


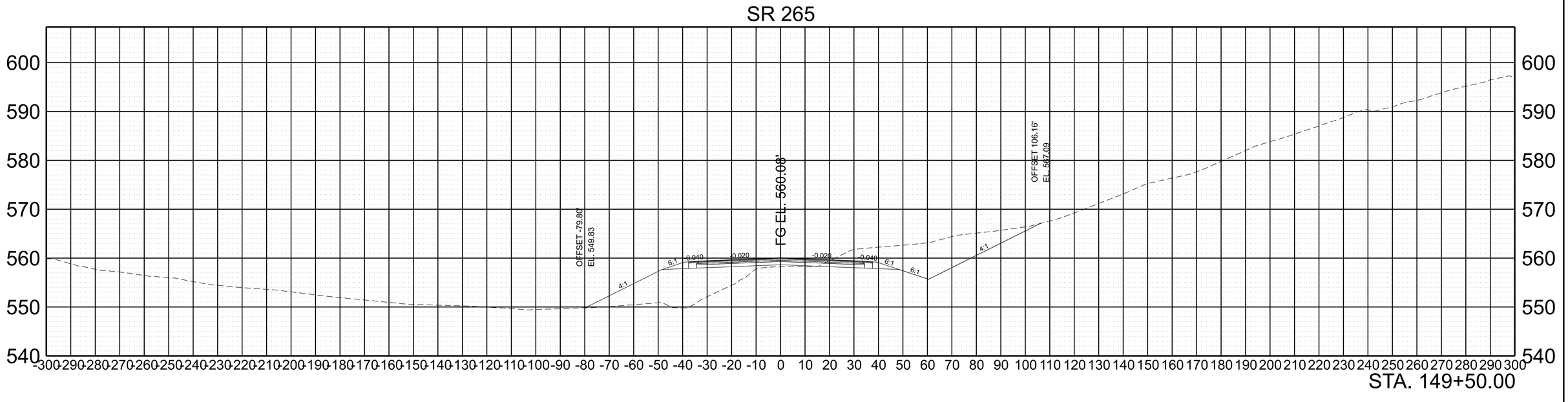
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:39 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A47

REV. ***DATE***
TEXT



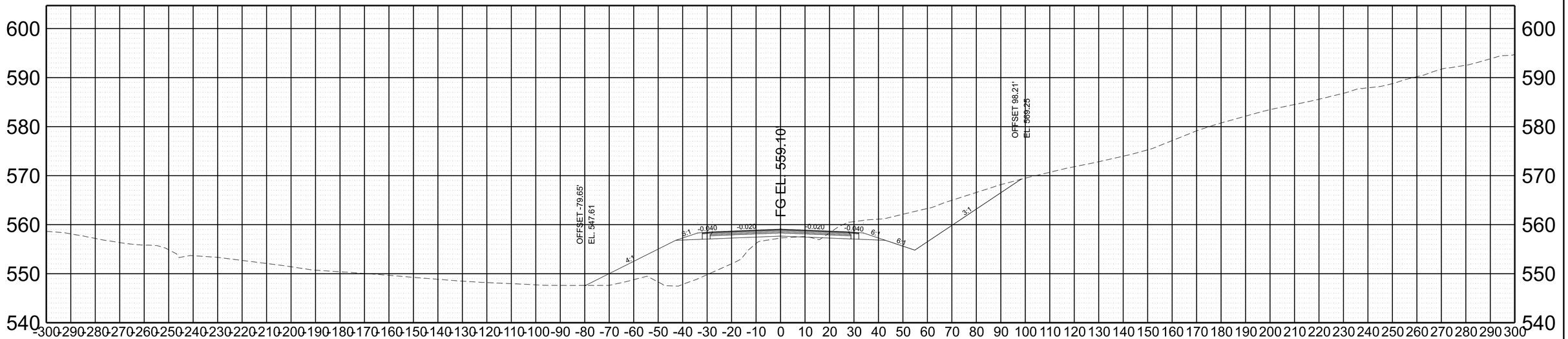


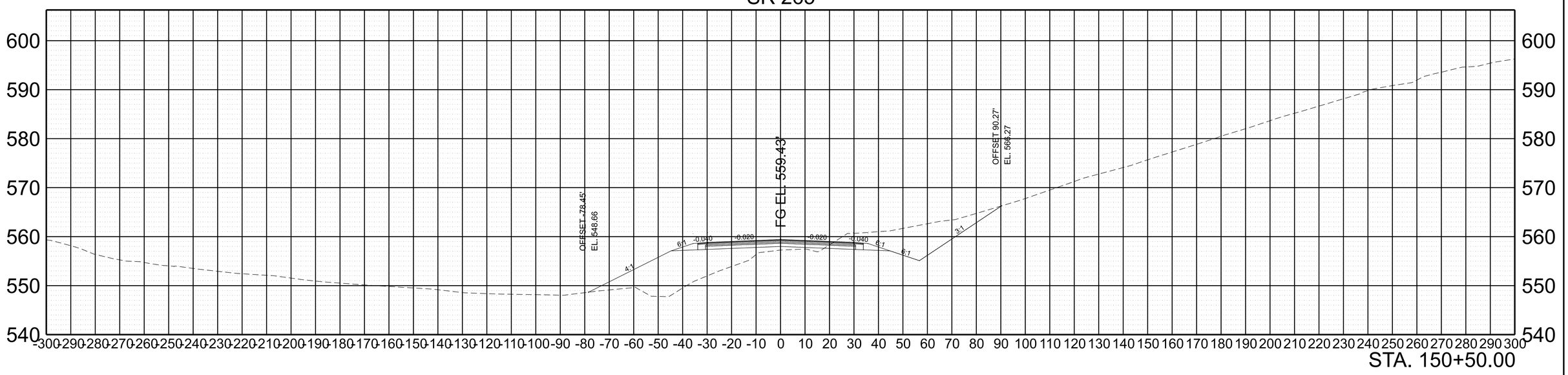
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:45 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A48

REV. ***DATE***
TEXT



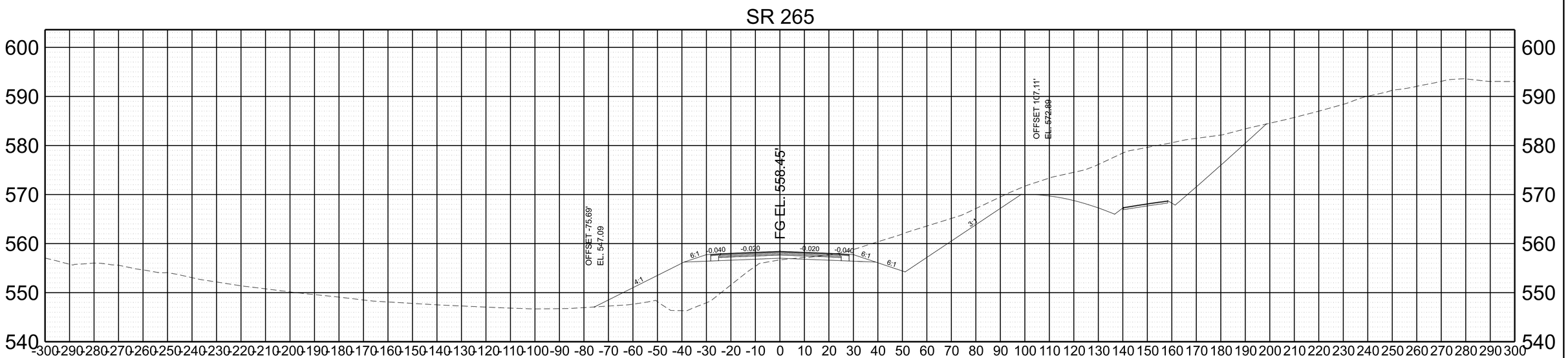


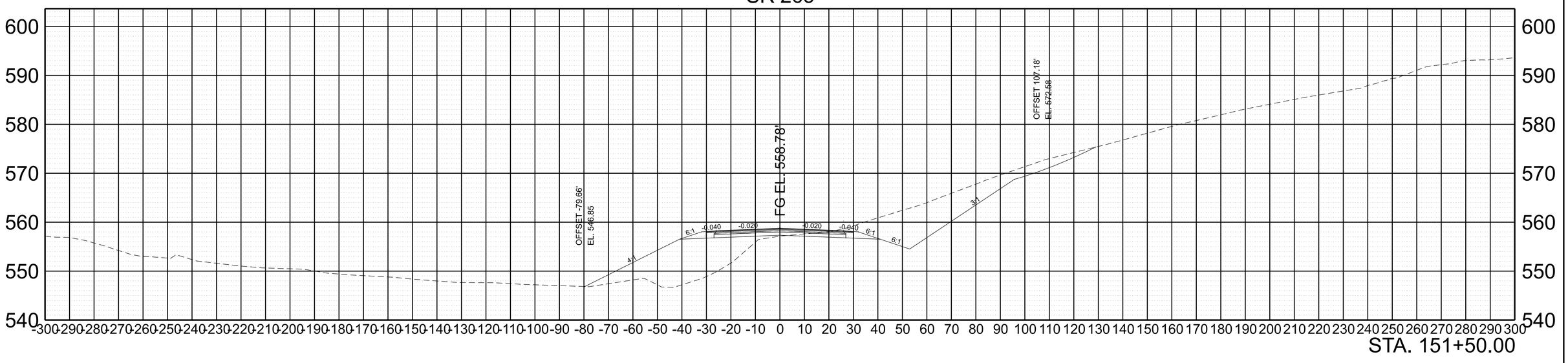
SCALE:		
	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:51 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A49

REV. ***DATE***
TEXT



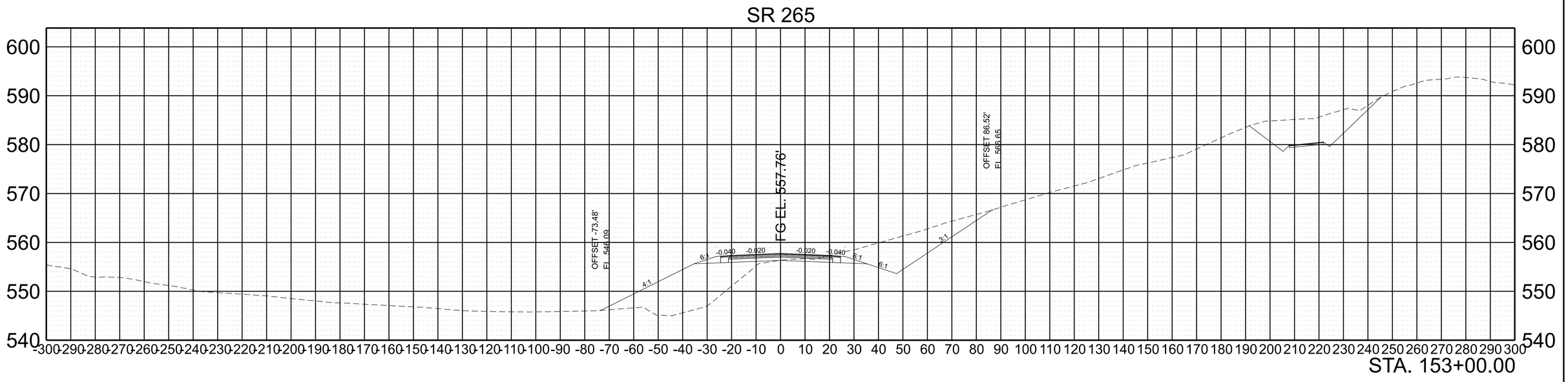


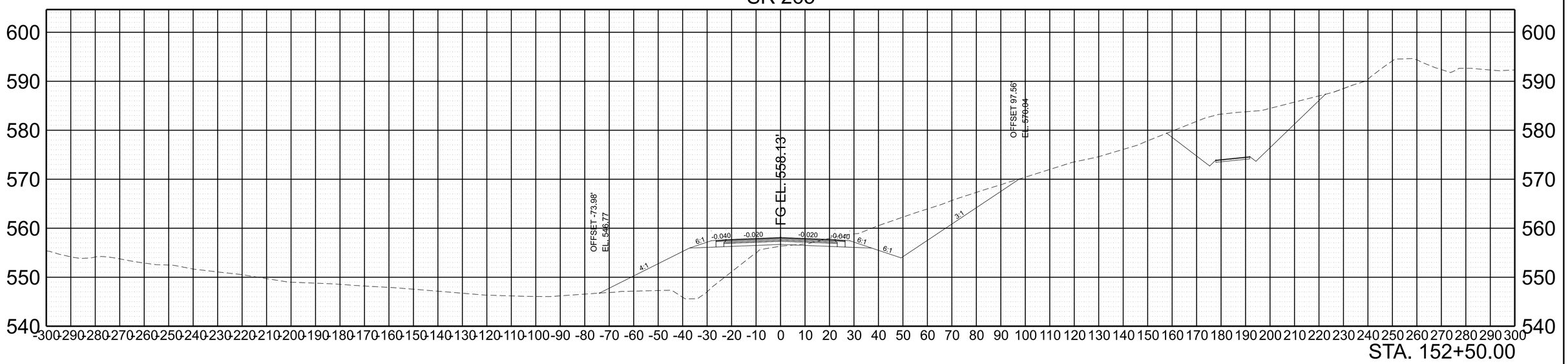
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:22:57 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A50

REV. ***DATE***
TEXT



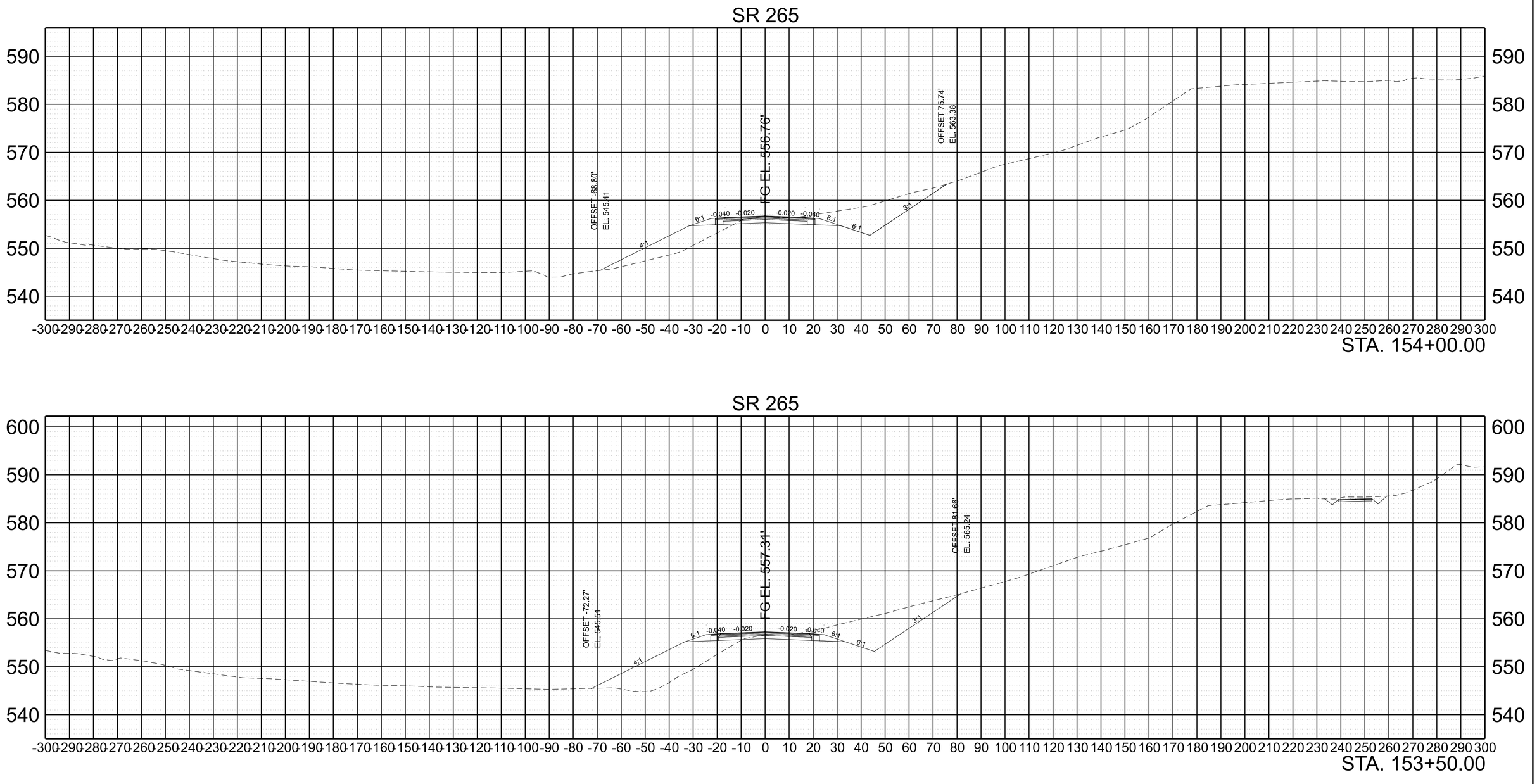


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:23:02 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A51

REV. ***DATE***
TEXT

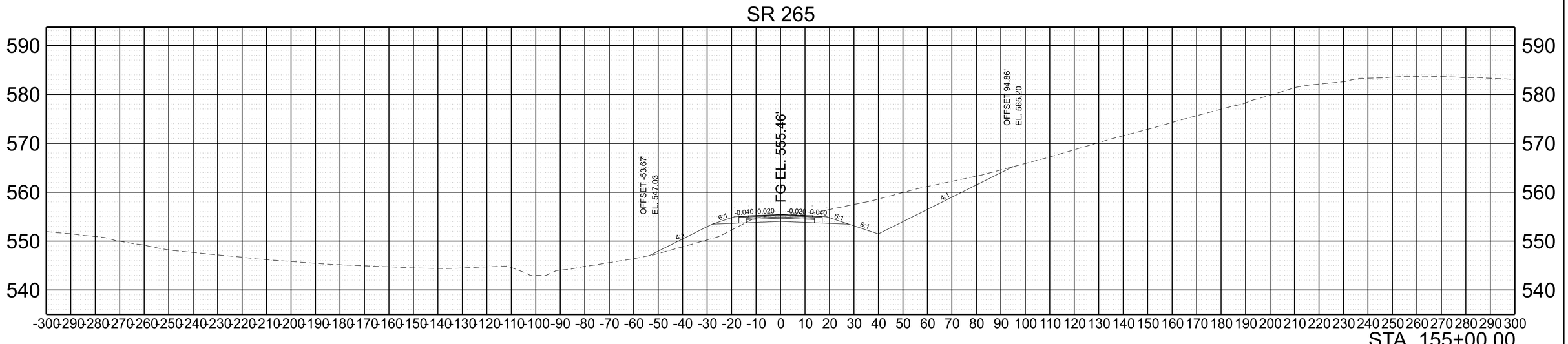


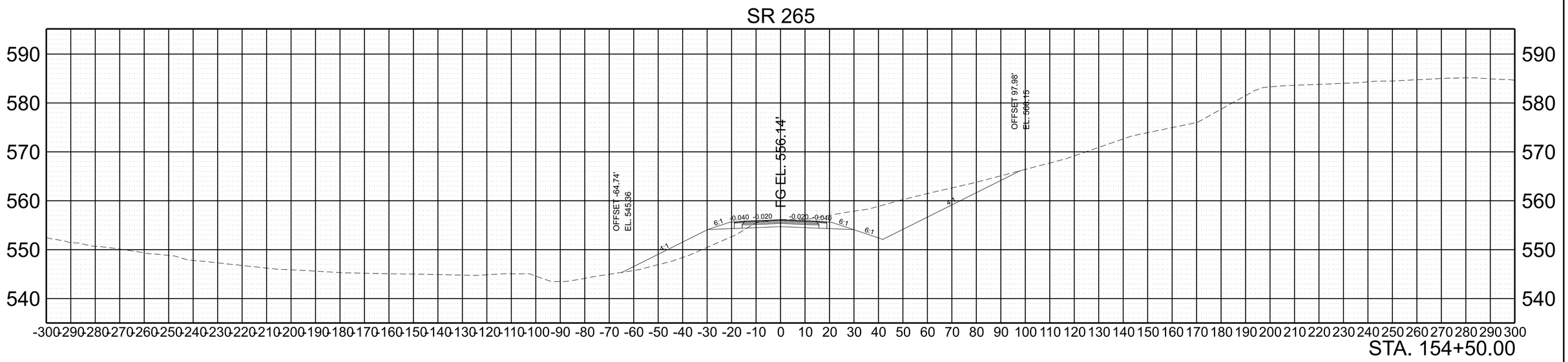
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:24:31 AM
C:\PW\WORKING\EAST01\D232841419\5I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A52

REV. ***DATE***
TEXT



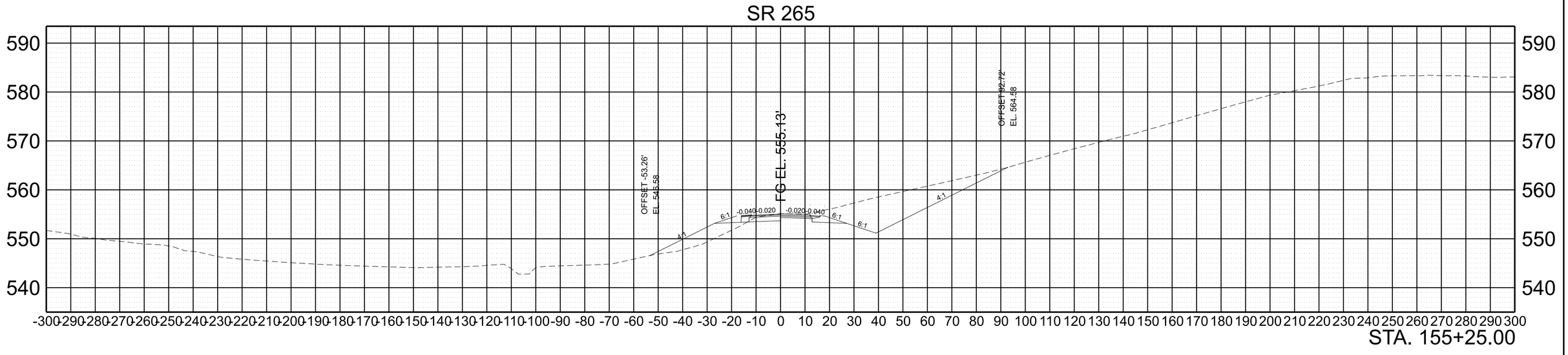


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:24:37 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A53

REV. ***DATE***
TEXT

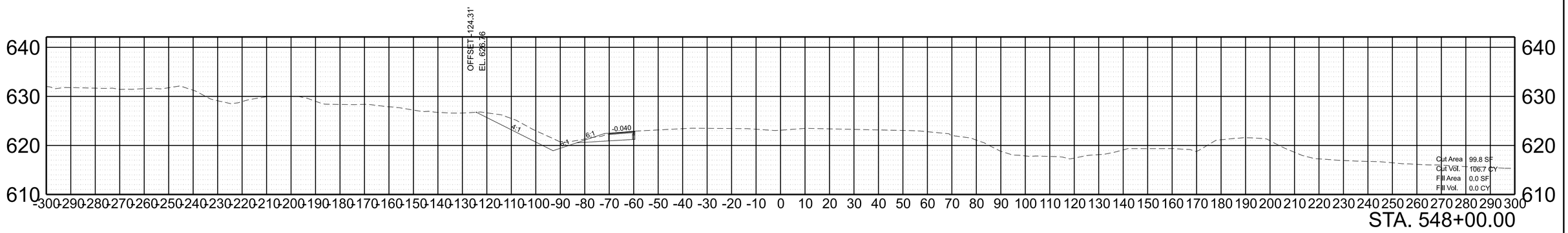


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

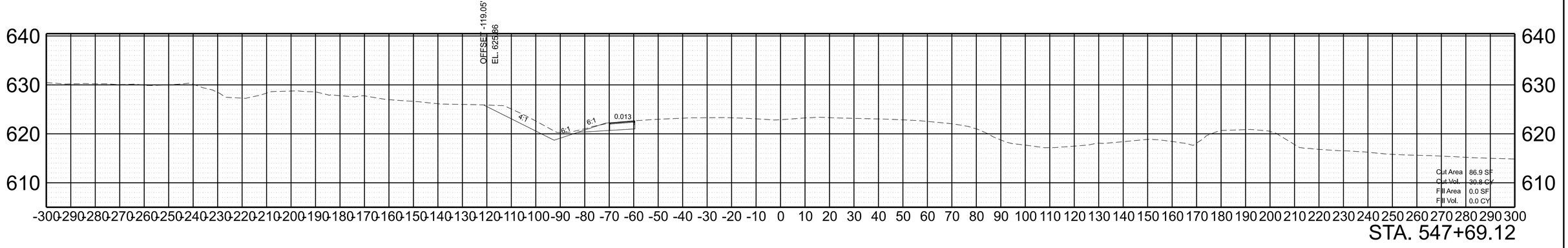
2/6/2023 8:24:42 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-SR-265.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A54

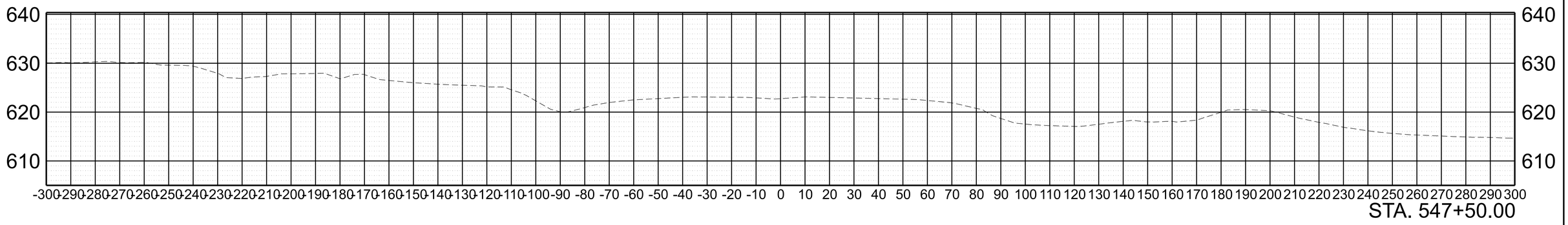
REV. ***DATE***
TEXT



STA. 548+00.00



STA. 547+69.12



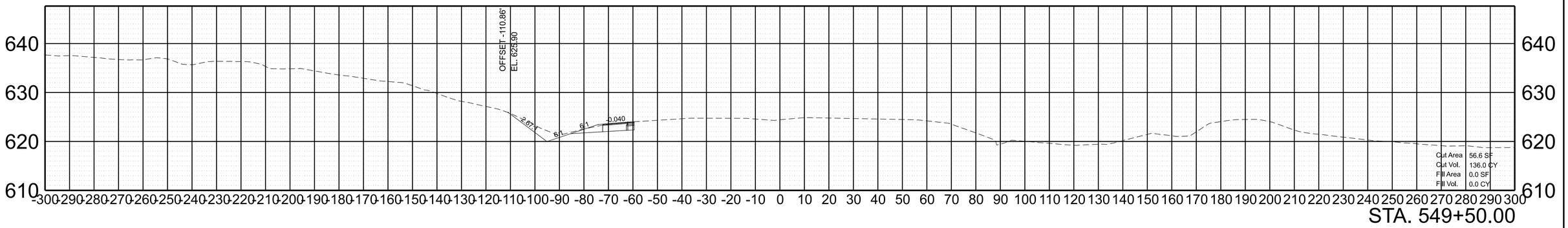
STA. 547+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

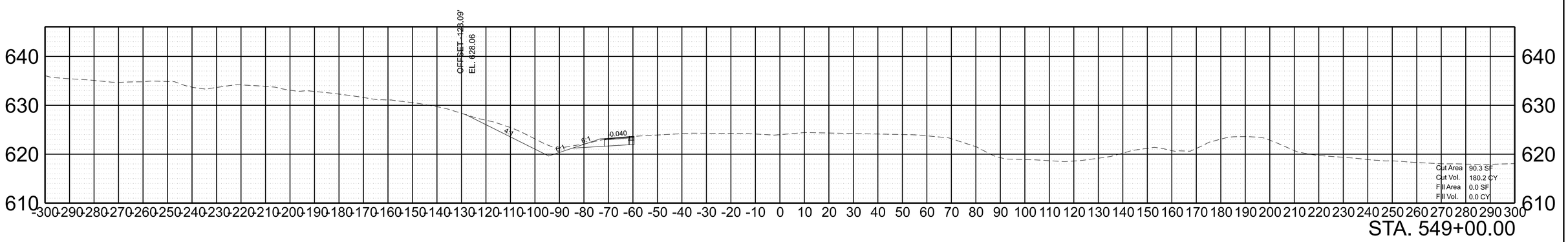
2/6/2023 8:25:06 AM
C:\PW\WORKING\EAST01\D232841419\5I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A55

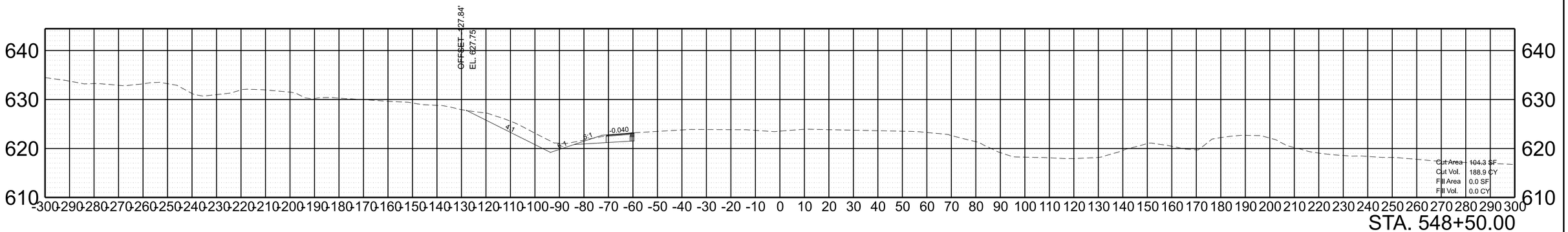
REV. ***DATE***
TEXT



STA. 549+50.00



STA. 549+00.00



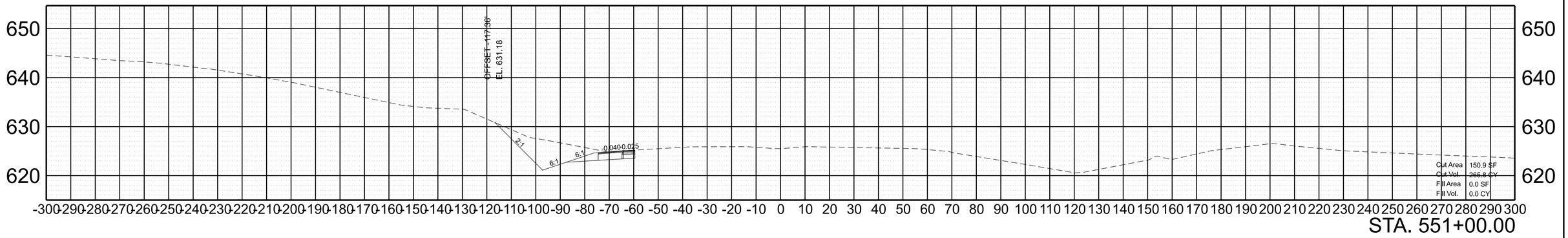
STA. 548+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

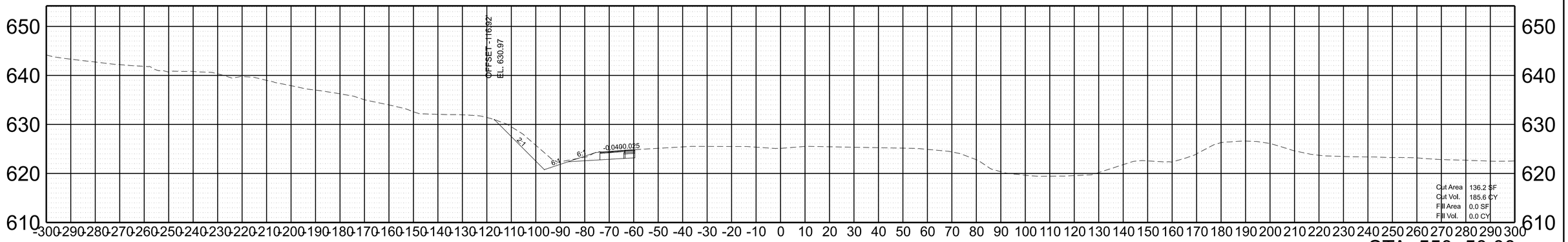
2/6/2023 8:25:09 AM
C:\PWWORKING\EAST01\D2328414\950\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A56

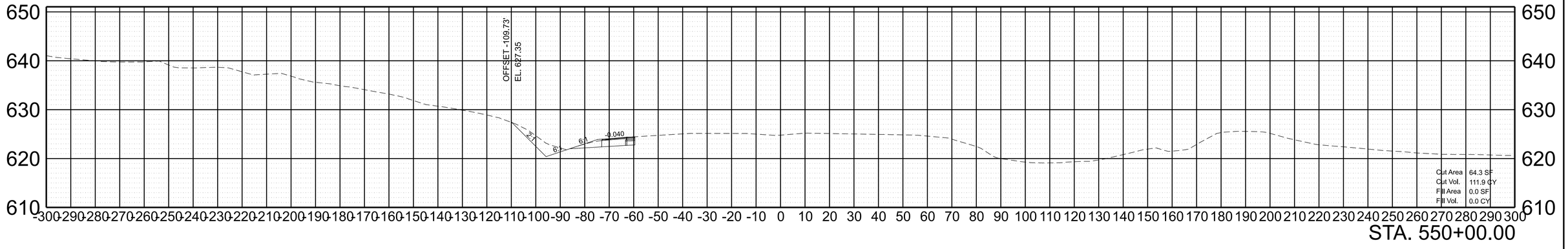
REV. ***DATE***
TEXT



STA. 551+00.00



STA. 550+50.00



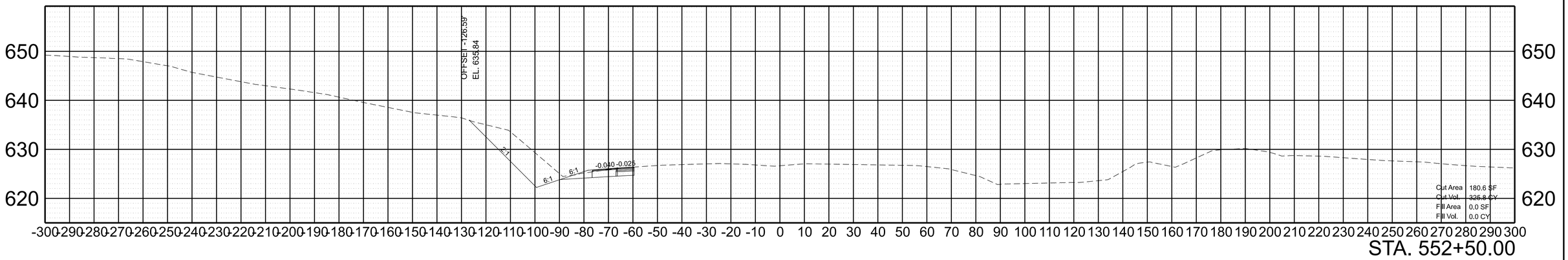
STA. 550+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

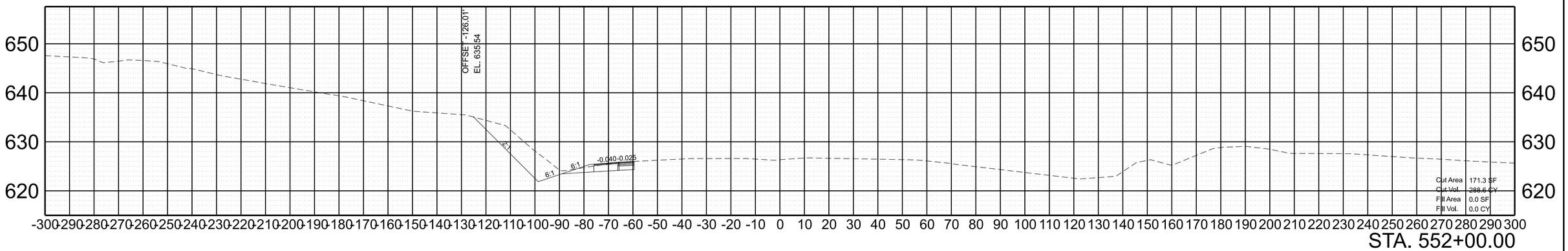
2/6/2023 8:25:11 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A57

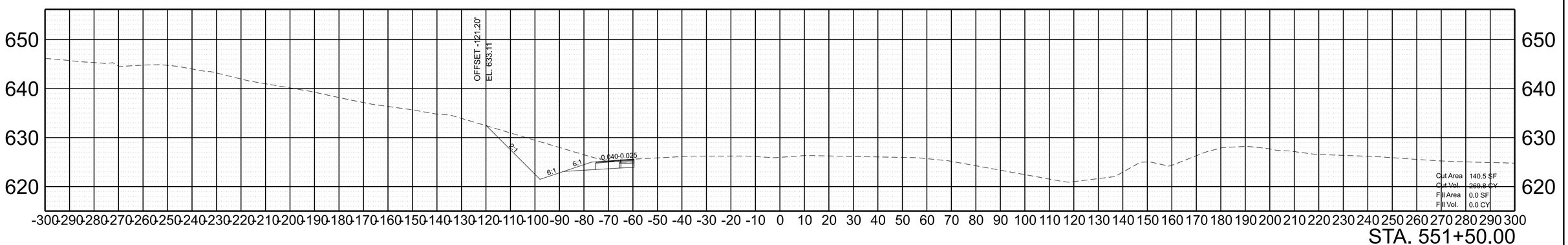
REV. ***DATE***
TEXT



STA. 552+50.00



STA. 552+00.00



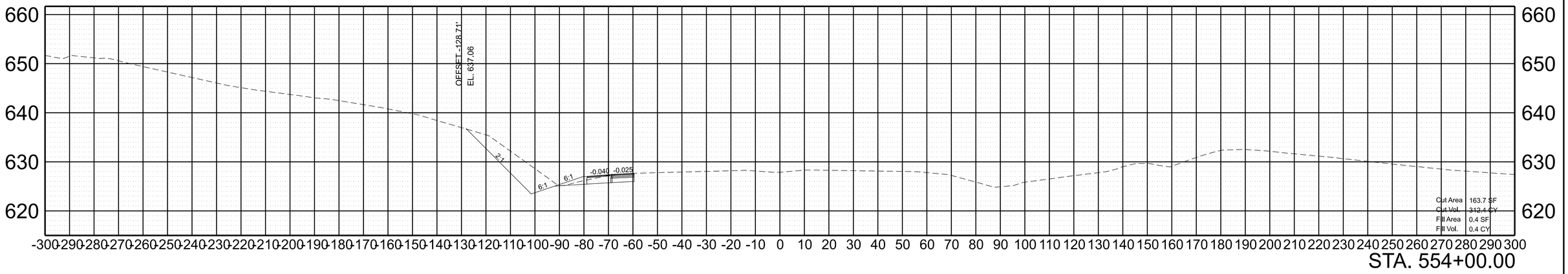
STA. 551+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

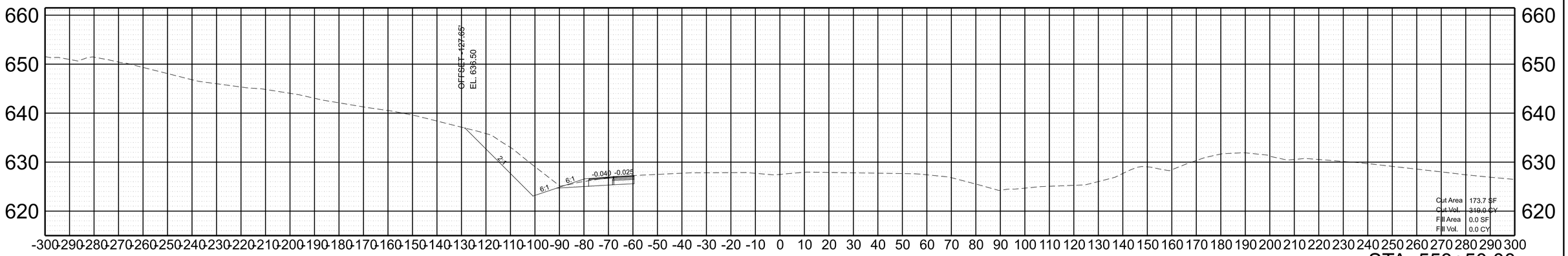
2/6/2023 8:25:14 AM
C:\PWWORKINGIEAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A58

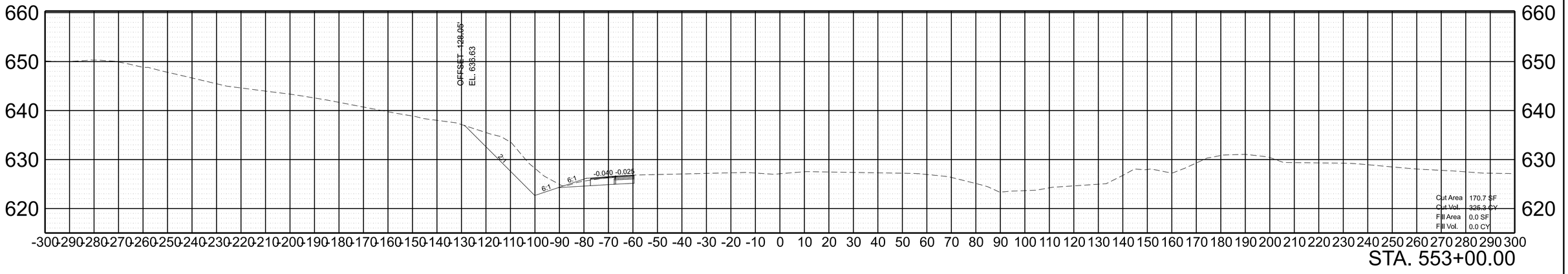
REV. ***DATE***
TEXT



STA. 554+00.00



STA. 553+50.00



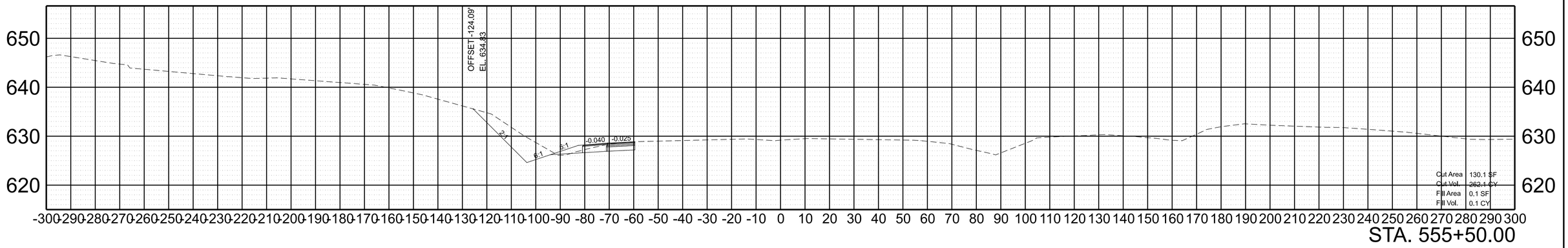
STA. 553+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

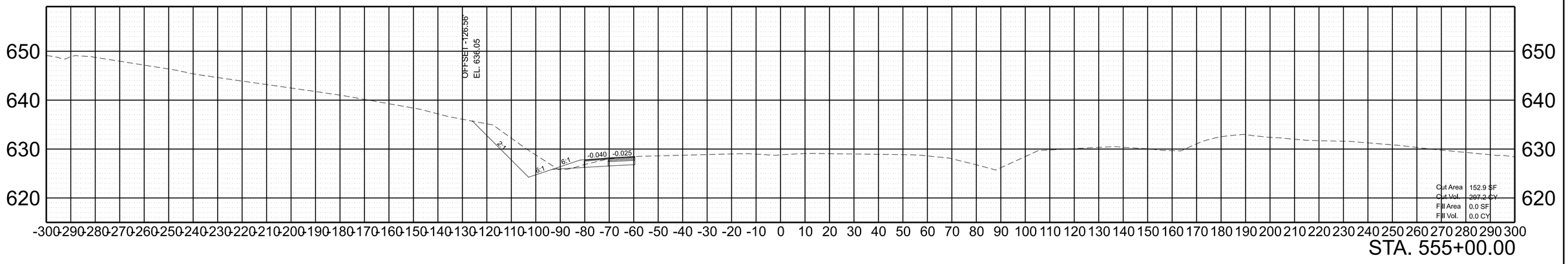
2/6/2023 8:25:16 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A59

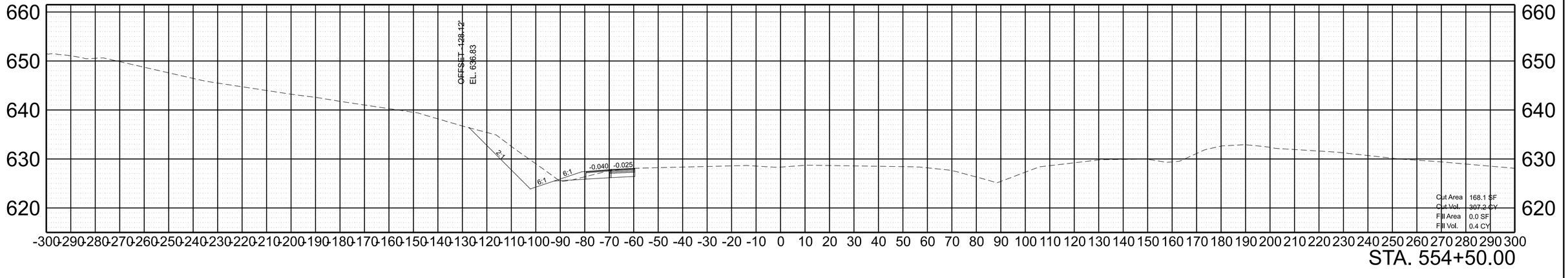
REV. ***DATE***
TEXT



STA. 555+50.00



STA. 555+00.00



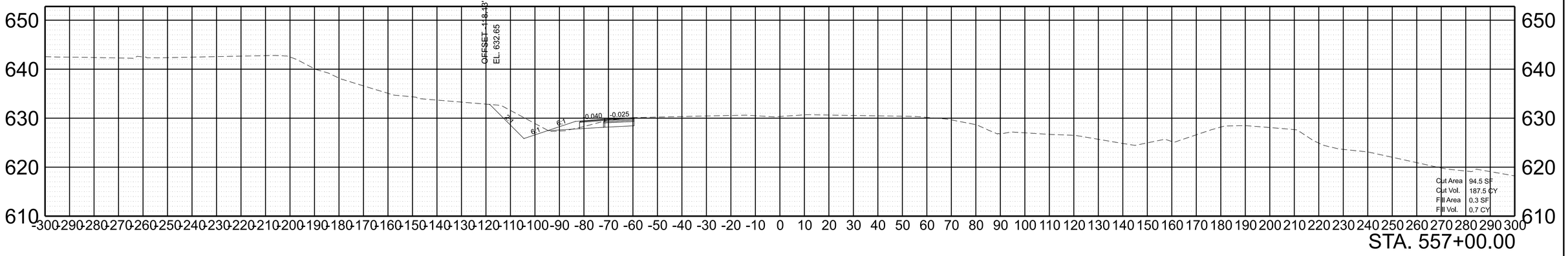
STA. 554+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

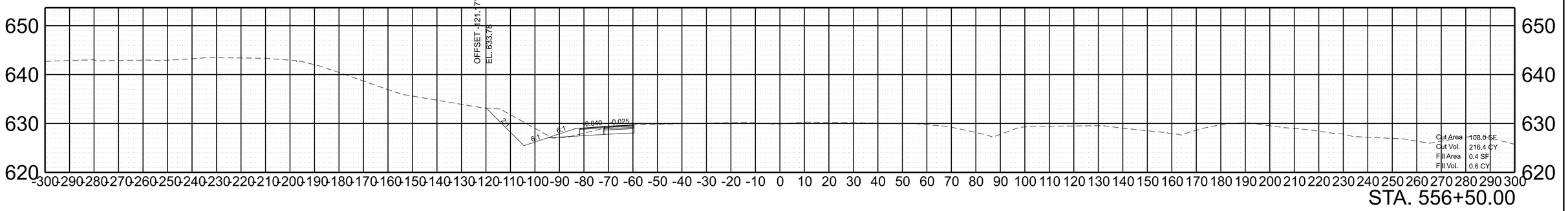
2/6/2023 8:25:19 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A60

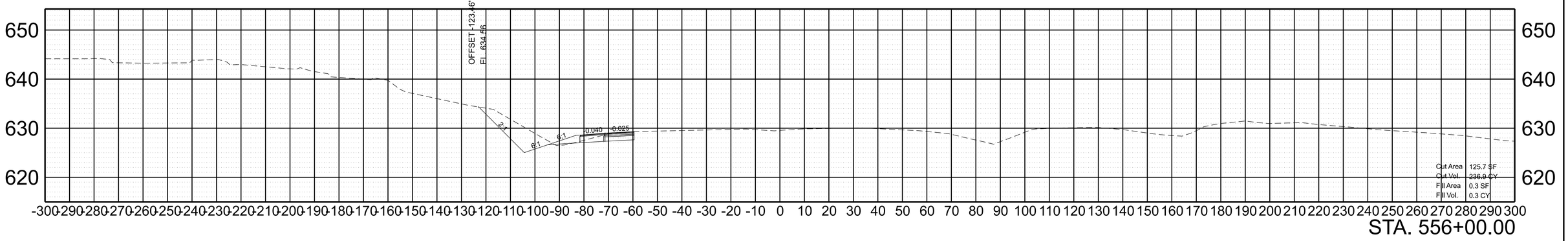
REV. ***DATE***
TEXT



STA. 557+00.00



STA. 556+50.00



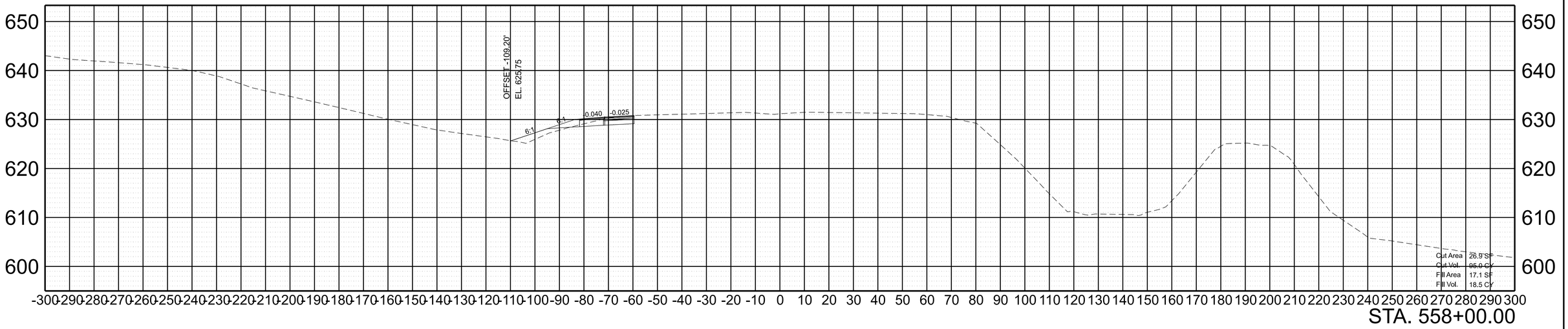
STA. 556+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

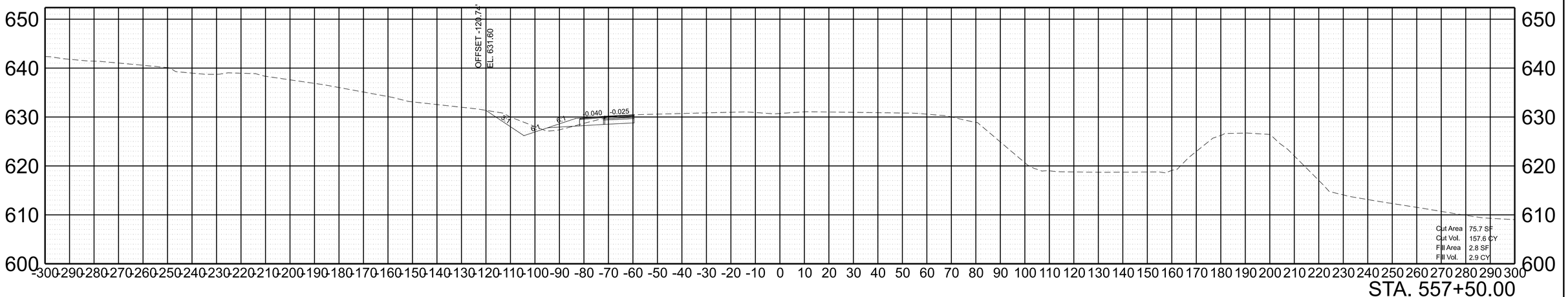
2/6/2023 8:25:22 AM
C:\PWWORKINGIEAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A61

REV. ***DATE***
TEXT



STA. 558+00.00



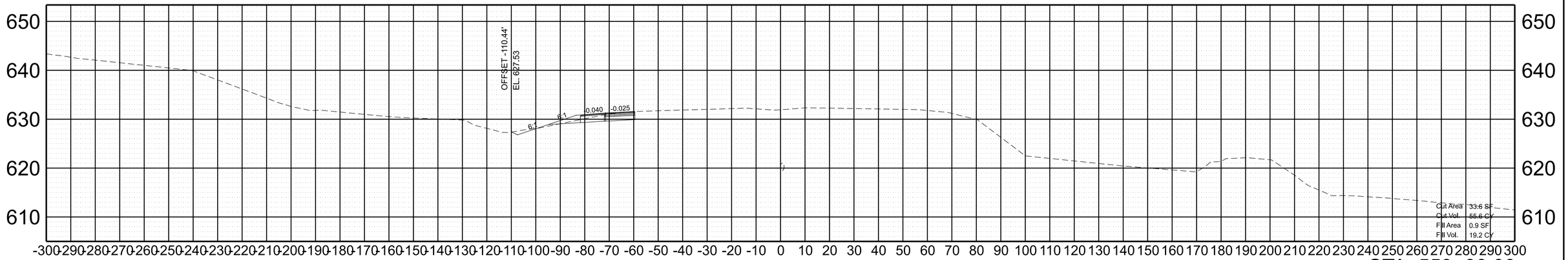
STA. 557+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

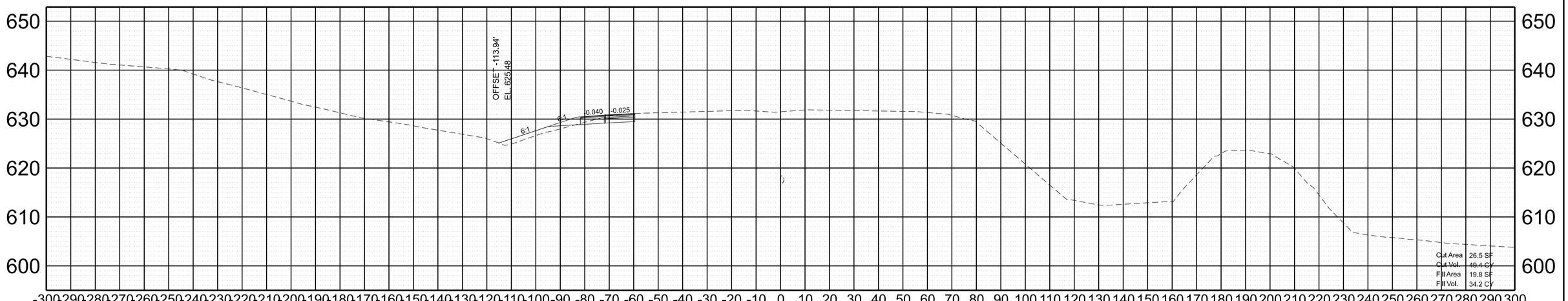
2/6/2023 8:25:24 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A62

REV. ***DATE***
TEXT



STA. 559+00.00



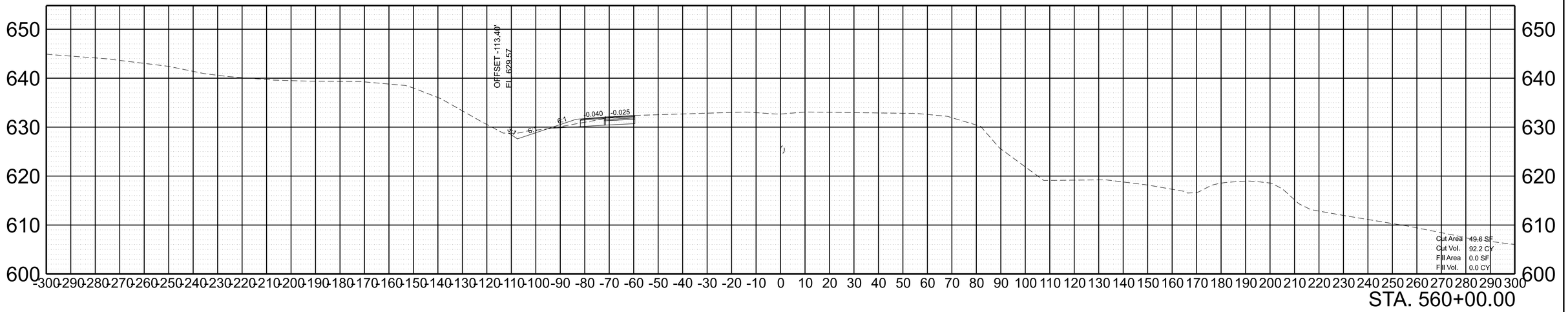
STA. 558+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

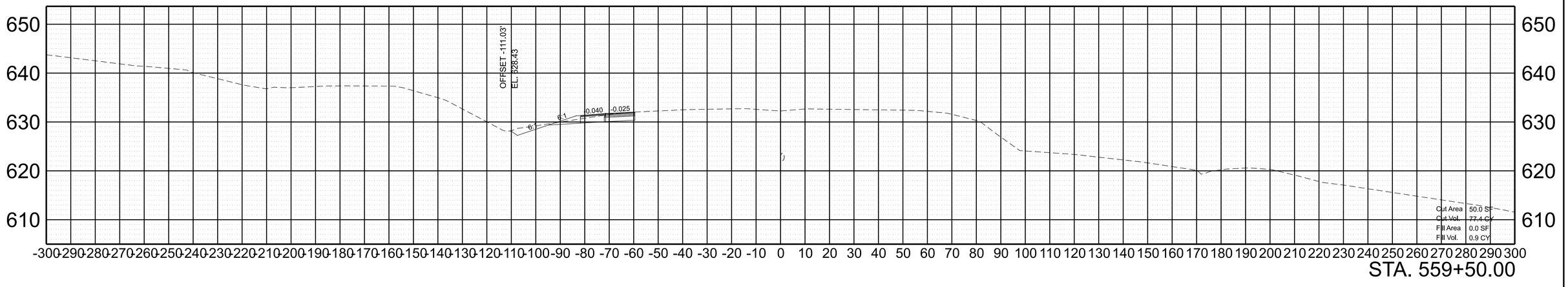
2/6/2023 8:25:26 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A63

REV. ***DATE***
TEXT



STA. 560+00.00



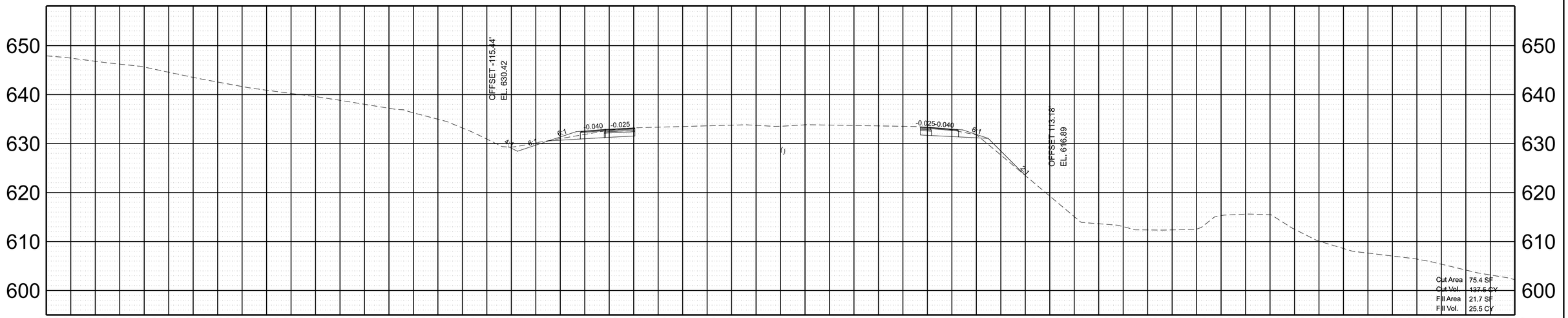
STA. 559+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

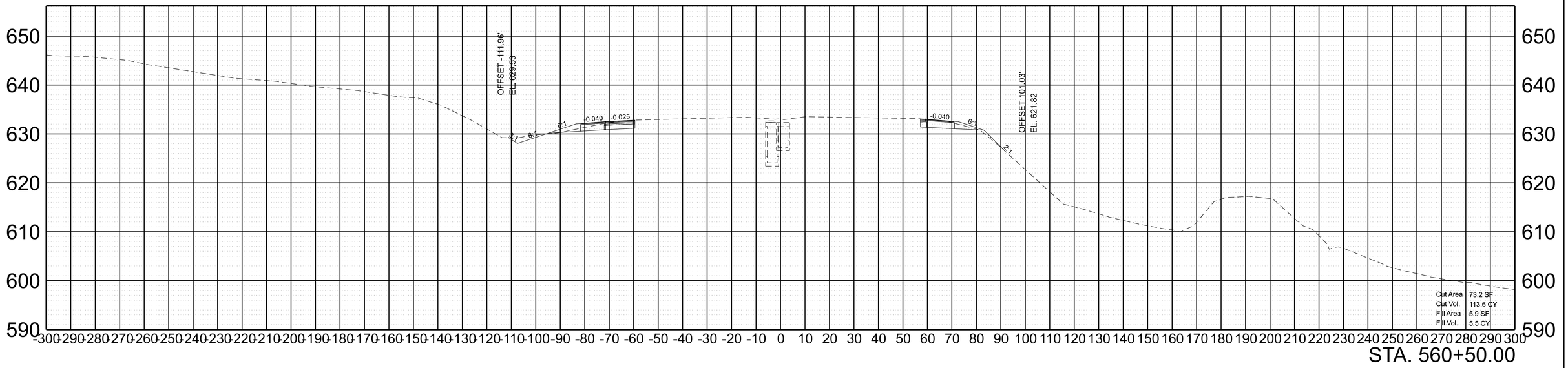
2/6/2023 8:25:28 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A64

REV. ***DATE***
TEXT



STA. 561+00.00



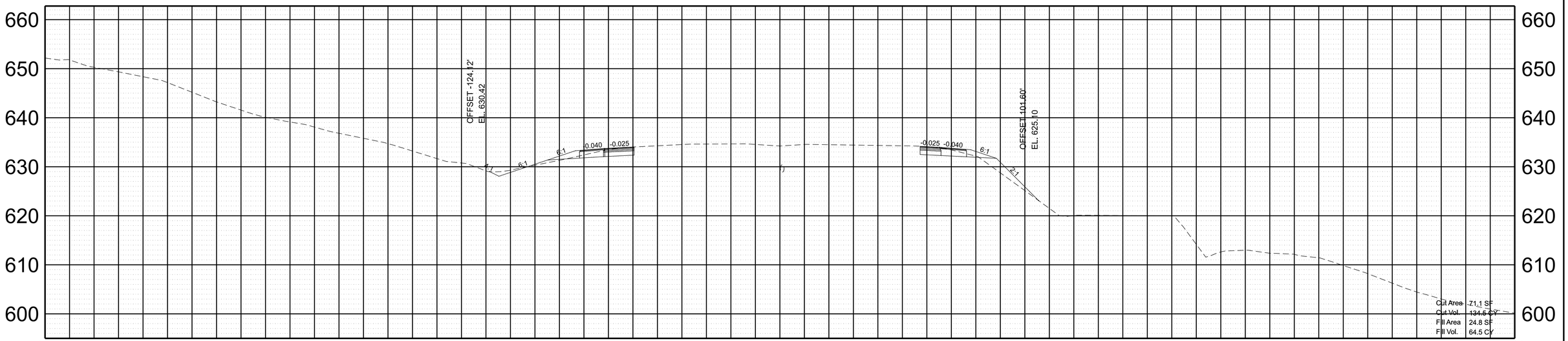
STA. 560+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

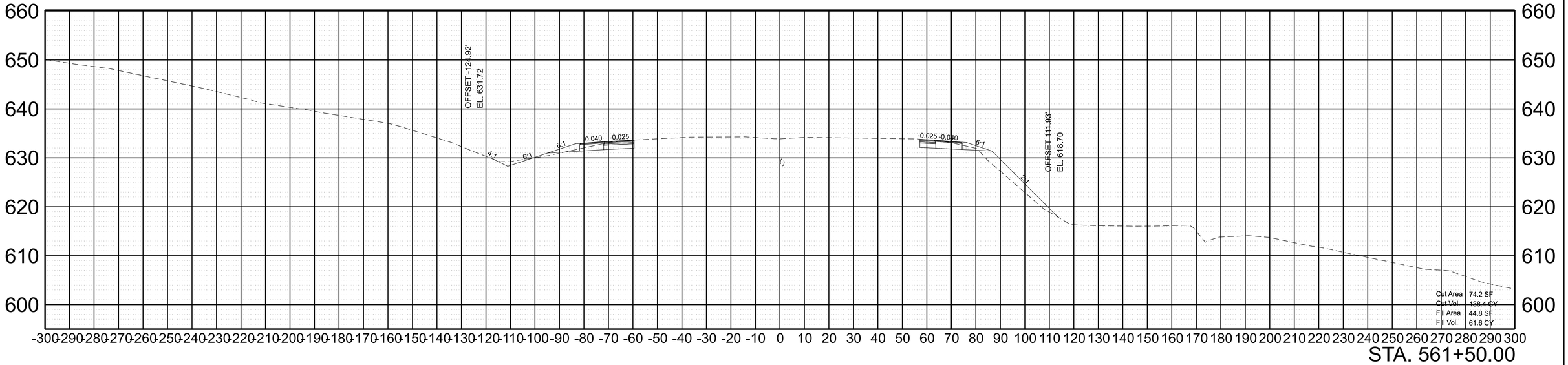
2/6/2023 8:25:30 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A65

REV. ***DATE***
TEXT



STA. 562+00.00



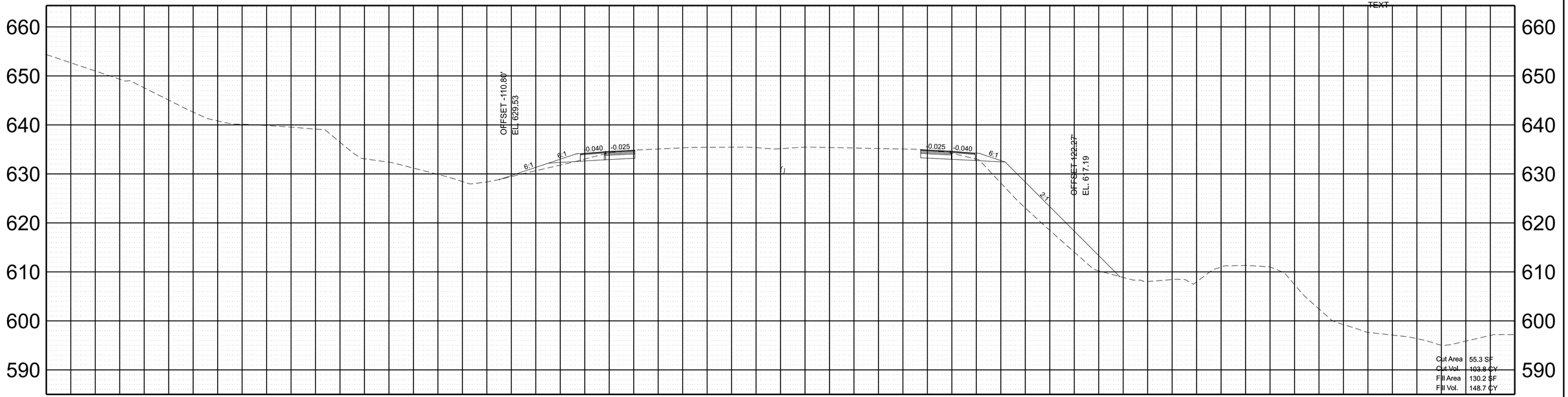
STA. 561+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

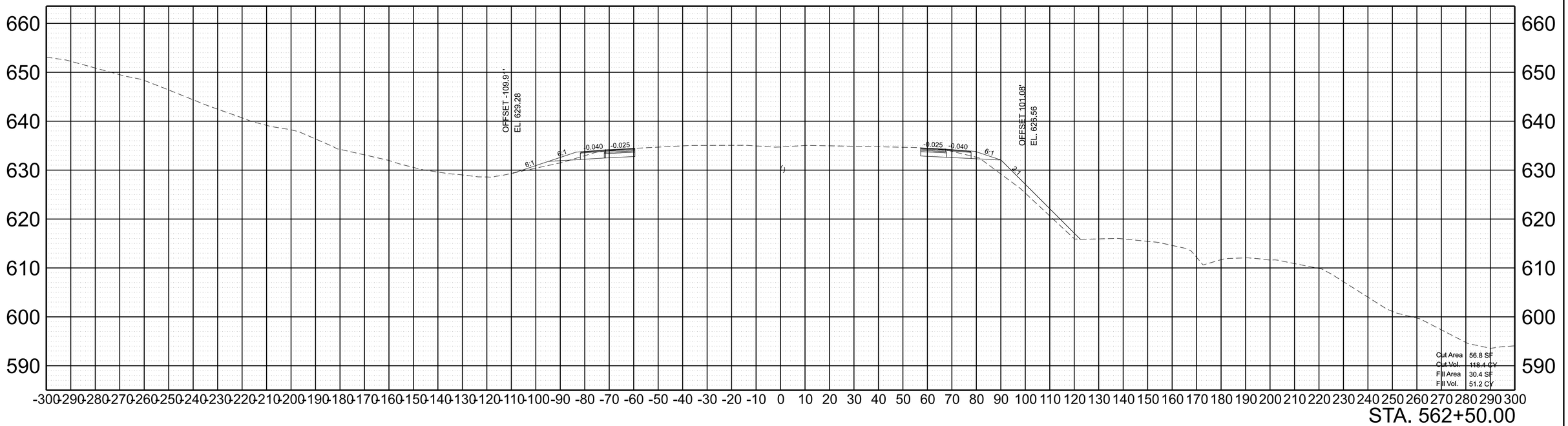
2/6/2023 8:25:33 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A66

REV. ***DATE***
TEXT



STA. 563+00.00



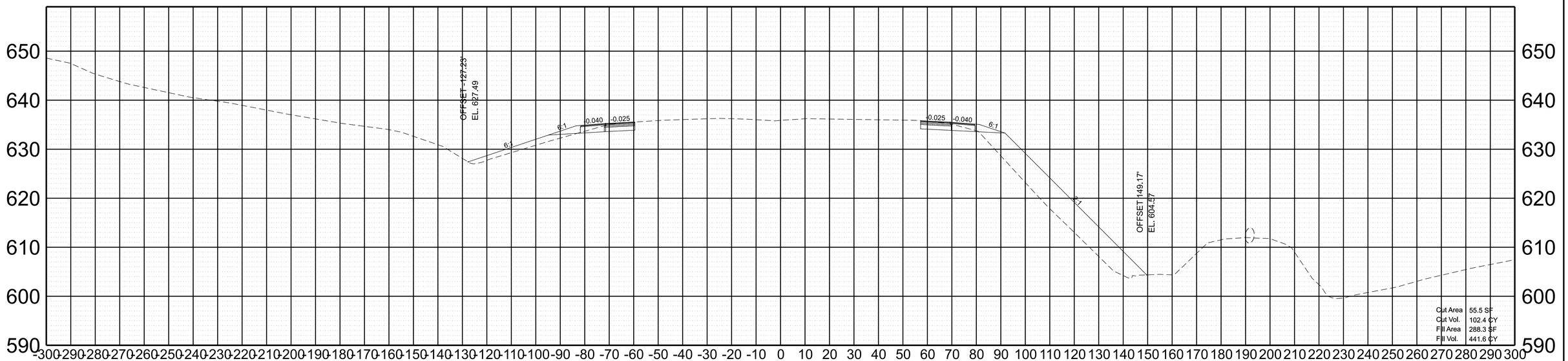
STA. 562+50.00

SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .	

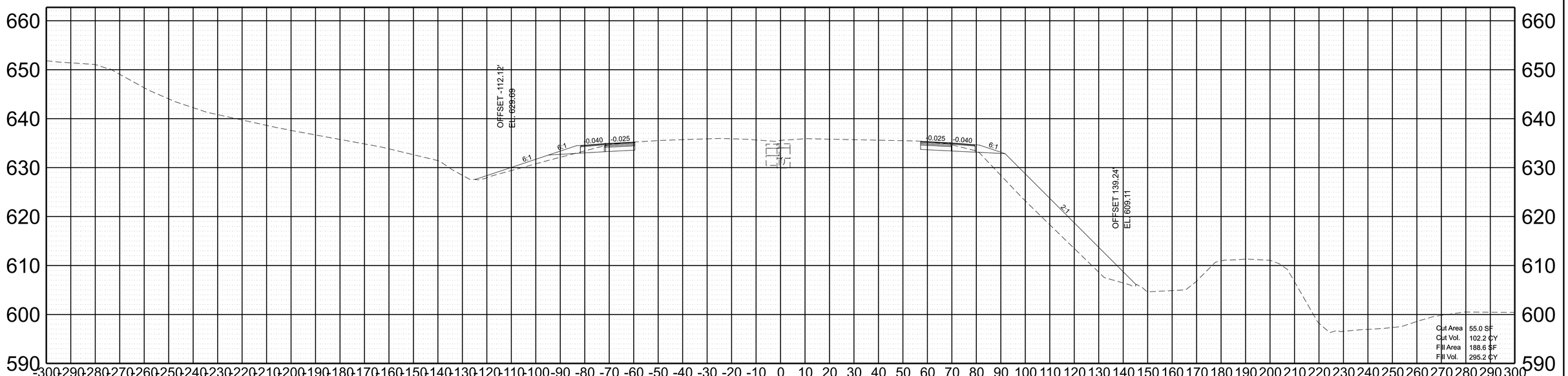
2/6/2023 8:25:35 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A67

REV. ***DATE***
TEXT



STA. 564+00.00



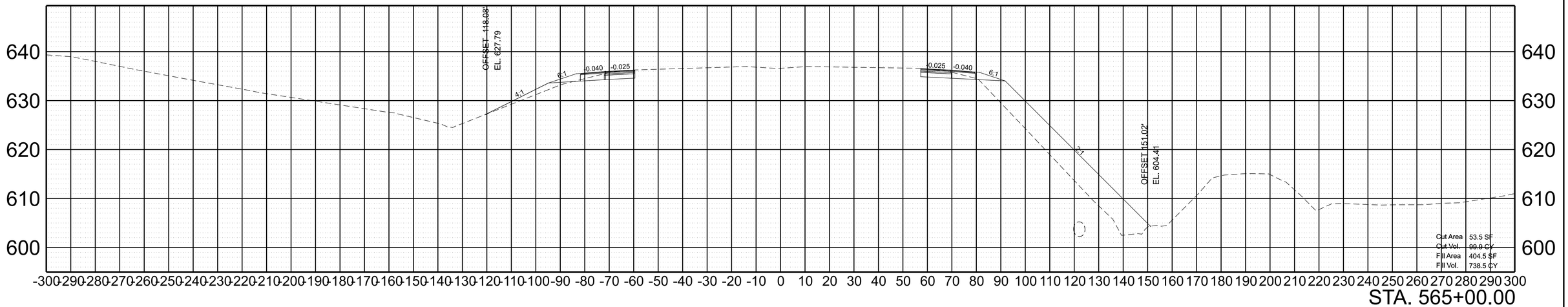
STA. 563+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

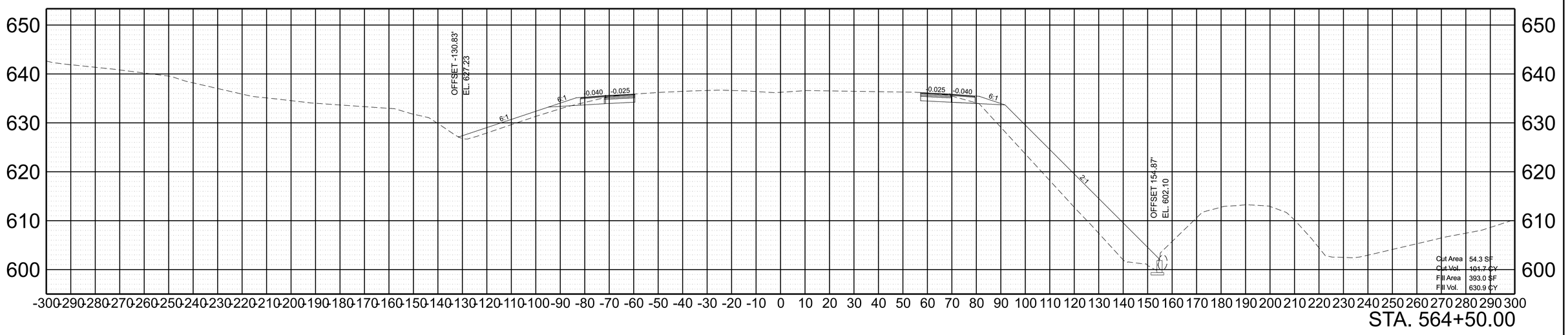
2/6/2023 8:25:38 AM
C:\PWWORKING\EAST\01\D2328414\95\0I40-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A68

REV. ***DATE***
TEXT



STA. 565+00.00



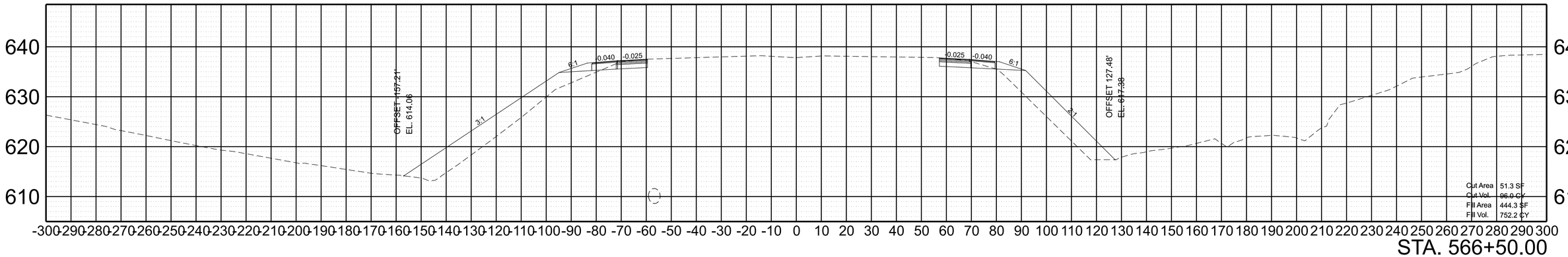
STA. 564+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

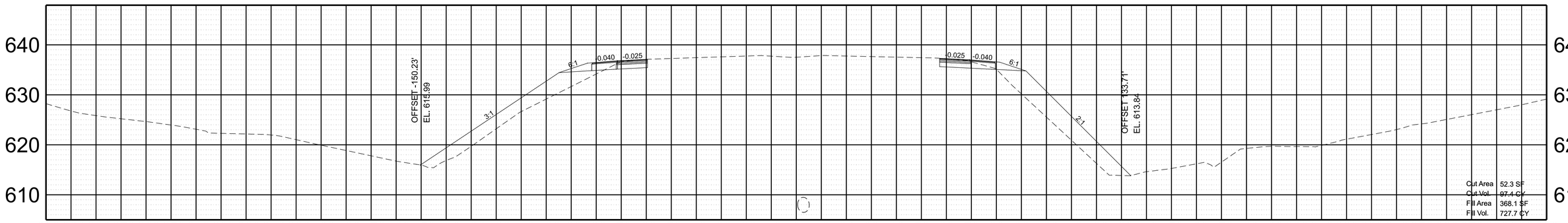
2/6/2023 8:25:40 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A69

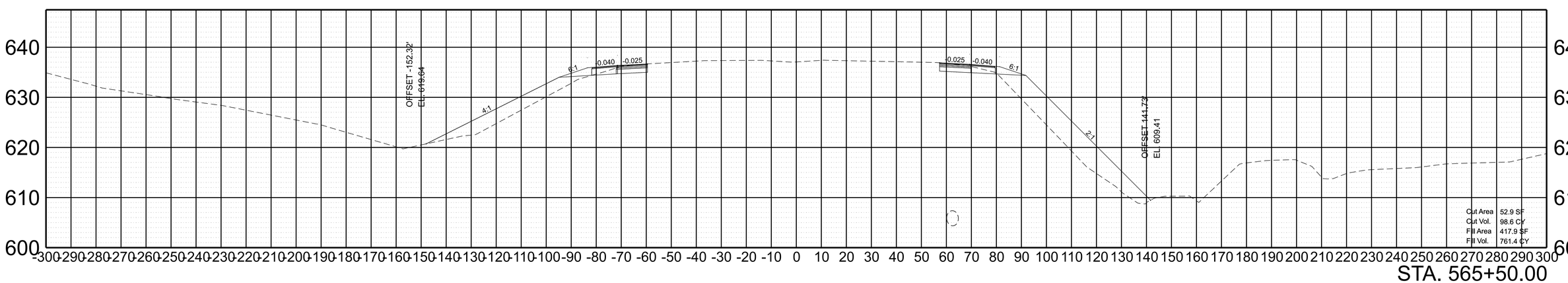
REV. ***DATE***
TEXT



STA. 566+50.00



STA. 566+00.00



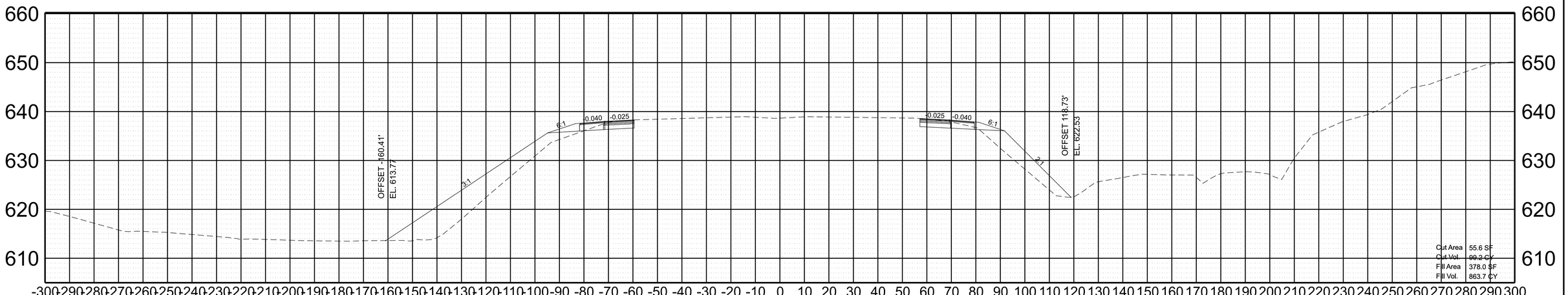
STA. 565+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

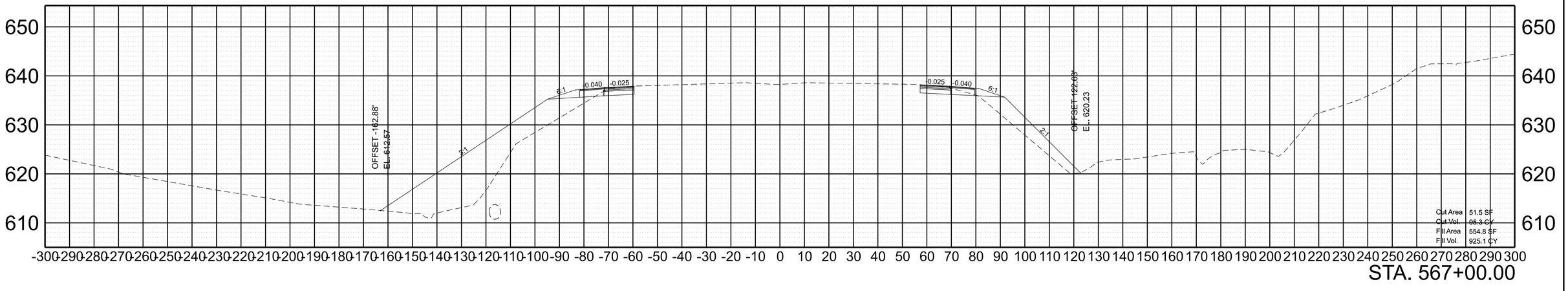
2/6/2023 8:25:43 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A70

REV. ***DATE***
TEXT



STA. 567+50.00



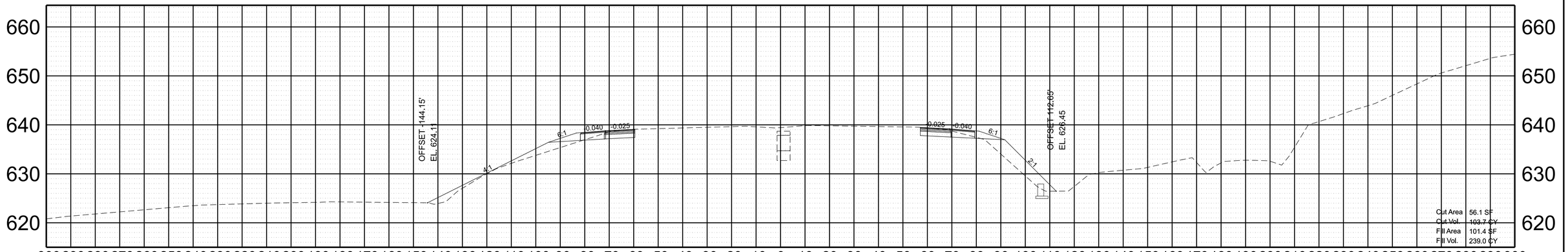
STA. 567+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

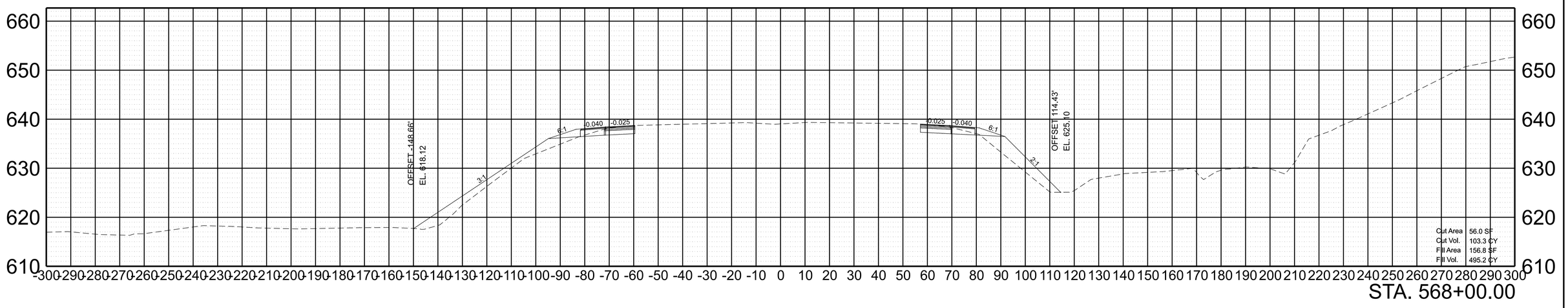
2/6/2023 8:25:45 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A71

REV. ***DATE***
TEXT



STA. 568+50.00



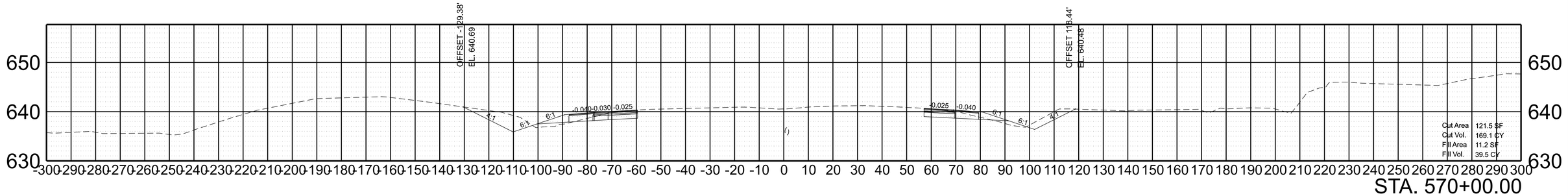
STA. 568+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

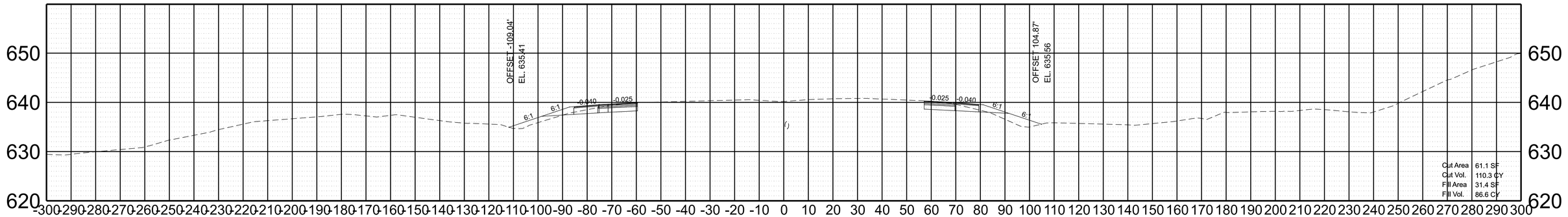
2/6/2023 8:25:47 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A72

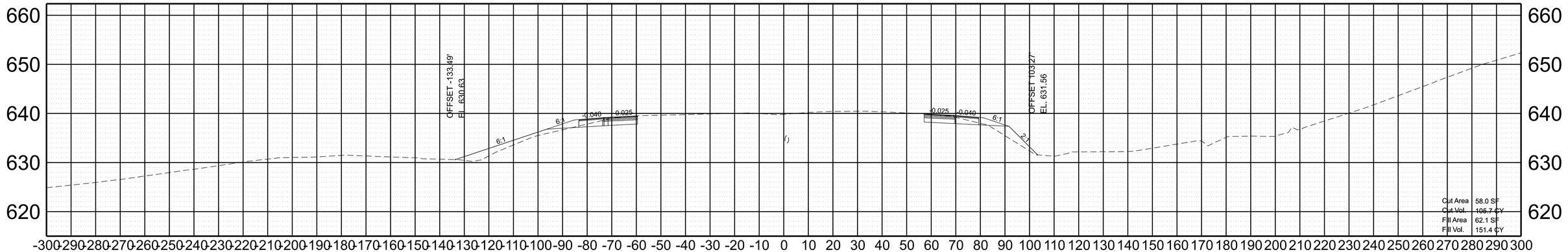
REV. ***DATE***
TEXT



STA. 570+00.00



STA. 569+50.00



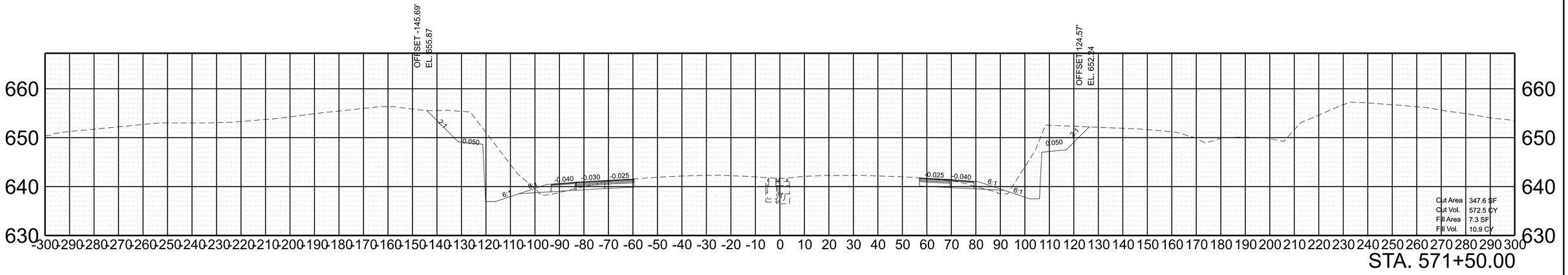
STA. 569+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

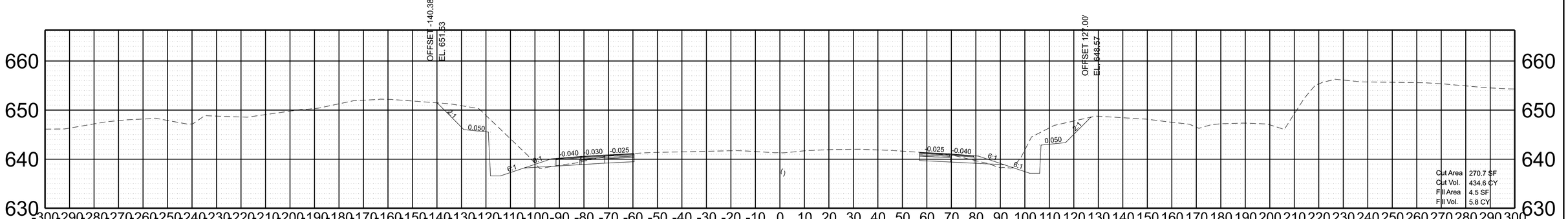
2/6/2023 8:25:50 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A73

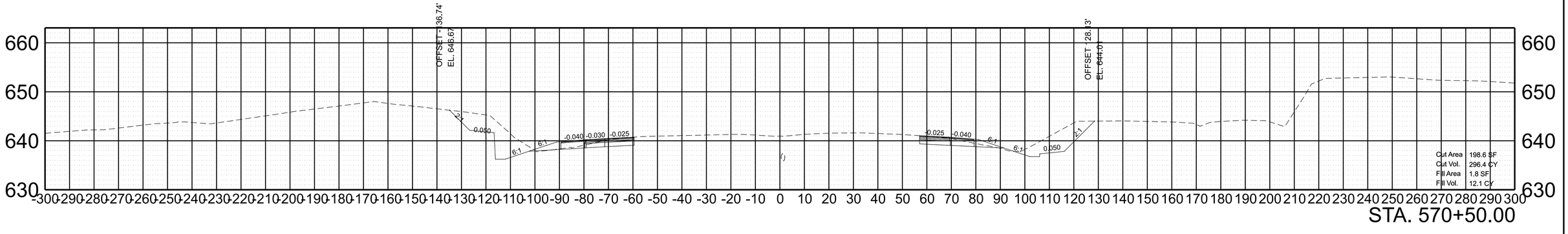
REV. ***DATE***
TEXT



STA. 571+50.00



STA. 571+00.00



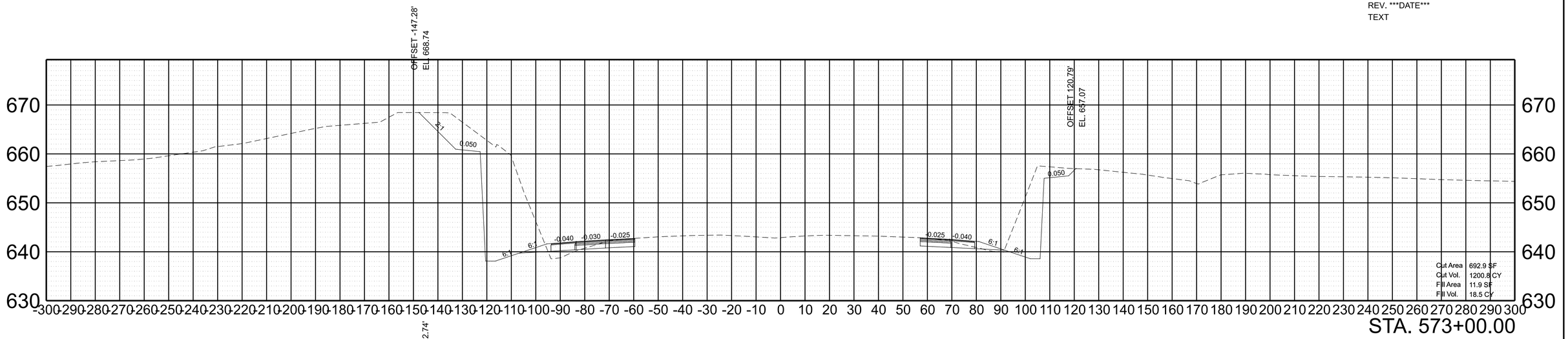
STA. 570+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

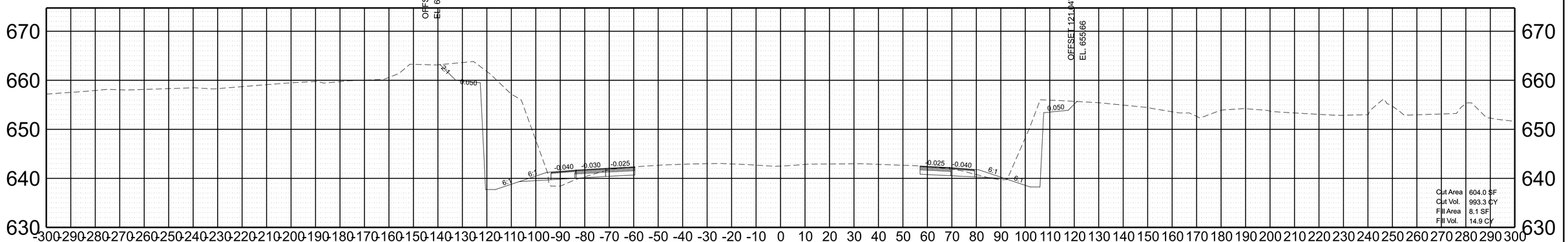
2/6/2023 8:25:53 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A74

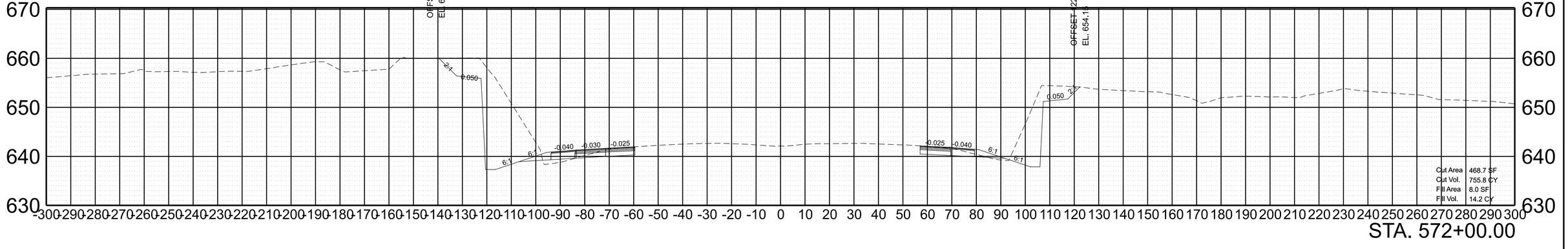
REV. ***DATE***
TEXT



STA. 573+00.00



STA. 572+50.00



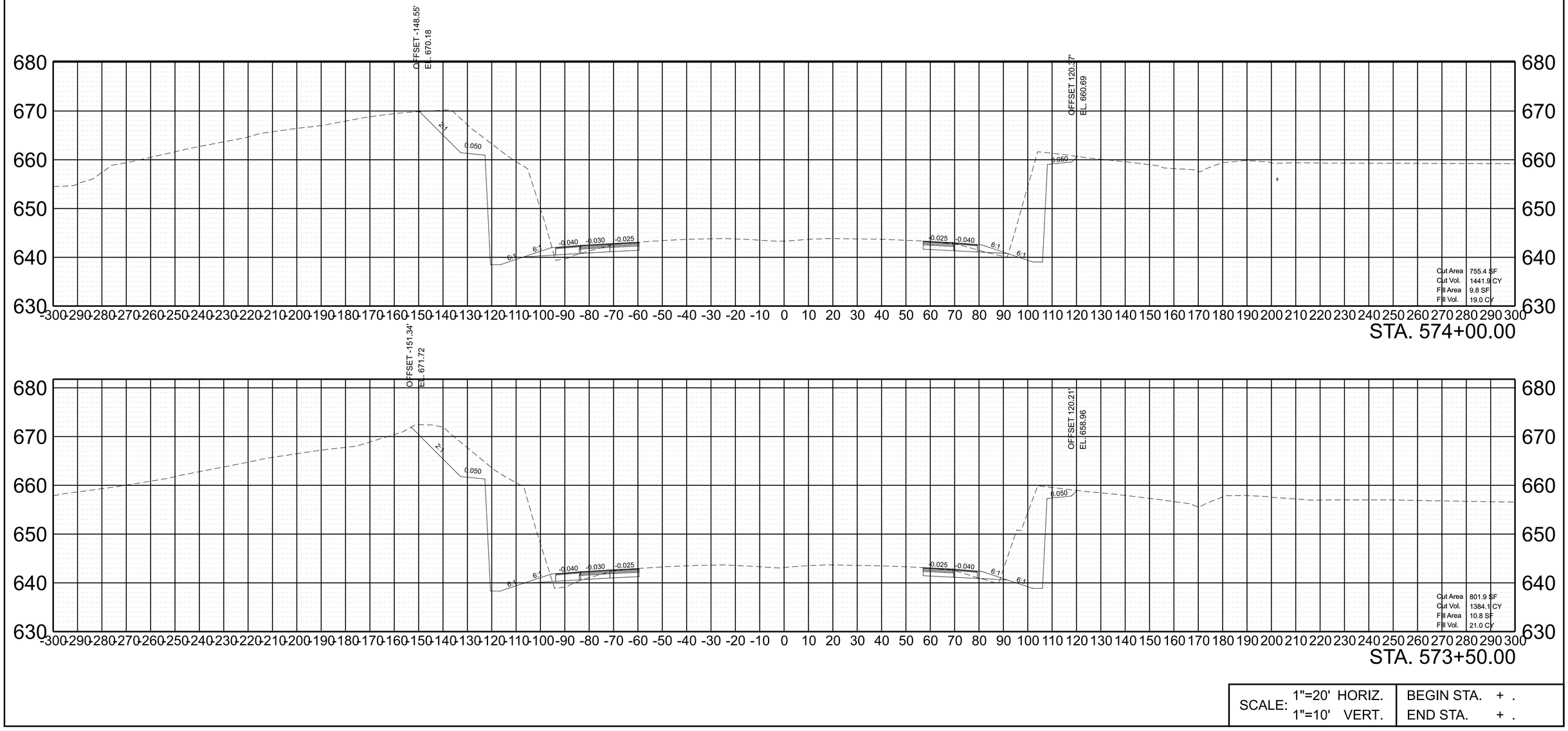
STA. 572+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:25:56 AM
C:\PWWORKING\EAST01\D2328414\95\I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A75

REV. ***DATE***
TEXT

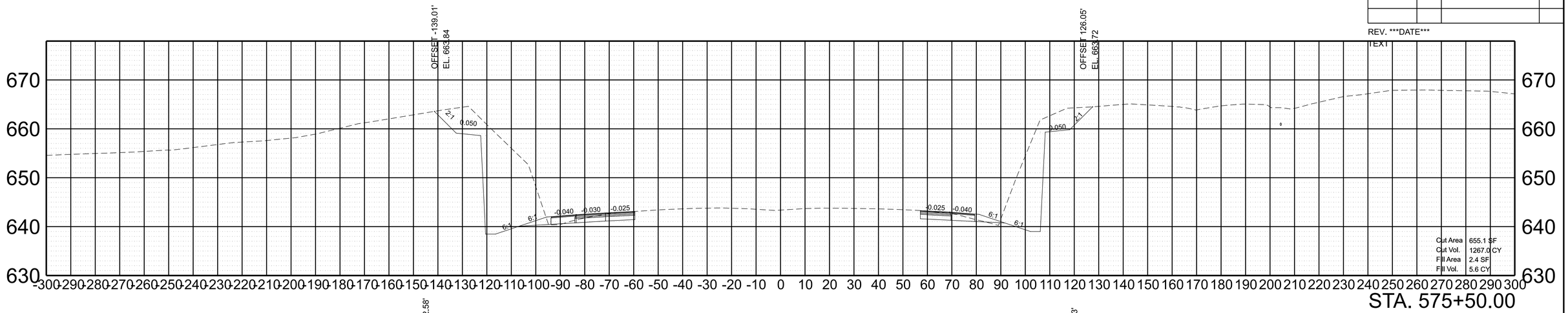


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

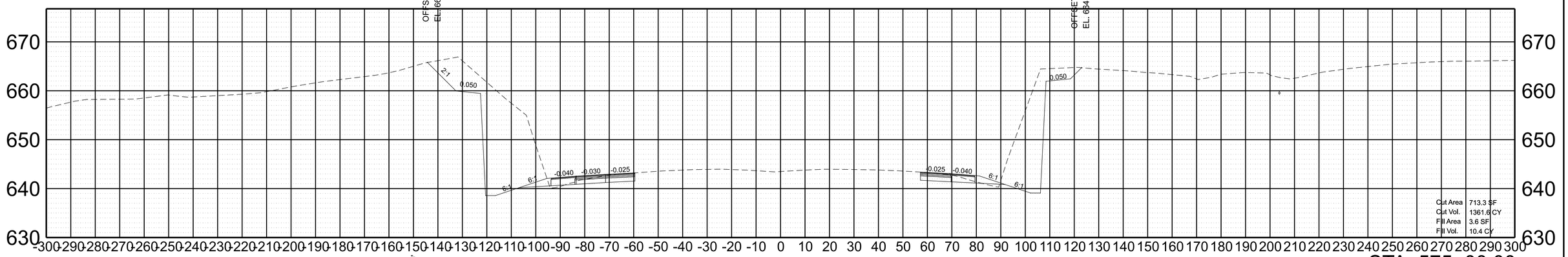
2/6/2023 8:25:59 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A76

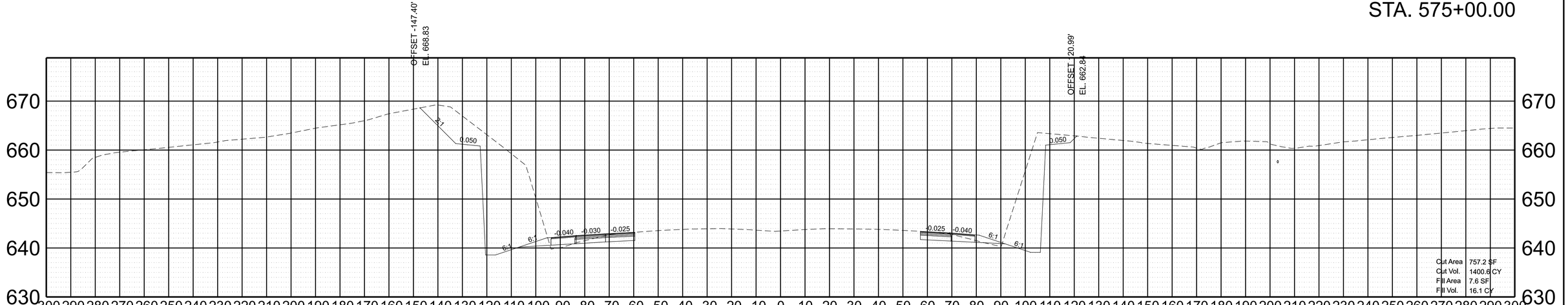
REV. ***DATE***
TEXT



STA. 575+50.00



STA. 575+00.00



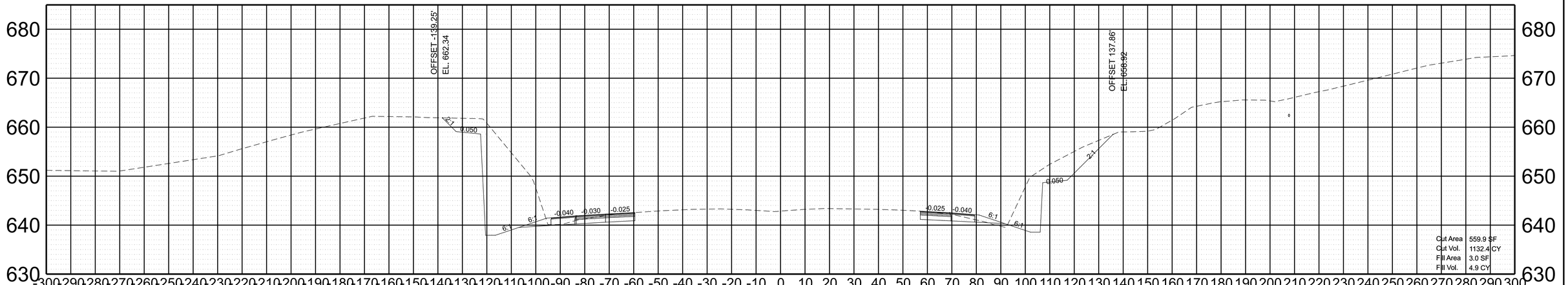
STA. 574+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

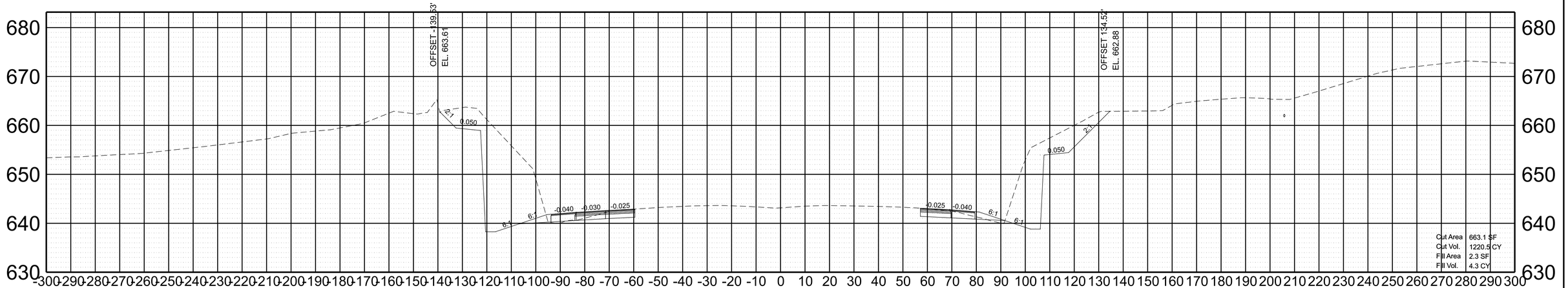
2/6/2023 8:27:23 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A77

REV. ***DATE***
TEXT



STA. 576+50.00



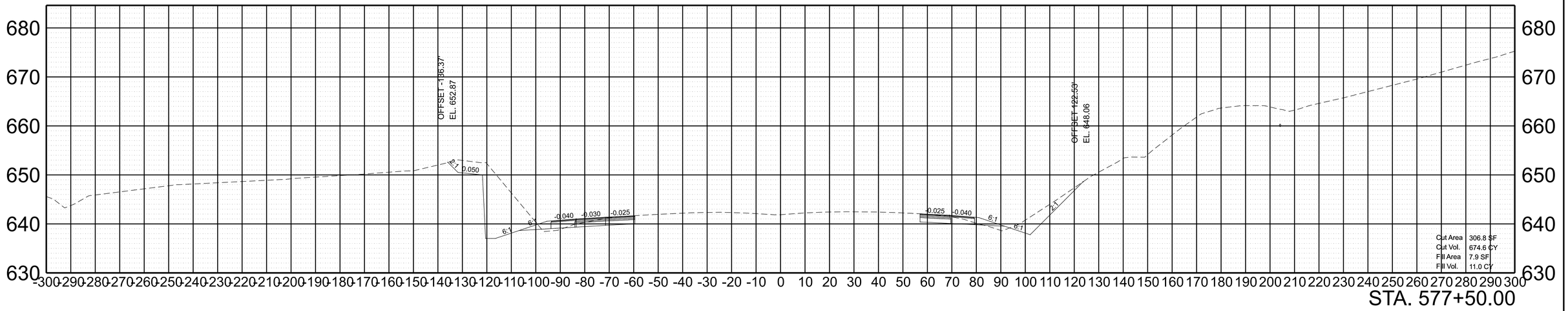
STA. 576+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

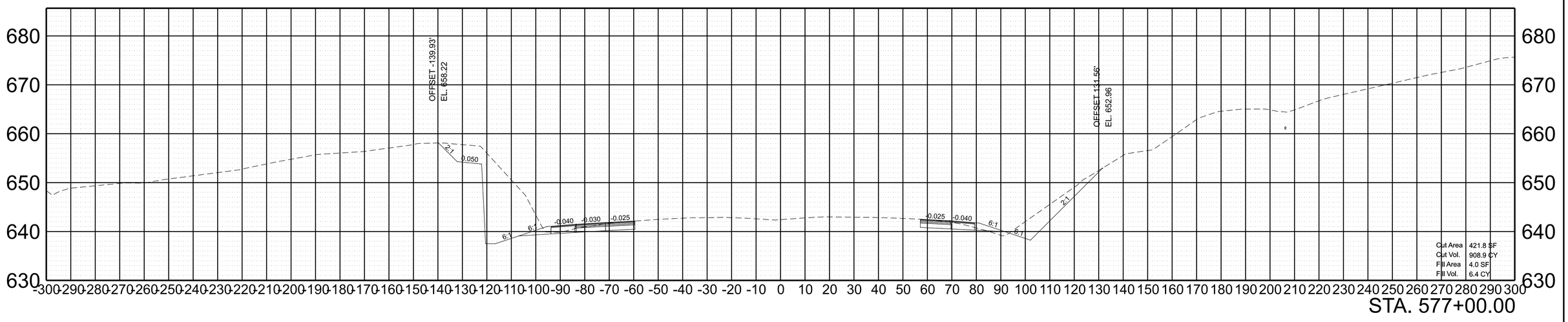
2/6/2023 8:27:26 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A78

REV. ***DATE***
TEXT



STA. 577+50.00



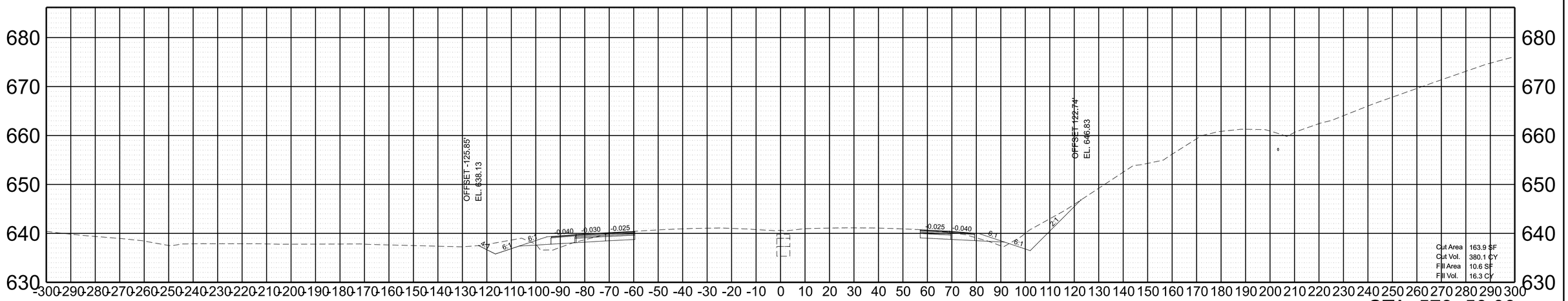
STA. 577+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

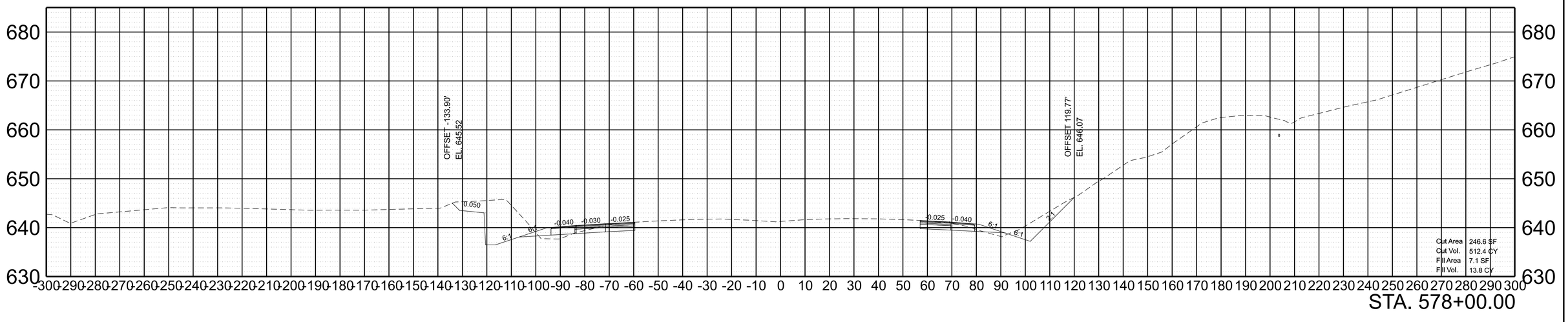
2/6/2023 8:27:28 AM
C:\PWWORKINGIEAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A79

REV. ***DATE***
TEXT



STA. 578+50.00



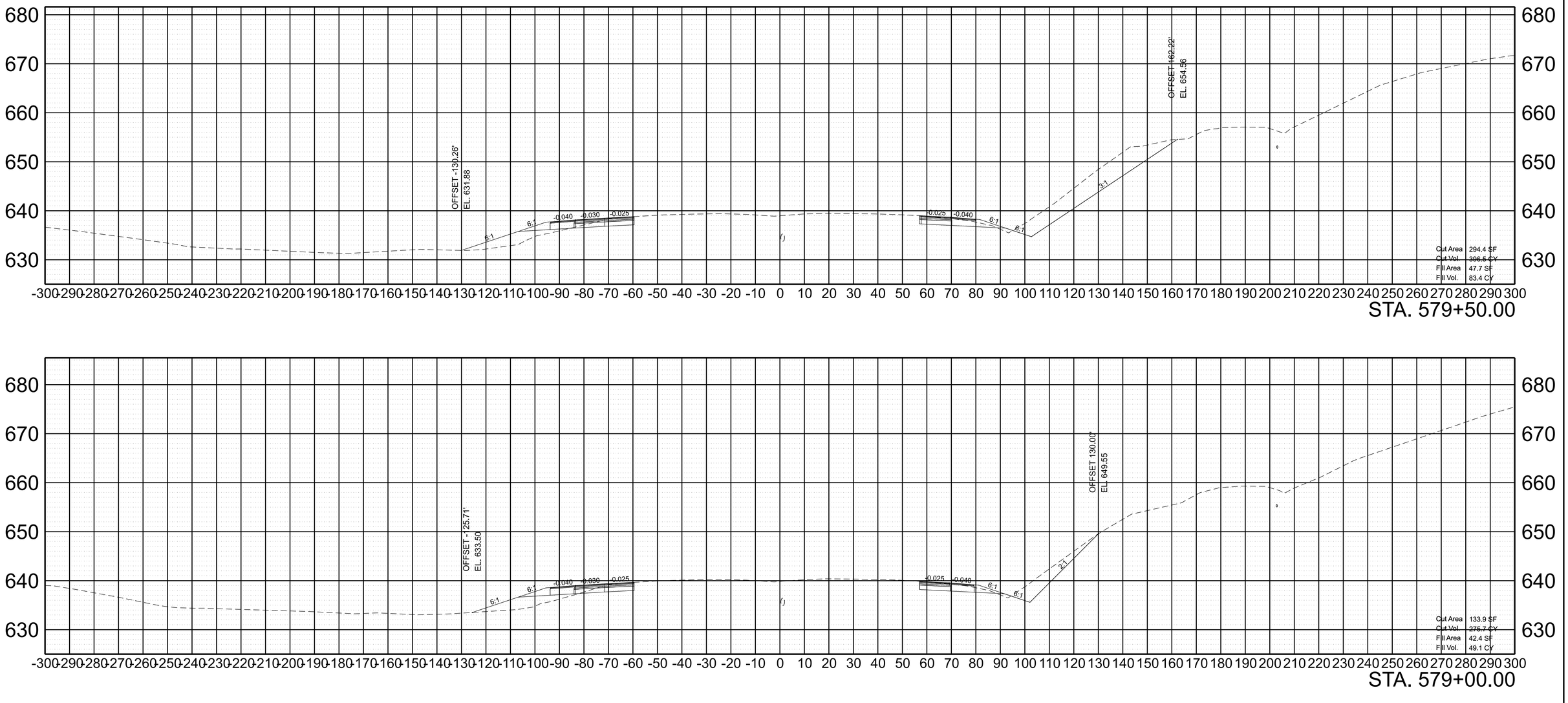
STA. 578+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:27:31 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A80

REV. ***DATE***
TEXT

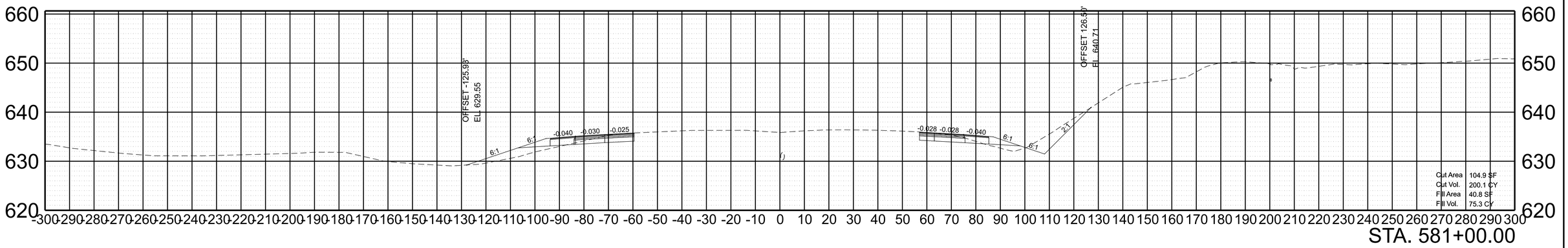


SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA. + . END STA. + .

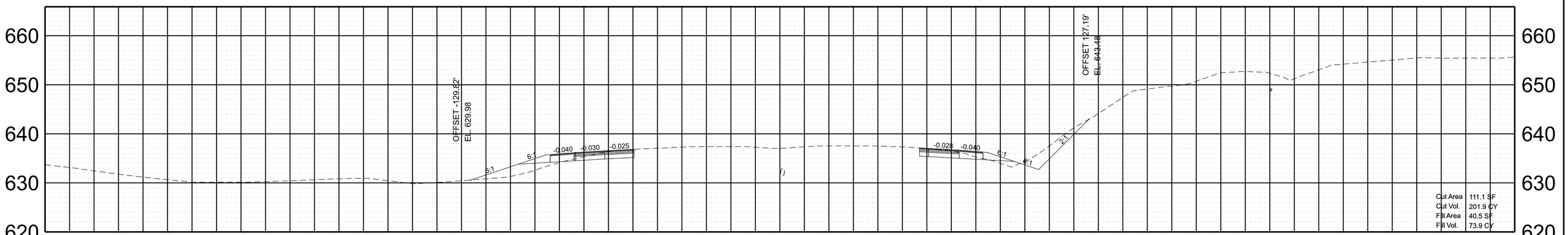
2/6/2023 8:27:33 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A81

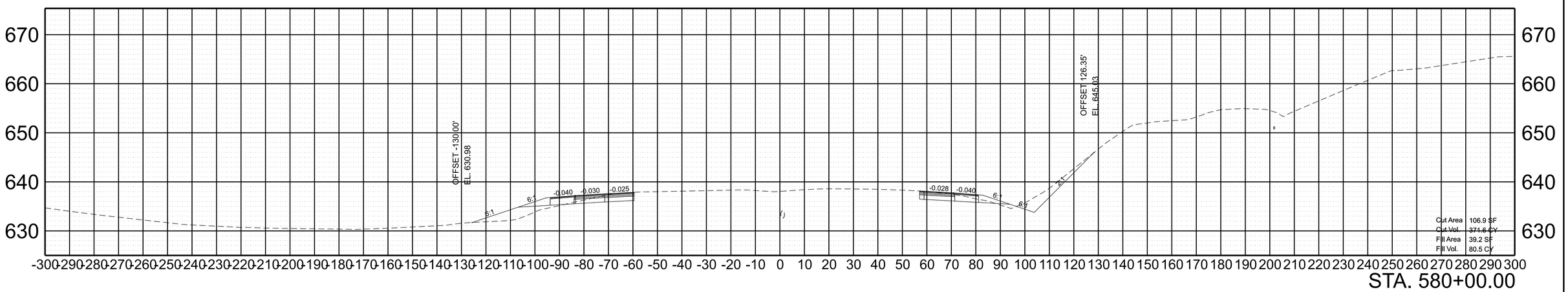
REV. ***DATE***
TEXT



STA. 581+00.00



STA. 580+50.00



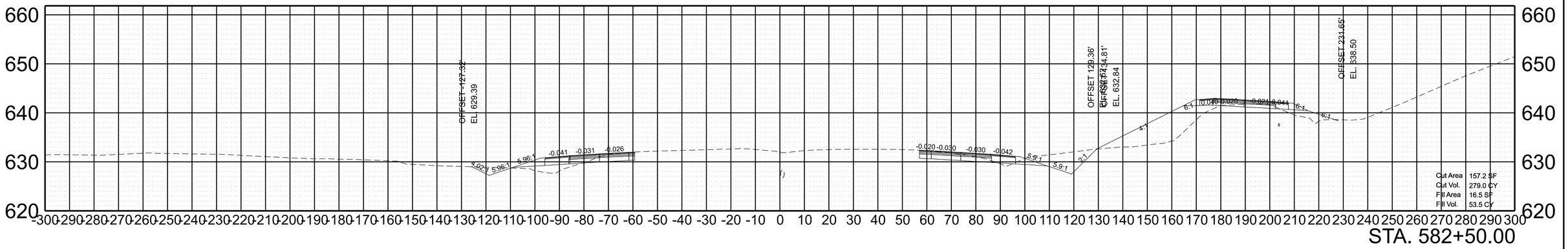
STA. 580+00.00

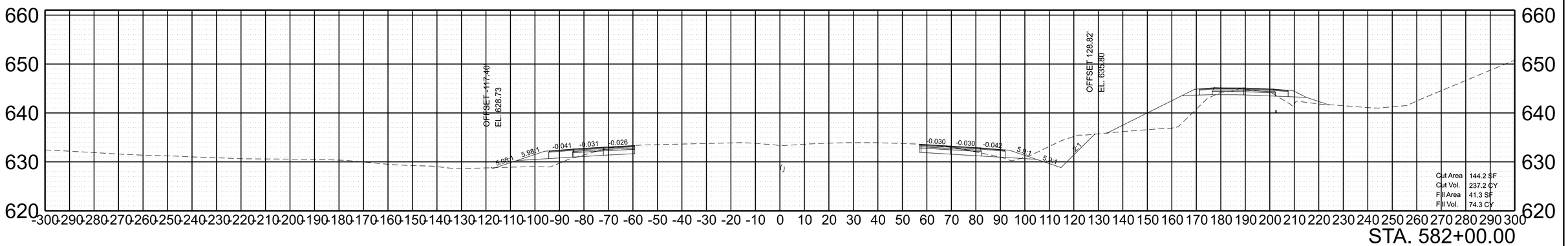
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

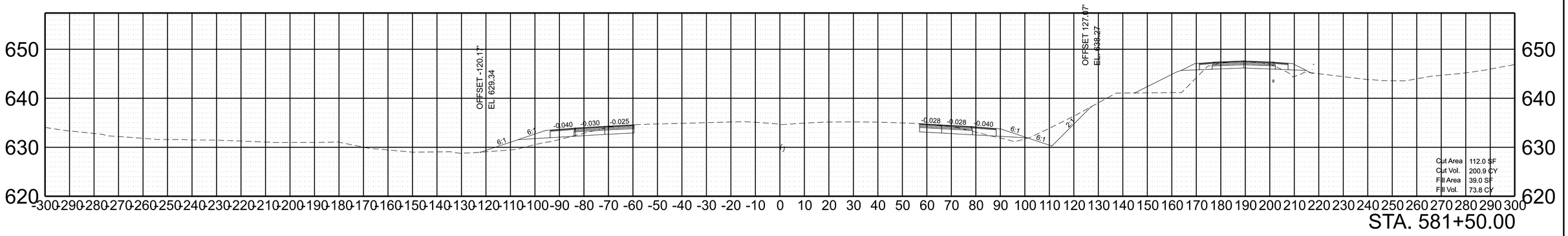
2/6/2023 8:27:36 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A82

REV. ***DATE***
TEXT





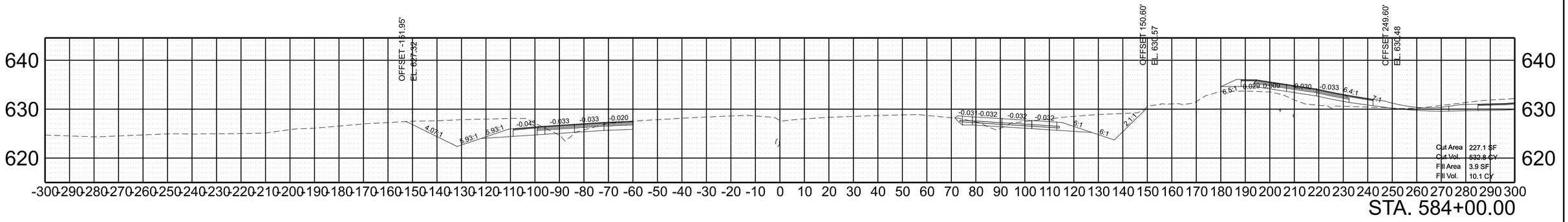


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

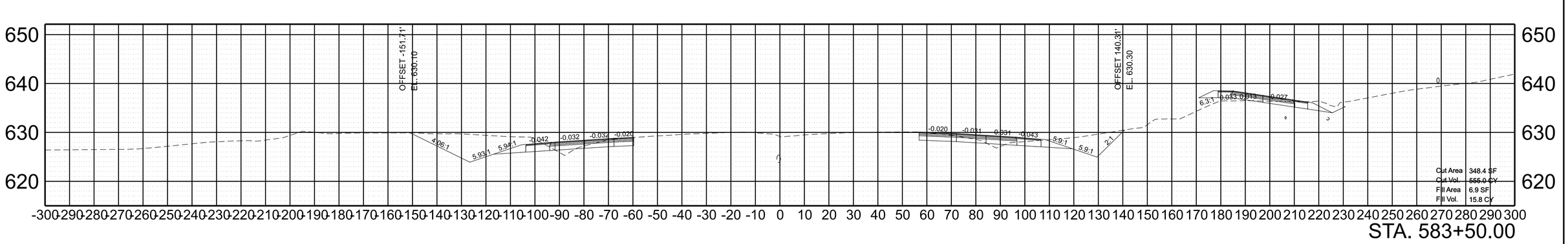
2/6/2023 8:27:40 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A83

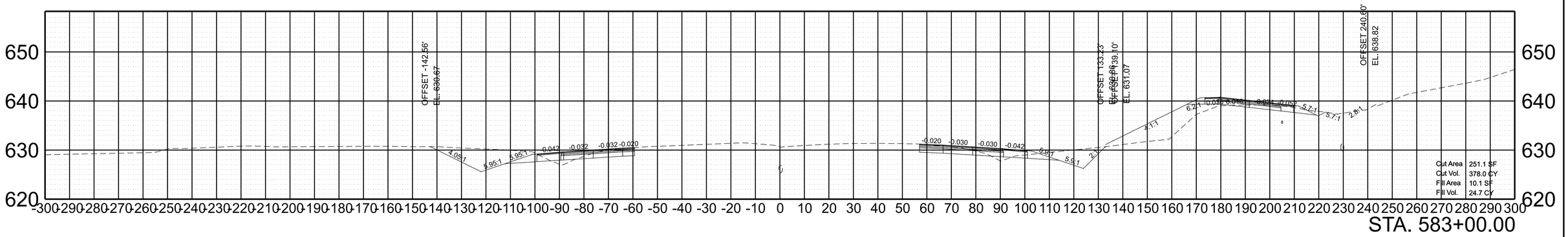
REV. ***DATE***
TEXT



STA. 584+00.00



STA. 583+50.00



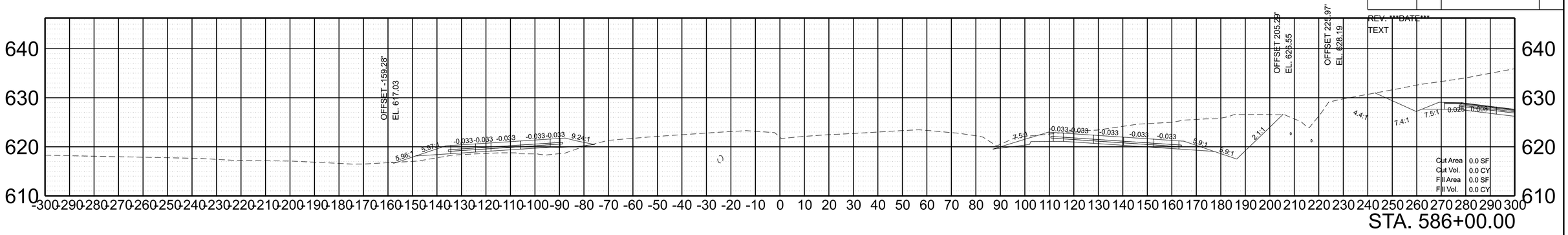
STA. 583+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

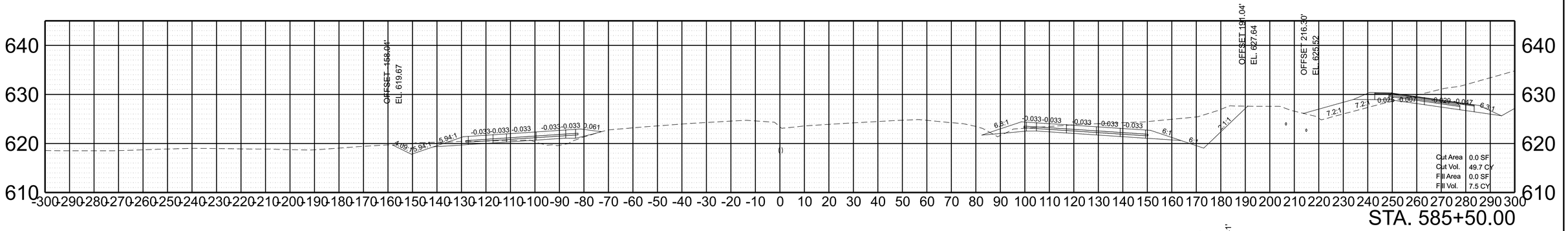
2/6/2023 8:27:44 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A84

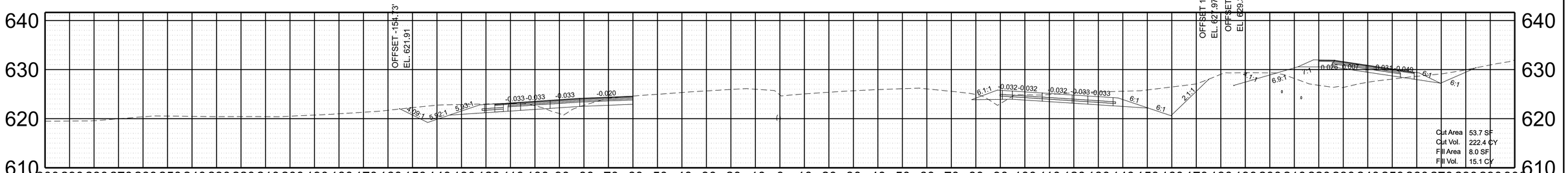
REV. ***DATE***
TEXT



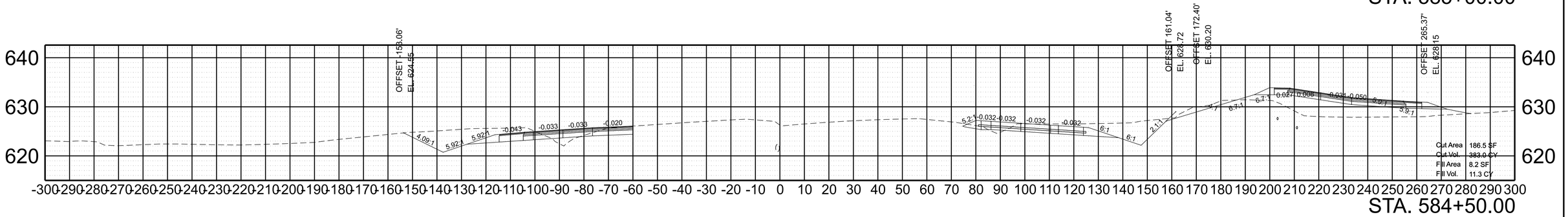
STA. 586+00.00



STA. 585+50.00



STA. 585+00.00



STA. 584+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:27:48 AM
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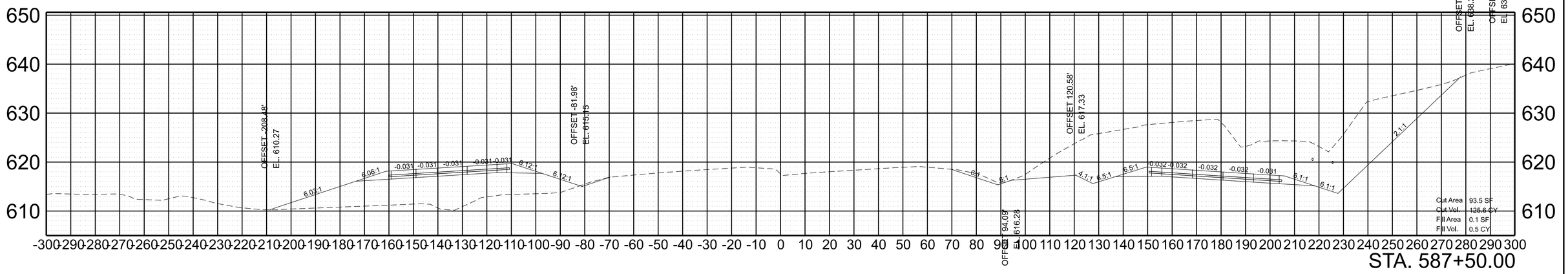
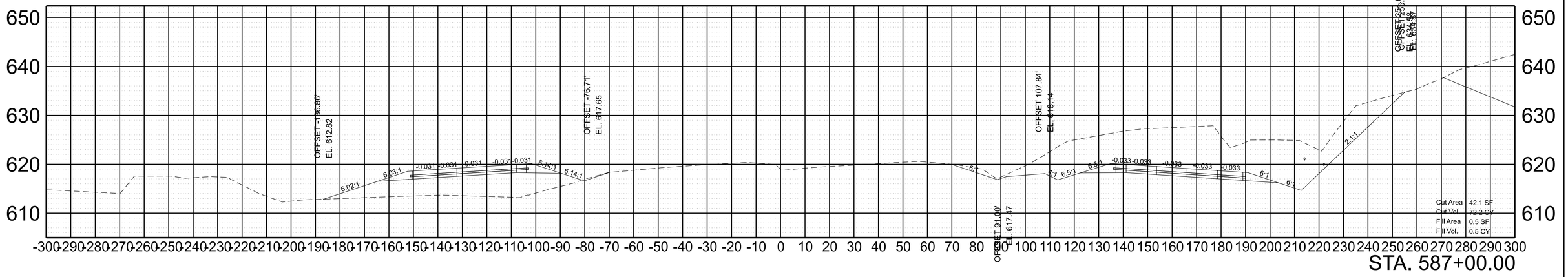
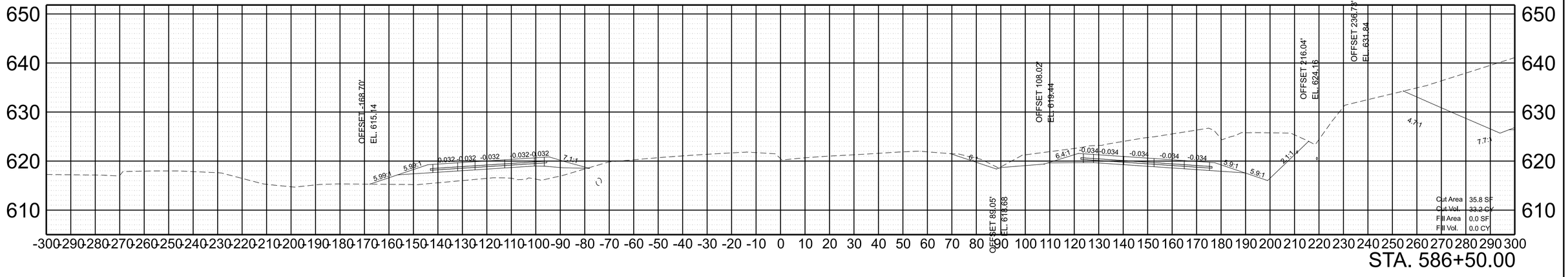
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A85

REV. ***DATE***
TEXT





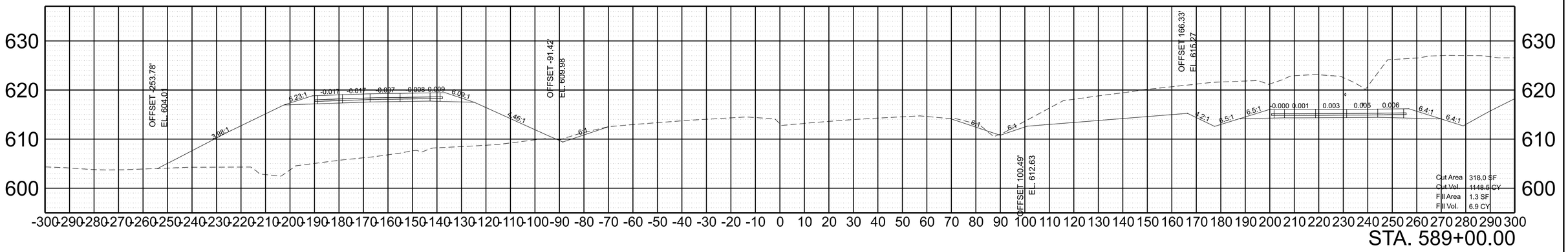


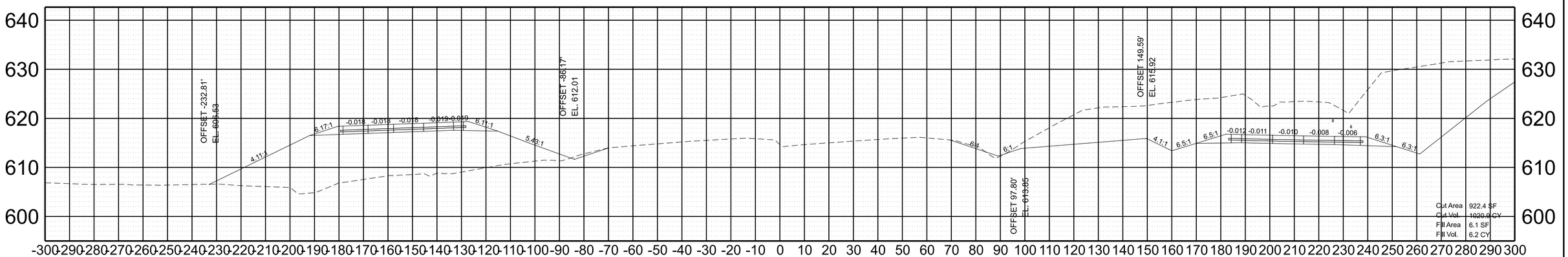
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

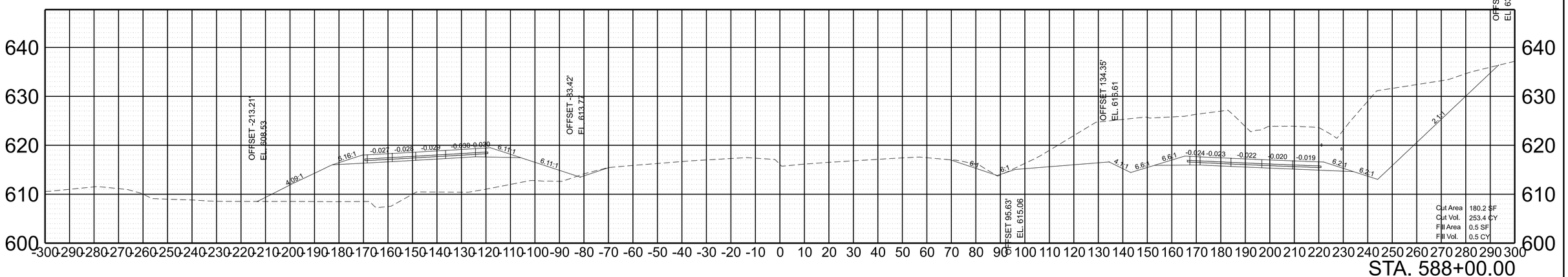
2/6/2023 8:27:51 AM
C:\PWWORKING\EAST\01D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A86

REV. ***DATE***
TEXT





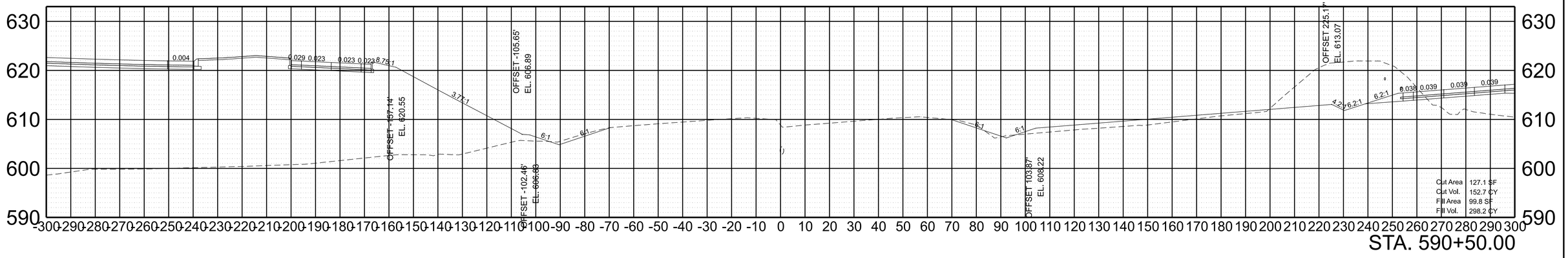


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

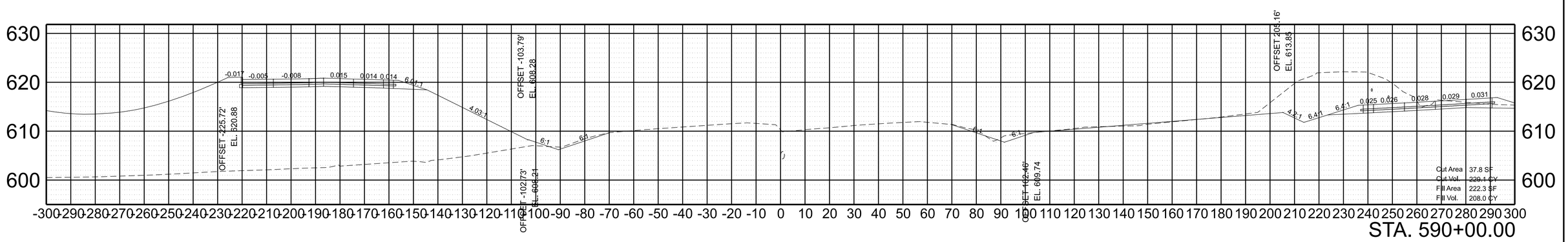
2/6/2023 8:27:55 AM
C:\PW\WORKING\EAST\01\D2328414\95\0040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A87

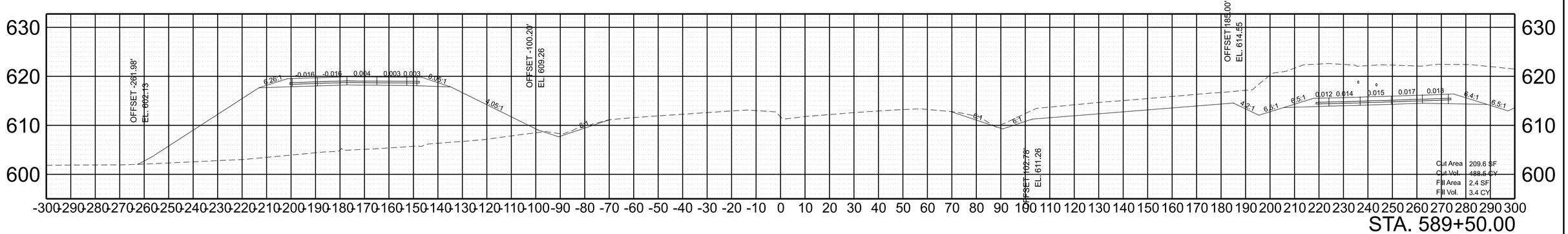
REV. ***DATE***
TEXT



STA. 590+50.00



STA. 590+00.00



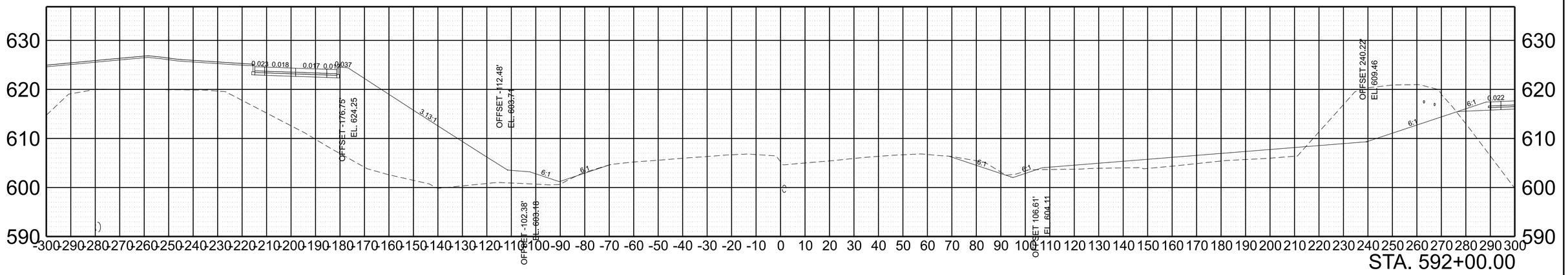
STA. 589+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

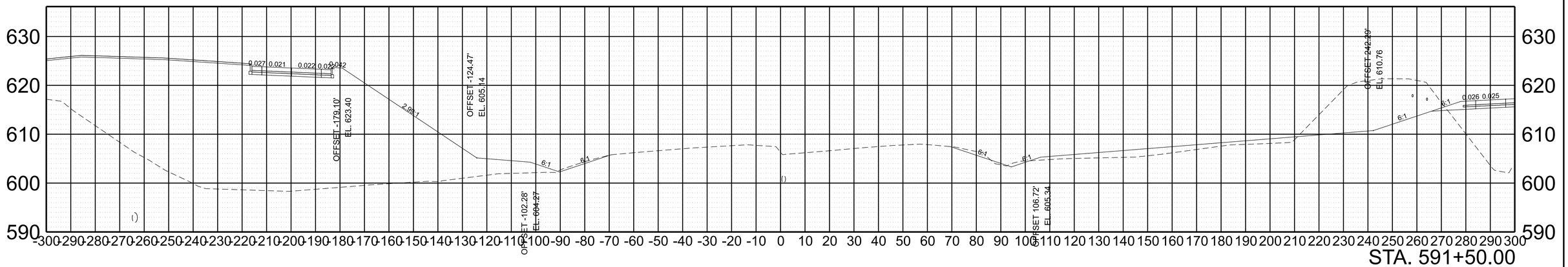
2/6/2023 8:27:59 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A88

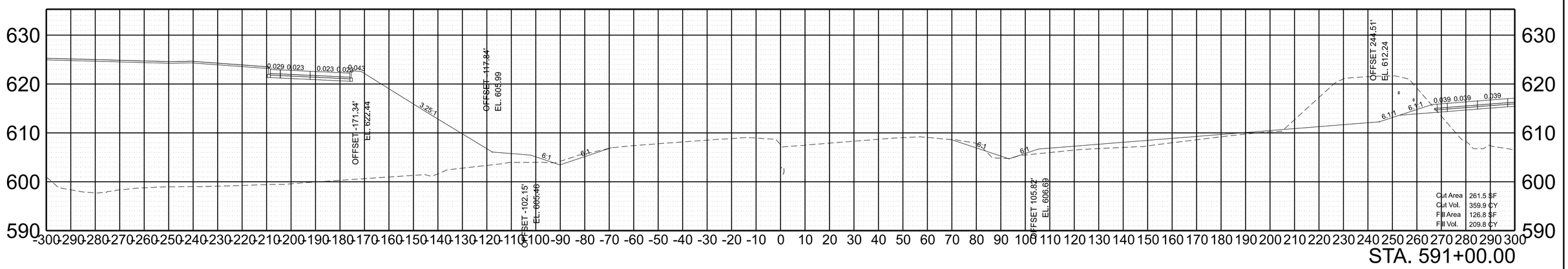
REV. ***DATE***
TEXT



STA. 592+00.00



STA. 591+50.00



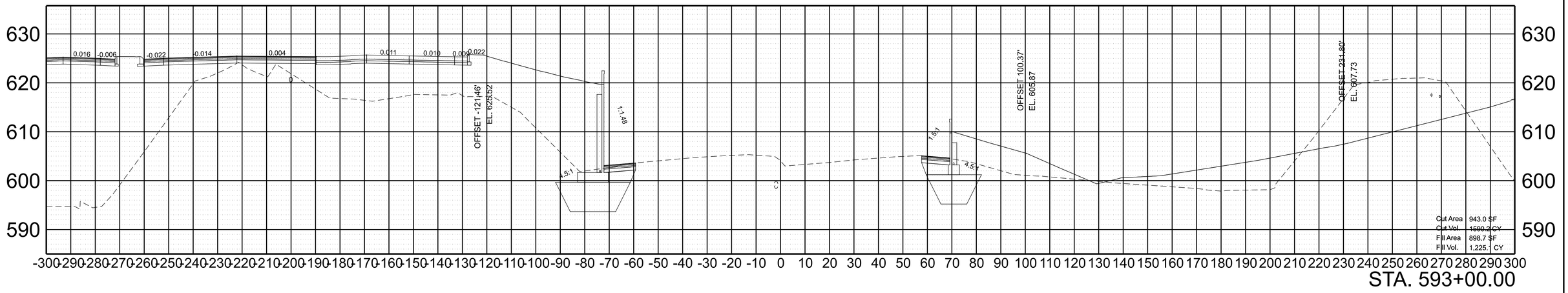
STA. 591+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

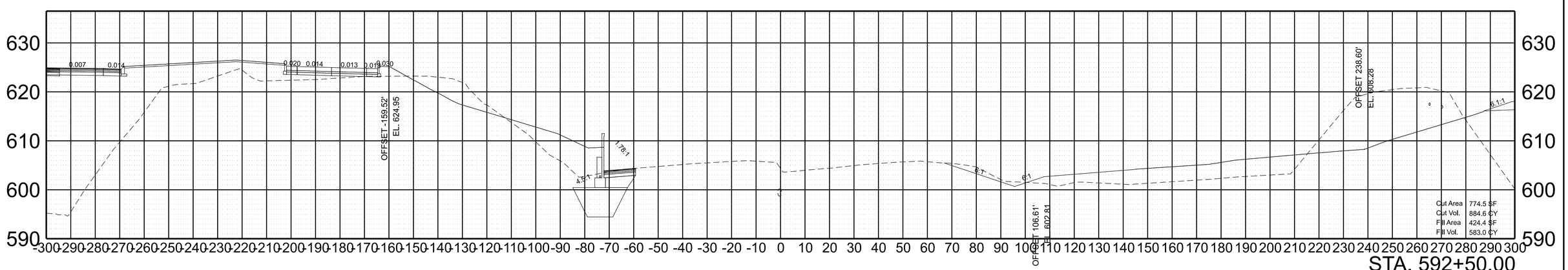
2/6/2023 8:28:02 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A89

REV. ***DATE***
TEXT



STA. 593+00.00



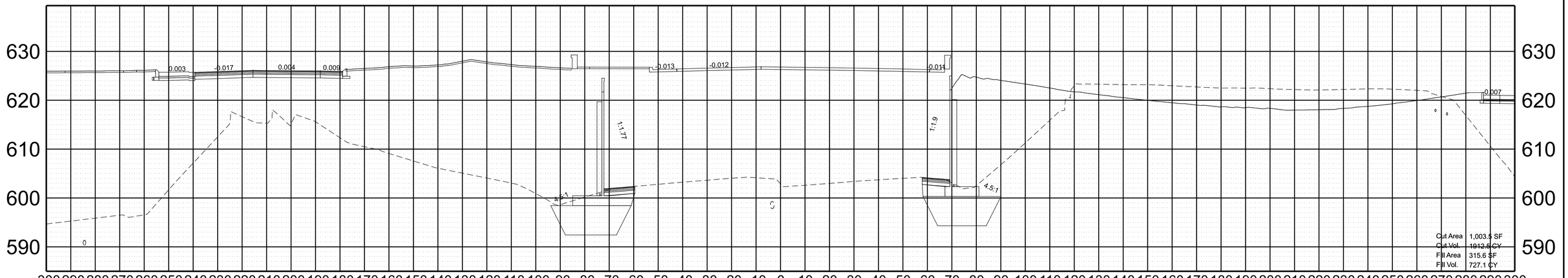
STA. 592+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

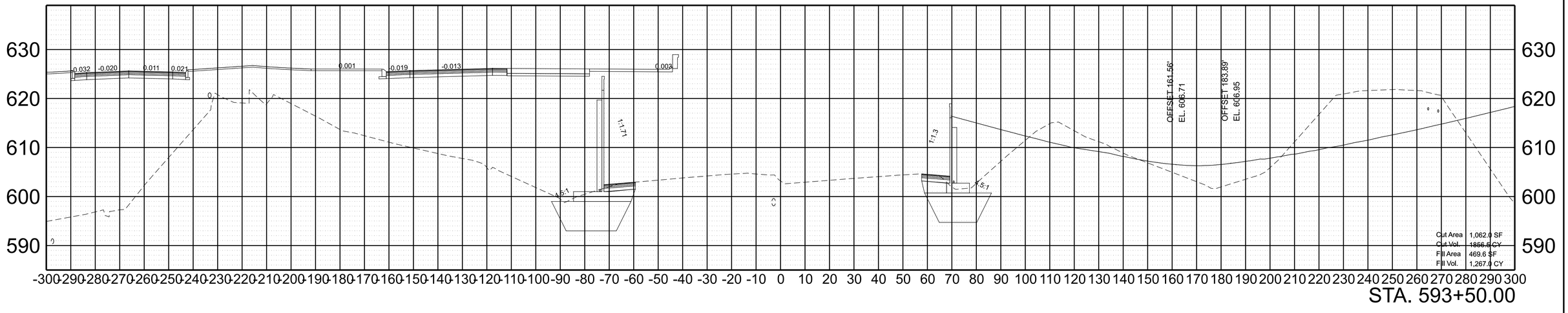
2/6/2023 8:28:07 AM
C:\PWWORKING\EAST01\D2328414\950\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A90

REV. ***DATE***
TEXT



STA. 594+00.00



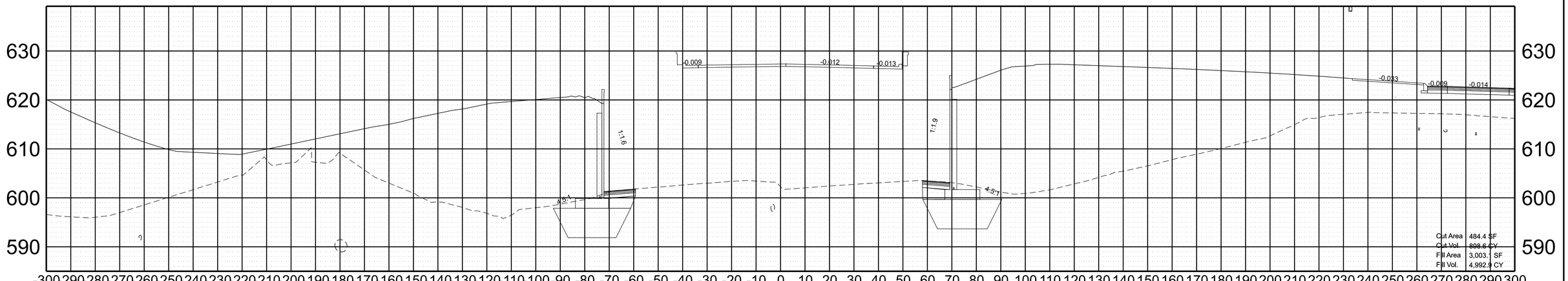
STA. 593+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

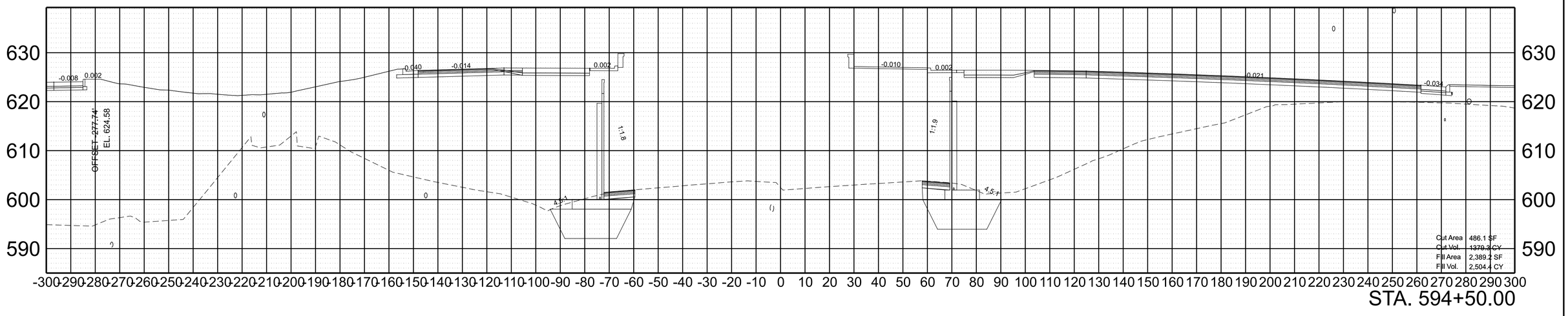
2/6/2023 8:28:12 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A91

REV. ***DATE***
TEXT



STA. 595+00.00



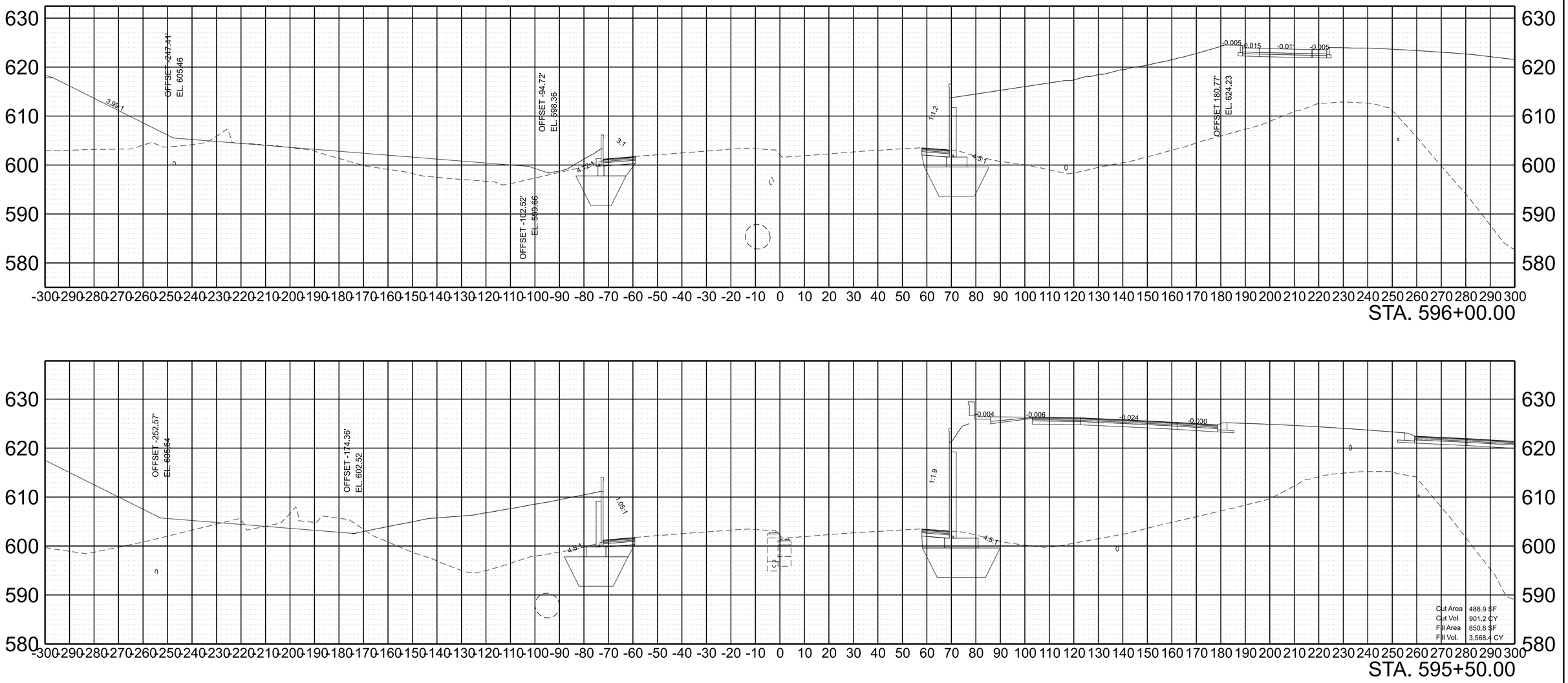
STA. 594+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:28:17 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A92

REV. ***DATE***
TEXT



STA. 596+00.00

Cut Area	488.9 SF
Cut Vol.	901.2 CY
Fill Area	850.8 SF
Fill Vol.	3,568.4 CY

STA. 595+50.00

SCALE:	1"=20' HORIZ. 1"=10' VERT.	BEGIN STA.	+ .
		END STA.	+ .

2/6/2023 8:28:23 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A93

REV. ***DATE***
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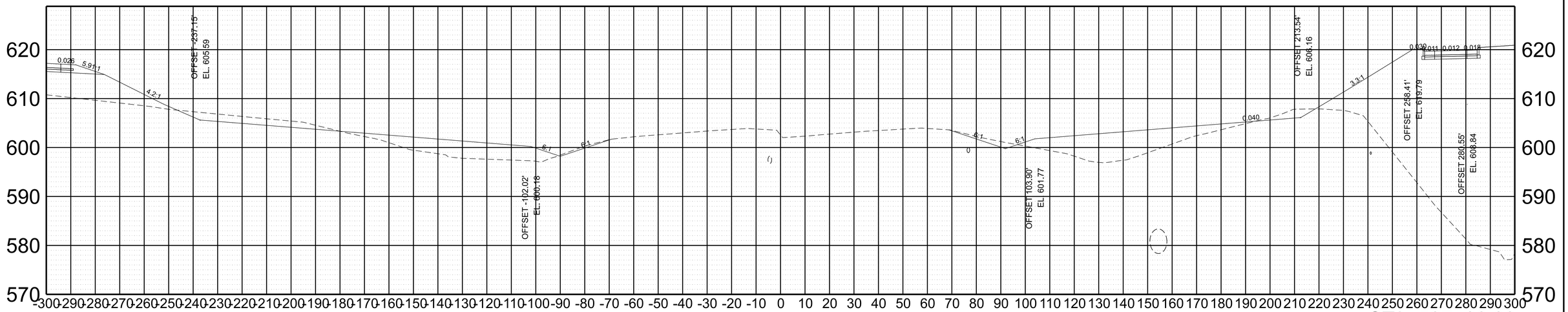
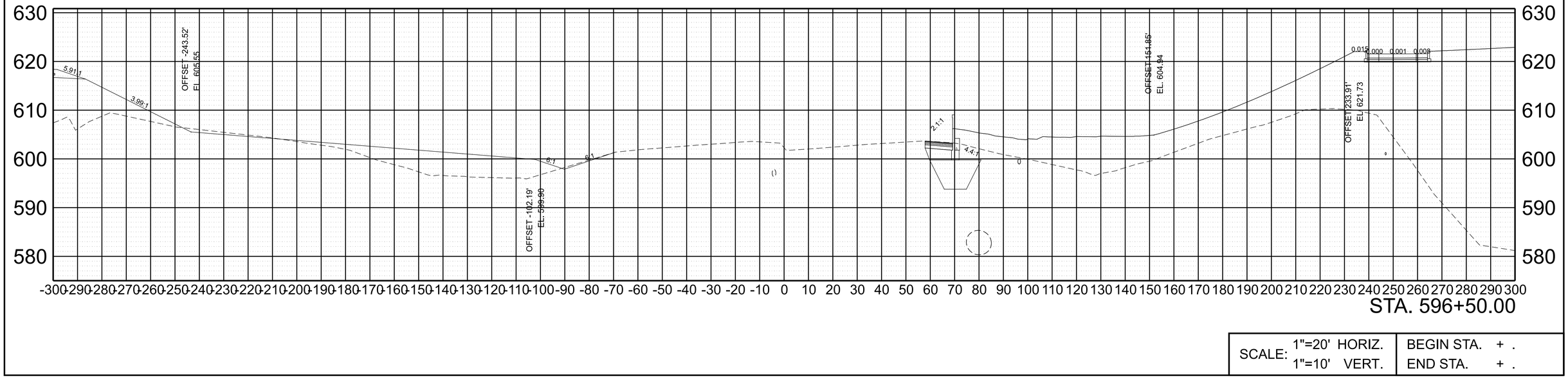


STA. 597+00.00



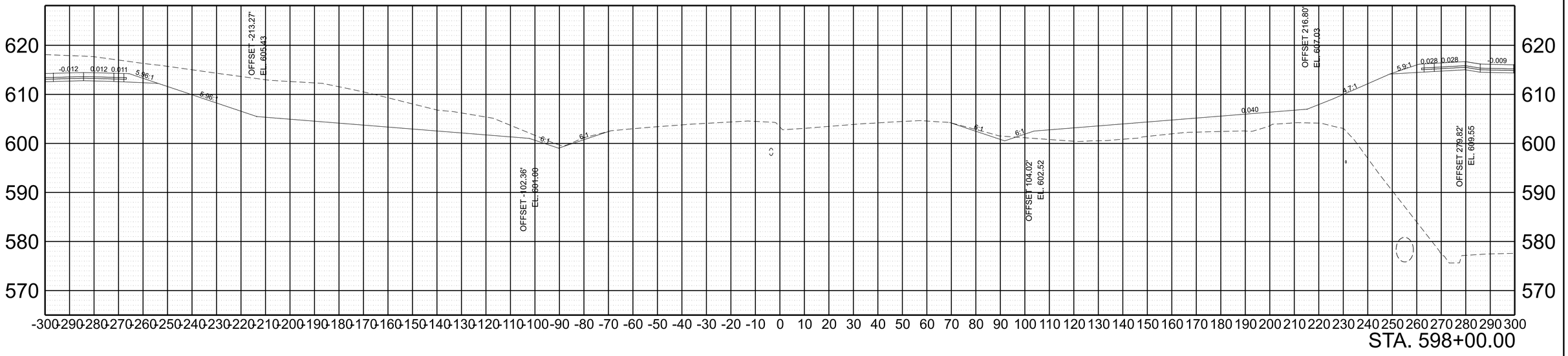
STA. 596+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

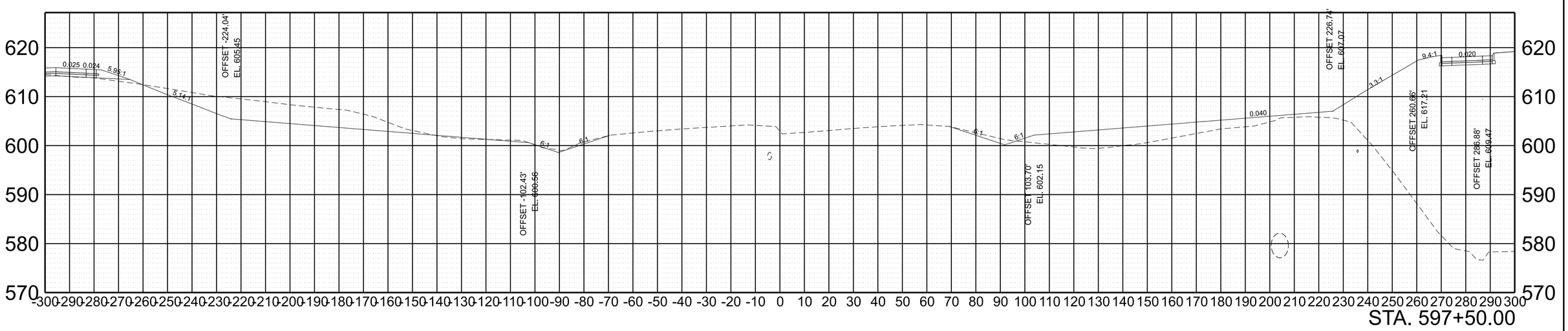
2/6/2023 8:28:25 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A94

REV. ***DATE***
TEXT



STA. 598+00.00



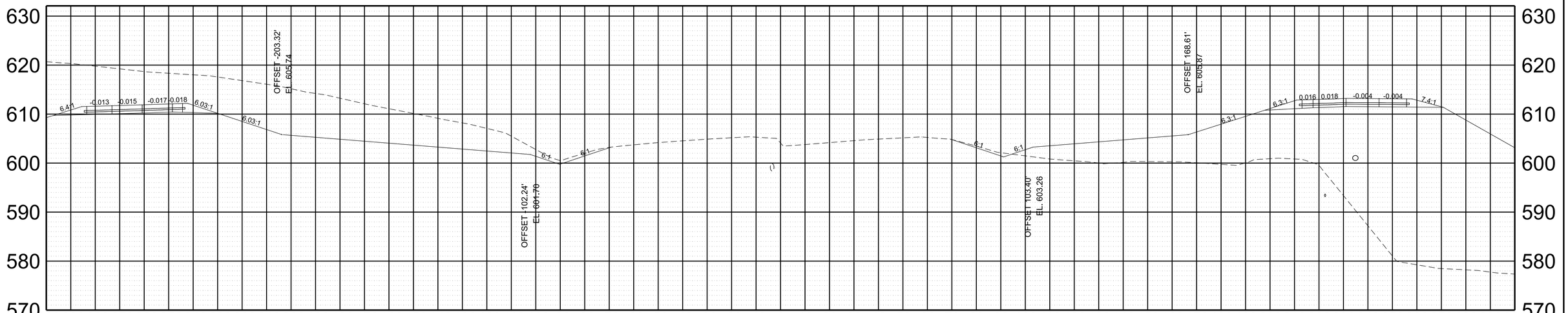
STA. 597+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

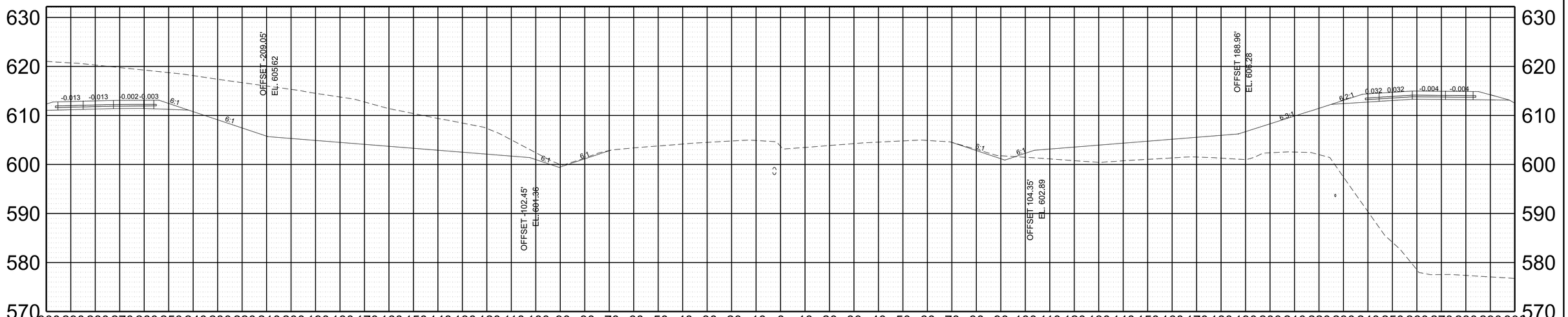
2/6/2023 8:28:28 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A95

REV. ***DATE***
TEXT



STA. 599+00.00



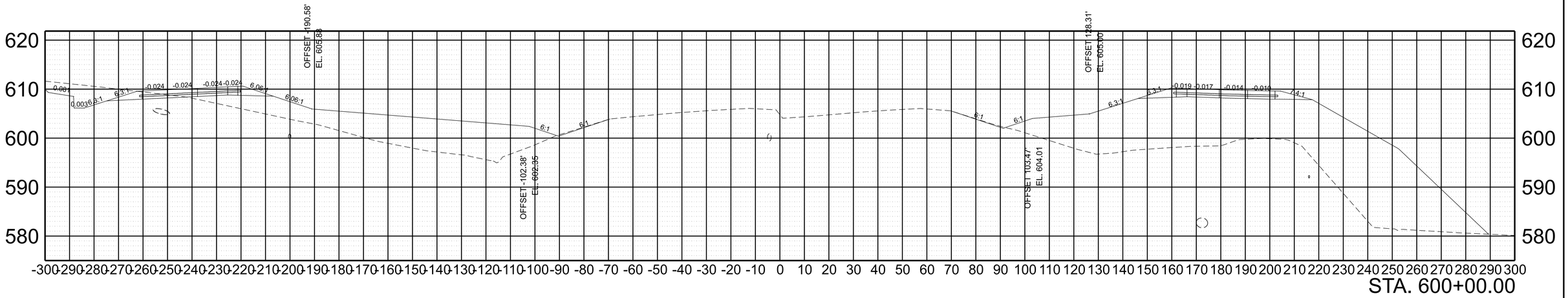
STA. 598+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

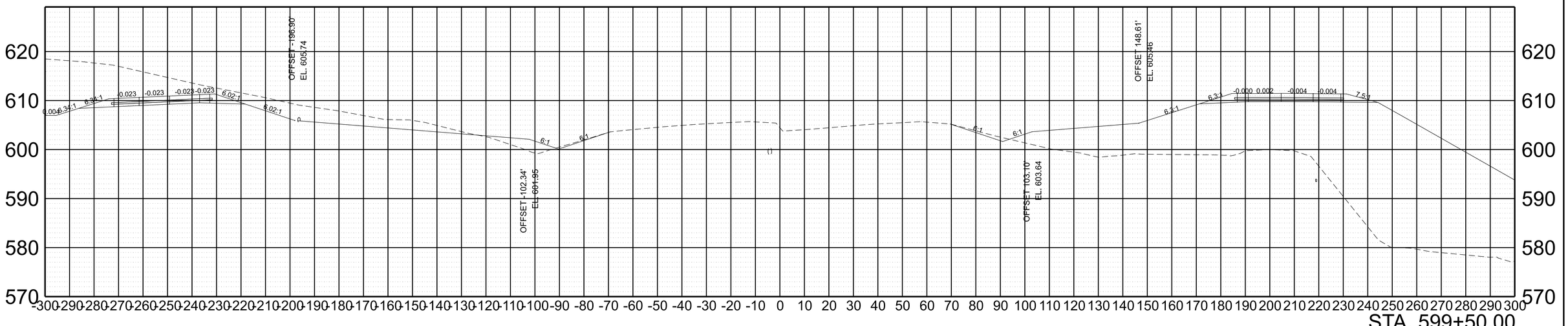
2/6/2023 8:28:31 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A96

REV. ***DATE***
TEXT



STA. 600+00.00



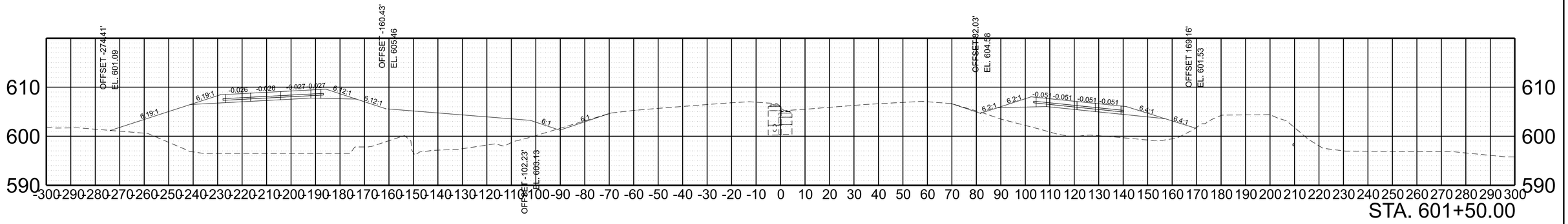
STA. 599+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

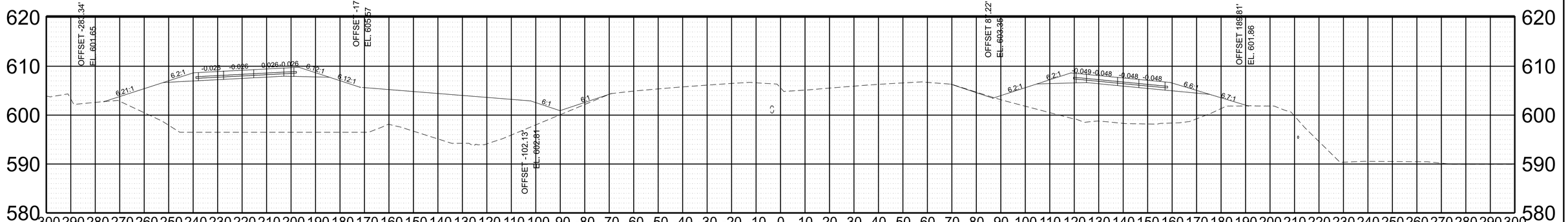
2/6/2023 8:28:33 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A97

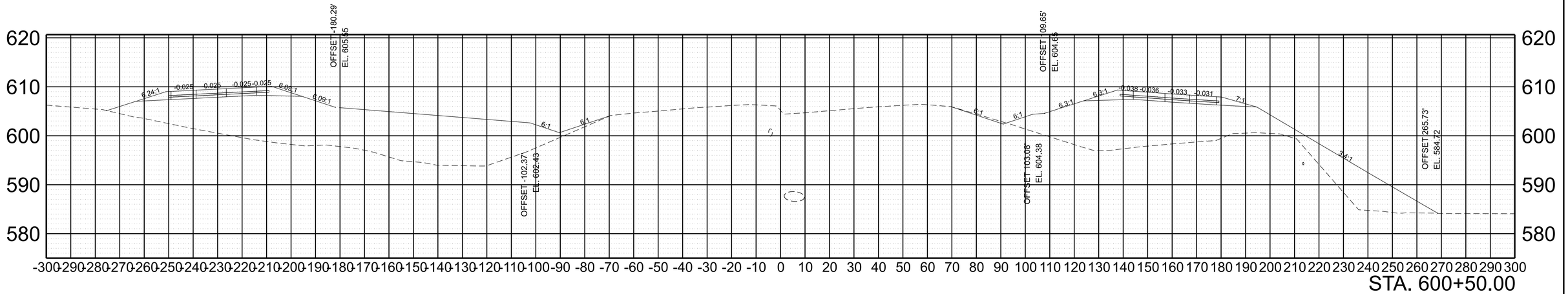
REV. ***DATE***
TEXT



STA. 601+50.00



STA. 601+00.00



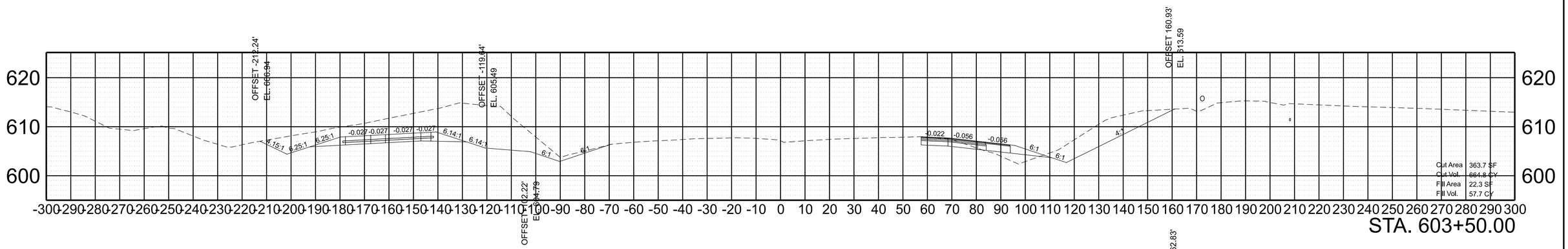
STA. 600+50.00

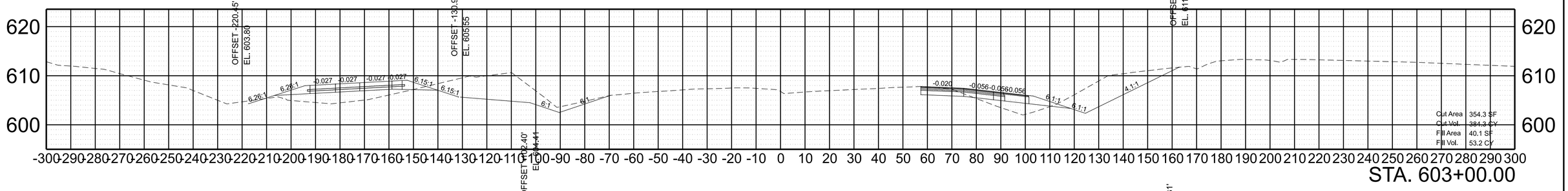
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

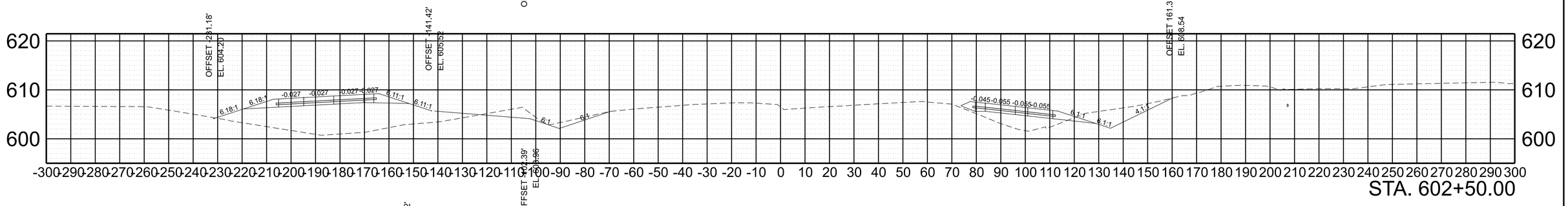
2/6/2023 8:28:37 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

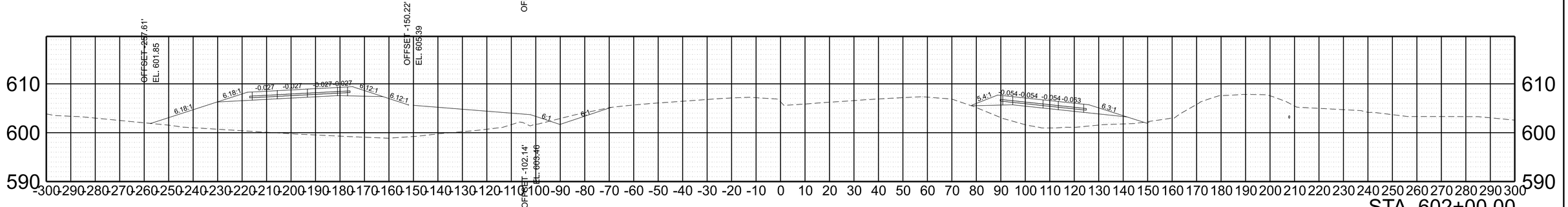
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A98

REV. ***DATE***
TEXT







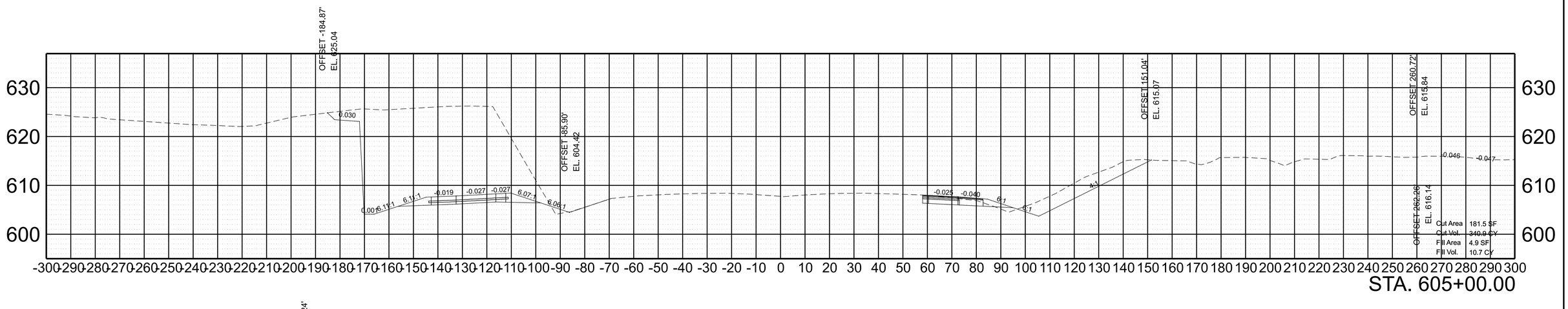


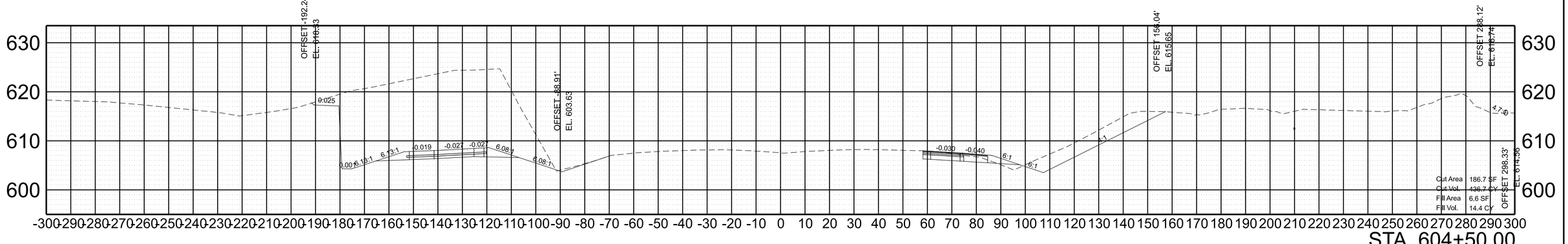
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

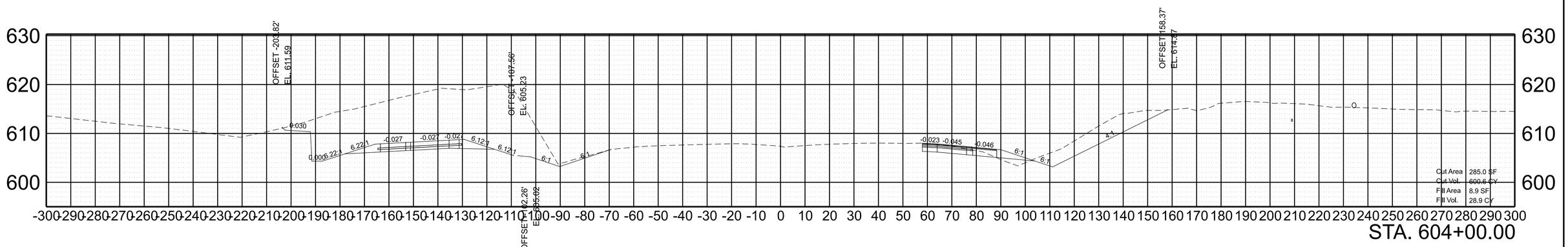
2/6/2023 8:28:40 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A99

REV. ***DATE***
TEXT





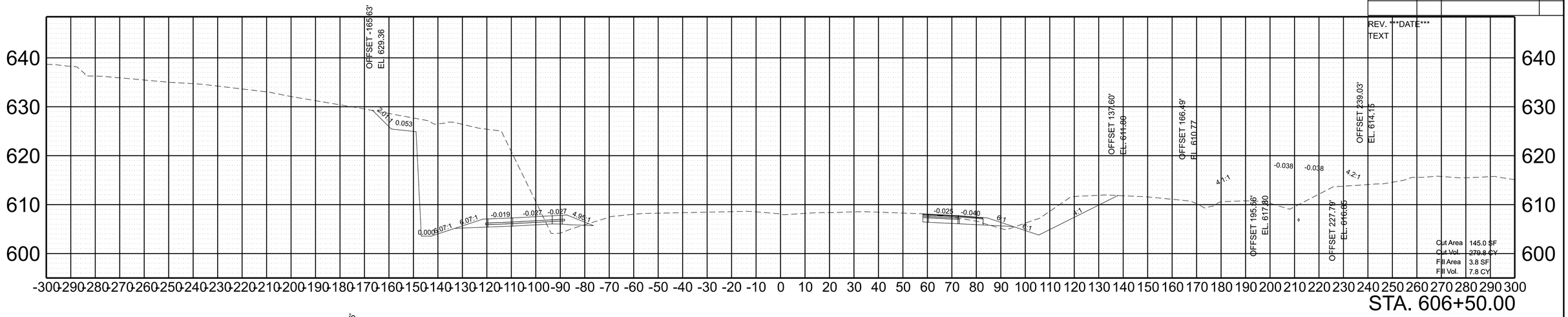


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

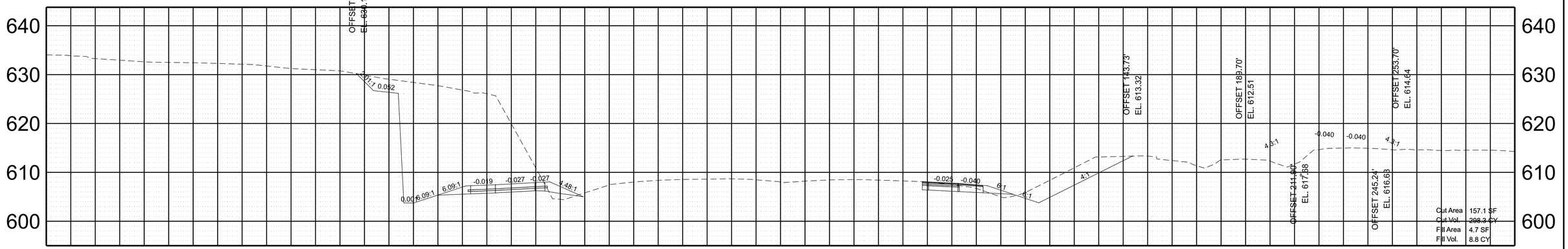
2/6/2023 8:28:43 AM
C:\PWWORKINGIEAST01\ID232841\I95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A100

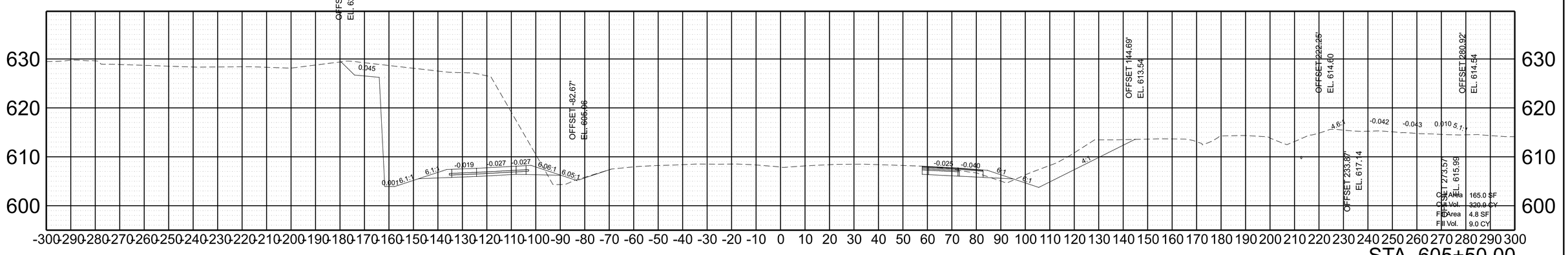
REV. ***DATE***
TEXT



STA. 606+50.00



STA. 606+00.00



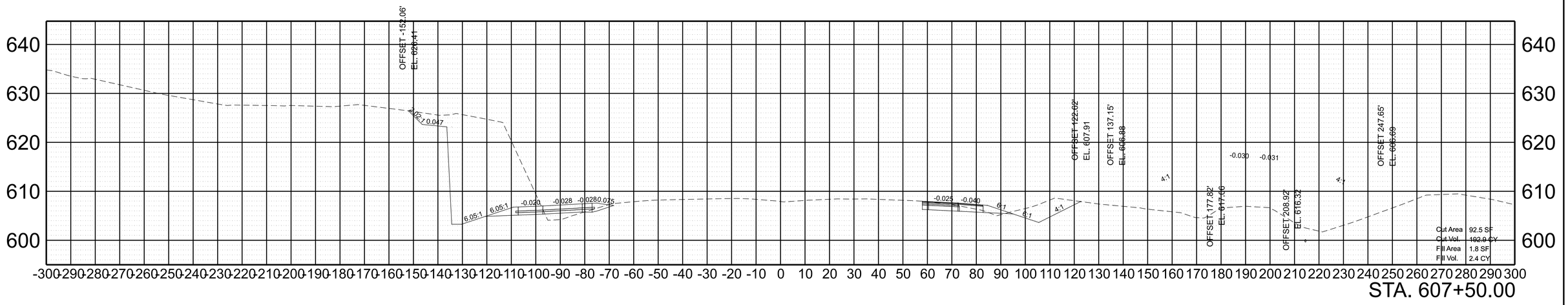
STA. 605+50.00

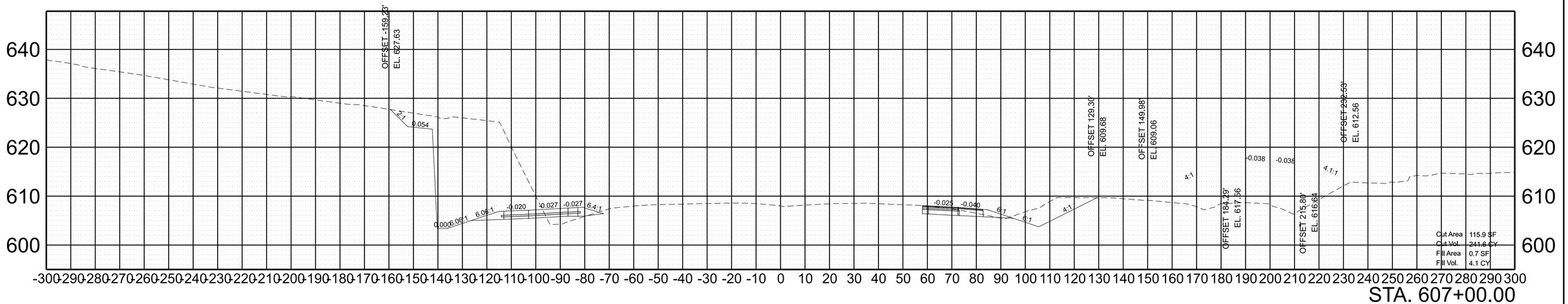
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:28:46 AM
C:\PWWORKINGIEAST01\D2328414\950040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A101

REV. ***DATE***
TEXT



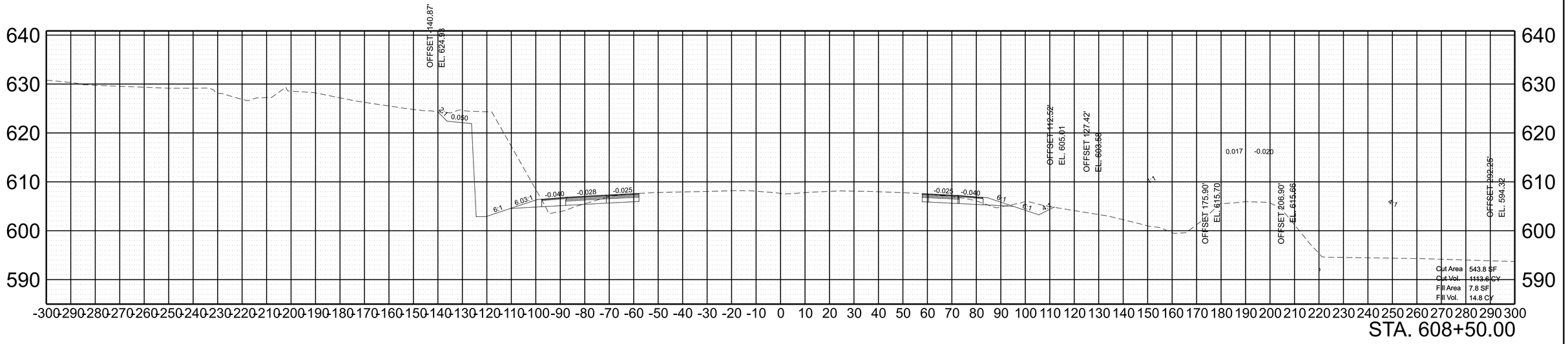


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

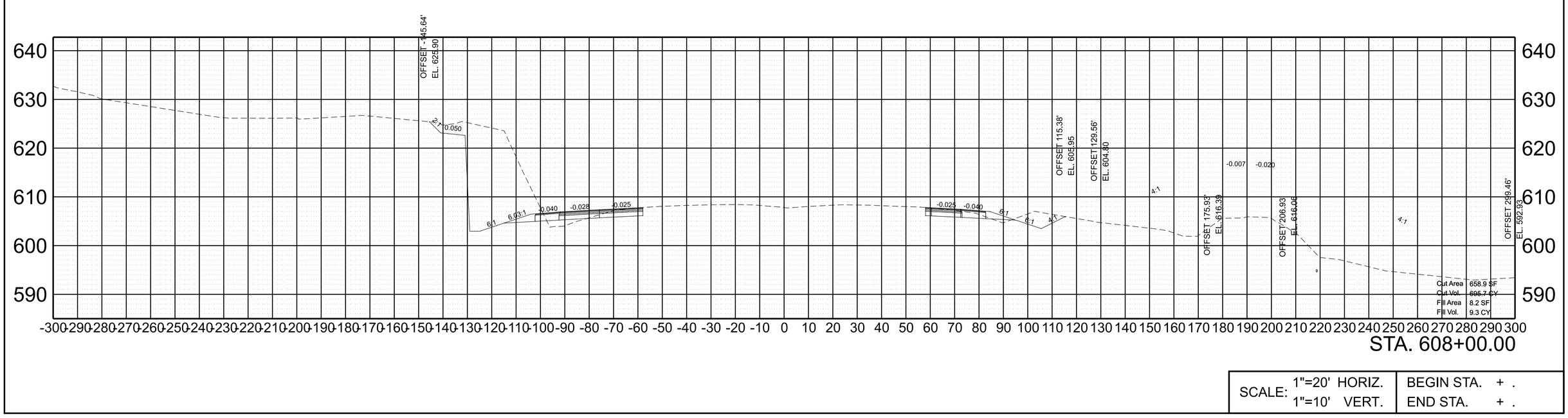
2/6/2023 8:30:09 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A102

REV. ***DATE***
TEXT



STA. 608+50.00



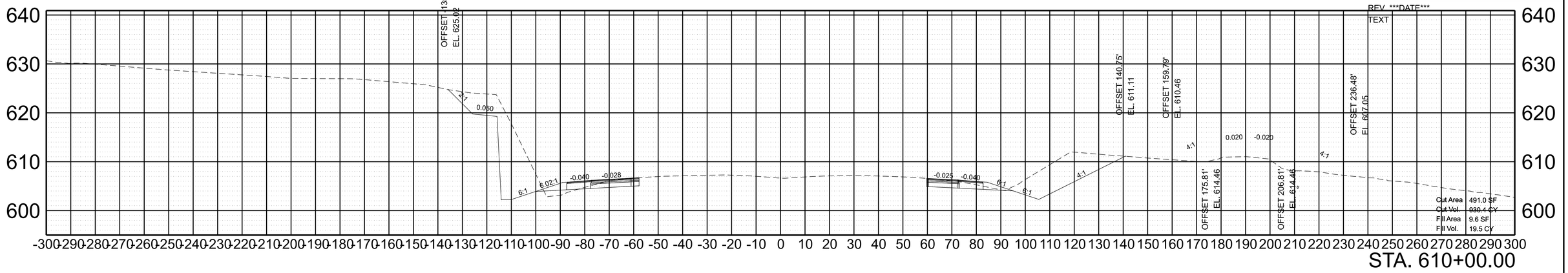
STA. 608+00.00

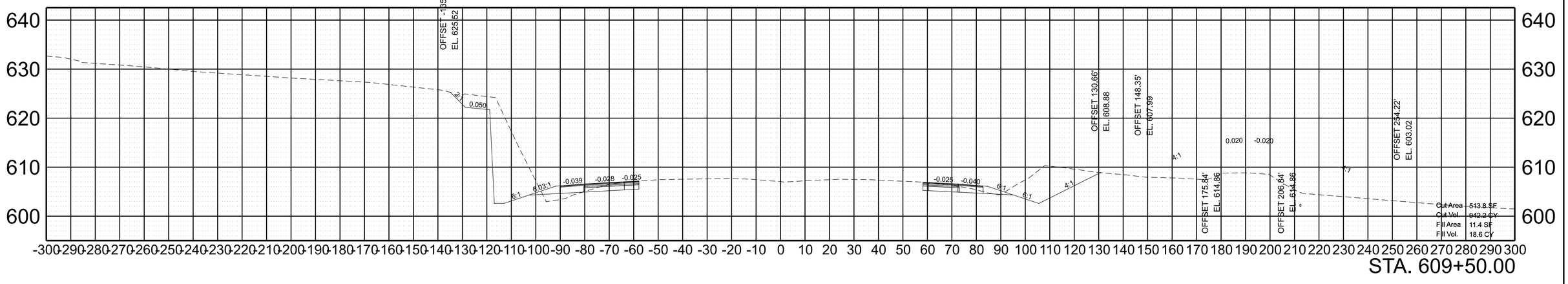
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

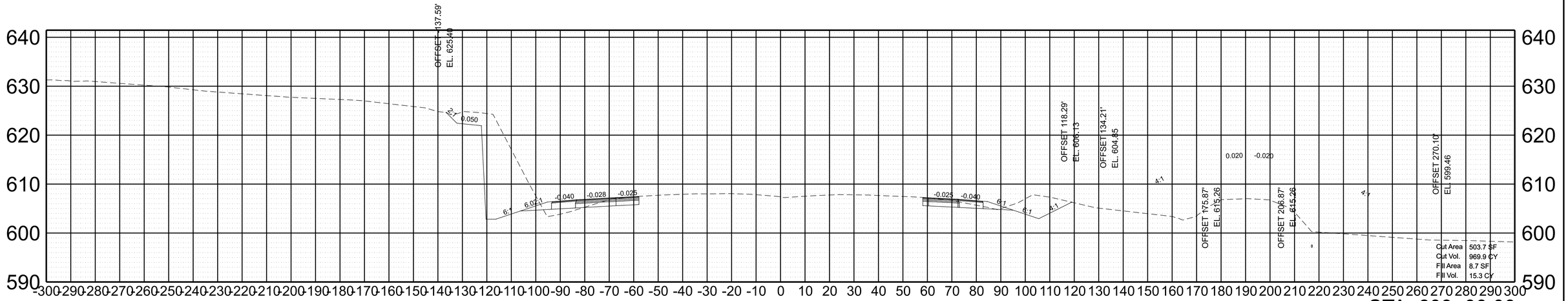
2/6/2023 8:30:12 AM
C:\PW\WORKINGIEAST01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A103

REV. ***DATE***
TEXT





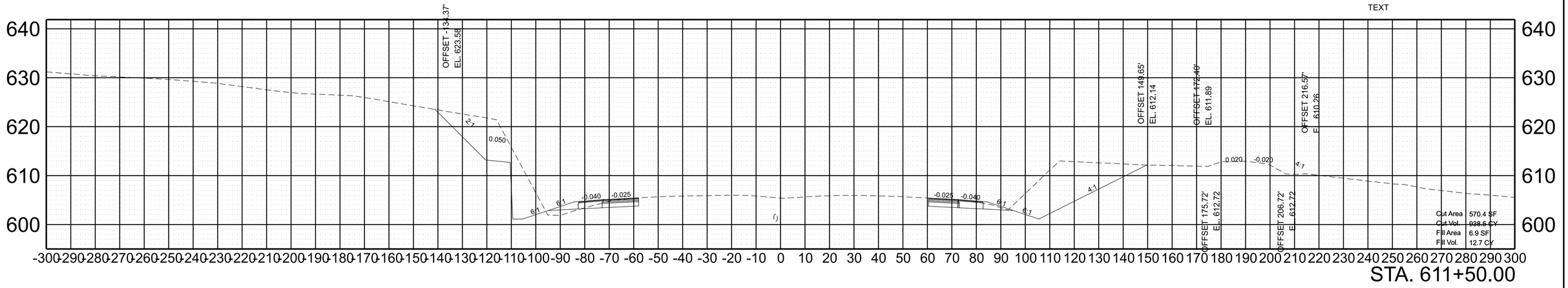


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

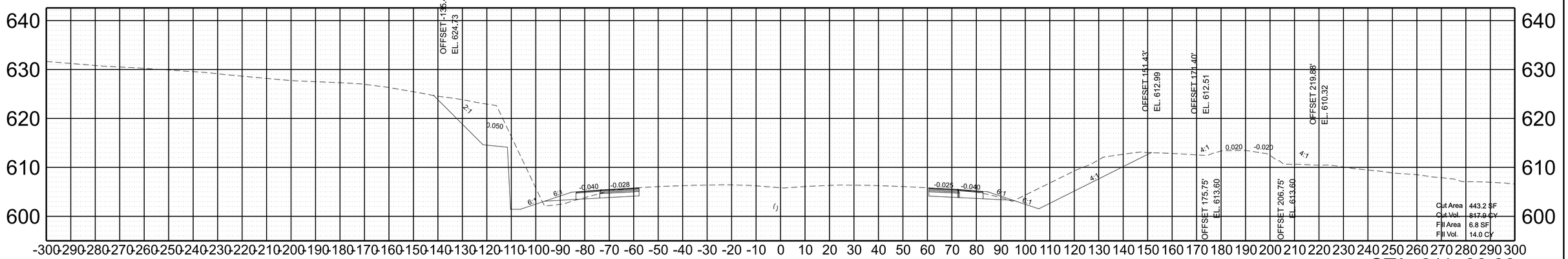
2/6/2023 8:30:15 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A104

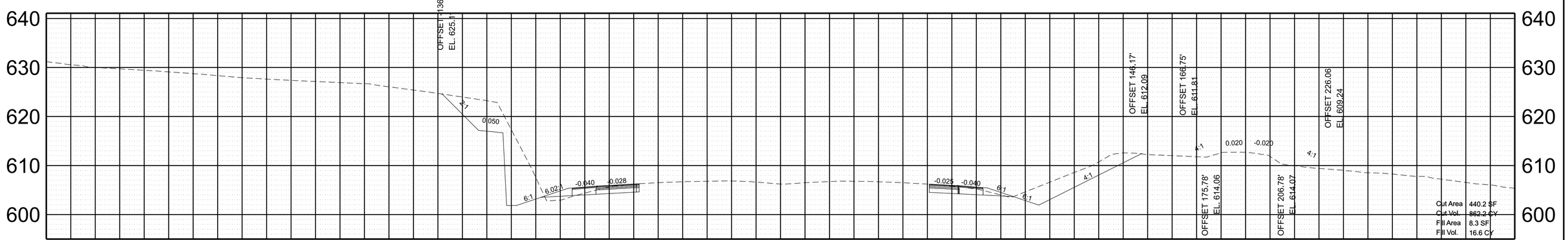
REV. ***DATE***
TEXT



STA. 611+50.00



STA. 611+00.00



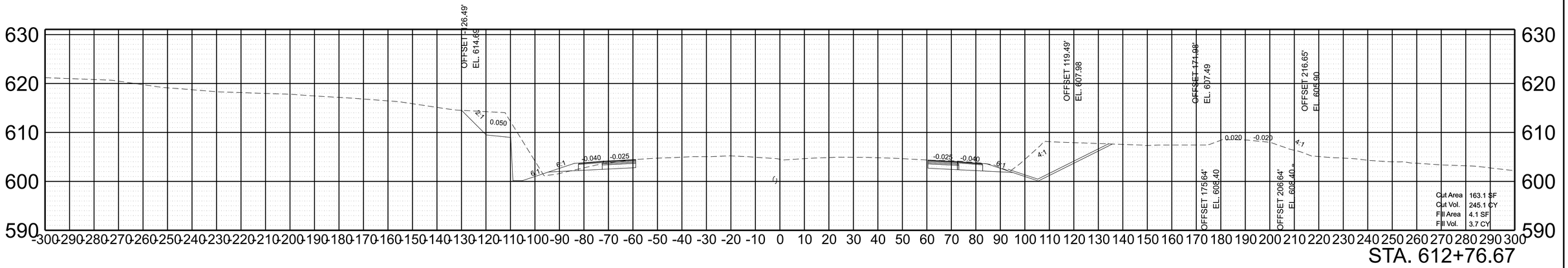
STA. 610+50.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

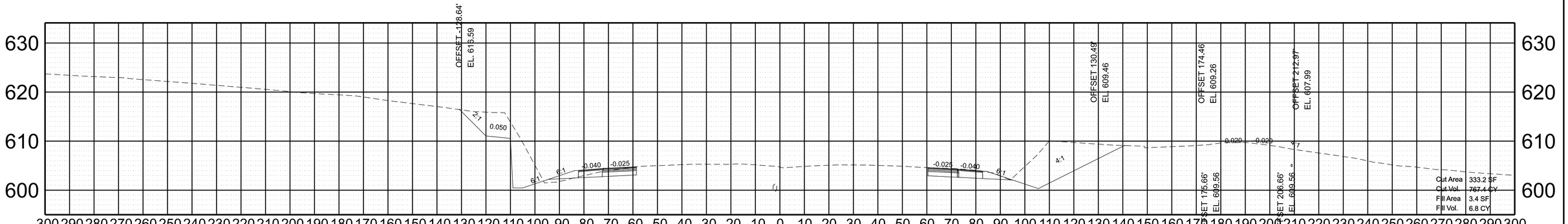
2/6/2023 8:30:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A105

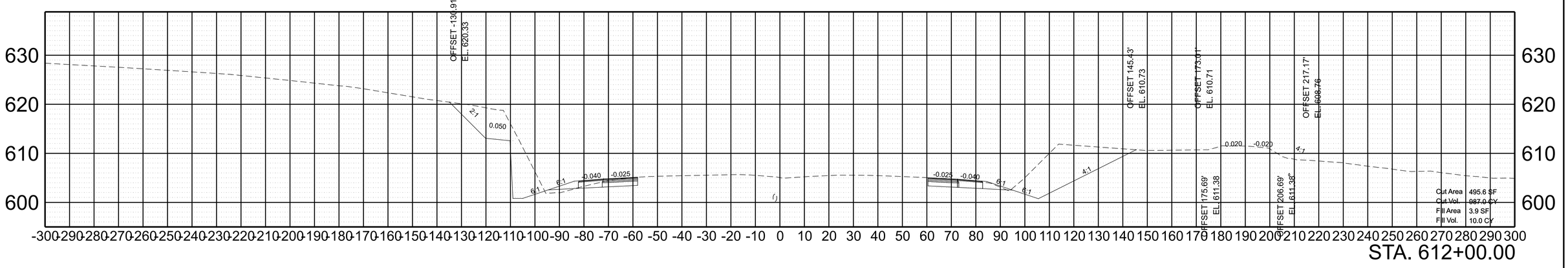
REV. ***DATE***
TEXT



STA. 612+76.67



STA. 612+50.00



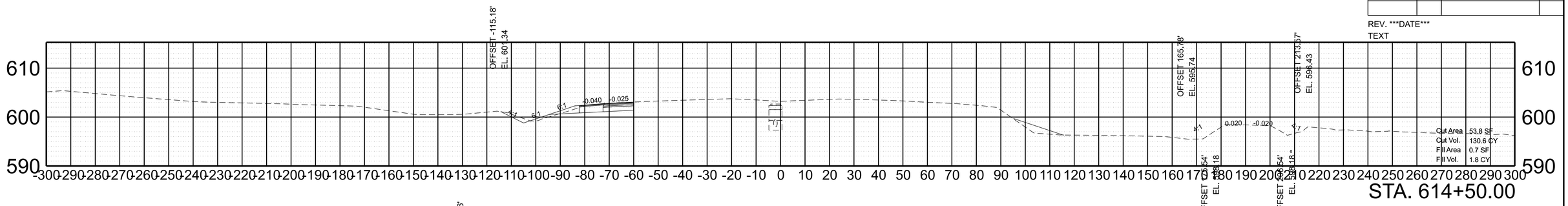
STA. 612+00.00

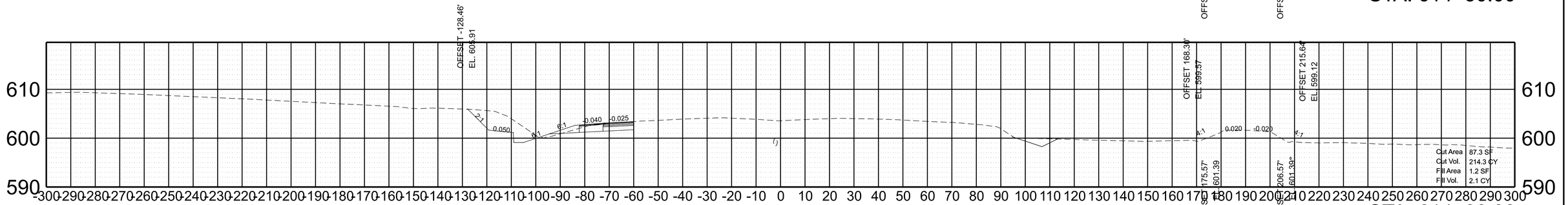
SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

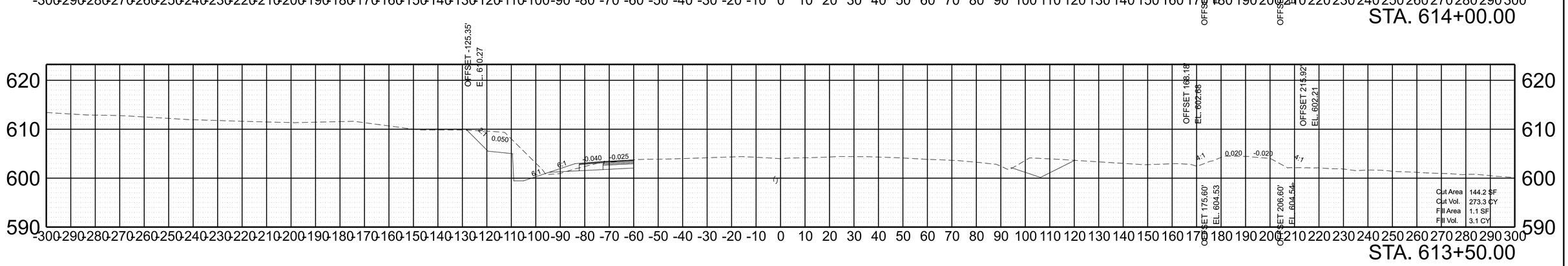
2/6/2023 8:30:20 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-I-40_20 SCALE.DGN

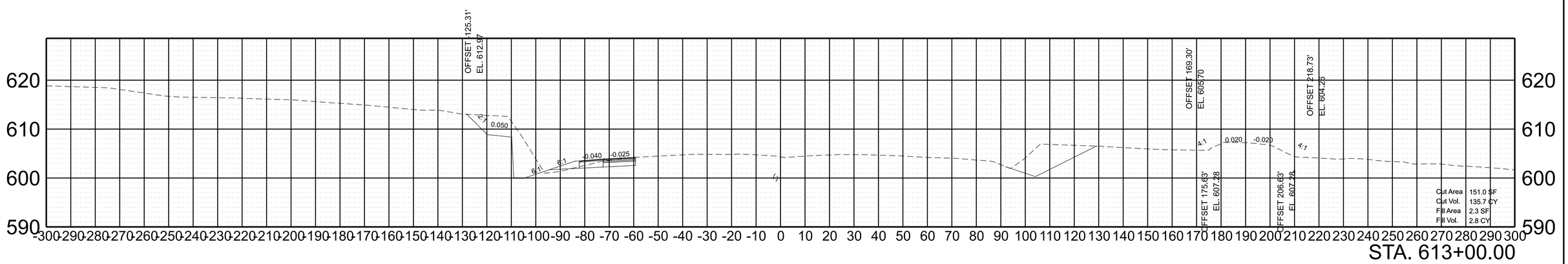
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A106

REV. ***DATE***
TEXT







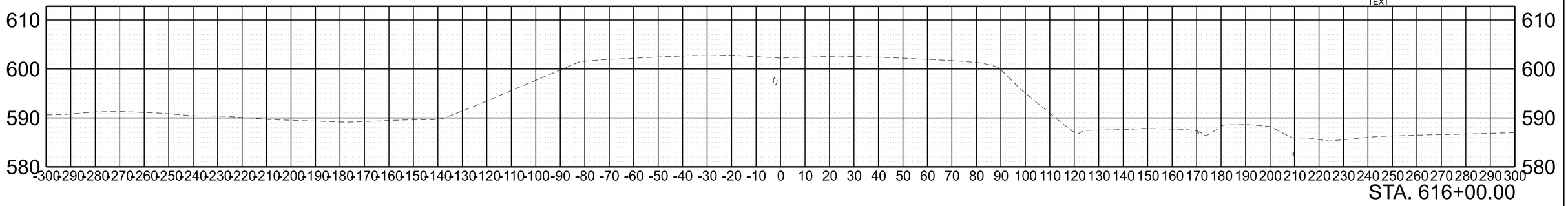


SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

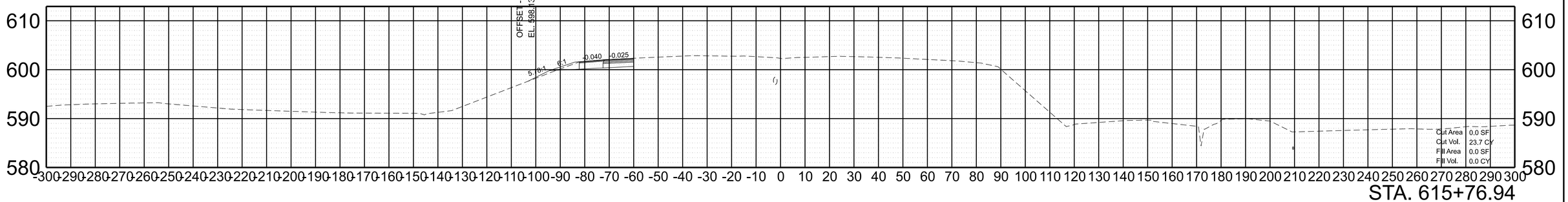
2/6/2023 8:30:24 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-I-40_20 SCALE.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A107

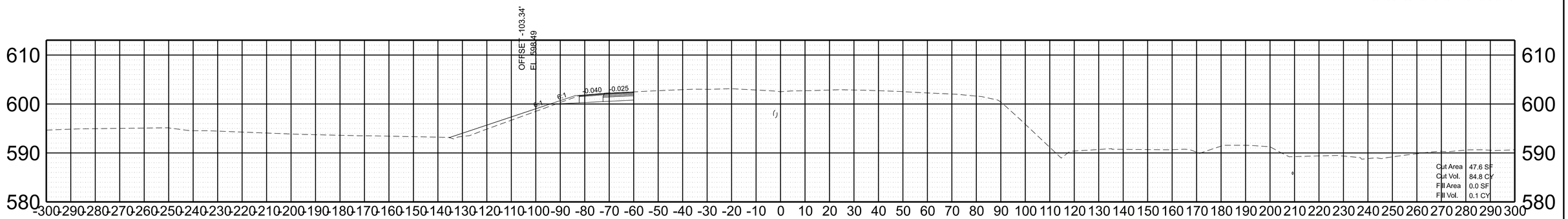
REV. ***DATE***
TEXT



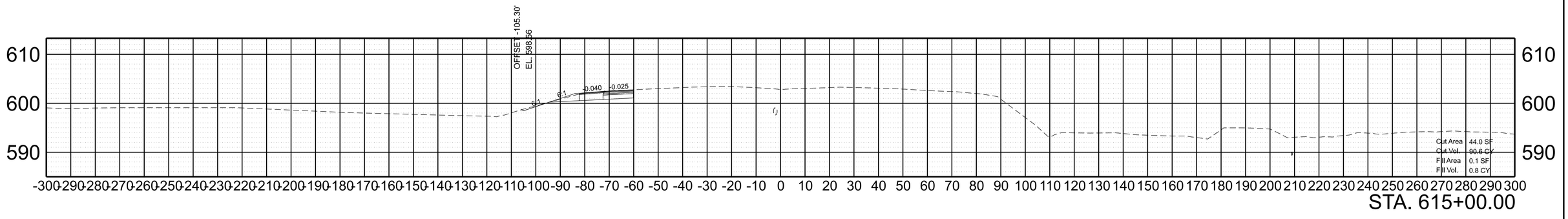
STA. 616+00.00



STA. 615+76.94



STA. 615+50.00



STA. 615+00.00

SCALE:	1"=20' HORIZ.	BEGIN STA. + .
	1"=10' VERT.	END STA. + .

2/6/2023 8:30:27 AM
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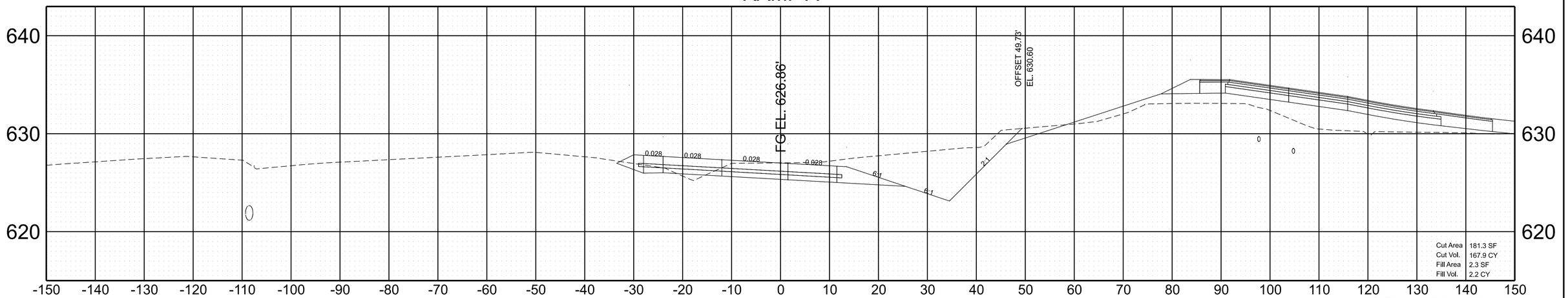
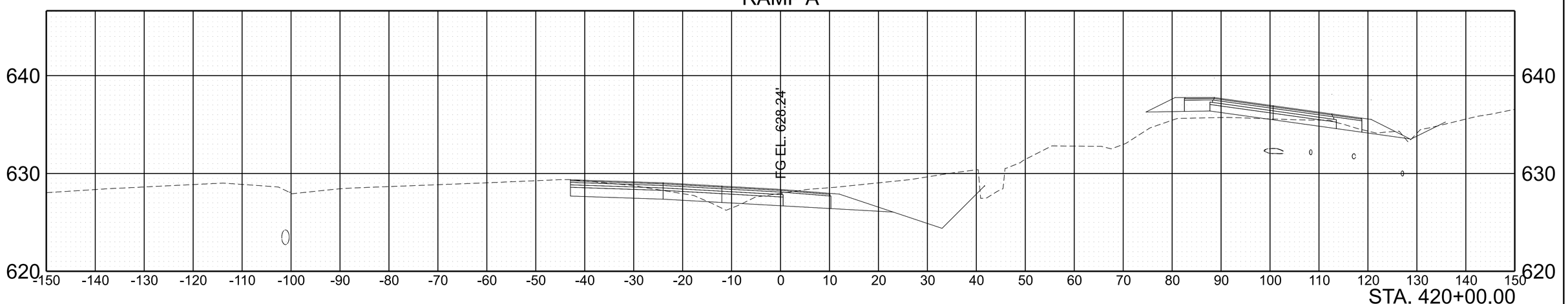
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A108

RAMP A



RAMP A

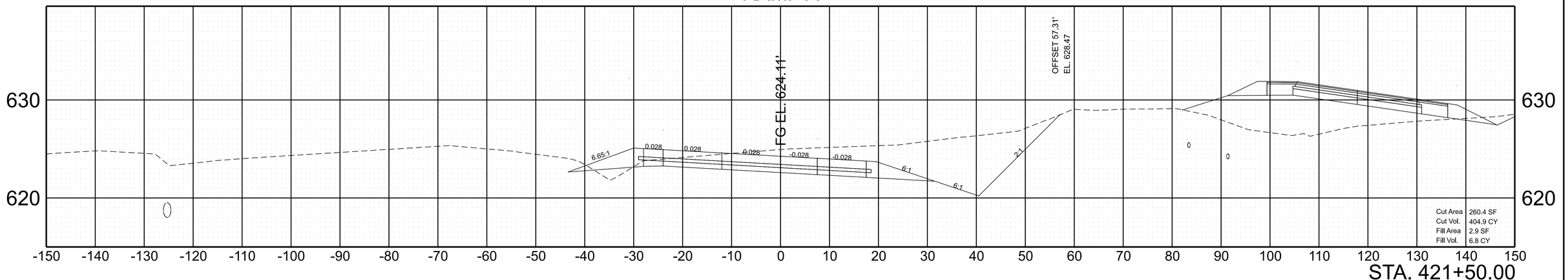


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 420+00.00 END STA. 420+50.00

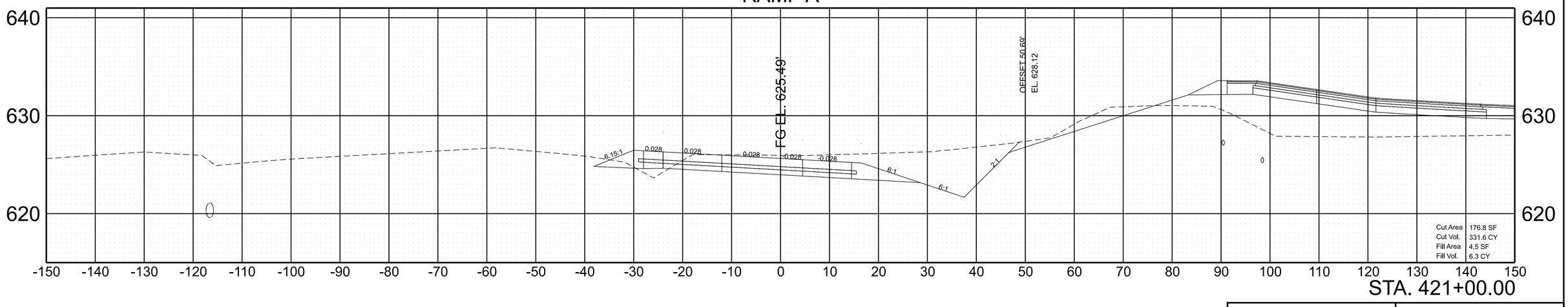
2/6/2023 8:31:02 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A109

RAMP A



RAMP A

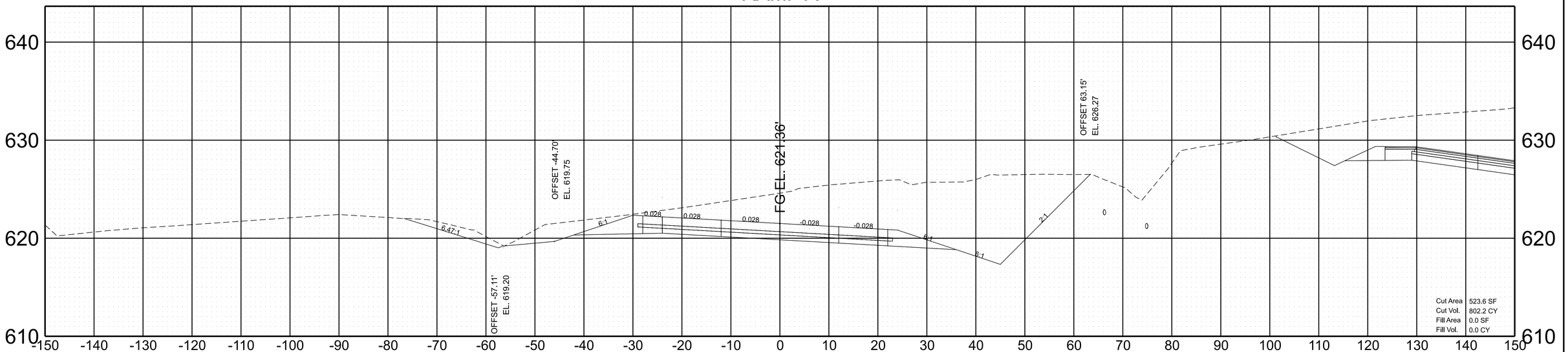


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 421+00.00 END STA. 421+50.00

2/6/2023 8:31:04 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-RAMP A.DGN

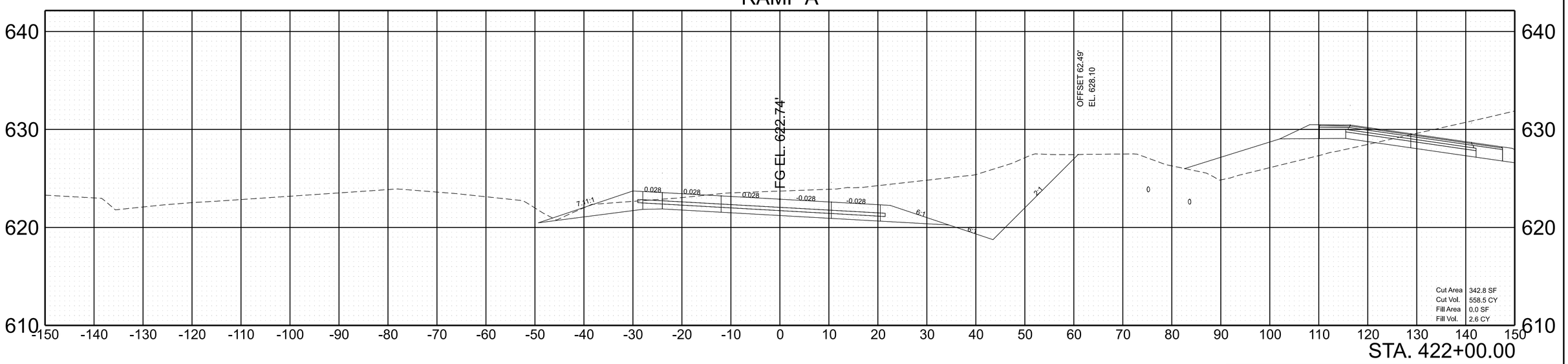
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A110

RAMP A



STA. 422+50.00

RAMP A



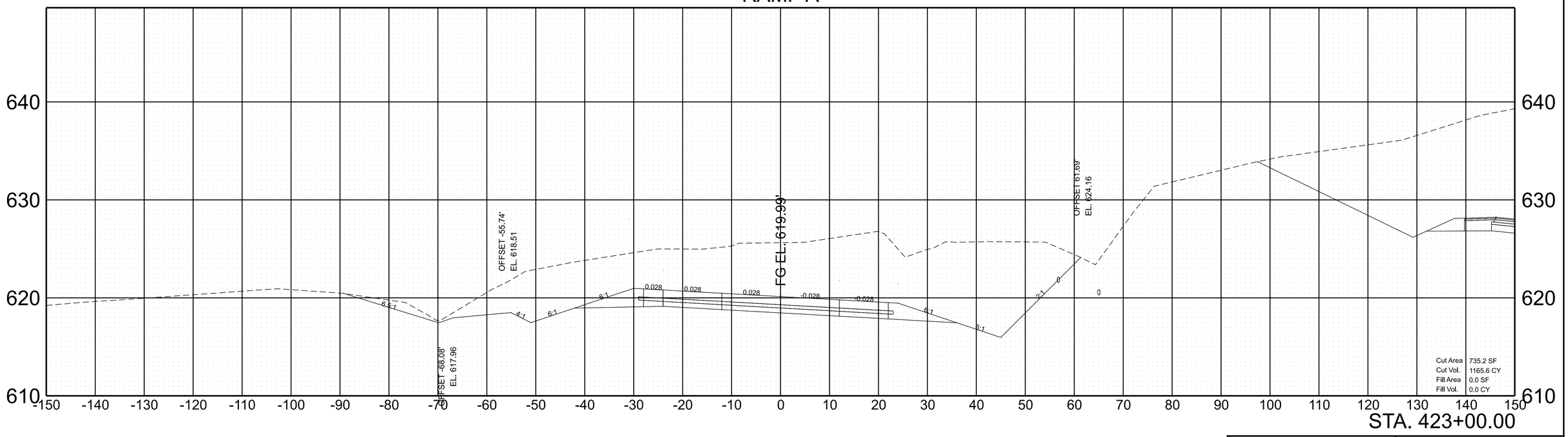
STA. 422+00.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 422+00.00 END STA. 422+50.00

2/6/2023 8:31:05 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A111

RAMP A

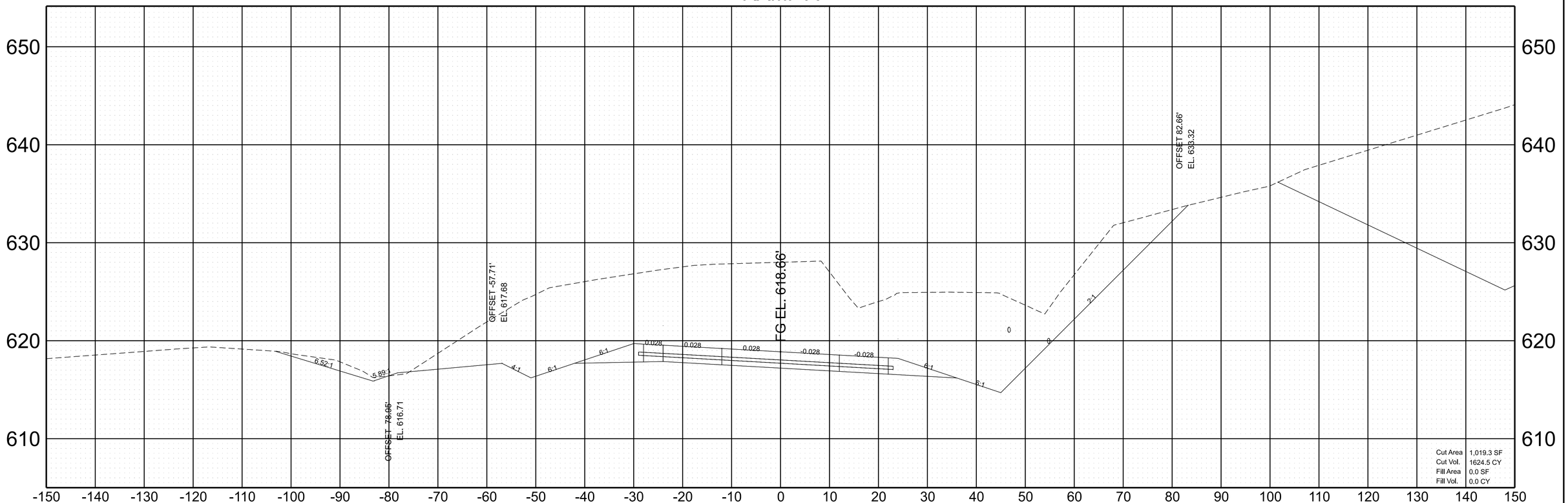


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 423+00.00 END STA. 423+00.00

2/6/2023 8:31:07 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A112

RAMP A



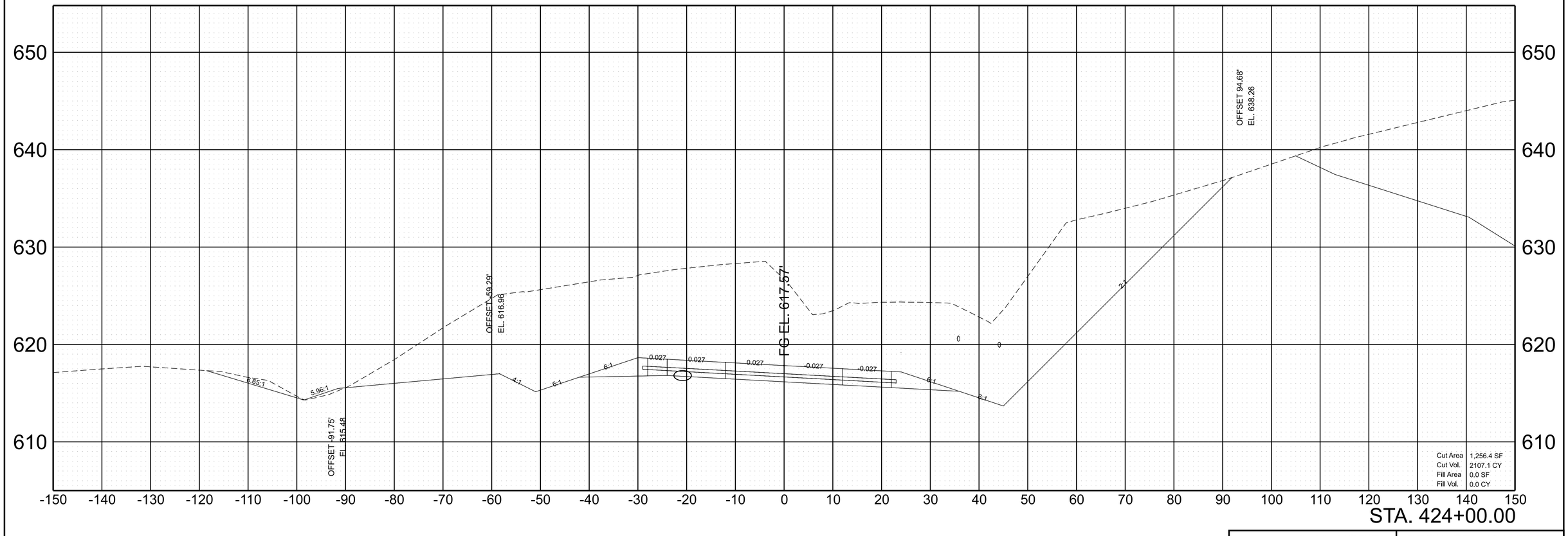
SCALE: 1"=10' HORIZ. 1"=5' VERT.

BEGIN STA. 423+50.00
END STA. 423+50.00

2/6/2023 8:31:08 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A113

RAMP A



SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 424+00.00 END STA. 424+00.00

2/6/2023 8:31:09 AM
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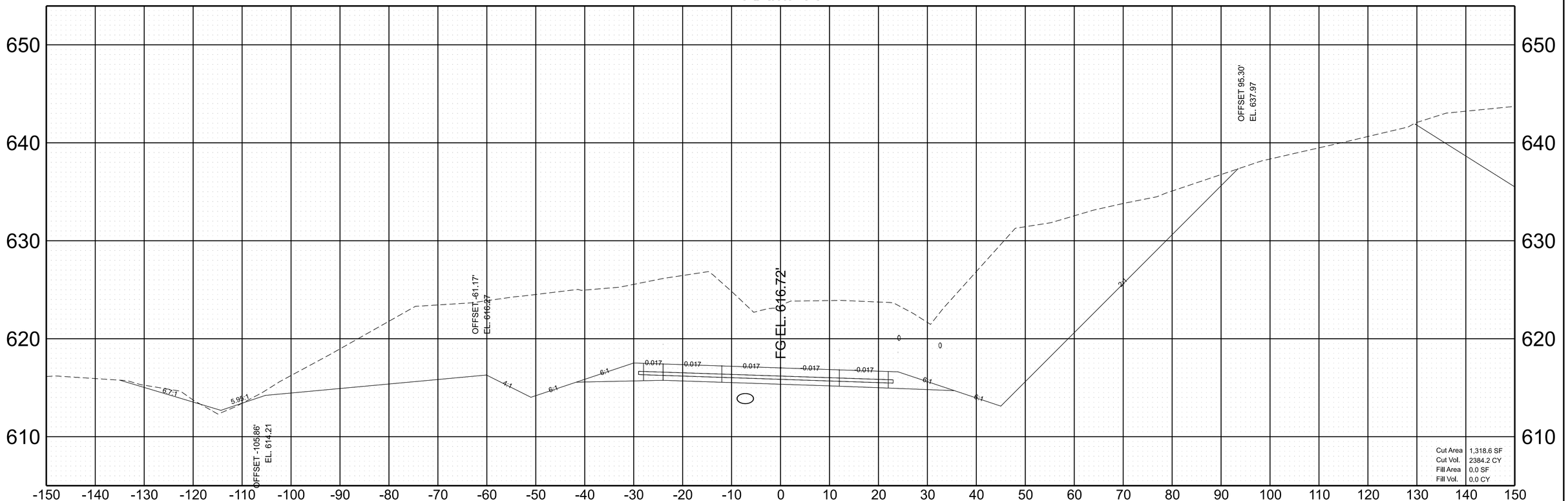
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A114

RAMP A

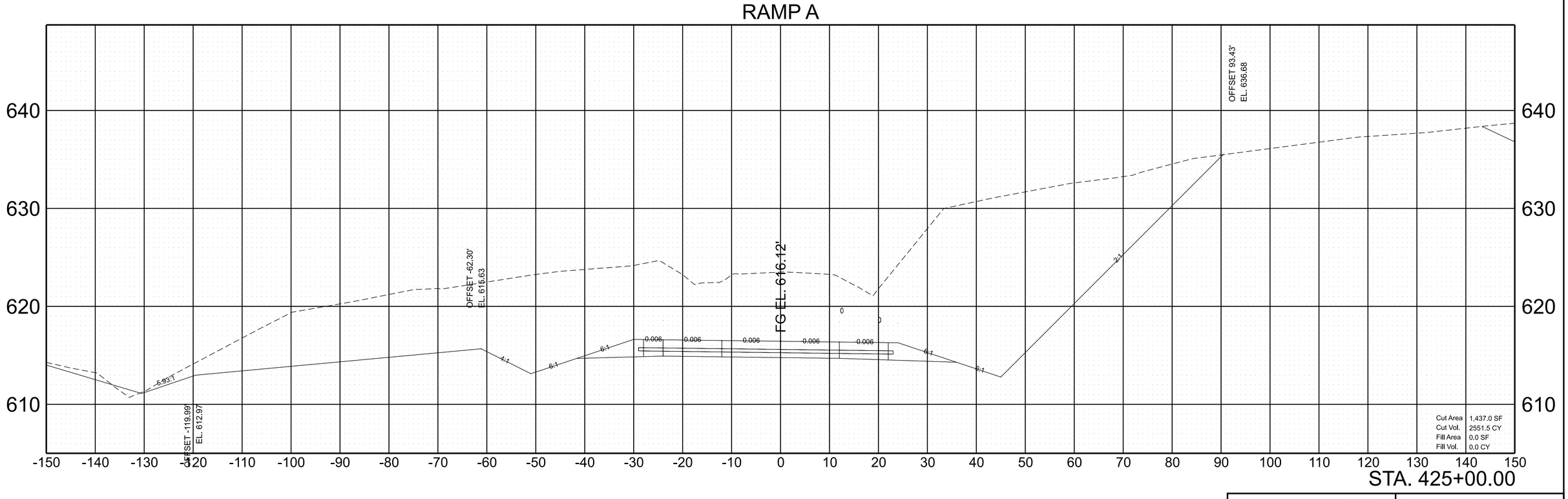


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 424+50.00
		END STA. 424+50.00

2/6/2023 8:31:11 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A115

RAMP A

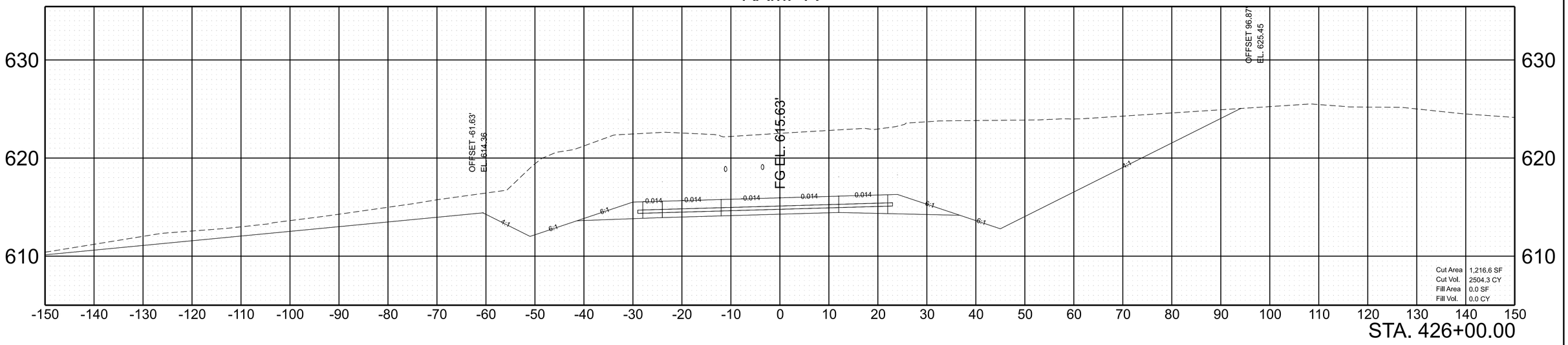


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 425+00.00 END STA. 425+00.00

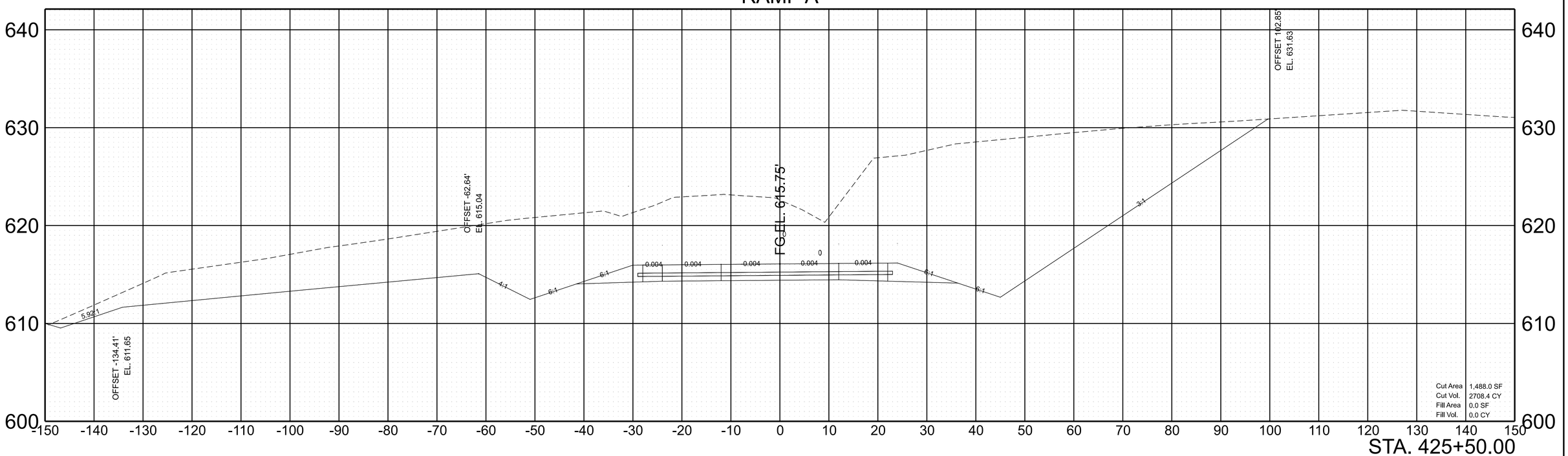
2/6/2023 8:31:12 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A116

RAMP A



RAMP A



SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 425+50.00 END STA. 426+00.00

2/6/2023 8:31:13 AM
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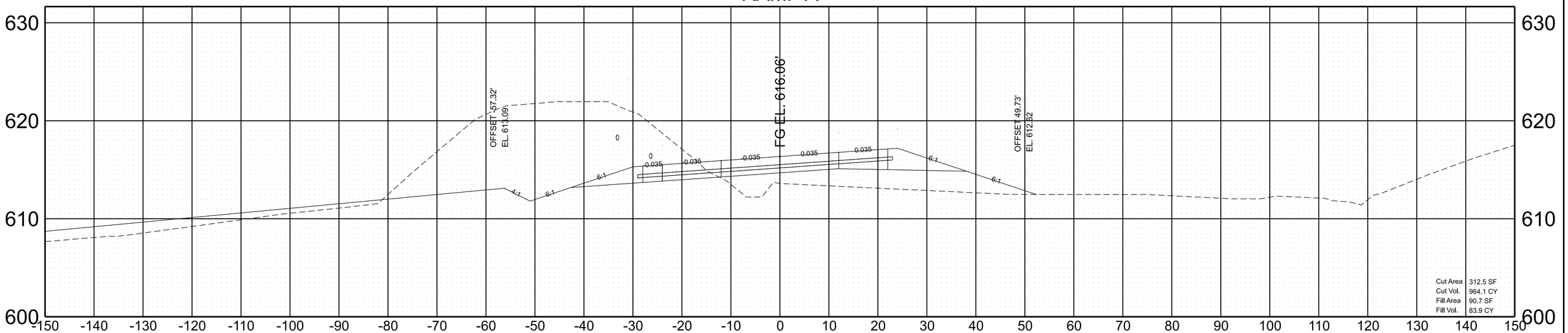
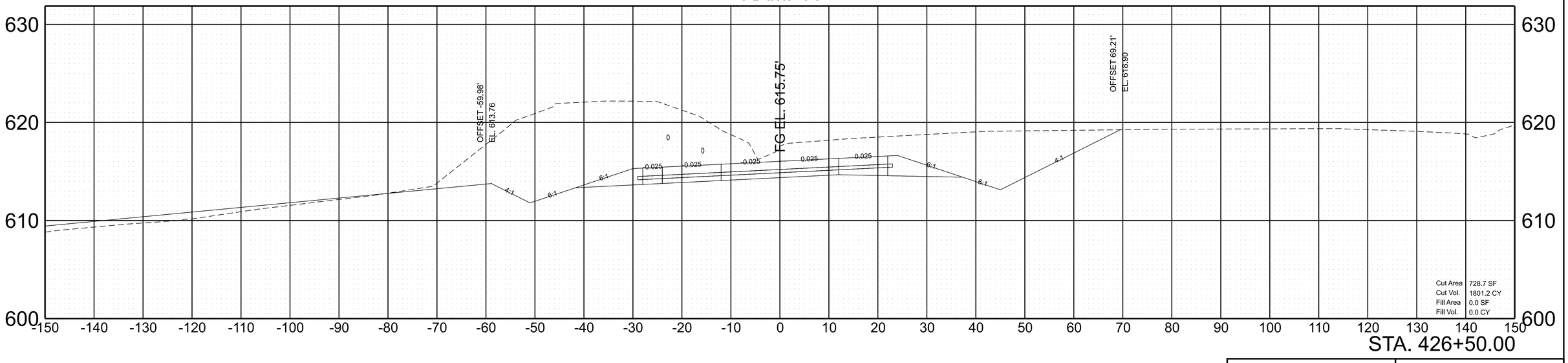
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A117

RAMP A



STA. 427+00.00

RAMP A



STA. 426+50.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 426+50.00 END STA. 427+00.00

2/6/2023 8:31:15 AM
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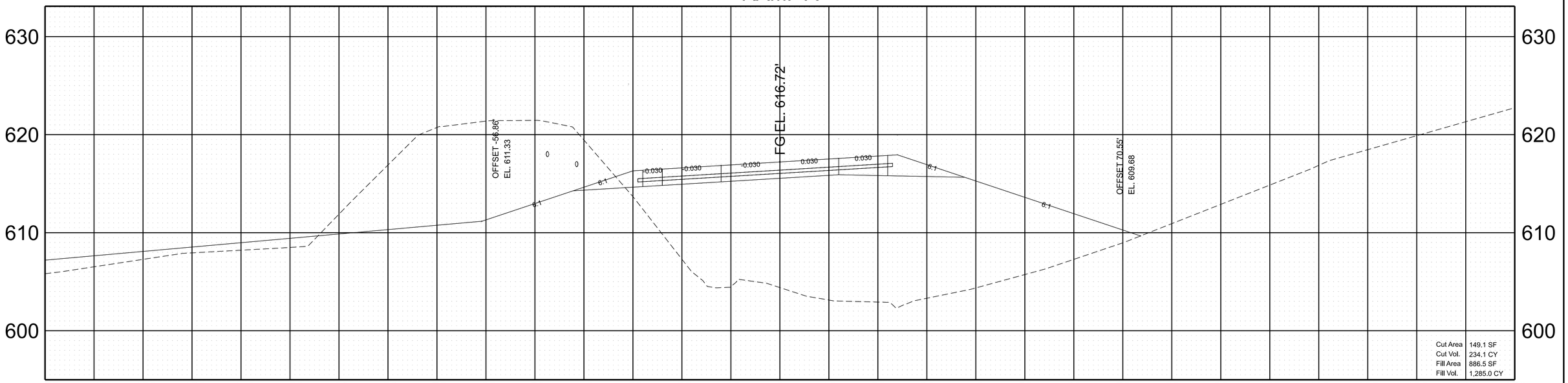
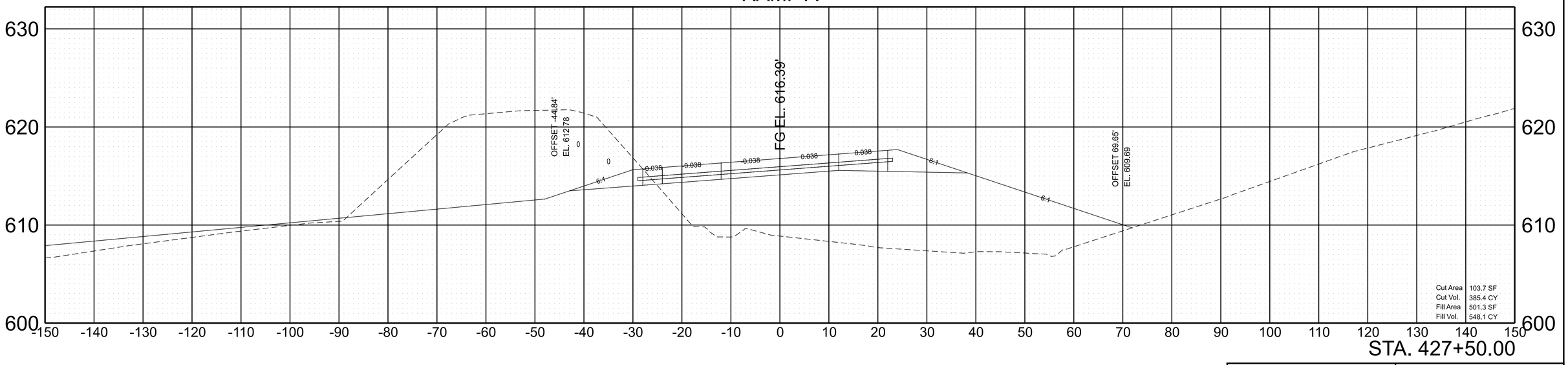
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A118

RAMP A



RAMP A

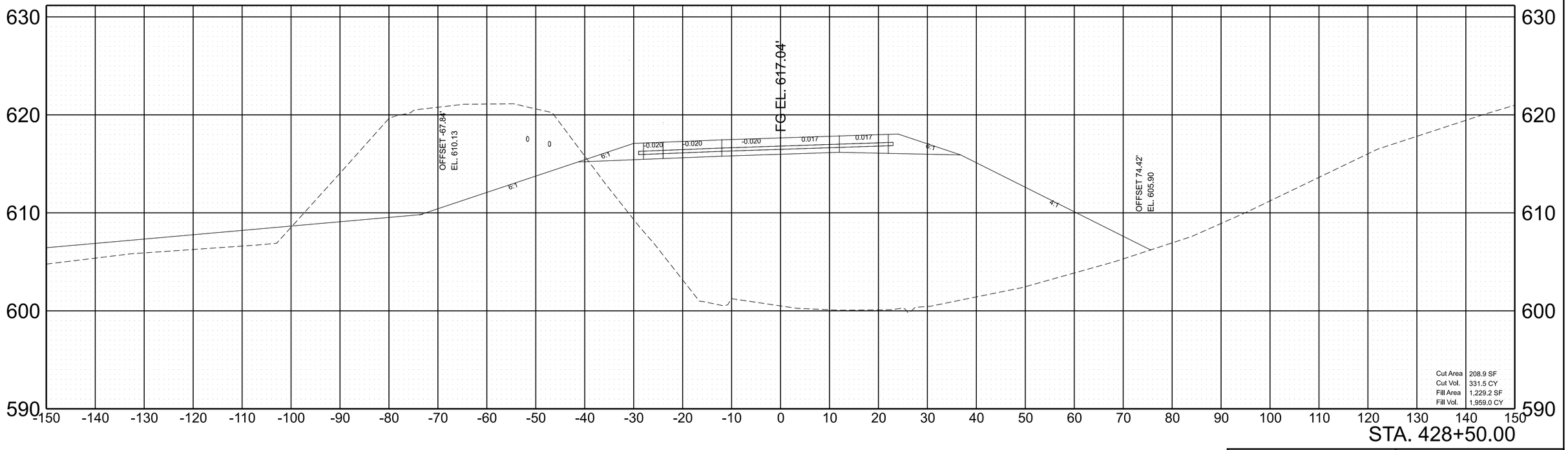


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 427+50.00 END STA. 428+00.00

2/6/2023 8:31:17 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A119

RAMP A

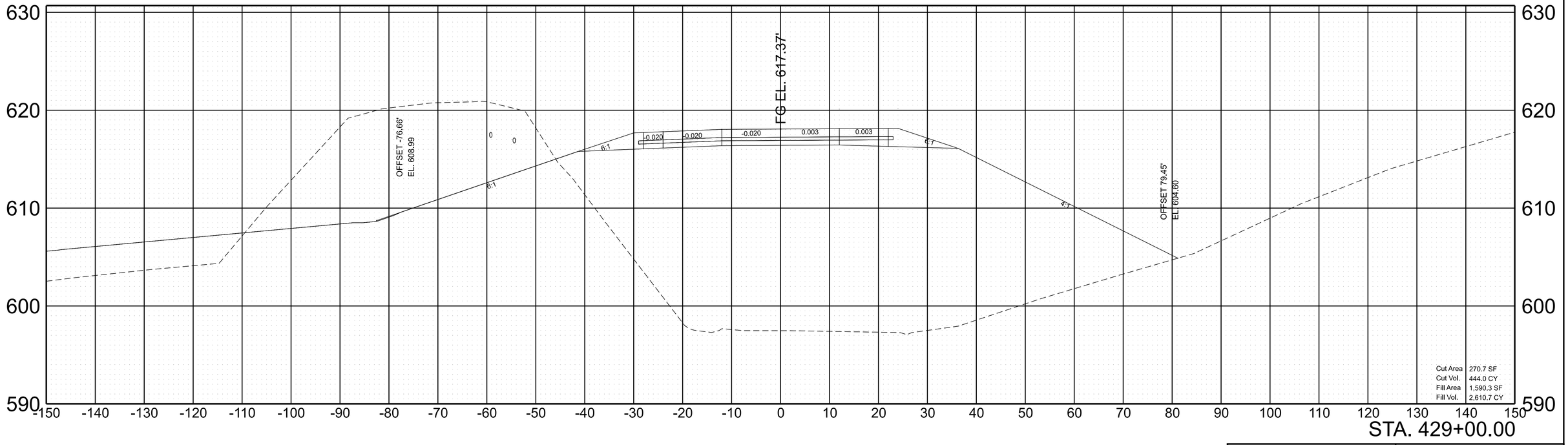


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 428+50.00 END STA. 428+50.00

2/6/2023 8:31:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A120

RAMP A

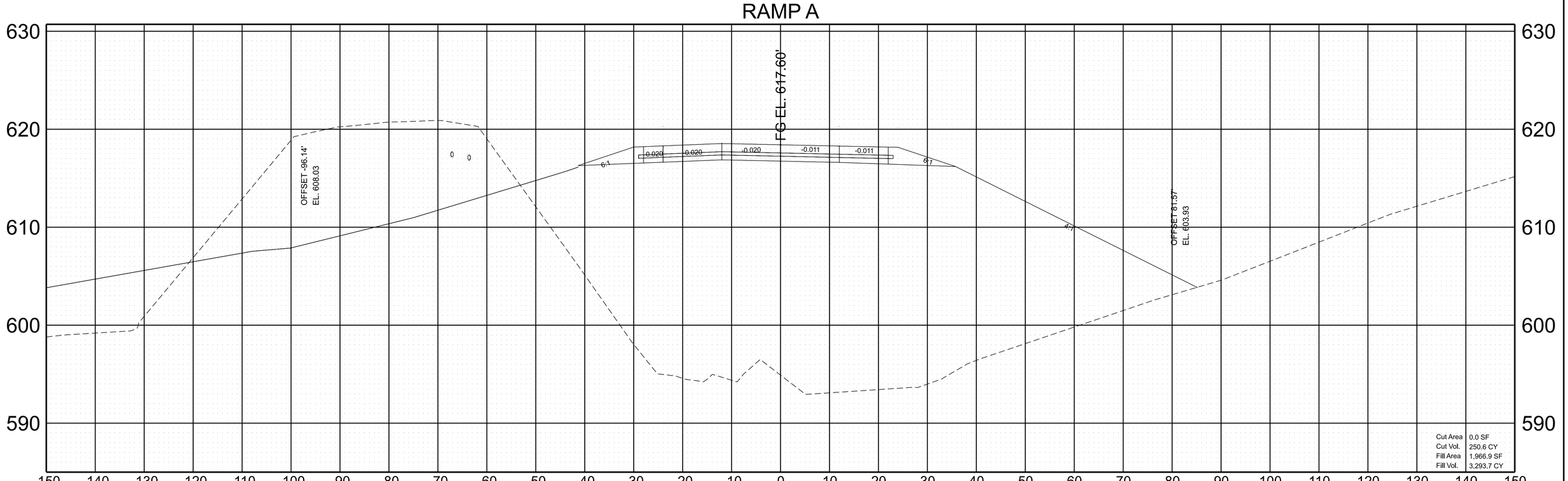


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 429+00.00 END STA. 429+00.00

2/6/2023 8:31:19 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A121

RAMP A

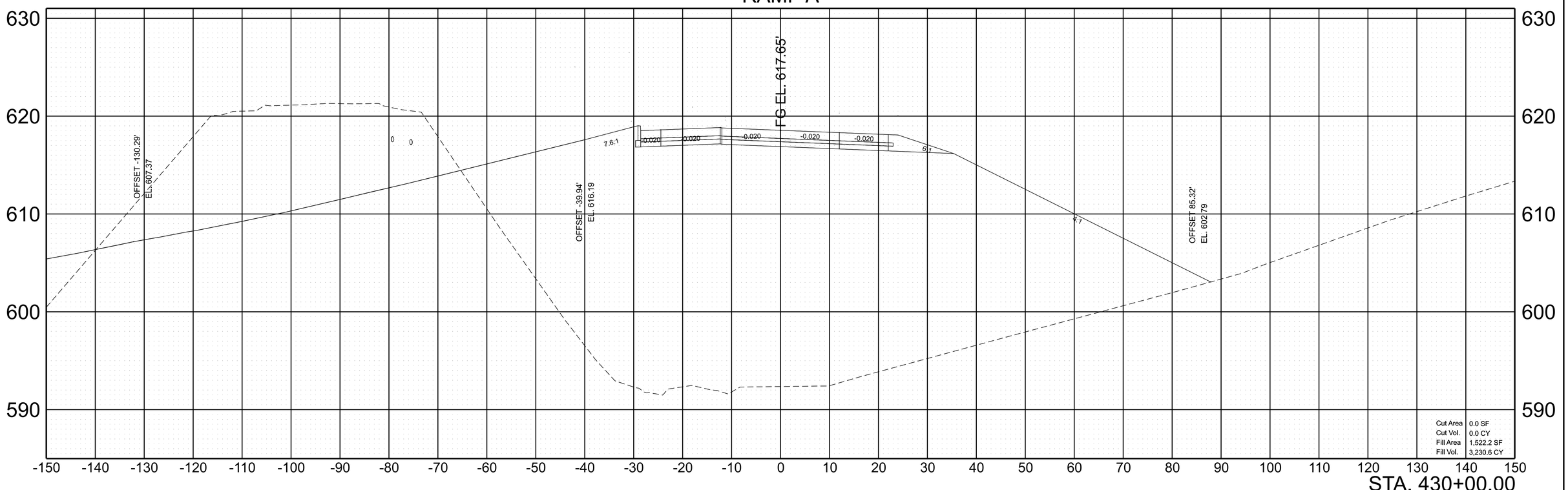


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 429+50.00 END STA. 429+50.00

2/6/2023 8:31:21 AM
C:\PW\WORKING\EAST01\D2328414195\I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A122

RAMP A

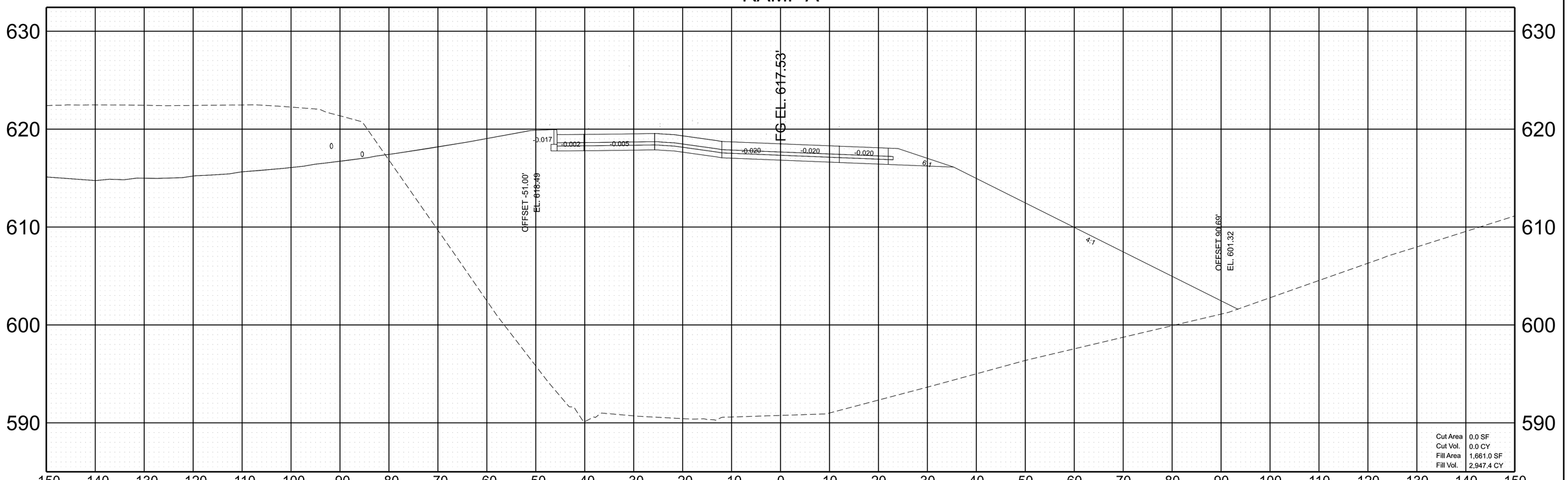


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 430+00.00 END STA. 430+00.00

2/6/2023 8:31:22 AM
C:\PWWORKINGIEAST01\D2328414\95\0040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A123

RAMP A

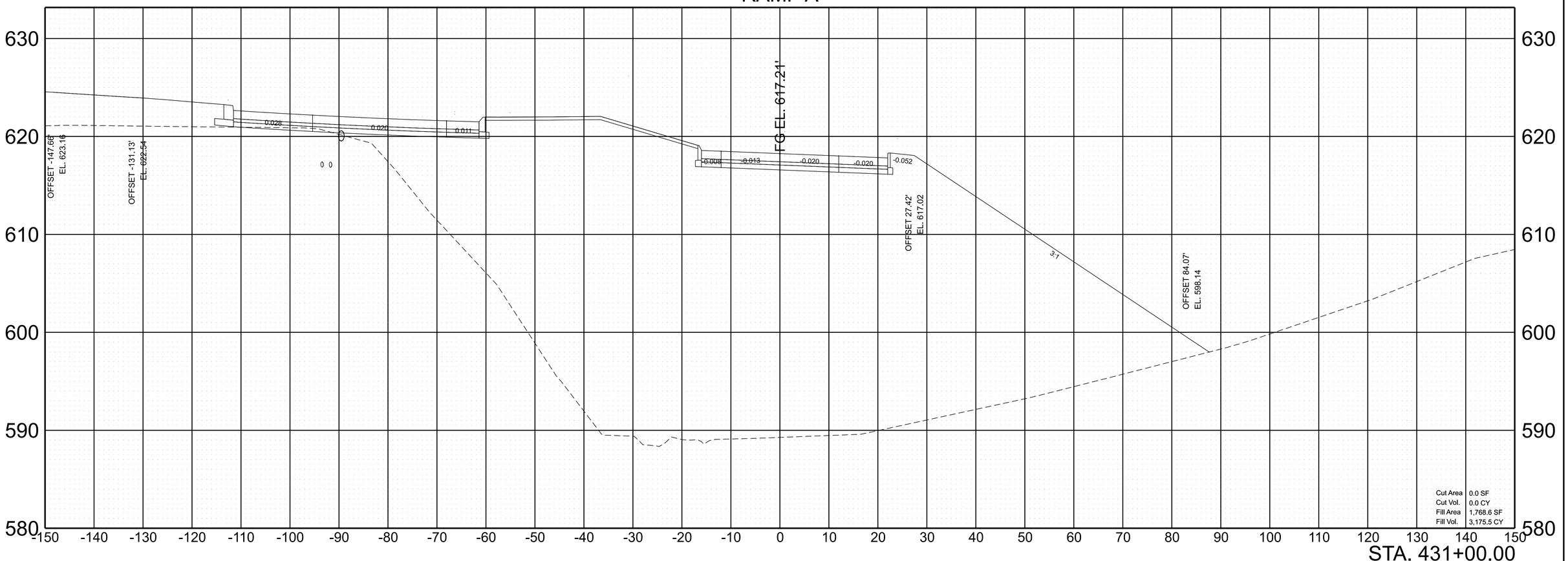


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 430+50.00 END STA. 430+50.00

2/6/2023 8:31:23 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A124

RAMP A

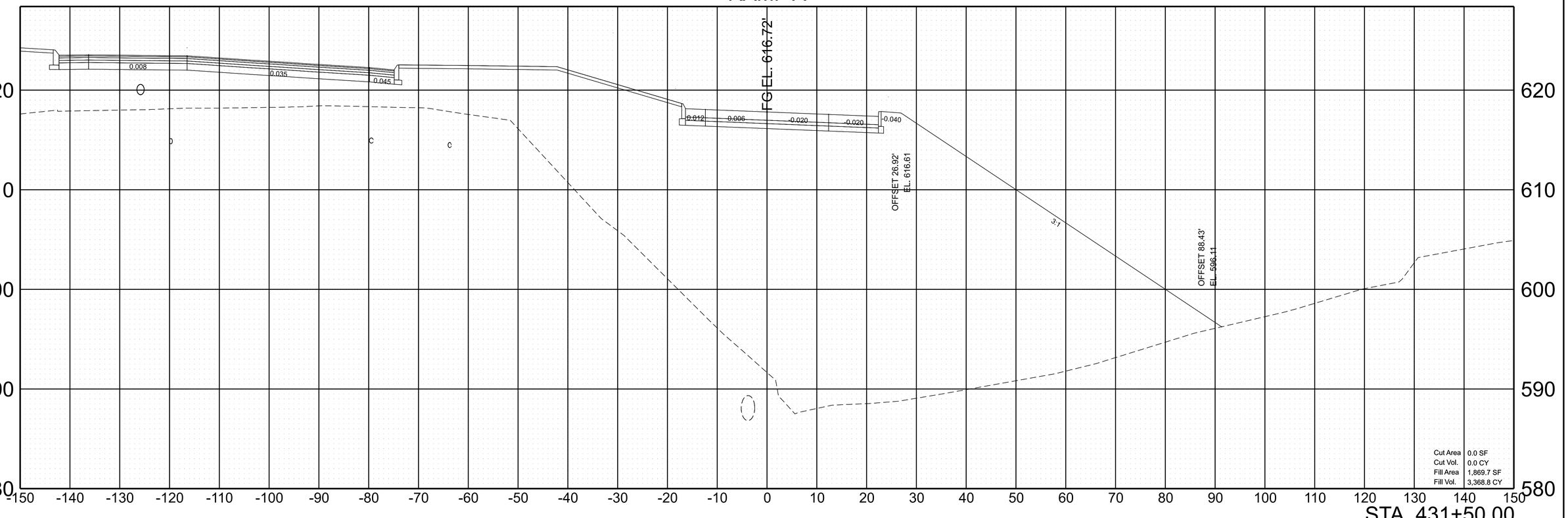


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 431+00.00 END STA. 431+00.00

2/6/2023 8:31:24 AM
C:\PWWORKING\EAST\01\D2328414\95\0040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A125

RAMP A

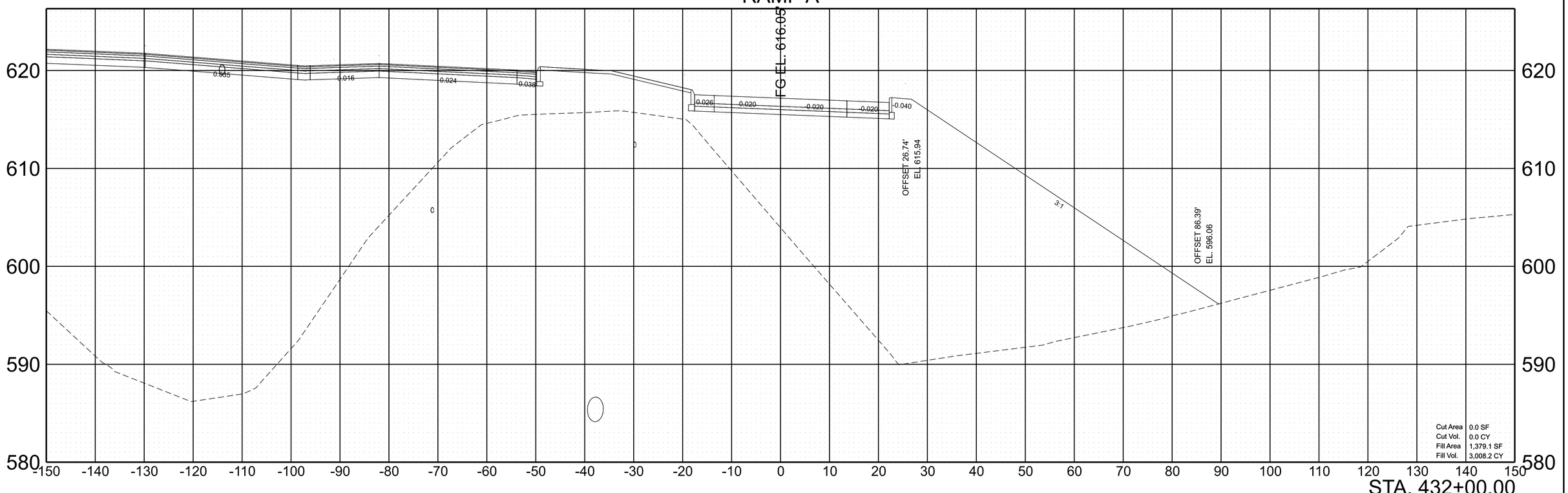


SCALE:	1"=10' HORIZ.	BEGIN STA. 431+50.00
	1"=5' VERT.	END STA. 431+50.00

2/6/2023 8:31:26 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A126

RAMP A

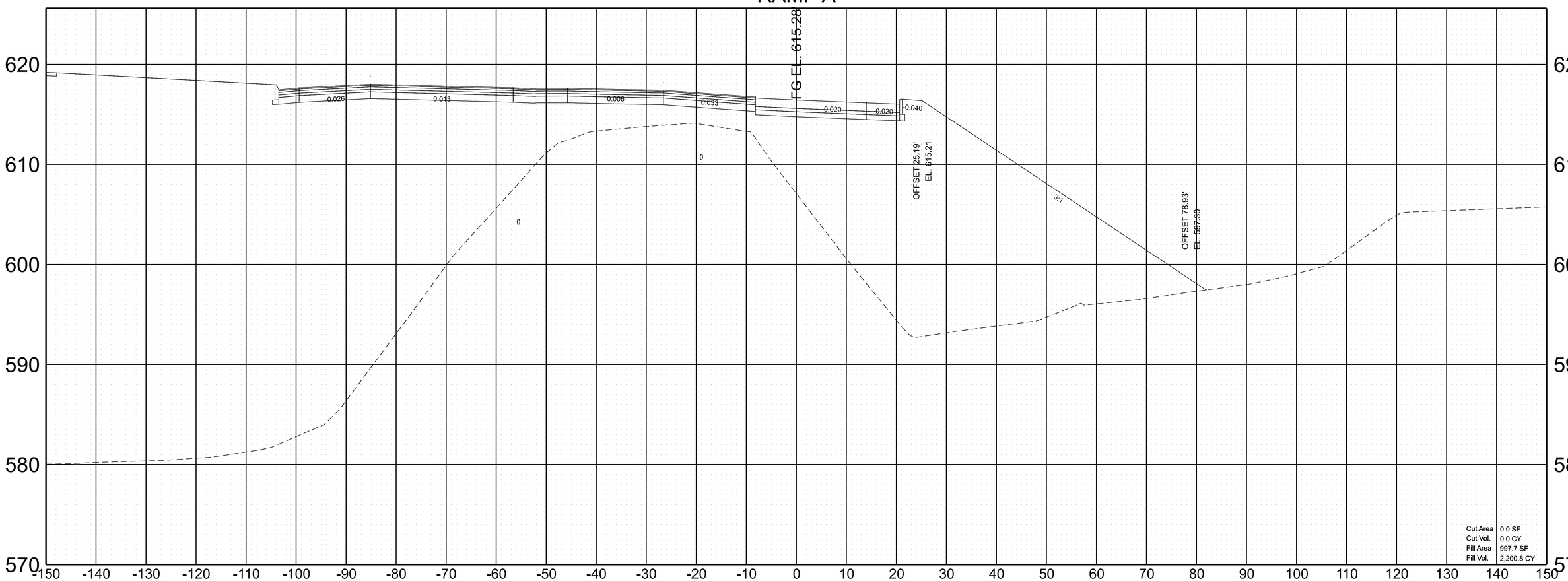


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 432+00.00 END STA. 432+00.00

2/6/2023 8:32:50 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A127

RAMP A

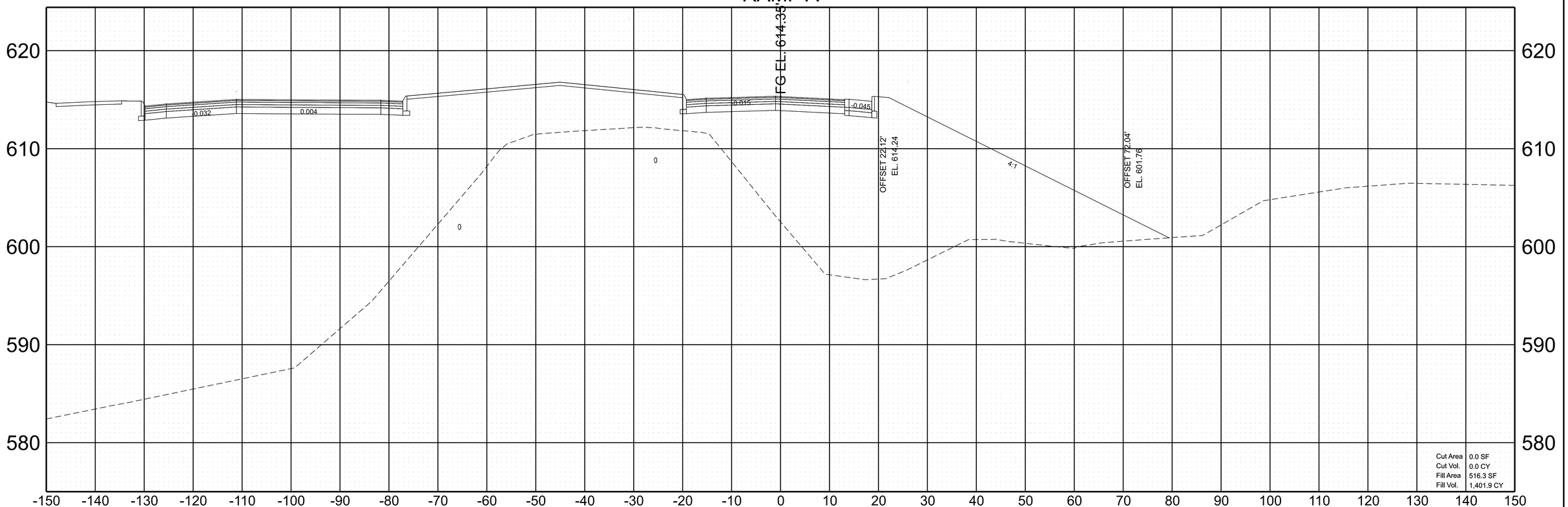


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 432+50.00 END STA. 432+50.00

2/6/2023 8:32:51 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A128

RAMP A

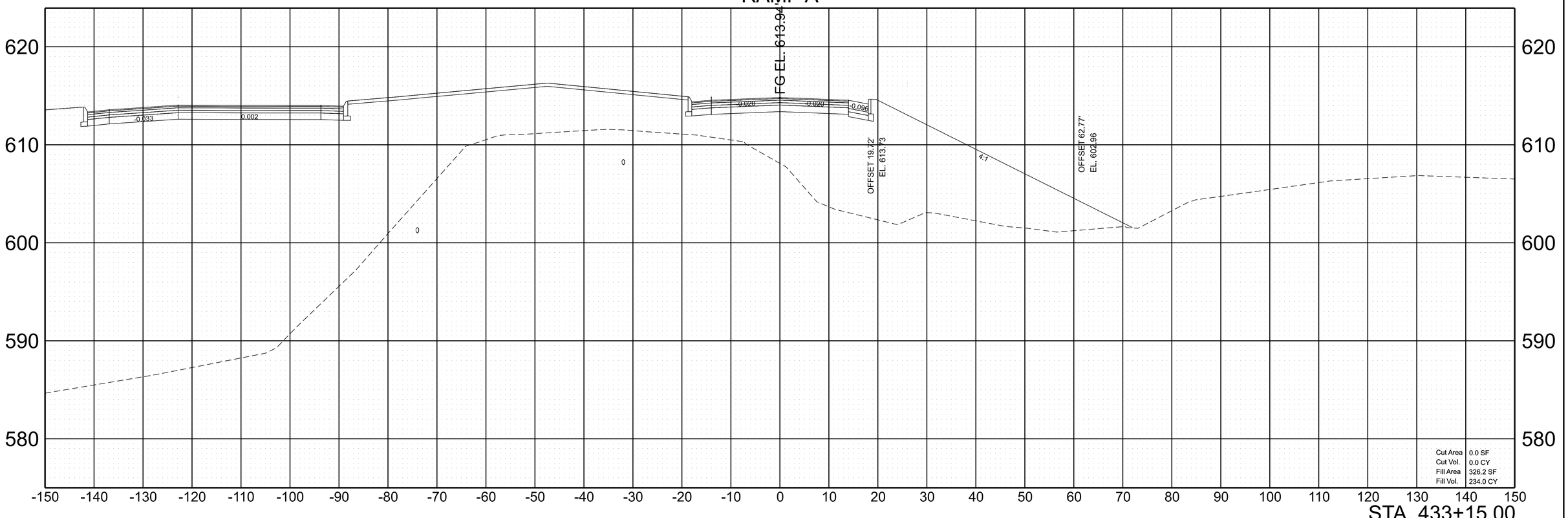


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 433+00.00 END STA. 433+00.00

2/6/2023 8:32:53 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A129

RAMP A

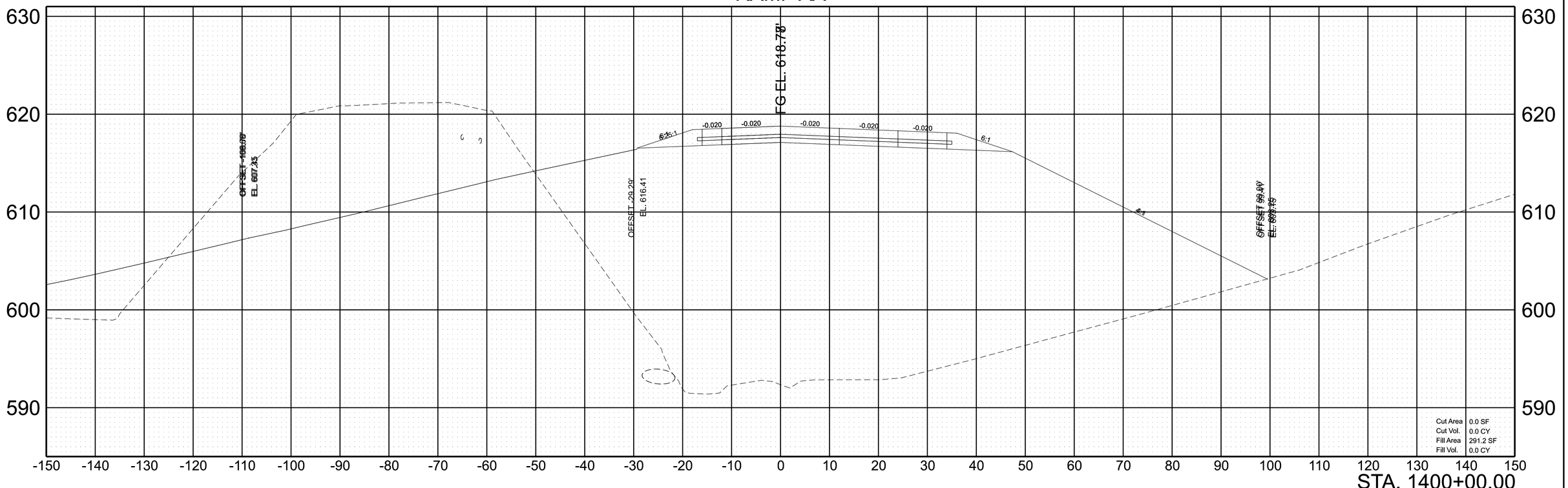


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 433+15.00 END STA. 433+15.00

2/6/2023 8:32:54 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP A.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A130

RAMP AA

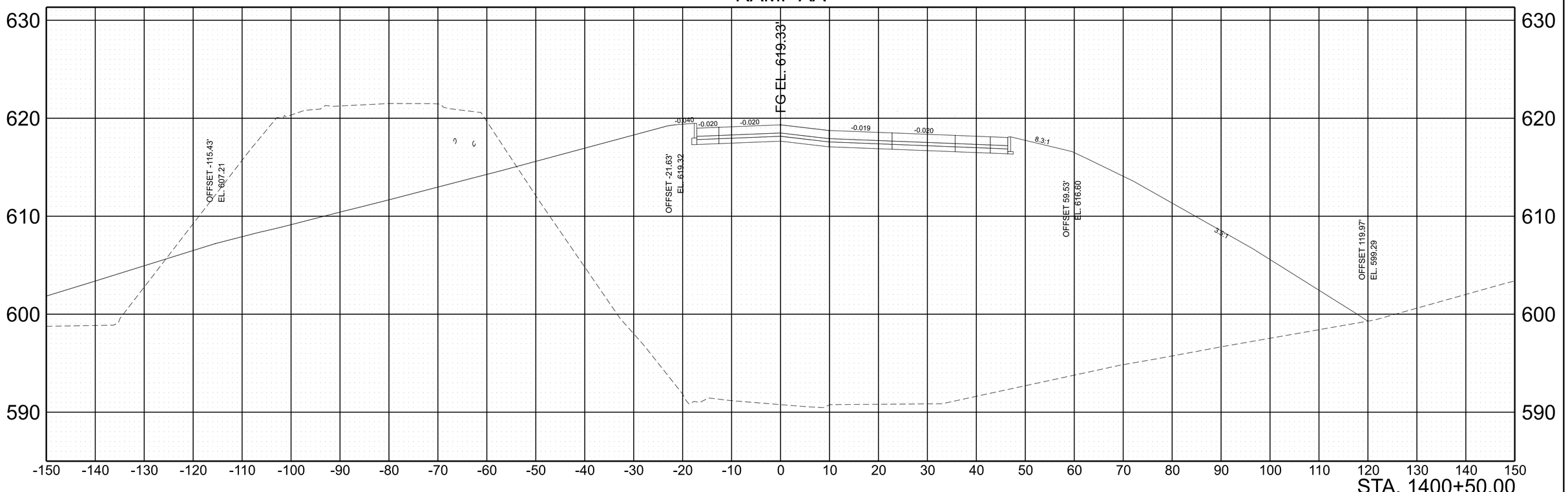


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA.	+ .
		END STA.	+ .

2/6/2023 8:33:14 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP AA.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A131

RAMP AA

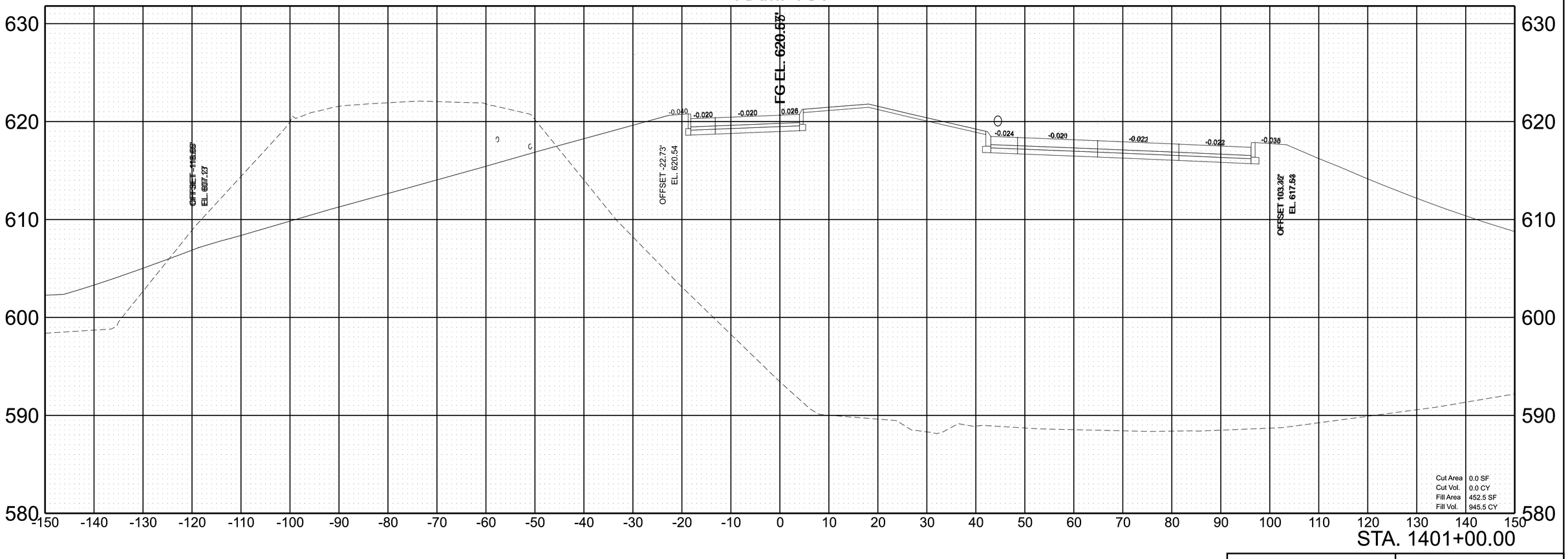


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:33:16 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP AA.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A132

RAMP AA



SCALE: 1"=10' HORIZ. 1"=5' VERT.

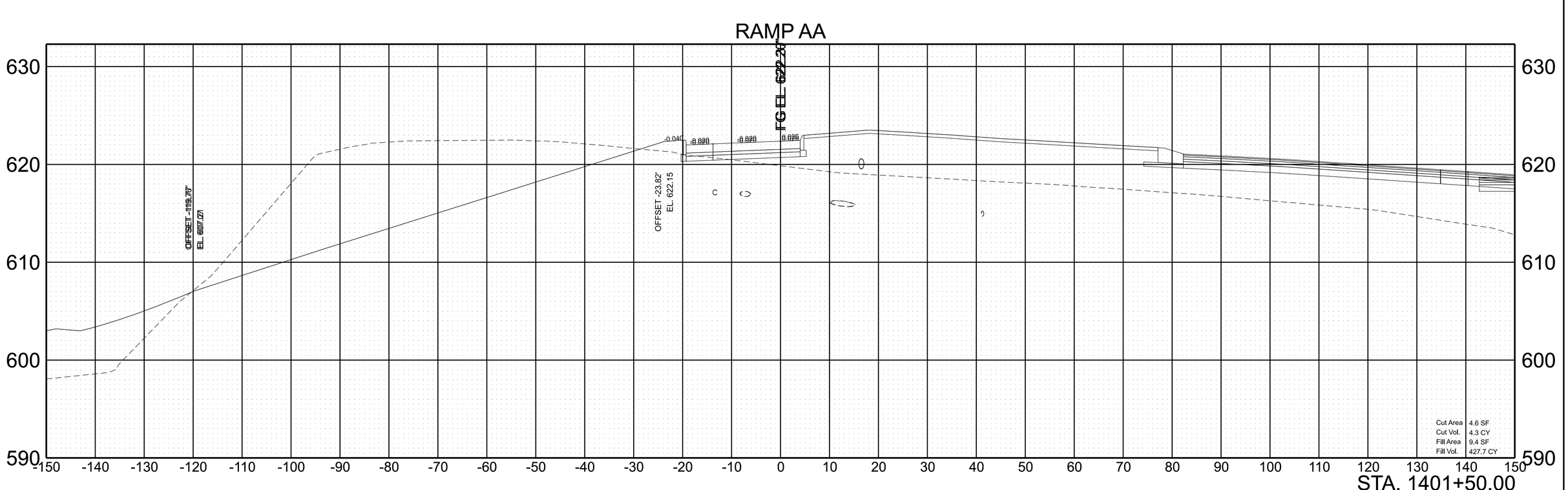
BEGIN STA. + .

END STA. + .

2/6/2023 8:33:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP AA.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A133

RAMP AA



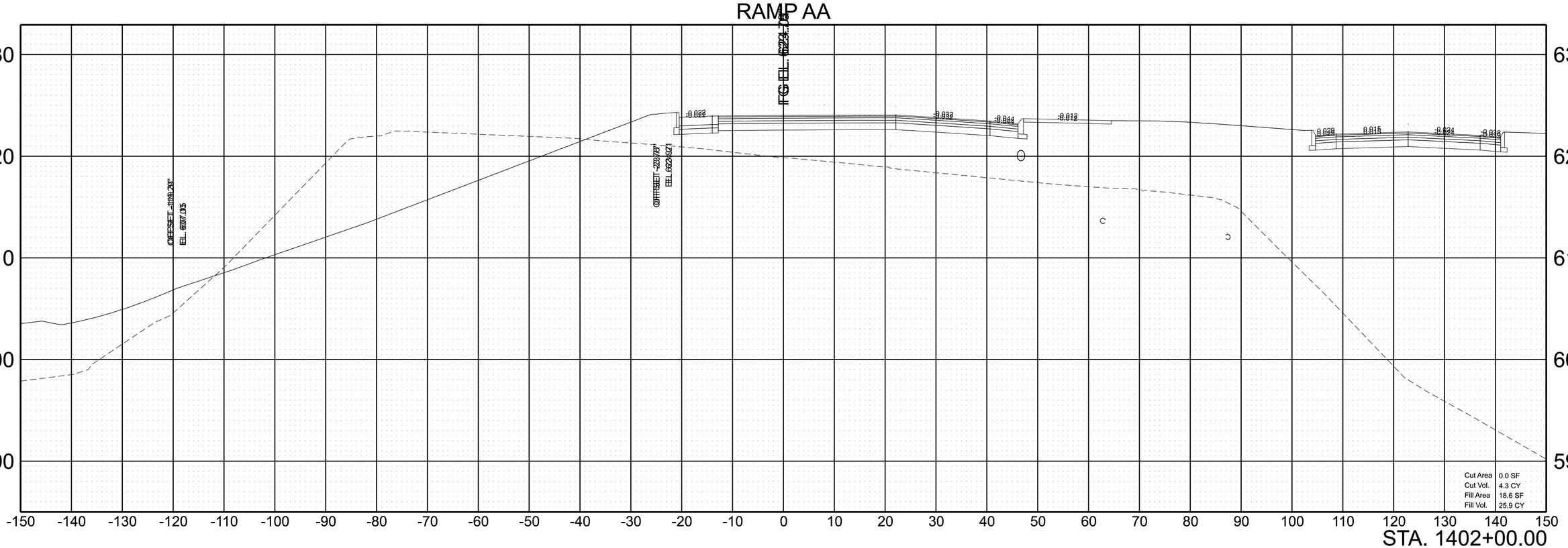
STA. 1401+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:33:20 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP AA.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A134

RAMP AA



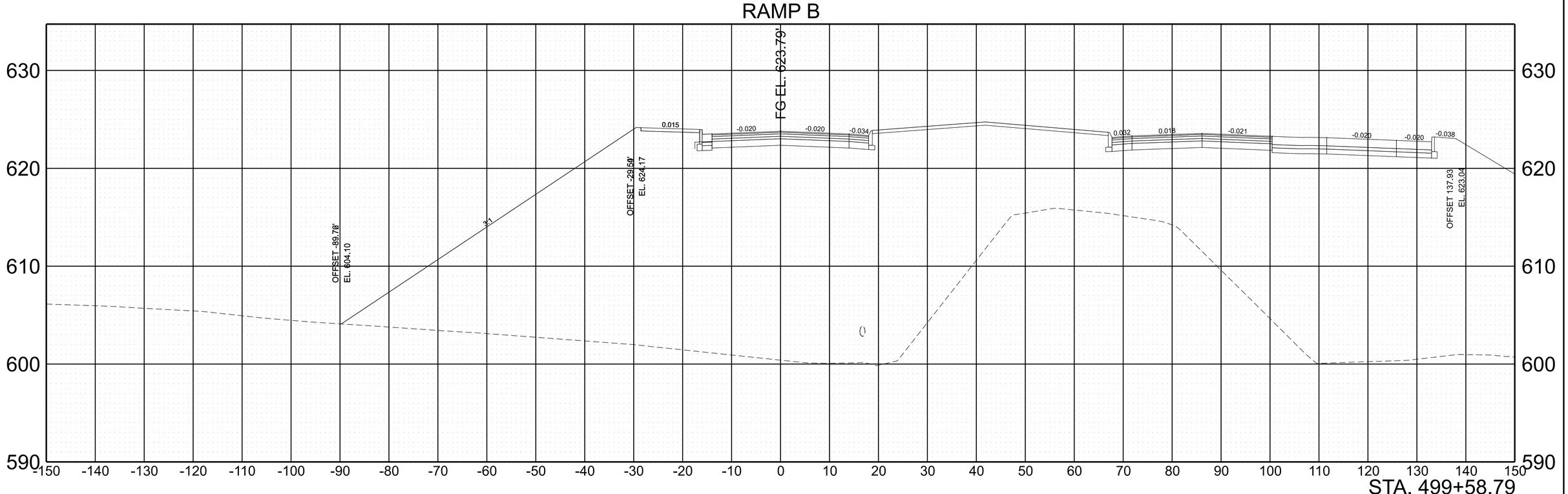
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:33:22 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP AA.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A135

REV. ***DATE***
TEXT

RAMP B



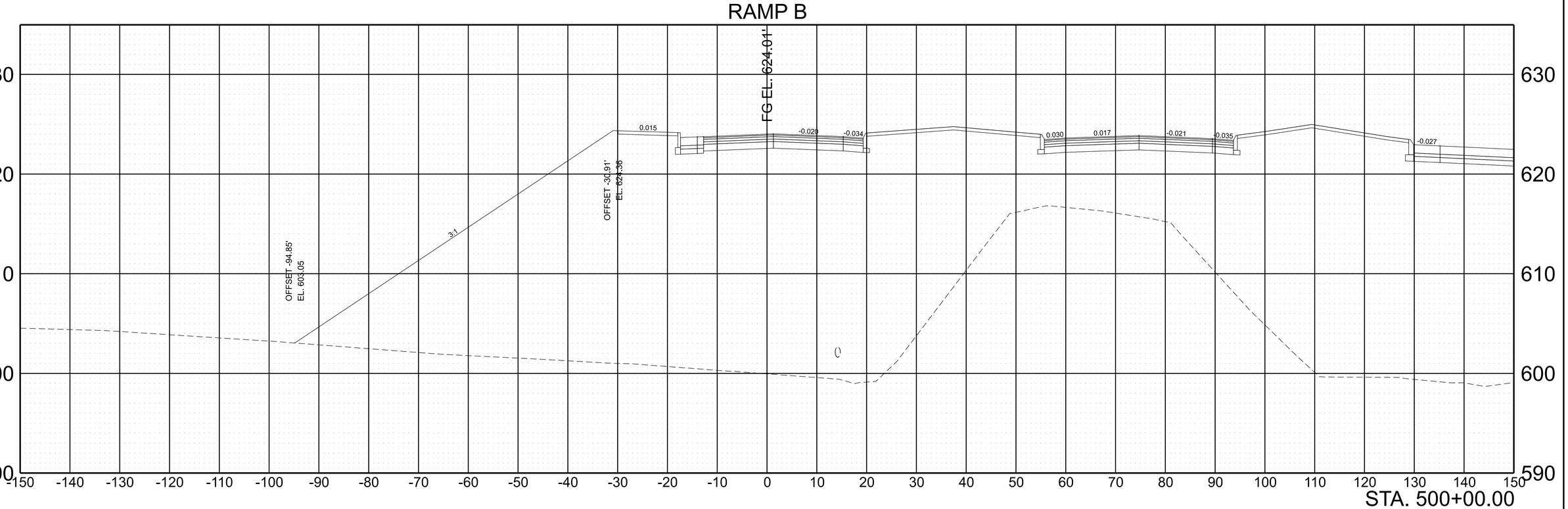
SCALE: 1"=10' HORIZ. 1"=5' VERT.

BEGIN STA. + .
END STA. + .

2/6/2023 8:33:56 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A136

REV. ***DATE***
TEXT



SCALE: 1"=10' HORIZ. 1"=5' VERT.

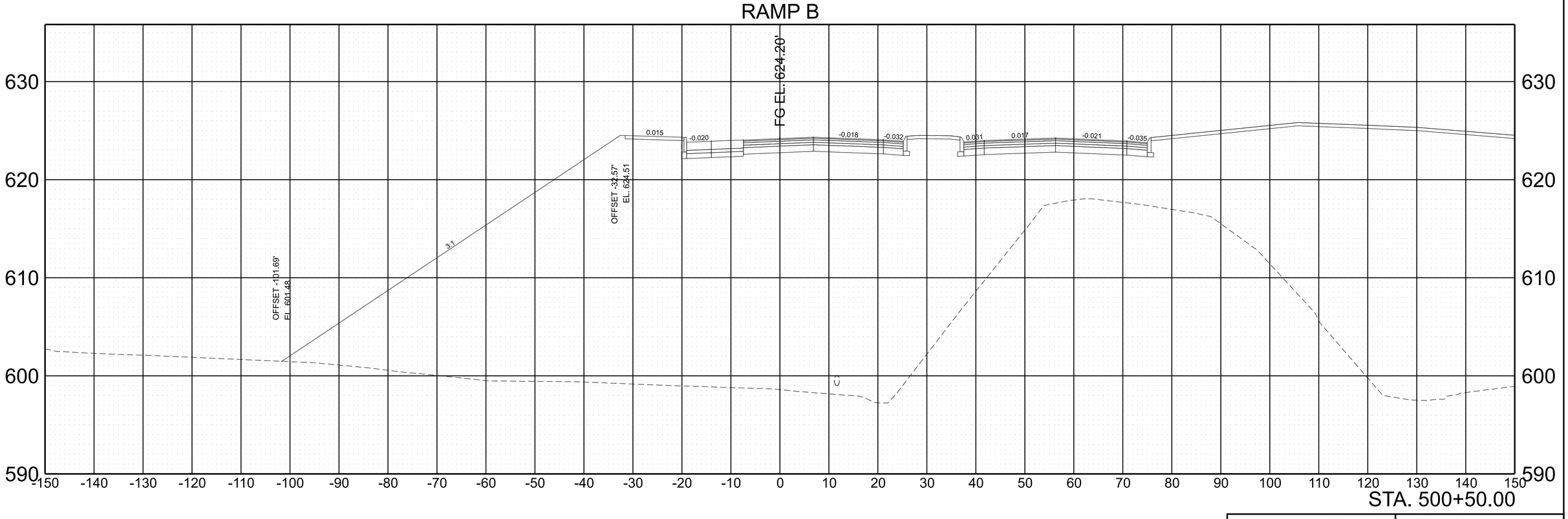
BEGIN STA. + .
END STA. + .

2/6/2023 8:33:58 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A137

REV. ***DATE***
TEXT

RAMP B



SCALE: 1"=10' HORIZ. 1"=5' VERT.

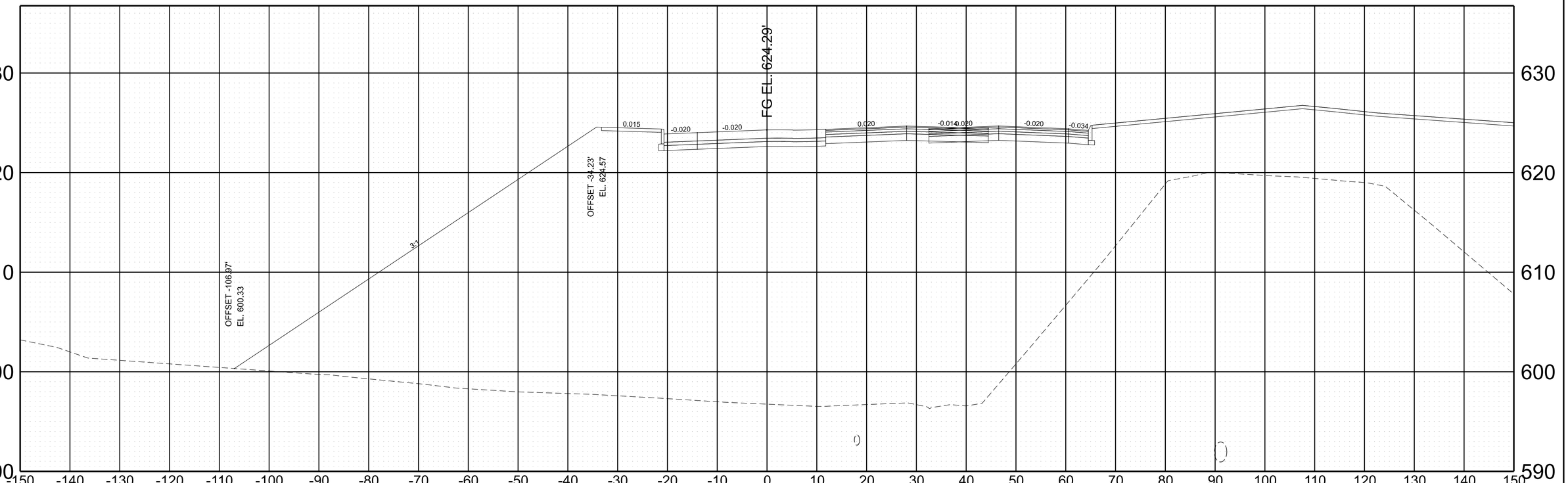
BEGIN STA. + .
END STA. + .

2/6/2023 8:34:00 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A138

REV. ***DATE***
TEXT

RAMP B



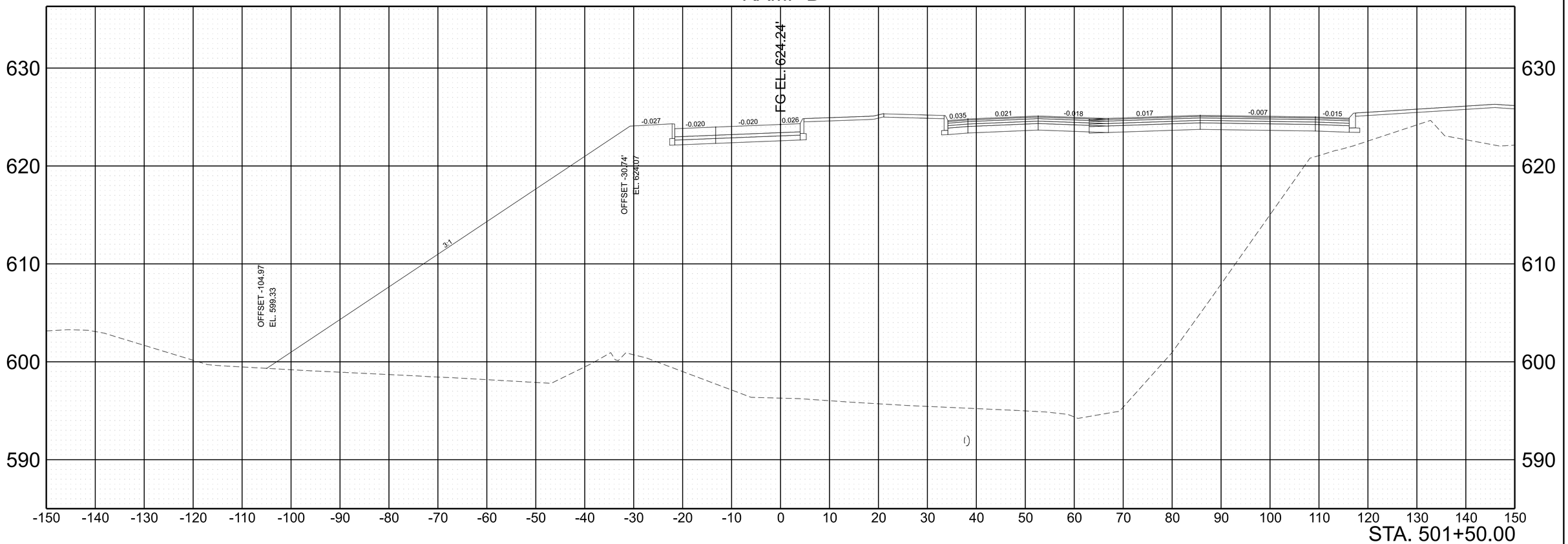
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:01 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A139

REV. ***DATE***
TEXT

RAMP B



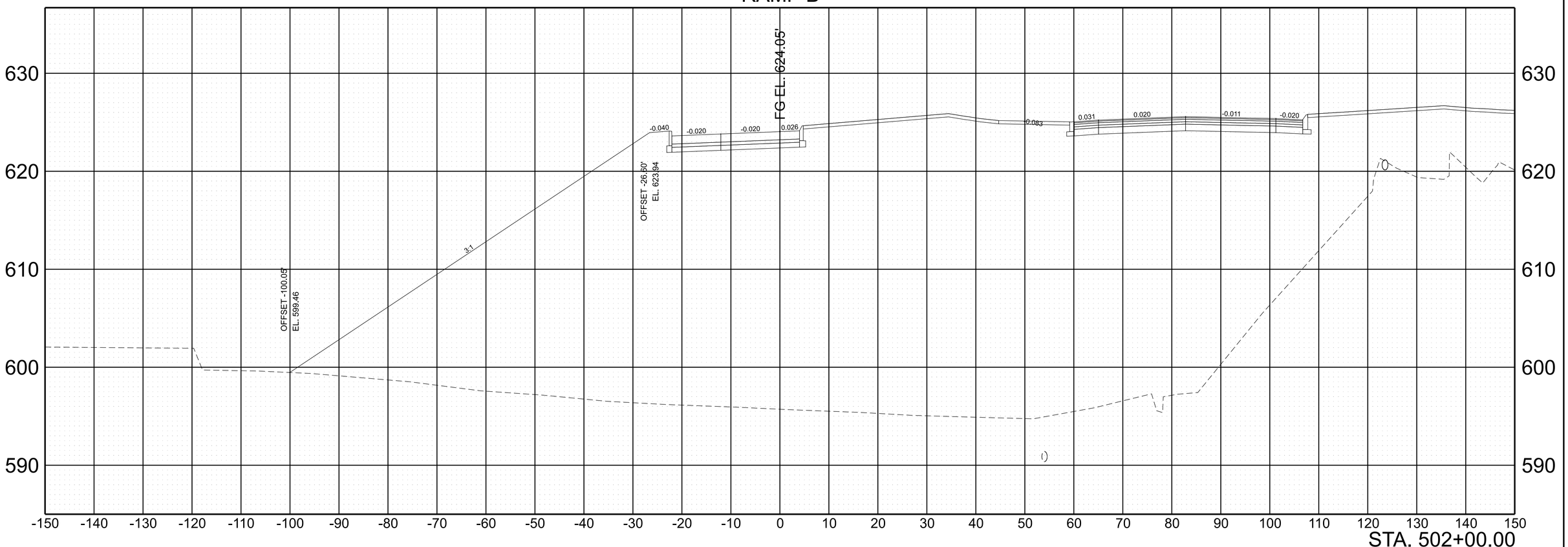
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:34:03 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A140

REV. ***DATE***
TEXT

RAMP B



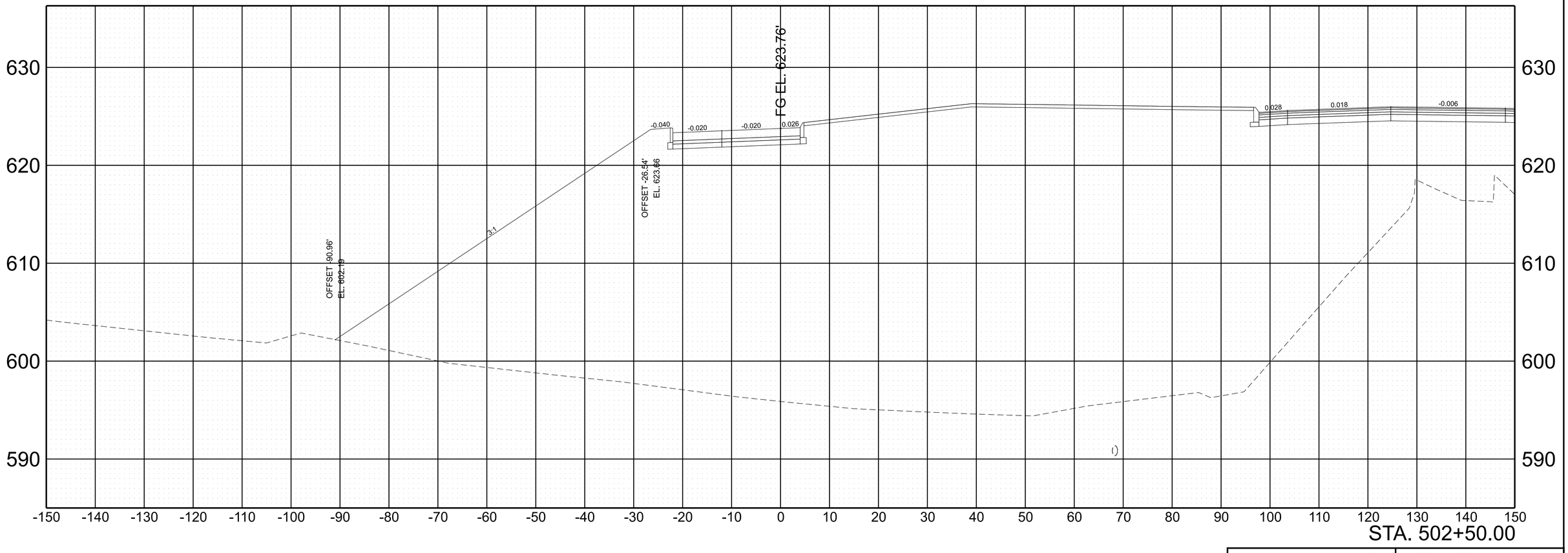
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:04 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A141

REV. ***DATE***
TEXT

RAMP B



SCALE: 1"=10' HORIZ. 1"=5' VERT.

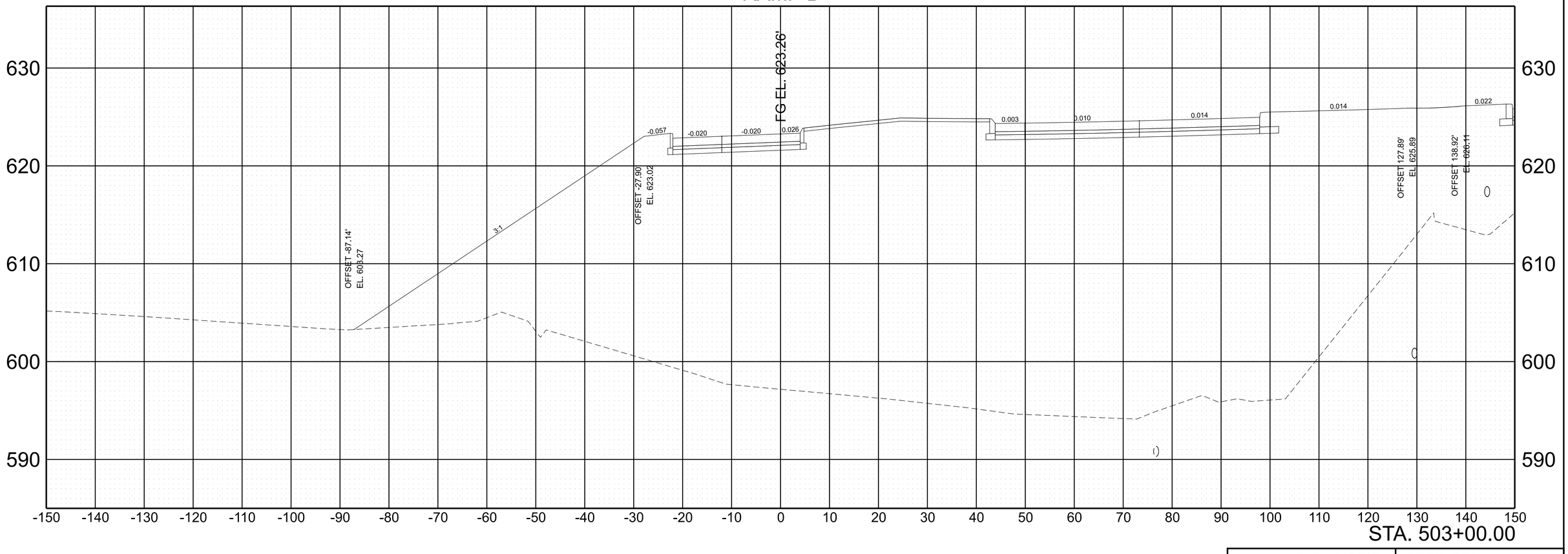
BEGIN STA. + .
END STA. + .

2/6/2023 8:34:06 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A142

REV. ***DATE***
TEXT

RAMP B



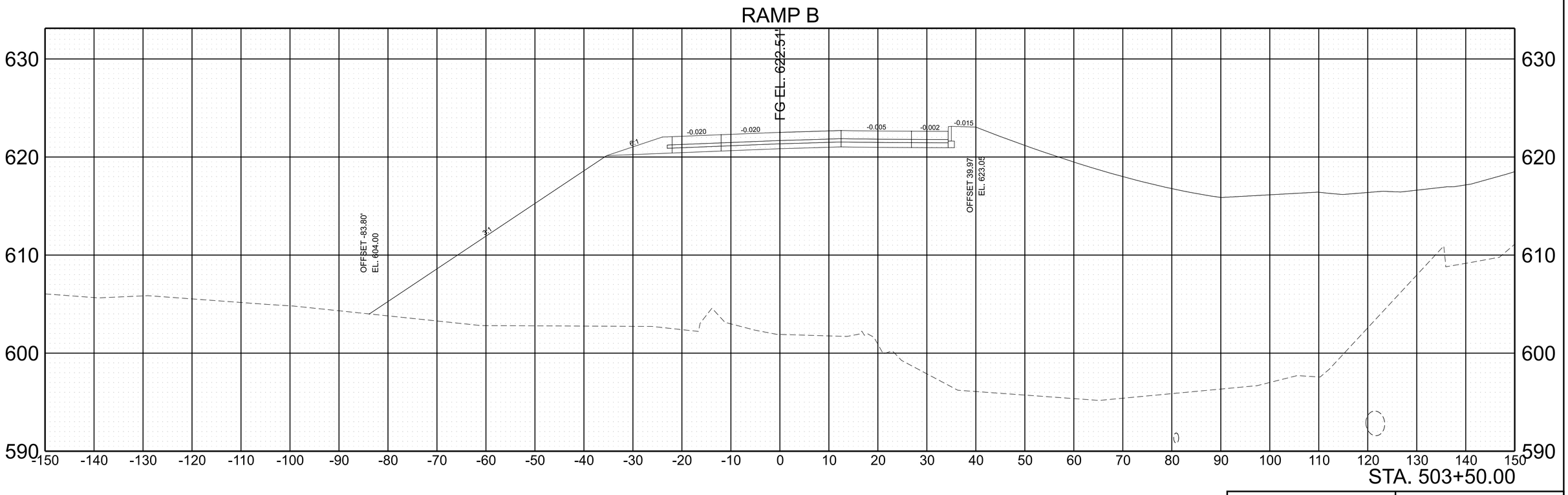
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:08 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A143

REV. ***DATE***
TEXT

RAMP B



STA. 503+50.00

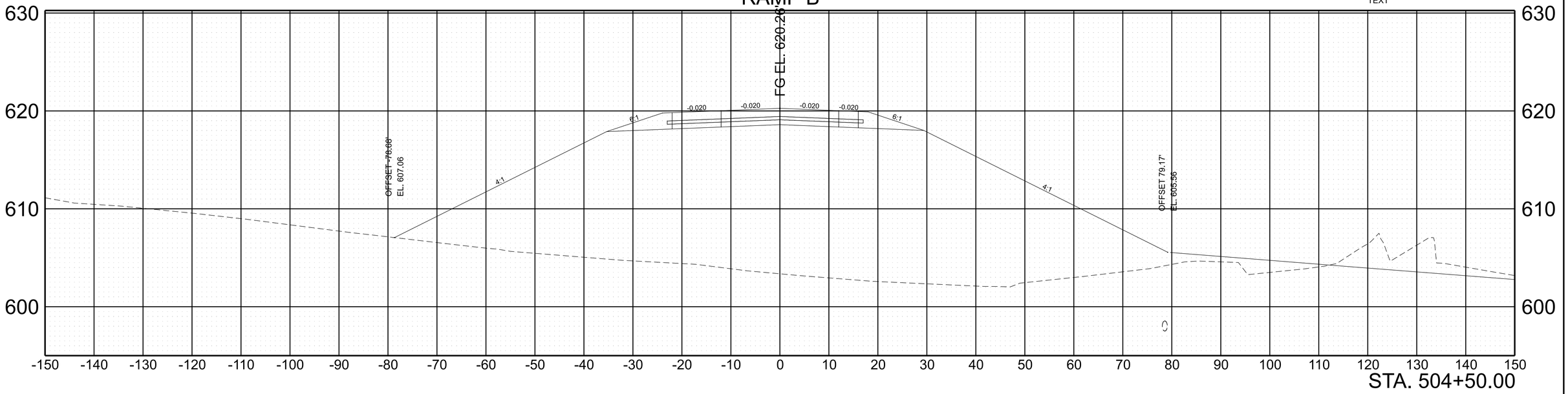
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:09 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A144

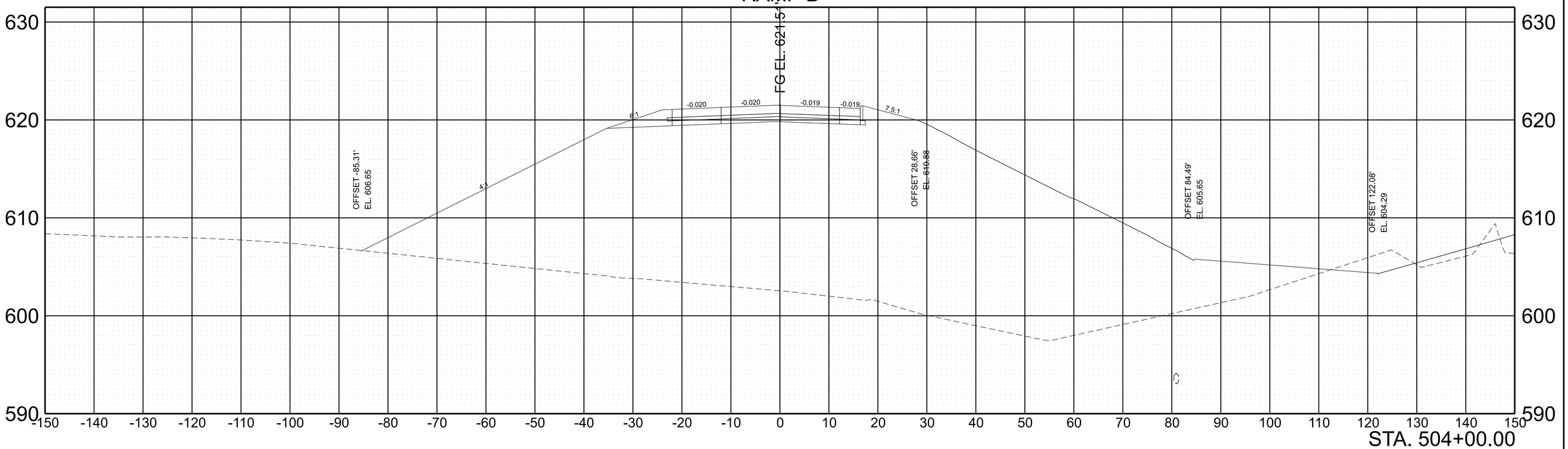
REV. ***DATE***
TEXT

RAMP B



STA. 504+50.00

RAMP B



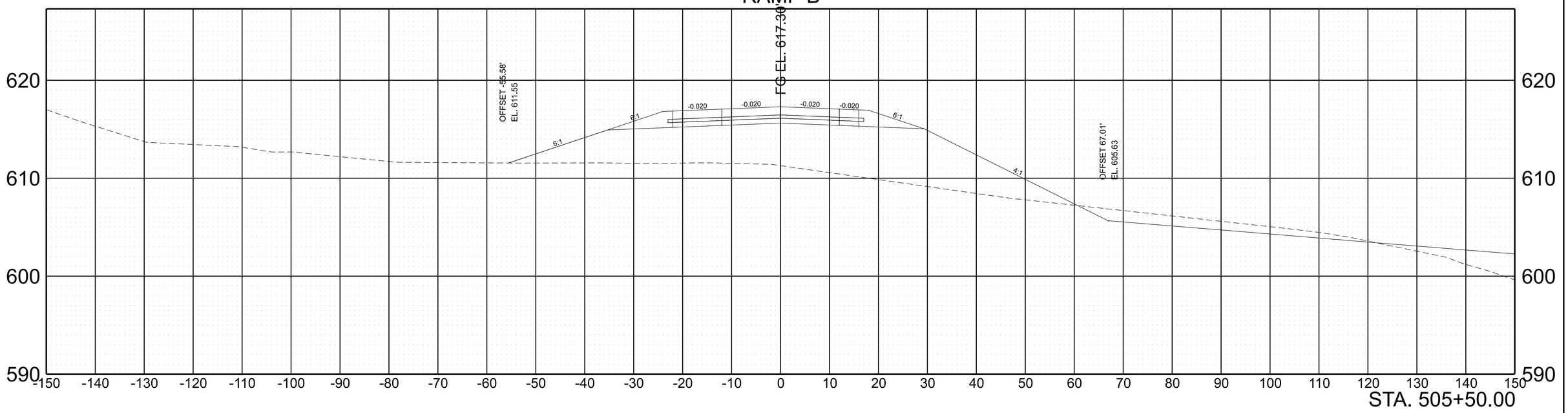
STA. 504+00.00

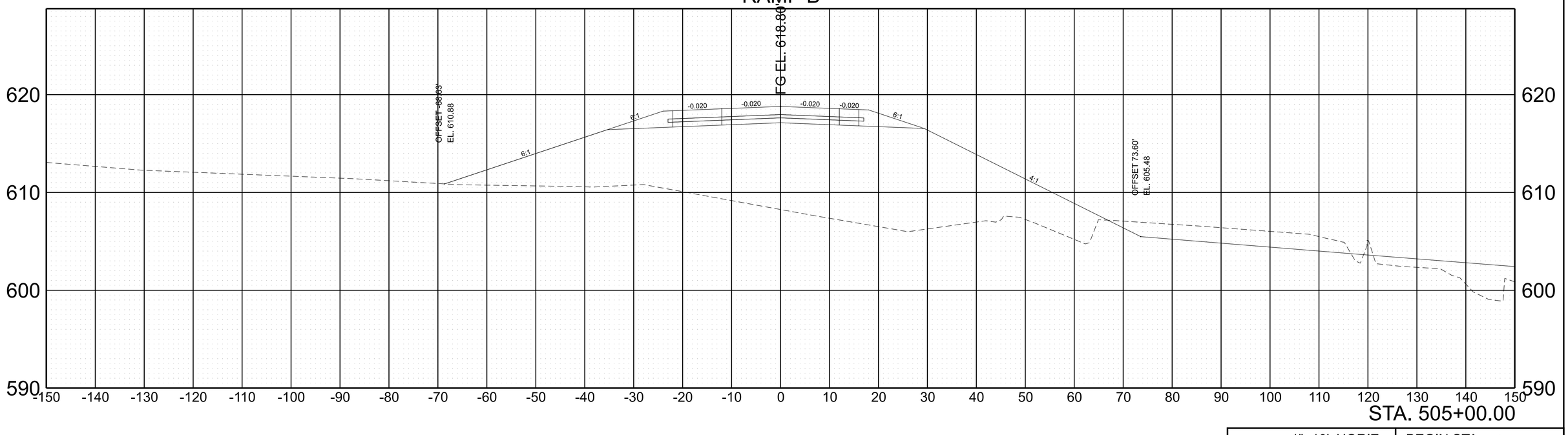
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:11 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A145

REV. ***DATE***
TEXT





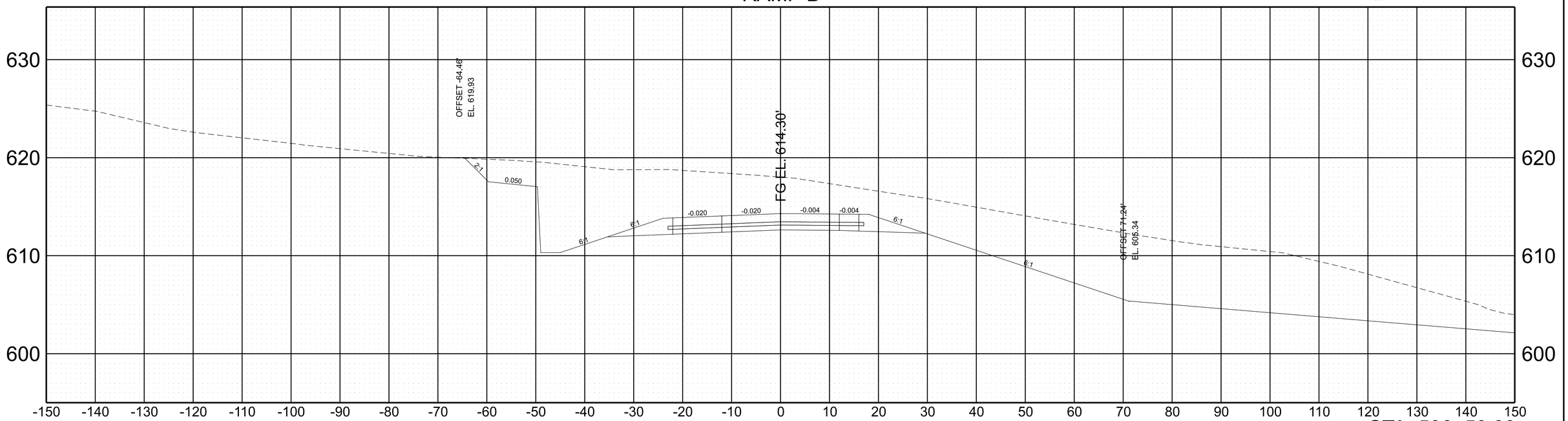
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:34:13 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A146

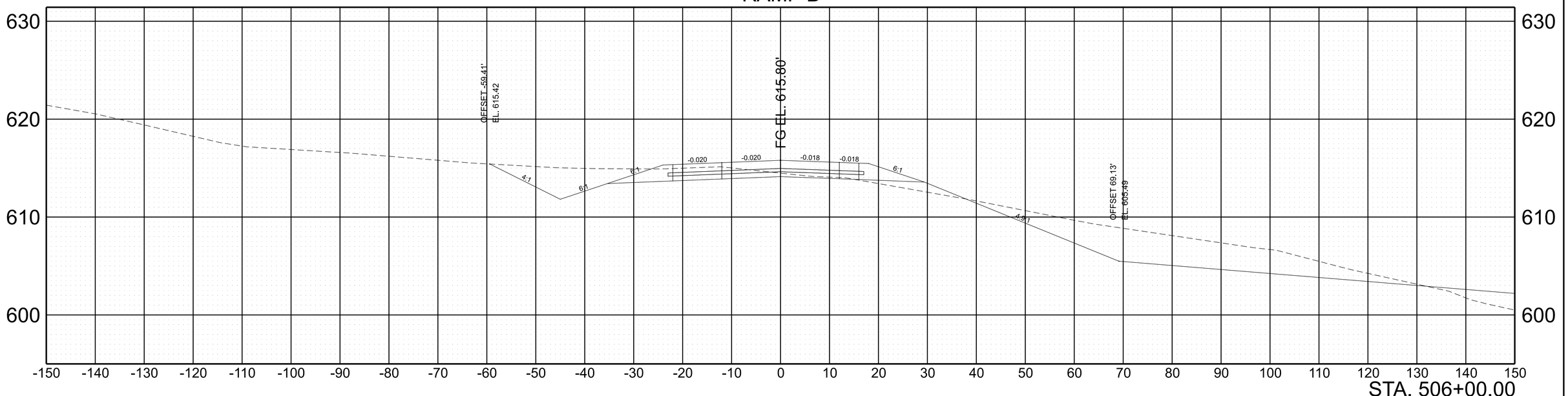
REV. ***DATE***
TEXT

RAMP B



STA. 506+50.00

RAMP B



STA. 506+00.00

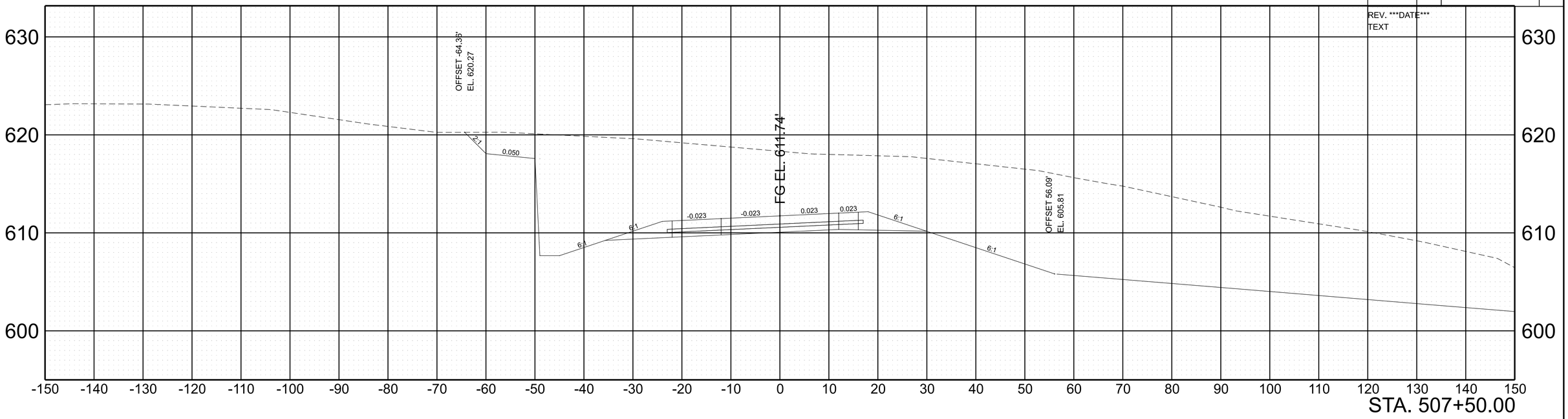
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:16 AM
C:\PWWORKING\EAST\01\D2328414\95\0040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A147

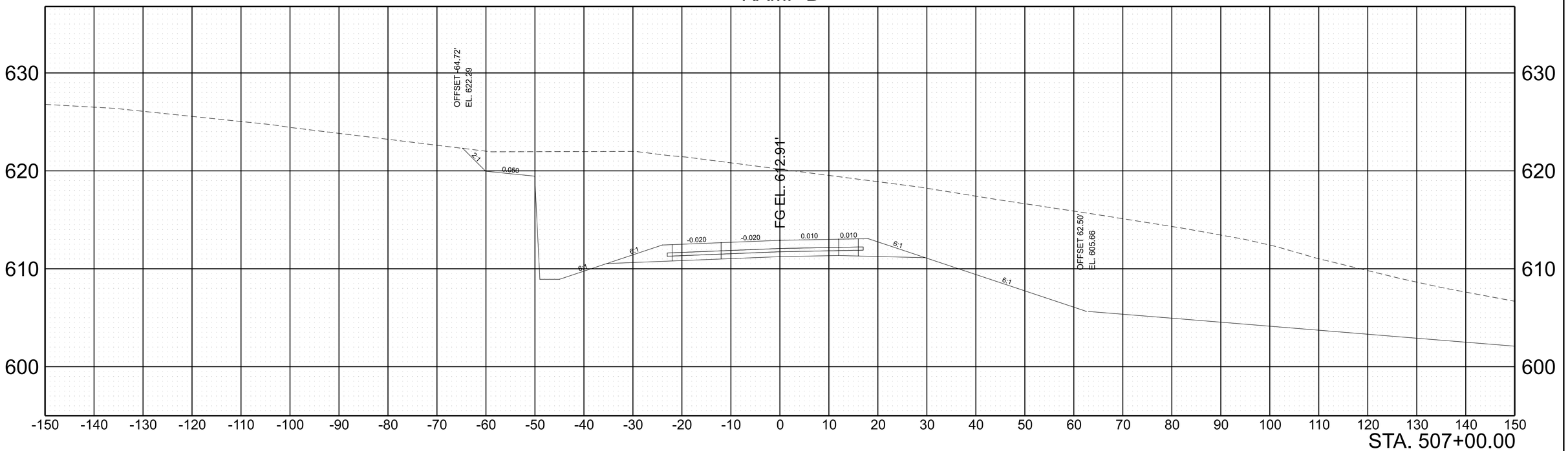
REV. ***DATE***
TEXT

RAMP B



STA. 507+50.00

RAMP B



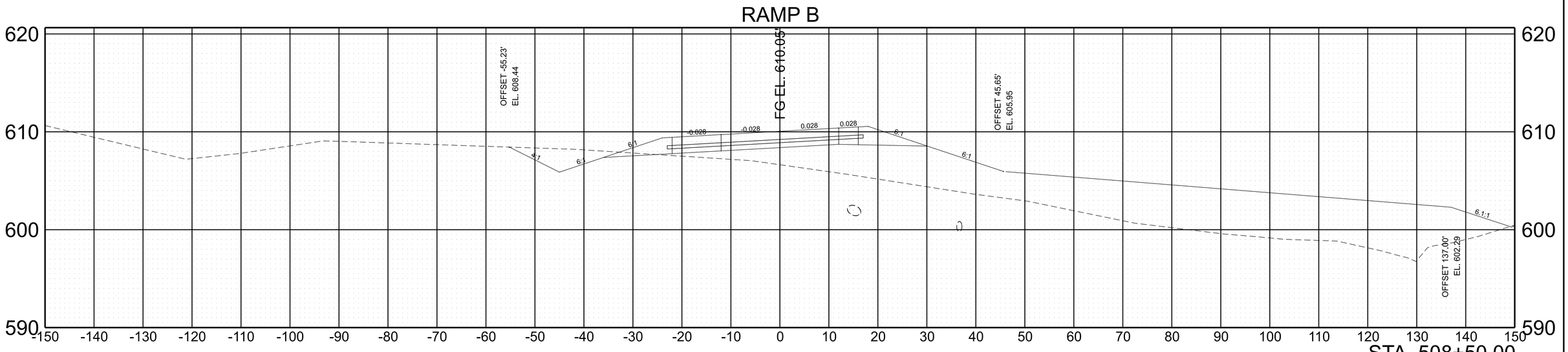
STA. 507+00.00

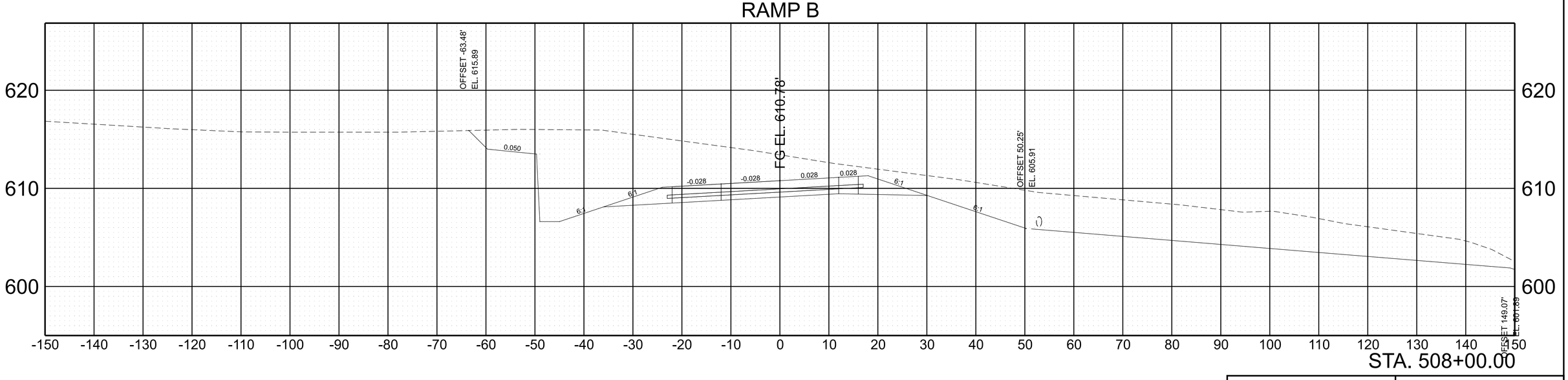
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A148

REV. ***DATE***
TEXT



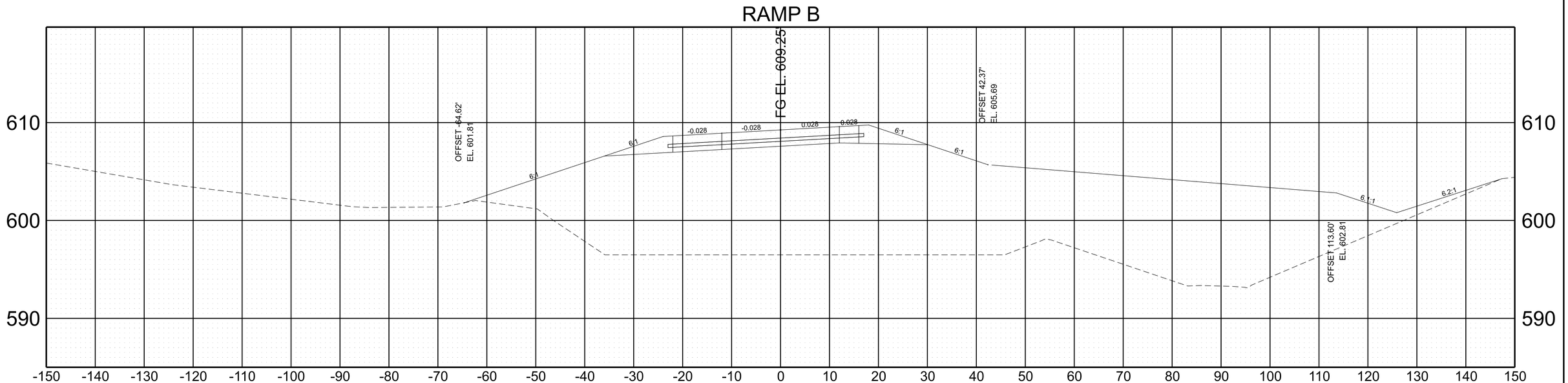


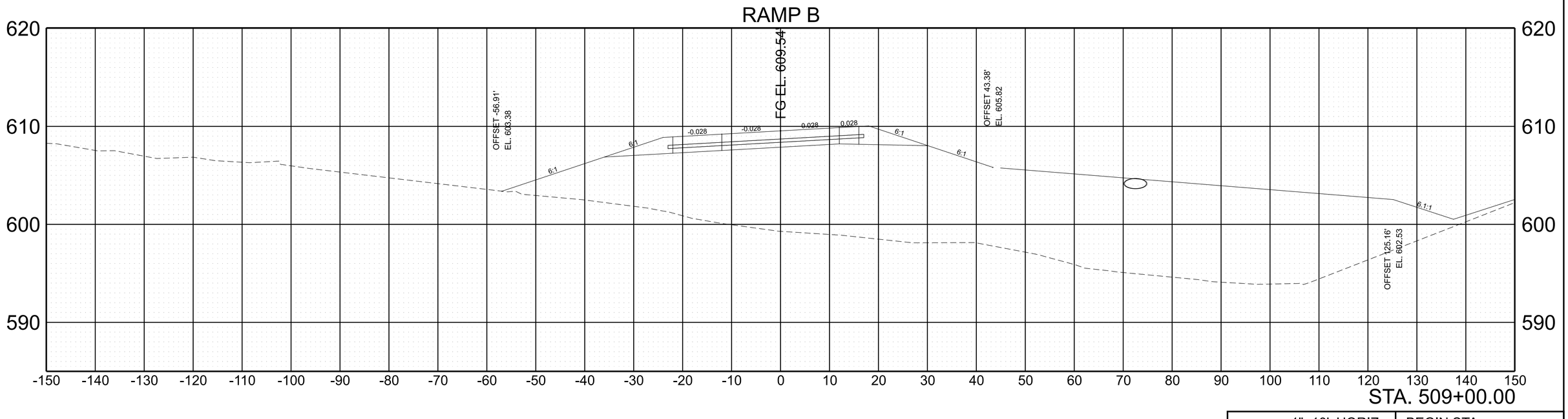
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:34:20 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A149

REV. ***DATE***
TEXT



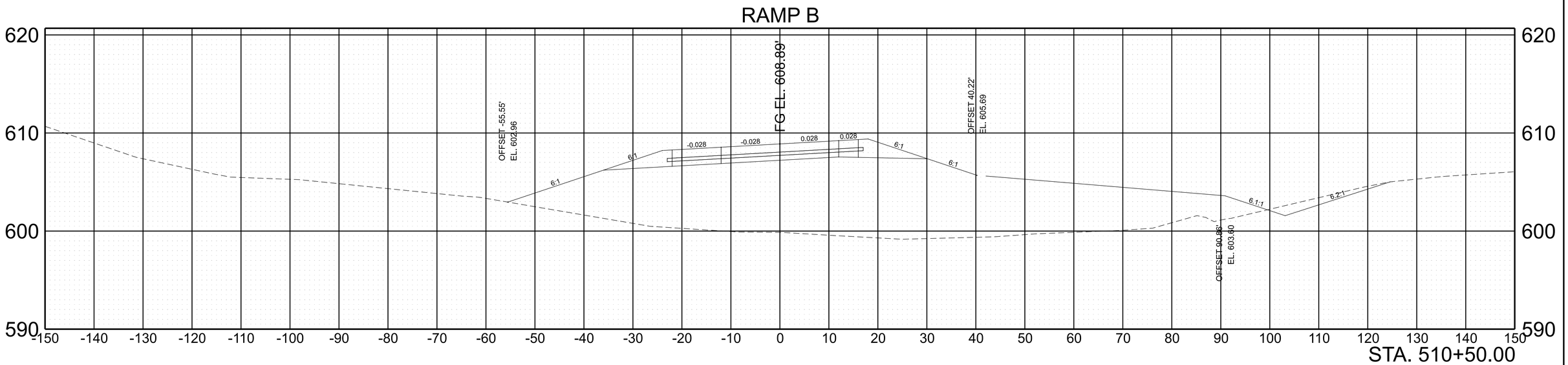


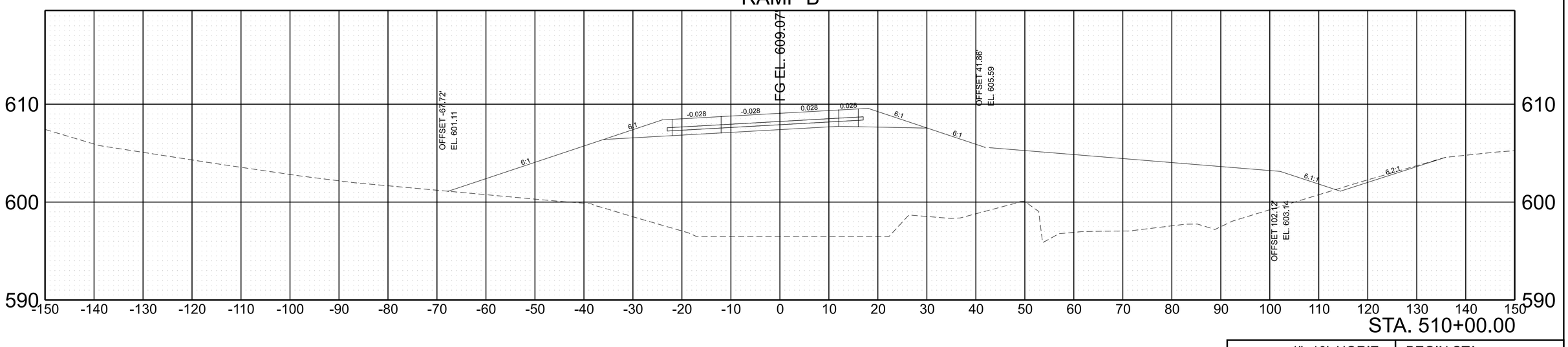
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:22 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A150

REV. ***DATE***
TEXT





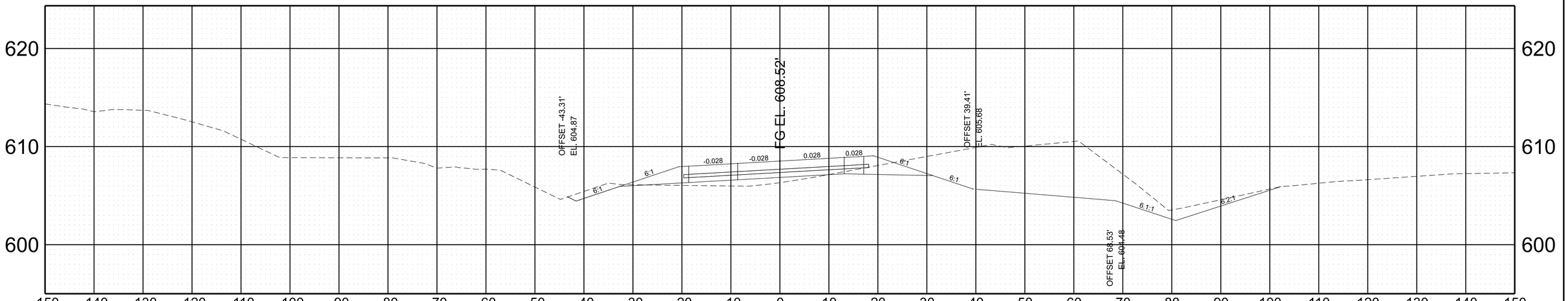
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:34:24 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A151

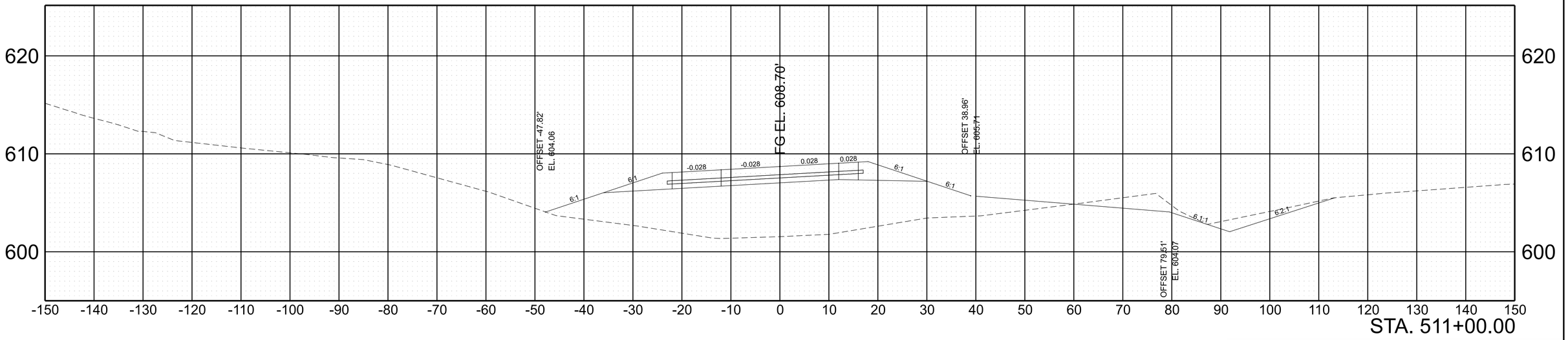
REV. ***DATE***
TEXT

RAMP B



STA. 511+50.00

RAMP B



STA. 511+00.00

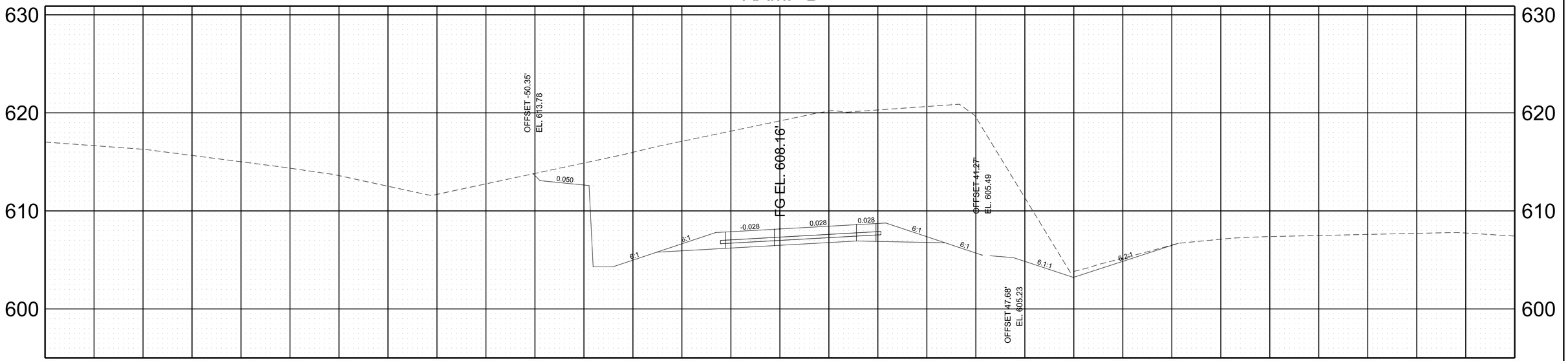
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:35:51 AM
C:\PWWORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A152

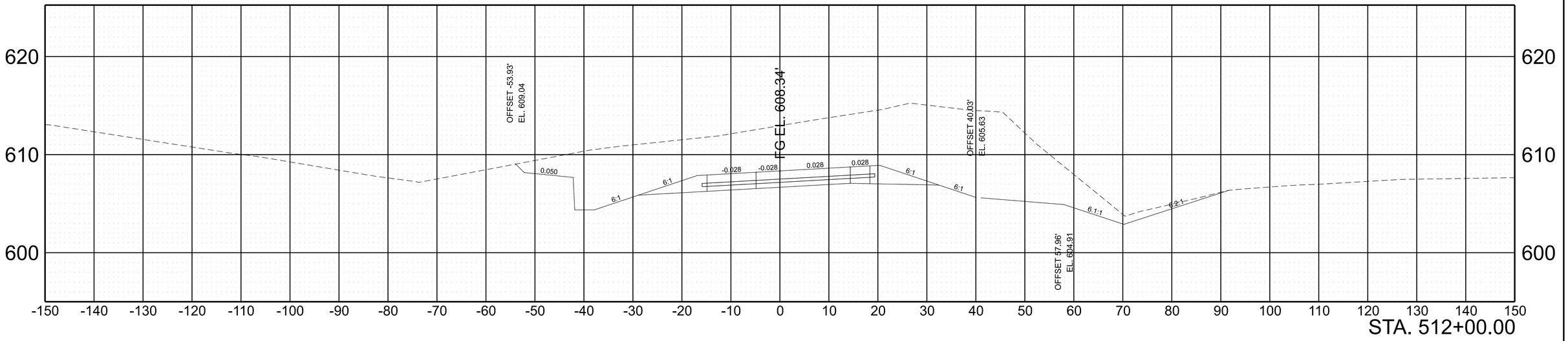
REV. ***DATE***
TEXT

RAMP B



STA. 512+50.00

RAMP B



STA. 512+00.00

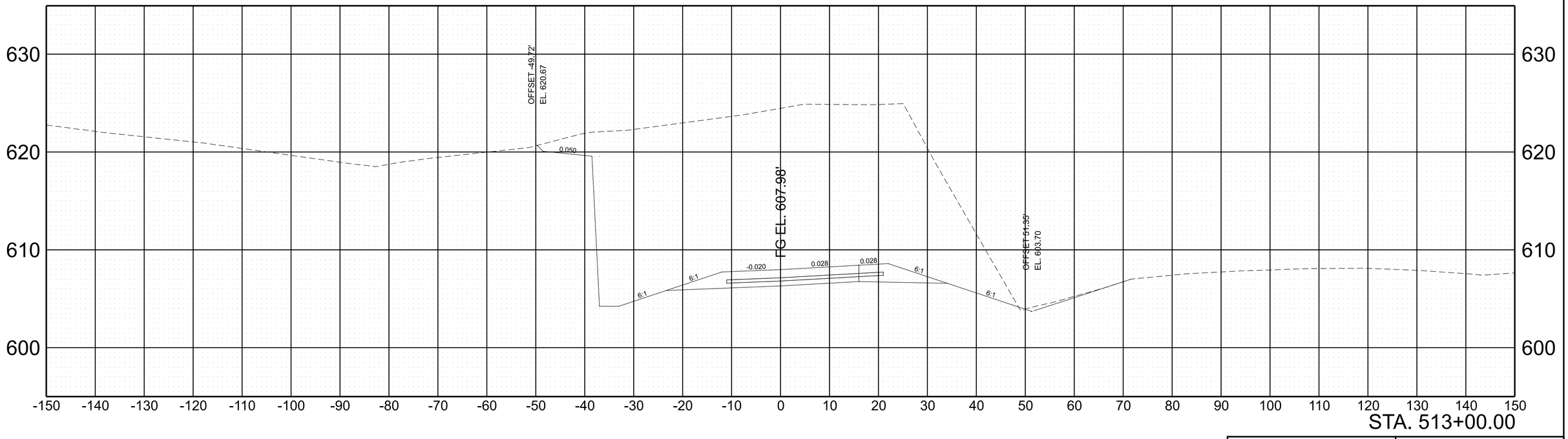
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:35:53 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A153

REV. ***DATE***
TEXT

RAMP B



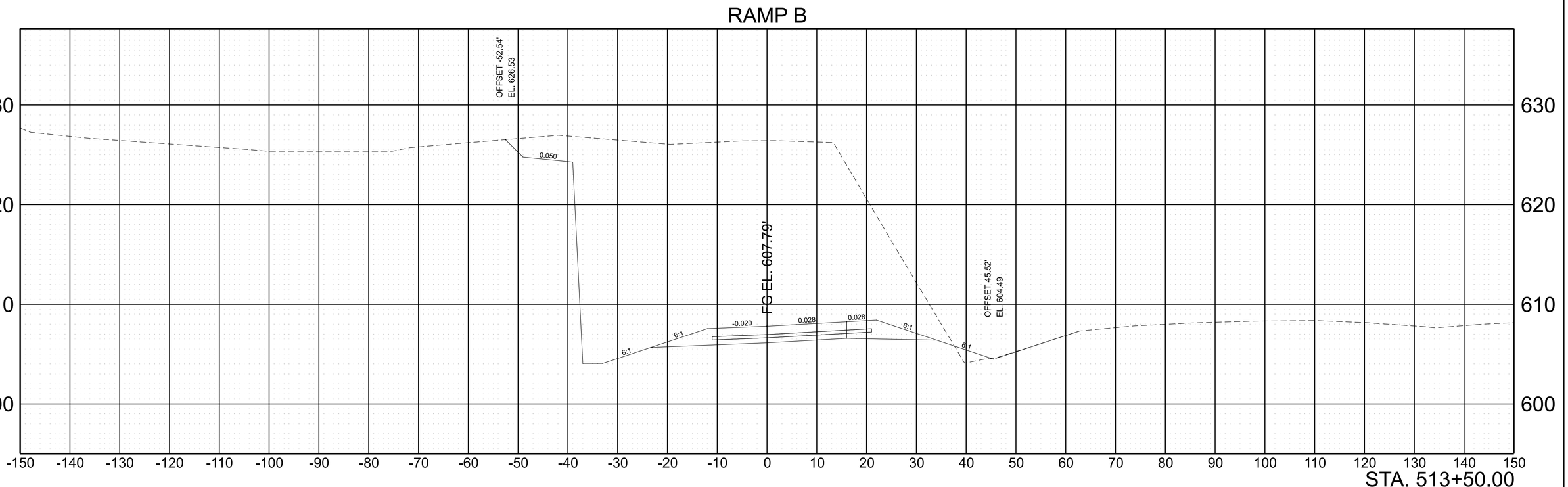
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:35:55 AM
C:\PWWORKING\EAST01\D2328414\9SI040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A154

REV. ***DATE***
TEXT

RAMP B

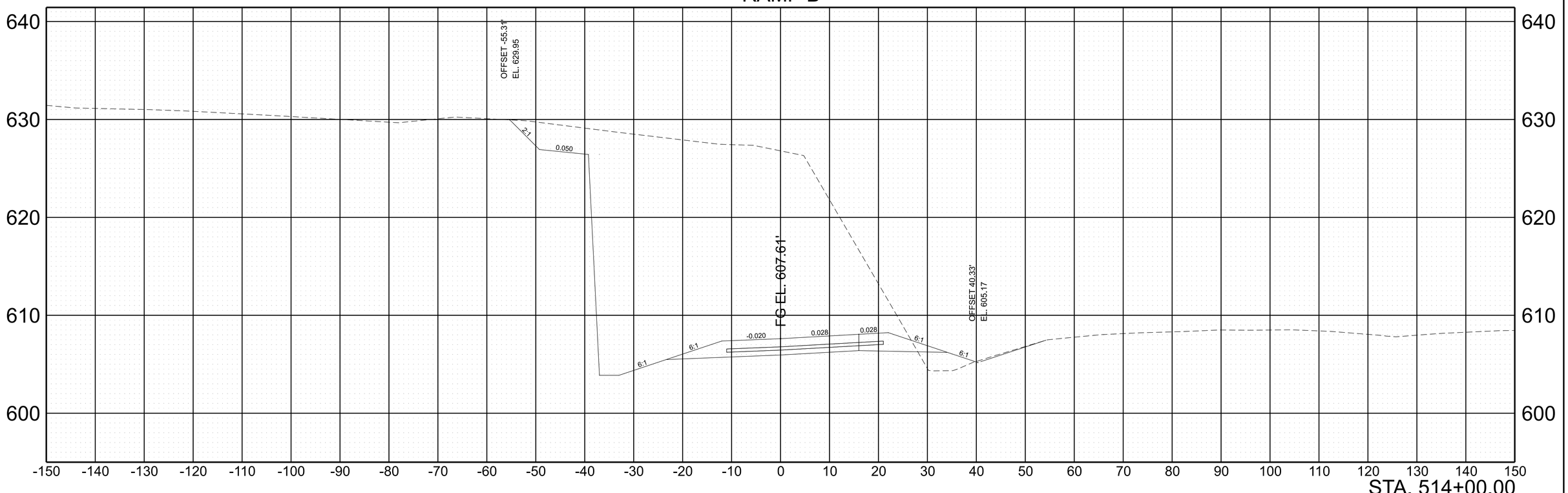


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:35:56 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A155

REV. ***DATE***
TEXT



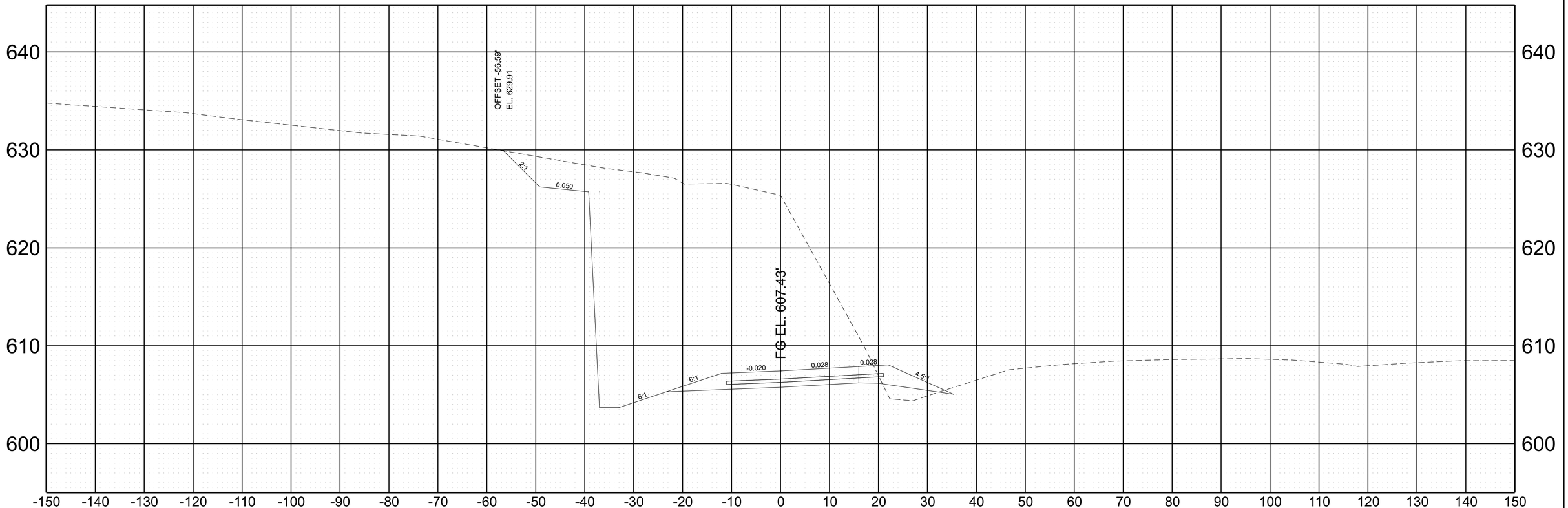
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:35:58 AM
C:\PWWORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A156

REV. ***DATE***
TEXT

RAMP B



SCALE: 1"=10' HORIZ. 1"=5' VERT.

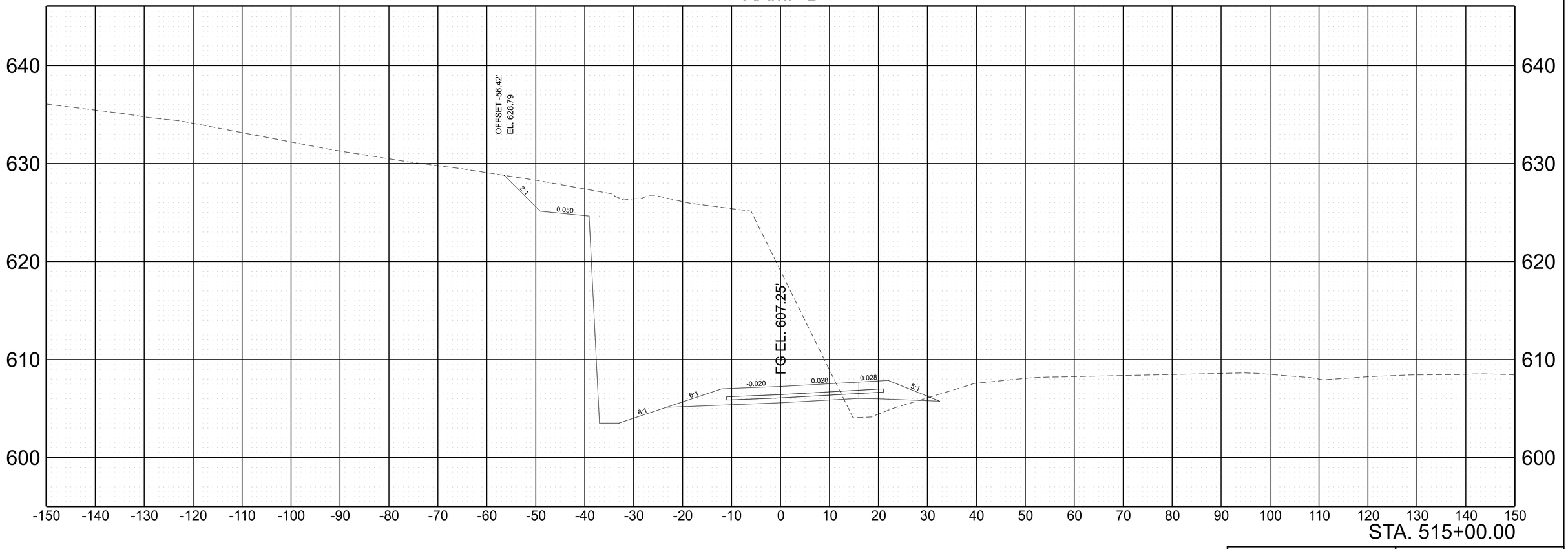
BEGIN STA. + .
END STA. + .

2/6/2023 8:35:59 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A157

REV. ***DATE***
TEXT

RAMP B



SCALE: 1"=10' HORIZ. 1"=5' VERT.

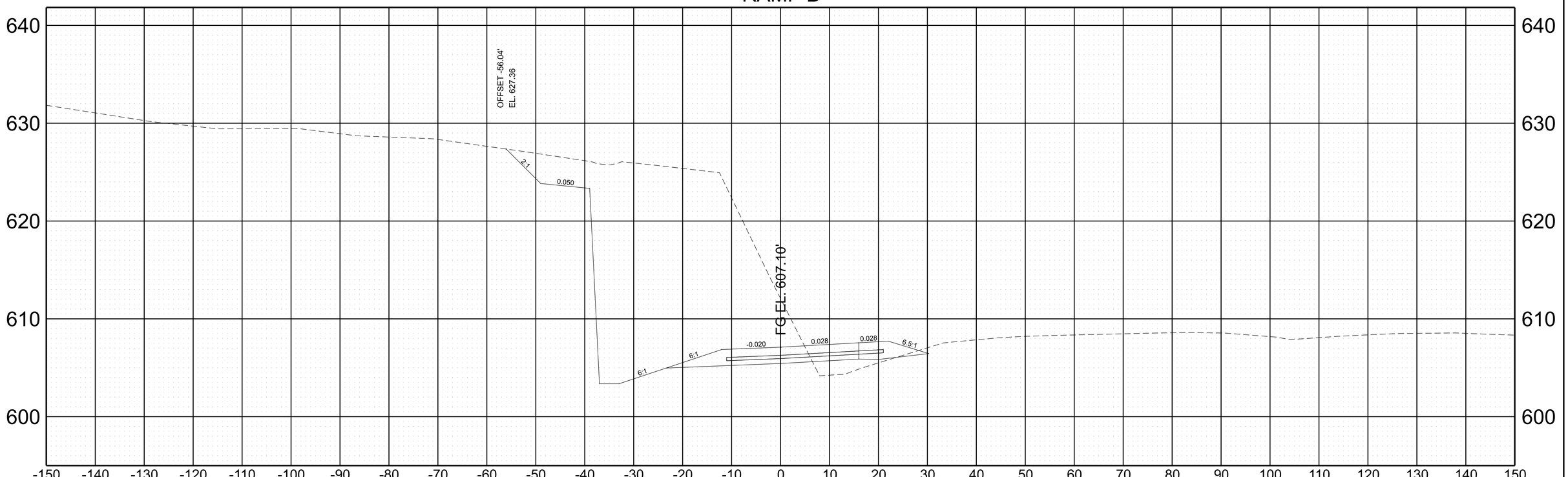
BEGIN STA. + .
END STA. + .

2/6/2023 8:36:01 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A158

REV. ***DATE***
TEXT

RAMP B



SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:02 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A159

REV. ***DATE***
TEXT

RAMP B

SCALE: 1"=10' HORIZ. 1"=5' VERT.

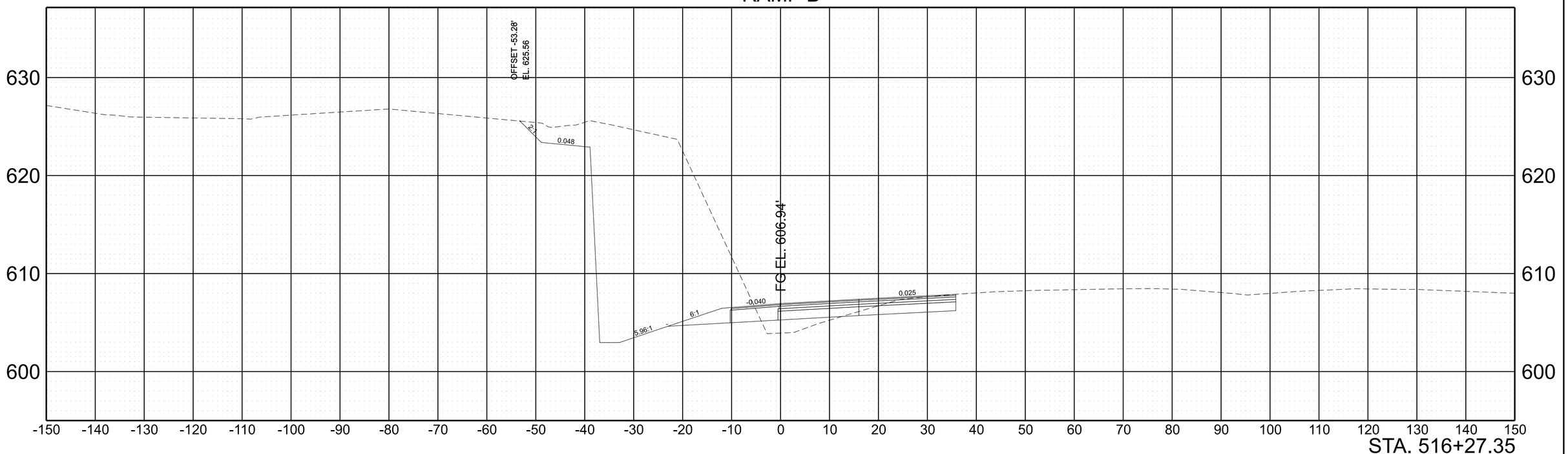
BEGIN STA. + .
END STA. + .

2/6/2023 8:36:04 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A160

REV. ***DATE***
TEXT

RAMP B



STA. 516+27.35

SCALE: 1"=10' HORIZ. 1"=5' VERT.

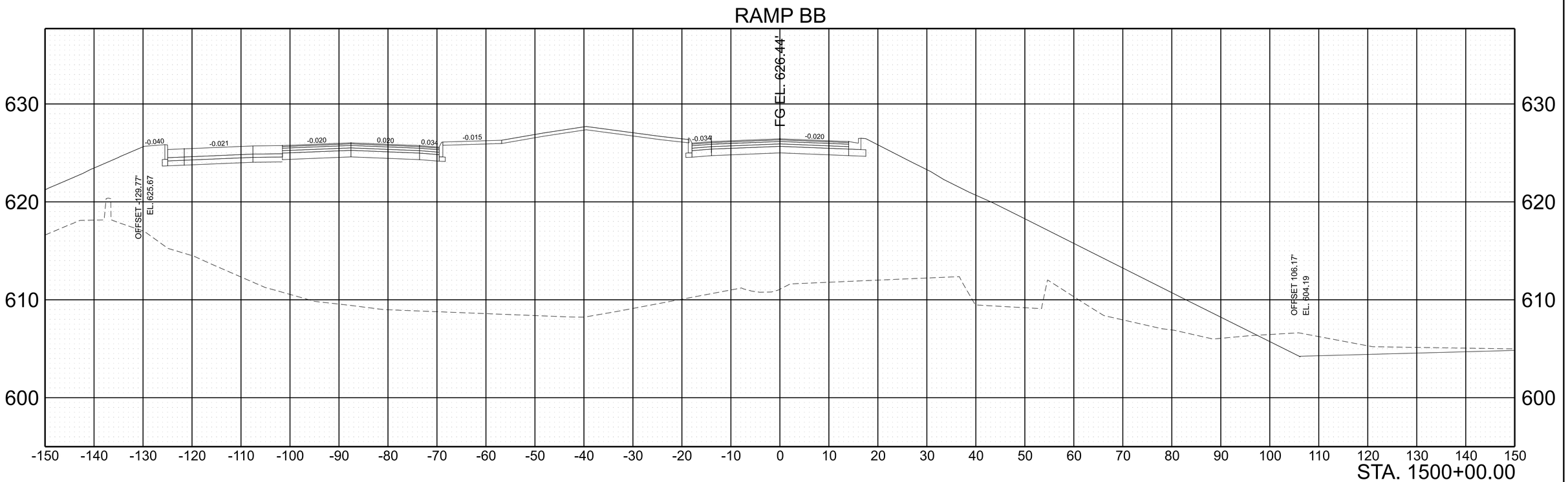
BEGIN STA. + .
END STA. + .

2/6/2023 8:36:05 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP B.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A161

REV. ***DATE***
TEXT

RAMP BB



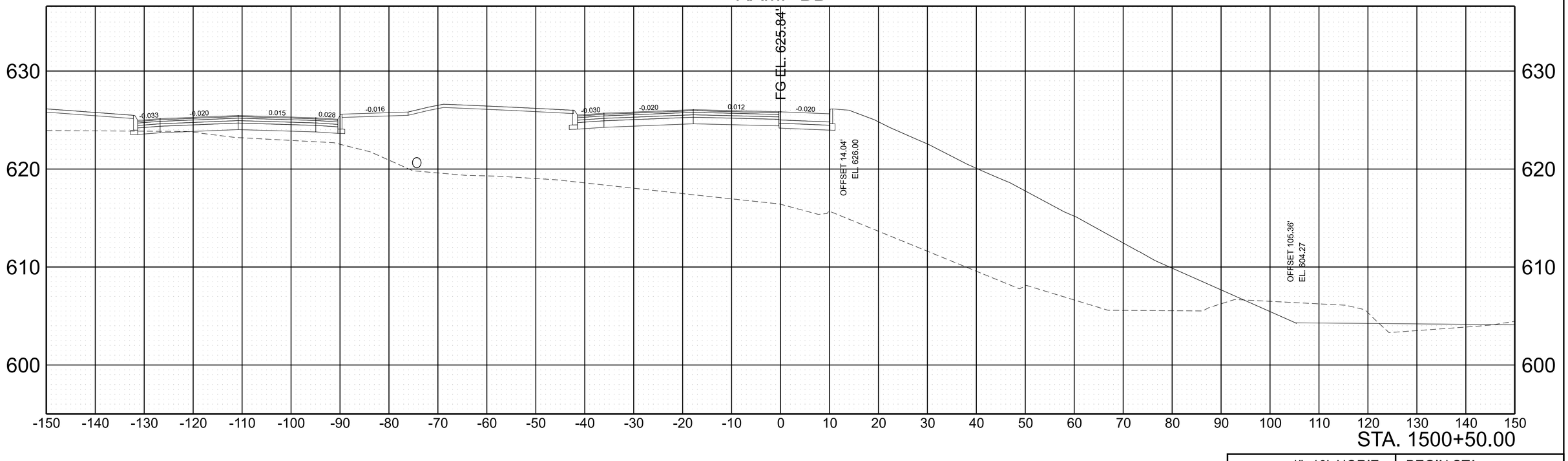
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:38 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A162

REV. ***DATE***
TEXT

RAMP BB



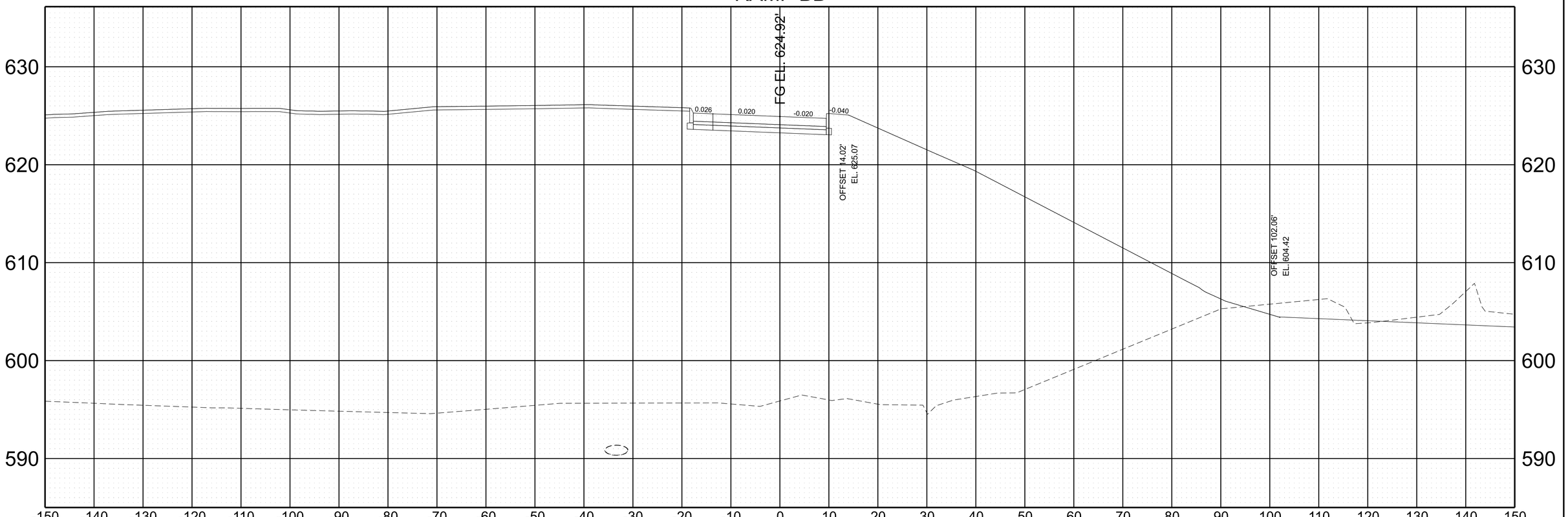
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:39 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A163

REV. ***DATE***
TEXT

RAMP BB



STA. 1501+00.00

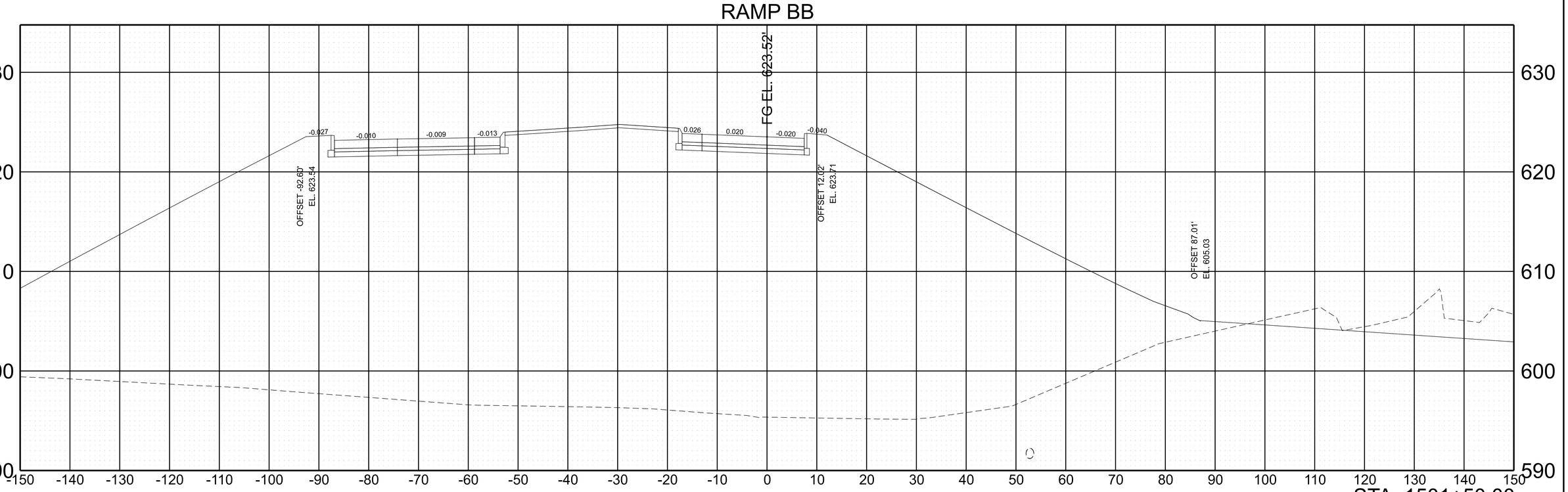
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:41 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A164

REV. ***DATE***
TEXT

RAMP BB



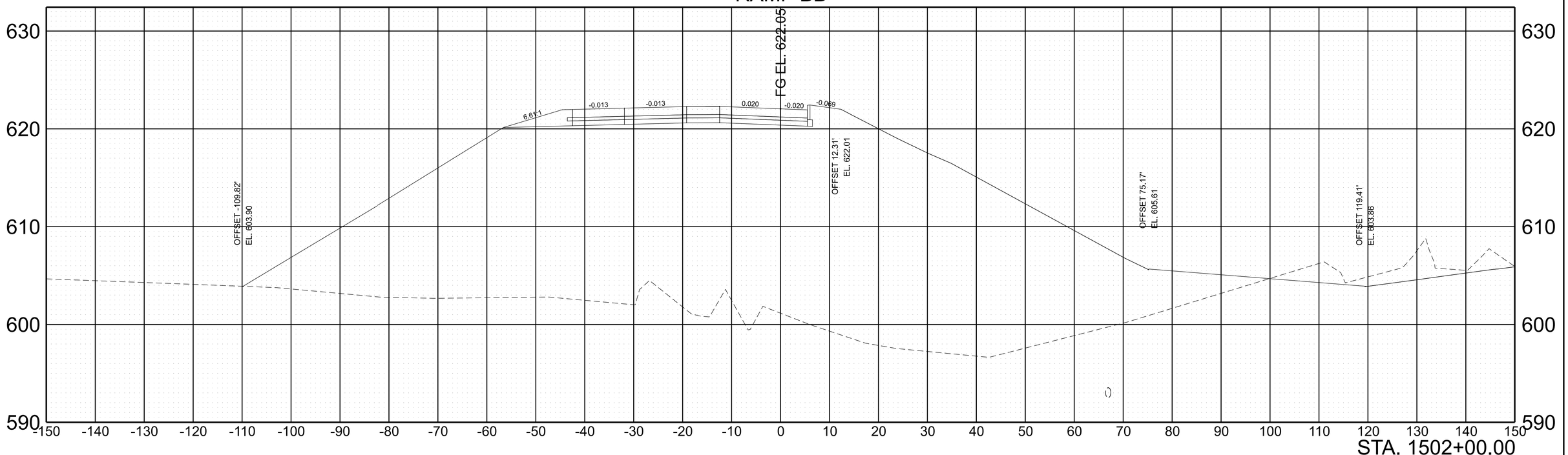
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:43 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A165

REV. ***DATE***
TEXT

RAMP BB

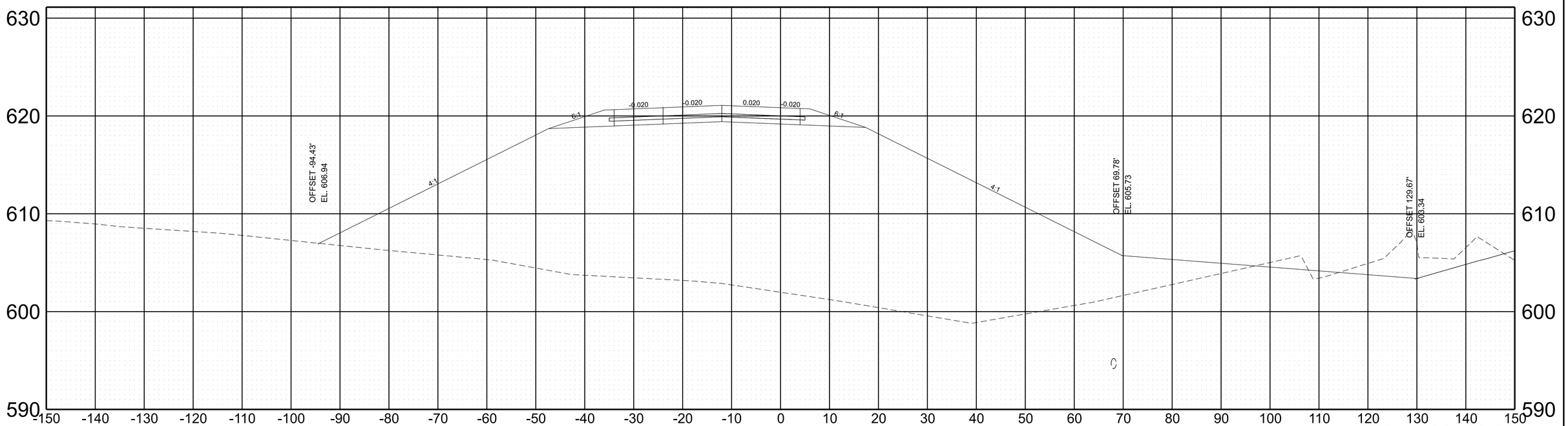


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:44 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A166

REV. ***DATE***
TEXT

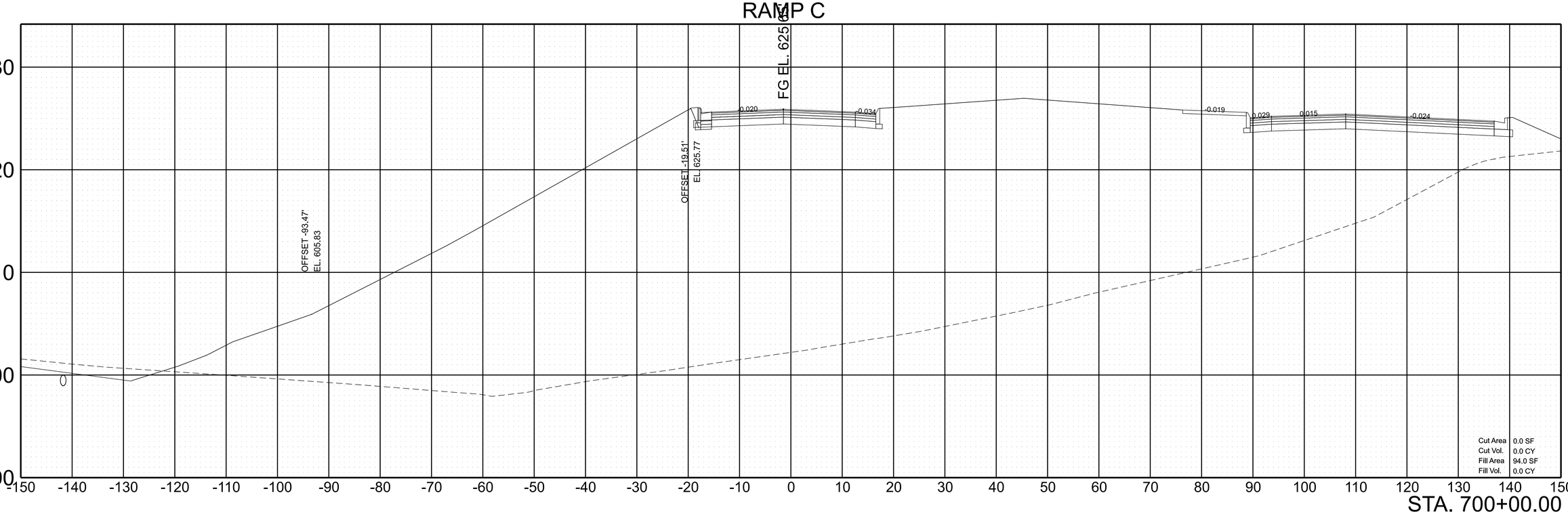


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:36:46 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-RAMP BB.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A167

RAMP C

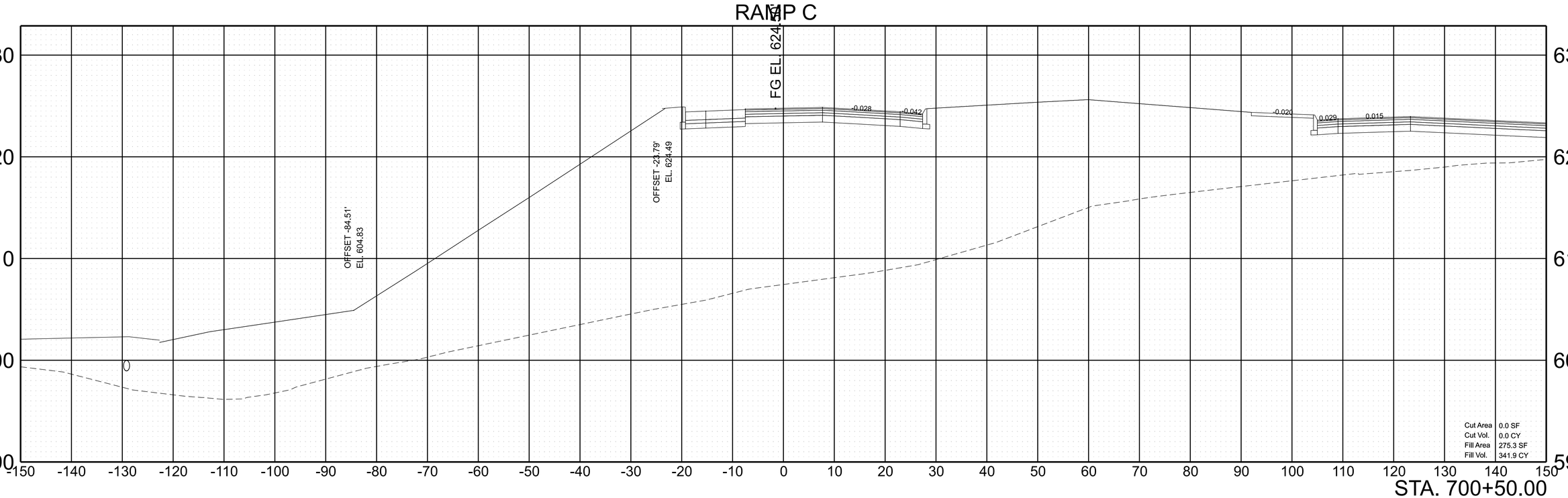


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:37:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A168

RAMP C



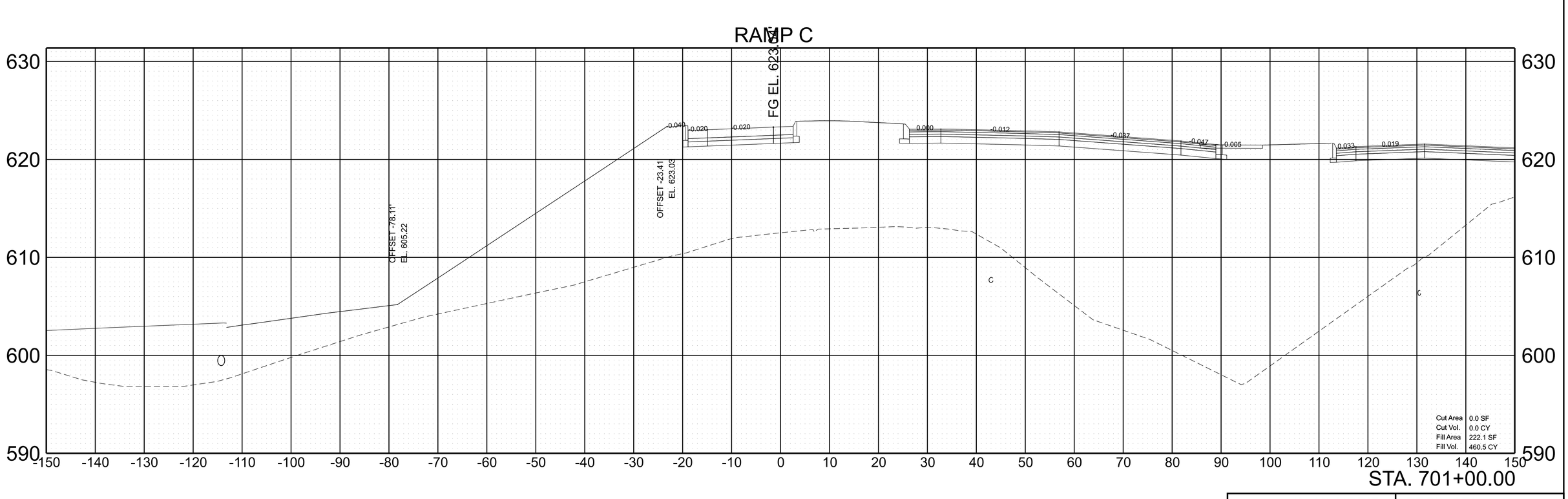
STA. 700+50.00

SCALE: 1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:37:20 AM
C:\PW\WORKING\EAST01\D2328414\95\l040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A169

RAMP C

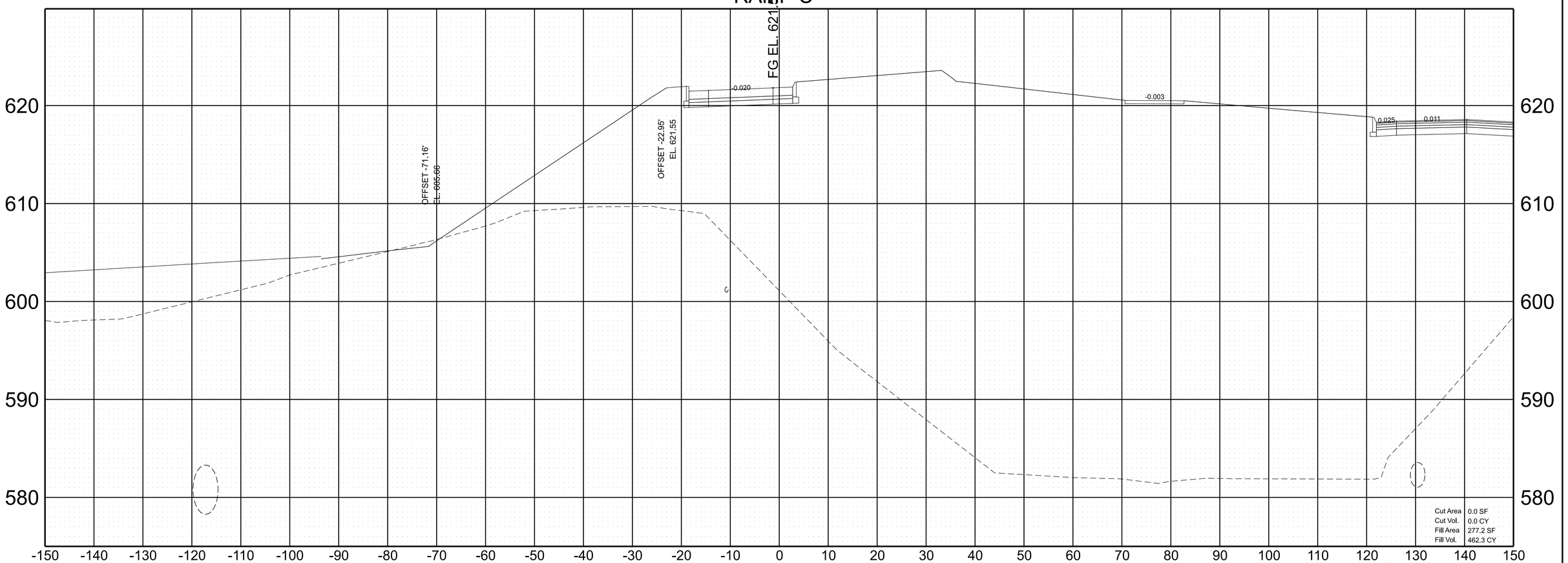


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:37:22 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A170

RAMP C

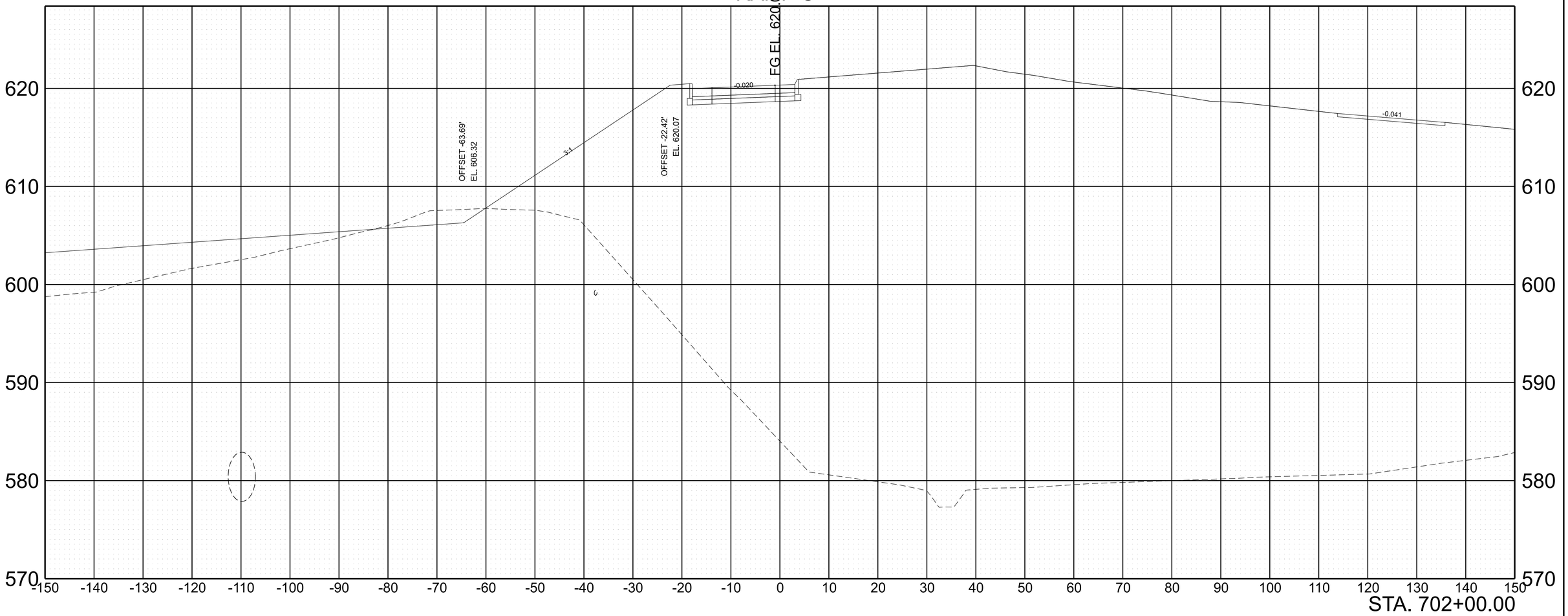


SCALE:		BEGIN STA. + .
	1"=10' HORIZ.	
	1"=5' VERT.	END STA. + .

2/6/2023 8:37:24 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A171

RAMP C



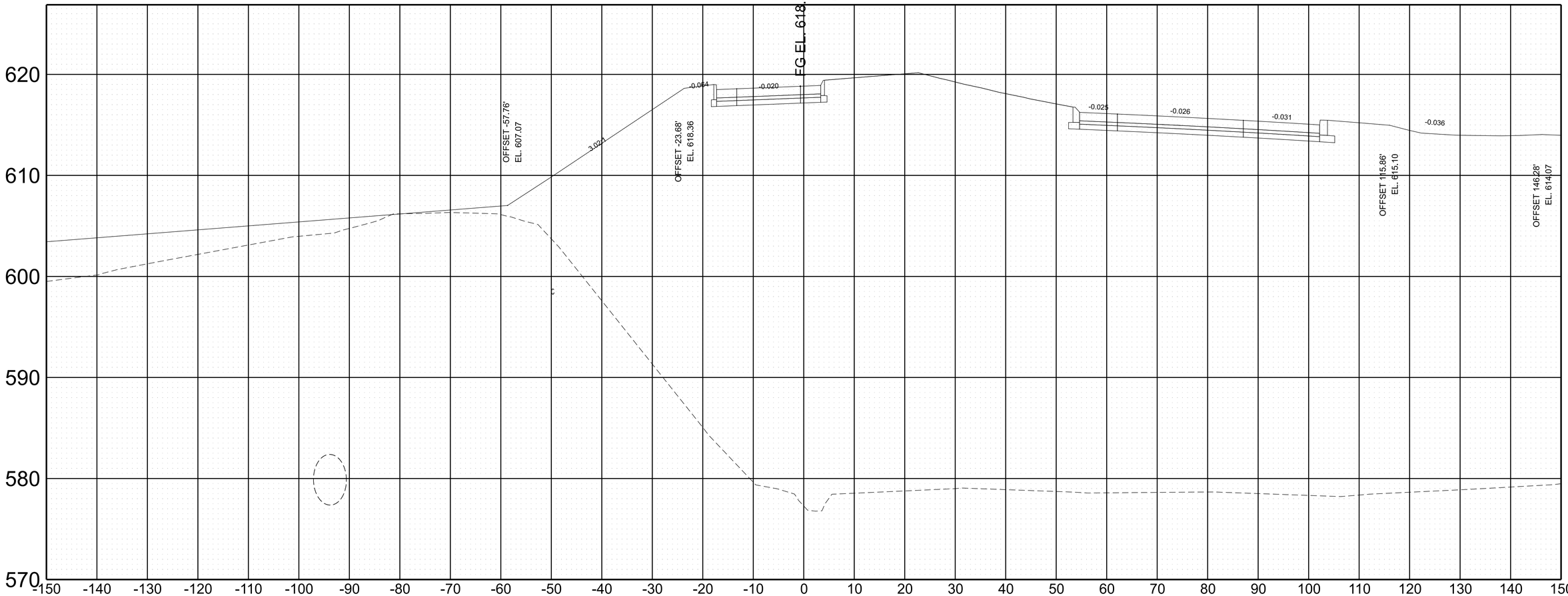
STA. 702+00.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:37:25 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A172

RAMP C



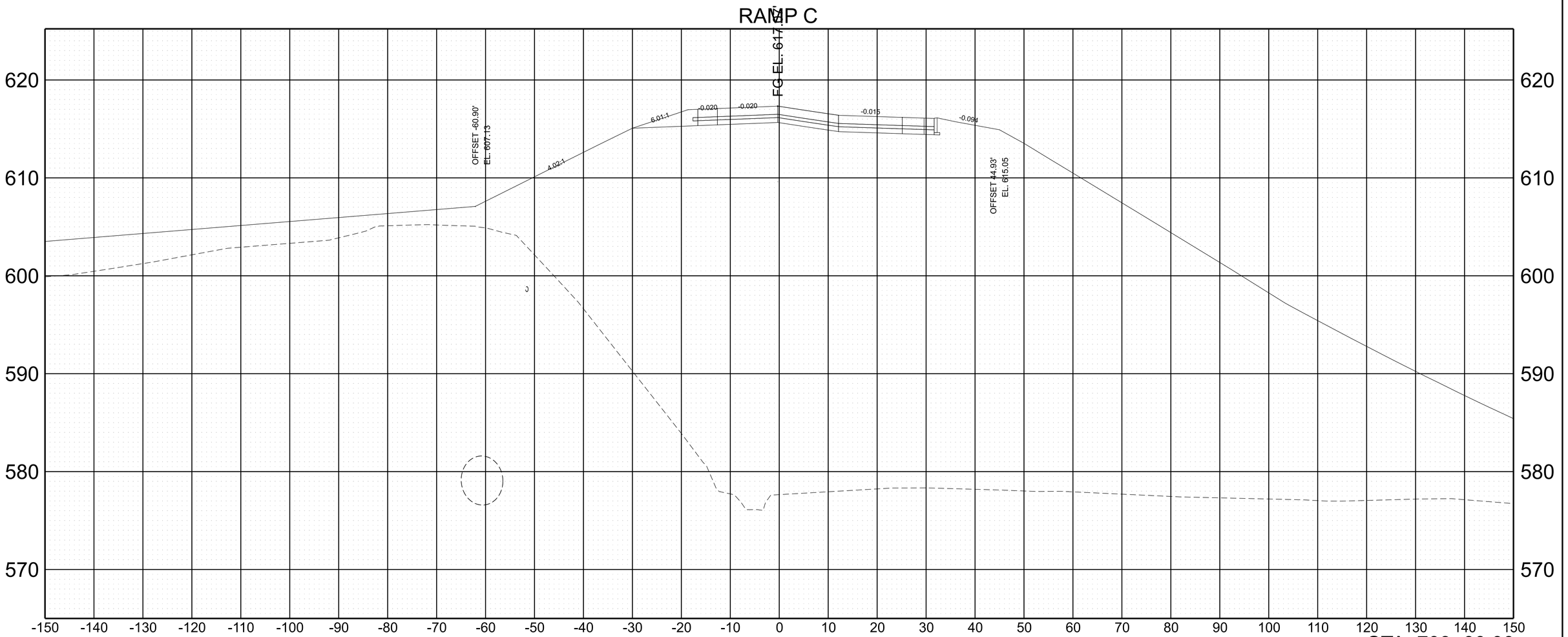
STA. 702+50.00

SCALE: 1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + .
	END STA. + .

2/6/2023 8:37:27 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A173

RAMP C

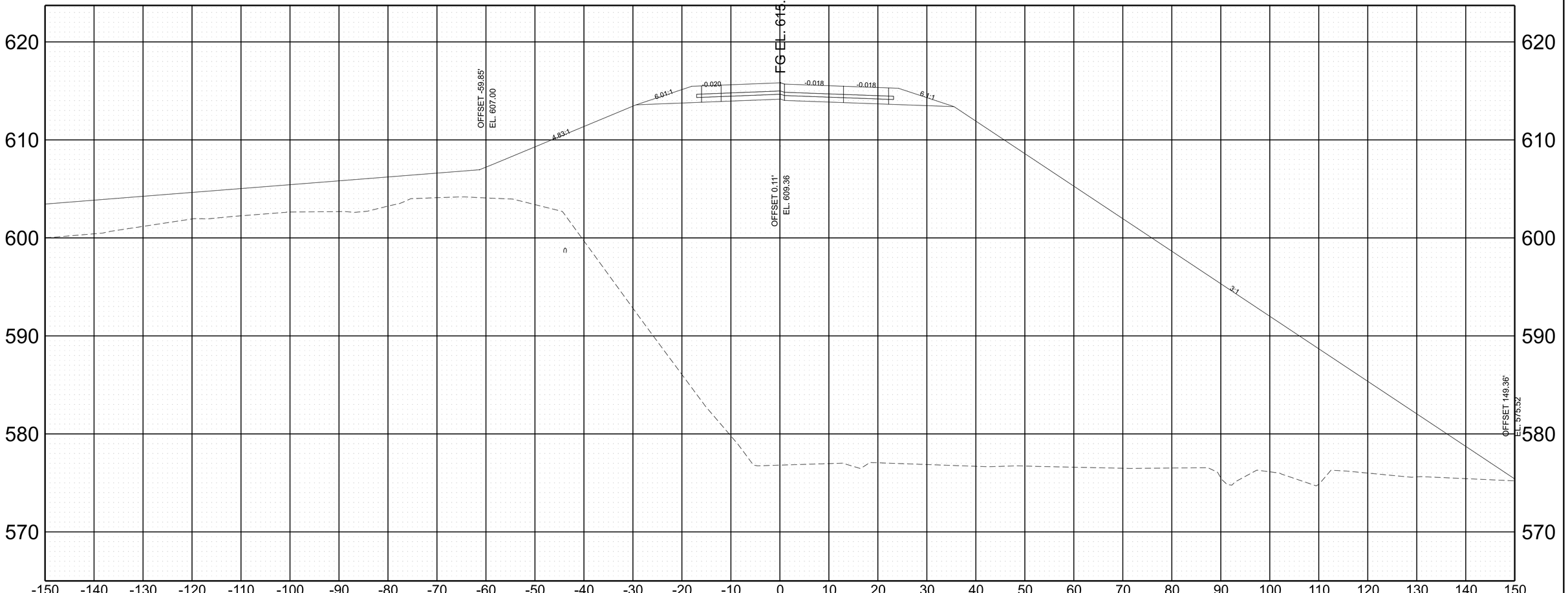


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:37:29 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A174

RAMP C

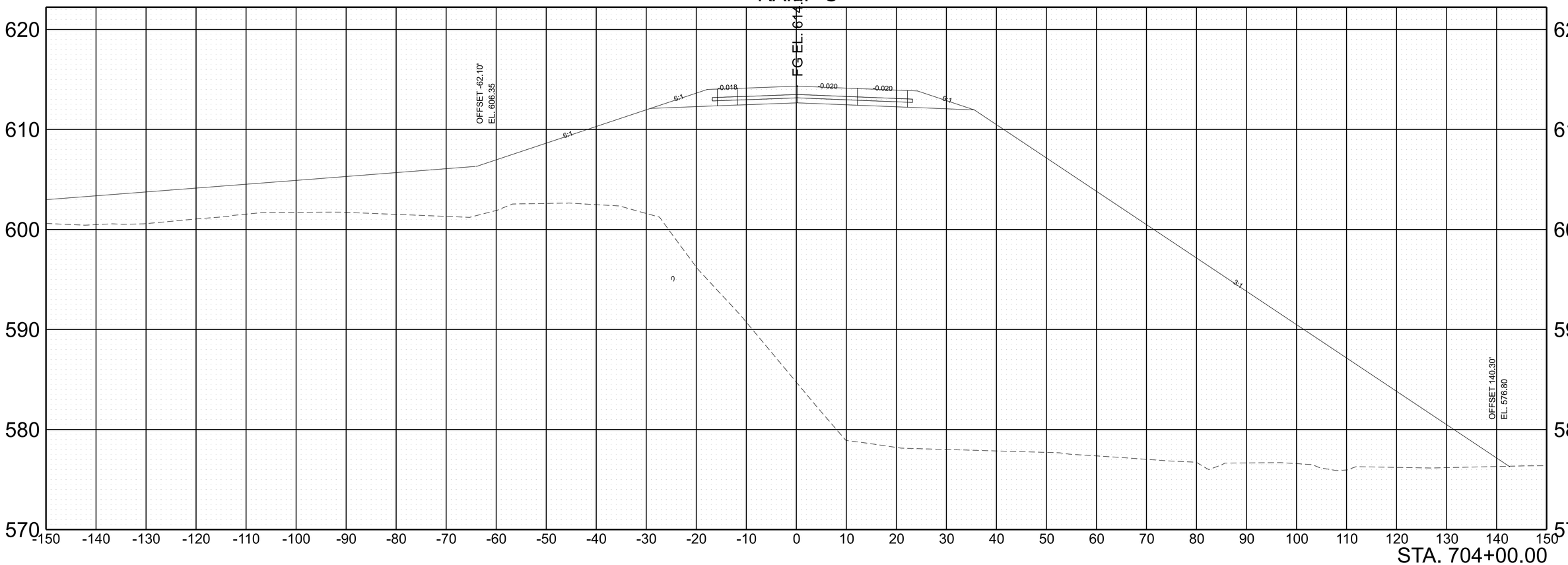


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:37:30 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A175

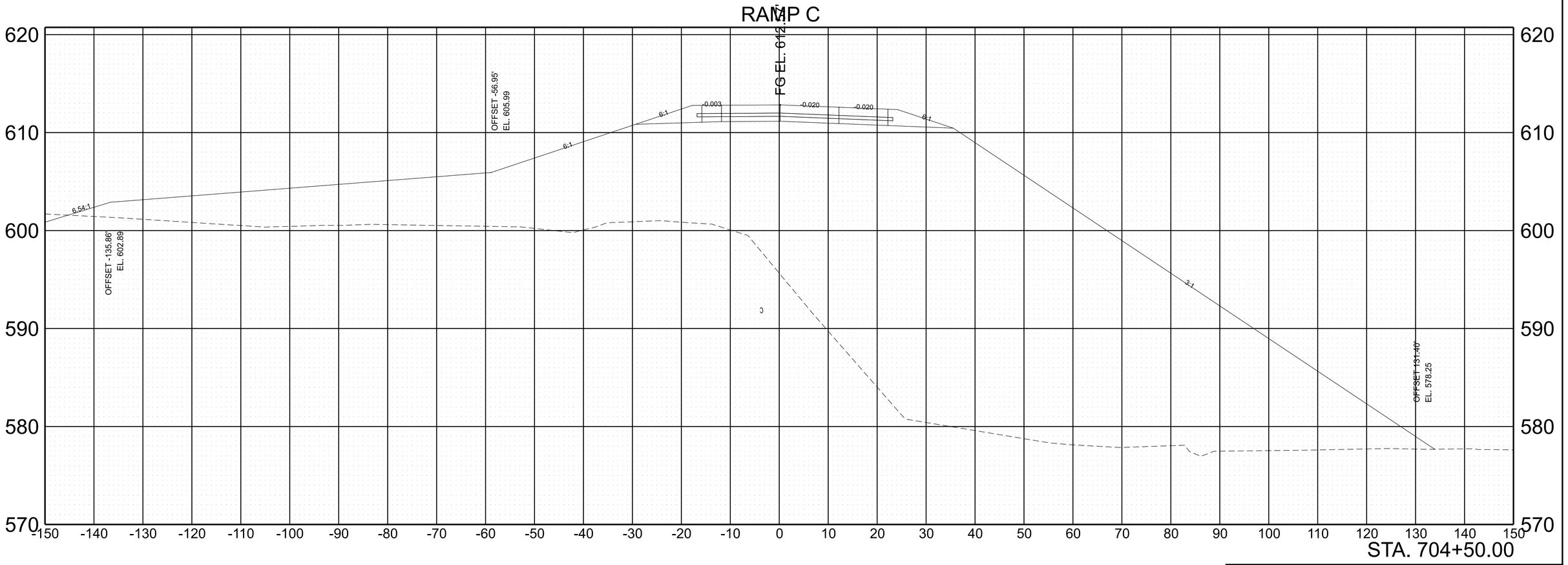
RAMP C



SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:37:32 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A176



SCALE: 1"=10' HORIZ. 1"=5' VERT.

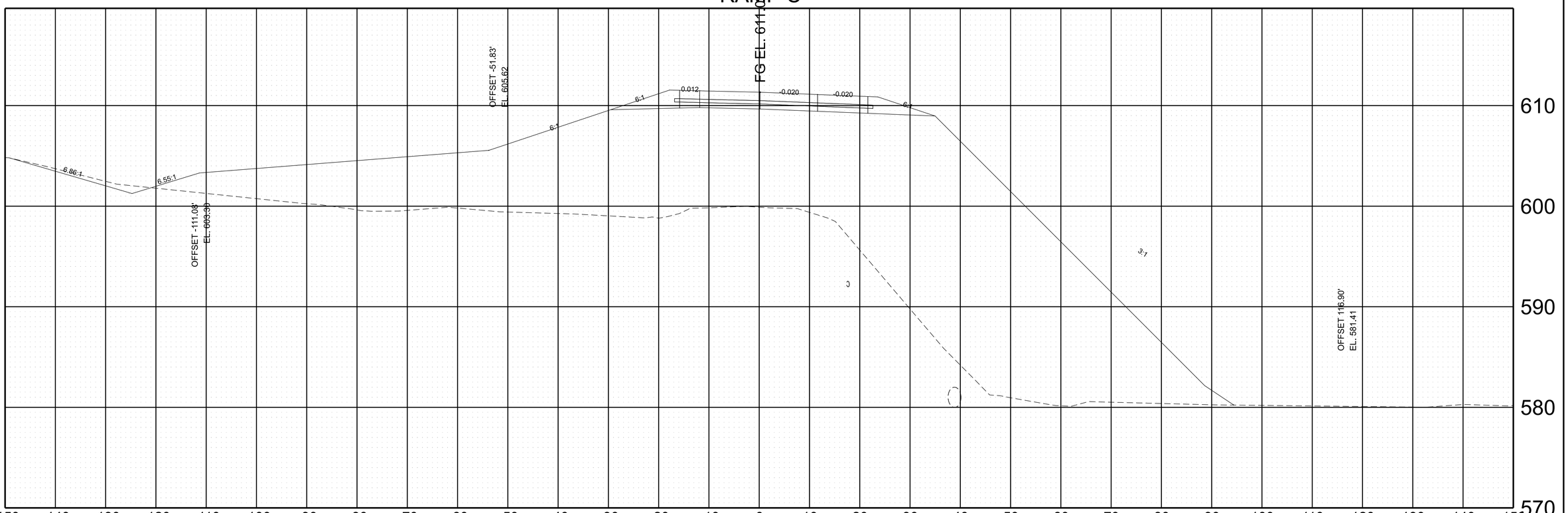
BEGIN STA. + .

END STA. + .

2/6/2023 8:38:57 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A177

RAMP C

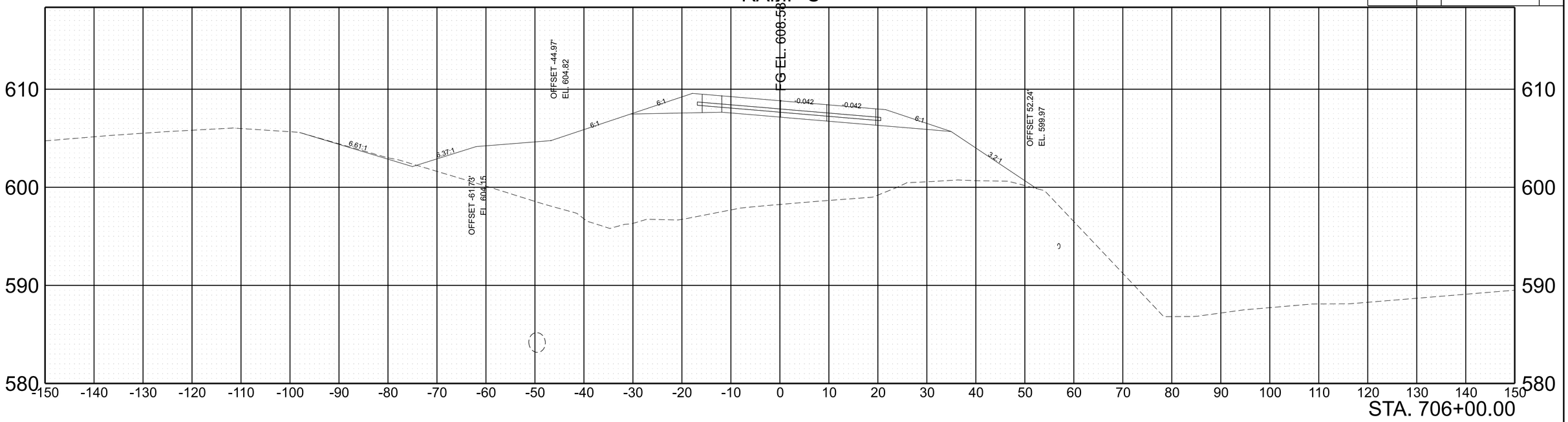


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:38:59 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP C.DGN

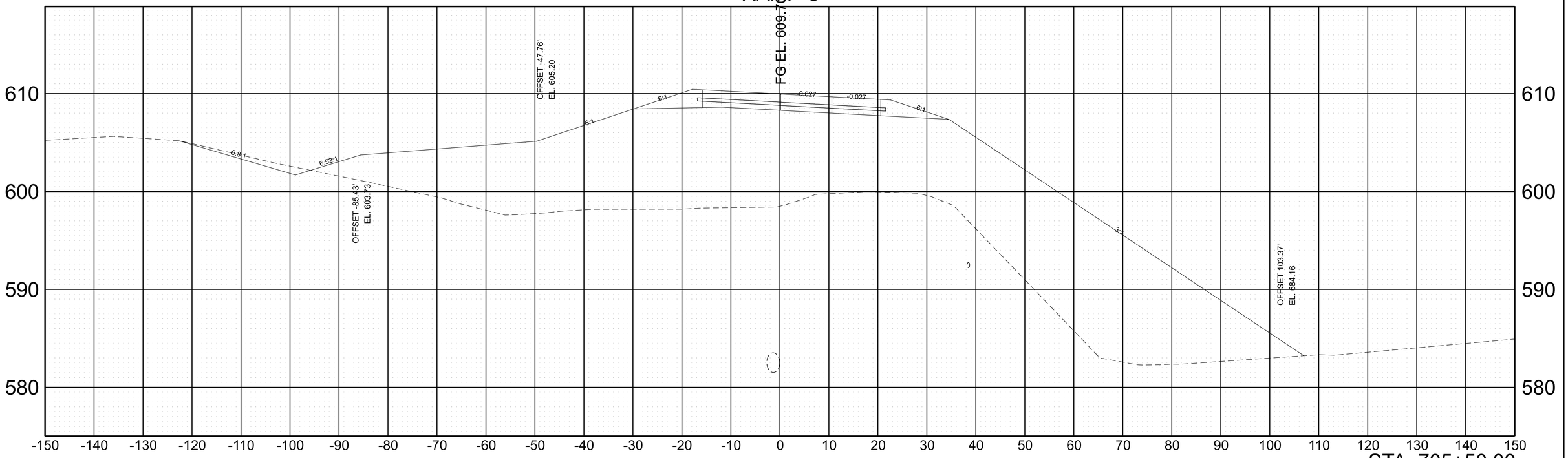
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A178

RAMP C



STA. 706+00.00

RAMP C



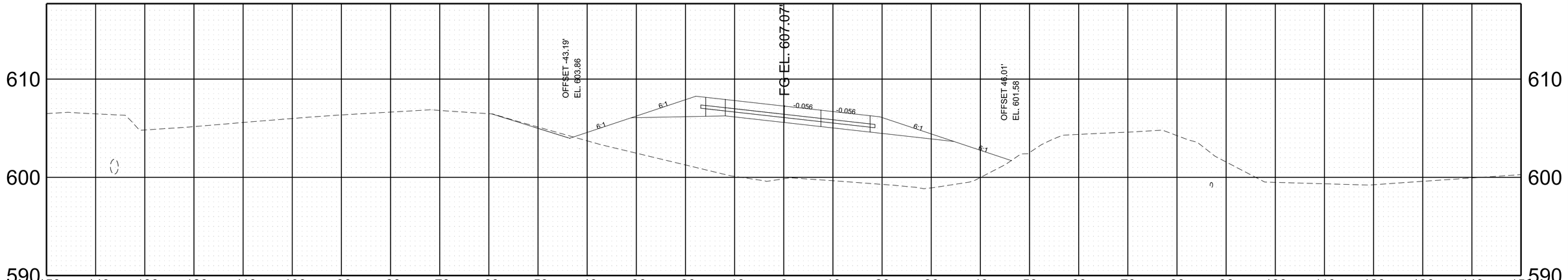
STA. 705+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:01 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

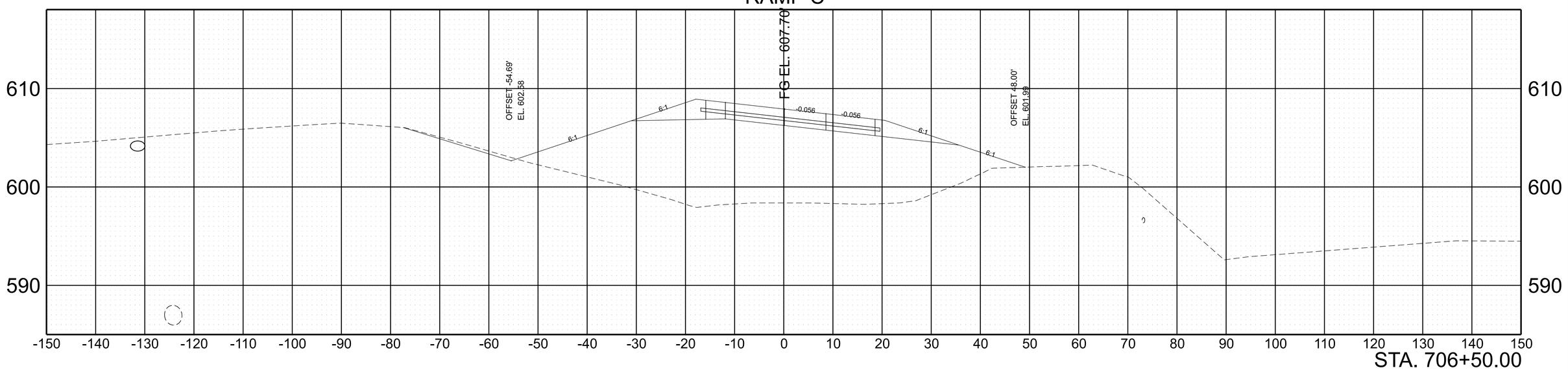
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A179

RAMP C



STA. 707+00.00

RAMP C



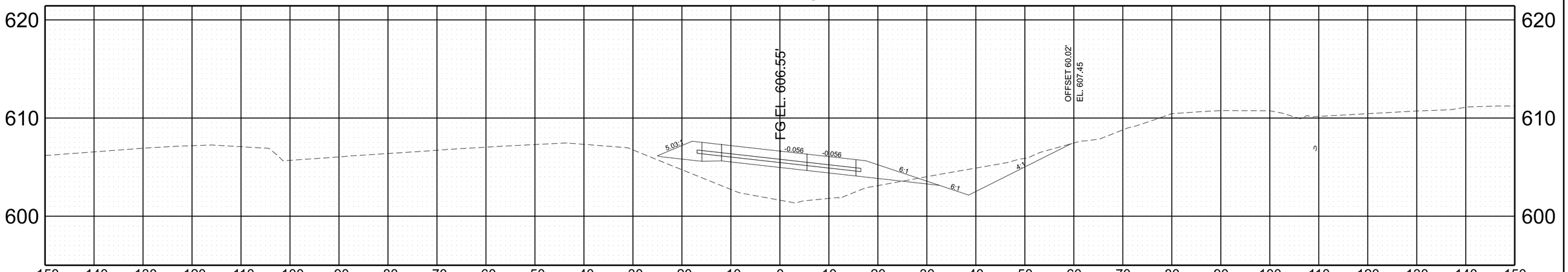
STA. 706+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:04 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

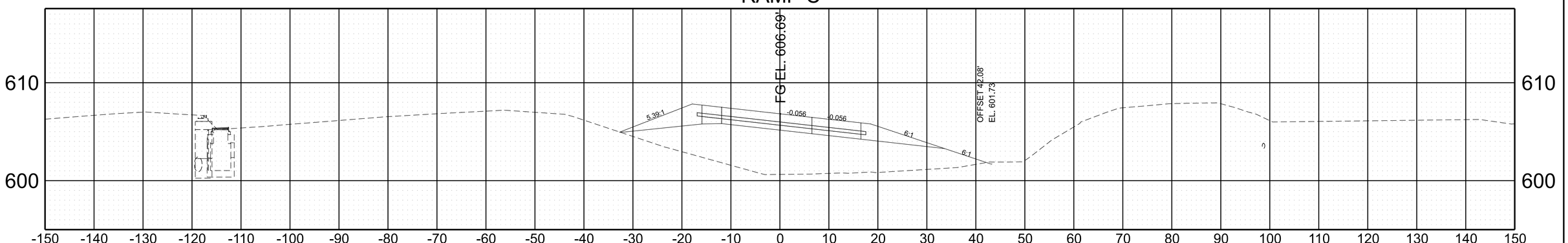
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A180

RAMP C



STA. 708+00.00

RAMP C

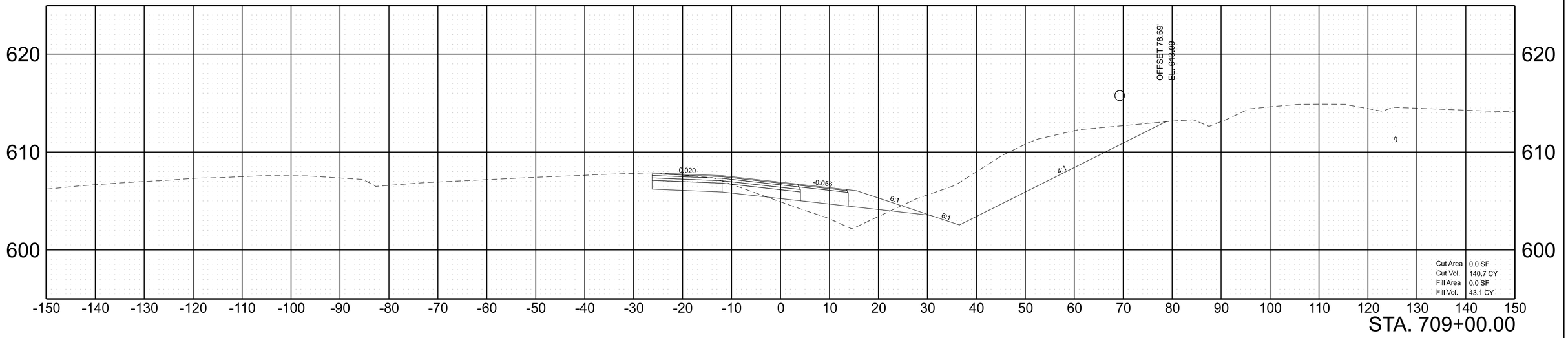


STA. 707+50.00

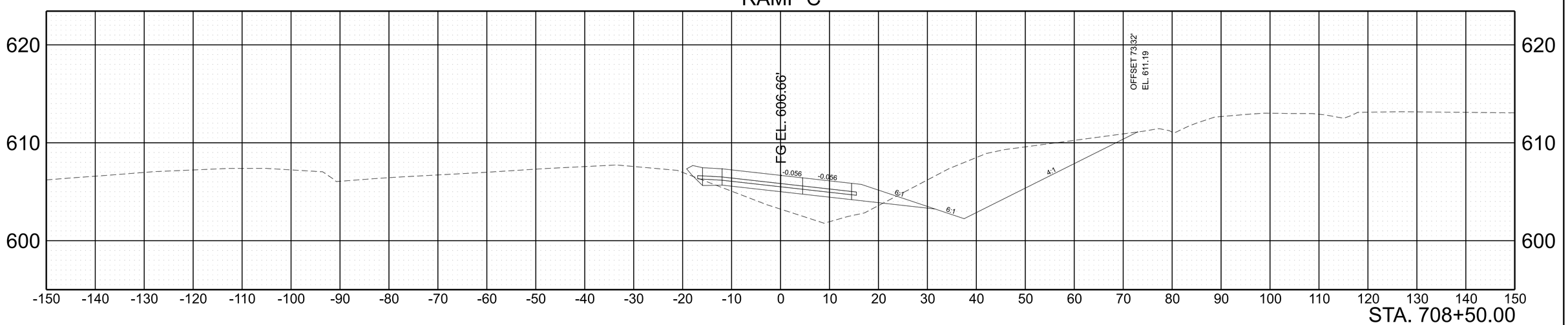
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:06 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A181



RAMP C

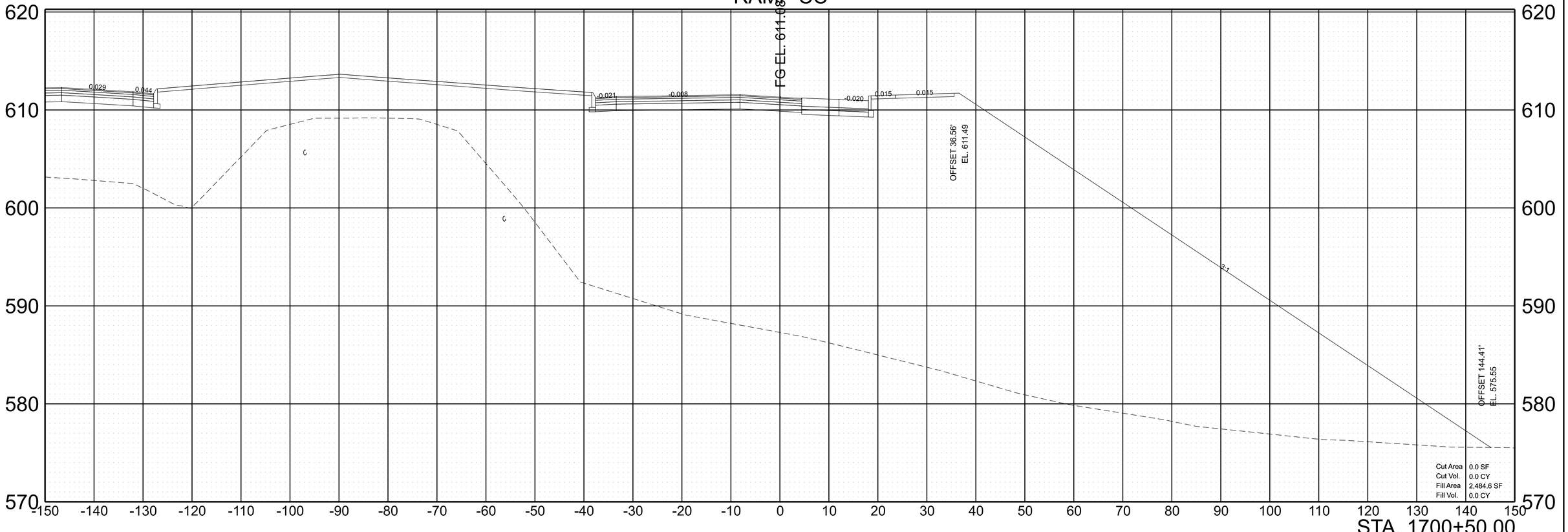


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:09 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP C.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A182

RAMP CC

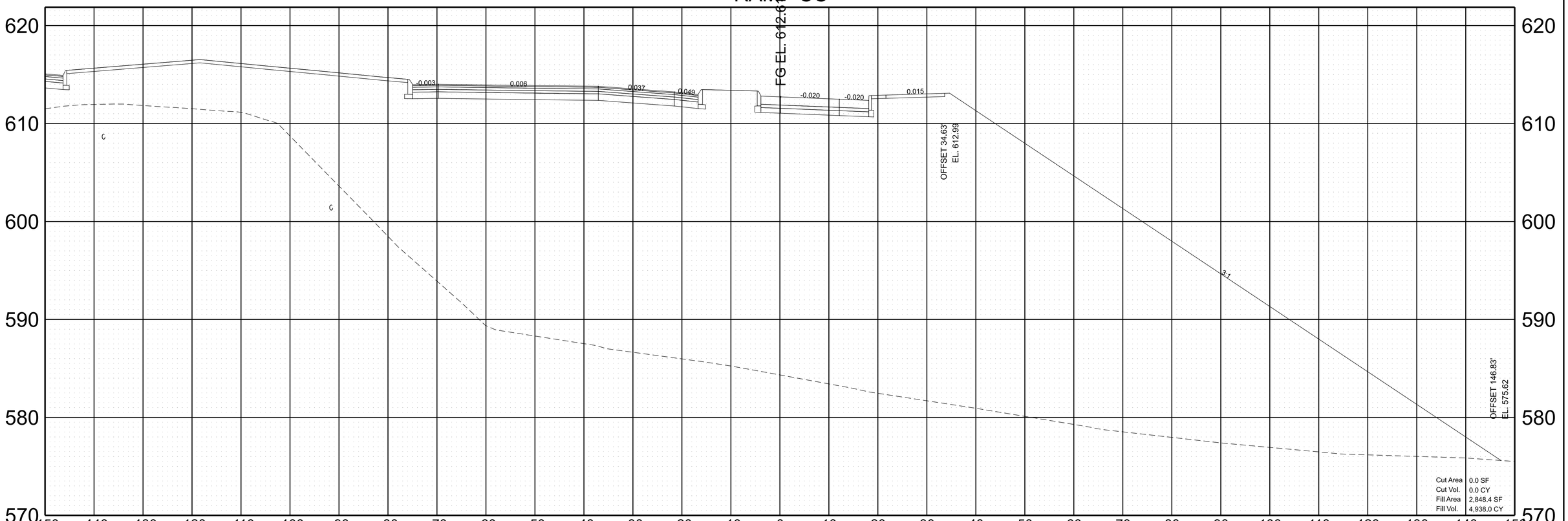


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:39:41 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A183

RAMP CC

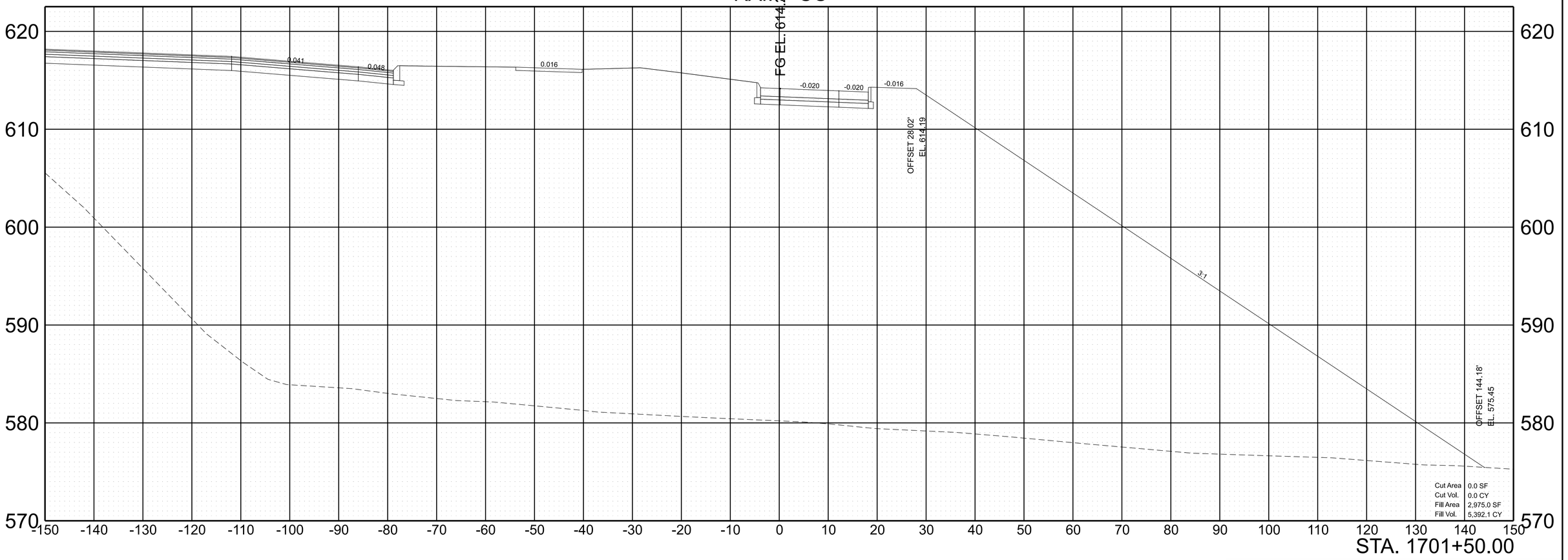


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:43 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A184

RAMP CC



STA. 1701+50.00

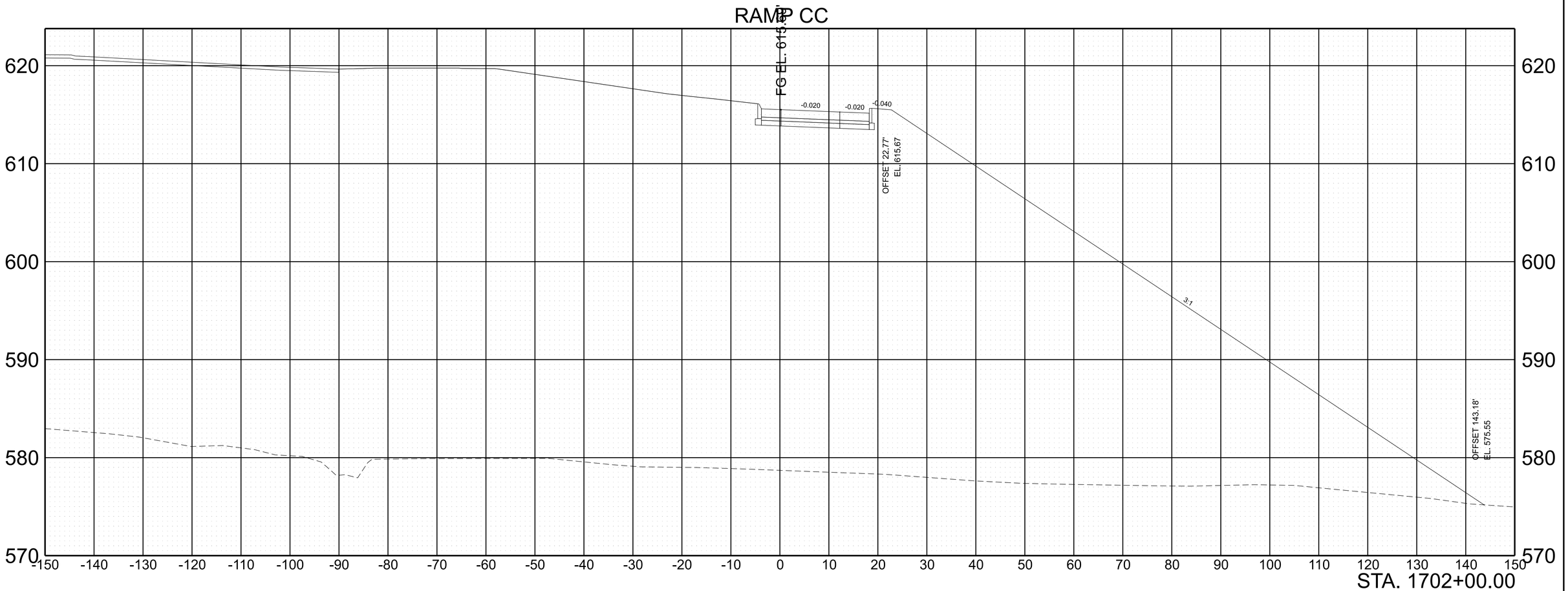
SCALE: 1"=10' HORIZ.
1"=5' VERT.

BEGIN STA. + .
END STA. + .

2/6/2023 8:39:45 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A185

RAMP CC

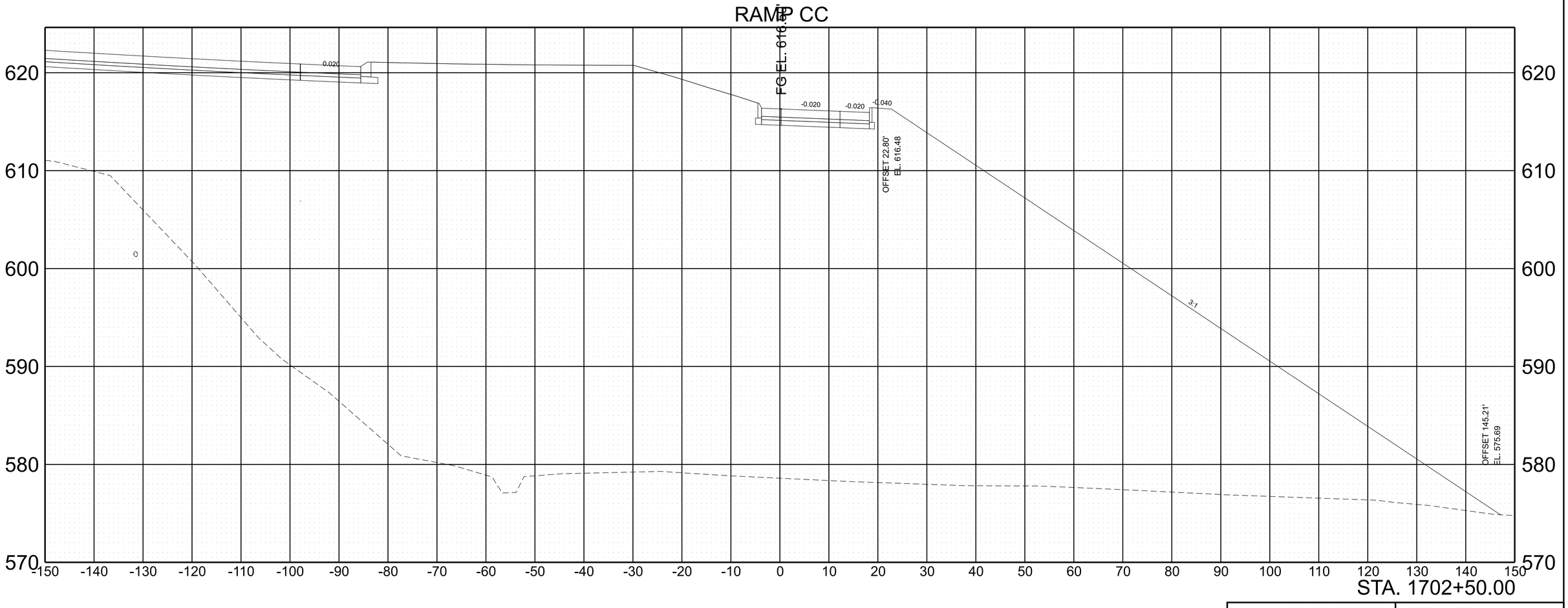


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:46 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A186

RAMP CC

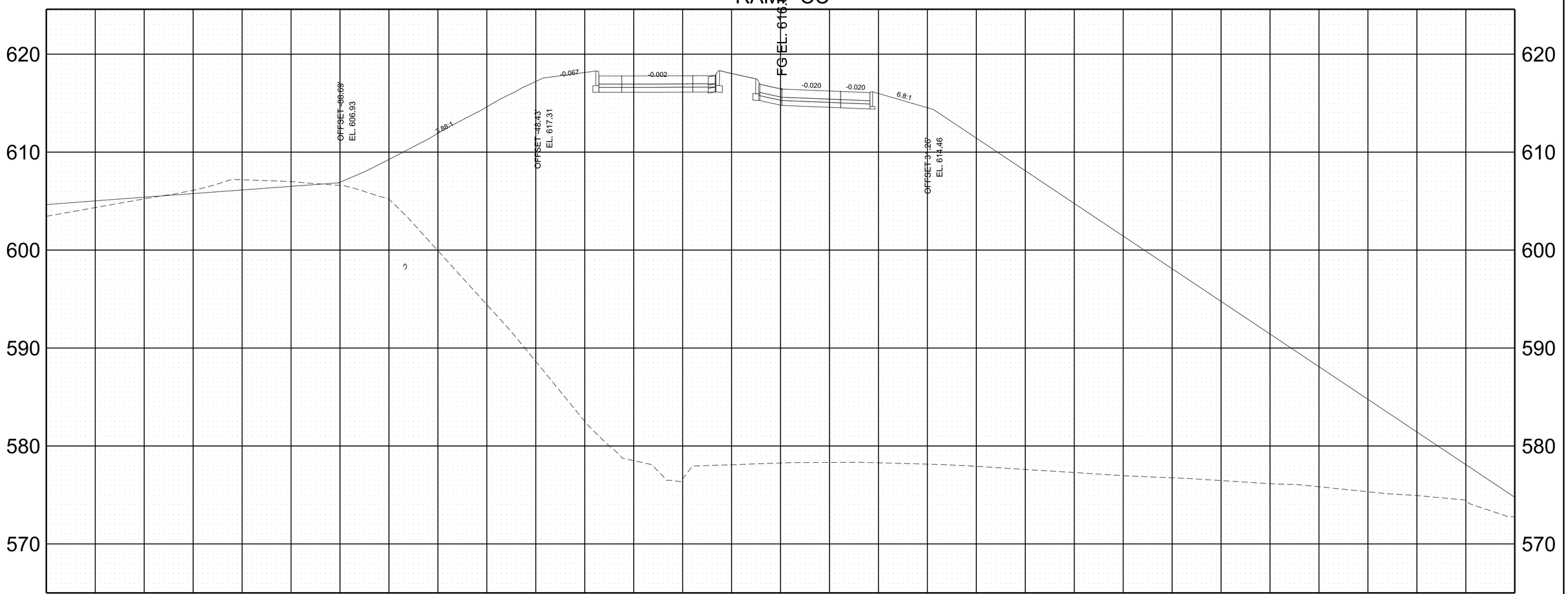


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:48 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A187

RAMP CC

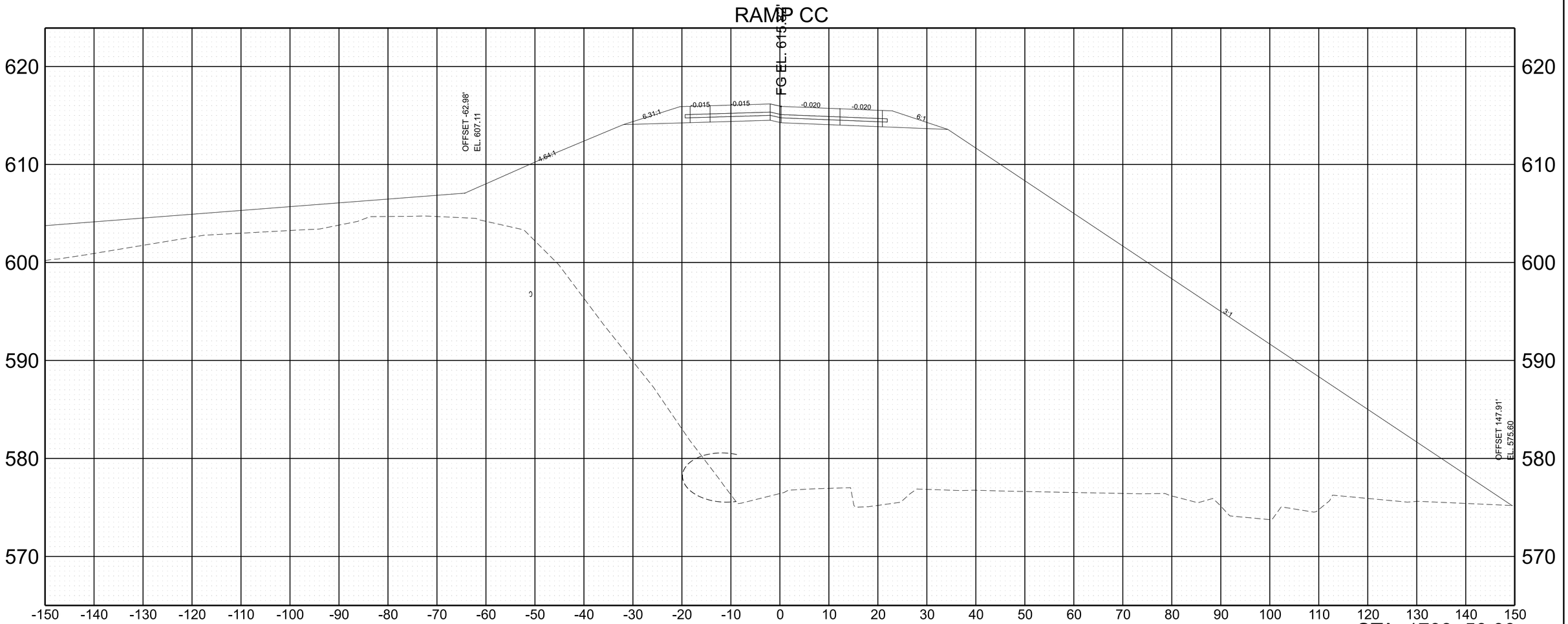


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:39:50 AM
C:\PW\WORKINGIEAST01\D2328414\95\0040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A188

RAMP CC



STA. 1703+50.00

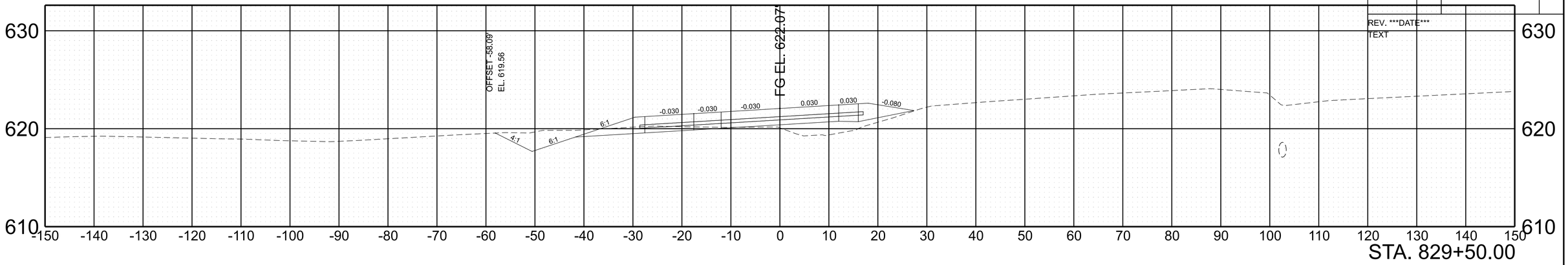
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:39:51 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP CC.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A189

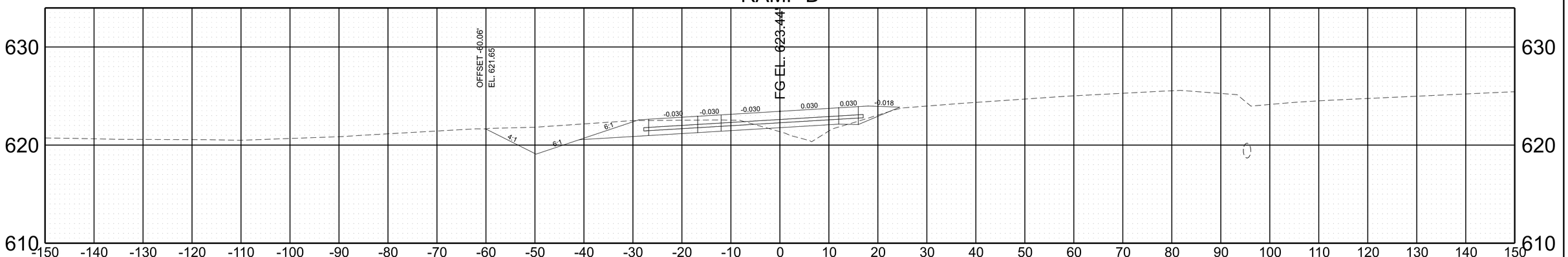
REV. ***DATE***
TEXT

RAMP D



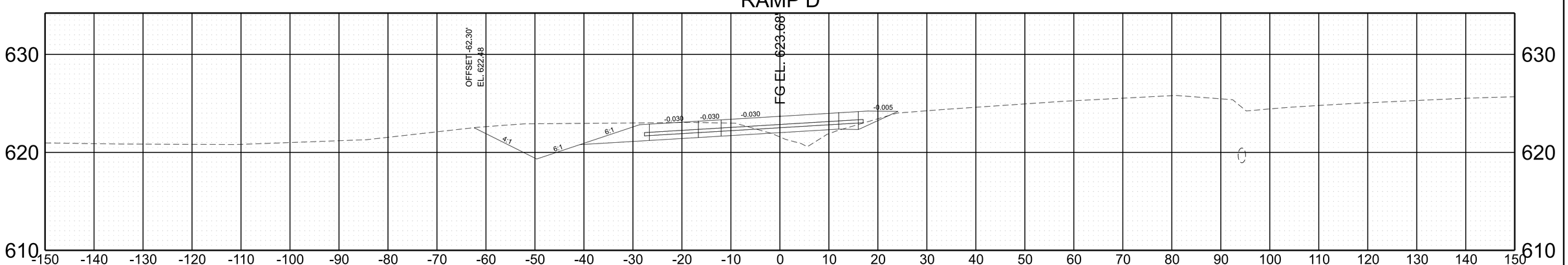
STA. 829+50.00

RAMP D



STA. 829+00.00

RAMP D



STA. 828+92.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:27 AM
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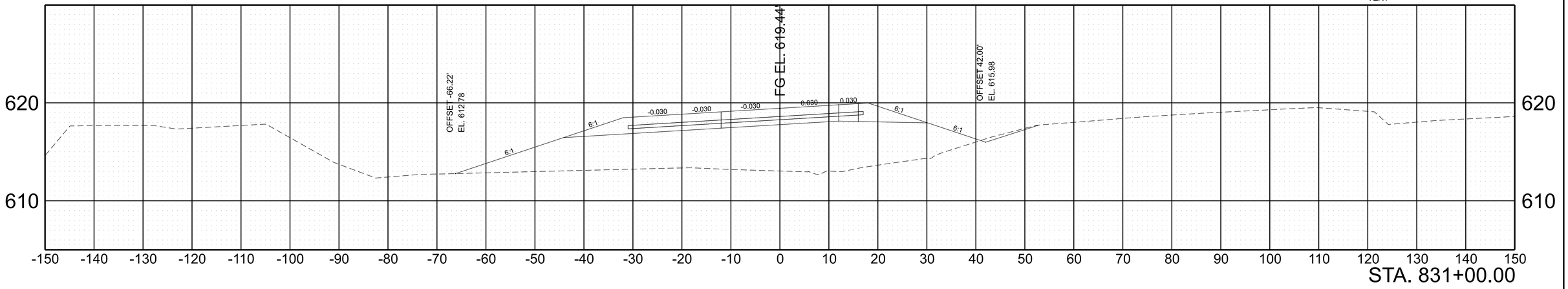
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A190

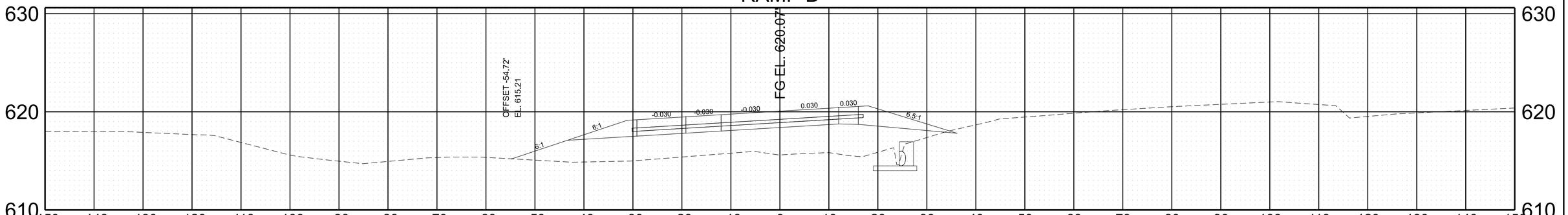
REV. ***DATE***
TEXT

RAMP D



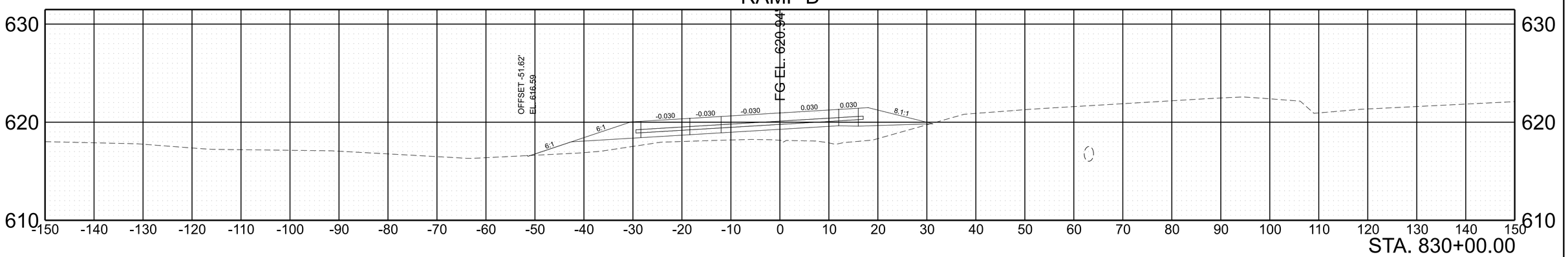
STA. 831+00.00

RAMP D



STA. 830+50.00

RAMP D



STA. 830+00.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:30 AM
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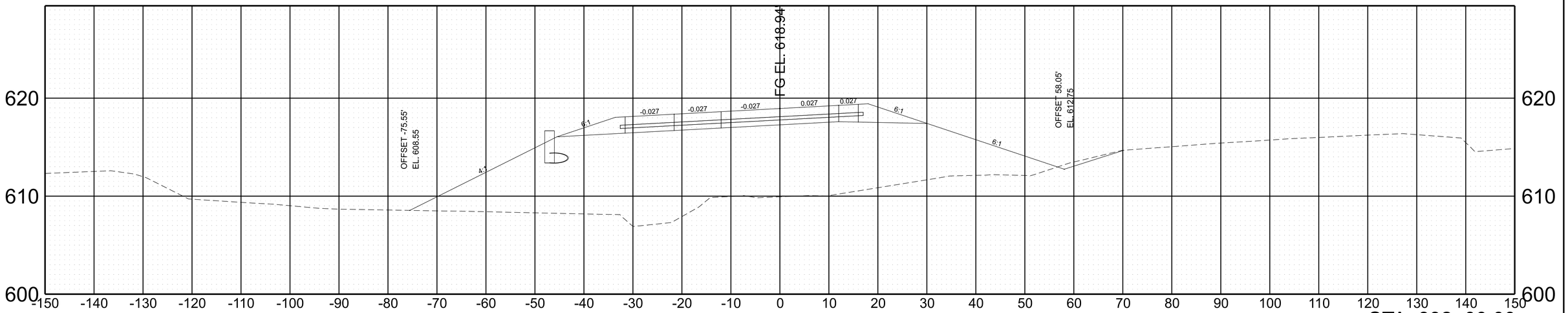
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A191

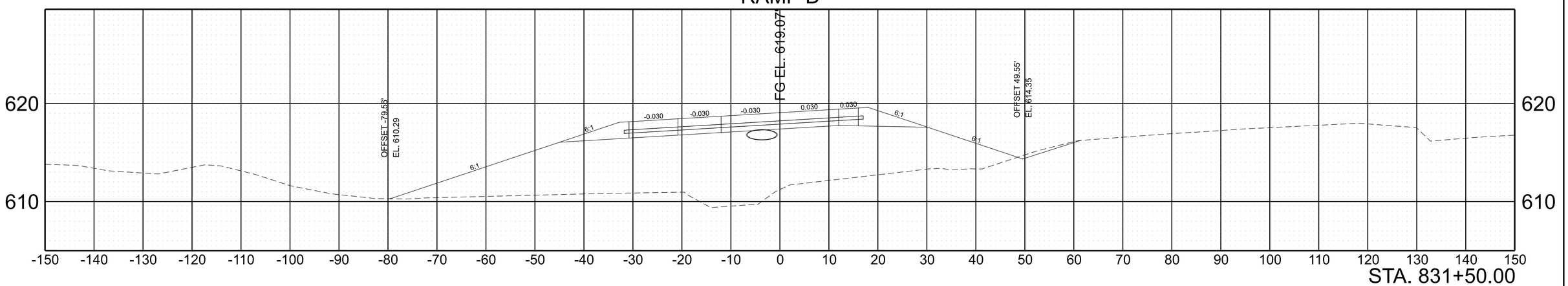
REV. ***DATE***
TEXT

RAMP D



STA. 832+00.00

RAMP D



STA. 831+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:32 AM
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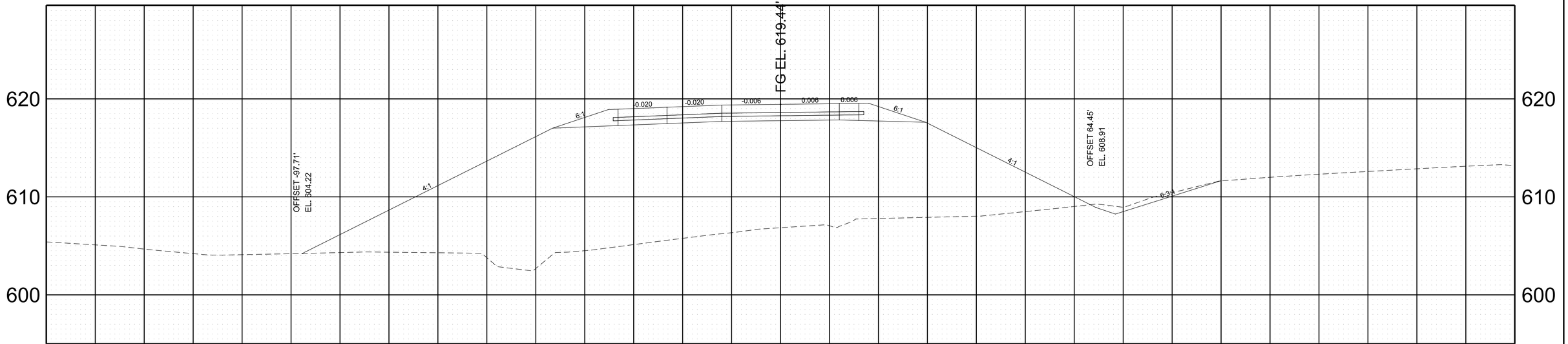
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A192

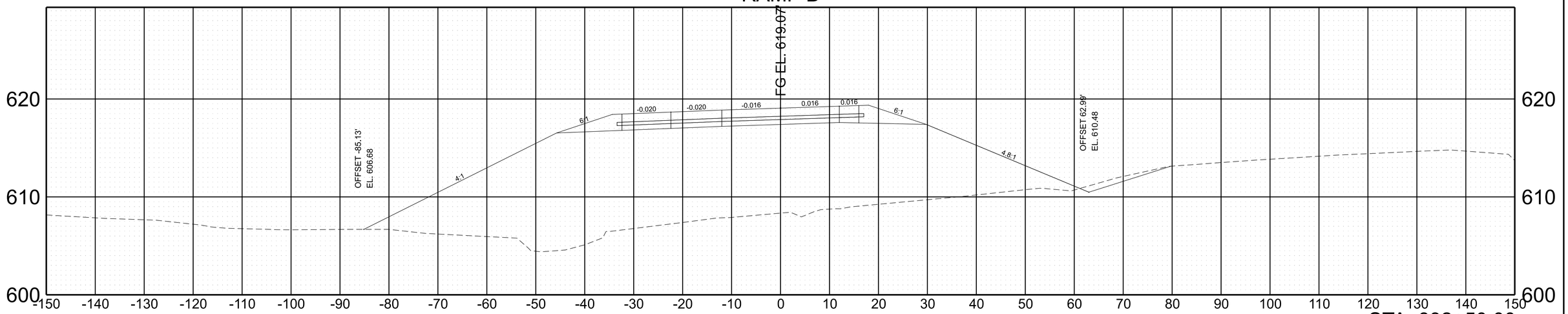
REV. ***DATE***
TEXT

RAMP D



STA. 833+00.00

RAMP D



STA. 832+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:35 AM
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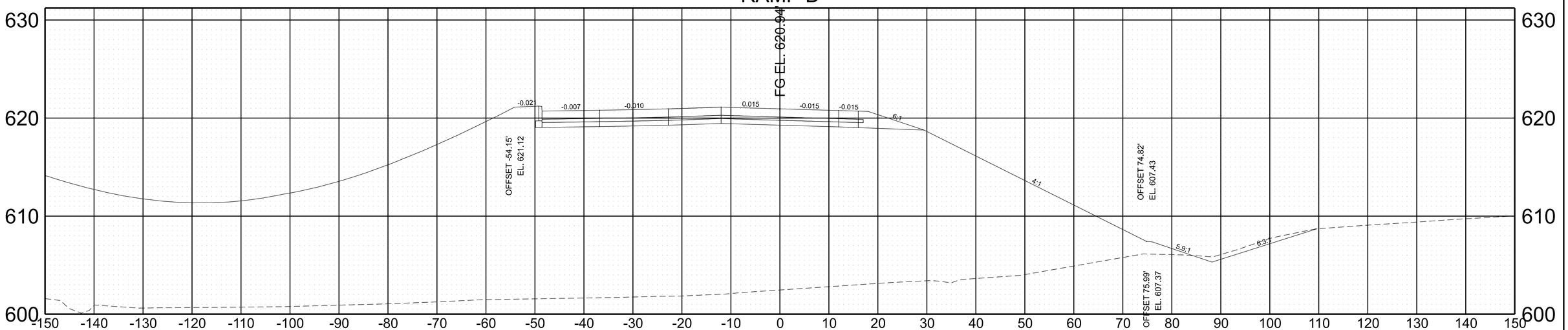
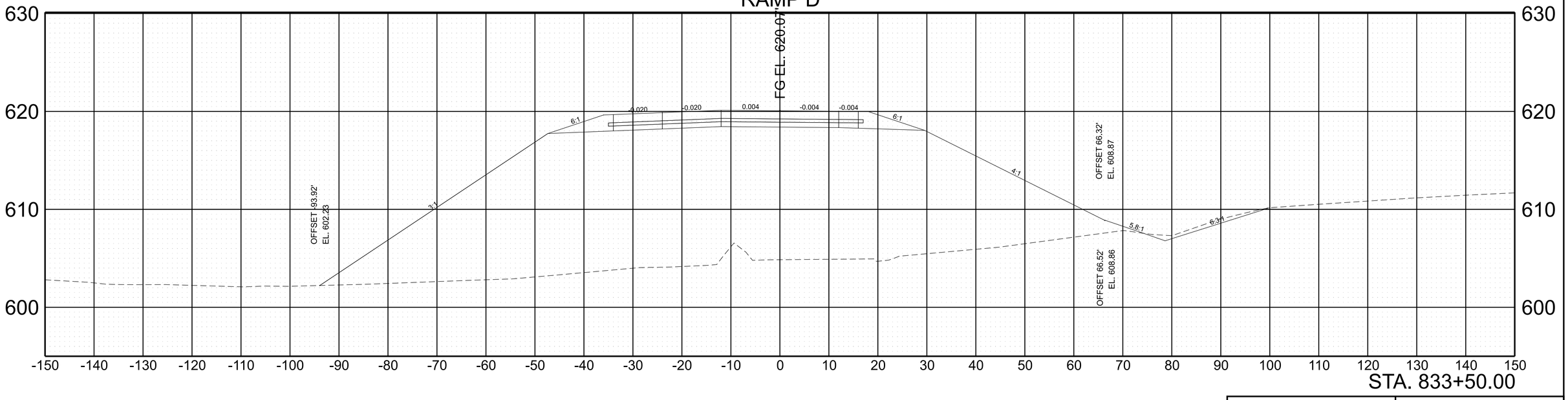
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A193

REV. ***DATE***
TEXT





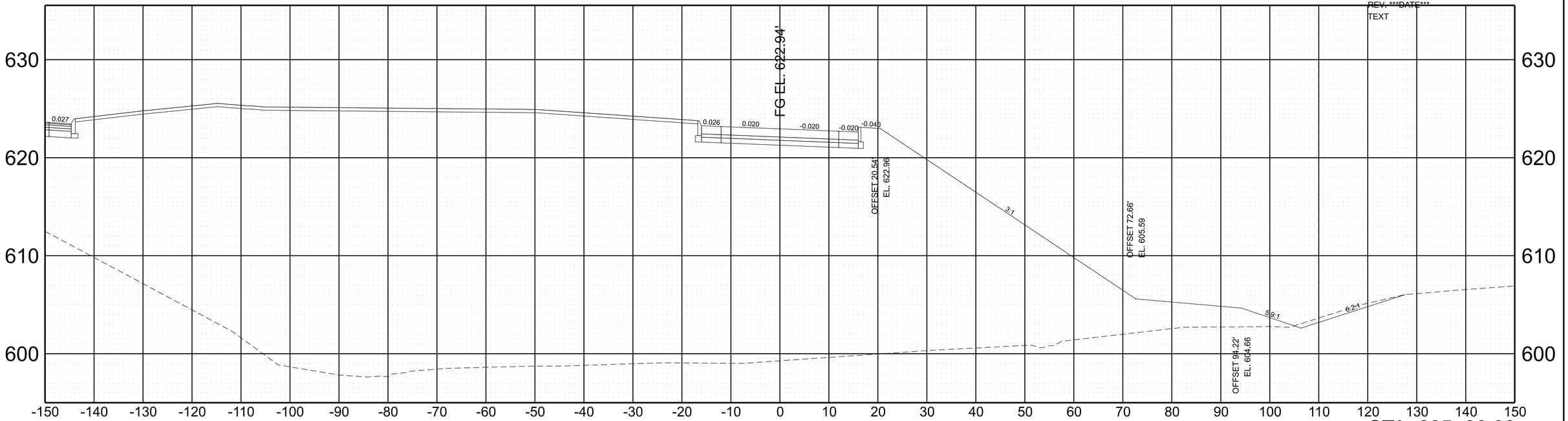
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:37 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A194

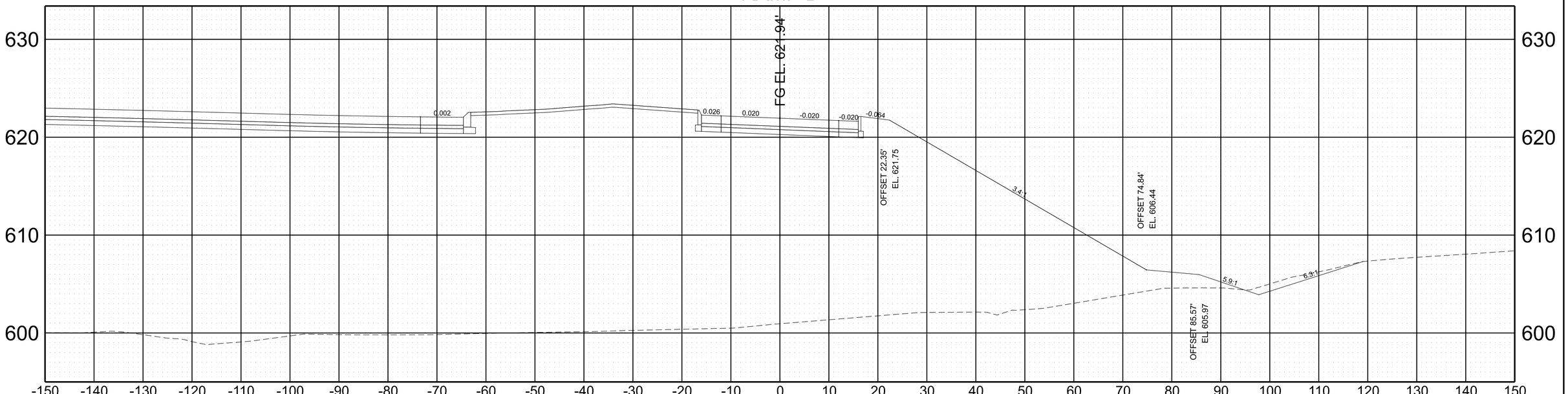
REV. ***DATE***
TEXT

RAMP D



STA. 835+00.00

RAMP D



STA. 834+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:40 AM
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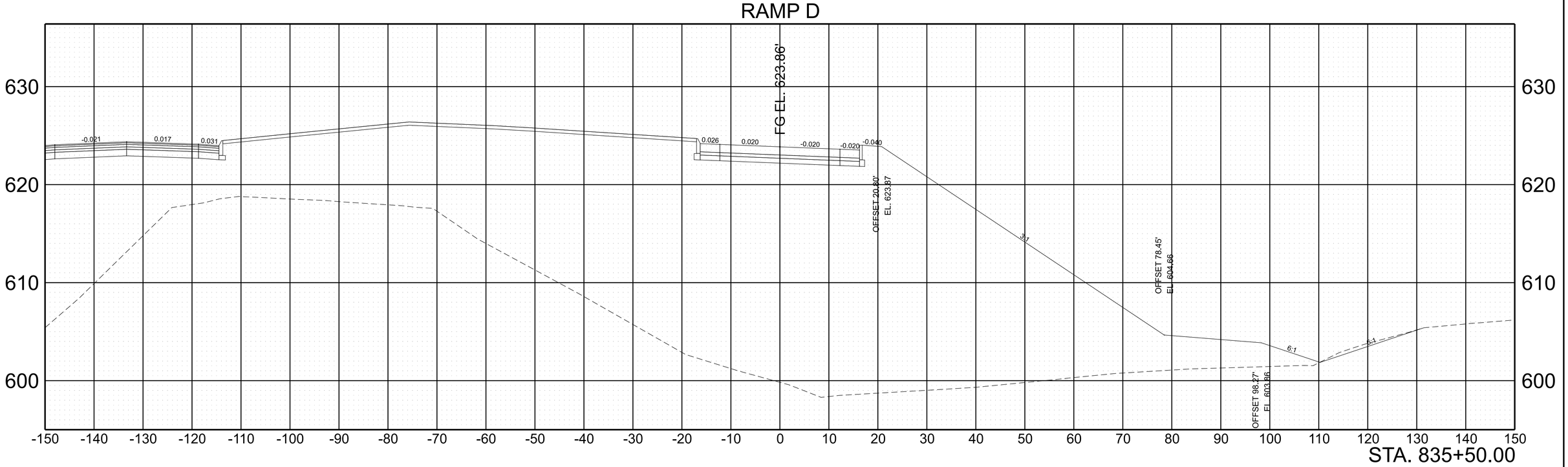
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A195

REV. ***DATE***
TEXT

RAMP D



STA. 835+50.00

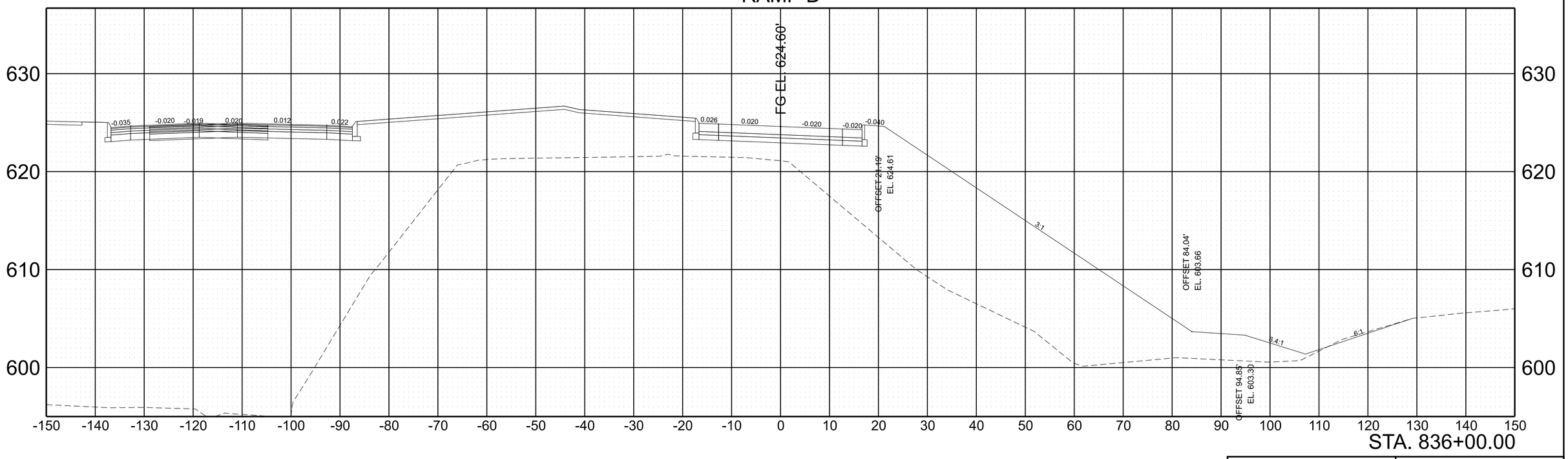
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:42 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A196

REV. ***DATE***
TEXT

RAMP D



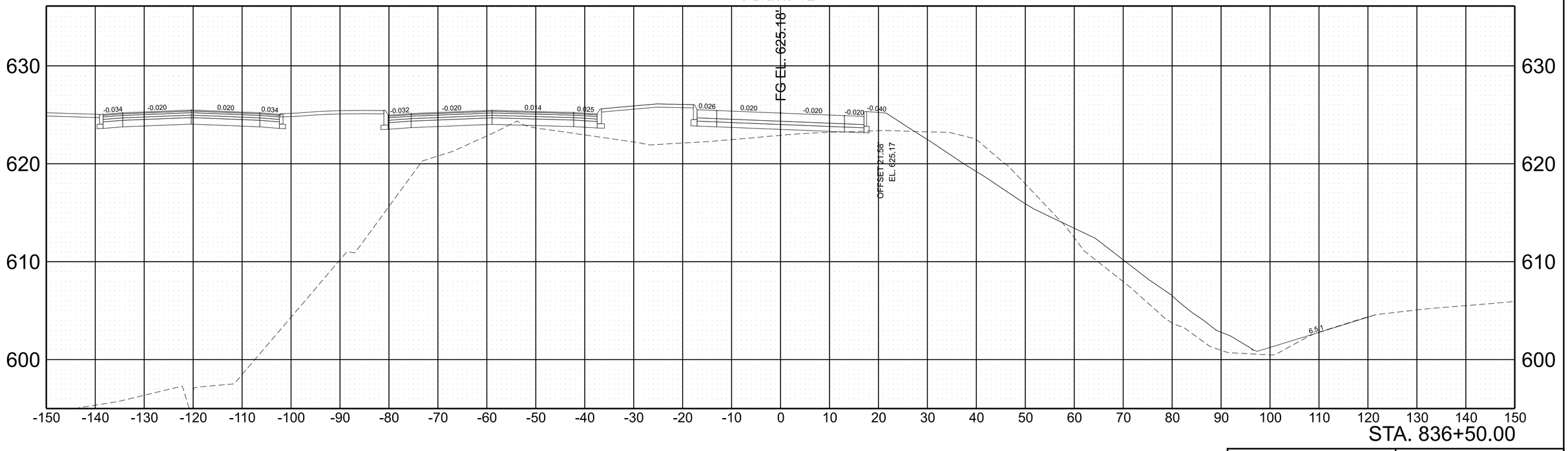
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:40:45 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A197

REV. ***DATE***
TEXT

RAMP D



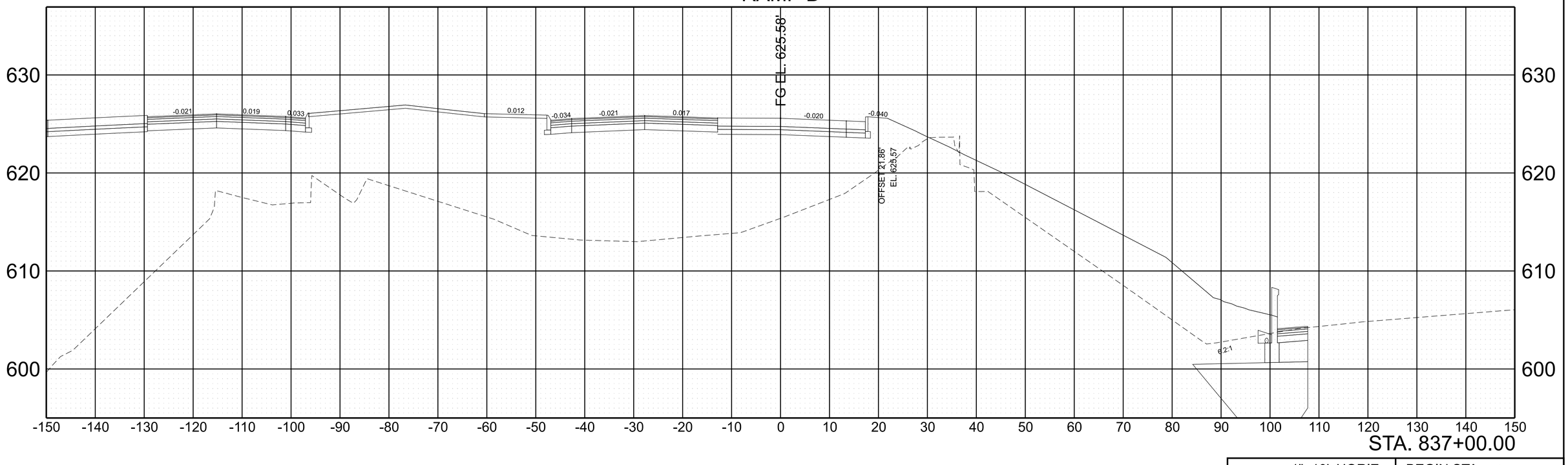
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:40:48 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A198

REV. ***DATE***
TEXT

RAMP D



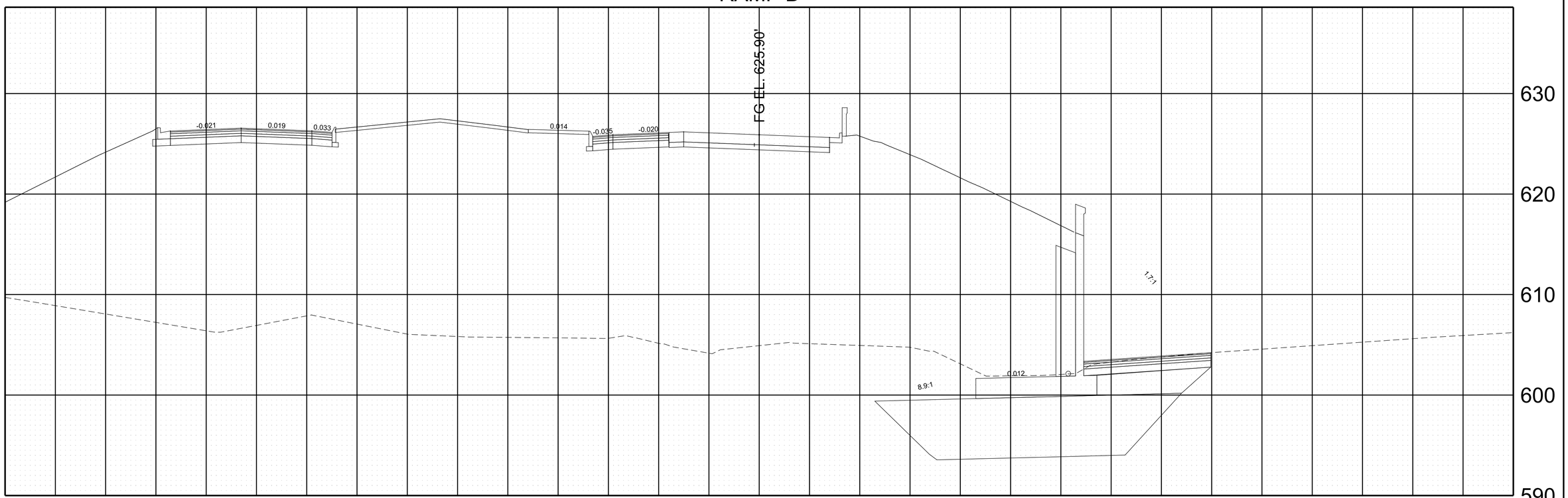
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:40:50 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A199

REV. ***DATE***
TEXT

RAMP D



STA. 837+50.00

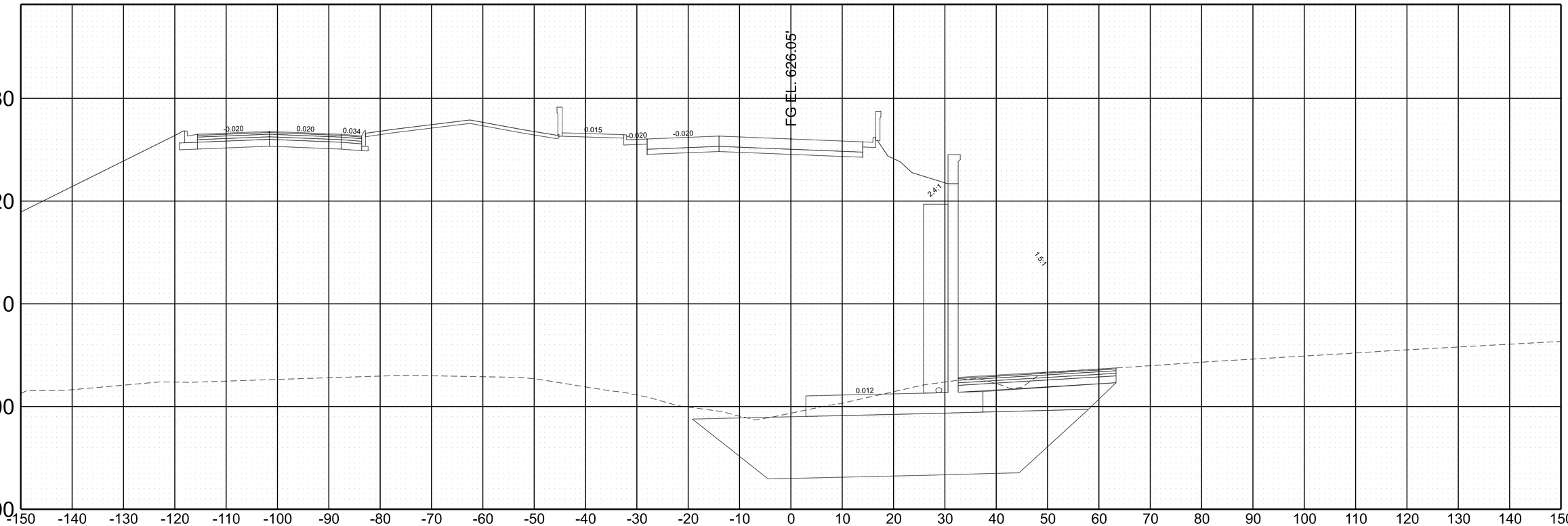
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:40:51 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A200

REV. ***DATE***
TEXT

RAMP D



STA. 837+71.58

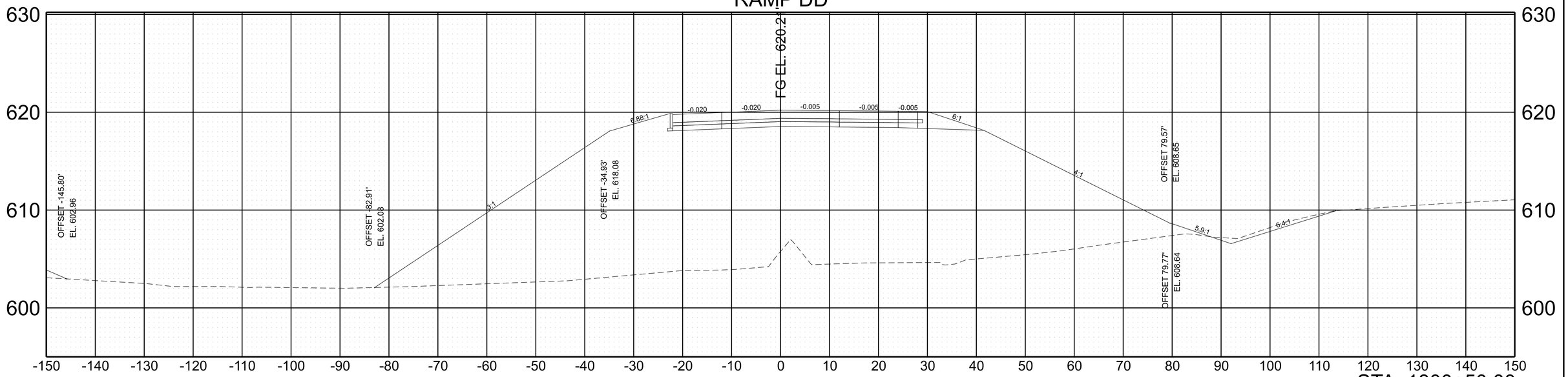
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

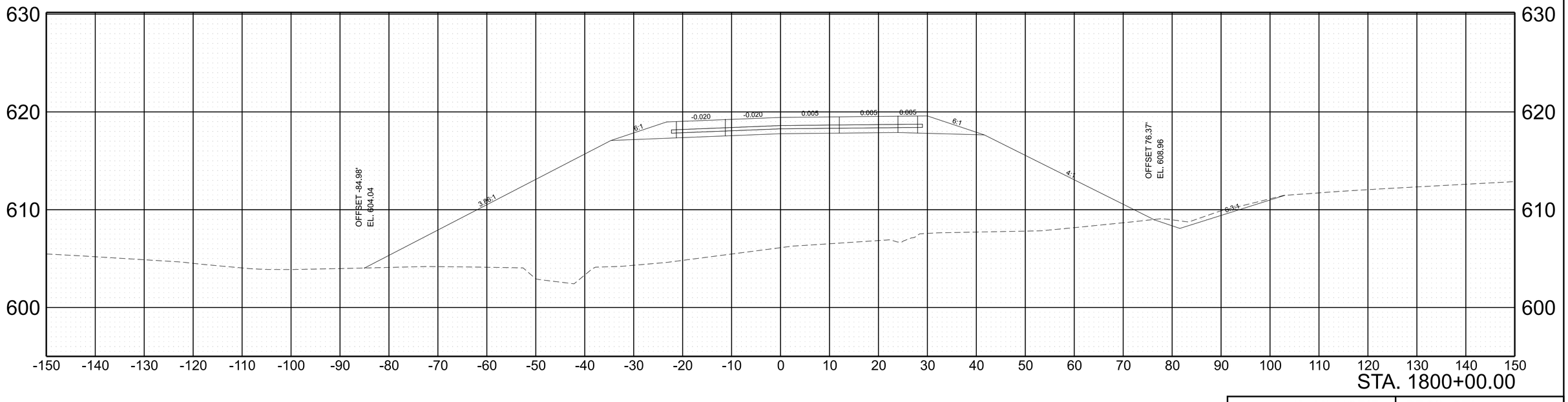
2/6/2023 8:40:53 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-RAMP D.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A201

REV. ***DATE***
TEXT

RAMP DD





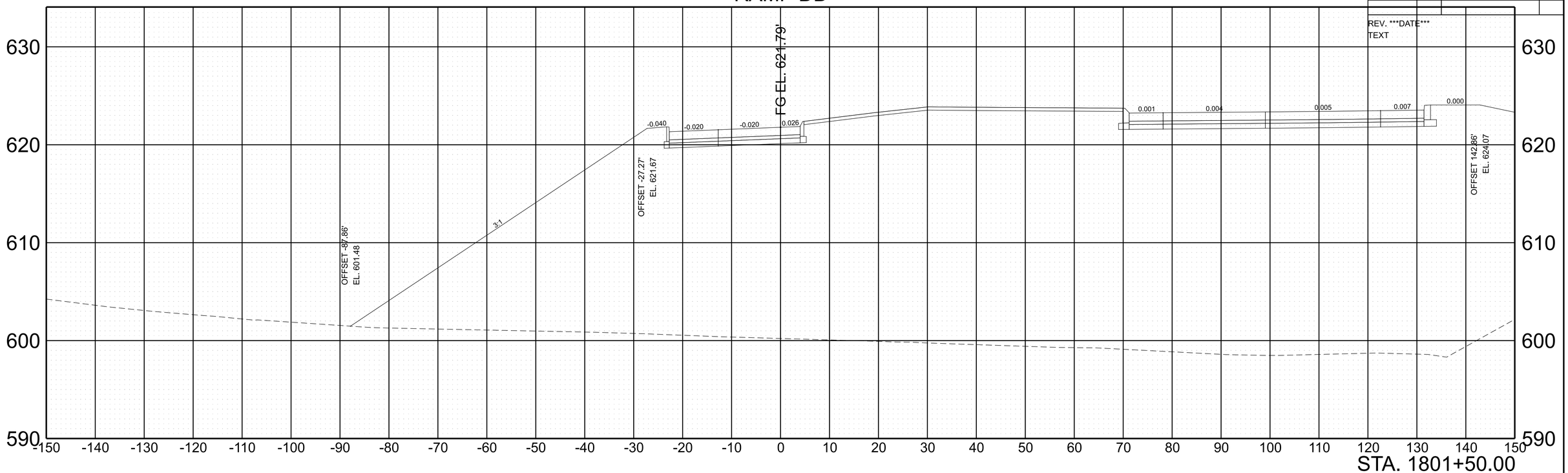
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:42:26 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-RAMP DD.DGN

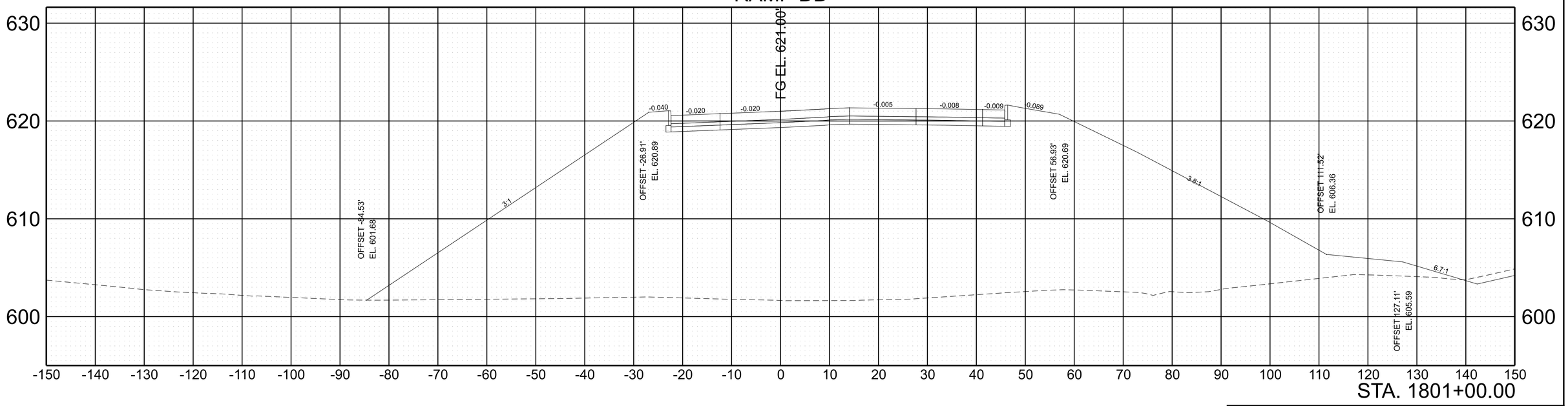
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A202

REV. ***DATE***
TEXT

RAMP DD



RAMP DD



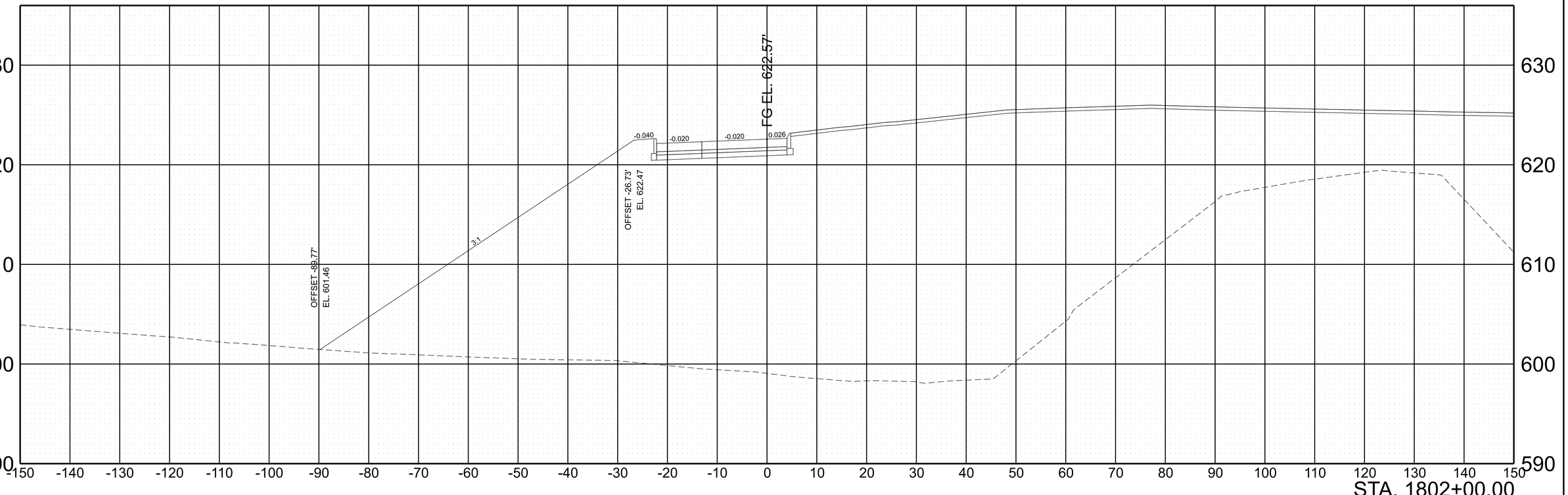
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:42:29 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP DD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A203

REV. ***DATE***
TEXT

RAMP DD



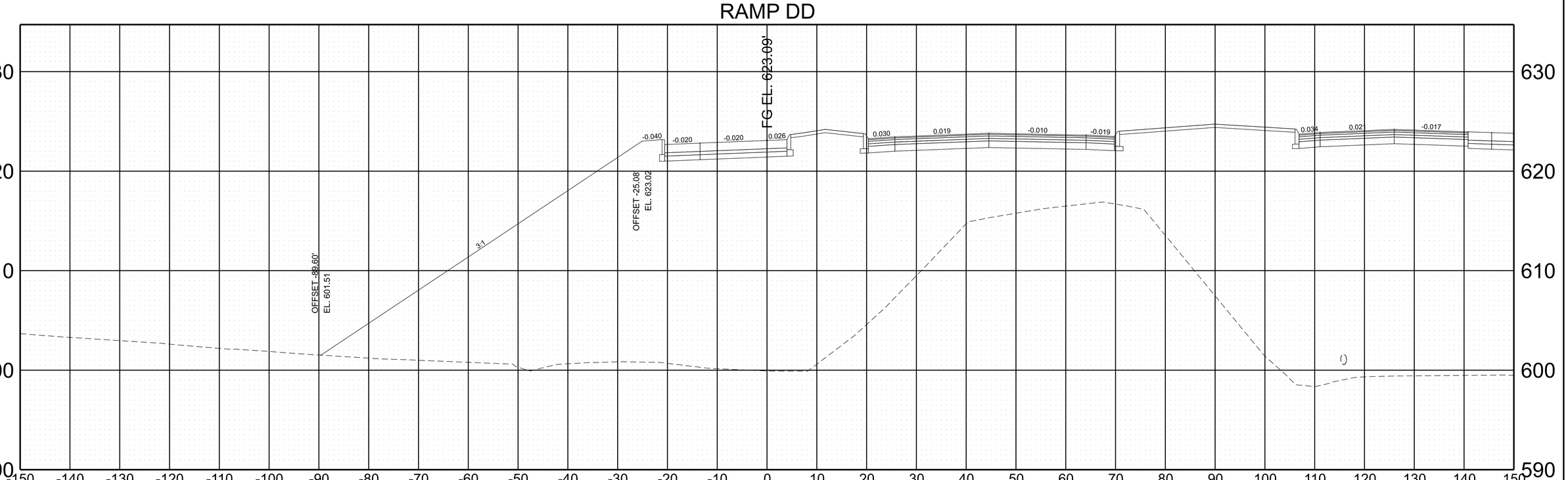
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:42:30 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-RAMP DD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A204

REV. ***DATE***
TEXT

RAMP DD



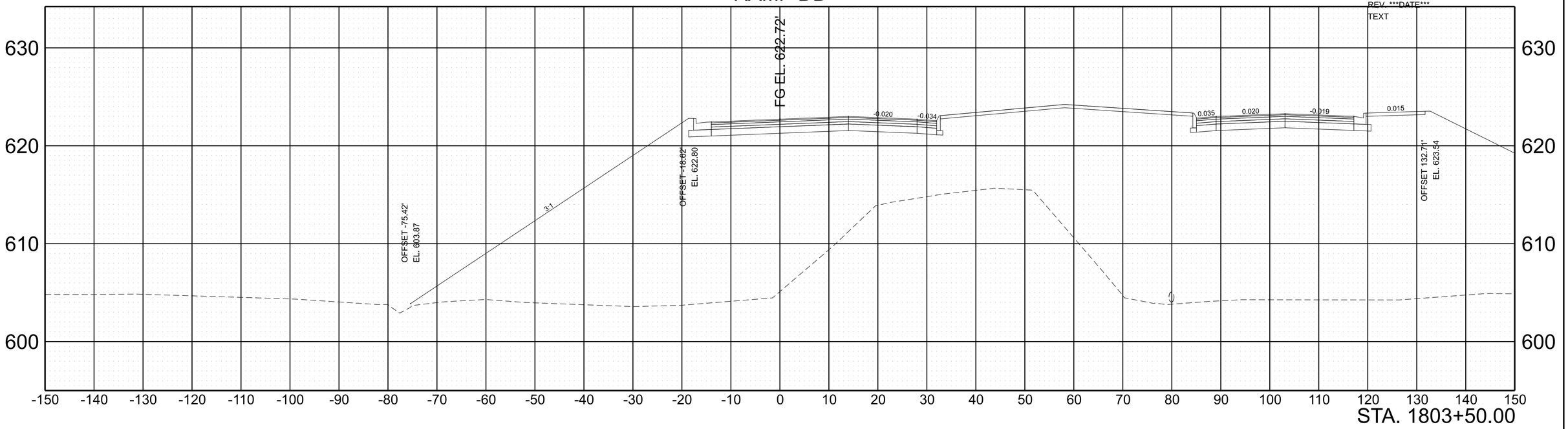
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:42:33 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-RAMP DD.DGN

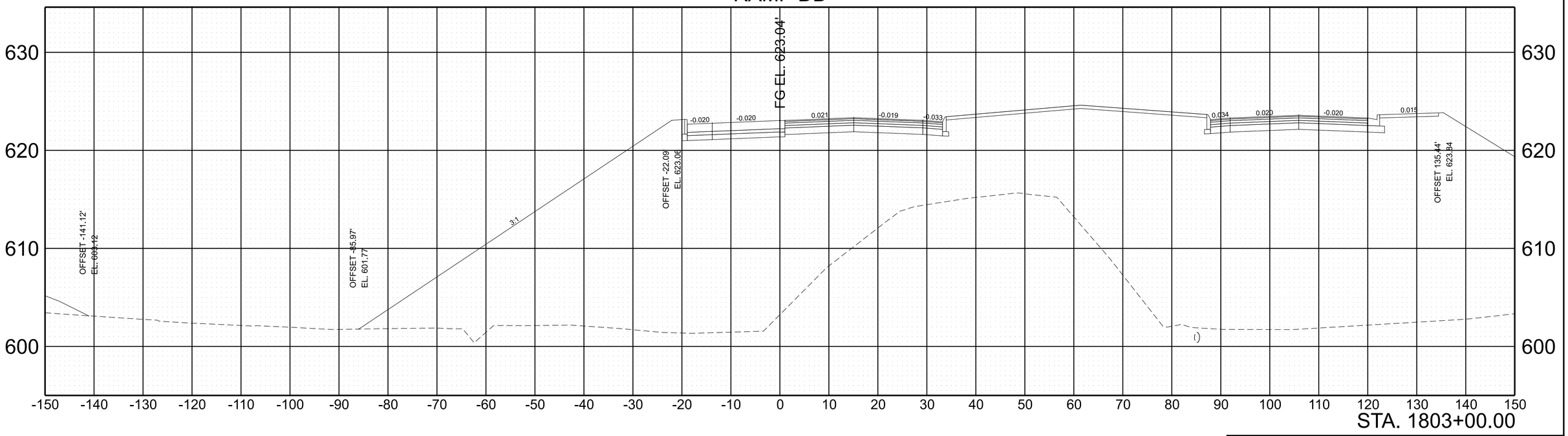
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A205

REV. ***DATE***
TEXT

RAMP DD



RAMP DD



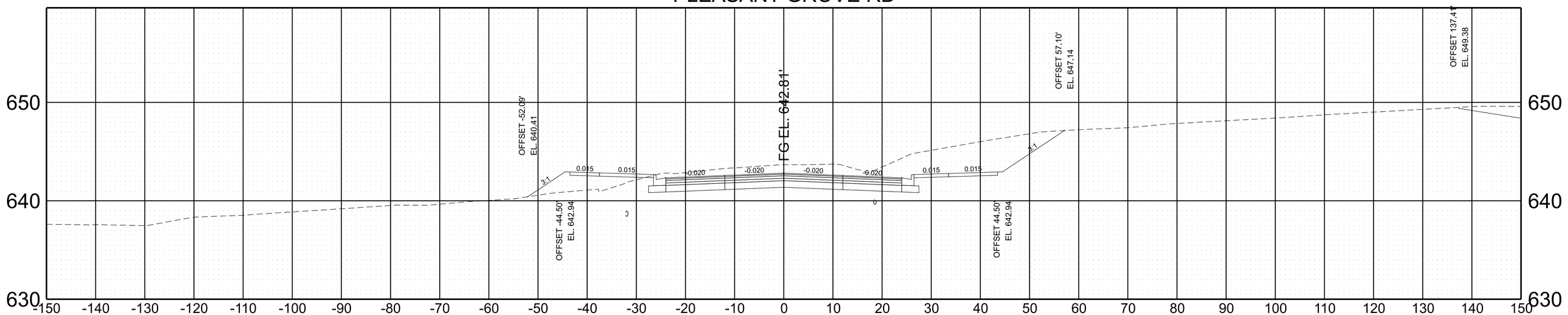
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:42:36 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-RAMP DD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A206

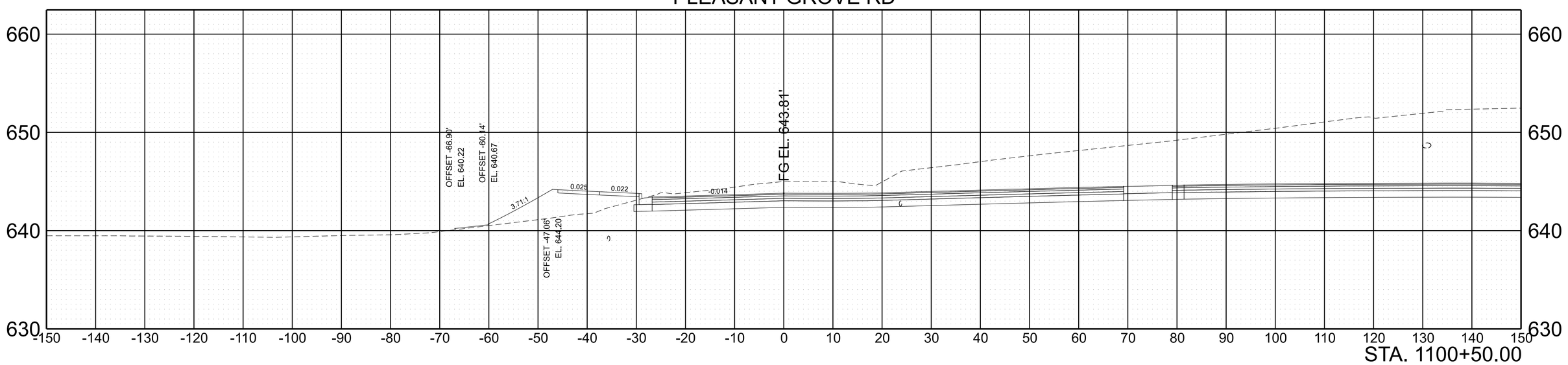
REV. ***DATE***
TEXT

PLEASANT GROVE RD



STA. 1101+00.00

PLEASANT GROVE RD



STA. 1100+50.00

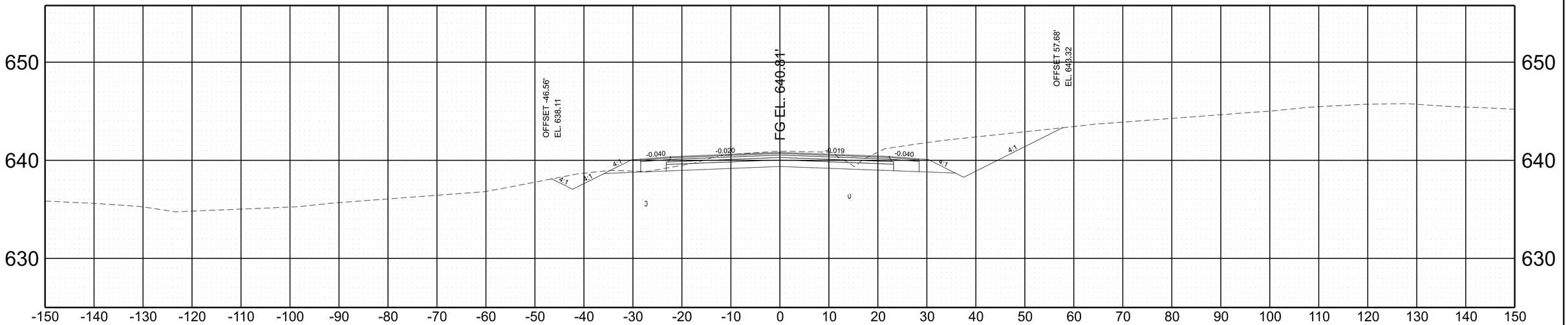
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:09 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A207

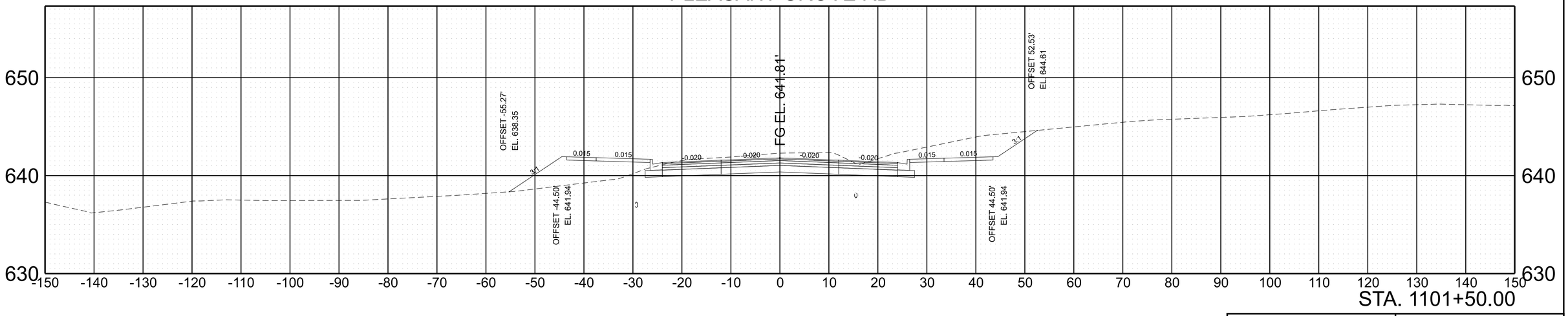
REV. ***DATE***
TEXT

PLEASANT GROVE RD



STA. 1102+00.00

PLEASANT GROVE RD



STA. 1101+50.00

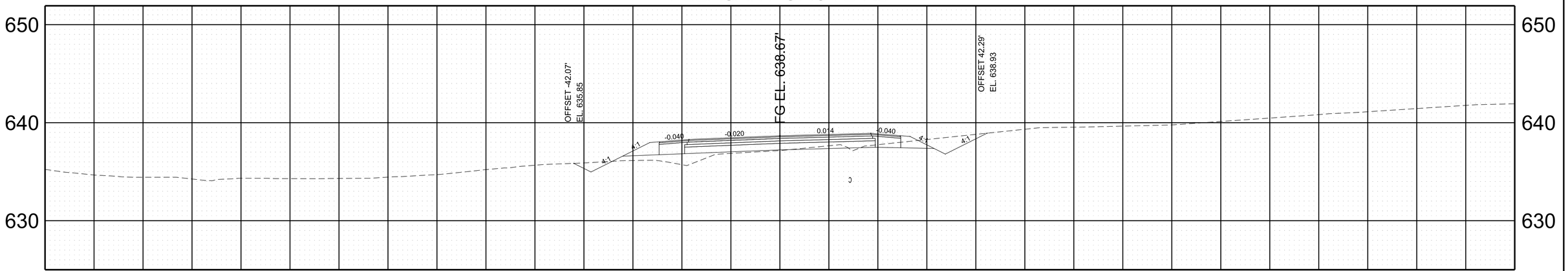
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:12 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A208

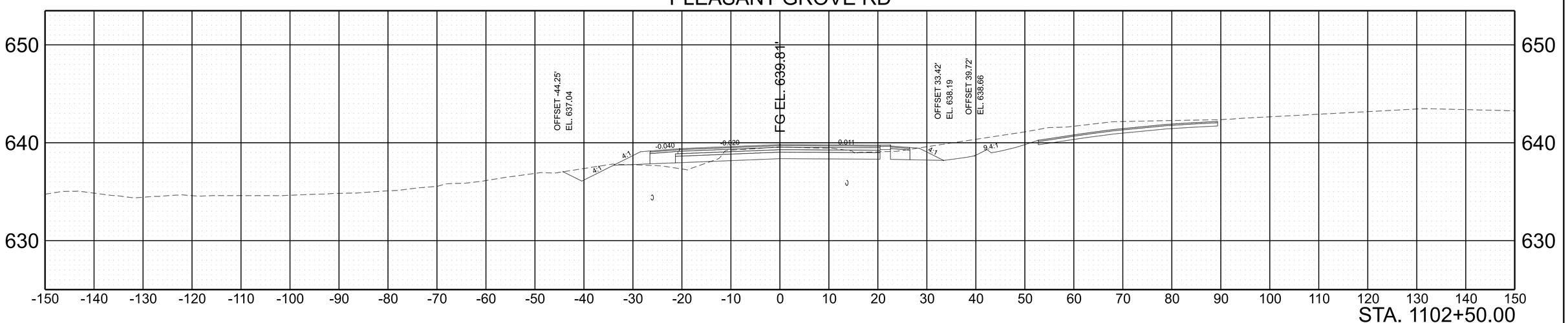
REV. ***DATE***
TEXT

PLEASANT GROVE RD



STA. 1103+00.00

PLEASANT GROVE RD



STA. 1102+50.00

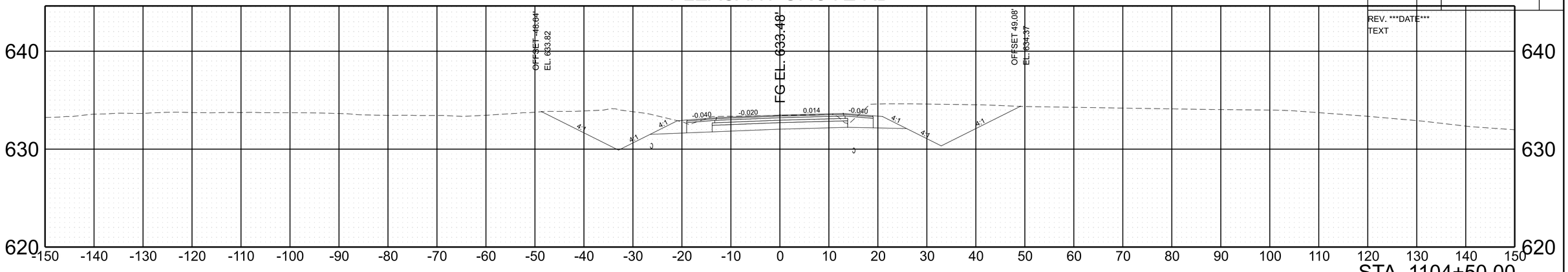
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:14 AM
C:\PWWORKINGIEAST01\D2328414\05\0040-SHT-XS-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A209

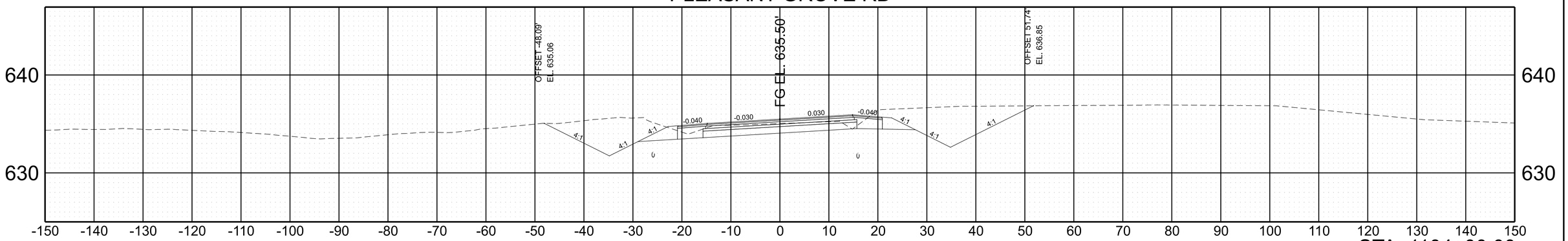
REV. ***DATE***
TEXT

PLEASANT GROVE RD



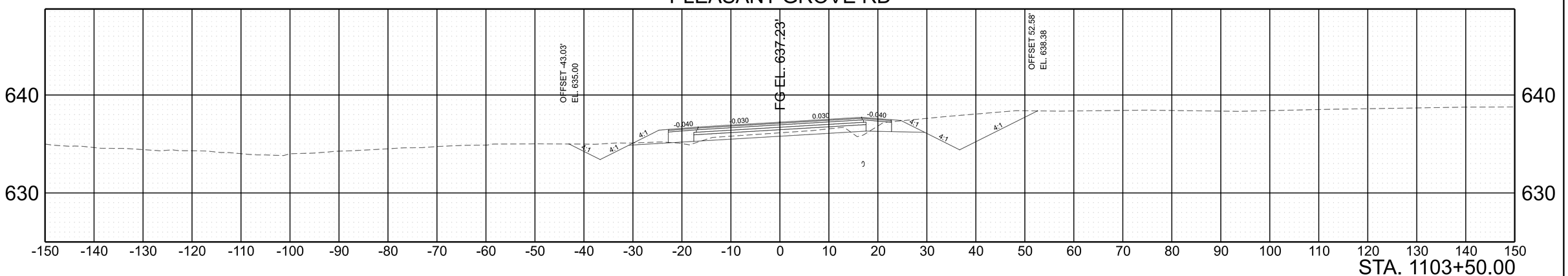
STA. 1104+50.00

PLEASANT GROVE RD



STA. 1104+00.00

PLEASANT GROVE RD



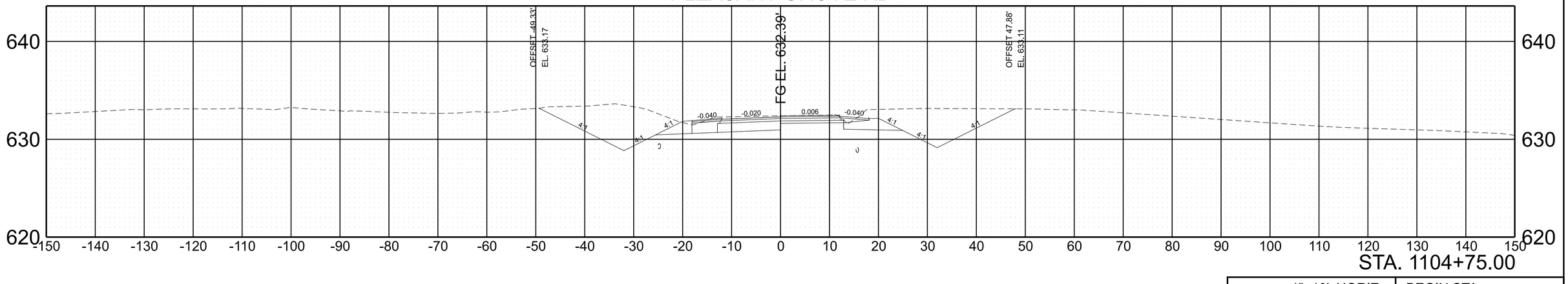
STA. 1103+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:17 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A210

REV. ***DATE***
TEXT

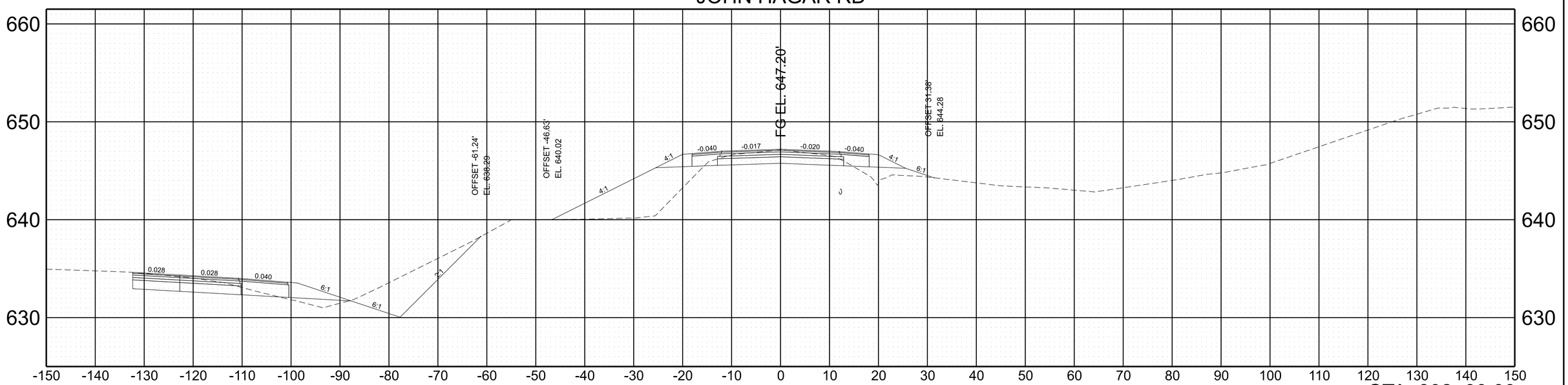


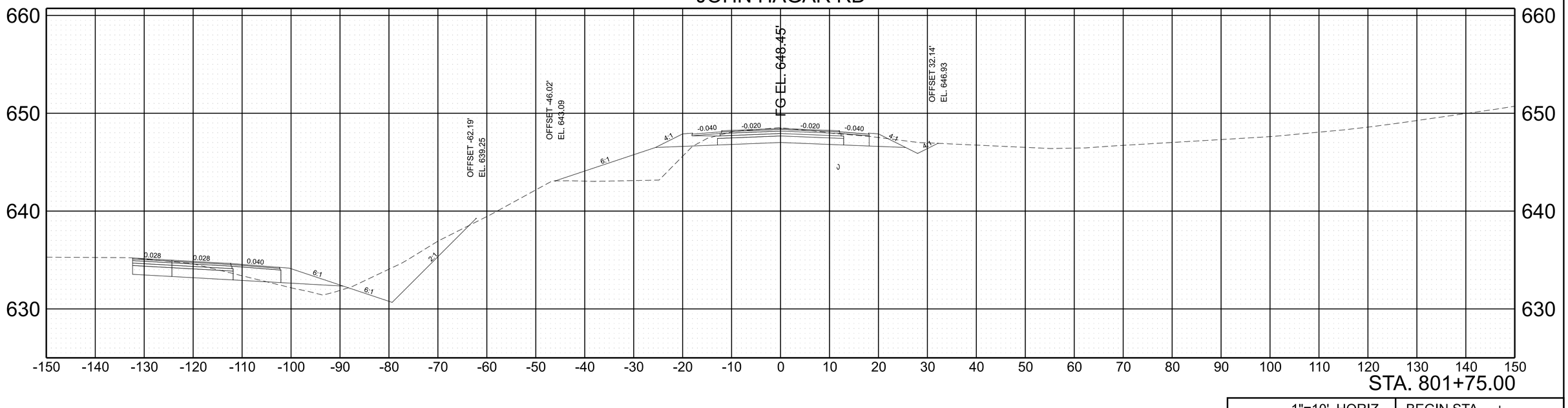
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:18 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PLEASANT GROVE RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A211

REV. ***DATE***
TEXT



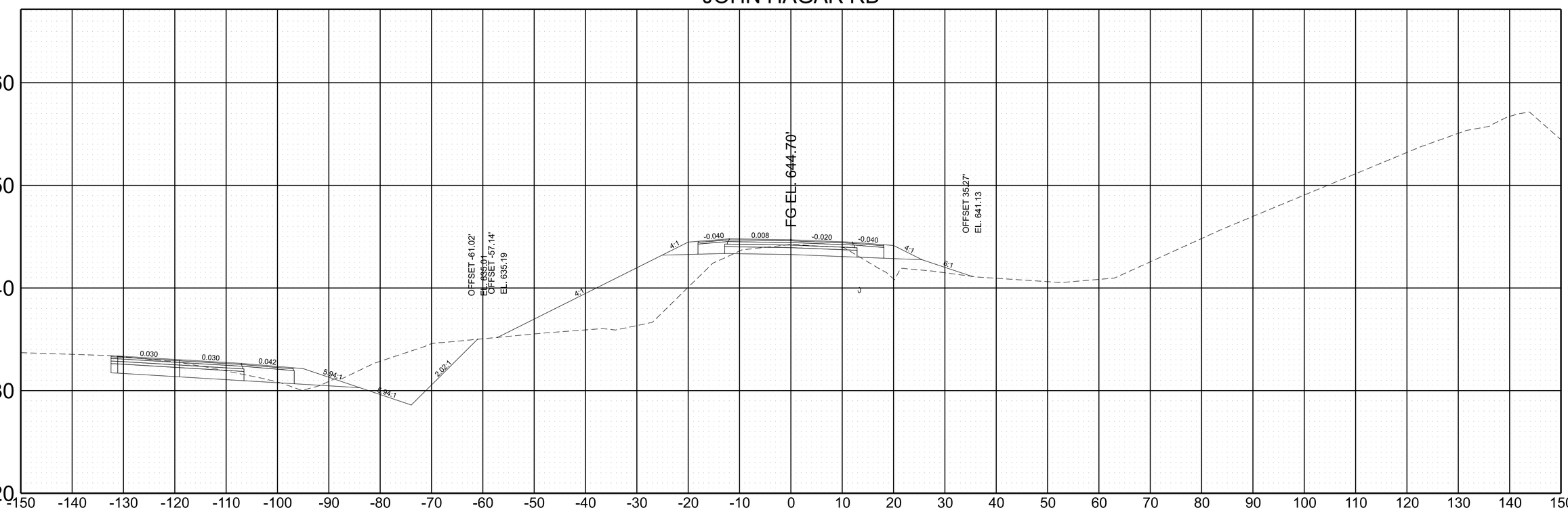


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:43:52 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A212

REV. ***DATE***
TEXT



SCALE: 1"=10' HORIZ. 1"=5' VERT.

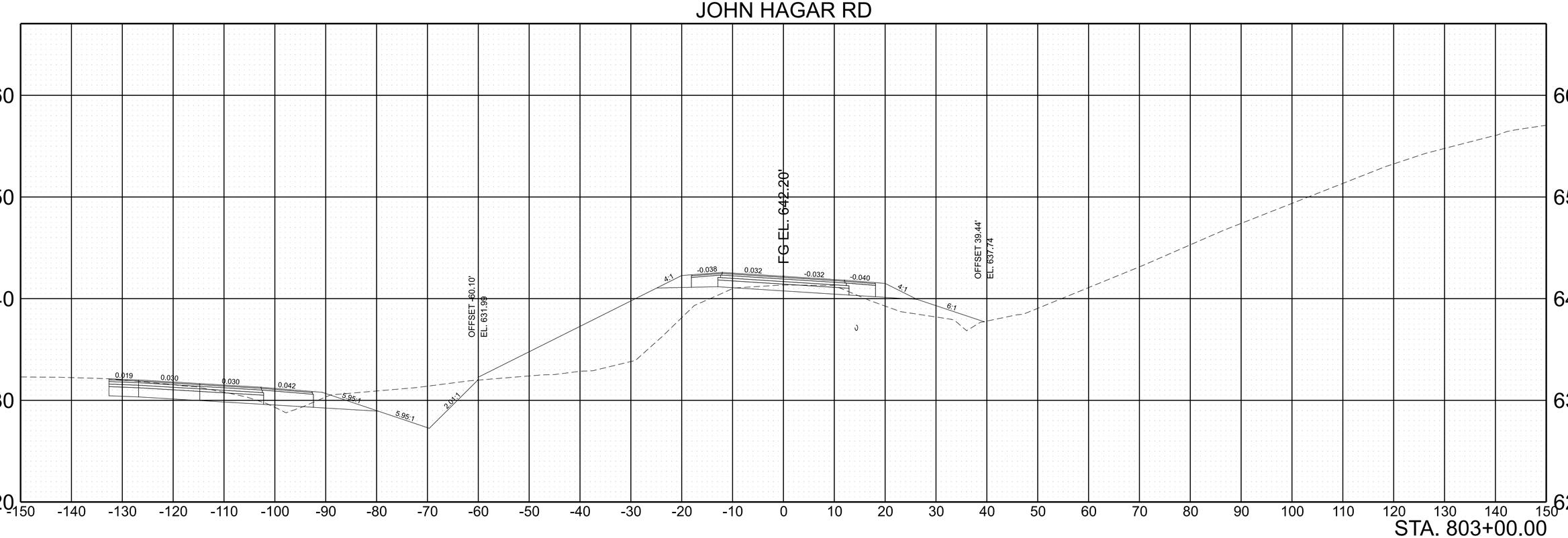
BEGIN STA. + .
END STA. + .

2/6/2023 8:43:54 AM
C:\PWWORKINGIEAST01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A213

REV. ***DATE***
TEXT

JOHN HAGAR RD



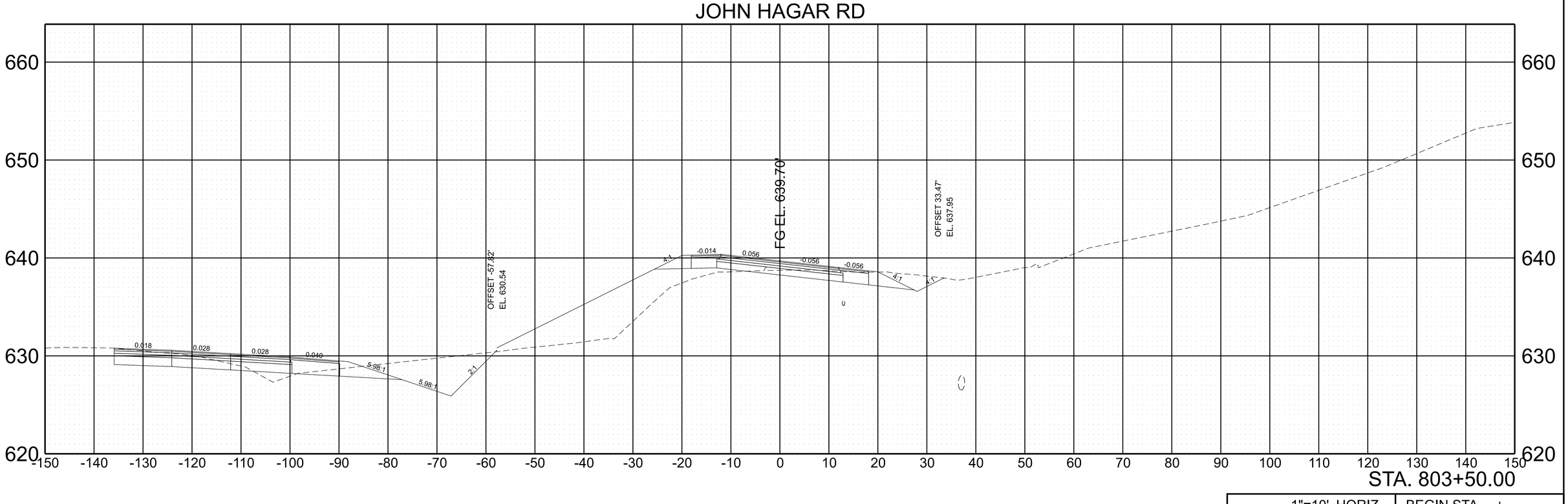
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:43:55 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A214

REV. ***DATE***
TEXT

JOHN HAGAR RD



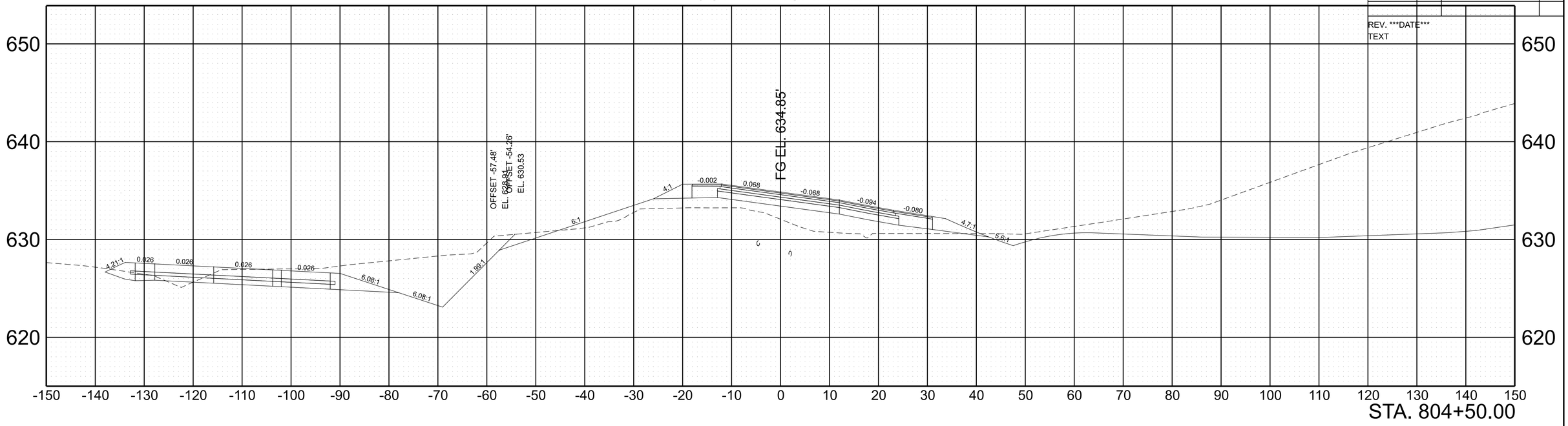
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:43:57 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-JOHN HAGAR RD.DGN

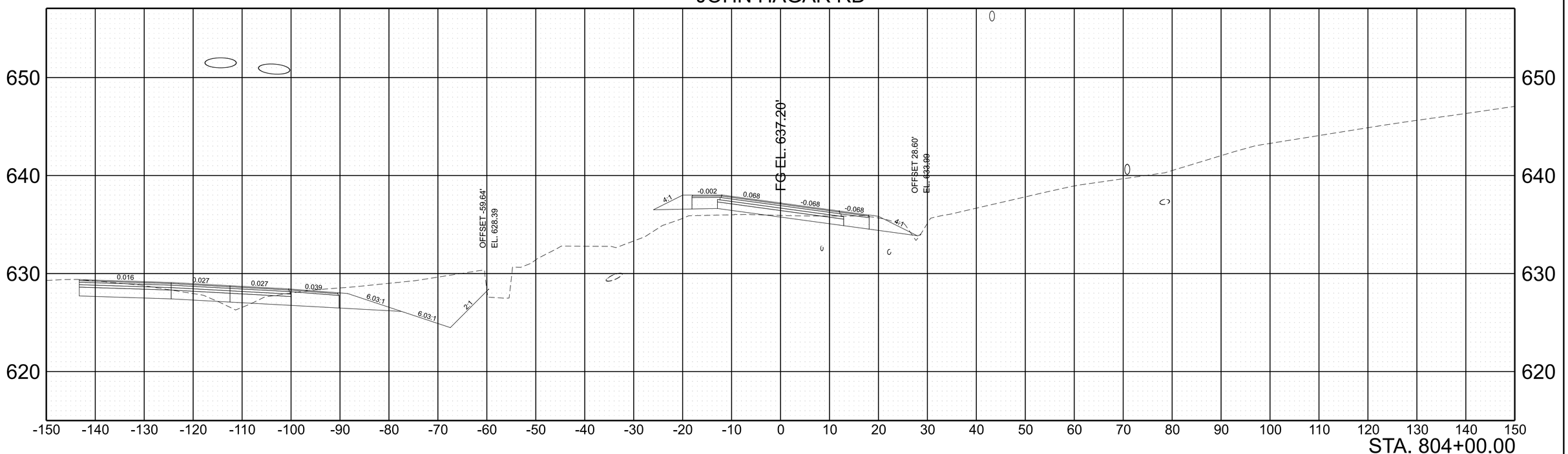
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A215

REV. ***DATE***
TEXT

JOHN HAGAR RD



JOHN HAGAR RD



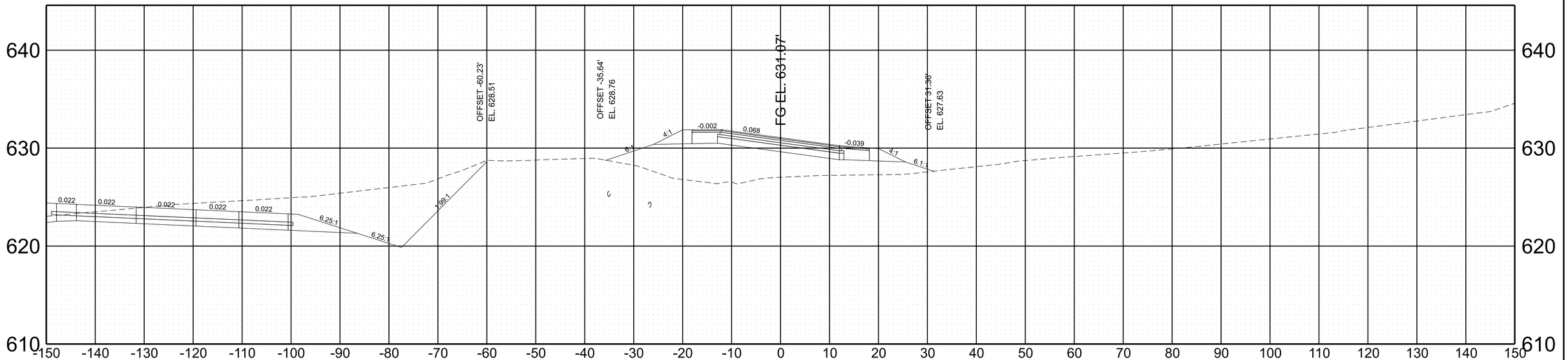
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:00 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	A216

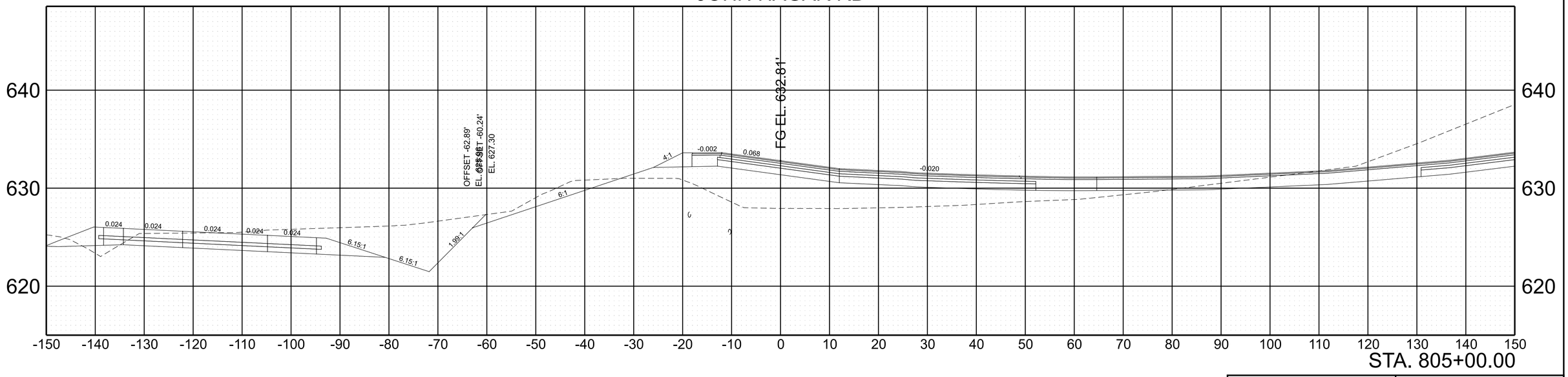
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 805+50.00

JOHN HAGAR RD



STA. 805+00.00

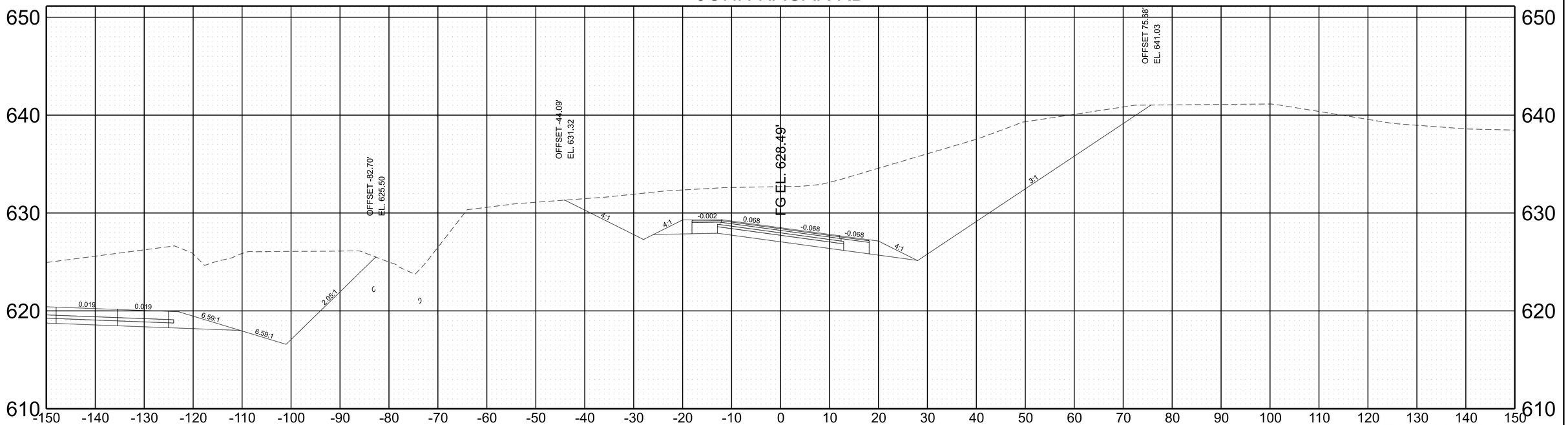
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:03 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A217

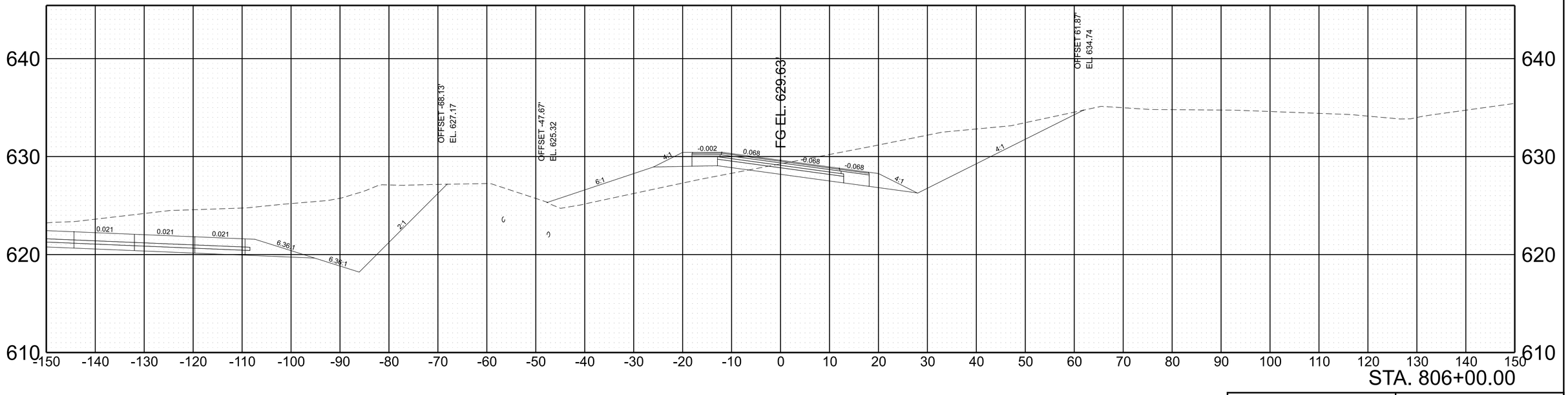
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 806+50.00

JOHN HAGAR RD



STA. 806+00.00

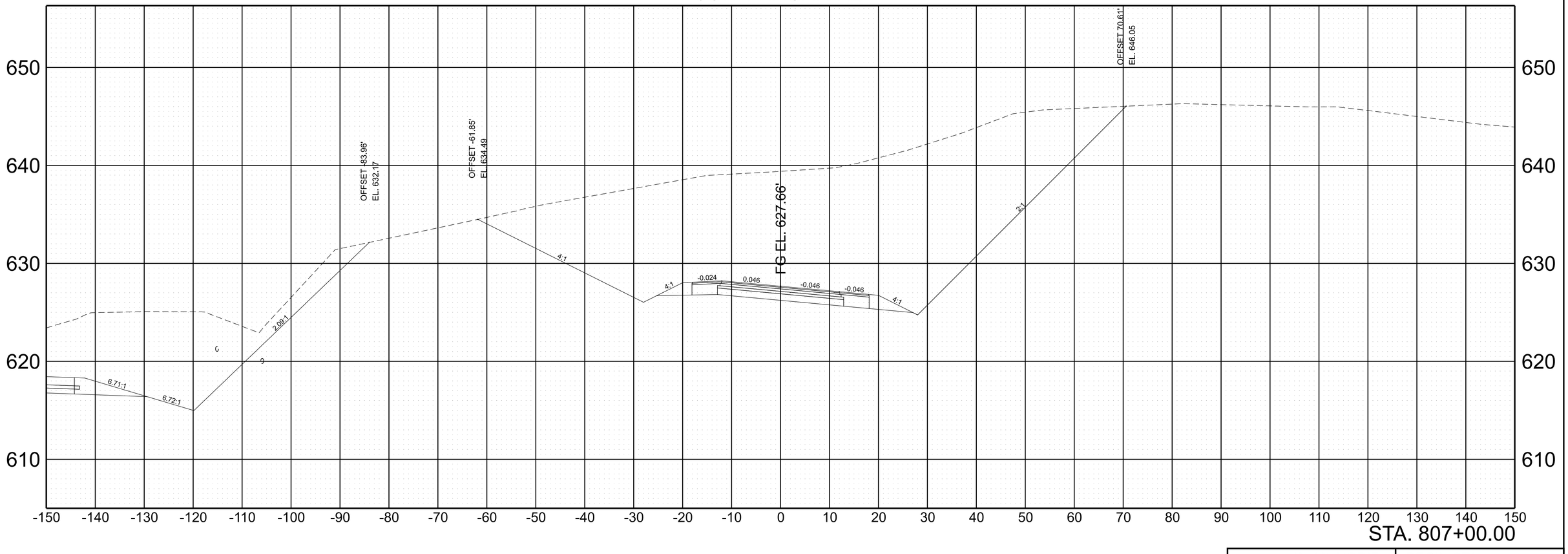
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:06 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A218

REV. ***DATE***
TEXT

JOHN HAGAR RD



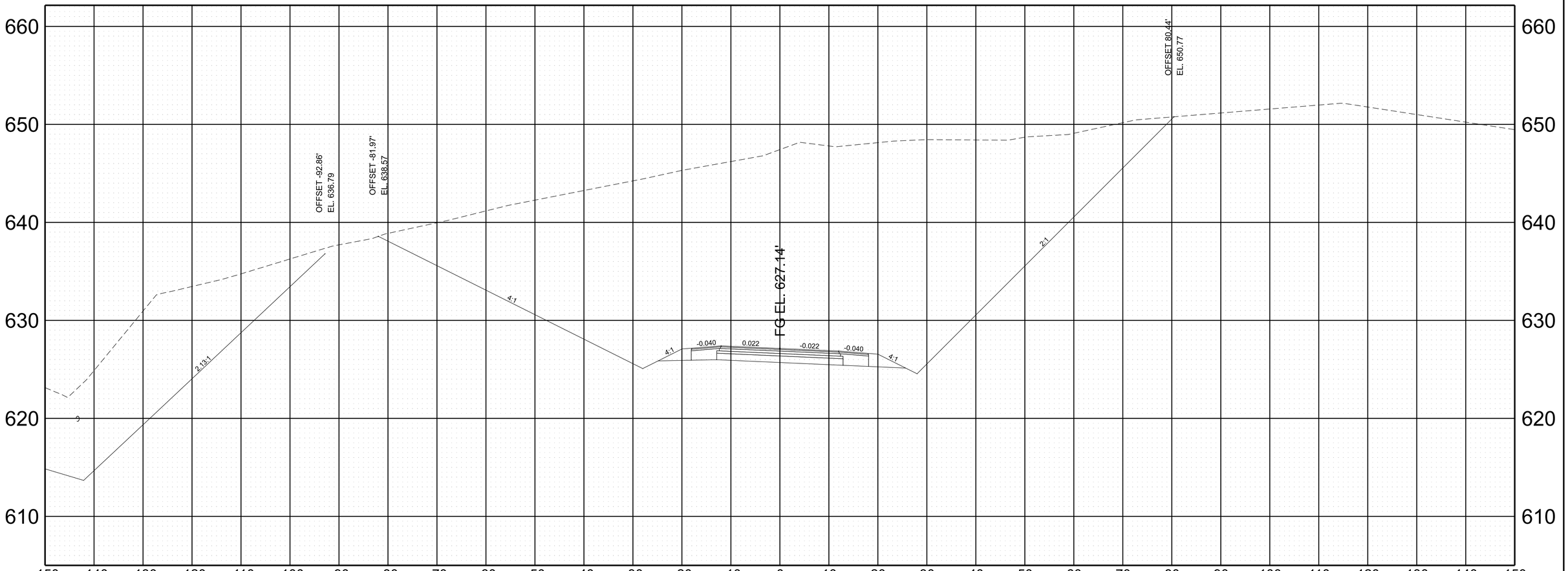
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:08 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A219

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 807+50.00

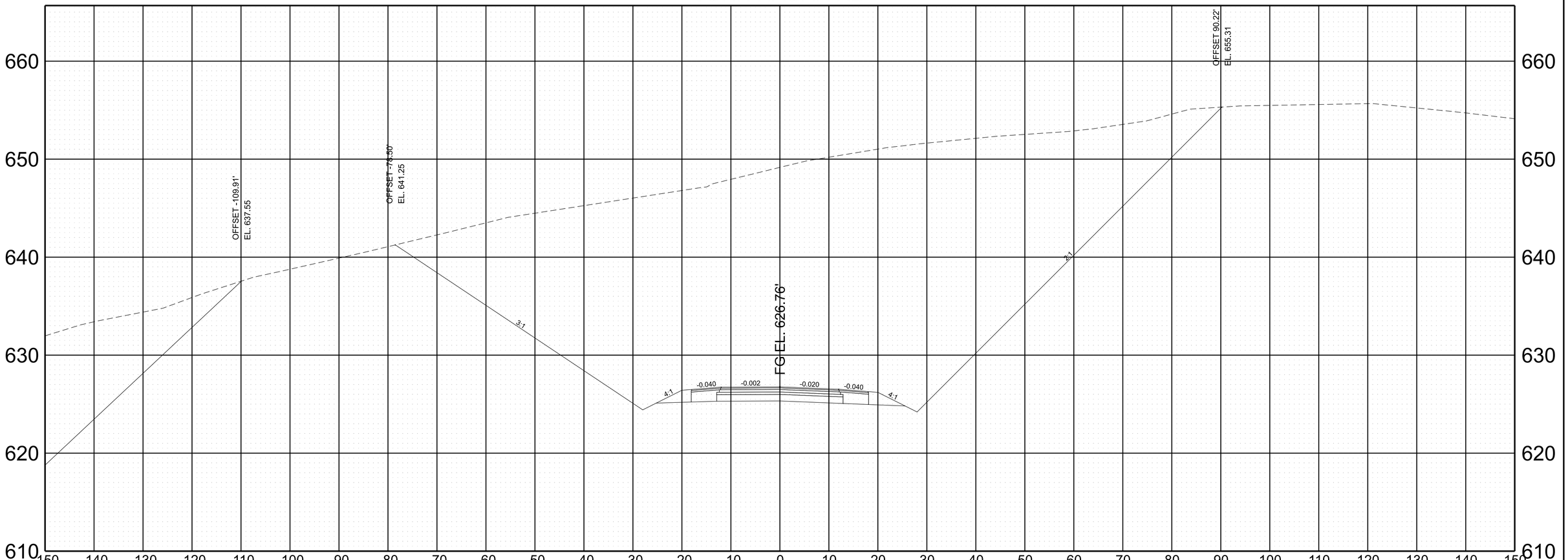
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:09 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A220

REV. ***DATE***
TEXT

JOHN HAGAR RD



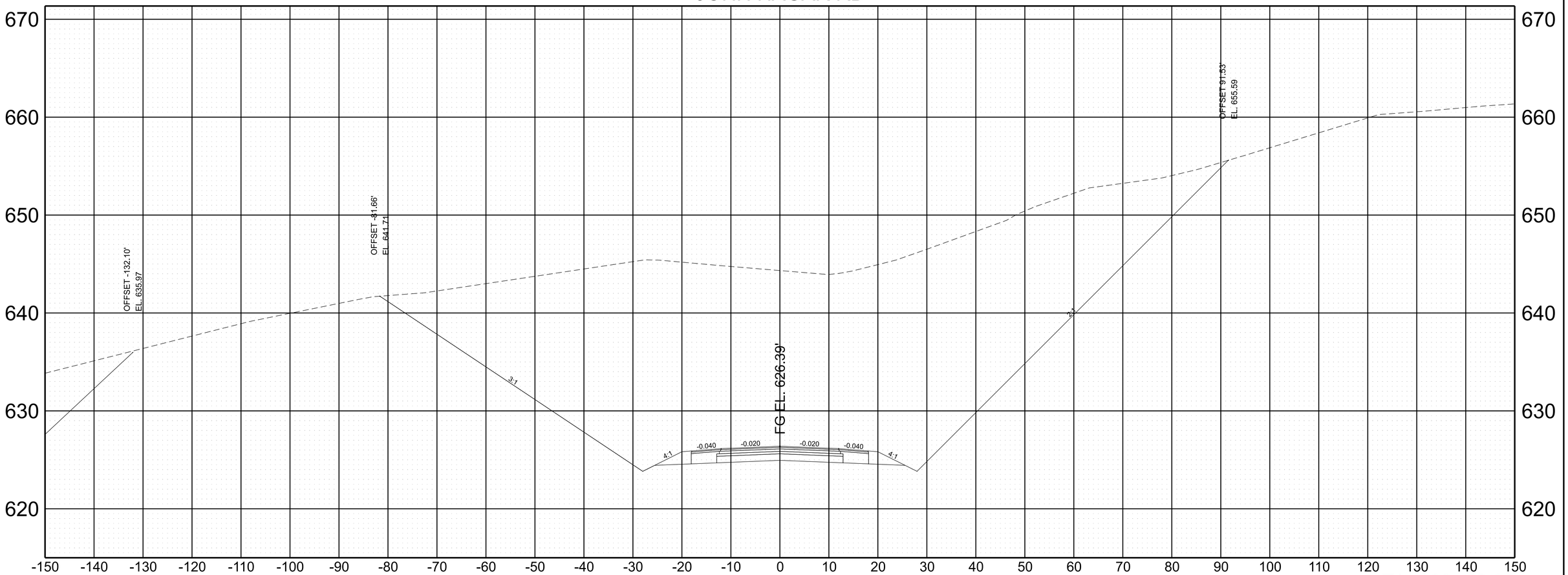
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:11 AM
C:\PWWORKING\EAST01\D2328414\9SI040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A221

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 808+50.00

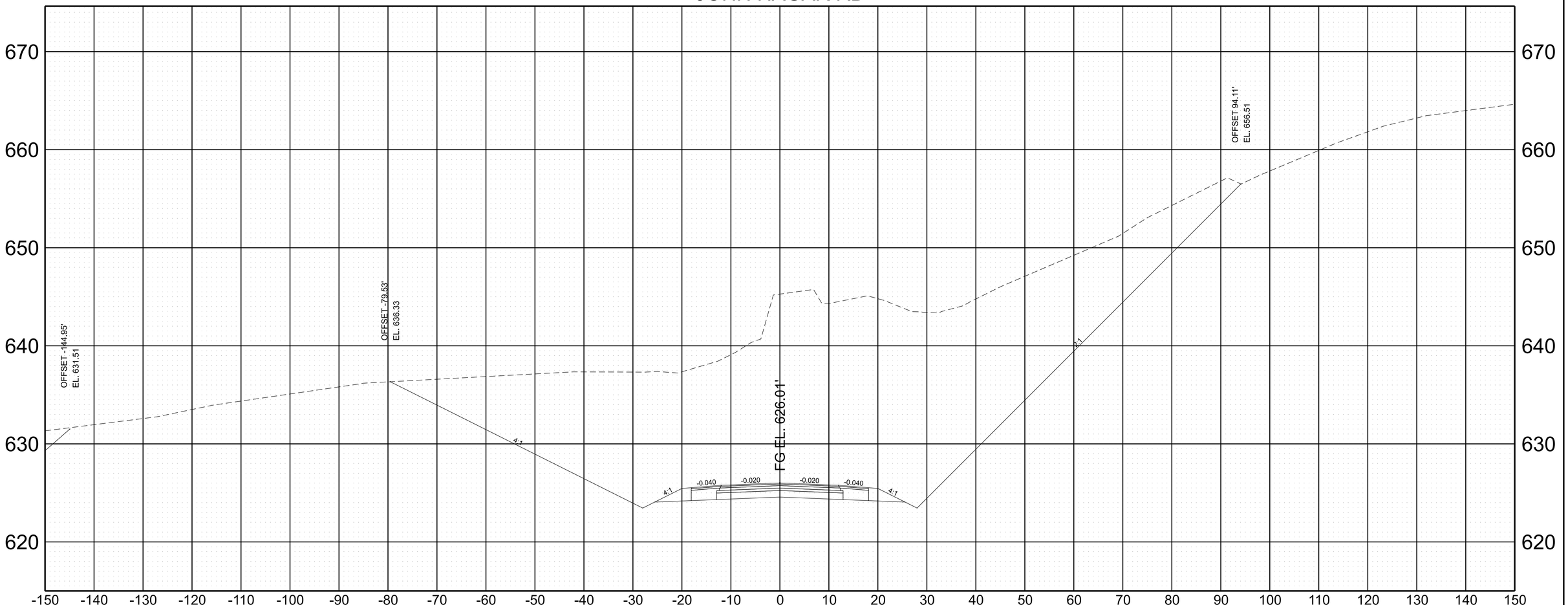
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:13 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A222

REV. ***DATE***
TEXT

JOHN HAGAR RD



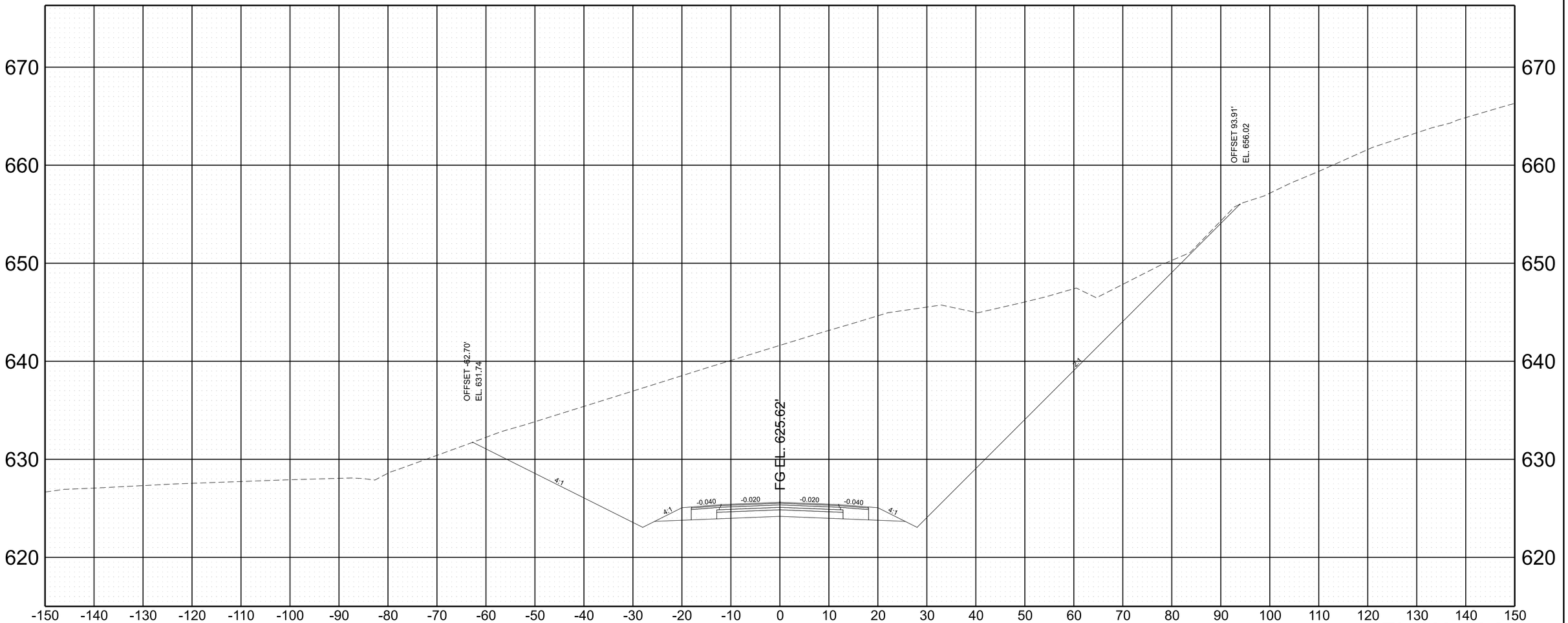
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:44:15 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A223

REV. ***DATE***
TEXT

JOHN HAGAR RD



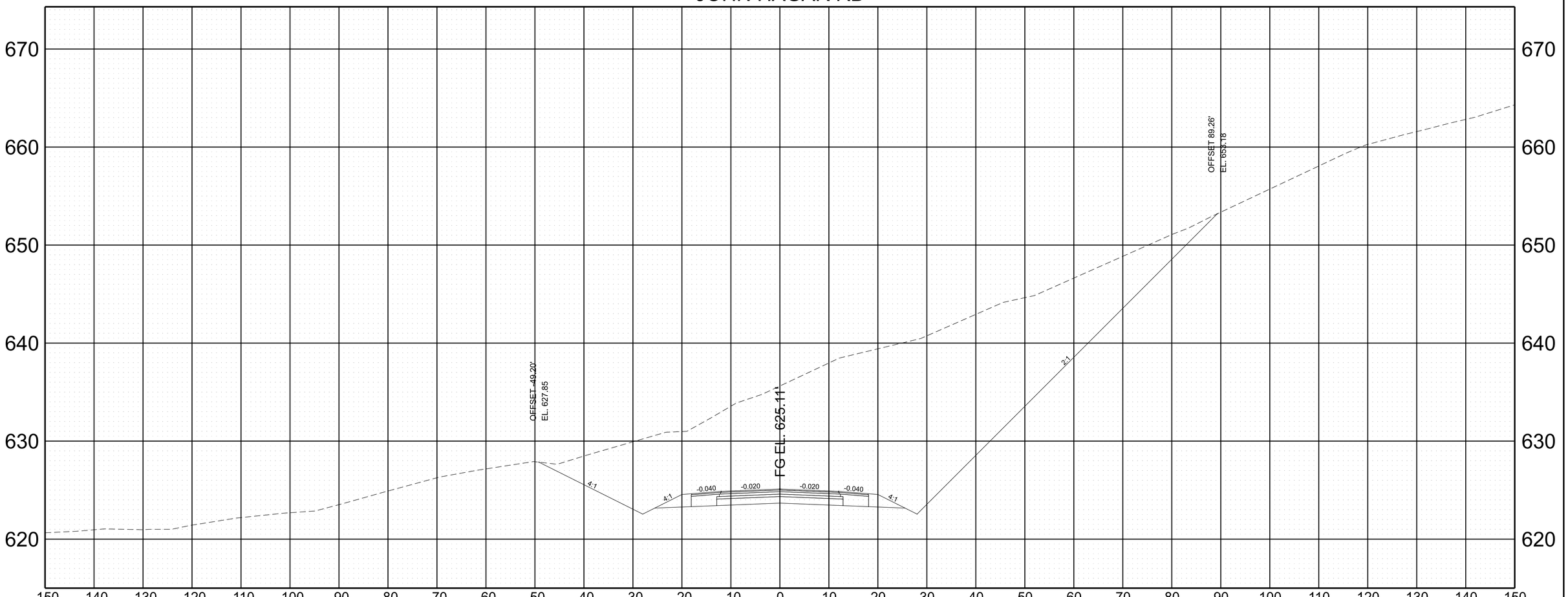
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:17 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A224

REV. ***DATE***
TEXT

JOHN HAGAR RD



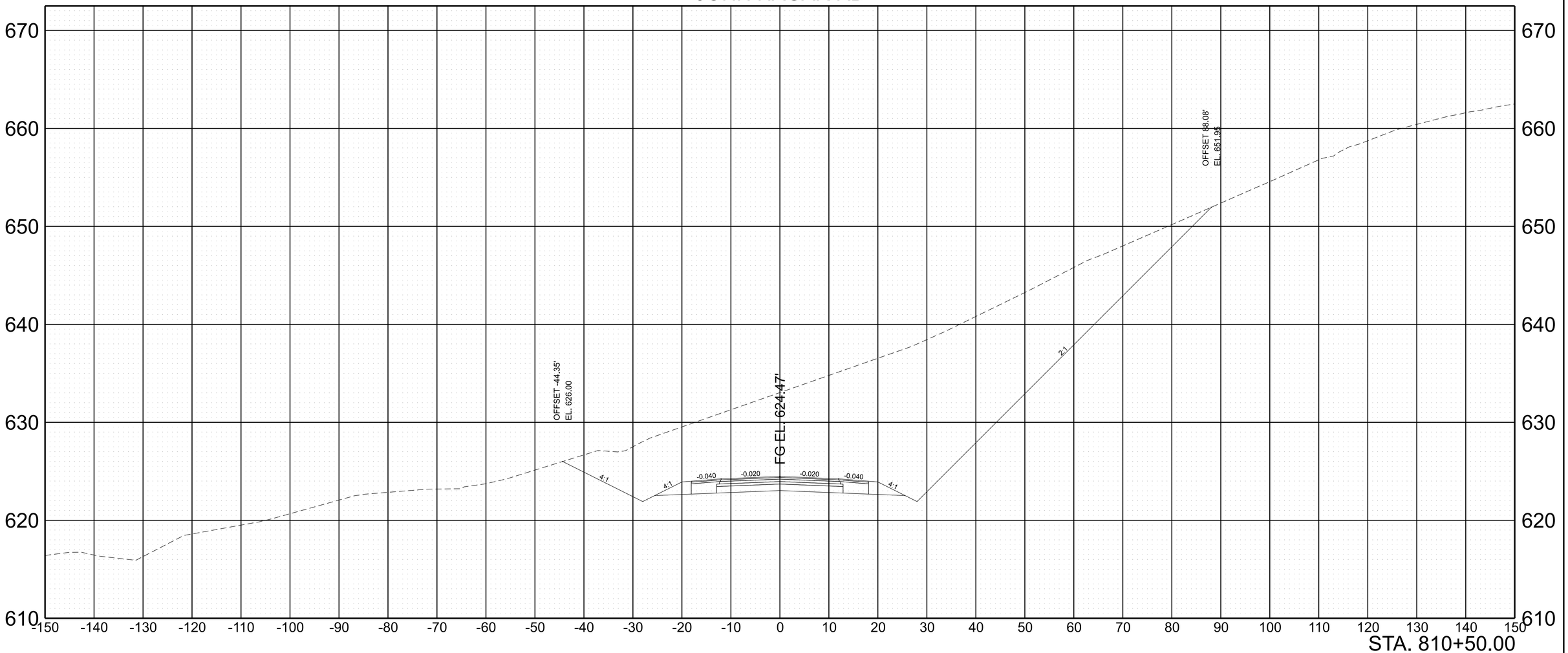
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:19 AM
C:\PWWORKINGIEAST01\D2328414\95\I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A225

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 810+50.00

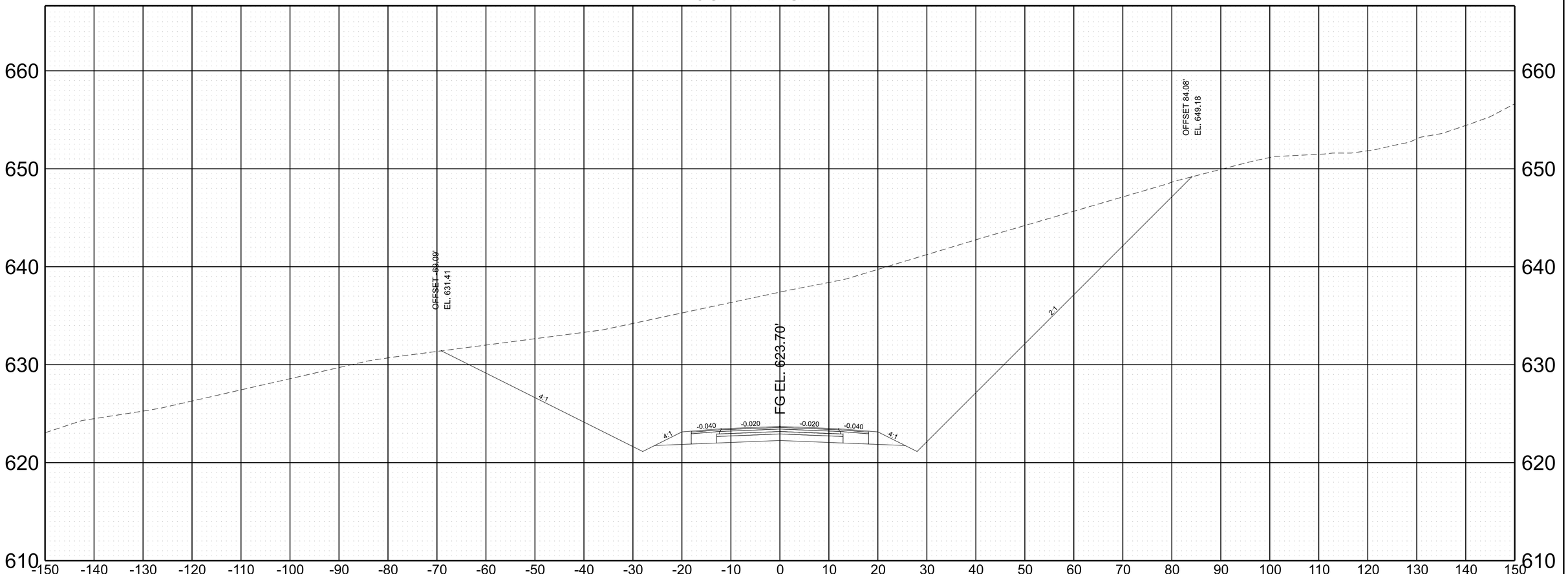
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:44:20 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A226

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 811+00.00

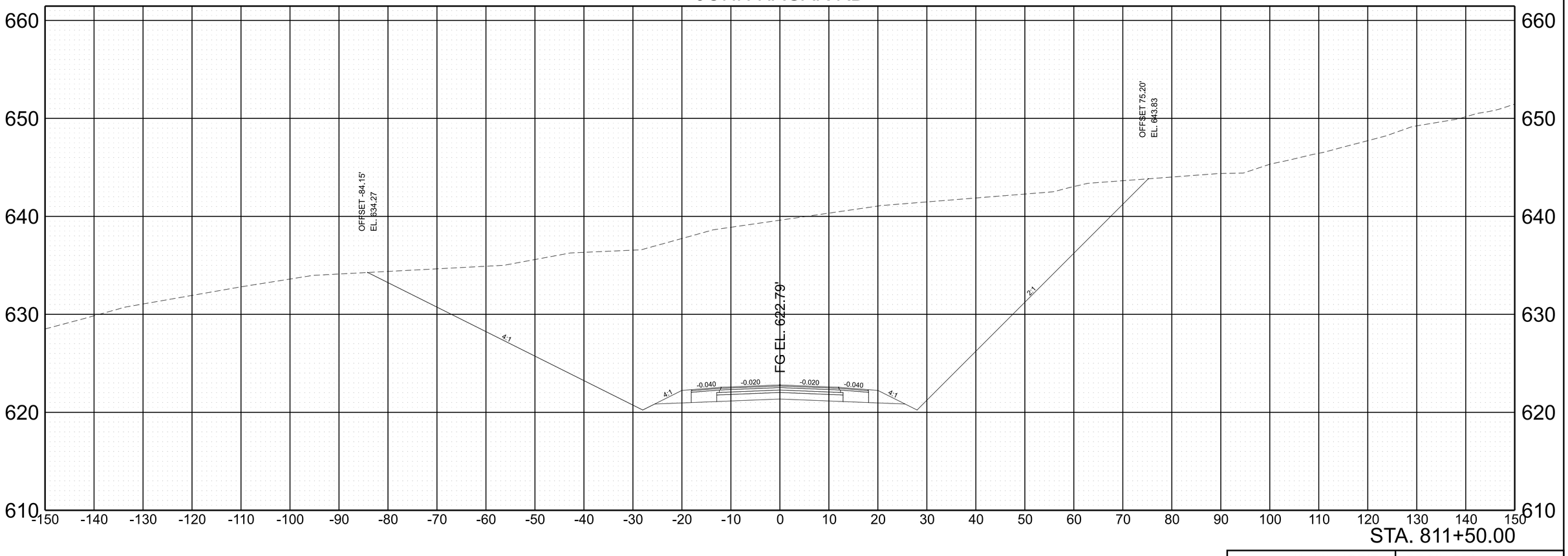
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:45:48 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A227

REV. ***DATE***
TEXT

JOHN HAGAR RD



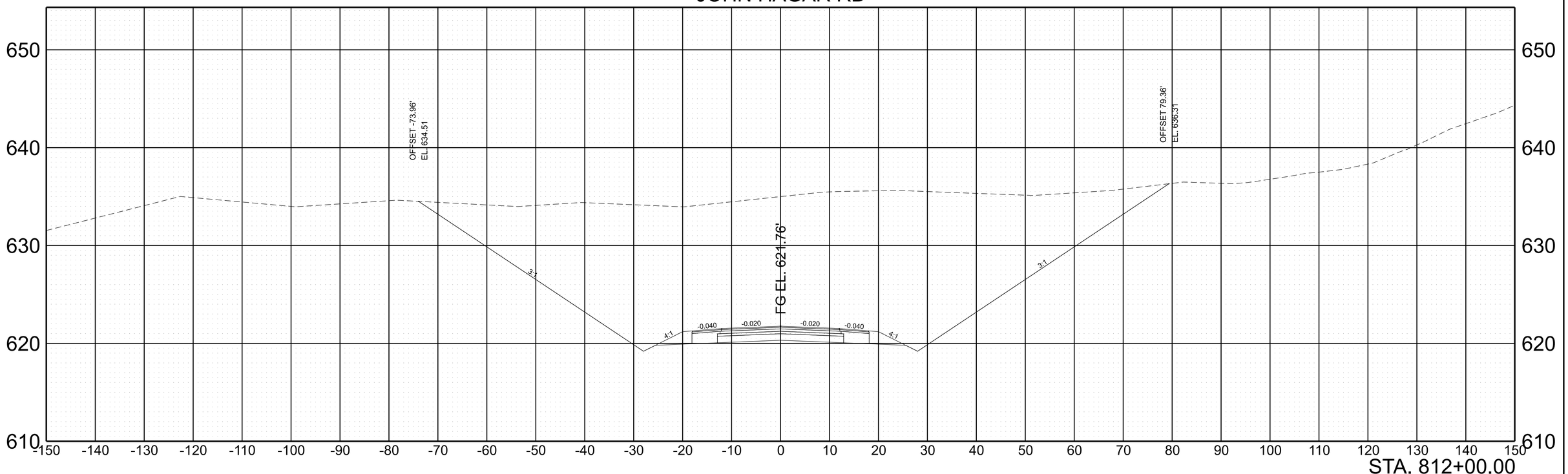
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:45:50 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A228

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 812+00.00

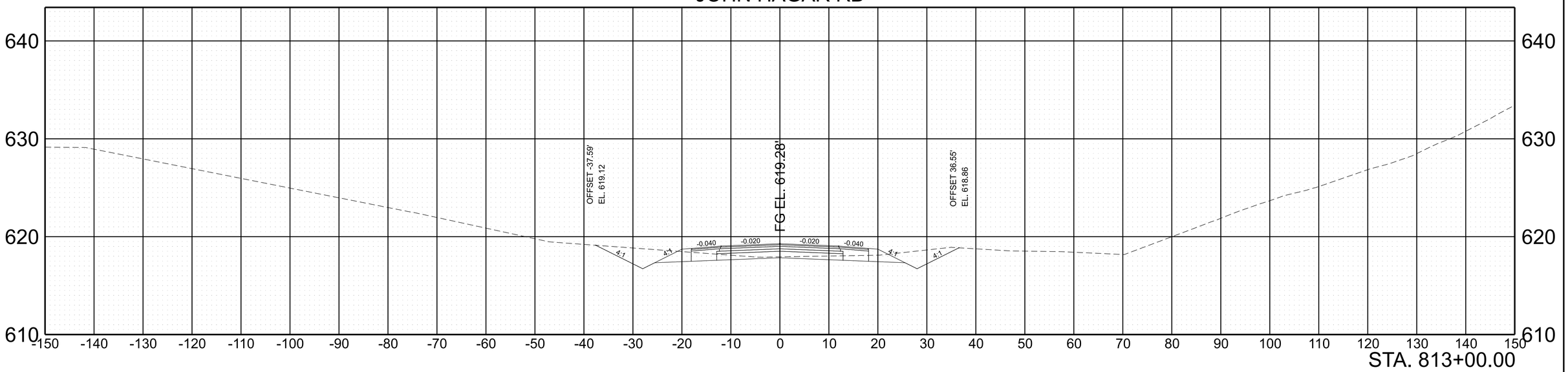
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:45:52 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A229

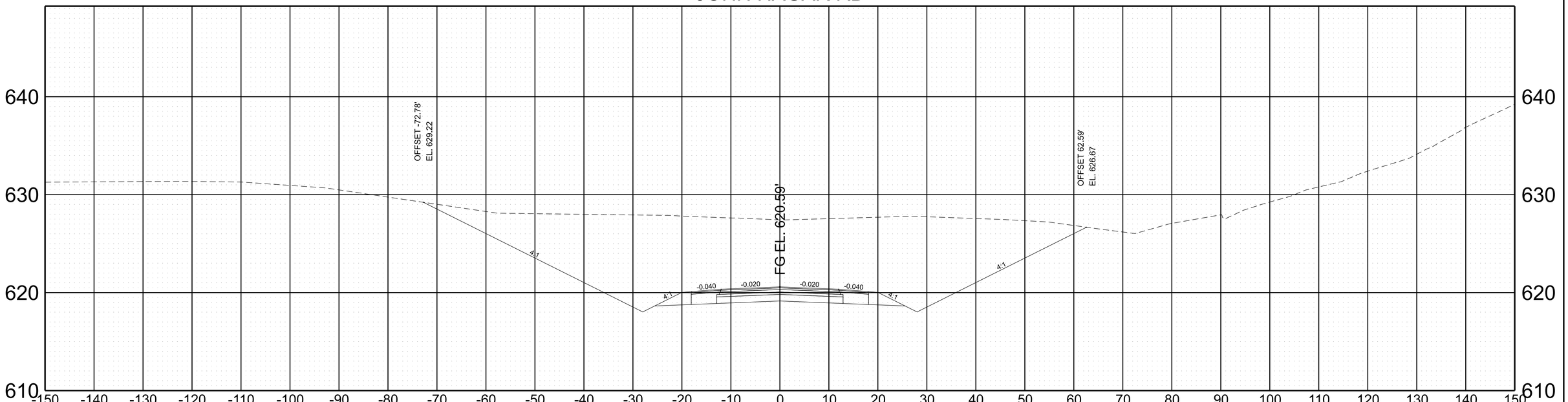
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 813+00.00

JOHN HAGAR RD



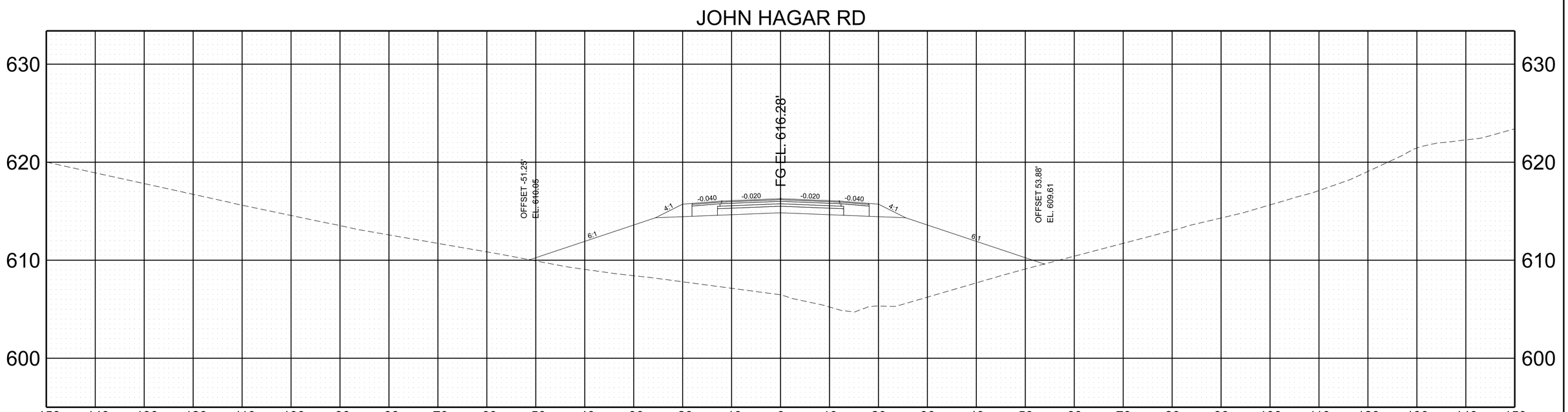
STA. 812+50.00

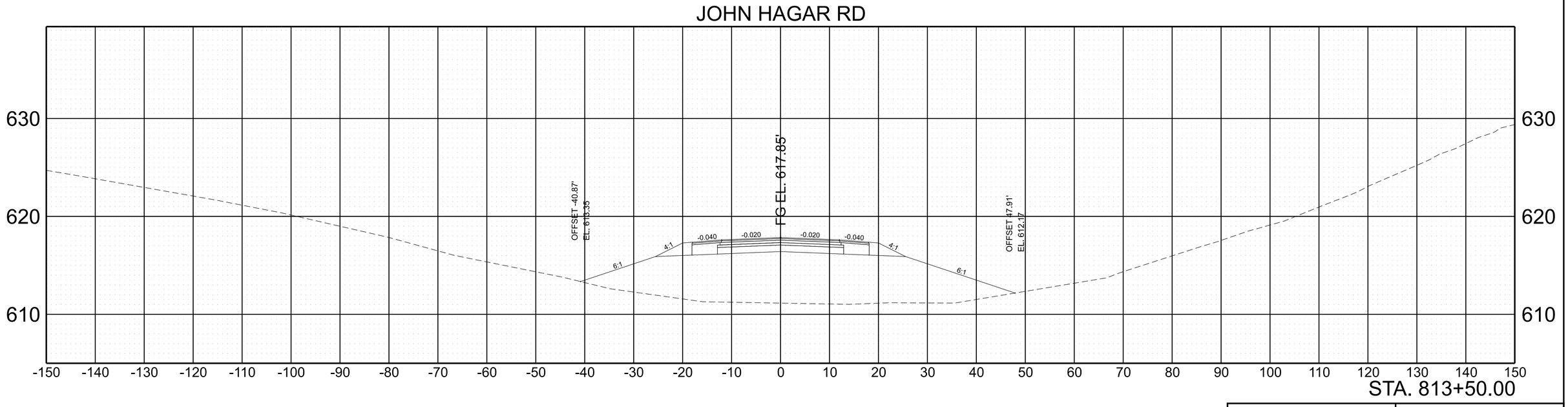
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:45:55 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A230

REV. ***DATE***
TEXT



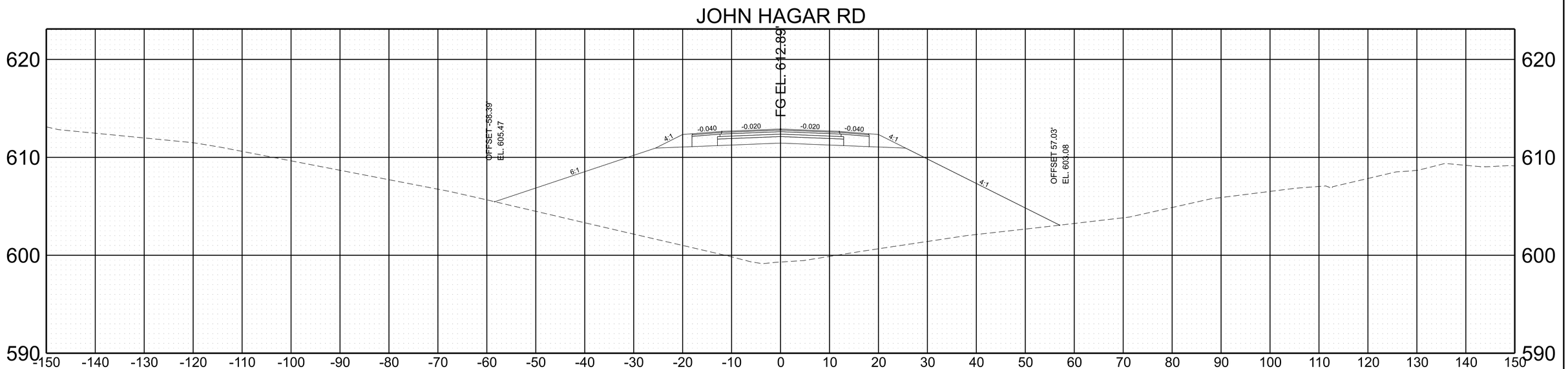


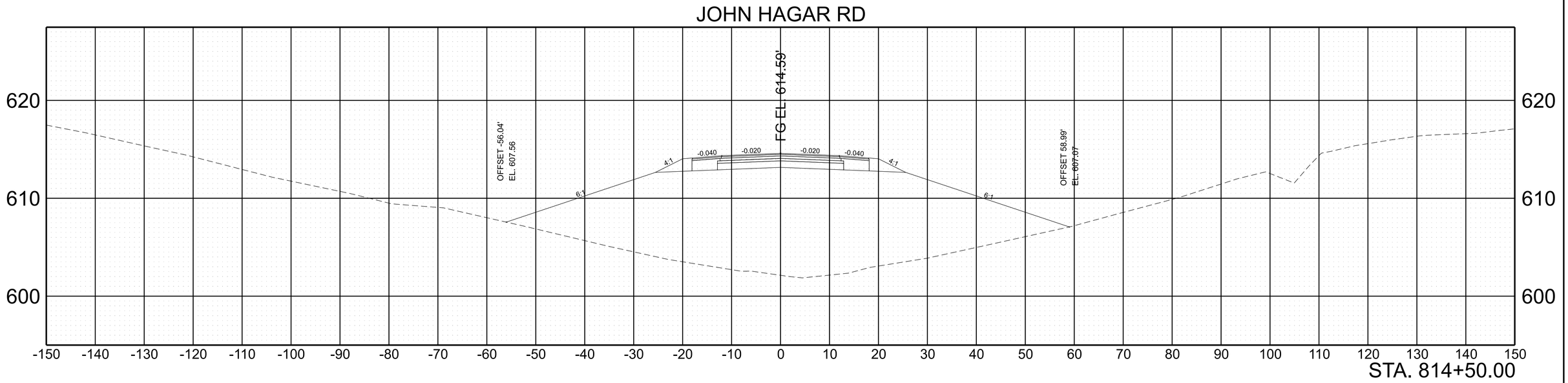
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:45:57 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A231

REV. ***DATE***
TEXT





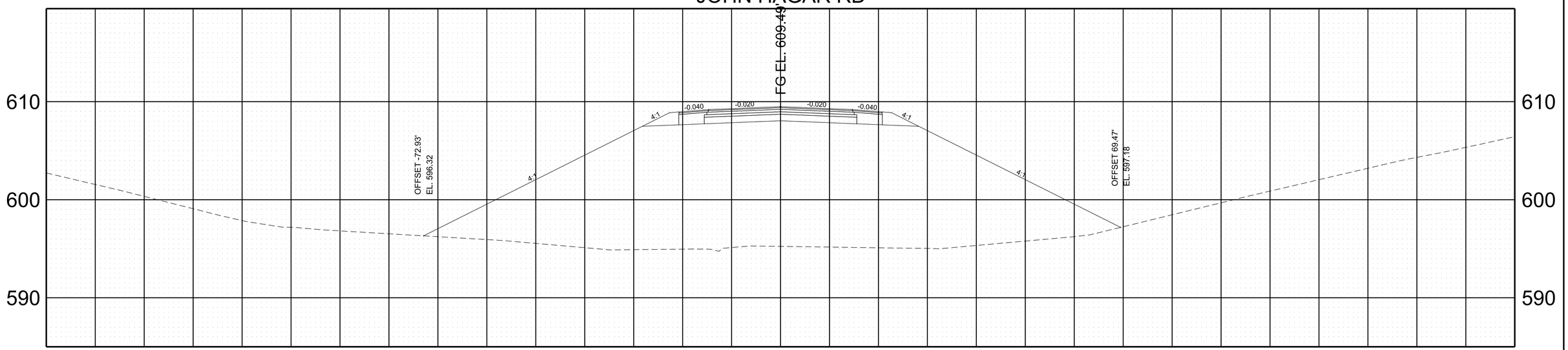
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:00 AM
C:\PWWORKING\EAST\01\D2328414\95\0040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A232

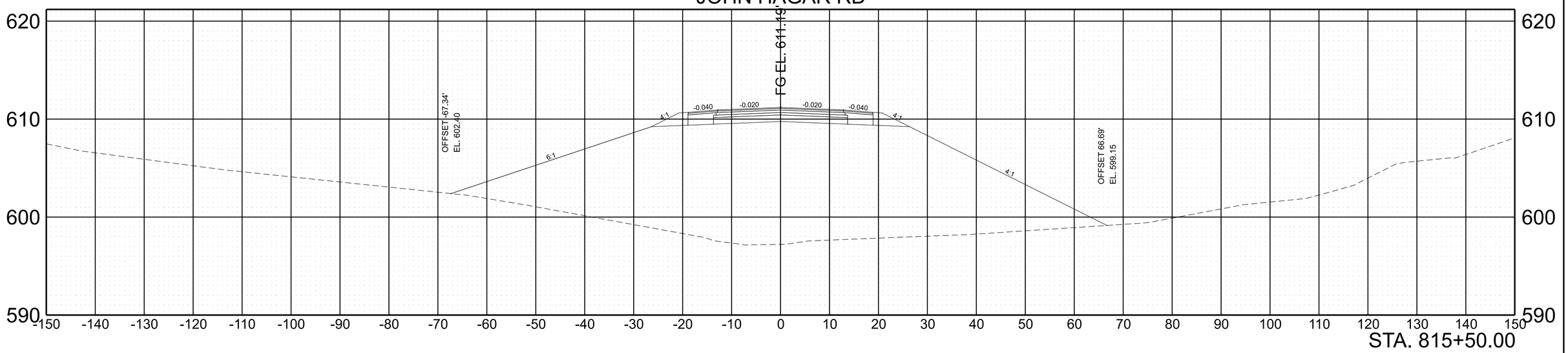
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 816+00.00

JOHN HAGAR RD



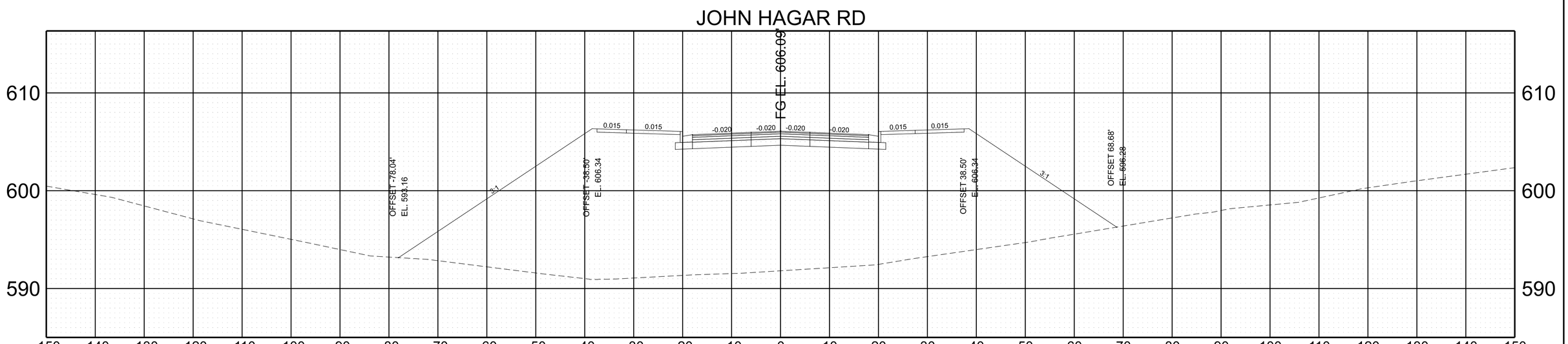
STA. 815+50.00

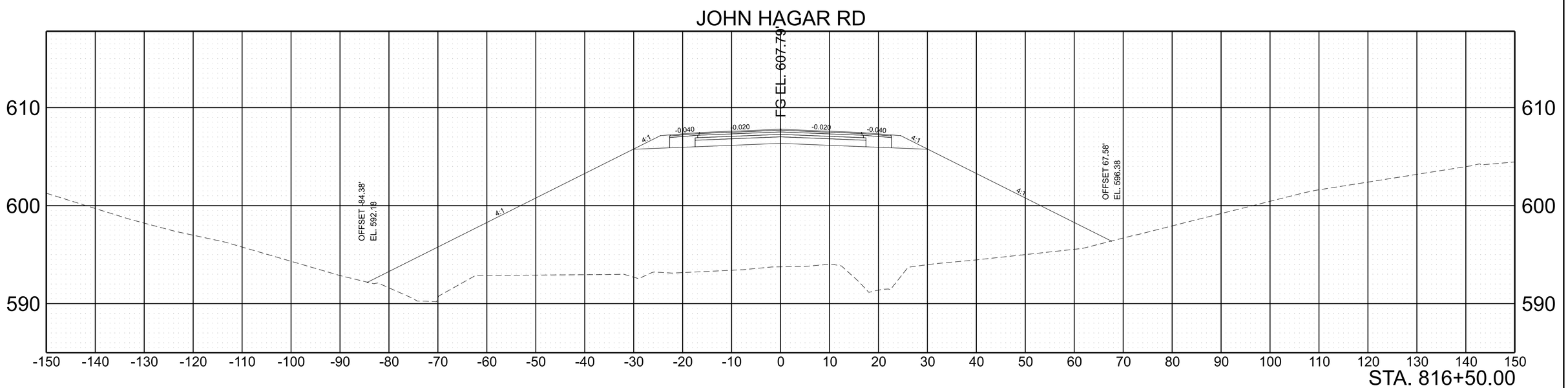
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:02 AM
C:\PWWORKING\EAST\01\D2328414\95\0040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A233

REV. ***DATE***
TEXT





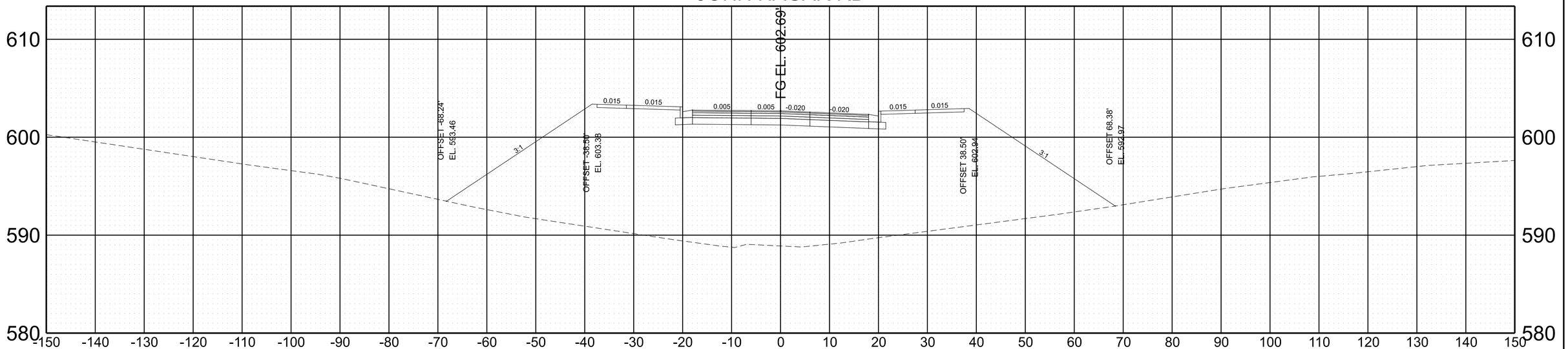
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:05 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A234

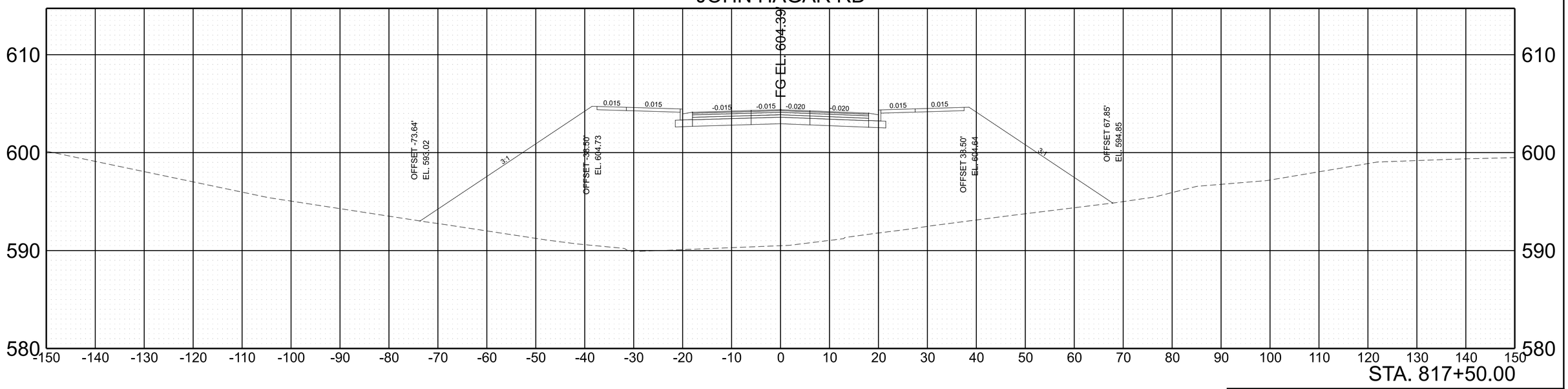
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 818+00.00

JOHN HAGAR RD



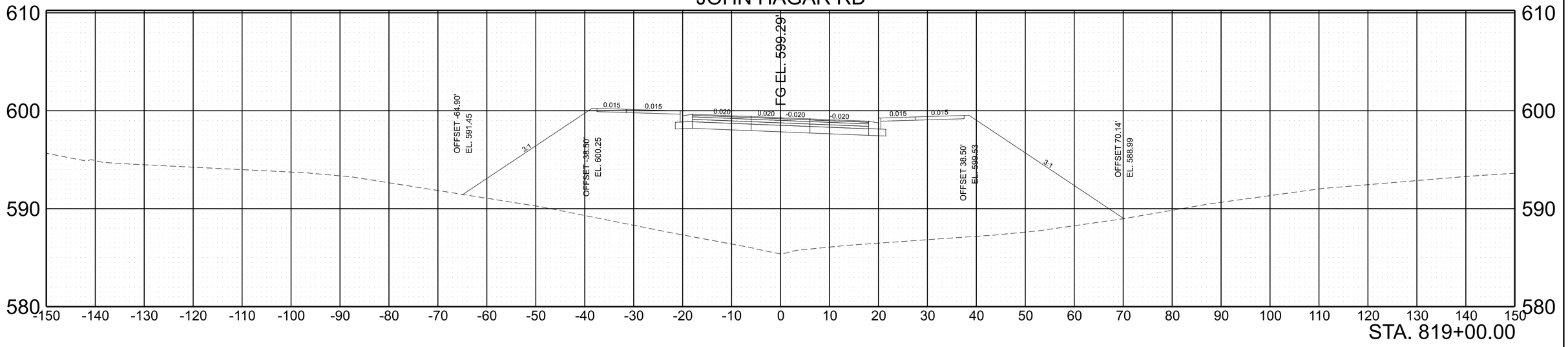
STA. 817+50.00

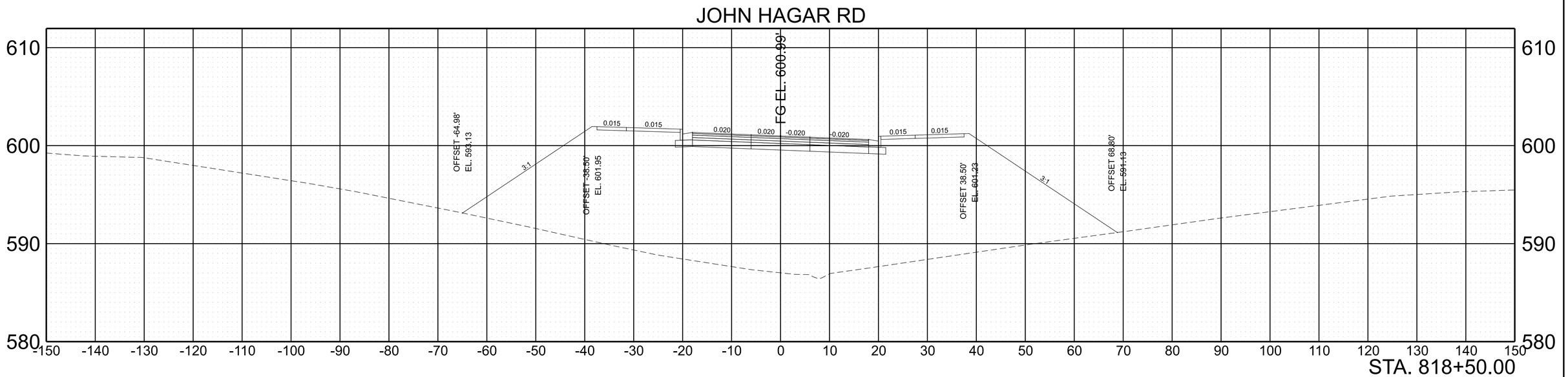
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:07 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A235

REV. ***DATE***
TEXT



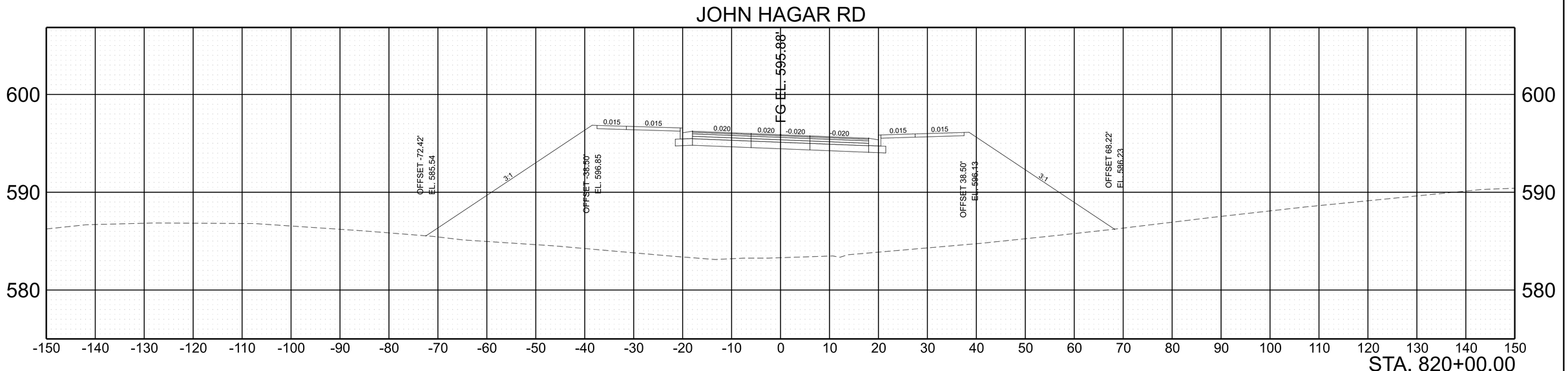


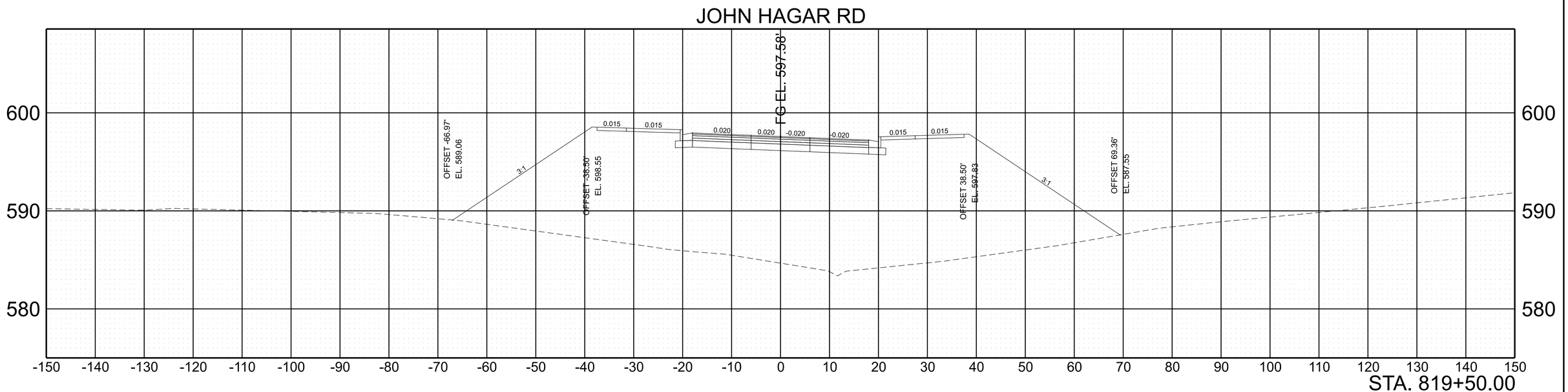
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:10 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A236

REV. ***DATE***
TEXT



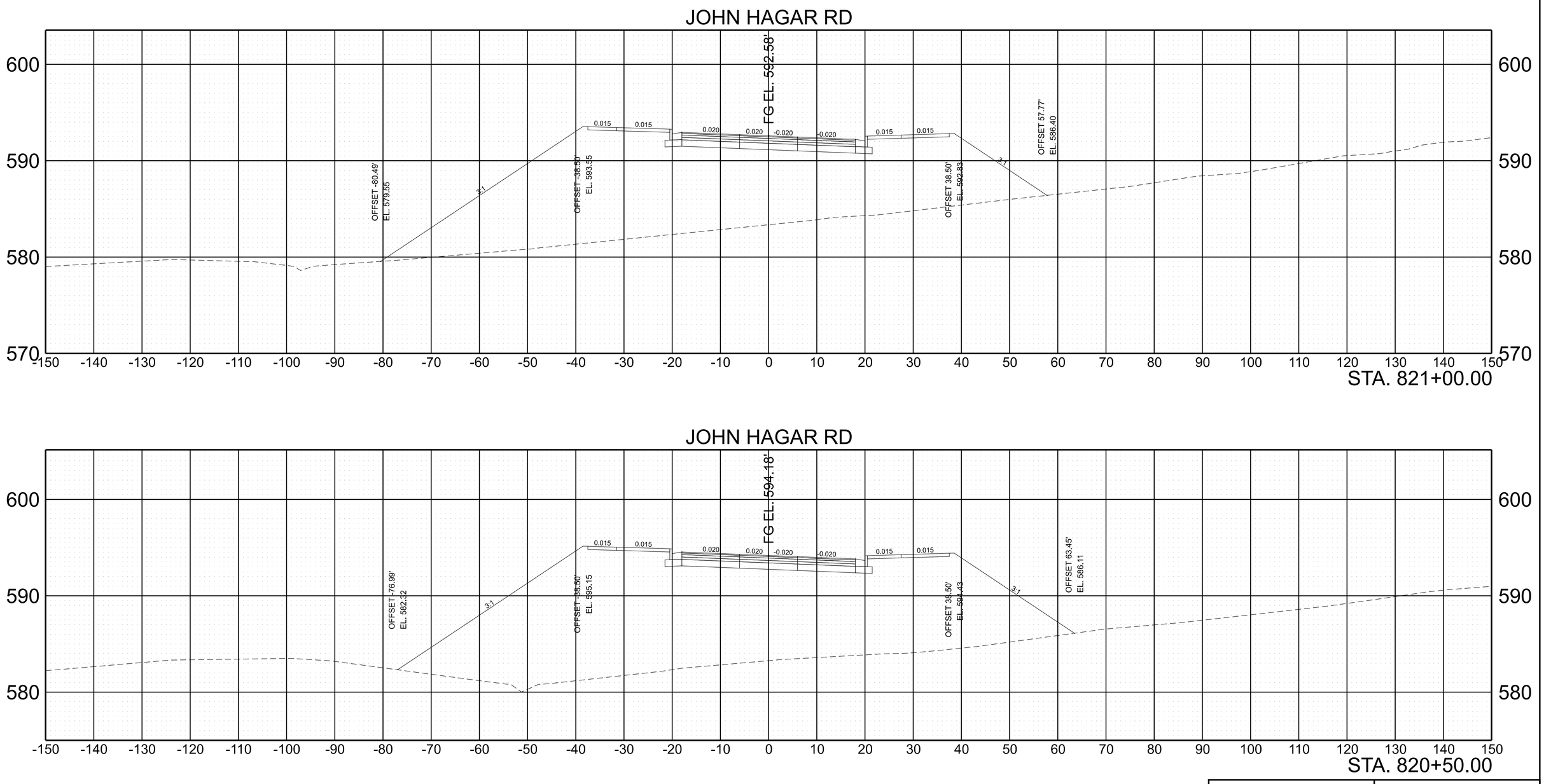


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:12 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A237

REV. ***DATE***
TEXT

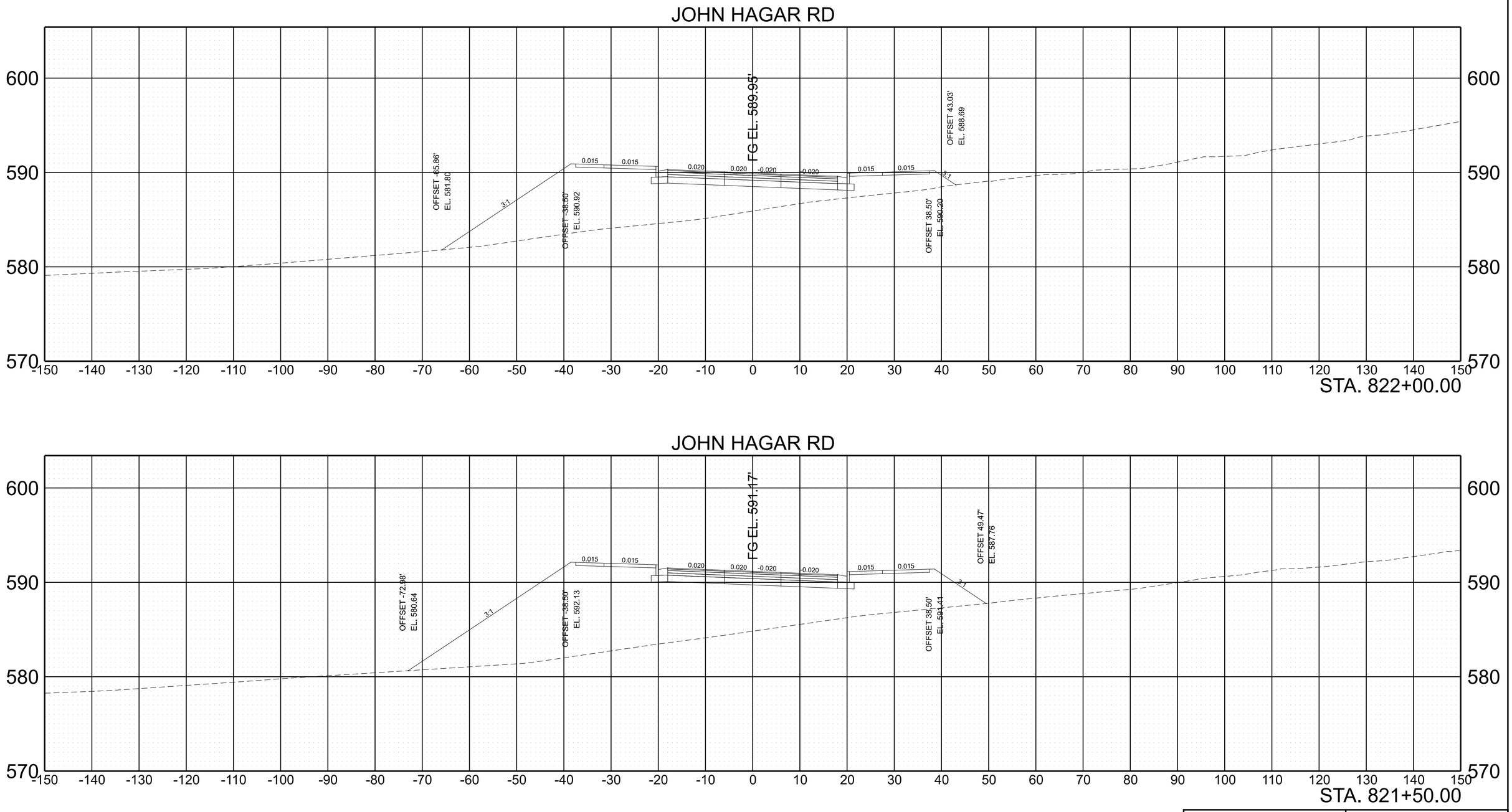


2/6/2023 8:46:15 AM
C:\PWWORKING\EAST01\D2328414\95\D40-SHT-XS-JOHN HAGAR RD.DGN

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A238

REV. ***DATE***
TEXT

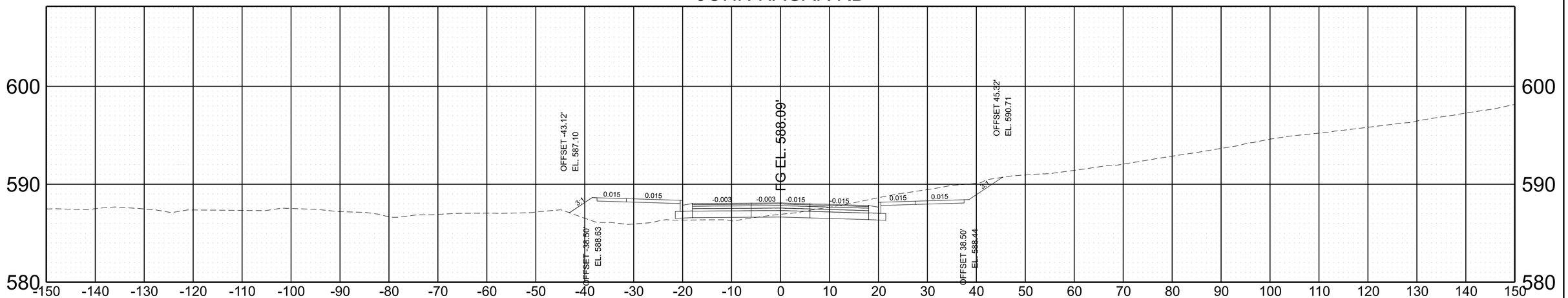


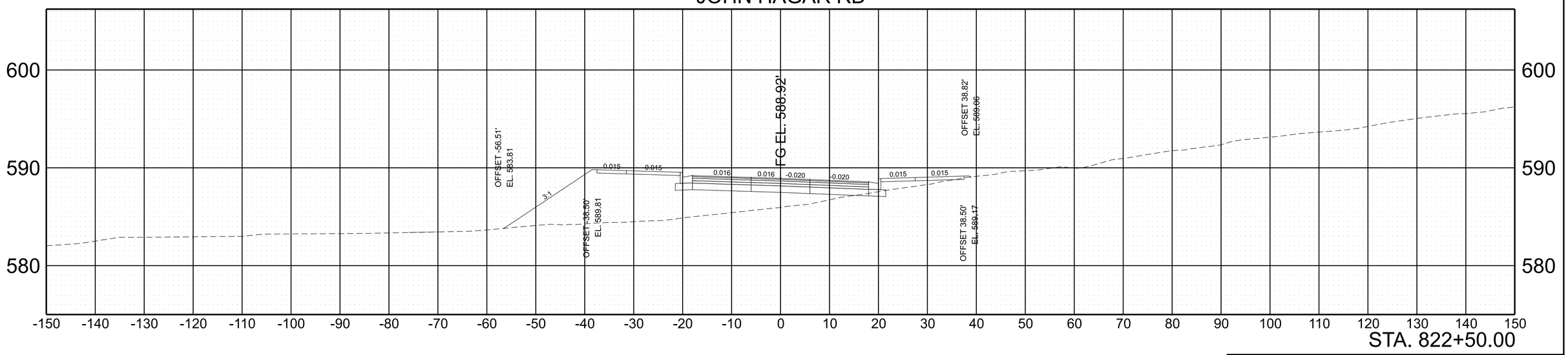
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:17 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A239

REV. ***DATE***
TEXT



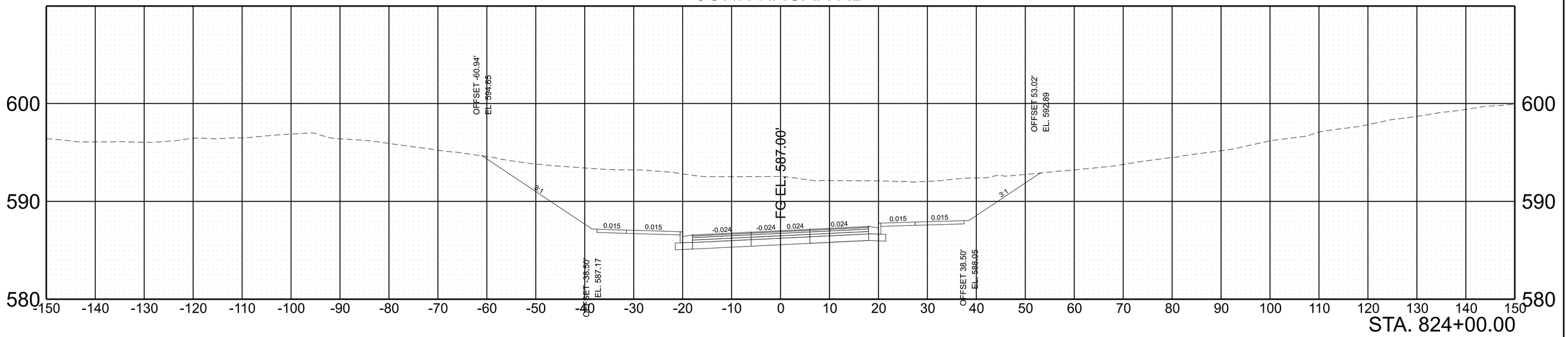


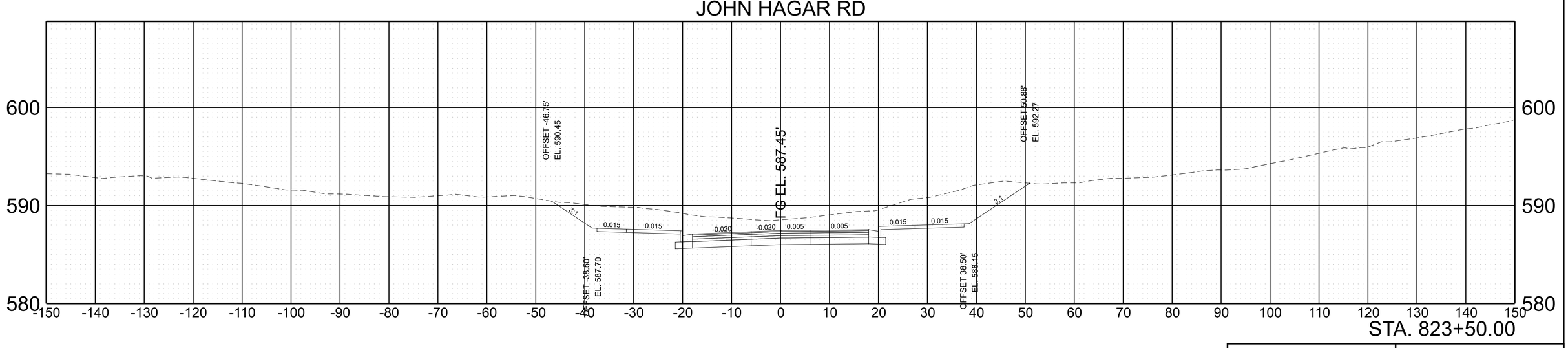
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:46:19 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A240

REV. ***DATE***
TEXT



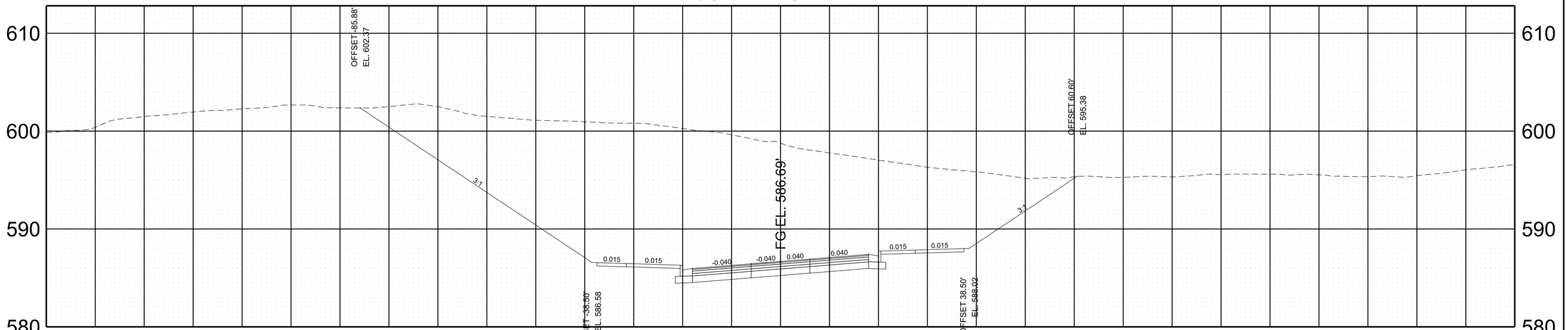


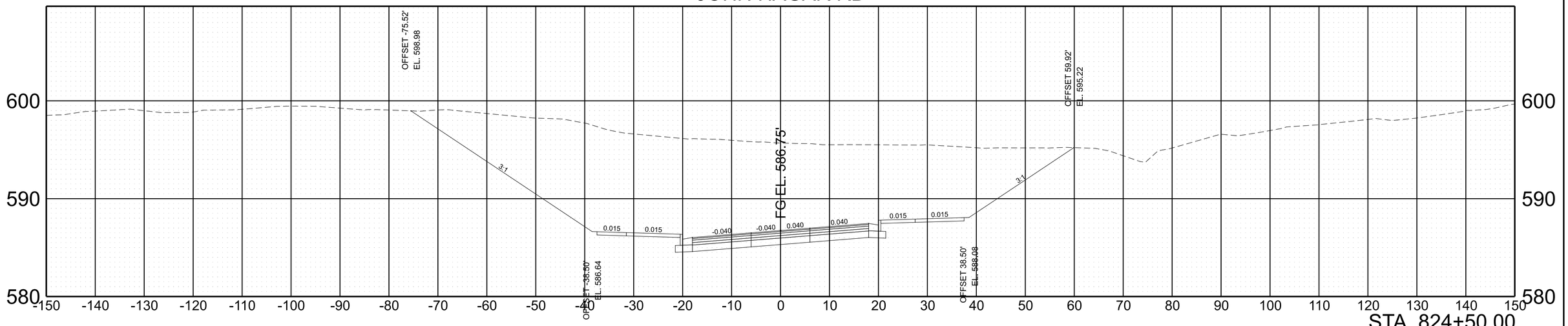
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:46:21 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A241

REV. ***DATE***
TEXT





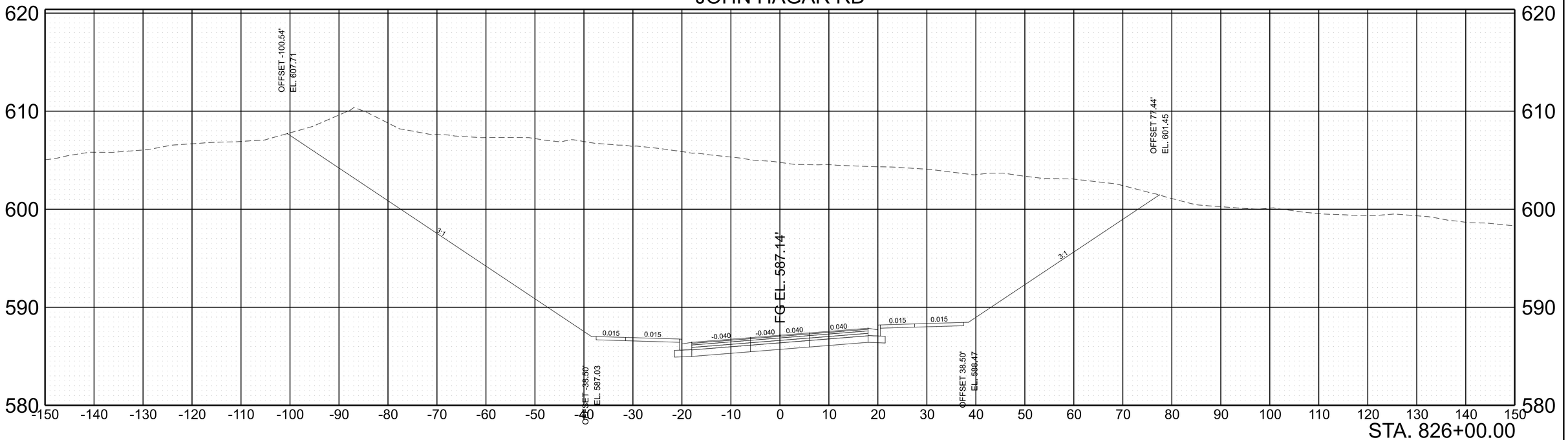
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:24 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A242

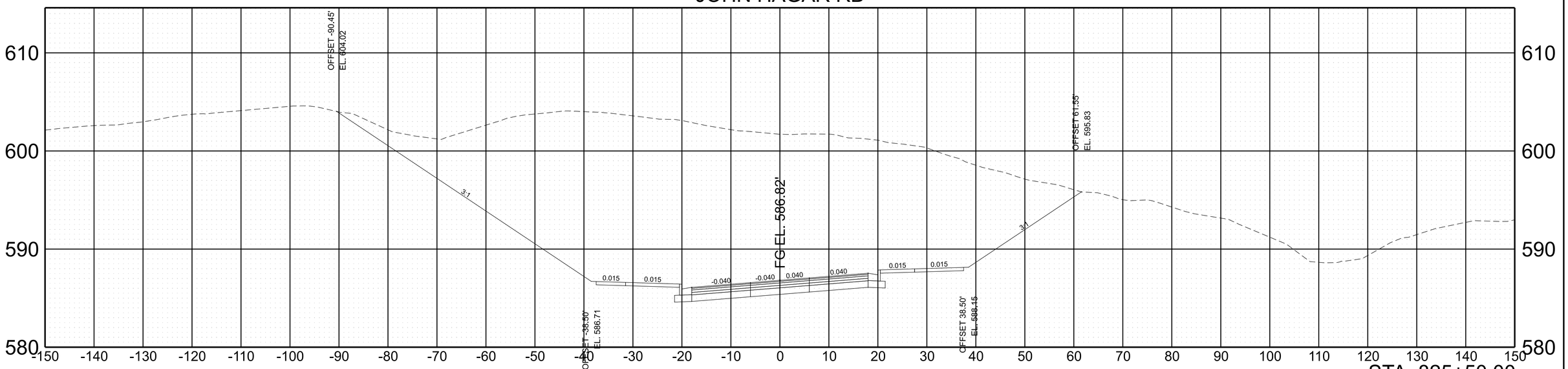
REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 826+00.00

JOHN HAGAR RD



STA. 825+50.00

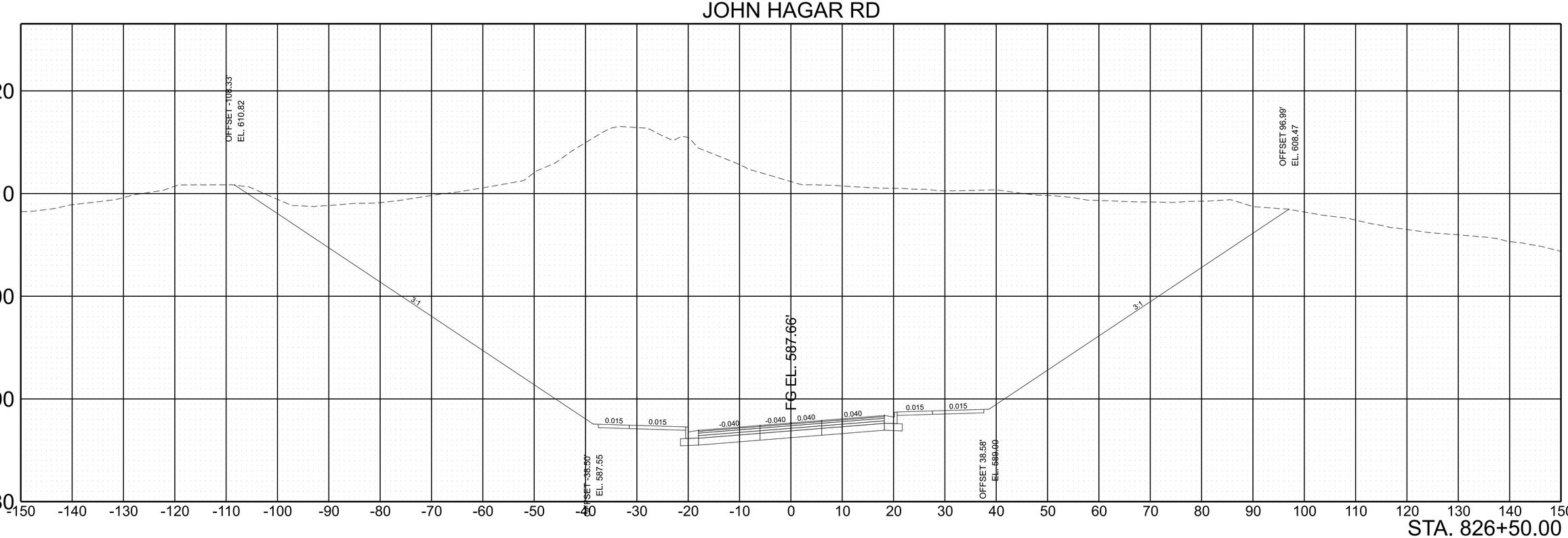
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:26 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A243

REV. ***DATE***
TEXT

JOHN HAGAR RD



STA. 826+50.00

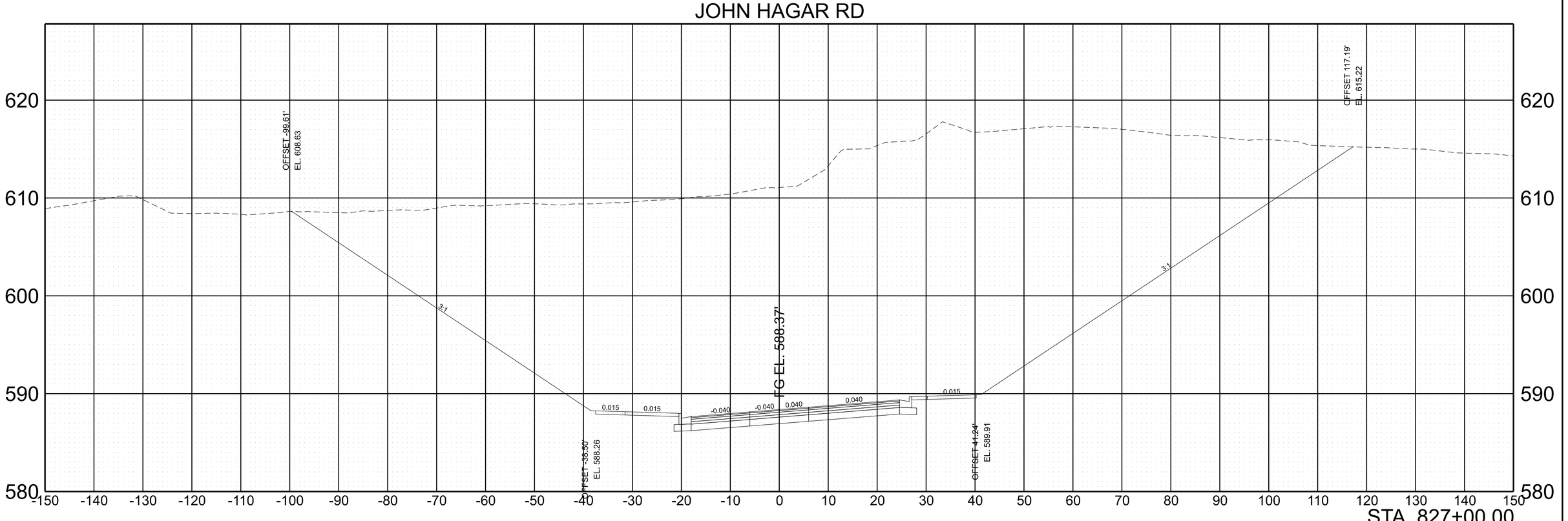
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:28 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A244

REV. ***DATE***
TEXT

JOHN HAGAR RD



SCALE: 1"=10' HORIZ. 1"=5' VERT.

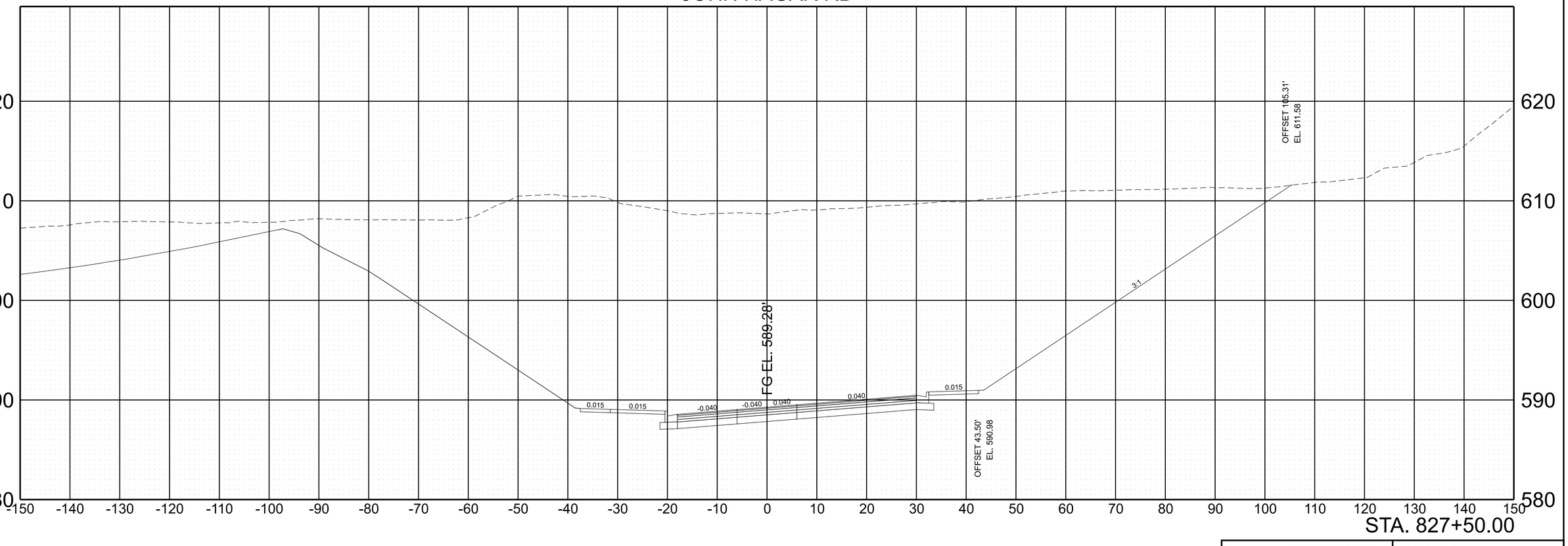
BEGIN STA. + .
END STA. + .

2/6/2023 8:46:30 AM
C:\PWWORKINGEAST01\D2328414\95\I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A245

REV. ***DATE***
TEXT

JOHN HAGAR RD



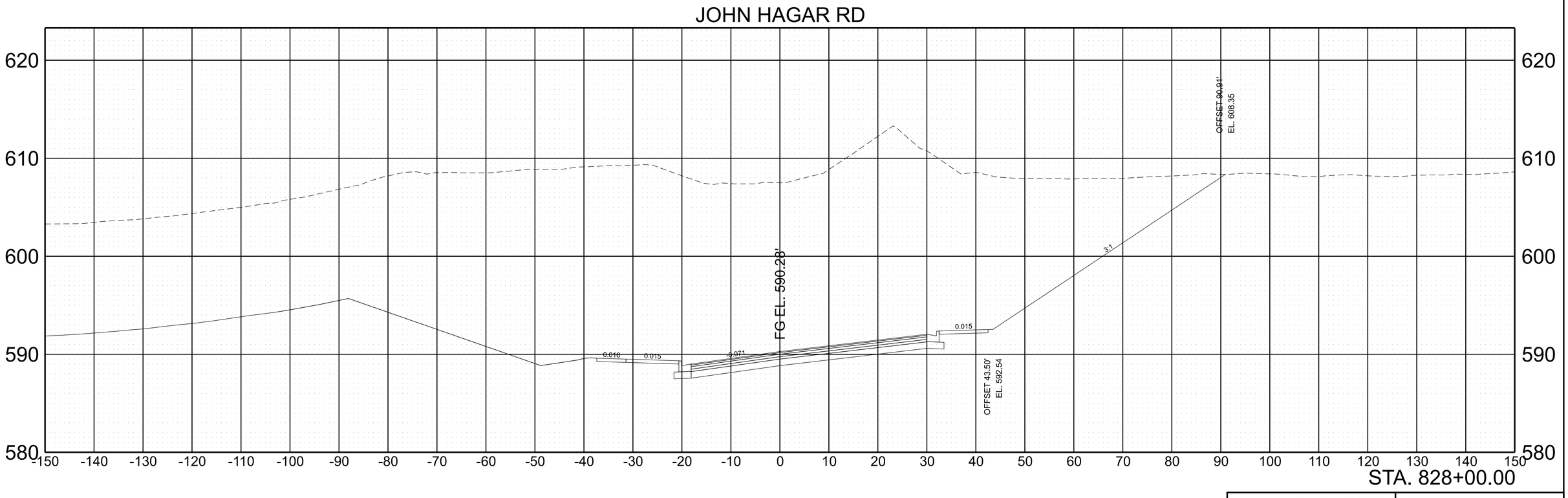
SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:31 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A246

REV. ***DATE***
TEXT

JOHN HAGAR RD



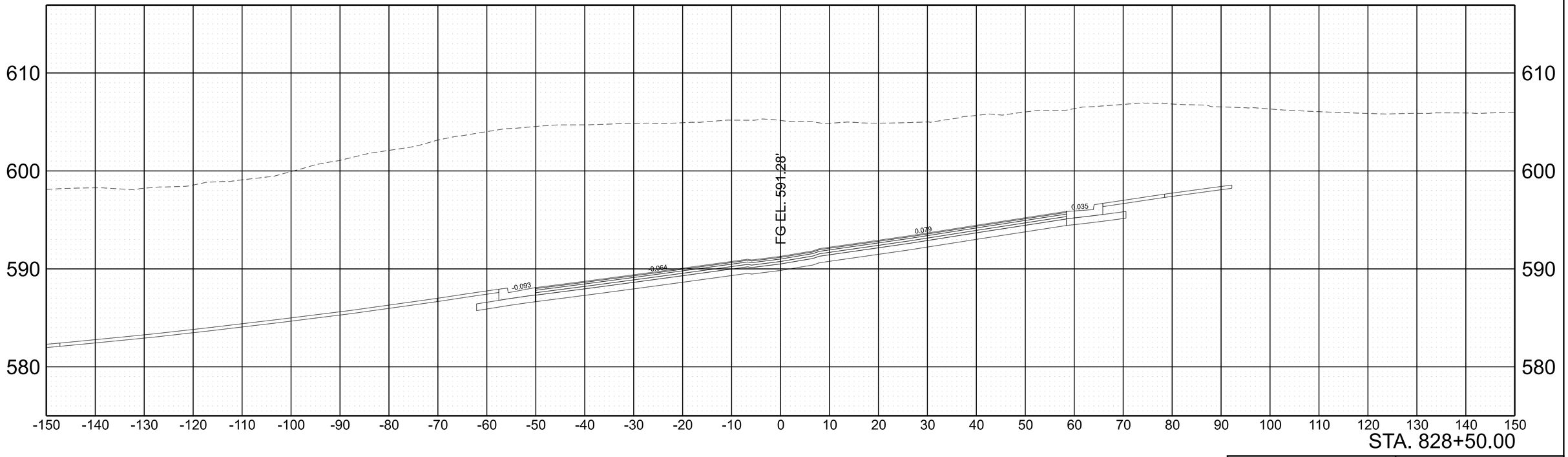
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:46:33 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A247

REV. ***DATE***
TEXT

JOHN HAGAR RD



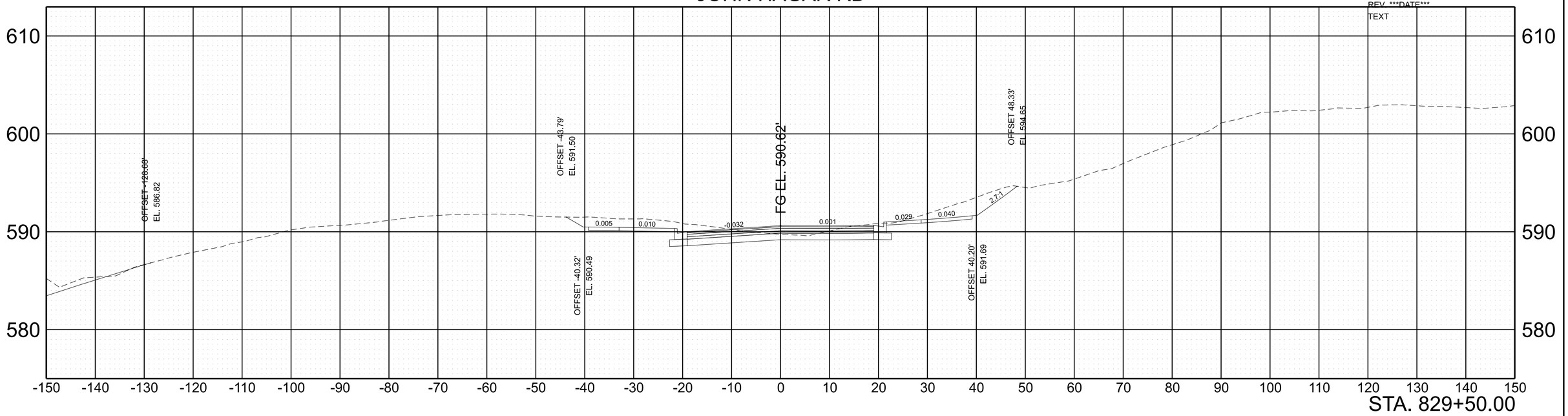
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:46:43 AM
C:\PWWORKINGEAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

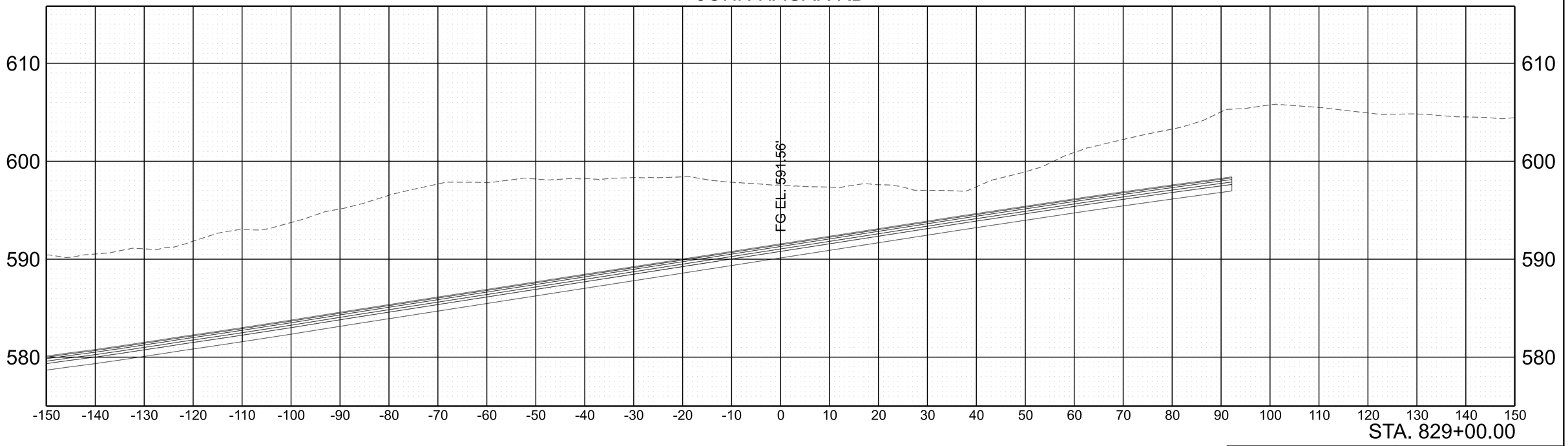
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A248

REV. ***DATE***
TEXT

JOHN HAGAR RD



JOHN HAGAR RD

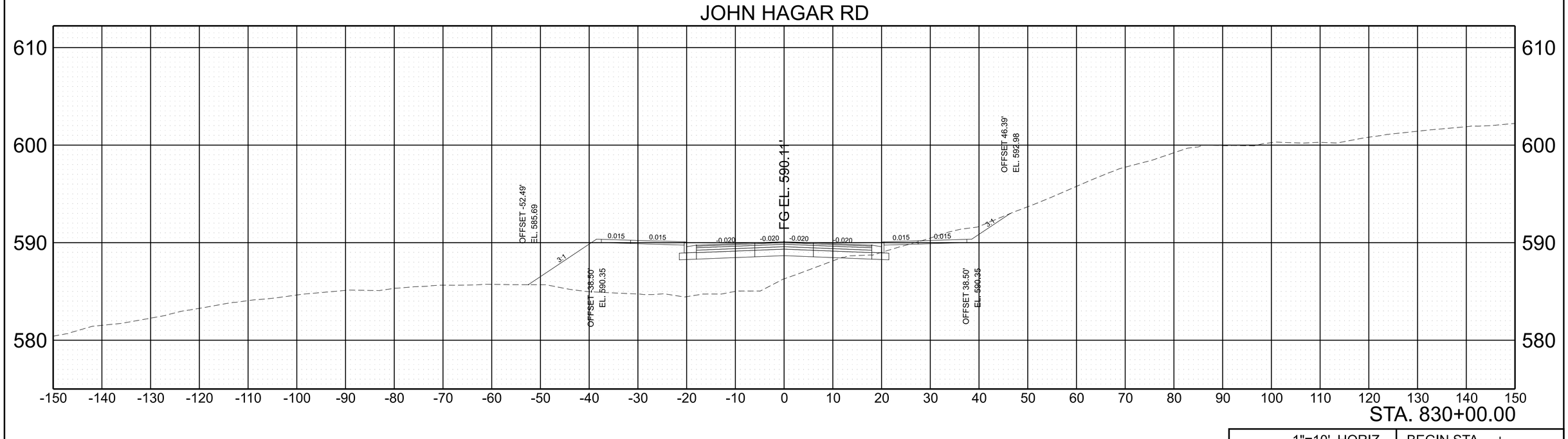


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:46:49 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A249

REV. ***DATE***
TEXT



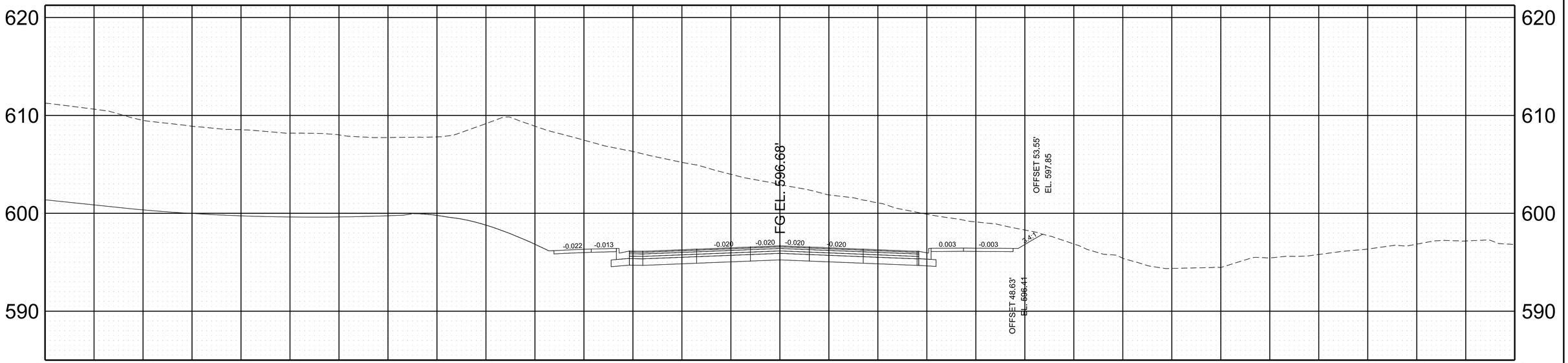
SCALE: 1"=10' HORIZ. 1"=5' VERT.

BEGIN STA. + .
END STA. + .

2/6/2023 8:46:54 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-JOHN HAGAR RD.DGN

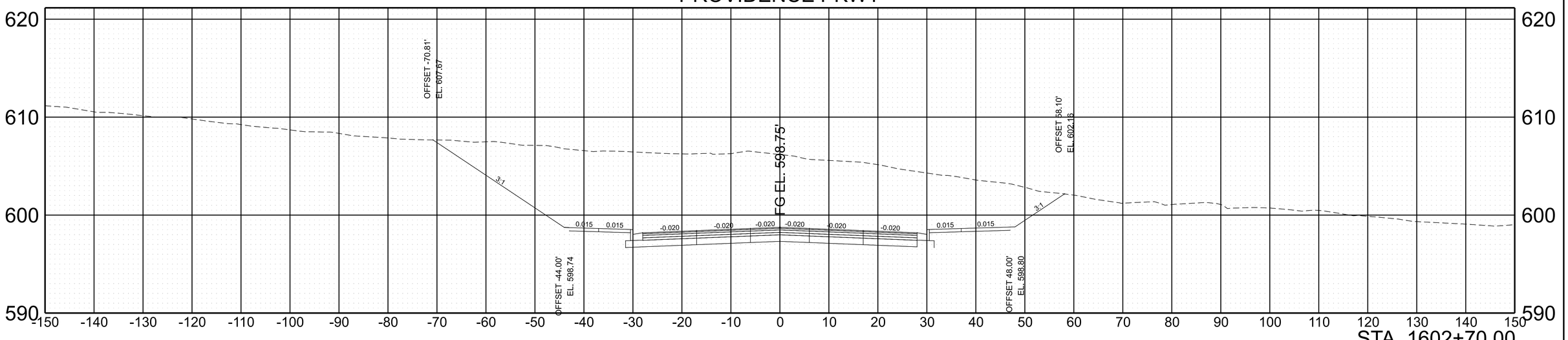
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A250

PROVIDENCE PKWY



STA. 1603+00.00

PROVIDENCE PKWY



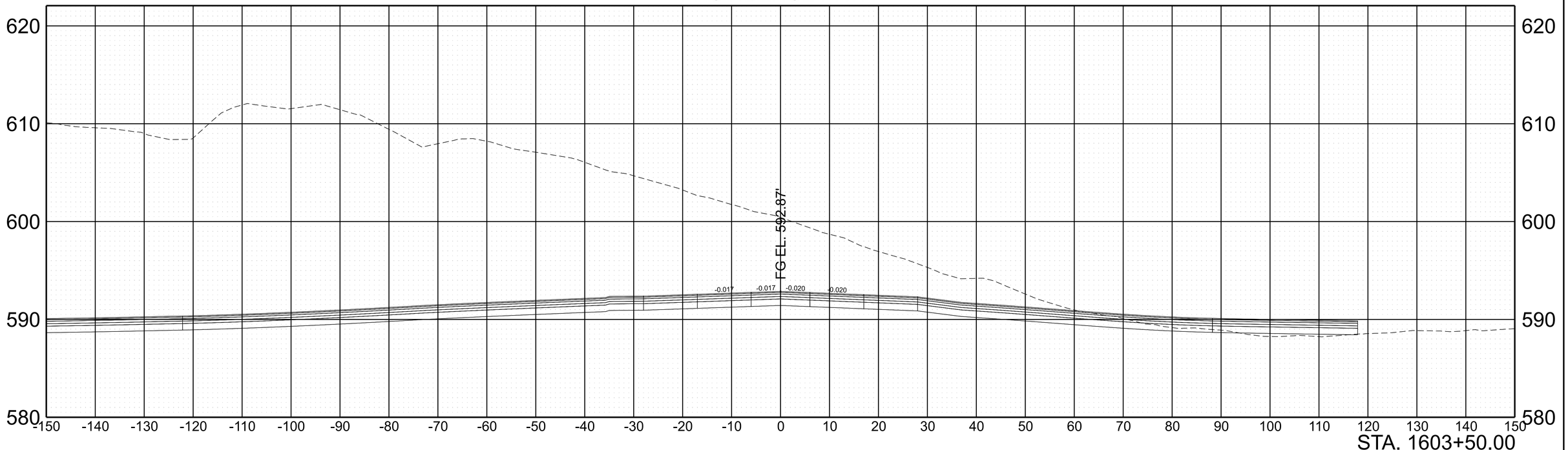
STA. 1602+70.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:47:27 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A251

PROVIDENCE PKWY



SCALE: 1"=10' HORIZ. 1"=5' VERT.

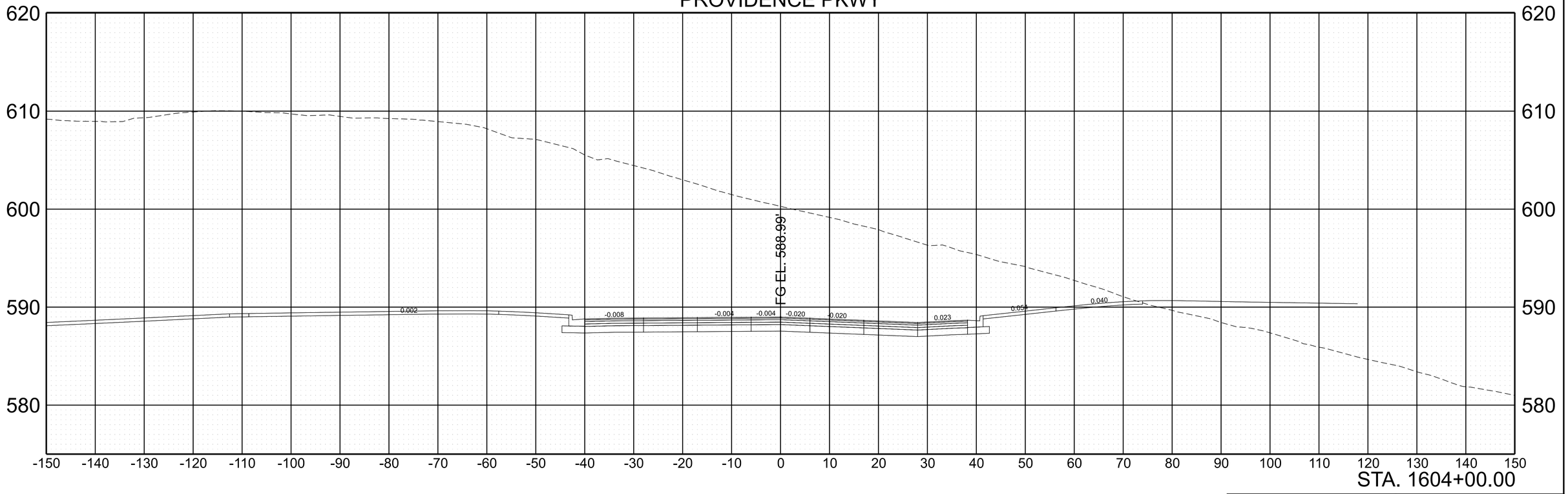
BEGIN STA. + .

END STA. + .

2/6/2023 8:48:52 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A252

PROVIDENCE PKWY



SCALE: 1"=10' HORIZ. 1"=5' VERT.

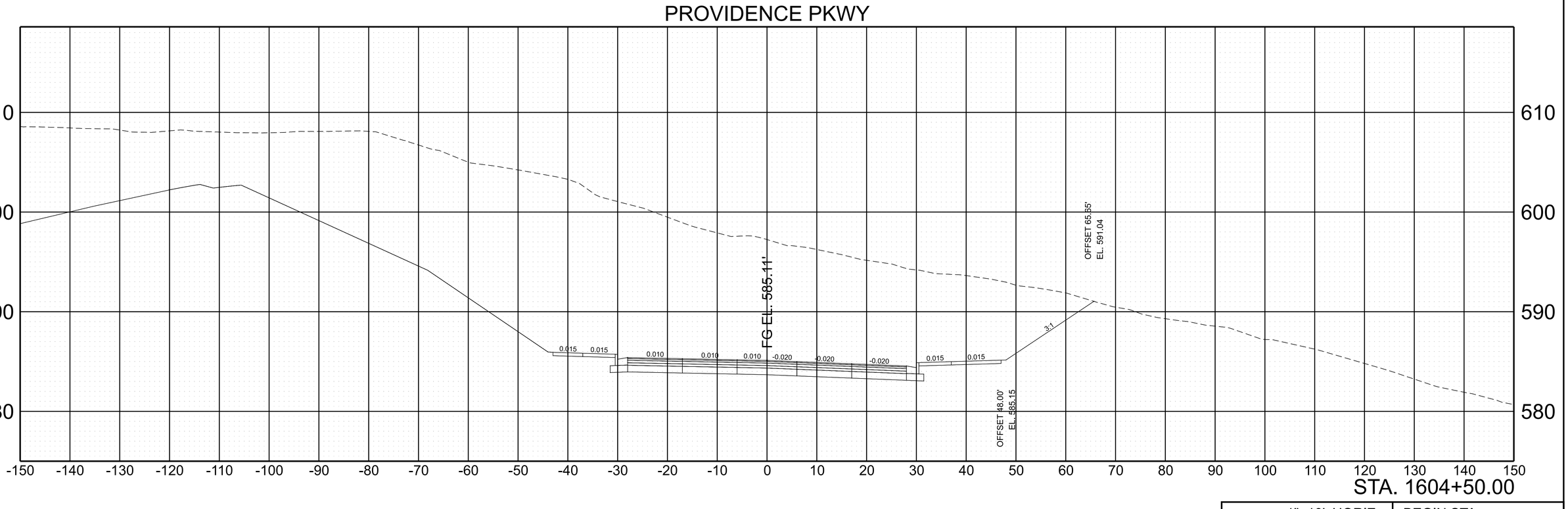
BEGIN STA. + .

END STA. + .

2/6/2023 8:48:53 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A253

PROVIDENCE PKWY

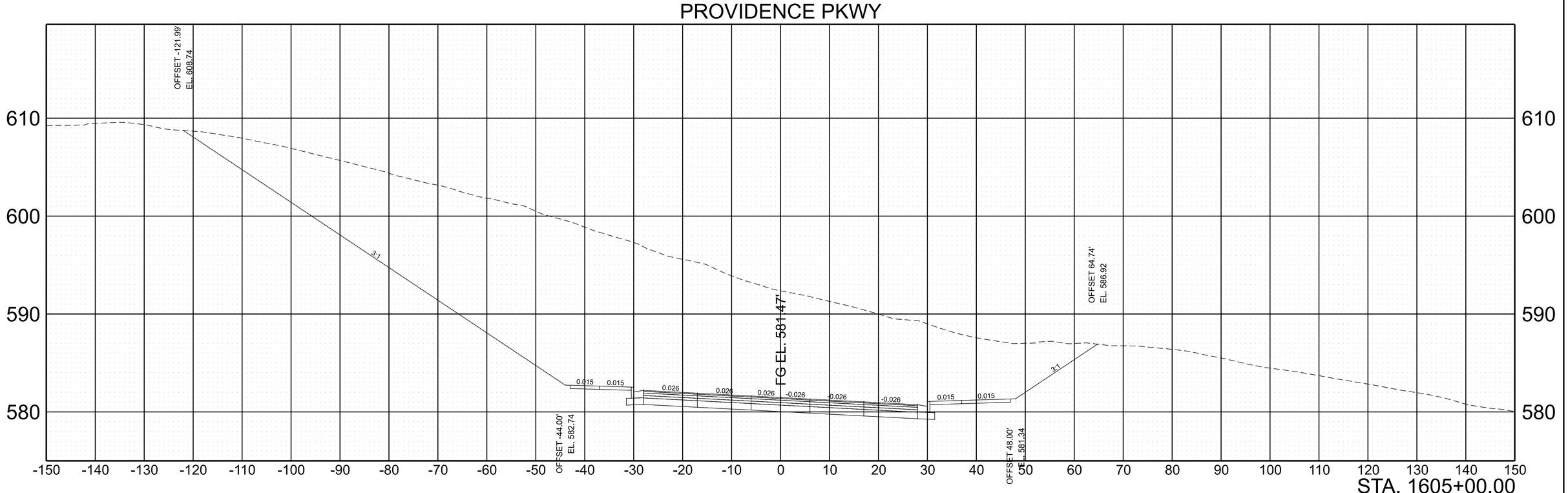


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:48:54 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A254

PROVIDENCE PKWY

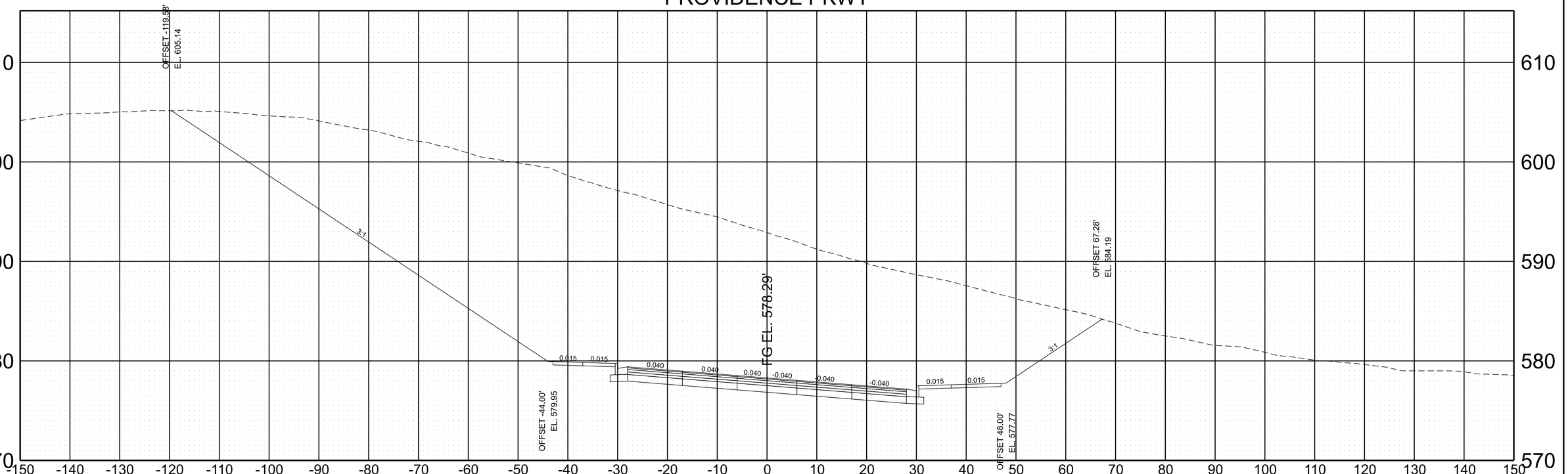


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:48:55 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A255

PROVIDENCE PKWY

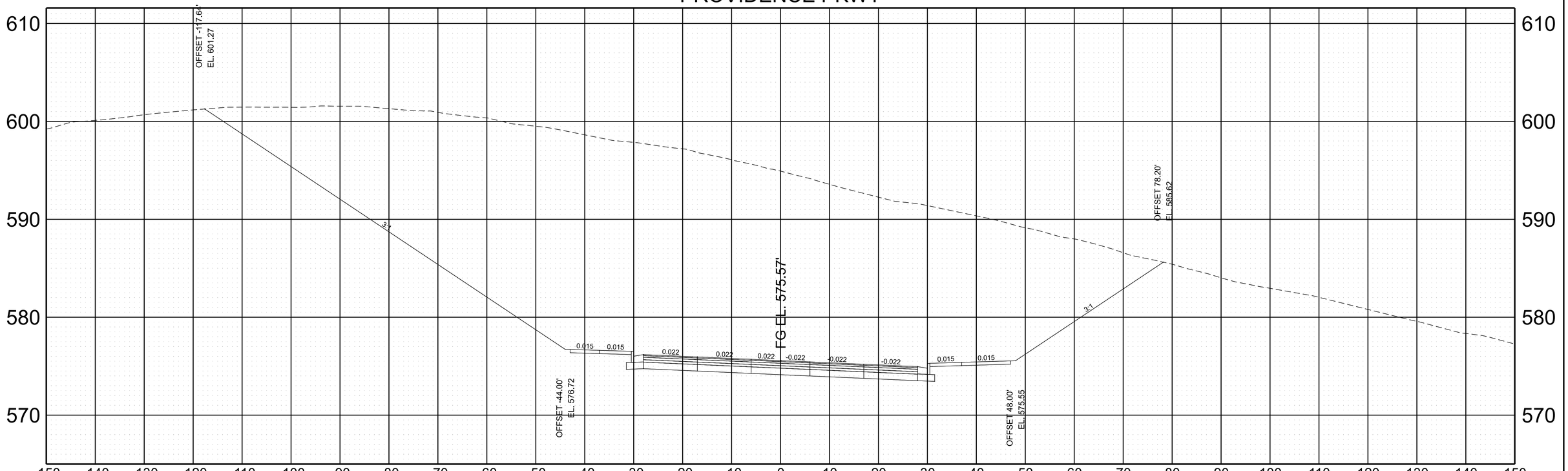


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:48:56 AM
C:\PWWORKING\EAST\01D2328414\95\040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A256

PROVIDENCE PKWY

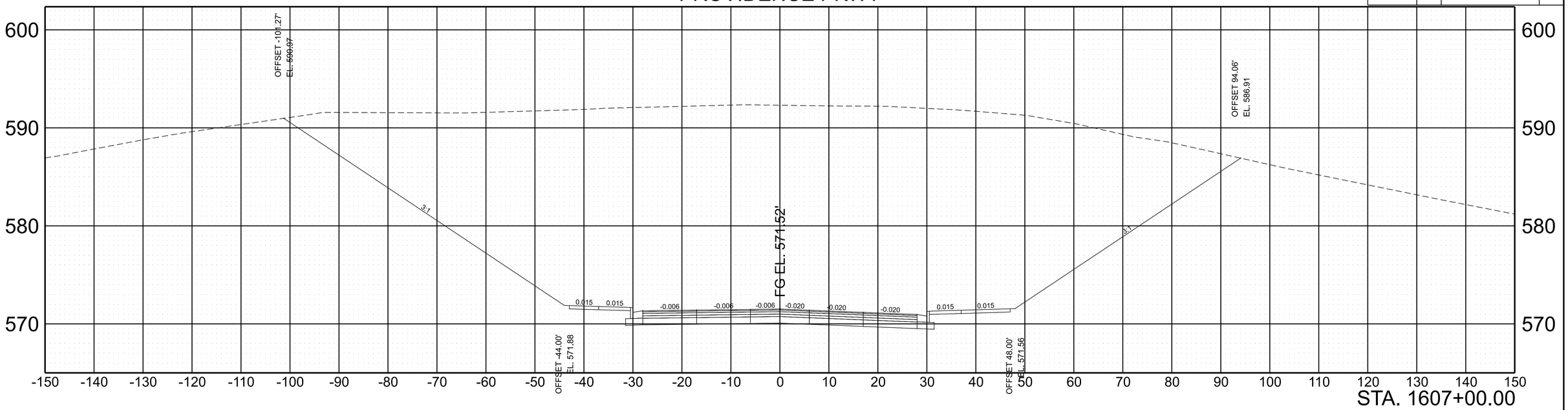


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:48:57 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-XS-PROVIDENCE PKWY.DGN

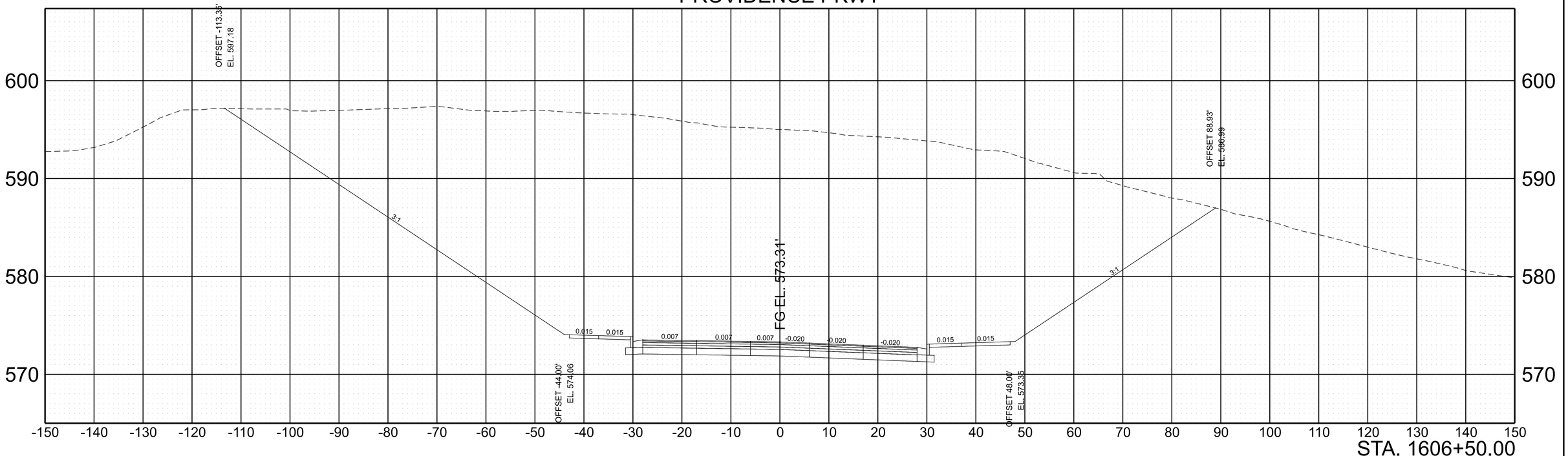
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A257

PROVIDENCE PKWY



STA. 1607+00.00

PROVIDENCE PKWY



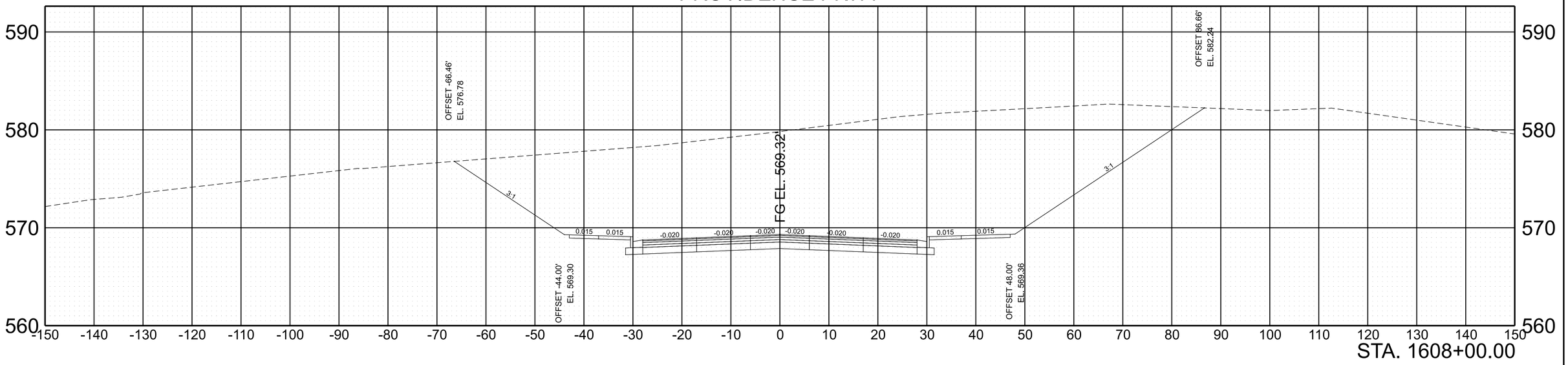
STA. 1606+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:48:58 AM
C:\PWWORKINGIEAST01\ID2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

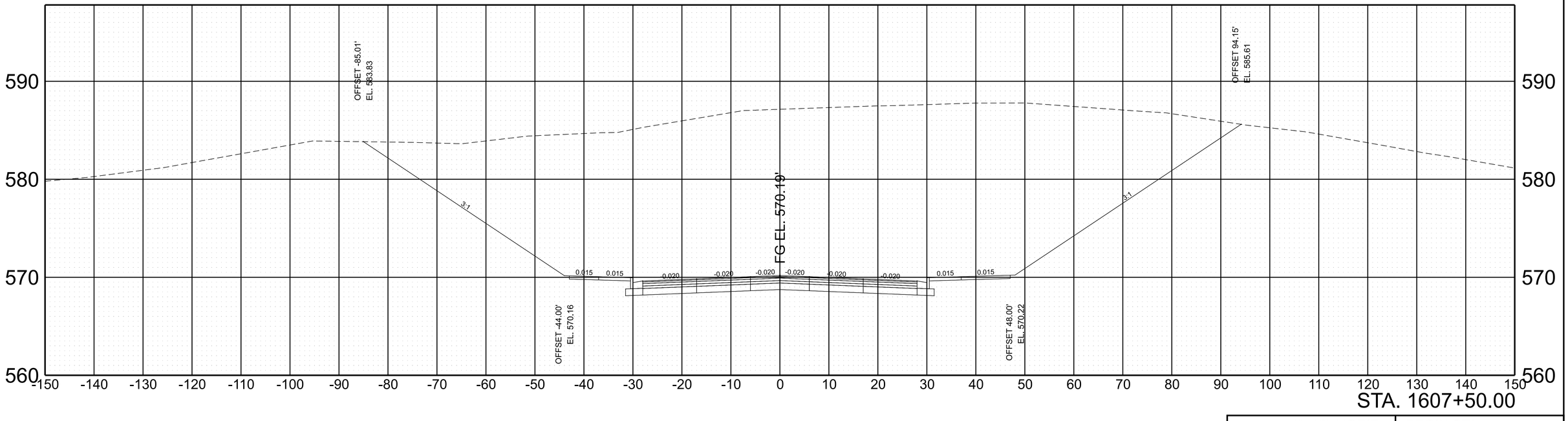
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A258

PROVIDENCE PKWY



STA. 1608+00.00

PROVIDENCE PKWY



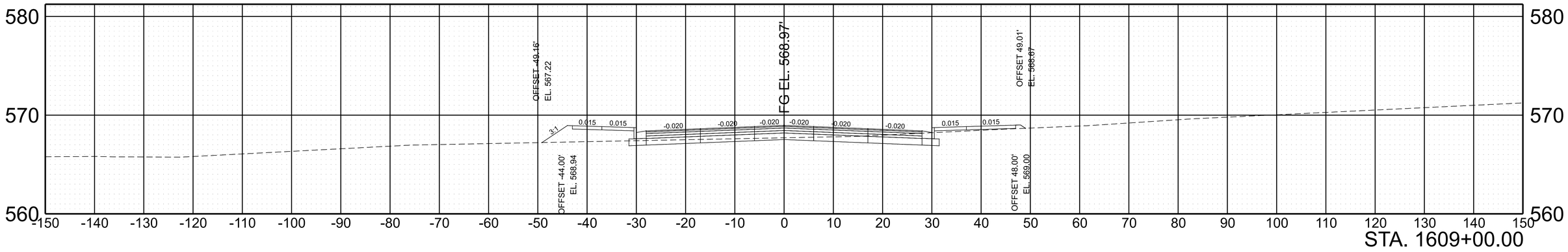
STA. 1607+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

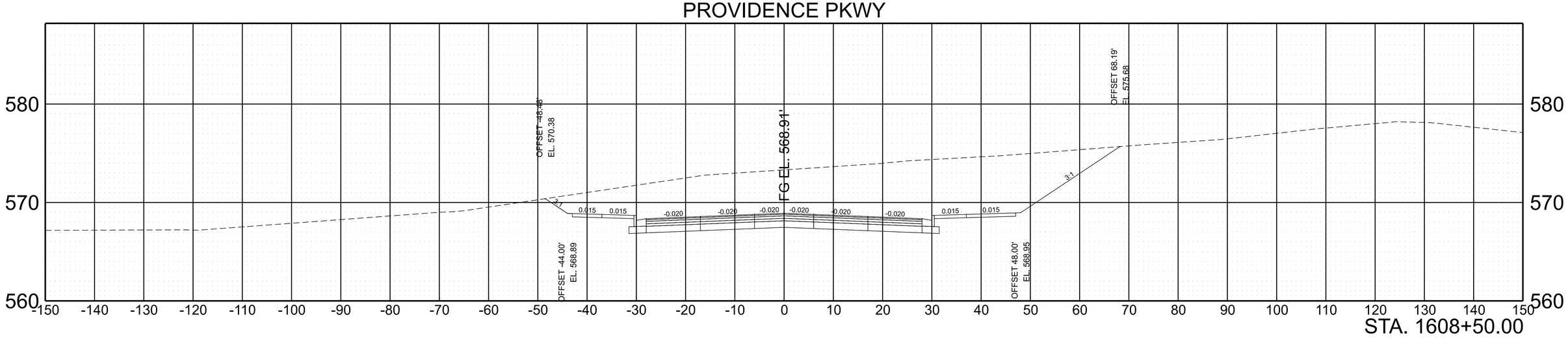
2/6/2023 8:49:00 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A259

PROVIDENCE PKWY



PROVIDENCE PKWY

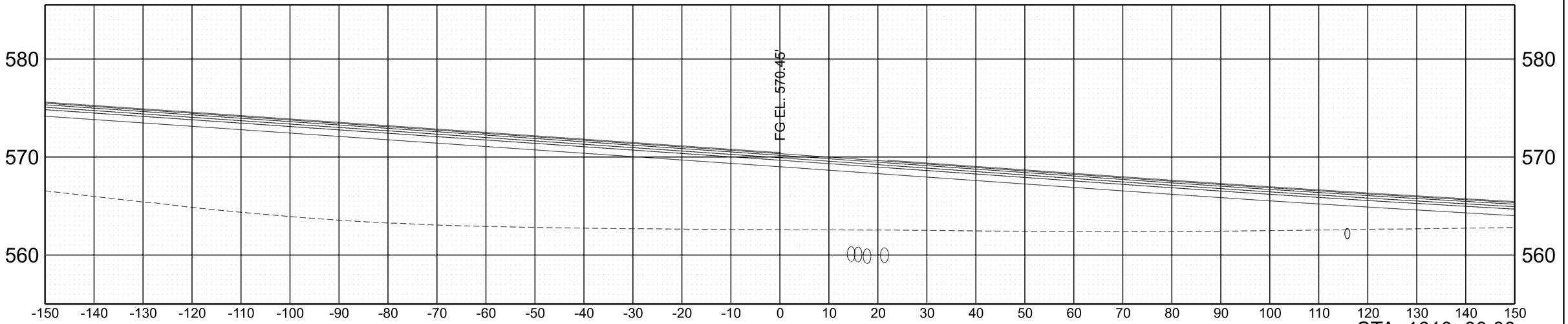


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

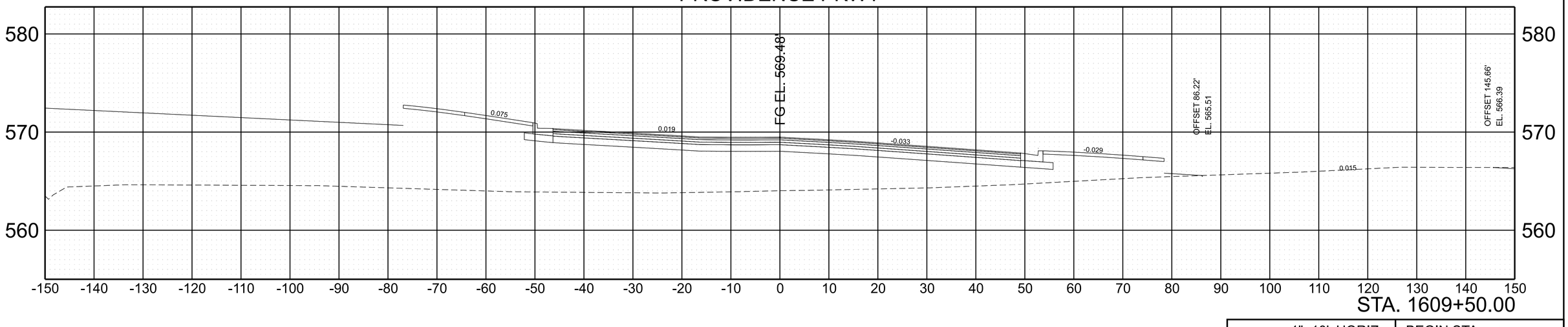
2/6/2023 8:49:01 AM
C:\PW\WORKING\EAST01\D2328414\95\0040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A260

PROVIDENCE PKWY



PROVIDENCE PKWY

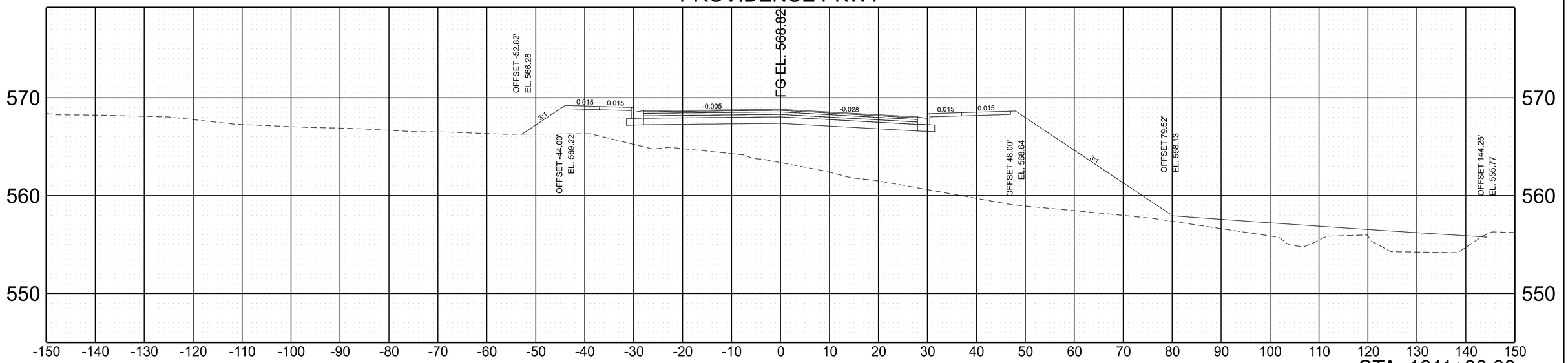


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

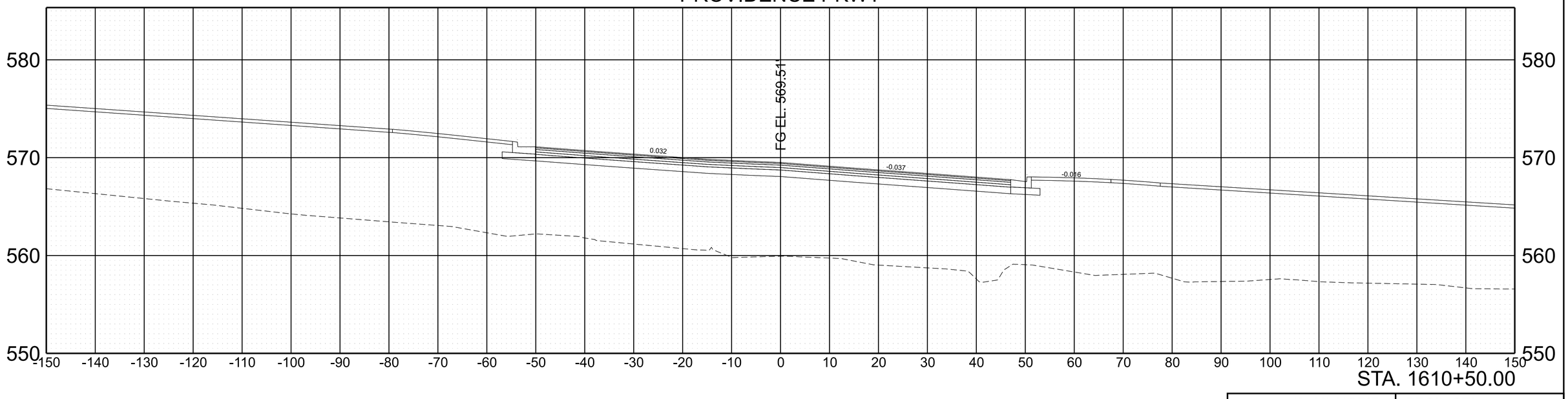
2/6/2023 8:49:02 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A261

PROVIDENCE PKWY



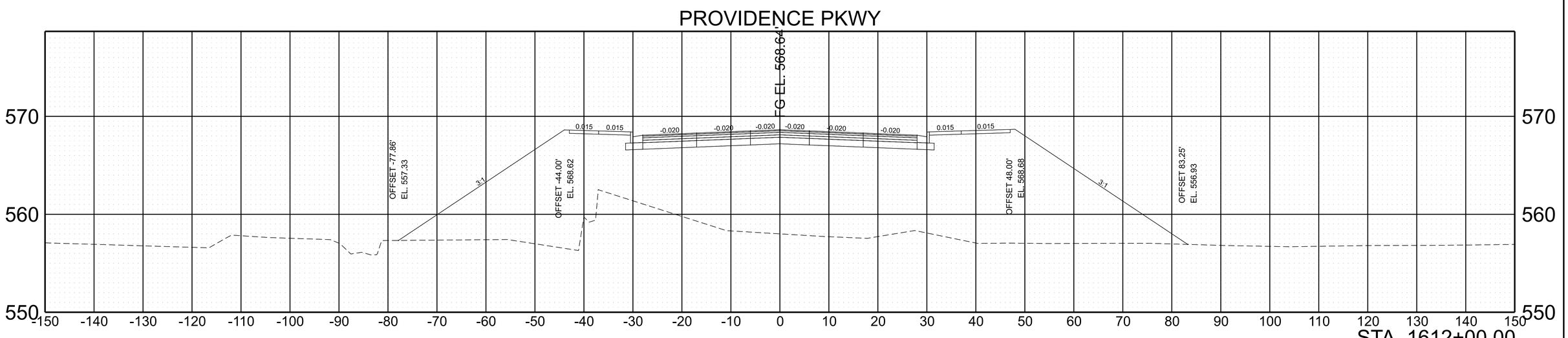
PROVIDENCE PKWY

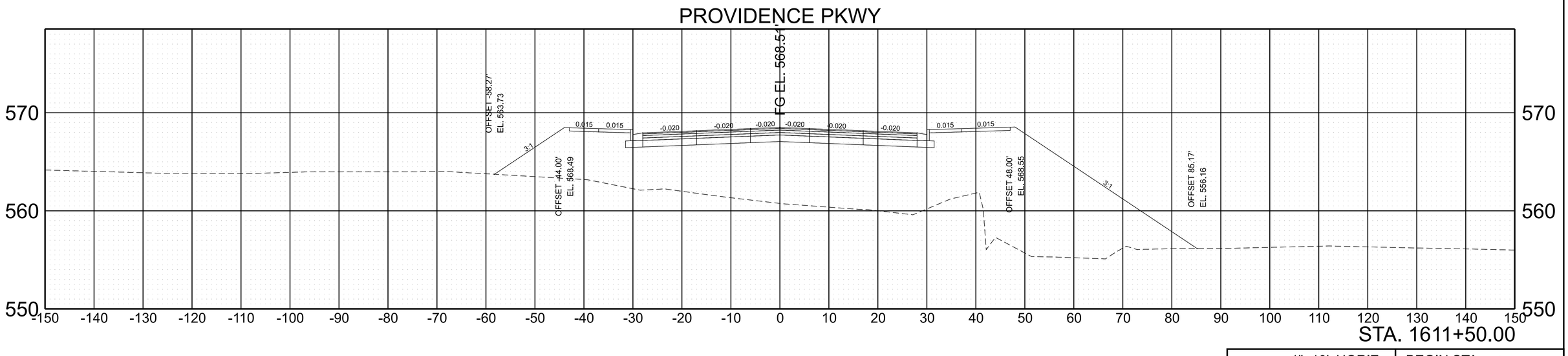


SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:49:03 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A262



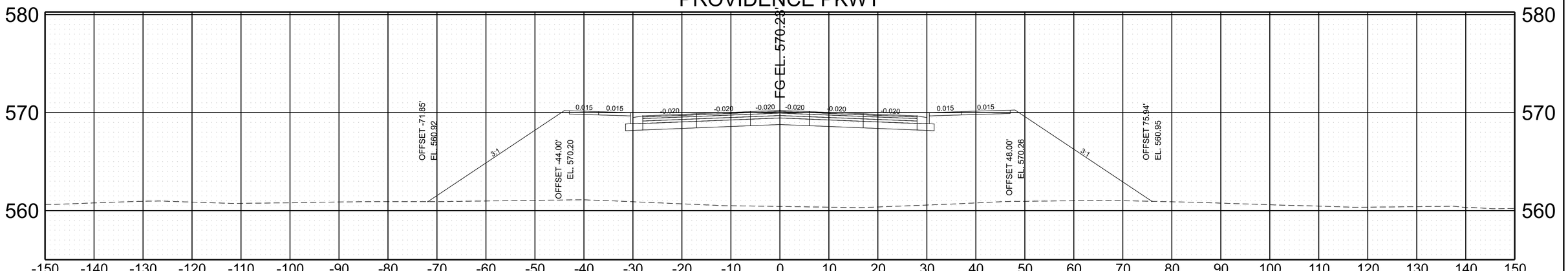


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:49:05 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

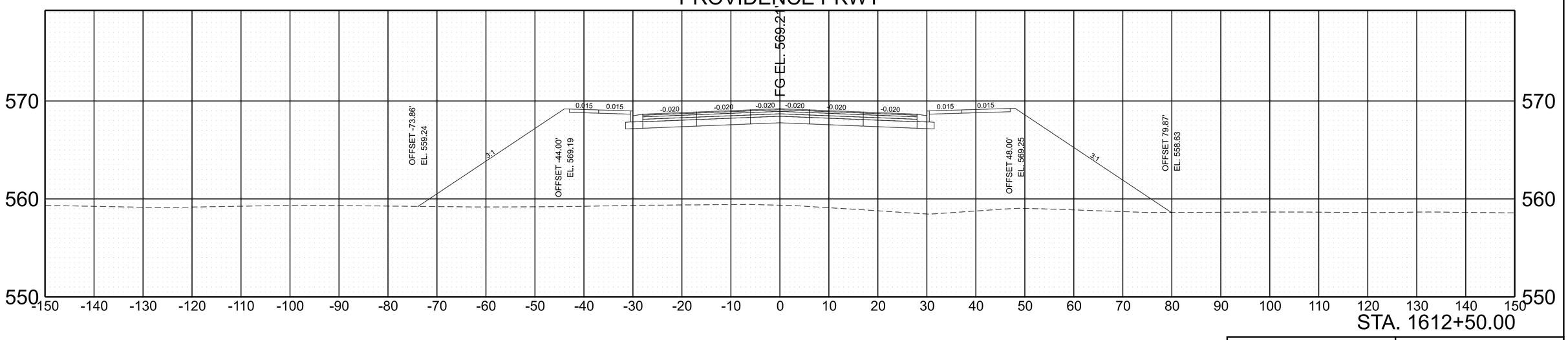
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A263

PROVIDENCE PKWY



STA. 1613+00.00

PROVIDENCE PKWY



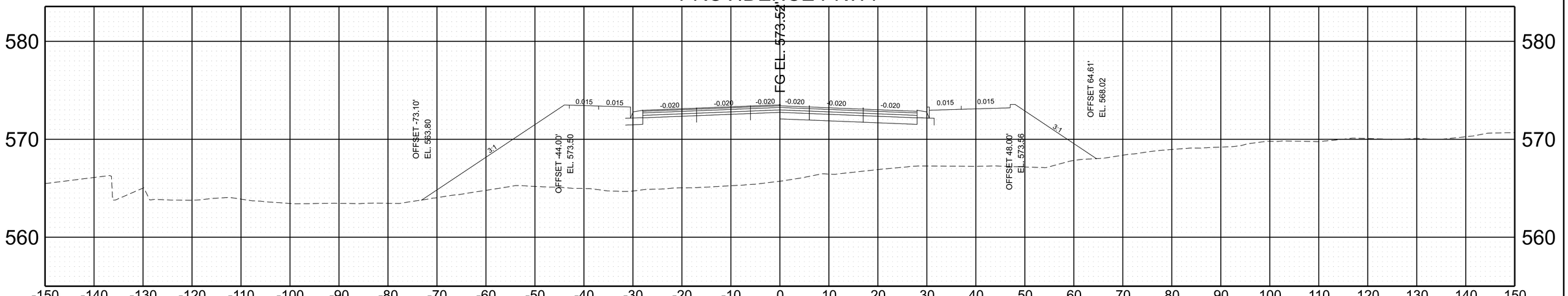
STA. 1612+50.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:49:06 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

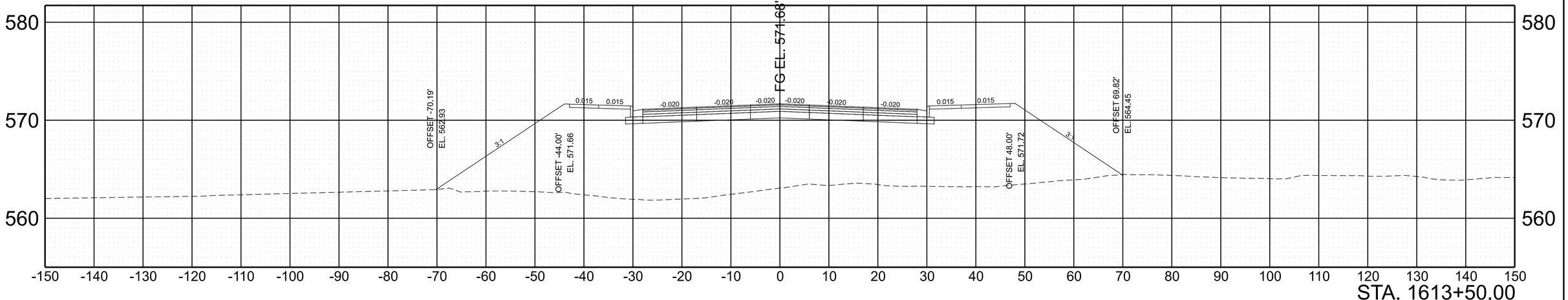
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A264

PROVIDENCE PKWY



STA. 1614+00.00

PROVIDENCE PKWY



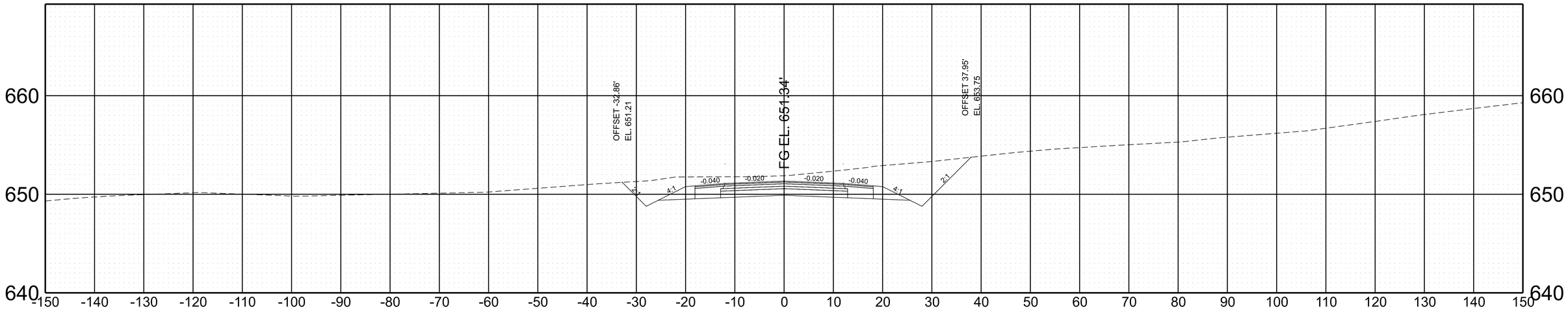
STA. 1613+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:49:07 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-PROVIDENCE PKWY.DGN

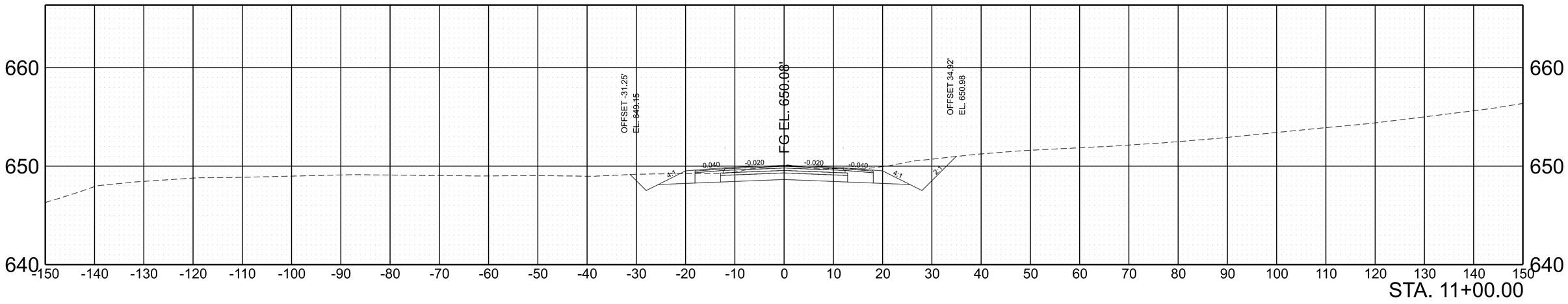
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A265

GUILL RD



STA. 11+50.00

GUILL RD

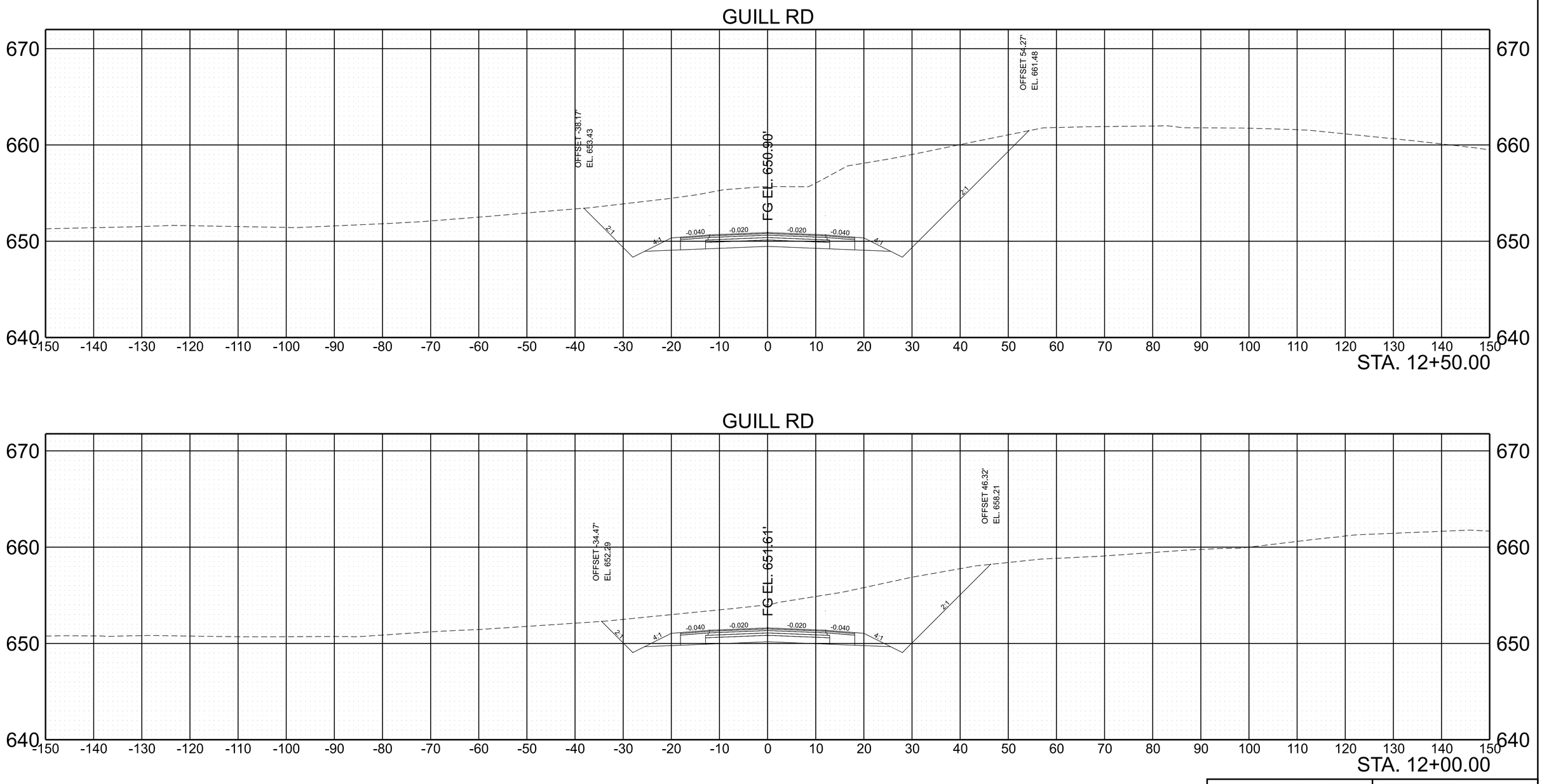


STA. 11+00.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:49:49 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-GUILL RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A266

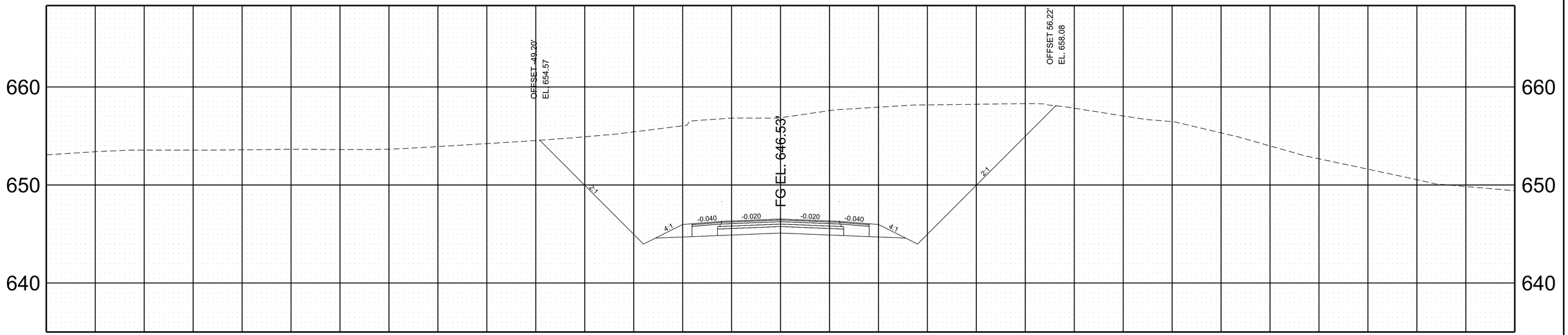


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:49:50 AM
C:\PW\WORKING\EAST01\D2328414195\I040-SHT-XS-GUILL RD.DGN

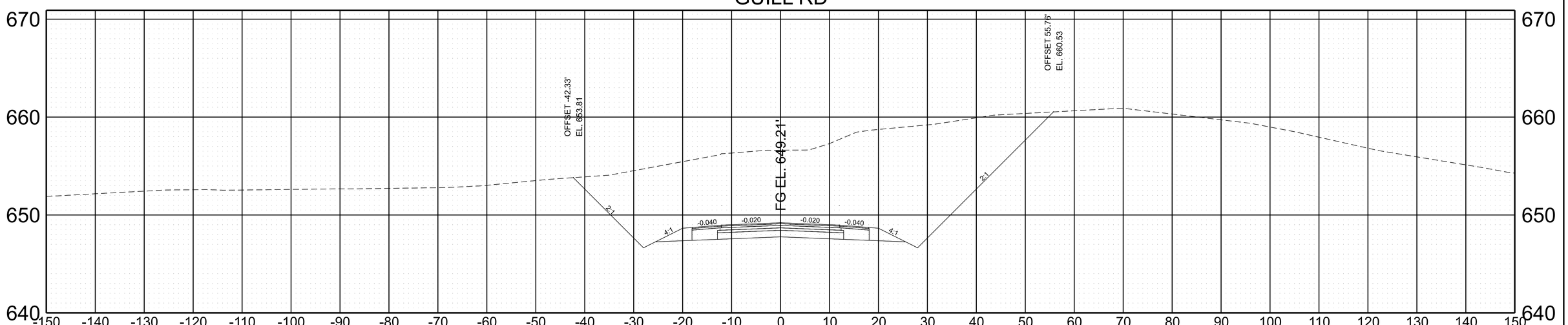
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A267

GUILL RD



STA. 13+50.00

GUILL RD



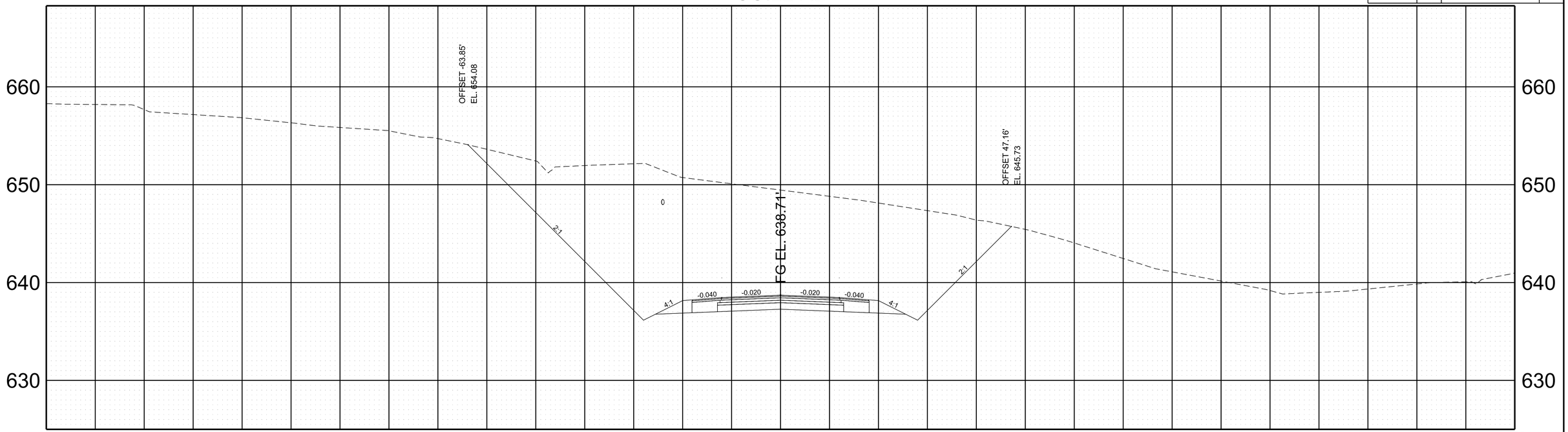
STA. 13+00.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:49:51 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-GUILL RD.DGN

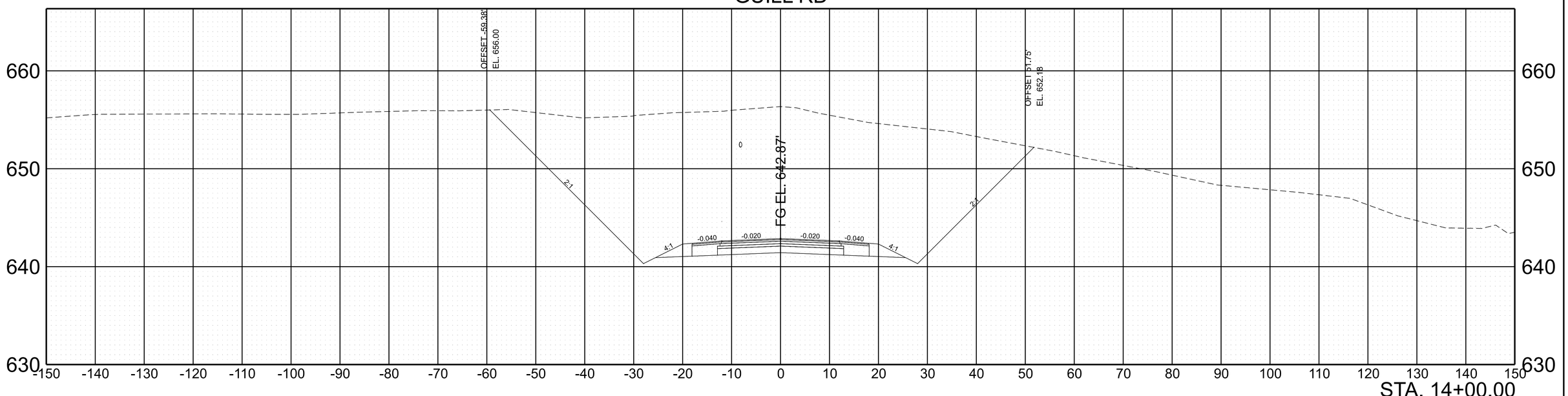
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A268

GUILL RD



STA. 14+50.00

GUILL RD



STA. 14+00.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + .
		END STA. + .

2/6/2023 8:49:51 AM
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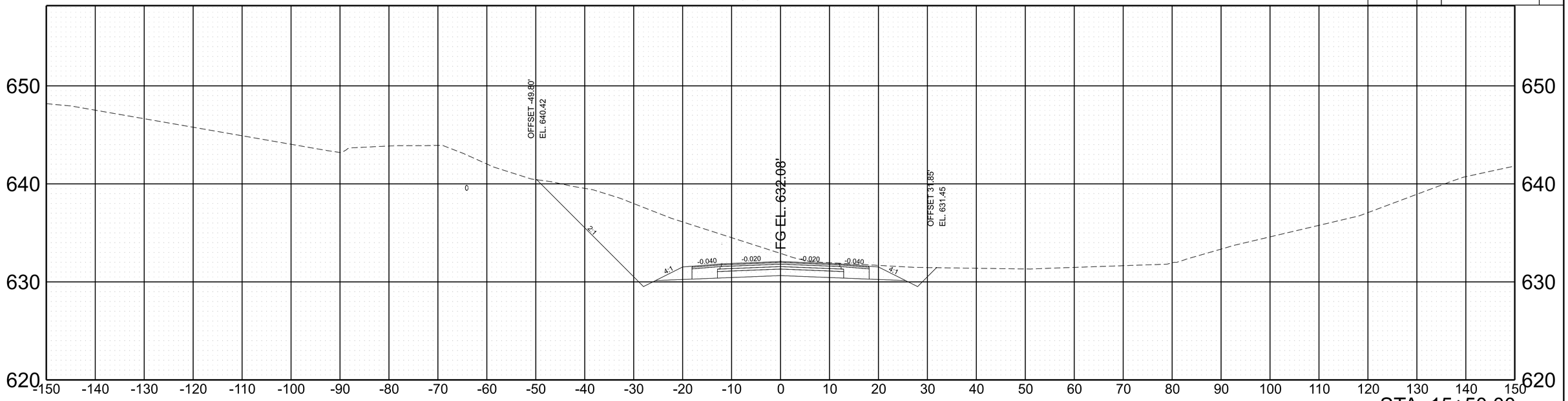
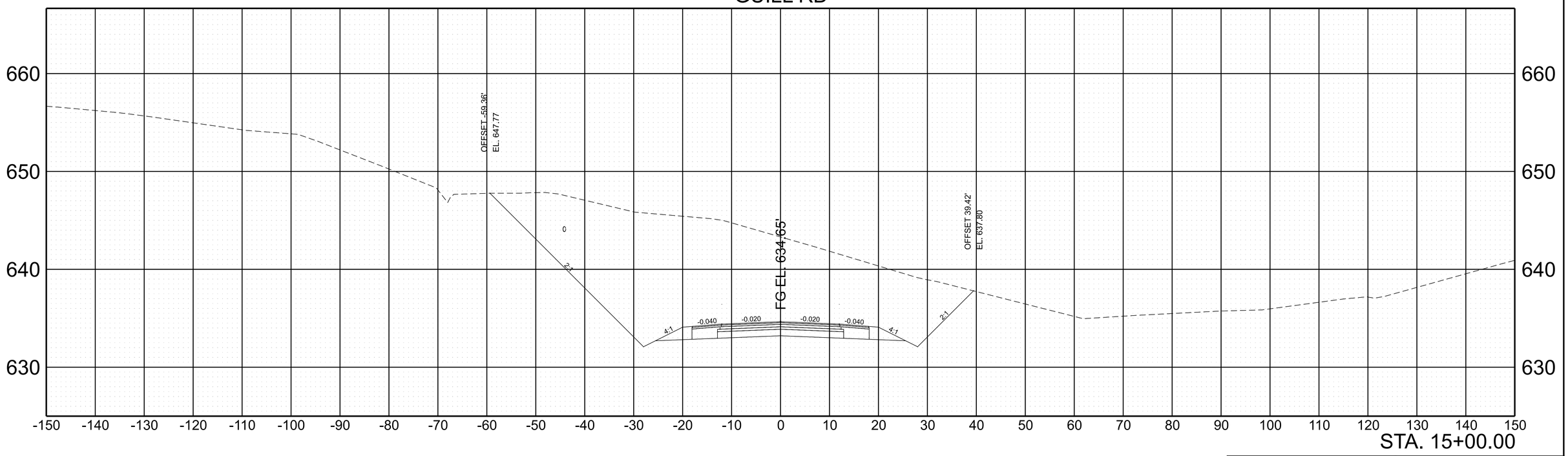
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A269

GUILL RD



STA. 15+50.00

GUILL RD



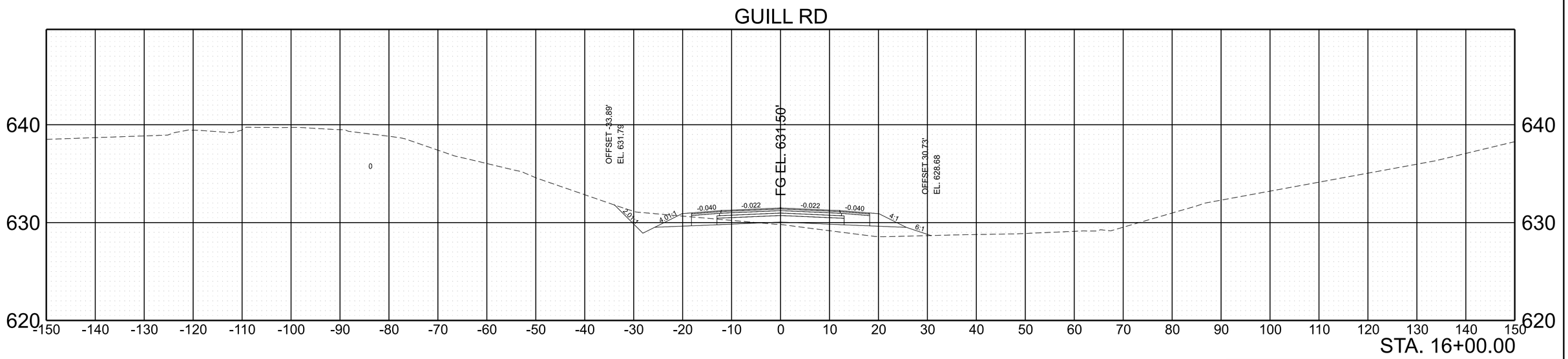
STA. 15+00.00

SCALE:	1"=10' HORIZ.	BEGIN STA. + .
	1"=5' VERT.	END STA. + .

2/6/2023 8:49:52 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-GUILL RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A270

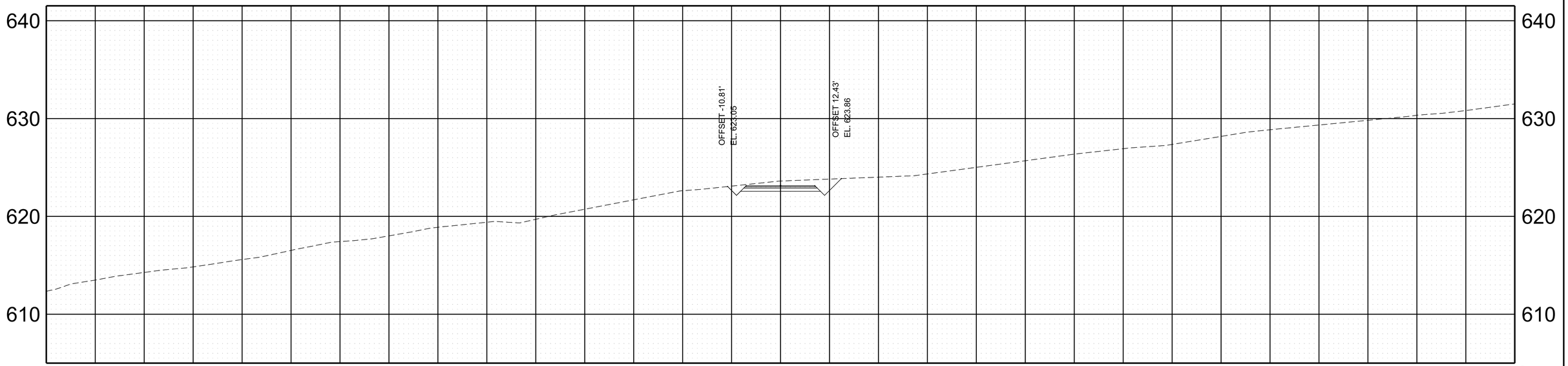


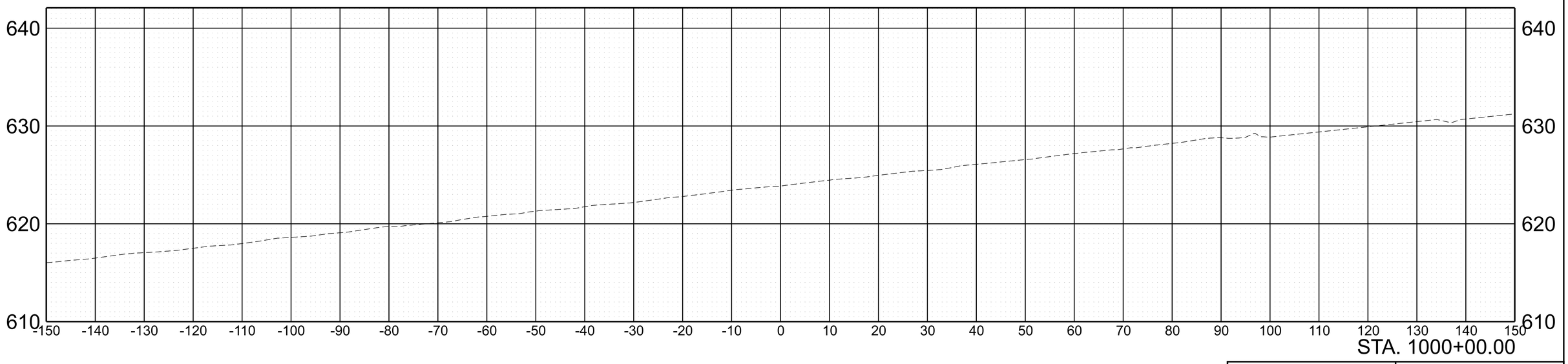


SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. + . END STA. + .

2/6/2023 8:49:53 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-XS-GUILL RD.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A271

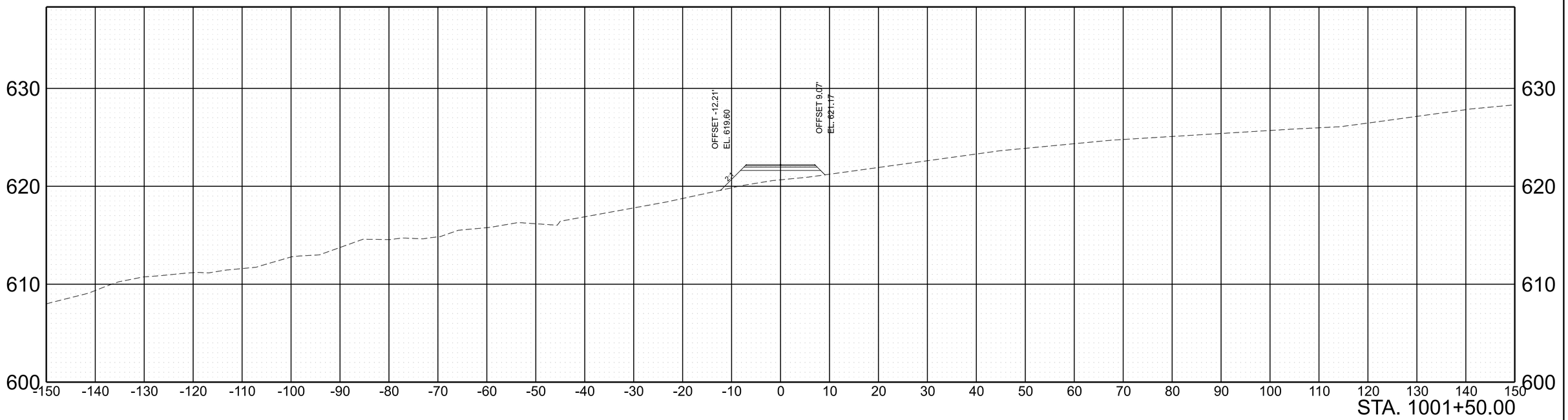


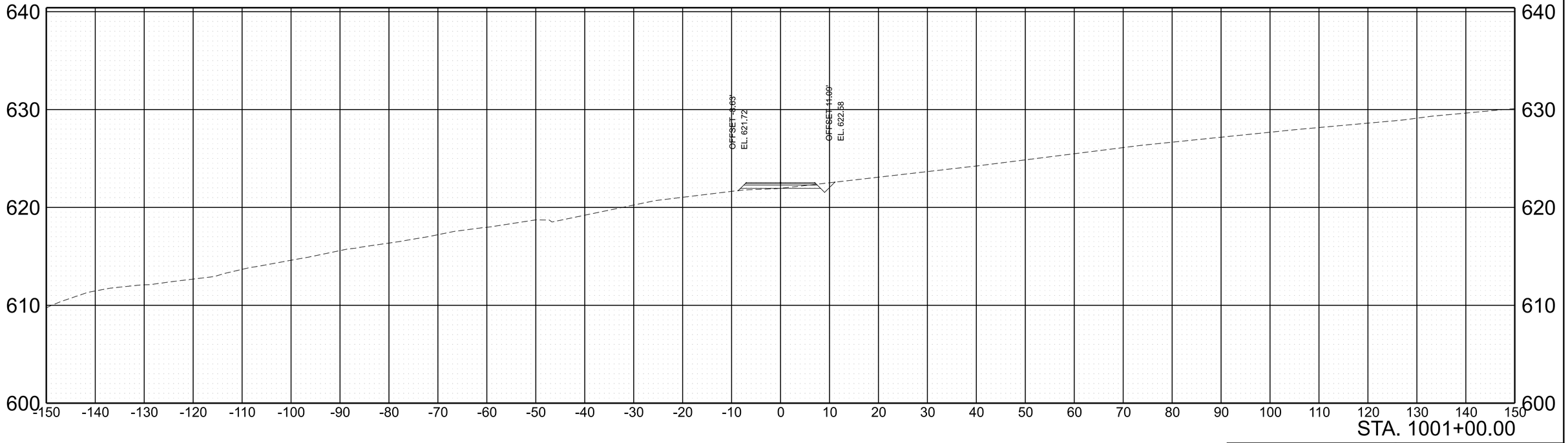


SCALE:	1"=10' HORIZ.	BEGIN STA. 1000+00.00
	1"=5' VERT.	END STA. 1000+50.00

2/6/2023 8:50:13 AM
C:\PWWORKING\EAST01\D2328414\95\0040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A272

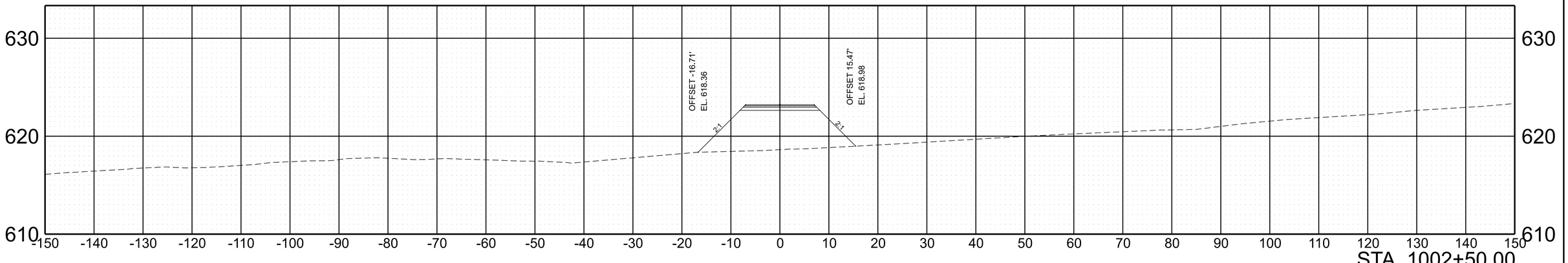


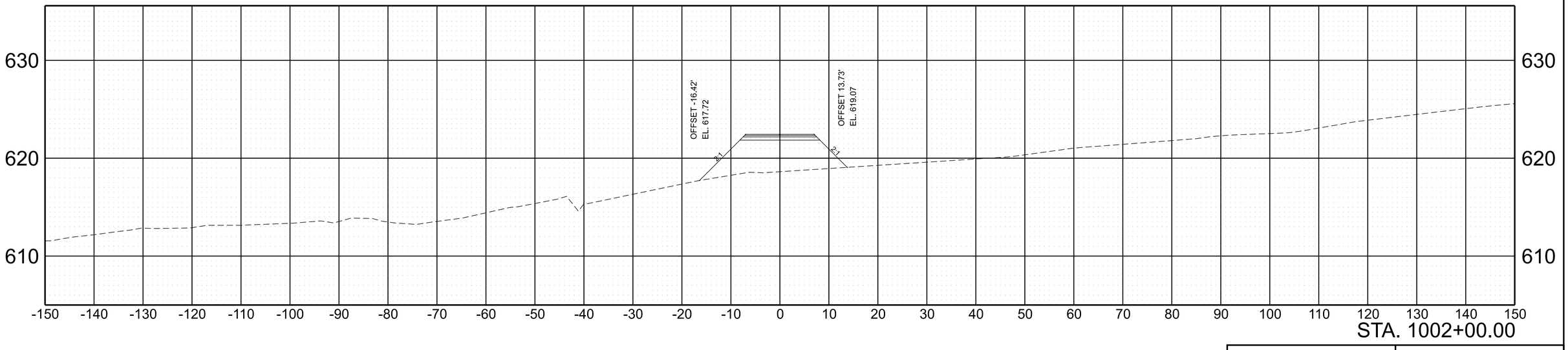


SCALE:	1"=10' HORIZ.	BEGIN STA. 1001+00.00
	1"=5' VERT.	END STA. 1001+50.00

2/6/2023 8:50:14 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A273

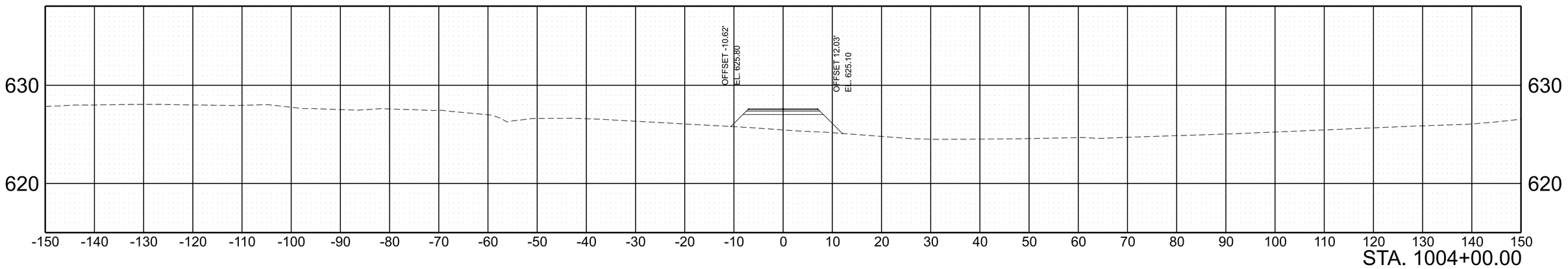




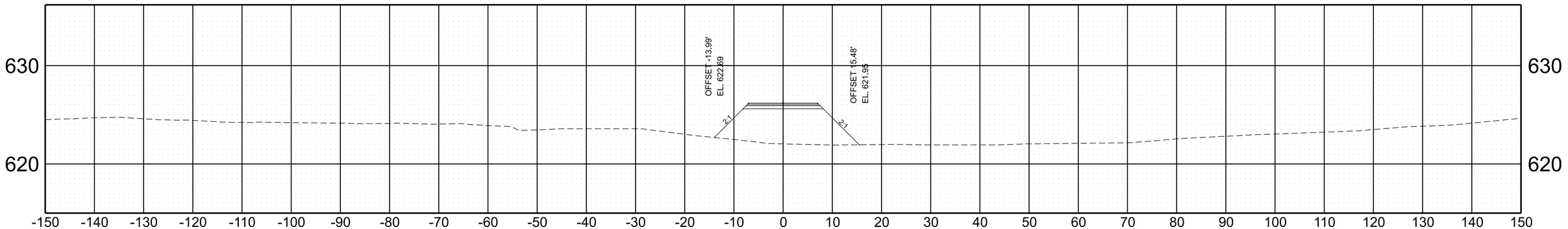
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1002+00.00 END STA. 1002+50.00

2/6/2023 8:50:15 AM
C:\PW\WORKING\EAST01\D2328414195\I040-SHT-XS-TILLMAN DRIVEWAY.DGN

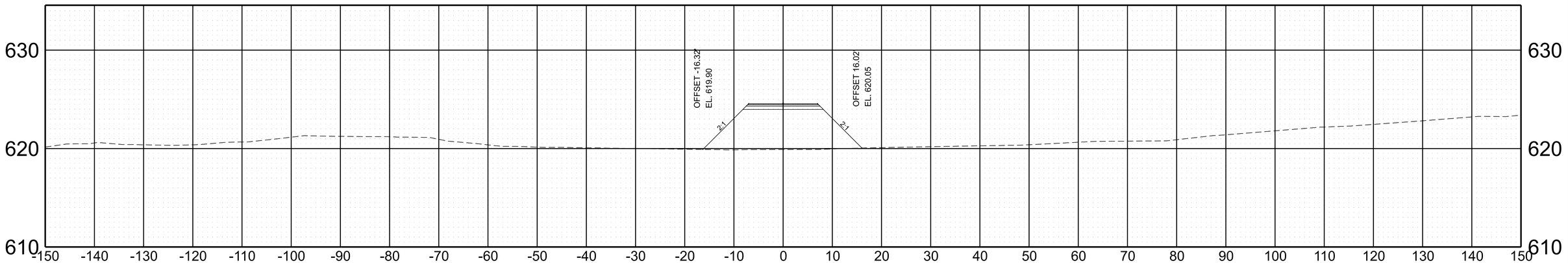
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A274



STA. 1004+00.00



STA. 1003+50.00



STA. 1003+00.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1003+00.00 END STA. 1004+00.00

2/6/2023 8:50:16 AM
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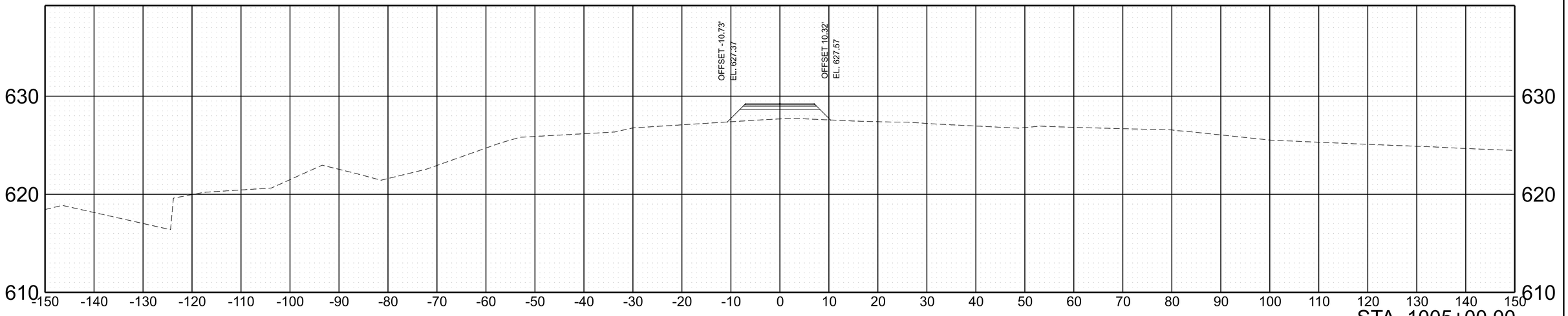
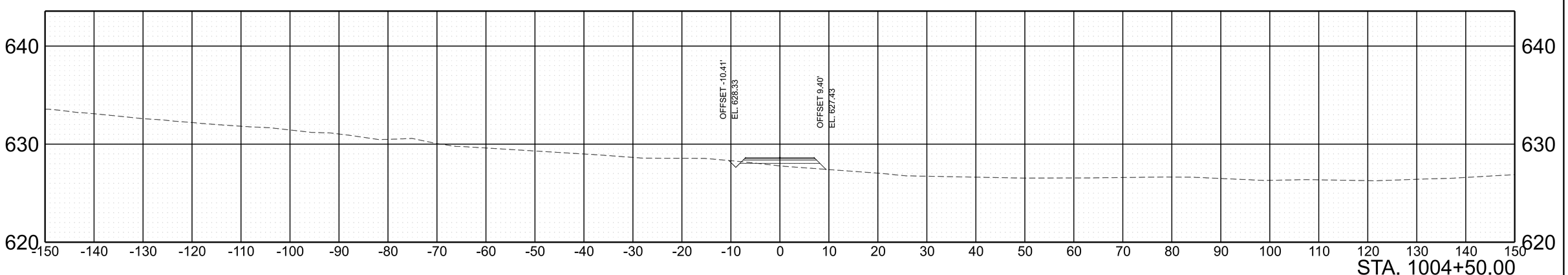
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A275

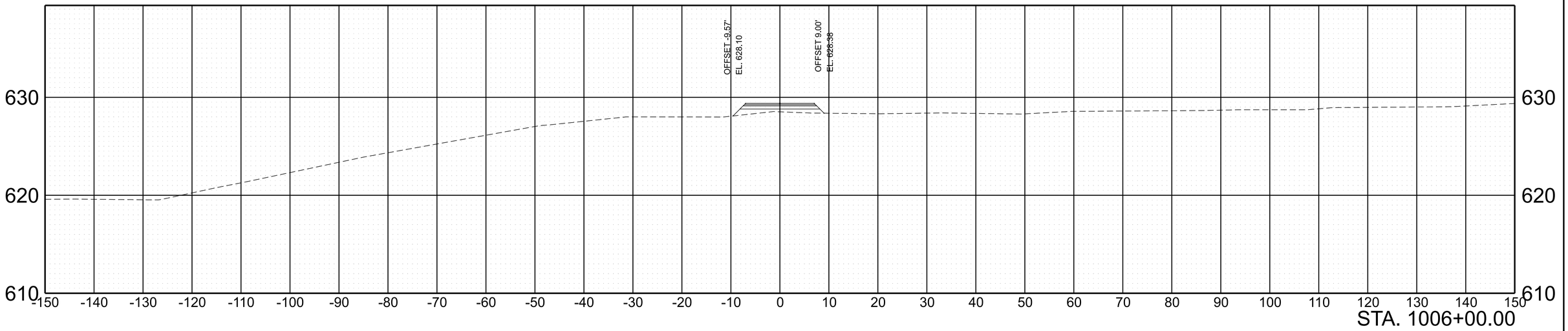


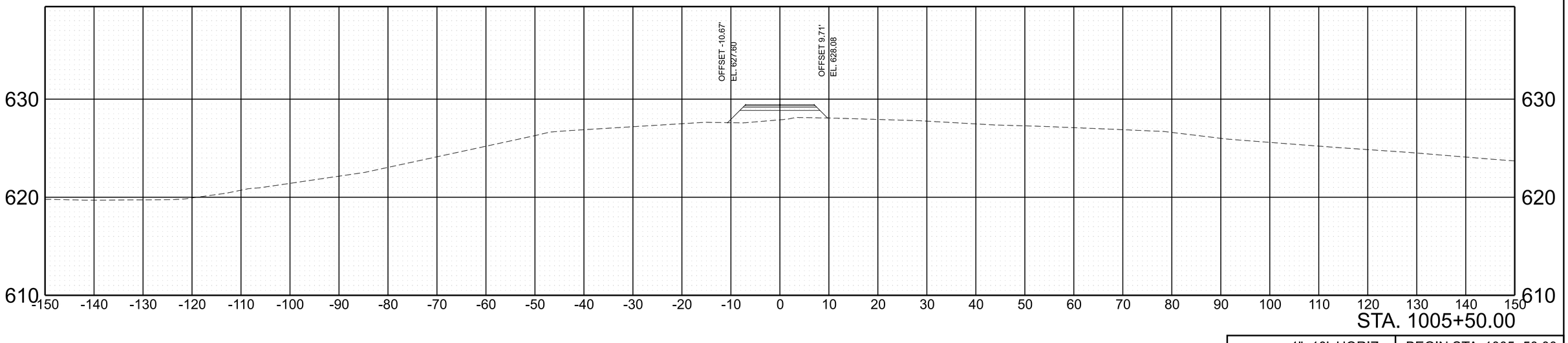


SCALE:	1"=10' HORIZ.	BEGIN STA. 1004+50.00
	1"=5' VERT.	END STA. 1005+00.00

2/6/2023 8:50:17 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A276

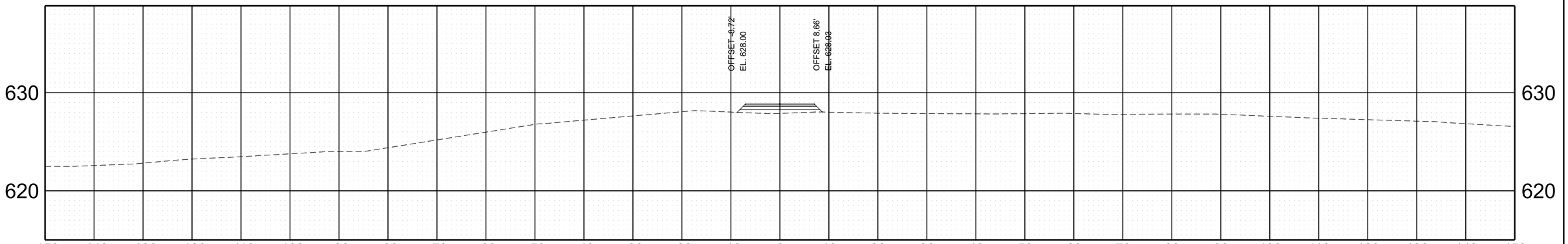




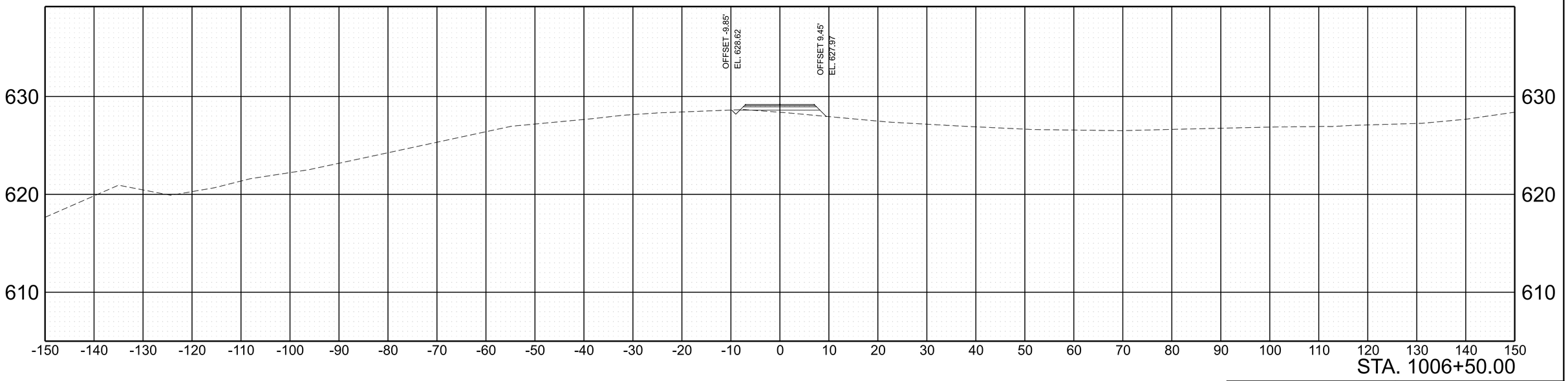
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1005+50.00 END STA. 1006+00.00

2/6/2023 8:51:14 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A277



STA. 1007+00.00

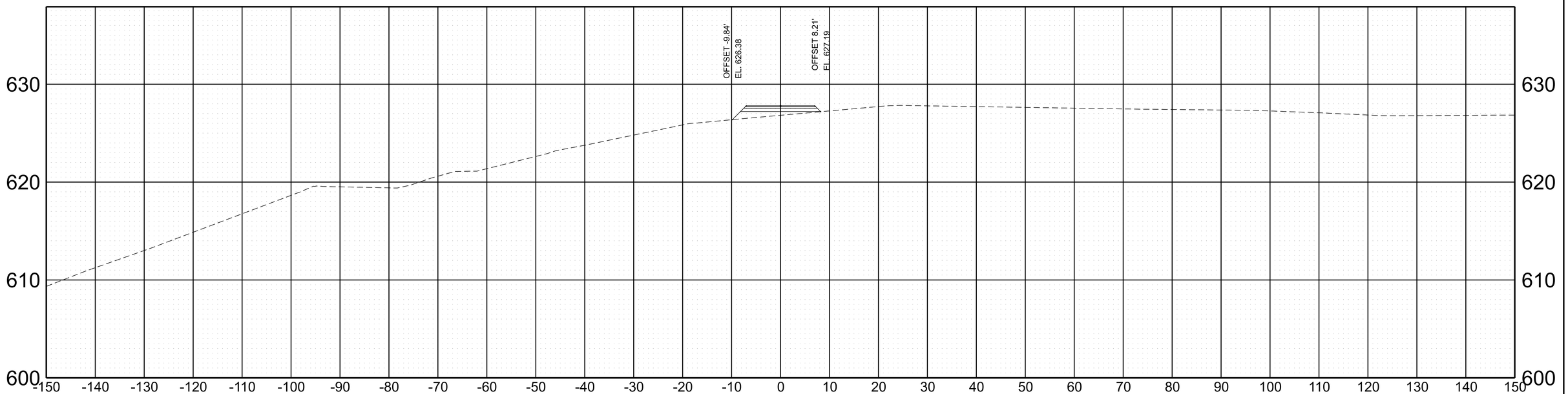


STA. 1006+50.00

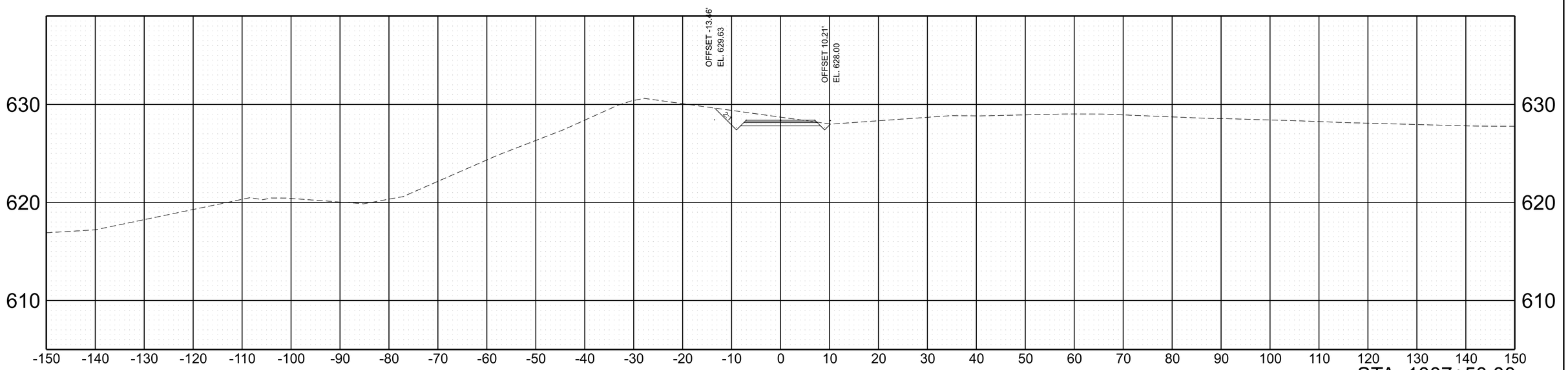
SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1006+50.00
		END STA. 1007+00.00

2/6/2023 8:51:16 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A278



STA. 1008+00.00

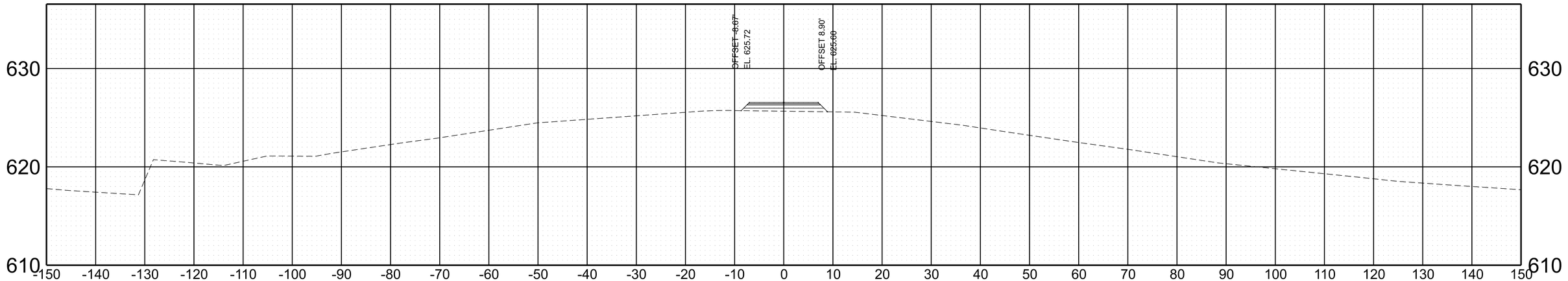


STA. 1007+50.00

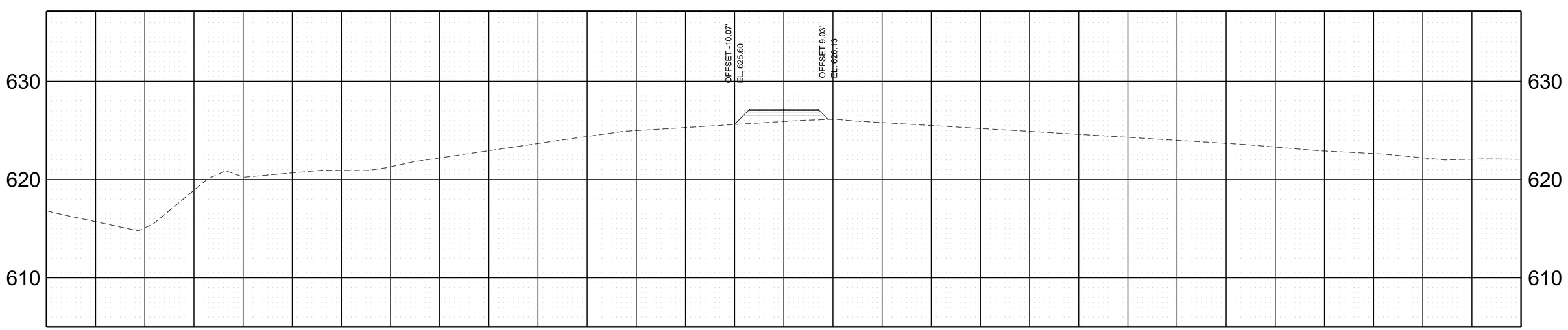
SCALE:	1"=10' HORIZ.	BEGIN STA. 1007+50.00
	1"=5' VERT.	END STA. 1008+00.00

2/6/2023 8:51:17 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A279



STA. 1009+00.00

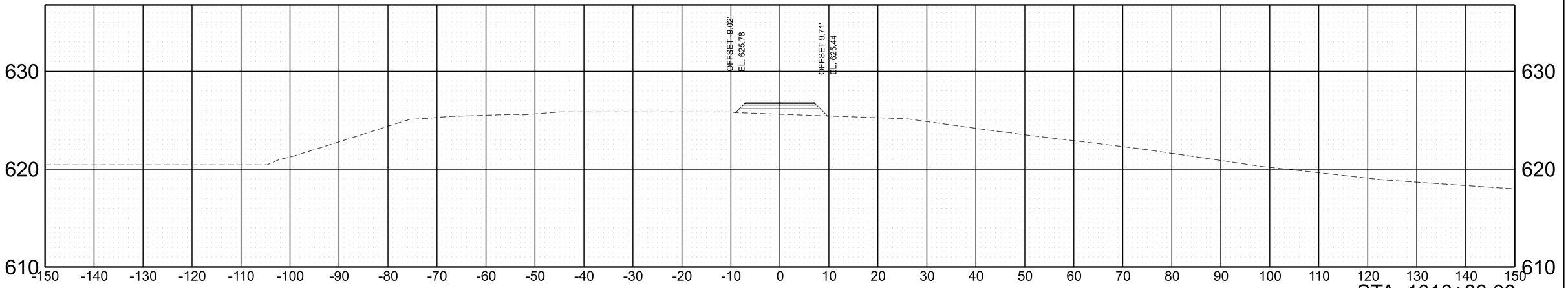


STA. 1008+50.00

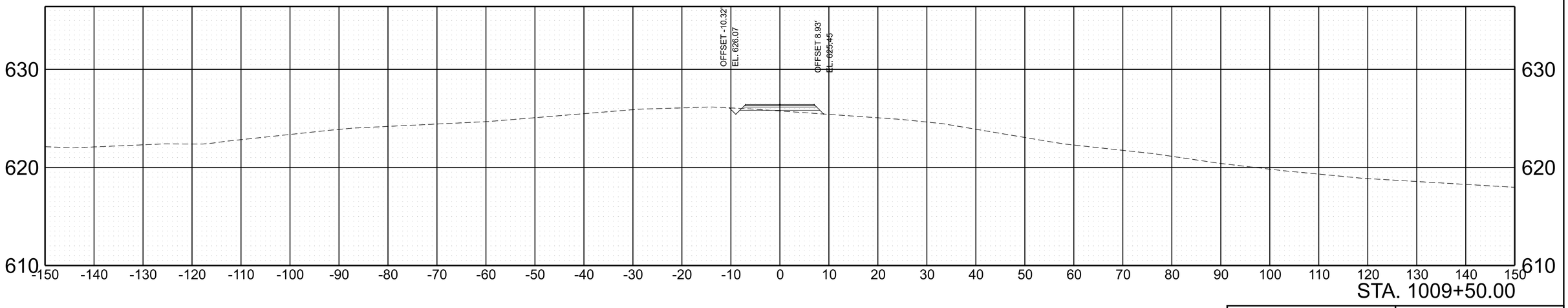
SCALE:	1"=10' HORIZ.	BEGIN STA. 1008+50.00
	1"=5' VERT.	END STA. 1009+00.00

2/6/2023 8:51:18 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A280



STA. 1010+00.00

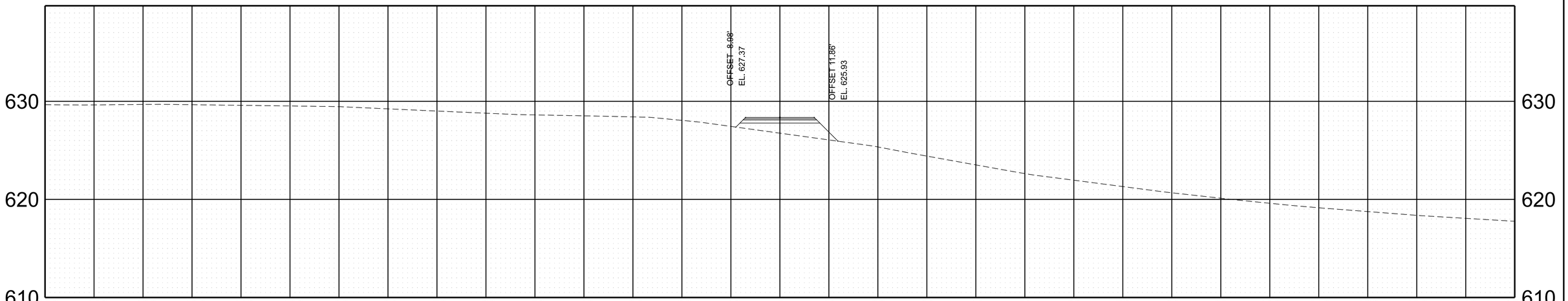


STA. 1009+50.00

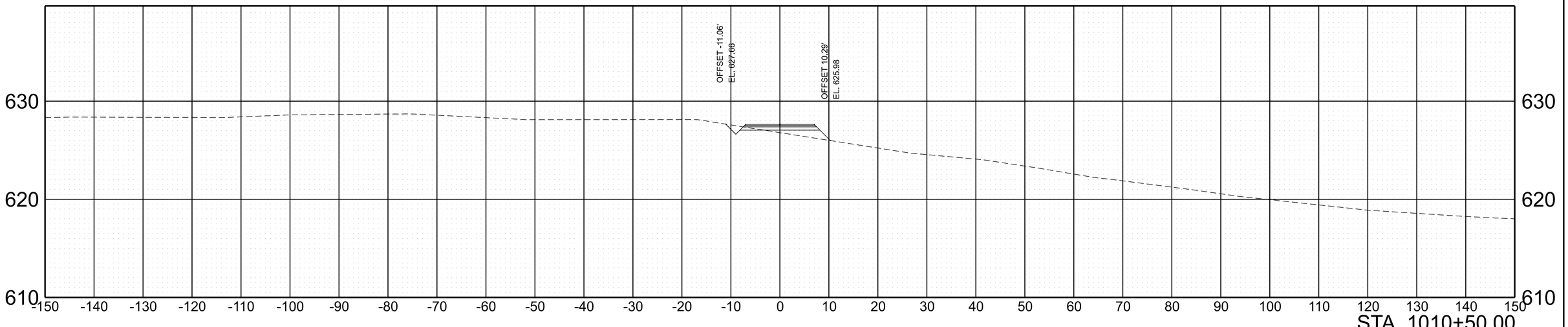
SCALE:	1"=10' HORIZ.	BEGIN STA. 1009+50.00
	1"=5' VERT.	END STA. 1010+00.00

2/6/2023 8:51:19 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A281



STA. 1011+00.00



STA. 1010+50.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1010+50.00 END STA. 1011+00.00

2/6/2023 8:51:20 AM
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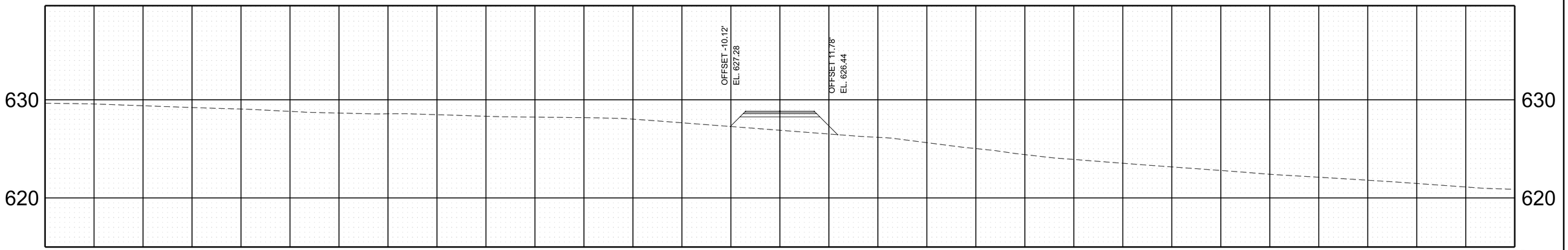
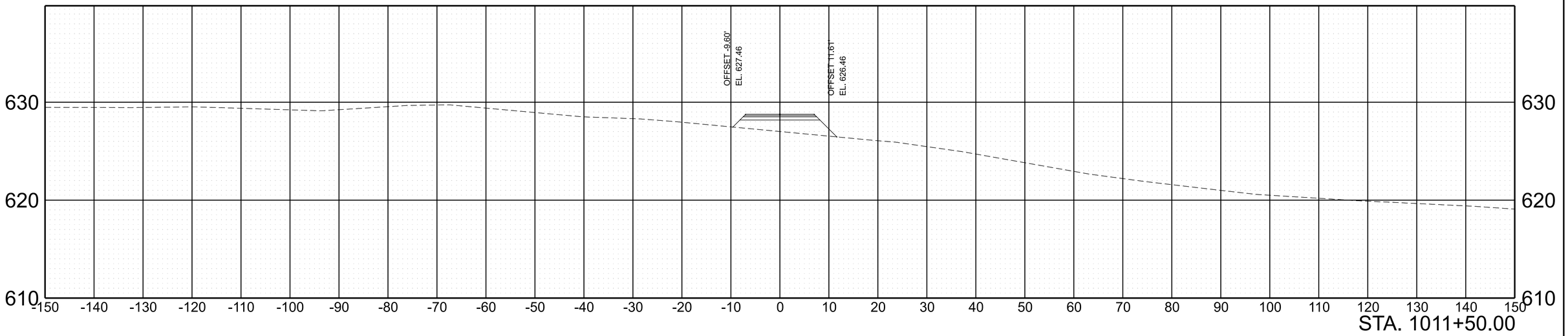
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A282



STA. 1012+00.00



STA. 1011+50.00

SCALE:	1"=10' HORIZ.	BEGIN STA. 1011+50.00
	1"=5' VERT.	END STA. 1012+00.00

2/6/2023 8:51:21 AM
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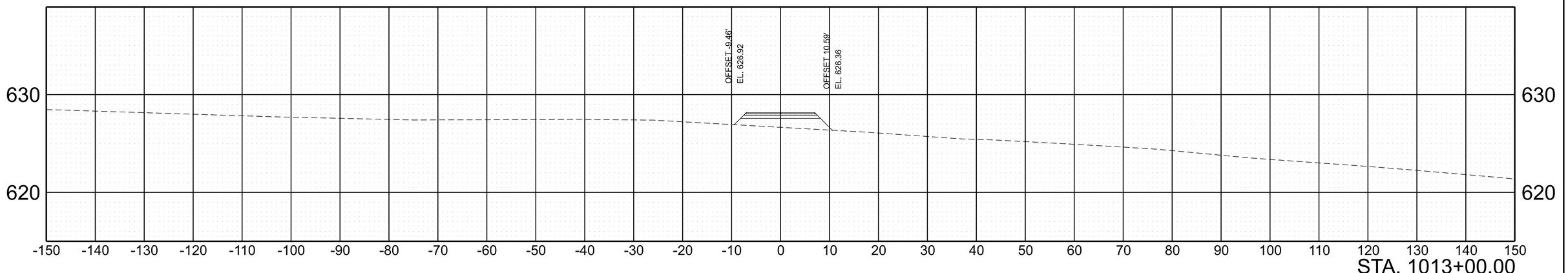
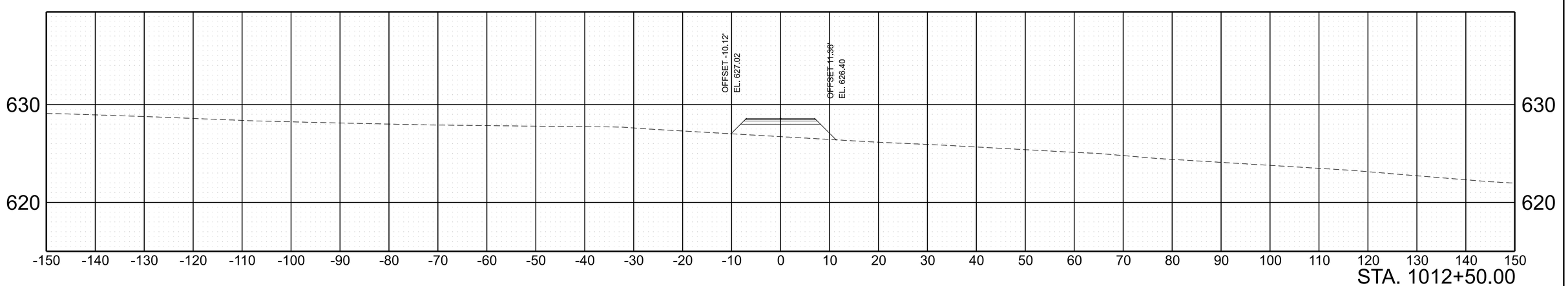
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A283

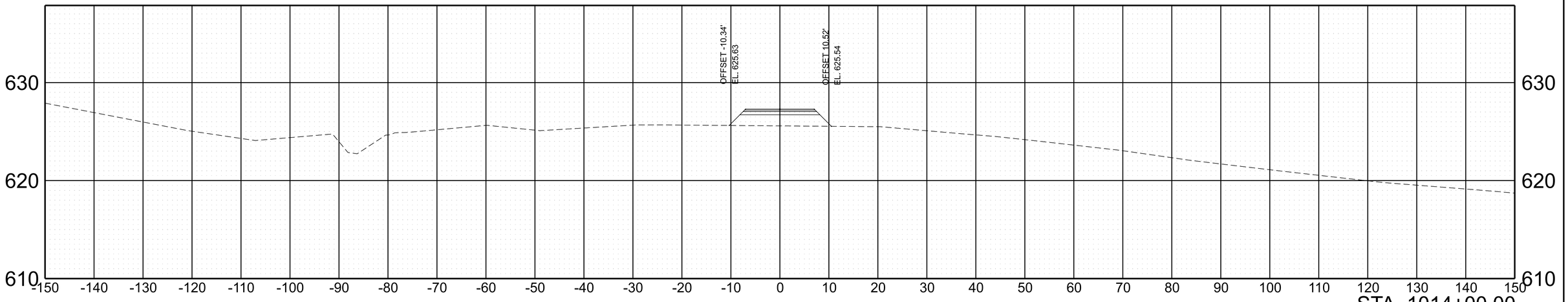


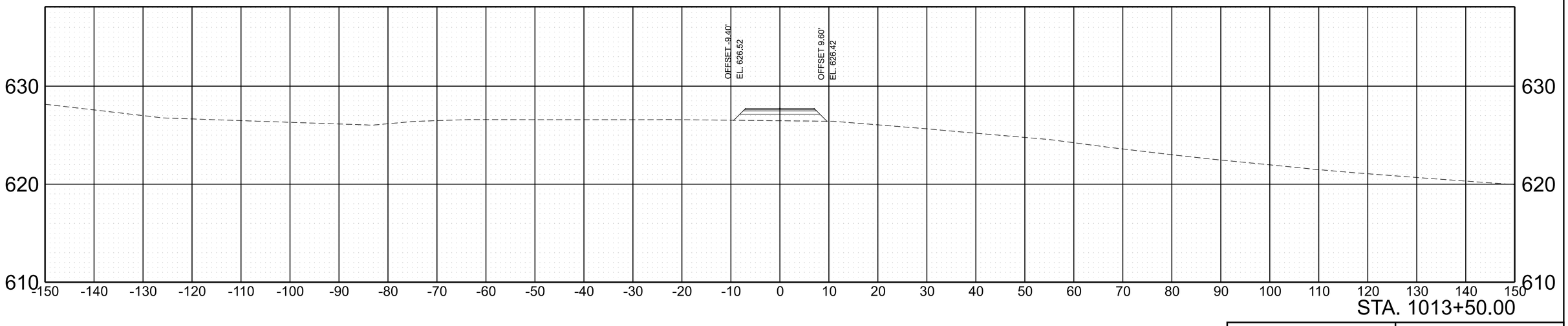


SCALE:	1"=10' HORIZ.	BEGIN STA. 1012+50.00
	1"=5' VERT.	END STA. 1013+00.00

2/6/2023 8:51:22 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A284





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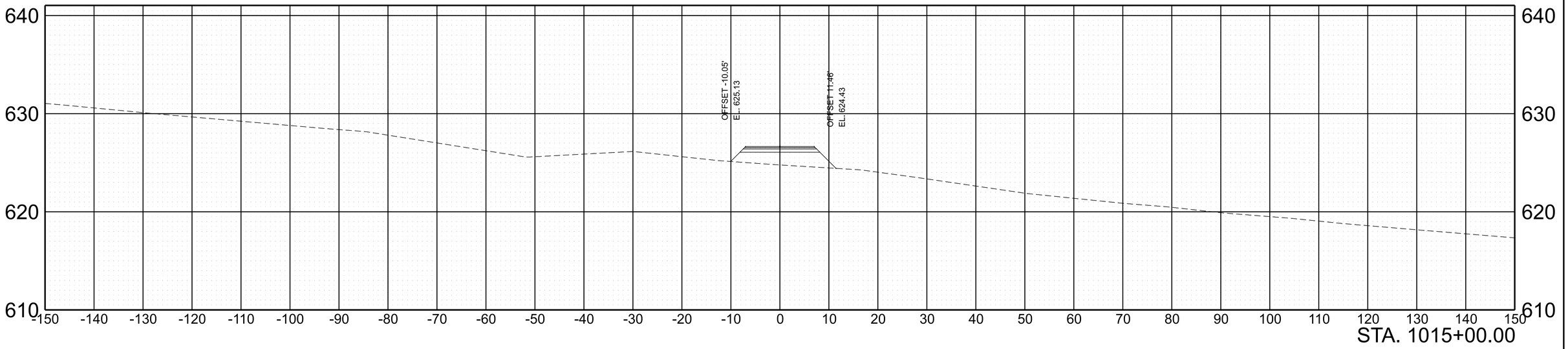
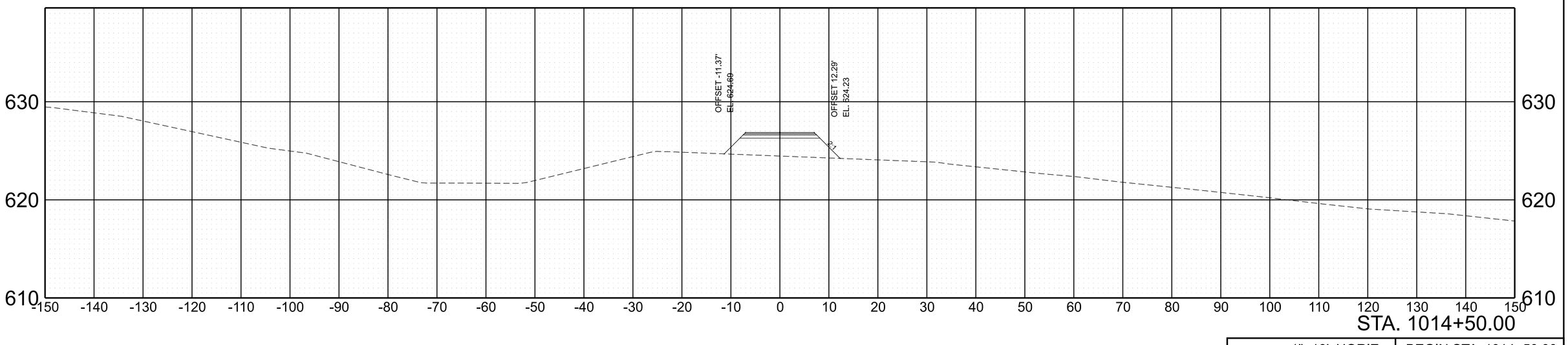
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A285





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	1"=5' VERT.	END STA. 1015+00.00

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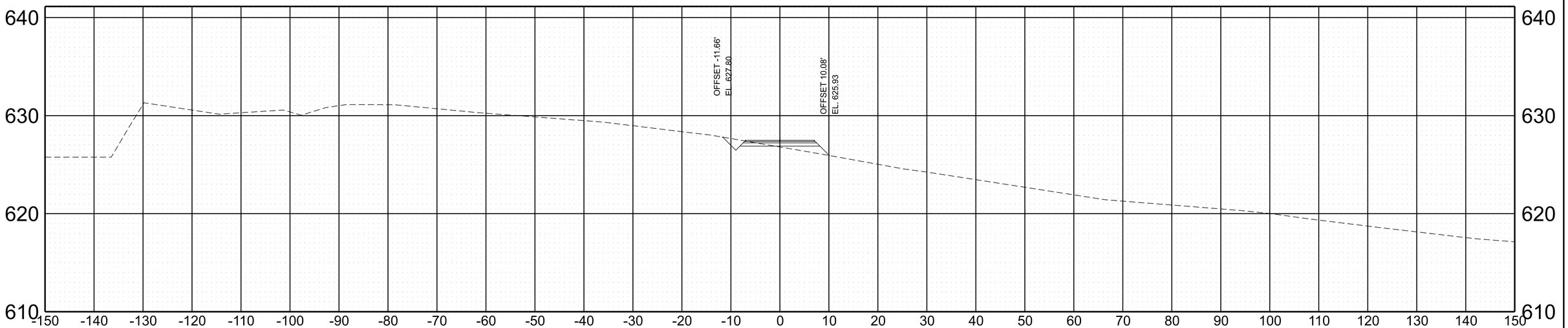
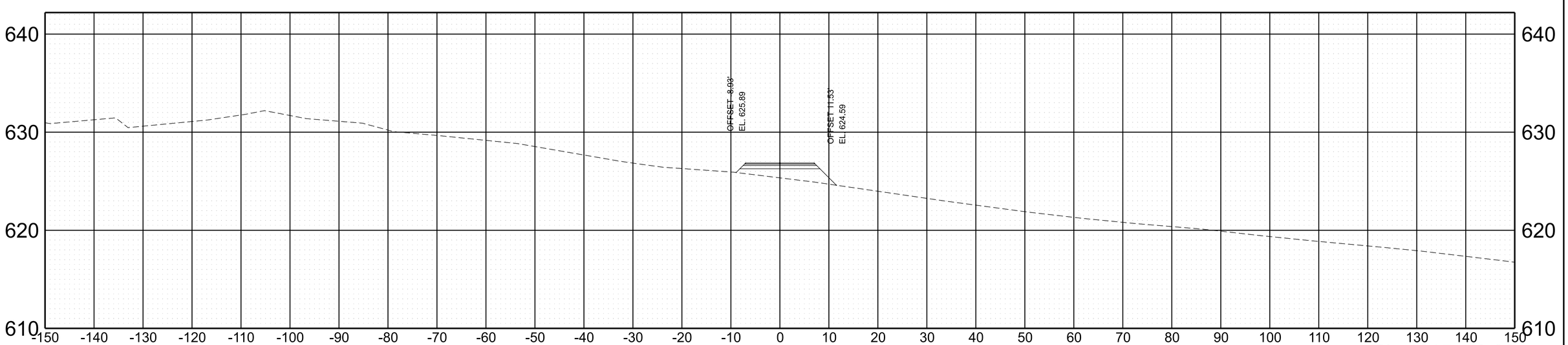
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A286



STA. 1016+00.00



STA. 1015+50.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1015+50.00 END STA. 1016+00.00

2/6/2023 8:51:25 AM
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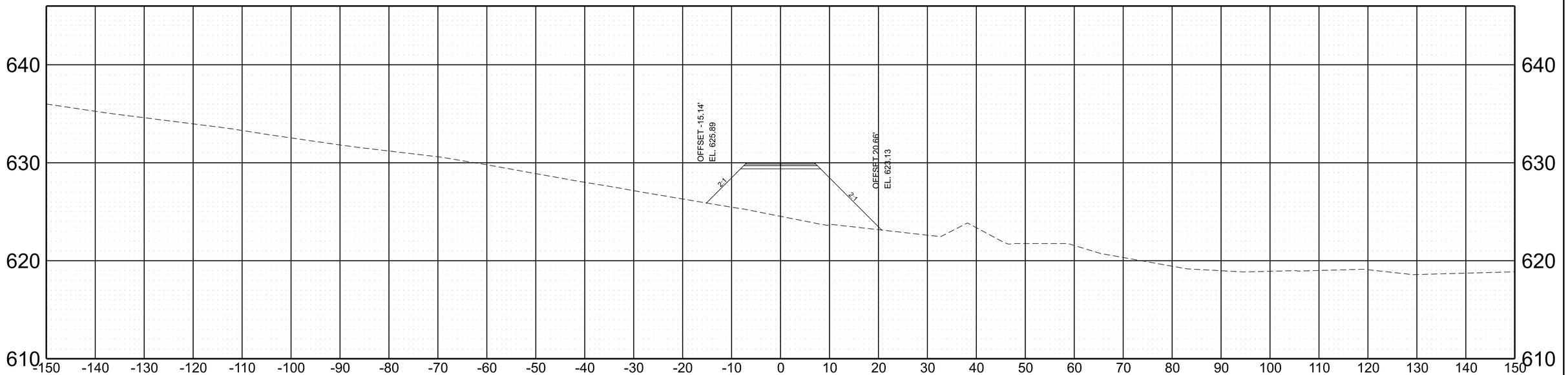
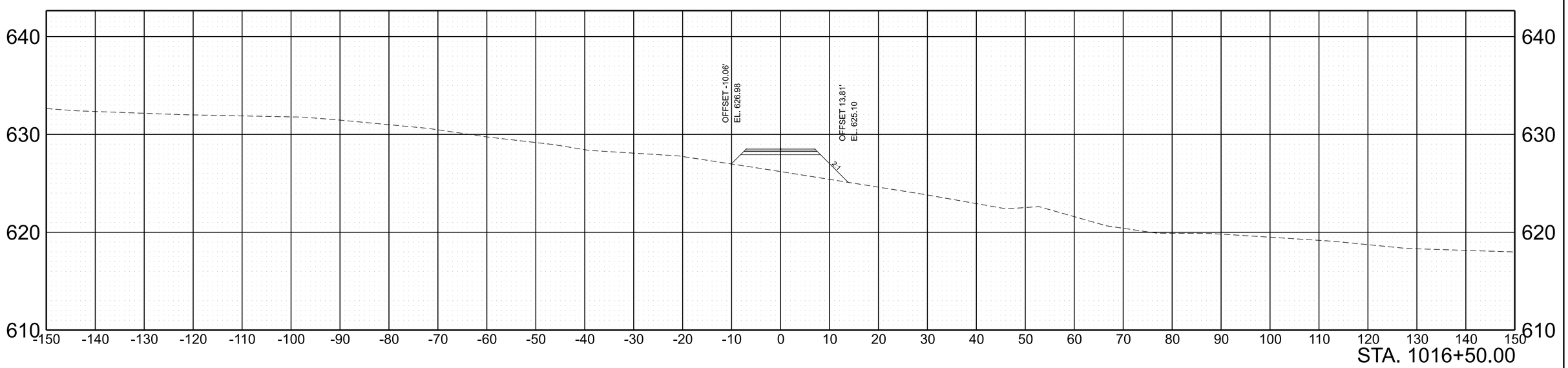
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A287



STA. 1017+00.00



STA. 1016+50.00

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	1"=5' VERT.	END STA. 1017+00.00

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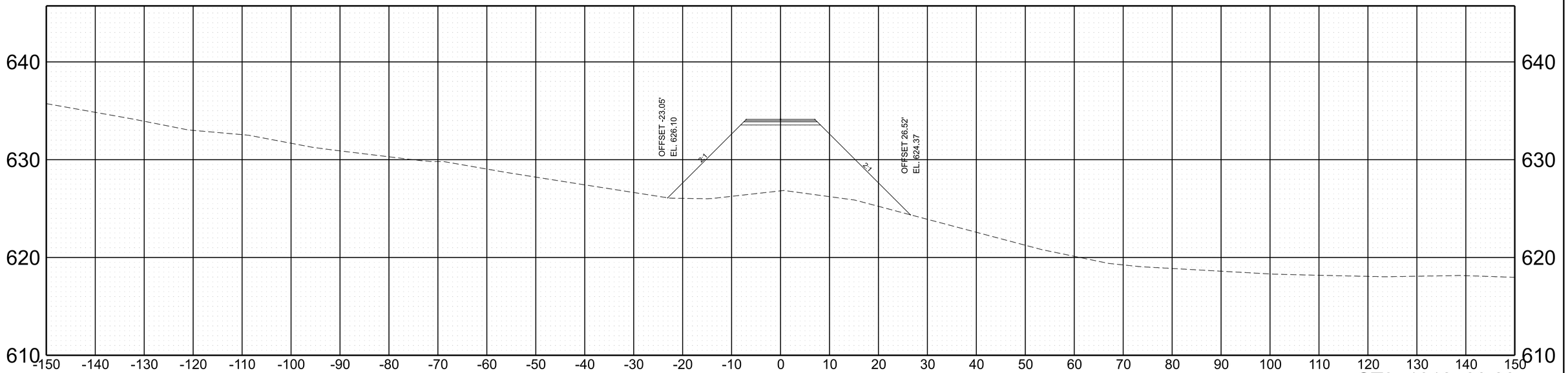
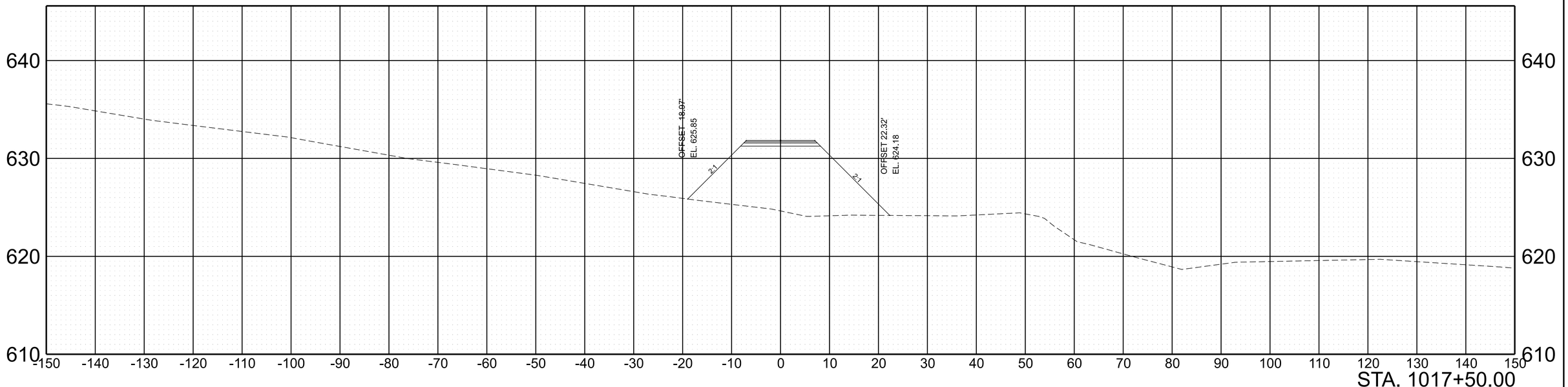
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A288



STA. 1018+00.00



STA. 1017+50.00

SCALE:	1"=10' HORIZ. 1"=5' VERT.	BEGIN STA. 1017+50.00 END STA. 1018+00.00

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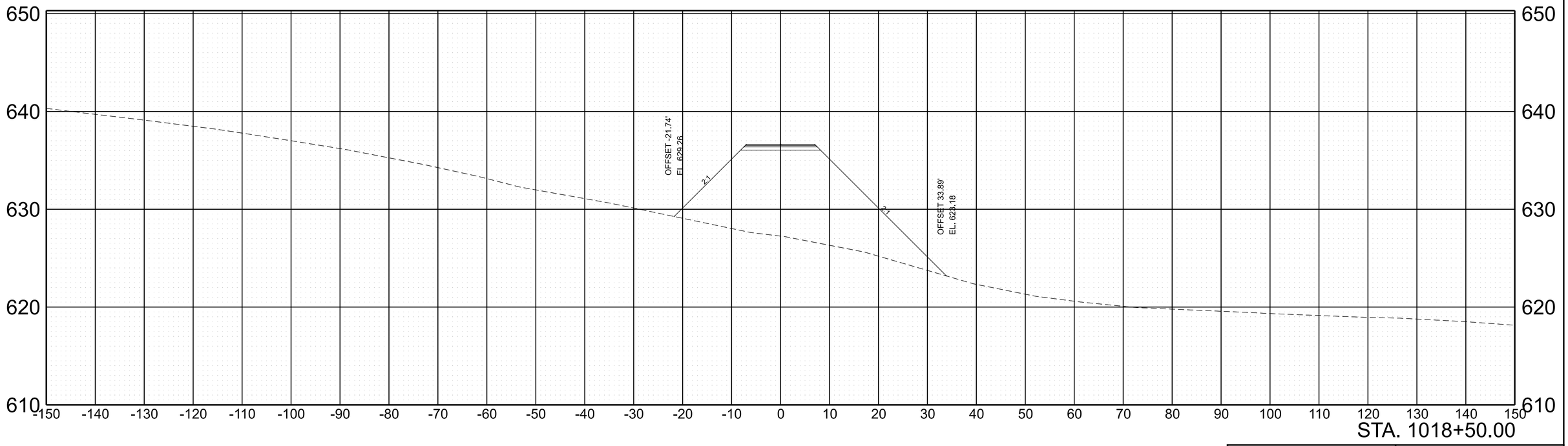
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A289



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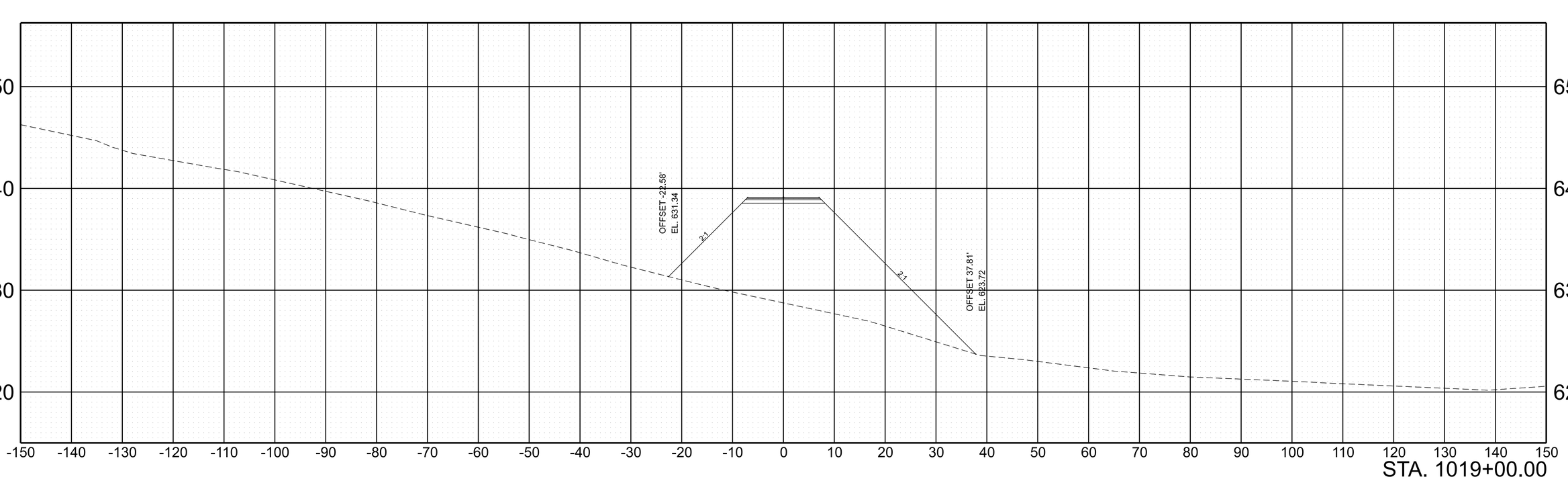
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A290



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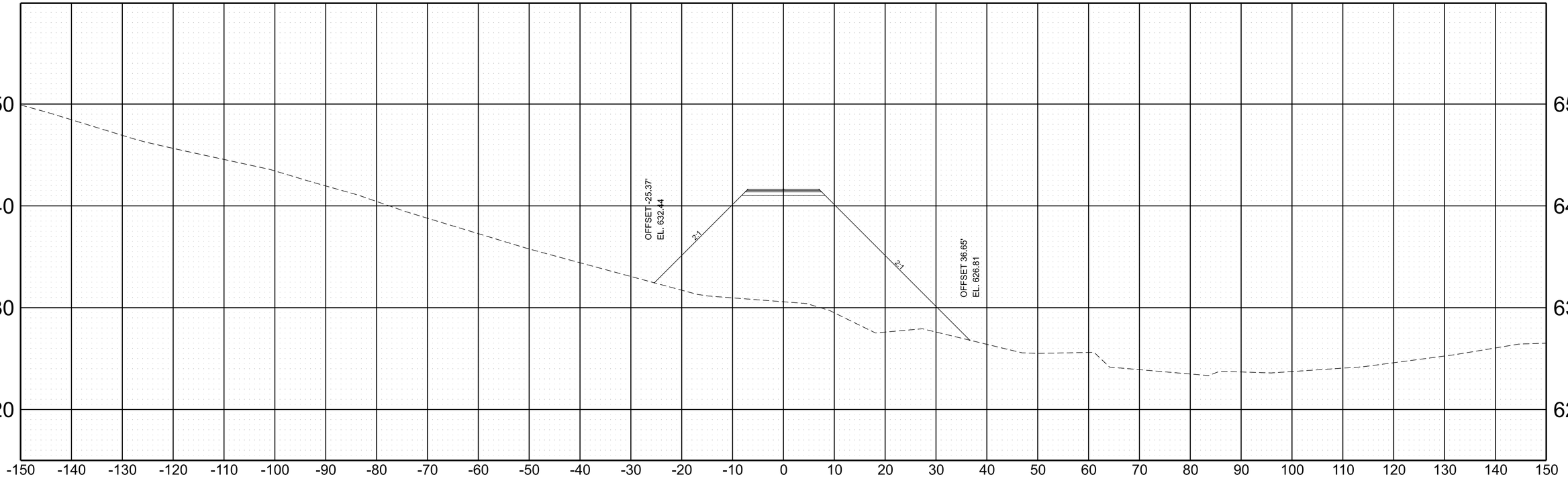
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A291



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2/6/2023 8:51:30 AM
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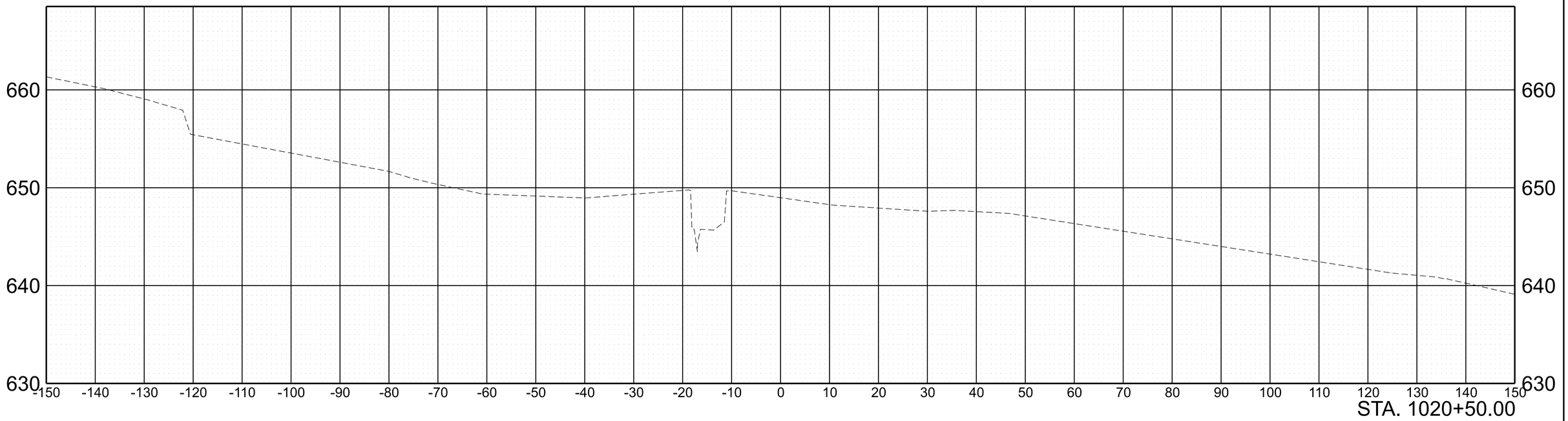
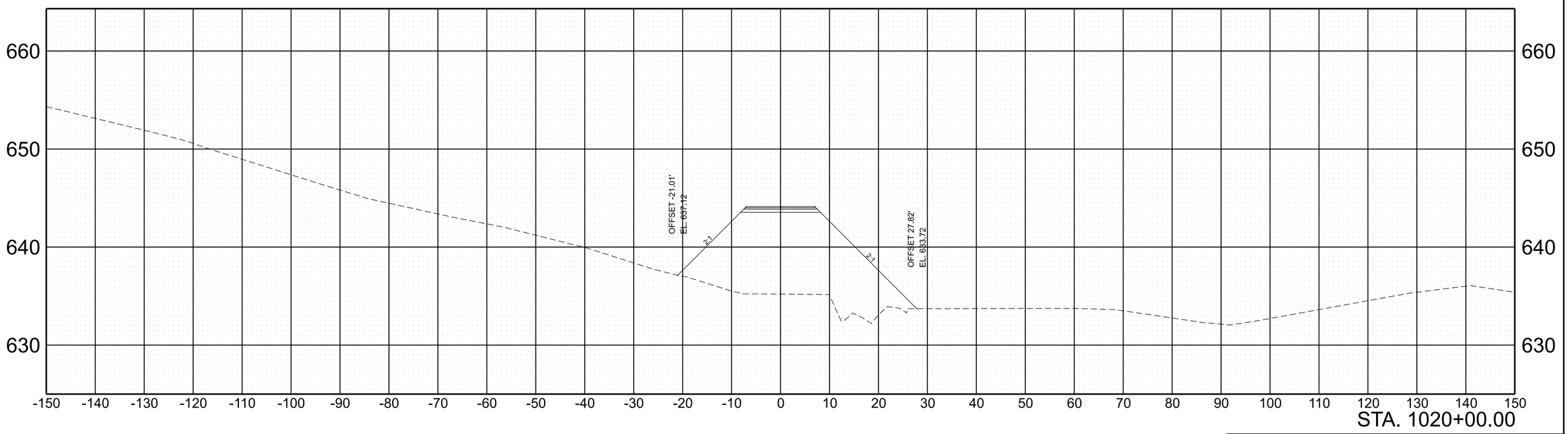
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2021	NH-I-40-5(150)	A292





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2/6/2023 8:51:32 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-XS-TILLMAN DRIVEWAY.DGN

Brian Kluttz

From: Reynolds, Brian <Brian.Reynolds@hdrinc.com>
Sent: Wednesday, August 30, 2023 5:29 PM
To: Sharon Sanders; Brian Kluttz
Cc: Bradley Martin; Jon Storey; Shaun Armstrong; Samuel T. Patterson; Birch, Valerie
Subject: [EXTERNAL] Environmental Boundaries- Wilson County, I-40, Interchange at SR-265 (Central Pike), PIN 124884.00

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Sharon and Brian,

The ROW impacts are provided below for use in the NEPA document based on the Initial Studies Plans dated 2/4/2023:

Area to be acquired:	26.6 acres
Slope easement:	12.9 acres
Construction easement:	6.5 acres
TOTAL:	46.0 acres

The DGN files with the ROW linework were provided with the Initial Studies submittal.

If you have any questions or need additional information, please let me know.

Brian Reynolds, PE, AICP
D 629.228.7546 **M** 615.364.6424

hdrinc.com/follow-us

Relocations

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY DIVISION
SUITE 600, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3196

Butch Eley
COMMISSIONER

BILL LEE
GOVERNOR

CONCEPTUAL STAGE RELOCATION PLAN

County(s): Wilson County
Route: SR-265 (Central Pike)/ Interstate 40
PIN: 124884.00
State Project No.: 95100-1113-44 **Federal Project No.: NH-I-40-5(150)**

Termini: Diverging Diamond Interchange connecting SR-265 to I-40 from west of Pleasant Grove Road to east of Providence Parkway

PROJECT INFORMATION: To improve safety and functionality of the roadway, the Tennessee Department of Transportation (TDOT) is proposing to create a Diverging Diamond Interchange on State Route 265 (Central Pike) to allow egress and ingress onto I-40. To further improve mobility around the area, Tillman Drive will be extended from its current location to connect to Pleasant Grove Drive, and John Hagar Road will follow a new alignment to connect with Central Pike further south. The project currently does not have an exact length for mileage.

A map showing the location of the proposed project is provided on page 4 of this report.

According to the preliminary plans, typical sections will contain the following:

For SR-265/ John Hagar Road/ Guill Road/ Providence Parkway: Two lane roads traveling in either direction that are Eleven (11) to Thirty (30) feet wide, while Twelve (12) to Fourteen (14) feet is typical. Occasional Two (2) Six (6) foot wide turning lanes and/or an Eight (8) to Fourteen (14) foot median. Two (2) to Six (6) foot wide Curb and Gutter, a Twelve (12) foot sidewalk is present is certain sections, and a 4:1 slope on either side of the roadway is often present.

For I-40: I-40 will retain it's Forty-Eight (48) foot roadway in either direction, with Twelve (12) Foot Ramps for Egress and Ingress to the Highway. Ten (10) foot paved shoulders are typical.

AREA INFORMATION: The subject area is in the Western Central portion of Wilson County. Current land use in the project area is residential.

According to the U.S. Census Bureau, the population of Wilson County in 2021 was 151,917, a 24.96 percent increase over the 2010 census of 113,993.

DISPLACEMENTS:

Anticipated Relocations	
BUSINESS RELOCATIONS	0
MULTI-FAMILY RESIDENTIAL RELOCATIONS	0
MOBILE HOME RELOCATIONS	0
SINGLE-FAMILY RESIDENTIAL RELOCATIONS	2

DISPLACEMENT EFFECTS AND ANALYSIS

Businesses:

RIGHT-OF-WAY LIMITS

This project is projected to displace a total of Zero (0) businesses.

Residential:

RIGHT-OF-WAY LIMITS

There are approximately Two (2) displaced residencies with this project. There are Two (2) Single-Family Residences that would be relocated, and both appear to be inhabited. Of these, one is due to the septic system being impacted, while the other is directly impacted by a Construction Easement.

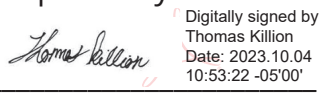
Availability of Replacement Housing: There will be no issues finding suitable housing for potential relocations. After a survey of the surrounding area, there were hundreds of homes for sale within 50 (Fifty) miles of the project that were close to comparable with the displaced' current residencies. During the survey there were also hundreds of residential rental units available within 50 (Fifty) miles of the project.

ENVIRONMENTAL: While there are some displaced residencies, it does not appear to be significantly environmentally impactful.

ECONOMIC IMPACT: There does not seem to be any major economic impacts from this project.

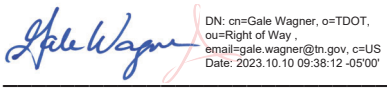
ASSURANCES: The Tennessee Department of Transportation will make relocation assistance available to all eligible persons impacted by this project, including residences, businesses, farm operations, non-profit organizations, and those requiring special services or assistance. The Regional Relocation Staff will administer the relocation program under the rules, policies, and procedures set forth in the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Uniform Relocation Assistance Act of 1972, implementing federal regulations, TCA 13-11-101 through 119, The State of Tennessee Relocation Assistance Brochure and Chapter IX of the State of Tennessee Department of Transportation Right-of-Way Manual. TDOT's relocation program is practical and will allow for the efficient relocation of all eligible displaced persons in accordance with State and Federal Guidelines.

Prepared By:



Thomas X. Killion,
Right of Way Agent

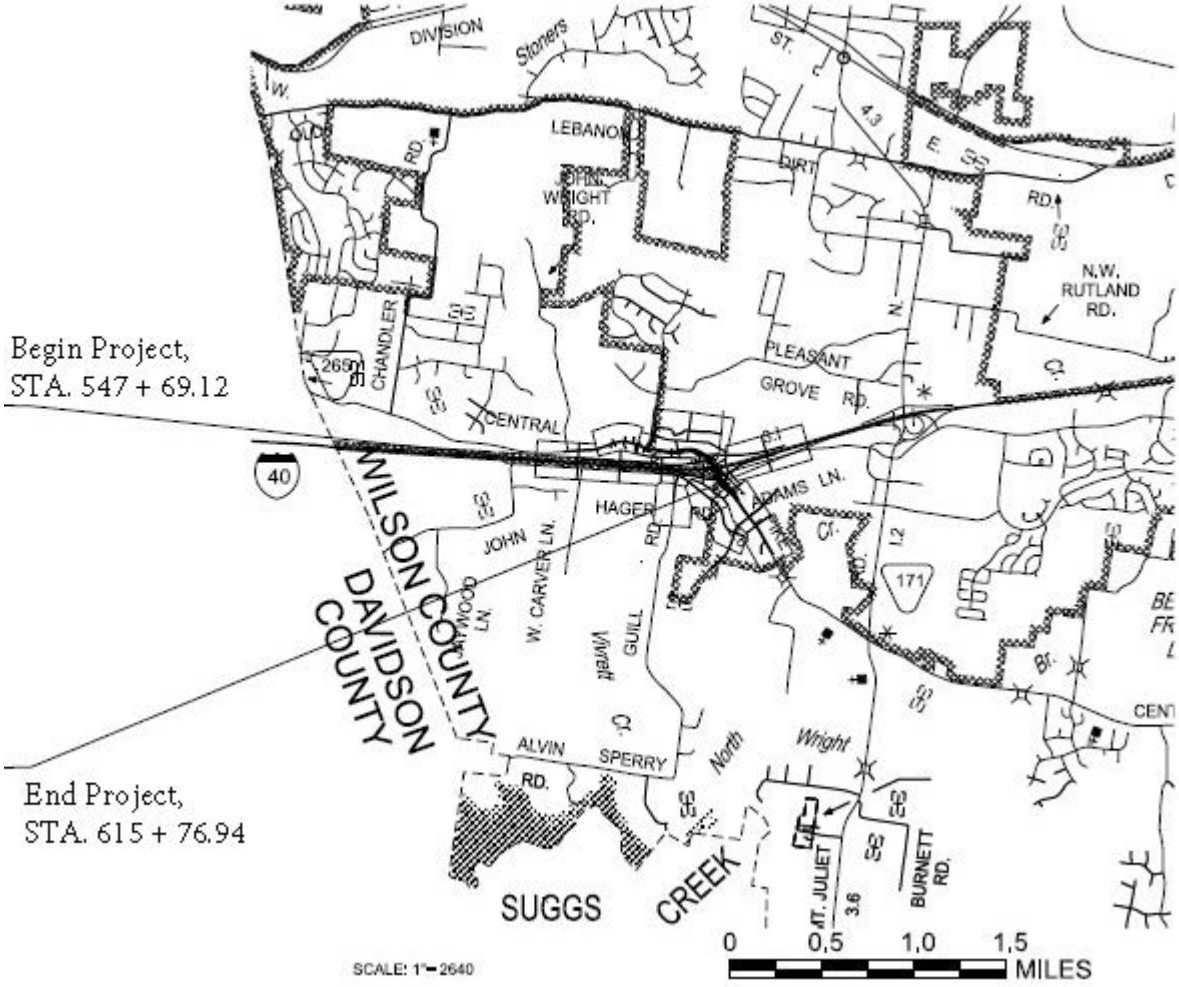
Approved by:



Gale Wagner
Assitant Director
Right of Way Division

Project Location Map

(For Illustration Only)



Brian Kluttz

From: Katherine Kahlon
Sent: Tuesday, November 14, 2023 10:06 AM
To: Brian Kluttz
Subject: FW: Interstate 40 @ SR-265 Wilson 124884.00

Brian,

Please see below for the addresses from Thomas.

Thank you,

Katherine Kahlon | ROW – Agent Supervisor
Right of Way Division
Suite 600, James K. Polk Bldg.
505 Deaderick Street, Nashville, TN 37243-0337
(615) 253-1119
Katherine.kahlon@tn.gov
tn.gov/tdot

From: Thomas X. Killion <Thomas.X.Killion@tn.gov>
Sent: Tuesday, November 14, 2023 8:46 AM
To: Katherine Kahlon <Katherine.Kahlon@tn.gov>
Subject: RE: Interstate 40 @ SR-265 Wilson 124884.00

Good Morning Katherine,

The address for the home on Sheet 5 is 6585 Central Pike, Mt. Juliet, TN 37122. The address for the home on Sheet 8 is 7110 Central Pike, Mt. Juliet, TN 37122.

Thank you,

Thomas Killion | Right of Way Agent
Right of Way & Utilities Division
James K. Polk Building, Suite 600
505 Deaderick Street
Nashville, TN 37243
O: (615) 418-2596
E: Thomas.X.Killion@tn.gov

From: Katherine Kahlon <Katherine.Kahlon@tn.gov>
Sent: Thursday, November 9, 2023 4:00 PM

To: Thomas X. Killion <Thomas.X.Killion@tn.gov>
Subject: FW: Interstate 40 @ SR-265 Wilson 124884.00

Katherine Kahlon | ROW – Agent Supervisor
Right of Way Division
Suite 600, James K. Polk Bldg.
505 Deaderick Street, Nashville, TN 37243-0337
(615) 253-1119
Katherine.kahlon@tn.gov
tn.gov/tdot

From: Brian Kluttz <Brian.Kluttz@tn.gov>
Sent: Thursday, November 9, 2023 3:57 PM
To: Katherine Kahlon <Katherine.Kahlon@tn.gov>
Subject: RE: Interstate 40 @ SR-265 Wilson 124884.00

Hi Katherine, regarding the proposed relocations for the above listed subject, I wanted to request verification of the physical address for the identified properties on Sheet #5, and Sheet #8 of the CSRP? If you have any questions, please let me know. Thank You.

Brian

Brian Kluttz| Environmental Studies Specialist Advanced
Environmental Division/ NEPA Programs Office
James K. Polk Building, 9th Floor
505 Deaderick St., Nashville, TN 37243
P: 615-391-9840
Brian.Kluttz@tn.gov
tn.gov/tdot
NEPA Programs Office (tn.gov)

From: Katherine Kahlon <Katherine.Kahlon@tn.gov>
Sent: Tuesday, October 10, 2023 9:47 AM
To: Sharon Sanders <Sharon.Sanders@tn.gov>; Brian Kluttz <Brian.Kluttz@tn.gov>
Cc: Samuel T. Patterson <Samuel.T.Patterson@tn.gov>
Subject: RE: Interstate 40 @ SR-265 Wilson 124884.00

Index Of Sheets

SEE SHEET 1A FOR INDEX OF SHEETS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

DOES THIS PROJECT QUALIFY FOR UTILITY CHAPTER 86	YES X	NO

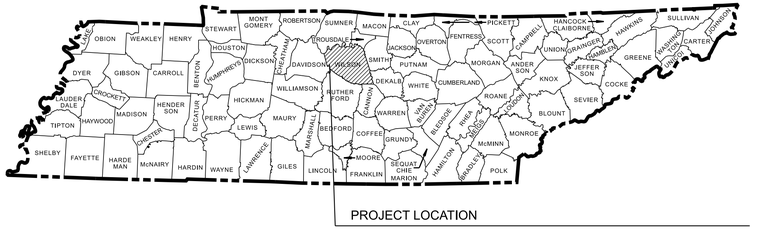
TENN.	YEAR	SHEET NO.
	2023	1
FED. AID PROJ. NO.	NH-I-40-5(150)	
STATE PROJ. NO.	95100-1113-44	

WILSON COUNTY

DIVERGING DIAMOND INTERCHANGE CONNECTING SR 265 TO I-40
FROM WEST OF PLEASENT GROVE RD TO EAST OF PROVIDENCE PARKWAY

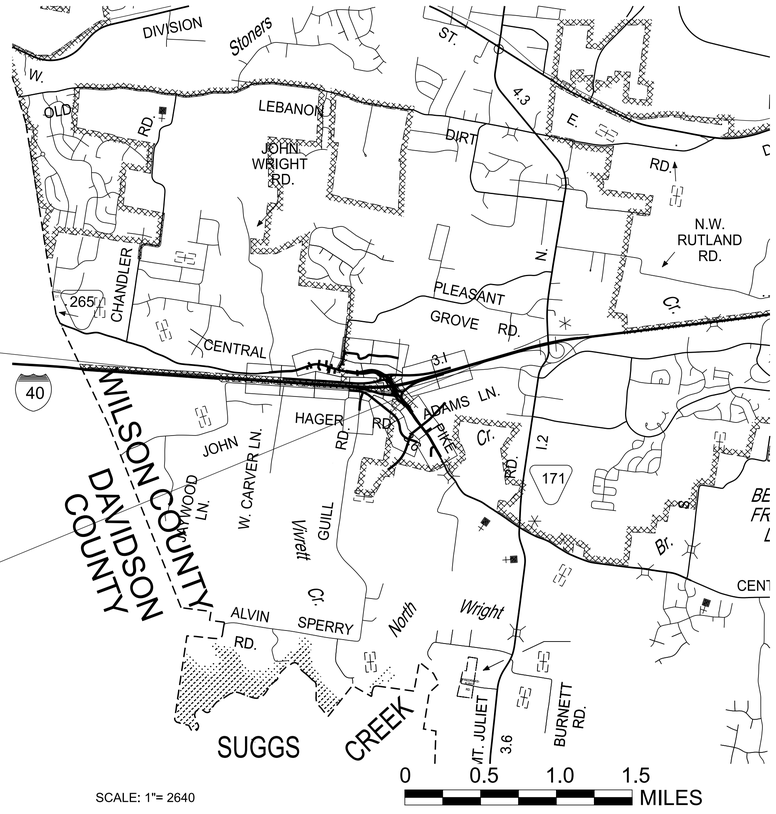
PRELIMINARY

STATE HIGHWAY NO. 265 F.A.H.S. NO. I-40



BRIDGE ID. EX. # 95I00400001
PROP. # SR 265 EB
PROP. # SR 265 WB

NO EXCLUSIONS



SCALE: 1"= 2640

95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 547+69.12 I-40

N 668229.0218 E 1807086.8164

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 615+76.94 I-40

N 668554.1848 E 1813815.3892

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED JANUARY 1, 2021 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 OR
TDOT TRANSPORTATION MANAGER 1 : SHARON M. SCHUTZ, PE

DESIGNED BY : CHRIS REBAR, PE

DESIGNER : HDR ENGINEERING, INC. CHECKED BY BRIAN REYNOLDS, PE

P.E. NO. [redacted]

PIN NO. 4884.1

R.O.W. LENGTH	MILES
ROADWAY LENGTH	MILES
BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES ▲
PROJECT LENGTH	MILES

▲ Not included in the project length (Non Riding Surface).

INITIAL STUDIES REQUEST

APPROVED: _____
WILL REID, CHIEF ENGINEER

DATE: _____

APPROVED: _____
HOWARD H. ELEY, COMMISSIONER

SURVEY - -

SEE SHEET 1A FOR TRAFFIC DATA.

COORDINATES ARE NAD/83(1995) (2011 ADJUSTMENT) ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 USING GEOID G2012BU7.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

2/4/2023 7:45:46 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-TITLE-INITIAL STUDIES.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1A

SHEET NAME **SHEET NO.**

SIGNATURE SHEETS ..... NOT USED
TITLE SHEET 1
ROADWAY INDEX AND STANDARD ROADWAY DRAWINGS 1A
STANDARD ROADWAY DRAWINGS ..... NOT USED
STANDARD STRUCTURE AND TRAFFIC OPERATIONS DRAWINGS ..... NOT USED
INDEX KEY SHEET 1B
SCHEMATIC PLAN AND COORDINATE CONTROL SHEETS ..... 1C - 1C9
PROJECT COMMITMENTS ..... NOT USED
ESTIMATED ROADWAY QUANTITIES ..... NOT USED
ESTIMATED BOX BRIDGE QUANTITIES ..... NOT USED
TYPICAL SECTIONS AND PAVEMENT SCHEDULE ..... 2B - 2B18
GENERAL NOTES ..... NOT USED
SPECIAL NOTES ..... NOT USED
TABULATED QUANTITIES ..... NOT USED
DETAIL SHEETS ..... NOT USED
RIGHT-OF-WAY NOTES, UTILITY NOTES AND UTILITY OWNERS ..... NOT USED
PROPERTY MAP(S) AND RIGHT-OF-WAY ACQUISITION TABLE(S) ..... 3A – 3B
PRESENT LAYOUT(S) ..... 4 – 20
RIGHT OF WAY DETAILS ..... 4A – 20A
PROPOSED LAYOUT(S) ..... 4B – 20B
PROPOSED LAYOUT CONTOURS ..... 4C - 20C
PROPOSED PROFILE(S) .....
- SR 265 ..... 4D – 9D
- SR 265 WB ..... 5E – 8E
- SR 265 EB ..... 5F – 8F
- I 40 ..... 6G, 7G, 10D – 15D

RAMP PROFILE(S) .....
- RAMP A ..... 7H, 11E – 13E
- RAMP AA 7I
- RAMP B ..... 6H, 14E – 15E
- RAMP BB 6I
- RAMP C ..... 7J, 14F – 15F
- RAMP CC 7K
- RAMP D ..... 6J, 11F – 13F
- RAMP DD 6K

SIDE ROADS PROFILE(S) .....
- PLEASANT GROVE RD 5G, 19E
- JOHN HAGAR RD ..... 13G, 16D – 17D
- PROVIDENCE PKWY 8G, 17E
- GUILL RD 13H, 18D

PRIVATE DRIVE, BUSINESS, AND FIELD ENTRANCE PROFILE(S) .....
- TILLMAN DR ..... 19D – 20D

DRAINAGE MAP(S) ..... 21 – 23
CULVERT SECTION(S) ..... NOT USED
EROSION PREVENTION AND SEDIMENT CONTROL PLANS ..... NOT USED
ENVIRONMENTAL MITIGATION PLAN(S) ..... NOT USED
SIGNING AND PAVEMENT MARKING PLAN(S) ..... NOT USED
SIGN SCHEDULE SHEET(S) ..... NOT USED
MISCELLANEOUS SIGNING DETAILS ..... NOT USED
ROADWAY CROSS SECTIONS ..... A1 – A184
SIDE ROAD CROSS SECTIONS ..... A185 – A270
TRAFFIC CONTROL PLANS ..... NOT USED
BRIDGED PLANS ..... NOT USED
GEOTECHNICAL PLANS ..... NOT USED
ITS PLANS ..... NOT USED
LIGHTING PLANS ..... NOT USED
NATURAL STREAM DESIGN PLANS ..... NOT USED
RETAINING WALL PLANS ..... NOT USED

SR 265

TRAFFIC DATA	
ADT (2025)	6,610
ADT (2045)	11,370
DHV (2045)	1,599
D	55 - 45
T (ADT)	2 %
T (DHV)	1 %
V	40 MPH

SR 265 WB

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	1,168
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

SR 265 EB

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	981
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

I-40

TRAFFIC DATA	
ADT (2025)	97,840
ADT (2045)	109,240
DHV (2045)	8628
D	50 - 50
T (ADT)	13 %
T (DHV)	9 %
V	70 MPH

RAMP A

TRAFFIC DATA	
ADT (2025)	4,470
ADT (2045)	7,460
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP AA

TRAFFIC DATA	
ADT (2025)	4,470
ADT (2045)	7,460
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

RAMP B

TRAFFIC DATA	
ADT (2025)	1,390
ADT (2045)	2,320
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP BB

TRAFFIC DATA	
ADT (2025)	1,390
ADT (2045)	2,320
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

RAMP C

TRAFFIC DATA	
ADT (2025)	1,260
ADT (2045)	2,100
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP CC

TRAFFIC DATA	
ADT (2025)	1,260
ADT (2045)	2,100
DHV (2045)	293
D	100 - 0
T (ADT)	%
T (DHV)	%
V	25 MPH

RAMP D

TRAFFIC DATA	
ADT (2025)	4,550
ADT (2045)	4,600
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	50 MPH

RAMP DD

TRAFFIC DATA	
ADT (2025)	4,550
ADT (2045)	4,600
DHV (2045)	994
D	100 - 0
T (ADT)	%
T (DHV)	%
V	20 MPH

PLEASANT GROVE RD

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	
D	-
T (ADT)	%
T (DHV)	%
V	40 MPH

JOHN HAGAR RD

TRAFFIC DATA	
ADT (2025)	2,200
ADT (2045)	8,750
DHV (2045)	740
D	-
T (ADT)	3 %
T (DHV)	%
V	40 MPH

PROVIDENCE PKWY

TRAFFIC DATA	
ADT (2025)	6,930
ADT (2045)	8,690
DHV (2045)	1,844
D	-
T (ADT)	3 %
T (DHV)	%
V	40 MPH

GUILL RD

TRAFFIC DATA	
ADT (2025)	
ADT (2045)	
DHV (2045)	
D	-
T (ADT)	%
T (DHV)	%
V	30 MPH

TILLMAN DR

TRAFFIC DATA	
ADT (2025)	20
ADT (2045)	40
DHV (2045)	
D	-
T (ADT)	1 %
T (DHV)	%
V	15 MPH

NOTE: TRAFFIC DATA PER INTERCHANGE ACCESS REQUEST FOR INTERSTATE 40 AT STATE ROUTE-265 (CENTRAL PIKE), MT. JULIET, WILSON COUNTY, PIN 124884.00, DATED NOVEMBER 15, 2017.

INITIAL STUDIES REQUEST

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INDEX SHEET

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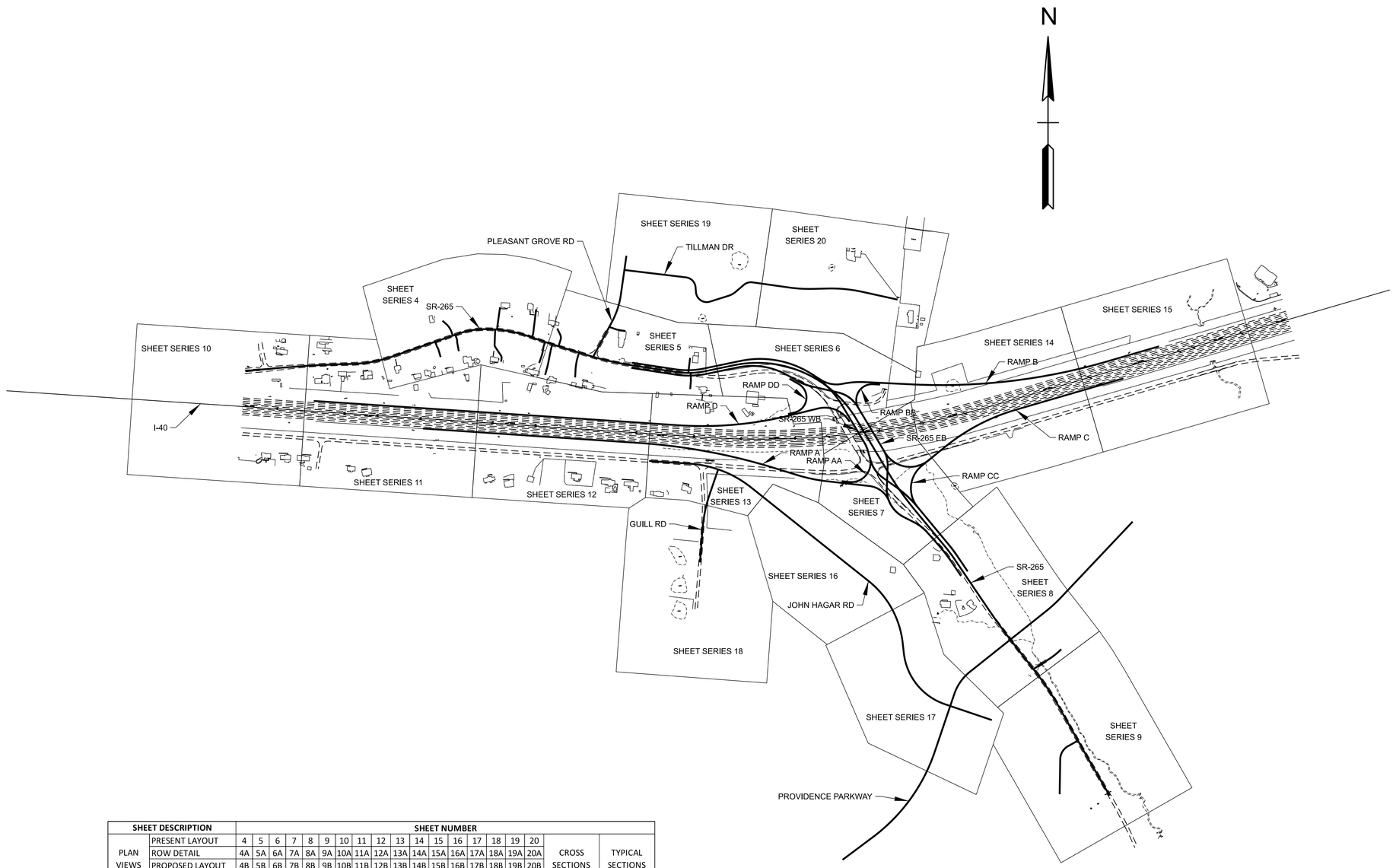
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1B

REV. ***DATE***
TEXT



SHEET DESCRIPTION		SHEET NUMBER																	CROSS SECTIONS	TYPICAL SECTIONS
PLAN VIEWS	PRESENT LAYOUT	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	ROW DETAIL	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A	19A	20A		
	PROPOSED LAYOUT	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B	18B	19B	20B		
	CONTOURS	4C	5C	6C	7C	8C	9C	10C	11C	12C	13C	14C	15C	16C	17C	18C	19C	20C		
PROFILES	SR 265	4D	5D	6D	7D	8D	9D												A001 - A053	2B - 2B3
	SR 265 WB		5E	6E	7E	8E														
	SR 265 EB		5F	6F	7F	8F														
	I 40			6G	7G			10D	11D	12D	13D	14D	15D						A054 - A107	2B4
	RAMP A				7H				11E	12E	13E								A108 - A129	2B5
	RAMP AA				7I														A130 - A134	2B6
	RAMP B			6H								14E	15E						A135 - A160	2B7
	RAMP BB			6I															A161 - A166	2B8
	RAMP C				7J							14F	15F						A167 - A181	2B9
	RAMP CC				7K														A182 - A188	2B10
	RAMP D			6J					11F	12F	13F								A189 - A200	2B11
	RAMP DD			6K															A201 - A205	2B12
	PLEASANT GROVE RD		5G														19E		A206 - A210	2B13
	JOHN HAGAR RD										13G			16D	17D				A211 - A249	2B14 - 2B15
	PROVIDENCE PKWY					8G									17E				A250 - A264	2B16
	GUILL RD										13H					18D			A265 - A270	2B17
	TILLMAN DR																19D	20D	A271 - A292	2B18

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INDEX KEY SHEET

SCALE: 1" = 400'

2/4/2023 7:46:49 AM
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SR 265
CURVE 1
PI 84+49.57
N 668491.8690
E 1807905.4377
Δ 03°02'34" RT.
D 00°56'44"
R 6060.00'
L 321.81'
T 160.95'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 2
PI 88+84.99
N 668506.3907
E 1808340.6835
Δ 17°08'59" LT.
D 06°21'58"
R 900.00'
L 269.39'
T 135.71'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 3
PI 95+91.07
N 668737.6387
E 1809009.9732
Δ 16°07'28" RT.
D 10°44'59"
R 533.00'
L 150.00'
T 75.50'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 4
PI 98+37.51
N 668750.3134
E 1809257.0878
Δ 22°14'04" RT.
D 06°32'53"
R 875.00'
L 339.55'
T 171.94'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 5
PI 101+80.69
N 668635.4685
E 1809585.0667
Δ 02°37'39" LT.
D 00°57'18"
R 6000.00'
L 275.14'
T 137.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 6
PI 106+05.60
N 668513.5585
E 1809992.1678
Δ 08°02'31" LT.
D 02°51'53"
R 2000.00'
L 280.71'
T 140.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 7
PI 111+63.66
N 668429.7623
E 1810544.3595
Δ 20°22'13" LT.
D 09°46'39"
R 586.00'
L 208.34'
T 105.28'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 8
PI 120+37.63
N 668608.0605
E 1811402.2198
Δ 70°52'22" RT.
D 07°09'43"
R 800.00'
L 989.57'
T 569.30'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265 WB
CURVE 1
PI 211+52.64
N 668448.9058
E 1810538.1821
Δ 20°22'13" LT.
D 10°05'14"
R 568.00'
L 201.94'
T 102.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 2
PI 219+83.80
N 668618.4769
E 1811354.0526
Δ 70°52'22" RT.
D 08°37'44"
R 664.00'
L 821.35'
T 472.52'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 1
PI 311+72.95
N 668410.6188
E 1810550.5368
Δ 20°22'13" LT.
D 09°18'05"
R 616.00'
L 219.00'
T 110.67'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 2
PI 316+88.18
N 668515.9390
E 1811057.2723
Δ 41°53'39" RT.
D 11°33'06"
R 496.00'
L 362.67'
T 189.87'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 3
PI 319+84.76
N 668358.3890
E 1811328.4828
Δ 17°14'43" LT.
D 18°44'26"
R 364.00'
L 109.56'
T 55.20'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 4
PI 323+20.45
N 668283.2162
E 1811656.5026
Δ 46°13'26" RT.
D 26°46'25"
R 214.00'
L 172.65'
T 91.33'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED MPH

I-40
CURVE 1
PI 593+45.73
N 667924.5239
E 1811653.2868
Δ 20°03'07" LT.
D 01°00'00"
R 5729.58'
L 2005.19'
T 1012.95'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 70 MPH

RAMP A
CURVE 1
PI 419+81.12
N 667921.3656
E 1810663.2736
Δ 13°17'22" RT.
D 01°23'14"
R 4130.00'
L 957.92'
T 481.12'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP B
CURVE 1
PI 501+16.74
N 668347.5066
E 1811516.3807
Δ 43°20'24" LT.
D 28°38'52"
R 200.00'
L 151.29'
T 79.47'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP B
CURVE 2
PI 502+75.21
N 668378.7975
E 1811679.5348
Δ 13°36'56" RT.
D 09°24'29"
R 609.00'
L 144.72'
T 72.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP BB
CURVE 1
PI 1502+04.24
N 668370.3579
E 1811605.3585
Δ 123°23'13" RT.
D 52°05'13"
R 110.00'
L 236.89'
T 204.24'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

RAMP D
CURVE 1
PI 829+24.26
N 668049.9141
E 1810847.4915
Δ 17°32'25" LT.
D 02°16'58"
R 2510.00'
L 768.40'
T 387.23'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP D
CURVE 2
PI 836+63.85
N 668226.8306
E 1811571.8436
Δ 72°51'25" RT.
D 28°56'14"
R 198.00'
L 251.78'
T 146.13'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP DD
CURVE 3
PI 1803+13.50
N 668227.8300
E 1811525.3592
Δ 136°07'19" LT.
D 53°32'51"
R 107.00'
L 254.21'
T 265.65'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

PLEASANT GROVE RD
CURVE 1
PI 1103+75.58
N 668881.4429
E 1810046.2002
Δ 20°09'54" LT.
D 10°13'53"
R 560.00'
L 197.09'
T 99.58'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

TILLMAN DR
CURVE 1
PI 1004+92.20
N 669094.6263
E 1810573.6875
Δ 78°17'44" RT.
D 76°23'40"
R 75.00'
L 102.49'
T 61.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 2
PI 1006+62.36
N 668905.5305
E 1810589.7920
Δ 102°37'28" LT.
D 76°23'40"
R 75.00'
L 134.34'
T 93.66'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 3
PI 1008+66.58
N 668982.8377
E 1810835.0932
Δ 22°55'45" LT.
D 38°11'50"
R 150.00'
L 60.03'
T 30.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

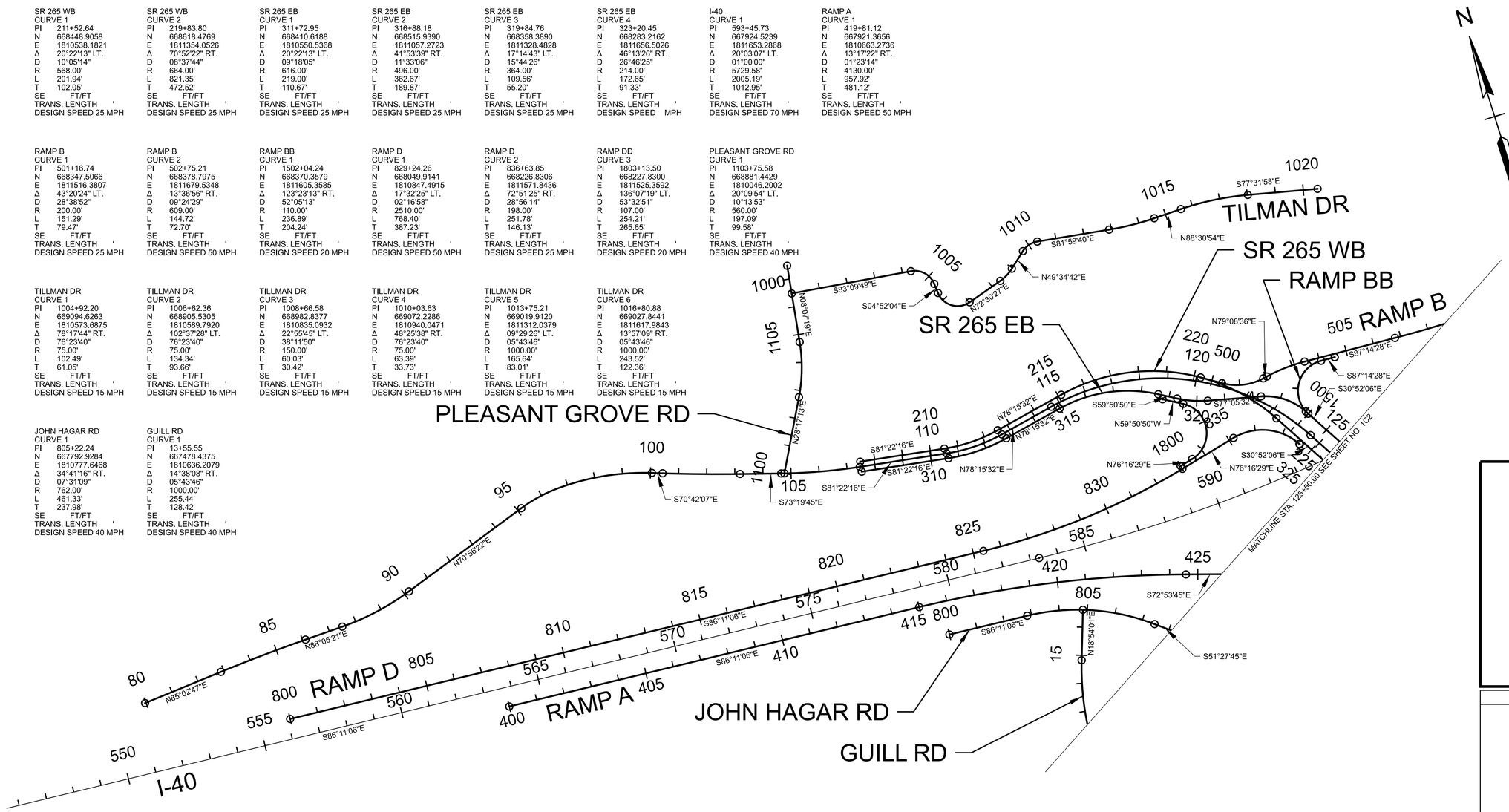
TILLMAN DR
CURVE 4
PI 1010+03.63
N 669072.2286
E 1810940.0471
Δ 48°25'38" RT.
D 76°23'40"
R 75.00'
L 63.39'
T 33.73'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 5
PI 1013+75.21
N 669019.9120
E 1811312.0379
Δ 09°29'26" LT.
D 05°43'46"
R 1000.00'
L 165.64'
T 83.01'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

TILLMAN DR
CURVE 6
PI 1016+80.88
N 669027.8441
E 1811617.9843
Δ 13°57'09" RT.
D 05°43'46"
R 1000.00'
L 243.52'
T 122.36'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 15 MPH

JOHN HAGAR RD
CURVE 1
PI 805+22.24
N 667792.9284
E 1810777.6468
Δ 34°41'16" RT.
D 07°31'09"
R 762.00'
L 461.33'
T 237.98'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

GUILL RD
CURVE 1
PI 13+55.55
N 667478.4375
E 1810636.2079
Δ 14°38'08" RT.
D 05°43'46"
R 1000.00'
L 255.44'
T 128.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH



THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SCHEMATIC PLAN SHEET

SCALE: 1" = 200'
SHEET 1 OF 2

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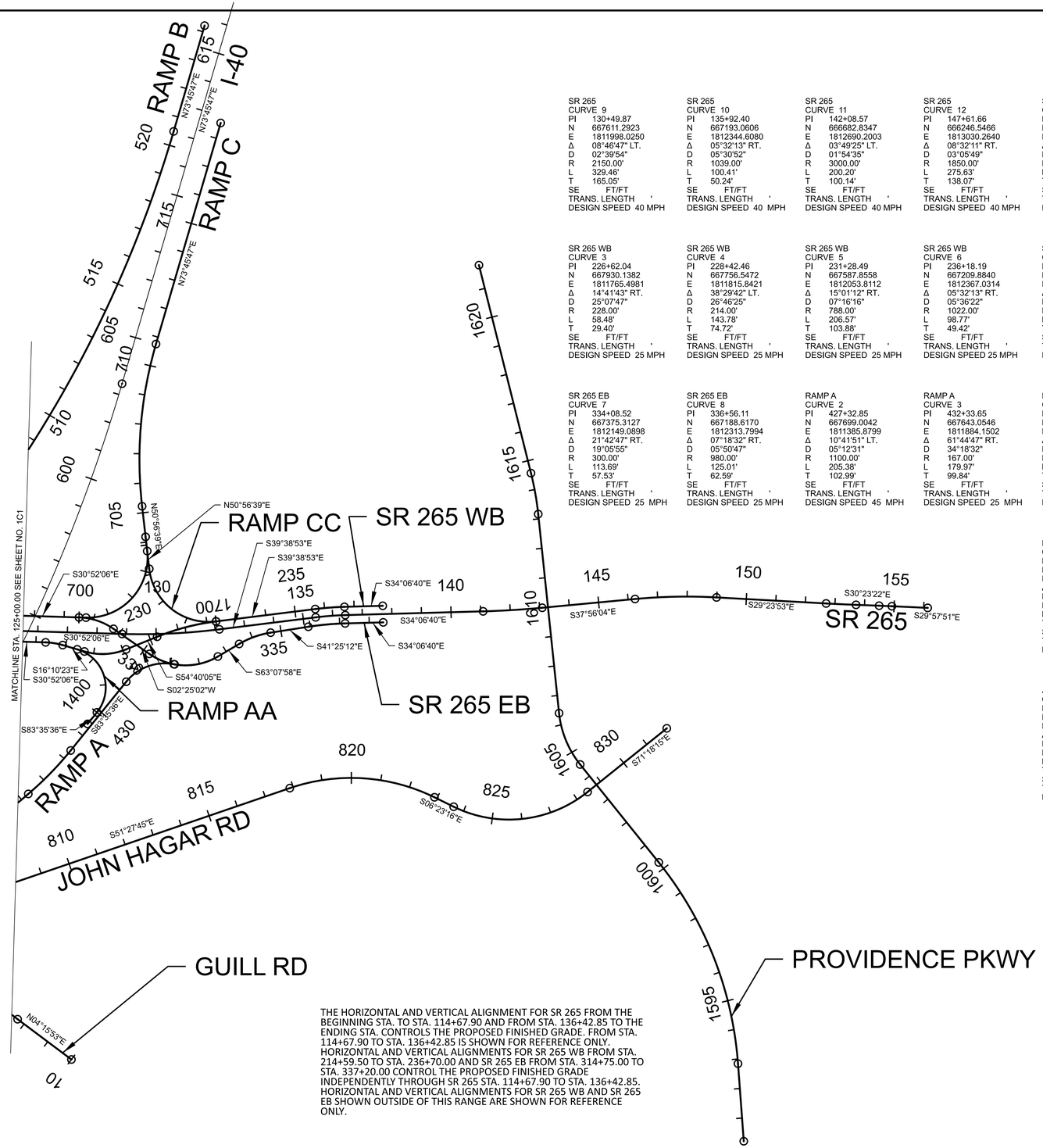

SR 265
CURVE 9
PI 130+49.87
N 667611.2923
E 1811998.0250
Δ 08°46'47" LT.
D 02°39'54"
R 2150.00'
L 329.46'
T 165.05'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 10
PI 135+92.40
N 667193.0606
E 1812344.6080
Δ 05°32'13" RT.
D 05°30'52"
R 1039.00'
L 100.41'
T 50.24'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 11
PI 142+08.57
N 666682.8347
E 1812690.2003
Δ 03°49'25" LT.
D 01°54'35"
R 3000.00'
L 200.20'
T 100.14'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 12
PI 147+61.66
N 666246.5466
E 1813030.2640
Δ 08°32'11" RT.
D 03°05'49"
R 1850.00'
L 275.63'
T 138.07'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 13
PI 153+20.60
N 665759.1313
E 1813304.8876
Δ 00°59'28" LT.
D 00°58'46"
R 5850.00'
L 101.20'
T 50.60'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265
CURVE 14
PI 154+70.93
N 665629.4539
E 1813380.9364
Δ 00°25'30" RT.
D 00°58'46"
R 5850.00'
L 43.39'
T 21.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

SR 265 WB
CURVE 3
PI 226+62.04
N 667930.1382
E 1811765.4981
Δ 14°41'43" RT.
D 25°07'47"
R 228.00'
L 58.48'
T 29.40'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 4
PI 228+42.46
N 667756.5472
E 1811815.8421
Δ 38°29'42" LT.
D 26°46'25"
R 214.00'
L 143.78'
T 74.72'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 5
PI 231+28.49
N 667587.8558
E 1812053.8112
Δ 15°01'12" RT.
D 07°16'16"
R 788.00'
L 206.57'
T 103.88'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 WB
CURVE 6
PI 236+18.19
N 667209.8840
E 1812367.0314
Δ 05°32'13" RT.
D 05°36'22"
R 1022.00'
L 98.77'
T 49.42'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 5
PI 328+14.38
N 667850.6510
E 1811915.0629
Δ 33°17'08" RT.
D 26°46'25"
R 214.00'
L 124.32'
T 63.97'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 6
PI 331+60.38
N 667501.3427
E 1811900.3179
Δ 65°33'00" LT.
D 26°46'25"
R 214.00'
L 244.83'
T 137.78'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 7
PI 334+08.52
N 667375.3127
E 1812149.0898
Δ 21°42'47" RT.
D 19°05'55"
R 300.00'
L 113.69'
T 57.53'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

SR 265 EB
CURVE 8
PI 336+56.11
N 667188.6170
E 1812313.7994
Δ 07°18'32" RT.
D 05°50'47"
R 980.00'
L 125.01'
T 62.59'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP A
CURVE 2
PI 427+32.85
N 667699.0042
E 1811385.8799
Δ 10°41'51" LT.
D 05°12'31"
R 1100.00'
L 205.38'
T 102.99'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 45 MPH

RAMP A
CURVE 3
PI 432+33.65
N 667643.0546
E 1811884.1502
Δ 61°44'47" RT.
D 34°18'32"
R 167.00'
L 179.97'
T 99.84'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP AA
CURVE 1
PI 1402+00.85
N 667659.6445
E 1811843.9453
Δ 112°34'47" LT.
D 42°45'29"
R 134.00'
L 263.29'
T 200.85'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 20 MPH

RAMP B
CURVE 3
PI 513+70.74
N 668326.0355
E 1812774.4786
Δ 18°59'45" LT.
D 01°23'14"
R 4130.00'
L 1369.25'
T 690.97'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 50 MPH

RAMP C
CURVE 1
PI 702+56.87
N 667685.0758
E 1812014.0334
Δ 98°11'15" LT.
D 28°21'51"
R 202.00'
L 346.17'
T 233.14'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

RAMP C
CURVE 2
PI 708+02.69
N 668104.6718
E 1812531.1602
Δ 22°49'08" RT.
D 04°07'19"
R 1390.00'
L 553.59'
T 280.51'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 45 MPH

RAMP CC
CURVE 1
PI 1702+04.10
N 667665.2871
E 1811989.6450
Δ 90°35'32" RT.
D 28°21'51"
R 202.00'
L 319.39'
T 204.10'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 25 MPH

JOHN HAGAR RD
CURVE 2
PI 820+53.37
N 666829.8853
E 1811986.7385
Δ 45°04'29" RT.
D 08°57'57"
R 639.04'
L 502.74'
T 265.19'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

JOHN HAGAR RD
CURVE 3
PI 826+32.89
N 666226.4892
E 1812054.2904
Δ 64°54'59" LT.
D 13°30'44"
R 424.03'
L 480.43'
T 269.70'
SE FT/FT
TRANS. LENGTH '
DESIGN SPEED 40 MPH

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C1

REV. ***DATE***
TEXT

INITIAL STUDIES REQUEST

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COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SCHEMATIC PLAN SHEET

SCALE: 1" = 200'
SHEET 2 OF 2

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C2

I-40							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	488+14.31	668625.2162	1801145.1989				
PC	583+32.78	667991.9192	1810642.5783				
HPI	593+45.73	667924.5239	1811653.2868	5729.58	2005.19	20°03'07"	Left
PT	603+37.97	668207.7560	1812625.8369				
PC	642+48.87	669301.2846	1816380.7481				
HPI	651+95.37	669565.9361	1817289.4972	11700	1888.89	09°15'00"	Right
PT	661+37.76	669681.0710	1818228.9702				

SR 265							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	79+96.84	668452.7754	1807454.3903				
PC	82+88.63	668477.9715	1807745.0936				
HPI	84+49.57	668491.8690	1807905.4377	6060.00	321.81	03°02'34"	Right
PT	86+10.44	668497.2358	1808066.2934				
PC	87+49.28	668501.8654	1808205.0504				
HPI	88+84.99	668506.3907	1808340.6835	900.00	269.39	17°08'59"	Left
PT	90+18.67	668550.7089	1808468.9516				
PC	95+15.57	668712.9831	1808938.6136				
HPI	95+91.07	668737.6387	1809009.9732	533.00	150.00	16°07'28"	Right
PCC	96+65.57	668741.5060	1809085.3730				
HPI	98+37.51	668750.3134	1809257.0878	875.00	339.55	22°14'04"	Right
PT	100+05.13	668693.4897	1809419.3673				
PC	100+43.10	668680.9413	1809455.2034				
HPI	101+80.69	668635.4685	1809585.0667	6000.00	275.14	02°37'39"	Left
PT	103+18.24	668595.9964	1809716.8780				
PC	104+65.02	668553.8893	1809857.4890				
HPI	106+05.60	668513.5585	1809992.1678	2000.00	280.71	08°02'31"	Left
PT	107+45.73	668492.4655	1810131.1643				
PC	110+58.38	668445.5580	1810440.2707				
HPI	111+63.66	668429.7623	1810544.3595	586.00	208.34	20°22'13"	Left
PT	112+66.71	668451.1860	1810647.4371				
PC	114+68.33	668492.2133	1810844.8346				
HPI	120+37.63	668608.0605	1811402.2198	800.00	989.57	70°52'22"	Right
PT	124+57.90	668119.4054	1811694.3071				
PC	128+84.82	667752.9641	1811913.3425				
HPI	130+49.87	667611.2923	1811998.0250	2150.00	329.46	08°46'47"	Left
PT	132+14.27	667484.2062	1812103.3396				
PC	135+42.15	667231.7469	1812312.5492				
HPI	135+92.40	667193.0606	1812344.6080	1039.00	100.41	05°32'13"	Right
PT	136+42.56	667151.4615	1812372.7845				
PC	141+08.43	666765.7425	1812634.0442				
HPI	142+08.57	666682.8347	1812690.2003	3000.00	200.20	03°49'25"	Left
PT	143+08.63	666603.8561	1812751.7600				
PC	146+23.59	666355.4439	1812945.3843				
HPI	147+61.66	666246.5466	1813030.2640	1850.00	275.63	08°32'11"	Right
PT	148+99.22	666126.2563	1813098.0389				
PT	153+71.20	665715.4822	1813330.4854				
PC	154+49.24	665648.1702	1813369.9603				
HPI	154+70.93	665629.4539	1813380.9364	5850.00	43.39	00°25'30"	Right
PT	154+92.63	665610.6567	1813391.7733				

SR 265 WB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	207+47.97	668509.6212	1810138.0862				
PC	210+50.60	668464.2163	1810437.2906				
HPI	211+52.64	668448.9058	1810538.1821	568.00	201.94	20°22'13"	Left
PT	212+52.54	668469.6715	1810638.0935				
PC	215+11.28	668522.3236	1810891.4229				
HPI	219+83.80	668618.4769	1811354.0526	664.00	821.35	70°52'22"	Right
PT	223+32.63	668212.8931	1811596.4850				
PC	226+32.64	667955.3739	1811750.4137				
HPI	226+62.04	667930.1382	1811765.4981	228.00	58.48	14°41'43"	Right
PT	226+91.12	667901.9014	1811773.6872				
PC	227+67.74	667828.3118	1811795.0292				
HPI	228+42.46	667756.5472	1811815.8421	214.00	143.78	38°29'42"	Left
PT	229+11.52	667713.3347	1811876.8011				
PC	230+24.61	667647.9318	1811969.0634				
HPI	231+28.49	667587.8558	1812053.8112	788.00	206.57	15°01'12"	Right
PT	232+31.18	667507.8696	1812120.0947				
PC	235+68.77	667247.9374	1812335.4971				
HPI	236+18.19	667209.8840	1812367.0314	1022.00	98.77	05°32'13"	Right
PT	236+67.53	667168.9655	1812394.7468				
END	237+97.09	667061.7013	1812467.4003				

SR 265 EB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	307+50.31	668474.0287	1810132.6850				
PC	310+62.28	668427.2232	1810441.1193				
HPI	311+72.95	668410.6188	1810550.5368	616.00	219.00	20°22'13"	Left
PT	312+81.28	668433.1393	1810658.8915				
PC	314+98.31	668477.3018	1810871.3740				
HPI	316+88.18	668515.9390	1811057.2723	496.00	362.67	41°53'39"	Right
PT	318+60.98	668420.5650	1811221.4515				
PC	319+29.56	668386.1149	1811280.7549				
HPI	319+84.76	668358.3890	1811328.4828	364.00	109.56	17°14'43"	Left
PT	320+39.12	668346.0591	1811382.2848				
PC	322+29.11	668303.6179	1811567.4787				
HPI	323+20.45	668283.2162	1811656.5026	214.00	172.65	46°13'26"	Right
PT	324+01.76	668204.8217	1811703.3618				
PC	327+50.41	667905.5595	1811882.2420				
HPI	328+14.38	667850.6510	1811915.0629	214.00	124.32	33°17'08"	Right
PT	328+74.73	667786.7379	1811912.3650				
PC	330+22.60	667639.0015	1811906.1288				
HPI	331+60.38	667501.3427	1811900.3179	214.00	244.83	65°32'60"	Left
PT	332+67.43	667439.0761	1812023.2267				
PC	333+50.99	667401.3140	1812097.7657				
HPI	334+08.52	667375.3127	1812149.0898	300.00	113.69	21°42'47"	Right
PT	334+64.68	667332.1686	1812187.1531				
PC	335+93.52	667235.5528	1812272.3910				
HPI	336+56.11	667188.6170	1812313.7994	980.00	125.01	07°18'32"	Right
PT	337+18.53	667136.7947	1812348.9004				
END	338+47.16	667030.2966	1812421.0350				

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COORDINATE CONTROL
MAINLINES

SHEET 1 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C3

PROVIDENCE PKWY							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1590+21.71	665060.5476	1811599.3709				
PC	1592+84.36	665217.8640	1811809.7035				
HPI	1596+66.80	665446.9204	1812115.9527	1231.27	741.60	34°30'35"	Left
PT	1600+25.97	665809.1741	1812238.5401				
PC	1604+50.19	666211.0169	1812374.5245				
HPI	1605+47.89	666303.5588	1812405.8409	332.22	190.04	32°46'29"	Right
PT	1606+40.23	666364.4160	1812482.2681				
PC	1613+16.17	666785.4705	1813011.0479				
HPI	1613+86.56	666829.3176	1813066.1131	997.95	140.55	08°04'10"	Left
PT	1614+56.72	666880.4602	1813114.4783				
END	1621+80.92	667406.6380	1813612.0810				

TILMAN DR							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1000+00.00	669153.2159	1810084.9852				
PC	1004+31.15	669101.8940	1810513.0667				
HPI	1004+92.20	669094.6263	1810573.6875	75.00	102.49	78°17'44"	Right
PT	1005+33.64	669033.7916	1810578.8685				
PC	1005+68.70	668998.8490	1810581.8444				
HPI	1006+62.36	668905.5305	1810589.7920	75.00	134.34	102°37'28"	Left
PT	1007+03.04	668933.6816	1810679.1173				
PC	1008+36.16	668973.6937	1810806.0786				
HPI	1008+66.58	668982.8377	1810835.0932	150.00	60.03	22°55'45"	Left
PT	1008+96.19	669002.5631	1810858.2527				
PC	1009+69.90	669050.3594	1810914.3705				
HPI	1010+03.63	669072.2286	1810940.0471	75.00	63.39	48°25'38"	Right
PT	1010+33.29	669067.5314	1810973.4461				
PC	1012+92.20	669031.4730	1811229.8352				
HPI	1013+75.21	669019.9120	1811312.0379	1000.00	165.64	09°29'26"	Left
PT	1014+57.85	669022.0635	1811395.0217				
PC	1015+58.52	669024.6727	1811495.6620				
HPI	1016+80.88	669027.8441	1811617.9843	1000.00	243.52	13°57'09"	Right
PT	1018+02.04	669001.4279	1811737.4624				
END	1020+51.12	668947.6543	1811980.6756				

PLEASANT GROVE RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1100+00.00	668550.7099	1809868.2153				
PC	1102+76.01	668793.7584	1809999.0125				
HPI	1103+75.58	668881.4429	1810046.2002	560.00	197.09	20°09'54"	Left
PT	1104+73.10	668980.0196	1810060.2682				
END	1107+48.05	669252.2128	1810099.1132				

GUILL RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	10+00.00	667123.8758	1810609.768				
PC	12+27.13	667350.3756	1810626.658				
HPI	13+55.55	667478.4375	1810636.208	1000	255.44	14°38'08"	Right
PT	14+82.57	667599.9313	1810677.805				
END	16+61.84	667769.5407	1810735.876				

JOHN HAGAR RD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	800+00.00	667827.9896	1810256.5829				
PC	802+84.26	667808.9052	1810540.2061				
HPI	805+22.24	667792.9284	1810777.6468	762.00	461.33	34°41'16"	Right
PT	807+45.59	667644.6623	1810963.7935				
PC	817+88.18	666995.1040	1811779.3080				
HPI	820+53.37	666829.8853	1811986.7385	639.04	502.74	45°04'29"	Right
PT	822+90.92	666566.3438	1812016.2427				
PC	823+63.19	666494.5162	1812024.2840				
HPI	826+32.89	666226.4892	1812054.2904	424.03	480.43	64°54'59"	Left
PT	828+43.62	666140.0376	1812309.7605				
END	831+86.80	666030.0337	1812634.8292				

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SIDE STREETS

SHEET 2 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C4

RAMP A							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	400+00.00	668053.1765	1808686.5426				
PC	415+00.00	667953.3763	1810183.2189				
HPI	419+81.12	667921.3656	1810663.2736	4130.00	957.92	13°17'22"	Right
PT	424+57.92	667779.8626	1811123.1150				
PC	426+29.86	667729.2941	1811287.4472				
HPI	427+32.85	667699.0042	1811385.8799	1100.00	205.38	10°41'51"	Left
PT	428+35.24	667687.5122	1811488.2244				
PC	431+33.81	667654.1955	1811784.9321				
HPI	432+33.65	667643.0546	1811884.1502	167.00	179.97	61°44'47"	Right
PT	433+13.78	667550.3833	1811921.3037				
END	433+16.11	667548.2214	1811922.1704				

RAMP AA							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1399+50.00	667687.6357	1811594.6644				
PC	1400+00.00	667682.0564	1811644.3521				
HPI	1402+00.85	667659.6445	1811843.9453	134.00	263.29	112°34'47"	Left
PT	1402+63.29	667852.5436	1811788.0017				

RAMP B							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	499+58.79	668432.3323	1811383.1457				
PC	500+37.27	668390.1856	1811449.3452				
HPI	501+16.74	668347.5066	1811516.3807	200.00	151.29	43°20'24"	Left
PT	501+88.55	668362.4749	1811594.4269				
PC	502+02.51	668365.1037	1811608.1335				
HPI	502+75.21	668378.7975	1811679.5348	609.00	144.72	13°36'56"	Right
PT	503+47.23	668375.2982	1811752.1531				
PC	506+79.78	668359.2925	1812084.3130				
HPI	513+70.74	668326.0355	1812774.4786	4130.00	1369.25	18°59'45"	Left
PT	520+49.03	668519.2368	1813437.8848				
END	524+21.25	668623.3130	1813795.2573				

RAMP BB							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
PC	1500+00.00	668194.6141	1811709.4097				
HPI	1502+04.24	668370.3579	1811605.3585	110.00	236.89	123°23'13"	Right
PT	1502+36.89	668360.5278	1811809.3582				
END	1502+86.89	668358.1212	1811859.3003				

RAMP C							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	700+00.00	667905.5595	1811882.2420				
PC	700+23.73	667885.1944	1811894.4150				
HPI	702+56.87	667685.0758	1812014.0334	202.00	346.17	98°11'15"	Left
PT	703+69.89	667831.9744	1812195.0770				
PC	705+22.18	667927.9278	1812313.3339				
HPI	708+02.69	668104.6718	1812531.1602	1390.00	553.59	22°49'08"	Right
PT	710+75.77	668183.1056	1812800.4831				
END	718+53.69	668400.6193	1813547.3720				

RAMP CC							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
PC	1700+00.00	667508.1354	1812119.8745				
HPI	1702+04.10	667665.2871	1811989.6450	202.00	319.39	90°35'32"	Right
PT	1703+19.39	667793.8852	1812148.1344				
END	1704+28.19	667862.4392	1812232.6231				

RAMP D							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	800+00.00	668244.4752	1807929.7123				
PC	825+37.03	668075.6777	1810461.1226				
HPI	829+24.26	668049.9141	1810847.4915	2510.00	768.40	17°32'25"	Left
PT	833+05.43	668141.7901	1811223.6608				
PC	835+17.72	668192.1588	1811429.8863				
HPI	836+63.85	668226.8306	1811571.8436	198.00	251.78	72°51'25"	Right
PT	837+69.49	668101.4000	1811646.8181				
END	837+71.58	668099.6086	1811647.8890				

RAMP DD							
Point Type	Station	Northing	Easting	Radius (ft)	Length (ft)	Delta	Direction
START	1800+00.00	668153.4475	1811220.8136				
PC	1800+47.85	668164.8008	1811267.2978				
HPI	1803+13.50	668227.8300	1811525.3592	107.00	254.21	136°07'19"	Left
PT	1803+02.06	668361.2670	1811295.6574				
END	1803+77.43	668399.1247	1811230.4881				

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SHEET 3 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C5

DR STA 93+40							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668655.5533	1808772.3975				
PC	10+33.53	668623.8585	1808783.3485				
HPI	10+36.20	668621.3369	1808784.2197	25.00	5.32	12°10'55"	Left
PT	10+38.85	668619.0561	1808785.6034				
PC	10+49.50	668609.9482	1808791.1286				
HPI	10+52.82	668607.1086	1808792.8512	25.00	6.60	15°08'06"	Right
PT	10+56.11	668603.9176	1808793.7727				
END	11+13.52	668548.7608	1808809.7009				

DR STA 94+69							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668697.6308	1808894.1802				
PC	10+35.59	668731.2666	1808882.5586				
HPI	10+37.53	668733.1042	1808881.9237	20.00	3.88	11°06'17"	Left
PT	10+39.46	668734.7851	1808880.9467				
PC	10+58.05	668750.8563	1808871.6061				
HPI	10+73.80	668764.4735	1808863.6917	100.00	31.24	17°54'04"	Left
PT	10+89.30	668774.9987	1808851.9750				
END	11+28.37	668801.1116	1808822.9058				

DR STA. 94+87							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668703.7689	1808911.9455				
PC	10+31.40	668674.0907	1808922.1997				
HPI	10+33.97	668671.6637	1808923.0383	25.00	5.12	11°43'43"	Right
PT	10+36.52	668669.1169	1808923.3660				
PC	10+45.02	668660.6855	1808924.4508				
HPI	10+47.05	668658.6656	1808924.7108	25.00	4.06	09°18'53"	Right
PT	10+49.08	668656.6301	1808924.6403				
PC	10+49.35	668656.3652	1808924.6311				
HPI	10+54.92	668650.7989	1808924.4384	50.00	11.09	12°42'45"	Left
PT	10+60.44	668645.3266	1808925.4754				
END	11+16.74	668590.0150	1808935.9564				

DR STA 97+70							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668740.6590	1809189.2572				
PC	10+27.12	668713.6018	1809187.4266				
HPI	10+27.85	668712.8769	1809187.3776	50.00	1.45	01°39'54"	Left
PT	10+28.57	668712.1508	1809187.3496				
PC	11+06.68	668634.1057	1809184.3441				
HPI	11+14.85	668625.9388	1809184.0296	25.00	15.80	36°12'26"	Left
PT	11+22.47	668619.1632	1809188.6001				
PC	11+93.73	668560.0938	1809228.4459				
HPI	12+02.54	668552.7843	1809233.3765	25.00	16.95	38°51'12"	Right
PT	12+10.68	668543.9990	1809232.6308				
END	12+38.09	668516.6873	1809230.3127				

DR STA 97+82							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668739.7413	1809201.5370				
PC	10+16.57	668756.2538	1809202.8879				
HPI	10+19.42	668759.0939	1809203.1202	100.00	5.70	03°15'52"	Right
PT	10+22.27	668761.9160	1809203.5139				
END	11+55.75	668894.1187	1809221.9555				

DR STA 100+31							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668685.0865	1809443.3654				
PC	10+13.61	668697.9356	1809447.8647				
HPI	10+24.40	668708.1117	1809451.4279	100.00	21.48	12°18'27"	Left
PT	10+35.09	668718.8134	1809452.7402				
END	11+97.56	668880.0750	1809472.5138				

DR STA 101+27							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668653.7257	1809534.7074				
PC	10+26.71	668628.3920	1809526.2330				
HPI	10+34.60	668620.9156	1809523.7320	100.00	15.73	09°00'55"	Left
PT	10+42.45	668613.1397	1809522.4335				
PC	10+71.07	668584.9048	1809517.7185				
HPI	10+88.60	668567.6163	1809514.8315	200.00	34.97	10°01'02"	Right
PT	11+06.04	668551.0936	1809508.9813				
END	11+51.78	668507.9743	1809493.7141				

DR STA 101+81							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668636.9493	1809585.6142				
PC	10+12.40	668625.1569	1809581.7863				
HPI	10+30.13	668608.2912	1809576.3115	300.00	35.42	06°45'55"	Left
PT	10+47.82	668590.8979	1809572.8617				
PC	11+30.58	668509.7229	1809556.7613				
HPI	11+47.49	668493.1337	1809553.4709	500.00	33.81	03°52'28"	Right
PT	11+64.39	668476.8049	1809549.0672				
END	12+18.27	668424.7816	1809535.0369				

DR STA 102+26							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668623.4362	1809627.7721				
PC	10+47.54	668668.7587	1809642.1154				
HPI	10+67.59	668687.8789	1809648.1664	50.00	38.15	43°42'40"	Left
PT	10+85.68	668705.8810	1809639.3278				
END	11+31.68	668747.1673	1809619.0572				

INITIAL STUDIES REQUEST

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COORDINATE CONTROL
DRIVEWAYS

SHEET 4 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C6

DR STA 103+74							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668579.9748	1809770.3799				
PC	10+28.47	668552.7030	1809762.2132				
HPI	10+76.71	668506.4855	1809748.3729	400.00	96.03	13°45'17"	Left
PT	11+24.50	668458.3026	1809745.9186				
END	11+75.27	668407.5957	1809743.3358				

DR STA 1102+36							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668758.2780	1809979.9187				
PC	10+46.78	668742.4695	1810023.9426				
HPI	10+56.00	668739.3507	1810032.6278	100.00	18.40	10°32'42"	Left
PT	10+65.18	668737.8741	1810041.7371				
END	11+17.05	668729.5744	1810092.9370				

DR STA 111+47							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668438.9250	1810528.5009				
END	11+05.35	668543.5057	1810541.2267				

DR STA 111+63							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	668439.1661	1810545.0018				
PC	10+49.70	668389.4849	1810546.4277				
HPI	10+55.31	668383.8808	1810546.5885	100.00	11.20	06°25'04"	Right
PT	10+60.90	668378.2938	1810546.1219				
END	11+12.73	668326.6487	1810541.8089				

DR STA 145+88							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	666383.9009	1812923.2035				
PC	11+28.19	666452.8539	1813031.2734				
HPI	11+74.40	666477.7095	1813070.2296	500.00	92.16	10°33'38"	Left
PT	12+20.35	666509.2838	1813103.9705				
END	12+37.93	666521.2949	1813116.8057				

DR STA 151+74							
Point Type	**Station**	**Northing**	**Easting**	**Radius (ft)**	**Length (ft)**	**Delta**	**Direction**
START	10+00.00	665887.4932	1813232.5648				
PC	10+79.65	665848.3947	1813163.1709				
HPI	11+39.82	665818.8597	1813110.7508	105.00	109.27	59°37'40"	Left
PT	11+88.92	665758.7005	1813109.7280				
END	14+32.05	665515.6087	1813105.5949				

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DRIVEWAYS

SHEET 5 OF 5

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C7

CONTROL POINTS-I-40

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	555+88.35	72.13
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	556+60.49	-68.36
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	566+07.19	65.84
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	567+52.02	-68.86
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	574+74.13	-530.82
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	575+94.46	-706.14
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	577+46.13	73.33
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	577+73.85	-68.90
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	583+44.10	268.02
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	583+46.66	546.62
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	587+62.59	-73.53
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	588+05.11	73.41
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	592+97.88	-198.65
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	594+29.37	286.71
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	595+63.77	-69.17
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	596+07.27	-208.77
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	596+84.82	82.67
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	598+78.82	191.58
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	600+02.73	1299.19
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	600+42.49	-74.21
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	601+33.63	1700.51
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	603+75.31	203.72
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	604+67.46	79.16
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	614+10.02	-76.74
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	616+35.42	80.51

CONTROL POINTS-SR 265

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	84+18.24	386.05
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	85+12.16	255.55
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	92+75.17	627.86
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	94+60.97	560.05
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	104+23.09	-13.33
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	105+05.68	-210.66
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	107+48.03	540.45
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	107+63.71	396.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	111+81.17	996.15
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	111+95.33	719.71
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	117+79.10	450.12
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	120+32.93	574.75
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	123+20.67	36.90
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	124+41.86	-229.78
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	125+50.54	-137.62
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	127+07.29	-583.49
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	127+36.49	-193.86
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	128+24.39	127.71
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	129+11.51	-342.56
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	130+35.98	-947.24
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	131+78.88	-817.13
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	133+46.08	-1878.28
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	135+54.98	-2022.87
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	140+08.80	-15.64
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	144+43.89	-13.60

CONTROL POINTS-SR 265 EB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	305+31.79	-325.72
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	286+58.17	2164.84
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	297+45.80	1106.58
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	285+98.08	2263.94
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	304+26.60	-328.65
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	307+48.34	522.46
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	296+12.79	1291.03
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	307+64.03	378.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	311+89.03	977.15
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	312+03.31	700.57
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	319+15.96	393.19
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	319+70.89	503.14
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	322+96.00	84.15
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	324+49.78	-177.98
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	325+63.07	-86.02
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	327+19.82	-531.89
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	327+49.02	-142.26
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	327+83.19	-1874.44
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	327+94.30	-922.43
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	328+18.88	-831.01
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	328+19.65	-318.75
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	329+28.01	137.52
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	336+35.48	-2050.88
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	345+19.75	-675.02
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	340+86.02	-242.81

CONTROL POINTS-SR 265 WB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	185+95.73	2275.36
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	186+55.83	2174.37
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	196+10.45	1308.44
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	197+43.46	1122.16
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	204+24.25	-324.38
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	205+29.44	-299.99
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	207+45.99	558.46
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	207+61.68	414.40
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	211+71.63	1015.36
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	211+85.77	739.06
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	218+09.18	477.75
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	223+32.79	12.10
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	223+48.95	569.79
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	224+42.41	-265.58
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	225+55.70	-173.62
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	226+54.05	-623.24
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	226+85.93	-242.65
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	228+31.02	58.02
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	230+60.77	-359.17
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	231+88.82	-925.85
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	232+23.98	-789.38
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	233+70.52	-1850.28
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	235+80.83	-1994.85
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	240+35.95	239.18
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	244+69.68	-672.59

INITIAL STUDIES REQUEST

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CONTROL POINTS
MAINLINES

SHEET 1 OF 3

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C8

CONTROL POINTS-PLEASANT GROVE RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1086+72.37	-2019.15
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1088+30.13	-1913.20
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1091+00.15	-1079.66
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1092+82.74	-886.26
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1093+83.71	1337.42
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1095+65.14	620.86
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1096+10.02	3612.17
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1096+35.88	1128.84
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1097+06.07	504.02
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1097+98.90	3206.69
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1100+02.33	-54.71
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1100+23.96	1403.85
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1101+31.90	1295.46
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1101+88.02	2061.59
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1102+11.75	-17.82
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1103+24.05	2161.01
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1103+28.04	2386.63
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1103+34.66	1688.24
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1103+37.96	1978.03
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1103+69.63	1947.36
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1103+77.71	2815.84
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1103+87.58	2383.93
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1104+03.33	2825.80
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1105+32.83	3864.10
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1105+83.12	3593.91

CONTROL POINTS-JOHN HAGAR RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	776+29.74	-2373.09
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	777+01.79	-2312.45
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	786+48.57	-1356.98
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	787+93.31	-1233.83
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	795+15.15	-867.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	796+35.37	-966.58
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	797+87.51	-241.99
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	798+15.15	-317.41
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	803+97.00	70.98
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	804+78.31	343.62
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	806+33.52	-399.00
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	807+13.83	-300.46
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	808+82.37	-827.27
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	810+82.65	-1048.64
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	811+56.35	-922.71
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	813+19.37	-578.02
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	813+50.20	-909.95
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	814+59.92	-1284.95
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	815+62.41	-989.21
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	818+01.69	-1536.56
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	818+17.97	-1391.15
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	818+84.78	-2430.97
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	819+32.89	-2571.34
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	821+76.50	-623.83
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	832+34.06	-520.14

CONTROL POINTS-GUILL RD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	5+49.64	2319.80
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	8+81.21	1999.24
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	13+20.20	-16.74
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	13+71.08	-2815.07
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	14+10.84	-2767.98
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	14+28.08	-1813.47
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	14+97.09	-1704.51
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	15+86.32	-79.11
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	16+18.53	-707.65
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	17+63.07	-725.00
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	19+14.51	403.85
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	19+69.09	1037.29
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	20+38.69	439.27
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	21+31.06	-1221.25
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	22+71.36	1285.07
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	22+74.70	1489.73
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	23+31.66	-1251.32
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	23+48.53	1174.65
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	23+50.71	956.03
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	24+91.90	1243.53
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	25+43.52	1998.86
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	25+87.68	1645.79
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	26+98.42	2075.03
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	33+68.39	3009.32
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	33+69.51	3240.03

CONTROL POINTS-TILMAN DR

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	979+55.06	2424.98
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	980+19.69	2294.67
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	989+72.14	1613.21
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	991+09.67	1416.12
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	998+06.43	632.21
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	999+17.35	428.48
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1006+38.25	995.01
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1006+40.90	1134.21
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1006+78.45	1485.09
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1006+78.97	1206.65
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1008+10.77	1110.90
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1008+12.54	957.93
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1018+25.93	808.80
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1021+03.12	699.90
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1021+08.93	1226.11
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1021+13.98	845.82
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1022+82.50	968.19
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1025+07.95	1065.13
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1025+45.86	818.06
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1029+71.40	1183.35
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1029+92.41	1111.12
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1030+98.51	2177.95
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1034+22.90	2590.77
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1037+44.25	1693.13
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1040+17.48	1966.59

CONTROL POINTS-PROVIDENCE PKWY

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1578+80.82	-4789.92
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1580+27.03	-4815.61
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1604+99.33	-3908.53
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1605+13.78	-3832.91
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1605+32.92	-2132.37
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1605+45.31	-2890.77
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1605+59.10	-2943.76
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1605+63.68	-2282.19
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1605+78.26	-3455.56
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1605+96.83	-3470.79
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1606+25.18	-2060.05
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1606+33.43	-2200.26
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1609+41.60	-1517.55
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1610+12.40	115.95
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1610+32.22	-317.54
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1610+86.73	-1999.26
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1612+41.07	-1753.58
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1612+72.02	-1561.79
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1615+89.12	-1357.69
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1616+07.66	-1840.76
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1618+75.10	-1484.88
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1620+14.58	-1072.36
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1621+57.05	-1133.26
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1630+49.14	-1174.75
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1631+64.14	-1122.58

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONTROL POINTS
SIDE STREETS

SHEET 2 OF 3

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	1C9

CONTROL POINTS-RAMP A

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	392+11.35	788.66
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	392+83.49	-729.56
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	402+30.19	-3.18
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	403+75.01	-137.88
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	410+97.13	-599.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	412+17.45	-775.16
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	413+69.13	4.31
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	413+96.85	-137.92
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	419+89.00	171.27
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	420+29.64	447.34
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	423+35.58	-247.75
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	424+14.90	-119.15
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	428+74.67	-526.72
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	431+12.18	-83.22
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	431+39.89	-608.18
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	431+40.09	-462.27
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	431+90.26	-378.81
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	432+25.46	-740.39
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	432+52.30	-451.42
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	432+78.23	-1047.11
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	432+89.03	-1996.71
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	432+92.07	-925.03
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	433+03.77	-2186.16
S56	666857.006	1812591.118	577.921	XCP	GPS 95-040-56	442+06.62	-961.91
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	446+27.56	-1392.83

CONTROL POINTS-RAMP B

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	471+93.12	3407.93
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	471+97.23	3499.29
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	480+88.15	2497.56
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	481+50.60	2328.55
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	485+62.57	1568.84
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	485+84.04	1464.18
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	490+47.15	1336.22
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	490+91.06	1412.88
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	497+09.58	1029.33
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	498+46.18	1246.63
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	498+99.63	490.97
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	500+15.64	587.12
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	501+67.32	153.58
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	503+98.39	634.26
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	504+67.66	259.31
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	504+81.49	114.05
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	506+17.46	383.00
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	508+20.79	445.42
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	509+17.23	149.98
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	511+04.47	1505.92
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	512+66.07	1875.37
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	512+80.52	353.11
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	513+44.71	214.18
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	522+54.33	-4.74
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	524+79.72	163.34

CONTROL POINTS-RAMP C

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	677+12.99	3915.61
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	677+87.47	3987.68
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	682+89.05	2104.32
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	683+33.70	2824.36
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	683+62.05	2968.90
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	683+64.74	2168.23
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	689+15.13	1803.06
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	690+16.31	1830.64
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	694+57.51	824.05
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	695+16.97	1258.87
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	695+89.76	422.18
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	696+05.91	766.46
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	696+99.37	-349.36
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	697+47.97	1342.16
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	698+12.66	-206.14
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	699+98.61	-142.27
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	700+56.69	184.44
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	703+19.68	1044.95
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	703+29.76	1472.87
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	704+37.35	-45.15
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	706+79.71	-219.10
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	709+39.89	125.18
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	710+44.33	6.31
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	719+87.03	-200.14
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	722+12.43	358.83

CONTROL POINTS-RAMP AA

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1362+31.55	3718.45
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1362+97.26	-3655.56
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1372+49.06	-2701.45
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1373+87.65	-2569.65
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1380+88.13	-1984.78
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1382+00.41	-1953.15
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1383+87.17	-1565.80
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1384+08.43	-1560.09
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1389+93.86	958.77
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1390+09.81	1002.94
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1393+89.32	-638.10
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1394+49.68	-526.54
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1401+13.61	1633.10
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1401+18.36	1202.58
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1401+46.43	2.48
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1402+47.84	433.60
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1402+51.38	945.45
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1402+92.02	2201.34
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1402+92.06	1033.60
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1403+25.39	250.36
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1404+49.02	1984.30
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1404+52.48	640.58
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1404+91.00	267.80
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1406+23.91	412.93
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1406+59.50	-407.48

CONTROL POINTS-RAMP BB

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1479+67.70	2035.68
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1483+99.80	1602.06
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1494+95.07	583.92
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1495+75.96	-459.69
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1496+65.20	364.34
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1498+50.92	172.45
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1499+09.72	-1320.96
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1500+07.80	-659.51
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1500+12.17	-1170.90
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1500+29.81	-648.78
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1500+36.83	-112.30
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1500+40.58	-1666.03
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1500+49.02	-1611.39
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1500+50.83	-2785.23
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1500+54.63	-3797.44
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1500+55.39	-2625.48
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1500+58.44	-3713.32
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1500+76.84	-1899.87
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1500+87.54	-1806.22
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1503+13.30	105.41
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1507+57.53	488.51
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1511+61.39	922.53
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1512+07.98	932.59
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1520+48.46	-1788.34
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1523+12.77	-2039.23

CONTROL POINTS-RAMP CC

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1687+64.93	-1237.71
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1691+97.96	-803.77
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1701+16.50	-1463.08
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1701+50.46	-1439.13
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1701+61.19	-4198.67
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1701+63.96	-3181.19
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1701+67.86	-4134.48
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1701+68.73	-2044.08
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1701+72.81	-3046.83
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1701+80.33	-310.99
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1701+81.75	-2031.99
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1701+85.91	-988.54
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1702+06.98	-1071.75
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1702+13.79	-2426.71
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1702+29.74	-2371.55
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1702+79.28	-692.08
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1703+11.60	-427.90
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1703+24.29	-235.36
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1704+02.26	-526.47
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1704+47.29	-49.02
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1707+14.10	-354.03
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1709+06.52	511.74
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1710+39.77	620.16
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1719+69.02	1574.66
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1721+15.79	1777.14

CONTROL POINTS-RAMP D

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	799+79.23	145.12
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	800+51.37	3.14
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	809+98.07	137.34
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	811+42.89	2.64
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	818+65.01	-459.32
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	819+85.33	-634.64
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	821+37.01	144.83
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	821+64.73	2.60
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	826+98.76	624.60
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	827+11.58	346.41
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	831+40.07	55.75
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	831+57.00	207.69
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	836+61.46	-35.86
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	837+64.62	-279.72
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	838+71.04	-212.35
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	840+27.79	-683.34
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	840+56.99	-375.40
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	841+44.89	381.31

CONTROL POINTS-RAMP D

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	842+27.75	-601.92
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	842+89.81	-1126.49
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	843+77.05	-2043.35
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	843+87.05	-1073.53
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	845+86.14	-2280.39
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	853+22.10	-1560.05
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	857+54.37	-1993.91

CONTROL POINTS-RAMP DD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S42	668102.5490	1807899.4340	628.448	XCP	GPS 95-040-42	1767+61.39	-3321.77
S35	668237.9280	1807980.7610	629.369	XCP	GPS 95-040-35	1768+72.51	-3241.15
S43	668041.0360	1808916.4320	636.803	XCP	GPS 95-040-43	1777+34.75	-2307.12
S36	668165.8020	1809069.8990	637.910	XCP	GPS 95-040-36	1779+13.44	-2150.95
S44	667957.7860	1810052.3480	640.974	XCP	GPS 95-040-44	1788+18.48	-1184.73
S37	668097.8510	1810089.4690	641.058	XCP	GPS 95-040-37	1788+87.77	-1132.71
S53	667445.5210	1810621.3840	655.759	XCP	GPS 95-040-53	1792+49.72	927.62

CONTROL POINTS-RAMP DD

Point	Northing	Easting	Elevation	Feature	GPS Point	Station	Offset
S54	667723.7160	1810636.5700	640.131	XCP	GPS 95-040-54	1793+30.48	725.27
S38	668052.9590	1811071.4860	616.305	XCP	GPS 95-040-38	1798+31.09	179.99
S45	667906.5380	1811115.7820	616.673	XCP	GPS 95-040-45	1798+39.38	268.32
S55	666505.5380	1812845.6370	561.692	XCP	GPS 95-040-55	1801+01.19	2276.45
S56	666857.0060	1812591.1180	577.921	XCP	GPS 95-040-56	1801+03.83	1845.79
S57	667739.3090	1811772.7220	619.560	XCP	GPS 95-040-57	1801+06.39	642.71
S46	667979.7380	1812003.6400	602.250	XCP	GPS 95-040-46	1801+51.49	707.71
S58	667909.5320	1812219.0110	600.539	XCP	GPS 95-040-58	1801+52.60	934.04
S39	668110.4960	1811859.9580	601.198	XCP	GPS 95-040-39	1801+63.47	530.99
S51	668206.5410	1811586.1890	620.152	XCP	GPS 95-040-51	1801+71.17	242.85
S59	668022.6040	1812718.6510	615.256	XCP	GPS 95-040-59	1801+72.62	1390.11
S47	668167.9600	1812772.3020	606.896	XCP	GPS 95-040-47	1801+83.26	1426.71
S40	668204.7110	1812323.0950	603.661	XCP	GPS 95-040-40	1801+83.96	976.08
S52	668254.9170	1811880.7690	603.643	XCP	GPS 95-040-52	1801+87.98	532.01
S48	668493.2340	1813894.0480	601.198	XCP	GPS 95-040-48	1801+99.33	2554.62
S41	668581.1940	1813633.6720	602.616	XCP	GPS 95-040-41	1802+04.19	2305.08
S50	668745.6130	1809952.8720	638.262	XCP	GPS 95-040-50	1816+56.21	-1323.77
S49	668578.6880	1809821.1460	643.531	XCP	GPS 95-040-49	1816+86.26	-1420.74

INITIAL
STUDIES
REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONTROL POINTS
RAMPS

2/4/2023 7:52:28 AM
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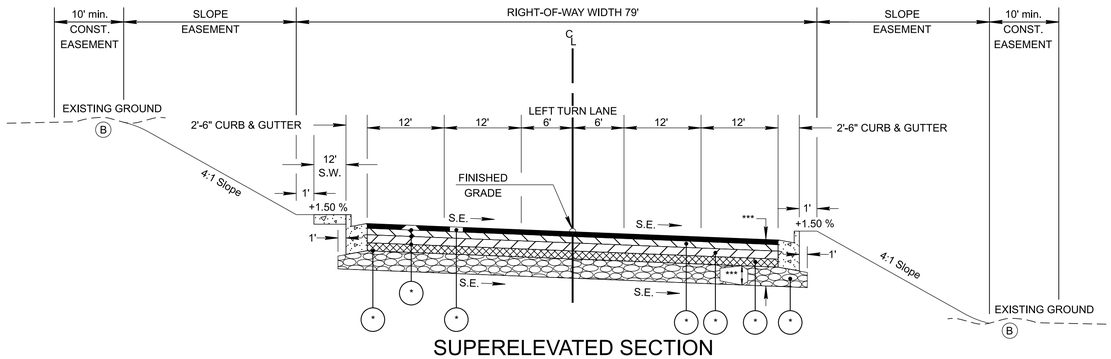
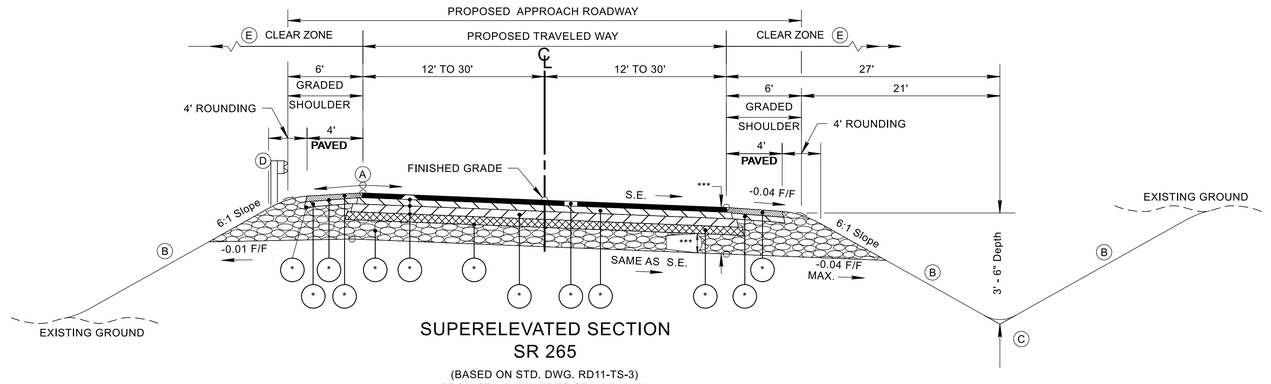
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B



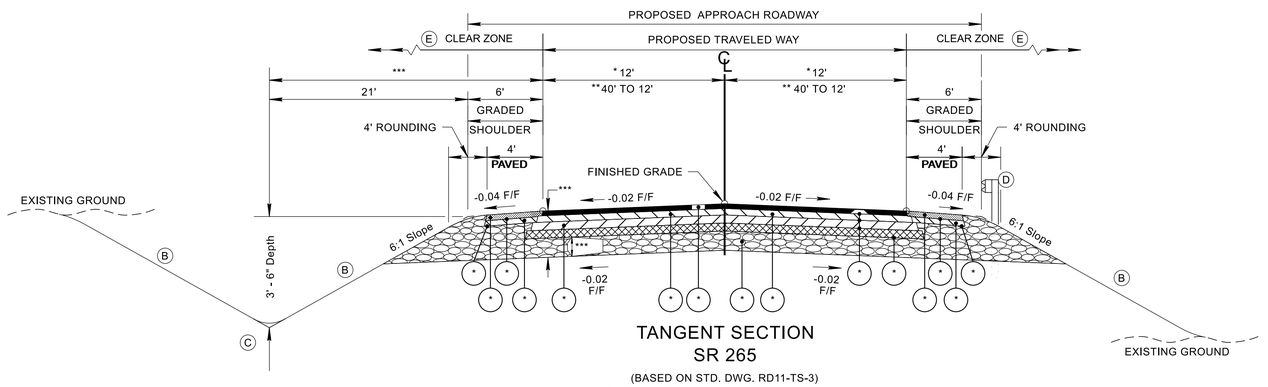
SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 98+59.00 TO STA. 101+09.12



SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
FROM STA. 94+06.82 TO STA. 98+59.00



TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
* FROM STA. 92+00.00 TO STA. 94+06.82
** FROM STA. 147+75.00 TO STA. 155+25.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

2/4/2023 7:53:48 AM
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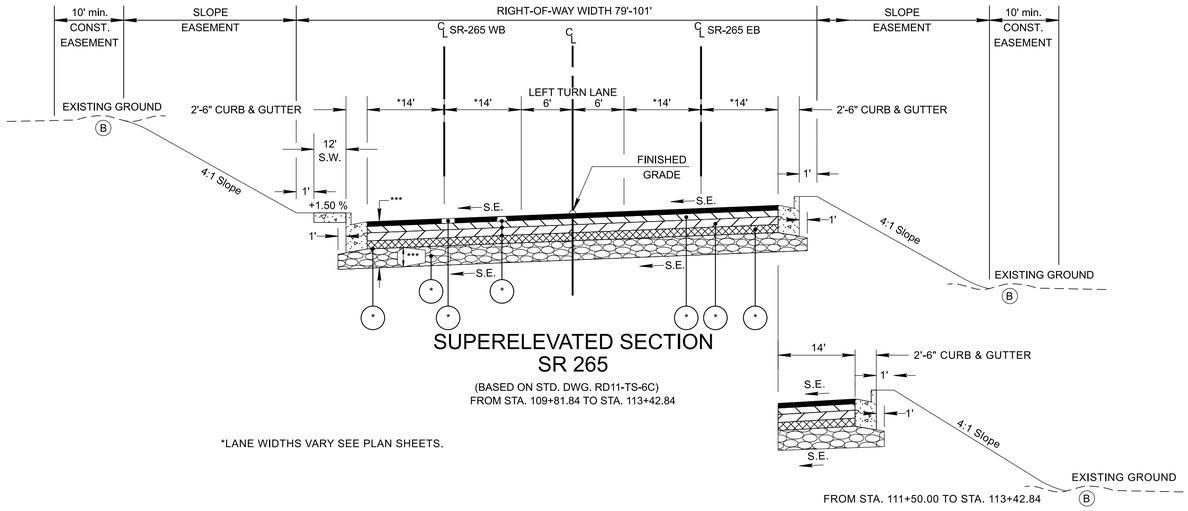
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B1

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

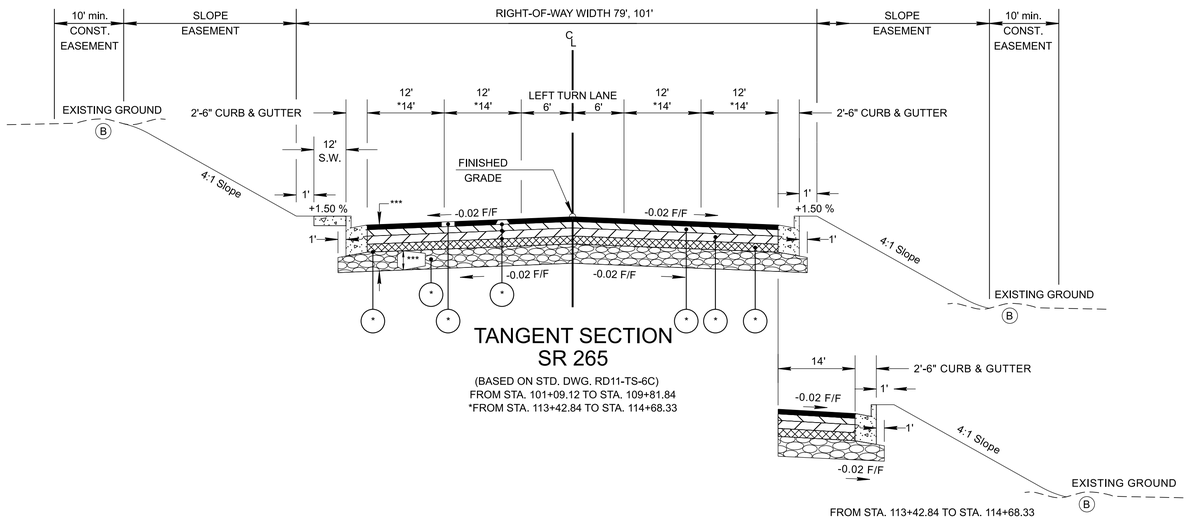


SUPERELEVATED SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 109+81.84 TO STA. 113+42.84

*LANE WIDTHS VARY SEE PLAN SHEETS.

FROM STA. 111+50.00 TO STA. 113+42.84



TANGENT SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 101+09.12 TO STA. 109+81.84
*FROM STA. 113+42.84 TO STA. 114+68.33

FROM STA. 113+42.84 TO STA. 114+68.33

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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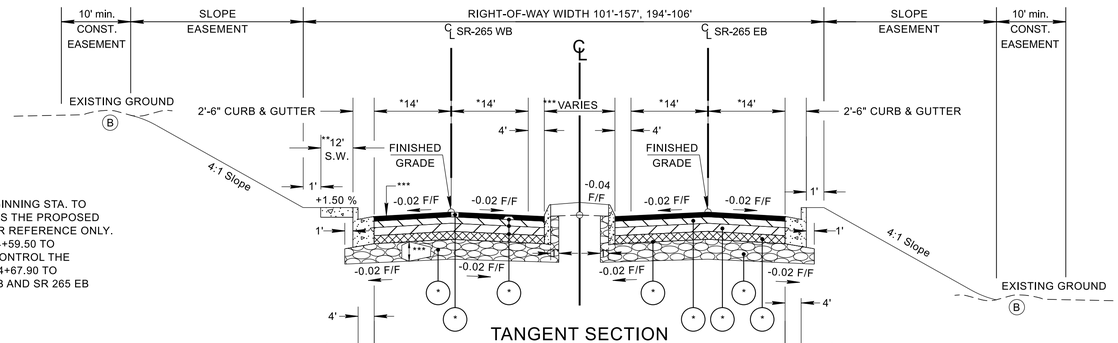
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B2

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



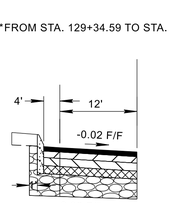
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 114+68.33 TO STA. 121+96.14
*FROM STA. 129+34.59 TO STA. 135+48.26

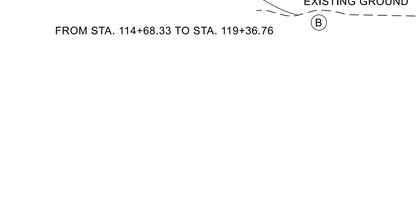
FROM STA. 121+61.86 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 131+10.42

FROM STA. 120+14.97 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 129+68.63

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SIDEWALK LOCATION VARIES SEE PLAN SHEETS.
***MEDIAN WIDTH VARIES SEE PLAN SHEETS.



*FROM STA. 129+34.59 TO STA. 135+48.26



FROM STA. 114+68.33 TO STA. 119+36.76

FROM STA. 135+71.67 TO STA. 135+48.26

B SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
SR 265

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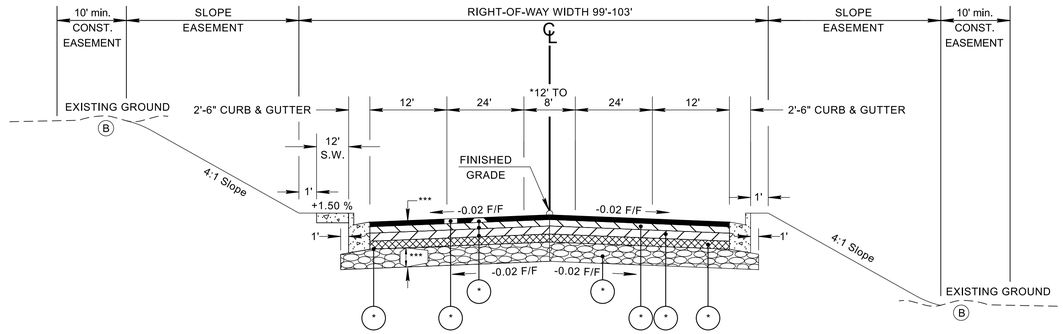
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B3

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

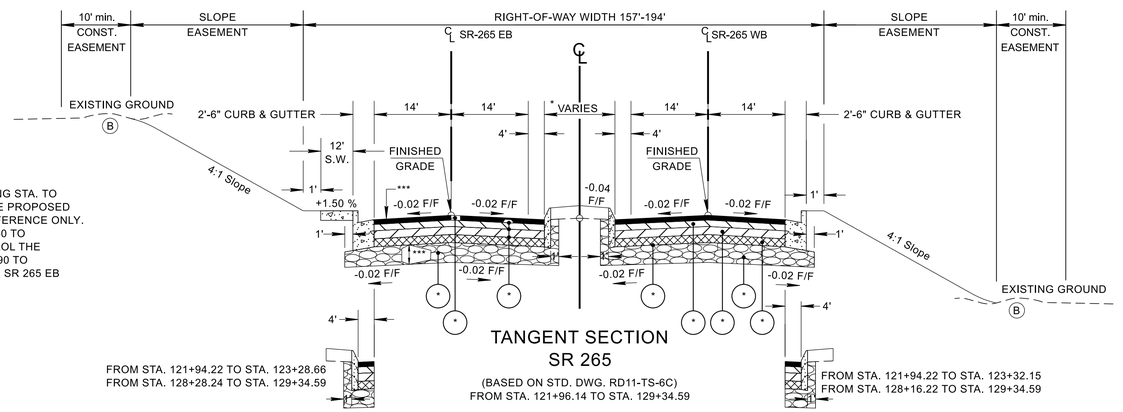


TANGENT SECTION
SR 265

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 135+48.26 TO STA. 147+75.00

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



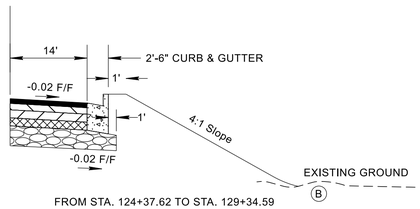
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 121+96.14 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+28.66
FROM STA. 128+28.24 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+32.15
FROM STA. 128+16.22 TO STA. 129+34.59

*MEDIAN WIDTH VARIES SEE PLAN SHEETS.



FROM STA. 124+37.62 TO STA. 129+34.59

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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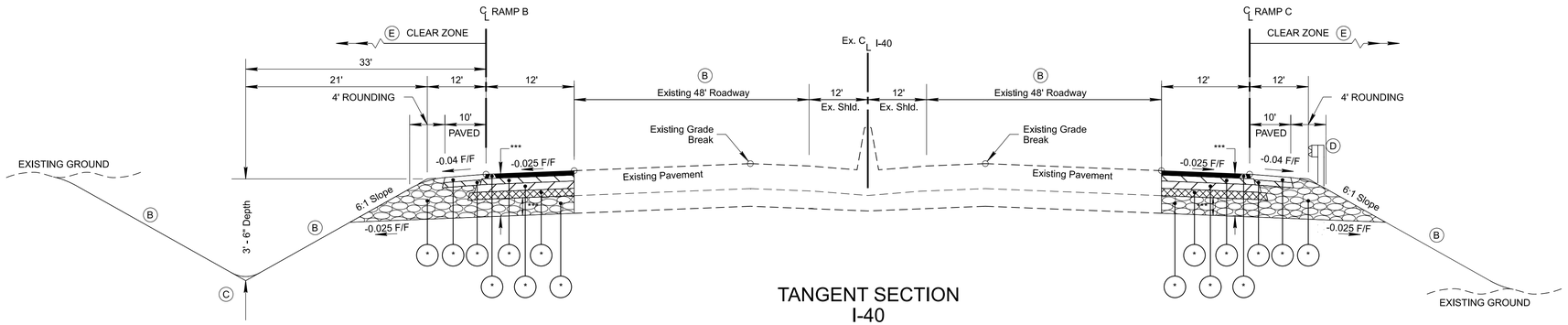
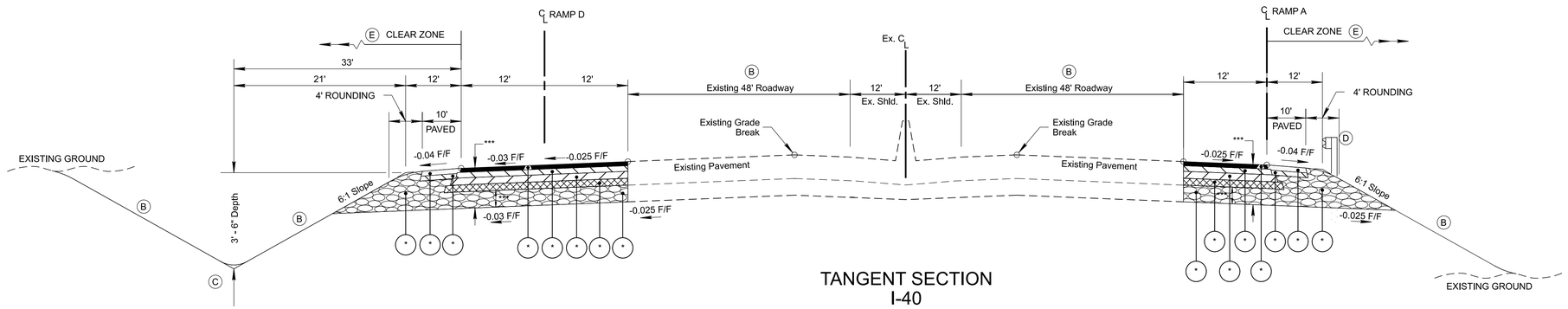
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B4



TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 607+82.14 TO STA. 615+76.94 LT (RAMP B)
FROM STA. 602+83.84 TO STA. 612+76.67 RT (RAMP C)



TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 547+69.12 TO STA. 585+03.52 LT (RAMP D)
FROM STA. 560+00.18 TO STA. 583+87.41 RT (RAMP A)

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
I-40

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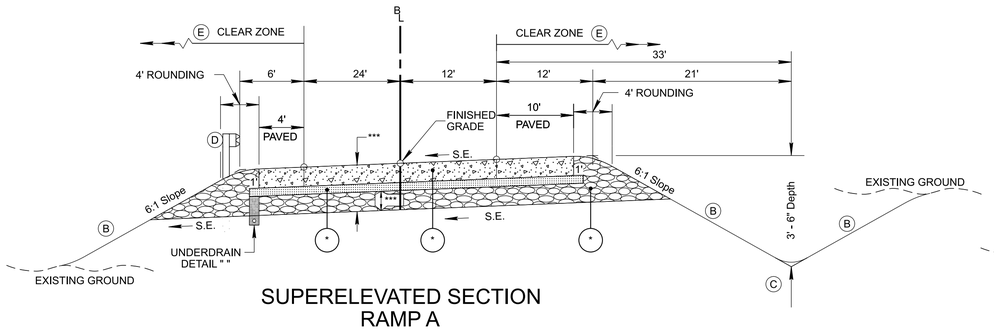
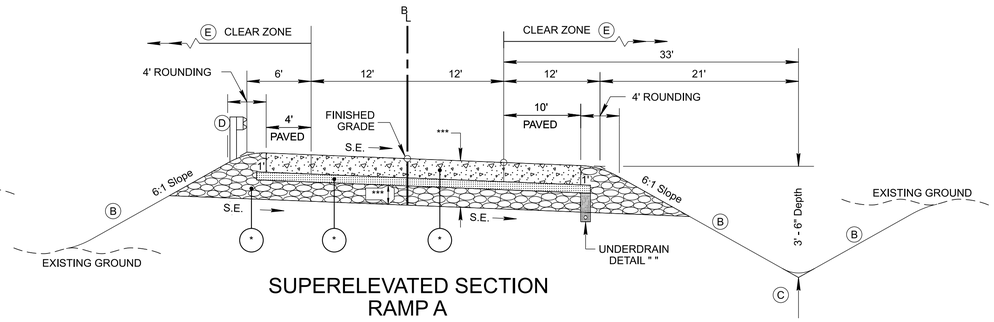
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B5



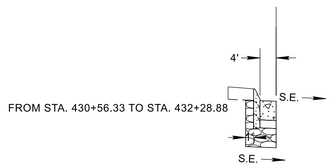
SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 425+30.66 TO STA. 428+10.59

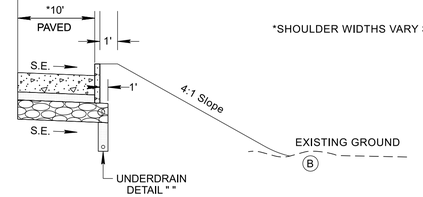


SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 429+91.00 TO STA. 433+13.78

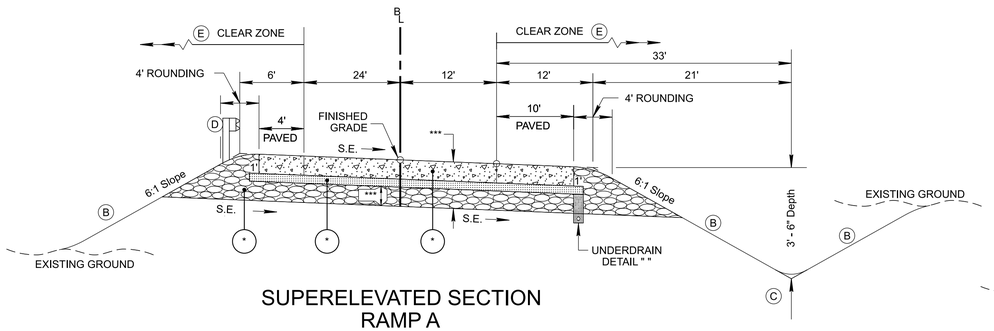


FROM STA. 430+56.33 TO STA. 432+28.88



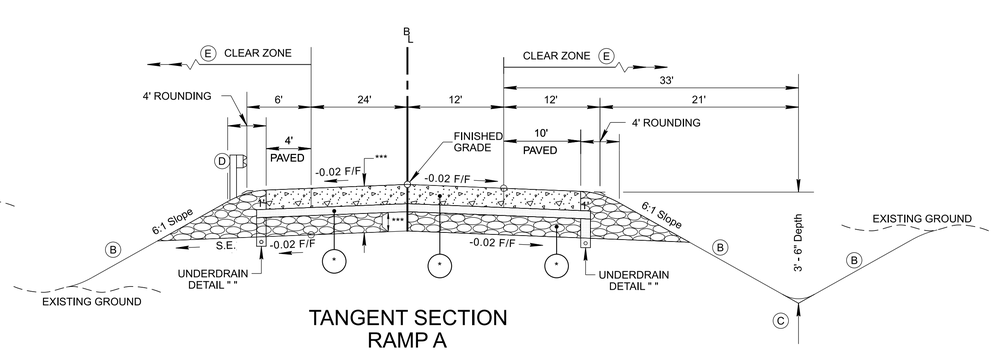
FROM STA. 430+55.47 TO STA. 433+16.11

*SHOULDER WIDTHS VARY SEE PLAN SHEETS.



SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 420+09.48 TO STA. 425+30.66



TANGENT SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 428+10.59 TO STA. 429+91.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS RAMP A

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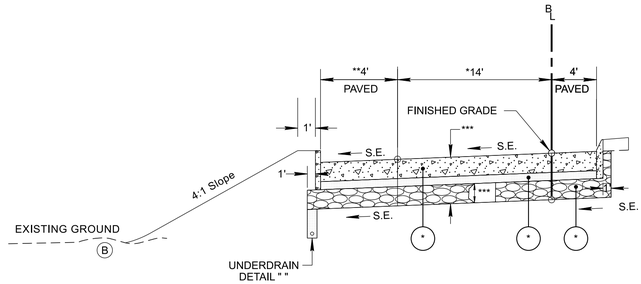
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B6

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP AA

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1400+00.00 TO STA. 1401+83.90

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
RAMP AA

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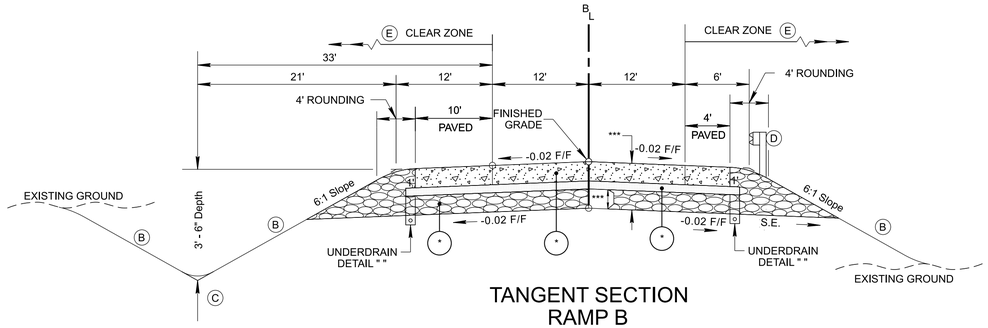
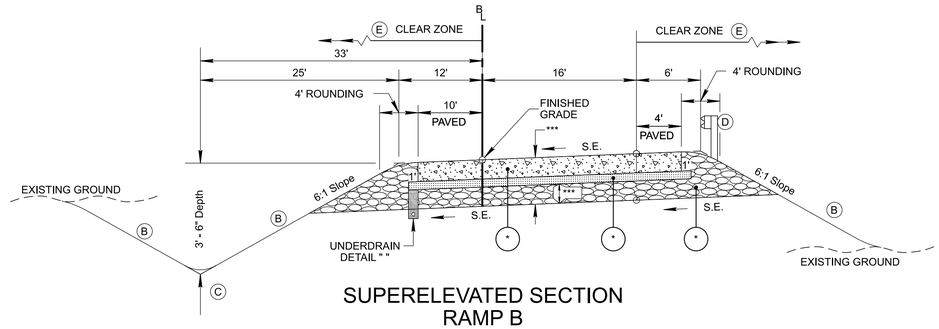
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B7



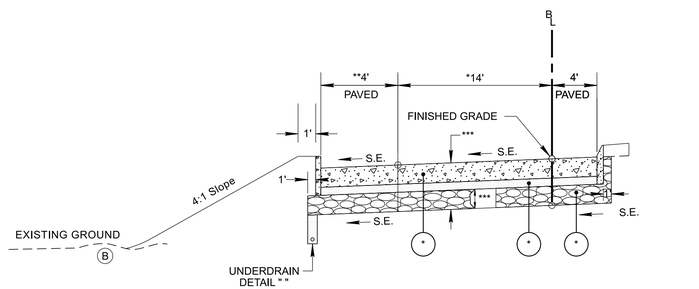
TANGENT SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 503+42.25 TO STA. 505+93.21



SUPERELEVATED SECTION
RAMP B

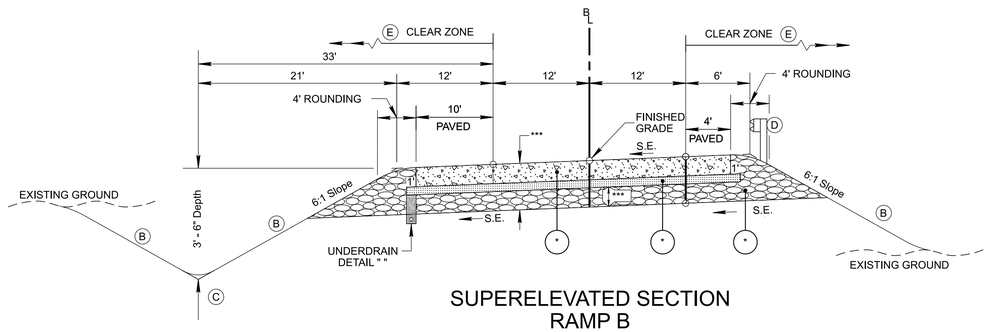
(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 512+65.00 TO STA. 516+27.35



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 499+58.79 TO STA. 503+42.25



SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 505+93.21 TO STA. 512+65.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS RAMP B

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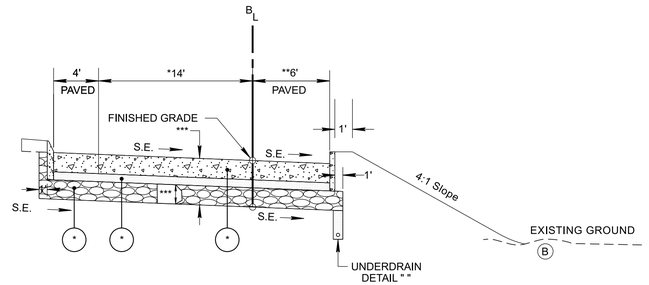
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B8

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP BB

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1500+49.57 TO STA. 1501+80.88

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
RAMP BB

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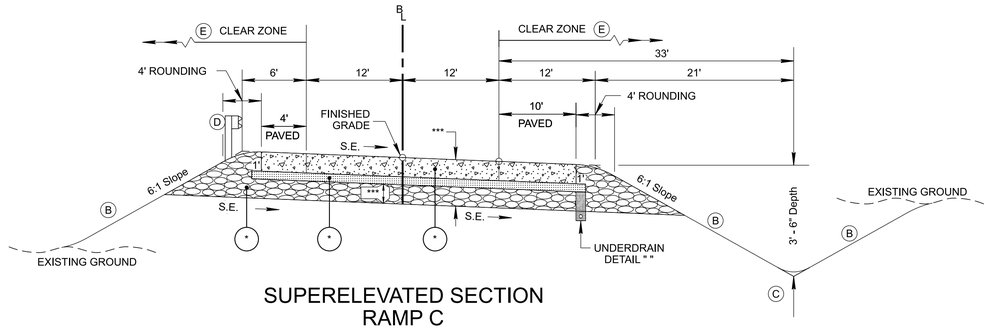
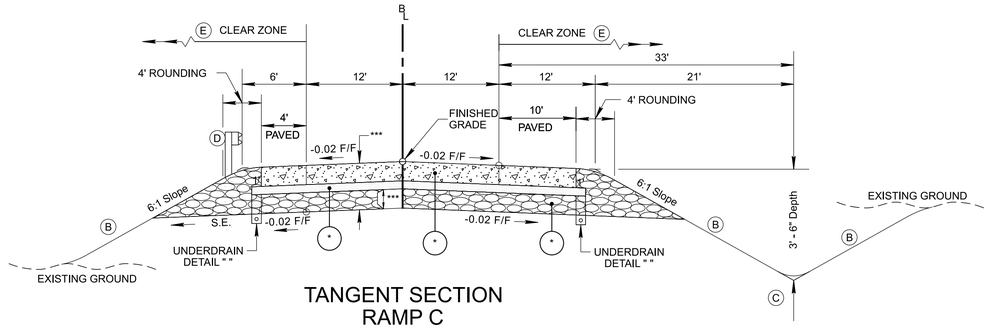
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B9



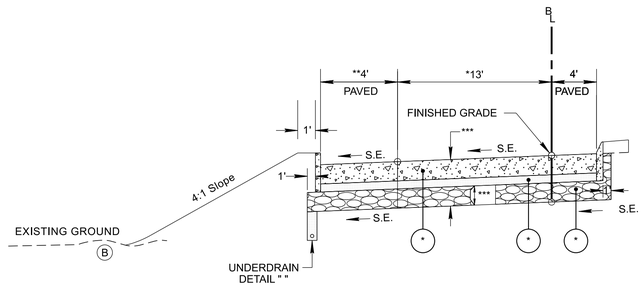
SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 703+95.34 TO STA. 708+61.12



TANGENT SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 702+90.60 TO STA. 703+95.34



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 700+65.85 TO STA. 702+90.60

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS RAMP C

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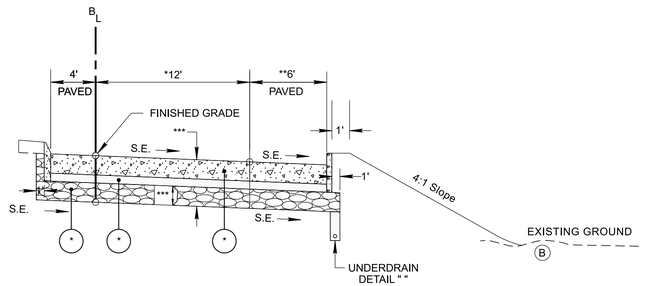
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B10

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP CC

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1700+62.68 TO STA. 1703+01.66

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP CC

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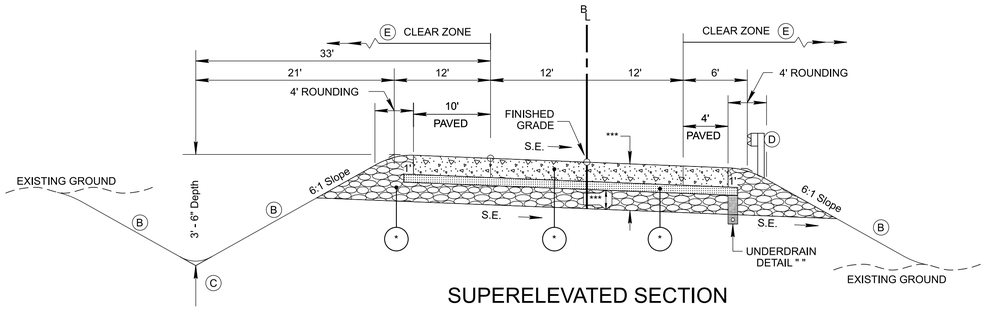
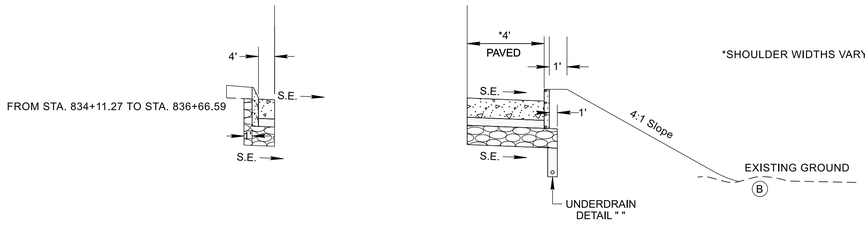
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B11



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 833+29.60 TO STA. 837+71.58



FROM STA. 834+11.27 TO STA. 836+66.59

FROM STA. 834+10.35 TO STA. 837+71.58

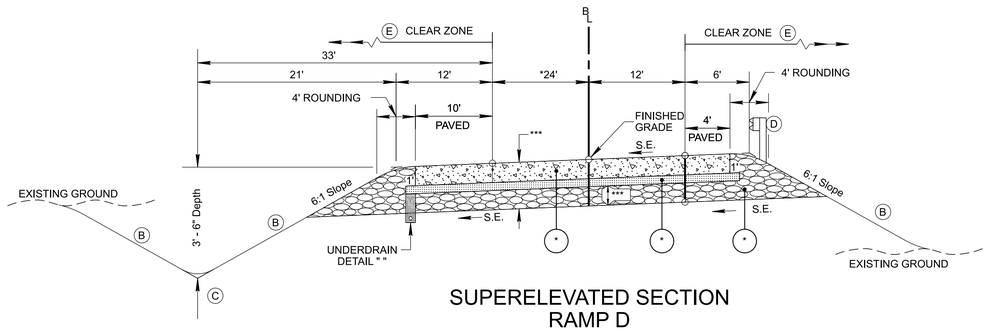
*SHOULDER WIDTHS VARY SEE PLAN SHEETS.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 828+91.41 TO STA. 833+29.60

*LANE WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP D

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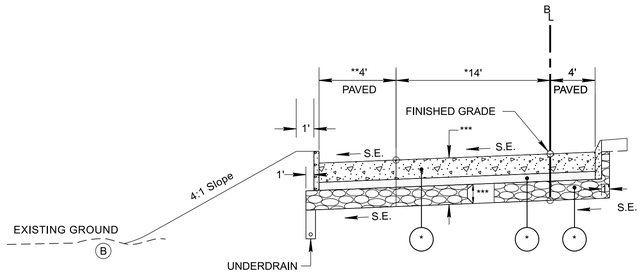
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B12

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP DD

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1800+47.85 TO STA. 1803+02.06

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP DD

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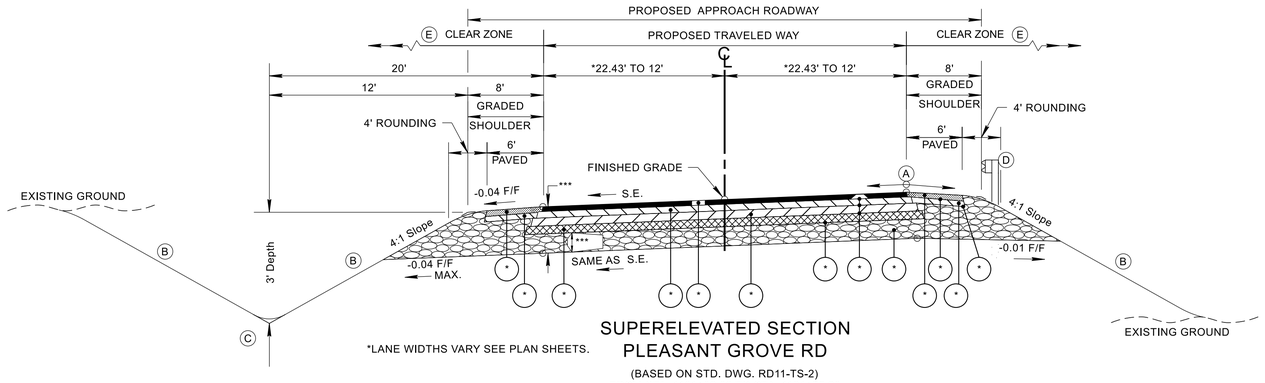
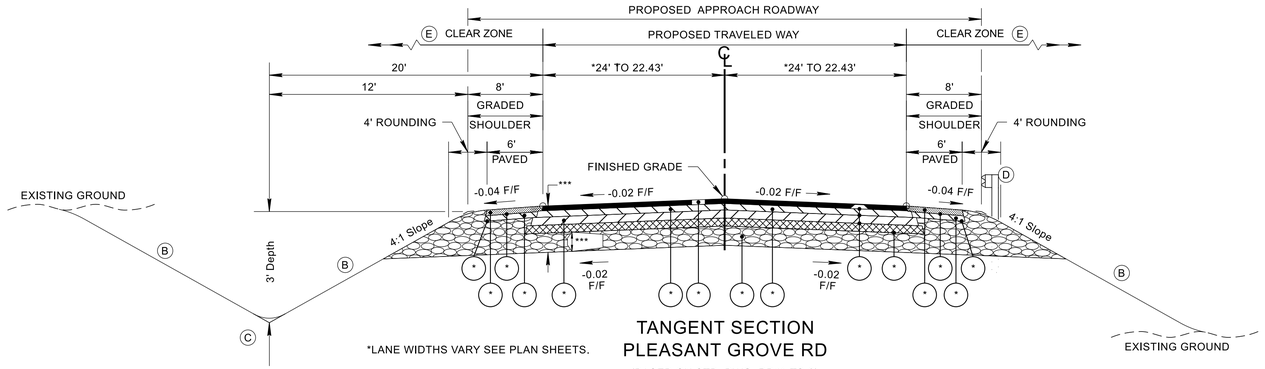
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B13



SUPERELEVATED SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

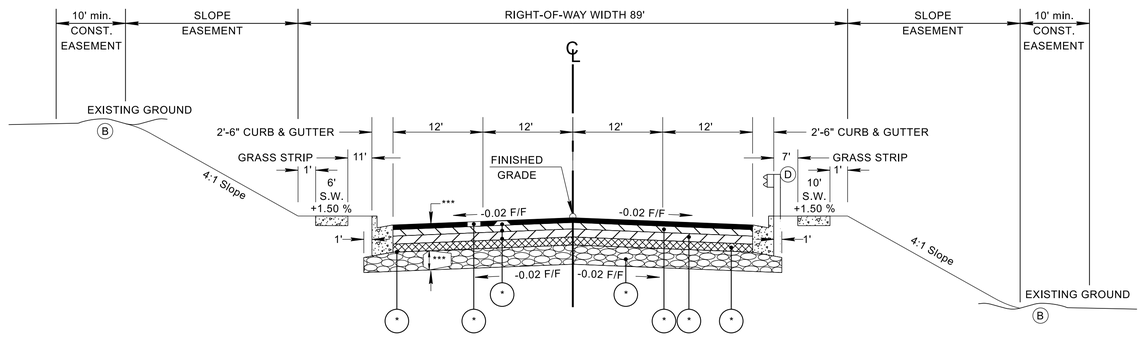
(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+96.00 TO STA. 1104+75.00



TANGENT SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+55.00 TO STA. 1101+96.00



TANGENT SECTION
PLEASANT GROVE RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1100+31.94 TO STA. 1101+55.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL
SECTIONS
PLEASANT GROVE RD

2/4/2023 7:53:58 AM
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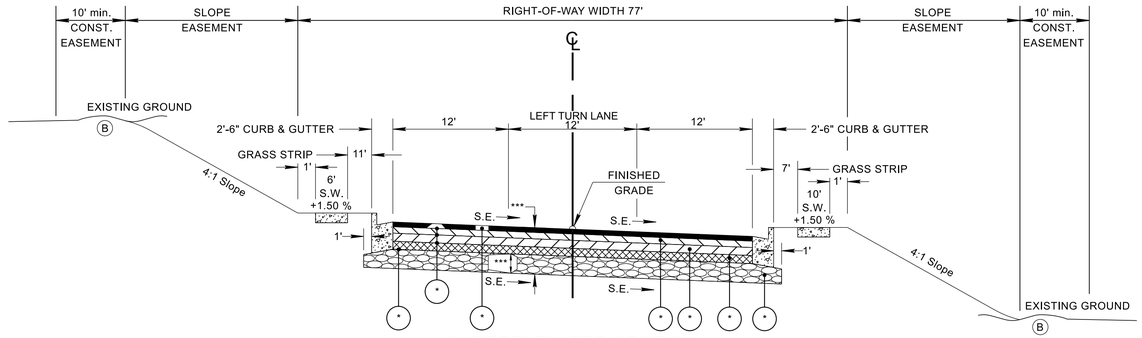
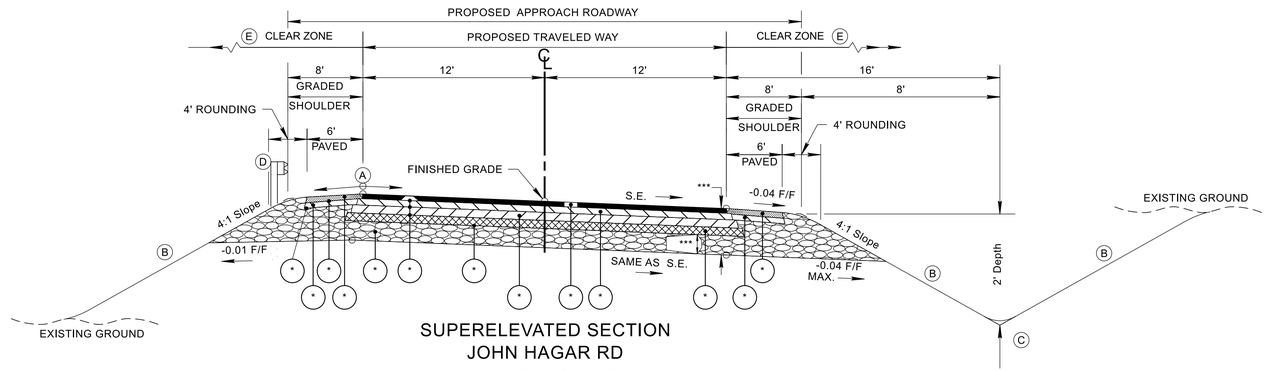
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B14



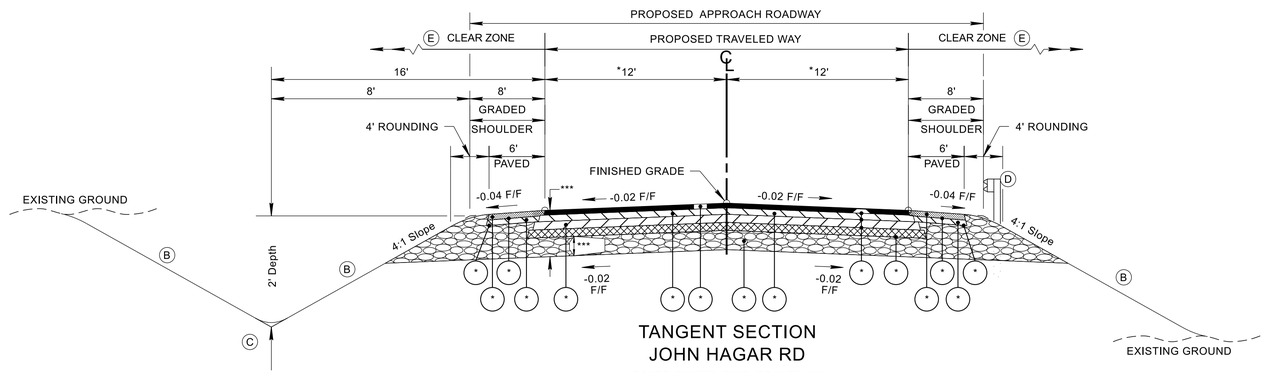
SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 816+88.46 TO STA. 823+37.33



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+93.00 TO STA. 808+37.00



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+75.00 TO STA. 801+93.00
*FROM STA. 808+37.00 TO STA. 816+88.46

*LANE WIDTHS VARY SEE PLAN SHEETS.

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
JOHN HAGAR RD

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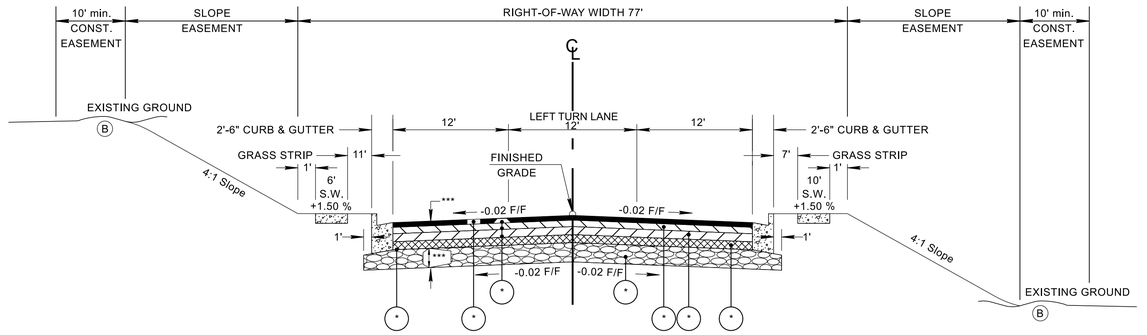
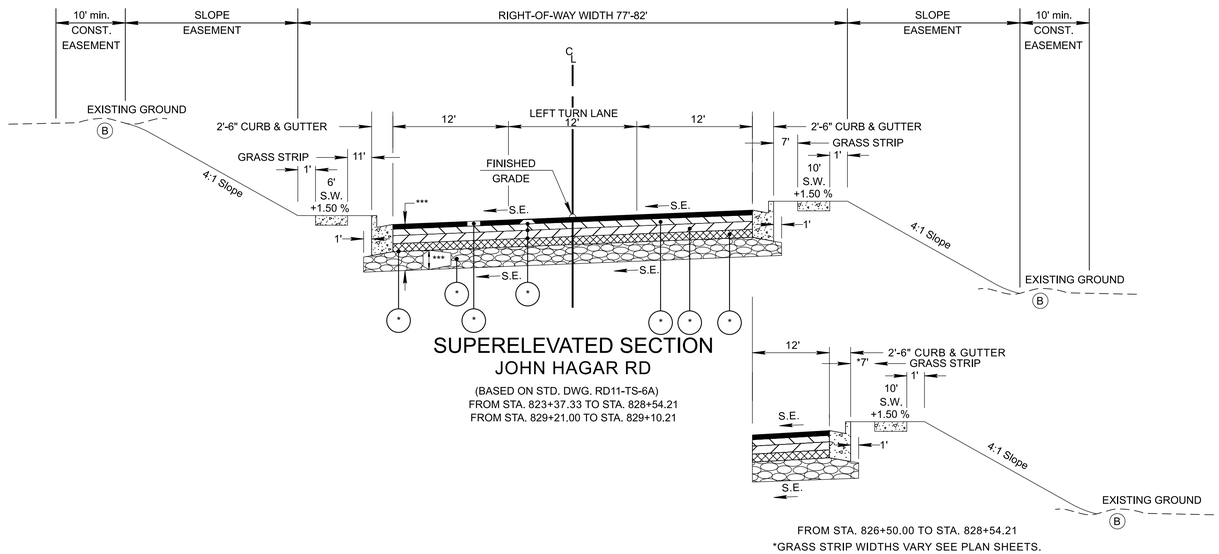
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B15

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 829+21.00 TO STA. 830+00.00



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 823+37.33 TO STA. 828+54.21
FROM STA. 829+21.00 TO STA. 829+10.21

FROM STA. 826+50.00 TO STA. 828+54.21
*GRASS STRIP WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
JOHN HAGAR RD

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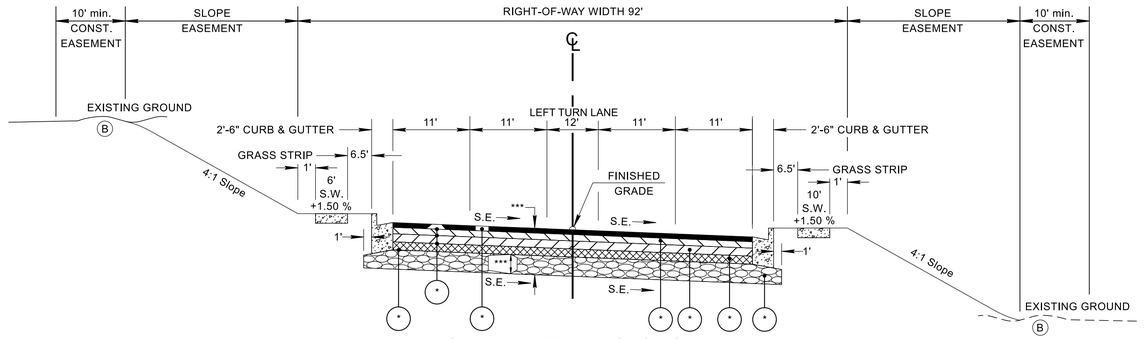
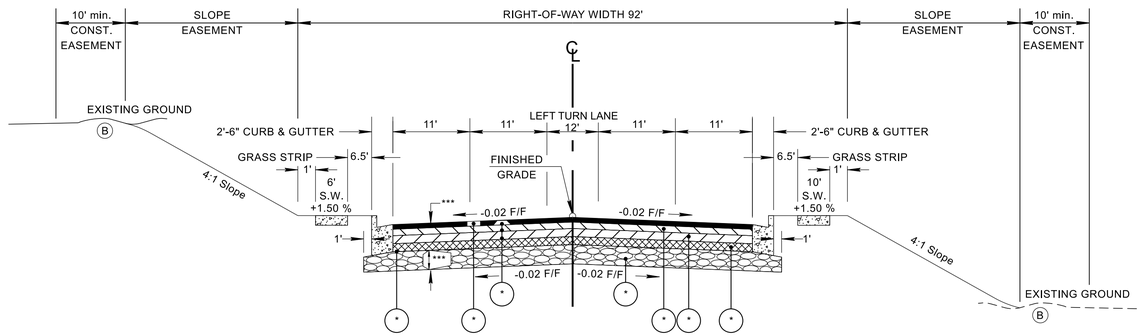
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B16

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1603+40.71 TO STA. 1607+49.71



TANGENT SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1602+70.00 TO STA. 1603+40.71
FROM STA. 1607+49.71 TO STA. 1614+00.00

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INITIAL STUDIES REQUEST

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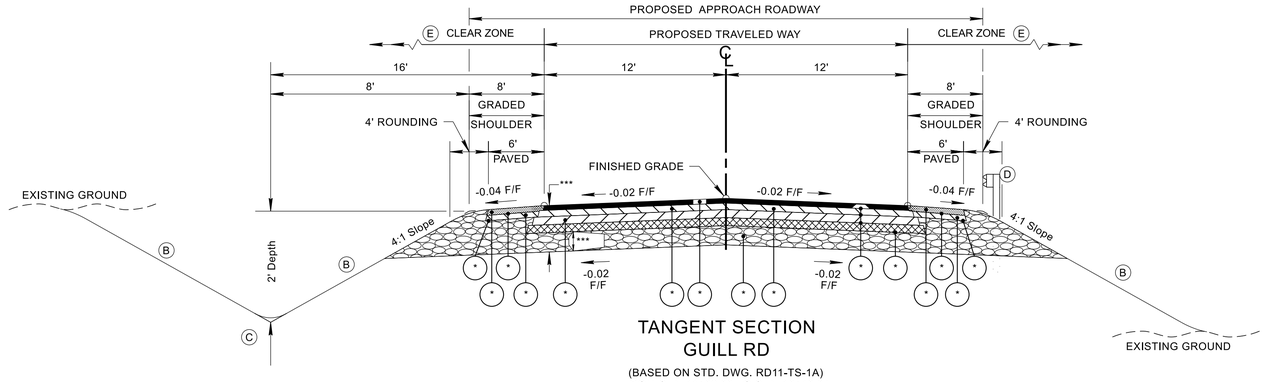
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
PROVIDENCES PKWY

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B17



TANGENT SECTION
GUILL RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 11+00.00 TO STA. 16+49.84

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

TYPICAL
SECTIONS
GUILL RD

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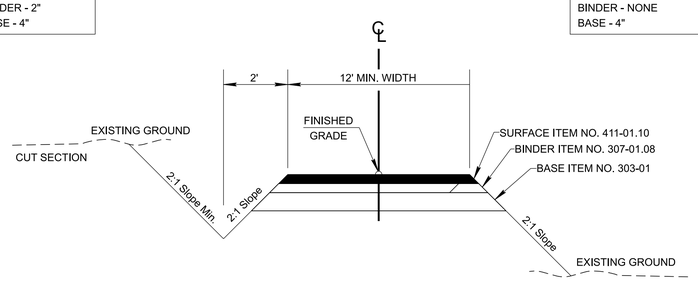
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B18

PROPOSED PAVEMENT SCHEDULE

(*) @ . " THICK (APPROX. LB./S.Y.) - .	(*) @ . " THICK (APPROX. LB./S.Y.) - .
(*) @ . " THICK (APPROX. LB./S.Y.) - . - .	(*) @ . " THICK (APPROX. LB./S.Y.) - . - .

BUSINESS
SURFACE - 1.25"
BINDER - 2"
BASE - 4"

FIELD OR RESIDENTIAL
SURFACE - 1.5"
BINDER - NONE
BASE - 4"



TANGENT SECTION
TILLMAN DRIVE
PRIVATE DRIVE TO BUSINESS,
FIELD, OR RESIDENTIAL PROPERTY

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
AND PAVEMENT SCHEDULE
TILLMAN DR

2/4/2023 7:56:08 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (ACRES)			
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE		LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERMANENT	SLOPE	CONSTRUCTION	AIR RIGHTS
				BOOK	PAGE												
1	GARY WISNIEWSKI	97	11.08	1958	772	0.810		0.810				0.810					
2	GARY WISNIEWSKI	97	11.09	809	2298	1.030		1.030				1.030					
3	CASEY GORDON	97	13.01	1856	1644	0.571		0.571				0.571					
4	TOM GOFF & WF, DONNA M. GOFF	97	12.04	1769	1299	0.920		0.920				0.920					
5	MICHAEL PEEK	97	12	464	491	0.740		0.740				0.740					
6	GUANPING ZHENG & WF, JIANKUN WANG	97	12.03	1687	1415	0.850		0.850				0.850					
7	DEBORAH BROWNELL	97	12.01	1923	200	1.030		1.030				1.030					
8	RANDALL FULLER & JOHN BLACKWELL	97	12.02	1415	1808	1.180		1.180				1.180					
9	RONNIE MANGRUM & WF, BRANDI MANGRUM	97	17.04	1672	1066	2.000		2.000				2.000					
10	AMANDA SIMONEAUX CRAWFORD	97	17.03	1931	235	2.000		2.000				2.000					
11	WESLEY C. WALL & WF, DANA JILL WALL	97	17.02	433	772	2.000		2.000				2.000					
12	JAMES C. WALL & WF, KAY T. WALL	97	17	820	433	1.720		1.720				1.720					
13	BILLY ELON EUBANKS & WF, VIRGINIA SUE EUBANKS	97	16.01	1053	1244	4.710		4.710				4.710					
14	JAMES M. HUETT & HEIDI M. HUETT	97	17.01	1693	2254	2.000		2.000				2.000					
15	DAVID MARTIN BUTLER & WF, BETSY CLARE BUTLER	97	29	318	369		1.000	1.000					1.000				
16	DOUGLAS R ANDERSON & WF, ALICIA M ANDERSON	97	28.05	1884	2070		1.000	1.000					1.000				
17	JAMES HUETT	97	18	1626	955	8.210		8.210				8.210					
18	PLEASANT GROVE METHODIST	97	19			1.200		1.200				1.200					
19	CHARLES E. (SONNY) TILLMAN	97	20	830	315	16.000		16.000				16.000					
20	CHARLES E. (SONNY) TILLMAN	97	20	830	315	1.000		1.000				1.000					
21	CHARLES E. (SONNY) TILLMAN	97	22	844	289	1.000		1.000				1.000					
22	MELTON LIVING TRUST	97	28.2	1617	2202		1.000	1.000					1.000				
23	RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY	97	28.21	1840	1642		1.000	1.000					1.000				
24	RAYMOND E. DAVIS JR & WF, PAMELA ANN DAVIS	97	28.08	384	471		1.350	1.350					1.350				
25	MELVIN W NELSON & WF, GENELLE NELSON	97	28.11	406	548		10.090	10.090					10.090				
26	JULIUS M. FULTON	97	27	314	347		0.350	0.350					0.350				
27	CHARLES E. (SONNY) TILLMAN	97	22	844	289	95.750		95.750				95.750					
28	CEMETERY HOLLIS/WRIGHT	97	21			1.000		1.000				1.000					
29	TERRI GENIE MINTON & HS, DAVID H MINTON	97	22.01	959	1876	5.000		5.000				5.000					
30	CHARLES E. (SONNY) TILLMAN	76	40.01	844	293	14.690		14.690				14.690					
31	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
32	PC TOWN CENTER LLC	97	75.07	2124	2162		31.910	31.910					31.910				
33	PHILLIP L SMARTT TRUSTEE	97	25	1081	1100		2.720	2.720					2.720				
34	THE ENCLAVE AT PROVIDENCE PROPERTY LLC	97	23.01	2075	429		26.320	26.320					26.320				
35	ANESKA J DAVIS & PHILLIP L SMARTT	97	75.06	1489	2110		1.050	1.050					1.050				
36	PHILLIP L SMARTT & WF, MARY R. SMARTT	97	75.02	396	366		5.950	5.950					5.950				
37	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
38	A H JOHNSON FAMILY LLC	97	23	2092	21		27.840	27.840					27.840				
39	ALDO A. JACOBOGODOY & ALDO MELISSA JACOBO	97	28.06	2199	783	3.400		3.400				3.400					
40	BRADLEY & KAATJE PITZER	97	28.23	1806	1		5.080	5.080					5.080				
41	JOSEPH & JENNY PEWITT	97	28.22	1038	44	3.460		3.460				3.460					
42	WARREN D. & DEBRA T. SMITH	97	28.13	398	431		5.040	5.040					5.040				
43	PETER J. & PATRICIA L. HICKS	97	28.04	1670	1468	3.490		3.490				3.490					
44	BYRON L. & KATHY T. PRICE	97	28.14	399	897		4.930	4.930					4.930				
45	BEAU D. & KENDRA FLEENOR	97	28.01	1635	1792	4.960		4.960				4.960					
46	THE GAMMONS FAMILY PROTECTION TRUST	97	28.15	1848	153		4.960	4.960					4.960				
47	CHARLES E. TILLMAN	76	51.00	1289	2399	28.480		28.480				28.480					
ACQUISITION TOTALS (ACRES)																	

INITIAL STUDIES REQUEST

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DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ACQUISITION TABLE

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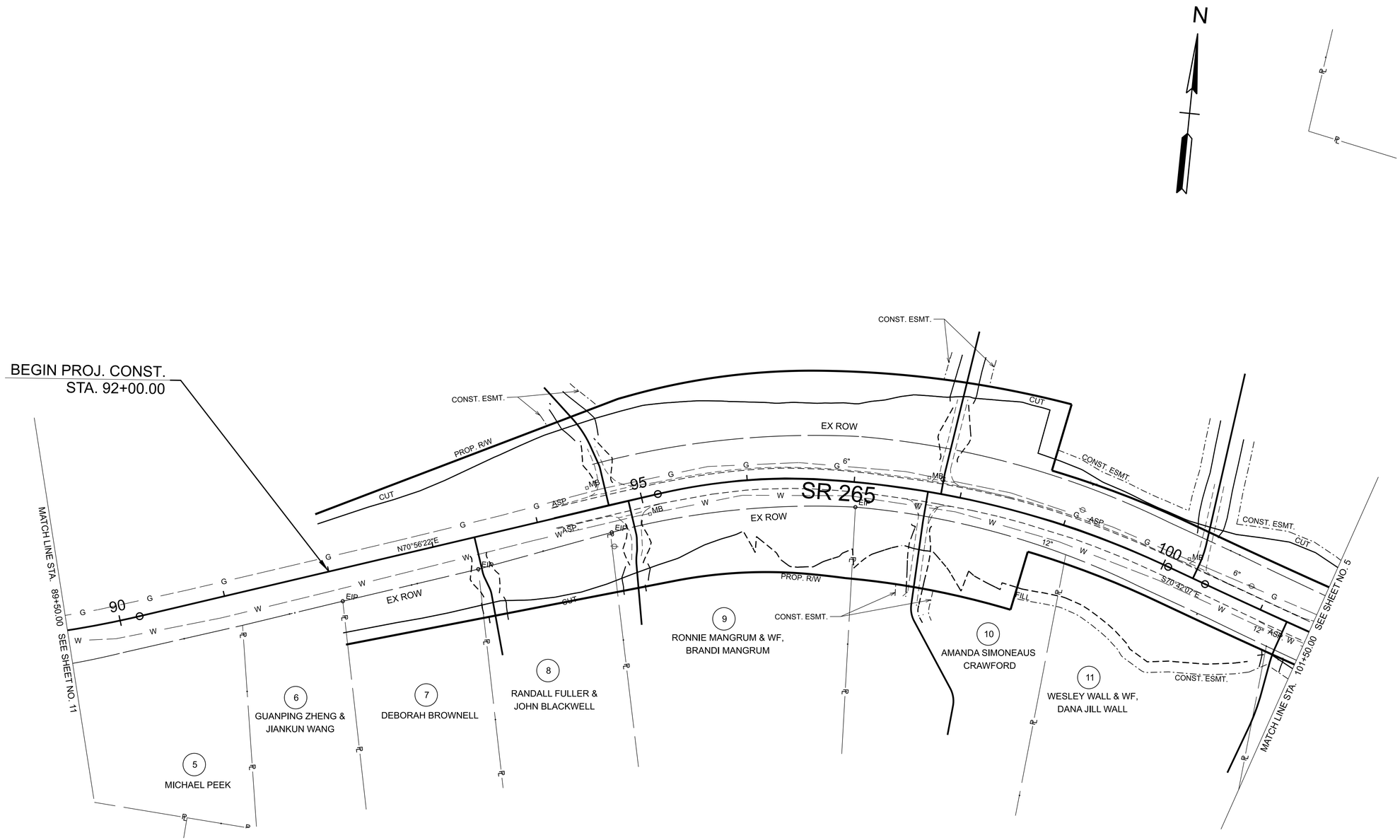
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 89+50 TO STA. 555+50
SCALE: 1" = 50'

2/4/2023 7:58:52 AM
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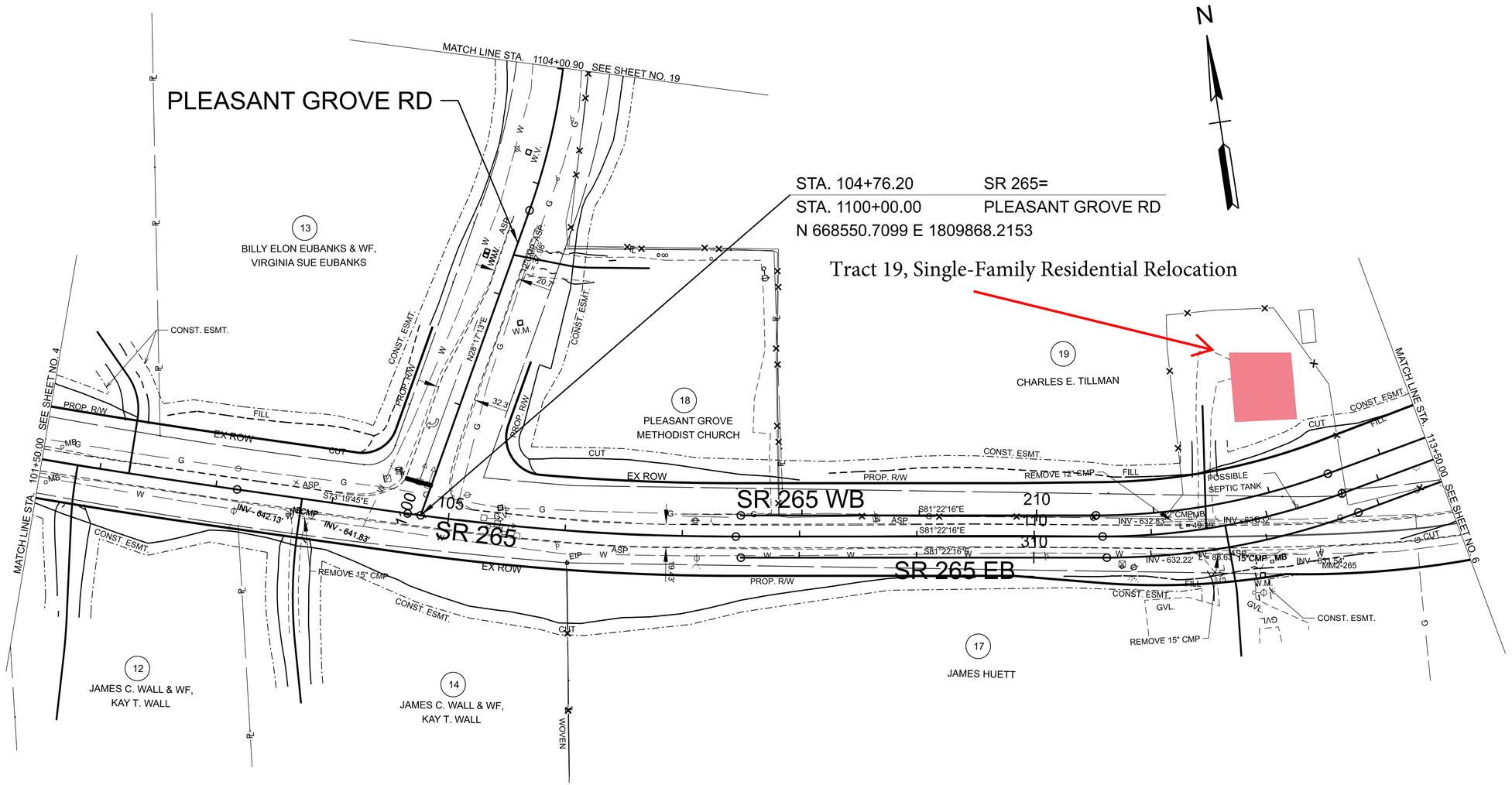
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:01:47 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6

STA. 122+06.97 SR 265=
STA. 321+94.93 SR 265 EB
N 668311.2545 E 1811534.1560

STA. 121+53.18 SR 265=
STA. 221+63.84 SR 265 WB
N 668345.2678 E 1811492.5014

STA. 222+07.03 SR 265 WB=
STA. 321+82.73 SR 265 EB
N 668313.9797 E 1811522.2647

N

MATCH LINE STA. 507+00.00 SEE SHEET NO. 14

CUT

PROP. R/W

505 S87°14'28"E

RAMP B

RAMP BB

S87°14'28"E

FILL

W

W.M.

W.V.

WOVEN FENCE WIRE

INV - 592.36'

30" ST

60" CMP

L = 125.58'

TOP - 592.27'
BOT - 592.27'

60" RCP 6.0

POSSIBLE SINKHOLE

1500

325

CONST. ESMT.

PROP. R/W

FILL

19

CHARLES E. TILLMAN

SR 265 WB

220

120

500 S57°31'00"E

N79°08'36"E

27

CHARLES E. TILLMAN

SR 265

EX ROW

ASP.

W

12"

S77°05'32"E

SR 265 EB

215

115

315

S59°50'50"E

320

N59°50'50"W

RAMP DD

24" CMP
L = 109.15'
INV - 593.83'

EP

ASP.

21

CHARLES E. TILLMAN

FILL

REMOVE 24" CMP

INV - 595.82'

12"CMP INV - 601.22'
L = 21.39'
INV - 600.51'

INV - 601.22'

20

CHARLES E. TILLMAN

PROP. R/W

17

JAMES HUETT

MATCH LINE STA. 833+25.00 SEE SHEET NO. 13

N78°15'32"E

N78°15'32"E

N78°15'32"E

MATCH LINE STA. 113+50.00 SEE SHEET NO. 5

VL

pMP

19 L.F.

ASP.

ASP.

ASP.

W

V

TOP - 606.64'
BOT - 599.59'

W

TOP - 604.89'
INV - 600.04'
INV - 598.89'
BOT - 599.04'

N76°16'29"E

835

RAMP D

C.A. FENCE

FILL

INV - 602.30'
INV - 602.30'

INV - 600.31'

MATCH LINE STA. 591+50.00 SEE SHEET NO. 13

CONC

16" CMP

INV - 621.58'

INV - 621.58'

EXIST. BRIDGE B510040000011

INV - 598.77'

S 38°06'06"E

S 38°06'06"E

JERSEY ST

MATCH LINE STA. 125+50.00 SEE SHEET NO. 7

SEE SHEET NO. 7

I-40

V

W

18'

ASP.

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:06:01 AM
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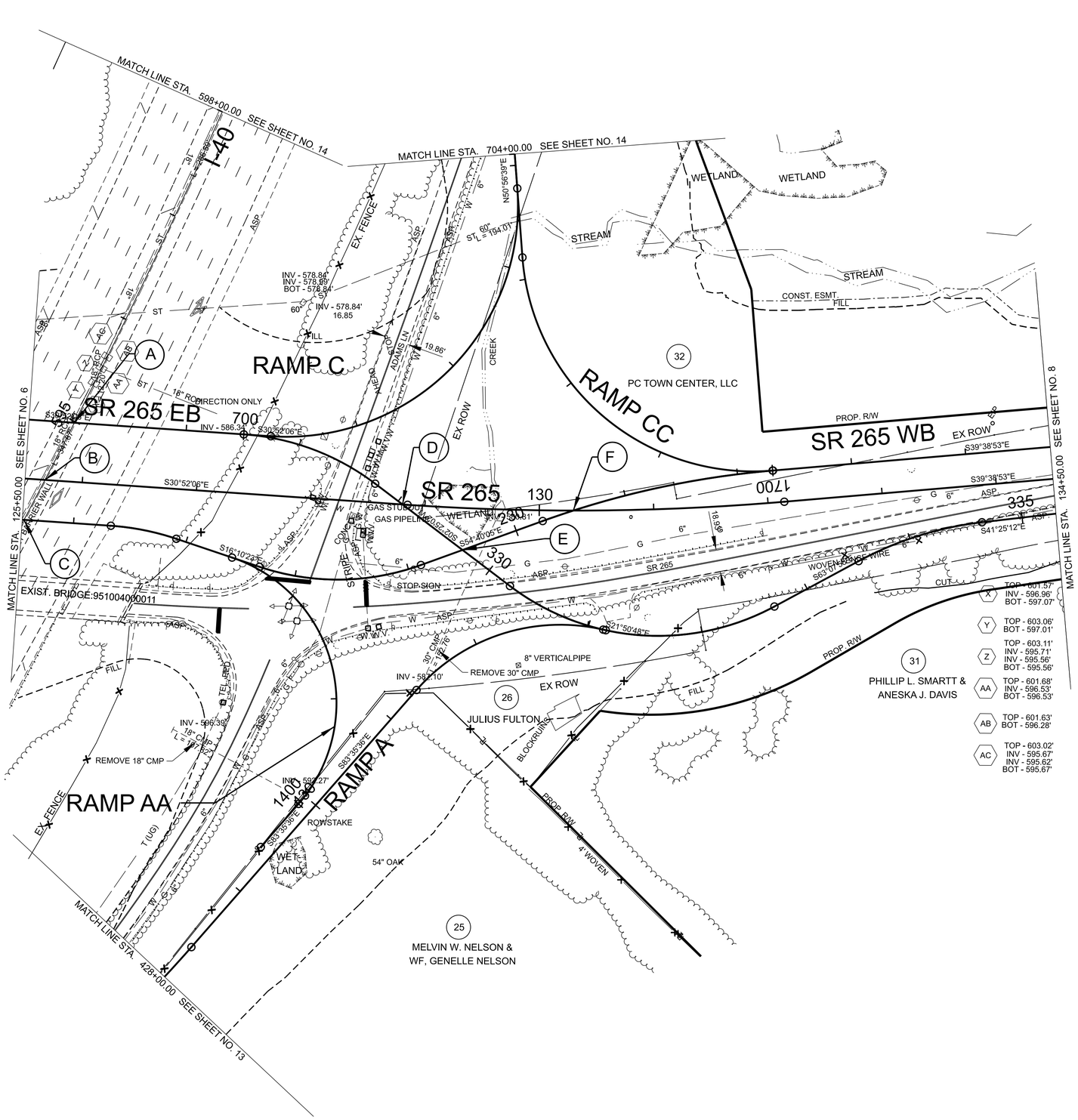
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 329+70.57 SR 265 EB=
STA. 229+50.16 SR 265 WB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 125+50 TO STA. 335+50
SCALE: 1" = 50'

2/4/2023 8:11:34 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8

END PROJ. CONST.
STA. 1614+00.00

STA. 143+28.07 SR 265=
STA. 1610+00.00 PROVIDENCE PKWY
N 666588.5226 E 1812763.7116

SR 265 WB

SR 265

SR 265 EB

PROVIDENCE PKWY

PC TOWN CENTER, LLC

THE ENCLAVE AT PROVIDENCE PROPERTY, LLC

PHILLIP L. SMARTT & WF, MARY R. SMARTT

PHILLIP L. SMARTT & ANESKA J. DAVIS

PHILLIP L. SMARTT, TRUSTEE

Tract 33, Single-Family Residential Relocation

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:17:07 AM
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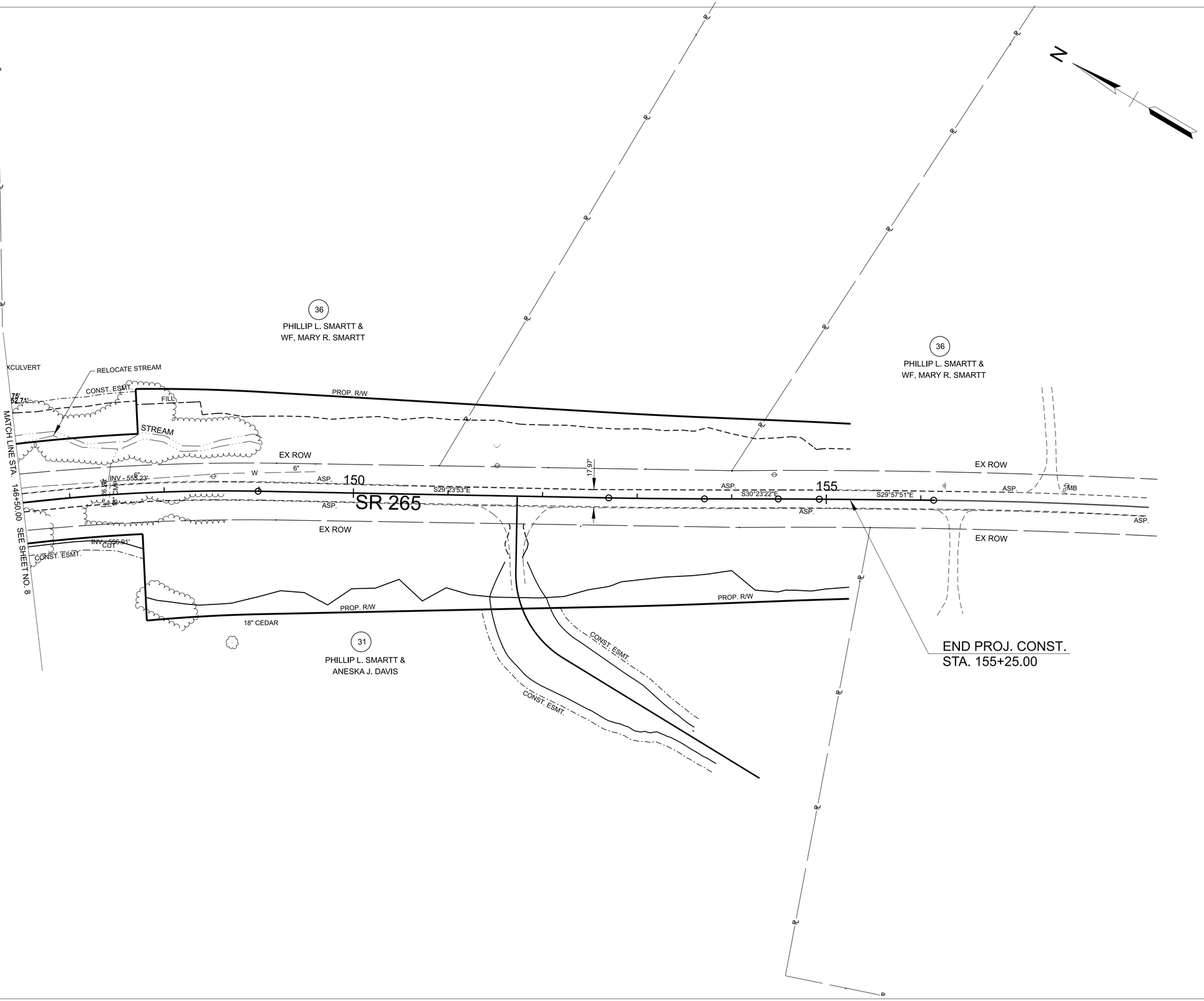
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 146+50 TO STA. 149+50
SCALE: 1" = 50'

2/4/2023 8:21:16 AM
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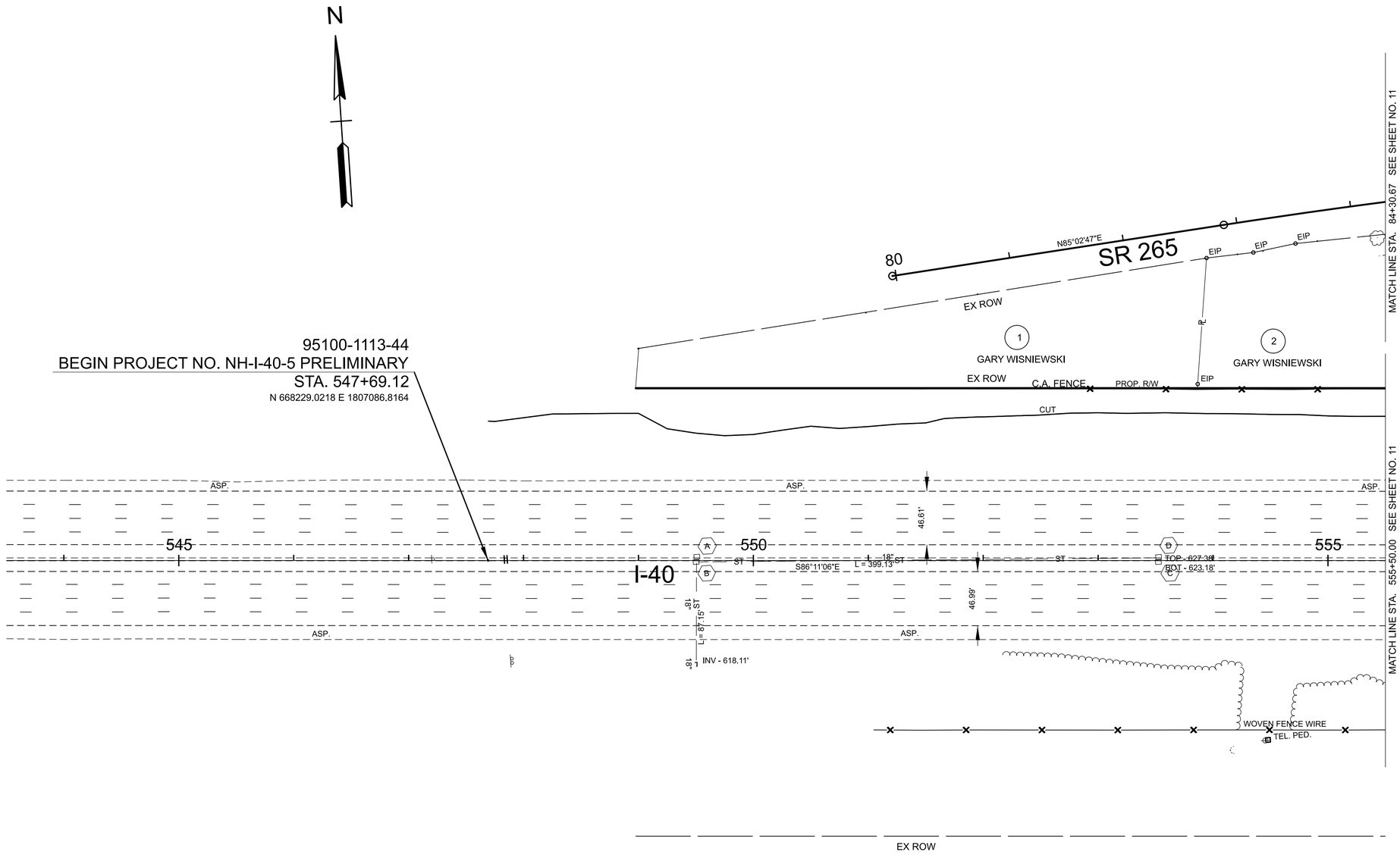
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10



A TOP - 624.23'
BOT - 620.73'

B TOP - 624.33'
INV - 620.68'
INV - 620.48'
BOT - 620.68'

C TOP - 627.38'
BOT - 623.18'

D TOP - 627.42'
INV - 622.67'
BOT - 623.27'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 542+00 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:24:07 AM
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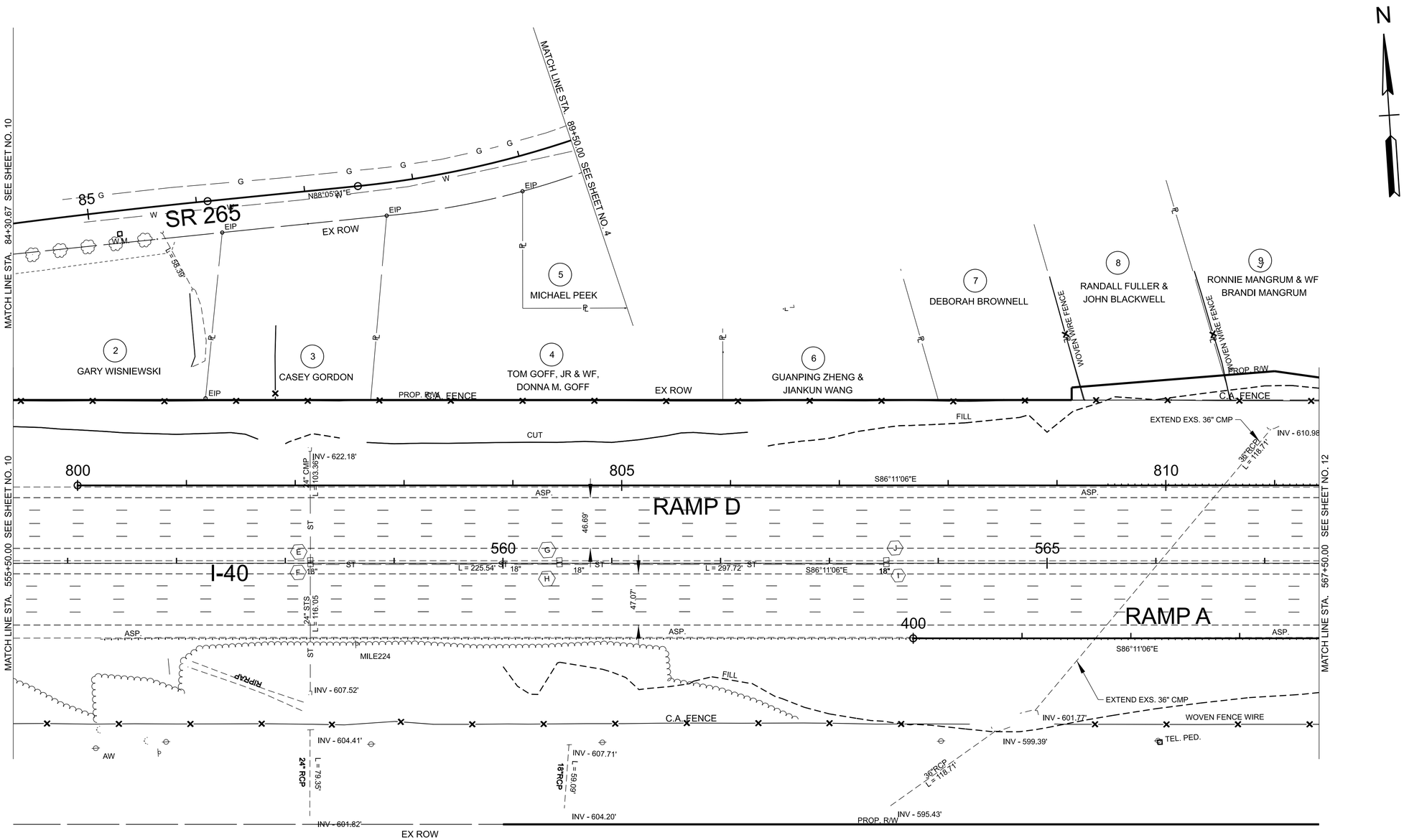
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 555+00 TO STA. 567+00
SCALE: 1" = 50'

E TOP - 631.06' INV - 615.66' BOT - 615.66'

F TOP - 631.19' INV - 615.64' INV - 615.74' INV - 619.34' BOT - 615.64'

G TOP - 632.95' INV - 627.25' INV - 627.20' BOT - 627.25'

H TOP - 632.99' BOT - 627.59'

I TOP - 635.42' BOT - 631.12'

J TOP - 635.48' INV - 630.58' BOT - 630.98'

2/4/2023 8:27:02 AM
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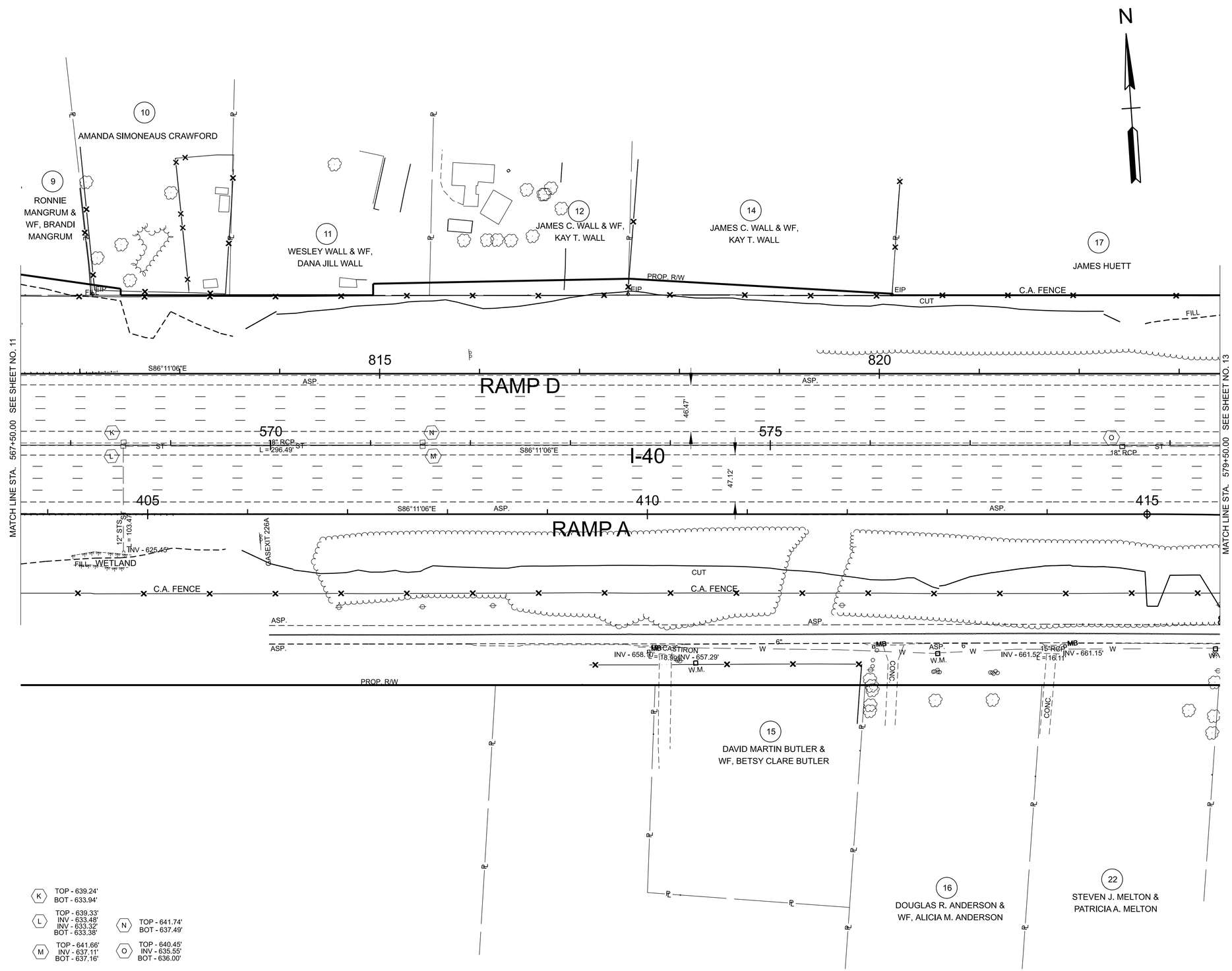
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 403+50 TO STA. 415+50
SCALE: 1" = 50'

2/4/2023 8:30:30 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PREL IM.	2023	NH-I-40-5(150)	13

N

P TOP - 632.11' BOT - 627.56'
R TOP - 622.26' INV - 617.06'
T TOP - 611.18' INV - 605.33' BOT - 605.63'
Q TOP - 631.74' INV - 627.04' INV - 626.44' BOT - 626.74'
S TOP - 623.56' INV - 617.26' BOT - 617.41'
U TOP - 612.66' BOT - 606.01'

17 JAMES HUETT

17 JAMES HUETT

4"WOVEN WOVEN FENCE WIRE FILL

PROP. R/W C.A. FENCE CUT P/T/C

4"WOVEN WOVEN FENCE WIRE

WOVEN FENCE WIRE 4"WOVEN

PROP. R/W FILL

MATCH LINE STA. 833+25.00 SEE SHEET NO. 6

BOARD

180

825 830

ASP. RAMP D P/T/C G

CONC. DITCH INV - 614.57' FILL

ASP.

580 585 590

L = 397.90' S1 S86°11'06"E 18" JERSEY BARRIER WALL 18" L = 322.27' ST

ST L = 112.07' 18" 18" ST L = 322.27' ST

I-40

46.64' 46.91'

ASP. ASP.

MATCH LINE STA. 579+50.00 SEE SHEET NO. 12

MATCH LINE STA. 591+50.00 SEE SHEET NO. 6

6" G 420

CUT C.A. FENCE FILL

RAMP A

300 S86°09'02"E

6" W W.M. L = 20.05' 12"CMP L = 20.13' MB MB ASP. W

T (UG) ASP. T (UG) TEL. PED TEL. PED T (UG) T (UG) ASP.

PT/C PROP. R/W W W.V. G.V. GAS PIPE LINE 805 G W G 6" W W G 6" W W G

425 S72°50'39"E 2.36'

JOHN HAGAR RD EX ROW PROP. R/W ASP. ASP. EX ROW

23 RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY

24 RAYMOND E. DAVIS, JR & WF, PAMELA ANN DAVIS

P/T/C 35 MPH GUILL RD W 4' BARRIER E

FILL N19°54'10"E CUT PROP. R/W

ROWSTAKE 4"WOVEN

BEGIN PROJ. CONST. STA. 801+75.00

18" MAGNOLIA CONC. 2SB CLEANOUT 44" SWEETGUM ASP.

30" SWEETGUM AC 34" SWEETGUM

42" TULIP POPLAR

GUILL RD ×15

CONST. ESMT. CONST. ESMT.

25 MELVIN W. NELSON & WF, GENELLE NELSON

16" HACK

25 MELVIN W. NELSON & WF, GENELLE NELSON FILL

MATCH LINE STA. 14+00.00 SEE SHEET NO. 18

MATCH LINE STA. 808+50.00 SEE SHEET NO. 16

MATCH LINE STA. 428+00.00 SEE SHEET NO. 7

STA. 16+61.84 GUILL RD=
STA. 804+84.43 JOHN HAGAR RD
N 667769.5407 E 1810735.8757

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 579+50 TO STA. 591+50
SCALE: 1" = 50'

2/4/2023 8:33:59 AM
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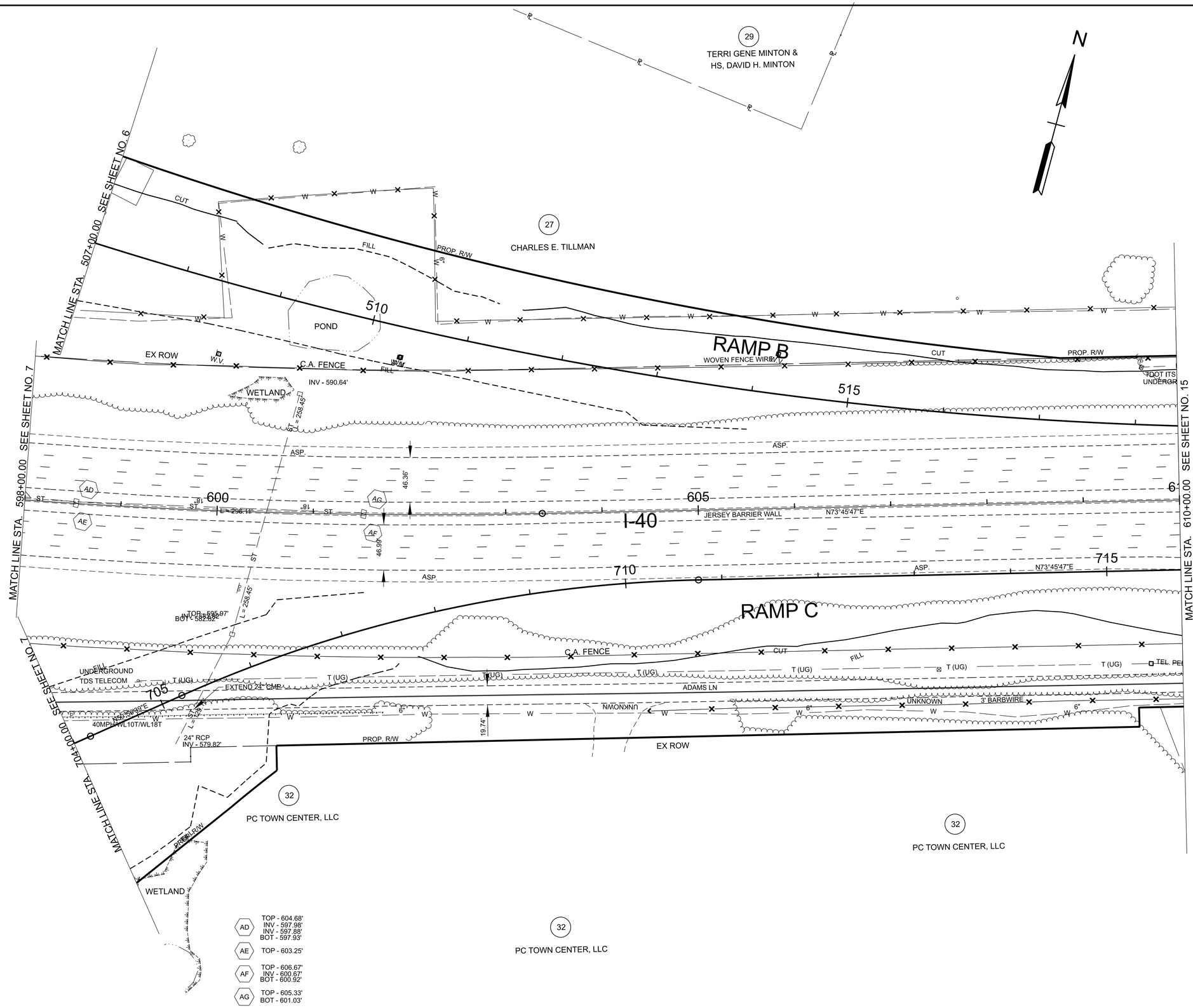
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:22 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15

27
CHARLES E. TILLMAN

30
CHARLES E. (SONNY) TILLMAN

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 615+76.94
N 668554.1848 E 1813815.3892

MATCH LINE STA. 610+00.00 SEE SHEET NO. 14

RAMP B

RAMP C

I-40

520 615 620

N73°45'47"E

L = 296.11' L = 247.49' L = 95.61' L = 348.32'

L = 122.57'

60.26' 60.21'

18.95'

ASP.

ST

AH AI AJ AK AL AM AN AO

MM225

C.A. FENCE

PROP. R/W

CUT

FILL

F (UG)

UNDERGROUNDFO

TDOTITS

TDOT ITS

BURIEDFIBEROPTIC

FIBEROPTICMARKER

POSSIBLE SINKHOLE

INV - 581.48'

INV-571.09'

INV-570.10'

STREAM

WATERLINE

W.V. BELOW

EX ROW

E/P

ESA FLAG

GREEN

CHAINLINK

T (UG)

TEL. PED.

CATV PED.

UNKNOWN

W.M.

W.V.

P/T/C

38
A.H. JOHNSON FAMILY, LLC

AH	TOP - 606.25' INV - 601.45' BOT - 601.45'	AL	TOP - 601.61' INV - 595.81' INV - 595.76' BOT - 595.96'
AI	TOP - 606.18' BOT - 601.38'	AM	TOP - 601.69' INV - 595.54' BOT - 601.61'
AJ	TOP - 603.12' BOT - 598.12'	AN	TOP - 602.14' INV - 597.24' INV - 597.14' BOT - 597.39'
AK	TOP - 602.99' INV - 598.09' INV - 597.84' BOT - 597.99'	AO	TOP - 601.97' BOT - 597.17'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 610+00 TO STA. 622+00
SCALE: 1" = 50'

2/4/2023 8:43:38 AM
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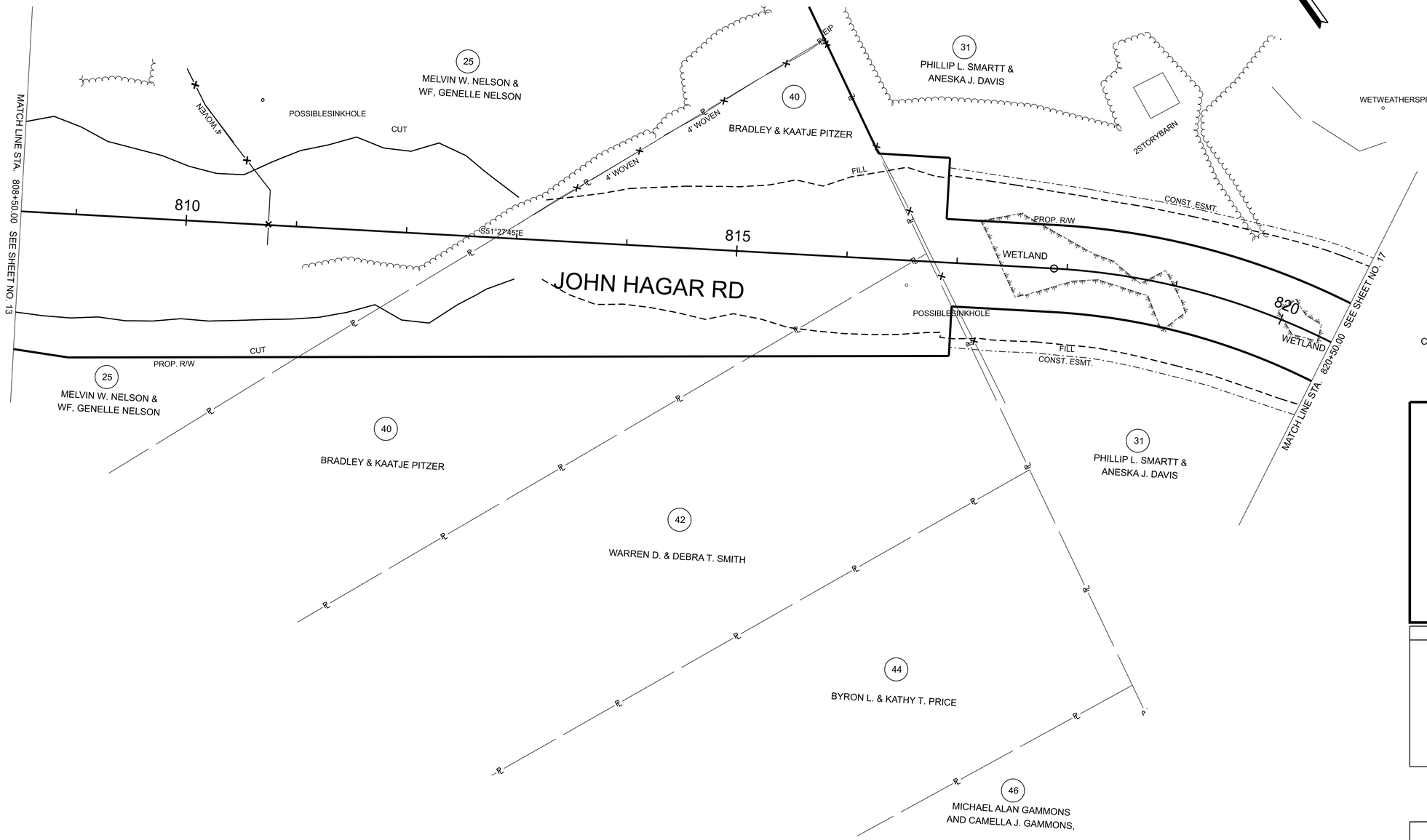
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 808+50 TO STA. 820+50
SCALE 1" = 50'

2/4/2023 8:47:10 AM
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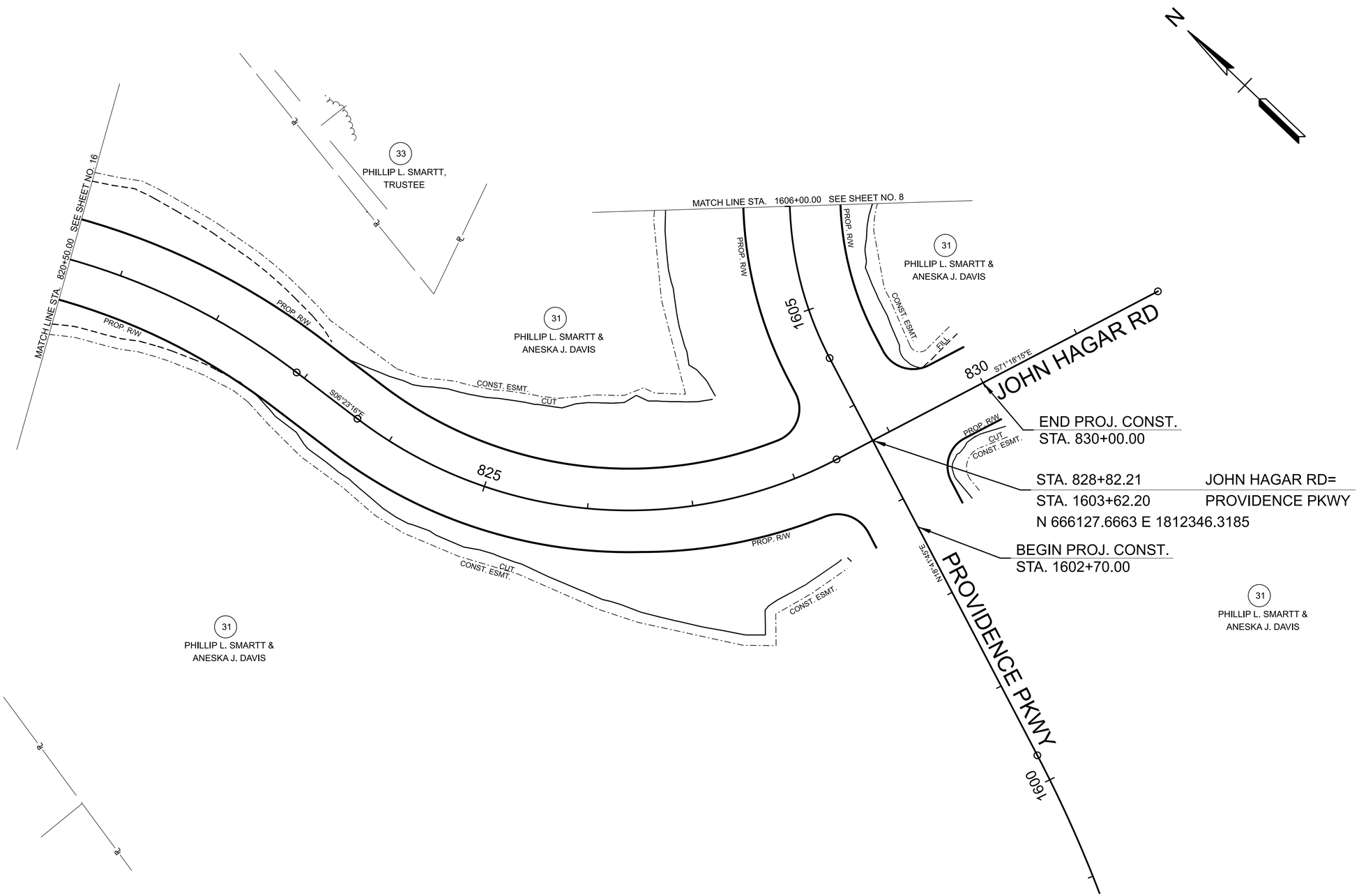
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:07 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18

N

45
BEAU D. & KENDRA FLEENOR

43
PETER J. & PATRICIA L. HICKS

41
JOSEPH & JENNY PEWITT

39
ALDO A. JACOBOGODOY
& ALDO MELISSA JACOBO

23
RONALD
CHRISTOPHER
TANBER
& KRISTIN TROMBLEY

24
RAYMOND E. DAVIS,
JR & WF,
PAMELA ANN DAVIS

END PROJ. CONST.
STA. 11+00.00

CONST. ESMT.

EX ROW

EIP

10

N04°15'53"E

GUILL RD

6" W

EX ROW

CONST. ESMT.

MATCH LINE STA. 14+00.00 SEE SHEET NO. 13

25
MELVIN W. NELSON &
WF, GENELLE NELSON

46
MICHAEL ALAN GAMMONS
AND CAMELLA J. GAMMONS,

44
BYRON L. & KATHY T. PRICE

42
WARREN D. & DEBRA T. SMITH

40
BRADLEY & KAATJE PITZER

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:53:30 AM
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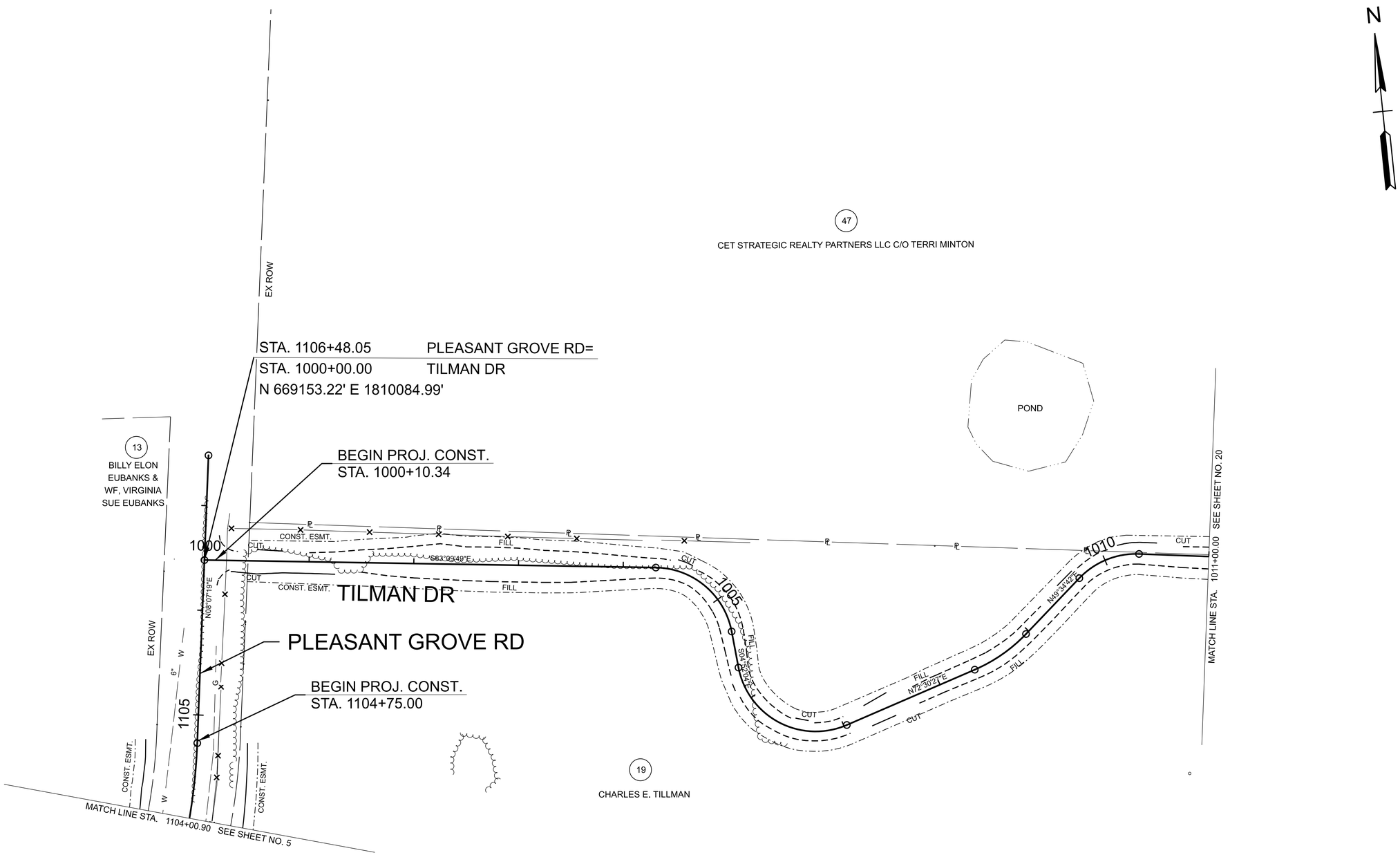
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	19



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

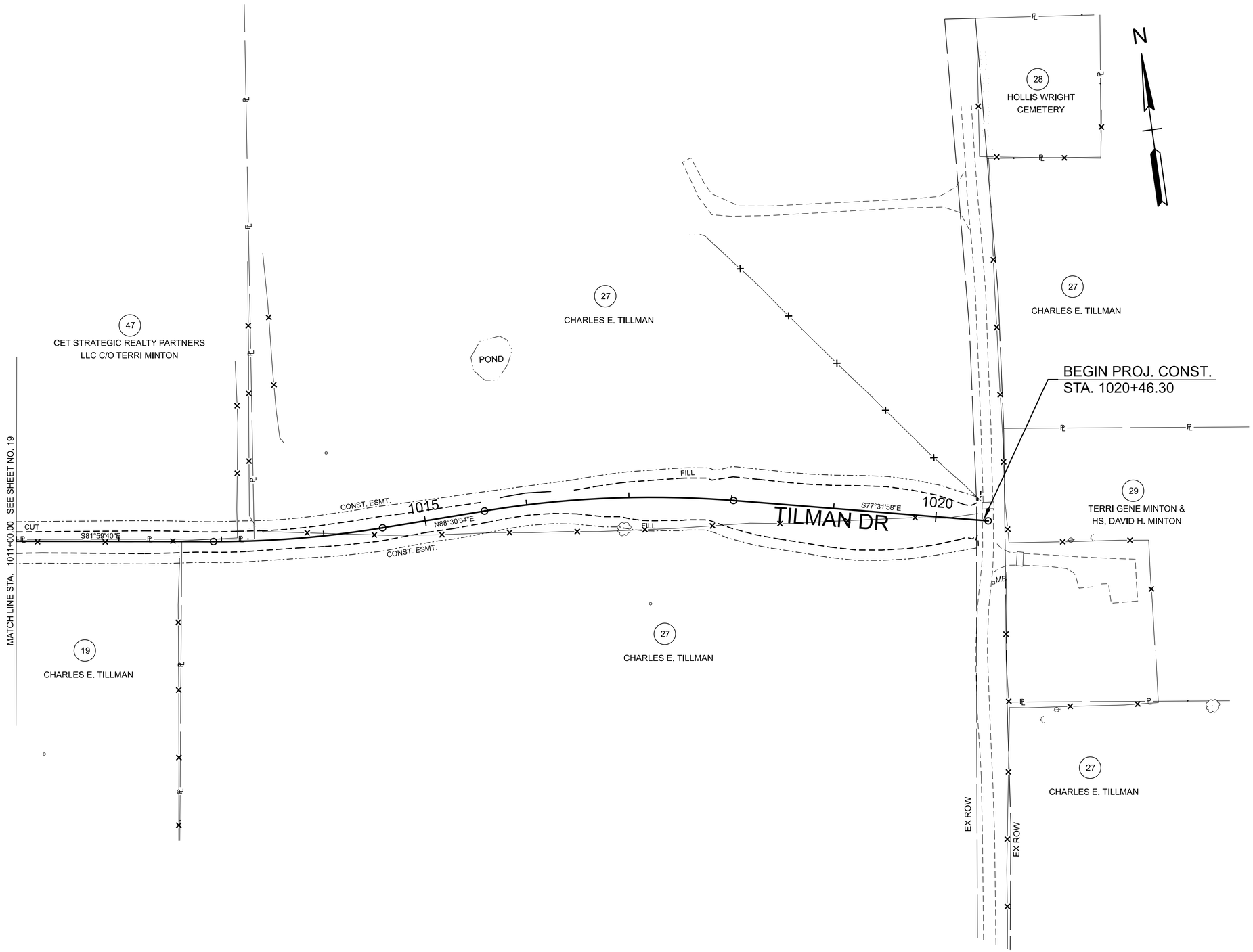
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
TILMAN DR

STA. 1104+50 TO STA. 1111+00
SCALE: 1" = 50'

2/4/2023 8:56:37 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
TILMAN DR

STA. 1111+00 TO STA. 1020+50
SCALE: 1" = 50'

2/4/2023 8:59:58 AM
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Ecology

Environmental Studies

Ecology

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Ecology

Study Results

Based upon review of the Preliminary Plans dated 02/04/2023, an updated Environmental Boundaries Report dated 8/17/23 was required to reflect the new Right-of-Way (ROW). However, the existing USFWS clearance from the 12/13/22 ESR response remains valid. Obligations under Section 7 of the Endangered Species Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat is designated that might be affected by the proposed action. Clearance from TWRA and TDEC DNA was also granted.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Environmental Boundaries Report (EBR)

Location: Email Attachment

Certification

Responder: Madalyn Brown

Title: TESS, R3

Signature: Madalyn Brown

Digitally signed by Madalyn Brown
Date: 2023.08.18 08:18:51 -05'00'

Environmental Studies

Ecology

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Planning Report - Intersection Access Request

Date of Plans: 11/15/2017

Location: TNCloud

Certification

Requestor: Nicole Falvey

Title: TESS Advanced - NEPA Section

Signature: Nicole Falvey

Digitally signed by Nicole Falvey
Date: 2020.05.06 14:27:18 -05'00'

Environmental Study

Technical Section

Section: Ecology

Study Results

Based upon review of the Planning Report dated 11/15/2017, coordination with USFWS was required. Coordination with USFWS has been finalized and Section 7 clearance has been granted. Obligations under Section 7 of the Endangered Species Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat is designated that might be affected by the proposed action.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Environmental Boundaries Report (EBR), Agency Coordination

Location: FileNet, Email Attachment

Certification

Responder: Sydney Norman

Title: TESS Adv, R3 Environmental Tech Group

Signature: Sydney Norman

Digitally signed by Sydney Norman
Date: 2022.12.13 08:41:10 -06'00'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
REGION 3 PROJECT DEVELOPMENT
ENVIRONMENTAL TECH GROUP
6601 CENTENNIAL BOULEVARD
NASHVILLE, TENNESSEE 37243-0360
(615) 350-4250

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

MEMORANDUM

To: Aso Hawrami
Region 3 Project Development

From: Madalyn Brown
Region 3 Environmental Tech Group

Madalyn Brown
Digitally signed by Madalyn Brown
Date: 2023.08.17 07:47:56 -05'00'

Date: August 17, 2023

Subject: ENVIRONMENTAL BOUNDARIES FOR:
Wilson County, I-40, Interchange at SR-265 (Central Pike)
PIN: 124884.00

The Environmental Tech Group recently evaluated changes to the subject project based on Preliminary plans dated February 4, 2023. An updated ecological evaluation has been conducted with the following results:

STREAMS: There are six (6) streams and three (3) ephemeral streams (WWC/EPH) within the project area.

WETLANDS: There are thirteen (13) wetlands within the project area.

OTHER FEATURES: There are three (3) seeps and four (4) potential sinkholes within the project area.

SPECIES:

- USFWS: Coordination with USFWS was completed and a bat survey was required. The bat survey was completed in August 2022. USFWS concurred with TDOT's conclusion to **Not Likely to Adversely Affect** for the Indiana bat (*Myotis sodalis*) and the northern long-eared bat (*Myotis septentrionalis*).

- TWRA: Coordination with TWRA was completed with no species concerns.

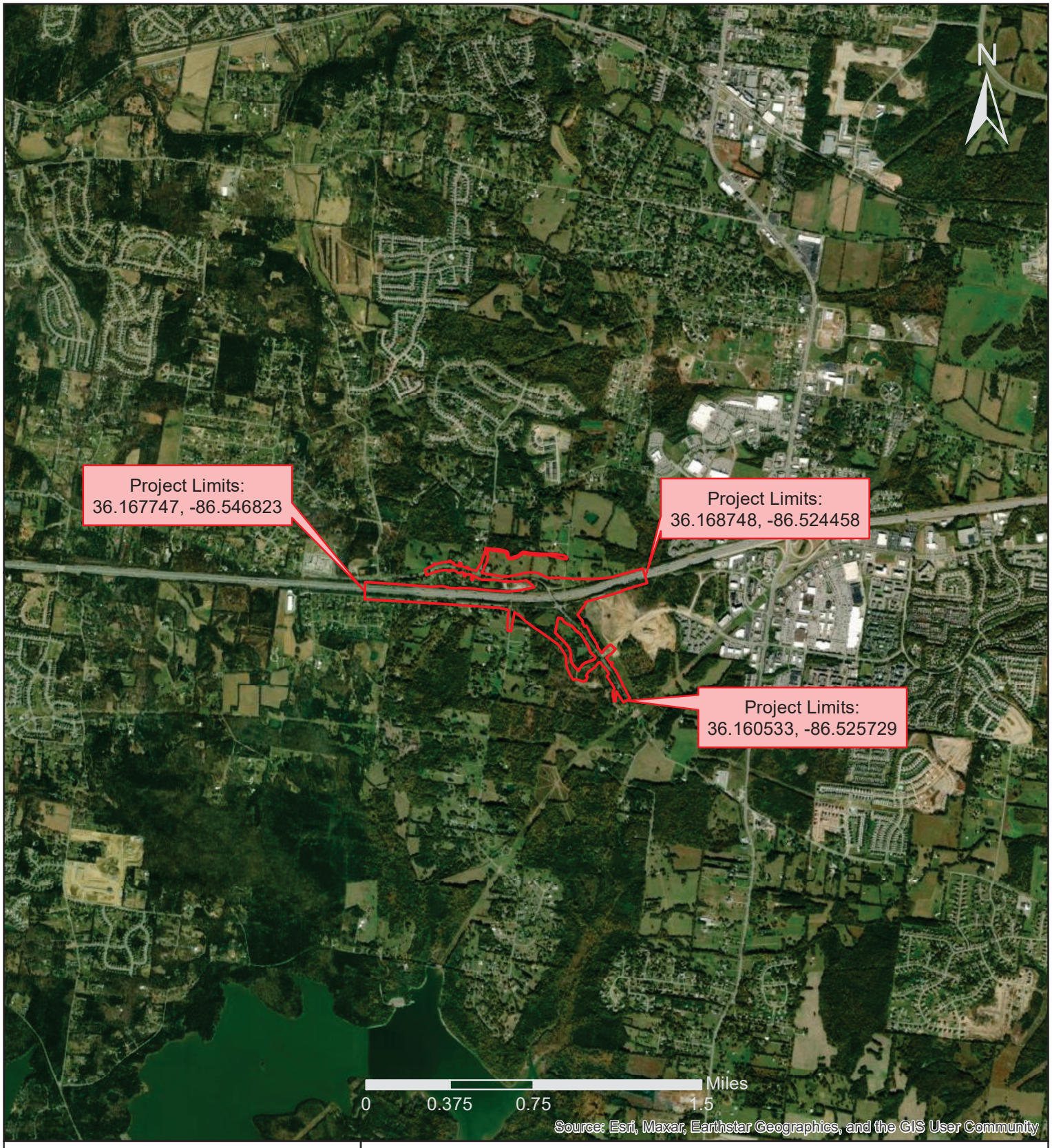
- TDEC DNA: Coordination with TDEC DNA was completed with no species concerns.

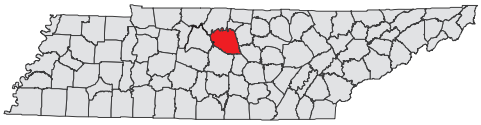
SPECIAL NOTES: There are no special notes for the subject project.

COMMITMENTS: There are no commitments for the subject project.

If the scope of work for this project is revised, please contact the Regional biologist for additional review and agency coordination as soon as possible. Your assistance is appreciated. If you have any questions or comments, please contact me at (615) 350-4209 or madalyn.brown@tn.gov.

xc: Bradley Martin
Anthony Myers
Wesley Peck
Melissa Portell
R3.EnvTechOffice
TDOT.Env.Ecology
TDOT.Env.Permits
TDOT.Env.Mitigation
TDOT Geotech
TDOT.Env NEPA



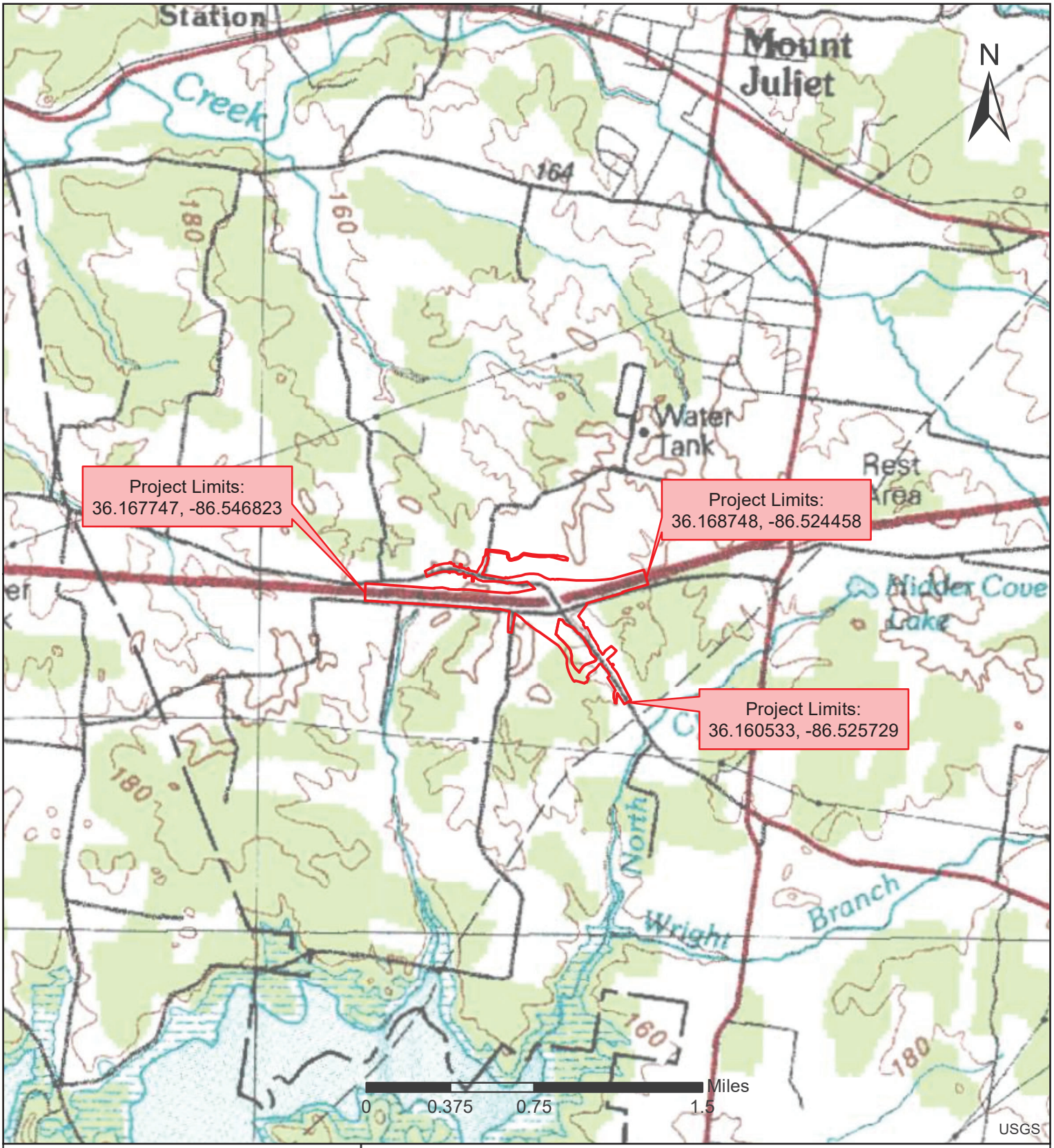


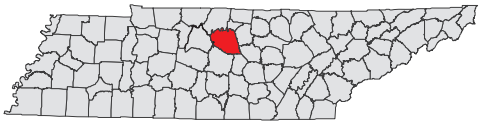
Wilson County, I-40, Interchange at SR-265 (Central Pike)

8/16/23

PIN 124884.00

TN TDOT Department of Transportation



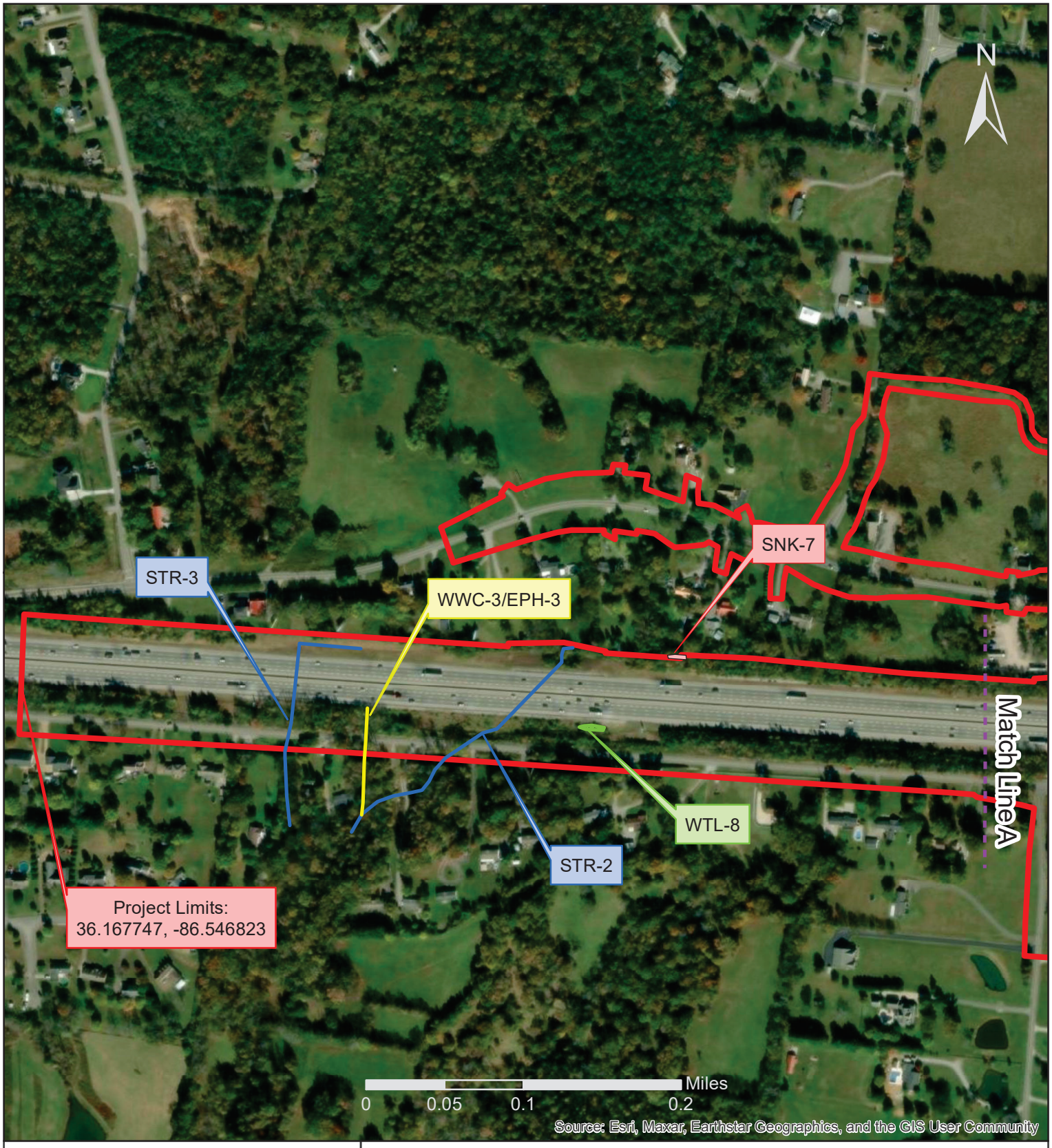


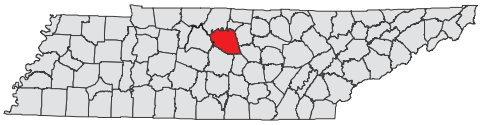
Wilson County, I-40, Interchange at SR-265 (Central Pike)

8/16/23

PIN 124884.00

TN TDOT Department of Transportation



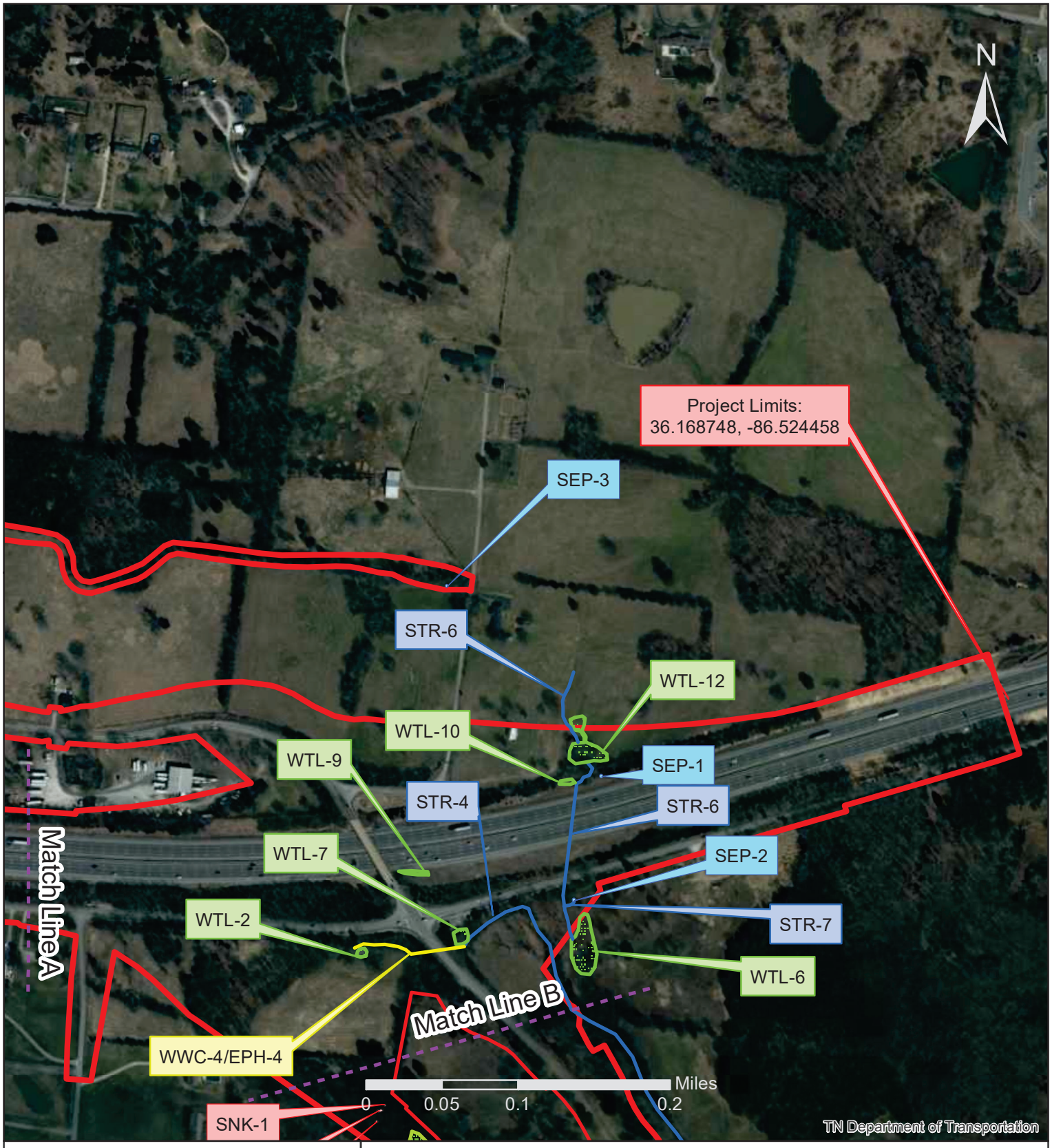


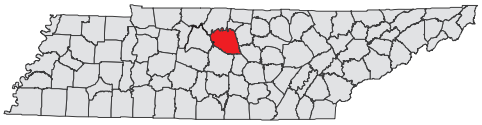
Wilson County, I-40, Interchange at SR-265 (Central Pike)

7/10/23

PIN 124884.00

TN TDOT Department of Transportation



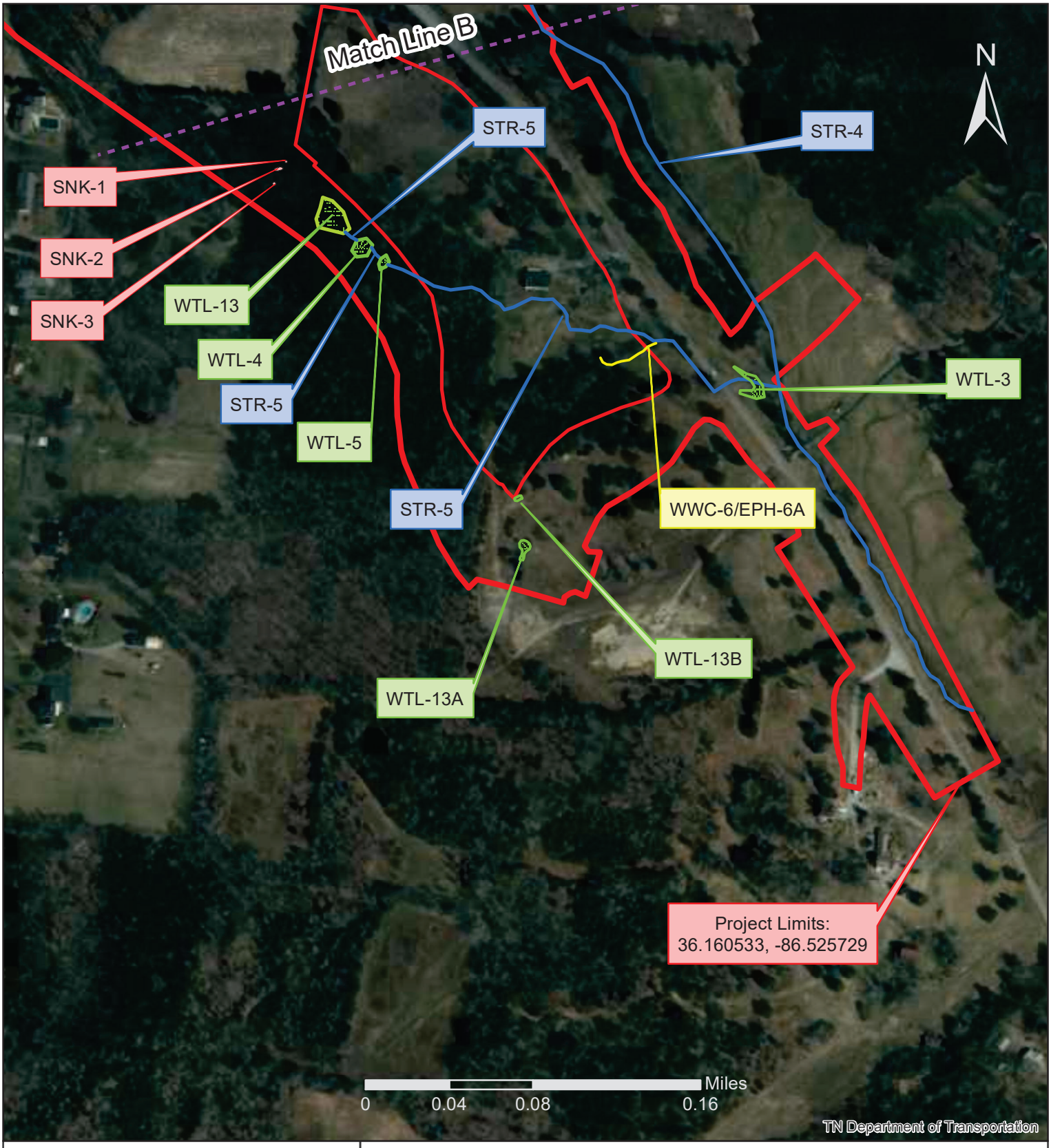


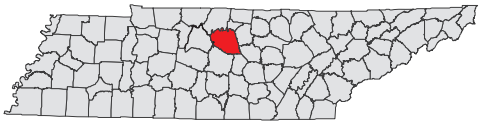
Wilson County, I-40, Interchange at SR-265 (Central Pike)

7/10/23

PIN 124884.00

TN TDOT Department of Transportation



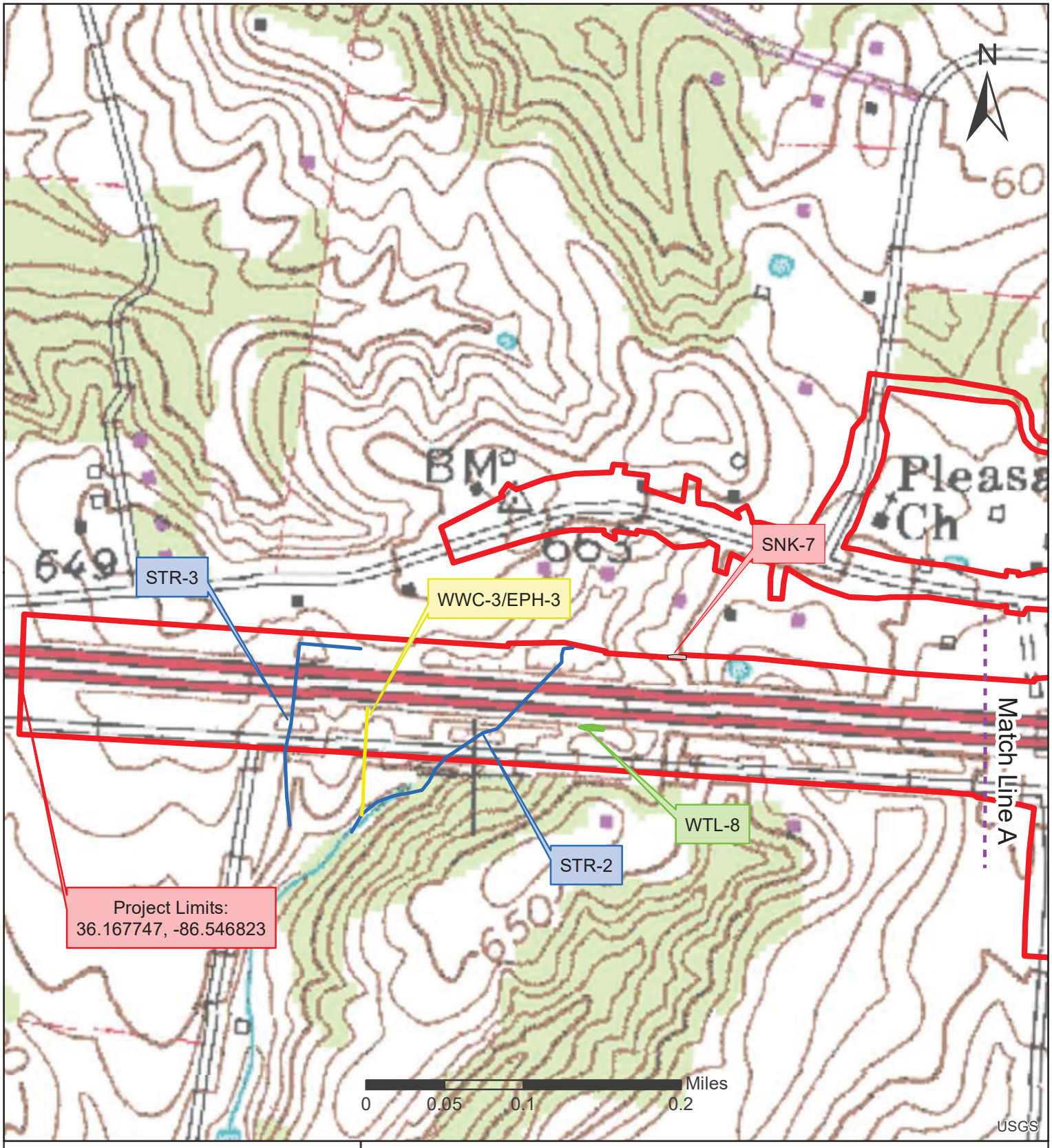


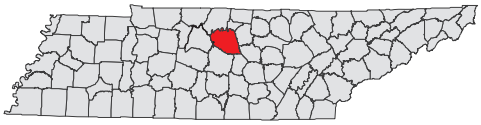
Wilson County, I-40, Interchange at SR-265 (Central Pike)

7/10/23

PIN 124884.00

TN TDOT Department of Transportation





Wilson County, I-40, Interchange at SR-265 (Central Pike)

7/10/23

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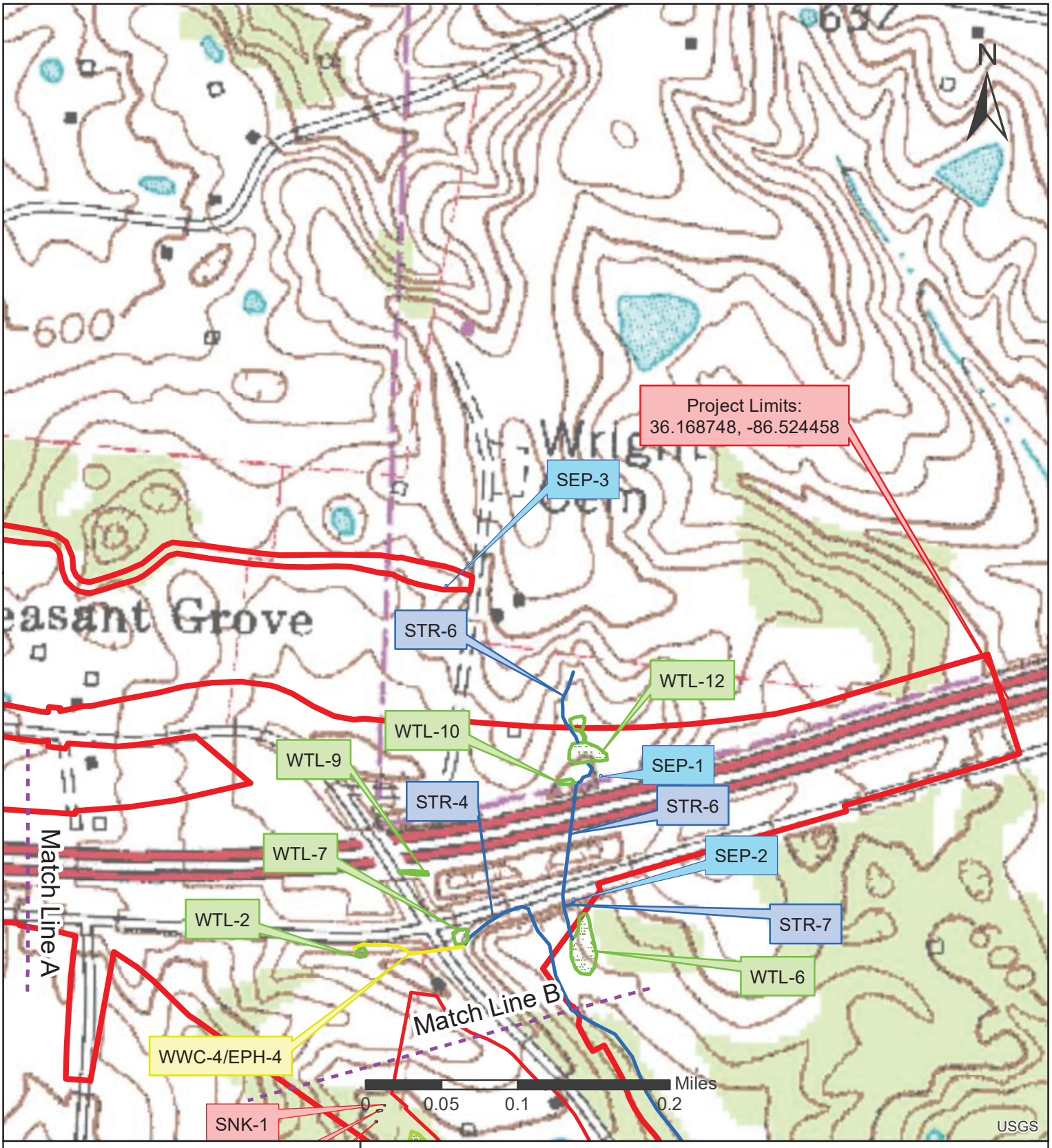

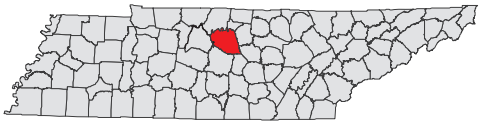

Wilson County, I-40, Interchange at SR-265 (Central Pike)

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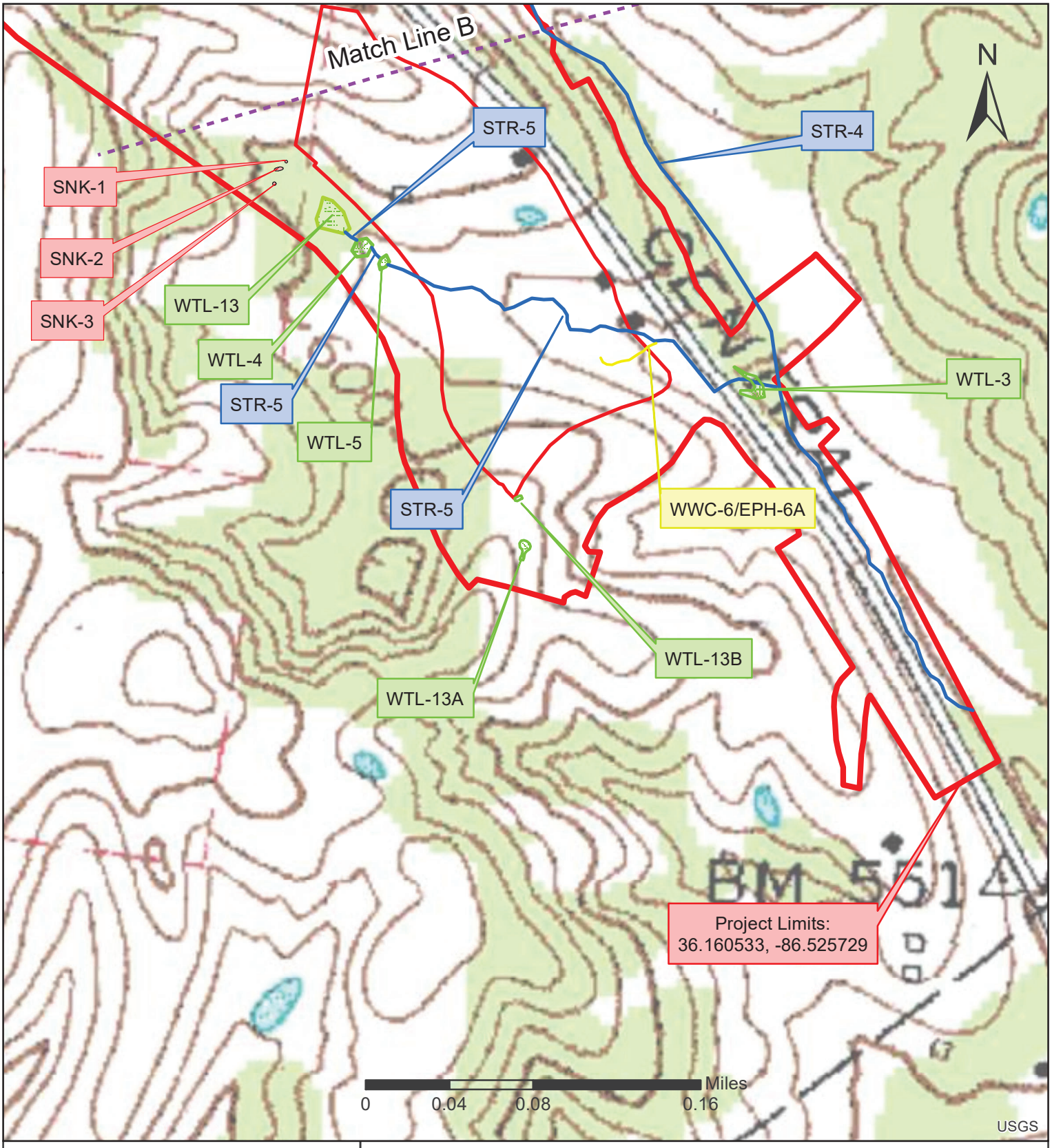

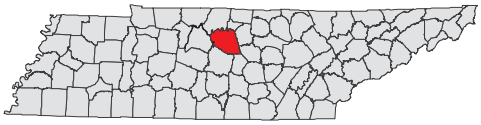

Wilson County, I-40, Interchange at SR-265 (Central Pike)

7/10/23

PIN 124884.00

TN TDOT Department of Transportation

Project Name: Wilson Co. I-40, Interchange at SR-265 (Central Pike) **PIN:** 124884.00

Water Resource Table

Based on: Plans

Date: 2/4/2023

Water Resources (Non-Wetland)					
Label	**Type**	**Latitude**	**Longitude**	**Receiving Waters**	**Quality**
STR-3	Intermittent Stream	36.166865	-86.543734	Misc. tribs to percy priest	Unassessed
WWC-3/EPH-3	Wet Weather Conveyance/Ephemeral	36.166829	-86.542904	Misc. tribs to percy priest	Unassessed
STR-2	Perennial Stream	36.166865	-86.542013	Misc. tribs to percy priest	Unassessed
SEP-3	Seep	36.169755	-86.530917	N/A	Unassessed
STR-6	Perennial Stream	36.166766	-86.529565	North Creek	Unassessed
SEP-1	Seep	36.167935	-86.529284	N/A	Unassessed
SEP-2	Seep	36.166757	-86.529327	North Creek	Unassessed
STR-7	Intermittent Stream	36.166659	-86.529438	North Creek	Unassessed
STR-4	Perennial Stream	36.162941	-86.52726	North Creek	Unassessed
WWC-4/EPH-4	Wet Weather Conveyance/Ephemeral	36.166303	-86.531381	North Creek	Unassessed
STR-5	Intermittent Stream	36.163951	-86.530606	North Creek	Unassessed
WWC-6/EPH-6A	Wet Weather Conveyance/Ephemeral	36.163413	-86.528789	North Creek	Unassessed

Water Resources (Wetland)					
Label	**Type**	**Latitude**	**Longitude**	**Receiving Waters**	**Quality**
WTL-8	Forested	36.167088	-86.540248	Misc. tribs to percy priest	Low Resource Value
WTL-9	Emergent	36.167023	-86.531334	N/A	Low Resource Value
WTL-10	Forested	36.167919	-86.52941	North Creek	Moderate Resource Value
WTL-12	Emergent	36.168228	-86.529294	North Creek	Low Resource Value
WTL-6	Shrub	36.166371	-86.529437	North Creek	Moderate Resource Value
WTL-7	Emergent	36.166375	-86.530709	North Creek	Low Resource Value
WTL-2	Emergent	36.166239	-86.531919	North Creek	Low Resource Value
WTL-13	Emergent	36.164451	-86.531415	North Creek	High Resource Value
WTL-4	Emergent	36.164300	-86.531029	North Creek	Moderate Resource Value
WTL-5	Emergent	36.163999	-86.530778	North Creek	Moderate Resource Value
WTL-3	Emergent	36.163233	-86.527602	North Creek	Low Resource Value
WTL-13B	Emergent	36.162476	-86.529634	North Creek	Low Resource Value
WTL-13A	Forested	36.162171	-86.529607	North Creek	Moderate Resource Value

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN, MLB	**Affiliation:**	TDOT	**Date:**	8/5/2021

1-Station: from plans	I-40 STA 558+18CL to 560+40L								
2-Map label and name	STR-3								
3-Latitude/Longitude	36.166865, -86.543734								
4-Feature description:									
-channel identification	perennial stream ☐		intermittent stream ☑		ephemeral stream ☐		wwc ☐		
-HD score (if applicable)									
-OHWM indicators	bed & banks ☑		deposition ☑		presence of litter / debris ☐		scour ☑		veg absent, bent, matted ☐
	change in plant community ☑		destruction of terrestrial veg ☐		multiple observed flow events ☐		sediment sorting ☐		water staining ☐
	change in soil character ☑		leaf litter disturbed or absent ☐		natural line impressed on bank ☐		shelving ☐		wracking ☐
-channel bottom width	2.5ft		-top of bank width		6ft				
-width at ordinary high water mark	3.5ft width, 6in height from channel bottom								
-bank height	LDB - 1ft				RDB - 1ft				
-riffle/pool complex or other specialized habitat present?	No								
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Cedar, Hackberry, Slippery Elm, Kudzu, UID Red Oak, Chinese Privet								
	RDB: Cedar, Hackberry, Slippery Elm, Kudzu, UID Red Oak, Chinese Privet								
-date of PJD request									
5-photo numbers	1,2								
6-HUC -8 Code & Name	05130203				Stones River				
7-Assessed	yes	☐	no	☑					
8-ETW	yes	☐	no	☑					
9-303 (d) List	yes	☐	siltation	☐	habitat:	☐	other:	☐	
	no	☑							
10-Notes	-Groundwater iron film observed north of I-40 and south of John Hagar Rd.								
Substrate	Mix of fine sediment and gravel								

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN, MLB	**Affiliation:**	TDOT	**Date:**	8/5/2021

1-Station: from plans	I-40 STA 560+70R								
2-Map label and name	WWC-3/EPH-3								
3-Latitude/Longitude	36.166829, -86.542904								
4-Feature description:									
-channel identification	perennial stream ☐		intermittent stream ☐		ephemeral stream ☑		wwc ☑		
-HD score (if applicable)	13.5								
-OHWM indicators	bed & banks ☑		deposition ☐		presence of litter / debris ☑		scour ☐		veg absent, bent, matted ☑
	change in plant community ☐		destruction of terrestrial veg ☑		multiple observed flow events ☐		sediment sorting ☐		water staining ☐
	change in soil character ☑		leaf litter disturbed or absent ☑		natural line impressed on bank ☐		shelving ☐		wracking ☐
-channel bottom width	2.5ft		-top of bank width		15ft				
-width at ordinary high water mark	3ft width, 1.5ft height from channel bottom								
-bank height	LDB - 3.5ft		RDB - 3.5ft						
-riffle/pool complex or other specialized habitat present?	No								
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Sugar Maple, Red Oak, Dogwood, Black Walnut, Honeysuckle, Boxelder								
	RDB: Sugar Maple, Hackberry, Honeysuckle, Cedar								
-date of PJD request									
5-photo numbers	3,4								
6-HUC -8 Code & Name	05130203		Stones River						
7-Assessed	yes	☐	no	☑					
8-ETW	yes	☐	no	☑					
9-303 (d) List	yes	☐	siltation	☐	habitat:	☐	other:	☐	
	no	☑							
10-Notes									
Substrate	Fine sediment, very small amount of gravel								

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UT to Percy Priest Reservoir	Date/Time: 8/5/2021
Assessors/Affiliation: SLN, MLB TDOT	Project ID : 124884.00
Site Name/Description: WWC-3/EPH-3	
Site Location: I-40 STA 560+70R	
HUC (12 digit): 051302030306, Suggs Creek	Lat/Long:
Previous Rainfall (7-days) : 1.5 inches	36.166829, -86.542904
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data : NOAA	
Watershed Size : <0.01 square miles	County: Wilson Co.
Soil Type(s) / Geology : Hampshire silt loam	Source: NRCS
Surrounding Land Use : Low density residential, roadway	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 13.5

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6)		**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	1.5	0	1	2	3
2. Sinuous channel	0.5	0	1	2	3
3. In-channel structure: riffle-pool sequences	1	0	1	2	3
4. Sorting of soil textures or other substrate	0	0	1	2	3
5. Active/relic floodplain	0	0	0.5	1	1.5
6. Depositional bars or benches	0	0	1	2	3
7. Braided channel	0	0	1	2	3
8. Recent alluvial deposits	1	0	0.5	1	1.5
9. Natural levees	0	0	1	2	3
10. Headcuts	0	0	1	2	3
11. Grade controls	1	0	0.5	1	1.5
12. Natural valley or drainageway	1	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	0	No = 0		Yes = 3	

B. Hydrology (Subtotal = 3.5)		**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0.5	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	1.5	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)		**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	1	3	2	1	0
21. Rooted plants in the thalweg [1]	3	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0	1	2	3
23. Bivalves/mussels	0	0	1	2	3
24. Amphibians	0	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	0	1	2	3
26. Filamentous algae; periphyton	0	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson County I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN, MLB	**Affiliation:**	TDOT	**Date:**	8/5/21

1-Station: from plans	I-40 STA 563+32R to 567+43L										
2-Map label and name	STR-2										
3-Latitude/Longitude	36.166865, -86.542013										
4-Feature description:											
-channel identification	perennial stream	✓	intermittent stream		ephemeral stream		wwc				
-HD score (if applicable)											
-OHWM indicators	bed & banks	✓	deposition		presence of litter / debris	✓	scour	✓	veg absent, bent, matted	✓	
	change in plant community	✓	destruction of terrestrial veg		multiple observed flow events		sediment sorting		water staining		
	change in soil character		leaf litter disturbed or absent		natural line impressed on bank		shelving		wracking		
-channel bottom width	4ft		-top of bank width		7.5ft						
-width at ordinary high water mark	5ft width, 8in height from channel bottom										
-bank height	LDB - 2.5ft		RDB - 2ft								
-riffle/pool complex or other specialized habitat present?	No										
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Cedar, Seedbox, Bush Honeysuckle, Elm, White Ash, Sugar Maple										
	RDB: Cedar, Bush Honeysuckle, Boxelder, Black Walnut										
-date of PJD request											
5-photo numbers	5,6										
6-HUC -8 Code & Name	05130203		Stones River								
7-Assessed	yes		no	✓							
8-ETW	yes		no	✓							
9-303 (d) List	yes		siltation		habitat:		other:				
	no	✓									

10-Notes

Groundwater film, Psephenidae, Uenoidae, Isopods, Physidae, and UID tadpoles observed. Multiple observations of groundwater seeping out of banks.

TN Waterbody ID: TN05130203003T_0999, Misc tribs to Percy Priest
Labeled as Vivrett Creek in Google Maps.

Substrate

Gravel cobble mix, small amount fine sediment

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-8

Investigator(s): SLN, MLB Section, Township, Range: --

Landform (hillslope, terrace, etc.): Artificial ditch Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR or MLRA): LRR N Lat: 36.167088 Long: -86.540248 Datum: WGS-84

Soil Map Unit Name: Hampshire silt loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:
Seasonal conditions abnormally wet.
Station: I-40 STA 567+76R to 568+62R
Photo: 7,8

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
One small pool at outlet scour hole. Lots of debris (trash) and leaf piles.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-8

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica, Green Ash	35	Yes	FACW
2. Platanus occidentalis, Sycamore	15	Yes	FACW
3. Liquidambar styraciflua, Sweetgum	10	No	FAC
4. Salix nigra, Black Willow	5	No	OBL
5.			
6.			
	65	= Total Cover	

50% of total cover: 32.5 20% of total cover: 13.0

Sapling Stratum (Plot size: 5m)			
1. Fraxinus pennsylvanica, Green Ash	5	Yes	FACW
2. Platanus occidentalis, Sycamore	5	Yes	FACW
3.			
4.			
5.			
6.			
	10	= Total Cover	

50% of total cover: 5 20% of total cover: 2.0

Shrub Stratum (Plot size: 5m)			
1. Diervilla lonicera, Bush Honeysuckle	3	Yes	
2. Fraxinus pennsylvanica, Green Ash	5	Yes	FACW
3.			
4.			
5.			
6.			
	8	= Total Cover	

50% of total cover: 4 20% of total cover: 1.6

Herb Stratum (Plot size: 1.5m)			
1. Symphyotrichum pilosum, White Hairy Oldfield Aster	15	Yes	FAC
2. Lonicera japonica, Japanese Honeysuckle	5	Yes	FACU
3. Ulmus americana, American Elm	3	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	23	= Total Cover	

50% of total cover: 11.5 20% of total cover: 4.6

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle, but dominance test still passes if species is not hydrophytic.

SOIL Sampling Point: WTL-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
3-10	10YR 4/2	92	10YR 3/6	8	C	M	SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-8 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Convex Slope (%): 3.5

Subregion (LRR or MLRA): LRR N Lat: 36.167008 Long: -86.540241 Datum: WGS-84

Soil Map Unit Name: Hampshire silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

Hydrophytic vegetation unable to be determined, but study area still not considered wetland due to lack of wetland hydrology and hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-8 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. Sorghum halepense, Johnson Grass	40	Yes	FACU
2. Cirsium sp., UID Thistle	7	No	
3. Rumex crispus, Curly dock	25	Yes	FAC
4. Solidago sp., UID Goldenrod	20	Yes	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	92 = Total Cover		
50% of total cover: 46	20% of total cover: 18.4		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Goldenrod unable to be identified to species. Dominance test unable to be determined.

SOIL

Sampling Point: WTL-8 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Bedrock

Depth (inches): 4

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Shallow bedrock did not allow for deeper soil sample.

WTL-8

SITUATION **TRAM REQUIRED**

- Wetland is a "roadside ditch" and not part of a larger wetland – constructed primarily to convey runoff……...NO, COMPLETE EXCEPTIONAL STATUS WETLAND SECTION ONLY

- Fringe wetlands associated with ponds, impoundments, reservoirs, large lakes…….YES- USE NON-HGM TRAM

- Created Depression wetlands, semi-permanent to permanently inundated (<6.6-feet deep)……...…….YES-USE NON-HGM TRAM

- Wetland impacts greater than 0.10 acre….....YES

NOTE: The Exceptional Status Wetland section must be completed for all proposed wetland alterations, including wetlands situations where HGM assessment is not required or the Non-HGM TRAM is used, including proposed wetlands impacts less than 0.10 acre.

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-8	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

Ecology Field Data Sheet: **Other Resource Features**
(Caves/Rock Houses; Potential Sinkholes; Specialized Habitats; Other)

Project: Wilson Co. I-40 Interchange at SR-265 (Central Pk) **PIN #:** 124884.00

Date of survey: 11/17/21 **Biologist(s):** SLN, MLB **Affiliation:** TDOT

1-Station: from plans	I-40 STA 570+61L to 571+16L	Tilman Drive STA 1019+80R
2-Map label	SNK-7	SEP-3
3-Lat/Long	36.167771, -86.538934	36.169755, -86.530917
4-Potential impact size	No impact expected	No impact expected
5-Feature name	Potential Sinkhole	Seep
6-Feature description:		
what is the feature	Potential sinkhole	Groundwater seep
portion affected	None	None
connection to other features	None	None
photo number(s)	9	10
other information	approximate size: 17ft x 40ft	approximate size: 2.5ft x 10ft
7- HUC code & name if applicable (12-digit)	051302030306, Suggs Creek	051302030306, Suggs Creek
8-Notes		

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-9

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Flat right-of-way Local relief (concave, convex, none): None Slope (%): 1

Subregion (LRR or MLRA): LRR N Lat: 36.167023 Long: -86.531334 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet.
Station: I-40 STA 594+00R to 595+15R
Photo: 11,12

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 5

Water Table Present? Yes ✓ No _____ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Rock restrictive layer at about 4-6 inch depth. Most likely causing retention of groundwater seepage.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-9

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. Cyperus strigosus, False Nutsedge	10	Yes	FACW
2. Carex frankii, Frank's Sedge	25	Yes	OBL
3. Cynodon dactylon, Bermuda Grass	10	Yes	FACU
4. UID Herb	5	No	
5. Rumex crispus, Curly Dock	10	Yes	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
50% of total cover: 30	20% of total cover: 12		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	90	5YR 4/4	10	C	M	SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-9 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Slight slope Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 36.166968 Long: -86.531324 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Season conditions abnormally wet.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-9 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 1.5m)			
1. Sorghum halepense, Johnson Grass	30	Yes	FACU
2. Lespedeza cuneata	5	No	FACU
3. Cirsium sp., UID Thistle	8	No	
4. Rumex crispus, Curly Dock	5	No	FAC
5. Cynodon dactylon, Bermuda Grass	40	Yes	FACU
6. UID Aster	3	No	
7. Solidago sp., UID Goldenrod	5	No	
8.			
9.			
10.			
11.			
	96 = Total Cover		

50% of total cover: 48 20% of total cover: 19.2

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WTL-9 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100					SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Too rocky to get deeper sample.

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-9

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.23
Maintain Biogeochemical Processes	0.27
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.18
Maintain Characteristic Wildlife Community	0.18
Quantitative Score (Average of FCIsX100)	21.00
Value Added Total	
TOTAL SCORE	21.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-9	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 11/03/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-9

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☑ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 10
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 15
C = Percentage low density residential, construction, or similar 0
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 75

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.22

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☑ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☑ Bermuda
☐ _____	☐ _____	3 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.50

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ◉ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 0.37
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.61

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered
☐ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present. 20

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.
☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☑ 10% – 39% (CI = 0.25)
☑ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ◉ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.01 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.25 (HYDRO) V3 _____ (TSIZE) V5 _____ (SCOV) V7 0.61 (COMP) V9 0.01 (BUFFER)

V2 0.22 (WSHEDINT) V4 _____ (TDEN) V6 0.75 (GVC) V8 0.80 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.25} \times \underline{0.22})^{1/2}$ = 0.23

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2}$ = _____

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{0.75+0.80}{5}\right)\right)^{1/2}$ = 0.27

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.75+0.61}{2}\right)}{9}$ = 0.18

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.75+0.61}{2}\right)+\frac{0.01}{\_\_\_}}{9}$ = 0.18

Slope Wetland

V1: HYDROPERIOD	**0.25**
V2: WETLAND WATERSHED INTEGRITY	**0.22**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**0.75**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.61**
2. Q =	0.495
# of Group 1 Dominants	
# of Group 2 Dominants	3
# of Group 3 Dominants	1
SPECIES RICHNESS CONSTANT	0.75
V8: SOIL ORGANIC MATTER	**0.8**
V9:BUFFER	**0.01**
1. Connection Index	0.1
2. Buffer width value (0-1)	0.1

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.23** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2} + V8}{2} \right) \right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.21**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3} \right) \right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5} \right) \right)^{1/2}$$

FCI 2 ground = **0.27**

Function 3: Maintain Characteristic Plant Community

FCI 3 trees= **#VALUE!**

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3} \right)}{3}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2} \right)}{6}$$

FCI 3 ground = **0.18**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2} \right)}{9}$$

Function 4: Maintain Characteristic Wildlife Community:

FCI 4 trees= **#VALUE!**

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3} \right) + V9}{4}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2} \right) + V9}{6}$$

FCI 4 ground = **0.18**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2} \right) + V9}{9}$$

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-10

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Roadway ditchline Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR or MLRA): LRR N Lat: 36.167919 Long: -86.529410 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet.
Station: I-40 STA 600+00L to 600+73L
Photo:13,14

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0.5
Water Table Present?	Yes ✓	No _____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-10

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra, Black Willow	15	Yes	OBL
2. Platanus occidentalis, Sycamore	15	Yes	FACW
3. Fraxinus pennsylvanica, Green Ash	10	Yes	FACW
4.			
5.			
6.			
	40	= Total Cover	

50% of total cover: 20 20% of total cover: 8

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1. Fraxinus pennsylvanica, Green Ash	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	5	= Total Cover	

50% of total cover: 2.5 20% of total cover: 1

Herb Stratum (Plot size: 1.5m)			
1. Symphyotrichum pilosum, Hairy White Oldfield Aster	20	Yes	FAC
2. Microstegium vimineum, Japanese Stiltgrass	3	No	FAC
3. Fraxinus pennsylvanica, Green Ash	10	Yes	FACW
4. UID Grass	15	Yes	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	48	= Total Cover	

50% of total cover: 24 20% of total cover: 9.6

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4-10	10YR 4/2	85	10YR 4/6	15	C	M	SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/3/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-10 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Toe of ROW slope Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR N Lat: 36.167898 Long: -86.529455 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

Hydrophytic vegetation unable to be determined, but study area still not considered wetland due to lack of wetland hydrology and hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-10 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1. Paulownia tomentosa, Princess Tree	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Shrub Stratum (Plot size: 5m)			
1. Diervilla lonicera, Bush Honeysuckle	8	Yes	
2.			
3.			
4.			
5.			
6.			
	8 = Total Cover		
50% of total cover: 4	20% of total cover: 1.6		
Herb Stratum (Plot size: 1.5m)			
1. Symphyotrichum pilosum, Hairy White Oldfield Aster	40	Yes	FAC
2. UID Grass	5	No	
3. Fraxinus pennsylvanica, Green Ash	5	No	FACW
4. Parthenocissus quinquefolia, Virginia Creeper	3	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	53 = Total Cover		
50% of total cover: 26.5	20% of total cover: 10.6		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle. Dominance test unable to be determined.

SOIL Sampling Point: WTL-10 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-10

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.41
Maintain Biogeochemical Processes	0.60
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.62
Maintain Characteristic Wildlife Community	0.55
Quantitative Score (Average of FCIsX100)	54.00
Value Added Total	
TOTAL SCORE	54.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-10	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 11/03/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN, MLB Wetland Name/Location WTL-10

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no roads or other impediments to surface or groundwater
- no excavation
- no alteration to overland runoff, groundwater discharge/recharge

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- roads or other impediments, water flow slightly altered
- minor portion of site excavated
- some alteration to overland runoff, groundwater discharge/recharge

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☑ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 8
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 77
C = Percentage low density residential, construction, or similar 0
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 15

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.66

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☑ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☐ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☑ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☐ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☑ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☑ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☑ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	____ Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ◉ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 0.495
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.70

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☑ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ◉ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.33 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.25 (HYDRO) V3 0.50 (TSIZE) V5 _____ (SCOV) V7 0.70 (COMP) V9 0.33 (BUFFER)

V2 0.66 (WSHEDINT) V4 1.00 (TDEN) V6 _____ (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.25} \times \underline{0.66})^{1/2}$ = 0.41

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{0.50+1.00}{2}\right)+1.00}{2}\right)\right)^{1/2}$ = 0.60

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{5}\right)\right)^{1/2}$ = _____

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.50+1.00+0.70}{3}\right)}{3}$ = 0.62

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{9}$ = _____

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.50+1.00+0.70}{3}\right)+\frac{0.33}{\_\_\_}}{4}$ = 0.55

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{9}$ = _____

Slope Wetland

V1: HYDROPERIOD	**0.25**	**Function 1: Matintain Hydrologic Regime**				
V2: WETLAND WATERSHED INTEGRITY	**0.659**	(V1 x V2)^(1/2)	**FCI 1 =**	**0.41**	**Final Tree =**	**0.54**
V3: CANOPY TREE CLASS	**0.5**					
V4: CANOPY TREE DENSITY	**1**	**Function 2: Maintain Biogeochemical Processes**				
V5: SHRUB COVER	**GOTOV6**	$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$	**FCI 2 trees=**	**0.60**	**Final Shrubs=**	**#VALUE!**
V6: GROUND VEGETATION COVER	**n/a**					
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.70**					
2. Q =	0.66				**Final Herbaceous =**	**#VALUE!**
# of Group 1 Dominants						
# of Group 2 Dominants	3	$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$	**FCI 2 shrubs=**	**#VALUE!**		
# of Group 3 Dominants						
SPECIES RICHNESS CONSTANT	0.75					
V8: SOIL ORGANIC MATTER	**1**		**FCI 2 ground =**	**#VALUE!**		
V9:BUFFER	**0.33**	$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$				
1. Connection Index	0.5					
2. Buffer width value (0-1)	0.66					

Function 3: Maintain Characteristic Plant Community

	FCI 3 trees=	**0.62**
$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$		
	FCI 3 shrubs=	**#VALUE!**
$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$		
	FCI 3 ground =	**#VALUE!**
$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$		

Function 4: Maintain Characteristic Wildlife Community:

	FCI 4 trees=	**0.55**
$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$		
	FCI 4 shrubs=	**#VALUE!**
$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$		
	FCI 4 ground =	**#VALUE!**
$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$		

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN	**Affiliation:**	TDOT	**Date:**	10/22/21

1-Station: from plans	SR-265 STA 704+45R to I-40 600+80L								
2-Map label and name	STR-6								
3-Latitude/Longitude	36.166766, -86.529565								
4-Feature description:									
-channel identification	perennial stream	✓	intermittent stream		ephemeral stream		wwc		
-HD score (if applicable)									
-OHWM indicators	bed & banks	✓	deposition	✓	presence of litter / debris	✓	scour		veg absent, bent, matted ✓
	change in plant community		destruction of terrestrial veg		multiple observed flow events		sediment sorting		water staining
	change in soil character		leaf litter disturbed or absent	✓	natural line impressed on bank		shelving		wracking
-channel bottom width	2.5ft		-top of bank width		3ft				
-width at ordinary high water mark	3ft width, 10in height from channel bottom								
-bank height	LDB - 1ft		RDB - 1ft						
-riffle/pool complex or other specialized habitat present?	No								
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Bush Honeysuckle, Hackberry, American Elm, Japanese Stiltgrass, Cedar, Green Ash								
	RDB: Bush Honeysuckle, Hackberry, American Elm, Japanese Stiltgrass, Cedar, Green Ash								
-date of PJD request									
5-photo numbers	15,16,21								
6-HUC -8 Code & Name	05130203		Stones River						
7-Assessed	yes		no	✓					
8-ETW	yes		no	✓					
9-303 (d) List	yes		siltation		habitat:		other:		
	no	✓							
10-Notes	Iron film observed throughout reach north of I-40 and at I-40 culvert outlet. Isopoda, Amphipoda, Psephenidae, one empty Caddisfly case observed near I-40 culvert outlet.								
Substrate	Fine sediment, cobble								

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/17/21 and 1/5/22

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-12

Investigator(s): SLN, MLB Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Sloped Slope (%): 8

Subregion (LRR or MLRA): LRR N Lat: 36.168228 Long: -86.529294 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam, Unman flaggy silty clay loam NWI classification: PUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet on 11/17/21 and average on 1/5/22. Photo #: 15-18
SR-265 STA 509+16CL to 510+8CL

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ✓ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): See Notes
Water Table Present?	Yes ✓	No _____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Groundwater expression in mowed areas (north and east sides of feature). Surface water 1-2in deep.

Southwestern half of wetland retains deeper water due to old anthropogenic berm. Water depth appears to be a few feet deep (up to 3ft) due to size of feature and a handful of herbaceous plants emerging from middle of water.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-12

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra, Black Willow	10	Yes	OBL
2. Fraxinus pennsylvanica, Green Ash	5	Yes	FACW
3.			
4.			
5.			
6.			
	15	= Total Cover	

50% of total cover: 7.5 20% of total cover: 3

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 1.5m)			
1. Lemna sp., UID Duckweed	70	Yes	OBL
2. Salix nigra, Black Willow	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	= Total Cover	

50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Data collected within southwestern half of wetland.

SOIL Sampling Point: WTL-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SICLO	Collected near SW boundary.
2-11	10YR 5/2	90	7.5YR 4/6	10	C	M	SICLO	Collected near SW boundary.
5/12	2.5Y 4/2	88	7.5YR 3/3	12	C	M	SILO	Collected near N boundary.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

Bermed retention area in southwestern half of wetland is considered depression. F8 indicator applicable to this area.

F3 indicator applicable to entire wetland.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 11/17/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-12 UPL

Investigator(s): SLN, MLB Section, Township, Range: --

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Concave Slope (%): 8

Subregion (LRR or MLRA): LRR N Lat: 36.168036 Long: -86.529201 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

Hydrophytic vegetation unable to be determined, but study area still not considered wetland due to lack of wetland hydrology and hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-12 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis occidentalis, Hackberry	15	Yes	FACU
2. Quercus palustris, Pin Oak	15	Yes	FACW
3.			
4.			
5.			
6.			
	30	= Total Cover	

50% of total cover: 15 20% of total cover: 6

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1. Diervilla lonicera, Bush Honeysuckle	30	Yes	
2. Callicarpa americana, Beautyberry	5	No	FACU
3.			
4.			
5.			
6.			
	35	= Total Cover	

50% of total cover: 17.5 20% of total cover: 7

Herb Stratum (Plot size: 1.5m)			
1. Carex sp., UID Sedge	3	Yes	
2. Glechoma hederacea, Ground Ivy	3	Yes	FACU
3. Diervilla lonicera, Bush Honeysuckle	5	Yes	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	11	= Total Cover	

50% of total cover: 5.5 20% of total cover: 2.2

Woody Vine Stratum (Plot size: 10m)			
1. Vitis sp., UID Grapevine	3	No	
2.			
3.			
4.			
5.			
	3	= Total Cover	

50% of total cover: 1.5 20% of total cover: 0.600000000000000

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle. Dominance test unable to be determined.

SOIL

Sampling Point: WTL-12 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 4/2	100					SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-12

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	
COMMENTS/NOTES:	

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.62
Maintain Biogeochemical Processes	0.50
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.23
Maintain Characteristic Wildlife Community	0.24
Quantitative Score (Average of FCIsX100)	40.00
Value Added Total	
TOTAL SCORE	40.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-12	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 01/05/2022 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-12

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no roads or other impediments to surface or groundwater
- no excavation
- no alteration to overland runoff, groundwater discharge/recharge

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- roads or other impediments, water flow slightly altered
- minor portion of site excavated
- some alteration to overland runoff, groundwater discharge/recharge

☑ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 8
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 92
C = Percentage low density residential, construction, or similar 0
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 0

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.77

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	1 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ◉ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 0.165
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.41

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☑ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ◉ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.17 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.50 (HYDRO) V3_____ (TSIZE) V5_____ (SCOV) V7 0.41 (COMP) V9 0.17 (BUFFER)

V2 0.77 (WSHEDINT) V4_____ (TDEN) V6 1.00 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.50} \times \underline{0.77})^{1/2} = \underline{0.62}$

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2} = \underline{\quad}$

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2} = \underline{\quad}$

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{5}\right)\right)^{1/2} = \underline{0.50}$

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)}{9} = \underline{0.23}$

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)+\frac{0.17}{\_\_\_}}{9} = \underline{0.24}$

Slope Wetland

V1: HYDROPERIOD	**0.5**
V2: WETLAND WATERSHED INTEGRITY	**0.77**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**1**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.41**
2. Q =	0.66
# of Group 1 Dominants	
# of Group 2 Dominants	1
# of Group 3 Dominants	
SPECIES RICHNESS CONSTANT	0.25
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.165**
1. Connection Index	0.5
2. Buffer width value (0-1)	0.33

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.62** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.40**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$$

FCI 2 ground = **0.50**

Function 3: Maintain Characteristic Plant Community

FCI 3 trees= **#VALUE!**

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 ground = **0.23**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

Function 4: Maintain Characteristic Wildlife Community:

FCI 4 trees= **#VALUE!**

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 ground = **0.24**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

Ecology Field Data Sheet: **Other Resource Features**

(Caves/Rock Houses; Sinkholes; Specialized Habitats; Other)

Project: Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Date of survey: 11/3/21 **Biologist:** SLN, MLB **Affiliation:** TDOT

1-Station: from plans	I-40 STA 601+60L	
2-Map label	SEP-1	
3- Lat/Long	36.167935, -86.529284	
4-Potential impact	No impact expected	
5-Feature name		
6-Feature description:		
what is it	Groundwater seep	
portion affected	None	
approximate size	2.5ft x 5ft	
photo number	19	
other		
7- HUC code & name if applicable (12-digit)	051302030306, Suggs Creek	
8-Determination: TDOT/ consultant	TDOT	
9-Determination: Confirmed? By?		
10-Mitigation: to be included in design		
11-Notes		

Ecology Field Data Sheet: **Other Resource Features**
(Caves/Rock Houses; Sinkholes; Specialized Habitats; Other)

Project: Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Date of survey: 1/5/22 **Biologist:** SLN **Affiliation:** TDOT

1-Station: from plans	SR-265 STA 705+8R	
2-Map label	SEP-2	
3- Lat/Long	36.166757, -86.529327	
4-Potential impact	No impact expected	
5-Feature name		
6-Feature description:		
what is it	Groundwater seep	
portion affected	None	
approximate size	10ft x 15ft	
photo number	20,21	
other		
7- HUC code & name if applicable (12-digit)	051302030306, Suggs Creek	
8-Determination: TDOT/ consultant	TDOT	
9-Determination: Confirmed? By?		
10-Mitigation: to be included in design		
11-Notes	Feeds STR-7 Soils: 1-10in depth 10YR 4/3 100% Does not pass hydric soils test to be wetland.	

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN	**Affiliation:**	TDOT	**Date:**	1/5/22

1-Station: from plans	SR-265 STA 704+45R to 705+00R								
2-Map label and name	STR-7								
3-Latitude/Longitude	36.166659, -86.529438								
4-Feature description:									
-channel identification	perennial stream ☐	intermittent stream ☑	ephemeral stream ☐	wwc ☐					
-HD score (if applicable)									
-OHWM indicators	bed & banks ☐	deposition ☐	presence of litter / debris ☐	scour ☐	veg absent, bent, matted ☑				
	change in plant community ☑	destruction of terrestrial veg ☐	multiple observed flow events ☐	sediment sorting ☐	water staining ☐				
	change in soil character ☐	leaf litter disturbed or absent ☐	natural line impressed on bank ☐	shelving ☐	wracking ☐				
-channel bottom width	1ft	-top of bank width	1.5ft						
-width at ordinary high water mark	1.5ft wide, 2in height from channel bottom								
-bank height	LDB - 2in	RDB - 2in							
-riffle/pool complex or other specialized habitat present?	No								
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Japanese Stiltgrass, Cedar, Chinese Privet, Japanases Honeysuckle, UID Dichanthelium								
	RDB: Japanese Stiltgrass, Cedar, Chinese Privet, Japanases Honeysuckle, UID Dichanthelium								
-date of PJD request									
5-photo numbers	20,21								
6-HUC -8 Code & Name	05130203	Stones River							
7-Assessed	yes	☐	no	☑					
8-ETW	yes	☐	no	☑					
9-303 (d) List	yes	☐	siltation	☐	habitat:	☐	other:	☐	
	no	☑							
10-Notes	Fed by seep (SEP-2). See photo log.								
Substrate	Fine sediment								

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/22/21 & 1/5/22

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-6

Investigator(s): SLN, MLB Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR N Lat: 36.166371 Long: -86.529437 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet on 10/22/21 and average on 1/5/22.

Station: SR-265 STA 704+59R

Photo: 22,23

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): See Notes
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): See Notes

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation at surface observed within northern half of wetland on 1/5/22 but not on 10/22/21.

Seasonal hydrology from STR-6 enters this feature and ends at vernal pool within wetland at 36.166250, -86.529286. Pool dry on 10/22/21. ~1.5ft of water observed in pool on 1/5/22.

Surface overflow from vernal pool into southern edge of wetland (photo 43) observed on 1/5/22 but not on 10/22/21. Surface water depth ~2in.

No indicators of groundwater table observed.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-6

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1. Fraxinus pennsylvanica, Green Ash	20	Yes	FACW
2. Ulmus Americana, American Elm	10	Yes	FACW
3. Platanus occidentalis, Sycamore	3	No	FACW
4.			
5.			
6.			
	33 = Total Cover		
50% of total cover: 16.5	20% of total cover: 6.6		
Shrub Stratum (Plot size: 5m)			
1. Ulmus Americana, American Elm	5	No	FACW
2. Rosa multiflora, Multiflora Rose	8	Yes	FACU
3. Callicarpa americana, American Beautyberry	12	Yes	FACU
4. Platanus occidentalis, Sycamore	3	No	FACW
5. Fraxinus pennsylvanica, Green Ash	5	No	FACW
6.			
	33 = Total Cover		
50% of total cover: 16.5	20% of total cover: 6.6		
Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	80	Yes	FAC
2. lespedeza cuneata, Sirecea Lespedeza	10	No	FACU
3. Iva annua,, Annual Marsh Elder	3	No	FAC
4. Dichanthelium clandestinum, Deertongue Grass	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	103 = Total Cover		
50% of total cover: 51.5	20% of total cover: 20.6		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Plots located within northern half of wetland. Data collected on 10/22/21.

SOIL Sampling Point: WTL-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					SILO	
3-11	10YR 4/1	80	5YR 4/6	20	C	M	SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/22/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-6 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR N Lat: 36.166337 Long: -86.529511 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

Hydrophytic vegetation unable to be determined, but study area still not considered wetland due to lack of wetland hydrology and hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-6 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana, Eastern Red Cedar	5	Yes	FACU
2. Juglans nigra, Black Walnut	2	Yes	FACU
3. Acer negundo, Boxelder	2	Yes	FAC
4.			
5.			
6.			
	9 = Total Cover		

50% of total cover: 4.5 20% of total cover: 1.8

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1. Diervilla lonicera, Bush Honeysuckle	20	Yes	
2. Frangula caroliniana, Carolina Buckthorn	10	Yes	FAC
3.			
4.			
5.			
6.			
	30 = Total Cover		

50% of total cover: 15 20% of total cover: 6

Herb Stratum (Plot size: 1.5m)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** _____ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle. Dominance test unable to be determined.

SOIL

Sampling Point: WTL-6 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/2	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-6

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	✓

COMMENTS/NOTES:

Well functioning vernal pool located within feature. Further review from TDEC requested.

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.69
Maintain Biogeochemical Processes	0.68
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.37
Maintain Characteristic Wildlife Community	0.46
Quantitative Score (Average of FCIsX100)	55.00
Value Added Total	
TOTAL SCORE	55.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-6	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	Yes	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 10/22/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-6

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no roads or other impediments to surface or groundwater
- no excavation
- no alteration to overland runoff, groundwater discharge/recharge

☑ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- roads or other impediments, water flow slightly altered
- minor portion of site excavated
- some alteration to overland runoff, groundwater discharge/recharge

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 10
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 67
C = Percentage low density residential, construction, or similar 8
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 15

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.64

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☑ > 20 (SI = 1.0) ☐ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☑ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	3 Number native shrub spp.		☑ Multiflora Rose
☐ _____	☐ _____	_____ Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.40

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ◉ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 0.30
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.54

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☑ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ◉ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.50 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.75 (HYDRO) V3 _____ (TSIZE) V5 1.00 (SCOV) V7 0.54 (COMP) V9 0.50 (BUFFER)

V2 0.64 (WSHEDINT) V4 _____ (TDEN) V6 _____ (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.75} \times \underline{0.64})^{1/2}$ = 0.69

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2}$ = _____

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{3}\right)\right)^{1/2}$ = 0.68

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{5}\right)\right)^{1/2}$ = _____

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_+\_\_\_\_}{3}\right)}{3}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.54}{2}\right)}{6}$ = 0.37

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{9}$ = _____

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_+\_\_\_\_}{3}\right)+\_\_\_}{4}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.54}{2}\right)+\frac{0.50}{\_\_\_}}{6}$ = 0.46

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{9}$ = _____

Slope Wetland

V1: HYDROPERIOD	**0.75**
V2: WETLAND WATERSHED INTEGRITY	**0.644**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**1**
V6: GROUND VEGETATION COVER	**n/a**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.54**
2. Q =	0.396
# of Group 1 Dominants	
# of Group 2 Dominants	3
# of Group 3 Dominants	2
SPECIES RICHNESS CONSTANT	0.75
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.495**
1. Connection Index	0.75
2. Buffer width value (0-1)	0.66

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.69** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **0.55**

Final Herbaceous = **#VALUE!**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$$

FCI 2 shrubs= **0.68**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$$

FCI 2 ground = **#VALUE!**

Function 3: Maintain Characteristic Plant Community

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 shrubs= **0.37**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

FCI 3 ground = **#VALUE!**

Function 4: Maintain Characteristic Wildlife Community:

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 shrubs= **0.46**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

FCI 4 ground = **#VALUE!**

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN	**Affiliation:**	TDOT	**Date:**	9/13/21

1-Station: from plans	SR-265 STA 129+67CL to 155+25L									
2-Map label and name	STR-4									
3-Latitude/Longitude	36.162941, -86.527260									
4-Feature description:										
-channel identification	perennial stream	✓	intermittent stream		ephemeral stream		wwc			
-HD score (if applicable)										
-OHWM indicators	bed & banks	✓	deposition	✓	presence of litter / debris	✓	scour	✓	veg absent, bent, matted	✓
	change in plant community		destruction of terrestrial veg		multiple observed flow events		sediment sorting		water staining	
	change in soil character		leaf litter disturbed or absent	✓	natural line impressed on bank	✓	shelving		wracking	
-channel bottom width	6ft		-top of bank width		10-12ft					
-width at ordinary high water mark	10ft width, 10in height from channel bottom									
-bank height	LDB - 1.5ft		RDB - 1.5ft							
-riffle/pool complex or other specialized habitat present?	No									
-dominant riparian species: ----------(LDB /RDB)----------	LDB: UID Red Oak (Chestnut or Chinkapin), Redbud, Japanese Stiltgrass, Cedar, Chinese Privet									
	RDB: Pin Oak, Cedar, Redbud, UID Red Oak (Chestnut or Chinkapin), Bush Honeysuckle									
-date of PJD request										
5-photo numbers	24,25,26,28									
6-HUC -8 Code & Name	05130203, Stones River									
7-Assessed	yes		no	✓						
8-ETW	yes		no	✓						
9-303 (d) List	yes		siltation		habitat:		other:			
	no	✓								
10-Notes	Heptageniidae, Psephenidae, Isopoda, and Physidae observed upon quick observation near southern edge of project area. Iron film due to groundwater observed immediately south of Adams Ln.									
Substrate	Highly variable throughout project area. At southern edge of project area: Cobble, boulder, some bedrock and gravel									

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/22/2021

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-7

Investigator(s): MLB, SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Toe of two large slopes Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 36.166375 Long: -86.530709 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Seasonal conditions abnormally wet.
Station: SR-265 STA 129+6CL to 129+65CL
Photo: 27,28

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-7

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. *Scirpus cyperinus, Woolgrass*	10	No	FACW
2. *Conoclinium coelestinum, Blue Mistflower*	2	No	FAC
3. *Iva annua, Sumpweed*	2	No	FAC
4. *Andropogon virginicus, Broomsedge*	2	No	FACU
5. *UID Grass*	80	Yes	
6.			
7.			
8.			
9.			
10.			
11.			
	96 = Total Cover		
50% of total cover: 48	20% of total cover: 19.2000000000000		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

UID grass solely observed within wet areas. Therefore presumed hydrophytic.

SOIL Sampling Point: WTL-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100						
3-11	10YR 4/2	90	7.5YR 4/6	10	C	M	SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/22/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-7 UPL

Investigator(s): MLB, SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Toe of large slope Local relief (concave, convex, none): Concave Slope (%): 10

Subregion (LRR or MLRA): LRR N Lat: 36.166458 Long: -86.530642 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-7 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Diospyros virginiana, Persimmon*	10	Yes	FAC
2. *Ulmus americana, American Elm*	2	No	FACW
3. *Celtis occidentalis, Hackberry*	2	No	FACU
4.			
5.			
6.			
	14	= Total Cover	
50% of total cover: 7	20% of total cover: 2.8		

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	
50% of total cover: 0	20% of total cover: 0		

Shrub Stratum (Plot size: 5m)			
1. ***Juniperus virigniana, Eastern Redcedar***	2	No	FACU
2. *Diervilla lonicera, Bush Honeysuckle*	15	Yes	
3.			
4.			
5.			
6.			
	17	= Total Cover	
50% of total cover: 8.5	20% of total cover: 3.4		

Herb Stratum (Plot size: 1.5m)			
1. ***Microstegium vimineum, Japanese Stiltgrass***	10	No	FAC
2. ***Dichanthelium clandestinum, Deertongue Grass***	60	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70	= Total Cover	
50% of total cover: 35	20% of total cover: 14.0		

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle.

SOIL

Sampling Point: WTL-7 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-9	10 YR 3/4	100					SILO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-7

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.36
Maintain Biogeochemical Processes	0.38
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.20
Maintain Characteristic Wildlife Community	0.21
Quantitative Score (Average of FCIsX100)	29.00
Value Added Total	
TOTAL SCORE	29.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-7	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 10/22/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN, MLB Wetland Name/Location WTL-7

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no roads or other impediments to surface or groundwater
- no excavation
- no alteration to overland runoff, groundwater discharge/recharge

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- roads or other impediments, water flow slightly altered
- minor portion of site excavated
- some alteration to overland runoff, groundwater discharge/recharge

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☑ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 30
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 10
C = Percentage low density residential, construction, or similar 30
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 30

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.53

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	1 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ◉ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 0.165
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.41

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☑ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ◉ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.08 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.25 (HYDRO) V3_____ (TSIZE) V5_____ (SCOV) V7 0.41 (COMP) V9 0.08 (BUFFER)

V2 0.53 (WSHEDINT) V4_____ (TDEN) V6 1.00 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.25} \times \underline{0.53})^{1/2} = \underline{0.36}$

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2} = \underline{\quad}$

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2} = \underline{\quad}$

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{5}\right)\right)^{1/2} = \underline{0.38}$

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)}{9} = \underline{0.20}$

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)+\frac{0.08}{\_\_\_}}{9} = \underline{0.21}$

Slope Wetland

V1: HYDROPERIOD	**0.25**
V2: WETLAND WATERSHED INTEGRITY	**0.529**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**1**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.41**
2. Q =	0.66
# of Group 1 Dominants	
# of Group 2 Dominants	1
# of Group 3 Dominants	
SPECIES RICHNESS CONSTANT	0.25
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.0825**
1. Connection Index	0.25
2. Buffer width value (0-1)	0.33

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.36** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.29**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$$

FCI 2 ground = **0.38**

Function 3: Maintain Characteristic Plant Community

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

FCI 3 ground = **0.20**

Function 4: Maintain Characteristic Wildlife Community:

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

FCI 4 ground = **0.21**

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN	**Affiliation:**	TDOT	**Date:**	9/13/21

1-Station: from plans	John Hagar Rd STA 429+30R to SR-265 STA 129+67CL								
2-Map label and name	WWC-4/EPH-4								
3-Latitude/Longitude	36.166303, -86.531381								
4-Feature description:									
-channel identification	perennial stream ☐		intermittent stream ☐		ephemeral stream ☑		wwc ☑		
-HD score (if applicable)	9.75								
-OHWM indicators	bed & banks ☐		deposition ☑		presence of litter / debris ☑		scour ☐		veg absent, bent, matted ☑
	change in plant community ☐		destruction of terrestrial veg ☐		multiple observed flow events ☐		sediment sorting ☐		water staining ☐
	change in soil character ☐		leaf litter disturbed or absent ☐		natural line impressed on bank ☐		shelving ☐		wracking ☐
-channel bottom width	1.5ft		-top of bank width		2-3ft				
-width at ordinary high water mark	2ft width, 8in height from channel bottom								
-bank height	LDB - 1ft				RDB - 1ft				
-riffle/pool complex or other specialized habitat present?	No								
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Cedar, Bush Honeysuckle, Osage Orange, Hackberry, Chinese Privet, Sugar Maple								
	RDB: Cedar, Bush Honeysuckle, Osage Orange, Hackberry, Chinese Privet, Sugar Maple								
-date of PJD request									
5-photo numbers	29,30								
6-HUC -8 Code & Name	05130203				Stones River				
7-Assessed	yes	☐	no	☑					
8-ETW	yes	☐	no	☑					
9-303 (d) List	yes	☐	siltation	☐	habitat:	☐	other:	☐	
	no	☑							
10-Notes									
Substrate	Fine sediment, gravel, small amount cobble								

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody:	Date/Time: 9/13/21
Assessors/Affiliation: SLN TDOT	Project ID : 124884.00
Site Name/Description: WWC-4/EPH-4	
Site Location: John Hagar Rd STA 429+30R to SR-265 STA 129+67CL	
HUC (12 digit): 051302030306, Suggs Creek	Lat/Long:
Previous Rainfall (7-days) : Trace amounts in last 7 days	36.166303, -86.531381
Precipitation this Season vs. Normal : abnormally wet (elevated) average low abnormally dry unknown Source of recent & seasonal precip data : NOAA	
Watershed Size : 0.01 square miles	County: Wilson Co.
Soil Type(s) / Geology : Talbott silt loam	Source: NRCS
Surrounding Land Use : Mowed field, wooded, roadway	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 9.75

Justification / Notes :

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.25)		**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0.5	0	1	2	3
2. Sinuous channel	1	0	1	2	3
3. In-channel structure: riffle-pool sequences	0.5	0	1	2	3
4. Sorting of soil textures or other substrate	0.5	0	1	2	3
5. Active/relic floodplain	0	0	0.5	1	1.5
6. Depositional bars or benches	0	0	1	2	3
7. Braided channel	0	0	1	2	3
8. Recent alluvial deposits	1	0	0.5	1	1.5
9. Natural levees	0	0	1	2	3
10. Headcuts	0	0	1	2	3
11. Grade controls	0.75	0	0.5	1	1.5
12. Natural valley or drainageway	0	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	0	No = 0		Yes = 3	

B. Hydrology (Subtotal = 1.5)		**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	0	1	2	3
16. Leaf litter in channel (January – September)	1	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0.5	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	0	No = 0		Yes = 1.5	

C. Biology (Subtotal = 4)		**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	1.5	3	2	1	0
21. Rooted plants in the thalweg [1]	2.5	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0	1	2	3
23. Bivalves/mussels	0	0	1	2	3
24. Amphibians	0	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	0	1	2	3
26. Filamentous algae; periphyton	0	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 9/13/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-2

Investigator(s): SLN, EWD Section, Township, Range: --

Landform (hillslope, terrace, etc.): Bermed depression at bottom of slope Local relief (concave, convex, none): Slope Slope (%): 30

Subregion (LRR or MLRA): LRR N Lat: 36.166239 Long: -86.531919 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet.
Station: John Hagar Rd. STA 429+30R to 429+70R
Photo: 31

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ✓ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Feature is an artificial bowl located on edge of large sloped field. Bermed along northern edge to retain water.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-2

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 1.5m)			
1. Typha latifolia, Broadleaf Cattail	85	Yes	OBL
2. Eupatorium serotinum, Late Boneset	5	No	FAC
3. Microstegium vimineum, Japanese Stiltgrass	5	No	FAC
4. Carex frankii, Frank's Sedge	10	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105 = Total Cover		

50% of total cover: 52.5 20% of total cover: 21

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR4/2	92	10YR3/6	8	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 9/13/2021

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-2 UPL

Investigator(s): SLN, EWD Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Sloped Slope (%): 10

Subregion (LRR or MLRA): LRR N Lat: 36.166227 Long: -86.531852 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-2 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1. Rhus glabra, Smooth Sumac or Rhus typhina, Staghorn Sumac	5	Yes	
2.			
3.			
4.			
5.			
6.			
	5 = Total Cover		

50% of total cover: 2.5 20% of total cover: 1

Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	10	No	FAC
2. Schedonorus arundinaceus, Tall Fescue	15	No	FACU
3. Cynodon dactylon, Bermuda Grass	45	Yes	FACU
4. Elephantopus carolinianus, Common Elephant's Foot	10	No	FACU
5. Ligustrum sinense, Chinese Privet	5	No	FACU
6. Vernonia gigantea, Giant Ironweed	5	No	FAC
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		

50% of total cover: 45 20% of total cover: 18

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Rhus glabra or R. typhina. Dominance test would not pass if species was hydrophytic.

SOIL

Sampling Point: WTL-2 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-2

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.28
Maintain Biogeochemical Processes	0.33
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.19
Maintain Characteristic Wildlife Community	0.19
Quantitative Score (Average of FCIsX100)	25.00
Value Added Total	
TOTAL SCORE	25.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-2	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SEASONALLY INUNDATED DEPRESSION WETLANDS

Date: 09/13/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-2

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA.

V1: Wetland Depth (WETDEPTH)

☐ 1. Wetland depth not impacted (SI = 1.0)		
- no fill material or sediment	- outlet unaltered	- no excavation
- no ditches/drainage tiles	- runoff/input unaltered	
☐ 2. Wetland depth slightly impacted (SI = 0.75)		
- portion of site with minimal fill material or sediment	- outlet lowered/raised	- minor excavation
- portion of site with ditches/drainage tiles	- runoff/input increased	
☐ 3. Wetland depth moderately impacted (SI = 0.5)		
- portion of site with moderate fill material or sediment	- outlet lowered/raised	- moderate excavation
- portion of site with ditches/drainage tiles	- increased hydroperiod	
☐ 4. Wetland depth significantly impacted (SI = 0.25)		
- portion of site with significant fill material or sediment	- outlet lowered/raised	- significant excavation
- portion of site with ditches/drainage tiles	- increased hydroperiod	
☑ 5. Wetland depth severely impacted (SI = 0.1)		
- excessive fill material or sediment	- outlet removed/blocked	- entire wetland affected
- numerous ditches/drainage tiles	- increased hydroperiod	- recovery potential lost

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 10
B = Percentage permeable land (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 90
C = Percentage low density residential, construction, or similar 0
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 0

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.78

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH
☐ ≥ 13 in. (SI = 1.0) ☐ 10 – 12 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot
☐ 3 – 7 (SI = 1.0) ☐ 8 – 11 (SI = 0.75) ☐ > 11 (SI = 0.5) ☐ 1 – 2 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot
☐ ≥ 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot
☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number of native shrub spp.		☐ _____
☐ _____	☐ _____	1 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 0.17
- ◉ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.41

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered
   ☑ 100 percent cover of O and/or A horizon present (SI = 1.0)
2. __ Surface horizons altered (estimate the percent of the WAA in which neither an O or A horizon is present)
3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25). This value is the SI for **V8**= 1.00

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.
   ☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☑ 10% – 39% (CI = 0.25)
   ☐ < 10% (CI = 0.1)
2. Multiply the CI by one of the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by **1.0**
- ○ b) if average buffer is 98 ft. to 491 ft., multiply by **0.66**
- ○ c) if average buffer width is 33 ft. to 97 ft., multiply by **0.33**
- ◉ d) if average buffer width is < 33 ft., multiply by **0.1**

This value is the SI for **V9**= 0.03

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.10 (WETDEPTH) V3 _____ (TSIZE) V5 _____ (SCOV) V7 0.41 (COMP) V9 0.03 (BUFFER)

V2 0.78 (WSHEDINT) V4 _____ (TDEN) V6 1.00 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCTION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.10} \times \underline{0.78})^{1/2}$ = 0.28

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI 2: (trees present) = $\left((V1 \times V2)^{\frac{1}{2}} \times \left(\frac{\left(\frac{V3+V4}{2}\right)+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_\_}{2}\right)\right)^{1/2}$ =

=

FCI 2: (shrubs present) = $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_\_+\_\_\_\_\_}{3}\right)\right)^{1/2}$ =

FCI 2: (ground cover) = $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{5}\right)\right)^{1/2}$ = 0.33

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI 3: (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3}$ =

FCI 3: (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6}$ =

FCI 3: (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)}{9}$ = 0.19

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI 4: (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4}$ =

FCI 4: (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6}$ =

FCI 4: (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.41}{2}\right)+\underline{0.03}}{9}$ = 0.19

Seasonally Inudated Depression Wetlands

V1: WETLAND DEPTH	**0.1**	**Function 1: Matintain Hydrologic Regime**				
V2: WETLAND WATERSHED INTEGRITY	**0.775**	(V1 x V2)^(1/2)	**FCI 1 =**	**0.28**	**Final Tree =**	**#VALUE!**
V3: CANOPY TREE CLASS	**GOTOV5**					
V4: CANOPY TREE DENSITY	**GOTOV5**	**Function 2: Maintain Biogeochemical Processes**				
V5: SHRUB COVER	**GOTOV6**	FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$	**FCI 2 trees=**	**#VALUE!**	**Final Shrubs=**	**#VALUE!**
V6: GROUND VEGETATION COVER	**1**					
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.41**					
2. Q =	0.66				**Final Herbaceous =**	**0.25**
# of Group 1 Dominants		FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$	**FCI 2 shrubs=**	**#VALUE!**		
# of Group 2 Dominants	1					
# of Group 3 Dominants						
SPECIES RICHNESS CONSTANT	0.25					
V8: SOIL ORGANIC MATTER	**0.95**	FCI (ground cover)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$	**FCI 2 ground =**	**0.33**		
V9:BUFFER	**0.025**					
1. Connection Index	0.25					
2. Buffer width value (0-1)	0.1					
		Function 3: Maintain Characteristic Plant Community				
		FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3}$	**FCI 3 trees=**	**#VALUE!**		
		FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6}$	**FCI 3 shrubs=**	**#VALUE!**		
		FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9}$	**FCI 3 ground =**	**0.19**		
		Function 4: Maintain Characteristic Wildlife Community:				
		FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4}$	**FCI 4 trees=**	**#VALUE!**		
		FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6}$	**FCI 4 shrubs=**	**#VALUE!**		
		FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9}$	**FCI 4 ground =**	**0.19**		

Ecology Field Data Sheet: **Other Resource Features**
(Caves/Rock Houses; Sinkholes; Specialized Habitats; Other)

Project: Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Date of survey: 10/12/21 **Biologist:** SLN **Affiliation:** TDOT

1-Station: from plans	John Hagar Rd. STA 816+31L	John Hagar Rd. STA 816+14CL
2-Map label	SNK-1	SNK-2
3- Lat/Long	36.164799, -86.531622	36.164744, -86.531680
4-Potential impact	No impact expected	No impact expected
5-Feature name		
6-Feature description:		
what is it	Potential sinkhole	Potential sinkhole
portion affected	None	None
approximate size	6ft diameter	3ft x 12ft
photo number	32	33
other		
7- HUC code & name if applicable (12-digit)	051302030306, Suggs Creek	051302030306, Suggs Creek
8-Determination: TDOT/ consultant	TDOT	TDOT
9-Determination: Confirmed? By?		
10-Mitigation: to be included in design		
11-Notes		

Ecology Field Data Sheet: **Other Resource Features**

(Caves/Rock Houses; Sinkholes; Specialized Habitats; Other)

Project: Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Date of survey: 10/12/21 **Biologist:** SLN **Affiliation:** TDOT

1-Station: from plans	John Hagar Rd. STA 816+56R	
2-Map label	SNK-3	
3- Lat/Long	36.164646, -86.531720	
4-Potential impact	No impact expected	
5-Feature name		
6-Feature description:		
what is it	Potential sinkhole	
portion affected	None	
approximate size	5ft x 10ft	
photo number	34	
other		
7- HUC code & name if applicable (12-digit)	051302030306, Suggs Creek	
8-Determination: TDOT/ consultant	TDOT	
9-Determination: Confirmed? By?		
10-Mitigation: to be included in design		
11-Notes		

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 1/5/22

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR N Lat: 36.164451 Long: -86.531415 Datum: WGS-84

Soil Map Unit Name: Hampshire silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:
Station: John Hagar Rd STA 817+38CL to 818+48CL
Photo:35,36,37,38

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1-14in

Water Table Present? Yes ✓ No _____ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana, Eastern Red Cedar	15	Yes	FACU
2. Fraxinus pennsylvanica, Green Ash	5	Yes	FACW
3.			
4.			
5.			
6.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Sapling Stratum (Plot size: 5m)			
1. Salix nigra, Black Willow	8	Yes	OBL
2. Ligustrum sinense, Chinese Privet	3	No	FACU
3. Juniperus virginiana, Eastern Red Cedar	5	Yes	FACU
4.			
5.			
6.			
	16 = Total Cover		
50% of total cover: 8	20% of total cover: 3.2		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	90	Yes	FAC
2. Carex sp., UID Sedge	5	No	
3. Ludwigia paulstris or Ludwigia repens	3	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	98 = Total Cover		
50% of total cover: 49	20% of total cover: 19.6		
Woody Vine Stratum (Plot size: 10m)			
1. Bignonia capreolata, Crossvine	2	No	FAC
2.			
3.			
4.			
5.			
	2 = Total Cover		
50% of total cover: 1	20% of total cover: 0.4		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Significant number of snags and fallen dead trees, ~10 total cover of wetland.

SOIL Sampling Point: WTL-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-8	10YR 4/2	93	10YR 4/6	7	C	M	SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/12/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13&4 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 15

Subregion (LRR or MLRA): LRR N Lat: 36.164340 Long: -86.531132 Datum: WGS-84

Soil Map Unit Name: Inman flaggy silty clay loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Upland point between WTL-13 and WTL-4.
Seasonal conditions abnormally wet.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13&4 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Celtis occidentalis, Hackberry	10	Yes	FACU
2. Maclura pomifera, Osage Orange	30	Yes	UPL
3.			
4.			
5.			
6.			
	40	= Total Cover	

50% of total cover: 20 20% of total cover: 8

Sapling Stratum (Plot size: 5m)			
1. Ulmus americana, American elm	8	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	8	= Total Cover	

50% of total cover: 4 20% of total cover: 1.6

Shrub Stratum (Plot size: 5m)			
1. Quercus shumardii, Shumard Oak	5	No	FAC
2. Maclura pomifera, Osage Orange	15	Yes	UPL
3. Ligustrum sinense, Chinese Privet	8	Yes	FACU
4. Diervilla lonicera, Bush Honeysuckle	10	Yes	
5.			
6.			
	38	= Total Cover	

50% of total cover: 19 20% of total cover: 7.6

Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	65	Yes	FAC
2. Ligustrum sinense, Chinese Privet	5	No	FACU
3. Quercus shumardii, Shumard Oak	5	No	FAC
4. Parthenocissus quinquefolia, Virginia Creeper	10	No	FACU
5. Toxicodendron radicans, Poison Ivy	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	

50% of total cover: 45 20% of total cover: 18

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle, but dominance test would not pass if species is hydrophytic.

SOIL

Sampling Point: WTL-13&4 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-10	10YR 4/3	100					SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-13

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	✓

COMMENTS/NOTES:

TRAM score of 76. Further review by TDEC requested.

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.83
Maintain Biogeochemical Processes	0.82
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.66
Maintain Characteristic Wildlife Community	0.74
Quantitative Score (Average of FCIsX100)	76.00
Value Added Total	
TOTAL SCORE	76.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-13	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 01/05/2022 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-13

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☑ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 75
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 20
C = Percentage low density residential, construction, or similar 5
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 0

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.93

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☑ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☐ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☑ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☐ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☑ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☑ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☑ Eastern Red Cedar	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	____ Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.44

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ◉ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 0.22
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.47

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☑ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ◉ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 1 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.75 (HYDRO) V3 0.50 (TSIZE) V5 _____ (SCOV) V7 0.47 (COMP) V9 1.00 (BUFFER)

V2 0.93 (WSHEDINT) V4 0.75 (TDEN) V6 _____ (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.75} \times \underline{0.93})^{1/2}$ = 0.83

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{0.50+0.75}{2}\right)+1.00}{2}\right)\right)^{1/2}$ = 0.82

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{5}\right)\right)^{1/2}$ = _____

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.50+0.75+0.47}{3}\right)}{3}$ = 0.66

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{9}$ = _____

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.50+0.75+0.47}{3}\right)+1.00}{4}$ = 0.74

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{9}$ = _____

Slope Wetland

V1: HYDROPERIOD	**0.75**	**Function 1: Matintain Hydrologic Regime**				
V2: WETLAND WATERSHED INTEGRITY	**0.925**	(V1 x V2)^(1/2)	**FCI 1 =**	**0.83**	**Final Tree =**	**0.76**
V3: CANOPY TREE CLASS	**0.5**					
V4: CANOPY TREE DENSITY	**0.75**	**Function 2: Maintain Biogeochemical Processes**				
V5: SHRUB COVER	**GOTOV6**	$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$	**FCI 2 trees=**	**0.82**	**Final Shrubs=**	**#VALUE!**
V6: GROUND VEGETATION COVER	**n/a**					
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.47**					
2. Q =	0.44				**Final Herbaceous =**	**#VALUE!**
# of Group 1 Dominants		$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$	**FCI 2 shrubs=**	**#VALUE!**		
# of Group 2 Dominants	2					
# of Group 3 Dominants	1					
SPECIES RICHNESS CONSTANT	0.5					
V8: SOIL ORGANIC MATTER	**1**	$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$	**FCI 2 ground =**	**#VALUE!**		
V9:BUFFER	**1**					
1. Connection Index	1					
2. Buffer width value (0-1)	1					
		Function 3: Maintain Characteristic Plant Community				
			FCI 3 trees=	**0.66**		
		$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$				
			FCI 3 shrubs=	**#VALUE!**		
		$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$				
			FCI 3 ground =	**#VALUE!**		
		$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$				
		Function 4: Maintain Characteristic Wildlife Community:				
			FCI 4 trees=	**0.74**		
		$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$				
			FCI 4 shrubs=	**#VALUE!**		
		$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$				
			FCI 4 ground =	**#VALUE!**		
		$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$				

Ecology Field Data Sheet: **Water Resources**

Project:	Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00				
Biologist:	SLN	**Affiliation:**	TDOT	**Date:**	See Notes

1-Station: from plans	John Hagar Rd STA 818+48CL to SR-265 STA 144+44L										
2-Map label and name	STR-5										
3-Latitude/Longitude	36.163951, -86.530606										
4-Feature description:											
-channel identification	perennial stream ☐		intermittent stream ☑		ephemeral stream ☐		wwc ☐				
-HD score (if applicable)											
-OHWM indicators	bed & banks ☑		deposition ☐		presence of litter / debris ☑		scour ☑		veg absent, bent, matted ☑		
	change in plant community ☐		destruction of terrestrial veg ☐		multiple observed flow events ☐		sediment sorting ☐		water staining ☐		
	change in soil character ☐		leaf litter disturbed or absent ☑		natural line impressed on bank ☐		shelving ☐		wracking ☐		
-channel bottom width	2-3ft			-top of bank width			3-4.5ft				
-width at ordinary high water mark	3ft width, 7in height from channel bottom										
-bank height	LDB - 1-1.5ft				RDB - 1ft						
-riffle/pool complex or other specialized habitat present?	No										
-dominant riparian species: ----------(LDB /RDB)----------	LDB: Cedar, Bush Honeysuckle, Chinese Privet, Coralberry, Japanese Stiltgrass										
	RDB: Cedar, Bush Honeysuckle, Privet, Coralberry, Japanese Stiltgrass, Osage Orange, Dogwood, Hackberry, Black Walnut										
-date of PJD request											
5-photo numbers	37,38,39,44										
6-HUC -8 Code & Name	05130203				Stones River						
7-Assessed	yes	☐	no	☑							
8-ETW	yes	☐	no	☑							
9-303 (d) List	yes	☐	siltation	☐	habitat:	☐	other:	☐			
	no	☑									

10-Notes

Feature exists in between WTL-13 and WTL-4, between WTL-4 and WTL-5, and down gradient of WTL-5. See EBR maps or plans for more detail.

Consistent flow not observed on 9/13/21 and 10/12/21. Consistent flow observed on 1/5/22. Feature deemed intermittent.

Iron film observed in WTL-13 on 10/12/21 and 1/5/22. Iron film also observed immediately east of Central Pk on 9/13/21.

Water flowing in channel east of Central Pk and <0.1" of rain in local watershed on 9/13/21.

Rainfall in previous 7 days: Trace amounts for 9/13/21. 1.08in for 10/12/21. 1.72in for 1/5/22.
Precipitation this Season vs. Normal: Elevated for 9/13/21 and 10/12/21. Average for 1/5/22.

Substrate

Fine sediment, small amount gravel, bedrock off project

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/12/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-4

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 15

Subregion (LRR or MLRA): LRR N Lat: 36.164300 Long: -86.531029 Datum: WGS-84

Soil Map Unit Name: Inman flaggy silty clay loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:
Seasonal conditions abnormally wet.
Station: John Hagar Rd STA 818+75CL to 819+19R
Photo: 38,39,40

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 3.5in
Water Table Present?	Yes ✓	No _____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-4

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1. Ligustrum sinense, Chinese Privet	2	No	FACU
2. Diervilla lonicera, Bush Honeysuckle	2	No	
3.			
4.			
5.			
6.			
	4 = Total Cover		
50% of total cover: 2	20% of total cover: 0.8		
Shrub Stratum (Plot size: 5m)			
1. Diervilla lonicera, Bush Honeysuckle	3	No	
2.			
3.			
4.			
5.			
6.			
	3 = Total Cover		
50% of total cover: 1.5	20% of total cover: 0.6		
Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	95	Yes	FAC
2. Polygonum persicaria, Spotted Ladysthumb	15	No	FACW
3. Erechtites hieraciifolius, Burnweed	8	No	FACU
4. Eleocharis obtusa, Blunt Spikerush	8	No	OBL
5. Carex sp., UID Sedge	5	No	
6.			
7.			
8.			
9.			
10.			
11.			
	131 = Total Cover		
50% of total cover: 65.5	20% of total cover: 26.2		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

No indicator status for Bush Honeysuckle.

SOIL Sampling Point: WTL-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
2-9	2.5Y 5/2	85	10YR 3/6	15	C	M	SICLO	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-4

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.96
Maintain Biogeochemical Processes	0.62
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.22
Maintain Characteristic Wildlife Community	0.29
Quantitative Score (Average of FCIsX100)	52.00
Value Added Total	
TOTAL SCORE	52.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-4	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 10/12/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-4

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☑ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no roads or other impediments to surface or groundwater
- no excavation
- no alteration to overland runoff, groundwater discharge/recharge

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- roads or other impediments, water flow slightly altered
- minor portion of site excavated
- some alteration to overland runoff, groundwater discharge/recharge

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 70
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 25
C = Percentage low density residential, construction, or similar 5
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 0

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.91

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☑ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	____ Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ◉ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 0

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☑ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ◉ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.66 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 1.00 (HYDRO) V3_____ (TSIZE) V5_____ (SCOV) V7 0.00 (COMP) V9 0.66 (BUFFER)

V2 0.91 (WSHEDINT) V4_____ (TDEN) V6 1.00 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{1.00} \times \underline{0.91})^{1/2}$ = 0.96

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2}$ = _____

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{5}\right)\right)^{1/2}$ = 0.62

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.00}{2}\right)}{9}$ = 0.22

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.00}{2}\right)+0.66}{9}$ = 0.29

Slope Wetland

V1: HYDROPERIOD	**1**
V2: WETLAND WATERSHED INTEGRITY	**0.9125**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**1**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.00**
2. Q =	0
# of Group 1 Dominants	
# of Group 2 Dominants	
# of Group 3 Dominants	1
SPECIES RICHNESS CONSTANT	0
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.66**
1. Connection Index	1
2. Buffer width value (0-1)	0.66

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.96** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.52**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$$

FCI 2 ground = **0.62**

Function 3: Maintain Characteristic Plant Community

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

FCI 3 ground = **0.22**

Function 4: Maintain Characteristic Wildlife Community:

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

FCI 4 ground = **0.29**

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/12/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-5

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): LRR N Lat: 36.163999 Long: -86.530778 Datum: WGS-84

Soil Map Unit Name: Inman flaggy silty clay loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:
Seasonal conditions abnormally wet.
Wetland located in old road bed.
Station: John Hagar Rd STA 820+00CL to 820+40CL
Photo:41

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 5in

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-5

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. Microstegium vimineum, Japanese Stiltgrass	2	No	FAC
2. Ludwigia repens or L. palustris	40	Yes	OBL
3. Polygonum persicaria, Spotted Ladysthumb	5	No	FACW
4. Ranunculus sp., UID Buttercup	2	No	
5. Echinochloa crus-galli, Barnyardgrass	8	No	FAC
6. Rotala ramosior, Toothcup	5	No	OBL
7.			
8.			
9.			
10.			
11.			
	62 = Total Cover		
50% of total cover: 31	20% of total cover: 12.4		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-12	10YR 4/2	90	10YR 3/6	10	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 10/12/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-5 UPL

Investigator(s): SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): LRR N Lat: 36.164037 Long: -86.530845 Datum: WGS-84

Soil Map Unit Name: Inman flaggy silty clay loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-5 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus virginiana, Eastern Redcedar	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Sapling Stratum (Plot size: 5m)			
1. Celtis occidentalis, Hackberry	25	Yes	FACU
2. Ligustrum sinense, Chinese Privet	15	Yes	FACU
3.			
4.			
5.			
6.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Shrub Stratum (Plot size: 5m)			
1. Ligustrum sinense, Chinese Privet	15	Yes	FACU
2. Symphoricarpos orbiculatus, Coralberry	10	Yes	FACU
3.			
4.			
5.			
6.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		
Herb Stratum (Plot size: 1.5m)			
1. Ligustrum sinense, Chinese Privet	10	Yes	FACU
2. Microstegium vimineum, Japanese Stiltgrass	20	Yes	FAC
3. Carex sp., UID Carex	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WTL-5 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-12	10YR 4/2	100	10YR 4/6	10	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-5

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	

COMMENTS/NOTES:

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.83
Maintain Biogeochemical Processes	0.54
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.22
Maintain Characteristic Wildlife Community	0.29
Quantitative Score (Average of FCIsX100)	47.00
Value Added Total	
TOTAL SCORE	47.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-5	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 10/12/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN Wetland Name/Location WTL-5

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☑ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 75
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 20
C = Percentage low density residential, construction, or similar 5
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 0

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.93

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☑ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	1 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ◉ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 0.165
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.41

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☑ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☑ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ◉ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.66 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.75 (HYDRO) V3 _____ (TSIZE) V5 _____ (SCOV) V7 0.41 (COMP) V9 0.66 (BUFFER)

V2 0.93 (WSHEDINT) V4 _____ (TDEN) V6 0.75 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.75} \times \underline{0.93})^{1/2}$ = 0.83

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2}$ = _____

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{0.75+1.00}{5}\right)\right)^{1/2}$ = 0.54

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.75+0.41}{2}\right)}{9}$ = 0.22

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4}$ = _____

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.75+0.41}{2}\right)+0.66}{9}$ = 0.29

Slope Wetland

V1: HYDROPERIOD	**0.75**
V2: WETLAND WATERSHED INTEGRITY	**0.925**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**0.75**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.41**
2. Q =	0.66
# of Group 1 Dominants	
# of Group 2 Dominants	1
# of Group 3 Dominants	
SPECIES RICHNESS CONSTANT	0.25
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.66**
1. Connection Index	1
2. Buffer width value (0-1)	0.66

Function 1: Matintain Hydrologic Regime

$(V1 \times V2)^{(1/2)}$

FCI 1 = **0.83** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.47**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$$

FCI 2 ground = **0.54**

Function 3: Maintain Characteristic Plant Community

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

FCI 3 ground = **0.22**

Function 4: Maintain Characteristic Wildlife Community:

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 trees= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

FCI 4 ground = **0.29**

Ecology Field Data Sheet: **Water Resources**

Project: Wilson Co.	I-40, Interchange at SR-265 (Central Pike)				PIN 124884.00
Biologist:	MLB,JLE	**Affiliation:**	-TDOT	**Date:**	05/24/2023

1-Station: from plans	Providence Pkwy 1607+93L to 1609+57L									
2-Map label and name	WWC-6/EPH-6A									
3-Latitude/Longitude	36.163413, -86.528789									
4-Feature description:										
-channel identification	perennial stream ☐	intermittent stream ☐	ephemeral stream ☑	wwc ☑						
-HD score (if applicable)	12.5									
-OHWM indicators	bed & banks ☑	deposition ☐	presence of litter debris ☐	scour ☐	veg absent, bent, matted ☑					
	change in plant community ☑	destruction of terrestrial veg ☐	multiple observe flow events ☑	sediment sorting ☐	water staining ☐					
	change in soil character ☐	leaf litter disturb or absent ☑	natural line impressed on bank ☐	shelving ☐	wracking ☐					
-channel bottom width	1.46 ft	-top of bank width	3.5 ft							
-width and max depth at ordinary high water mark	W:1.6 ft	D:0.2 ft								
-width at bankfull	2.2 ft									
-bank height	LDB - 0.9 ft	RDB - 1.0 ft								
-riffle/pool complex or other specialized habitat present?	no									
-dominant riparian species: ----------(LDB /RDB)----------	LDB: bush honeysuckle, green ash, hackberry, Chinese privet									
	RDB: green ash, bush honeysuckle, rough leaved dogwood									
-particle size distribution %	Silt/Sand: 100%	Gravel: 0%	Cobble: 0%	Boulder: 0%	Bedrock: 0%					
5-photo numbers	42-43									
6-HUC -8 Code & Name	05130203, Stones River									
7-Assessed	yes ☐	no ☑								
8-ETW	yes ☐	no ☑								
9-303 (d) List	yes ☐	siltation ☐	habitat: ☐	other: ☐						
	no ☑									
10-Notes	starts at wetland off project around 36.163534, -86.528911, flows east, sheet flow to STR-5									

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: UT to North Creek	Date/Time: 05/24/2023
Assessors/Affiliation: MLB,JLE -TDOT	Project ID : PIN 124884.00
Site Name/Description: I-40, Interchange at SR-265 (Central Pike)	
Site Location: WWC-6/EPH-6A	
HUC (12 digit): 051302030306, Suggs Creek	Lat/Long: 36.163413, -86.528789
Previous Rainfall (7-days) : 0.67 inches in the last seven days	
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data : NOAA past weather/AgACIS last 7 days	
Watershed Size : <2.0 square miles	County: Wilson Co.
Soil Type(s) / Geology : Inman flaggy silty clay loam, Talbot silt loam	Source: NRCS
Surrounding Land Use : low density residential	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Ephemeral/Wet Weather Conveyance

Secondary Indicator Score (if applicable) = 12.5

Justification / Notes :

slight degree of historical alteration to channel due to presence of culvert, proximity to roadway, and location in a developed area.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.5)		**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	2.5	0	1	2	3
2. Sinuous channel	0.5	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	0	1	2	3
4. Sorting of soil textures or other substrate	0	0	1	2	3
5. Active/relic floodplain	0	0	0.5	1	1.5
6. Depositional bars or benches	1	0	1	2	3
7. Braided channel	0	0	1	2	3
8. Recent alluvial deposits	0	0	0.5	1	1.5
9. Natural levees	0	0	1	2	3
10. Headcuts	0	0	1	2	3
11. Grade controls	0.5	0	0.5	1	1.5
12. Natural valley or drainageway	1	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	0	No = 0		Yes = 3	

B. Hydrology (Subtotal = 4)		**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	1	0	1	2	3
15. Water in channel and >48 hours since sig. rain	1	0	1	2	3
16. Leaf litter in channel (January – September)	0	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0.5	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	1.5	No = 0		Yes = 1.5	

C. Biology (Subtotal = 3)		**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	0.5	3	2	1	0
21. Rooted plants in the thalweg [1]	2	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0	1	2	3
23. Bivalves/mussels	0	0	1	2	3
24. Amphibians	0	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0.5	0	1	2	3
26. Filamentous algae; periphyton	0	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

25. isopods observed

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 9/13/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-3

Investigator(s): EWD, SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Sloped Slope (%): 3

Subregion (LRR or MLRA): LRR N Lat: 36.163233 Long: -86.527602 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Seasonal conditions abnormally wet.

Wetland located along edge of active construction area. Evidence of large equipment driving through feature.

Station: SR-265 STA 143+20L to 144+31L

Photo: 44

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1

Water Table Present? Yes ✓ No _____ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-3

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. Cyperus strigosus, False Nutsedge	30	Yes	FACW
2. Ludwigia palustris, Marsh Seedbox	5	No	OBL
3. Xanthium strumarium, Cocklebur	10	No	FAC
4. Dichanthelium sphaerocarpon, Roundseed Panicgrass	15	Yes	FACU
5. Conoclinium coelestinum, Mistflower	15	Yes	FAC
6. Eupatorium serotinum, Late Boneset	5	No	FAC
7. Iva annua, Annual Marsh Elder	5	No	FAC
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6-12	10YR 4/2	88	7.5YR 3/4	12	C	M	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PIN 124884.00 I-40 Interchange at Central Pk City/County: Wilson Co. Sampling Date: 9/13/21

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-3 UPL

Investigator(s): EWD, SLN Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Slopes Slope (%): 3

Subregion (LRR or MLRA): LRR N Lat: 36.163244 Long: -86.527553 Datum: WGS-84

Soil Map Unit Name: Talbott silt loam NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Seasonal conditions abnormally wet.

Located along edge of active construction area. Evidence of large equipment driving through study area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-3 UPL

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 1.5m)			
1. Digitaria sanguinalis, Hairy Crabgrass	70	Yes	FACU
2. Paspalum dilatatum, Dallisgrass	30	Yes	FAC
3. Dichanthelium sphaerocarpon, Roundseed Panicgrass	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105 = Total Cover		

50% of total cover: 52.5 20% of total cover: 21

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WTL-3 UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: Wilson Co. I-40 Interchange at Central Pk, PIN 124884.00 WTL-3

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	
COMMENTS/NOTES:	

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.65
Maintain Biogeochemical Processes	0.50
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.26
Maintain Characteristic Wildlife Community	0.26
Quantitative Score (Average of FCIsX100)	42.00
Value Added Total	
TOTAL SCORE	42.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-3	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 09/13/2021 Project Name PIN 124884.00 Wilson Co. I-40 Interchange at Central Pk

Field Personnel SLN, EWD Wetland Name/Location WTL-3

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☑ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 65
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 14
C = Percentage low density residential, construction, or similar 18
D = Percentage high density residential, or similar 0
E = Percentage urban, commercial, industrial, or similar 3

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.85

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	3 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ◉ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 0.495
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.70

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☐ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present. 10

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☑ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ◉ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9 =** 0.01 **.**

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.50 (HYDRO) V3 _____ (TSIZE) V5 _____ (SCOV) V7 0.70 (COMP) V9 0.01 (BUFFER)

V2 0.85 (WSHEDINT) V4 _____ (TDEN) V6 1.00 (GVC) V8 0.90 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.50} \times \underline{0.85})^{1/2} = \underline{0.65}$

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2} = \underline{\quad}$

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2} = \underline{\quad}$

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+0.90}{5}\right)\right)^{1/2} = \underline{0.50}$

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.70}{2}\right)}{9} = \underline{0.26}$

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.70}{2}\right)+0.01}{9} = \underline{0.26}$

Slope Wetland

V1: HYDROPERIOD	**0.5**	**Function 1: Matintain Hydrologic Regime**				
V2: WETLAND WATERSHED INTEGRITY	**0.8453**	(V1 x V2)^(1/2)	**FCI 1 =**	**0.65**	**Final Tree =**	**#VALUE!**
V3: CANOPY TREE CLASS	**GOTOV5**					
V4: CANOPY TREE DENSITY	**N/A**	**Function 2: Maintain Biogeochemical Processes**				
V5: SHRUB COVER	**GOTOV6**	$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2}$	**FCI 2 trees=**	**#VALUE!**	**Final Shrubs=**	**#VALUE!**
V6: GROUND VEGETATION COVER	**1**					
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.70**					
2. Q =	0.66				**Final Herbaceous =**	**0.42**
# of Group 1 Dominants		$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2}$	**FCI 2 shrubs=**	**#VALUE!**		
# of Group 2 Dominants	3					
# of Group 3 Dominants						
SPECIES RICHNESS CONSTANT	0.75					
V8: SOIL ORGANIC MATTER	**0.9**		**FCI 2 ground =**	**0.50**		
V9:BUFFER	**0.01**	$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2}$				
1. Connection Index	0.1					
2. Buffer width value (0-1)	0.1					
		Function 3: Maintain Characteristic Plant Community				
			FCI 3 trees=	**#VALUE!**		
		$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$				
			FCI 3 shrubs=	**#VALUE!**		
		$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$				
			FCI 3 ground =	**0.26**		
		$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$				
		Function 4: Maintain Characteristic Wildlife Community:				
			FCI 4 trees=	**#VALUE!**		
		$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$				
			FCI 4 shrubs=	**#VALUE!**		
		$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$				
			FCI 4 ground =	**0.26**		
		$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: I-40, Interchange at SR-265 (Central Pike), PIN 124884.00 City/County: Wilson Sampling Date: 5/23/23

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13B

Investigator(s): MLB, JLE Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslopes Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N, MLRA 123 Lat: 36.162476 Long: -86.529634 Datum: NAD-83

Soil Map Unit Name: Inman flaggy silty clay loam, Talbott silt loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Station #: Providence Pkwy STA 1604+77L

Photo: 45

Although this wetland does not have hydric soils due to gravel fill, it meets the requirements for vegetation and hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 4 inches
Water Table Present?	Yes ✓	No _____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13B

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Herb Stratum (Plot size: 1.5m)			
1. *Typha latifolia*	2	No	OBL
2. *Rhynchospora globularis*	30	Yes	FACW
3. *Scirpus pendulus*	10	No	OBL
4. *Carex frankii*	30	Yes	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	72 = Total Cover		

50% of total cover: 36 20% of total cover: 14.4

Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

50% of total cover: 0 20% of total cover: 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0[1]

4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-13B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 4/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Soils are USACE Regional Supplement Chapter 5 problematic (7. very shallow mineral soils) due to gravel fill.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: I-40, Interchange at SR-265 (Central Pike), PIN 124884.00 City/County: Wilson Sampling Date: 5/23/23

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13B UPL

Investigator(s): MLB, JLE Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslopes Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N, MLRA 123 Lat: 36.162435 Long: -86.529585 Datum: NAD-83

Soil Map Unit Name: Inman flaggy silty clay loam, Talbott silt loam NWI classification: Not Mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Gravel present in soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13B UPL

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1. *Juniperus virginiana*	15	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Herb Stratum (Plot size: 1.5m)			
1. *Lespedeza cuneata*	80	Yes	FACU
2. *Leucanthemum vulgare*	5	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0[1]

4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: WTL-13B UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 5/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Soils are USACE Regional Supplement Chapter 5 problematic (7. very shallow mineral soils) due to gravel fill.

TRAM Summary Worksheet

Project: 124884.00, Wilson Co. I-40 at SR-265 WTL-13B

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	
COMMENTS/NOTES:	

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.50
Maintain Biogeochemical Processes	0.45
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.23
Maintain Characteristic Wildlife Community	0.25
Quantitative Score (Average of FCIsX100)	36.00
Value Added Total	
TOTAL SCORE	36.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-13B	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 05/23/2023 Project Name I-40, Interchange at SR-265 (Central Pike), PIN 124884.00

Field Personnel MLB, JLE Wetland Name/Location WTL-13B

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☐ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☑ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 23
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 20
C = Percentage low density residential, construction, or similar 17
D = Percentage high density residential, or similar 20
E = Percentage urban, commercial, industrial, or similar 20

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.52

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☐ 3 – 5 in. (SI = 0.25)
☑ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☑ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	2 Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ◉ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 0.33
- ○ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 _____
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.57

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☑ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ◉ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ○ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9** = 0.17 .

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.50 (HYDRO) V3 0.00 (TSIZE) V5 0.00 (SCOV) V7 0.57 (COMP) V9 0.17 (BUFFER)

V2 0.52 (WSHEDINT) V4 0.00 (TDEN) V6 1.00 (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.50} \times \underline{0.52})^{1/2} = \underline{0.51}$

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2} = \underline{\quad}$

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2} = \underline{\quad}$

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{1.00+1.00}{5}\right)\right)^{1/2} = \underline{0.45}$

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)}{3} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.57}{2}\right)}{9} = \underline{0.23}$

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_+\_\_\_}{3}\right)+\_\_\_}{4} = \underline{\quad}$

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_+\_\_\_}{2}\right)+\_\_\_}{6} = \underline{\quad}$

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{1.00+0.57}{2}\right)+\frac{0.17}{\_\_\_}}{9} = \underline{0.25}$

Slope Wetland

V1: HYDROPERIOD	**0.5**
V2: WETLAND WATERSHED INTEGRITY	**0.52**
V3: CANOPY TREE CLASS	**GOTOV5**
V4: CANOPY TREE DENSITY	**N/A**
V5: SHRUB COVER	**GOTOV6**
V6: GROUND VEGETATION COVER	**1**
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.57**
2. Q =	0.66
# of Group 1 Dominants	0
# of Group 2 Dominants	2
# of Group 3 Dominants	0
SPECIES RICHNESS CONSTANT	0.5
V8: SOIL ORGANIC MATTER	**1**
V9:BUFFER	**0.17**
1. Connection Index	0.5
2. Buffer width value (0-1)	0.33

Function 1: Matintain Hydrologic Regime

(V1 x V2)^(1/2)

FCI 1 = **0.51** **Final Tree =** **#VALUE!**

Function 2: Maintain Biogeochemical Processes

$$FCI\ (trees\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2} + V8}{2} \right) \right)^{1/2}$$

FCI 2 trees= **#VALUE!** **Final Shrubs=** **#VALUE!**

Final Herbaceous = **0.36**

$$FCI\ (shrubs\ present) = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3} \right) \right)^{1/2}$$

FCI 2 shrubs= **#VALUE!**

$$FCI\ (ground\ cover) = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5} \right) \right)^{1/2}$$

FCI 2 ground = **0.45**

Function 3: Maintain Characteristic Plant Community

FCI 3 trees= **#VALUE!**

$$FCI\ (trees\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

FCI 3 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

FCI 3 ground = **0.23**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

Function 4: Maintain Characteristic Wildlife Community:

FCI 4 trees= **#VALUE!**

$$FCI\ (trees) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

FCI 4 shrubs= **#VALUE!**

$$FCI\ (shrubs\ present) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

FCI 4 ground = **0.25**

$$FCI\ (groundcover) = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: I-40, Interchange at SR-265 (Central Pike), PIN 124884.00 City/County: Wilson Sampling Date: 5/23/23

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13A

Investigator(s): MLB, JLE Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslopes Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N, MLRA 123 Lat: 36.162171 Long: -86.529607 Datum: NAD-83

Soil Map Unit Name: Hampshire Silt Loam NWI classification: Not Mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Station #: John Hagar Rd. STA 828+20CL
Photo: 46

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 4 inches
Water Table Present?	Yes ✓	No _____	Depth (inches): surface
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13A

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10m)			
1. *Fraxinus pennsylvanica*	30	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1. ***Salix nigra***	5	No	OBL
2. *Fraxinus pennsylvanica*	40	Yes	FACW
3. *Juniperus virginiana*	2	No	FACU
4.			
5.			
6.			
	47 = Total Cover		
50% of total cover: 23.5	20% of total cover: 9.4		
Herb Stratum (Plot size: 1.5m)			
1. ***Carex vulpinoidea***	5	Yes	OBL
2. ***Rhynchospora globularis***	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WTL-13A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5YR 5/2	90	7.5YR 5/6	10	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: I-40, Interchange at SR-265 (Central Pike), PIN 124884.00 City/County: Wilson Sampling Date: 5/23/23

Applicant/Owner: Tennessee Department of Transportation (TDOT) State: TN Sampling Point: WTL-13AUPL

Investigator(s): MLB,JLE Section, Township, Range: --

Landform (hillslope, terrace, etc.): Hillslopes Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR or MLRA): LRR N, MLRA 123 Lat: 36.162137 Long: -86.529651 Datum: NAD-83

Soil Map Unit Name: Hampshire Silt Loam NWI classification: Not Mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

This upland is on the west side of SR-265

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: WTL-13AUPL

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10m)			
1. *Juniperus virginiana*	50%	Yes	FACU
2.			
3.			
4.			
5.			
6.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Sapling Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Shrub Stratum (Plot size: 5m)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 1.5m)			
1. ***Lespedeza cuneata***	30%	Yes	FACU
2. ***Cynodon dactylon***	20%	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
50% of total cover: 25	20% of total cover: 10		
Woody Vine Stratum (Plot size: 10m)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0[1]

4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WTL-13AUPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 5/3	100%					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

TRAM Summary Worksheet

Project: 124884.00, Wilson Co. I-40 at SR-265 WTL-13A

EXCEPTIONAL STATUS WETLANDS	Check if applicable
1. ONRW	
2. ETW	
3. Further Review Requested: Attach Wetland Background and Exceptional Status Wetlands Worksheet	
COMMENTS/NOTES:	

WETLAND FUNCTION (FCI)	SCORE
Maintain Hydrologic Regime	0.75
Maintain Biogeochemical Processes	0.66
Retain Particulates (Riverine Only)	
Maintain Characteristic Plant Community	0.47
Maintain Characteristic Wildlife Community	0.36
Quantitative Score (Average of FCIsX100)	53.00
Value Added Total	
TOTAL SCORE	53.00

An affirmative response to any of numbers 1-6 of the Decision Table identifies the wetland per rule as an Outstanding National Resource Water or Exceptional Tennessee Water. A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table WTL-13	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding National Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)	No	**ETW**
3	The wetland is within a state or national park, wildlife refuge, forest, wilderness area, or natural area.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of a state or federally listed threatened or endangered aquatic or semi-aquatic plant(s), or aquatic animal(s).	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as "**Critical Habitat**" for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**	No	Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g., "bog", "fen", and "wet prairie/barren" communities).	No	Determination Required by TDEC
9	The wetland is **an inherently valuable resource** (e.g., vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.	No	Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.	No	Determination Required by TDEC
11	The wetland is observed and documented to be a **significant fish and wildlife habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.	No	Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**	No	Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 or above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)	No	Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 05/23/2023 Project Name I-40, Interchange at SR-265 (Central Pike), PIN 124884.00

Field Personnel MLB,JLE Wetland Name/Location WTL-13A

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

☐ 1. Hydrology not altered (SI = 1.0)
- no fill material or excessive sediment
- no ditches/drainage tiles
- no alteration to overland runoff, groundwater discharge/recharge
- no roads or other impediments to surface or groundwater
- no excavation

☑ 2. Hydrology slightly altered (SI = 0.75)
- portion of site with minimal fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow slightly altered
- minor portion of site excavated

☐ 3. Hydrology moderately altered (SI = 0.5)
- portion of site with moderate fill or sediment
- portion of site with drainage ditches/tiles
- some alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow moderately altered
- moderate portion of site excavated

☐ 4. Hydrology significantly altered (SI = 0.25)
- portion of site with significant fill or sediment
- portion of site with drainage ditches/tiles
- significant alteration to overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow significantly altered
- significant portion of site excavated

☐ 5. Hydrology severely altered (SI = 0.1)
- entire site impacted by fill or excessive sediment
- entire site with numerous drainage ditches/tiles
- no contributions to or from overland runoff, groundwater discharge/recharge
- roads or other impediments, water flow completely blocked
- entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 23
B = Percentage permeable land, (e.g., park, golf course, pasture, hay, orchard, tree farm, or similar) 20
C = Percentage low density residential, construction, or similar 17
D = Percentage high density residential, or similar 20
E = Percentage urban, commercial, industrial, or similar 20

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.52

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☐ 6 – 9 in. (SI = 0.5) ☑ 3 – 5 in. (SI = 0.25)
☐ < 3 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☐ > 15 (SI = 0.5) ☑ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☐ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added to Group 1 or 2 species based on the scientific literature or professional judgement. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☑ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☐ Slippery elm	☐ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☐ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☐ Boxelder	☐ _____	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ _____	☐ Phragmites
☐ Overcup oak	☐ _____	____ Number native shrub spp.		☐ _____
☐ _____	☐ _____	____ Number native herbaceous spp.		☐ _____

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.66

3. Multiply Q above by one of the following constants that reflects species richness:[1]

- ○ a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 _____
- ○ b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 _____
- ○ c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 _____
- ◉ d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 0.17
- ○ e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 _____

4. Calculate the square root of the value from Step 3 above. This value is the SI for **V7**= 0.41

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This value is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☐ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☑ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

- ○ a) if average buffer width is ≥ 492 ft., multiply by 1.0
- ○ b) if average buffer is 98 ft to 491 ft., multiply by 0.66
- ○ c) if average buffer width is 33 ft to 97 ft., multiply by 0.33
- ◉ d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9** = 0.025.

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.75 (HYDRO) V3 0.25 (TSIZE) V5 _____ (SCOV) V7 0.41 (COMP) V9 0.03 (BUFFER)

V2 0.52 (WSHEDINT) V4 0.50 (TDEN) V6 _____ (GVC) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\underline{0.75} \times \underline{0.52})^{1/2}$ = 0.62

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{0.25+0.50}{2}\right)+1.00}{2}\right)\right)^{1/2}$ = 0.66

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = _____

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{5}\right)\right)^{1/2}$ = _____

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.25+0.50+0.41}{3}\right)}{3}$ = 0.47

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)}{9}$ = _____

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{0.25+0.50+0.41}{3}\right)+\frac{0.03}{\_\_\_}}{4}$ = 0.36

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{6}$ = _____

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_}{9}$ = _____

Slope Wetland

WTL-13A

V1: HYDROPERIOD	**0.75**	**Function 1: Matintain Hydrologic Regime**
V2: WETLAND WATERSHED INTEGRITY	**0.52**	(V1 x V2)^(1/2)
V3: CANOPY TREE CLASS	**0.25**	
V4: CANOPY TREE DENSITY	**0.5**	**Function 2: Maintain Biogeochemical Processes**
V5: SHRUB COVER	**N/A**	
V6: GROUND VEGETATION COVER	**n/a**	
V7: VEGETATION COMPOSITION AND DIVERSITY	**0.41**	
2. Q =	0.66	
# of Group 1 Dominants	0	
# of Group 2 Dominants	1	
# of Group 3 Dominants	0	
SPECIES RICHNESS CONSTANT	0.25	
V8: SOIL ORGANIC MATTER	**1**	
V9:BUFFER	**0.025**	
1. Connection Index	0.25	
2. Buffer width value (0-1)	0.1	

$$\text{FCI (trees present)} = \left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2} + V8}{2} \right) \right)^{1/2}$$

$$\text{FCI (shrubs present)} = \left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3} \right) \right)^{1/2}$$

$$\text{FCI (ground cover)} = \left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5} \right) \right)^{1/2}$$

Function 3: Maintain Characteristic Plant Community

$$\text{FCI (trees present)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right)}{3}$$

$$\text{FCI (shrubs present)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right)}{6}$$

$$\text{FCI (groundcover)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right)}{9}$$

Function 4: Maintain Characteristic Wildlife Community:

$$\text{FCI (trees)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V3+V4+V7}{3}\right) + V9}{4}$$

$$\text{FCI (shrubs present)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V5+V7}{2}\right) + V9}{6}$$

$$\text{FCI (groundcover)} = \frac{(V1 \times V2)^{1/2} + 2\left(\frac{V6+V7}{2}\right) + V9}{9}$$

FCI 1 =	**0.62**	**Final Tree =**	**0.53**
FCI 2 trees=	**0.66**	**Final Shrubs=**	**#VALUE!**
FCI 2 shrubs=	**#VALUE!**	**Final Herbaceous =**	**#VALUE!**
FCI 2 ground =	**#VALUE!**		
FCI 3 trees=	**0.47**		
FCI 3 shrubs=	**#VALUE!**		
FCI 3 ground =	**#VALUE!**		
FCI 4 trees=	**0.36**		
FCI 4 shrubs=	**#VALUE!**		
FCI 4 ground =	**#VALUE!**		

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00

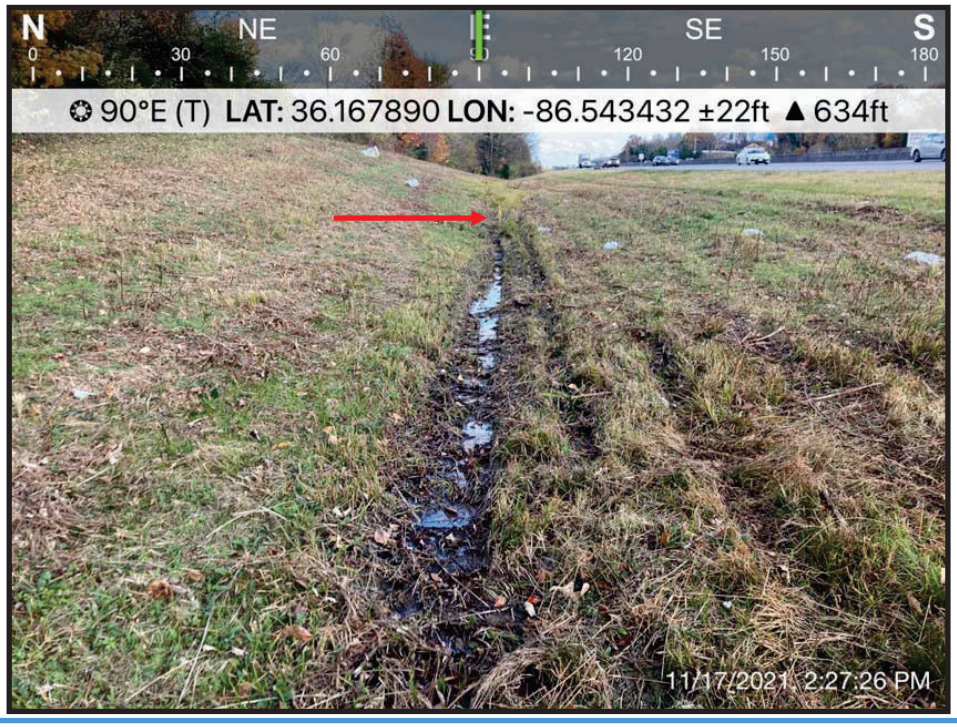

Photo 1: STR-3, view upstream at start of feature on north side of I-40. Red arrow shows start of feature.



Photo 2: STR-3, view downstream south of John Hagar Rd.

TN TDOT Department of Transportation

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 3: WWC-3/EPH-3, view upgradient south of John Hagar Rd.



Photo 4: WWC-3/EPH-3, view downgradient south of John Hagar Rd.

TN TDOT Department of Transportation

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 5: STR-2, view downstream at I-40 culvert inlet.



Photo 6: STR-2, view upstream between I-40 and John Hagar Rd.

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Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 7: WTL-8, view east from center of wetland.



Photo 8: WTL-8, view west from center of wetland.

TN TDOT Department of Transportation

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 9: SNK-7



Photo 10: SEP-3, groundwater seeps out of slope for approximately ten feet.

TN TDOT Department of Transportation



Photo 11: WTL-9, view of entire feature from western tip.



Photo 12: WTL-9, view of entire feature from eastern tip.



Photo 13: WTL-10, view east from near the western boundary.



Photo 14: WTL-10, view west from near the eastern boundary.



Photo 15: STR-6, view upstream between starting point and WTL-12.



Photo 16: STR-6, view downstream between starting point and WTL-12.



Photo 17: WTL-12, channelized portion of wetland connecting northern section (foreground) and southern section (background) of the feature.



Photo 18: WTL-12, view of southeastern section of wetland. Although there is a water valve present, the strong presence of iron film and iron oxidizing bacteria provides evidence of groundwater surfacing.



Photo 19: SEP-1



Photo 20: SEP-2, beginning of STR-7.



Photo 21: STR-7, view downstream between SEP-2 and STR-6.



Photo 22: WTL-6, vernal pool during wet season.



Photo 23: WTL-6, view of center of wetland.



Photo 24: STR-4, view upstream at starting point, the Central Pk culvert outlet.



Photo 25: STR-4, view downstream along the WTL-7 southern boundary

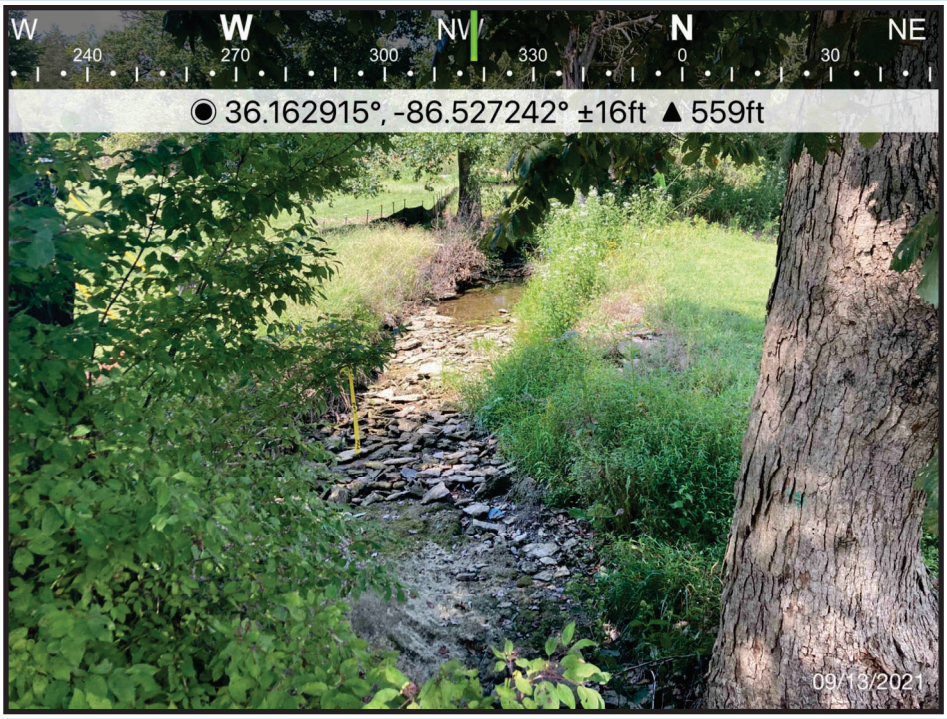

Photo 26: STR-4, view upstream at driveway entrance near southern edge of investigation limits.



Photo 27: WTL-7



Photo 28: View of WTL-7 and STR-4 from the Central Pk road shoulder.

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 29: WWC-4/EPH-4, view upgradient along John Hagar Rd.



Photo 30: WWC-4/EPH-4, view downgradient along John Hagar Rd.

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Photo 31: WTL-2



Photo 32: SNK-1

Wilson County, I-40 Interchange at SR-265 (Central Pike), PIN 124884.00



Photo 33: SNK-2



Photo 34: SNK-3

TN TDOT Department of Transportation



Photo 35: WTL-13, view of northern section strongly dominated by Japanese stiltgrass. The majority of the wetland exhibited this herbaceous community.



Photo 36: WTL-13, view of southern edge of wetland.



Photo 37: STR-5, view upstream coming out of WTL-13 during dry season.



Photo 38: STR-5, view downstream between WTL-13 and WTL-4 during wet season.



Photo 39: WTL-4, view southeast from northern boundary where STR-5 enters feature.



Photo 40: WTL-4, view from southwestern boundary of feature.



Photo 41: WTL-5, located within an old road bed.



Photo 42: WWC-6/EPH-6A, view upgradient



Photo 43: WWC-6/EPH-6A, view downgradient



Photo 44: WTL-3 (left) and STR-5 (red arrow) during dry season.



Photo 45: WTL-13B, eastern view flags showing boundary.



Photo 46: WTL-13A, southeast view

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501
(931) 528-6481

November 2, 2022

Ms. Sydney Norman
Tennessee Department of Transportation
Environmental Tech Group
6601 Centennial Boulevard
Nashville, Tennessee 37243-0334

Subject: FWS# 2023-0001028. Proposed Interstate 40 Interchange at State Route 265 (Central Pike) in Mount Juliet; PIN 124884.00, P.E. 95100-0113-04, Wilson County, Tennessee.

Dear Ms. Norman,

Thank you for your letter dated October 5, 2022, transmitting bat survey results for construction of a new Interstate 40 Interchange at State Route 265 in Mount Juliet, Wilson County, Tennessee. The scope of work includes addition of new right of way areas that would be cleared and grubbed. You have requested our concurrences on the determinations of "not likely to adversely affect" for the federally endangered Indiana bat (*Myotis sodalis*) and threatened northern long-eared bat (*Myotis septentrionalis*) based on negative survey results. We have reviewed the subject proposal and offer the following comments.

Due to the project occurring within a summer buffer for the Indiana bat, your office contracted with Civil and Environmental Consultants, Inc., to perform a presence/probable absence survey for listed bats. A mist netting survey was conducted, in accordance with our current survey guidance, during the period of June 29 through July 5, 2022, at three sites determined by qualified bat biologists as areas where bats would likely travel and forage. Efforts resulted in no captures of bats. Based on these results, we concur with your determinations of "not likely to adversely affect" for the Indiana bat and the northern long-eared bat. This survey will be valid until April 1, 2028.

We are not aware of any federally listed species that would be impacted by the project. Therefore, based on the best information available at this time, we believe that your obligations have been fulfilled for all species that currently receive protection under the Endangered Species

Act of 1973 (ESA). Obligations under section 7 of the ESA must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

The tricolored bat (*Perimyotis subflavus*) was proposed for federal listing in accordance with sections 3(6) and 4(a)(1) of the Endangered Species Act (ESA) of 1973, as amended, on September 14, 2022. No designated critical habitat has been proposed at this time. While a proposed species is not afforded protection under the ESA, there is a prohibition against jeopardy of its continued existence. The listing decision for this species should be announced within 12 months of the date when the proposed rule was published. If the tricolored bat is listed, the prohibition against taking a listed species under section 9 of the ESA becomes effective 30 days later, regardless of a proposed action's stage of completion. At this time, you should determine if the action is likely to jeopardize the continued existence of this species and confer with our office only if jeopardy may occur. If your proposed action will not be complete should the tricolored bat be listed and it may result in effects to the species after the effective date of the final listing rule, you would need to coordinate with our office on potential impacts at that time.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at john_griffith@fws.gov.

Sincerely,

Field Supervisor

xc: Casey Parker, TWRA, Jackson, TN

Sydney Norman

From: Griffith, John <john_griffith@fws.gov>
Sent: Wednesday, November 2, 2022 4:22 PM
To: Sydney Norman
Cc: Casey Parker; Sikula, Nicole R
Subject: [EXTERNAL] Re: IPaC delivered Official Species List for project: TDOT - PIN 124884.00, Wilson Co. I-40 Interchange at SR-265 (Central Pk)
Attachments: 20221005_2023-0001028 I-40 Interchange at SR-265 (Central Pike) in Mt. Juliet; Wilson Co_signed.pdf

Categories: Coordination

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Sydney,

Appreciate the coordination on this one. Please see our response.

John Griffith
Transportation Biologist
U.S. Fish and Wildlife Service
Tennessee Field Office
931-525-4995 (office)
931-528-7075 (fax)

From: Administrator Email <ecosphere_support@ecosphere.fws.gov>
Sent: Wednesday, October 5, 2022 10:12 AM
To: Griffith, John <john_griffith@fws.gov>; Tennessee ES, FWS <tennesseeES@fws.gov>; Sykes, Robbie <robbie_sykes@fws.gov>; Alexander, Steven <steven_alexander@fws.gov>
Subject: IPaC delivered Official Species List for project: TDOT - PIN 124884.00, Wilson Co. I-40 Interchange at SR-265 (Central Pk)

To: IPaC point(s) of contact for Tennessee Ecological Services Field Office
Project Location: Wilson County, Tennessee

IPaC has delivered an official Section 7 species list on behalf of your office. For your convenience, IPaC has created an ETK project (2023-0001028) with a new associated 'Species List Provided' event. A PDF file of the species list document is attached to the event and contact information for the project can be found on the last page of the PDF.

IPaC has automatically set the consultation status to "Closed". If you need to do any additional work in this project (*e.g.*, add staff, add events, change lead office, etc.), you must first change the status to "active" so that you can edit the project. You can access the project via the link, above.

Lead FWS Office:
The Tennessee Ecological Services Field Office is currently designated as the lead office for Section 7 on this project. The following additional offices have jurisdiction and have been notified: None. If another office is the lead office on this project, please access the project (via the link above) and update it. IPaC will not reset the Lead Office once it has been

updated by a biologist.

*Projects created in ETK by IPaC have not been assigned to an FWS staff member. To identify the staff assigned to this project, please access the project (via the link above) and add their name(s).

Sydney Norman

From: Casey Parker
Sent: Thursday, January 13, 2022 1:01 PM
To: Sydney Norman; TDOT.Env Ecology
Cc: Vincent Pontello
Subject: RE: Coordination Request - Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Categories: Coordination

Subject: Coordination Request - Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Ms. Sydney Norman,

I have reviewed the information that you provided regarding the proposed interchange improvements at SR-265 on I-40 in Wilson County, Tennessee. The implementation of standard BMP's will be sufficient to satisfy the needs of the Tennessee Wildlife Resources Agency for this proposed project. Thank you for the opportunity to review and comment, please contact me if you need further assistance.

Casey Parker - Wildlife Biologist
Liaison to TDOT & Federal Highway Administration
Tennessee Wildlife Resources Agency
Environmental Services Division
Email: casey.parker@tn.gov

From: Sydney Norman <Sydney.Norman@tn.gov>
Sent: Monday, December 13, 2021 1:14 PM
To: Casey Parker <Casey.Parker@tn.gov>
Cc: Vincent Pontello <Vincent.Pontello@tn.gov>; R3 EnvTechOffice <R3.EnvTechOffice@tn.gov>; TDOT.Env Ecology <TDOT.Env.Ecology@tn.gov>
Subject: Coordination Request - Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

Hello Casey,

TDOT is proposing to make improvements to an existing portion of Interstate 40 in Wilson County. The proposed work would include the construction of a new interchange at SR-265 (Central Pike). Attached is a coordination request and KMZ file for your review. Please let me know if you need additional information or have any questions.

Thanks again,
Sydney

Sydney Norman l Environmental Studies Specialist Advanced
Region 3 Environmental Tech Group
6601 Centennial Blvd. Bldg A 2nd Floor
Nashville, TN 37243-0360
Office: 615-350-4220
Cell: 615-210-1056

Sydney Norman

From: Casey Parker
Sent: Wednesday, January 26, 2022 1:42 PM
To: Sydney Norman
Cc: Environmental Review; Dillon Blankenship; Vincent Pontello
Subject: Re: Environmental Review Submitted for PIN 124884.00, Wilson Co. I-40 Interchange at SR-265 (Central Pk)
Attachments: image002.png; image001.jpg; RE: Coordination Request - Wilson Co. I-40 Interchange at SR-265 (Central Pk), PIN 124884.00

I concur, TWRAs response is still valid for this project with the current data.

Casey Parker - Wildlife Biologist
Liaison to TDOT & Federal Highway Administration
Tennessee Wildlife Resources Agency
Environmental Services Division
Email: casey.parker@tn.gov

On Jan 26, 2022, at 1:39 PM, Sydney Norman <Sydney.Norman@tn.gov> wrote:

Casey,
I'm sending this email to record our phone conversation held today regarding the subject project. Per our conversation, the existing clearance for the project dated 1/13/2022 (attached) remains valid. Please confirm this conclusion or voice any questions/concerns you may have. Of course feel free to contact me as well if need be.

Thanks again,
Sydney

Sydney Norman l Environmental Studies Specialist Advanced
Region 3 Environmental Tech Group
6601 Centennial Blvd. Bldg A 2nd Floor
Nashville, TN 37243-0360
Office: 615-350-4220
Cell: 615-210-1056

From: Dillon Blankenship <Dillon.Blankenship@tn.gov>
Sent: Tuesday, January 25, 2022 11:35 AM

To: Sydney Norman <Sydney.Norman@tn.gov>
Cc: Environmental Review <Environmental.Review@tn.gov>; Casey Parker <Casey.Parker@tn.gov>
Subject: RE: Environmental Review Submitted for PIN 124884.00, Wilson Co. I-40 Interchange at SR-265 (Central Pk)

Hi Sydney,

Please see the attached review regarding rare plants and let me know should you have any questions. **PLEASE NOTE**: *Ambystoma barbouri* has been observed approximately 4.22 miles south of the study area and 6.41 miles northeast of the study area and photos from your site surveys suggest that suitable habitat for this species could be impacted by the project. *Ambystoma barbouri* has been documented from locations in every cardinal direction from study area.

I am aware of TWRA's response regarding this site, but request that you consult with them to ensure that our data concurs with theirs for this site. Our office is happy to assist with identifying streams in your study area with the highest potential for the species.

Thank you for providing the project polygon to assist with our review, your diligent documentation of the project site, and your time for our brief discussion on 1/13.

Regards,

Dillon

Dillon Blankenship | Data Manager
Division of Natural Areas | Natural Heritage Program
William R. Snodgrass Tennessee Tower, 2nd Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243
p. 615-532-4799
dillon.blankenship@tn.gov
www.tn.gov/environment/natural-areas

We value your feedback! Please complete our customer satisfaction survey.

-----Original Message-----
From: Environmental.Review@tn.gov <Environmental.Review@tn.gov>
Sent: Monday, December 13, 2021 4:05 PM
To: Sydney Norman <Sydney.Norman@tn.gov>
Subject: Environmental Review Submitted for PIN 124884.00, Wilson Co. I-40 Interchange at SR-265 (Central Pk)

Hi Sydney Norman, TDOT:

Thank you for your environmental review submission.We will email you our comments within 30 days. If you have any questions about your review, please contact Dillon Blankenship at dillon.blankenship@tn.gov.

Kind regards-

Environmental Review Coordinator
Division of Natural Areas
TN Natural Heritage Program
Williams R. Snodgrass TN Tower
312 Rosa L. Parks Ave. 2nd Floor
Nashville, TN 37243

STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Natural Areas
Natural Heritage Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 2nd Floor
Nashville, Tennessee 37243
Phone 615/532-0431 Fax 615/532-0046

January 25, 2022

Sydney Norman
TDOT
6601 Centennial Blvd, Bldg A, 2nd Floor
Nashville, TN 37243

Subject: I-40 Interchange at SR-265 (Central Pike)
TDOT PIN 124884.00
(36.16716° -86.53173°)
Wilson County, TN
Rare Species Database Review

Dear Ms. Norman:

Thank you for your correspondence of 13 December 2021 requesting a rare species database review for the proposed I-40 interchange at SR-265 in Wilson County, Tennessee.

We have reviewed the state's natural heritage database with regard to the project boundaries, and we find that no rare species have been observed previously within one mile of the project area.

Within four miles of the project area the following rare species have been reported:

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Vascular Plant	*Ammoselinum popei*	Pope's Sand-parsley	G4	S2	--	T	Glades
Vascular Plant	*Amsonia tabernaemontana var. gattingeri*	Limestone Blue Star	G5T3Q	S3	--	S	Glades, Barrens, And Rocky River Bars
Vascular Plant	*Arabis hirsuta*	Western Hairy Rockcress	G5	S1	--	T	Glades and Limestone Bluffs
Vascular Plant	*Astragalus tennesseensis*	Tennessee Milk-vetch	G3	S3	--	S	Glades
Vascular Plant	*Echinacea tennesseensis*	Tennessee Coneflower	G2	S2	DM	T	Ordovician Limestone Glades

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Vascular Plant	*Paysonia densipila*	Duck River Bladderpod	G3	S3	--	S	Cultivated Fields
Vascular Plant	*Phemeranthus calcaricus*	Limestone Fame-flower	G3	S3	--	S	Glades
Vascular Plant	*Phlox bifida ssp. stellaria*	Glade Cleft Phlox	G5?T3	S3	--	T	Glades
Vascular Plant	*Schoenolirion croceum*	Yellow Sunnybell	G4	S3	--	T	Wet Areas in Glades
International Terrestrial Ecological System Classification	*Nashville Basin Limestone Glade and Woodland*	Nashville Basin Limestone Glade, Barrens, and Woodland	GNR	SNR	--	Rare, Not State Listed	
Vertebrate Animal	*Etheostoma luteovinctum*	Redband Darter	G4	S4	--	D	Limestone streams; Nashville Basin & portions of Highland Rim.

The Division of Natural Areas - Natural Heritage Program has reviewed the location of the proposed project workspace with respect to rare plant species. Based on the habitat within the project area and the type of project, we do not anticipate any impacts to occurrences of rare, threatened, or endangered plant species from this project.

We ask that you continue to coordinate this project with the Tennessee Wildlife Resources Agency contact assigned to your agency to ensure that legal requirements for protection of state listed rare animals are addressed. Additionally, we ask that you contact the U.S. Fish and Wildlife Service Field Office, Cookeville, Tennessee (931-525-4970) for comments regarding federally listed species. Please ensure that best management practices to address erosion and sediment are implemented and maintained during construction activities. Note that the General Aquatic Resource Alteration Permit states that "use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 feet of top of bank." Where necessary and feasible, we encourage use of biodegradable netting under the CGP (Construction General Stormwater Permit) as well.

Thank you for considering Tennessee's rare species throughout the planning of this project. Should you have any questions, please do not hesitate to contact me at 615-532-4799 or dillon.blankenship@tn.gov.

Sincerely,

Dillon

Dillon Blankenship | Environmental Review Coordinator
Tennessee Natural Heritage Program

Index Of Sheets

SEE SHEET 1A FOR INDEX OF SHEETS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

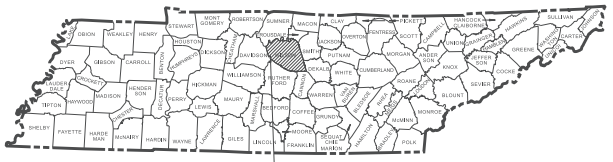
WILSON COUNTY

DIVERGING DIAMOND INTERCHANGE CONNECTING SR 265 TO I-40
FROM WEST OF PLEASENT GROVE RD TO EAST OF PROVIDENCE PARKWAY

PRELIMINARY

DOES THIS PROJECT QUALIFY FOR UTILITY CHAPTER 86	YES X	NO

TENN.	YEAR	SHEET NO.
	2023	1
FED. AID PROJ. NO.	NH-I-40-5(150)	
STATE PROJ. NO.	95100-1113-44	



PROJECT LOCATION

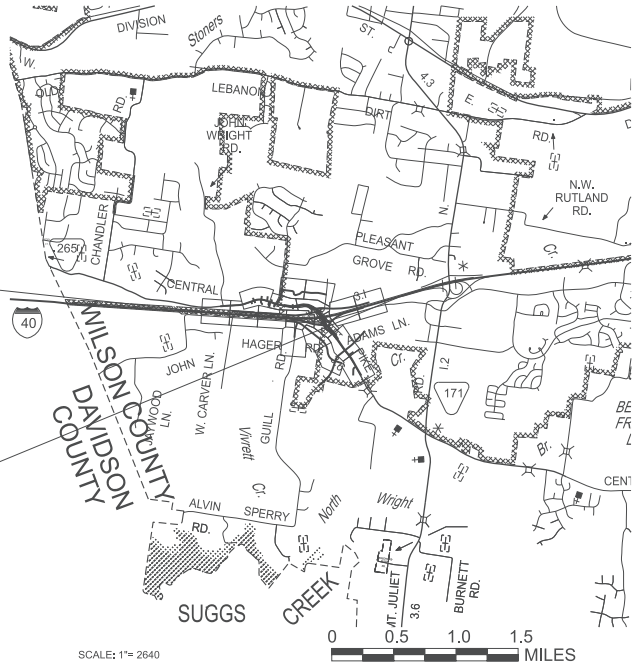
BRIDGE ID. EX. # 95I00400001
PROP. # SR 265 EB
PROP. # SR 265 WB

STATE HIGHWAY NO. 265 F.A.H.S. NO. I-40

Environmental Boundaries

NO EXCLUSIONS

INITIAL STUDIES REQUEST



SCALE: 1"= 2640

95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 547+69.12 I-40
N 668229.0218 E 1807086.8164

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 615+76.94 I-40
N 668554.1848 E 1813815.3892

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED JANUARY 1, 2021 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 OR
TDOT TRANSPORTATION MANAGER 1 : SHARON M. SCHUTZ, PE

DESIGNED BY : CHRIS REBAR, PE

DESIGNER : HDR ENGINEERING, INC. CHECKED BY BRIAN REYNOLDS, PE

P.E. NO. 95100-0113-04 (NEPA)

PIN NO. 124884.00

R.O.W. LENGTH	MILES
ROADWAY LENGTH	MILES
BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES ▲
PROJECT LENGTH	MILES

▲ Not included in the project length (Non Riding Surface).

SURVEY - -

SEE SHEET 1A FOR TRAFFIC DATA.

COORDINATES ARE NAD/83(1995) (2011 ADJUSTMENT) ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 USING GEOID G2012BU7.

APPROVED: _____
WILL REID, CHIEF ENGINEER

DATE: _____

APPROVED: _____
HOWARD H. ELEY, COMMISSIONER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

2/4/2023 7:45:46 AM
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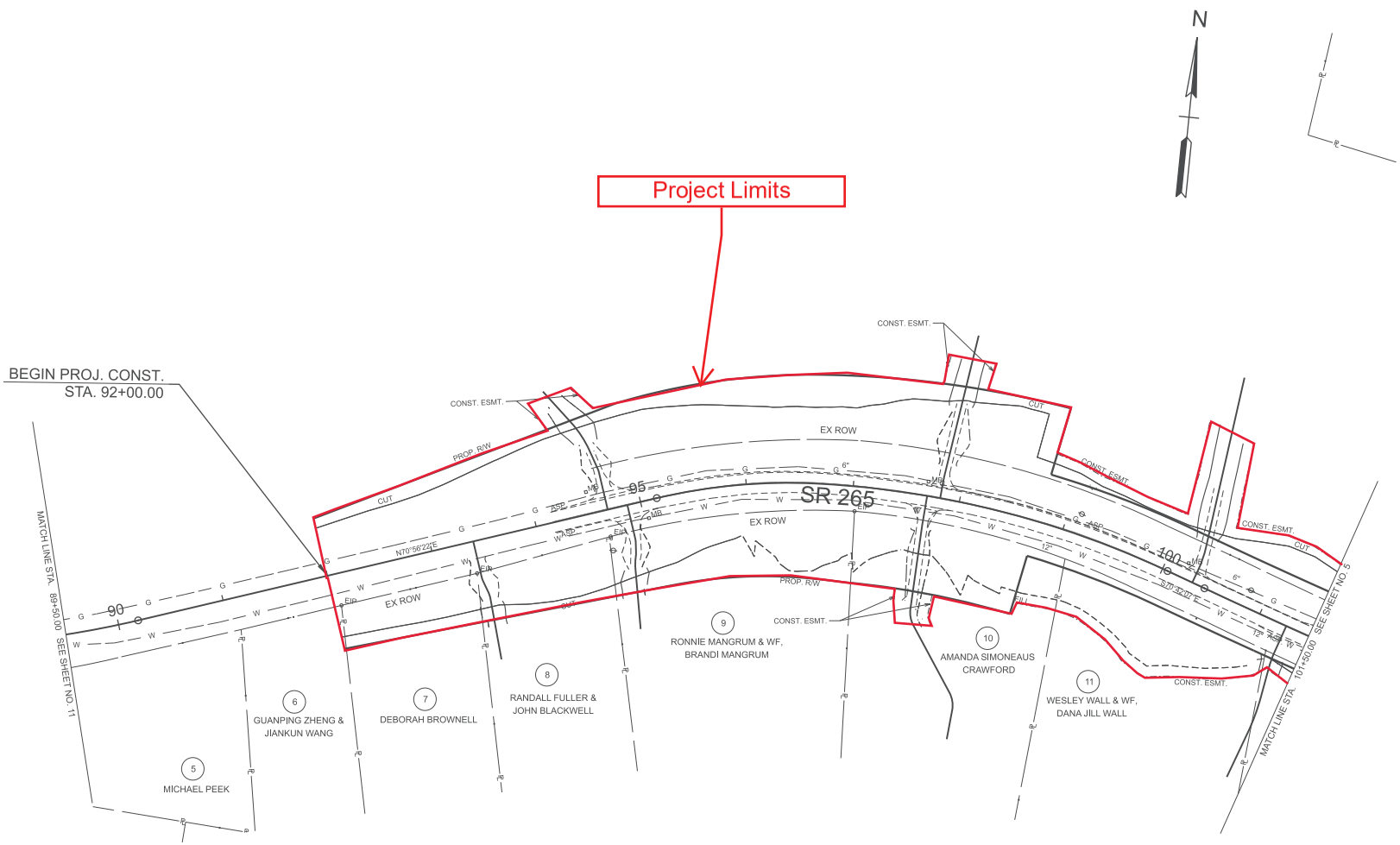
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	4



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 89+50 TO STA. 555+50
SCALE: 1" = 50'

2/4/2023 7:58:52 AM
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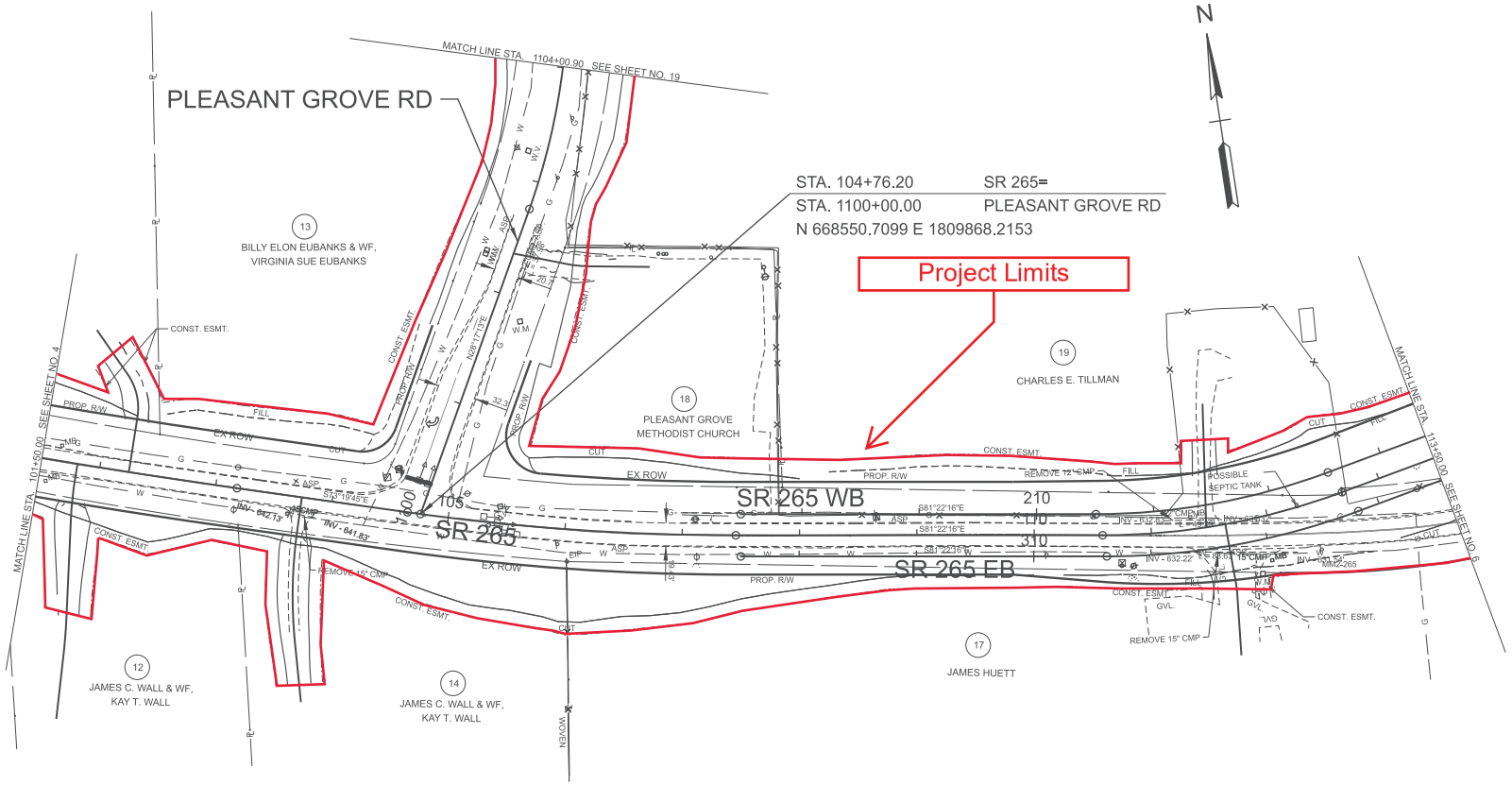
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	5



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

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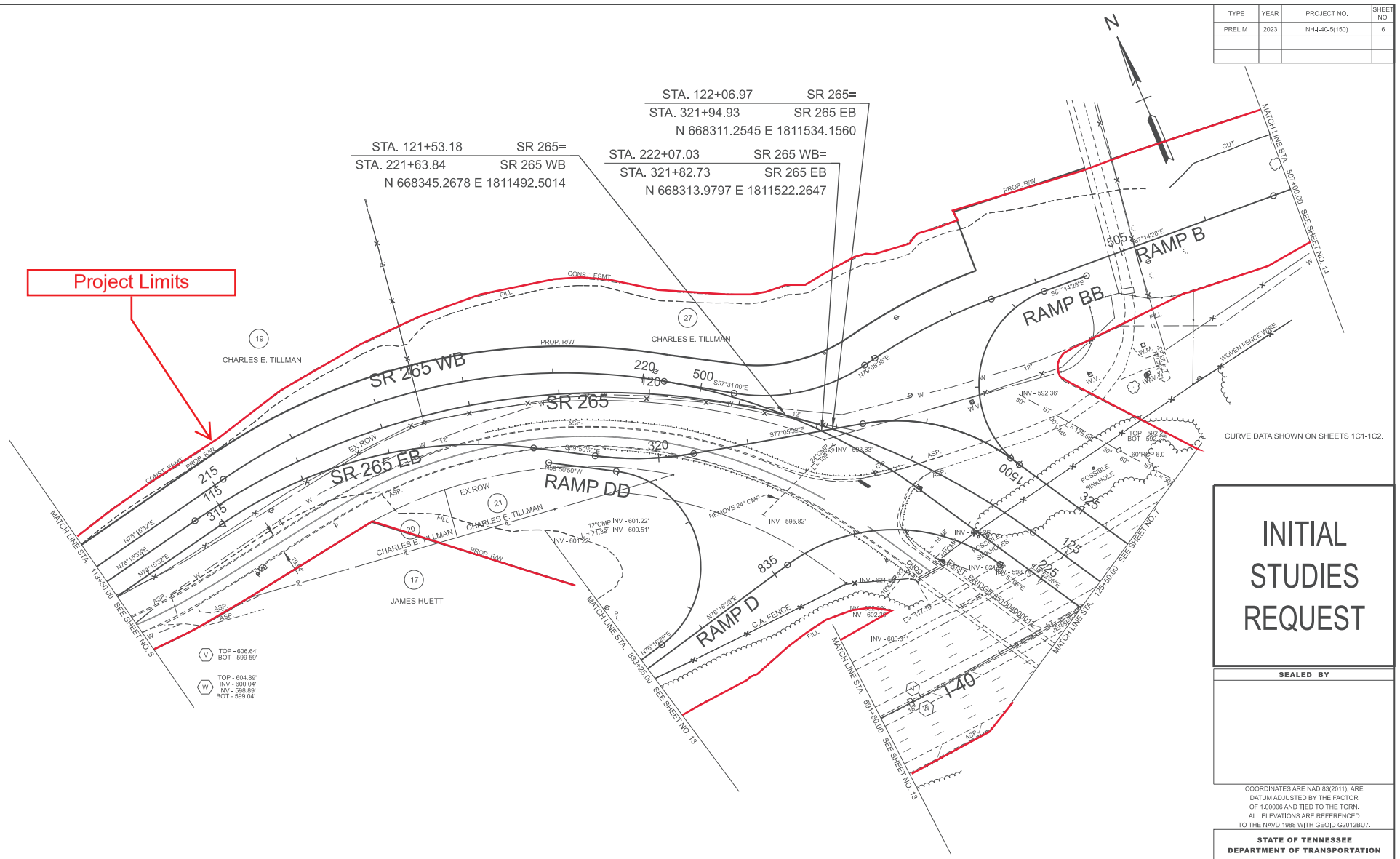

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	6

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

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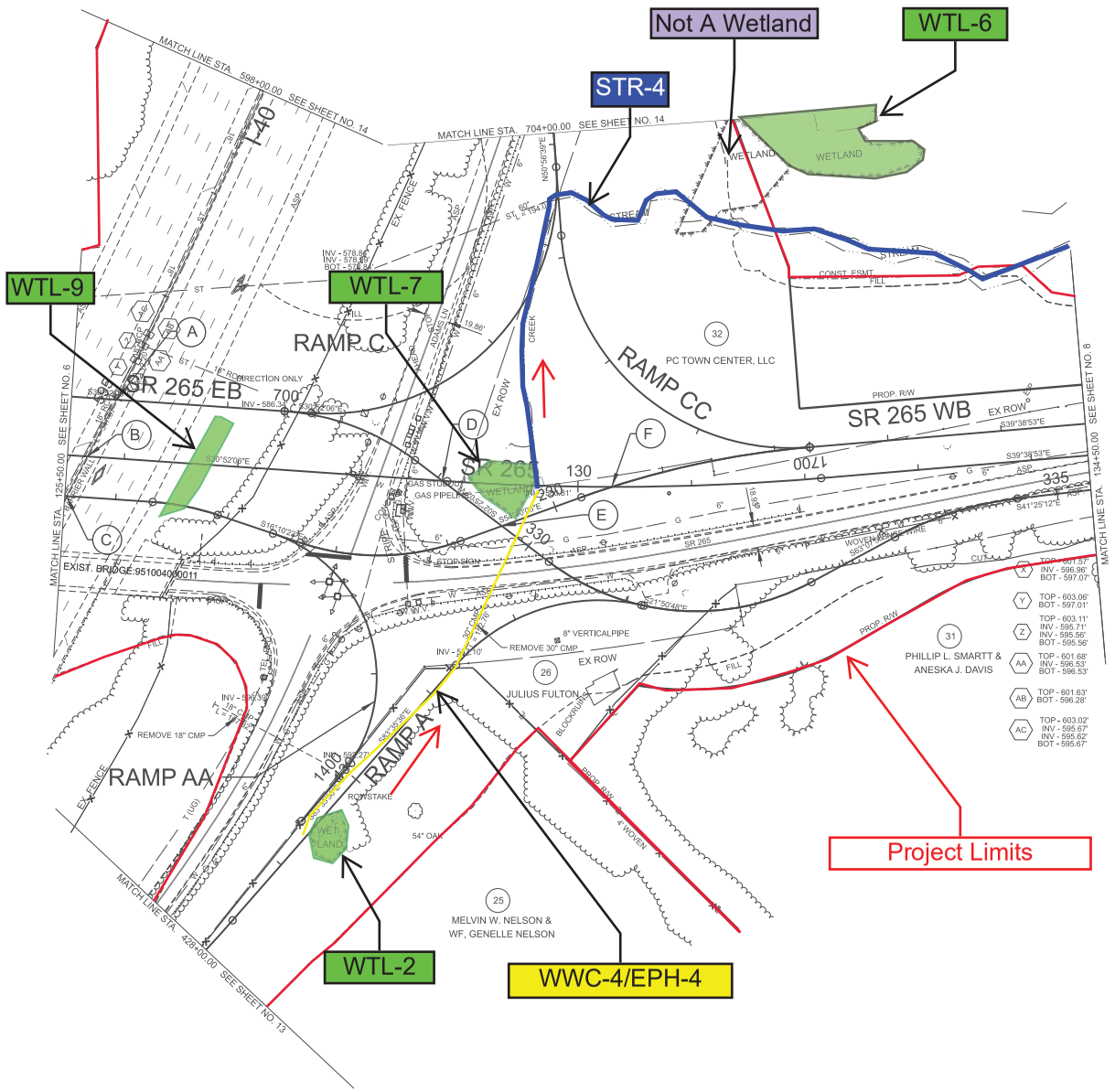

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7

(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 329+70.57 SR 265 EB=
STA. 229+50.16 SR 265 WB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 125+50 TO STA. 335+50
SCALE: 1" = 50'

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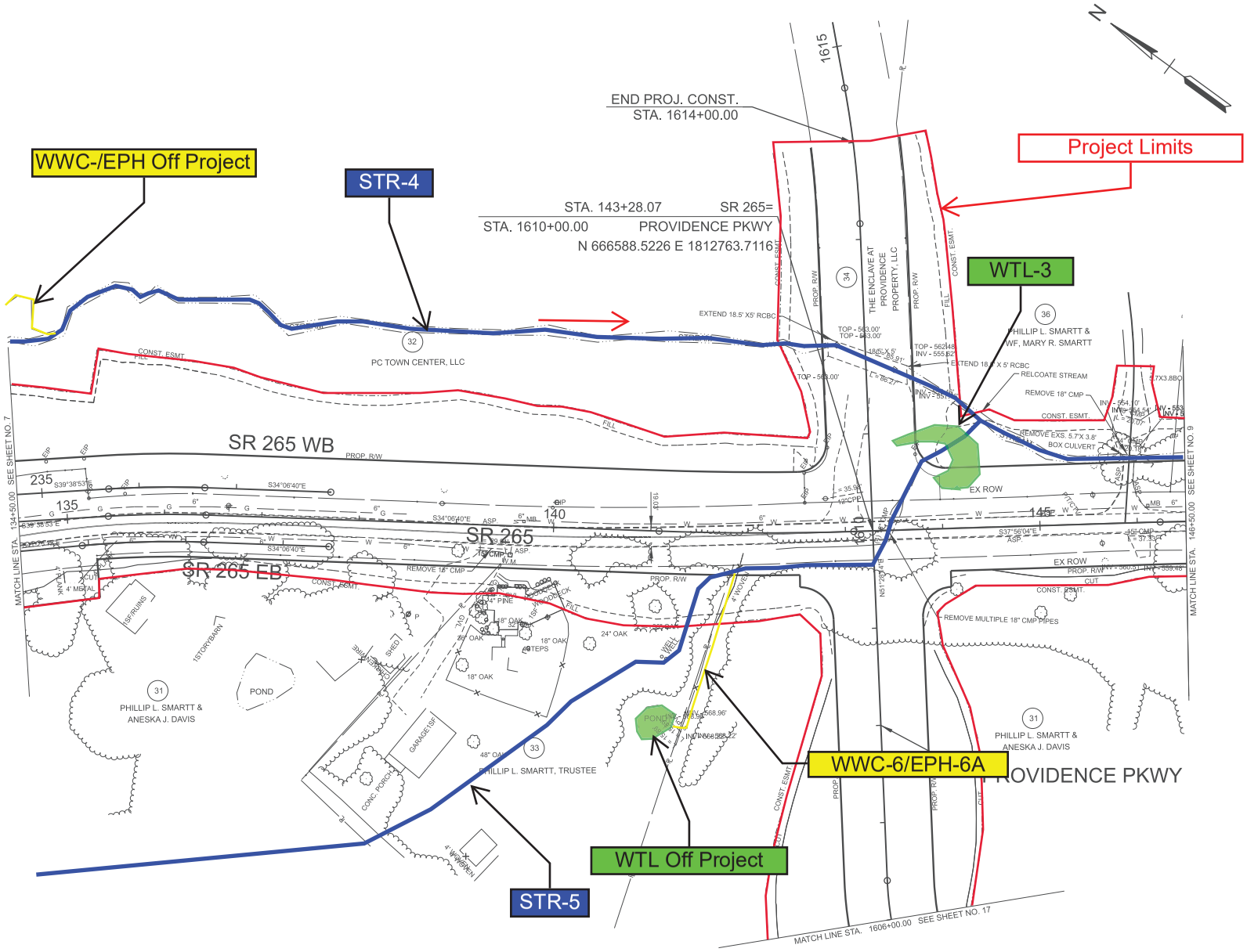

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	8

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

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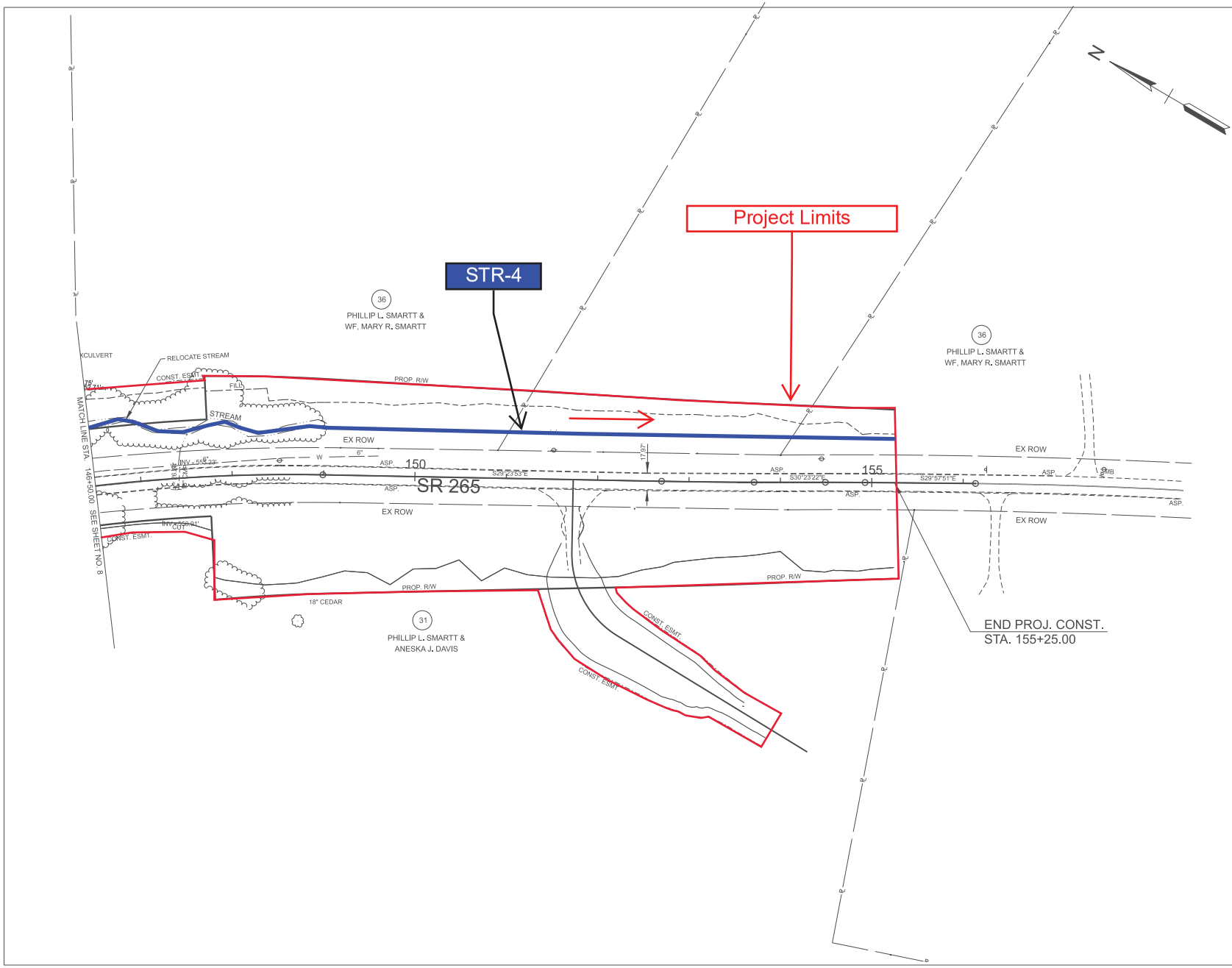

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	9

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 146+50 TO STA. 149+50
SCALE: 1" = 50'

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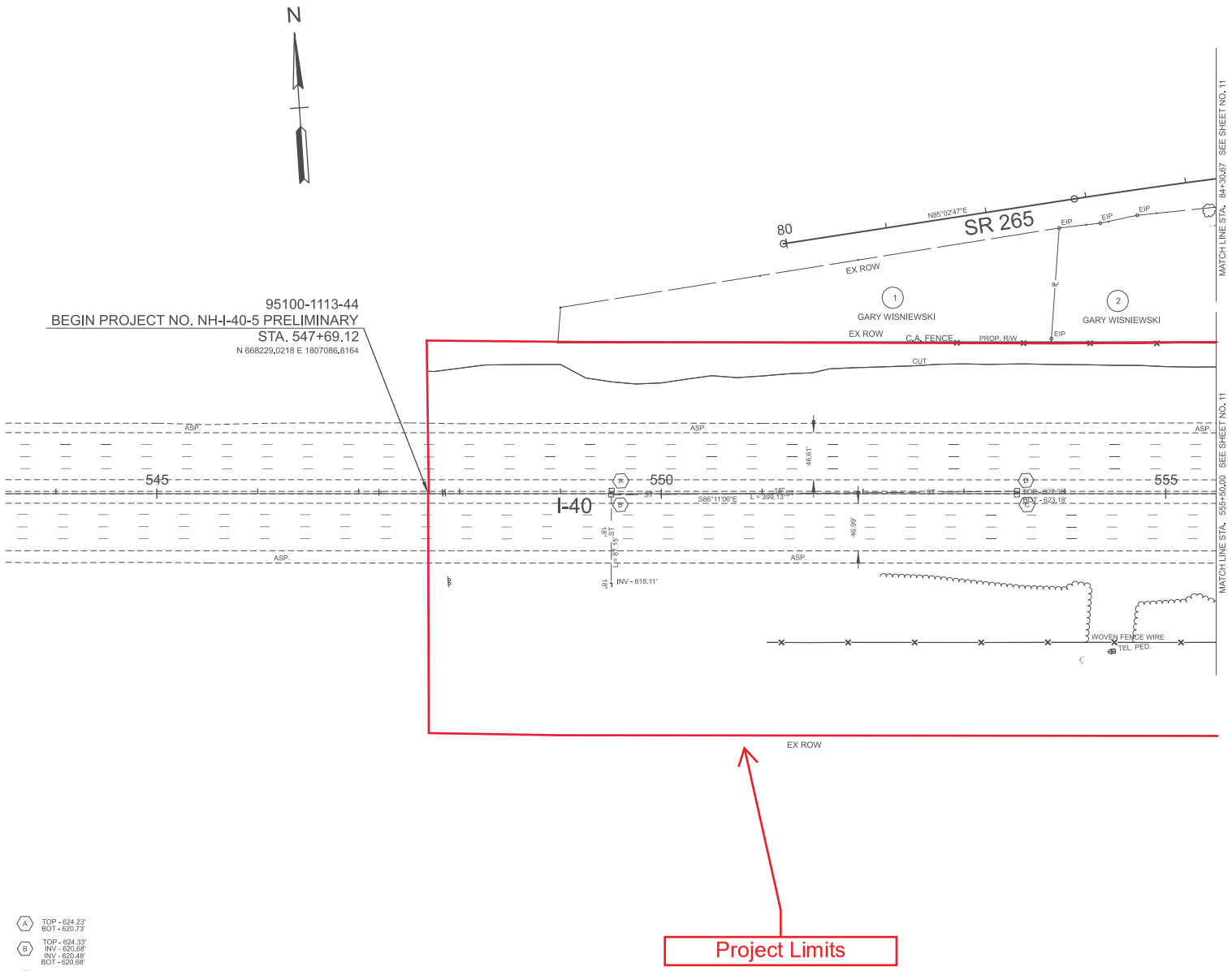

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 542+00 TO STA. 555+00
SCALE: 1" = 50'

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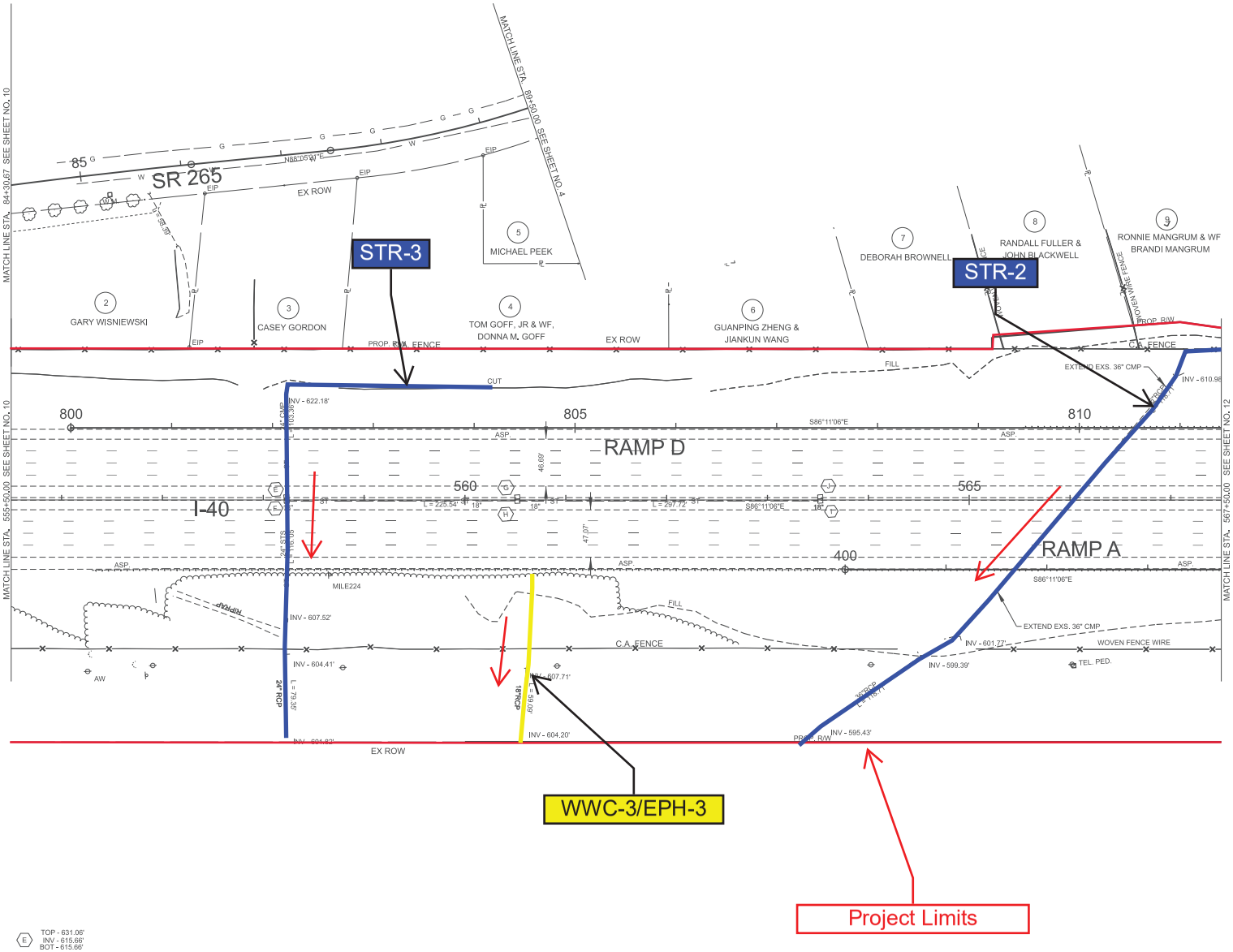

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	11

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 555+00 TO STA. 567+00
SCALE: 1" = 50'

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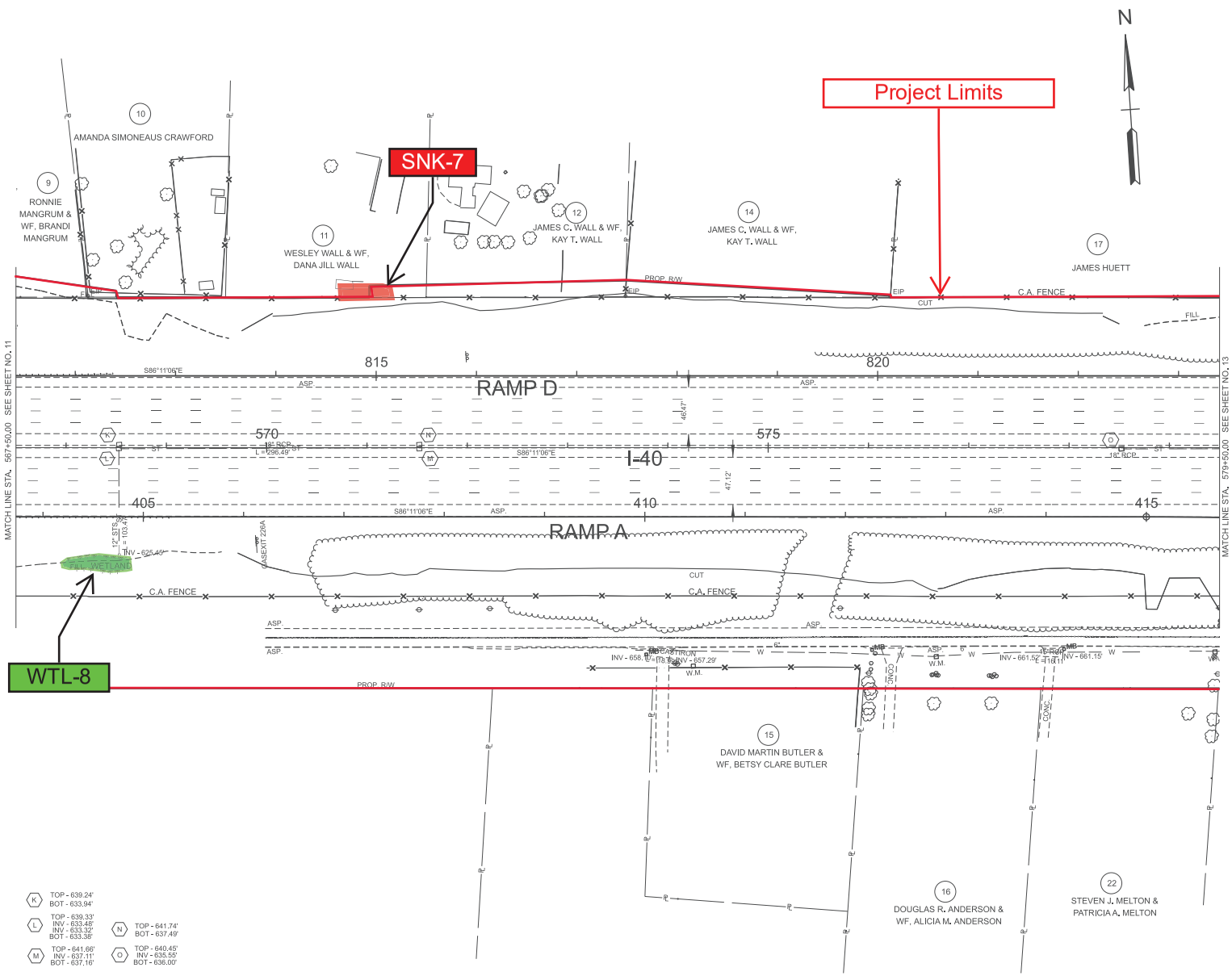

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	12

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 403+50 TO STA. 415+50
SCALE: 1" = 50'

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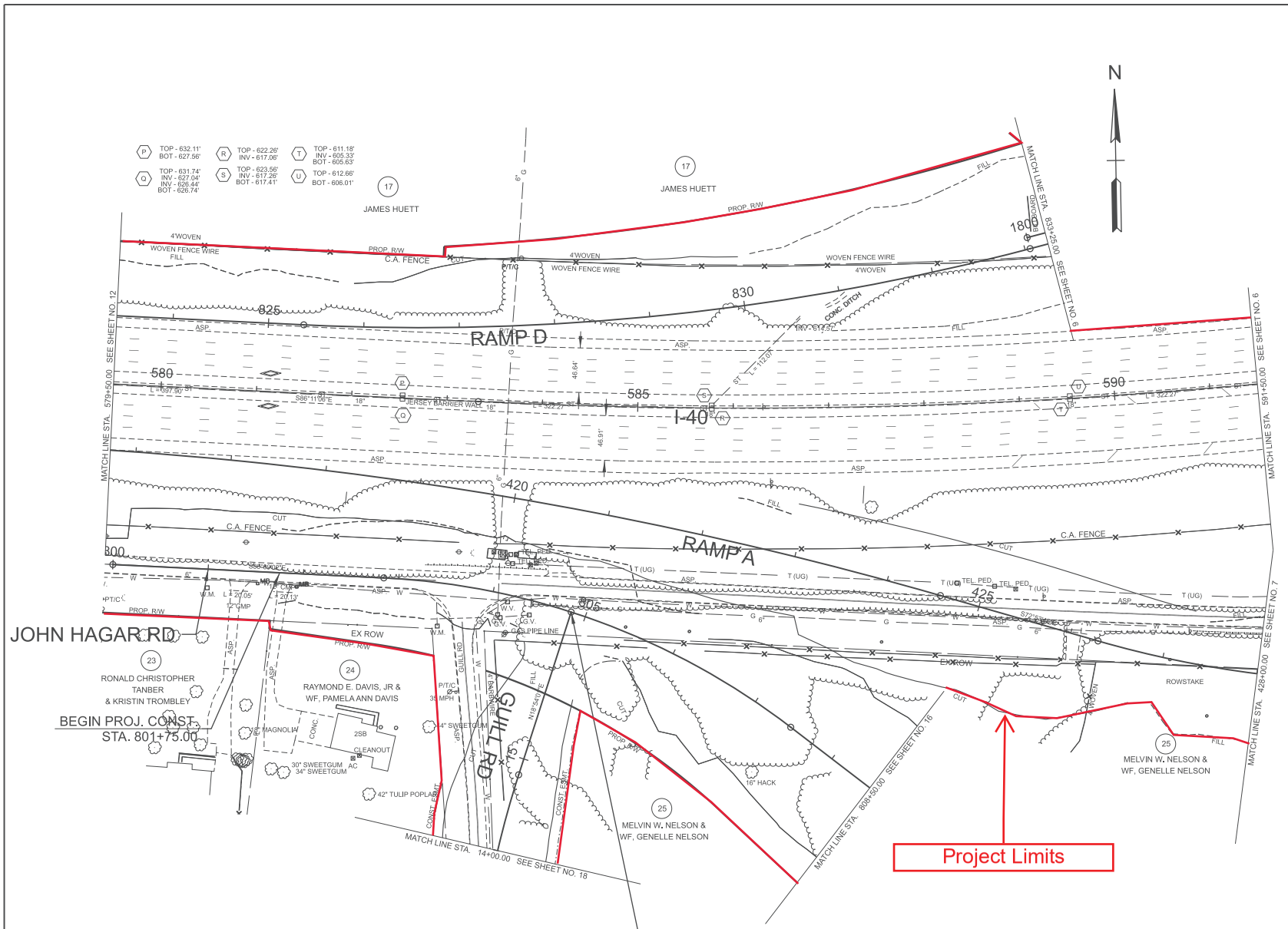

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 579+50 TO STA. 591+50
SCALE: 1" = 50'

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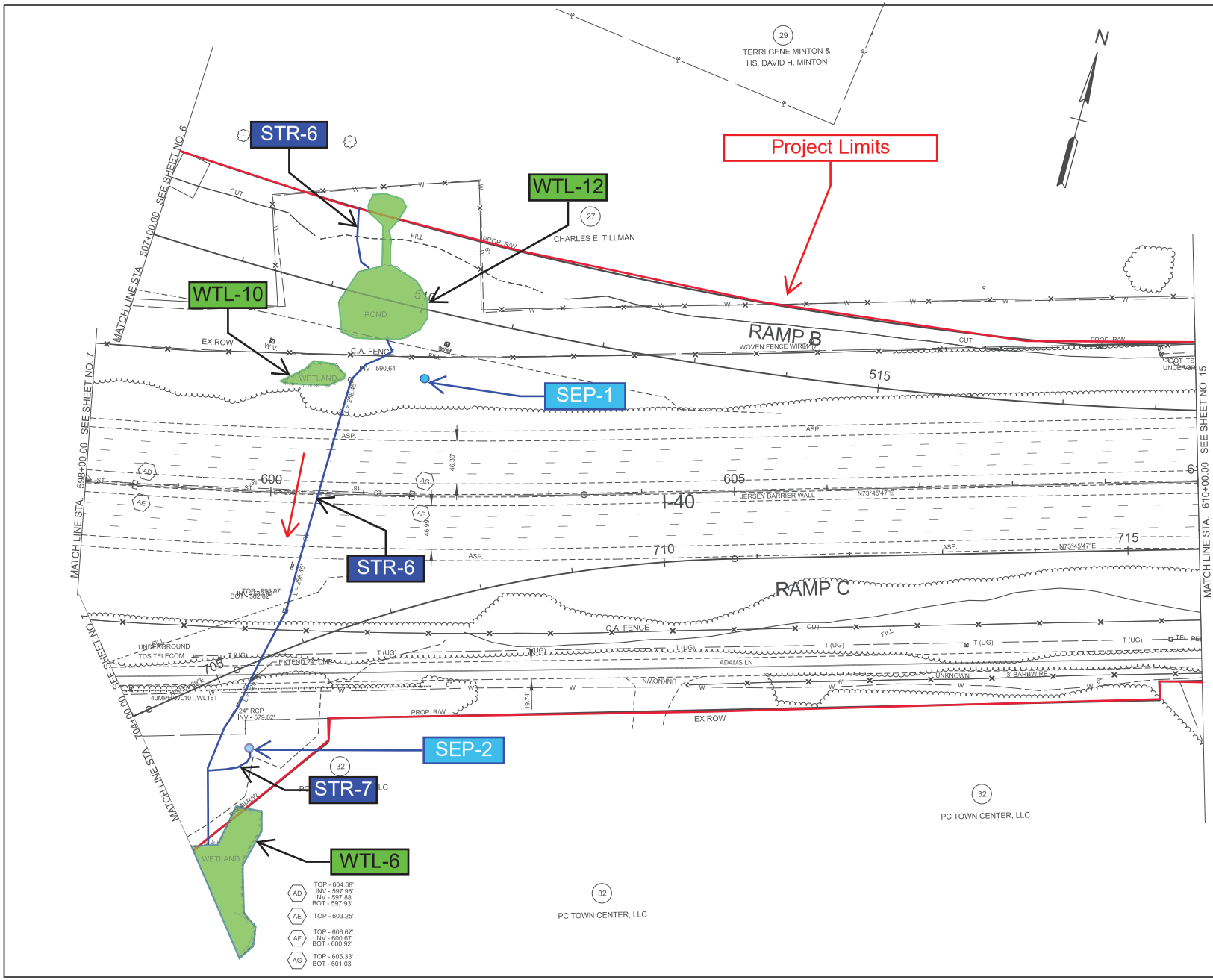

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:22 AM
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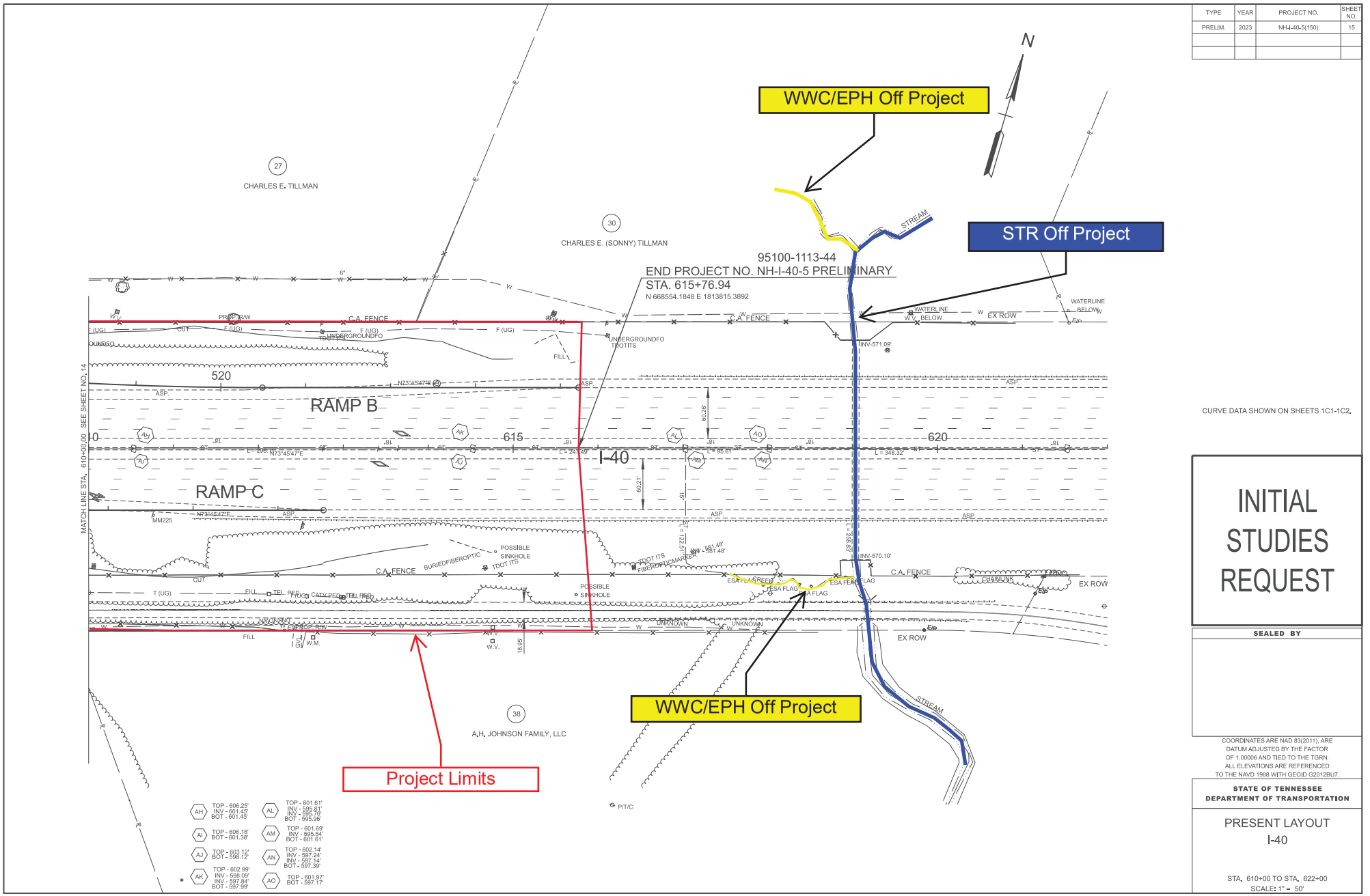

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 610+00 TO STA. 622+00
SCALE: 1" = 50'

2/4/2023 8:43:38 AM
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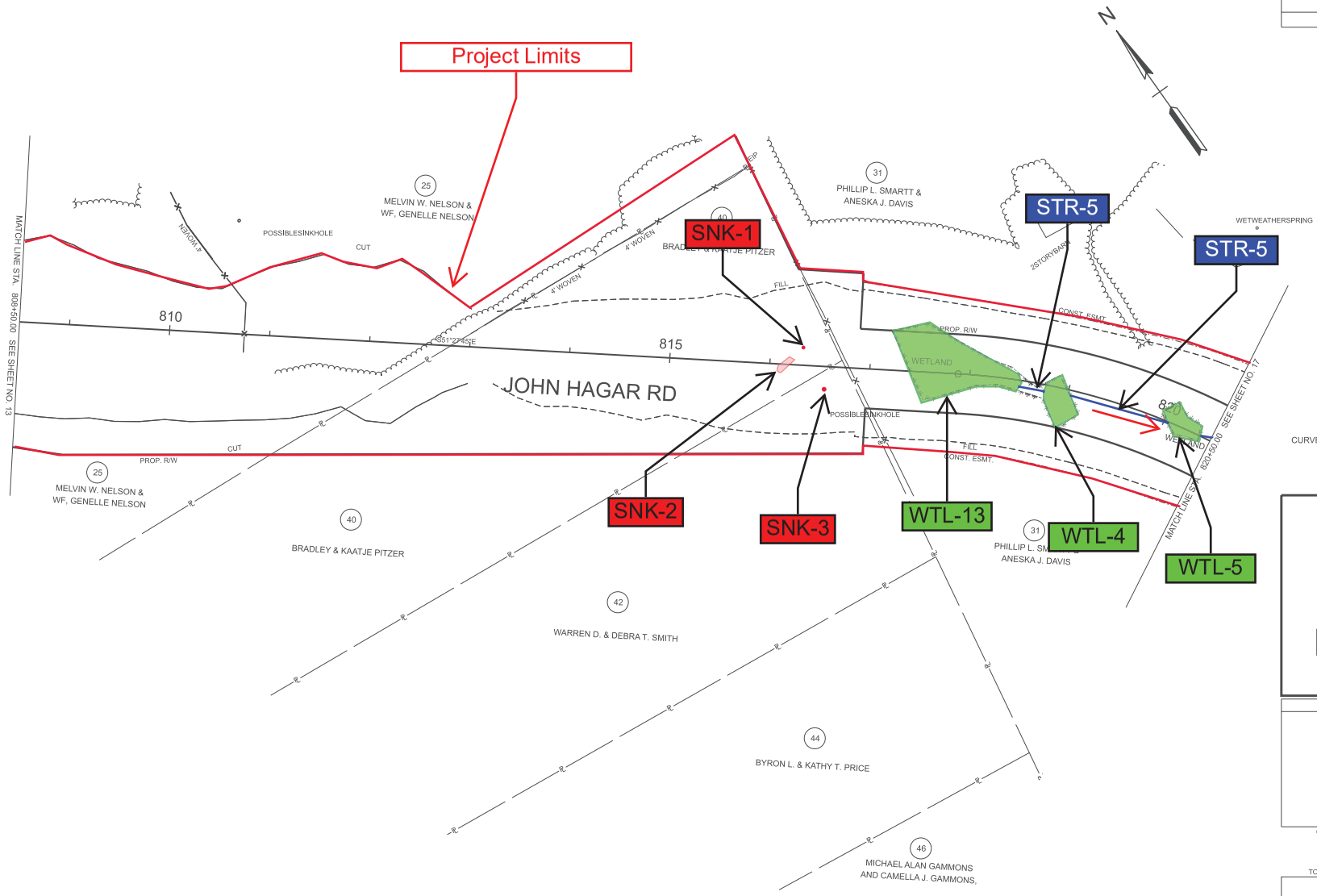
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	16



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 808+50 TO STA. 820+50
SCALE 1" = 50'

2/4/2023 8:47:10 AM
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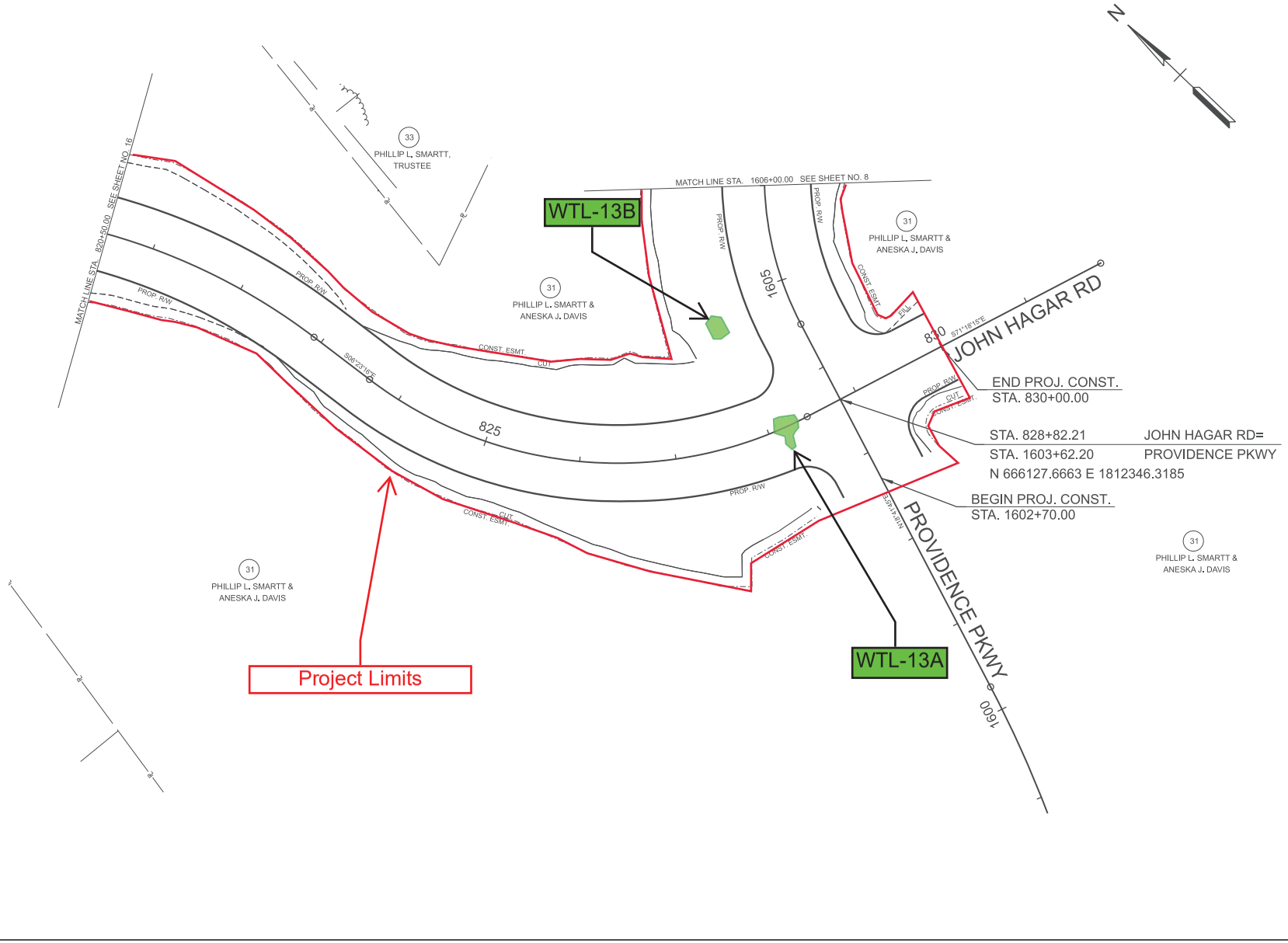

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	17

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:07 AM
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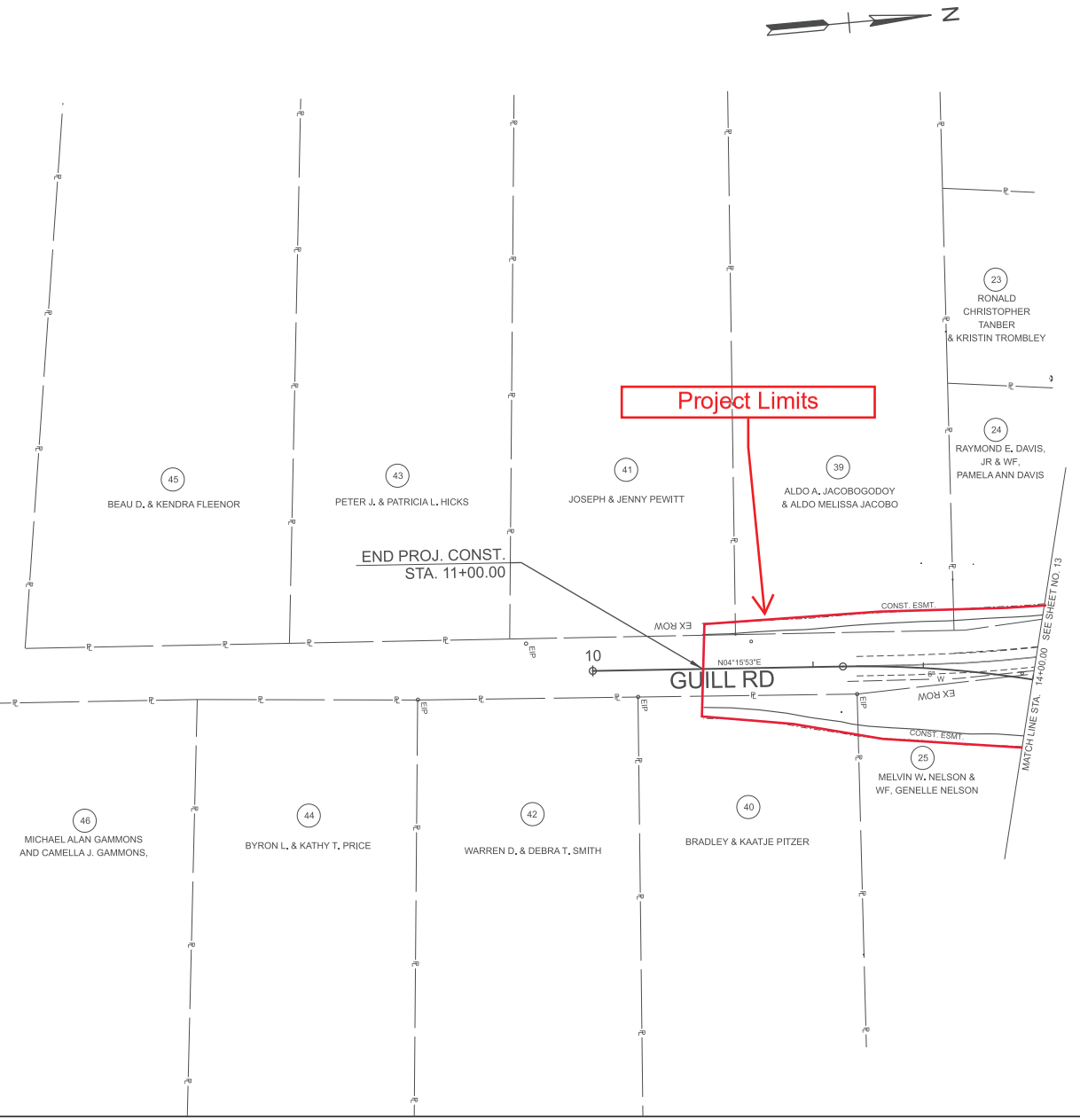
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	18



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
GUILL RD

STA. 11+00 TO STA. 14+00
SCALE: 1" = 50'

2/4/2023 8:53:30 AM
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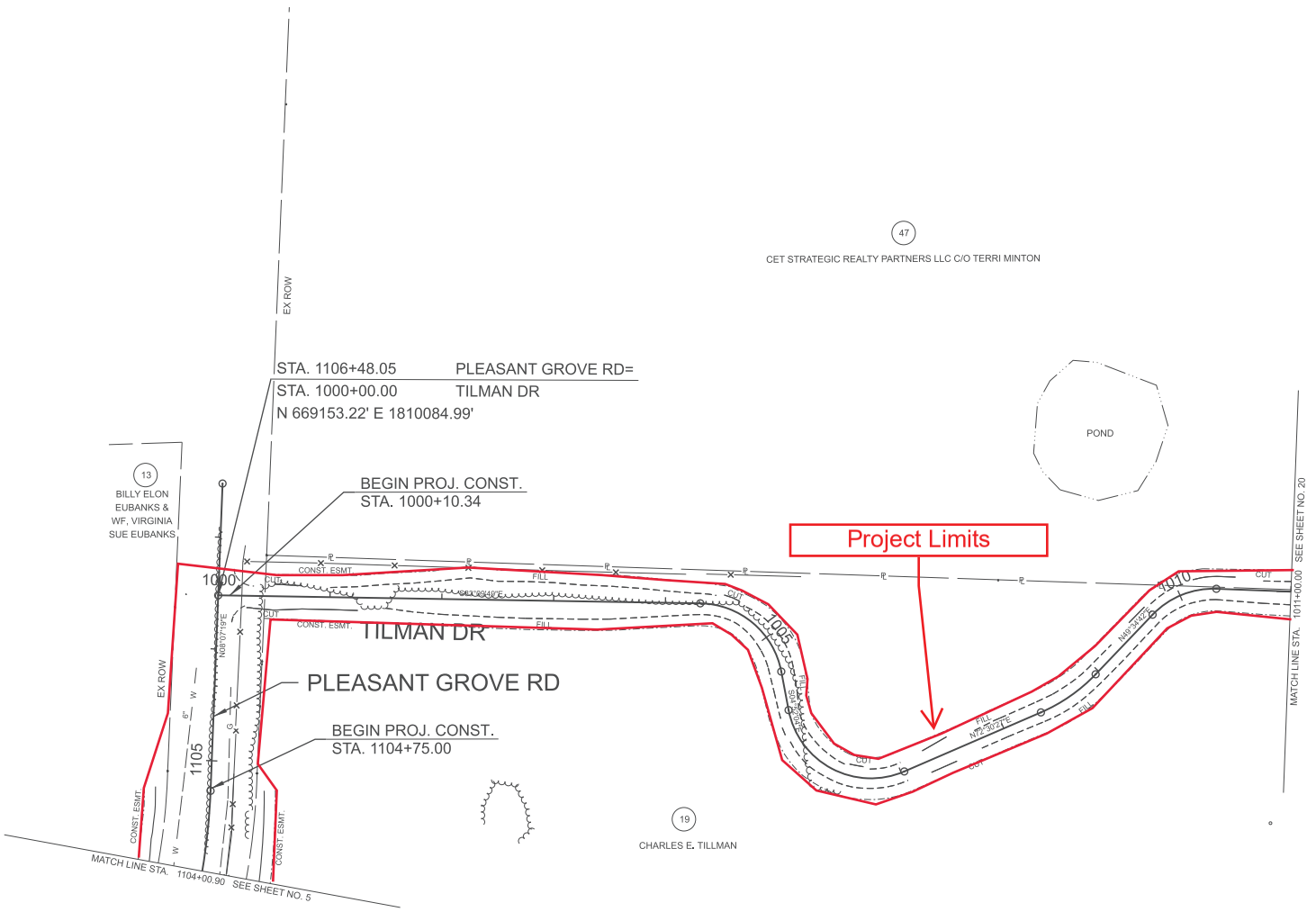
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	19



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011). ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
TILMAN DR

STA. 1104+50 TO STA. 1111+00
SCALE: 1" = 50'

2/4/2023 8:56:37 AM
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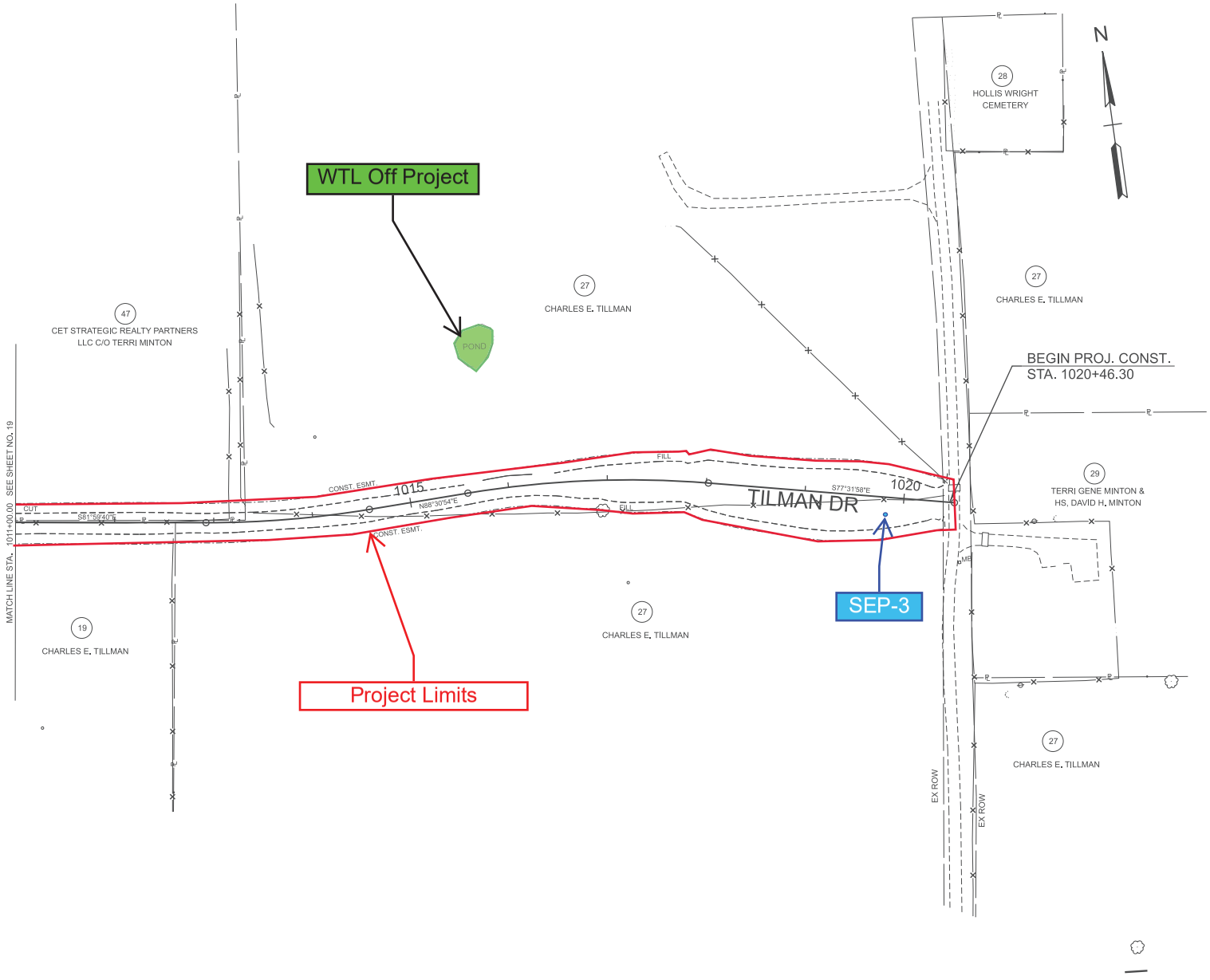

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NHJ-40-5(150)	20

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
TILMAN DR

STA. 1111+00 TO STA. 1020+50
SCALE: 1" = 50'

2/4/2023 8:59:58 AM
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INDIANA BAT (*Myotis sodalis*) and NORTHERN LONG-EARED BAT (*Myotis septentrionalis*) SURVEY REPORT

I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
PE# 95100-0113-04 PIN: 124884.00
WILSON COUNTY, TENNESSEE

PREPARED FOR:

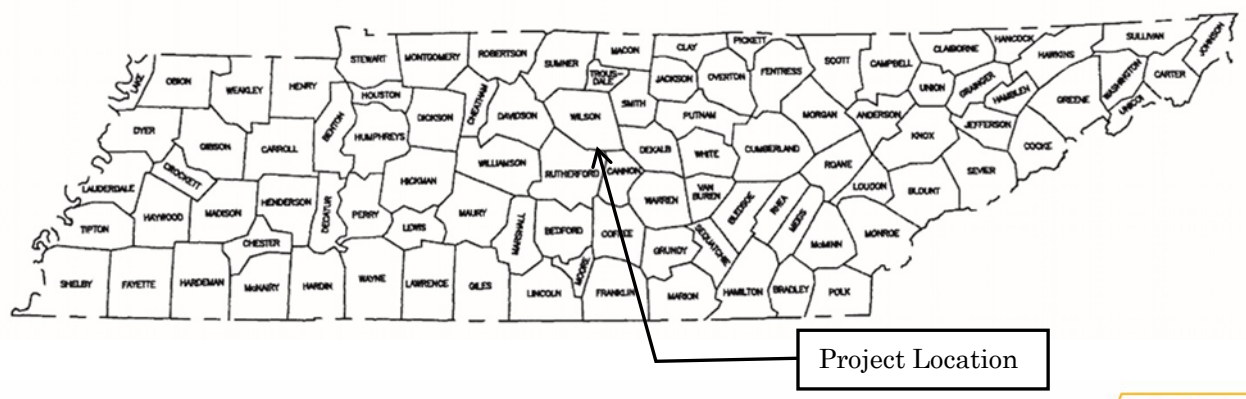
TENNESSEE DEPARTMENT OF TRANSPORTATION
JAMES K. POLK BUILDING – SUITE 900
505 DEADERICK STREET
NASHVILLE, TN

PREPARED BY:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
117 SEABOARD LANE, SUITE E-100
FRANKLIN, TN 37067

CEC PROJECT 323-564

AUGUST 30, 2022



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1.0 INTRODUCTION

This report presents the findings of an Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) presence/probable absence mist net survey conducted for the Tennessee Department of Transportation (TDOT) by Civil & Environmental Consultants, Inc. (CEC). The survey was completed for the proposed I-40 Interchange at SR-265 (Central Pike) in Mt. Juliet, Wilson County, Tennessee.

The proposed project involves construction of an I-40 interchange at SR-265 (Central Pike) (Figure 1). The project site consists of approximately 1.5 linear miles (2.5 km) which includes residential, agriculture properties and mixed secondary forests.

The purpose of this study was to confirm the presence or probable absence of the federally endangered Indiana bat and the federally threatened northern long-eared bat at the project area. This survey was based on CEC's professional judgment and interpretation of the technical criteria outlined in the U.S. Fish and Wildlife Service (USFWS) agency document titled *2022 Range-wide Indiana Bat & Northern Long-Eared Bat Survey Guidelines* (USFWS 2022).

2.0 METHODOLOGY

CEC biologists traversed the project area by vehicle and on foot to identify potential bat habitat (roosting areas, feeding areas, drinking pools, and flight corridors). Our field reconnaissance was completed to establish mist net sites that would maximize the success of the mist net survey. Given the size, shape, and amount of forested habitat within the project area, three (3) mist net sites were selected for this project. Refer to Appendix A for the USFWS correspondence relating to the number of proposed mist net sites and proposed net nights.

The sites completed by CEC near the project area contained the following bat habitats: roosting areas, feeding areas, and flight corridors. These sites had the highest potential to capture Indiana bats and northern long-eared bats (Figures 1 and 2).

The mist net sites completed by CEC included two mist net sets per site. All mist nets used during the survey were Avinet – USA-made 75/2 38mm mesh, polyester, reduced "bag" for bats (Avinet Inc. - Dryden, New York). The mist nets measure 2.6 meters high, contain four shelves, and are various lengths ranging from 3 meters to 18 meters. CEC used Avinet stackable poles for single high net sets and telescoping, self-locking, reinforced electrical grade, non-conductive fiberglass poles that allow up to three nets to be stacked on top of each other. These non-conductive fiberglass net poles reach a maximum of 40 feet into the canopy. The custom-built net poles and CEC mist net surveying techniques are based upon Gardner et al. (1989), and Nagorsen and Peterson (1980).

The bat mist net survey was completed under strict adherence to the USFWS *2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines*, dated March 2022. All captured bats were identified by Mr. J.D. Wilhide, an authorized Collection Permit holder (see Appendix B for Scientific Collector's Permits). Photographs of each mist net site are presented in Appendix C. All collections made during the survey were recorded on field data sheets, which are presented in Appendix D.

3.0 RESULTS

CEC sampled three (3) sites for a total of 12 net nights (3 survey sites x 2 nights per survey site x 2 nets set per survey night = 12 net nights) from June 29 to July 2, and July 5 to 6, 2022. Each survey site was sampled for a minimum of five hours starting at sunset. The following section provides a detailed description of the mist net sites and presents the results of the netting effort at each site.

Site 1

Mist net Site 1 was sampled over a two-day period from June 29 to 30, 2022. On the initial survey night, two mist net sets (Net A, one 6-meter long, double high net and Net B, one 6-meter long, double high net) were erected over a forested corridor. The nets spanned the entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the first night of surveying.

On the second survey night, two mist net sets (Net A, one 6-meter long, double high net and Net B, one 9-meter long, double high net) were erected over a forested corridor. The nets spanned the entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the second night of surveying.

Site 2

Mist net Site 2 was sampled over a two-day period from July 5 to 6, 2022. On the initial survey night, two mist net sets (Net A, one 6-meter long, double high net and Net B, one 6-meter long, double high net) were erected over a forest corridor. The nets spanned the entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the first night of surveying.

On the second survey night two mist net sets (Net A, one 6-meter long, double high net and Net B, one 6-meter long, double high net) were erected over a forest corridor. The nets spanned the entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the second night of surveying.

Site 3

Mist net Site 3 was sampled over a two-day period from July 1 to 2, 2022. On the initial survey night, two mist net sets (Net A, one 9-meter long, double high net and Net B, one 6-meter long, double high net) were erected along a pond edge and forest corridor. The nets spanned the pond edge opening and entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the first night of surveying.

On the second survey night, two mist net sets (Net A, one 9-meter long, double high net and Net B, one 6-meter long, double high net) were erected along a pond edge and forest corridor. The nets

spanned the pond edge opening and entire width of the corridor and extended upward 20 feet closing in the canopy. No bats were captured during the second night of surveying.

4.0 CONCLUSIONS

CEC conducted an Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) presence/probable absence mist net survey for the tree clearing activity associated with the proposed I-40 interchange improvements at SR-265 (Central Pike), Wilson County, Tennessee from June 29 to July 2, and July 5 to 6, 2022. No bats were captured along the proposed project area. The mist netting effort consisted of a total of 12 net nights. No Indiana bats or northern long-eared bats were captured during the survey. No additional bat surveys are recommended or warranted at this time.

5.0 LEVEL OF CARE

The Indiana bat survey services performed by CEC were conducted in a manner consistent with the criteria outlined in the USFWS documents titled *2022 Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines*, dated March 2022, and with the level of care and skill ordinarily exercised by members of the environmental consulting profession practicing contemporaneously under similar conditions in the locality of the project.

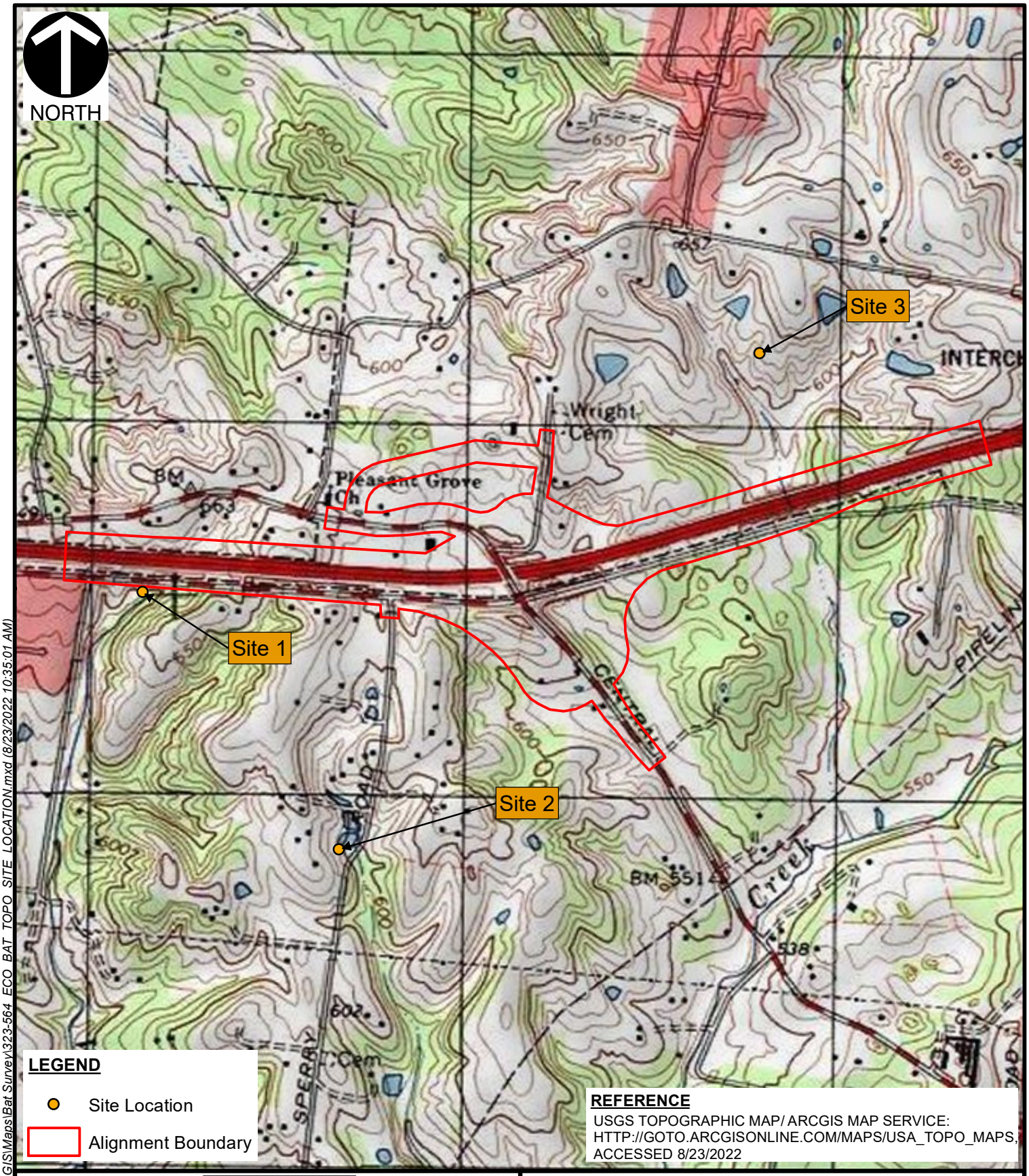
6.0 REFERENCES

Gardner, J. E., J. D. Garner, and J. E. Hofmann. 1989. A Portable Mist-Netting System for Capturing Bats with Emphasis on *Myotis sodalis* (Indiana bat). Bat Research News 30:1-8.

Nagorsen, D. W.; Peterson, R. L., 1980: Mammal Collectors Manual. A Guide for Collecting, Documenting, and Preparing Mammal Specimens for Scientific Research. Belonging to the unnumbered series: Life Sciences Miscellaneous Publications. Royal Ontario Museum, Toronto. ISBN: 0-88854-255-0 pa.

U.S. Fish and Wildlife Service. 2022. *2022 Range-wide Indiana Bat & Northern Long-Eared Bat Survey Guidance*.

FIGURES



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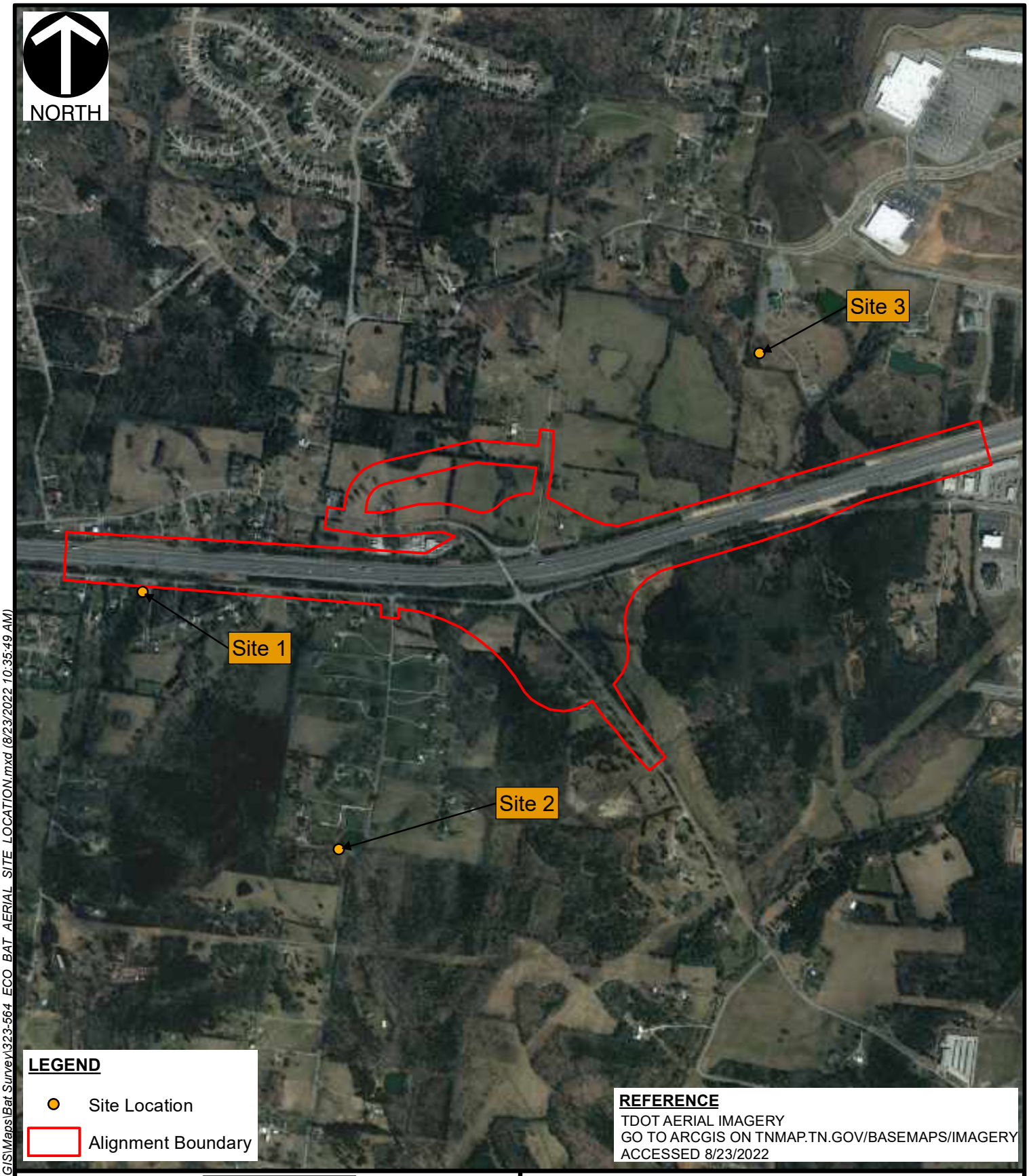
I-40 INTERCHANGE AT SR-265
LEBANON, WILSON COUNTY, TN

SITE LOCATION USGS TOPOGRAPHIC MAP

DRAWN BY:	JFS	CHECKED BY:	JDW	APPROVED BY: * Hand signature on file	TJN	FIGURE NO:	1
DATE:	8/23/2022	SCALE:	1 " = 1,150 '	PROJECT NO:	323-564		



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LEBANON, WILSON COUNTY, TN

SITE LOCATION AERIAL MAP

DRAWN BY:	JFS	CHECKED BY:	JDW	APPROVED BY: * Hand signature on file	TJN	FIGURE NO:	2
DATE:	8/23/2022	SCALE:	1 " = 1,150 '	PROJECT NO:	323-564		



LEGEND

- Net Location
- Alignment Boundary

REFERENCE
TDOT AERIAL IMAGERY
GO TO ARCGIS ON TNMAP.TN.GOV/BASEMAPS/IMAGERY
ACCESSED 8/23/2022

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SITE 1 NET LOCATION AERIAL MAP

DRAWN BY:	JFS	CHECKED BY:	JDW	APPROVED BY:	* Hand signature on file TJN	FIGURE NO:	2A
DATE:	8/23/2022	SCALE:	1 " = 300 '	PROJECT NO:	323-564		

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I-40 INTERCHANGE AT SR-265
LEBANON, WILSON COUNTY, TN

SITE 2 NET LOCATION AERIAL MAP

DRAWN BY:	JFS	CHECKED BY:	JDW	APPROVED BY:	* Hand signature on file TJN	FIGURE NO:	2B
DATE:	8/23/2022	SCALE:	1 " = 300 '	PROJECT NO:	323-564		

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SITE 3 NET LOCATION AERIAL MAP

DRAWN BY:	JFS	CHECKED BY:	JDW	APPROVED BY:	* Hand signature on file TJN	FIGURE NO:	2C
DATE:	8/23/2022	SCALE:	1 " = 300 '	PROJECT NO:	323-564		

APPENDIX A
U.S. FISH & WILDLIFE SERVICE CORRESPONDENCE

From: Griffith, John
To: Wilhide, Jack
Subject: Re: [EXTERNAL] Request for Concurrence - Wilson County; I40 Interchange at SR-265, PIN: 124884.00
Date: Monday, May 9, 2022 2:19:00 PM
Attachments: image002.png

J.D.,

The study plan looks fine and the proposed survey level of effort is sufficient to establish presence/absence for northern long-eared bat and Indiana bat at the site. CEC can proceed with surveys as planned. Thanks,

John Griffith
Transportation Biologist
U.S. Fish and Wildlife Service
Tennessee Field Office
931-525-4995 (office)
931-528-7075 (fax)

From: Wilhide, Jack <jwilhide@cecinc.com>
Sent: Monday, May 9, 2022 7:59 AM
To: Griffith, John <john_griffith@fws.gov>
Subject: [EXTERNAL] Request for Concurrence - Wilson County; I40 Interchange at SR-265, PIN: 124884.00

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

John,

CEC is requesting survey concurrence on the above referenced project related to Indiana and Northern long-eared bat surveys. We request to perform a mist net survey to confirm the presence/probable absence of the Indiana and Northern long-eared bat. The project is I40 interchange improvement, length is approximately 1.6 miles (2.51 km). CEC proposes to survey three (3) mist net sites for 2 nights (3 sites x 2 nights x 2 nets per site = 12 net nights). The mist net survey is scheduled to start around 5 June, weather permitting. The mist net survey will follow the 2022 Range-Wide Indiana Bat & Northern Long-eared Bat Survey Guidelines. Please let me know if you have any questions or need additional information.

Thank you,

Jack D. Wilhide, CWB | *Project Manager*
Civil & Environmental Consultants, Inc.

117 Seaboard Lane, Suite E-100, Franklin, TN 37067
direct 615.577.9343 **office** 615.333.7797 **mobile** 615.887.0086
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APPENDIX B
SCIENTIFIC COLLECTION PERMIT

NATIVE ENDANGERED & THREATENED SP. RECOVERY

Permit Number: ES148282

Version Number: 6

Effective: 2022-04-16 **Expires:** 2027-04-30

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

ES Atlanta Permit Office
1875 Century Boulevard
Atlanta, Georgia 30345
permitsR4ES@fws.gov

Robert Tawes

FWS T&E Chief

Digitally signed by
Robert Tawes
2022-04-17 21:24:22

Permittee:

JACK (J.D.) WILHIDE

dba CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

117 SEABOARD LANE, SUITE E-100

FRANKLIN, TN 37067

US

Authority: Statutes and Regulations: 16 U.S.C. 1539 (a), 16 U.S.C. 1533 (d) 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13

Location where authorized activity may be conducted:

Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Reporting requirements:

Annual Reports are due by January 31 following each year that this permit is in effect.

Authorizations and Conditions:

A. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accordance with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local tribal, or other federal law.

C. The following individuals are authorized to conduct activities as authorized by this permit:

All Species/All Activities/All Locations: Mr. Jack (J.D.) Wilhide;
Gray Bat, Indiana Bat, Northern Long-eared Bat/All Activities except entering hibernacula or maternity roost caves/All Locations: Scott M. Bergeson;
Indiana Bat, Northern Long-eared Bat/Mist-netting, handling, banding, radio-tagging only/Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee only: Caleb A. Duke.

Trained assistants not named on this permit may work on permitted bat activities under the direct and on-site supervision of the individuals named above. However, trained assistants may not work independently at a site. Trained assistants are individuals who are considered qualified by the permitted biologist(s) to select sampling sites, deploy sampling equipment and nets, and handle bats in the field.

Permittee must remain present at each mist-net and harp trap site while it is being operated.

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the terms of this permit and all sections of title 50 Code of Federal Regulations, parts 13 and 17, pertinent to issued permits. Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and

criminal penalties for failure to comply with permit conditions. In addition, the permittee shall have all other applicable Federal, Tribal, State, and/or local government permits prior to the commencement of activities authorized in this permit.

E. Permittee is authorized to take (enter hibernacula or maternity roost caves, capture with mist nets or harp traps, handle, identify, band, and radio tag) gray bats (*Myotis grisescens*), Indiana bats (*Myotis sodalis*), northern long-eared bats (*Myotis septentrionalis*), Ozark big-eared bats (*Corynorhinus townsendii ingens*), and Virginia big-eared bats (*Coryrhinus townsendii virginianus*) while conducting presence/probable absence surveys, studies to document habitat use, and population monitoring, as described in permittee's November 16, 2020, application and as conditioned below.

F. The permitted activities described herein require prior, site-specific approval from the U.S. Fish and Wildlife Service (USFWS) Field Supervisor in the State(s) where the project will occur. Permittee shall notify the USFWS Field Supervisor for the State in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D. Your request for this site-specific approval must be in writing and must indicate:

1. The purpose and a description of the activities proposed (e.g., surveys, radio telemetry studies, etc.).

2. Location of proposed activities, including project site (legal description and lat/long), county, and state.

3. Dates when the project is proposed to take place.

4. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter/email must be carried with this permit to authorize site-specific activities.*

This permit is not valid without applicable concurrence letter(s)/email(s) for activities and any required State permits.

G. Permittee shall adhere to the following conditions involving capture and handling of bats:

G.1. Federally listed bats may be captured following the protocol(s) provided by the USFWS, when available. Permittee must contact the USFWS Field Supervisor in the state(s) in which activities are proposed to ensure correct protocol(s) are used (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D). For example, the current Range-wide Indiana Bat Summer Survey Guidelines are available at: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines. The monitoring interval for mist nets is once every 10 minutes. Harp traps must be continually monitored.

G.2. Captured bats, other than Virginia big-eared bats (VBEB) and Ozark big-eared bats (OBEB) (see Condition G.3., below), may be held for a maximum of 30 minutes, unless injured. If an exception is required to this prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D).

G.3. VBEB and OBEB should be removed from the net or harp trap soon after capture. If there are multiple bats in the net/trap, VBEB and OBEB should be removed first, if possible. Ideally, VBEB and OBEB will be processed immediately after removal from the net or harp trap and then released. If this is not possible, gather what data can be obtained immediately while the VBEB and/or OBEB is in hand (age, sex, etc.) and release the bat, or, put the bat into a **HOLDING CAGE**. VBEB and OBEB **may not be held for more than 10 minutes**. **DO NOT PUT VBEB OR OBEB IN AN INDIVIDUAL BAG OR SMALL CONTAINER.** VBEB and OBEB are highly social and being held individually in bags increases stress and can lead to mortality.

Recommended holding cages measure 11 in x 7 in x 8 in high and are made of plywood and ¼-inch hardware cloth. Alternative options such as small soft-sided (mesh) pet carriers of a similar size also are suitable. If VBEB and OBEB are put into a holding cage(s), place the cage in a dark, quiet location, and process as soon as possible. A holding cage shall contain only multiple OZBBs, or only multiple VABBs (avoid overcrowding). Do not place other species/subspecies in either cage(s). Holding cages shall be decontaminated using the most current White-nose Syndrome decontamination guidance after a night of

use (https://www.whitenosesyndrome.org/topics/decontamination). Do not decontaminate holding cages within a single net night/harp trap night.

G.4. If any bat appears to be going into shock (i.e., becomes limp and unresponsive), place the bat in a dark, quiet location and monitor periodically. Do not place it in a bag, small container, or in a holding cage with other bats. Do not continue to handle the bat. Place the bat on a rock, flat surface, or other area where it can recover and is removed from capture activities and predators. If a stressed bat recovers, it should be released immediately. Do not attempt to gather additional data on the bat and do not place a transmitter on the bat.

G.5. Permittees shall carry out non-intrusive measurements on all captured bats, except as specified in Condition G.4. (above). Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data form provided by the USFWS (e.g., USFWS Bat Reporting Form available at: https://www.fws.gov/media/bat-reporting-spreadsheets-2020-2021. Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.).

G.6. If bands are applied, they must be lipped metal bands having a unique identifier. Bands should be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

G.7. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least five days, or until the transmitter falls off, whichever occurs first. **** Although not required as a condition of this permit, in order to gather needed information to promote the conservation of the northern long-eared bat, it is recommended that the permittee radio-track female and juvenile northern long-eared bats captured when conducting mist-netting***

and radio-tracking of Indiana bats within the white-nose syndrome (WNS) zone of the range of the northern long-eared bat. Specifics on the number of females and juvenile bats to be tracked will be determined in coordination with the appropriate Field Office, as specified in Condition F (above).

G.8. No mist-netting shall occur within 20 meters of a known or potential summer or winter roost site, either natural or artificial, of a federally listed bat. If an exception is required to this prohibition, permittee must receive prior written approval from the USFWS Field Supervisor for the State in which the activities are proposed to occur (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D).

G.9. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://whitenosesyndrome.org/.

G.10. Caves, mines, or other suitable hibernation and roost sites, such as bridges/culverts, may be quietly searched in a manner that minimizes disturbance by utilizing the minimum number of people and time required to complete the survey. Surveys of known hibernacula conducted during the winter hibernation season shall follow the guidelines established in the recovery plans for each federally listed bat species with regards to how often a site may be visited and other species-specific requirements related to entering hibernaculum. Under no circumstances should multiple trips to the hibernation area occur within the same year without written approval of the USFWS Field Supervisor for the State in which activities are proposed.

Bats may be handled during winter surveys in order to collect band information and confirm the identification of listed species. When possible, bands should be read without touching the bat. Banded bats should only be handled if easily accessible and removal of the bat does not disturb a large number of additional bats and is unlikely to result in injury to the bat. Detailed photographs should be taken to document the presence of listed species in previously undocumented hibernaculum. Where hibernacula area and safety conditions allow, individuals entering hibernacula are recommended to utilize night vision goggles or red-filtered light and to remain in the site no more than 90 minutes to complete the work.

G.11. When carrying out mist-netting, harp-trapping, hibernacula surveys and handling of bats under this permit, permittee must use COVID-specific Personal Protective Equipment (PPE) in addition to the PPE already identified by the USFWS and states for mitigating the risk of spread of the fungus that causes white-nose syndrome, which includes the use of disposable gloves, disposable or site-dedicated clothing, and adherence to decontamination procedures. COVID-specific PPE is a non-vented N95 respirator (no exhalation valve) or any respirator or mask that provides a similar level of protection (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest3.html#half).

G. 12. Surveys of gray, Virginia big-eared, and Ozark big-eared bat maternity roosts and their other known summer roost sites shall be conducted by observing the bats with night vision equipment and/or infrared light sources (e.g., thermal infrared) as they emerge from their roosts to avoid any possible disturbance to these bats. At previously undocumented sites for these species, the accepted method to determine if they are present is to carefully and slowly enter the potential roost site to check for evidence of presence/use, such as visual observation of bats, significant quantities or a strong smell of guano, or the audible sounds produced by bats roosting at the site. As soon as any evidence is obtained that the roost site is being used by a federally listed bat species, survey team members shall immediately exit the roost site and make further observations from outside the entrance to the roost. All further observations shall be made from the entrance during the evening emergence.

H. Upon determination that endangered and/or threatened bats are present, permittee shall notify the USFWS Field Office within the geographic location of study areas (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D) immediately (not to exceed 1 business day).

I. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. NOTE: This permit is limited to the above activities and identified species.

J. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

K. No injury or mortality is expected to occur to federally listed species covered under this permit. In the event that any accidental injury or mortality occurs, all activities must cease and the injury or mortality reported immediately (not to exceed 1 business day) to the appropriate USFWS species recovery lead (Condition P) and Southeast Region Recovery Permit Coordinator at the address and telephone number noted in Condition O.1., below. Based upon consultation between these offices, a decision will be made as to whether any of the authorized activities can continue. Decisions will also be made concerning the disposition of any dead or injured specimens. The permittee shall provide a written statement to the USFWS species recovery lead(s) and Southeast Region Recovery Permit Coordinator, which documents the cause of the injury/mortality, and identifies the remedial measures employed by the permittee to eliminate future mortality/injury events. The final decision on remedial measures and disposition of specimens rests with the USFWS.

L. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this authorization, initial notification must be made immediately to the USFWS Field Office in the State in which the specimen is found (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D). Notification should also be made by the next work day to the USFWS' Southeast Region Recovery Permit Coordinator identified in Condition O.1., below. Those offices will confer with the USFWS' Division of Law Enforcement as appropriate and determine next steps. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead animal, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

M. This permit is non-transferable.

N. An annual report summarizing the authorized activities must be submitted by January 31 following each year this permit is valid to the offices identified in Conditions N and O, as well as to the USFWS Field Offices in the States where activities occurred (https://www.fws.gov/?type=%5B%22Conservation%20Office%22%5D). When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office. Each report should include, at a minimum, the following information:

N.1. The date, time, geographic locations (including datum and projection information).

N.2. All locations surveyed (regardless of whether federally-listed bats were captured/observed).

N.3. Band numbers of all bats banded.

N.4. Information on any injuries and/or mortalities and disposition of specimens.

N.5. Location and characteristics of roost trees and bat colonies.

N.6. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

N.7. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data form provided by the USFWS (e.g., USFWS Bat Reporting Form available at: https://www.fws.gov/media/bat-reporting-spreadsheets-2020-2021). Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The permittee may be requested to provide individual photographs after submittal of annual reporting data. **The completed bat reporting spreadsheet must also be sent by email to Keith_Lott@fws.gov.**

N.8. Copies of all site-specific authorization letters/emails required under Condition F.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

O. For purposes of monitoring compliance and administration of the terms and conditions of this permit, the contact office of the U.S. Fish and Wildlife Service is:

O.1. U.S. Fish and Wildlife Service (Southeast Region)

Attn: Recovery Permits Coordinator
1875 Century Boulevard
Atlanta, Georgia 30345-3301
Telephone: 404/679-7097
Facsimile: 404/679-7081
permitsR4es@fws.gov

Copies of your reports shall also be sent to the Regional Offices listed below:

O.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Southwest Region (Region 2)
500 Gold Ave., SW
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6665; fax 505/248-6788)
permitsR2ES@fws.gov

O.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Midwest Region
Ecological Services – Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

O.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Northeast Region
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589

(703/358-2402; fax 413/253-8482)
PermitsR5ES@fws.gov

O. 5. Regional Recovery Permits Coordinator & Assistant Regional Recovery Coordinator
U.S. Fish and Wildlife Service – Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4212; fax 303/236-0027)
permitsR6ES@fws.gov

P. Additionally, based on the species, reports and publications shall be submitted to the following:

P.1. For activities/studies involving Indiana Bats:

Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Ecological Services Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261 x1213; fax 812/334-4273)
lori_pruitt@fws.gov

P.2. For activities involving gray bats:

Iwona Kuczynska
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park De Ville Drive, Suite A
Columbia, Missouri 65203

(573/234-2132 x174; fax 573/234-2181)
iwona_kuczynska@fws.gov

P.3. For activities involving northern long-eared bats:

Jill Utrup
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office
4104 American Blvd. E
Bloomington, Minnesota 55425
(612/725-3548 x207; fax 612/725-3609)
jill_utrup@fws.gov

P.4. For Studies involving Virginia big-eared bats:

Elizabeth Stout
U.S. Fish and Wildlife Service
West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, West Virginia 26241
(304/636-6586 x19; fax 304/636-7824)
Elizabeth_Stout@fws.gov

P.5. For activities/studies involving Ozark big-eared bats:

Richard Stark, Recovery Lead
Oklahoma Field Office
U.S. Fish and Wildlife Service
9014 E. 21st St.

Tulsa, Oklahoma 74129-1428
(918) 382-4501
Richard_stark@fws.gov

END

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit : 1487 **Issue date:** 10/23/2021 **Expiration date:** 10/23/2022

Pursuant to authority of T.C.A. 70-2-213: J.D. Wilhide

and the following additional permittees:
Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Benjamin Smith, Cory Murphy

are granted permission to take the following species:

Collect fishes, crayfish and mussels at project sites. , Hairy-tailed mole (using small mammal traps)., Bats, including listed species following USFWS requirements., Animals will be released at site of capture or relocated within the same waterway.

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit : 1487 **Issue date:** 10/23/2021 **Expiration date:** 10/23/2022

Pursuant to authority of T.C.A. 70-2-213: J.D. Wilhide

and the following additional permittees:

Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Benjamin Smith, Cory Murphy

Restricted to the following locations:

Statewide, depending on contract. Must have TWRA Regional approval prior to any field work.

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit: 1487 **Issue date:** 10/23/2021 **Expiration date:** 10/23/2022

Pursuant to authority of T.C.A. 70-2-213:
J.D. Wilhide

and the following additional permittees:
Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Benjamin Smith, Cory Murphy

Restricted to the following collection methods:
Electrofishing, Gillnets & Seines, Hand and Dipnets, SCUBA, Small Mammal traps (No snap traps), Mist nets, Harp traps

Subject to the following rules:

Wildlife may not be held longer than 24 hours without prior approval. All containers and equipment utilized in the collection of amphibians and reptiles shall be decontaminated and disinfected for ranavirus and other pathogens. This permit is invalid unless accompanied by all applicable federal permits.

No species listed by TWRA as endangered, threatened, in need of management, or of greatest conservation need may be taken without approval; release these species immediately. Report the occurance of endangered or threatened species to TWRA within five days.

Prior to collecting in the field, you are required to notify the TWRA Regional Dispatcher with the name(s) of person(s) doing the collecting, where, when and what species you will be collecting. Contact information is attached.

Bobby Wilson

Executive Director, Tennessee Wildlife Resources Agency

10/23/2021
Date

The State of Tennessee

AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX C
PHOTOGRAPHS



Photo 1: Site 1 Net A.



Photo 2: Site 1 Net B



Photo 3: Site 2 Net A



Photo 4: Site 2 Net B



Photo 5: Site 3 Net A.



Photo 6: Site 3 Net B.

APPENDIX D
CIVIL & ENVIRONMENTAL CONSULTANTS DATA SHEETS

CEC Bat Capture Data Sheet

Site No. #1	**Project Name:** I-40 Interchange		**Date:** 29 June 2022		
County: Wilson	**State:** TN	**Client:** TDOT	**Surveyors:** J.D. Wilhide & Abby Danner		
Photo #:	**Permit # (State & Fed):** TWRA #1467 & USFWS ES 148282-6				

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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19											
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21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase: New Moon		% 0.7
	Rise	Set
Moon:	5:39a	9:01p
Sun:	6:33a	8:05p

Time	Temp	Sky**	Wind***	# Bats
8p	78.4	0	0	0
9p	77.0	0	0	0
10p	75.0	0	0	0
11p	76.3	0	0	0
12mid	74.6	0	0	0
1am	74.5	1	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):		
#	N	W
A	36.166392	-86.542668
B	36.166428	-86.542765
C		
1		
2		

	Acoustic Unit Serial #	Brand
1		
2		
3		

***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended
**** Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm
***** Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

CEC Bat Capture Data Sheet

Site No.	#1 night 2	**Project Name:**	I-40 Interchange	**Date:**	30 June 2022
County:	Wilson	**State:** TN	**Client:** TDOT	**Surveyors:**	JDW & A. Danner
Photo #:		**Permit # (State & Fed):**	TWRA #1467 & USFWS ES146262-6		

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
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23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase:		**%**
New Moon		0.3
	Rise	**Set**
Moon:	6:34a	9:45p
Sun:	5:37a	8:04p

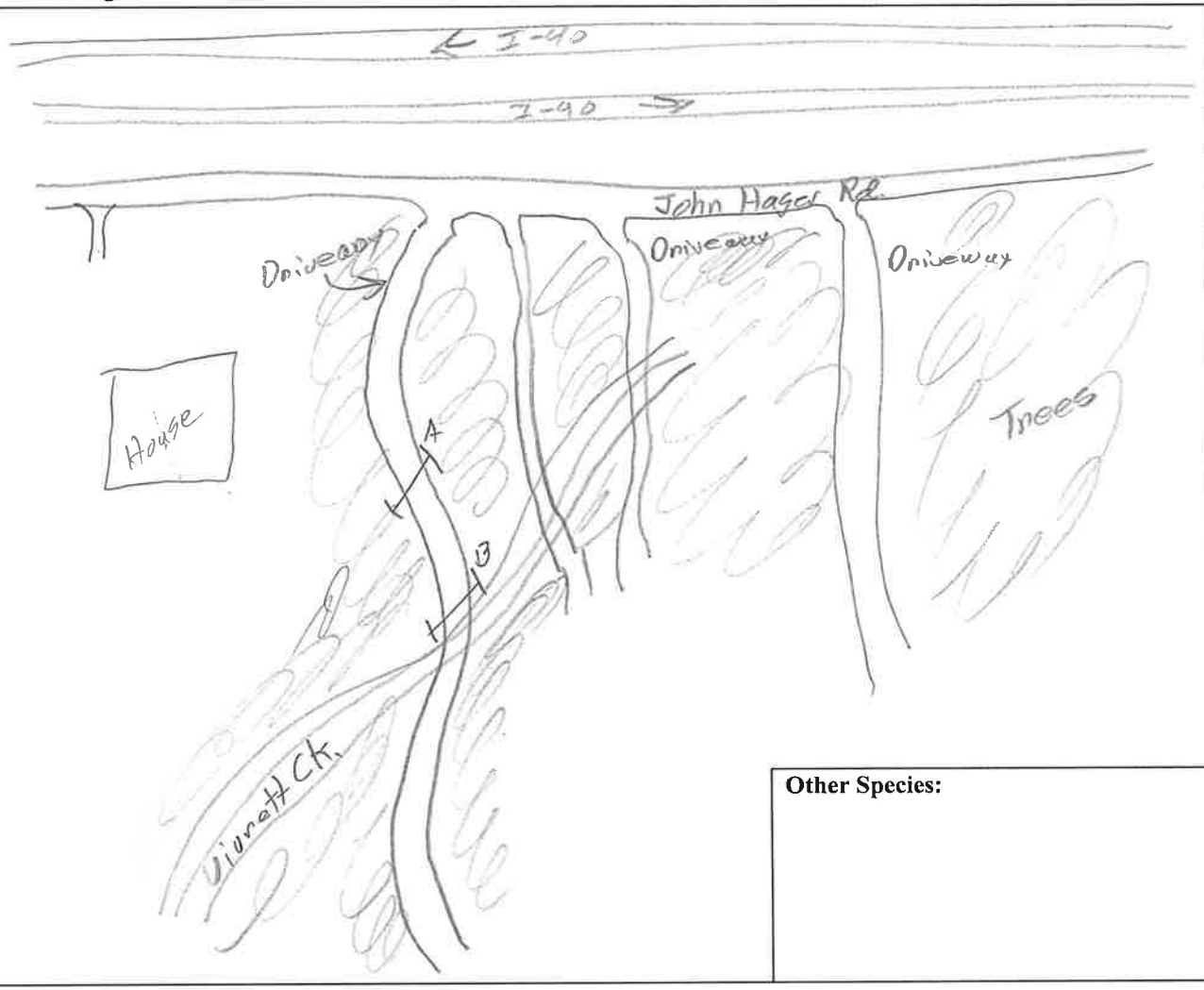
Time	Temp	Sky**	Wind***	# Bats
8p	77.5	2	0	0
9p	75.3	2	0	0
10p	73.6	2	0	0
11p	72.7	1	0	0
12a	72.3	1	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):		
#	N	W
A	36.166592	-86.542668
B	36.166426	-86.542765
C		
1		
2		

Acoustic Unit Serial #		Brand
1		
2		
3		

***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended
**** Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm
***** Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Site No.: #1	Project Name: I-40 Interchange	Date: 29 June 2022
Net Site Diagram		Dominant Vegetation



1	Sweet gum
2	Walnut
3	Sycamore
4	Privet
5	Oak (R&W) Hickory

Net(s) or Acoustic Unit(s) by Habitat

Habitat	A	B	C	Acoustic
River				
Stream				
Pond				
Road Rut				
Corridor	X	X		
Cave/mine				
Total				

No. of Poles X Net length

A	31.2	=	5.2	X	6
B	31.2	=	5.2	X	6
C		=		X	
D		=		X	

Other Species:

Comments: Creek is dry.

CEC Bat Capture Data Sheet

Site No.	#2	**Project Name:**	I-40 Interchange	**Date:**	5 July 2022
County:	Wilson	**State:** TN	**Client:** TDOT	**Surveyors:**	JD Wilhide & Abby Danner
Photo #:		**Permit # (State & Fed):**	TWRA #1467 & USFWS ES146262-6		

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase:	First Quarter	**%**	38.7
	Rise	**Set**	
Moon:	11:32a	12:16a	7/6/22
Sun:	5:36a	8:08p	

Time	Temp	Sky**	Wind***	# Bats
7p	83.5	2	0	0
9p	81.1	1	0	0
10p	80.2	0	0	0
11p	79.7	0	0	0
12mid	74.7	0	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):		
#	N	W
A	36.160354	-86.536402
B	36.160191	-86.536973
C		
1		
2		

	Acoustic Unit Serial #	Brand
1		
2		
3		

***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

**** Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

***** Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

CEC Bat Capture Data Sheet

Site No.	#2 night 2	**Project Name:**	I-40 Interchange	**Date:**	6 July 2022
County:	Wilson	**State:** TN	**Client:** TDOT	**Surveyors:**	JDW & A. Danner
Photo #:		**Permit # (State & Fed):**	TWRA #1467 & USFWS ES148282-6		

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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20											
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22											
23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase: First Quarter **%** 49.0

	Rise	Set
Moon:	12:34p	12:14a
Sun:	5:36a	8:07p

Time	Temp	Sky**	Wind***	# Bats
8p	79.4	1	0	0
9p	78.2	2	0	0
10p	75.6	2	0	0
11p	71.1	2	0	0
12mid	76.2	1	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):

#	N	W
A	36.160355	-86.536902
B	36.160191	-86.536973
C		
1		
2		

	Acoustic Unit Serial #	Brand
1		
2		
3		

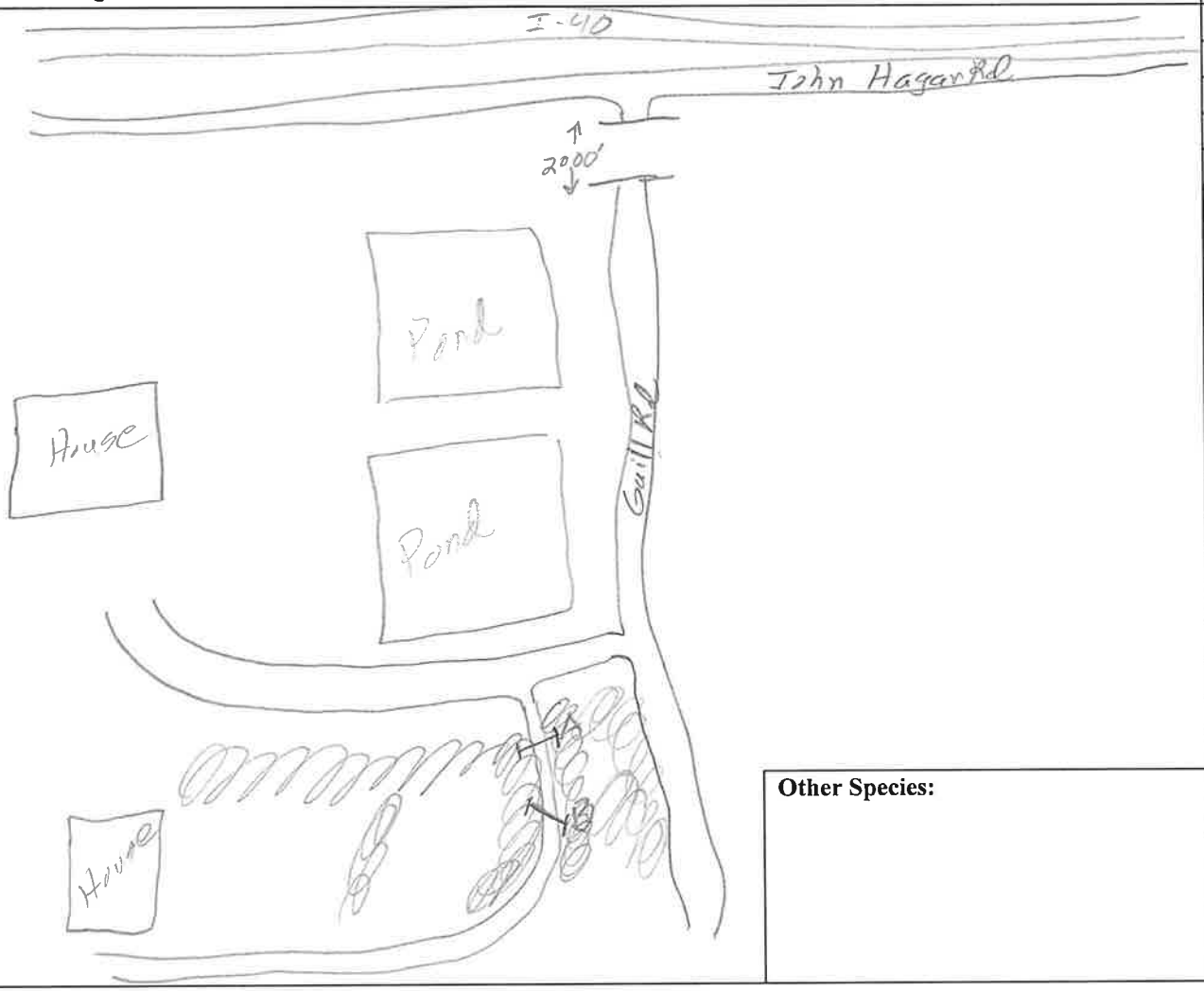
***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

** **Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

*** **Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Site No.: #2	Project Name: I-40 Interchange	Date: 5 July 2022

Net Site Diagram



Other Species:

Dominant Vegetation

1	Sassafras
2	Hickory
3	Sweetgum
4	Oak
5	

Net(s) or Acoustic Unit(s) by Habitat

Habitat	A	B	C	Acoustic
River				
Stream				
Pond				
Road Rut				
Corridor	X	X		
Cave/mine				
Total				

No. of Poles X Net length

A	31.2	=	5.2	X	6
B	31.2	=	5.2	X	6
C		=		X	
D		=		X	

Comments:

CEC Bat Capture Data Sheet

Site No.	#3	**Project Name:**	I-40 Interchange	**Date:**	1 July 2022
County:	Wilson	**State:**	TN	**Client:**	TDOT	**Surveyors:**	JD Wilhide & Abby Danner
Photo #:		**Permit # (State & Fed):**	TWRA #1487 & USFWS ES14826Z-6		

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
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21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase: Waxing Crescent **%** 7.6

	Rise	Set
Moon:	7:32a	10:22p
Sun:	5:34a	9:08p

Time	Temp	Sky**	Wind***	# Bats
8p	79.8	0	0	0
9p	80.2	2	0	0
10p	79.1	2	0	0
11p	79.0	1	0	0
12mid	76.4	2	0	0
1a	75.2	1	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):

#	N	W
A	36.172777	-86.524352
B	36.172662	-86.524445
C		
1		
2		

Acoustic Unit Serial #		Brand
1		
2		
3		



***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

** **Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

*** **Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

CEC Bat Capture Data Sheet

Site No. #3 night 2	**Project Name:** I-40 Interchange			**Date:** 2 July 2022	
County: Wilson	**State:** TN	**Client:** TDOT		**Surveyors:** JDW & A. Danner	
Photo #:	**Permit # (State & Fed):** TWRA #1467 & USFWS ES148262-6				

#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
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19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

Moon Phase: Waxing Crescent **%** 13.4

	Rise	Set
Moon:	8:31a	10:54p
Sun:	5:34a	8:08p

Time	Temp	Sky**	Wind***	# Bats
8p	74.2	2	1	0
9p	75.2	3	0	0
10p	75.1	3	0	0
11p	74.3	2	0	0
12mid	74.2	2	0	0
Ave				

Net(s) and/or Acoustic Unit(s) Lat/Long (DD.dddd):

#	N	W
A	36.172777	-86.524352
B	36.172662	-86.524445
C		
1		
2		

Acoustic Unit Serial #		Brand
1		
2		
3		

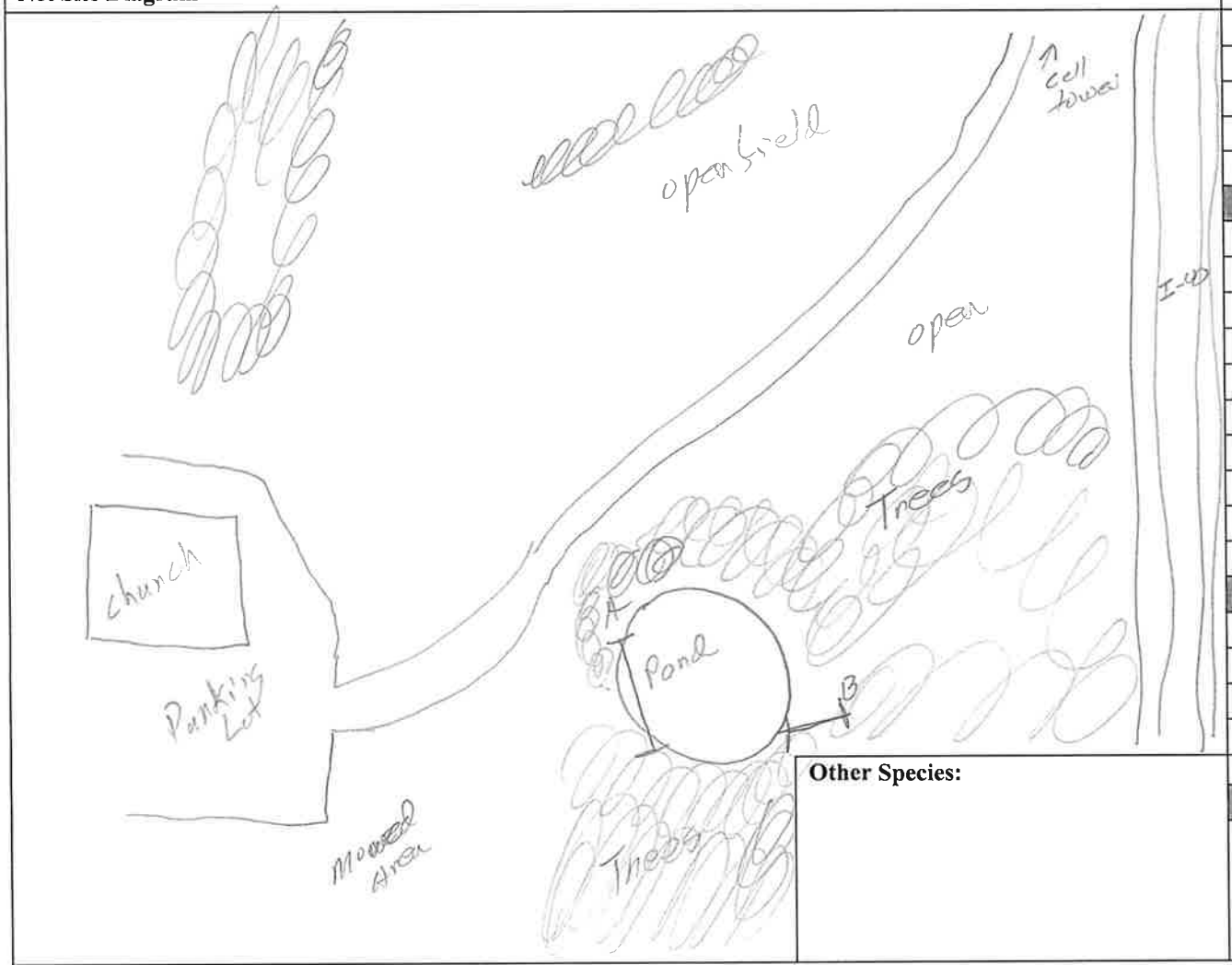
***Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

**** Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

***** Wind Code :** 0- Clam (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Site No.: #3	Project Name: I-40 Interchange	Date: 1 July 2022

Net Site Diagram



Other Species:

Dominant Vegetation

1	Sycamore
2	Cedar
3	Cottonwood
4	
5	

Net(s) or Acoustic Unit(s) by Habitat

Habitat	A	B	C	Acoustic
River				
Stream				
Pond	X			
Road Rut				
Corridor		X		
Cave/mine				
Total				

No. of Poles X Net length

A	46.8	=	5.2	X	9
B	31.2	=	5.2	X	6
C		=		X	
D		=		X	

Comments: Pond mostly covered in Duckweed.

Project Name: Wilson Co. I-40, Interchange at SR-265 (Central Pike) **PIN:** 124884.00

Water Resource Table for NEPA Documentation

Based on: Plans

Date: 2/4/2023

Table Amounts are based on (choose only one): Estimated extent of resource with proposed ROW

Water Resources (Non-Wetland)							
Label	**Type**	**Latitude**	**Longitude**	**Receiving Waters**	**Quality**	**Amount (Linear Feet)**	**Amount (Acres)**
STR-3	Intermittent Stream	36.166865	-86.543734	Misc. tribs to Percy Priest	Unassessed	355	0.029
WWC-3/EPH-3	Wet Weather Conveyance/Ephemeral	36.166829	-86.542904	Misc. tribs to Percy Priest	Unassessed	146	0.01
STR-2	Perennial Stream	36.166865	-86.542013	Misc. tribs to Percy Priest	Unassessed	587	0.07
SEP-3	Seep	36.169755	-86.530917	N/A	Unassessed	0	0.0006
STR-6	Perennial Stream	36.166766	-86.529565	North Creek	Unassessed	688	0.05
SEP-1	Seep	36.167935	-86.529284	N/A	Unassessed	0	0.0003
SEP-2	Seep	36.166757	-86.529327	North Creek	Unassessed	0	0.003
STR-7	Intermittent Stream	36.166659	-86.529438	North Creek	Unassessed	40	0.001
STR-4	Perennial Stream	36.162941	-86.52726	North Creek	Unassessed	1,650	0.38
WWC-4/EPH-4	Wet Weather Conveyance/Ephemeral	36.166303	-86.531381	North Creek	Unassessed	188	0.009
STR-5	Intermittent Stream	36.163951	-86.530606	North Creek	Unassessed	596	0.04
WWC-6/EPH-6A	Wet Weather Conveyance/Ephemeral	36.163413	-86.528789	North Creek	Unassessed	33	0.001
					Total:	4,283	1

Water Resources (Wetland)*

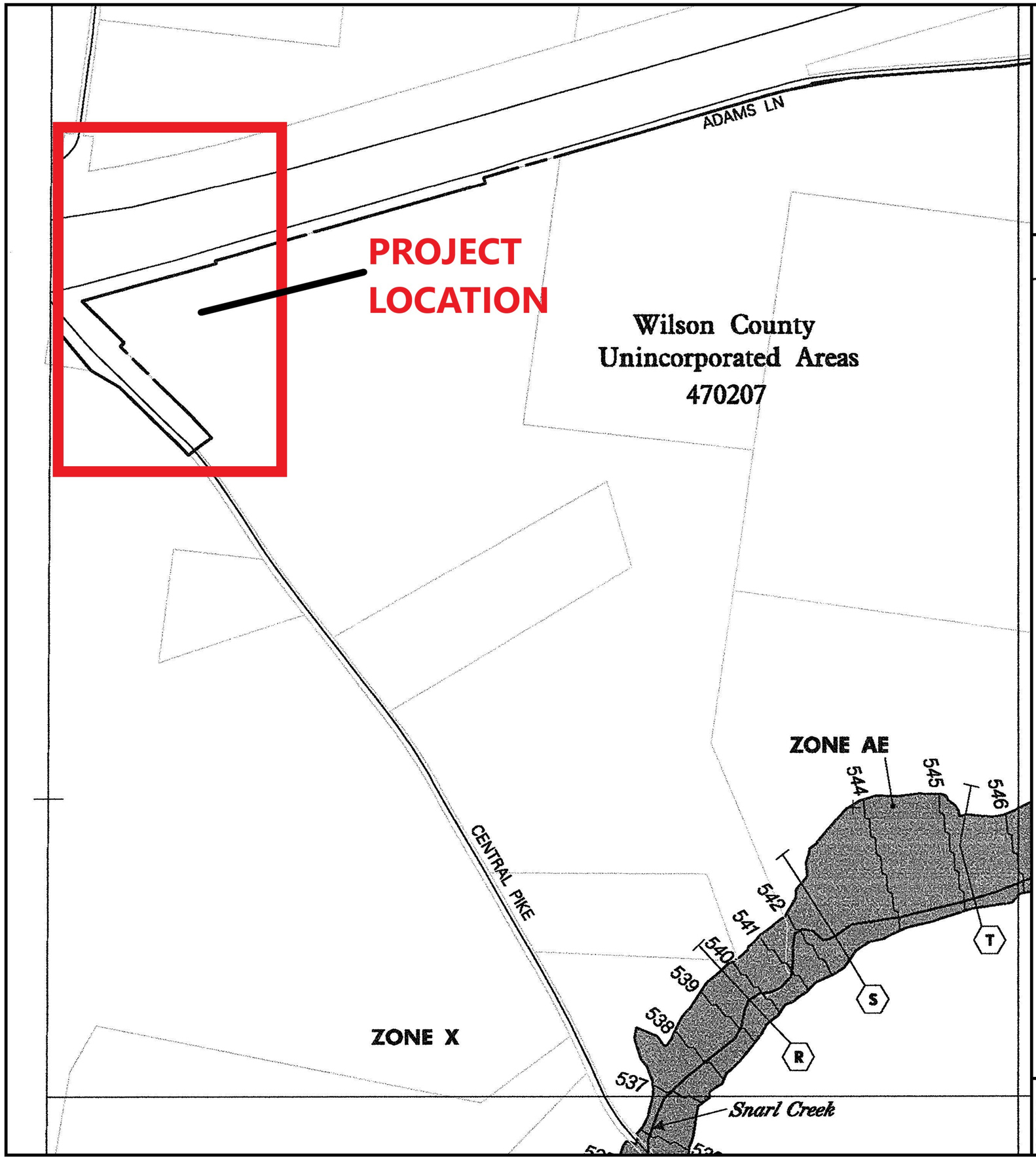
Label	Type	Latitude	Longitude	Receiving Waters	Quality	Amount (Acres)
WTL-8	Forested	36.167088	-86.540248	Misc. tribs to Pery Priest	Low Resource Value	0.02
WTL-9	Emergent	36.167023	-86.531334	N/A	Low Resource Value	0.02
WTL-10	Forested	36.167919	-86.52941	North Creek	Moderate Resource Value	0.02
WTL-12	Emergent	36.168228	-86.529294	North Creek	Low Resource Value	0.19
WTL-6	Shrub	36.166371	-86.529437	North Creek	Moderate Resource Value	0.01
WTL-7	Emergent	36.166375	-86.530709	North Creek	Low Resource Value	0.05
WTL-2	Emergent	36.166239	-86.531919	North Creek	Low Resource Value	0.02
WTL-13	Emergent	36.164451	-86.531415	North Creek	High Resource Value	0.11
WTL-4	Emergent	36.164300	-86.531029	North Creek	Moderate Resource Value	0.04
WTL-5	Emergent	36.163999	-86.530778	North Creek	Moderate Resource Value	0.01
WTL-3	Emergent	36.163233	-86.527602	North Creek	Low Resource Value	0.04
WTL-13B	Emergent	36.162476	-86.529634	North Creek	Low Resource Value	0.004
WTL-13A	Forested	36.162171	-86.529607	North Creek	Moderate Resource Value	0.02
					Total:**	0.554

*Unless described otherwise in the NEPA document; all wetlands are presumed to serve the following functions to varying degrees, based on location: wildlife habitat, flood storage, groundwater recharge, nutrient processing, contaminant filtering, and recreation.

**For the purposes of the NEPA document, Amount is assumed to be Permanent Loss.

Note- Features and estimated amounts referenced in this table are based on information available and may change as the project is further refined througout project development.

Floodplain Management



FEET
METERS
150 0 150 300

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0142D

FIRM

FLOOD INSURANCE RATE MAP

WILSON COUNTY, TENNESSEE AND INCORPORATED AREAS

PANEL 142 OF 445

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MT. JULIET, CITY OF	470290	0142	D
WILSON COUNTY	470207	0142	D

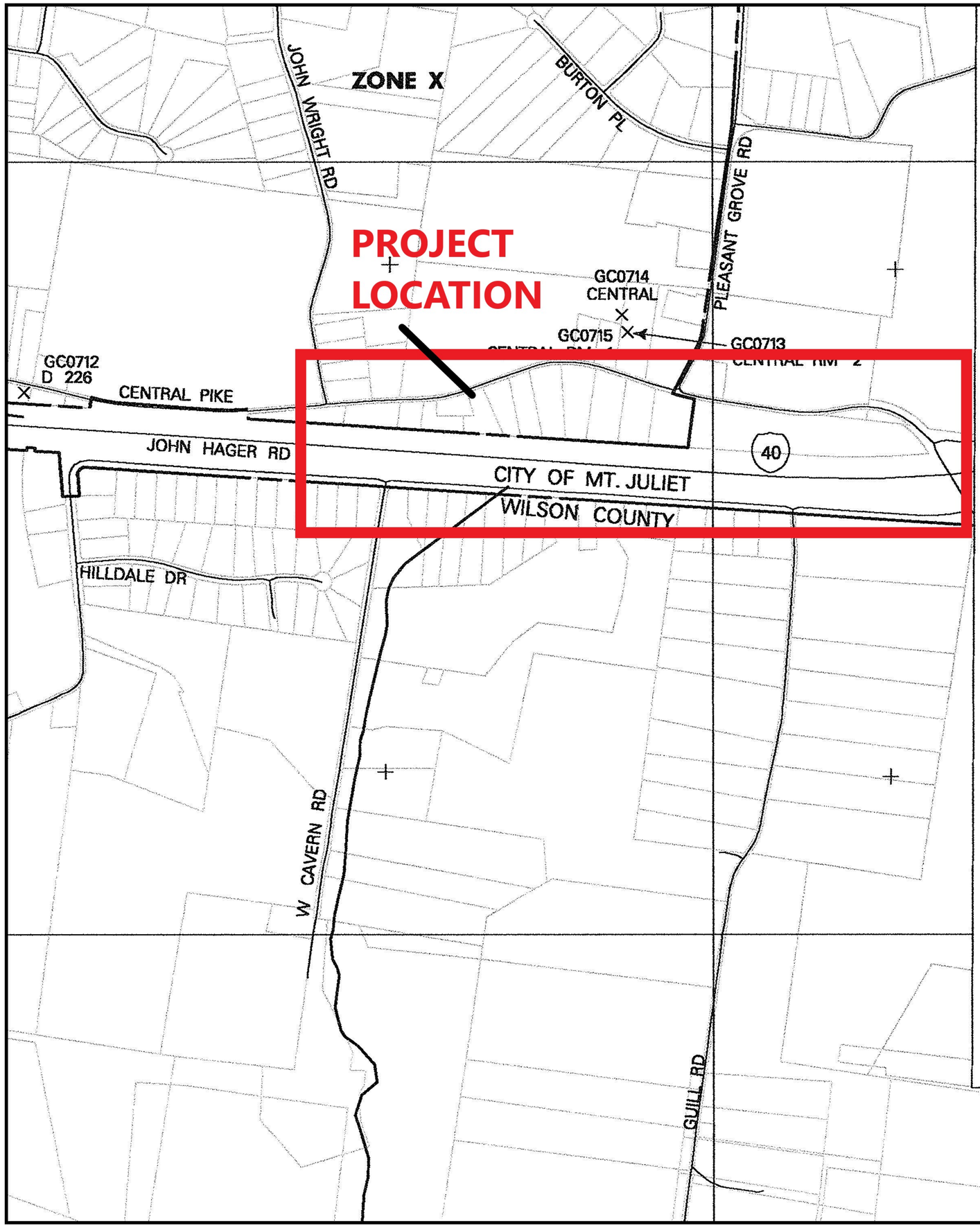
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47189C0142D

EFFECTIVE DATE
FEBRUARY 20, 2008

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.



map revision history prior to countywide mapping, refer to th
ble located in the Flood Insurance Study report for this juris

if flood insurance is available in this community, contact y
e National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0145D

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

WILSON COUNTY,
TENNESSEE
AND INCORPORATED AREAS

PANEL 145 OF 445

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MT. JULIET, CITY OF	470290	0145	D
WILSON COUNTY	470207	0145	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
47189C0145D

EFFECTIVE DATE
FEBRUARY 20, 2008

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

Air and Noise

Environmental Studies

Air and Noise

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Air and Noise

Study Results

AIR QUALITY

Transportation Conformity
This project is in Wilson County which is in attainment for all regulated criteria pollutants. Therefore, conformity does not apply to this project.

Mobile Source Air Toxics (MSATs)
This project qualifies as a categorical exclusion under 23 CFR 771.117 and, therefore, does not require an evaluation of MSATs per FHWA's "Interim Guidance Update on Air Toxic Analysis in NEPA Documents" dated January 2023.

NOISE

A preliminary noise impact review identified areas containing noise-sensitive land uses, called Noise Analysis Areas (NAAs), including thirteen NAAs (1 through 13) adjacent to the section of the project currently being evaluated. Within the thirteen NAAs, 651 Category B receptors were identified along with 3 Category C receptors and 1 Category F receptor.

Noise Impacts
TDOT is committed to detailed noise modeling using the FHWA Traffic Noise Model (TNM) to estimate the distance within which noise impacts might occur. The TNM models will use the survey-based design plans, the design year 2045 (or most current) design hour traffic volumes provided by TDOT, and the existing posted speed limits of 70 miles per hour on I-40 and 35 miles per hour on Central Pike.

Noise Abatement Evaluation
Should the impact evaluation indicate that there are impacts to residences, TDOT will commit to noise abatement evaluation.

Statement of Likelihood
Noise barriers may be feasible due to the proximity of numerous receptors adjacent to a major interstate facility. Noise barriers may need to be evaluated at other locations for the noise study, but are not likely to be feasible due to receptors adjacent to Central Pike/Providence Parkway that have direct driveway access.

Construction Activities
Construction activities may generate intermittent and temporary noise above existing noise levels. The noise levels resulting from construction activities will depend on the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses. However, the noise increases will be temporary and will not constitute a noise impact as defined by TDOT's noise policy. The procedures in TDOT's Standard

Specifications for Road and Bridge Construction will help minimize construction noise effects.

Undeveloped Lands
Some tracts of undeveloped land exist in the project area. TDOT encourages the local governments with jurisdiction over these lands, as well as potential developers, to practice noise compatibility planning to avoid future noise impacts. Additionally, the federal and state noise regulations do not allow federal funds to be used to construct noise abatement for newly constructed land uses in known noise-sensitive areas.

Commitments

Did the study of this project result in any environmental commitments? **Yes**

A preliminary noise impact review was completed for planning purposes. The review identified noise-sensitive land uses within the project area. Per 23 CFR 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise), a detailed noise impact analysis and abatement evaluation will be required with survey-based design plans and design year traffic projections. Noise impacts are possible. TDOT is committed to continual impact analysis and abatement evaluation.

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Noise Technical Report

Location: Email Attachment

Certification

Responder: Chasity L. Stinson

Title: TESS Advanced, TDOT Environmental Division

Signature: Chasity L. Stinson

Digitally signed by Chasity L. Stinson
Date: 2023.07.24 07:21:07 -05'00'

TN TDOT Department of Transportation

MEMO

To: Kyle Kirschenmann, Environmental Manager

From: Mandy Phillips, AECOM

Date: April 25, 2023

Subject: Preliminary Noise Technical Review
I-40 Interchange at SR-265 (Central Pike)
PIN 124884.00
PE-N 95100-0113-04

A preliminary noise impact review was conducted for the I-40 Interchange at SR-265 (Central Pike) project in Wilson County for planning purposes. The review involved the identification of noise analysis areas (NAAs), noise-sensitive receptors, TNM receivers, existing noise measurements, and identifying potential noise impact and noise abatement evaluation study needs. The results of the preliminary study are summarized below.

Noise Abatement Criteria

Noise impact is determined by comparing future project noise levels to 1) a set of Noise Abatement Criteria (NAC) for a land use category and 2) existing noise levels. The FHWA noise regulation and TDOT's noise policy state that traffic noise impacts require consideration of abatement when worst-hour noise levels approach or exceed the NAC listed in Table 1. TDOT's noise policy defines "approach" as one decibel below the NAC, or 66 dBA for Category B and C land uses. The FHWA noise regulation and TDOT's noise policy also define impacts to occur if there is a substantial increase in existing noise levels. TDOT's criteria to define a substantial noise increase is shown in Table 2.

Noise Analysis Areas (NAAs)

Review of the project mapping revealed approximately thirteen NAAs containing noise-sensitive land uses that might be impacted by the project, as summarized in Table 3.

Noise-Sensitive Receptors

We identified the noise-sensitive receptors in each NAA and the TNM receiver location(s) to represent each use, as summarized in Table 4.

Existing Noise Measurements

Existing noise level measurements were performed according to FHWA-HEP-18-066 (Final Report Noise Measurement Field Guide). Short-term existing ambient Leq(h) noise level data were obtained in one-minute increments for 20-minute periods at thirteen representative areas, with one to two measurements per representative area. NAA 10-12 were in proximity to active construction sites therefore only one noise measurement was collected during non-active construction periods. Long-term existing ambient Leq(h) noise level data were obtained in one-minute increments for 24-hours at one location (LT1) to determine the

existing worst hour sound level where traffic noise was not currently dominant, but increased traffic noise would be expected from the project. The locations of noise measurement sites are shown on Figures 1(A-F). Sound level meter microphones were set to a 90-degree angle. The response was set to slow and A-weighting was used. Leq, Lmax, Lmin, L10, and L90 data was logged and reported on measurement field sheets (Attachment A). Weather data, specifically temperature, humidity, pressure, and wind speed/direction were verified using a hand-held weather gauge while in the field.

Potential Noise Impacts and Noise Abatement Evaluation

TDOT is committed to detailed noise modeling using the FHWA Traffic Noise Model (TNM2.5) to estimate the distance within which noise impacts might occur. The TNM models will use the survey-based design plans, the design year 2045 design hour traffic volumes provided by TDOT, and the existing posted speed limits of 70 miles per hour on I-40 and 35 miles per hour on Central Pike.

Table 5 summarizes the number of potentially-impacted land uses by Activity Category. As shown, the project has the potential to impact 651 Category B residences, including 47 single-family residences, approximately 296 apartment units in one apartment complex, and approximately 308 more units/complexes proposed for construction.

The project may impact Category C land uses including three places of worship. One category F receptor, a truck maintenance facility located at 6600 Central Pike, was identified in the study area. Should the impact evaluation indicate that there are impacts to residences, TDOT will commit to noise abatement evaluation. Noise barriers may be feasible due to the proximity of numerous receptors adjacent to a major interstate facility. Noise barriers may need to be evaluated at other locations for the noise study, but are not likely to be feasible due to receptors adjacent to Central Pike/Providence Parkway that have direct driveway access.

Changes made during the design process for the project could affect conclusions regarding noise impacts and abatement. Therefore, final noise abatement decisions will be made during the final design process. TDOT Policy requires identification whether it is “likely” or “unlikely” that noise barriers will be installed for each noise sensitive area identified. “Likely” does not mean a firm commitment. The final decision on installation of noise abatement shall be made upon completion of project final design, the public involvement process, and compliance with TDOT Policy.

Sincerely,

Mandy Phillips

Senior Environmental Planner

TN TDOT Department of Transportation

MEMO

TABLES

TN TDOT Department of Transportation

MEMO

Table 1:
FHWA Noise Abatement Criteria

Activity Category	L_{Aeq}(1h) dBA	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(1)	67	Exterior	Residential.
C(1)	67	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E(1)	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	–––	–––	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–––	–––	Undeveloped lands that are not permitted.

(1) Includes undeveloped lands permitted for this activity category.

Table 2:
Substantial Noise Level Increase

Existing Noise Level (dBA) [1]	Predicted Design Year Noise Level Increase (dB) [2]
42 or less	15 or more
43	14 or more
44	13 or more
45	12 or more
46	11 or more
47 or more	10 or more

(1) Worst-hour noise level from the combination of natural and mechanical sources and human activity.
(2) Predicted design year noise level minus existing noise level.

Table 3:
Noise Analysis Areas

Noise Analysis Area	Description	Activity Category	NAC (dBA)
NAA 1	Single family residences.	B	67
NAA 2	Single family residences, maintenance facility.	B, F	67
NAA 3	Single family residences.	B	67
NAA 4	Single family residences.	B	67
NAA 5	Single family residences.	B	67
NAA 6	Single family residences.	B	67
NAA 7	Single family residences, place of worship.	B, C	67
NAA 8	Single family residences, place of worship.	B, C	67
NAA 9	Single family residences, cemetery.	B, C	67
NAA 10	Mixed use development under construction.	B, E	67
NAA 11	Apartment complex under construction.	B	67
NAA 12	Single family residences, assisted living facility under construction, parcels for future development.	E	72
NAA 13	Single family residences.	B	67

Table 4:
Existing Noise Measurements

Noise Analysis Area	Receptor Description	Activity Category	Existing (dBA)
NAA 1	ST01 - 6025 Central Pike (Single Family Residence)	B	69.3
NAA 2	ST02 - 6400 Central Pike (Single Family Residence)	B	63.4, 63.5
NAA 3	ST03 - 6775 John Hagar Road (Single Family Residence)	B	66.1, 66.2,
NAA 4	ST04 - 7061 John Hagar Road (Single Family Residence)	B	71.2, 71.3
NAA 5	ST05 - 7275 John Hagar Road (Single Family Residence)	B	67.3, 67.5
NAA 6	ST06 - 135 Guill Road (Single Family Residence)	B	51.8, 52.0
NAA 7	ST07 - 1544 Pleasant Grove Road (Place of Worship)	C	60.6, 60.8
NAA 8	ST08 - 6485 Central Pike (Place of Worship)	C	63.3, 65.8
NAA 9	ST09 - 180 Tillman Drive (Single Family Residence)	B	67.8, 67.9
NAA 10	ST10 - 37122 Providence Central (Mixed Use Property under development)	B, E	55.4
NAA 11	ST11 - 630 Providence Parkway (Apartments under construction)	B	57.1, 57.2
NAA 12	ST12 - 7445 Central Pike (Assisted living facility under construction, parcels for future development)	E	63.4, 63.7
NAA 13	LT01 - 7110 Central Pike (Single Family Residence)	B	53.4

Table 5: Potentially-Impacted Noise-Sensitive Receptors

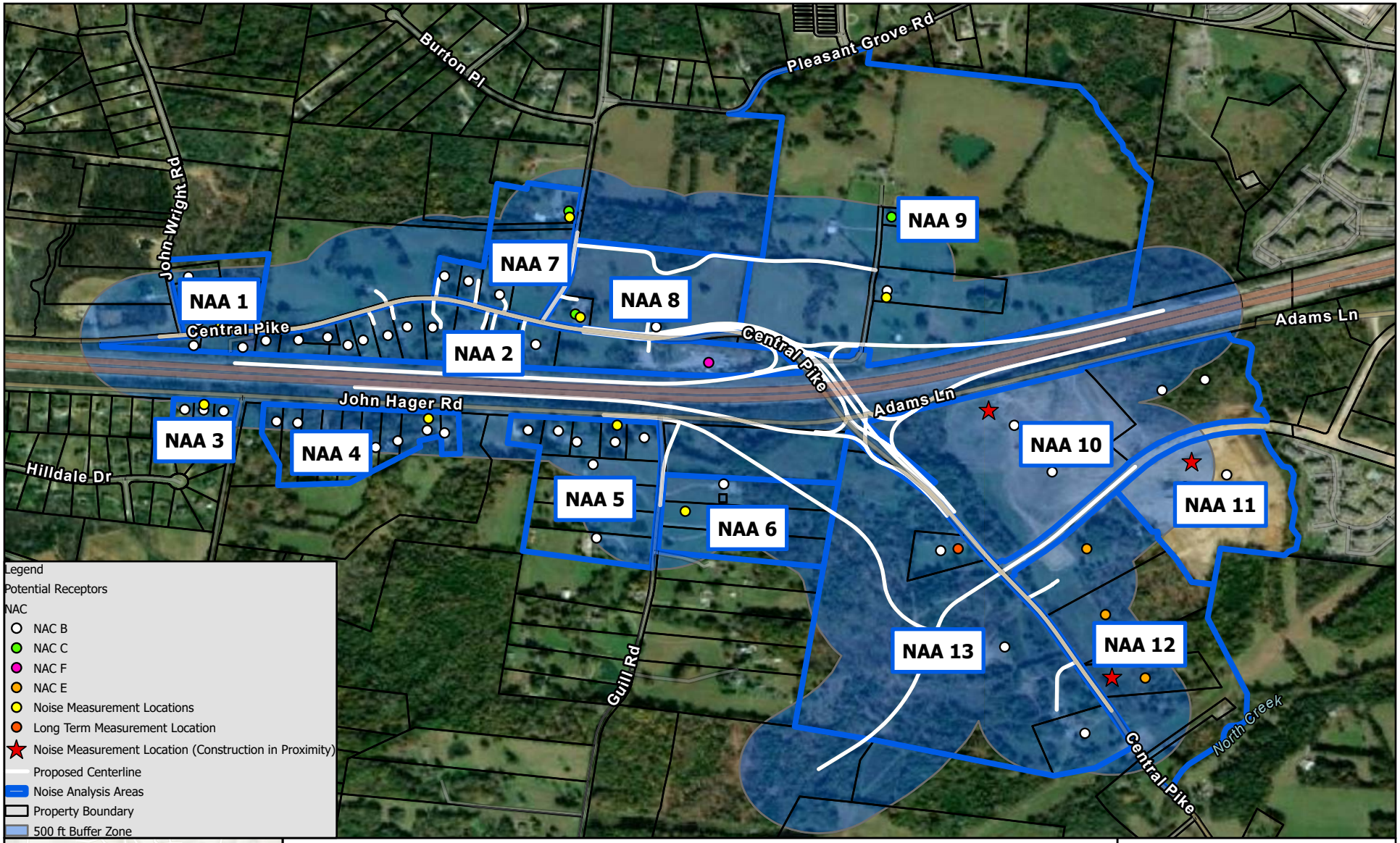
Activity Category / Evaluation Location	Activity Description	Number of Receptors
B / Exterior	Residential.	651
C / Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.	3
F	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.	1

TN TDOT Department of Transportation

MEMO

Figures 1A-F:
Noise Analysis Areas and Receptors

Environmental Division | Air & Noise Section • JK Polk Building, 9th Floor •
505 Deaderick St. • Nashville, TN 37243 • Tel: 615-532-8684



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri Community Maps Contributors, Nashville Davidson Metro Govern, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, EPA, NPS, USDA, Maxar

2023

Coordinate System: GCS WGS 1984

N

0 0.14 0.27 Mi

0 500 1,000 Feet

Figure 1A



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri Community Maps Contributors, Nashville Davidson Metro Govern, Tennessee STS GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

2023

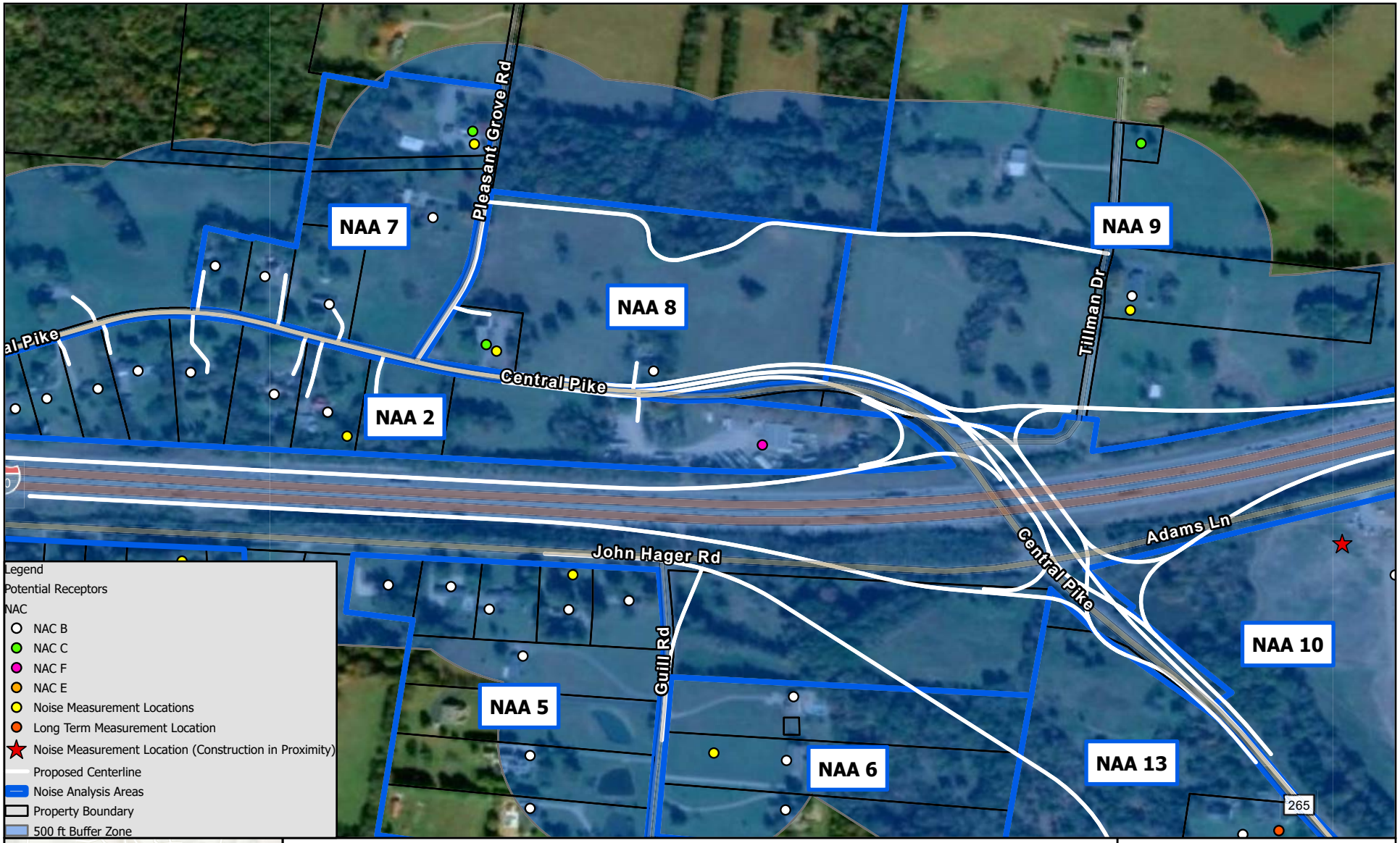
Coordinate System: GCS WGS 1984

N

0 0.07 0.13 Mi

0 400 800 Feet

Figure 1B



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri Community Maps Contributors, Nashville Davidson Metro Govern, Tennessee STS GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

2023

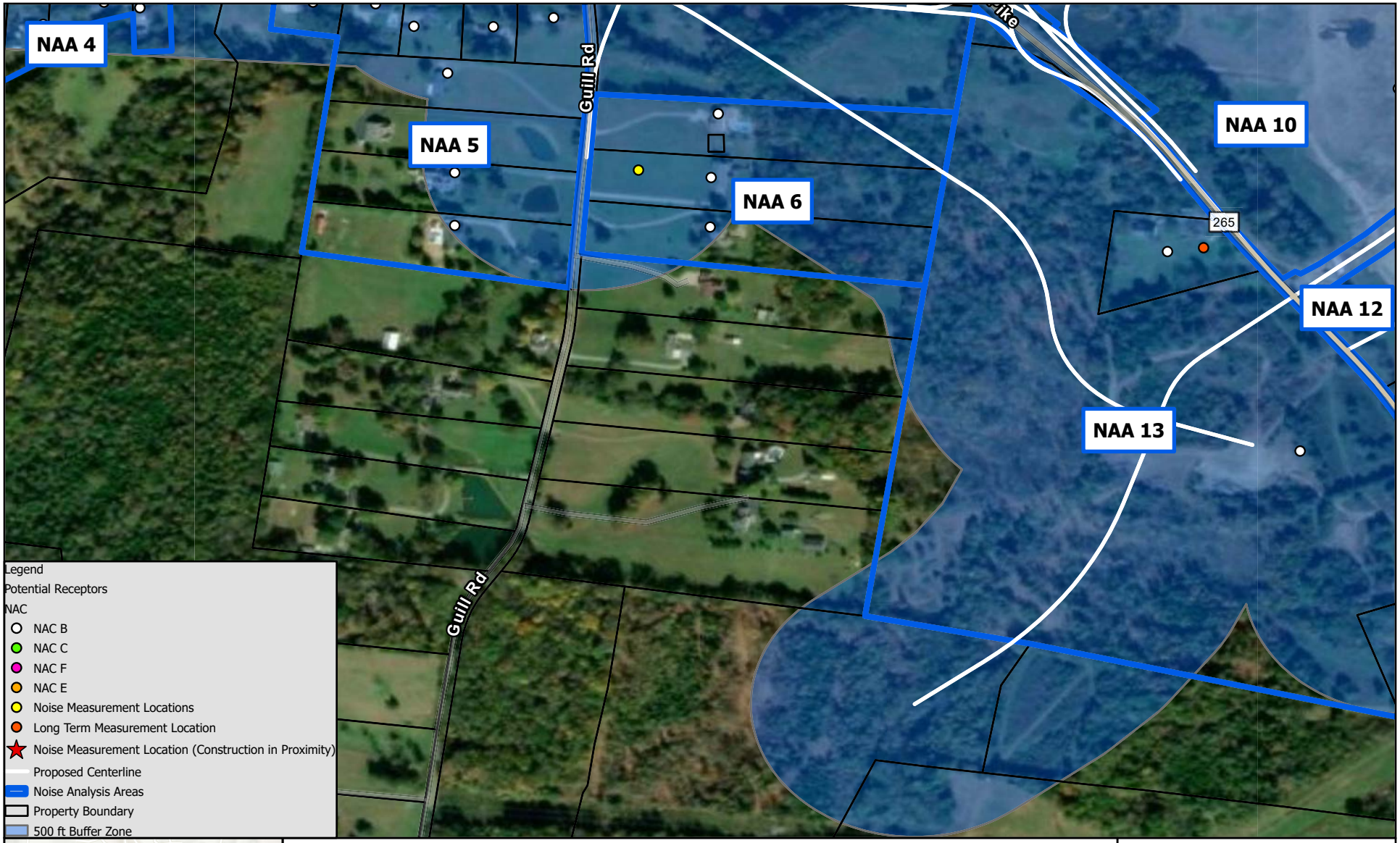
Coordinate System: GCS WGS 1984

N

0 0.07 0.13 Mi

0 400 800 Feet

Figure 1C



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri, NASA, NGA, USGS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri Community Maps Contributors, Nashville Davidson Metro Govern, Tennessee STS GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

2023

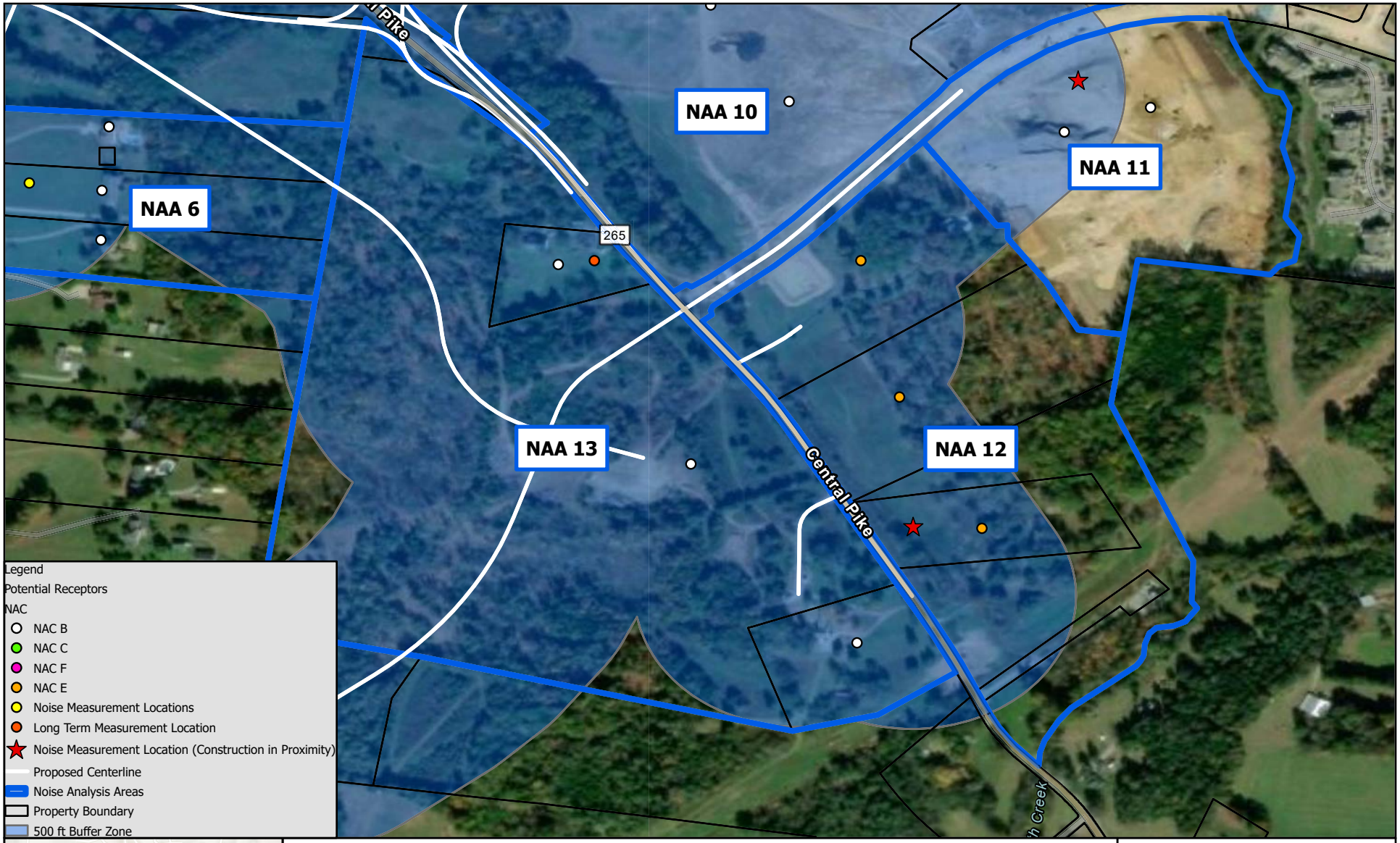
Coordinate System: GCS WGS 1984

N

0 0.07 0.13 Mi

0 400 800 Feet

Figure 1D



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri, NASA, NGA, USGS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri Community Maps Contributors, Nashville Davidson Metro Govern, Tennessee STS GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

2023

Coordinate System: GCS WGS 1984

N

0 0.07 0.13 Mi

0 400 800 Feet

Figure 1E



EXISTING NOISE LEVELS FIELD MEASUREMENTS
I-40 INTERCHANGE AT SR-265 (CENTRAL PIKE)
WILSON COUNTY (PIN 124884.00)

Esri, NASA, NGA, USGS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri Community Maps Contributors, Nashville Davidson Metro Govern, Tennessee STS GIS, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

2023

Coordinate System: GCS WGS 1984

N

0 0.07 0.13 Mi

0 400 800 Feet

Figure 1F

TN TDOT Department of Transportation

MEMO

Attachment A:

Noise Measurement Data Sheets

Environmental Division | Air & Noise Section • JK Polk Building, 9th Floor •
505 Deaderick St. • Nashville, TN 37243 • Tel: 615-532-8684

TN TDOT Department of Transportation

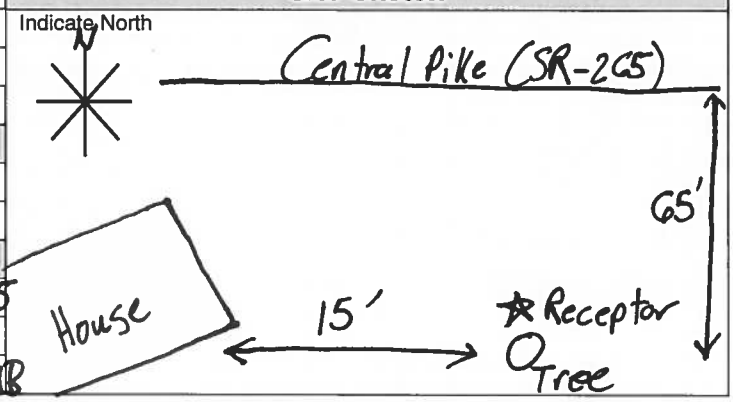
Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

LT01

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	7110 SR-265
Land Use	Residential
Meteorological Conditions	
Temperature(s)	67.7 °F
Wind Speed & Dir	1.2 mph, from S
Calibration	
Analyzer/Filename	20030800_1145
(Pre) Cal Time/Level	7:46 AM
(Post) Cal Time/Level	7:46 AM / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	8:35 AM	Completed receptor setup; started readings
2		for 24 hours
3	12:46 PM	57.1 dB
4	7:11 PM	58.4 dB
5	9:07 AM	53.4 dB
6		
7		File No.: 23040500.200
8		
9	L_{10} = 57.7 dB	
10	L_{90} = 40.0 dB	
11	L_{min} = 36.3 dB	
12	L_{max} = 73.7 dB	
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

L_{EQ} = 53.4 dB



LT01

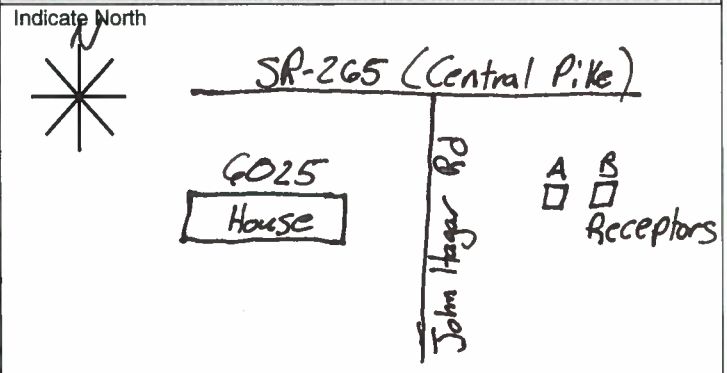
TN TDOT Department of Transportation

ST01

Noise Measurement Data Sheet
I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	6025 Central Pike
Land Use	Residential
Meteorological Conditions	
Temperature(s)	70.7 °F
Wind Speed & Dir	2.5 mph, from S
Calibration	
Analyzer/Filename	A: G200 B: G20
(Pre) Cal Time/Level	A 9:17 AM / 114 dB
(Post) Cal Time/Level	B 9:19 AM / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	9:19 AM	Run
2	9:24 AM	(A) 69.7 dB (B) 70.2 dB - 5 min reading
3	9:29 AM	(A) 69.5 dB (B) 69.4 dB - 10 min reading
4	9:34 AM	(A) 69.3 dB (B) 69.2 dB - 15 min reading
5	9:39 AM	(A) 69.3 dB (B) 69.3 dB - 20 min reading
6		
7		File No: (A) G200_LxT.004
8		(B) G201 - LxT.036
9		
10		LEQ(A) = 69.3 dB
11		
12		
13		
14		
15		
16		LEQ(B) = 69.3 dB
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

L10(A) = 70.8
L90(A) = 67.5
Lmin(A) = 65.
Lmax(A) = 75.

L10(B) = 70.7 d
L90(B) = 67.4
Lmin(B) = 65.2
Lmax(B) = 75.1



ST01

TN TDOT Department of Transportation

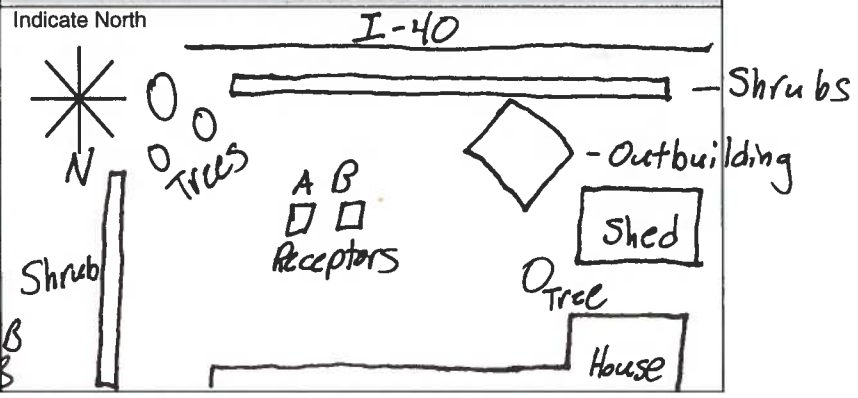
ST02

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	6400 Central Pike
Land Use	Residential
Meteorological Conditions	
Temperature(s)	71.1 °F
Wind Speed & Dir	0.7mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 10:11 AM / 114dB
(Post) Cal Time/Level	(B) 10:12 AM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)
1	10:12 AM	Run
2	10:17 AM	(A) 63.3 dB (B) 63.3 dB - 5 min reading
3	10:22 AM	(A) 63.5 dB (B) 63.5 dB - 10 min reading
4	10:27 AM	(A) 63.4 dB (B) 63.4 dB - 15 min reading
5	10:32 AM	(A) 63.4 dB (B) 63.5 dB - 20 min reading
6		
7		File No: (A) 6200_LxT.005
8		(B) 6201_LxT.037
9		
10		
11		LEQ(A) = 63.4dB
12		
13		
14		
15		
16		LEQ(B) = 63.5dB
17		
18		
19		
20		
21		L10(A) = 64.7dB L10(B) = 64.8dB
22		L90(A) = 61.8dB L90(B) = 61.8dB
23		Lmin(A) = 59.2dB Lmin(B) = 59.3dB
24		Lmax(A) = 69.3dB Lmax(B) = 68.4dB
25		
26		
27		
28		
29		
30		



ST02

TN TDOT Department of Transportation

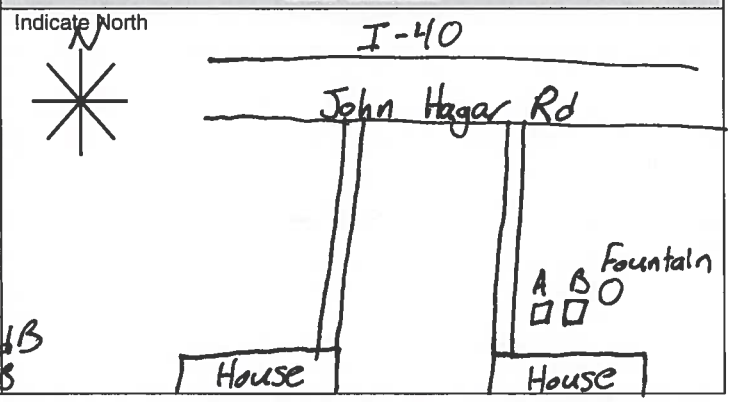
ST03

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	6775 John Hagar Rd
Land Use	Residential
Meteorological Conditions	
Temperature(s)	81.7 °F
Wind Speed & Dir	1.6mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 5:36 PM / 114dB
(Post) Cal Time/Level	(B) 5:37PM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)	
1	5:39 PM	Run	
2	5:40 PM	(A) 67.4 dB	(B) 67.3dB - Interstate Traffic
3	5:42 PM	(A) 68.1dB	(B) 68.0dB - I-40 Traffic
4	5:43 PM	(A) 65.8dB	(B) 65.9dB - 5 min reading
5	5:47 PM	(A) 68.5dB	(B) 68.4dB - I-40 Traffic
6	5:48 PM	(A) 68.7dB	(B) 68.5dB - I-40 Traffic
7	5:48 PM	(A) 66.9dB	(B) 66.1dB - 10 min reading
8	5:50 PM	(A) 70.0dB	(B) 70.1dB - Old Truck (John Hagar)
9	5:51 PM	(A) 68.0dB	(B) 68.1dB - I-40 Traffic
10	5:51 PM	(A) 68.6dB	(B) 68.6dB - I-40 Traffic
11	5:52 PM	(A) 68.2dB	(B) 68.1dB - 15 min reading
12	5:53 PM	(A) 66.0dB	(B) 66.2dB - I-40 Traffic
13	5:55 PM	(A) 69.3dB	(B) 69.4dB - I-40 Traffic
14	5:55 PM	(A) 68.7dB	(B) 69.0dB - I-40 Traffic
15	5:57 PM	(A) 70.0dB	(B) 70.0dB - I-40 Traffic
16	5:58 PM	(A) 66.1dB	(B) 66.2dB - 20 min Reading
17			
18		File No: (A) 6200 - LxT.014	(B) 6201 - LxT.046
19		(B) 6201 - LxT.046	
20			
21		**LEQ(A) = 66.1dB**	
22			
23			
24			
25		**LEQ(B) = 66.2dB**	
26			
27			
28			
29		$L_{10}(A)$ = 67.5dB	$L_{10}(B)$ = 67.8dB
30		$L_{90}(A)$ = 64.1dB	$L_{90}(B)$ = 64.3dB
		$L_{min}(A)$ = 62.3dB	$L_{min}(B)$ = 62.4dB
		$L_{max}(A)$ = 70.2dB	$L_{max}(B)$ = 70.1dB



ST03

TN TDOT Department of Transportation

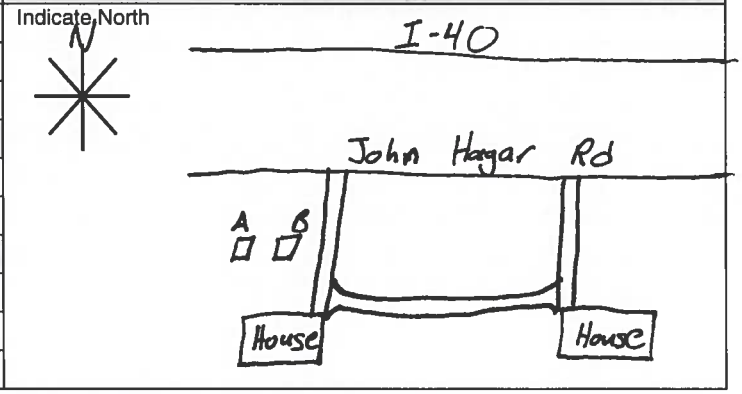
ST04

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Daniel Hundley
Date	April 4, 2023
Address	John Hagar Rd 7061
Land Use	Residential
Meteorological Conditions	
Temperature(s)	80 °F
Wind Speed & Dir	0.7mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 5:10PM / 114dB
(Post) Cal Time/Level	(B) 5:11PM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)
1	5:06 PM	Run
2	5:11 PM	(A) 71.1dB (B) 71.0dB - 5 min reading
3	5:13 PM	(A) 75.1dB (B) 76.2dB - Loud vehicle (I-40)
4	5:16 PM	(A) 71.1dB (B) 71.0dB - 10 min reading
5	5:17 PM	(A) 74.4dB (B) 75.1dB - Loud vehicle (I-40)
6	5:19 PM	(A) 76.1dB (B) 76.0dB - Dumptruck (I-40)
7	5:21 PM	(A) 71.3dB (B) 71.2dB - 15 min reading
8	5:24 PM	(A) 76.1dB (B) 76.0dB - Loud vehicle (I-40)
9	5:26 PM	(A) 71.3dB (B) 71.2dB - 20 min reading
10		(A)
11		File No: 6200 - LxT.013
12		(B) 6201 - LxT.045
13		
14		
15		LEQ(A) = 71.3dB
16		
17		
18		
19		
20		
21		LEQ(B) = 71.2dB
22		
23		
24		
25		
26		L10(A) = 72.6dB L10(B) = 72.5dB
27		L90(A) = 69.3dB L90(B) = 69.2dB
28		Lmin(A) = 65.1dB Lmin(B) = 65.0dB
29		Lmax(A) = 78.4dB Lmax(B) = 78.3dB
30		



ST04

TN TDOT Department of Transportation

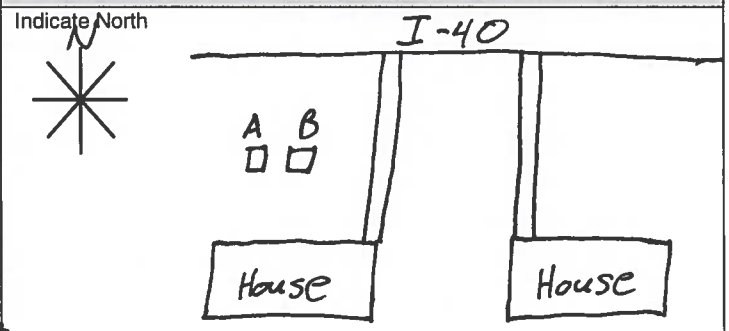
Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

ST05

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	7275 John Hagar Rd
Land Use	Residential
Meteorological Conditions	
Temperature(s)	81.7 °F
Wind Speed & Dir	3.4mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 4:30PM / 114dB
(Post) Cal Time/Level	(B) 4:30PM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)
1	4:31 PM	Run
2	4:33PM	(A) 67.8dB (B) 67.7dB – motorcycle (I-40)
3	4:34 PM	(A) 68.6dB (B) 68.3dB – 18 wheeler (I-40)
4	4:35PM	(A) 68.1dB (B) 68.2dB – 18 wheeler (I-40)
5	4:36PM	(A) 66.5dB (B) 66.7dB – 5 min reading
6	4:38 PM	(A) 78.3dB (B) 78.4 dB – 18 wheeler (I-40)
7	4:40 PM	(A) 70.1dB (B) 70.5 dB – Traffic (I-40)
8	4:41PM	(A) 67.1dB (B) 67.3dB – 10 min reading
9	4:41PM	(A) 69.9dB (B) 70.2dB – 18 wheeler (I-40)
10	4:44 PM	(A) 71.2dB (B) 71.3dB – 18 wheeler (I-40)
11	4:45 PM	(A) 70.9dB (B) 71.0dB – 18 wheeler (I-40)
12	4:46PM	(A) 70.1dB (B) 70.0dB – Airplane
13	4:47 PM	(A) 71.5dB (B) 71.3dB – Rumble Strip
14	4:49PM	(A) 71.4 dB (B) 70.3dB – Disturbance
15	4:51 PM	(A) 67.3dB (B) 67.5dB – 20 min reading
16	4:46PM	(A) 67.4 dB (B) 67.6dB – 15 min reading
17		File No: (A) 6200 – LxT.012
18		(B) 6201 – LxT.044
19		
20		
21		LEQ(A) = 67.3 dB
22		
23		
24		
25		
26		LEQ(B) = 67.5dB
27		
28		
29		
30		

$L_{10}(A) = 68.9dB$
$L_{90}(A) = 64.8dB$
$L_{min}(A) = 61.6dB$
$L_{max}(A) = 78.7dB$

$L_{10}(B) = 69.1dB$
$L_{90}(B) = 65.0dB$
$L_{min}(B) = 61.8dB$
$L_{max}(B) = 79.2dB$



ST05

TN TDOT Department of Transportation

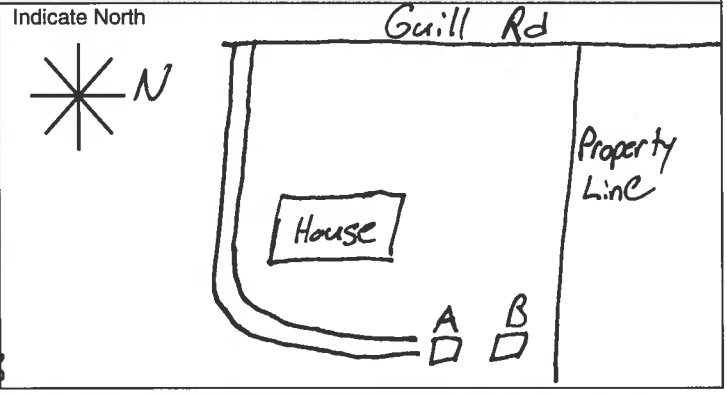
ST06

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4 2023
Address	150 Guill Road
Land Use	Residential
Meteorological Conditions	
Temperature(s)	87.3 °F
Wind Speed & Dir	2.8 mph, from S
Calibration	
Analyzer/Filename	(A) G200 (B) G201
(Pre) Cal Time/Level	(A) 3:57PM / 114dB
(Post) Cal Time/Level	(B) 3:57PM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)
1	3:58 PM	Run
2	4:00 PM	(A) — (B) — → Blast from construction (Miscead)
3	4:02 PM	(A) 54.2dB (B) 54.1dB – Loud vehicle on I-40
4	4:02 PM	(A) 55.6dB (B) 55.7dB – Airplane
5	4:03 PM	(A) 51.2dB (B) 51.3dB – 5 min reading
6	4:07 PM	(A) 64.3dB (B) 64.2dB – Airplane
7	4:08 PM	(A) 52.0dB (B) 52.1dB – 10 min reading
8	4:09 PM	(A) 53.4dB (B) 53.3dB – Airplane
9	4:13 PM	(A) 51.9dB (B) 52.0dB – 15 min reading
10	4:14 PM	(A) 57.2dB (B) 57.3dB – Truck on I-40
11	4:18 PM	(A) 51.8dB (B) 52.0dB – 20 min reading
12		
13		File No: (A) G200-LxT.0011
14		(B) G201-LxT.043
15		
16		
17		
18		LEQ(A) = 51.8dB
19		
20		
21		
22		
23		LEQ(B) = 52.0dB
24		
25		
26		
27		
28		L10(A) = 52.9dB L10(B) = 52.9dB
29		L90(A) = 50.0dB L90(B) = 50.2dB
30		Lmin(A) = 48.8dB Lmin(B) = 49.0 dB
		Lmax(A) = 64.5dB Lmax(B) = 65.1dB



ST06

TN TDOT Department of Transportation

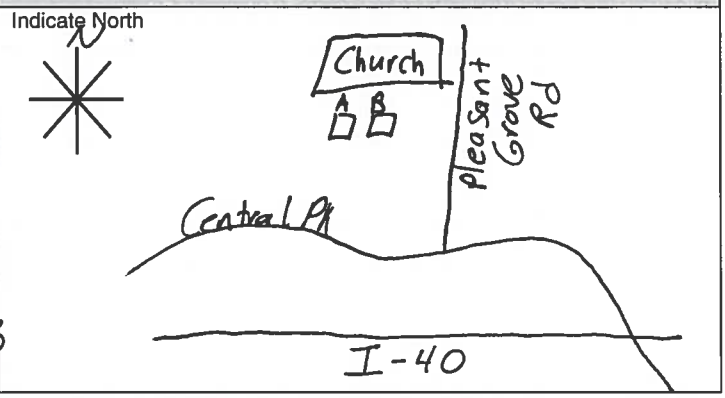
ST07

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Daniel Hundley
Date	April 4, 2023
Address	1514 Pleasant Grove Rd
Land Use	Church
Meteorological Conditions	
Temperature(s)	80 °F
Wind Speed & Dir	4.5 mph, from S
Calibration	
Analyzer/Filename	(A) G200 (B) G201
(Pre) Cal Time/Level	(A) 2:38 PM / 114 dB
(Post) Cal Time/Level	(B) 2:39 PM / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	2:39 PM	Run
2	2:44 PM	(A) 61.0 dB (B) 60.8 dB - 5 min reading
3	2:48 PM	(A) 60.9 dB (B) 60.7 dB - Car horn (Pleasant Grove Rd)
4	2:49 PM	(A) 60.9 dB (B) 60.7 dB - 10 min reading
5	2:51 PM	(A) 60.8 dB (B) 60.7 dB - Airplane
6	2:54 PM	(A) 60.9 dB (B) 60.7 dB - 15 min reading
7	2:56 PM	(A) 60.8 dB (B) 60.7 dB - Heavy truck (Pleasant Grove Rd
8	2:59 PM	(A) 60.8 dB (B) 60.6 dB - 20 min reading
9		
10		File No: (A) G200_LxT.0010
11		(B) G201_LxT.0042
12		
13		
14		**LEQ(A) = 60.8 dB**
15		
16		
17		
18		
19		**LEQ(B) = 60.6 dB**
20		
21		
22		
23		
24		L10(A) = 62.4 dB L10(B) = 62.3 dB
25		L90(A) = 59.0 dB L90(B) = 58.8 dB
26		Lmin(A) = 56.6 dB Lmin(B) = 56.5 dB
27		Lmax(A) = 67.6 dB Lmax(B) = 66.5 dB
28		
29		
30		



ST07

TN TDOT Department of Transportation

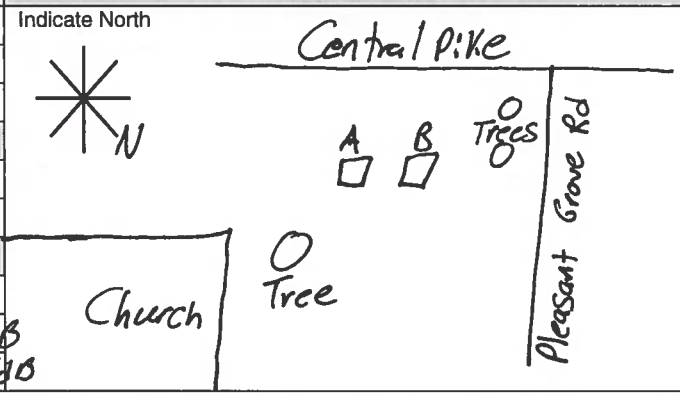
ST08

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	6485 Central Pike
Land Use	Church
Meteorological Conditions	
Temperature(s)	75 °F
Wind Speed & Dir	2.7 mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 10:46 AM / 114 dB
(Post) Cal Time/Level	(B) 10:46 AM / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	10:48 AM	Run
2	10:53 AM	(A) 61.2 dB (B) 61.3 dB - 5 min reading
3	10:56 AM	(A) 65.1 dB (B) 65.2 dB - Dumptruck
4	10:58 AM	(A) 62.1 dB (B) 62.1 dB - 10 min reading
5	10:59 AM	(A) 67.3 dB (B) 67.4 dB - Dumptruck
6	11:01 AM	(A) 66.7 dB (B) 66.8 dB - Truck w/ trailer
7	11:02 AM	(A) 66.7 dB (B) 66.2 dB - Dumptruck
8	11:03 AM	(A) 62.7 dB (B) 63.2 dB - 15 min reading
9	11:05 AM	(A) 67.6 dB (B) 67.5 dB - Dumptruck
10	11:06 AM	(A) 66.1 dB (B) 66.3 dB - Dumptruck
11	11:07 AM	(A) 69.1 dB (B) 69.0 dB - Truck w/ trailer
12	11:08 AM	(A) 63.3 dB (B) 62.8 dB - 20 min reading
13		
14		
15		**LEQ(A) = 63.3 dB**
16		
17		
18		
19		
20		**LEQ(B) = 65.8 dB**
21		
22		
23		
24		
25		File No = (A) 6200_LxT.006
26		(B) 6201_LxT.00823
27		
28		$L_{10}(A)$ = 64.9 dB $L_{10}(B)$ = 67.7 dB
29		$L_{90}(A)$ = 61.4 dB $L_{90}(B)$ = 62.9 dB
30		$L_{min}(A)$ = 59.4 dB $L_{min}(B)$ = 60.4 dB
		$L_{max}(A)$ = 71.3 dB $L_{max}(B)$ = 73.9 dB



ST08

TN TDOT Department of Transportation

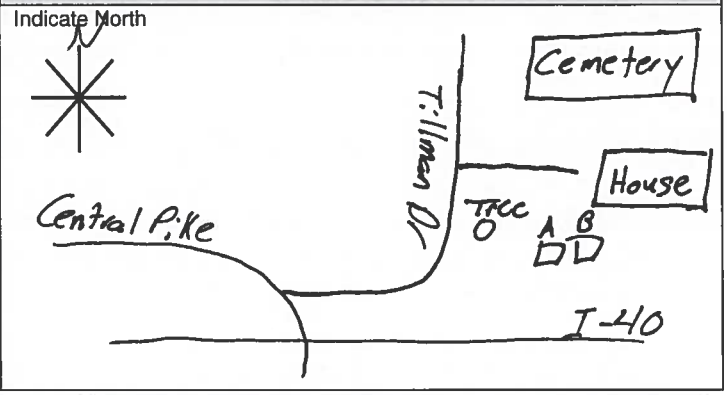
ST09

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Daniel Hundley
Date	April 4, 2023
Address	180 Tillman Drive
Land Use	Residential
Meteorological Conditions	
Temperature(s)	80 °F
Wind Speed & Dir	7.1 mph, from S
Calibration	
Analyzer/Filename	(A) G200 (B) G201
(Pre) Cal Time/Level	(A) 1:39 / 114 dB
(Post) Cal Time/Level	(B) 1:39 / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	1:44 PM	Run
2	1:49 PM	(A) 68.1dB (B) 67.3dB – 5 min reading
3	1:52 PM	(A) 69.0dB (B) 68.6dB – Airplane
4	1:54 PM	(A) 68.2 dB (B) 68.1dB – 10 min reading
5	1:58 PM	(A) disturbed
6	1:59 PM	(A) 68.0dB (B) 67.9 dB – 15 min reading
7	1:55 PM	(A) 72.1 dB (B) 70.1 dB – helicopter
8	2:04 PM	(A) 67.9 dB (B) 67.8 dB – 20 min reading
9		
10		File No: (A) G200-LxT.008
11		(B) G201-LxT.040
12		
13		
14		**$L_{EQ(A)} = 67.9$ dB**
15		
16		
17		
18		
19		**$L_{EQ(B)} = 67.8$ dB**
20		
21		
22		
23		
24		
25		$L_{10(A)} = 69.5$dB $L_{10(B)} = 69.4$dB
26		$L_{90(A)} = 65.9$dB $L_{90(B)} = 65.9$dB
27		$L_{min(A)} = 63.6$dB $L_{min(B)} = 63.4$dB
28		$L_{max(A)} = 72.0$dB $L_{max(B)} = 71.6$dB
29		
30		



ST09

TN TDOT Department of Transportation

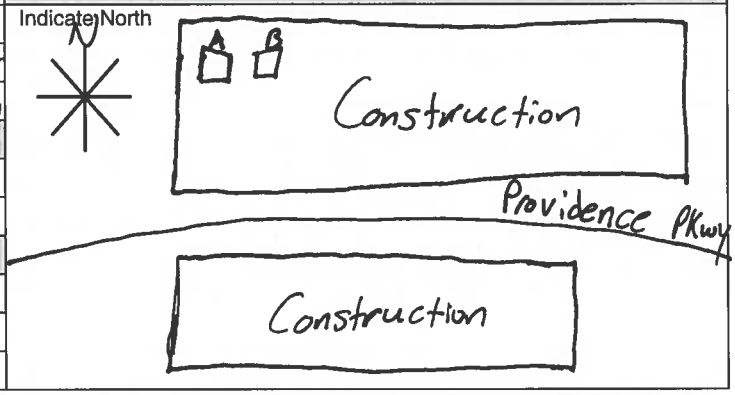
ST 10

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Daniel Hundley
Date	April 4, 2023
Address	37122 Providence Pkwy
Land Use	Apartment Construction
Meteorological Conditions	
Temperature(s)	80 °F
Wind Speed & Dir	1.5 mph, from S
Calibration	
Analyzer/Filename	(A) G200 (B) G201
(Pre) Cal Time/Level	(A) 6:43 / 114 dB
(Post) Cal Time/Level	(B) 6:43 / 114 dB

Site Sketch



Period #	Start Time	Event Description(s)
1	6:44 PM	Run
2	6:49 PM	(A) 56.3 dB (B) 56.2 dB - 5 min reading
3	6:47 PM	(A) 61.0 dB (B) 60.9 dB - Airplane
4	6:50 PM	(A) 63.9 dB (B) 63.8 dB - loud traffic (I-40)
5	6:50 PM	(A) 59.6 dB (B) 59.8 dB - Airplane
6	6:51 PM	(A) 62.3 dB (B) 62.1 dB - loud traffic (I-40)
7	6:54 PM	(A) 60.1 dB (B) 60.0 dB - Airplane
8	6:54 PM	(A) 56.1 dB (B) 56.1 dB - 10 min reading
9	6:59 PM	(A) 55.7 dB (B) 55.7 dB - 15 min reading
10	7:04 PM	(A) 55.3 dB (B) 55.4 dB - 20 min reading
11		
12		File No: (A) G200 - LxT.016
13		(B) G201 - LxT.048
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

$LEQ_{(A)} = 55.4$ dB

$LEQ_{(B)} = 55.4$ dB

$L_{10}(A) = 57.7$ dB	$L_{10}(B) = 57.6$ dB
$L_{90}(A) = 52.4$ dB	$L_{90}(B) = 52.4$ dB
$L_{min}(A) = 50.8$ dB	$L_{min}(B) = 50.9$ dB
$L_{max}(A) = 66.3$ dB	$L_{max}(B) = 65.4$ dB



ST10

TN TDOT Department of Transportation

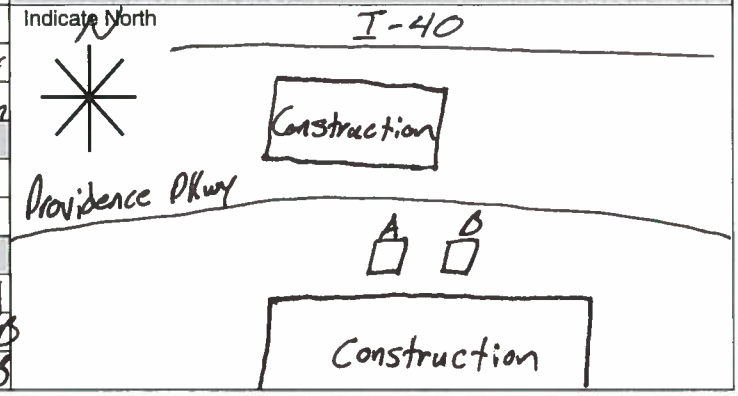
Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

ST11

Analyst Name	Daniel Hundley
Date	April 4, 2023
Address	37122 Providence Pkwy
Land Use	Apartment Construction
Meteorological Conditions	
Temperature(s)	80 °F
Wind Speed & Dir	1.5mph, from S
Calibration	
Analyzer/Filename	(A) G200 (B) G201
(Pre) Cal Time/Level	(A) 6:12PM / 114dB
(Post) Cal Time/Level	(B) 6:12PM / 114dB

Site Sketch



Period #	Start Time	Event Description(s)
1	6:13 PM	Run
2	6:18 PM	(A) 56.9dB (B) 56.8dB - 5min reading
3	6:17 PM	(A) 66.0dB (B) 65.8dB - loud car (Providence)
4	6:19 PM	(A) 63.0dB (B) 62.7dB - Airplane
5	6:20 PM	(A) 68.8dB (B) 67.0dB - loud car (Providence)
6	6:22 PM	(A) 63.8dB (B) 62.9dB - Airplane
7	6:23 PM	(A) 57.6dB (B) 57.6dB - 10 min reading
8	6:28 PM	(A) 57.1dB (B) 57.1dB - 15 min reading
9	6:33 PM	(A) 57.1dB (B) 57.2dB - 20 min reading
10		
11		File No: (A) G200 - LxT.015
12		(B) G201 - LxT.047
13		
14		
15		
16		**$L_{eq}(A) = 57.1$ dB**
17		
18		
19		
20		
21		**$L_{eq}(B) = 57.2$ dB**
22		
23		
24		
25		$L_{10}(A) = 59.0$dB $L_{10}(B) = 59.1$dB
26		$L_{90}(A) = 54.0$dB $L_{90}(B) = 54.0$dB
27		$L_{min}(A) = 52.3$dB $L_{min}(B) = 52.3$dB
28		$L_{max}(A) = 68.9$dB $L_{max}(B) = 69.2$dB
29		
30		



ST11

TN TDOT Department of Transportation

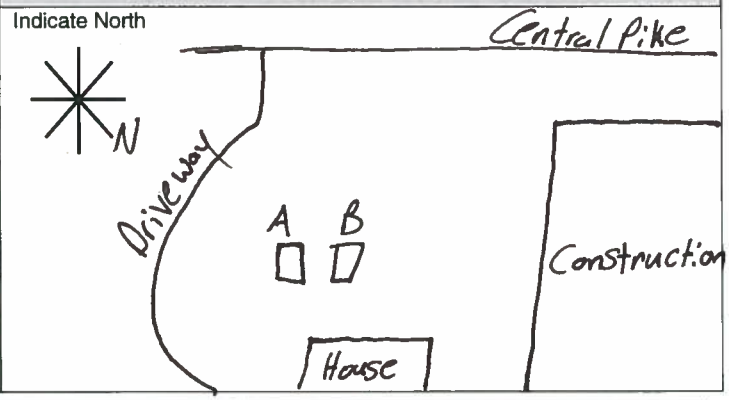
ST12

Noise Measurement Data Sheet

I-40 Interchange, PIN 124884.00, Wilson County, Tennessee

Analyst Name	Mandy Phillips
Date	April 4, 2023
Address	7445 Central Pike
Land Use	Residential
Meteorological Conditions	
Temperature(s)	79.7 °F
Wind Speed & Dir	5.1 mph, from S
Calibration	
Analyzer/Filename	(A) 6200 (B) 6201
(Pre) Cal Time/Level	(A) 12:57 PM / 114 dB
(Post) Cal Time/Level	(B) 12:57 PM / 114 dB

Site Sketch

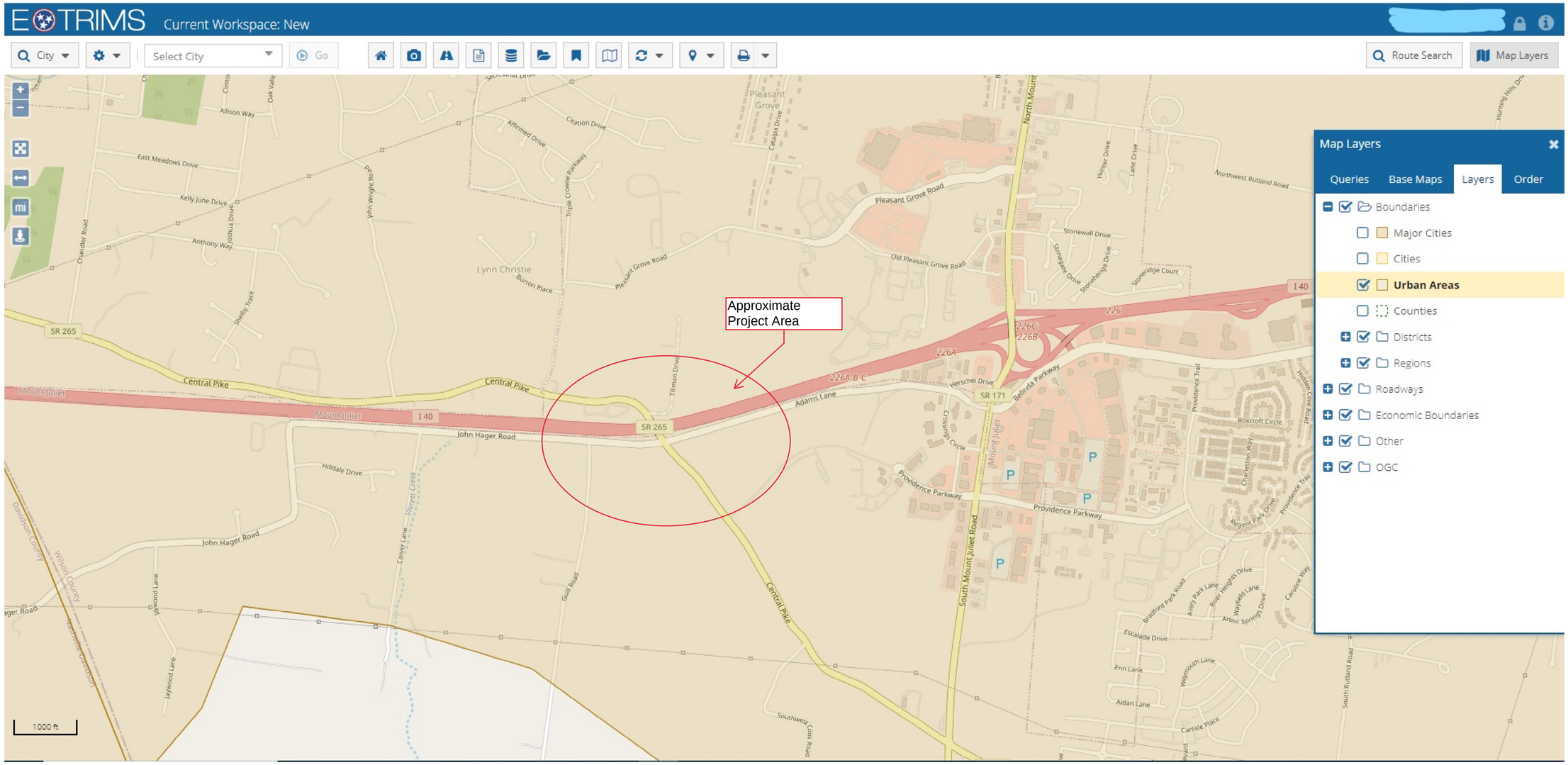


Period #	Start Time	Event Description(s)
1	12:58 PM	Run
2	1:03 PM	(A) 65.2 dB (B) 65.7 dB - 5 min reading
3	1:08 PM	(A) 64.6 dB (B) 65.1 dB - 10 min reading
4	1:13 PM	(A) 63.9 dB (B) 64.3 dB - 15 min reading
5	1:18 PM	(A) 63.4 dB (B) 63.7 dB - 20 min reading
6		
7		File No: (A) 6200_LxT.007
8		(B) 6201_LxT.039
9		
10		
11		LEQ(A) = 63.4 dB
12		
13		
14		
15		
16		
17		LEQ(B) = 63.7 dB
18		
19		
20		
21		
22		
23		L10(A) = 66.5 dB L10(B) = 66.5 dB
24		L90(A) = 57.6 dB L90(B) = 57.6 dB
25		Lmin(A) = 54.3 dB Lmin(B) = 54.4 dB
26		Lmax(A) = 74.9 dB Lmax(B) = 76.9 dB
27		
28		
29		
30		



ST12

Farmland



E TRIMS
Current Workspace: New
City
Select City
Go
Route Search
Map Layers
Approximate Project Area
Map Layers
Queries
Base Maps
Layers
Order
Boundaries
Major Cities
Cities
Urban Areas
Counties
Districts
Regions
Roadways
Economic Boundaries
Other
OGC
Central Pike
John Hager Road
Adams Lane
Providence Parkway
Pleasant Grove Road
Old Pleasant Grove Road
Lynn Christie
Mount Juliet
I 40
SR 265
SR 171
226
226A
226A B C
226C
226B
1000 ft

Cultural Resources

Environmental Studies

Archaeology

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Archaeology

Study Results

In a letter dated June 13, 2023 the TN SHPO concurred that no NRHP listed, eligible, or potentially eligible properties would be affected by this undertaking.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Michael Jeu

Title: Archaeologist

Signature: Michael Jeu Digitally signed by Michael Jeu Date: 2023.06.14 13:07:09 -05'00'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

June 12, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

RE: Archaeological Assessment for a New Interchange along Interstate 40 from Interchange at State Route 265 (Central Pike) (IA) in Wilson County, Tennessee. PIN: 124884.00

Dear Mr. McIntyre,

The Tennessee Department of Transportation (TDOT) with funding from the Federal Highway Administration (FHWA), proposes a new interchange along Interstate 40 from Interchange at State Route 265 (Central Pike) (IA) in Wilson County (see attached maps).

Please find enclosed RK&K's **draft** report of a Phase I archaeological assessment for the subject project. Andrew Weidman served as Principal Investigator. We have reviewed the enclosed report and agree with the conclusions and recommendations. It is the opinion of TDOT that there are no National Register of Historic Places listed, eligible, or potentially eligible archaeological resources within the project as currently designed and no further archaeological investigations are warranted.

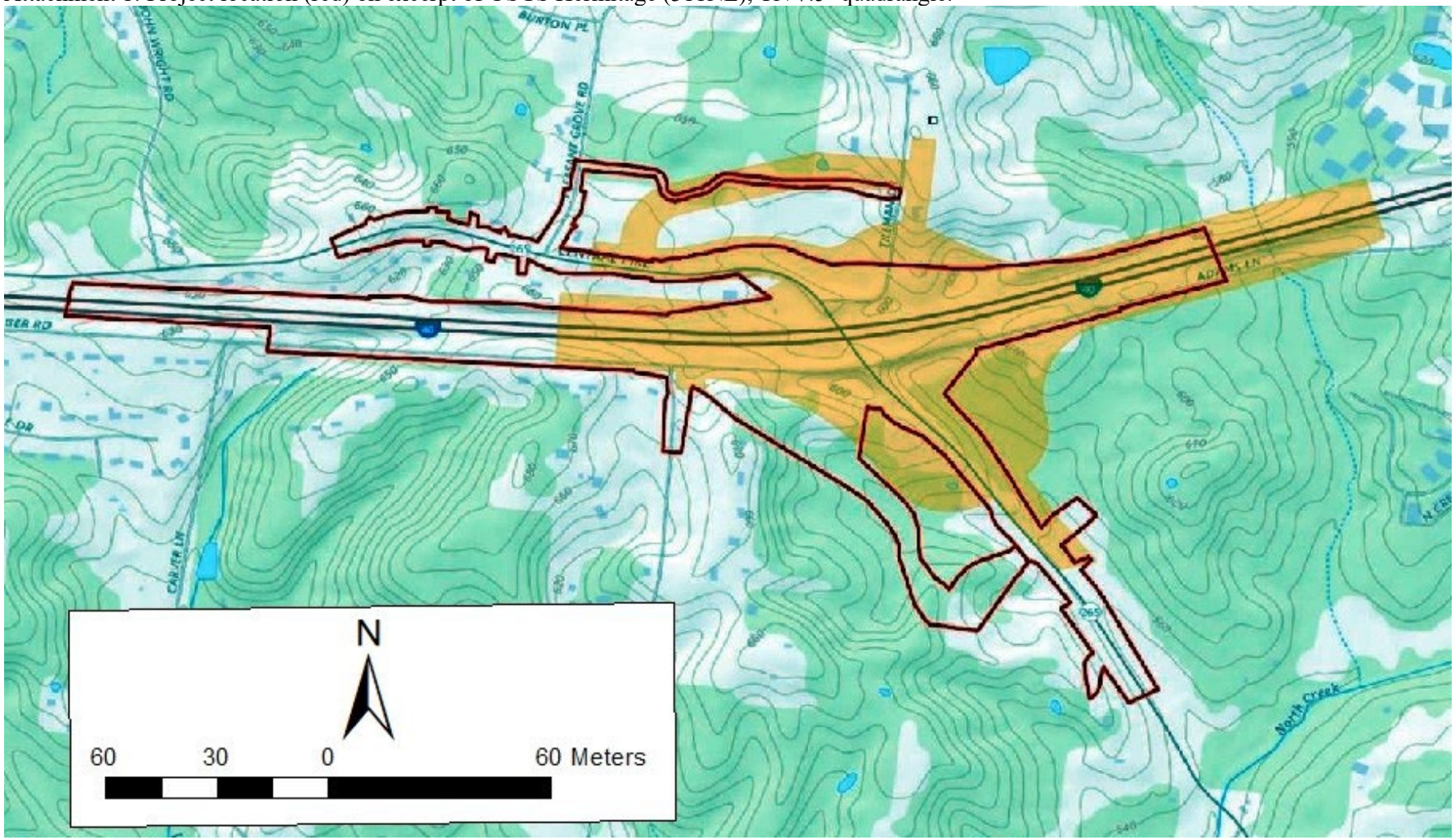
In compliance with Section 106 of the National Historic Preservation Act (as amended) and implementing regulations 36 CFR 800, please review the enclosed information and provide me with your comments. If any additional information is needed, please contact Michael Jeu (901) 497-7366 for archaeology, or me at (615) 741-0977. I appreciate your assistance.

Sincerely,

K. Brandon Chance
Cultural Resources Manager

BC/mj

Attachment 1: Project location (red) on excerpt of USGS Hermitage (311NE), TN 7.5’ quadrangle.



ADDENDUM PHASE I ARCHAEOLOGICAL IDENTIFICATION SURVEY, INTERSTATE 40 INTERCHANGE AT STATE ROUTE 265 (CENTRAL PIKE), WILSON COUNTY, TENNESSEE

FINAL REPORT

Authored by:

J. Andrew Ross
Diannah Bowman
Andrew J. Weidman, RPA

Prepared for:

Tennessee Department of Transportation
James K. Polk Building, 9th Floor
505 Deaderick St.
Nashville, TN 37243

Prepared by:

Rummel, Klepper & Kahl, LLP
300 James Robertson Parkway, Suite 600
Nashville, TN 37201



_____

Andrew J. Weidman, MA, RPA
Principal Investigator

June 14, 2023

Lead Agency: Federal Highway Administration
TDOT Project No. 95100-0113-04
PIN No.: 124884.00
Contract/Work Order No.: E2307 016
TDOA Permit No.: 001426
Accession No.: 23.035

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MANAGEMENT SUMMARY

Rummel, Klepper, and Kahl, LLP (RK&K), on behalf of the Tennessee Department of Transportation (TDOT), conducted an Addendum Phase I Archaeological Identification Survey for the proposed Interstate 40 (I-40) Interchange at State Route 265 (SR-265 [Central Pike]) project in Wilson County, Tennessee. This project proposes improvements to the existing I-40 interchange. A Phase I Archaeological Survey was completed for a previous version of this project in 2020 (Detty and Jordan-Greene 2020) but project plans have since been revised and additional Phase I survey has been requested. This project will be state funded.

The purpose of the Addendum Phase I Archaeological Identification Survey was to identify any archaeological resources within the archaeological Area of Potential Effects (APE) and, to the extent possible, evaluate their eligibility for listing in the National Register of Historic Places (NRHP). No previously identified archaeological sites are located within the APE.

The APE for this study included the extent of existing and proposed right-of-way and proposed easements within project limits as shown on project plans (March 2023). This addendum assessment surveyed areas of the APE that exceeded the extent of the 2020 APE. The full APE, including the previously surveyed areas, measured approximately 49 hectares (ha) (120 acres [ac]). The new survey areas measured approximately 22 ha (54 ac).

Fieldwork was conducted on from April 10 to April 20, 2023, and consisted of pedestrian survey and systematic shovel testing. A total of 409 shovel test pits (STPs) were excavated as part of this survey, six of which were positive for archaeological materials. Transect-based STPs were excavated systematically at 20-meter (m) (66-foot [ft]) intervals along transects generally spaced 20 m (66 ft) apart and oriented in a manner that provided the most effective overall coverage of the APE. There were 83 planned STP locations that were not excavated because of their placement in existing roadway, excessive slope, drainage ditches, standing water, or other disturbance. Eighteen (18) of the excavated STPs were close-interval delineation STPs excavated to determine the boundaries of resources identified in transect-based STPs.

One new archaeological site (40WI270) and one isolated find (IF-1) were identified in the APE as part of this survey. 40WI270 is an early- to mid-twentieth-century rural domestic site consisting of a low-density artifact scatter and one articulated stone feature. 40WI270 is unlikely to contribute any significant information to our understanding of the early- to mid-twentieth-century occupation of the county or region. **RK&K recommends that 40WI270 is not eligible for inclusion in the NRHP.**

IF-1 is a non-diagnostic, culturally unaffiliated prehistoric isolated chert flake tool. Isolated finds typically do not meet the minimum criteria for inclusion in the NRHP. **RK&K recommends that IF-1 is not eligible for inclusion in the NRHP.**

No further work is recommended.

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I. INTRODUCTION

Rummel, Klepper, and Kahl, LLP (RK&K), on behalf of the Tennessee Department of Transportation (TDOT), conducted an Addendum Phase I Archaeological Identification Survey for the proposed the Interstate 40 (I-40) Interchange at State Route 265 (SR-265 [Central Pike]) project in Wilson County, Tennessee (**Figure 1** and **Figure 2**). This project proposes improvements to the existing I-40 interchange. A Phase I Archaeological Survey for a previous version of this project was completed in 2020 (Detty and Jordan-Greene 2020) but project plans have since been revised and additional Phase I survey has been requested. The purpose of the Addendum Phase I Archaeological Identification Survey was to identify any archaeological resources within the archaeological Area of Potential Effects (APE) and, to the extent possible, evaluate their eligibility for listing in the National Register of Historic Places (NRHP). This project will be state funded.

The APE for this study included the extent of existing and proposed right-of-way and proposed easements within project limits as shown on project plans (March 2023). This addendum assessment surveyed areas of the APE that exceeded the extent of the 2020 APE. The full APE, including the previously surveyed areas, measured approximately 49 hectares (ha) (120 acres [ac]). The new survey areas measured approximately 22 ha (54 ac).

A site file records review was conducted in coordination with the Tennessee Division of Archaeology (TDOA). All site information was gathered by RK&K on March 30, 2023, via the TDOA Site File HUB. Fieldwork was conducted from April 10 to April 20, 2023, and consisted of pedestrian survey and systematic shovel testing. Andrew J. Weidman, RPA, served as the Principal Investigator for this project. Archaeological fieldwork was completed under the supervision of Field Manager J. Andrew Ross and assisted by field technicians Bruce G. Burton and Shawn Yingst. Jean M. Cascardi, RPA provided Geographic Information Systems (GIS) and mapping support. Diannah Bowman assisted with the background research and report. Project Management was provided by Karen Hutchins-Keim, Ph.D., RPA, and James R. Kodlick, RPA.

Archaeological services were conducted pursuant to Section 106 of the National Historic Preservation Act (NHPA), as amended, and its implementing regulations, 36 CFR §800; the National Environmental Policy Act of 1969 (NEPA); the Archaeological and Historic Preservation Act of 1974 (AHPA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA). All archaeological field investigations, artifact analysis, technical reporting, and artifact curation satisfied the requirements specified in the *Secretary of the Interior's (SOI) Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register 48:190:44716–44742), the *Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies* (Tennessee Department of Environment and Conservation 2018), and TDOT's *Scope of Work for Consultant Implemented Phase I Archaeological Assessments* (May 2021). All proposed work was conducted or supervised by staff that meet or exceed the Secretary of Interior's Professional Standards for archaeologists as specified in 36 CFR §61. The Phase I survey and associated technical report were completed under the conditions of the TDOA Archaeological Permit Number 001426 (**Appendix A**).

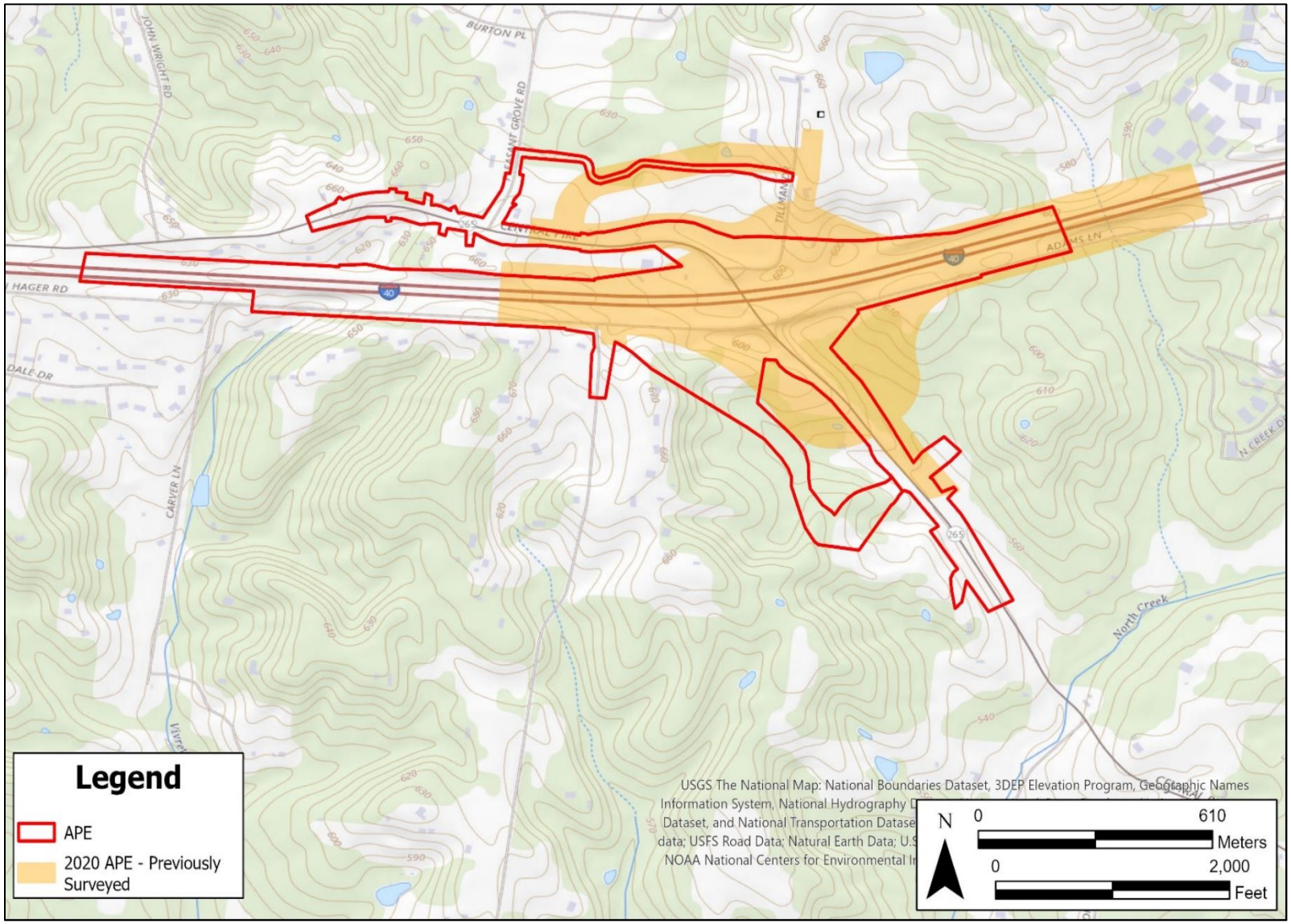

Figure 1: Topographic map (USGS Hermitage, TN [Quad No. 311-NE]) showing current APE and 2020 APE (Detty and Jordan-Greene 2020).

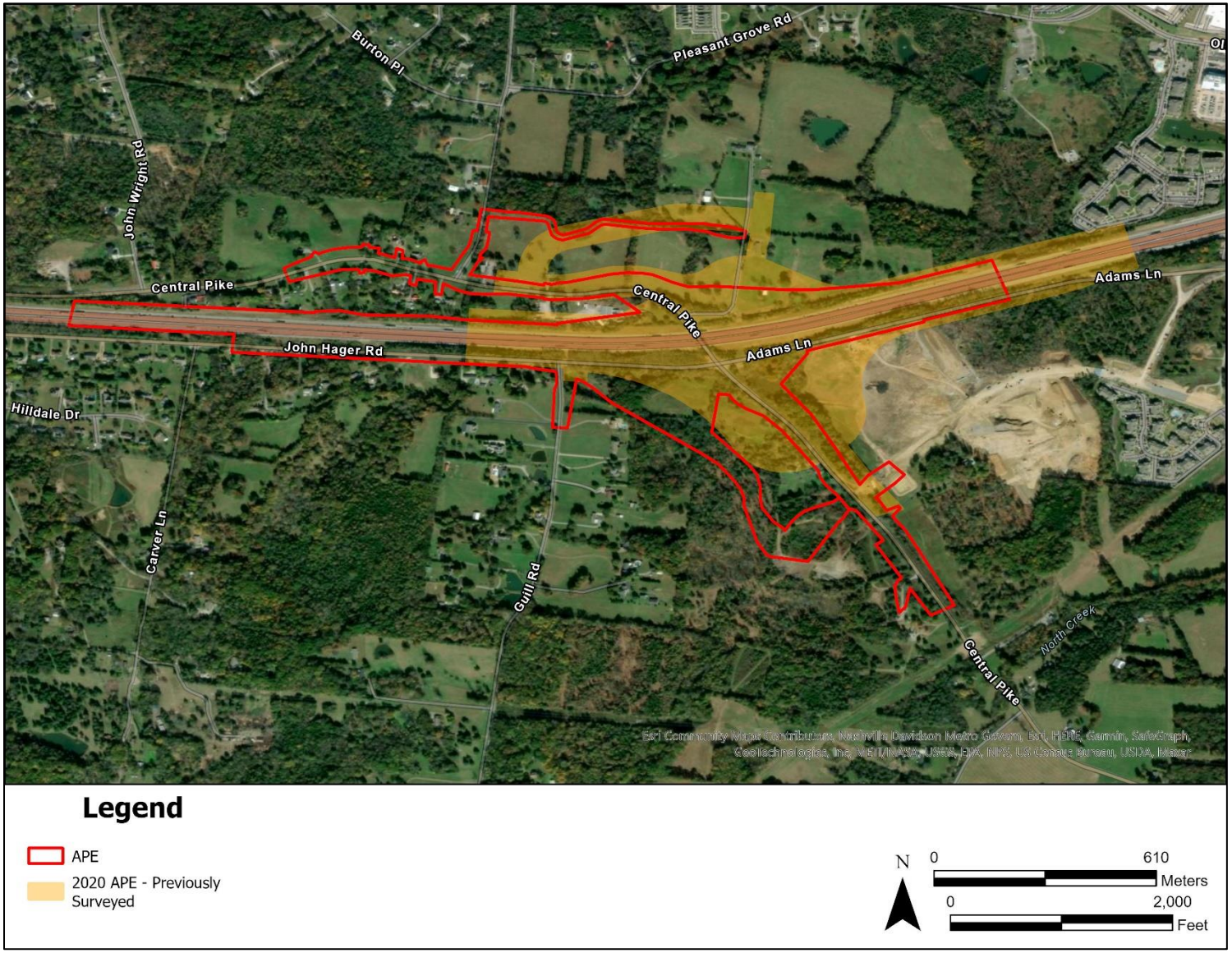

Figure 2: Aerial imagery showing current APE and 2020 APE (Detty and Jordan-Greene 2020).

II. ENVIRONMENTAL SETTING

A. PROJECT LOCATION

The APE is located in Mt. Juliet, Tennessee in the western portion of Wilson County and generally coincides with the existing I-40 / SR-265 interchange, though several areas of the APE do not align with existing roadway. The APE mostly consists of existing roadway, agricultural pastureland, undeveloped woodland, driveways, residential lawns, and commercial lawns.

B. PHYSIOGRAPHY, GEOLOGY, AND HYDROLOGY

Wilson County is located in the Central (Nashville) Basin physiographic province of Tennessee. The Central Basin is an erosional remnant of the Nashville Dome that has been most eroded at its center (inner basin) with less weathering around the periphery. The APE is situated in the inner part of the Central Basin, where topography typically consists of rolling and hilly uplands dissected by small to large streams with moderately broad floodplains (Campbell 1996).

Most of Wilson County is underlain by Mississippian era limestone, and outcrops of this limestone were evident throughout the APE. This limestone is soluble and rapid weathering of the rock is common when exposed at the surface or near the surface; eroded limestone sinkholes are common throughout the county. The county is drained by creeks, intermittent drainages, and underground streams in the limestone caverns and sinkholes, most of which ultimately drain into the Cumberland River or the Stones River (Campbell 1996). The APE is primarily drained by small, intermittent drainages that flow into North Creek and Vivrett Creek, which flow into the J. Percy Priest Reservoir of the Stones River.

C. SOILS

The APE contains seven soil units, all of which are components of the following soil series: Gladeville, Hampshire, Inman, Stiversville, and Talbott (**Figure 3**). All soil units are listed in **Table 1**. Each of these soil series is described in detail below. All soil information provided below is from the *Soil Survey of Wilson County, Tennessee* (Campbell 1996) and the United States Department of Agriculture-Natural Resource Conservation Service's (USDA-NRCS) *Web Site for Official Soil Series Descriptions and Series Classification* (USDA-NRCS 2023).

Gladeville series soils are very shallow, well drained, flaggy soils that formed in residuum weathered from thin-bedded flaggy limestone. These soils are on gently sloping to steep uplands. The typical stratigraphic sequence for Gladeville soils is: **A1** (0-10 centimeters below surface [cmbs] [0-4 in) (10 YR 3/2 flaggy silty clay loam); **A2** (10-20 cmbs [4-8 in]) (10 YR 3/3 very flaggy silty clay loam); **C** (20-25 cmbs [8-10 in]) (7.5 YR 4/4 very flaggy clay). Limestone bedrock underlays these soils.

Hampshire series soils are deep, well drained upland soils formed in clayey residuum of interbedded limestone and shale and the underlying residuum of interbedded siltstone, fine grained sandstone, shale, and limestone. The typical stratigraphic sequence for Hampshire soils is: **Ap** (0-18 cmbs [0-7 in]) (10 YR 3/2 silt loam); **Bt1** (18-30 cmbs [7-12 in] (7.5YR 4/4 silty clay loam); **Bt2** (30-61 cmbs [12-24 in]) (7.5 YR 5/6) clay. Fragments of rock range from 0 to 15 percent in the Ap and Bt horizons.

Inman series soils are moderately deep, well drained, flaggy soils formed in clayey residuum weathered from interbedded phosphatic limestone and shale. They are located on rolling to steep uplands in the outer part of the Central Basin. The typical stratigraphic sequence for Inman soils is: **Ap** (0-15 cmbs [0-6 in]) (10 YR 4/2 flaggy silty clay loam); **Bw1** (15-30 cmbs [6-12 in] (10 YR 5/4 flaggy silty clay); **Bw2** (30-43 cmbs [12-17 in]) (10 YR 5/6) flaggy silty clay; **Bw3** (43-64 cmbs [17-25 in]) (2.5 Y 5/6) flaggy silty clay; **Cr/B** (64-81 cmbs [25 to 32 in] interbedded, highly fractured limestone and shale.

Stiversville series soils are deep, well drained permeable soils on uplands formed mostly in residuum of siltstone and fine-grained sandstone interbedded with shale and limestone. The typical stratigraphic sequence for Stiversville soils is: **Ap** (0-20 cmbs [0-8 in) (10YR 3/3 loam); **BA** (20-36 cmbs [8-14 in]) (7.5 YR 4/4 loam); **Bt1** (36-58 cmbs [14-23 in]) (7.5 YR 4/4 loam); **Bt2** (58-86 cmbs [23-34 in]) (7.5YR 4/4 clay loam).

Talbott series soils are moderately deep, well drained soils that formed in clayey residuum weathered from limestone. The typical stratigraphic sequence for Talbott series soils is: **Ap** (0-15 cmbs [0-6 in]) (10YR 4/3 silty loam); **Bt1** (15-25 cmbs [6-10 in]) (5 YR 4/6 clay); **Bt2** (25-51 cmbs [10-20 in]) (5 YR 5/6 clay).

Table 1: Soil types within the APE (USDA-NRCS Web Soil Survey 2023.

MAP UNIT SYMBOL	MAP UNIT NAME	DRAINAGE	ACRES	PERCENT
GaC	Gladeville-Rock outcrop complex, 2 to 15 percent slopes, extremely stony	Well drained	0.3	0.3
HaC2	Hampshire silt loam, 5 to 12 percent slopes, eroded	Well drained	28.3	23.6
HaD2	Hampshire silt loam, 12 to 20 percent slopes, eroded	Well drained	10.1	8.5
InD2	Inman flaggy silty clay loam, 12 to 20 percent slopes, eroded	Well drained	32.3	27.0
StC2	Stiversville silt loam, 5 to 12 percent slopes, eroded	Well drained	2.2	1.8
TaC2	Talbott silt loam, 5 to 12 percent slopes, eroded	Well drained	32.7	27.3
TrC2	Talbott silt loam, 5 to 20 percent slopes, eroded, rocky	Well drained	13.7	11.5
Total			**119.7**	**100.0%**

D. PALEOENVIRONMENT

The environmental conditions of the Late Pleistocene and Early Holocene differed considerably from current environmental conditions in North America. A warming climate during the Late Pleistocene caused glaciers that covered much of northern North America to recede northward, creating glacial meltwaters that raise oceanic levels, inundating coastlines and creating a new landscape (Bonnicksen 2000). During the Late Pleistocene, more than 30 genera of mammals went extinct across the continent, and in southeastern North America, this included large mammals such as mammoths and mastodons (Haynes 2009).

The Pleistocene-Holocene transition was marked by a climatic episode known as the Younger Dryas (10,800-9,700 BC), which was a reversal of general warming trends and a return to glacial-like conditions. The Younger Dryas was presumably caused by a freshwater influx into the North Atlantic or Arctic Ocean (Broecker 2006; Broecker and Denton 2012; Broecker et al. 1988; Tarasov and Peltier 2005), and in the southeastern United States, a shift in vegetation occurred as species adapted to cooler, moister conditions (Hussey 1993; LaMoreaux et al. 2009; Meeks and Anderson 2012; Watts 1975, 1980).

As the climate continued to warm, increased moisture encouraged the northward advance of pine and spruce dominated boreal forests (Delcourt and Delcourt 1981). As temperatures increased these forests were replaced with deciduous, northern hardwoods such as oak, hickory, elm, birch, and beech (Webb et al. 1993). The warming trend eventually returned, and for the last 10,000 years, a modern forest has covered much of southeastern North America (Bonnicksen 2000; Delcourt 1979; Sheehan et al. 1985).

E. MODERN ENVIRONMENTAL SETTING

1. Flora

The APE is in the Western Mesophytic region as described by Braun (1950) and is dominated by oaks, hickory, and walnut, which seasonally produced an abundant nut crop. Other species include bodoc (Osage orange) and persimmon. This region would have historically consisted of bodoc (Osage orange), oaks, hickory, walnut, and persimmon. Seed-producing plants were also common in the floodplain and sometimes in the uplands, including lamb's quarter (*Chenopodium sp*.), knotweeds (*Polygonum sp*.), and wild bean (*Strophostyles leiosperma*). The dominant land cover would have consisted of forest; however, due to historical impacts such as deforestation for agriculture, timber production, fuelwood, and urban expansion, the current vegetation in the APE is primarily mixed grasses and secondary growth.

2. Fauna

The APE is in the Carolinian Biotic Province (Dice 1943), a rich faunal community supported by substantial waterways and adjacent bottom lands. Modern-day mammals consist of white-tailed deer, turkey, beaver, otter, muskrat, raccoon, opossum, squirrel, rabbit, gray fox, and skunk. In addition to the present-day species, animals that would have existed during prehistoric and early historic periods would have also included black bear, bison, elk, and cougar. Birds of possible food value include red-tailed hawk, crow, quail, dove, killdeer, and several varieties of ducks and geese. Fish found in nearby creeks and rivers include crappie, bass, catfish, and drum.

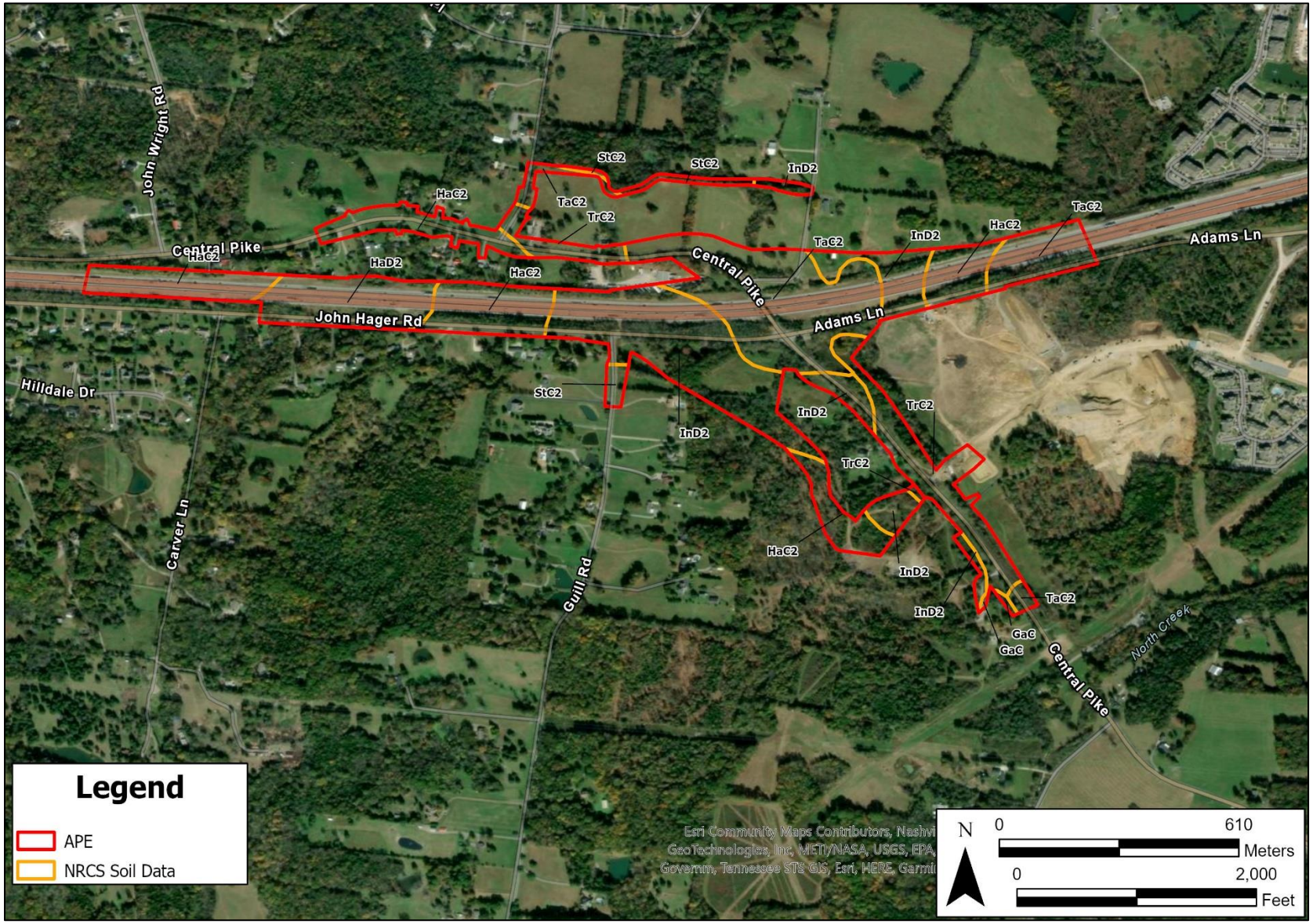

Figure 3: Project soils map.

3. Modern Environment

Modern day Wilson County is in the Cool Temperate climate zone and has hot summers and cool winters (Campbell 1996). The average temperature is 38 degrees Fahrenheit in winter and 68 degrees in summer. Average annual precipitation is approximately 52 inches with the heaviest rainfall occurring in April through September (Campbell 1996).

The archaeological APE for the project encompasses dissected rolling uplands north and south of I-40 and along SR-265. The current land-use setting of the APE includes residential manicured lawns, agricultural pastures, and the existing I-40, SR-265, John Hager Road, and Pleasant Grove Road corridors.

III. PREVIOUS RESEARCH AND CULTURAL BACKGROUND

A. PREVIOUS ARCHAEOLOGICAL RESEARCH

Background research was completed to identify any archaeological surveys or previously identified archaeological sites, cemeteries, above ground resources, or historic properties within a 1.6-km (1-mi) radius of the APE and to contextualize any archaeological resources encountered within the APE during this project. The site file records review for the project was conducted by the Principal Investigator for RK&K on March 12 and March 30, 2023, via the TDOA Site File HUB. Additional background research was conducted through RK&K's archaeological reference library and via online journals and historical resources. Research materials include the following: historic maps, historic aerial photography, county and local histories, tribal histories, and land records.

The records review identified no previously identified archaeological resources, cemeteries, historic properties, or above ground resources within the APE. Two previously recorded archaeological sites were identified within the search radius of the APE. **Table 2** lists these sites and provides additional information on their disposition and NRHP status. No additional historic properties, above ground historic resources, or cemeteries were identified within the search radius.

One previous archaeological survey has been conducted within the APE (**Figure 4**). A Phase I survey for a previous version of this project—*Phase I Archaeological Assessment for the Interstate-40 at State Route 265, Wilson County, Tennessee*—was conducted in 2020 by TRC (Detty and Jordan-Greene 2020 [DOA No. 9408]). This survey encompassed a large portion of the current APE. No archaeological resources, cemeteries, or above ground resources were identified within the section of the 2020 survey that coincides with the current APE. Three additional Phase I archaeological surveys have been conducted within the search radius (**Table 3**).

Table 2: Previously recorded archaeological resources within a 1.6-km (1-mi) radius of APE.

SITE NO.	CULTURAL AFFILIATION	SITE TYPE	NRHP STATUS	RECORDER	DATE RECORDED
40WI190	Historic: 1901 to 1932	Rural farmstead	Not assessed	DuVall and Associates	2005
40SY263	Historic: 1866 to 1932	Rural farmstead	Not assessed	Kathy Manning	2018

Table 3: Previous archaeological investigations within a 1.6-km (1-mi) radius of APE.

SURVEY NO.	REPORT TITLE	REPORT AUTHOR	SURVEY DATE
9804	Phase I Archaeological Assessment for the Interstate-40 at State Route 265, Wilson County, Tennessee	Brenda Detty and Krista Jordan-Greene	2020
9224	Archaeological Survey (Phase I) of the Proposed South Mount Juliet Road (State Route 171) Improvements, Mount Juliet, Wilson County, Tennessee	Kathy Manning	2020
No Data	Due Diligence Cultural Resources Investigation of Approx. 32 Acres/Johnson Property South of I-40, Wilson County, Tennessee	M. Cochrane	2005
6356	A Cultural Resource Survey for Proposed Improvements to the Interstate 40 - Mount Juliet Road Interchange, Mount Juliet, Wilson County, Tennessee	Marc E. Wampler and Ted Karpynec	2004

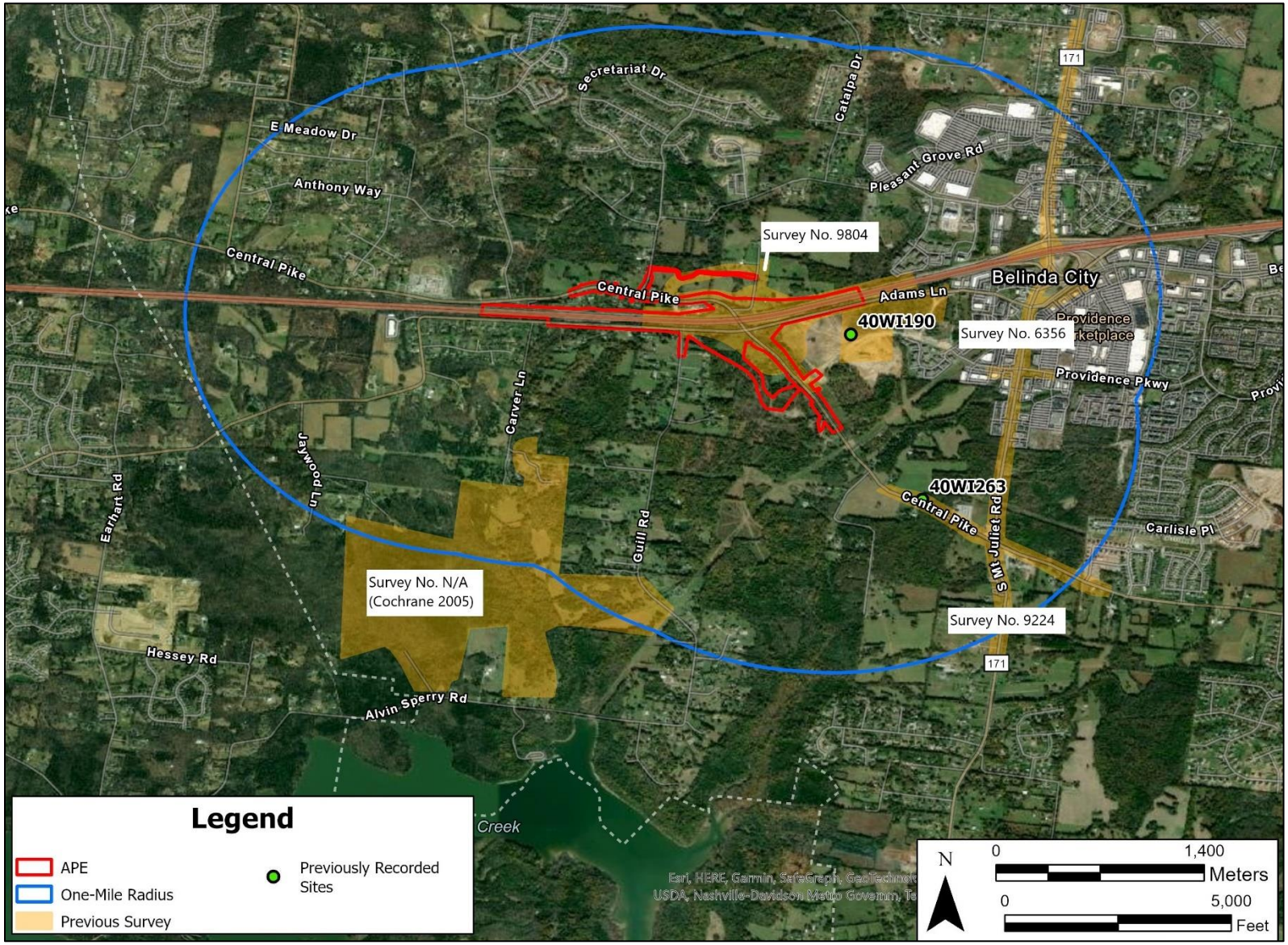

Figure 4: Previously recorded resources within a 1.6-km (1-mi) radius of the APE.

B. REGIONAL PREHISTORIC CULTURAL CONTEXT

This section provides a synopsis of general cultural trends over the last 14,000 years in Middle Tennessee and the surrounding area. While not intended to be a comprehensive study, it does provide a framework for discussing the results of this survey. The prehistoric period in Middle Tennessee can be divided into four generalized periods: Paleoindian, Archaic, Woodland, and Mississippian.

1. Paleoindian Period (c. 12,000-8,000 BC)

The first well-documented inhabitants of eastern North America were relatively mobile, with a subsistence strategy primarily based on migratory (and now-extinct) large animals such as mastodons; however, they also relied on other plant and smaller animal food resources including leafy plants, seeds, nuts, and berries (Clausen et al. 1979; Cushman 1982; Dincauze 1993; McNett et al. 1977; Meltzer 1993; Sassaman et al. 1990). Settlements likely included small temporary camps and less common base camps occupied by loosely organized bands. High quality lithic material was selected for tools and key diagnostics of this period are fluted and unfluted lanceolate projectile points. Formal flake tools such as endscrapers, gravers, retouched blades, burins, and unifacial and bifacial knives have also been documented for this period (Gardner 1979). Sophisticated wood, bone, and antler technology may have also been utilized as there have been several finds of worked ivory (Goodyear 1999).

Over the course of the Paleoindian period, fluted point forms underwent a general reduction in size, and true fluting gave way to basal thinning. The classic fluted Clovis projectile point type marks early Paleoindian assemblages. Cumberland, Suwannee, and Simpson points identify middle Paleoindian assemblages. Late Paleoindian types include Hardaway/Dalton, Quad, and Beaver Lake projectile point forms (Goodyear 1982; Miller et al. 2016). Most Paleoindian points have been found from surface or isolated contexts. The Coates-Hines Site (40WM31) in Williamson County, Tennessee, produced a mastodon skeleton that was thought to have been butchered (Breitburg et al. 1996); however, Tune et al. (2018) have disputed this and argue that the site is not cultural. Various models have been posited regarding Paleoindian settlement patterns with camp locations focused on proximity to high-quality lithic raw material sources (Gardner 1983; Smallwood et al. 2015), landforms (Anderson 1995), aquatic and riverine environments (Gagliano 1977), or groups were very nomadic and followed the seasonal movements of large game species (Kelly and Todd 1988).

2. Archaic Period (8,000-1,000 BC)

The Archaic period exhibits an increase in the density and horizontal dispersal of archaeological remains. This period is characterized by a reliance on animals and wild plant resources, which became increasingly stabilized and broad-based over time. Group organization is presumed to have still been mobile, making use of seasonally available resources in different areas of the Southeast. Group size gradually increased during the period, culminating in a more complex society in the Late Archaic.

The technology during the Archaic period appears to have been progressively more diverse than the Paleoindian period. Over the course of the Archaic period, for example, increasing numbers of artifacts and tool types appear, such as groundstone, woodworking and plant processing implements, carved and polished stone bowls, atlatl weights, stone pipes, and beads (Anderson

2001; Griffin 1967; Jennings 1975). Regional differentiation in projectile point and other artifact styles also occurs, suggesting the emergence and elaboration of local cultural traditions. This cultural variability is thought to be partially related to localized differences in environment and subsistence resources and to an increasing regional population base, with a concomitant circumscription of group territories and mobility (Ford 1974). In its most common expression, the Archaic period is viewed as one in which the predominately big-game hunting of the Paleoindian period was replaced by a more generalized or diffuse hunting and gathering way of life (Cleland 1976; Griffin 1967).

The Archaic period formally begins with the onset of Holocene, post-glacial, climatic conditions and has been subdivided into three sub-periods: Early (8,000-6,000 BC), Middle (6,000-3,000 BC), and Late Archaic (3,000-1,000 BC).

The Archaic period was a relatively long and successful foraging adaptation, with subsistence based on hunting, fishing, and the collection of wild plant resources. Diagnostic artifacts of the Early Archaic period include side- and corner-notched hafting elements such as Big Sandy, Hardin, Kirk Corner Notched, Decatur Notched, Pine Tree Corner Notched, and Lost Lake projectile points.

Prehistoric populations may have declined in the region as a result of environmental pressures related to the warmer and drier climate during the Middle Archaic period. The shell midden sites along the Tennessee, Tombigbee, and Green Rivers may be attributed to repeated or long-term seasonal occupation of the resource-rich landforms (Meeks 2000). Diagnostic hafted bifaces of the Middle Archaic period include Eva, Cypress Creek, Stanly Stemmed, Morrow Mountain Rounded, Halifax Side Notched, and White Springs/Sykes types (Chapman 1985; Kimball 1985; Smith 1996).

The Late Archaic period is a time of considerable population growth, regional adaptation, and inter-regional exchange of raw materials (Griffin 1967). Sedentism increased and horticulture began to be developed with the utilization of squash, sunflowers, sumpweed, maygrass, knotweed, little barley, and gourds (Adovasio and Johnson 1981; Anderson 2001; Chapman and Watson 1993). Also, during this period vessels carved out of soapstone became an exchange item from quarries in the Piedmont and the Appalachians (Anderson and Sassaman 2012). Additional trade goods include marine shell, copper, steatite, and distinctive chert suggesting the beginnings of a complex regional trade network. Point types of the Late Archaic period include Savannah River, Appalachian Stemmed, and Iddins Undifferentiated Stemmed (Chapman 1985).

3. Woodland Period (1,000 BC-800 AD)

Across the eastern United States, the Woodland period is marked by the widespread adoption of pottery, an increased role in horticulture for subsistence, and an elaboration of mortuary ceremonialism (Griffin 1967; Yarnell and Black 1985). In the greater Southeast, the Woodland period began with a transition from the Late Archaic that was marked by increasing sedentism and technological changes in food storage and preparation. Religious life, as evidenced by increased ceremonialism and the development of burial mounds, became more sophisticated. The intensification of long-distance trade networks centered on the exchange of non-local exotic materials (e.g., copper, obsidian) is also evident. Triangular projectile points indicate the adoption and expansion in the use of the bow and arrow as opposed to the earlier spear and atlatl. Pottery

became more refined and regional differentiation of wares, particularly with respect to temper, paste, and surface decoration, became manifest during the Woodland period.

The Woodland Period is subdivided into the Early (1,000 B.C. – A.D. 1), Middle (A.D. 1 – 600), and Late (A.D. 600 – 900). Early Woodland period occupations exhibit a continuance of early Archaic hunter-gather lifeways, but with an increased reliance on pottery vessels. Horticultural activities focused on the domestication of different plants such as goosefoot, maygrass, knotweed, sumpweed, little barley, and sunflower. Hafted bifaces include Adena and McFarland types (Faulkner 1992; McCollough and Faulkner 1973). Ceramics are characterized by quartz-tempered (Watts Bar phase), and limestone-tempered (Long Branch phase) fabric marked wares (Faulkner 1992).

The Middle Woodland period represents a time of increased cultural complexity and evidence of Hopewellian interaction (Caldwell 1964; Chapman and Shea 1981; Seeman 1979). The development of ceremonialism and a complex inter-regional trade network is exhibited in copper objects, sheets of mica, ceramics decorated with non-indigenous motifs, greenstone celts, sandstone pipes. Pinson Mounds—a Middle Woodland ceremonial center—was the largest site in the southeast for nearly 400 years and is critical to understanding the Middle Woodland period in Tennessee. Research at Pinson Mounds demonstrates that sandy textured cordmarked ceramics begin to appear and fabric marked wares decline during the Middle Woodland period in Tennessee (Mainfort 1994). Point types include Pigeon Side-Notched, Greenville, and Camp Creek, Connestee Triangular, and Bradley Spikes. Ceramic types include sand-tempered Connestee series, limestone-tempered Pickwick Complicated Stamped, Wright Check Stamped, Bluff Creek Simple Stamped, and Candy Creek Cordmarked.

The Late Woodland period is characterized by an increase in centralized villages and associated burial mounds. Agricultural intensification of corn, tobacco, beans, and gourds has largely replaced horticulture. Points are small and triangular and include Jack's Reef, Hamilton Incurvate, and Madison types (Wetmore 2002). Ceramic types are largely limestone-tempered Hamilton Cord Marked.

4. Mississippian Period (800-1600 AD)

The Mississippian period in the Southeastern United States is interpreted as a time of permanent settlements, increased religious and social complexity, and greater dependence on agricultural practices such as maize cultivation. The most dramatic characteristics of this period are observed in the construction of large, fortified villages and flat-topped earthen mounds utilized in political and religious functions. An elaborate and complex iconography also became widespread throughout the Midwest and Southeast during this time (Dragoo 1975; Griffin 1967; Koerner et al. 2016; Stoltman 1978). A rise in ceremonialism is expressed architecturally in large public constructions and more rigid social organization associated with chiefdom-level societies. In some regions, settlements became securely permanent in which houses were rebuilt many times and some villages were surrounded by a palisade.

Villages were frequently associated with large public constructions including truncated pyramidal mounds fronting plazas. While some of the population was housed in these large, fortified villages, inhabitants were also likely dispersed into farming hamlets.

The Mississippian period has been subdivided into Early (A.D. 900-1000), Middle (A.D. 1000-1350), and Late (A.D. 1350-1600). The Early Mississippian period in the Middle Tennessee Valley is referred to as the Langton phase. Hamilton and Madison point types are well represented during this time. The appearance and rapid spread of shell tempering in the ceramic assemblage is also characteristic (Futato 1998:226-227). Houses within villages tended to include walled trenches and single set posts.

Settlements in the Middle Mississippian period shifted from the floodplains or first stream terraces to older terraces. Platform mounds and stockade walls appeared, and mortuary practices became highly symbolic with a variety of personal adornments such as beads, ear spools, and gorgets (Braly et al. 2016).

The Late Mississippian period in Tennessee is marked by large settlements with deep midden deposits, palisades, and human interments throughout the village as well as in the mounds. Mortuary practices suggest that status was determined by age and gender (Harle et al. 2016). A substantial population decline/abandonment has been suggested during the Late Mississippian (Williams 1980, 1983, and 1990).

C. REGIONAL HISTORIC CULTURAL CONTEXT

1. Contact and Early Historic Period (1600-1775 AD)

The Spanish were the first Europeans to arrive in what is now Tennessee during the expedition led by Hernando DeSoto in the 1540s. The exact route has not been determined, but Hudson et al. (1985) and DePratter et al. (1985) suggest that DeSoto's journey encountered the village of Chiaha (northern border of the Coosa chiefdom) located on Zimmerman's Island in the French Broad River in present-day Tennessee, and the Little Egypt site in present-day northwest Georgia, the central town of the Coosa chiefdom. The towns that were visited by DeSoto reflected Mississippian culture and were likely linguistically affiliated with Muskogean-speaking groups (Lewis et al. 1995). From initial European contact to the historic period, the archaeological and ethnohistoric record indicates a steady decline of the Native American population and extensive movement of many tribes. Introduced European disease, especially smallpox, may have been a major catalyst for this decline (Smith 2002).

The Mississippian pattern of large towns surrounded by smaller hamlets continued to operate in the Central Basin along the Cumberland River to farm maize in the alluvial valleys (Hudson 1976). The Chickasaw and the Creek along with the Cherokee and the Shawnee had hunting ground territories in Cumberland River area (Satz 1979).. By the 1670s the tribes were showing increase participation in the fur trade (Clark 1998; Satz 1979). There were two trading posts established in the Nashville area: one in 1689 by French-Canadian explorer Martin Chartier, and the other—the French Lick trading post—in 1715 by Jean du Charleville (Native History Association 2016). Because of the increase hunting pressure from the fur trade, inter-tribal conflict rose resulting in the Cherokee and the Chickasaw pushing out the Shawnee (Satz 1979). In 1794 the defeat of the Cherokee Tribe at Black Fox Springs by militia ended all the tribes hunting in the area (Weeks 1992; Hankins 1998).

2. Historic Period (1775-1950 AD)

During the colonial period, the land that is now Tennessee was part of the colony of North Carolina. French trappers and European hunting parties are known to have been present in the Wilson County area during the 1760s. In 1783, the western territories of North Carolina were ceded to the United States government but were revoked the following year (Rothrock 1946). This led to turmoil with the boundaries which resulted in treaties and conflicting land claims (**Figure 5**). John B. Walker established the first permanent settlement in the area at Hickory Ridge, west of the present-day Lebanon, in 1794. Tennessee became the sixteenth state in the union in 1796 (Burns 2023).

Wilson County was established in 1799 and was named for an American Revolution hero from North Carolina, Major David Wilson (Drake 1976; Burns 2023). In 1801 Josiah Wood was granted to operate a ferry on the Cumberland River near Hunters Point north of Lebanon (Merritt and Burns 1961). In 1802 Lebanon was named the county seat and became a significant manufacturing and trade center. In 1812, Cloyd's Cumberland Presbyterian Church began in the Mount Juliet area and Mount Juliet was established by 1835 (Merritt 1961). By 1820, stagecoach services were established in the county and Eagle Tavern, near Mount Juliet, was a well-known stop (Merritt 1961). On Matthew Rhea's 1832 map, the area around Mount Juliet was labeled as "Cedar Glades" (Merritt and Burns 1961; see **Figure 6**). In 1860, the enslaved population in Wilson Co. was 31 percent and many of whom worked on farms or in textile mills in Lebanon (Burns 1983). Early Wilson County had a primarily agricultural economy (Burns 1983, 1987).

Several Civil War engagements occurred in Wilson County, including a battle at the square in Lebanon in 1862. Both forces occupied Lebanon at different points during that year (Burns 1983). Cumberland University, founded in Lebanon in 1842, served as barracks and campground of a Union federal garrison during the Civil War and became a prominent cultural center in the county after the Civil War (Merritt and Burns 1961). In 1869 railway transportation came into Wilson County, increasing the value of local forest products (Burns 2023). Sheep production and thoroughbred horses became the leading industries in the 1850s and there was a textile manufacturing boom (Burns 1987). The early-twentieth century saw new industries being established: a military academy, wool manufacturing, woodworking, hotels, theaters, poultry production, and two cooperative creameries (Burns 1983, 1987). In the 1920s the streets were paved, and a reservoir built in Lebanon (Burns 1987). Because Middle Tennessee had a similar in landscape to western Europe, the United States Army conducted World War II training in Wilson County with the headquarters at Cumberland University in 1942 (Nance 2007). Eight hundred troops were supervised from 1942 to 1944 during the Tennessee Maneuvers in preparation for service in World War II (Burns 2023).

The completion of I-40 during the 1960s transferred the center of the trading network from Lebanon to Nashville (Wampler and Karpynec 2004). Since then, western Wilson County has become increasingly suburbanized as Nashville expands.

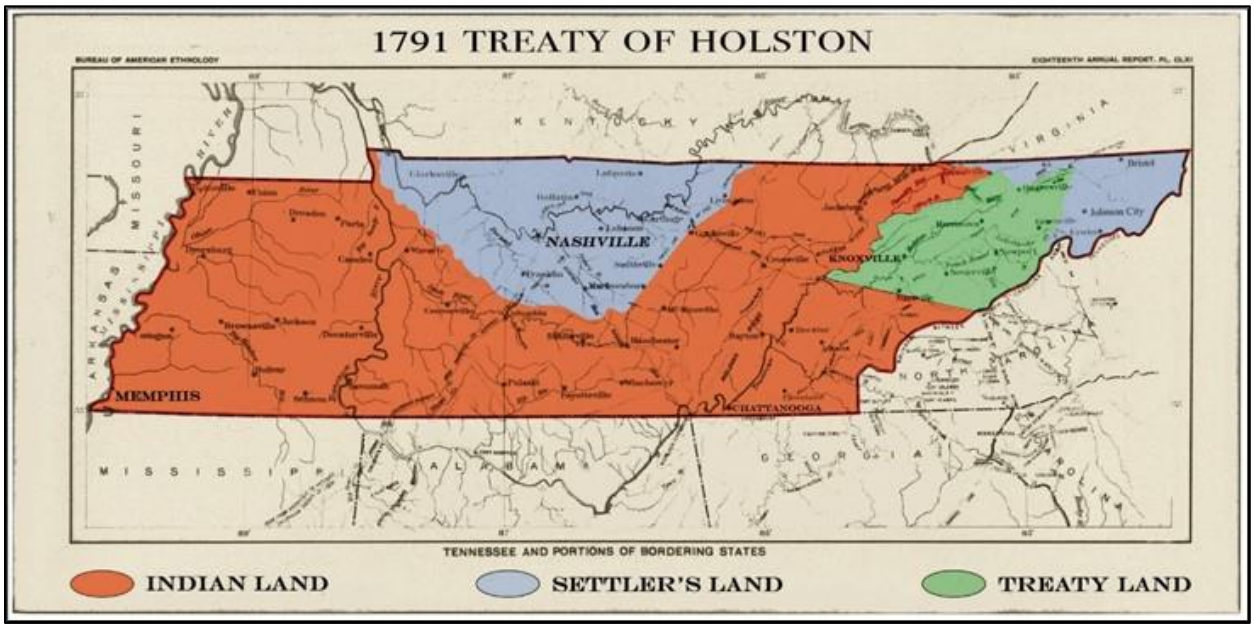

Figure 5: 1791 Treaty of Holston map showing early European settlement areas and Native American lands in Tennessee.



Figure 6: Detail of Matthew Rhea's 1832 map showing Davidson and Wilson Counties.

3. Current Land Use

The APE is located southwest of Mt. Juliet, Tennessee in the western portion of Wilson County along the existing I-40 corridor at its intersection with SR-265 (Central Pike). Since the construction of I-40 in the 1950s and 1960s, the APE has been partially utilized as a roadway, though many of the areas surrounding the roadways have remained primarily agricultural, residential, and commercial.

D. SURVEY EXPECTATIONS

Background research and the TDOA site file search show that the probability of prehistoric sites within the current survey area is low to moderate. No prehistoric sites have been previously recorded within the APE, though several prehistoric sites have been recorded in archaeological surveys nearby the APE. Modern and historic development is likely to have impacted prehistoric archaeological resources, though the extent of the disturbance has not been assessed.

Historic period site locations are usually influenced by transportation routes (via water or land), topography, soil conditions, and safe water sources. Therefore, historic farmsteads or residences (i.e., residential structures, outbuildings, wells, fields, fences, etc.) may be encountered within the project APE because of the prime farmland soils, nearby roads, and access to fresh water via the numerous waterways in the area. Historic USGS topographic maps and aerial imagery indicate that historic period resources are present within the APE. Historic USGS topographic maps indicate that historic period resources may be present within the APE (see **Figure 7, Figure 8**, and **Figure 9**).

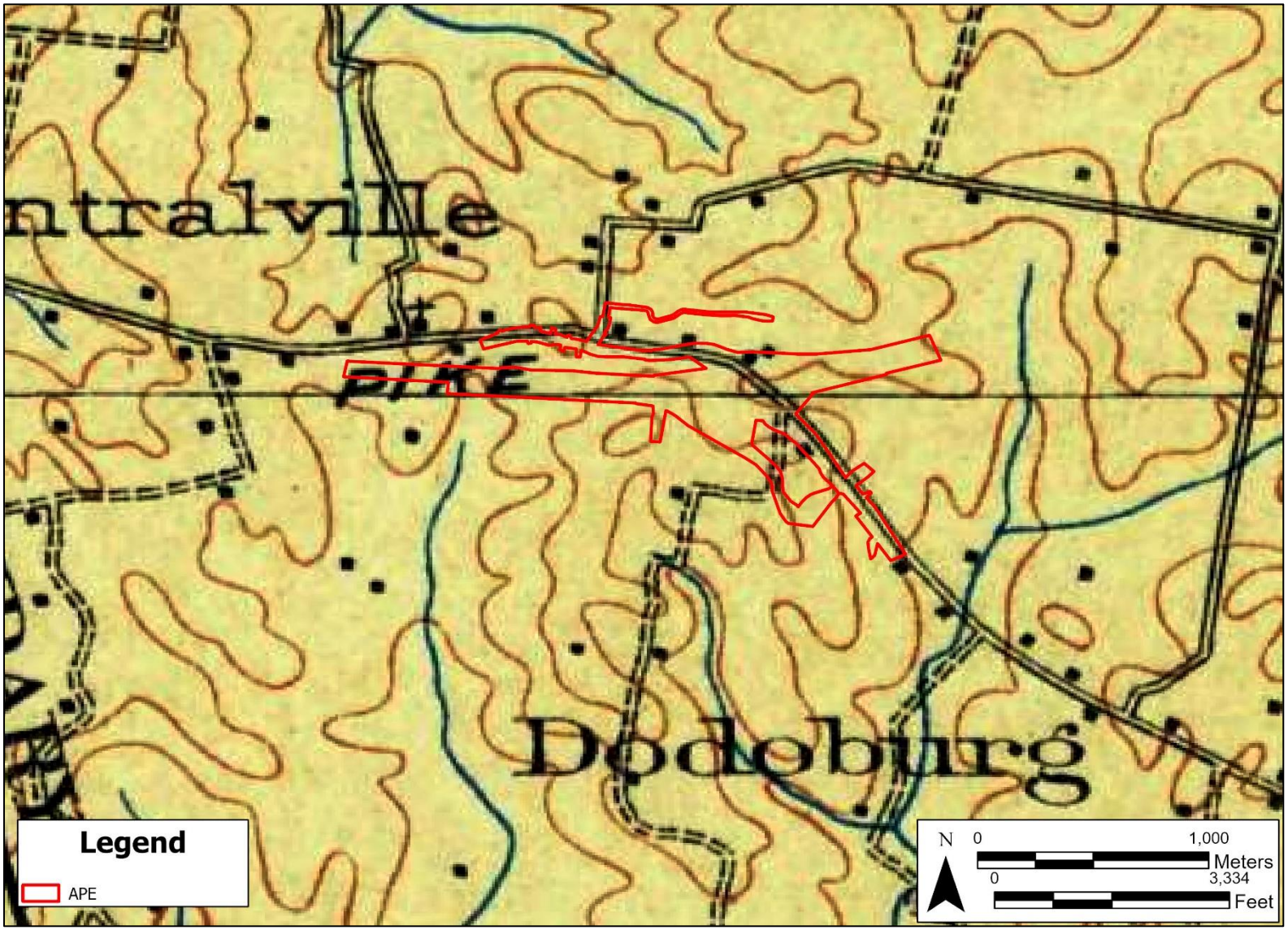

Figure 7: Historic USGS quad map (Nashville, TN [1903]) showing the APE.

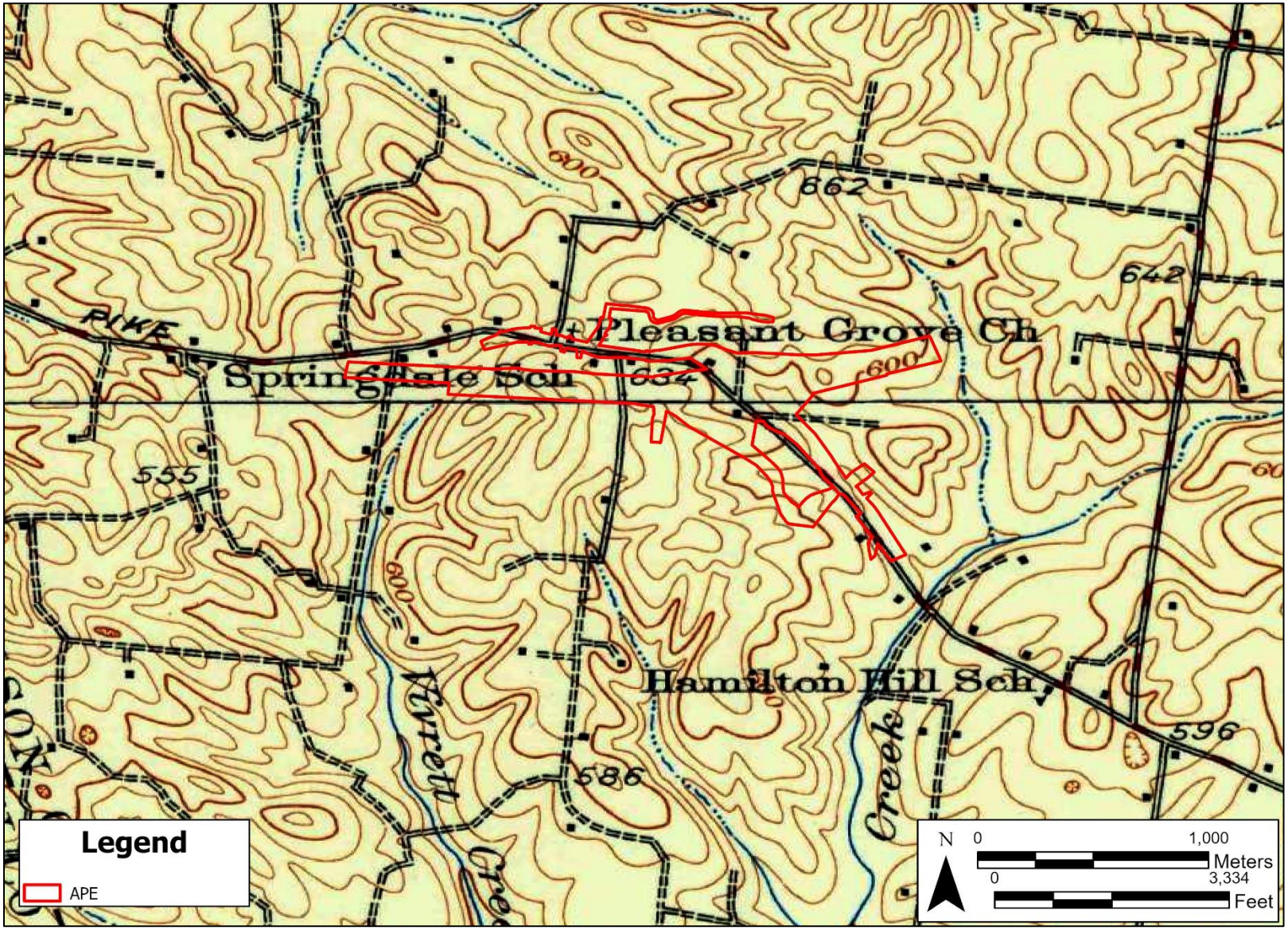

Figure 8: Historic USGS quad map (Hermitage, TN [1932]) showing the APE.

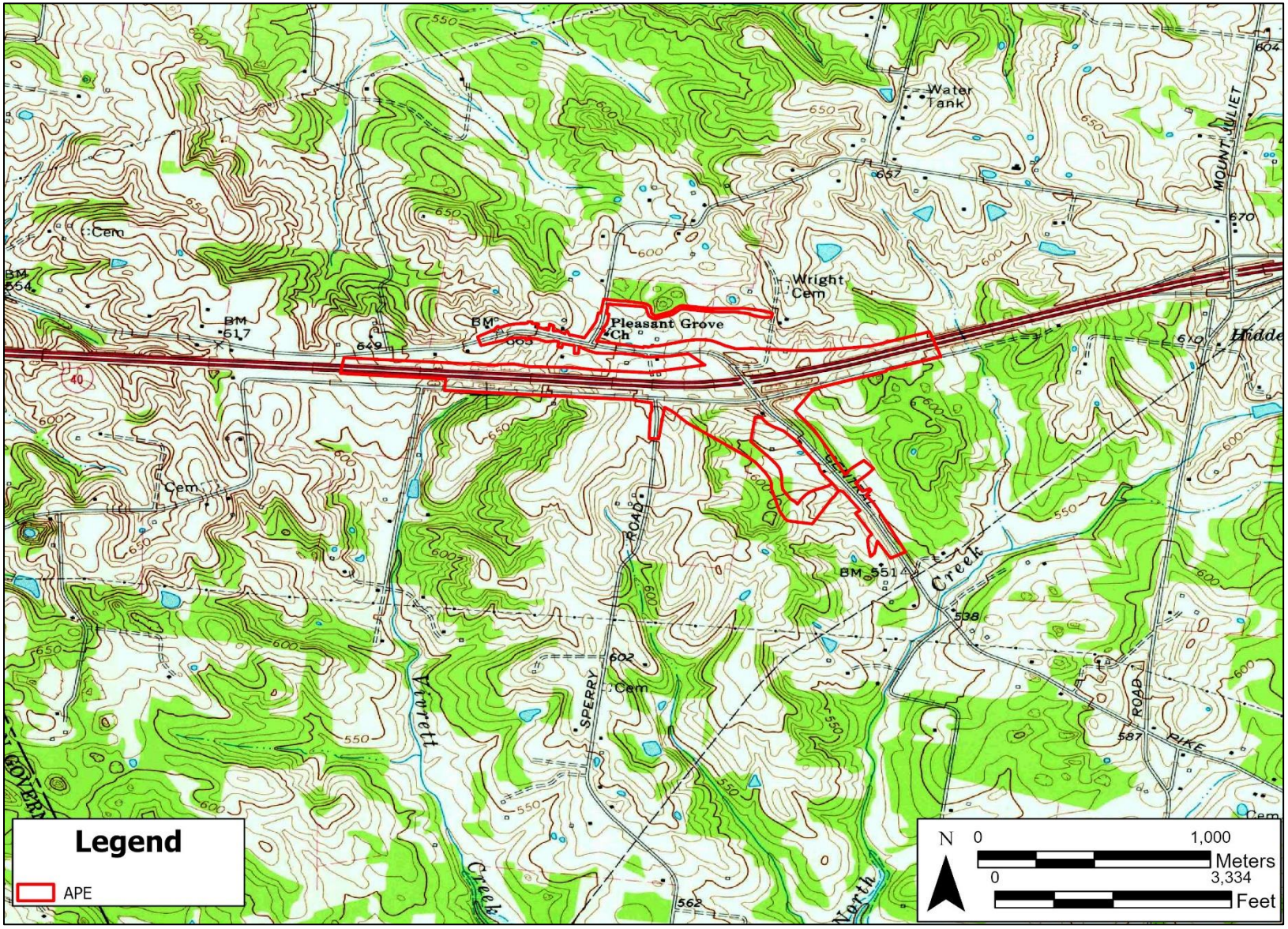

Figure 9: Historic USGS quad map (Hermitage, TN [1968]) showing the APE.

IV. RESEARCH DESIGN AND METHODOLOGY

A. RESEARCH DESIGN

The objective of the Addendum Phase I Archaeological Identification Survey was to identify all archaeological resources within the APE and, to the extent possible, evaluate those resources for inclusion in the NRHP. Tasks performed to accomplish these objectives included background research, field survey, artifact analysis, applying the NRHP eligibility criteria, and curation. The methods employed for accomplishing these tasks are described below.

B. BACKGROUND RESEARCH

Prior to conducting field investigations, RK&K conducted general background research via the TDOA site files for information on previously identified historic resources, archaeological sites, cemeteries, and prior cultural resource surveys conducted within a one-mile radius of the APE. The background research at TDOA was conducted by an individual who meets the SOI Professional Standards as an Archaeologist. Additional archival research, using both primary and secondary sources, occurred at local, county, state, and Federal repositories and with on-line resources. Research materials included the NRHP, historic maps, historic aerial photography, atlases, county and local histories, land records, tax records, land use records, and tribal histories. The purpose of this research was to 1) create a narrative of prehistoric and historic land use within the APE and surrounding area to anticipate the presence or absence of archaeological resources, and 2) establish a cultural and historical context to aid in the interpretation of any archaeological resources identified.

C. FIELD SURVEY METHODS

1. Pedestrian Survey

Prior to shovel testing, a general pedestrian survey was conducted throughout the entire APE. The purpose of the pedestrian survey was to identify any above-ground resources, previously disturbed areas, inundated areas, areas of excessive slope, areas with sufficient surface visibility for controlled surface collection, access points, or crew safety concerns. Pedestrian survey consisted of field staff traversing the entire APE on foot. Detailed field notes and photographs were taken to document the pedestrian survey.

2. Shovel Test Survey

The APE was subdivided into four Survey Areas (I-IV) to help organize planning efforts and documentation. The limits of the survey areas were determined by a variety of factors including manmade boundaries (e.g., fences, fields, roads), land use, soil type, natural boundaries (e.g., topography, vegetation), and access points. Within each Survey Area, additional field designations (A – O) were issued by the field staff to further organize the fieldwork. While conducting the fieldwork, changes were made to the project expectations that required an additional designation of "x" to be added to certain field designation areas for clarity (e.g., Nx, Ox).

Areas determined by field staff to be undisturbed or potentially undisturbed, have poor surface visibility, be under 43% slope (22 degrees), or otherwise have archaeological potential, were

subject to subsurface shovel testing. Shovel testing employed either 1) a transect-based strategy, where individual shovel test pits (STPs) were excavated along linear transects at 20-m (66-ft) intervals, or 2) a judgmental strategy, where STPs were excavated judgmentally in areas where the level of disturbance was in question or in areas that demonstrated increased archaeological potential. Because of the amorphous nature of the APE, several transects were spaced at a decreased interval to ensure adequate shovel testing coverage. Each transect STP was assigned an alpha-numeric designator that included the field designation and STP number. (e.g., B-B1, Ox-A22). Areas not subject to shovel testing included locations with extant asphalt or concrete improvements, areas with buried utilities, locations that were significantly disturbed by cutting/filling activities, locations with poorly drained soils or standing water, or wetland areas.

Each STP measured 30 cm (12 in) in diameter and extended a minimum of 10 cm (3.9 in) vertically into sterile subsoil or up to one meter (m) (3.3 feet [ft]) below the surface, whichever was reached first. All soil from STPs was screened through 0.25 in mesh for the recovery of artifacts. Artifacts post-dating ca. 1970 were noted and discarded in the field. All other prehistoric and historic materials were retained for analysis at the RK&K archaeology laboratory.

STPs were recorded on standardized field forms, which include a schematic soil profile with information on soil texture, Munsell color notation, and inclusions. All STP locations and transect locations were recorded on field maps and using a GPS device (Eos Arrow 100) with sub-meter accuracy. Digital photographs were taken of a representative sample of positive STPs to document the APE and features associated with new or previously identified archaeological sites.

If archaeological resources were identified, additional close-interval shovel testing was conducted around positive STPs in a cruciform pattern at half of the original interval to delineate the boundaries of the site. Site delineation STPs were established and labelled using a grid coordinate system (i.e., N1000 E1010) in relation to a site datum established for each site. A site record form was completed and submitted to the TDOA for each newly recorded site identified as part of the survey.

D. LABORATORY METHODS AND ARTIFACT CURATION

Artifacts retained during the field investigation were processed in RK&K's archaeology laboratory. Artifacts were analyzed, typed, quantified, and described in comparison to typologies for the region. A range of national, regional, and local references form the basis for the analysis of prehistoric cultural materials including but not limited to Chapman (1973, 1985); Coe (1964), Faulkner (1977); Goodyear (1982); Kimball (1985); Kneberg (1952); Lewis and Kneberg (1941, 1946); Lewis and Kneberg-Lewis (1961); Mainfort (1986), etc.

A range of references form the basis for the material-type analysis of historic cultural materials including Miller et al. (2000), Hume (2001), Maryland Archaeology Conservation Lab (2018), the Florida Museum (2018), Lindsey (2018), and Jones et al. (1989). Artifacts were cataloged in a relational Access database and artifact data was imported into ArcGIS allowing for inter- and intra-site spatial analysis of the archaeological field and laboratory data, the creation of artifact density maps, site plans, and other site illustrations.

V. RESULTS

RK&K, on behalf of TDOT, conducted an Addendum Phase I Archaeological Identification Survey for the proposed the I-40 Interchange at SR-265 project in Wilson County, Tennessee (see **Figure 1**; **Figure 2**). A Phase I Archaeological Survey was completed in 2020 for a previous version of this project (Detty and Jordan-Greene 2020) but project plans have since been revised and additional Phase I survey has been requested.

RK&K conducted the Addendum Phase I Archaeological Identification Survey from April 10 to April 20, 2023. Fieldwork consisted of a combination of pedestrian survey and systematic shovel testing. The APE for this study included the extent of existing and proposed right-of-way and proposed easements within project limits as shown on project plans (March 2023). This addendum assessment surveyed areas of the APE that exceeded the extent of the 2020 APE. The full APE, including the previously surveyed areas, measured approximately 49 ha (120 ac). The new survey areas measured approximately 22 ha (54 ac).

Prior to shovel testing, a general pedestrian survey was conducted throughout the entire APE. The purpose of the pedestrian survey was to identify any above-ground resources, previously disturbed areas, inundated areas, areas of excessive slope, areas with sufficient surface visibility for surface collection, access points, or crew safety concerns. Pedestrian survey consisted of field staff traversing the entire APE on foot. No resources were identified during the pedestrian survey.

A total of 409 STPs were excavated as part of this survey, six of which were positive for archaeological materials. An additional 83 planned STPs were not excavated because of their placement in existing roadway, excessive slope, drainage ditches, standing water, or other disturbance. Eighteen (18) of the excavated STPs were close-interval delineation STPs to determine the boundaries of resources identified in transect-based STPs. **Figure 10** shows the full results of the Phase I Archaeological Identification Survey, including an overlay of the area surveyed as part of the 2020 Phase I survey and individual Survey Areas (I-IV).

For organizational purposes, the APE was subdivided into four archaeological Survey Areas (Survey Area I, II, III, and IV) which have unique topographic settings and land-use categories. **Figure 10** shows these APE subdivisions, and each of the Survey Areas are addressed individually below and include a more detailed map showing the survey results. On each of the survey area maps, brief explanations are provided for areas where planned STPs were not excavated.

One new historic archaeological site (40WI270) and one prehistoric isolated find (IF-1) were identified in the APE as part of this survey. These resources are summarized in **Table 4** and addressed in detail below.

Table 4*:* Addendum Phase I Archaeological Identification Survey results summary.

SITE/IF NO.	SURVEY TYPE (NEW/REVISIT)	SITE TYPE	TEMPORAL AFFILIATION	NRHP RECOMMENDATION
40WI270	New	Historic, domestic	Early- to Mid- 20th century	Not Eligible
IF-1	New	Isolated find	Unknown prehistoric	Not Eligible

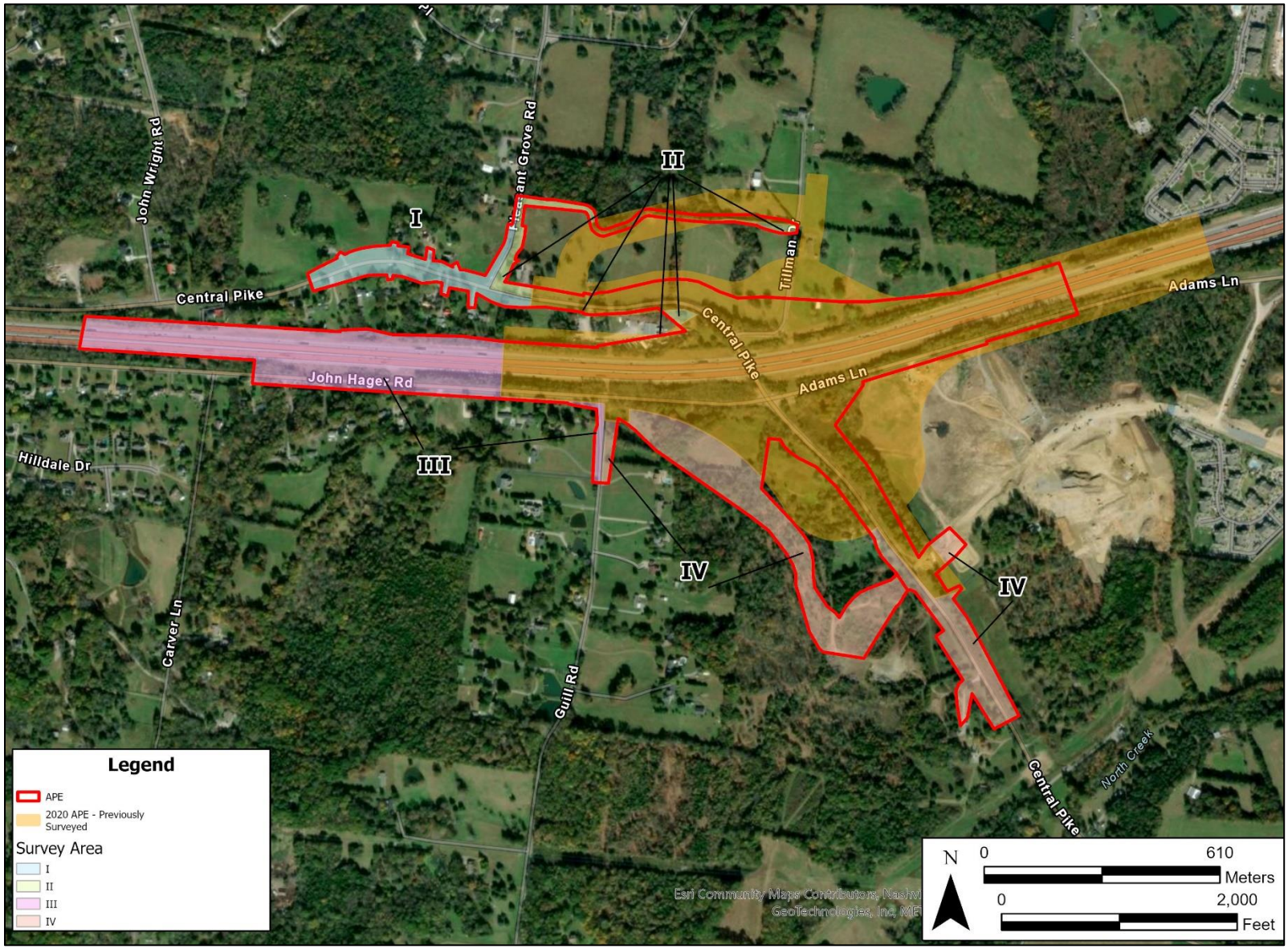

Figure 10: Addendum Phase I Archaeological Identification Survey, Survey Areas I-IV overview.

A. SURVEY AREA I

Survey Area I includes portions of SR-265 north of I-40 and the western portion of Pleasant Grove Road (**Figure 11**). The survey area extends approximately 15-20 m (50-65 ft) from the margins of the existing roadway and includes an upland ridge and saddle with moderate to steep north to south trending side slopes. This survey area is mostly comprised of manicured lawns associated with early- to late- twentieth-century residential homes. A small portion of the western extent of the survey area north of SR-265 remains an open agricultural field (**Figure 12**). Disturbances within Survey Area I include storm drainages and buried utilities adjacent to SR-265 and Pleasant Grove Road (**Figure 12, Figure 13,** and **Figure 14**) and residential driveways.

A total of 69 STPs were excavated in Survey Area I, including six radial STPs to delineate a single positive STP. Twelve planned STPs were not excavated because of excessive slope, impervious surfaces, and marked utility disturbance. One isolated find—an expedient chert flake tool fragment—was identified north of SR-265 in STP G-B4 on a narrow ridge saddle. Six radial STPs were excavated at 10-m (32-ft) intervals in cardinal directions to delineate the find. All six radials were negative, and the location was designated IF-1. IF-1 is presented in detail in section V.I.1 below.

The soil profiles recorded in Survey Area I generally conform to the Hampshire and Talbott Soil Series mapped for the area by the USDA. Both soils are upland soils formed in clayey residuum of weathered limestone with shallow profiles. The recorded Ap horizons (Stratum I) recorded in Survey Area I were a silt loam that ranged from approximately 15- to 25-cm in depth with a brown to (10YR 4/3) to dark yellowish brown (10YR 4/4) color. The Bt1 (Stratum II) horizon consisted of a yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) silty clay. Profiles within the manicured lawns associated with the twentieth-century residences typically contained a shallow Stratum I ranging from 5 cm to less than 15 cm (0.2 to 0.5 feet) underlain by yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) Bt horizon. The deflated Ap horizon (Stratum I) may reflect grading or disturbances associated with construction of the residences.

STP G-B4 and those within the vicinity of IF-1 had thick Ap horizons that exceeded the soil expectations as listed in the county soil survey report. STP N1000 E990 had an Ap that extended to near 45 cmbs (1.4 feet) underlain by a brownish yellow (10YR 6/6) clayey loam Bt1 horizon and brownish yellow (10YR 6/8) Bt2 horizon (**Figure 15**).

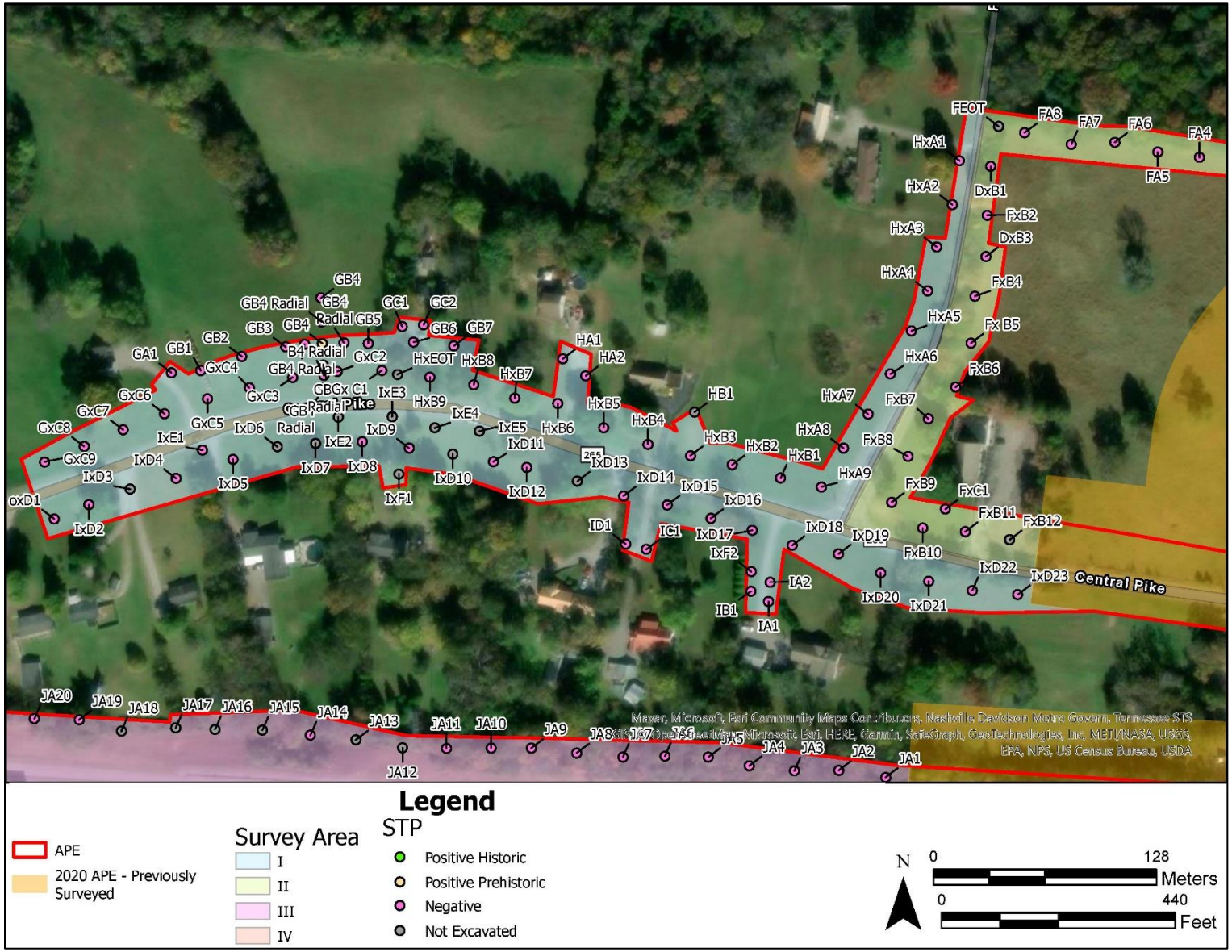

Figure 11: Survey Area I, shovel testing results overview.



Figure 12: Survey Area I, upland ridge saddle north of SR-265, view west.



Figure 13: Survey Area I, general conditions south of SR-265, view west.



Figure 14: Survey Area I utility disturbance and drainage on west side of Pleasant Grove Road, view north.

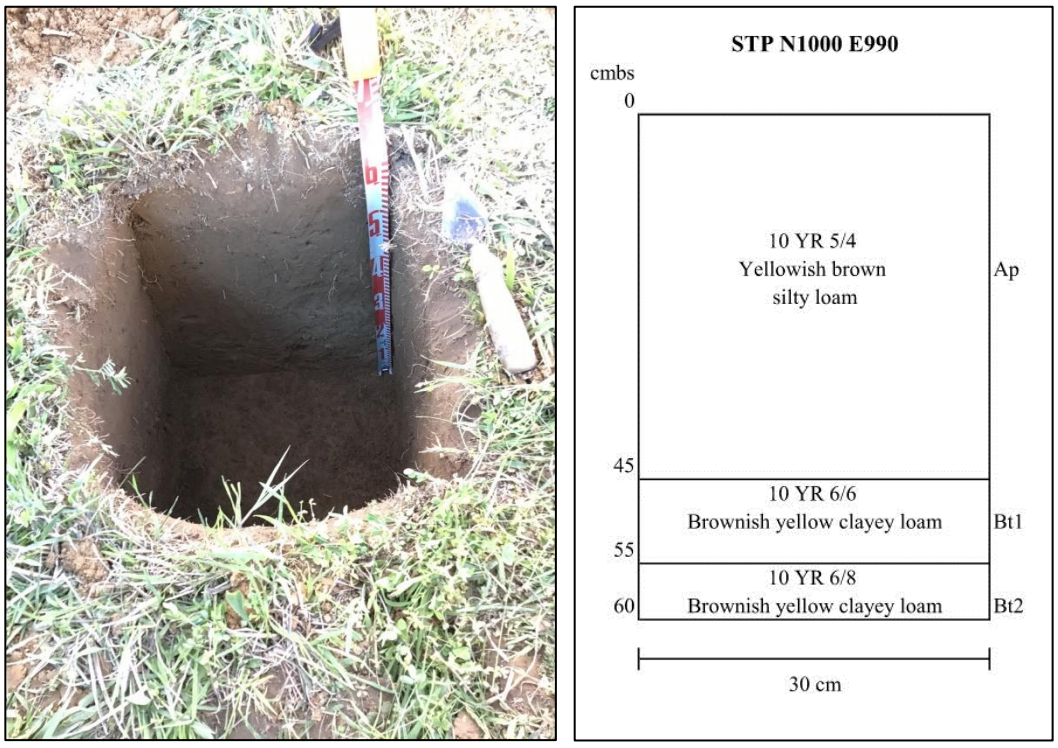

Figure 15: Survey Area I representative STP soil profile (STP N1000 E990).

B. SURVEY AREA II

Survey Area II consisted of six distinct areas: two linear corridors along the north boundary of two agricultural fields between Tillman Drive and Pleasant Grove Road; a 15- to 20-meter (50- to 65-feet) wide corridor in the agricultural pasture east of Pleasant Grove Road and north of SR-265; and three small test areas south of SR-265 on the grounds of a late twentieth-century auto/truck repair and salvage facility (**Figure 16** and **Figure 17**) that was likely used for agricultural activities prior to its current function. Survey Area II extends across a relatively flat upland comprised of agricultural pastures and fields. Disturbances within Survey Area II include historic agricultural activities, stormwater drainages, and buried utilities adjacent to SR-265 and Pleasant Grove Road (**Figure 18**) and surface grading at the auto/truck repair and salvage facility south of SR-265 (**Figure 19**).

A total of 37 STPs were excavated in Survey Area II. Six planned STPs were not excavated because of impervious disturbed surfaces and marked utility disturbances.

Talbott and Stiversville Soils are mapped for Survey Area II by the USDA, and the soil profiles recorded generally conform to the expectations for Talbott Soils. Both Talbott and Stiversville soils are well drained upland soils formed in residuum of weathered limestone with shallow profiles. The Talbott soils encountered across Survey Area II demonstrated considerable variation in depths, which appear to be dependent on the current land-use setting. STPs along the northern and western extent of the agricultural fields contained predominately shallow profiles of 10- to 15-cmbs with a dark brown (10YR 3/3) silt loam Ap (Stratum I) horizon and a yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) silty clay Bt1 (Stratum II) horizon.

Two soil profiles documented within Survey Area II demonstrate the variability recorded based on historic land-use patterns. STP F-A7 in the agricultural pasture east of Pleasant Grove Road contained a deflated and plow disturbed Bt1 horizon of mottled yellowish brown 10YR 5/6 and strong brown 7.5YR 5/6 silty clay that extended 30 cmbs (1.0 ft) (**Figure 20**). STP DX-A1 located within the front lawn of an early- twentieth-century house contained a dark yellowish brown (10YR 4/4) silty loam Ap that extended 41 cmbs (1.4 ft) underlain by a yellowish brown (10YR 5/8) silty clay Bt1 horizon (**Figure 21**).

No archaeological resources or historic resources were observed or retained in Survey Area II.

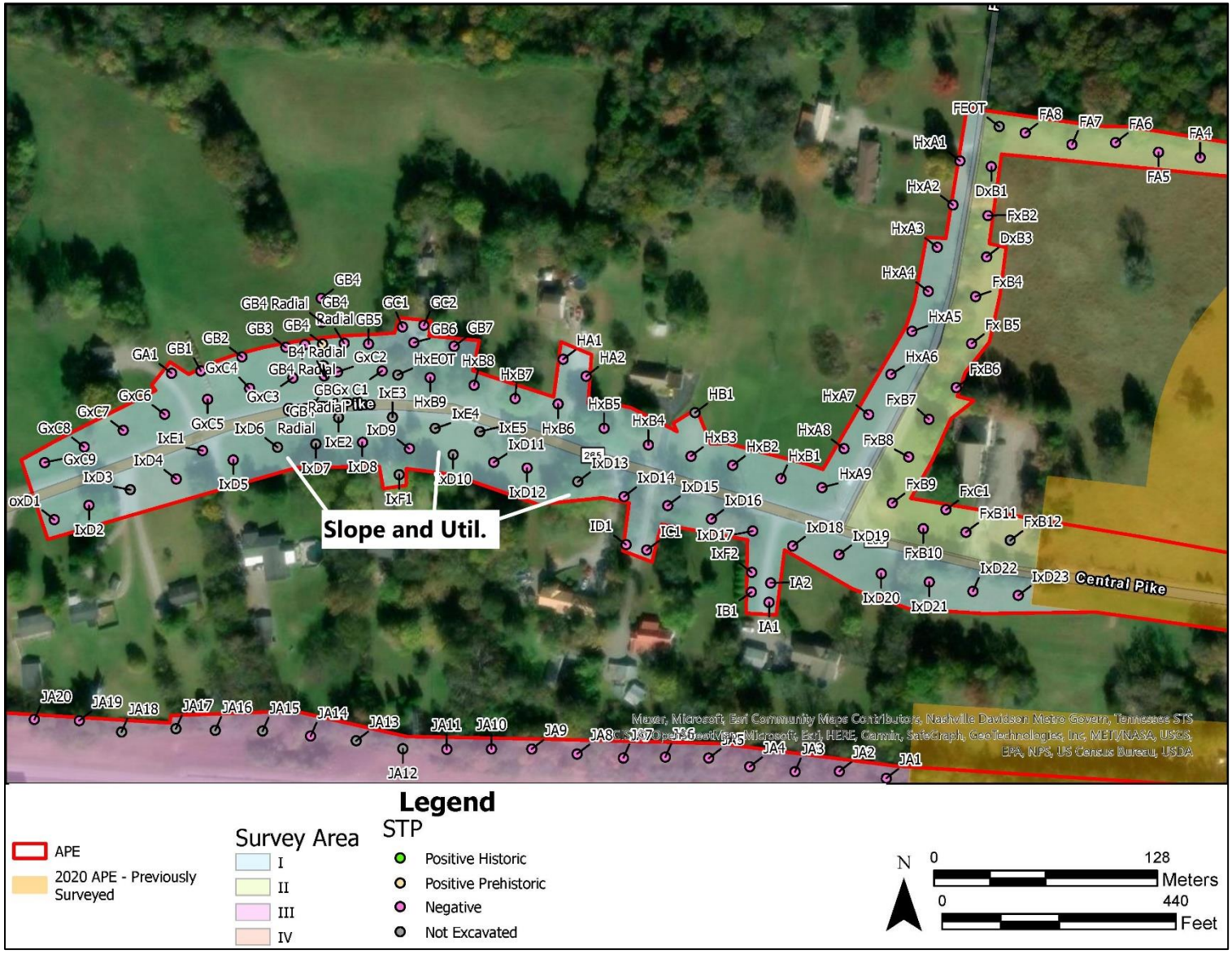

Figure 16: Survey Area II, shovel testing results overview (1 of 2).

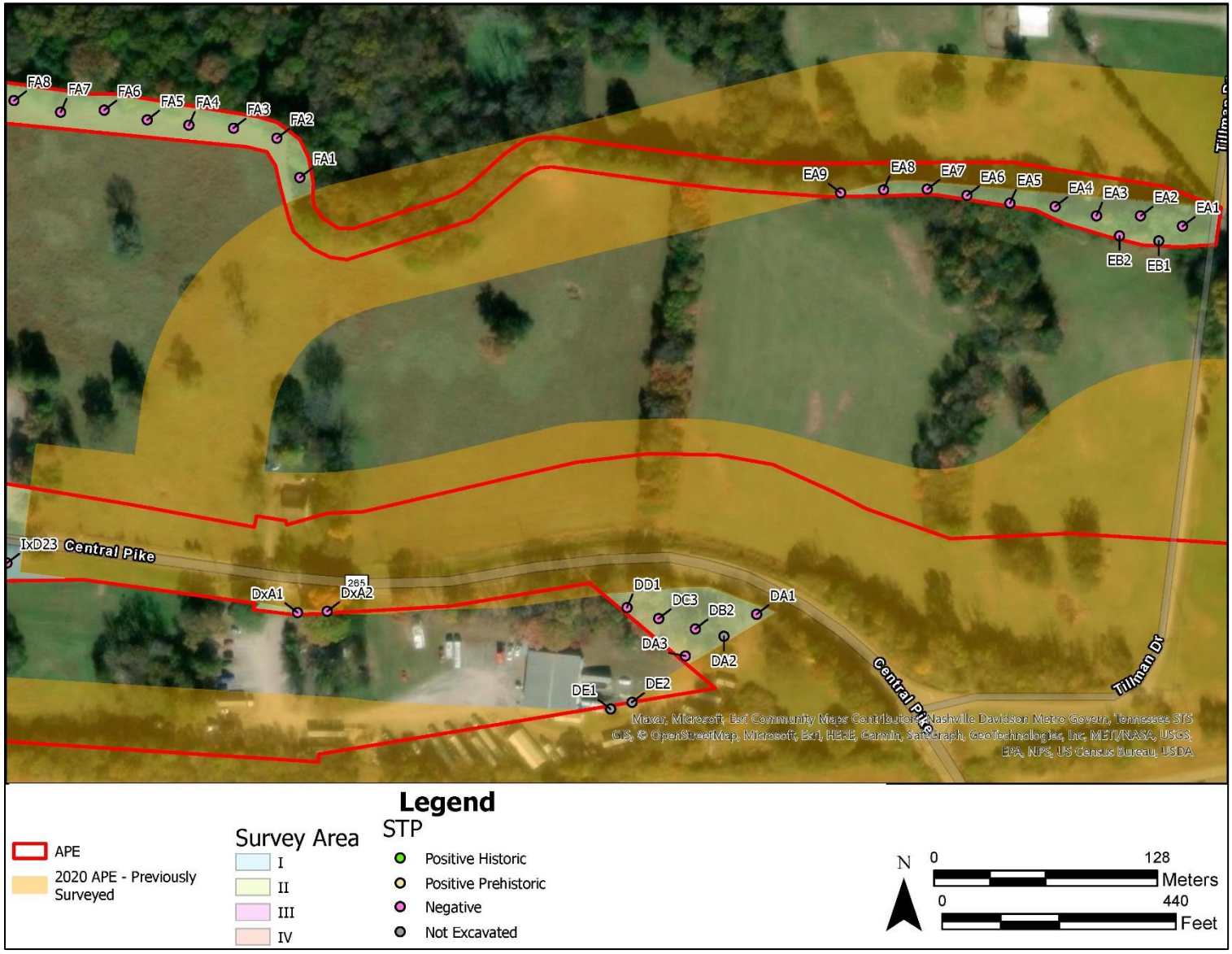

Figure 17: Survey Area II, shovel testing results overview (2 of 2).



Figure 18: Survey Area II, roadway and drainage along Pleasant Grove Road, view north.



Figure 19: Survey Area II, auto/truck repair and salvage facility, view west.

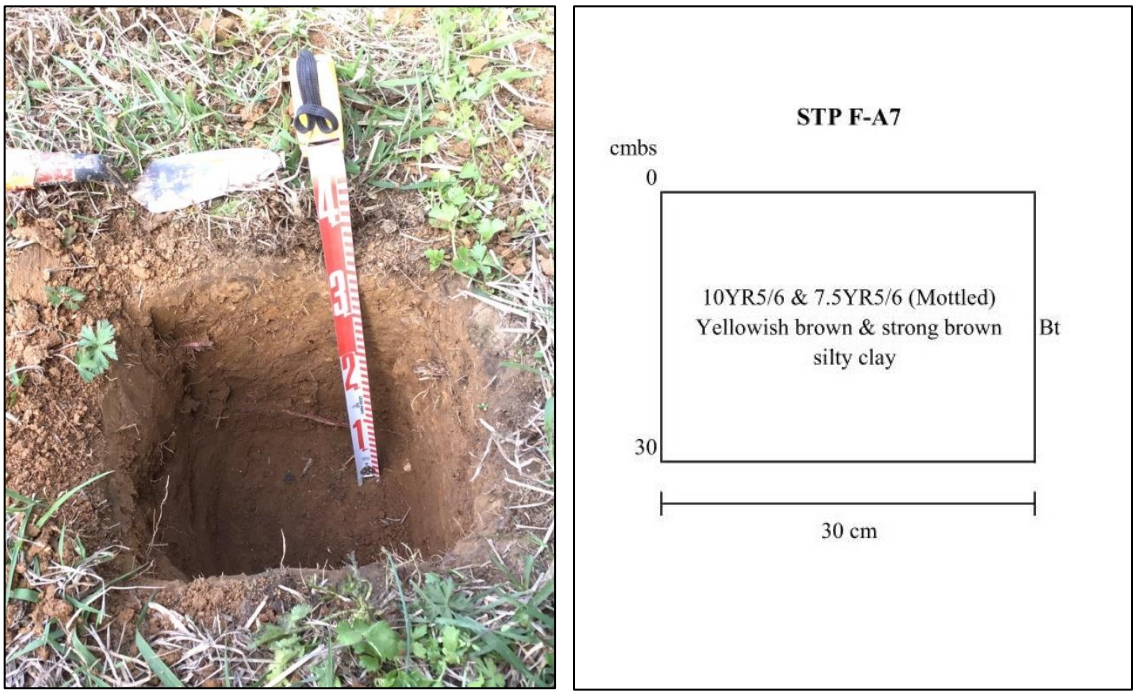

Figure 20: Survey Area II representative STP soil profile (STP F-A7).

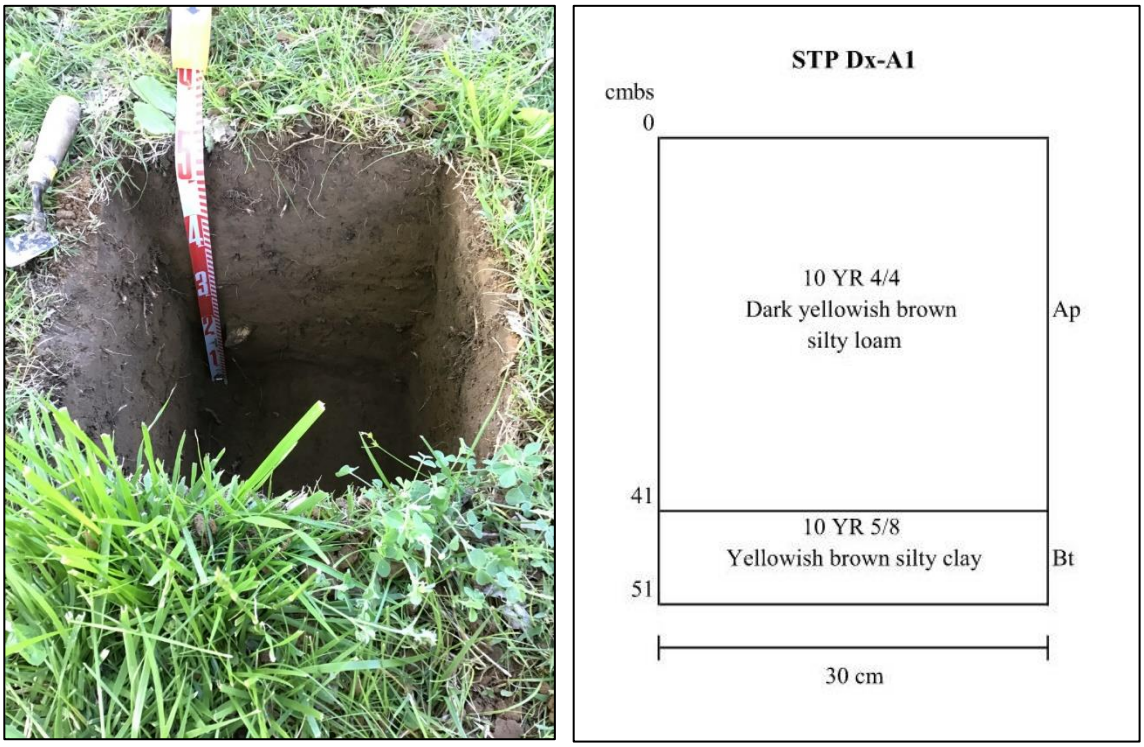

Figure 21: Survey Area II representative STP soil profile (STP DX-A1).

C. SURVEY AREA III

Survey Area III consisted of large, linear stretch of the I-40 corridor and John Hager Road corridor, both north and south of the existing roadways, and a short 15-m-wide section west of Guill Road and south of John Hager Road (**Figure 22, Figure 23**, and **Figure 24**). Survey Area III extends across the west to east trending slopes of an upland ridge. The head of Viverett Creek is located in the western extent of the survey area. The current land-use includes the existing roadway corridor north and south of I-40 and residential housing along Guill and John Hager Road. The John Hager Road and I-40 corridors date to the mid-twentieth century and involved cutting and filling episodes to achieve the existing road grades. The current alignment of Guill Road within the APE was constructed between 1903 and 1932. The APE south of John Hager Road and west of Guill Road is currently primarily manicured lawns associated with a mid-twentieth-century housing development. Disturbances within Survey Area III include historic agricultural activities, cut and fill construction for I-40 (**Figure 25** and **Figure 26**), and John Hager Road, associated storm drainages for the three roads and buried utilities adjacent to both John Hager and Guill Road (**Figure 27**).

A total of 96 STPs were excavated within Survey Area III. Twenty-five additional planned STPs were not excavated because of excessive slope, disturbed fill material berms, buried utilities, and active wetlands. Shovel testing of Survey Area III was divided into three sections: 1) the ROW north of I-40; 2) the ROW south of I-4; and 3) south of John Hager Road.

A single transect of 35 STPs were excavated north of I-40. The transect ran adjacent to the northern extent of the road cut of the existing highway corridor along a narrow terrace of secondary-growth woods approximately 10 m (33 ft) in width (**Figure 28**). An additional 10 planned STPs were not excavated because of slope, artificial contours of the road, and drainage controls (**Figure 29**).

The section south of the I-40 ROW and north of John Hager Road was surveyed with a single transect of 22 STPs and a judgmental transect of seven additional STPs. The judgmental transect STPs were excavated at the west and eastern ends of the survey area where the I-40 road berm was constricted, which required additional STPs in some areas to provide adequate survey coverage. The judgmental transect was excavated at a staggered 20 m (66 ft) interval 10 m (33 ft) north of the initial transect. Three planned STPs were not excavated because of disturbances associated with artificial road berms (**Figure 26**).

The survey area south of John Hager Road consisted of a 15-m-wide (49-ft) corridor extending 720 m (2,362 ft) west of Guill Road along John Hager Road and 160 m (525 ft) along the west side of Guill Road. A total of 32 STPs were excavated, and 10 planned tests were not excavated because of slope, impervious driveway surfaces, and active wetlands. This section of Survey Area III consisted primarily of manicured lawns associated with mid-twentieth-century residences. **Figure 30** captures the setting of the western portion of the survey area south of John Hager Road and the I-40 ROW with intact slopes divided by graded driveway entrances, the fill berms of the I-40 corridor, and John Hager Road as well as a wetland associated with Vivrett Creek.

The soil profiles recorded in Survey Area III closely conform to the Hampshire and Inman Soil Series mapped for the area by the USDA. Both soils are well drained upland soils formed in clayey residuum of weathered limestone. Stratum I typically consisted of silt loam that ranged from approximately 10- to 25-cm (4- to 10-in) in depth with a brown (10YR 4/3) to dark yellowish

brown (10YR 4/4) color. Stratum I soils recorded within Survey Area III were frequently mottled, which is indicative of disturbance. The Stratum II soil horizon consisted of a yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) silty clay. In several instances the Stratum II soils were underlain by limestone bedrock.

Shovels test profiles for J-A35, K-A24, and K-B24 are representative of the profiles recorded in Survey Area III. STP J-A35 (**Figure 31**) is located at the northern margin of the I-40 road berm and contained a brown (7.5YR 4/4) silt loam Ap horizon (Stratum I) that extended to 21 cmbs (8 in) underlain by a thin yellowish brown (10YR 5/6) clay loam Bt1 horizon (Stratum II) that terminated at 32 cmbs (13 in) at limestone bedrock. STP K-A24 is located south of John Hager Road in the western section of Survey Area III. Stratum I contained a gravelly clay loam matrix of dark brown (10YR 3/3) mottled with brownish yellow (10YR 6/8) that extended to 22 cmbs (9 in). The disturbed soils of Stratum I were underlain by an intact brownish yellow (10YR 6/8) clay Stratum II (Bt1) (**Figure 32**). STP K-B24 is located within the section south of I-40 north of John Hager Road on an elevated rise above the I-40 road cut. Stratum I contained a dark yellowish brown (10YR 3/4) silt loam that extended to 17 cmbs (7 in) underlain by a very pale brown (10YR 7/3) clay loam containing small to medium flaggy siltstone and terminating at 27 cmbs (11 in) at limestone bedrock.

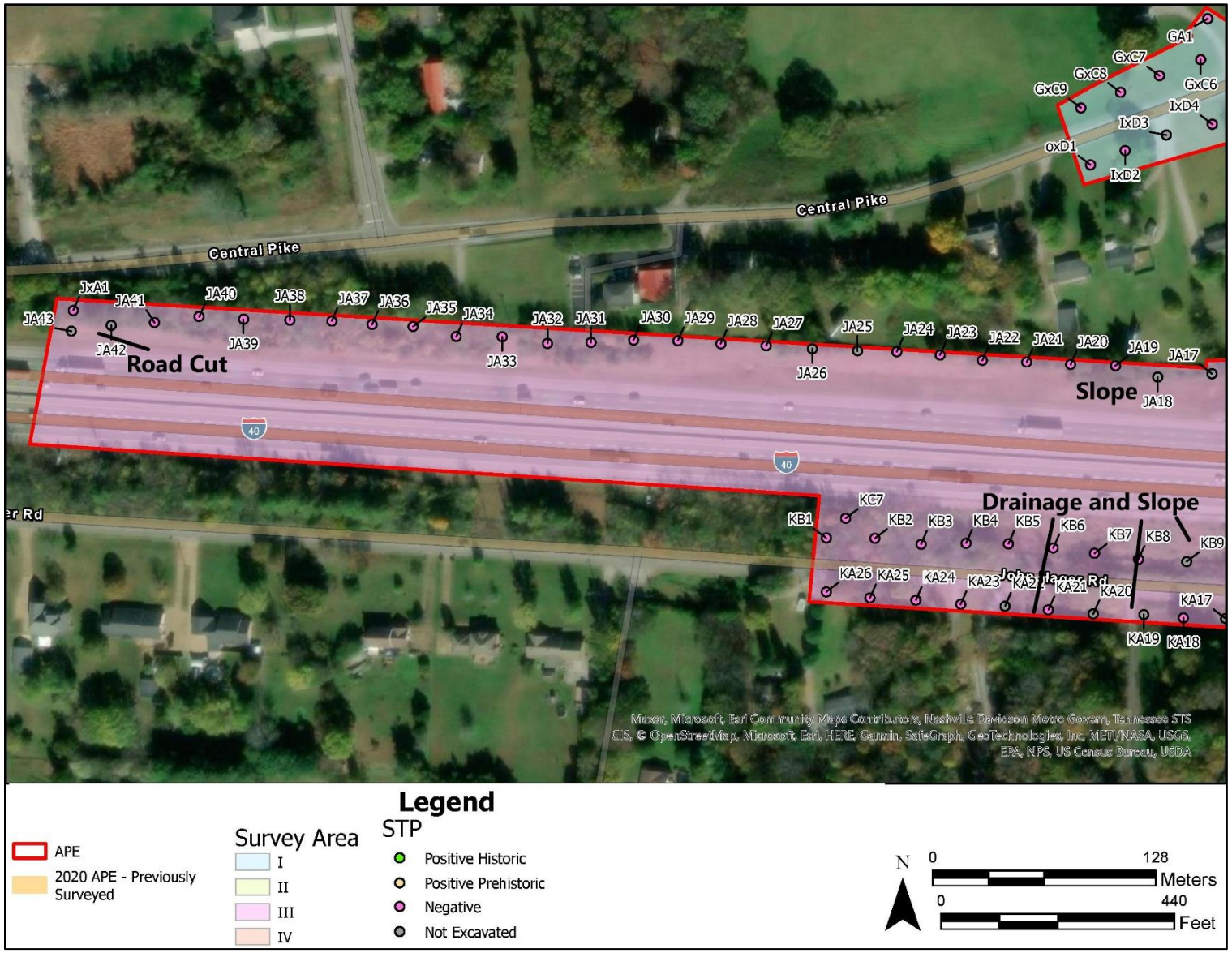

Figure 22: Survey Area III, shovel testing results overview (1 of 3).

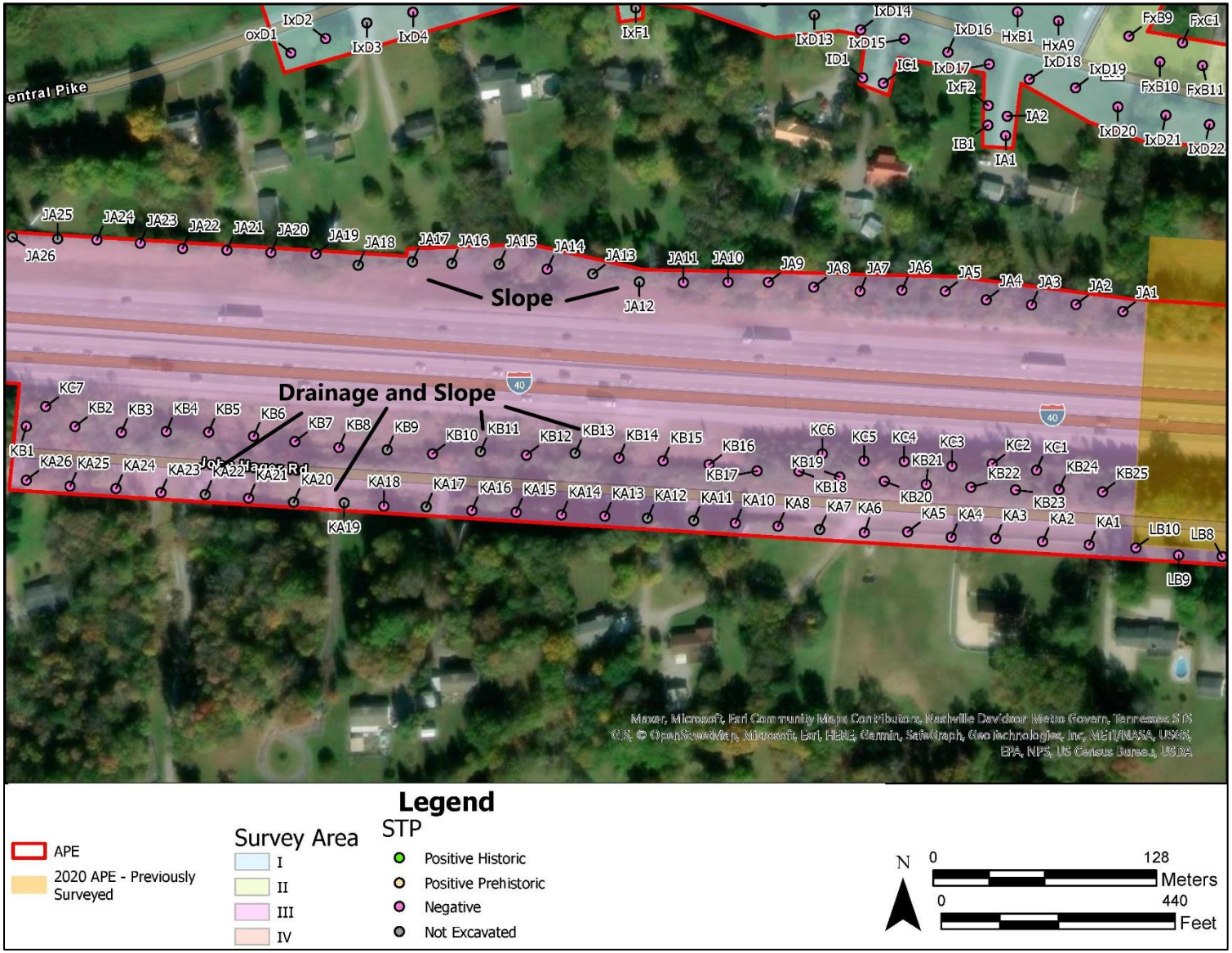

Figure 23: Survey Area III, shovel testing results overview (2 of 3).

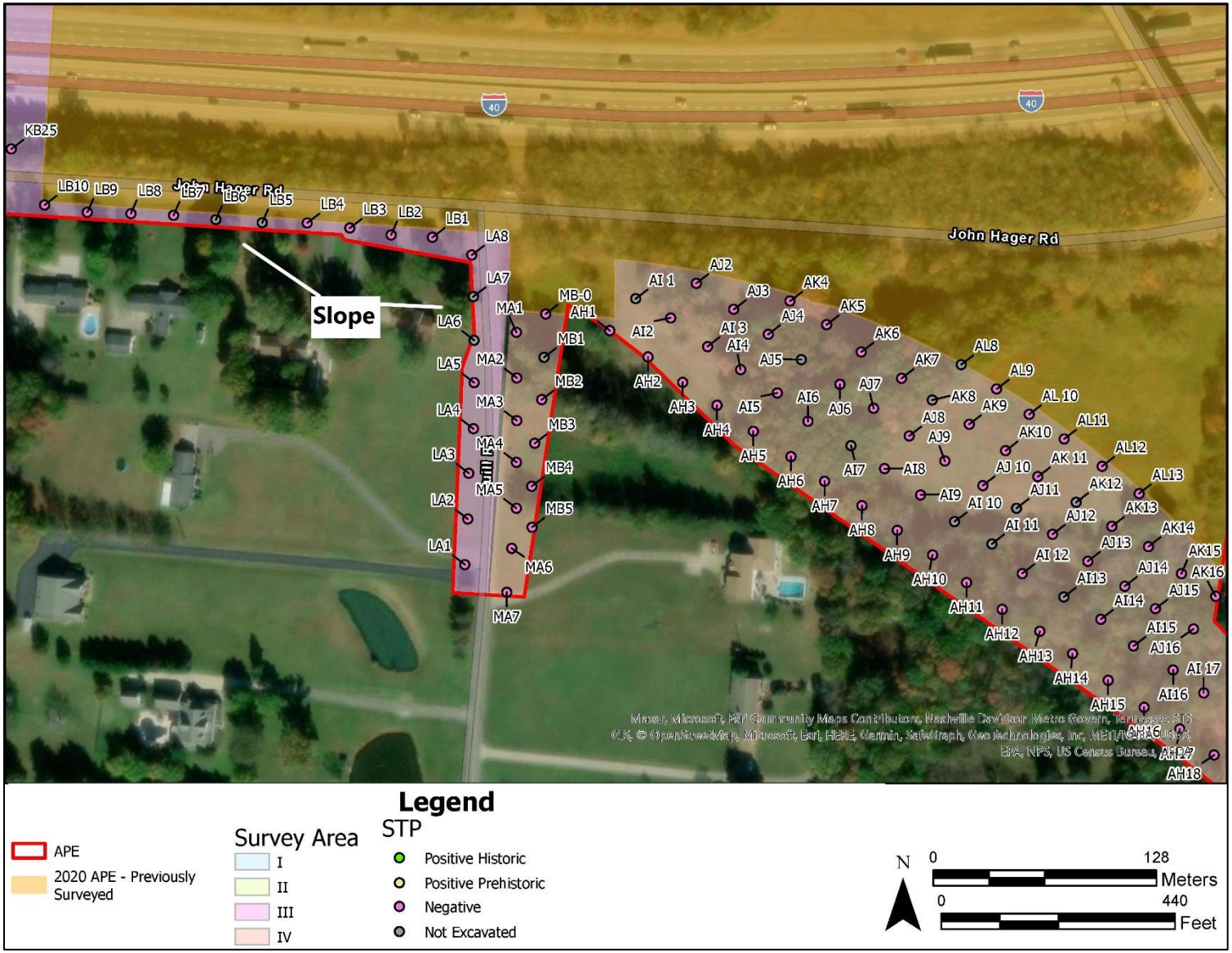

Figure 24: Survey Area III, shovel testing results overview (3 of 3).



Figure 25: Survey Area III, I-40 road-cut along westbound lanes, view north.



Figure 26: Survey Area III, general conditions along John Hager Road: road berm, drainage, utilities, view east.



Figure 27: Survey Are III general conditions, water drainage south of John Hager Road, view west.



Figure 28: Survey Area III general conditions, remnant upland along I-40 road cut, view west.



Figure 29: Survey Area III general conditions, slope and drainage controls north of I-40, view east.



Figure 30: Survey Area III general conditions south of I-40 and John Hager Road, view west.

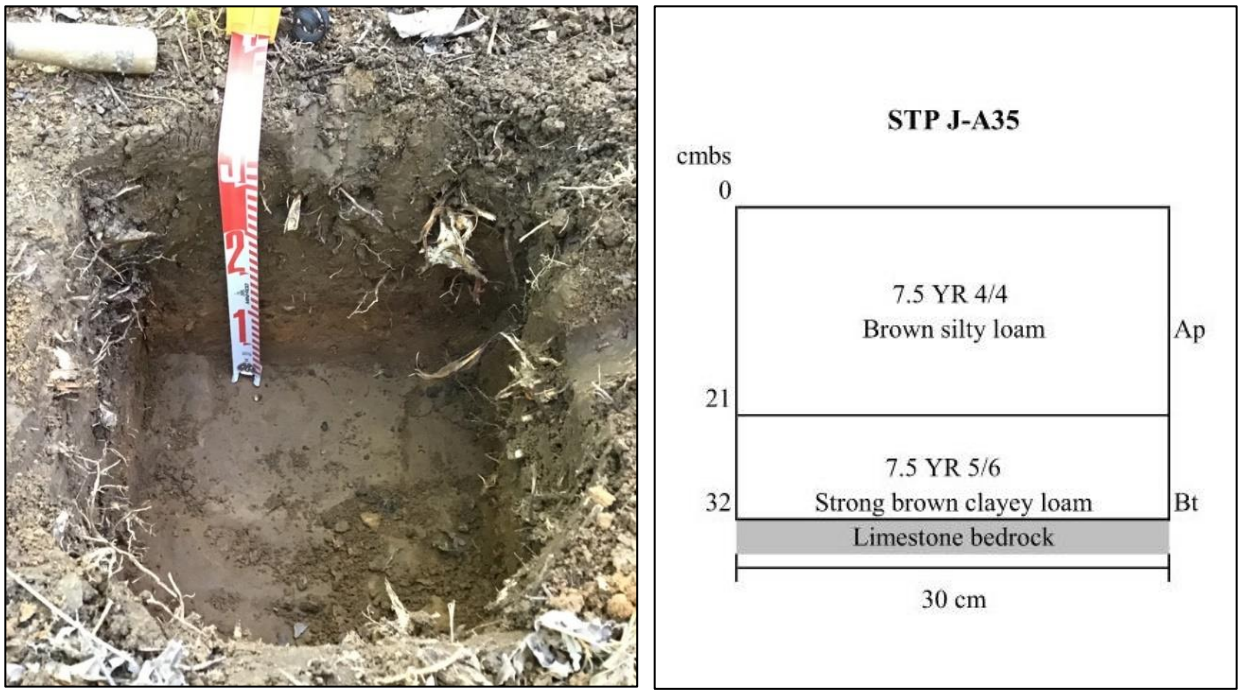

Figure 31: Survey Area III representative STP soil profile (STP J-A35).

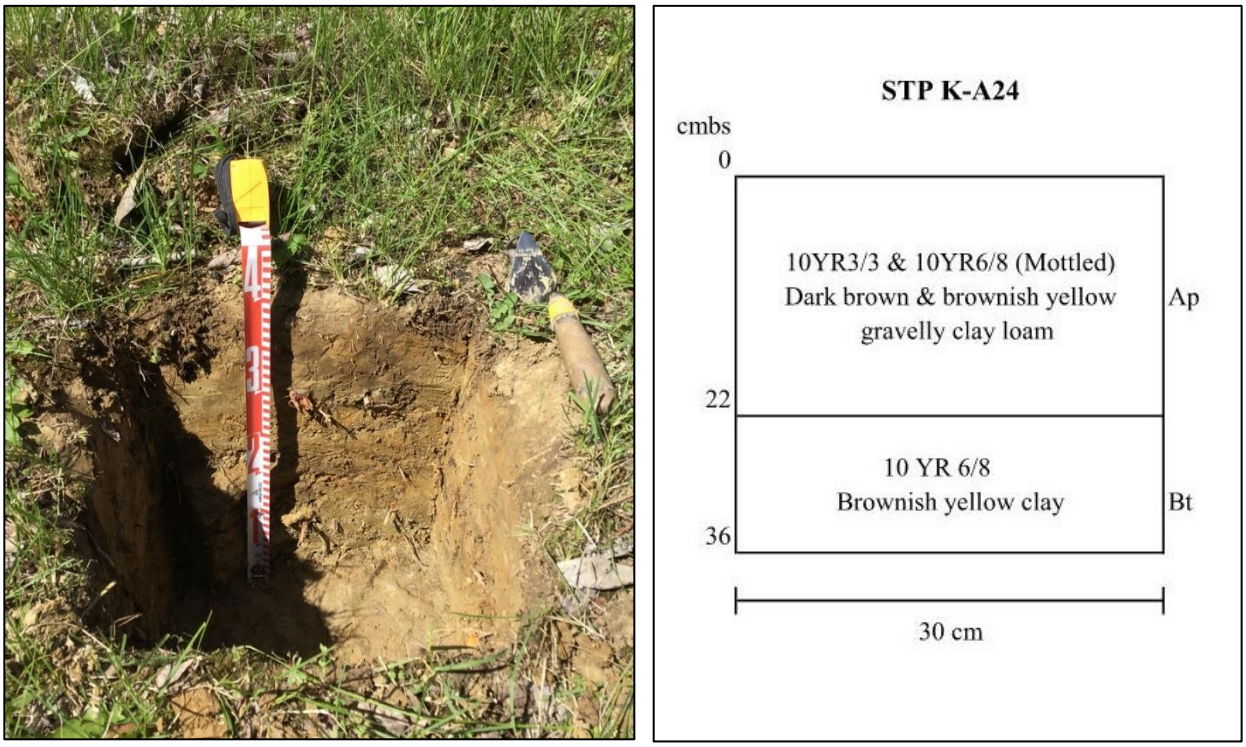

Figure 32: Survey Area III representative STP soil profile (STP K-A24).

D. SURVEY AREA IV

Survey Area IV consisted of agricultural pastures, wooded areas, and residential manicured lawns along SR-265 and Guill Road (**Figure 33**, **Figure 34**, and **Figure 35**). Survey Area IV extends across the northern and eastern slopes of a dissected upland that crosses two broad east-southeast trending drainage swales. An unnamed tributary of North Creek flows along the eastern boundary of the survey area. The current land use is primarily secondary woods and agricultural pasture. Disturbances within Survey Area IV include historic grading on the elevated upland west of SR-265 (**Figure 36),** stormwater drainages, and buried utilities adjacent to Guill Road (**Figure 37**) and recent drainage improvements along SR-265. Recent and ongoing construction of Providence Parkway and the associated stormwater retention areas have severely impacted portions of the APE east of SR-265 (**Figure 38, Figure 39,** and **Figure 40).**

Survey Area IV consisted of an approximate 850 m (2,789 ft) linear corridor between SR-265 and Guill Road that ranged from 30- to 90- m (98- to 295-ft) wide traversing upland pastures and a broad wooded swale (**Figure 41** and **Figure 42**); a narrow 25-m (82-ft) wide corridor east of Guill Road extending 170 m (558 ft) south from John Hager Road (**Figure 43**); and two corridors 25 m (82 ft) east of and 30 m (98 ft) west of SR-265 extending approximately 480 m (1,575 ft) along the west and 390 m (1,280 ft) along the east alignment of SR-265 (**Figure 44**). Disturbances within Survey Area IV include clearing of woodland for agriculture activities, historic road construction, maintenance with associated water drainage features and utilities, and the recent road construction of Providence Parkway and adjacent stormwater management features (see **Figure 39** and **Figure 40**).

A total of 208 STPs were excavated within Survey Area IV. Forty planned STPs were not excavated because of excessive slope, impervious graded driveways, buried utilities, wetlands, and recent construction disturbances associated with Providence Parkway and the stormwater management system. One twentieth-century historic archaeological site (40WI270) was identified and documented west of SR-265. This resource is addressed in detail in section V.I.2 below.

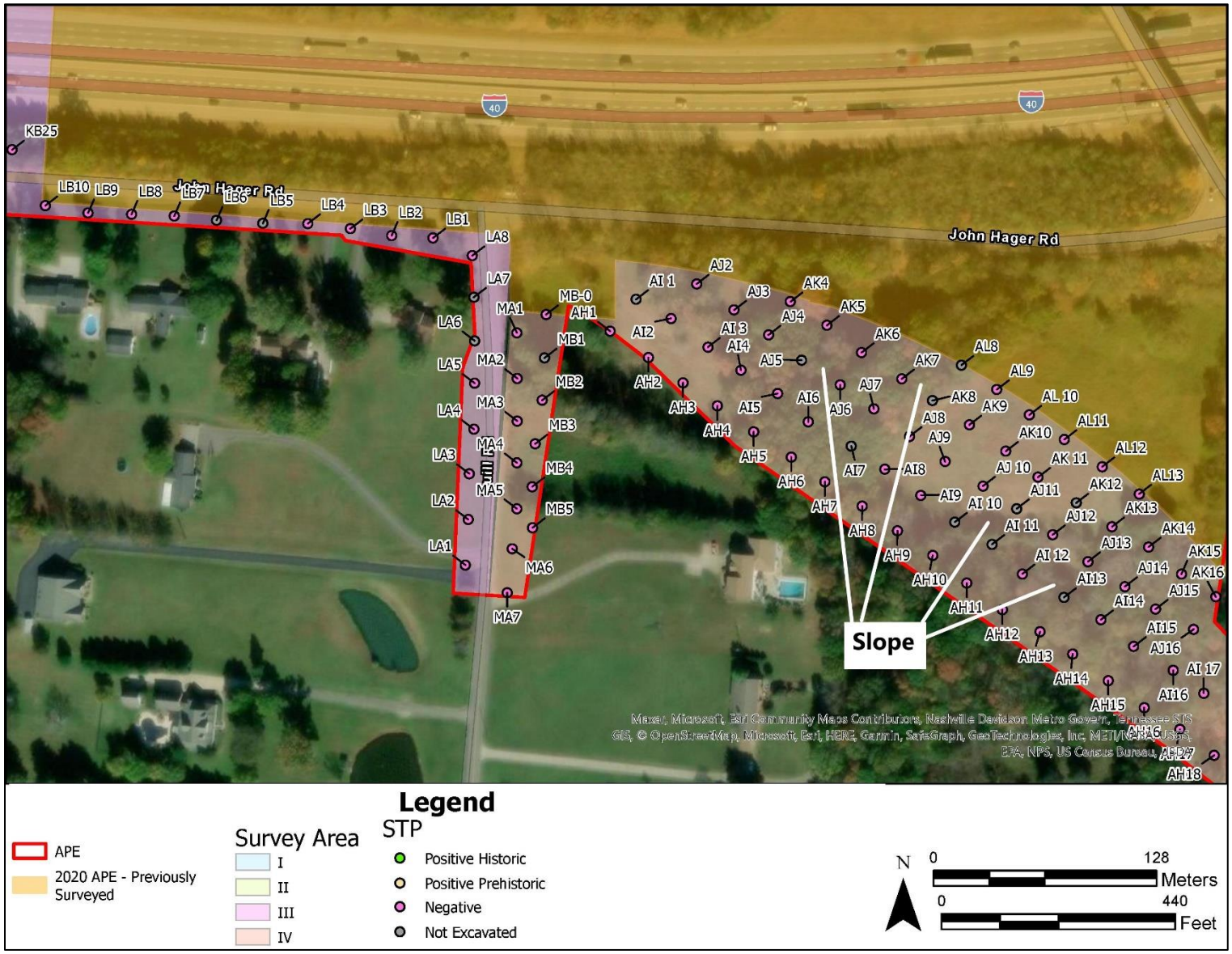

Figure 33: Survey Area IV, shovel testing results overview (1 of 3).

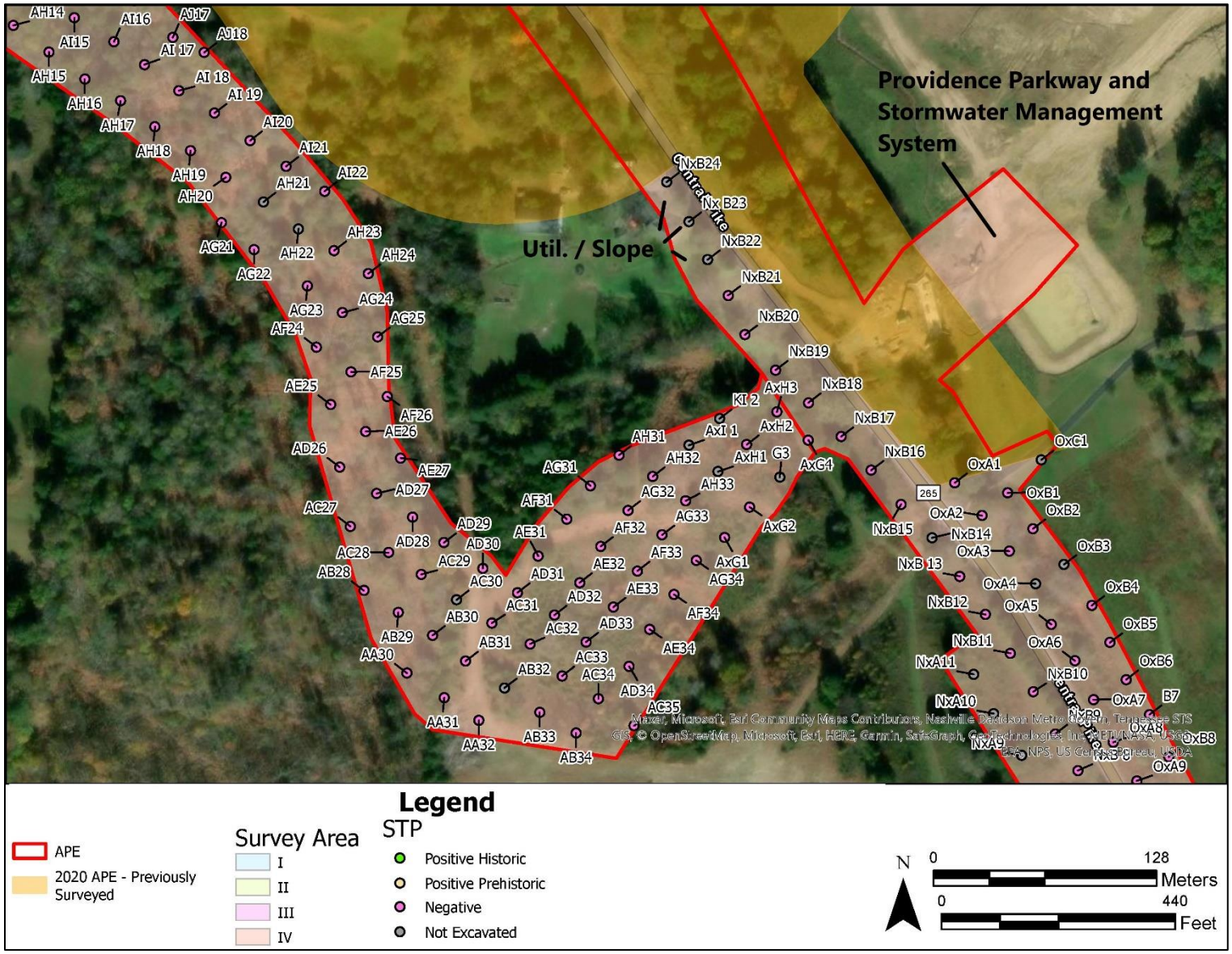

Figure 34: Survey Area IV, shovel testing results overview (2 of 3).

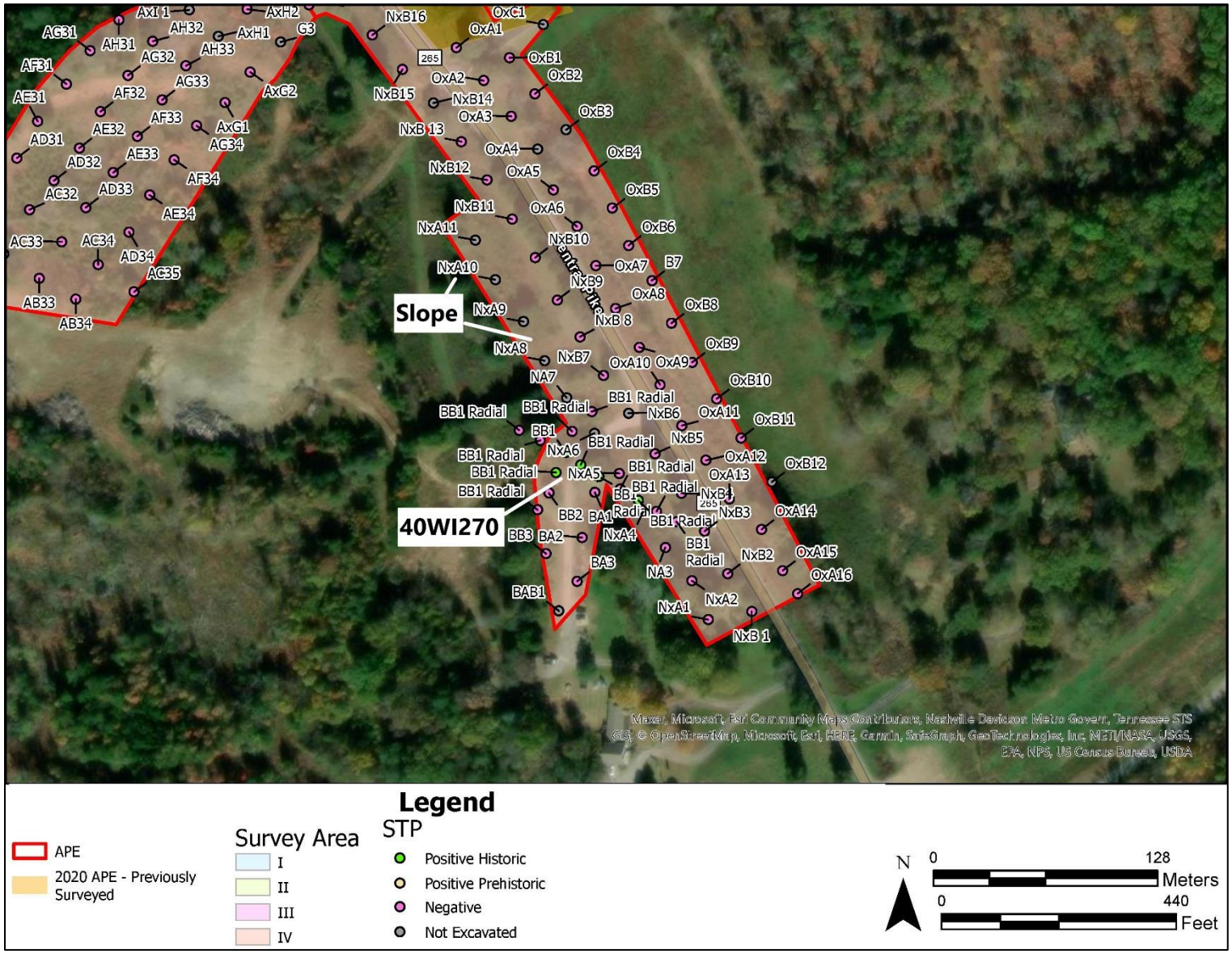

Figure 35: Survey Area IV, shovel testing results overview (3 of 3).



Figure 36: Graded surface and young secondary planted pines in vicinity of STP A-A31, view north.



Figure 37: Road berm, drainage, and utility disturbances along Guill Road, Survey Area IV, view south.



Figure 38: Drainage improvements and disturbance along SR-265, Survey Area IV, view south.



Figure 39: Ongoing roadway improvements, SR-265 at Providence Parkway, Survey Area IV, view northwest.



Figure 40: Stormwater management berm, SR-265 at Providence Parkway, Survey Area IV, view south.



Figure 41: Upland pasture from STP A-I9 within Survey Area IV, view east.



Figure 42: Wooded swale in Survey Area IV, from STP A-J18, view west.



Figure 43: Survey Area IV east of Guill Road, from STP M-A3, view north.



Figure 44: Survey Area IV west of SR-265 from STP NX-A3, view south.

The soil profiles recorded in Survey Area IV closely conform to the Hampshire, Inman, and Talbott Soil Series mapped for the area by the USDA. These soils are all well drained upland soils formed in clayey residuum of weathered limestone. Hampshire and Inman soils were the predominant soils mapped in the uplands and slopes west of SR-265 and Talbott soils are mapped for the broad swale surrounding the stream east of SR-265. Soil profiles for STPs excavated in each soil series very closely match the expected hue and texture listed in USDA Soil Series descriptions, though there was some variability within and between areas. These inconsistencies are likely the result of topographic variability and historic impacts. The Ap horizon(Stratum I) recorded within Survey Area IV was typically a silty loam that ranged from approximately 15- to 25-cm (6-10 in) in depth with a brown to (10YR 4/3) to dark yellowish brown (10YR 4/4) color. The B-horizon (Stratum II) soils were recorded as a yellowish brown (10YR 5/6) to brownish yellow (10YR 6/6) silty clay. Profiles east of SR-265 east of the stream contained similar profiles but the presence of iron concretions suggest this portion of the APE is poorly drained.

The STP soil profiles for A-A31, A-J9, A-G22 are representative of the profiles recorded in in the uplands and swale in the corridor between SR-265 and Guill Road in Survey Area IV. STP A-A31 (**Figure 45**) is located in the graded upland west of SR-265. Stratum I contained a displaced mottled dark yellowish brown (10YR 4/4) and brownish yellow (10YR6/6) clay loam that extended to 10 cmbs (4 in) underlain by a brownish yellow (10YR 6/6) clay Bt1 horizon (Stratum II) that terminated at 15 cmbs (6 in) at intact limestone bedrock. STP A-J9 is located in the western upland pasture east of Guill Road. Stratum I (Ap horizon) contained a dark yellowish brown (10YR 3/4) silt loam matrix to 25 cmbs (10 in) underlain by the yellowish brown (10YR 5/6) silty clay Stratum II (Bt1 horizon) matrix that was excavated to the limestone bedrock at 40 cmbs (16 in).

STP A-G22 is located within the broad swale at the center of the SR-265 and Guill Road APE corridor. The Ap horizon (Stratum I) contained a dark yellowish brown (10YR 4/4) silt loam that extended to 16 cmbs (6 in) underlain by a brown (10YR 5/4) clay Bt horizon that was excavated to 27 cmbs (11 in).

The STP profiles recorded along the western and eastern margins or SR-265 did contain some variability based on topographic positioning. The APE to the west of SR-265 occupied the base and toe of the eastern slope of the upland while STPs east of SR-265 were positioned along an active stream within a broad, nearly level swale. STP Nx-B2 (**Figure 46**) located west of SR-265 contained a dark yellowish brown (10YR 4/4) silt loam Ap (Stratum I) that extended to 19 cmbs (7 in). The Ap horizon was underlain by a brownish yellow (10YR 6/8) clayey loam Bt1 horizon (Stratum II) that terminated at 29 cmbs (11 in).

STP Ox-B10 located east of the stream contained a dark brown (10YR 3/3) silt loam Ap horizon (Stratum I) that extended to 15 cmbs (6 in). The Ap horizon was underlain by a very pale brown (10YR 7/3) clay loam Bt1 horizon (Stratum II) with small iron oxide inclusions that terminated at 48 cmbs (19 in) at a fraggy limestone bedrock deposit (**Figure 47**).

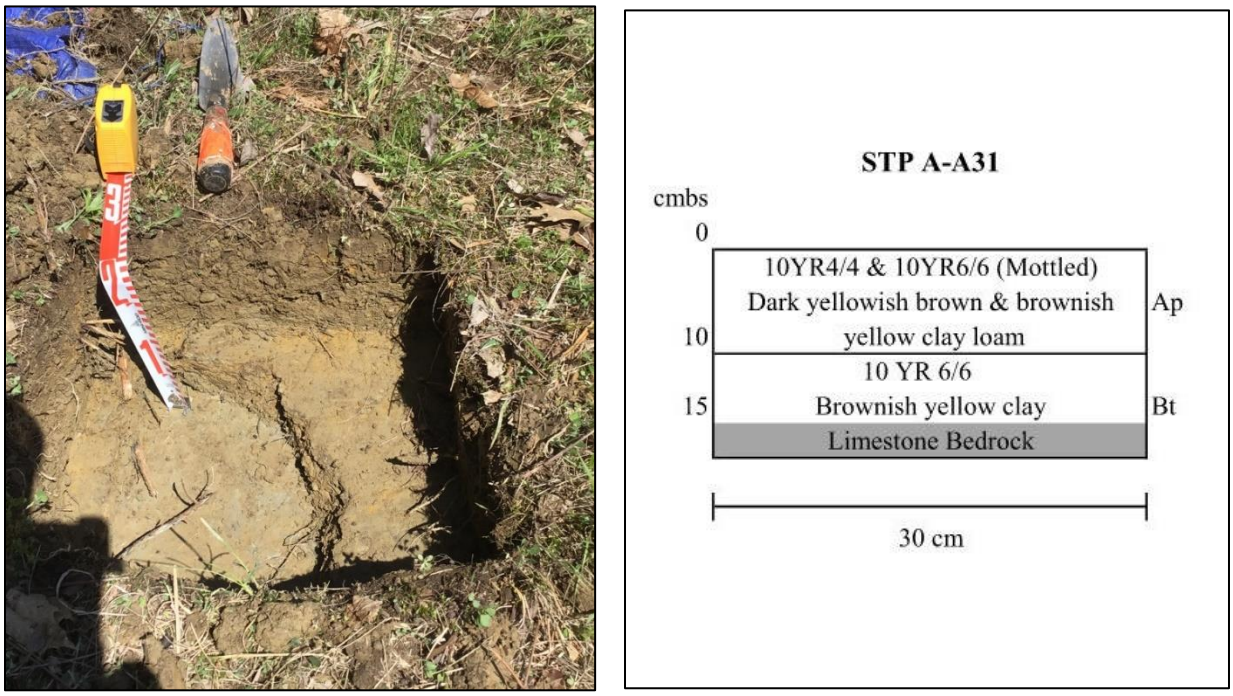

Figure 45: North soil profile, STP A-A31.

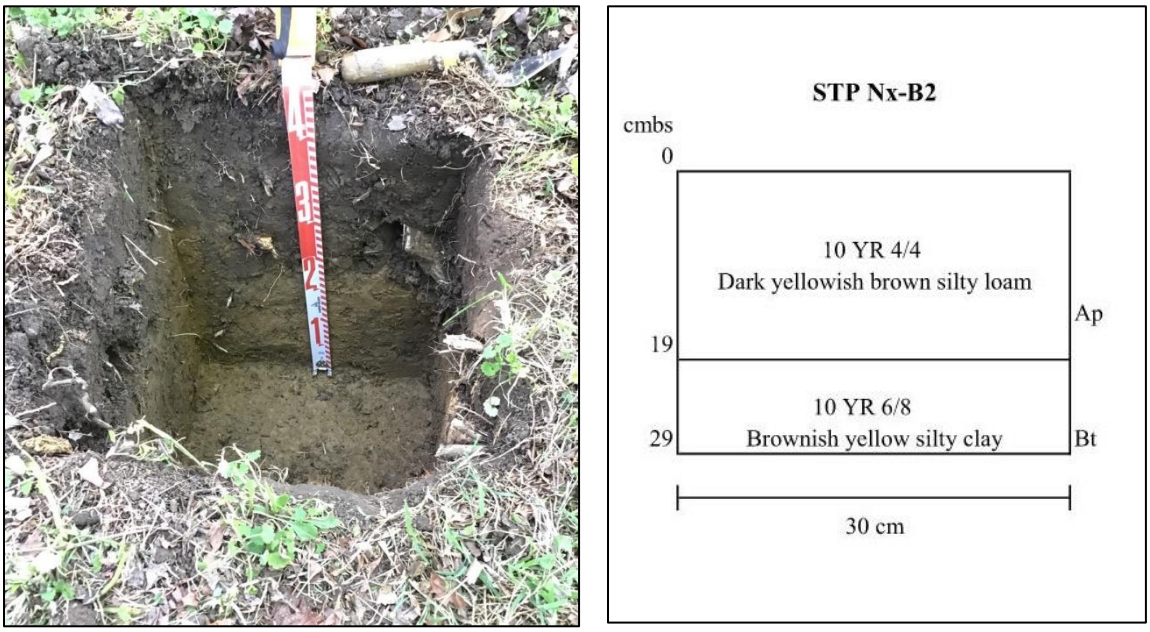

Figure 46: West soil profile, STP NX-B2.

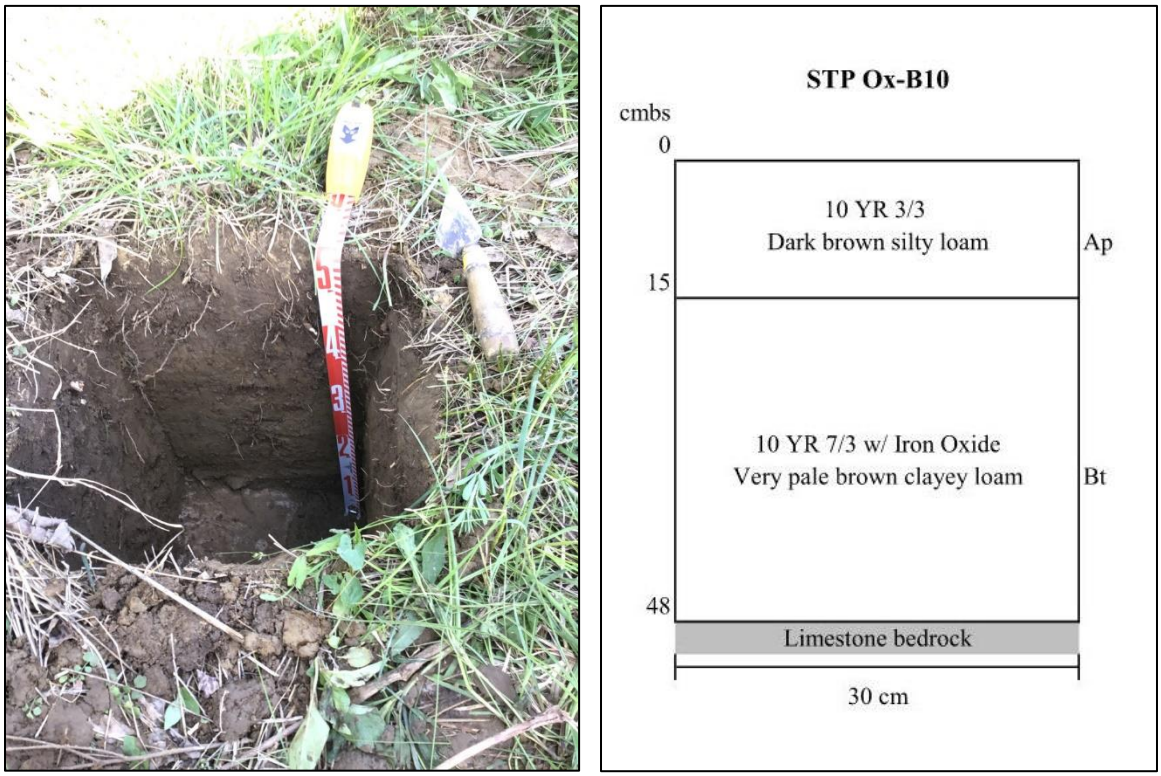

Figure 47: West soil profile, STP OX-B10.

E. RESOURCES IDENTIFIED

1. Isolated Find 1

Isolated Find 1 (IF-1) consists of one non-diagnostic prehistoric artifact—a primary chert flake tool (**Figure 48**). IF-1 was recovered from STP G-B4 located in Survey Area I north of SR-265 on a narrow ridge saddle. The single artifact was recovered from the Ap horizon. Six radial STPs were excavated at 10-meter (32-feet) intervals in cardinal directions to delineate the positive STP. All six radials were negative, and the resource was designated IF- 1 (**Figure 49** and **Figure 50**).

The artifact was initially identified by field staff as a non-reworked flake, but closer inspection in the lab showed potential retouch or utilization along a single margin. The full artifact catalog for IF-1 is provided in **Appendix B.**

Soils at STP G-B4 and within the vicinity had a relatively thick Ap horizons compared to expectations from the soil survey. STP N1000 E990 had an Ap horizon that extended to approximately 30 cmbs (12 in) below surface underlain by a thin 5 cm (2 in) brownish yellow (10YR 6/6) silt loam above the brownish yellow (10YR 6/8) Bt1 horizon (**Figure 51**).

Based on the results of the field investigation and artifact analysis, IF-1 is an undetermined prehistoric activity area that does not satisfy the criteria for designation as an archeological site. The single artifact recovered is an expedient flake tool fragment recovered from the Ap horizon, and no additional artifacts or features were identified. There was no evidence of intact cultural deposits. The archaeological deposits at IF-1 are unlikely to contribute any additional significant information to our understanding of the prehistoric activities of the county or region. Isolated finds typically do not meet the minimum criteria for inclusion in the NRHP. **RK&K recommends that IF-1 is not eligible for inclusion in the NRHP. No further work is recommended.**



Figure 48: IF-1, Chert flake tool fragment (7.001).

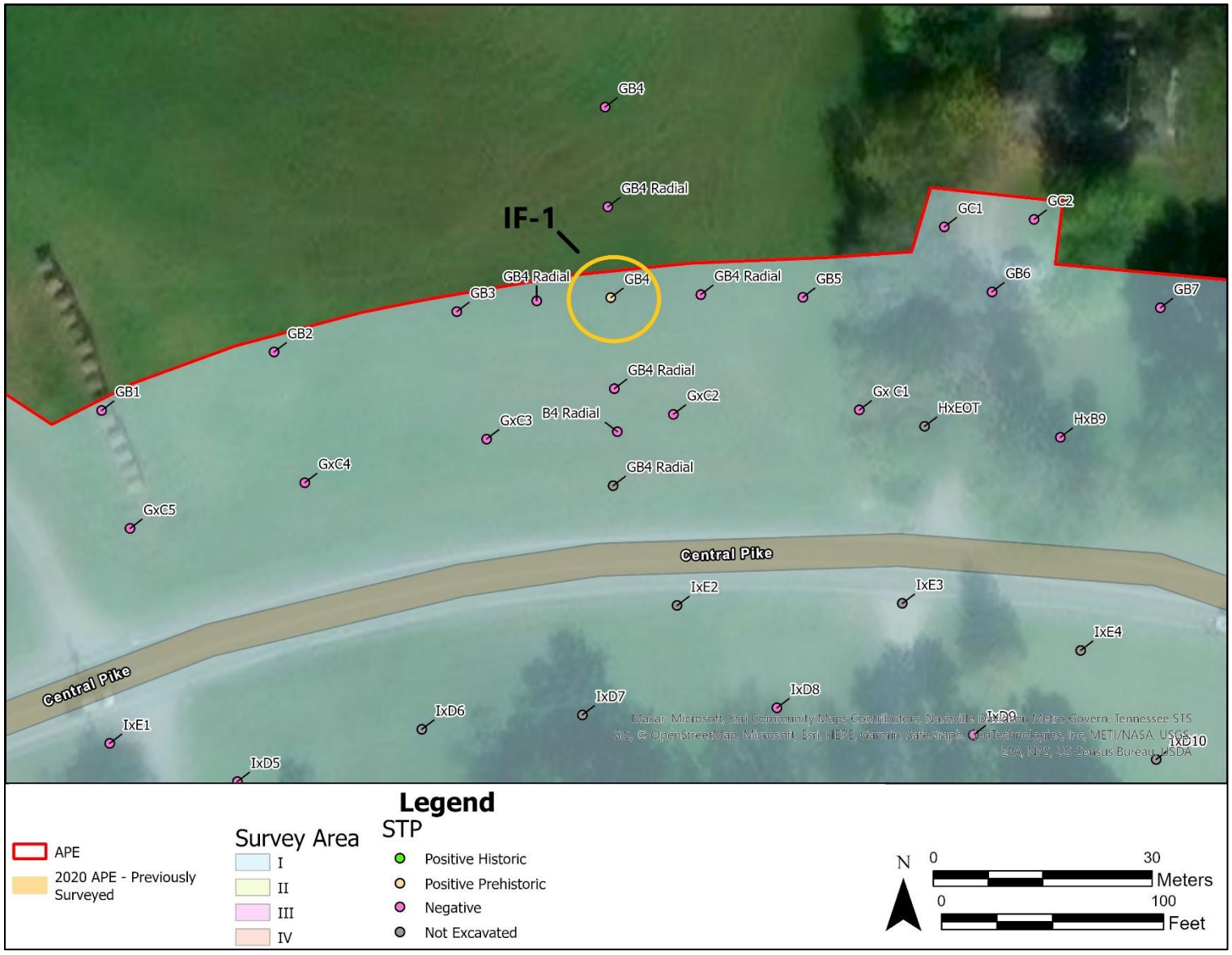

Figure 49: Aerial imagery showing IF-1.



Figure 50: General conditions at IF-1, view to the west.

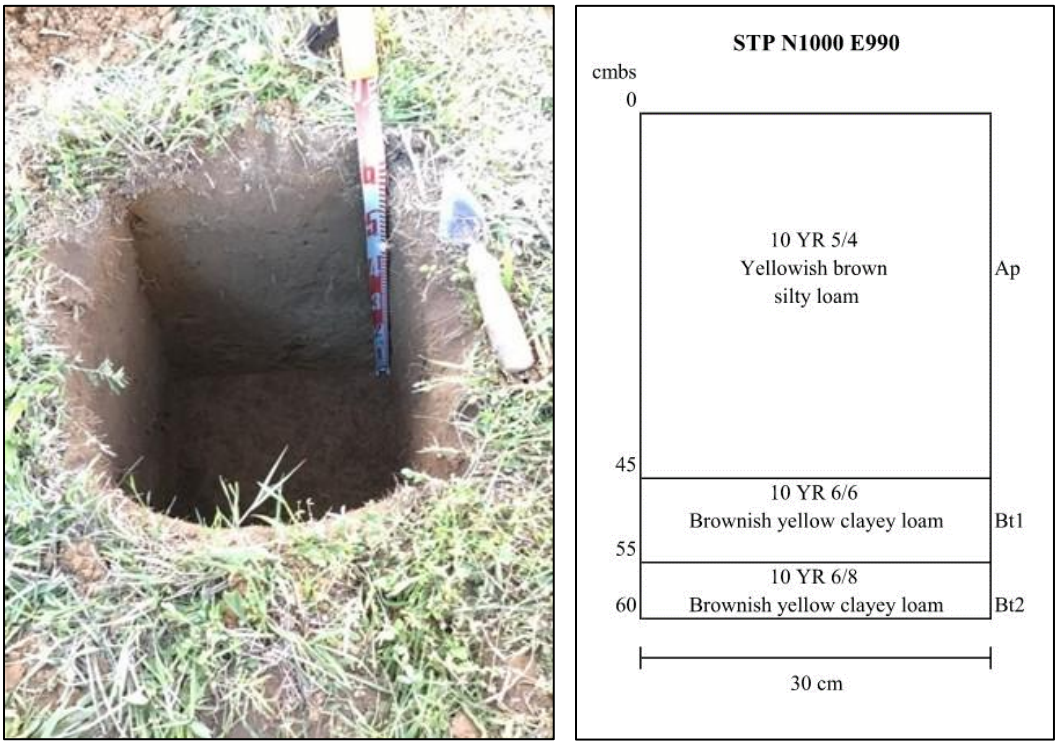

Figure 51: STP N1000 E990, radial for IF-1.

2. Site 40WI270

Archaeological site (40WI270) is an early- to mid-twentieth-century rural domestic artifact scatter located in Survey Area IV immediately west of SR-265 and containing a single subsurface feature of articulated stones (**Figure 52** and **Figure 53**). The site and stone feature were initially identified in STP B-B1 (N1000 E1000) near the base of an east trending slope approximately 40 m (131 ft) west of SR-265 along a graded and partially cut gravel driveway (**Figure 54** and **Figure 55**). The articulated stone feature and over half of the site artifact assemblage (N=13) was recovered from Stratum II and III above and within the stone feature (**Figure 56**). The remaining artifacts (N=7) were all recovered in Stratum I of the delineation STPs. Collectively, the artifacts represent a low-density historic scatter associated with the twentieth-century occupation of the site.

Following its initial identification in STP B-B1, the site was delineated at 10-m (33-ft) intervals in cardinal directions, though several delineation STPs were not excavated because of heavy slope or disturbance caused by the existing gravel driveway and roadway. The site measures approximately 50 m by 20 m (164 ft by 65 ft).

A total of 20 artifacts were recovered from the site, including historic ceramics, glass, and ferrous metal (**Table 5**). Ceramics include refined white earthenware (1820-present) and Albany Slip stoneware (1825-1920). Ferrous metal artifacts include a wire-drawn round iron nail (1890-present) and a machine-made spoon head. Glass artifacts include glass container fragments broadly dating to the nineteenth and twentieth centuries. Two colorless machine made glass fragments with basal stippling mend to form the scripted "D" of Duraglass. These characteristics have overlapping manufacturing dates and provide a collective date range 1940 to 1964. The manufacturing of the glass with "Duraglass" written in script and truncating the basal stippling dates to as late as 1964.. **Figure 57** shows a sample of the collected artifacts form 40WI270. The full artifact catalog, including artifact depths, is provided in **Appendix B**.

By functional group categories, the assemblage is primarily related to the Kitchen/Domestic activities (N=18). This suggests that the stone feature may be associated with a domestic structure as opposed to an outbuilding. The remaining two artifacts include a wire nail which is classified as being within the Architectural functional group and a stoneware vessel fragment of indeterminate function.

The profile for STP B-B1 (N1000 E1000) contained a recently developed or deposited dark yellowish brown (10YR 4/4) silt loam to 8 cmbs (3 in) underlain by a displaced mottled fill of dark yellowish brown (10YR 4/4) and brownish yellow (10YR 6/8) clay loam. The displaced Stratum II soils were underlain by a very dark grayish brown (10YR 3/2) silt loam which surrounded the stones of the feature.

To supplement the interpretation of the artifacts recovered, historic USGS topographic maps were reviewed. A structure is first depicted near the location of 40WI270 on the *1903 Nashville, TN* quadrangle and remains on the *1932 Hermitage, TN, 1952 Hermitage, TN,* and *1957 Hermitage, TN* quadrangles. There is no structure depicted on USGS quadrangle maps at the site's location on the 1968 *Hermitage, TN* quadrangle. Disturbances to the site include presumed demolition of the structure, a graded and cut driveway within two m (7 ft) of the stone foundation, and recent grading near the site (**Figure 54** and **Figure 55**).

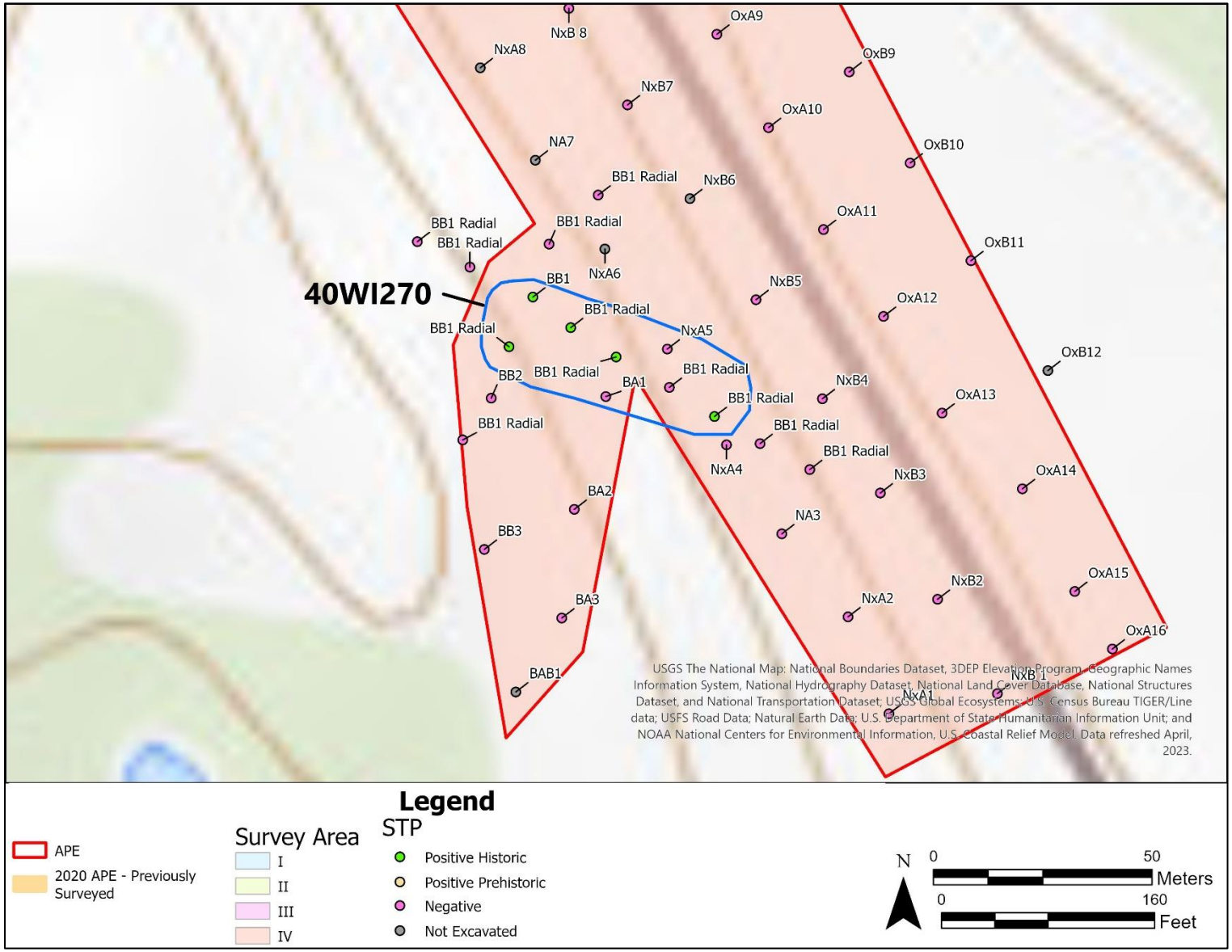

Figure 52: Topographic map showing 40WI270 (Hermitage, TN [Quad No. 311-NE], USGS 2022).

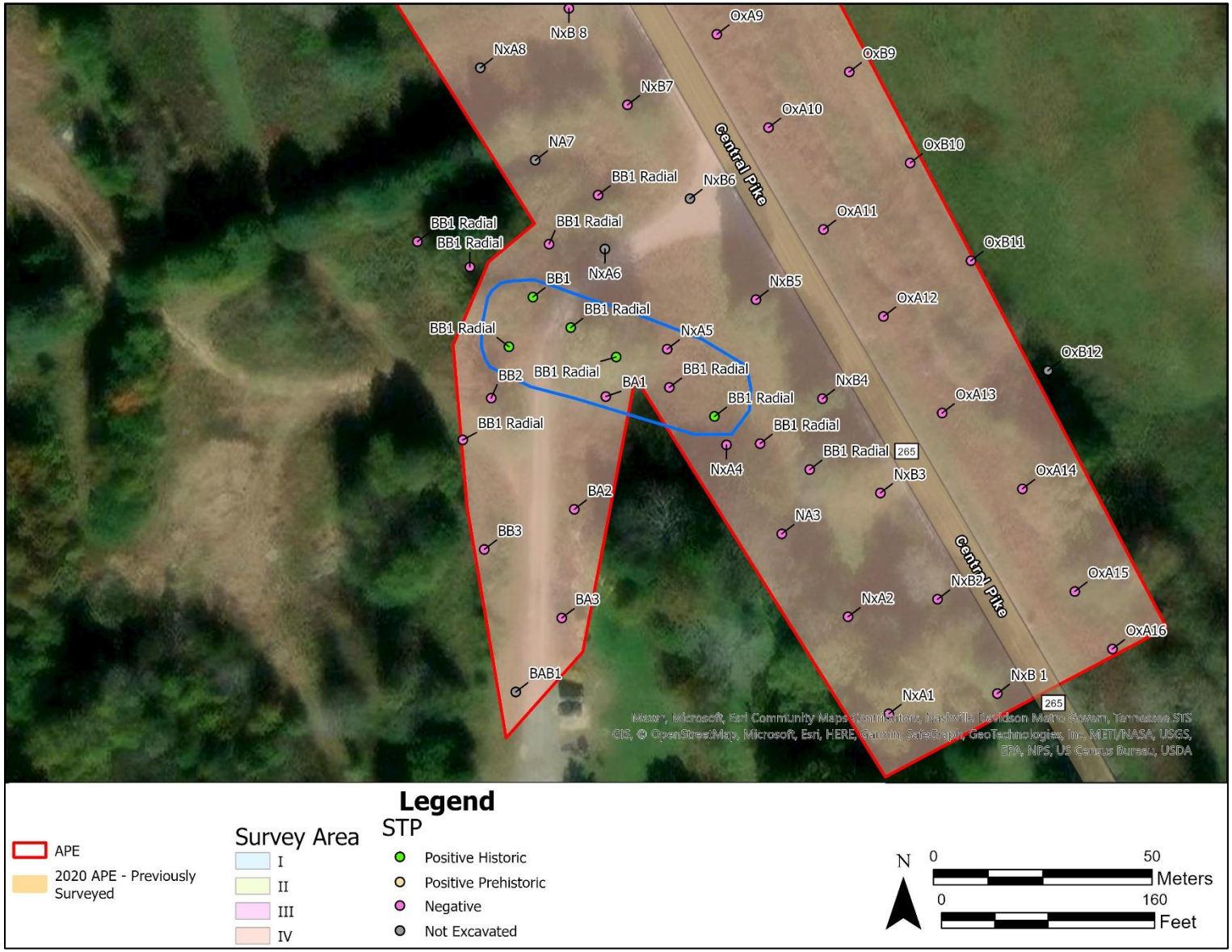

Figure 53: Aerial imagery showing 40WI270.



Figure 54: General conditions at 40WI270, view to the south.



Figure 55: General conditions at 40WI270 from south of site showing recent ground disturbance, view northeast.



Figure 56: Profile of stone feature in STP B-B1 (N1000 E1000) at 40WI270.



Figure 57: Sample of artifacts recovered from 40WI270 (Top to Bottom, Left to Right) - 1.001, 6.001, 1.002, 2.006, 2.005, 2.001, 2.002, 6.002, 1.003, 2.004, 1.005, 5.002, 1.006, 3.001, 4.001.

Table 5. Artifacts recovered from 40WI270.

CAT. NO.	PROVENIENCE	MATERIAL	CLASS	TYPE	PART	N=
1.001	B-B1 (N1000 E1000)	Ceramic	Refined Earthenware	Refined White Earthenware	Body	1
1.002	B-B1 (N1000 E1000)	Ceramic	Stoneware	Albany Slip	Body	1
1.003	B-B1 (N1000 E1000)	Glass	Colorless	Machine Made	Body	2
1.004	B-B1 (N1000 E1000)	Glass	Colorless	Machine Made	Body	1
1.005	B-B1 (N1000 E1000)	Glass	Amber/Brown	Machine Made	Body	1
1.006	B-B1 (N1000 E1000)	Glass	Other (Glass)	Machine Made	Body	1
2.001	B-B1 (N1000 E1000)	Glass	Colorless	Machine Made	Base	1
2.002	B-B1 (N1000 E1000)	Glass	Colorless	Machine Made	Body	1
2.003	B-B1 (N1000 E1000)	Glass	Colorless	Machine Made	Body	1
2.004	B-B1 (N1000 E1000)	Glass	Amber/Brown	Machine Made	Body	1
2.005	B-B1 (N1000 E1000)	Metal	Ferrous	Drawn (Wire)	Complete	1
2.006	B-B1 (N1000 E1000)	Metal	Ferrous	Machine Made	Head	1
3.001	N1000 E1010	Glass	Colorless	Machine Made	Body	1
4.001	N990 E1000	Glass	Colorless	Machine Made	Body	1
4.002	N990 E1000	Glass	Colorless	Machine Made	Body	1
5.001	N1000 E1040	Glass	Colorless	Machine Made	Body	1
5.002	N1000 E1040	Glass	Aqua	Contact Mold, Unidentified	Body	1
6.001	N1000 E1020	Ceramic	Refined Earthenware	Refined White Earthenware	Body	1
6.002	N1000 E1020	Glass	Colorless	Contact Mold, Unidentified	Body	1

Based on the results of the field investigations, artifact analysis, and review of historic imagery, 40WI270 is a twentieth-century rural domestic site consisting of a small, low-density artifact scatter and structural stone feature. 40WI270 was evaluated for its eligibility for listing in the NRHP under Criterion D: the potential to yield information important in the history of Wilson County or surrounding region. The low-density, twentieth-century historic artifact scatter and stone foundation feature are not likely to contribute any additional significant information to our understanding of the early-twentieth-century settlement and occupation of the county or region. It is unlikely that further work at this site would produce any information beyond that which has already been gathered. **RK&K recommends that 40WI270 is not eligible for inclusion in the NRHP. No further work is recommended.**

VI. SUMMARY AND RECOMMENDATIONS

RK&K, on behalf of TDOT, conducted an Addendum Phase I Archaeological Identification Survey for the proposed I-40 Interchange at SR-265 (Central Pike) project in Wilson County, Tennessee. This project proposes improvements to the existing I-40 interchange. A Phase I Archaeological Survey was conducted for a previous version of this project in 2020 (Detty and Jordan-Greene 2020) but project plans have since been revised and additional Phase I survey has been requested. The purpose of the Addendum Phase I Archaeological Identification Survey was to identify any archaeological resources within the APE and, to the extent possible, evaluate their eligibility for listing in the NRHP.

The APE for this study included the extent of existing and proposed right-of-way and proposed easements within project limits as shown on project plans (March 2023). This addendum assessment surveyed areas of the APE that exceeded the extent of the 2020 APE. The full APE, including the previously surveyed areas, measured approximately 49 ha (120 ac). The new survey areas measured approximately 22 ha (54 ac).

Fieldwork was conducted from April 10 to April 20, 2023, and consisted of pedestrian survey and systematic shovel testing. A total of 409 STPs were excavated as part of this survey, six of which were positive for archaeological materials. Transect-based STPs were excavated systematically at 20-m (66- ft) intervals along transects generally spaced 20 m (66 ft) apart and oriented in a manner that provided the most effective overall coverage of the APE. There were 83 planned STP locations that were not excavated because of their placement in existing roadways, areas of excessive slope, buried utilities, drainage ditches, standing water, or other disturbance. Eighteen of the excavated STPs were close-interval delineation STPs to determine the boundaries of resources identified in transect-based STPs.

One new archaeological site (40WI270) and one isolated find (IF-1) were identified in the APE as part of this survey. 40WI270 is an early- to mid-twentieth-century rural domestic site consisting of a low-density artifact scatter and one articulated stone feature. 40WI270 is unlikely to contribute any significant information to our understanding of the early- to mid-twentieth-century occupation of the county or region. **RK&K recommends that 40WI270 is not eligible for inclusion in the NRHP.**

IF-1 is a non-diagnostic, culturally unaffiliated prehistoric isolated chert flake tool. Isolated finds typically do not meet the minimum criteria for inclusion in the NRHP. **RK&K recommends that IF-1 is not eligible for inclusion in the NRHP.**

No further work is recommended.

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APPENDIX A: TDOA ARCHAEOLOGICAL PERMIT

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF ARCHAEOLOGY
Cole Building #3, 1216 Foster Avenue
NASHVILLE, TN 37243
(615) 741-1588

ARCHAEOLOGICAL PERMIT

NO. 001426

IN ACCORDANCE WITH THE PROVISIONS OF TENNESSEE CODE ANNOTATED SECTION 11-6-101 ET SEQ. PERMISSION IS HEREBY GRANTED TO:

ANDREW WEIDMAN

REPRESENTING:

RK & K

FOR ARCHAEOLOGICAL INVESTIGATION ON THE FOLLOWING DESIGNATED STATE-OWNED OR CONTROLLED LANDS:

PHASE I ARCHAEOLOGICAL SURVEY OF THE I-40 INTERCHANGE AT SR-265 ADDENDUM, WILSON COUNTY

IN ACCORDANCE WITH THE APPLICATION FILED MARCH 16, 2023 IN THE OFFICE OF THE DIVISION OF ARCHAEOLOGY AND IN CONFORMITY WITH THE DATA SUBMITTED THEREIN WHICH IS CONSIDERED AS A PART OF THIS PERMIT.

ISSUED THIS 10TH DAY OF APRIL 2023

TO EXPIRE THE 15TH DAY OF JUNE 2023

ADDITIONAL TERMS TO PERMIT APPLICATION: ARTIFACTUAL REMAINS AND PROJECT RECORDS ARE THE PROPERTY OF THE STATE OF TENNESSEE. THIS PERMIT IS SUBJECT TO PERIODIC REVIEW AND/OR CANCELLATION BY THE DIVISION OF ARCHAEOLOGY SHOULD CONDITIONS WARRANT SAME.

Phillip R. Hodges
DIRECTOR/STATE ARCHAEOLOGIST

Andrew Weidman
Digitally signed by Andrew Weidman
DN: E=aweidman@rkk.com, CN=Andrew Weidman, OU=Internal, OU=UserAccounts, DC=rkk, DC=com
Date: 2023.03.24 16:07:35-04'00'
APPLICANT

CN-0939

APPENDIX B: ARTIFACT CATALOG

40WI270 Artifact Catalog

Cat. ID	Spec. ID	Provenience (STP)	Depth (cmbs)	Material	Class	Type	Object	n=	Functional Group
1	001	B-B1 (N1000 E1000)	8-23	Ceramic	Refined Earthenware	Refined White Earthenware	Vessel, Tableware, Flat	1	Kitchen/Domestic
1	002	B-B1 (N1000 E1000)	8-23	Ceramic	Stoneware	Albany Slip	Vessel, Hollow	1	Indeterminate
1	003	B-B1 (N1000 E1000)	8-23	Glass	Colorless	Machine Made	Vessel, Hollow	2	Kitchen/Domestic
1	004	B-B1 (N1000 E1000)	8-23	Glass	Colorless	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
1	005	B-B1 (N1000 E1000)	8-23	Glass	Amber/Brown	Machine Made.	Bottle, Unid.	1	Kitchen/Domestic
1	006	B-B1 (N1000 E1000)	8-23	Glass	Other (Glass)	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
2	001	B-B1 (N1000 E1000)	23-44	Glass	Colorless	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
2	002	B-B1 (N1000 E1000)	23-44	Glass	Colorless	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
2	003	B-B1 (N1000 E1000)	23-44	Glass	Colorless	Machine Made.	Vessel, Hollow	1	Kitchen/Domestic
2	004	B-B1 (N1000 E1000)	23-44	Glass	Amber/Brown	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
2	005	B-B1 (N1000 E1000)	23-44	Metal	Ferrous	Drawn (Wire)	Nail, Wire	1	Architectural
2	006	B-B1 (N1000 E1000)	23-44	Metal	Ferrous	Unidentified	Spoon, Table	1	Kitchen/Domestic
3	001	N1000 E1010	0-30	Glass	Colorless	Machine Made	Vessel, Hollow	1	Kitchen/Domestic
4	001	N990 E1000	0-30	Glass	Colorless	Machine Made.	Vessel, Hollow	1	Kitchen/Domestic
4	002	N990 E1000	0-30	Glass	Colorless	Machine Made.	Vessel, Hollow	1	Kitchen/Domestic
5	001	N1000 E1040	0-25	Glass	Colorless	Machine Made.	Vessel, Hollow	1	Kitchen/Domestic
5	002	N1000 E1040	0-25	Glass	Aqua	Contact Mold,	Vessel, Hollow	1	Kitchen/Domestic
6	001	N1000 E1020	0-30	Ceramic	Refined Earthenware	Refined White Earthenware	Unidentified	1	Kitchen/Domestic
6	002	N1000 E1020	0-30	Glass	Colorless	Machine Made	Vessel, Hollow	1	Kitchen/Domestic

Isolated Find 1 Artifact Catalog

Cat. ID	Spec. ID	Provenience (STP)	Depth (cmbs)	Material	Class	Type	Object	n=	Comments
7	001	G-B4	0-20	Lithic	Chert (Unid.)	Tool	Flake tool	1	Light gray, semi-translucent chert, poss. Fort Payne/variant. Cortex on platform.

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

06-13-2023 14:04:07 CDT

Brandon Chance
TDOT
k.brandon.chance@tn.gov

RE: Federal Highway Administration (FHWA), a New Interchange along Interstate 40 from Interchange at SR-265 (Central Pike), TDOT PIN 124884.00, Project#: SHPO0003305, Wilson County, TN

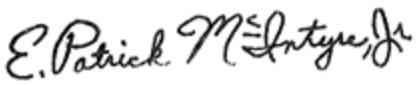
Dear Brandon Chance:

In response to your request, we have reviewed the archaeological report of investigations and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we find that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Complete and/or updated Tennessee Site Survey Forms should be submitted to the Tennessee Division of Archaeology for all sites recorded and/or revisited during the current investigation. Please provide your Project # when submitting any additional information regarding this undertaking. Questions or comments may be directed to Jennifer Barnett, who drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.

Your cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG8644256_PfNbgTFp7XvLMQtUPU7w

Environmental Studies

Historic Preservation

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Historic Preservation

Study Results

In a letter dated 08/01/2023, the TN-SHPO concurred that there are no architectural resources eligible for listing in the National Register of Historic Places that would be affected by the proposed project.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Historical-Architectural Report

Location: Email Attachment

Certification

Responder: Haley Seger

Title: TESS Adv. - Historic Preservation

Signature: Haley Seger Digitally signed by Haley Seger Date: 2023.08.07 08:55:58 -05'00'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

July 13, 2023

Mr. E. Patrick McIntyre, Jr.
Executive Director and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

RE: Historic/Architecture Assessment for the Proposed Interstate 40 Interchange at State Route 265 (Central Pike), in Mt. Juliet, Wilson County; PIN 124884.00

Dear Mr. McIntyre,

The Tennessee Department of Transportation (TDOT), with funding from the Federal Highway Administration (FHWA), proposes to construct a new interchange for Interstate 40 at State Route 265 (SR-265, Central Pike) in Wilson County. The proposed project would include the construction of a new interchange, including new ramps, lanes, and access roads, as well as associated road and safety improvements including road widening and resurfacing.

The project was originally studied in 2020, and in a SHPO letter dated 8/13/2020, TN-SHPO concurred that no National Register of Historic Places (NRHP) eligible or listed resources would be effected by the proposed project. Since that time, the proposed project area has expanded. Cultural Resource Analysts conducted a survey of the proposed project area and did not identify any eligible or listed resources. TDOT has reviewed the documentation and concur with their findings. It is the opinion of TDOT that there are no properties within the architectural area of potential effects that are listed in or eligible for listing in the NRHP. An archaeology assessment has been submitted separately.

In compliance with Section 106 of the National Historic Preservation Act (as amended) and implementing regulations 36 CFR 800, please review the enclosed information and provide me with your comments. If any additional information is needed, please contact Haley Seger at (615) 615-770-1762 for architectural resources, or me at (615) 741-7179. I appreciate your assistance.

Sincerely,



K. Brandon Chance
Technical Studies Office Manager
KBC/hms

Contract Publication Series 23-215

HISTORIC ARCHITECTURE ASSESSMENT FOR THE PROPOSED I-40 INTERCHANGE AT SR 265 (CENTRAL PIKE), WILSON COUNTY, TENNESSEE (PIN 124884.00)





by
Chelsey Johnson, MA
and
Jenny Andrews, MA

Prepared for

TN TDOT Department of Transportation

Prepared by

cra cultural resource analysts, inc

Kentucky | West Virginia | Wyoming
Indiana | Louisiana | Tennessee | Virginia

Contract Publication Series 23-215

HISTORIC ARCHITECTURE ASSESSMENT FOR THE PROPOSED I-40 INTERCHANGE AT SR 265 (CENTRAL PIKE), WILSON COUNTY, TENNESSEE (PIN 124884.00)

By

Chelsey Johnson, MA
and
Jenny Andrews, MA

Prepared for

Haley Seger
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Prepared by

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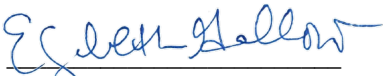
CRA Project No.: T230209



Elizabeth Gallow, MHP
Principal Investigator

July 10, 2023

MANAGEMENT SUMMARY

In May 2023, Cultural Resource Analysts, Inc., completed a historic architectural assessment for the proposed I-40 interchange project in Wilson County, Tennessee. The project calls for the construction of a new interchange at the present crossing of SR 265 (Central Pike) and I-40. This assessment was conducted by Cultural Resource Analysts, Inc., at the request of Haley Seger of the Tennessee Department of Transportation.

The proposed project involves the construction of a new interchange at SR 265 (Central Pike), and includes improvements to SR 265, Providence Parkway, John Hagar Road, Guill Road, and Pleasant Grove Road, and construction of new connector roads between Pleasant Grove Road and Tillman Drive, and between Providence Parkway and John Hagar Road. Information regarding the exact amounts of right-of-way acquisition and temporary or permanent construction easements is not available at this time. However, the Initial Studies plans showing proposed locations of right-of-way acquisition and easements are included as an attachment to this report. The area of potential effects for the historic architectural survey is defined in accordance with Tennessee Department of Transportation specifications to include all properties adjacent to the proposed project area, which, given the nature of the proposed improvements, encompasses all properties that may be affected by the proposed project.

Before conducting the architectural field survey, a records review was completed to identify historic architectural resources including buildings, structures, sites, or objects located adjacent to or within the immediate viewshed of the proposed project area that may be historically significant. Discussion with Tennessee Historical Commission staff indicated two previously surveyed architectural resources are located within the area of potential effects: WI-2121 and WI-2097. Prefield research using the Tennessee Property Viewer combined with determinations made in the field resulted in the recordation and National Register of Historic Places eligibility evaluation of a total of 21 sites.

Based on the results of the field survey and archival research, one site (Inventoried Property A) was selected for further evaluation and subject to full inventory (Table 1). Cultural Resource Analysts, Inc., recommends that Inventoried Property A lacks the necessary significance and integrity to warrant listing in the National Register of Historic Places under Criterion A, B, or C. The remaining 20 sites were charted and are described in Table 2, and are recommended ineligible for listing in the National Register of Historic Places under Criterion A, B, or C. Two of the charted sites contain extant previously surveyed resources.

Cultural Resource Analysts, Inc., recommends that the proposed I-40 interchange construction will result in no historic properties affected.

Table 1. Inventoried Properties

	Property Name/Type	Survey Number	NRHP Eligibility Recommendation
Inventoried Property A	Wright/Tillman Farm		Not Eligible.

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I. STATEMENT OF DETERMINATION

The Tennessee Department of Transportation (TDOT) is proposing to construct a new interchange at the current crossing of SR 265 (Central Pike) and I-40 in Wilson County, Tennessee. The proposed project also calls for improvements to SR 265, Providence Parkway, John Hagar Road, Guill Road, and Pleasant Grove Road, and construction of new connector roads between Pleasant Grove Road and Tillman Drive, and between Providence Parkway and John Hagar Road. Information regarding the exact amounts of right-of-way (ROW) acquisition and temporary or permanent construction easements is not available at this time. However, the Initial Studies plans showing proposed locations of ROW acquisition and easements are included as an attachment to this report.

Pursuant to 36 CFR 800.4, which requires the TDOT and the Federal Highway Administration (FHWA) to identify historic resources near its proposed projects, Cultural Resource Analysts, Inc. (CRA), staff completed a historic architectural survey of the area of potential effects (APE) for this proposed project in order to identify and document the possible effects of the project on historic properties. The APE was defined in accordance with TDOT specifications to include all properties adjacent to the proposed project area, which, given the nature of the proposed improvements, encompasses all properties that may be affected by the proposed project.

A map of previously surveyed resources is typically available on the Tennessee Historical Commission's (THC) website; however, previously surveyed Wilson County resources have not been added to the Viewer. Discussion with THC staff members via email indicates two previously surveyed architectural resources are located within the APE: WI-2121 and WI-2097. Prefield research using the Tennessee Property Viewer combined with determinations made in the field resulted in the recordation and National Register of Historic Places (NRHP) eligibility evaluation of a total of 21 sites.

Based on the results of the field survey and archival research, one site (Inventoried Property A) was selected for further evaluation and subject to full inventory (Table 1). CRA recommends that Inventoried Property A lacks the necessary significance and integrity to warrant listing in the NRHP under Criterion A, B, or C. The remaining 20 sites were charted and are described in Table 2, and are recommended ineligible for listing in the NRHP under Criterion A, B, or C. Two of the charted sites contain extant previously surveyed resources.

Cultural Resource Analysts, Inc., recommends that the proposed I-40 interchange construction will result in no historic properties affected.

II. PROJECT DESCRIPTION

TDOT is proposing to construct a new interchange at the current crossing of SR 265 (Central Pike) and I-40 in Wilson County, Tennessee (Figures 1–4). The proposed project involves the construction of the interchange itself, and includes improvements to SR 265, Providence Parkway, John Hagar Road, Guill Road, and Pleasant Grove Road, as well as the construction of new connector roads between Pleasant Grove Road and Tillman Drive, and between Providence Parkway and John Hagar Road. I Information regarding the exact amounts of right-of-way (ROW) acquisition and temporary or permanent construction easements is not available at this time. However, the Initial Studies plans showing proposed locations of ROW acquisition and easements are included as an attachment to this report.

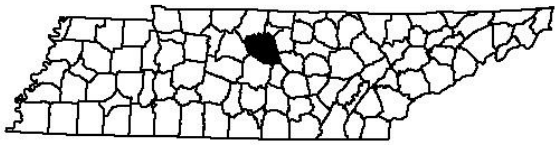

Figure 1. Map of Tennessee showing the location of Wilson County.

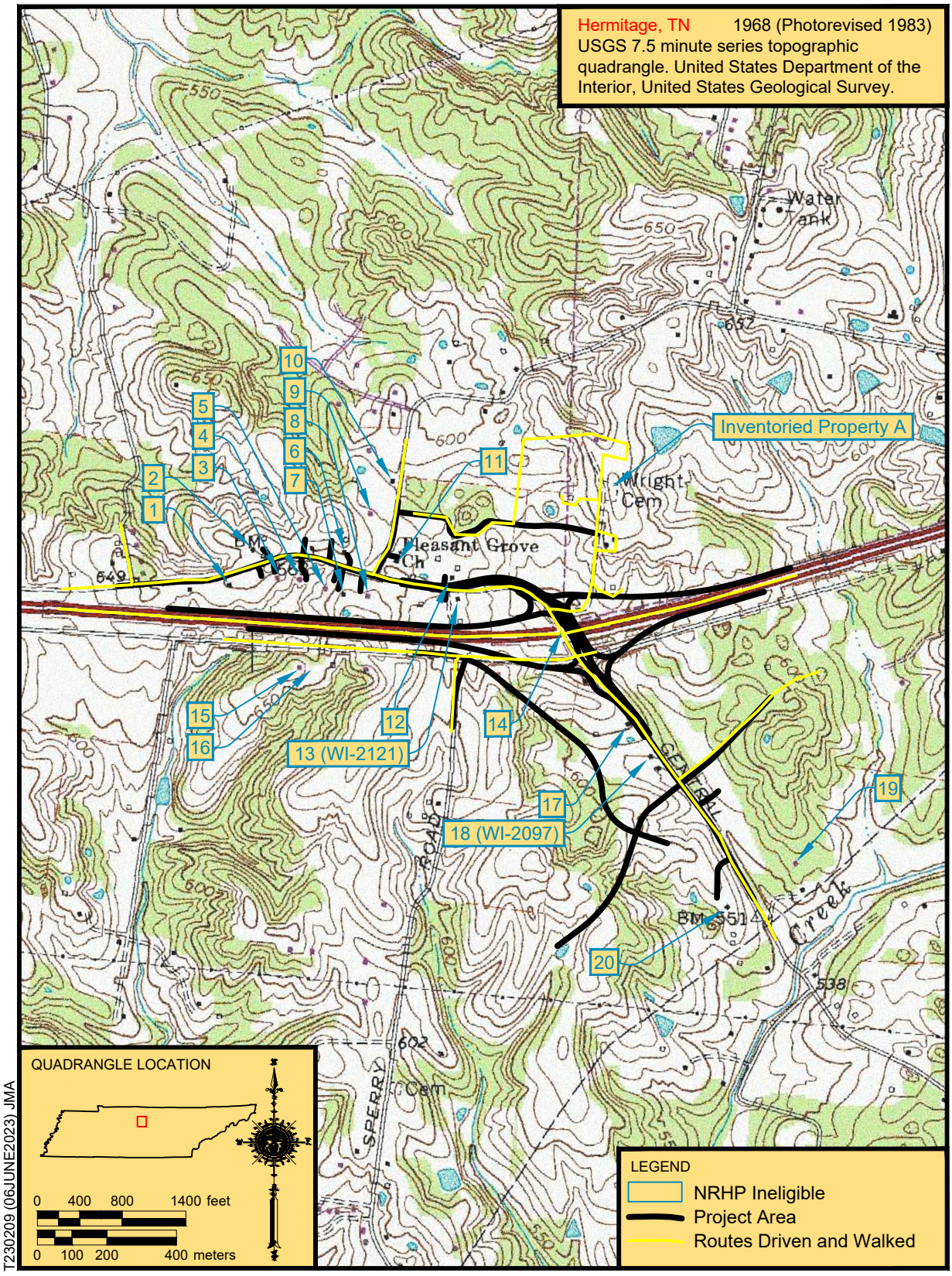

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Figure 2. Topographic map depicting the project area, the routes driven and walked, and the locations of surveyed resources.

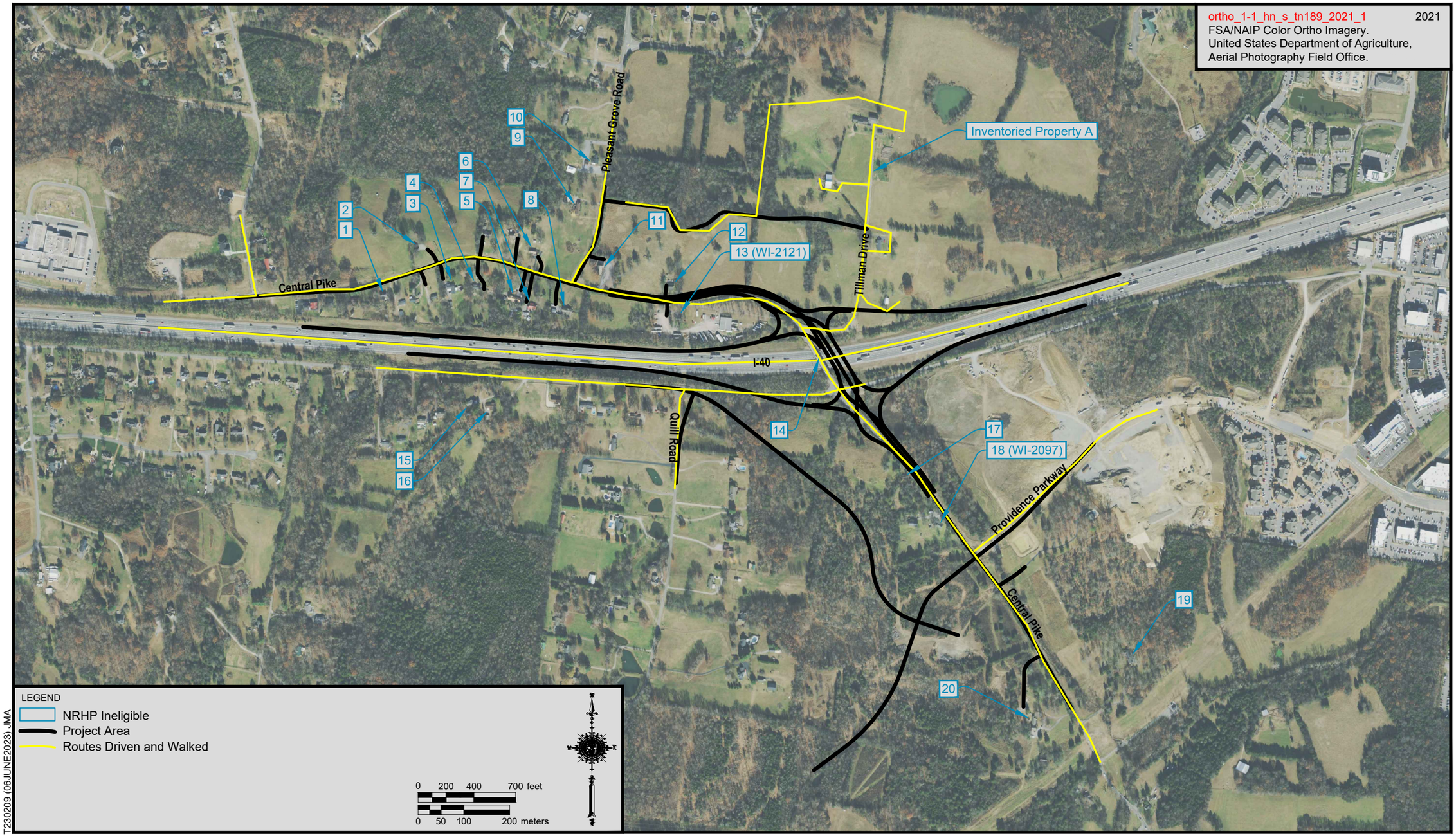


Figure 3. Aerial photograph depicting the project area, the routes driven and walked, and the locations of surveyed resources.

III. PUBLIC PARTICIPATION

TDOT has prepared a list for each county of historic groups, county historians, and other individuals and organizations that might be interested in proposed projects. TDOT regularly updates and refines this list. TDOT will mail a copy of this report to the following groups and individuals for review and comment, and if they desire, to participate as a consulting party in the Section 106 review process.

Wilson County Historian
Greater Nashville Regional Council
220 Athens Way, Suite 200
Nashville, TN 37228

Wilson County Mayor
228 East Main Street, #104
Lebanon, TN 37087

Mount Juliet-West Wilson County TN Historical Society

Wilson County Archives
111 South College Street
Lebanon, TN 37807

Wilson County Black History Committee

Mayor of Mount Juliet
2425 North Mount Juliet Road
Mount Juliet, TN 37122

Property Owner
180 and 335 Tillman Drive
Mount Juliet, TN 37122

IV. RESEARCH AND SURVEY METHODOLOGY

On May 16 and 17, 2023, CRA personnel conducted a historic architectural resource survey for the proposed I-40 interchange construction in Wilson County. The survey was conducted in accordance with the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (National Park Service [NPS] 1983). Guidelines offered in the document entitled *Guidelines for Local Surveys: A Basis for Preservation Planning: National Register Bulletin #24* were also followed (NPS 1985). In addition, recommendations provided in "Documentation Standards: Section 106 Assessments, Documentation of Adverse Effects, Section 4(f) Evaluations for Tennessee Department of Transportation Consultants" were followed (Looney 2018).

The purpose of the survey was to document historic architectural resources within the APE of the proposed project and assess potential effects of the project. The survey included documentation of individual properties adjacent to the project area.

General Setting and Environment

Wilson County is located in central Middle Tennessee. The central portion of the county is located within the Inner Nashville Basin section of the Interior Plateau province, which is characterized by smooth to rolling plains with occasional small knobs or hills. The fringes of the county and the project area are

located within the Outer Nashville Basin section of the same province, which is more heterogeneous than the Inner Basin, with more hilly topography and higher elevations (Griffith et al. 1998). The north border of the county is formed by the Cumberland River, which widens significantly as it approaches Davidson County and Old Hickory Dam, becoming a reservoir by the same name. A small portion of J. Percy Priest Reservoir, formed by the impoundment of the Stones River, is within western Wilson County, just south of Mount Juliet. Additional minor streams blanket the county, the most prominent being Fall Creek. The county encompasses approximately 570.87 sq mi (United States Census Bureau 2022).

The proposed project area is located approximately 2.4 mi southeast of the historic center of Mount Juliet, and the majority of the project falls within the contemporary Mount Juliet city limits. Mount Juliet is located in western Wilson County, and the project area begins approximately 1.4 mi from the Davidson County border. The project area runs primarily along SR 265/Central Pike between its intersections with John Wright Road and Cook Road, but extends to a lesser degree into intersecting roads and undeveloped landscape on either side of SR 265 (Figures 4–13). North Creek is the closest waterway to the project site, and crosses SR 265 south of I-40 and south of the project area, flowing into J. Percy Priest Reservoir approximately 1.5 mi southwest of the project area.



Figure 4. View from the west terminus of the project area north of I-40, looking west from near the intersection of SR 265 and John Wright Road.



Figure 5. Overview of the north-central project area, looking northeast from the intersection of SR 265 and Tillman Drive.



Figure 6. Overview of the north-central project area, looking south across the intersection of SR 265 and Pleasant Grove Road.



Figure 7. Overview of a portion of the planned route for the connector between Pleasant Grove Road and Tillman Drive, looking south from within the Tillman Farm property (Inventoried Property A).



Figure 8. Overview of a portion of the planned route for the connector between Pleasant Grove Road and Tillman Drive, looking northeast from near Charted Property 12.



Figure 9. View from the west terminus of the project area along John Hagar Road, looking east.



Figure 10. View of the south-central project area at the intersection of Central Pike and Adams Road, looking north toward I-40 and the planned location of the interchange.



Figure 11. View of the project area from the intersection of Central Pike and Adams Road, looking east along Adams Road.



Figure 12. View of ongoing development surrounding the project area at Providence Parkway, looking southeast.



Figure 13. Overview of the southern terminus of the project area, looking northwest along Central Pike.

Historic topographic maps indicate the nearest named communities to the project area were Dodoburg to the southeast, and Centralville to the west. The area was historically rural, with large farmsteads and additional residences clustered around Central Pike. The construction of I-40 immediately south of Central Pike brought great change to the area. The section of SR 265/Central Pike which encompasses the project area is heavily trafficked during daylight hours. The proximity of the area to the interstate and the Davidson County line has led to an explosion of late twentieth-century and more recent development, including numerous residential developments as well as large commercial complexes. Additional massive residential and commercial developments are underway immediately southeast of the project area; however, at this time, the majority of the property directly fronting SR 265/Central Pike is occupied by single-family dwellings with moderate to large rolling lots.

Historic Context

Wilson County

The area that would eventually become Wilson County has a rich settlement history that predates the colonization of North America by thousands of years. Along the Cumberland River around present day Nashville, the Middle Cumberland Culture has been defined for the Mississippian period in the region. A Mississippian mound center at Spring Creek located within a property that came to be known as the Sellars Farm (approximately 3 mi southeast of present-day Lebanon) yielded significant archaeological findings, including two pairs of Tennessee-Cumberland style stone statues, one of which is now recognized as the State Artifact of Tennessee. The Spring Creek mound center was abandoned by 1400, and by the time the first Europeans arrived in the Nashville area, Mississippian groups had entirely vanished. Reasons for the disappearance are unknown, but are generally attributed to stress from social and environmental factors (Moore et al. 2006; Tennessee Department of Environment and Conservation [TDEC]).

By the time the earliest white settlers arrived in Middle Tennessee, the area had become a sort of buffer zone between more established Cherokee, Chickasaw, and Shawnee settlements to the east, west, and north, respectively. Early reports indicate that the Cumberland River Valley and the general vicinity of present-day Nashville were home to several permanent Shawnee settlements by the 1680s, with the recorded settlements being located along the Cumberland River watershed. In 1714, allied Cherokee and Chickasaw parties succeeded in overtaking the Shawnee settlements and driving the Shawnee people from the region. Both the Cherokee and Chickasaw tribes laid claim to the land previously inhabited by the Shawnees, while Shawnee hunters continued to use the area as well, leading to persistent local disputes between the three tribes throughout the mid-eighteenth century. By the late eighteenth century, white settlers had begun occupying these tribal lands in the Cumberland Valley and Middle Tennessee. The United States negotiated a treaty with Cherokee tribal leaders in 1785 at Hopewell Plantation in South Carolina, which resulted in tribal cession of claim to the area including what is now Wilson County (Figure 14). The Hopewell Treaty was the first to be signed between the Cherokee Nation and the United States government, and similar treaties were signed between the Choctaw Nation and Chickasaw Nation at Hopewell within the following months. The Hopewell Treaty also became the first treaty with the Cherokee Nation to be broken by the United States; only a few months after signing, John Sevier violated the treaty terms by leading attacks on Cherokee towns in East Tennessee in an attempt to secure more land for white settlement (Clark 2018; Osiyo 2017; Royce 1887; Royce and Thomas 1899).

French trappers and European explorers began arriving in present-day Wilson County as early as 1760, and in 1794, John B. Walker led the first known group of permanent white settlers to Hickory Ridge, west of present-day Lebanon. Five years later, the Third General Assembly of the State of Tennessee passed an act dividing a portion of Sumner County to create Wilson and Smith Counties. Wilson County was named in honor of Major David Wilson, a Revolutionary War hero and member of the Territorial Assembly and Speaker of the House of Representatives in 1794 (Burns 2017; Lebanon Wilson County Chamber of Commerce [LWCCC] n.d.).

Lebanon was chosen to be the county seat in 1801, and the town was laid out in 1802 and incorporated in 1819. Lebanon remains the largest city within Wilson County, and was named as a biblical reference to the eastern red cedar trees (*Juniperus virginiana*) that are found throughout the region. Wilson County has two other incorporated areas: Watertown, established in 1845 and incorporated in 1905, and Mount Juliet, settled in 1835 and incorporated in 1973 (Burns 2017; LWCCC n.d.).

In general, central Middle Tennessee saw a flourishing antebellum economy enabled by the prevalence of enslaved labor in the agricultural, timber, and livestock sectors. An 1861 map depicting enslaved population percentages at the onset of the Civil War indicates 30.9 percent of the population of Wilson County was enslaved at the time, reflecting significantly higher levels of enslavement than the majority of the state, but lower than the nearby counties of Williamson, Rutherford, and Maury, which were near or surpassed 50 percent (Hergesheimer 1861). Wilson County's economy was largely dependent on agricultural production. In the 1830s, textile, flour, and paper mills were established (Burns 2017).

Because of its close proximity to the Cumberland River and its position along a significant turnpike, Wilson County and Lebanon were heavily impacted by the Civil War. The county formally sided with the confederacy, sending 600 volunteers across six companies to the 7th Tennessee Infantry Regiment in 1861. However, some citizens enlisted with the Union Army individually. In early 1862, the first federal troops arrived in Lebanon. On the morning of May 5, 1862, Colonel John Hunt Morgan and his cavalry were attacked by General Ebenezer Dumont and his Union cavalry as they advanced from Murfreesboro. The battle centered around the public square and spilled over into Cedar Grove Cemetery, where many of the fallen soldiers were later interred. Morgan was forced to retreat, but seven months later paraded 2,000 Union troops captured in Hartsville back through the Lebanon town square en route to Murfreesboro (Tennessee Civil War Trails 2010).

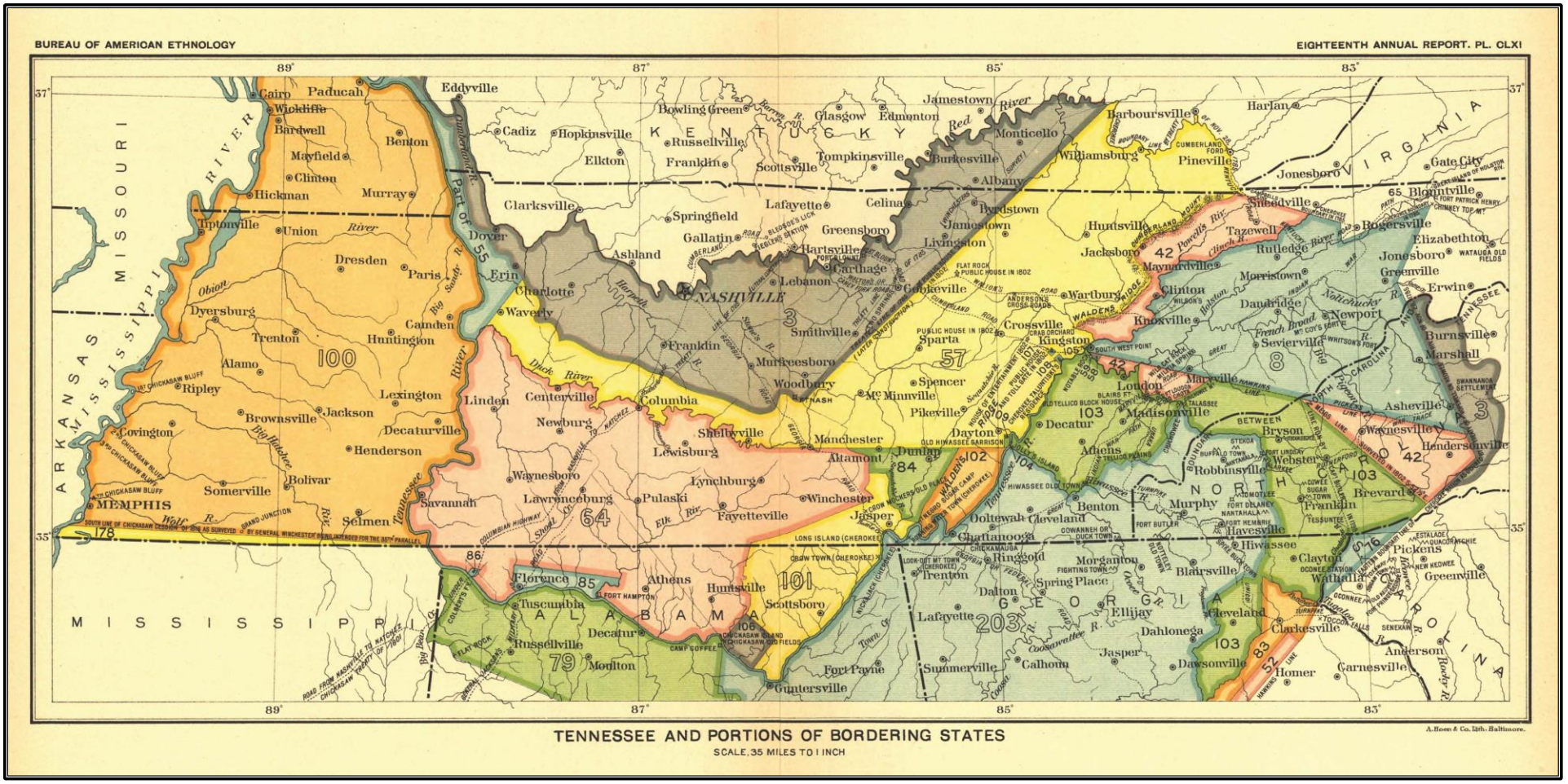


Figure 14. 1899 map compiled by Charles C. Royce depicting cessions or transferals of land between Indigenous groups and the United States government in present-day Tennessee. The 1785 cession resulting from negotiations between Cherokee tribal leaders and the United States at Hopewell Plantation is depicted in gray (Royce and Thomas 1899).

By 1875, Wilson County ranked first in the state in the production of sorghum, wheat, butter, and horses, and second in grass seed, hay, barley, clover, sheep, hogs, mules, and cedar. Throughout the 1870s, the economy and transportation options of the county were boosted by the arrival of the railroad. The Tennessee and Pacific Railroad was one of the first railroad services to Lebanon, and was acquired in 1877 by the Nashville, Chattanooga and St. Louis Railway (Figure 15). The arrival of rail transportation led to a significantly increased export demand for forest products (Burns 2017; Parks 2014).

Wilson County is known for its cedar glades, which form a unique ecosystem with thin soil over limestone and thick stands of eastern red cedars. However, by the 1930s, the glades had been depleted due to a high demand for cedar for manufacturing purposes, particularly the manufacture of pencils. In the mid-1930s, a Works Progress Administration (WPA) project resettled farmers who had settled on the poor land within the logged cedar flats of Wilson County. The Lebanon Cedar Forest Project replanted thousands of red cedar seedlings and opened as a federally managed public forest with numerous recreational facilities in 1937 (Figure 16). The federal government deeded the land to the state in 1955, and state and federal entities now share management of Cedars of Lebanon State Park (Suddarth 2017).

As the early twentieth century began, Wilson County began to see an increase in industrial development, including in the production of textiles such as woolen blankets, denim, and knitwear. The 1950s and 1960s planning and construction of Interstate 40 routed the new highway directly through the center of the county, bringing significant new opportunities for tourism and traveler-oriented services along the route. On September 19, 1969, Dan Evins established the first Cracker Barrel Old Country Store on Highway 109 in Lebanon, Tennessee. By 1977, Evins and his investors had opened 13 stores throughout the southeast; as of 2023, Cracker Barrel has 661 restaurants in 45 states and remains headquartered in Lebanon (Burns 2017; Cracker Barrel 2020).

25th Civil District

The project area is located in the historic 25th Civil District of Wilson County, situated at the southeast corner of the county along the borders with Davidson and Rutherford Counties (Figure 17) (Clemmons 1907). An 1888 map indicates that by that time, the 25th District villages of Dodoburg (sometimes spelled "Dodoburgh") and Rural Hill had post offices (see Figure 15). Dodoburg is depicted in historic maps as the named community nearest the project area (Rand, McNally & Company 1888). Information published in Goodspeed's 1886 history of Wilson County and the 1907 map indicate that Pleasant Grove Methodist Episcopal Church was the only church in the district around the turn of the century; Pleasant Grove Church is discussed in this report as Charted Property 11 (Clemmons 1907; Goodspeed 1886).

Hamilton Hill School, sometimes referred to as Hamilton Academy, served white children of the 25th district from 1879 until the 1938 construction of a centralized school in Mount Juliet. The school was located on the west side of Central Pike, and both the original building and its circa 1890 replacement were constructed on a tract of land donated by Samuel Hamilton. In 1949, the disused building was repurposed as a gathering spot for a women's civic group known as the Granny Club, succeeded in 1953 by the women's Hamilton Hill Demonstration Club and the men's Community Improvement Club. These civic groups made various improvements to the circa 1890 frame school building, which they used as a meeting space. The building is still extant at 7936 Central Pike, approximately 0.5 mi southeast of the southern terminus of the project area, and was recently determined eligible for listing in the NRHP under Criterion A with significance in education and social history (THC 2020).

The construction of Central Pike is not discussed in available publications detailing Wilson County history, suggesting the pike was likely the result of various improvements to existing paths and roadways over time, rather than a concerted road-building effort by a turnpike company or other entity (Burns 2017; Goodspeed 1886). The road is first depicted on the 1905 topographic map of Nashville and runs from Hermitage, just over the Davidson County line, through Gladeville and south-central Wilson County to the vicinity of Cherry Valley, ending at its junction with Sparta Pike.

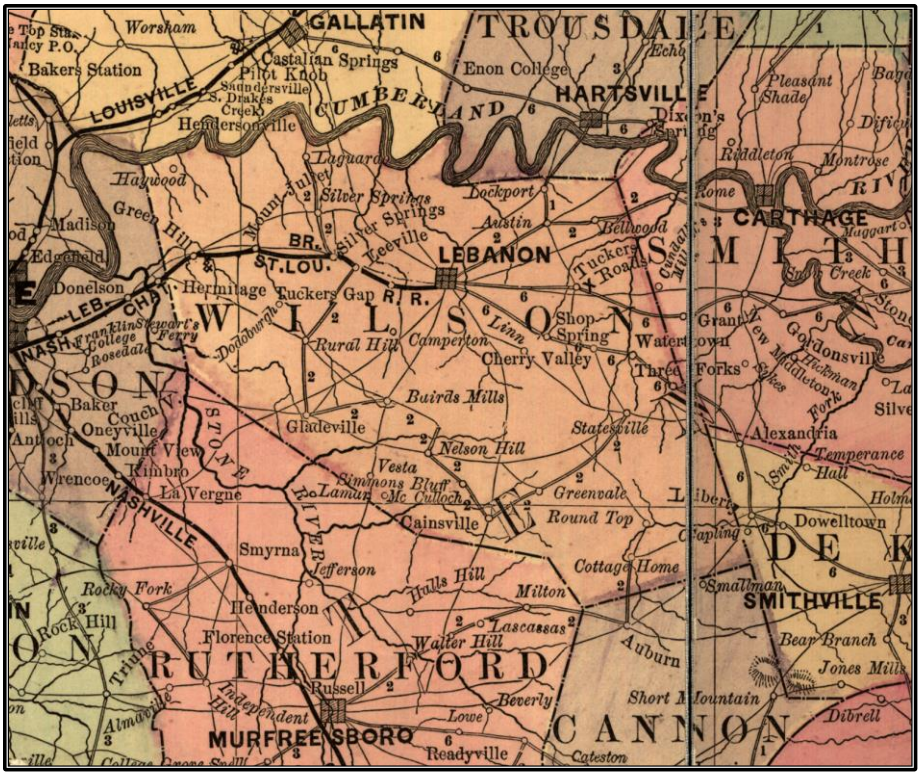


Figure 15. Circa 1888 map showing railroads and post offices in Wilson County (Rand, McNally & Co. 1888).

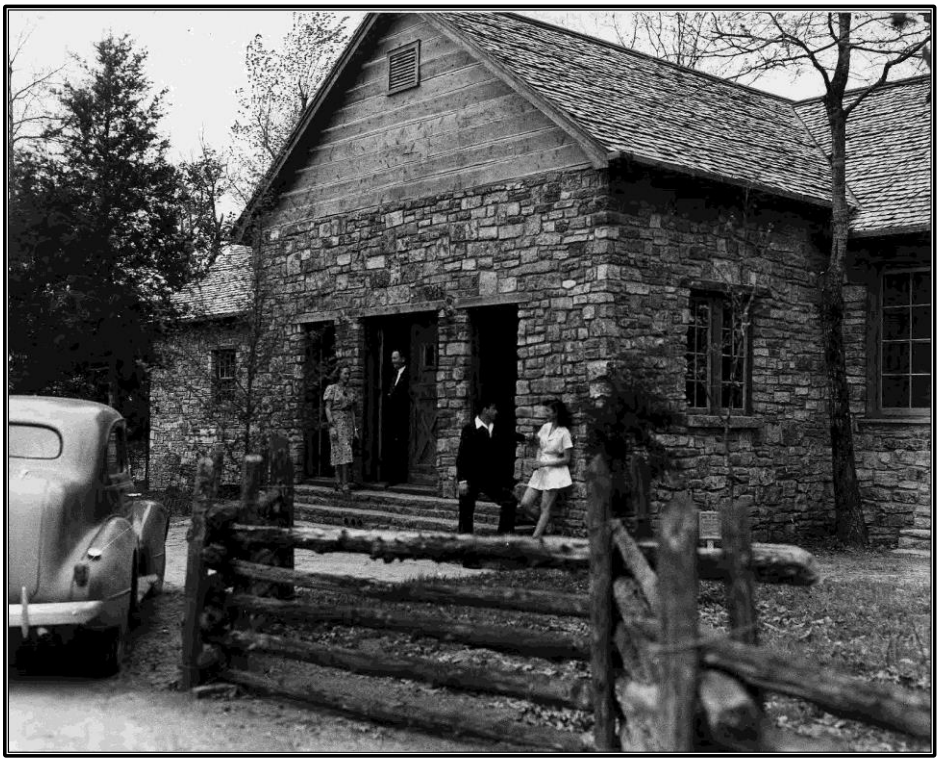


Figure 16. Circa 1938 photograph of the WPA-constructed Park Lodge at the Lebanon Cedar Forest Park (now Cedars of Lebanon State Park). Image courtesy of the Tennessee State Library and Archives (TSLA), RG 82: Tennessee Department of Conservation Photograph Collection, 1937–1967: 21983.

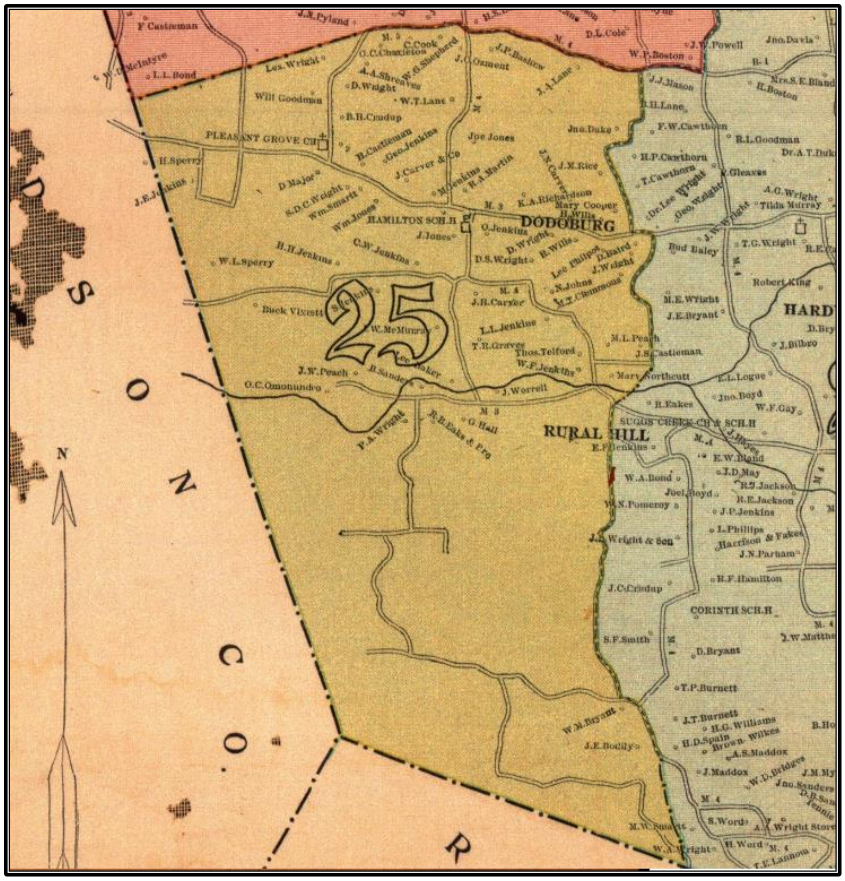


Figure 17. A portion of the 1907 B.H. Clemmons map of Wilson County depicting Central Pike and the vicinity of the project area (Clemmons 1907).

The historic village of Dodoburg appears to have faded into obscurity, and is no longer recognized as a community. The community is not described in broad county histories; mentions of Dodoburg are limited to newspapers from near the turn of the twentieth century, and are generally confined to social columns (Burns 2017; Goodspeed 1886). US Postmaster appointment records indicate the first appointment for the "Dodoburgh" post office was George W. Wright, in 1884, and the last appointment was John W. Wright, May 10, 1900 (National Archives and Records Administration Appointment of Postmasters, 1832–September 30, 1971, Tennessee, Montgomery–Wilson, Volume 44:810, Volume 70:586). A young man from Dodoburg was murdered in 1907, and the trial proceedings received some coverage in local news due to the difficulty of finding an impartial jury (Burns 2017:65). In 1917, newspapers across Tennessee reported that the "thriving little settlement" of Dodoburg was "wiped off the face of the map" by a tornado (*The Tennessean* [*TT*] 1917:14). The storm reportedly leveled numerous homes and buildings belonging to the Philipot, Hibbits, Wells, Gleaves, Baldwin, Carver, Jones, Wright, and Jenkins families. One critical and several minor injuries were reported, as well as significant damages to livestock, timber stands, a sawmill, and telephone and telegraph lines to Mount Juliet (*TT* 1917:14). Dodoburg is mentioned again in a handful of obituaries from the 1920s; research did not reveal mentions of the community after 1935.

Area of Potential Effects

The proposed project is located in Wilson County along SR 265 (Central Pike), and includes improvements to intersecting streets north and south of the existing I-40 overpass, as well as the construction of new connector roads (see Figure 2). The APE was defined in accordance with TDOT

specifications to include all properties immediately adjacent to the proposed project area, which, given the nature of the proposed improvements, encompasses all properties that may be affected by the proposed project.

Records Review

Before entering the field, available surveys, reports, studies, maps, and other data pertinent to the project area were identified and reviewed. Discussion with THC staff and the NPS NRHP viewer indicate there are no NRHP-listed resources in the APE or the immediate vicinity of the project area. Previously surveyed resources in Wilson County are not fully mapped on the THC's website (Figure 18); information regarding previous surveys in the area was provided by THC staff members via email. THC staff indicated two previously surveyed architectural resources are located within the APE: WI-2121 and WI-2097.

THC staff provided multiple previous reports on surveys conducted in the general vicinity of the project area. The previous reports provided related to the construction of and later improvements to the I-40 interchange at SR 171 (Mt. Juliet Road); review of these reports did not indicate an overlap between the previous projects and the APE of the current project.

TDOT staff provided a 2020 report file indicating that a historic architecture assessment was conducted by TDOT historians for an earlier iteration of the current project (TDOT PIN 124884.00). The file included a report entitled *Historic/Architectural Resources Assessment for the Proposed Interstate 40 (I-40) Interchange at State Route 265 (SR-265, Central Pike), Log Mile 2.01, Wilson County*, as well as correspondence with the State Historic Preservation Office (SHPO). The 2020 study area was similar to the current project, but occupied a slightly smaller footprint and did not include some of the connector roads and tie-ins to existing roads as anticipated in the current plans. TDOT recommended there were no NRHP-listed or -eligible properties within the APE for the previous iteration of the project, and the SHPO concurred in a letter dated August 13, 2020 (McIntyre 2020; Seger 2020).

The 1995 Multiple Property Documentation Form (MPDF) for Historic Family Farms in Middle Tennessee (#64500605) identifies three associated historic contexts: Settlement and Subsistence Farming (1780–1950), Expansion and the Market Economy (1850–1900), and Rural Reform and Agriculture (1900–1945). The MPDF appears to have been developed in close association with continuing development of the Tennessee Century Farms project, which identifies farms of 10 acres or larger that have been in continuous use as an income-producing agricultural property by a single family for at least 100 years. The guidelines for evaluation are tailored to properties identified by the Tennessee Century Farms program, and focuses "on complete farm complexes as historical documents of changing agricultural processes and movements, rather than the more typical focus on architecturally distinctive farmhouses…[contributing to] the identification and preservation of rural resources" (Van West 1994:5). The current Tennessee Multiple Property Submission Finding Aid indicates that one property in Wilson County was listed under the MPDF in 1995: the Ida New and William Madison Turner Farm (#95001275), which is located south of Lebanon in central Wilson County and currently operates under the name Wedge Oak Farm (NPS 2022:153). No additional potentially relevant Tennessee Multiple Property Submissions were identified.

Prefield research using the Tennessee Property Viewer combined with determinations made in the field resulted in the recordation and NRHP eligibility evaluation of 21 sites containing historic architectural resources 45 years of age or older.

In addition to the file search, archival research included a review of available maps, used to help identify potential historic structures within the APE for the proposed project (Figure 19).The earliest detailed map available is a 1907 B.H. Clemmons map of Wilson County, which notes names of property owners (see Figure 17) (Clemmons 1907). The following topographic maps and aerial photographs were reviewed:

1905 Nashville, Tennessee, 30-minute series topographic quadrangle (USGS 1905)

1907 map of Wilson County, Tennessee (Clemmons 1907)

1903-1909 map of Rural Delivery Routes, Wilson County, Tennessee (United States Postal Service [USPS] 1903-1909)

1932 Hermitage, Tennessee, 15-minute series topographic quadrangle (USGS 1932)

1940 map of Rural Free Delivery Routes, Wilson County, Tennessee (USPS 1940)

1950a aerial, Number AR1KE0000020140 (USGS 1950a)

1950b aerial, Number AR1NN0000040047 (USGS 1950b)

1951 aerial, Number AR1NN0000040046 (USGS 1951)

1952 Hermitage, Tennessee, 7.5-minute series topographic quadrangle (USGS 1952)

1957 Hermitage, Tennessee, 7.5-minute series topographic quadrangle (USGS 1957a)

1957 aerial, Number AR1VNR000010005 (USGS 1957b)

1968 Hermitage, Tennessee, 7.5-minute series topographic quadrangle (USGS 1968)

1975 aerial, Number AR1VDUT00120009 (USGS 1975)

1968 (Revised [R] 1983) Hermitage, Tennessee, 7.5-minute series topographic quadrangle (USGS 1968 [R 1983])

V. FIELD SURVEY RESULTS

In accordance with TDOT standards, all buildings, structures, and objects 45 years of age or older within the APE for the proposed project were documented during the field survey.

Project plans indicate that the project will utilize or replace the approximately 0.36 mi section of Adams Road extending east from its intersection with SR 265 (see Figures 2 and 3). Adams Road was closed to all traffic at the time of survey due to ongoing construction of large developments, and was therefore inaccessible to CRA personnel. However, prefield research and limited observation during field survey did not indicate that there are extant resources 45 years of age or older along this portion of the project corridor.

In the southwest quadrant of the project area, the project plans call for construction of a new road extending Providence Parkway on the west side of SR 265, and construction of a new connector road between this extension and John Hagar Road (see Figures 2 and 3). At present, the land on which the new roads will be constructed consists of a single, highly irregular, approximately 103-acre privately owned parcel which spans both sides of SR 265. The parcel is hilly and largely forested, with small, cleared sections of pasture near the intersection of Adams Road and SR 265. An abandoned residence immediately fronting SR 265/Central Pike was partially visible from the ROW and is discussed below as Charted Property 17. However, the majority of the property, including the anticipated locations of the new connector roads, could not be observed from the ROW due to the size and topography of the parcel and to dense tree cover along the edge of the ROW. The property's Property Valuation Administrator (PVA) record lists two loft barns and a tobacco barn, but does not list a residence. Historic topographic maps depict one outbuilding located approximately halfway between the residence and the proposed location of the roadway. The possible location of the additional barns could not be determined using aerial imagery or during field survey, and it is unclear whether any of the barns are extant.

The results of the architectural resource survey are presented below and in Table 2, and the locations of the historic architectural resources are mapped in Figures 2 and 3. The information from the survey was supplemented with an examination of archival photographs, historic maps, and aerial photographs to confirm dates of construction and alterations over time. CRA personnel did not have access to the interior of surveyed resources, unless otherwise noted. Only those historic resources listed in the NRHP, previously determined eligible for listing in the NRHP, or which CRA's architectural historians judged to merit further evaluation to determine eligibility based on their age, integrity, architectural character, or other indication of potentially significant associations were subject to a full inventory. One site, the Wright/Tillman Farm,

was selected for a more detailed survey and evaluation and is described below. Evaluations and effects assessments are found after each description of the resources associated with the property. The 20 remaining sites briefly described in Table 2 were excluded from further assessment based on their lack of associative significance, lack of architectural significance, and/or compromised integrity due to modern modifications, including alterations to the historic form, replacement materials, and non-historic additions. Each resource has been assessed to determine if it appears eligible for listing in the NRHP.

In addition to documenting individual properties, CRA also considered the potential for historic districts within the APE. Overall, the area along SR 265/Central Pike within the APE does not present a landscape that represents a discrete or unique historic context. Prior to the construction of I-40, the area retained a distinctly rural and agricultural character, with scattered early twentieth-century residences located along Central Pike between Dodoburg and Pleasant Grove Church. The overall character of the project area was altered drastically by the massive intrusion of I-40. With the construction of the interstate, the area became more accessible, and the large tracts along Central Pike were divided into smaller parcels for residential use. Numerous single-family homes were built in the mid- to late twentieth century, with construction favoring popular types of the era, such as Ranch and Split Level homes. The overall character of the wider surrounding area has changed substantially in more recent decades, as it has been subjected to intensive development to accommodate the sprawl of Nashville and the resulting rapid growth of Mount Juliet. When considered collectively, the APE and the adjacent areas present a mix of historic and modern residences, as well as scattered commercial and religious buildings, that represent many different time periods. Many do not present a discernible architectural style, and those that do generally have integrity issues. Therefore, CRA recommends that the area within and adjacent to the proposed project area does not demonstrate sufficient integrity nor contain a significant concentration of thematically or architecturally related resources to warrant listing in the NRHP as a historic district under Criterion A, B, or C.



Figure 18. THC Viewer street map showing the general vicinity of the project area.

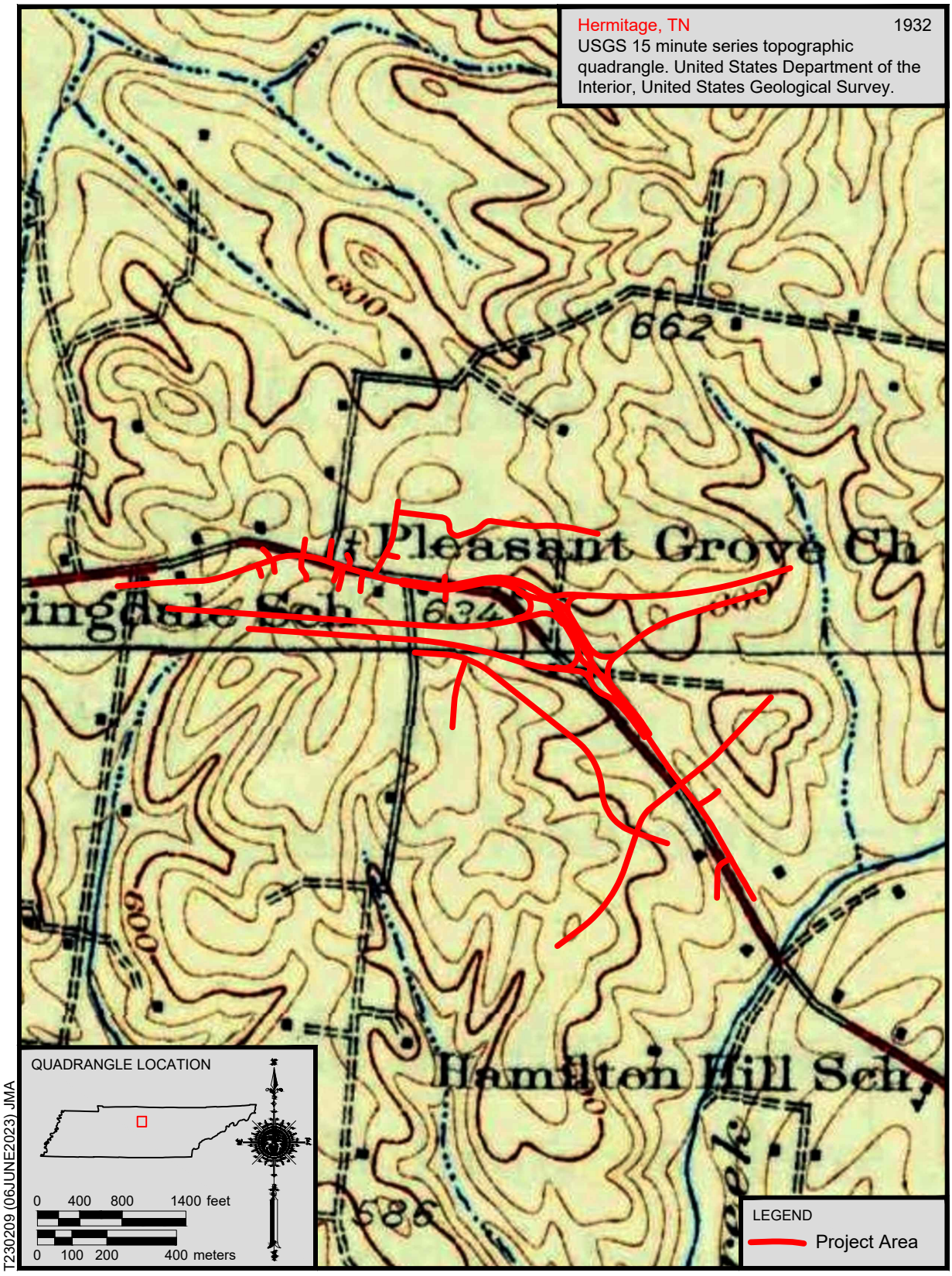


Figure 19. Project area as depicted on a portion of the 1932 Hermitage, Tennessee 15-minute series topographic quadrangle (USGS 1932).

Table 2. Charted Properties.

Property No.	Survey No.	Description	Photograph
1		6180 Central Pike Oriented north, the circa 1900 residence is a frame, two-story, three-bay (ww/d/ww), side-gable house in the Folk Victorian style. The residence is clad in faux-wood composite siding and is sheltered beneath a roof sheathed in asphalt shingles. The foundation was obscured by faux-stone composite cladding. The house features a centered front gable with millwork detailing at the eaves. One exterior brick chimney pierces the roof on the west elevation. The façade is characterized by a central single-leaf entry filled with a wood-panel door set behind a full-light storm door. The entry opens onto a one-story, partial-width porch sheltered by a shed roof supported by four milled posts. The porch features millwork detailing along the eaves. Attached to the rear of the residence is a one-story, shed-roof addition and a one-story, gable-roof ell. The ell is pierced on the west elevation by a double-leaf entry filled with a pair of multi-light French doors that open onto a set of wood steps, and on the east elevation by a single-leaf entry. Visible windows on the residence exhibit one-over-one and two-over-one, double-hung wood sashes, the majority of which are flanked by inoperable louvered shutters. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 1 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not retain sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Furthermore, the building's integrity has been compromised by the incorporation of modern materials, such as the siding and shutters. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 1 is ineligible for listing in the NRHP.	

2		6235 Central Pike Oriented south, the circa 1910 residence is a frame, one-and-one-half-story, four-bay (w/d/w/w), side-gable house. The residence is clad in aluminum siding and rests beneath a roof sheathed in asphalt shingles. The foundation material could not be determined from the ROW. Attached to the north elevation is a rear ell. Adjacent to the east elevation of the ell is a wood-frame arbor. Visible windows on the residence exhibit one-over-one, double-hung wood and vinyl sashes, some with six-over-six, snap-in grids. The façade is characterized by an offset single-leaf entry filled with a replacement door. The entry opens onto a one-story, partial-width porch sheltered by a shed roof supported by five milled posts set on a wood deck. To the left of the entry is a single window bay; to the right of the entry are two single window bays, one of which replaced a second entry. Located behind the house are two modern outbuildings. One outbuilding (Resource A) has a shed roof and is clad in particle board, with a plywood door. The second outbuilding (Resource B) is a modern prefabricated metal shed. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 2 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. Due to the removal of the second entry and the incorporation of numerous replacement elements, such as windows, doors, and siding, the residence no longer reads as a true representation of a locally important type, period, or method of construction. The residence does not possess additional known architectural significance, and is therefore ineligible for listing under Criterion C. Consequently, Charted Property 2 is ineligible for listing in the NRHP.	
3		6266 Central Pike Oriented north, the circa 1977 residence is a frame, one-story, four-bay (w/w/d/ww), side-gable house with a below-grade level. It is clad in vertical plywood siding and stone veneer, and rests beneath a roof sheathed in asphalt shingles. The foundation material could not be determined from the ROW. The roof is pierced by a single exterior end chimney clad in stone veneer. Visible windows exhibit one-over-one, double-hung vinyl sashes. The façade is characterized by an offset single-leaf entry that opens onto a partial-width porch sheltered by a front-gable roof supported by vinyl posts; the porch is lined with a vinyl handrail. On the south elevation of the residence is a rear ell with a gable roof. In the corner of the ell is an elevated wood deck. East of the residence is an above-ground pool with a wood deck. Visible associated outbuildings include a one-story, front-gable outbuilding built sometime prior to 1997. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 3 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. The building displays diminished integrity due to the incorporation of replacement materials, such as windows and porch elements. Therefore, it is ineligible for listing under Criterion C. Additionally, at present, the residence is less than 50 years of age and does not satisfy Criteria Consideration G. Consequently, Charted Property 3 is ineligible for listing in the NRHP.	

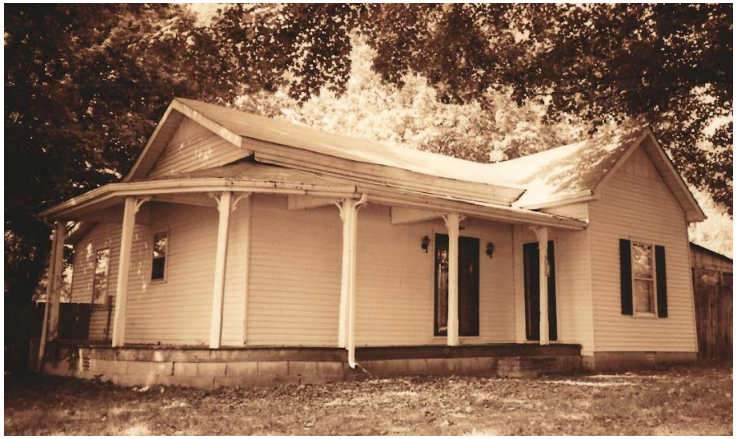
4		6316 Central Pike Oriented north, the circa 1978 residence consists of a frame, one-story, five-bay (ww/ww/d/ww/ww), side-gable house with a below-grade level. The residence is set on a concrete foundation that is clad in stone veneer, is clad in composite siding, and rests beneath a roof sheathed in asphalt shingles. The façade is characterized by an offset single-leaf entry filled with a wood-panel door pierced by a single vertical light. The entry opens onto a partial-width porch sheltered by a prominent front gable supported by square posts set on a concrete deck. The gable field of the porch is clad in composite shingles. Visible windows exhibit one-light sliding sashes. The below-grade level is pierced on the east elevation by two vehicular bays filled with metal roll-up doors. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 4 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Therefore, the building is ineligible for listing under Criterion C. Additionally, at present, the residence is less than 50 years of age and does not satisfy Criteria Consideration G. Consequently, Charted Property 4 is ineligible for listing in the NRHP.	
5		6386 Central Pike Oriented north, the circa 1977 residence consists of a frame, one-story, six-bay (c/c/ww/d/w/w), side-gable house with a below-grade level. It is set on a concrete foundation that is clad in stone veneer, is clad in vinyl siding and stone veneer, and rests beneath a roof sheathed in modern metal panels. Near the west end of the house is a prominent front gable. At the east end of the residence is an integral carport and a carport addition. The roof is pierced by a single interior stone chimney on the integral carport. Unless otherwise noted, visible windows exhibit one-over-one, double-hung vinyl sashes. The façade is characterized by an offset single-leaf entry filled with a wood-panel door pierced by two lights at the top edge, set behind a full-light storm door. The below-grade level of the residence is pierced on the west elevation by a single vehicular bay, a single-leaf entry filled with a modern door pierced by an oval light, and a single window bay containing one-light sliding vinyl sashes. Located east of the residence are two modern outbuildings, which are a circa 2016 prefabricated shed with a gambrel roof, and a circa 2015 open-frame metal carport. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 5 and events or persons of historical importance. Therefore, the site is not eligible for listing in the NRHP under Criterion A or B. The residence does not possess known architectural significance, and has been drastically altered with additions and replacement materials to the point that it no longer reflects the original form or period of construction of the residence. Therefore, it is ineligible for listing in the NRHP under Criterion C. Additionally, at present, the residence is less than 50 years of age and does not satisfy Criteria Consideration G. Consequently, Charted Property 5 is ineligible for listing in the NRHP.	

6		6391 Central Pike Oriented south, the circa 1968 residence is a frame, one-and-one-half-story, four-bay (ww/ww/d/ww), side-gable house in a chalet style. The residence is clad in stone veneer and vinyl siding, and rests beneath a steeply pitched roof sheathed in asphalt shingles. The foundation material could not be determined from the ROW. The façade is characterized by an offset single-leaf entry set behind a two-light storm door, which opens onto a partial-width porch sheltered by a front gable supported by two square posts. Visible windows exhibit one-light sliding vinyl sashes over stone sills. The upper half story on the east elevation is pierced by a double-leaf entry filled with a pair of French doors, which open onto an elevated wood deck. North of the residence there are two outbuildings. One outbuilding is an equipment shed with metal siding and a front-gable roof sheathed in metal panels; along the east elevation is a shed-roof extension. The second outbuilding is a modern prefabricated metal shed with a gambrel roof and a pair of barn-style doors. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 6 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Further, the building's integrity has been compromised by the incorporation of modern materials such as windows and siding. Therefore, the building is ineligible for listing under Criterion C. Consequently, Charted Property 6 is ineligible for listing in the NRHP.	
7		6400 Central Pike Oriented north, the circa 1939 residence is a frame, one-story, five-bay (w/w/w/d/w), side-gable house. The residence is set on a continuous stone foundation, is clad in vinyl siding, and rests beneath a roof sheathed in modern metal panels. Visible windows exhibit one-over-one, double-hung vinyl sashes; façade windows are flanked by shutters. The façade is characterized by an offset single-leaf entry filled with a multi-light door. The entry opens onto a partial-width porch sheltered by a shed-roof extension supported by square wood posts on stone piers. Attached to the south elevation of the residence is a gable-roof rear addition at the southwest corner. Located south of the residence there are at least two outbuildings, which are a front-gable barn with a flat-roof addition that has been converted into a garage, and a second barn that is visible in aerial photographs but not from the ROW. A full view of the property was obscured by mature tree cover and a recently fallen tree along the ROW. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 7 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 7 is ineligible for listing in the NRHP.	

8		6432 Central Pike Oriented north, the circa 1977 residence is a frame, two-story, four-bay (www/wwww/d/www), side-gable, Split-Level house. It is set on a concrete foundation, is clad in vinyl siding and brick veneer, and rests beneath a roof sheathed in asphalt shingles. The roof is pierced on the north slope by a single interior brick chimney. Windows exhibit metal-frame casement sashes. The façade is characterized by an offset, recessed, single-leaf entry filled with an original wood-panel door set behind a full-light storm door; the entry is flanked by vertical single-light sidelights. To the left and right of the entry, the upper and lower levels of the façade are pierced by ribbons of windows; above the entry is a single large, fixed window. To the left of the entry is a front-gable, second-story projection clad in composite shingle siding. Located west of the residence is a circa 2015 one-story, side-gable garage clad in metal panels pierced on the north elevation by a single-leaf entry and three vehicular bays filled with metal roll-up doors. Located east of the residence is a circa 2016 wood gazebo with a pyramidal roof. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 8 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Therefore, it is ineligible for listing under Criterion C. Additionally, at present, the residence is less than 50 years of age and does not satisfy Criteria Consideration G. Consequently, Charted Property 8 is ineligible for listing in the NRHP.	
9		1614 Pleasant Grove Road Oriented east, the circa 1971 residence is a frame, one-story, seven-bay (w/w/d/ww/w/w/w), hip-roof house in the Linear Ranch style. It is set on a concrete foundation, clad in brick veneer, and rests beneath a roof sheathed in asphalt shingles. The north end of the house is slightly below grade and has two levels. Unless otherwise noted, visible windows exhibit one-over-one, double-hung wood sashes over brick sills; façade windows are flanked by inoperable shutters. The façade is characterized by an offset single-leaf entry filled with a replacement door pierced by an oval light, set behind a storm door. The entry opens onto a small porch sheltered by a front gable supported by two pairs of fluted columns set on a brick-clad deck. The front gable has prominent eave returns and is clad in vinyl siding in the gable field. Located west of the residence is a circa 2006 one-story garage and equipment shed with a side-gable roof and metal cladding. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 9 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 9 is ineligible for listing in the NRHP.	

10		1544 Pleasant Grove Road Oriented east, the circa 1945 residence consists of a frame, one-story, five-bay (ww/d/ww/w/w), side-gable house. It is set on a concrete foundation, is clad in brick veneer, and vinyl siding, and rests beneath a roof sheathed in asphalt shingles. A single interior chimney pierces the west slope of the roof. Visible windows exhibit one-over-one, double-hung vinyl sashes with six-over-six, snap-in grids; three-light picture windows; or double-hung, two-over-two-light, wood sashes. The façade is characterized by a single-leaf entry that opens onto a partial-width porch sheltered by a shed-roof extension supported by four square posts set on a concrete deck. Attached to the north elevation of the residence is a gable-roof addition. The south elevation of the residence is pierced by a single-leaf entry that opens onto a porch sheltered by a shed roof. Located southwest of the residence is a circa 1968–1997 one-story outbuilding with concrete-block walls and a gable roof. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 10 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. The building also displays diminished integrity due to the incorporation of replacement elements such as windows. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 10 is ineligible for listing in the NRHP.	
11		6485 Central Pike Pleasant Grove United Methodist Church The Pleasant Grove Methodist Church congregation appears to be among the earlier church congregations in the historic 25th Civil District of Wilson County, and is the only church listed in the district in an 1886 county history (Goodspeed 1886). Historic maps suggest the original church building was located elsewhere; the 1905 topographic map depicts the church as clearly located at the northeast intersection of Central Pike and John Wright Road, while the 1907 map of Wilson County depicts the church at the northwest side of the intersection of Central Pike and either Pleasant Grove Road or John Wright Road (Clemmons 1907; USGS 1905). The 1932 topographic map depicts the church at its present location (USGS 1932). Therefore, the present church building was likely constructed between 1905 and 1931. Oriented south, the one-story, one-bay (dd), front-gable church rests on stone piers with concrete-block infill, is clad in composite siding, and is sheltered by a steeply pitched roof sheathed in asphalt shingles. A one-story rear addition is set on a concrete-block foundation, is clad in vinyl siding, and rests beneath a flat roof. The roof of the main church block is pierced on the ridgeline by a four-sided, pyramidal-roof steeple that houses a bell. Sanctuary windows exhibit six-over-six, double-hung wood sashes with textured, amber-colored glass. Windows on the rear addition exhibit one-light sliding vinyl sashes. The façade of the church is characterized by a double-leaf entry filled with a pair of modern doors pierced by multi-light stained glass panels. The door is flanked by grooved pilasters and capped with a broken-arch pediment. The entry opens onto a recessed porch sheltered by a front gable supported by four fluted columns. On the east elevation, the addition extends beyond the plane of the main church block and is pierced on its south elevation by a single-leaf entry that opens onto a concrete porch sheltered by a shed roof. Associated objects and outbuildings include a church sign set on an L-shaped brick base and a modern shed clad in vertical-board siding and resting beneath a gable roof sheathed in asphalt shingles. **NRHP Evaluation:** Not Eligible. Criteria Consideration A states that a religious property deriving primary significance from architectural or artistic distinction or historical importance may be eligible for listing in the NRHP (NPS 1990). While the mid- to late nineteenth-century formation of the Pleasant Grove Methodist congregation reflects important settlement patterns of the same period in this area of Wilson County, Charted Property 13 more accurately reflects the church's twentieth-century history. Research did not reveal the church to be associated with events or persons of twentieth-century historical significance. The	

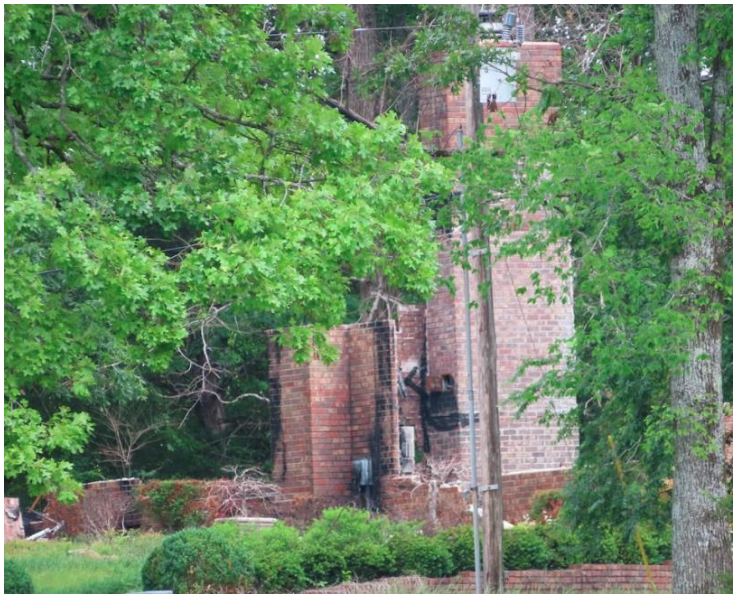
		building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Consequently, Charted Property 11 does not satisfy Criteria Consideration A, and is ineligible for listing in the NRHP.	
12		6585 Central Pike Oriented south, the circa 1944 residence consists of a frame, one-and-one-half-story, three-bay (w/d/w), side-gable Bungalow. It is set on a concrete-block foundation, is clad in vinyl siding, and rests beneath a roof sheathed in asphalt shingles. Windows exhibit original six-over-six, double-hung wood sashes. The façade is characterized by a central single-leaf entry filled with a six-light, wood-panel door, set behind a two-light storm door. The entry opens onto a full-width porch sheltered by a shed-roof extension supported by pyramidal wood posts set on brick piers. Located northeast of the residence is a one-story outbuilding (Resource A) clad in aluminum siding and resting beneath a gable roof of metal panels, likely built in the 1950s. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 12 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Further, the building's integrity has been compromised by the incorporation of modern materials such as vinyl siding. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 12 is ineligible for listing in the NRHP.	

13	WI-2121	6600 Central Pike Charted Property 13 was previously recorded as “Dr. Quill’s House.” The THC survey file for the property consists only of two photographs labeled as such (see bottom photograph at right), and does not include notes or a survey date. Research did not reveal additional information regarding a Dr. Quill or Quill family in Mount Juliet or Wilson County. Oriented north, the circa 1925 residence consists of a frame, one-story, two-bay (w/w), gable-and-wing house. It is set on a stone foundation, is clad in aluminum siding, and rests beneath a roof sheathed in asphalt shingles. Windows exhibit one-over-one, double-hung vinyl sashes with six-over-six, snap-in grids. The façade is characterized by a single-leaf entry piercing the east elevation of the front-gable projection, filled with an original single-light wood door. The entry opens onto a wrap-around porch sheltered by a shed roof supported by square posts with milled brackets. Attached to the south elevation of the residence is a shed-roof addition set on a concrete-block foundation. Attached to the west elevation is an enclosed shed-roof porch. Located east of the residence is a modern prefabricated shed with a gambrel roof. Located east of the residence is a large modern outbuilding clad in metal panels. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 13 and events or persons of historical importance. Therefore, the site is not eligible for listing in the NRHP under Criterion A or B. Due to the introduction of modern replacement materials, such as vinyl windows and siding, the residence does not retain sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction. The residence does not possess additional known architectural significance, and is therefore ineligible for listing under Criterion C. Consequently, Charted Property 13 is ineligible for listing in the NRHP.	 

14		Central Pike Bridge over I-40, LM 2.24 Bridge #95I00400001 The circa 1963 bridge is a two-lane, cast-in-place concrete, four-span bridge that conveys SR 265/Central Pike over I-40. The 2021 bridge inventory records an out-to-out width of 34.4 ft and a total length of 236.1 ft. The bridge has a concrete deck with a simple, low, concrete railing. The substructure consists of three concrete bents with arched concrete spandrels. The north and south abutments display concrete embankment protection. **NRHP Evaluation:** Not Eligible. The bridge is a type included in the Program Comment for post-1945 concrete and steel bridges. Research did not reveal the bridge to be associated with a significant event or person. Concrete bridges of this type are common roadside engineering structures found throughout the region, and the bridge at log mile 2.24 on SR 265/Central Pike is not a very early or particularly important example of its type in Tennessee, and displays no distinctive architectural or engineering features that depart from standard designs for bridge types covered by the program comment. Therefore, Charted Property 14 is ineligible for listing in the NRHP.	
15		7061 John Hagar Road Oriented north, the circa 1964 residence is a frame, one-story, four-bay (w/d/ww/w), side-gable Linear Ranch house. It is set on a concrete foundation, is clad in brick veneer, and rests beneath a roof sheathed in asphalt shingles. A single exterior brick chimney pierces the roof on the façade. Visible windows exhibit one-over-one, double-hung vinyl sashes over brick sills. The façade is characterized by an offset single-leaf entry filled with an original wood door with fanlight set behind a two-light storm door. The entry opens onto a partial-width porch sheltered by a front gable supported by two metal posts with decorative scrollwork. The porch exhibits a wrought iron railing. The view of the residence from the ROW was heavily obscured by topography, mature tree cover, and vegetative overgrowth; no further details of the residence could be discerned. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 15 and events or persons of historical importance. Therefore, the site is not eligible for listing in the NRHP under Criterion A or B. Visible portions of the residence do not suggest that it displays sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction. The residence does not possess additional known architectural significance. Therefore, available information suggests the building is ineligible for listing under Criterion C. Consequently, Charted Property 15 is ineligible for listing in the NRHP.	

16		7065 John Hagar Road Oriented north, the circa 1972 residence is a frame, one-story, cross-gable Linear Ranch house. It is set on a concrete foundation, clad in brick veneer, and rests beneath a roof sheathed in asphalt shingles. Visible windows exhibit double-hung vinyl sashes with simulated divided lights. The view of the residence from the ROW was heavily obscured by topography, mature tree cover, and vegetative overgrowth; no further details of the residence could be discerned. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 16 and events or persons of historical importance. Therefore, the site is not eligible for listing in the NRHP under Criterion A or B. Visible portions of the residence do not suggest that it displays sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction. The residence does not possess additional known architectural significance. Therefore, available information suggests the building is ineligible for listing under Criterion C. Consequently, Charted Property 16 is ineligible for listing in the NRHP.	
17		7257 Central Pike Charted Property 17 consists of an abandoned residence which first appears on a 1905 topographic map (USGS 1905). The property's PVA record does not describe a residence, but lists two loft barns and a tobacco barn on the approximately 105-acre property. No additional resources were visible from the ROW. The possible location of the additional barns could not be determined using aerial imagery or during field survey, and it is unclear whether any of the barns are extant. Oriented east, the residence is a frame, one-and-one-half-story, front-gable house. It is set on stone piers, is clad in weatherboard siding, and rests beneath a roof sheathed in metal panels. A single interior chimney pierces the roof on the north slope. The façade is characterized by two single-leaf entries that open onto a full-width porch sheltered by a shed roof supported by wood posts. The house is abandoned and in an extreme state of disrepair. All windows and doors have been removed from visible fenestration. Much of the residence was obscured by vegetative overgrowth; no further details were visible from the ROW. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 17 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. Due to loss of materials and finishes such as roofing, windows, doors, and siding, the residence does not retain sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction. The residence does not possess additional known architectural significance, and is therefore ineligible for listing under Criterion C. Consequently, Charted Property 17 is ineligible for listing in the NRHP.	

18	WI-2097	7110 Central Pike Charted Property 18 was previously recorded as "The Hickerson House." The THC survey file for the property consists only of two photographs labeled as such (see bottom photo at right), and does not include notes or a survey date. Research did not reveal additional information regarding a Hickerson family in Mount Juliet or Wilson County. The property's PVA record lists a construction date of 1952, and the residence first appears on a 1952 topographic map (USGS 1952). Oriented northeast, the residence is a frame, one-story, seven-bay (w/w/d/w/wdw/w/w), side-gable house. It is clad in vinyl siding and rests beneath a roof sheathed in asphalt shingles. The center portion represents the original house, with a small addition on the northwest elevation, and a larger circa 2000 addition at the southeast elevation. The foundation material of the original house could not be determined from the ROW; THC survey photos depict a stone foundation. The foundation of the southeast addition is concrete block. An interior brick chimney pierces the roof on the northeast slope; this was an exterior end chimney on the southeast elevation of the original house but has been enclosed by the addition. A second chimney pierces the roof of the original house on the southwest slope. Unless otherwise noted, visible windows exhibit one-over-one, double-hung vinyl sashes with simulated divided lights. The façade of the original house is characterized by a central single-leaf entry filled with a replacement door pierced by an oval light, set behind a full-light storm door, flanked by five-light sidelights, with a four-light transom. The entry opens onto a partial-width porch sheltered by a shed roof with an unusual trapezoidal central section, supported by four Tuscan columns set on a concrete deck. The façade of the northwest addition is pierced by a modern octagonal light; the façade of the southeast addition is pierced by a single-leaf entry filled with a modern single-light door; the entry opens onto an unsheltered wood porch. Located behind the house are at least three outbuildings, which are a small equipment shed clad in vertical-board siding and stone veneer that likely dates to the 1950s, a large circa 2005 garage clad in vinyl siding, and a modern prefabricated shed clad in metal panels. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 18 and events or persons of historical importance. Therefore, the site is not eligible for listing in the NRHP under Criterion A or B. The residence does not possess known architectural significance, and has been altered with additions and replacement materials to the point that it no longer reflects the original type, period, or method of construction of the residence, and is therefore ineligible for listing under Criterion C. Consequently, Charted Property 18 is ineligible for listing in the NRHP.	 

19		7445 Central Pike A gable-roof dwelling at this location, oriented west, is apparent in recent aerial photographs and on topographic maps dating back to 1968. However, the house appears to have been largely demolished and only certain portions remain standing, some of which show evidence of a fire event. Access to the property was not granted and, with limited visibility from the ROW, no further information about the existing structure could be determined at the time of the survey. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 19 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not possess known architectural significance, and visible elements suggest that the majority of the residence has been destroyed. Therefore, the building is ineligible for listing under Criterion C. Consequently, Charted Property 19 is ineligible for listing in the NRHP.	
20		7430 Central Pike The earliest map evidence of a house at this location appears on a 1945 topographic map. A review of historic aerial photographs indicates that the original house on the property is not extant. The older portion of the current house is on the north end, constructed sometime between 1958 and 1980; the form and materials of the older portion suggest it dates to the 1960s. The house was expanded circa 2007 with a large two-story addition on the south end. Oriented southeast, the circa 1960 residence consists of a one-story house in the Courtyard Ranch style with a later two-story addition on the south elevation. The residence is frame, eight-bays (ww/w/w/dd/w/d/ww/ww), and cross-gabled. It is set on a concrete foundation, clad in stone veneer, board-and-batten siding, and vinyl siding, and rests beneath a roof sheathed in asphalt shingles. Visible windows vary and include one-over-one, double-hung wood sashes, and one-over-one, double-hung vinyl sashes. The façade is characterized by an offset double-leaf entry filled with a pair of multi-light French doors and a single-leaf entry. The entries open onto a porch that is inset between the two prongs of the courtyard U, sheltered by a shed roof supported by two square posts. Between the two entries is a multi-light picture window. The façade of the south prong of the U is pierced by a vinyl picture window with a multi-light, snap-in grid. A brick fire pit is located north of the residence; additional outbuildings were not visible from the ROW. **NRHP Evaluation:** Not Eligible. Research did not reveal an association between Charted Property 20 and events or persons of historical importance. Therefore, the site is not eligible for listing under Criterion A or B. The building does not display sufficient distinctive characteristics to function as a true representation of a locally important type, period, or method of construction, and does not possess additional known architectural significance. Further, the building's integrity has been compromised by a large south addition and the incorporation of modern materials such as windows. Therefore, it is ineligible for listing under Criterion C. Consequently, Charted Property 20 is ineligible for listing in the NRHP.	

Inventoried Properties

Inventoried Property A

Photographs: Figures 21 and 22; Table 3

Maps: Figures 2, 3, and 20

Quad: Hermitage, TN 1957 (Revised 1983)

Lat: 36.170920°

Long: -86.530540°

Property Address: 180 and 335 Tillman Drive
Mount Juliet, Tennessee 37122

Owner Information: Terri and David Minton/CET Strategic Realty Partners LLC
335 Tillman Drive
Mount Juliet, Tennessee 37122

Parcel Number: 095 097 02200 000 2023; 095 097 02201 000 2023; 095 076 05100 000 2023

Deed Book/Page: 2180/583; 959/1876

Construction Date: 1850–1989

Description: Inventoried Property A consists of a collection of residential and agricultural parcels collectively referred to as the Tillman Farm, and historically associated with the Wright family. The farm consists of two residences, four barns, and small associated outbuildings situated on approximately 130 acres across three tracts (Figures 20–22). A cemetery historically associated with the Wright family is centrally located within the farm; the cemetery is now located on a tax-exempt, approximately 0.4-acre parcel, but was likely established on land owned by the Wrights. The majority of the extant resources are located along Tillman Drive, which is signed as a private drive and extends approximately 0.34 mi east and north of SR 265/Central Pike. The land is in use as an active cattle farm, and consists of numerous cleared pastures with small stands of trees. Access to the property was provided by current property owner David Minton, who escorted CRA personnel to areas of the property with extant resources.

While the deed lineage of the property is complicated, with numerous twentieth-century subdivisions and transferals among the Wright family, research at the Wilson County Register of Deeds (WCRD) indicates that the Wright family owned large tracts of land in the vicinity of Inventoried Property A from the mid-1800s until the mid-1970s. The circa 1850 establishment of the Wright Cemetery suggests the Wrights owned that land at the time. A review of records, including Goodspeed's history of Wilson County and birth and death records and federal census data available on Ancestry.com, indicates that that Lewis Wright (1794–1872) came from Virginia to the 25th District of Wilson County around 1809, and married Temperance Eddings Wright (1799–1842) in Wilson County in 1821. The couple had 11 children. Goodspeed writes one son, George W. Wright (1838–1907), operated a steam saw and grist-mill in the 25th District, but lived in the 24th (Goodspeed 1886).

The earliest recoverable deed for a tract related to Inventoried Property A dates to 1899 and records the conveyance of 50 acres from J.D. Wright, Effie Wright, and W. U. Wright to Annie Wright (WCRD Deed Book [DB] 58:17).The relation between Wilson County patriarch Lewis Wright and Hollis Wright (1804–1850), the first person buried in the Wright Cemetery, or Annie Wright, could not be traced successfully.

Although smaller tracts were sold in and out of the family over the course of the twentieth century, the majority of the land appears to have been transferred among descendants of William Ulexus (Lex) Wright and Annie (née Alexander) Wright (married 23 April 1895). A 1951 deed indicates that upon the death of

Annie and Lex, at least three tracts in their possession were conveyed to their sons, Guy and Alonzo Wright; shortly thereafter Guy conveyed his interest to Alonzo and his wife, Gladys (WCRD DB 134:154). In 1966, Charles "Sonny" Tillman and his wife, Norma Mott Tillman, began purchasing portions of the Wright property, and continued purchasing surrounding tracts until at least 1984 (WCRD DB 174:609, DB 299:172, DB 389:643). Newspaper articles and information from the current property owner indicate that Sonny and Norma built a residence (described below as Resource D) and began farming the property in 1968. Their daughter and son-in-law, Terri and David Minton, built their own residence (Resource E) on the property in 1989 (Humbles 2023; David Minton, personal communication 2023). In 2022, ownership of four parcels containing a total of eight tracts was transferred from Charles Sonny Tillman to a limited liability corporation, care of his daughter, Terri Minton (WCRD DB 2180:583).

Extant resources associated with Inventoried Property A include the circa 1850 Hollis Wright Cemetery (Resource A), two circa 1900–1950 barns (Resources B and C), a circa 1968 Linear Ranch House (Resource D), a circa 1989 residence (Resource E), and two collapsed barns (Resources F and G).

A circa 1920–1932 American Bungalow fronting SR 265 is also located on a large parcel owned by the Mintons and used as part of the contemporary farming operation (see Figure 20). However, research at the WCRD indicates that, although the land containing the bungalow was owned by the Wright family in the early twentieth century, it was sold to P.L. Carver at public sale in 1914 (WCRD DB: 75:84) and owned by William Murray and Annie Smith Lester from 1931 until 1967 (WCRD DB 176:255). Therefore, it is likely that either Carver or the Lesters constructed the bungalow, which was purchased by the Tillmans in 1984 and is presently in use as a rental property (WCRD DB 389:643). As research did not reveal a historical association between the bungalow and members of the Wright or Tillman families, the bungalow is discussed separately as Charted Property 12.

The current property owner stated that a small, one-story residence with no indoor plumbing was once located just east of Tillman Drive, and was removed in advance of the construction of his residence (Resource E). A residence is first depicted at this location on a 1957 topographic map, and does not appear on the 1932 topographic map (USGS 1932, 1957a). Topographic maps indicate that an additional residence fronting Pleasant Grove Road was located in the northwest quadrant of the farm; aerial imagery suggests the residence was torn down circa 2010. Google Street View imagery depicts the residence as a one-story, vernacular, L-shaped residence with a wide L-shaped porch, two interior brick chimneys, and a substantial rear ell. The 1907 map of Wilson County does not exactly match representations of area roadways and structures as depicted in the 1905 topographic map of Nashville, nor do the road patterns closely align with what is depicted in the 1932 Hermitage quadrangle (Clemmons 1907; USGS 1905, 1932). Based on the 1907 map, it is possible that the dwelling fronting Pleasant Grove Road was constructed by that time and the home of D. Wright or A.A. Shreaves (see Figure 17). Given the relative size of this residence and its prominent frontage along Pleasant Grove Road, it is more likely that it served as the primary Wright residence in the early twentieth century than the small residence that occupied the current footprint of Resource E.

Extant individual resources presently located at Inventoried Property A are described and individually evaluated in Table 3. An overall NRHP evaluation of the Wright/Tillman farmstead is provided in the NRHP Evaluation section below.

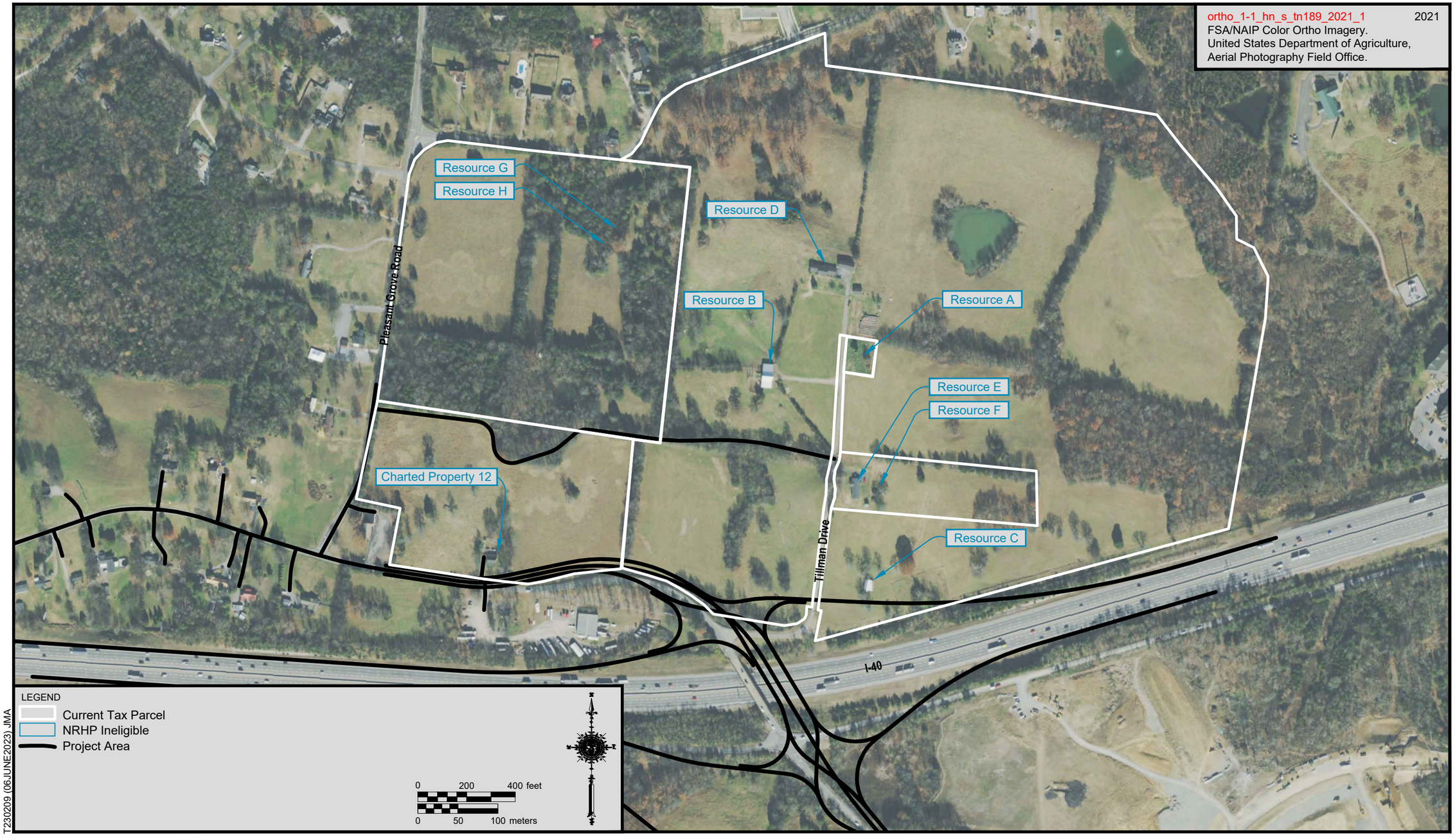


Figure 20. Inventoried Property A: Aerial photograph depicting the project area, current tax parcel boundaries, and the location of surveyed resources associated with the Tillman Farm.

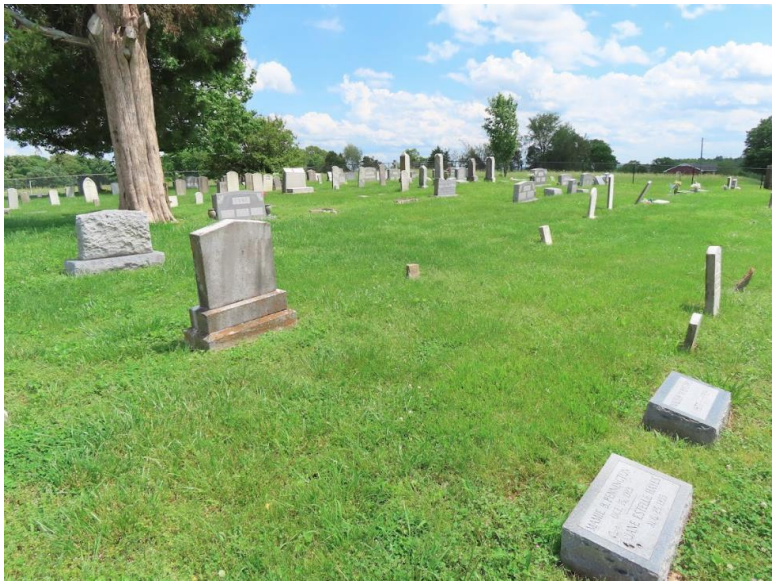


Figure 21. Inventoried Property A: Overview of the property, looking north along Tillman Drive towards the barn (Resource C) and circa 1989 residence (Resource E).



Figure 22. Inventoried Property A: Overview of the property, looking north along Tillman Drive from near the cemetery (Resource A) towards the circa 1968 residence (Resource D).

Table 3. Inventoried Property A: Extant Resources.

Resource	Description	Photograph
A	Resource A consists of the Hollis Wright Cemetery, sometimes referred to simply as the Wright Cemetery. Field survey and a review of cataloged memorials listed on FindAGrave.com indicate the cemetery is active and contains approximately 256 marked burials. The earliest marked burial is that of Hollis Wright, Sr. (1780–1850). Approximately 36 burials date to the nineteenth century, and approximately 209 burials occurred in 1973 or earlier. The cemetery is well-maintained and the great majority of the markers are intact and in good condition. Most are double or single granite or marble tablets with traditional motifs, with five low obelisks clustered near the center. Markers are arranged in rows running north-south, and are generally oriented west. Modern and older burials are intermixed, with no clearly delineated original or historic section of the cemetery. Common surnames include Wright (57), Lane (19), Goodman (16), McWhirter (11), Gleaves (10), and Oliphant (10). The cemetery is surrounded by a chain-link fence, and a wrought-iron arch reading "Hollis Wright Cemetery" rests upon two pillars clad in stone veneer, marking the entry gate at the northeast corner. **NRHP Evaluation:** Not Eligible. The National Register Criteria Considerations stipulate that for a burial site or cemetery to be considered individually eligible for the NRHP, it must satisfy either Criteria Consideration C or D (NPS 1990). The Hollis Wright Cemetery is not known to be the only extant site associated with any figure of outstanding historical importance, and therefore does not satisfy Criteria Consideration C. Research did not indicate that the Hollis Wright Cemetery includes the graves of any persons of transcendent importance, nor suggest that the cemetery derives its primary significance from age, distinctive design features, or association with historic events; therefore, the cemetery does not satisfy Criteria Consideration D. Consequently, Resource A is ineligible for individual listing in the NRHP.	 

B	Resource B is a circa 1925–1940, east-oriented, front-gable, three-portal, post-frame barn with asymmetrical shed-roof wings extending along the north and south elevations. Aerial imagery and information from the current property owner indicate the wings were added after Sonny Tillman purchased the property in the 1960s. The barn is clad in vertical board siding and sheltered by a metal-panel roof. Three portals provide access to the main drives in the main block of the barn; each is filled with a double-leaf board door. Additional portals to the side drives and hay loft are uncovered. Limited interior survey indicates that the main block is divided into multiple areas for stock processing and equipment storage, and that the south wing is outfitted with individual livestock stables. **NRHP Evaluation:** Not Eligible. Resource B does not possess known associative or architectural significance. Due to the substantial additions, the barn no longer reflects its original form. Resource B is therefore ineligible for individual listing in the NRHP under Criterion A, B, or C.	
C	Resource C is a circa 1925–1940, south-oriented, front-gable, two-portal, post-frame barn with a shed-roof wing extending along the east elevations. The barn is clad in vertical board siding and sheltered by a metal-panel roof. Portals are uncovered; the south elevation is pierced by three entry portals at grade and by an additional sheltered portal providing access to the hay loft. One portal pierces the north elevation. The interior of the barn is simply configured, consisting of an open floor area for stock shelter and feeding, and a partial-width suspended manger that extends below the hayloft. **NRHP Evaluation:** Not Eligible. Resource C does not possess known associative or architectural significance, and is therefore ineligible for individual listing in the NRHP under Criterion A, B, or C.	

D	Resource D is a circa 1968, one-story, seven-bay (w/w/d/w/w/w/w), side-gable, frame Linear Ranch house oriented south. The residence rests on a basement foundation, is clad in a brick veneer, and is sheltered by an asphalt-shingle roof. Windows throughout the residence are replacement, double-hung, one-over-one-light vinyl sashes with simulated divided lights. The façade displays an off-center, single-leaf primary entry containing a panel door with no lights, flanked by partial-height, three-light sidelights. The entry opens onto a partial-width porch sheltered by an extended eave supported by Tuscan columns. The east and west elevations are each pierced by two windows. The north (rear) elevation was not clearly visible from the path of access granted by the property owner. Additional resources associated with the residence include a circa 1968 one-story, five-bay (g/g/g/w/w), side-gable carport building and a circa 1975–1997 one-story, two-bay (d/g), front-gable detached garage. **NRHP Evaluation:** Not Eligible. Resource D does not possess known associative or architectural significance. The residence is therefore ineligible for individual listing in the NRHP under Criterion A, B, or C.	
E	Resource E is a circa 1989, one-story, seven-bay (w/ww/d/w/w/w/ww), side-gable, frame residence oriented west. The residence rests on a basement foundation, is clad in a brick veneer, and is sheltered by an asphalt-shingle roof. Windows throughout the residence are double-hung, one-over-one-light vinyl sashes. The façade displays an off-center, single-leaf primary entry containing a panel door with no lights. The entry opens onto a three-bay, front-gable porch with a poured-concrete deck and fluted vinyl column supports. The north elevation is pierced by an entry containing a nine-light panel door. The south elevation is pierced by a window containing a tripartite window with an arched one-light transom. The east (rear) elevation is pierced by seven windows, one of which contains a one-light fixed sash. Additional resources associated with the residence include a circa 1975–1997, three-bay (w/dd/w), front-gable frame shed and an elevated wood play structure. **NRHP Evaluation:** Not Eligible. Resource E is less than 50 years of age and does not possess known exceptional associative or architectural significance. The residence therefore does not satisfy Criteria Consideration G, and is ineligible for individual listing in the NRHP under Criterion A, B, or C.	

F	Resource F is a circa 1925–1955 post-frame, shed-roof building oriented south, clad in vertical board siding and sheltered by a metal-panel roof. The shed is open along the south and east elevations, and displays no fenestration at the west and north (rear) elevations. The property owner stated that the building was used as a stock shelter, and once had an eastern portion that functioned as an adjacent milking parlor. Aerial imagery suggests the milking parlor was removed after 2010. **NRHP Evaluation:** Not Eligible. Resource F does not possess known associative or architectural significance. The building no longer reflects its original form, due to the removal of the milking parlor, and is therefore ineligible for individual listing in the NRHP under Criterion A, B, or C.	
G	Resource G consists of a collapsed barn. Remnants suggest the barn was a post-frame barn with vertical board siding and a standing seam roof. No further information about the age, form, or materials of the barn could be determined in the field. **NRHP Evaluation:** Not Eligible. Resource G does not possess known associative or architectural significance. Due to near-total collapse, the building no longer reflects its original form. Therefore, Resource G is ineligible for individual listing in the NRHP under Criterion A, B, or C.	

H	Resource H consists of a collapsed barn. Topographic maps suggest the barn was built prior to 1952. Remnants suggest the barn was clad in vertical board siding and sheltered by a standing seam roof. No further information about the age, form, or materials of the barn could be determined in the field. **NRHP Evaluation:** Not Eligible. Resource H does not possess known associative or architectural significance. Due to total collapse, the building no longer reflects its original form. Therefore, Resource H is ineligible for individual listing in the NRHP under Criterion A, B, or C.	

NRHP Evaluation: Not Eligible. The local agricultural significance and integrity of Inventoried Property A when considered as a farmstead is discussed below. Research did not reveal a strong association between Inventoried Property A and other events of local, regional, or national historical significance; therefore, Inventoried Property A is not eligible for listing in the NRHP under Criterion A.

Although the Wright family appears to have been prolific in this area of Wilson County, research did not reveal Wright family members to be of local, regional, or national historical importance. Research did not reveal later owners, farmers, or known tenants of the property, including Charles "Sonny" and Norma Tillman and Terri and David Minton, to be of local, regional, or national historical importance. Therefore, Inventoried Property A is not eligible for listing in the NRHP under Criterion B.

As discussed in Table 3, none of the extant resources associated with Inventoried Property A are known to possess architectural significance that would merit individual listing in the NRHP under Criterion C.

When considered collectively, the older agricultural resources associated with Inventoried Property A—the barns (Resources B, C, G, and H), the stock shed and milking parlor (Resource F), and the Wright family cemetery (Resource A)—reflect typical components of a Middle Tennessee family farmstead. The 1994 Historic Family Farms in Middle Tennessee MPDF provides a framework for assessment of farms that are eligible for the Tennessee Century Farms program, which recognizes income-producing farms 10 acres or larger that have been cultivated on the same family-owned land for at least 100 years, and for which at least one family member and Tennessee resident still serves as an active manager (Van West 1994:3–4). The MPDF identifies four inquiries for the Settlement and Subsistence Farming (1780–1850) historic context that may be useful in evaluating or establishing the significance of a farm dating to this period. The inquiries focus on whether the farm dates to the period of initial settlement for the region or county, whether community institutions (such as post offices, schools, or churches) were built on or located at the farm, whether the farm's initial commodities serve as a representative example of the general trends in Tennessee agriculture from the period, or whether the farm's initial commodities serve as an example unique or experimental agricultural production for the period (Van West 1994:8–12).

Inventoried Property A does not qualify as a Tennessee Century Farm, having transferred from the Wright family to the Tillman family in the mid-twentieth century. Based on the cemetery's establishment date, it is likely that the Wright farm was established prior to 1850, although no additional information was recovered concerning the Wright farm, including the location of buildings, possible modifications to the landscape, or the commodities produced. The establishment of the farm likely postdates the 1799 establishment of Wilson County, no community institutions are known to have been established on the property, and the initial commodities of the Wright family farm are not known. Therefore, available information does not indicate that Inventoried Property A demonstrates significance in any of the areas identified in the MPDF for farms established between 1780 and 1850, and the property is not eligible for listing under the Historic Family Farms in Middle Tennessee Multiple Property listing.

Nonetheless, large farmsteads dating to the late nineteenth and early twentieth centuries are becoming increasingly rare in Middle Tennessee and Wilson County—particularly in the areas near the Davidson County line and interstate or major arterial highways, due to the rapid expansion of the Nashville metro area and subsequent suburbanization of rural areas. The location and form of the original primary residence or residences associated with the property could not be determined with certainty. It is, however, quite clear that the residence is no longer extant. The majority of the extant agricultural buildings do not reflect their initial period of construction due to additions (Resource B), removal of portions of the building (Resource F), or severe damage due to collapse (Resources G and H). The two residences (Resources D and E) represent modern intrusions within the built environment of the farmstead, resulting in a landscape that does not reflect the early to mid-nineteenth-century agricultural significance of the Wright family farmstead. Therefore, lacking integrity, Inventoried Property A is not eligible for listing in the NRHP under Criterion A or C as a historic farmstead.

Consequently, CRA recommends that Inventoried Property A is not individually eligible for inclusion in the NRHP under Criterion A, B, or C.

Determination of Effect: N/A.

Section 4(f) Assessment: N/A.

VI. CONCLUSIONS

In May 2023, CRA completed a historic architectural assessment for the proposed I-40 interchange project in Wilson County, Tennessee. The project calls for the construction of a new interchange at the present crossing of SR 265 (Central Pike) and I-40. This assessment was conducted by CRA, at the request of Haley Seger of TDOT.

Before conducting the architectural field survey, a records review was completed to identify historic architectural resources including buildings, structures, sites, or objects located adjacent to or within the immediate viewshed of the proposed project area that may be historically significant. Discussion with THC staff indicated two previously surveyed architectural resources are located within the area of potential effects: WI-2121 and WI-2097. Prefield research using the Tennessee Property Viewer combined with determinations made in the field resulted in the recordation and NRHP eligibility evaluation of a total of 21 sites.

Based on the results of the field survey and archival research, one site (Inventoried Property A) was selected for further evaluation and subject to full inventory (Table 1). CRA recommends that Inventoried Property A lacks the necessary significance and integrity to warrant listing in the NRHP under Criterion A, B, or C. The remaining 20 sites were charted and are described in Table 2, and are recommended ineligible for listing in the NRHP under Criterion A, B, or C. Two of the charted sites contain extant previously surveyed resources.

CRA recommends that the proposed I-40 interchange construction will result in no historic properties affected.

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1950b aerial, Number AR1NN0000040047, United States Geological Survey, Washington, DC.

1951 aerial, Number AR1NN0000040046, United States Geological Survey, Washington, DC.

1952 Hermitage, Tennessee, 7.5-minute series topographic quadrangle, United States Geological Survey, Washington, DC.

1957a Hermitage, Tennessee, 7.5-minute series topographic quadrangle, United States Geological Survey, Washington, DC.

1957b aerial, Number AR1VNR000010005, United States Geological Survey, Washington, DC.

1968 Hermitage, Tennessee, 7.5-minute series topographic quadrangle, United States Geological Survey, Washington, DC.

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1903-1909 Map of Rural Free Delivery Routes, Wilson County, Tennessee. United States Postal Service, Washington, DC.

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Attachment 1: Initial Studies Plans

Index Of Sheets

SEE SHEET 1A FOR INDEX OF SHEETS.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

DOES THIS PROJECT QUALIFY FOR UTILITY CHAPTER 86	YES X	NO

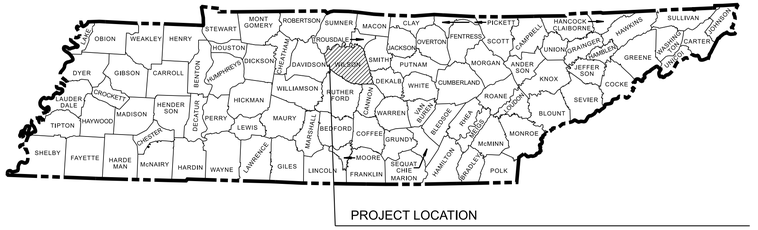
TENN.	YEAR	SHEET NO.
	2023	1
FED. AID PROJ. NO.	NH-I-40-5(150)	
STATE PROJ. NO.	95100-1113-44	

WILSON COUNTY

DIVERGING DIAMOND INTERCHANGE CONNECTING SR 265 TO I-40
FROM WEST OF PLEASENT GROVE RD TO EAST OF PROVIDENCE PARKWAY

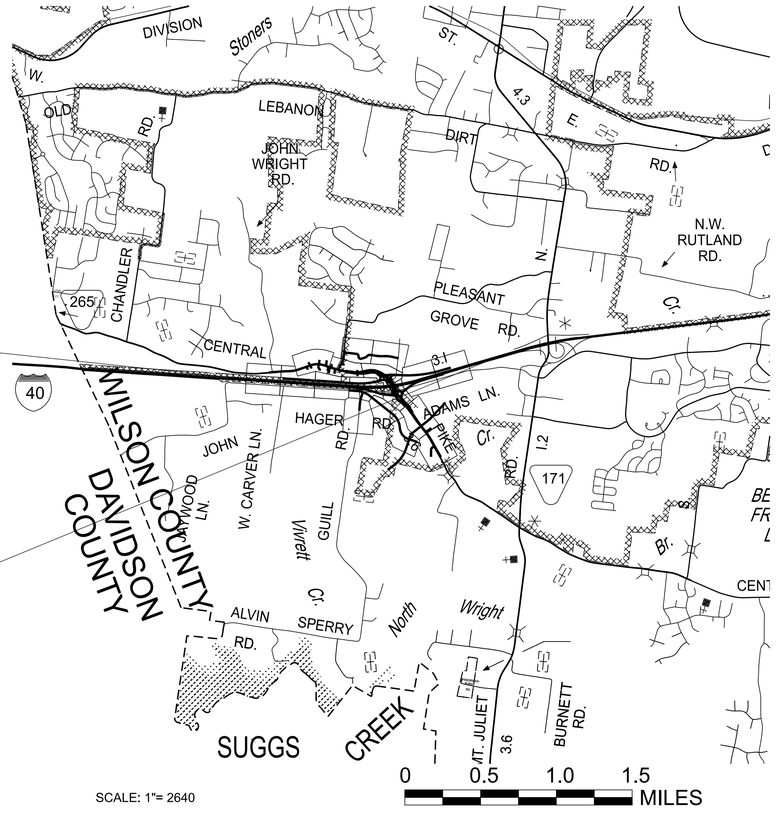
PRELIMINARY

STATE HIGHWAY NO. 265 F.A.H.S. NO. I-40



BRIDGE ID. EX. # 95I00400001
PROP. # SR 265 EB
PROP. # SR 265 WB

NO EXCLUSIONS



SCALE: 1"= 2640

95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 547+69.12 I-40

N 668229.0218 E 1807086.8164

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY

STA. 615+76.94 I-40

N 668554.1848 E 1813815.3892

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED JANUARY 1, 2021 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

TDOT C.E. MANAGER 1 OR
TDOT TRANSPORTATION MANAGER 1 : SHARON M. SCHUTZ, PE

DESIGNED BY : CHRIS REBAR, PE

DESIGNER : HDR ENGINEERING, INC. CHECKED BY BRIAN REYNOLDS, PE

P.E. NO. 95100-0113-04 (NEPA)

PIN NO. 124884.00

R.O.W. LENGTH	MILES
ROADWAY LENGTH	MILES
BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES
BOX BRIDGE LENGTH	MILES ▲
PROJECT LENGTH	MILES

▲ Not included in the project length (Non Riding Surface).

INITIAL STUDIES REQUEST

APPROVED: _____
WILL REID, CHIEF ENGINEER

DATE: _____

APPROVED: _____
HOWARD H. ELEY, COMMISSIONER

SURVEY - -

SEE SHEET 1A FOR TRAFFIC DATA.

COORDINATES ARE NAD/83(1995) (2011 ADJUSTMENT) ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 USING GEOID G2012BU7.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED: _____
DIVISION ADMINISTRATOR DATE

2/4/2023 7:45:46 AM
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PRELIM.	2023	NH-I-40-5(150)	1B

REV. ***DATE***
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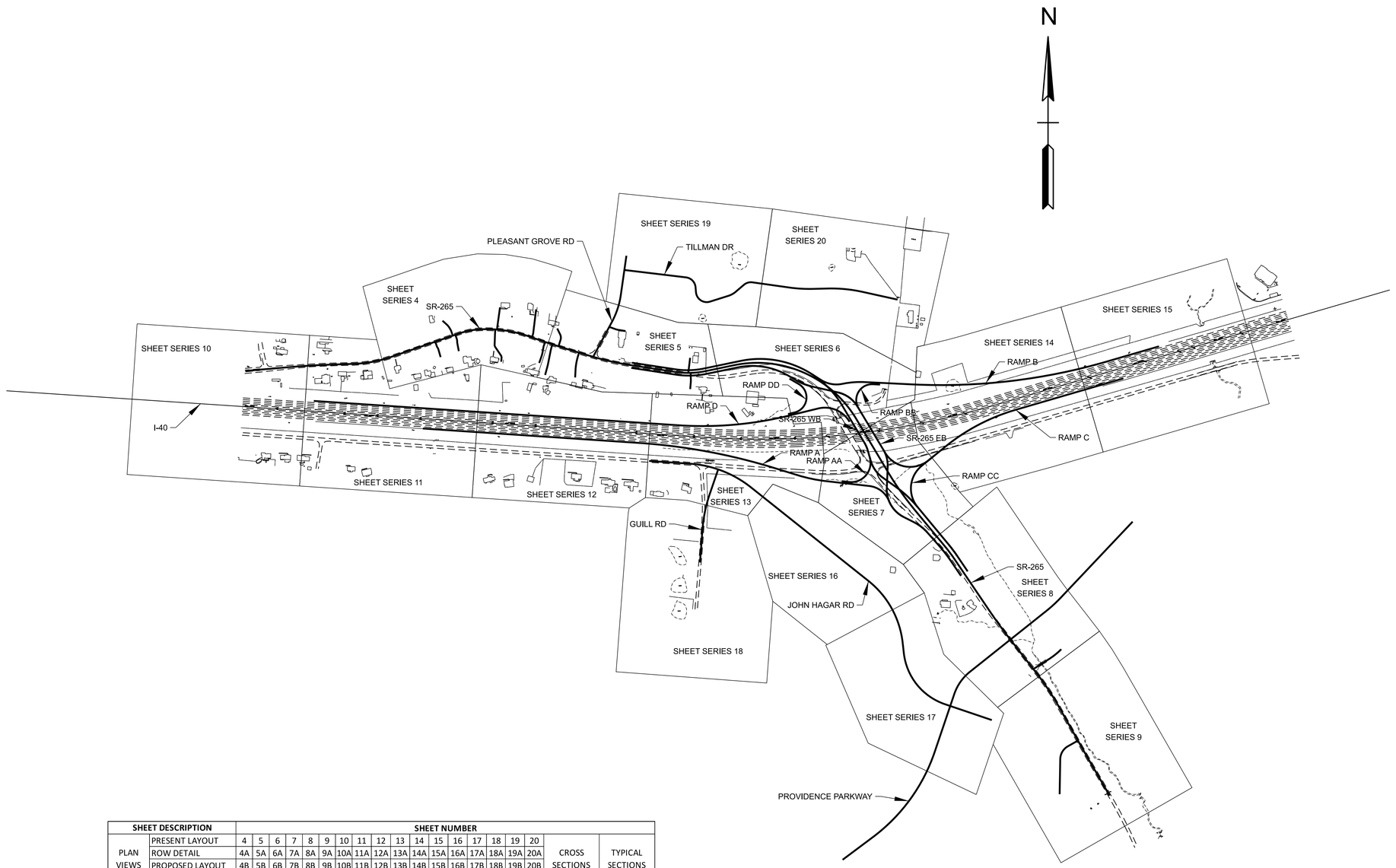

SHEET DESCRIPTION		SHEET NUMBER																	CROSS SECTIONS	TYPICAL SECTIONS
PLAN VIEWS	PRESENT LAYOUT	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	ROW DETAIL	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A	17A	18A	19A	20A		
	PROPOSED LAYOUT	4B	5B	6B	7B	8B	9B	10B	11B	12B	13B	14B	15B	16B	17B	18B	19B	20B		
	CONTOURS	4C	5C	6C	7C	8C	9C	10C	11C	12C	13C	14C	15C	16C	17C	18C	19C	20C		
PROFILES	SR 265	4D	5D	6D	7D	8D	9D												A001 - A053	2B - 2B3
	SR 265 WB		5E	6E	7E	8E														
	SR 265 EB		5F	6F	7F	8F														
	I 40			6G	7G			10D	11D	12D	13D	14D	15D						A054 - A107	2B4
	RAMP A				7H				11E	12E	13E								A108 - A129	2B5
	RAMP AA				7I														A130 - A134	2B6
	RAMP B			6H								14E	15E						A135 - A160	2B7
	RAMP BB			6I															A161 - A166	2B8
	RAMP C				7J							14F	15F						A167 - A181	2B9
	RAMP CC				7K														A182 - A188	2B10
	RAMP D			6J					11F	12F	13F								A189 - A200	2B11
	RAMP DD			6K															A201 - A205	2B12
	PLEASANT GROVE RD		5G														19E		A206 - A210	2B13
	JOHN HAGAR RD										13G			16D	17D				A211 - A249	2B14 - 2B15
	PROVIDENCE PKWY					8G									17E				A250 - A264	2B16
	GUILL RD										13H					18D			A265 - A270	2B17
	TILLMAN DR																19D	20D	A271 - A292	2B18

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

INDEX KEY SHEET

SCALE: 1" = 400'

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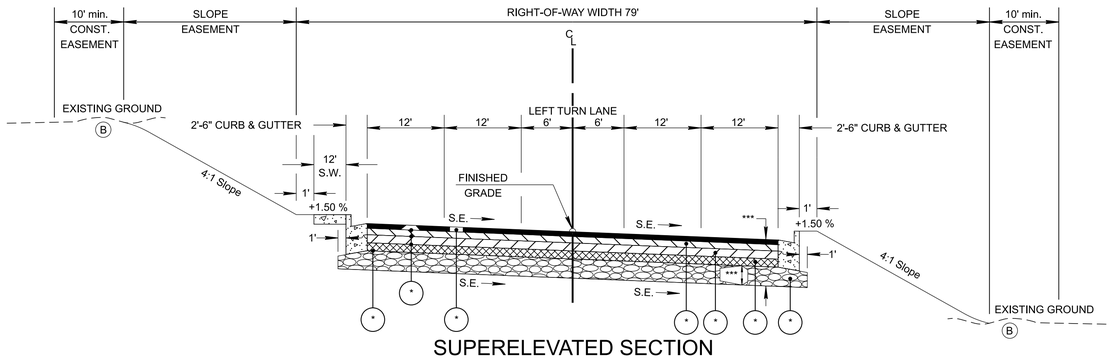
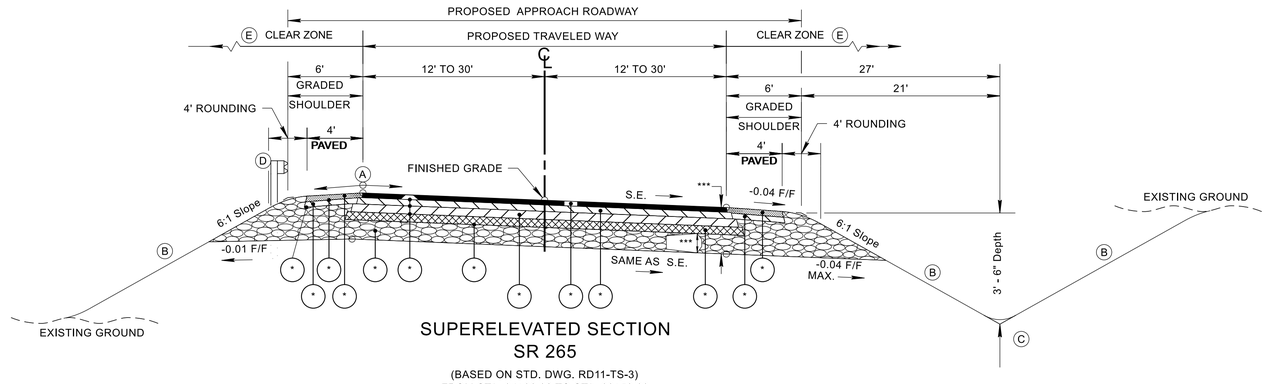


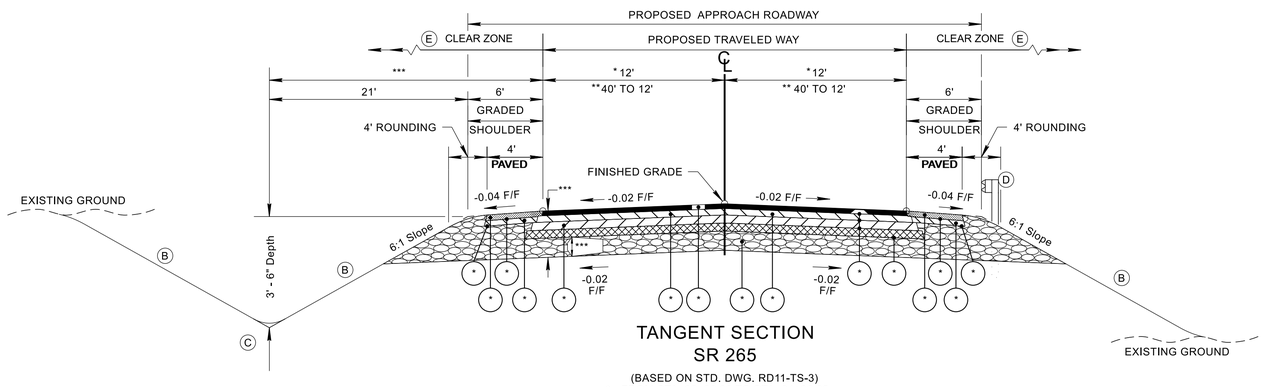
SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 98+59.00 TO STA. 101+09.12



SUPERELEVATED SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
FROM STA. 94+06.82 TO STA. 98+59.00



TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-3)
* FROM STA. 92+00.00 TO STA. 94+06.82
** FROM STA. 147+75.00 TO STA. 155+25.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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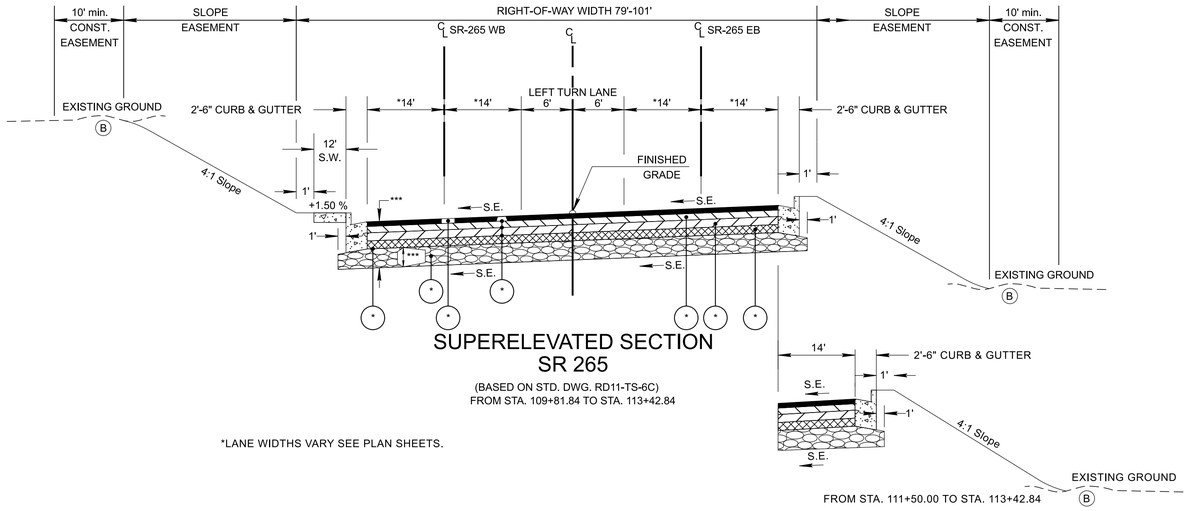
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B1

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

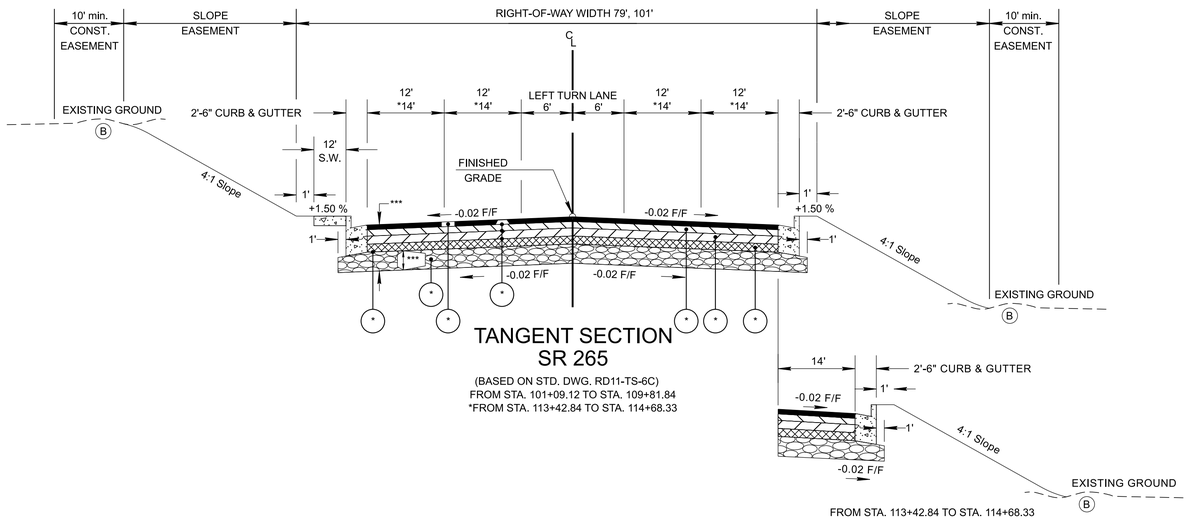


SUPERELEVATED SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 109+81.84 TO STA. 113+42.84

*LANE WIDTHS VARY SEE PLAN SHEETS.

FROM STA. 111+50.00 TO STA. 113+42.84



TANGENT SECTION SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 101+09.12 TO STA. 109+81.84
*FROM STA. 113+42.84 TO STA. 114+68.33

FROM STA. 113+42.84 TO STA. 114+68.33

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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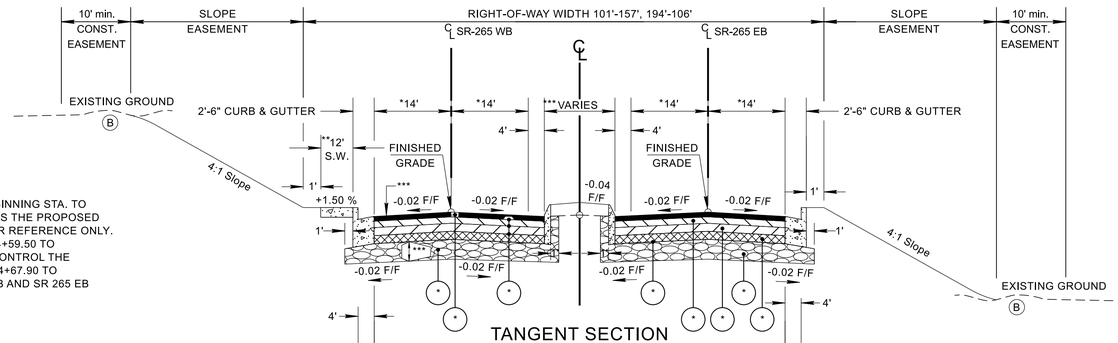
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B2

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



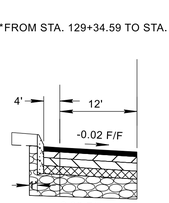
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 114+68.33 TO STA. 121+96.14
*FROM STA. 129+34.59 TO STA. 135+48.26

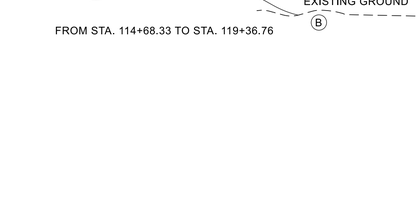
FROM STA. 121+61.86 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 131+10.42

FROM STA. 120+14.97 TO STA. 121+96.14
FROM STA. 129+34.59 TO STA. 129+68.63

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SIDEWALK LOCATION VARIES SEE PLAN SHEETS.
***MEDIAN WIDTH VARIES SEE PLAN SHEETS.



*FROM STA. 129+34.59 TO STA. 135+48.26



FROM STA. 114+68.33 TO STA. 119+36.76

FROM STA. 135+71.67 TO STA. 135+48.26

B SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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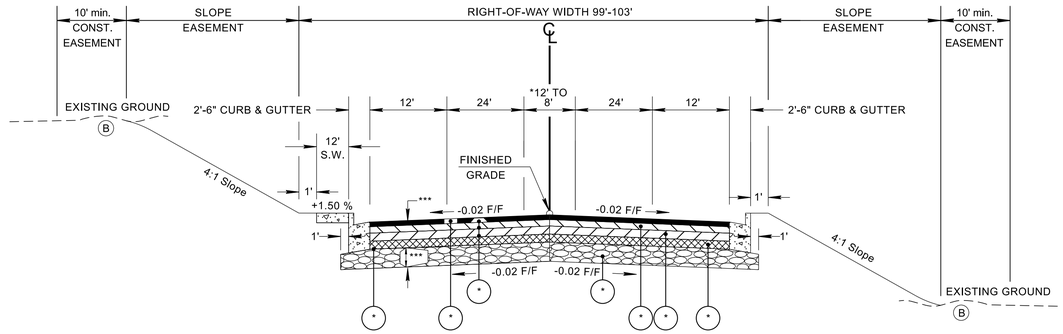
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B3

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

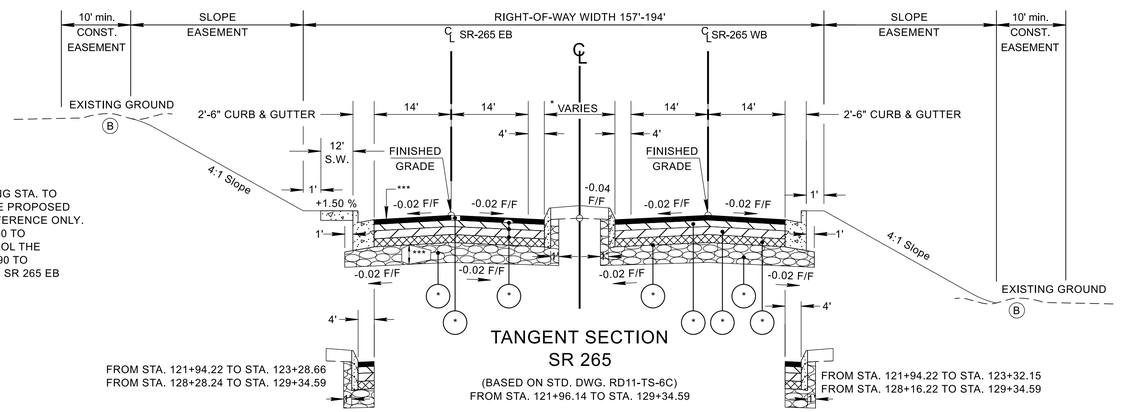


TANGENT SECTION
SR 265

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 135+48.26 TO STA. 147+75.00

THE HORIZONTAL AND VERTICAL ALIGNMENT FOR SR 265 FROM THE BEGINNING STA. TO STA. 114+67.90 AND FROM STA. 136+42.85 TO THE ENDING STA. CONTROLS THE PROPOSED FINISHED GRADE. FROM STA. 114+67.90 TO STA. 136+42.85 IS SHOWN FOR REFERENCE ONLY. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB FROM STA. 214+59.50 TO STA. 236+70.00 AND SR 265 EB FROM STA. 314+75.00 TO STA. 337+20.00 CONTROL THE PROPOSED FINISHED GRADE INDEPENDENTLY THROUGH SR 265 STA. 114+67.90 TO STA. 136+42.85. HORIZONTAL AND VERTICAL ALIGNMENTS FOR SR 265 WB AND SR 265 EB SHOWN OUTSIDE OF THIS RANGE ARE SHOWN FOR REFERENCE ONLY.



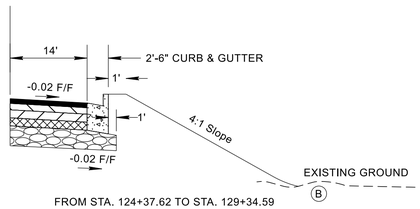
TANGENT SECTION
SR 265

(BASED ON STD. DWG. RD11-TS-6C)
FROM STA. 121+96.14 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+28.66
FROM STA. 128+28.24 TO STA. 129+34.59

FROM STA. 121+94.22 TO STA. 123+32.15
FROM STA. 128+16.22 TO STA. 129+34.59

*MEDIAN WIDTH VARIES SEE PLAN SHEETS.



FROM STA. 124+37.62 TO STA. 129+34.59

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
SR 265

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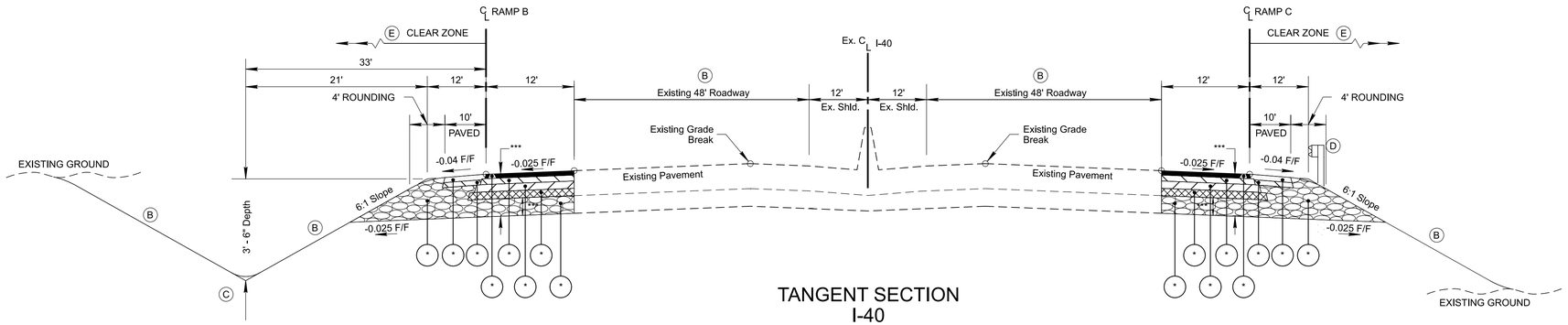
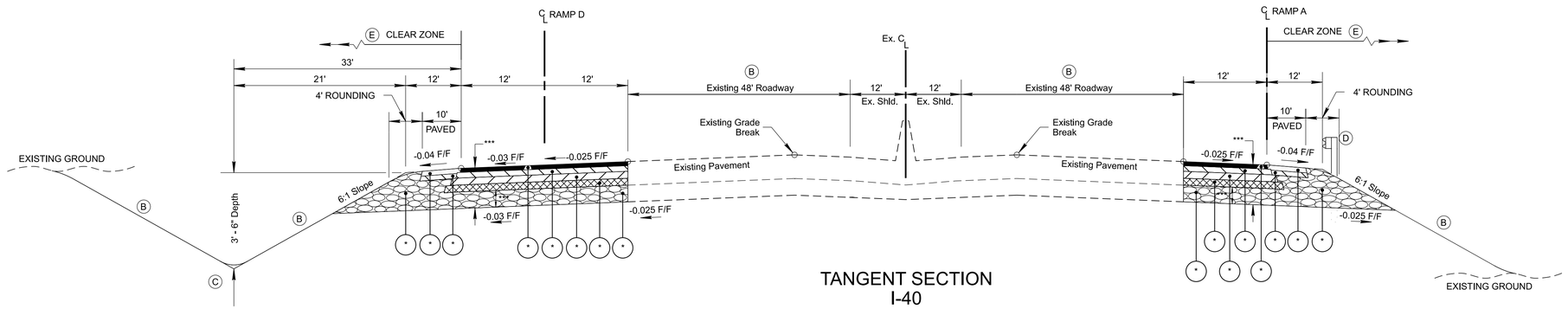


TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 607+82.14 TO STA. 615+76.94 LT (RAMP B)
FROM STA. 602+83.84 TO STA. 612+76.67 RT (RAMP C)



TANGENT SECTION
I-40

(BASED ON STD. DWG. RD11-TS-5W)
FROM STA. 547+69.12 TO STA. 585+03.52 LT (RAMP D)
FROM STA. 560+00.18 TO STA. 583+87.41 RT (RAMP A)

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
I-40

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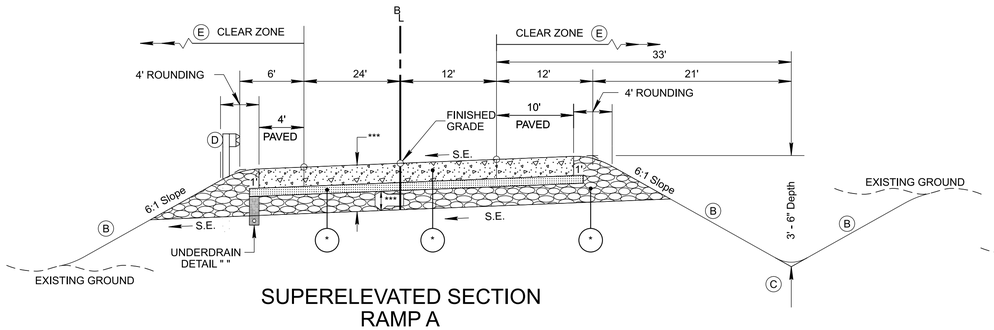
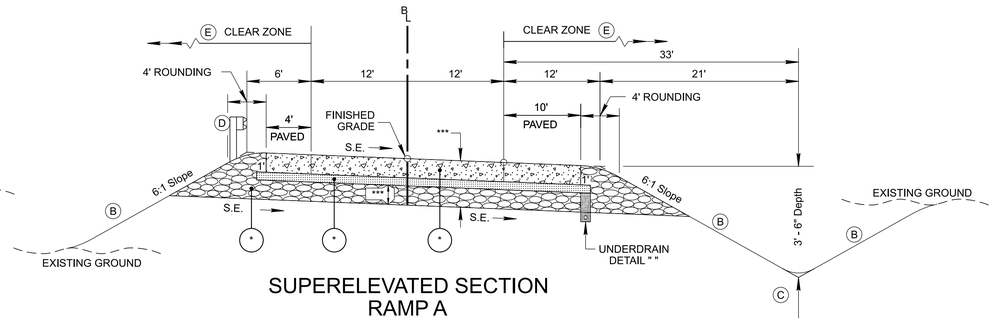
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B5



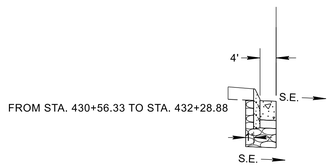
SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 425+30.66 TO STA. 428+10.59

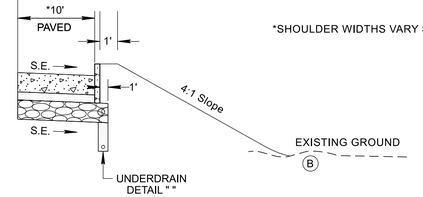


SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 429+91.00 TO STA. 433+13.78

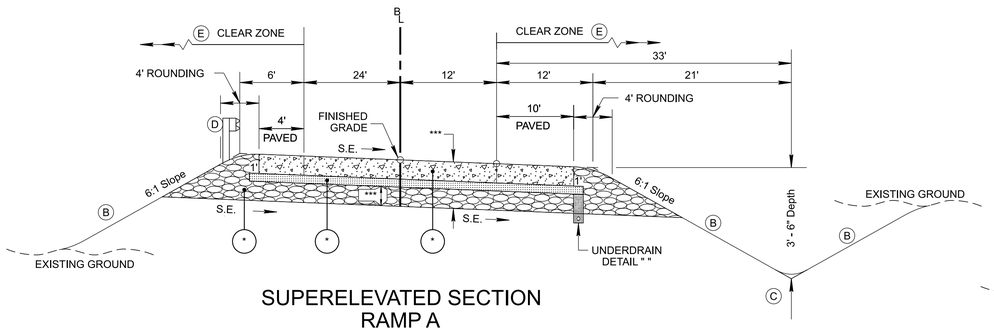


FROM STA. 430+56.33 TO STA. 432+28.88



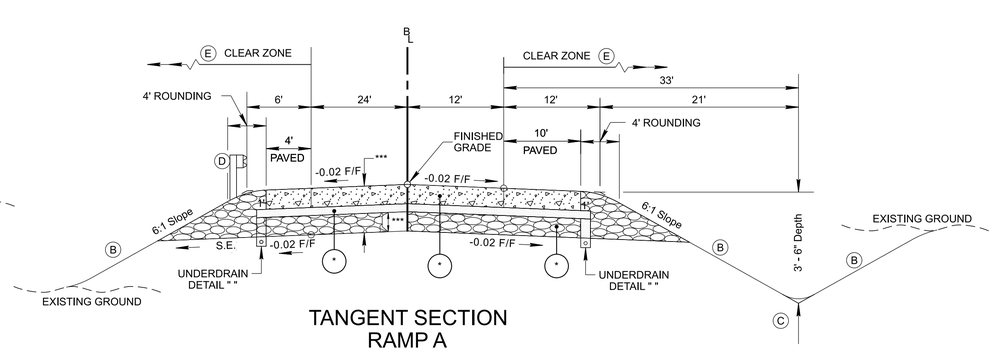
FROM STA. 430+55.47 TO STA. 433+16.11

*SHOULDER WIDTHS VARY SEE PLAN SHEETS.



SUPERELEVATED SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 420+09.48 TO STA. 425+30.66



TANGENT SECTION RAMP A

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 428+10.59 TO STA. 429+91.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS RAMP A

2/4/2023 7:53:52 AM
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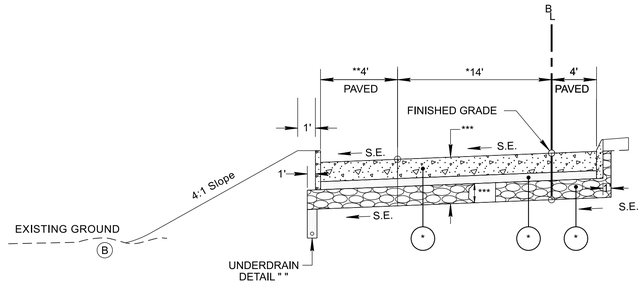
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B6

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP AA

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1400+00.00 TO STA. 1401+83.90

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP AA

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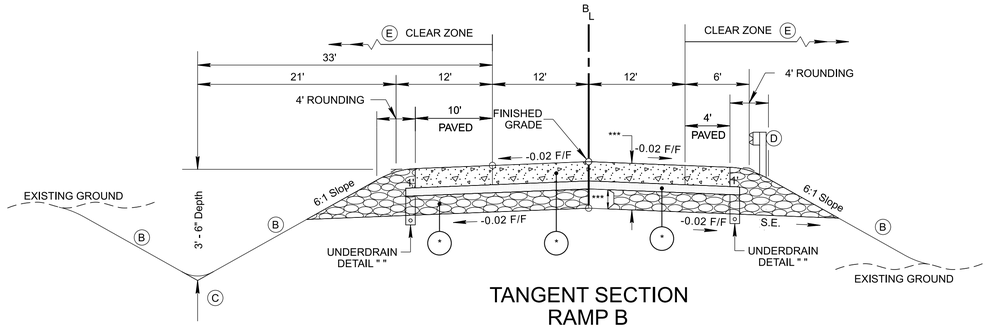
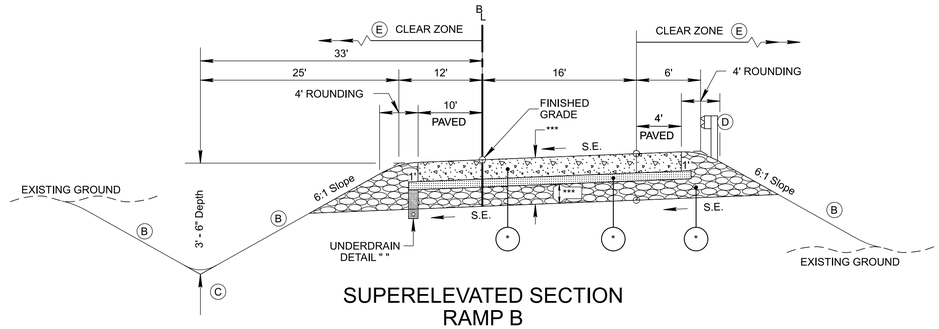
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B7



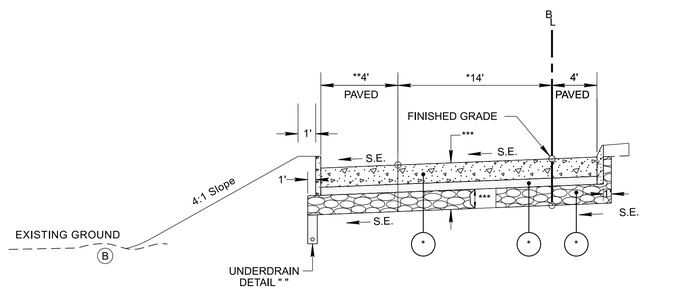
TANGENT SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 503+42.25 TO STA. 505+93.21



SUPERELEVATED SECTION
RAMP B

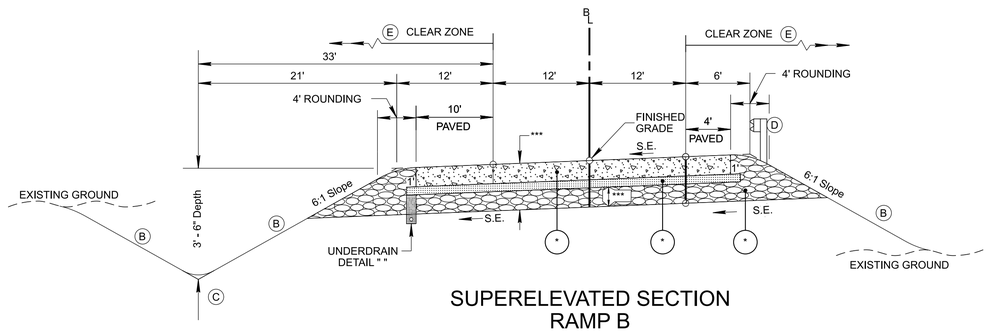
(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 512+65.00 TO STA. 516+27.35



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 499+58.79 TO STA. 503+42.25



SUPERELEVATED SECTION
RAMP B

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 505+93.21 TO STA. 512+65.00

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS RAMP B

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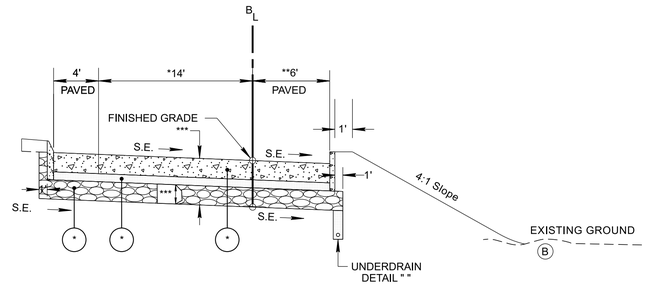
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B8

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP BB

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1500+49.57 TO STA. 1501+80.88

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP BB

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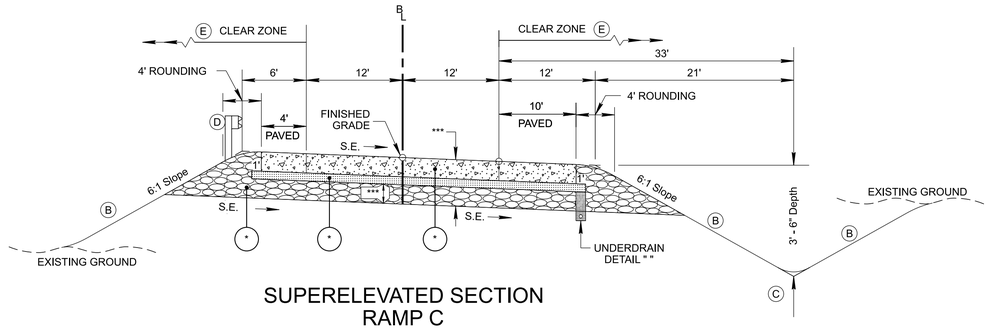
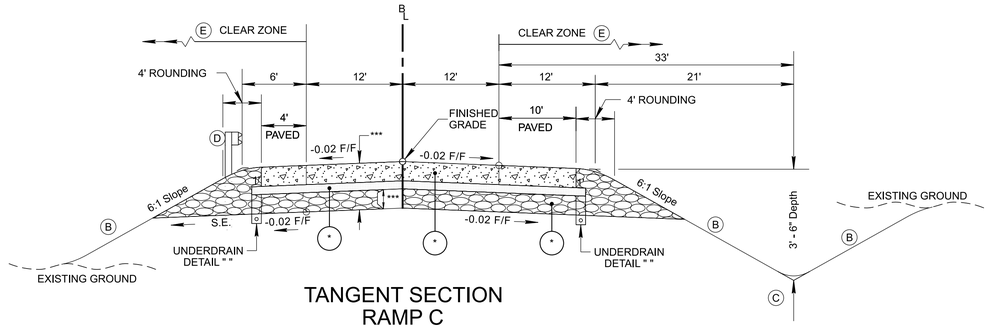
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B9



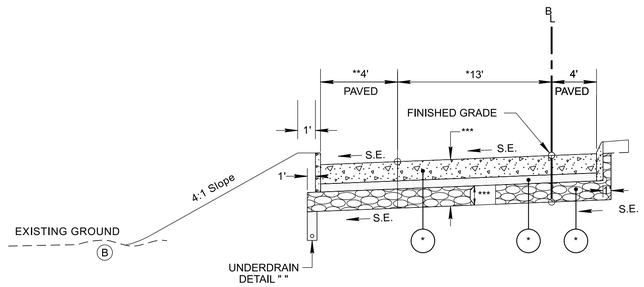
SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 703+95.34 TO STA. 708+61.12



TANGENT SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 702+90.60 TO STA. 703+95.34



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION RAMP C

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 700+65.85 TO STA. 702+90.60

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS RAMP C

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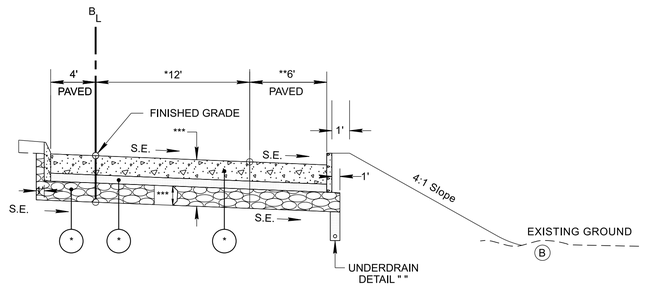
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B10

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
RAMP CC

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1700+62.68 TO STA. 1703+01.66

*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP CC

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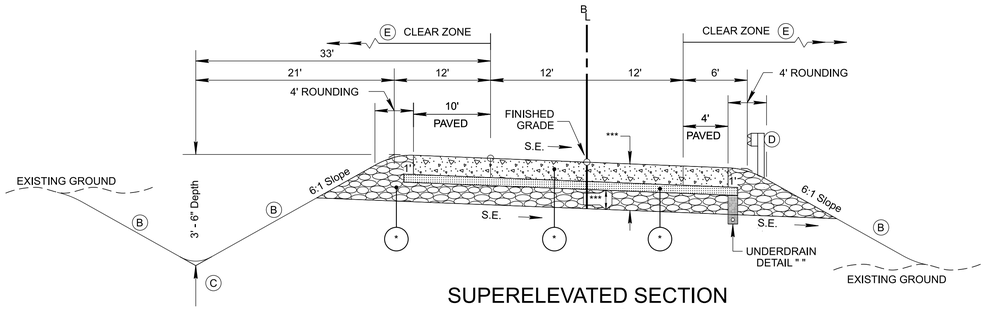
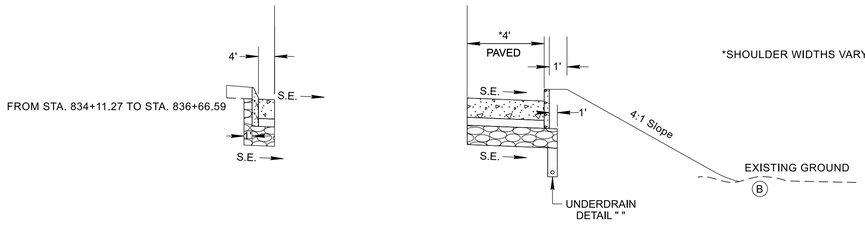
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B11



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 833+29.60 TO STA. 837+71.58



FROM STA. 834+11.27 TO STA. 836+66.59

FROM STA. 834+10.35 TO STA. 837+71.58

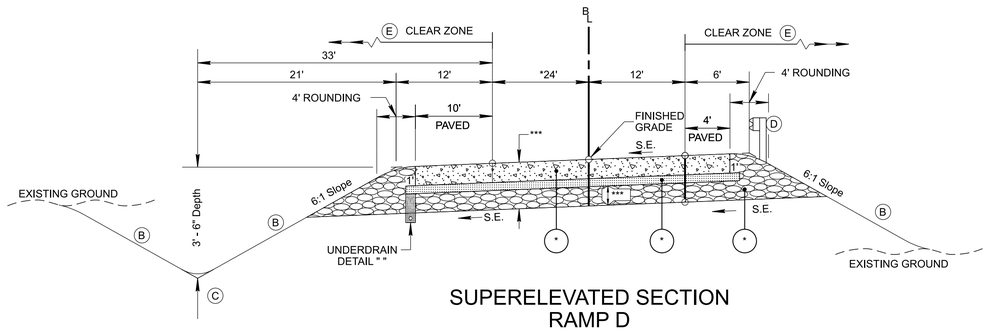
*SHOULDER WIDTHS VARY SEE PLAN SHEETS.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.



SUPERELEVATED SECTION
RAMP D

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 828+91.41 TO STA. 833+29.60

*LANE WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP D

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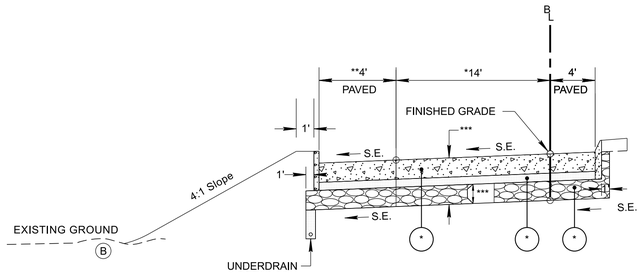
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B12

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



*LANE WIDTHS VARY SEE PLAN SHEETS.
**SHOULDER WIDTHS VARY SEE PLAN SHEETS.

SUPERELEVATED SECTION
RAMP DD

(BASED ON STD. DWG. RD11-TS-4)
FROM STA. 1800+47.85 TO STA. 1803+02.06

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
RAMP DD

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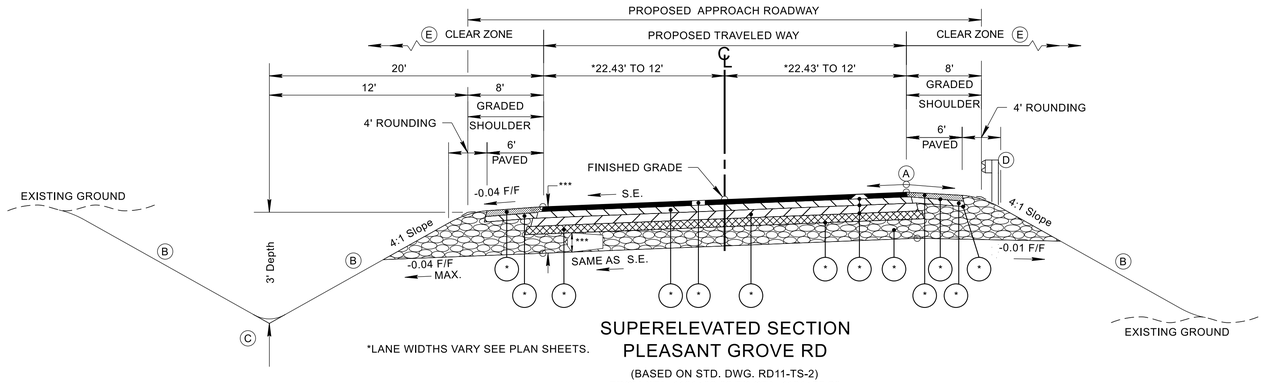
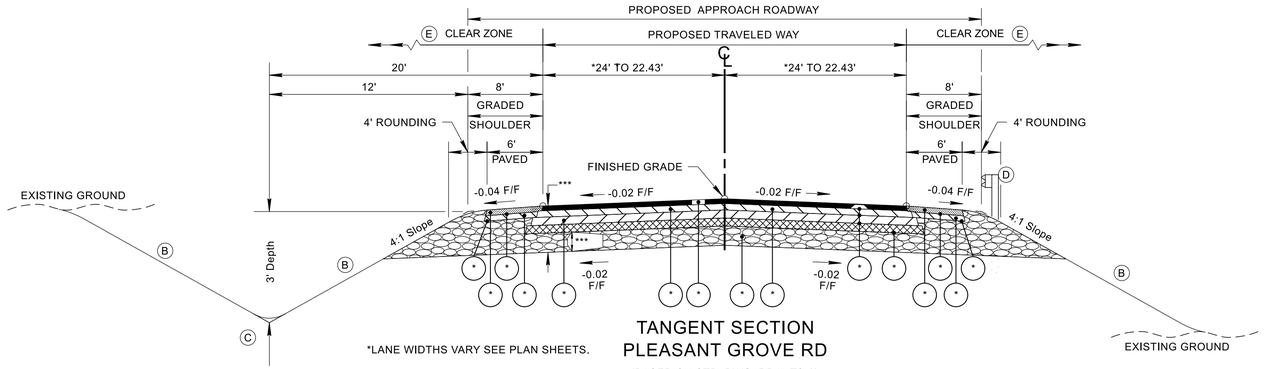
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B13



SUPERELEVATED SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

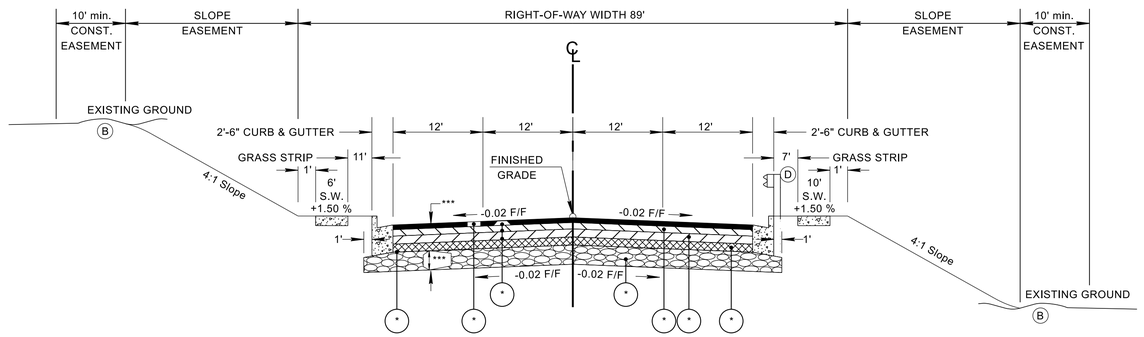
(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+96.00 TO STA. 1104+75.00



TANGENT SECTION
PLEASANT GROVE RD

*LANE WIDTHS VARY SEE PLAN SHEETS.

(BASED ON STD. DWG. RD11-TS-2)
FROM STA. 1101+55.00 TO STA. 1101+96.00



TANGENT SECTION
PLEASANT GROVE RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1100+31.94 TO STA. 1101+55.00

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL
SECTIONS
PLEASANT GROVE RD

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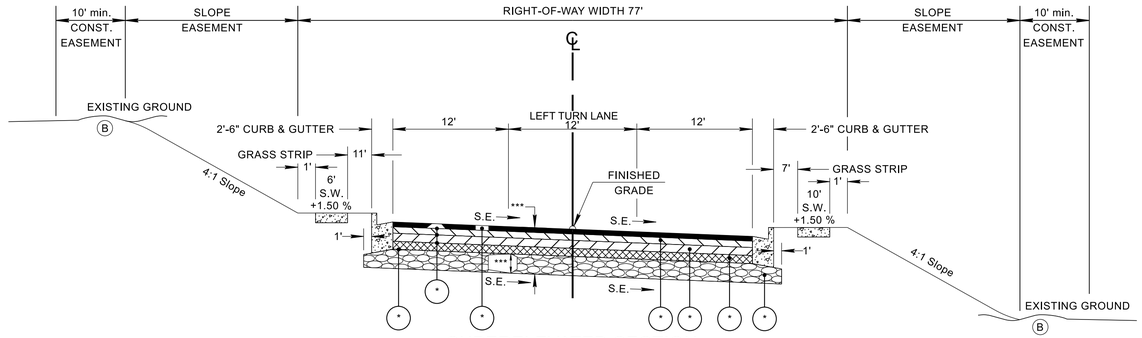
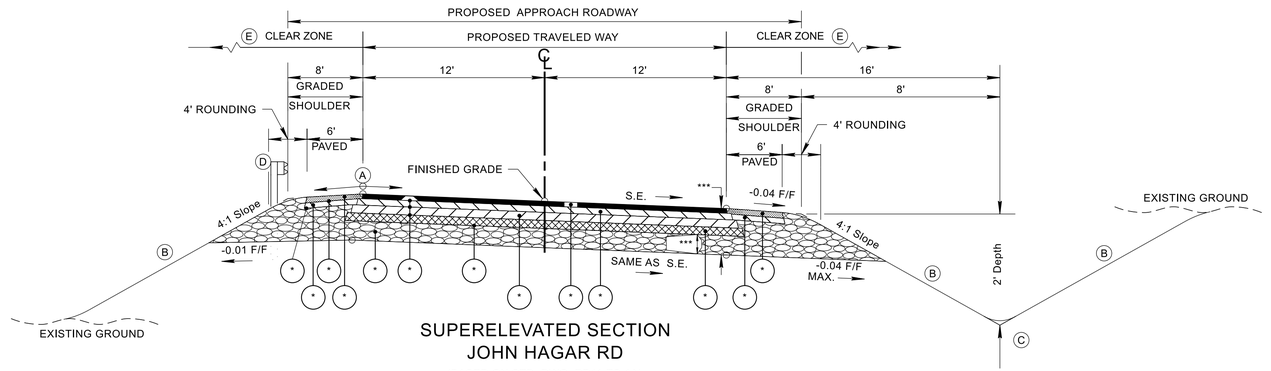
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B14



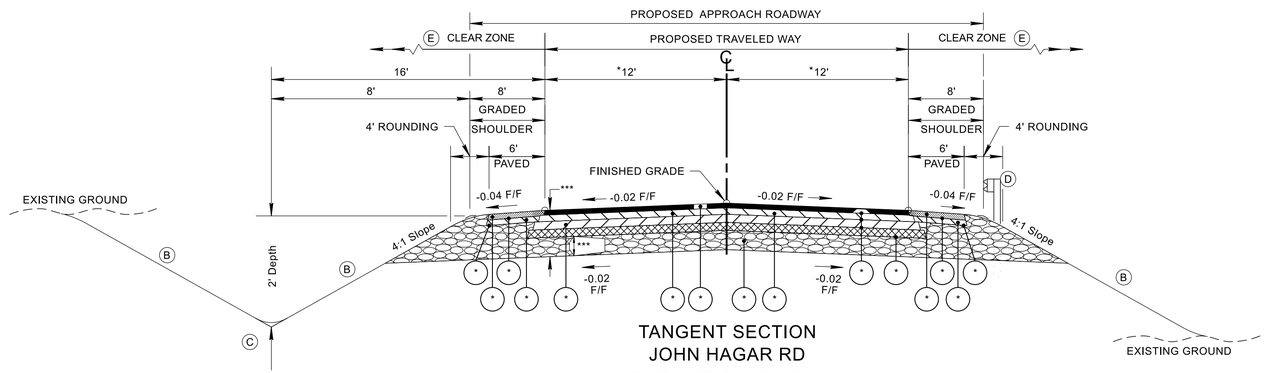
SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 816+88.46 TO STA. 823+37.33



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+93.00 TO STA. 808+37.00



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 801+75.00 TO STA. 801+93.00
*FROM STA. 808+37.00 TO STA. 816+88.46

*LANE WIDTHS VARY SEE PLAN SHEETS.

(A) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHALL NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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TYPICAL SECTIONS
JOHN HAGAR RD

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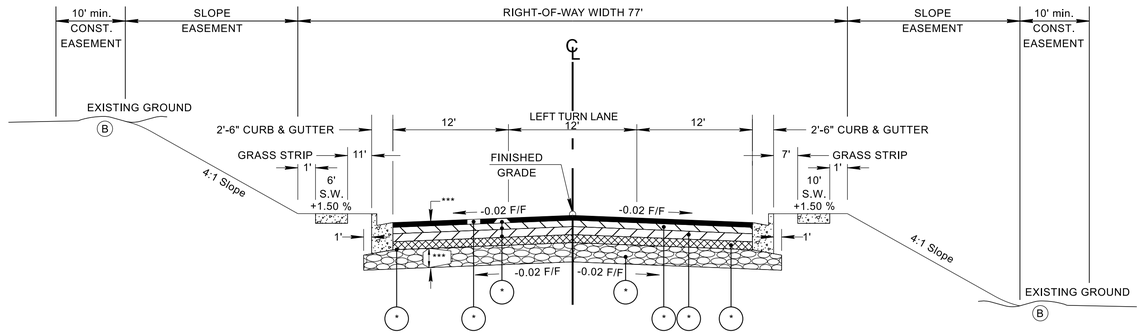
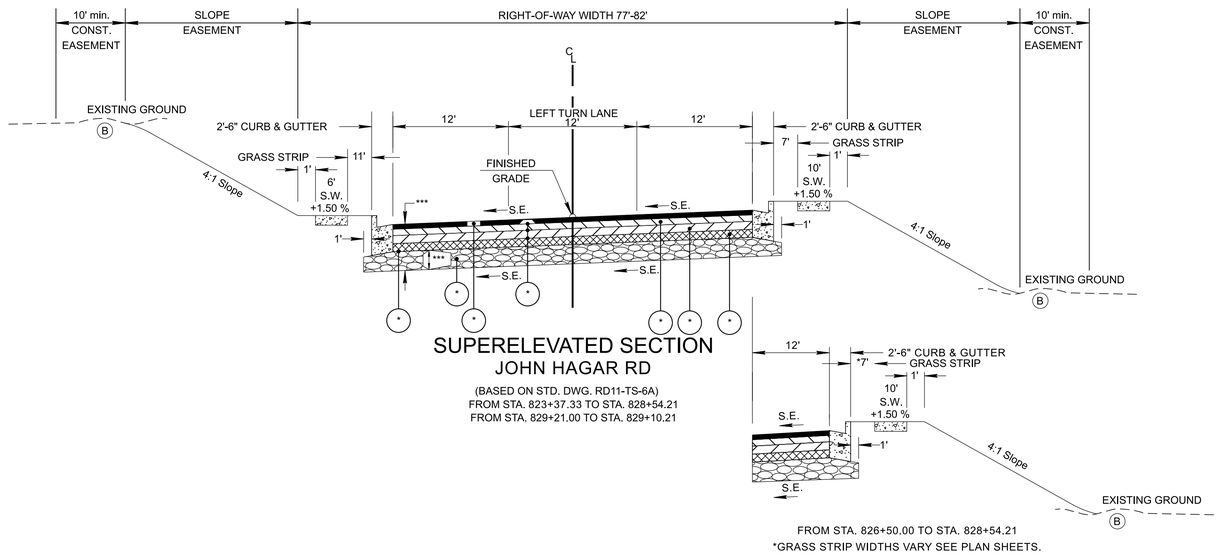
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B15

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



TANGENT SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 829+21.00 TO STA. 830+00.00



SUPERELEVATED SECTION
JOHN HAGAR RD

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 823+37.33 TO STA. 828+54.21
FROM STA. 829+21.00 TO STA. 829+10.21

FROM STA. 826+50.00 TO STA. 828+54.21
*GRASS STRIP WIDTHS VARY SEE PLAN SHEETS.

INITIAL STUDIES REQUEST

SEALED BY

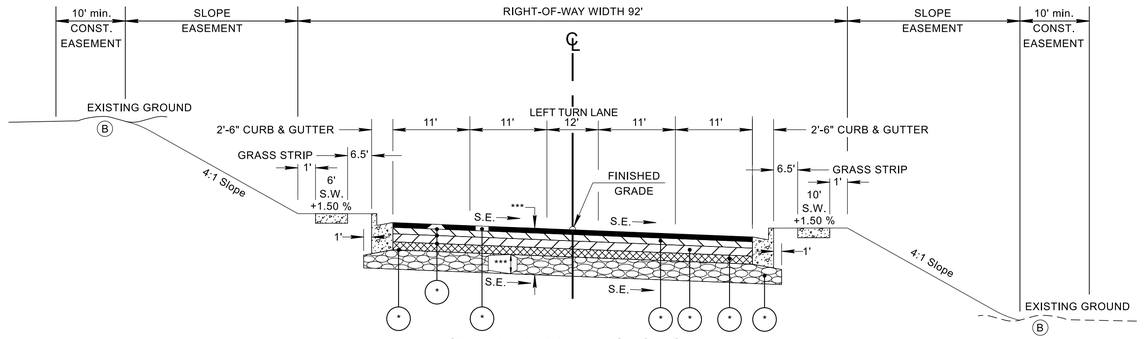
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
JOHN HAGAR RD

2/4/2023 7:53:59 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-ROADWAY TYPICAL SECTIONS.DGN

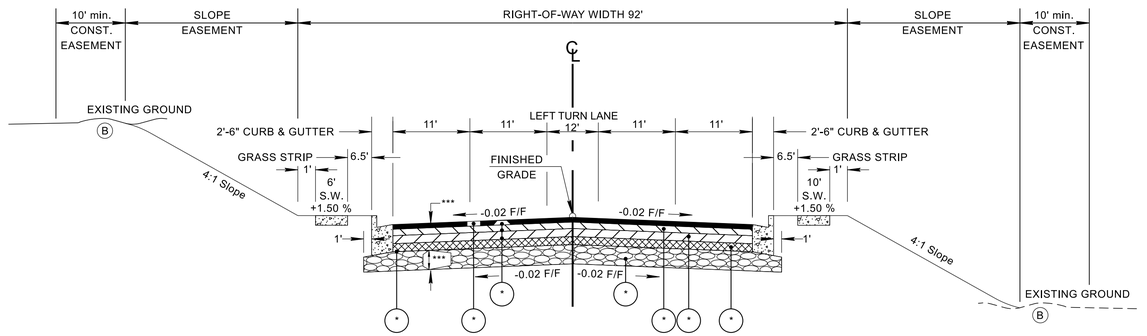
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B16

Ⓑ SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.



SUPERELEVATED SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1603+40.71 TO STA. 1607+49.71



TANGENT SECTION
PROVIDENCES PKWY

(BASED ON STD. DWG. RD11-TS-6A)
FROM STA. 1602+70.00 TO STA. 1603+40.71
FROM STA. 1607+49.71 TO STA. 1614+00.00

2/4/2023 7:54:00 AM
C:\PWWORKING\EAST01\D2328414\9SI040-SHT-ROADWAY TYPICAL SECTIONS.DGN

INITIAL STUDIES REQUEST

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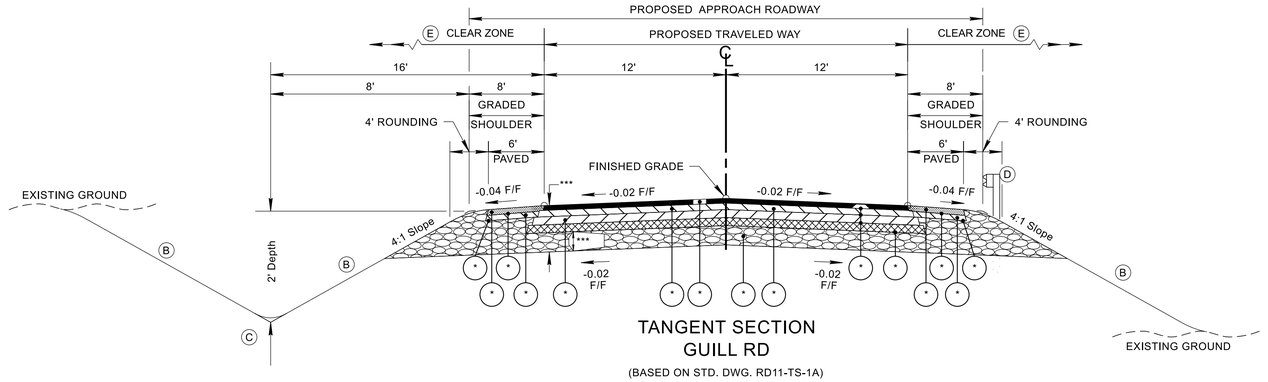
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS
PROVIDENCES PKWY

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	2B17



TANGENT SECTION
GUILL RD

(BASED ON STD. DWG. RD11-TS-1A)
FROM STA. 11+00.00 TO STA. 16+49.84

(B) SEE STANDARD DRAWINGS RD11-S-11 AND RD11-S-11B FOR FILL AND CUT SLOPE TABLES, ROUNDING ON TOP OF CUT SLOPES AND TOE OF FILL SLOPES, SPECIAL ROCK TREATMENT AND SUB GRADE ROUNDING IF APPLICABLE.

(C) SEE STANDARD DRAWING RD11-S-11A FOR ROUNDING OF ROADSIDE DITCH SLOPES.

(D) SEE STANDARD DRAWING S-PL-6 FOR TYPICAL GUARDRAIL PLACEMENT.

(E) SEE STANDARD DRAWING S-CZ-1 FOR CLEAR ZONE CRITERIA. SEE THE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR FURTHER INFORMATION REGARDING CLEAR ZONES.

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL
SECTIONS
GUILL RD

2/4/2023 7:54:01 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-ROADWAY TYPICAL SECTIONS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (ACRES)			
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE		LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERMANENT	SLOPE	CONSTRUCTION	AIR RIGHTS
				BOOK	PAGE												
1	GARY WISNIEWSKI	97	11.08	1958	772	0.810		0.810				0.810					
2	GARY WISNIEWSKI	97	11.09	809	2298	1.030		1.030				1.030					
3	CASEY GORDON	97	13.01	1856	1644	0.571		0.571				0.571					
4	TOM GOFF & WF, DONNA M. GOFF	97	12.04	1769	1299	0.920		0.920				0.920					
5	MICHAEL PEEK	97	12	464	491	0.740		0.740				0.740					
6	GUANPING ZHENG & WF, JIANKUN WANG	97	12.03	1687	1415	0.850		0.850				0.850					
7	DEBORAH BROWNELL	97	12.01	1923	200	1.030		1.030				1.030					
8	RANDALL FULLER & JOHN BLACKWELL	97	12.02	1415	1808	1.180		1.180				1.180					
9	RONNIE MANGRUM & WF, BRANDI MANGRUM	97	17.04	1672	1066	2.000		2.000				2.000					
10	AMANDA SIMONEAUX CRAWFORD	97	17.03	1931	235	2.000		2.000				2.000					
11	WESLEY C. WALL & WF, DANA JILL WALL	97	17.02	433	772	2.000		2.000				2.000					
12	JAMES C. WALL & WF, KAY T. WALL	97	17	820	433	1.720		1.720				1.720					
13	BILLY ELON EUBANKS & WF, VIRGINIA SUE EUBANKS	97	16.01	1053	1244	4.710		4.710				4.710					
14	JAMES M. HUETT & HEIDI M. HUETT	97	17.01	1693	2254	2.000		2.000				2.000					
15	DAVID MARTIN BUTLER & WF, BETSY CLARE BUTLER	97	29	318	369		1.000	1.000					1.000				
16	DOUGLAS R ANDERSON & WF, ALICIA M ANDERSON	97	28.05	1884	2070		1.000	1.000					1.000				
17	JAMES HUETT	97	18	1626	955	8.210		8.210				8.210					
18	PLEASANT GROVE METHODIST	97	19			1.200		1.200				1.200					
19	CHARLES E. (SONNY) TILLMAN	97	20	830	315	16.000		16.000				16.000					
20	CHARLES E. (SONNY) TILLMAN	97	20	830	315	1.000		1.000				1.000					
21	CHARLES E. (SONNY) TILLMAN	97	22	844	289	1.000		1.000				1.000					
22	MELTON LIVING TRUST	97	28.2	1617	2202		1.000	1.000					1.000				
23	RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY	97	28.21	1840	1642		1.000	1.000					1.000				
24	RAYMOND E. DAVIS JR & WF, PAMELA ANN DAVIS	97	28.08	384	471		1.350	1.350					1.350				
25	MELVIN W NELSON & WF, GENELLE NELSON	97	28.11	406	548		10.090	10.090					10.090				
26	JULIUS M. FULTON	97	27	314	347		0.350	0.350					0.350				
27	CHARLES E. (SONNY) TILLMAN	97	22	844	289	95.750		95.750				95.750					
28	CEMETERY HOLLIS/WRIGHT	97	21			1.000		1.000				1.000					
29	TERRI GENIE MINTON & HS, DAVID H MINTON	97	22.01	959	1876	5.000		5.000				5.000					
30	CHARLES E. (SONNY) TILLMAN	76	40.01	844	293	14.690		14.690				14.690					
31	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
32	PC TOWN CENTER LLC	97	75.07	2124	2162		31.910	31.910					31.910				
33	PHILLIP L SMARTT TRUSTEE	97	25	1081	1100		2.720	2.720					2.720				
34	THE ENCLAVE AT PROVIDENCE PROPERTY LLC	97	23.01	2075	429		26.320	26.320					26.320				
35	ANESKA J DAVIS & PHILLIP L SMARTT	97	75.06	1489	2110		1.050	1.050					1.050				
36	PHILLIP L SMARTT & WF, MARY R. SMARTT	97	75.02	396	366		5.950	5.950					5.950				
37	PHILLIP L. SMARTT & ANESKA J. DAVIS	97	75	2092	24		113.040	113.040					113.040				
38	A H JOHNSON FAMILY LLC	97	23	2092	21		27.840	27.840					27.840				
39	ALDO A. JACOBOGODOY & ALDO MELISSA JACOBO	97	28.06	2199	783	3.400		3.400				3.400					
40	BRADLEY & KAATJE PITZER	97	28.23	1806	1		5.080	5.080					5.080				
41	JOSEPH & JENNY PEWITT	97	28.22	1038	44	3.460		3.460				3.460					
42	WARREN D. & DEBRA T. SMITH	97	28.13	398	431		5.040	5.040					5.040				
43	PETER J. & PATRICIA L. HICKS	97	28.04	1670	1468	3.490		3.490				3.490					
44	BYRON L. & KATHY T. PRICE	97	28.14	399	897		4.930	4.930					4.930				
45	BEAU D. & KENDRA FLEENOR	97	28.01	1635	1792	4.960		4.960				4.960					
46	THE GAMMONS FAMILY PROTECTION TRUST	97	28.15	1848	153		4.960	4.960					4.960				
47	CHARLES E. TILLMAN	76	51.00	1289	2399	28.480		28.480				28.480					
ACQUISITION TOTALS (ACRES)																	

INITIAL STUDIES REQUEST

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ACQUISITION TABLE

2/4/2023 7:56:26 AM
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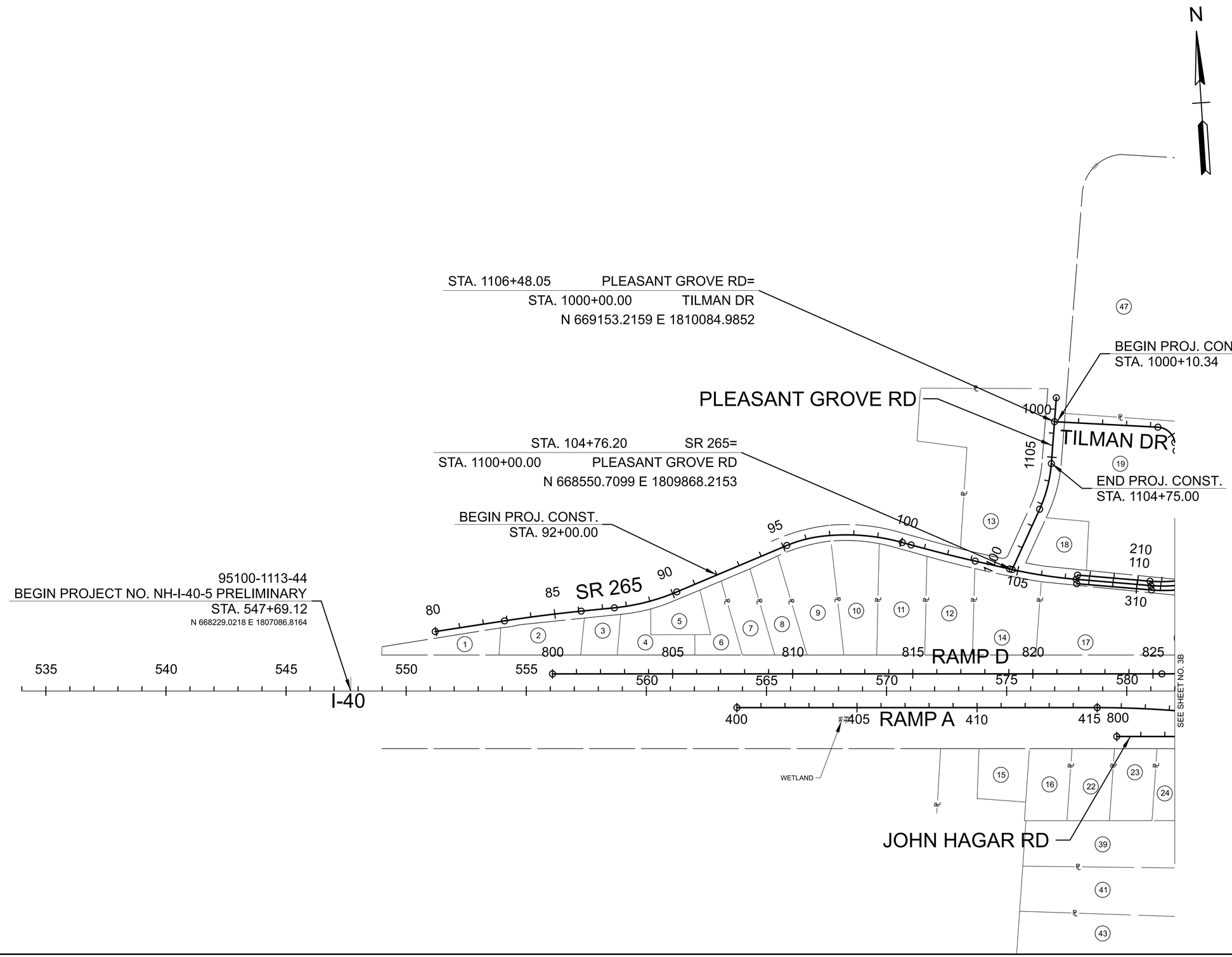
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3A



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:57:53 AM
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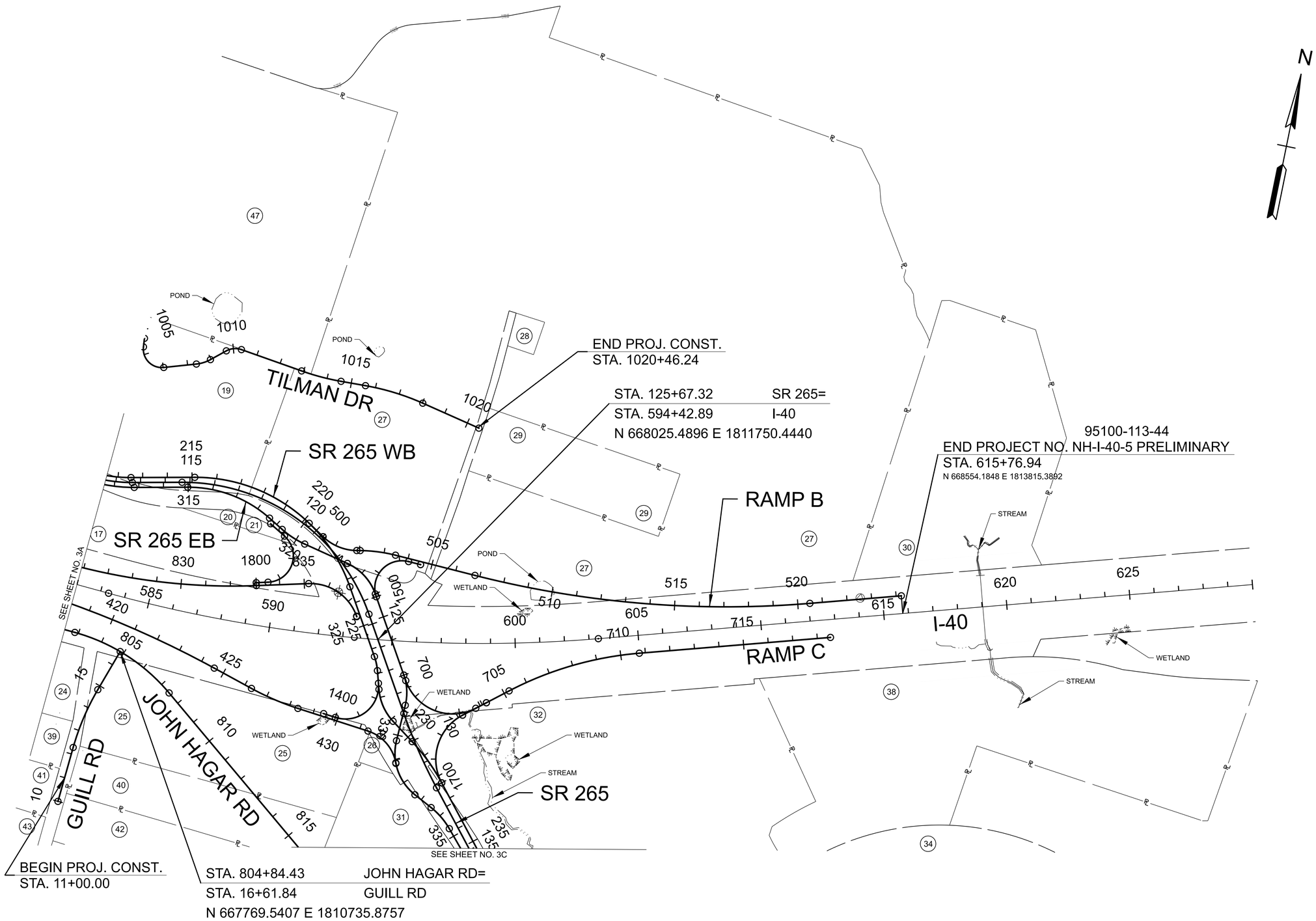
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3B



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:57:56 AM
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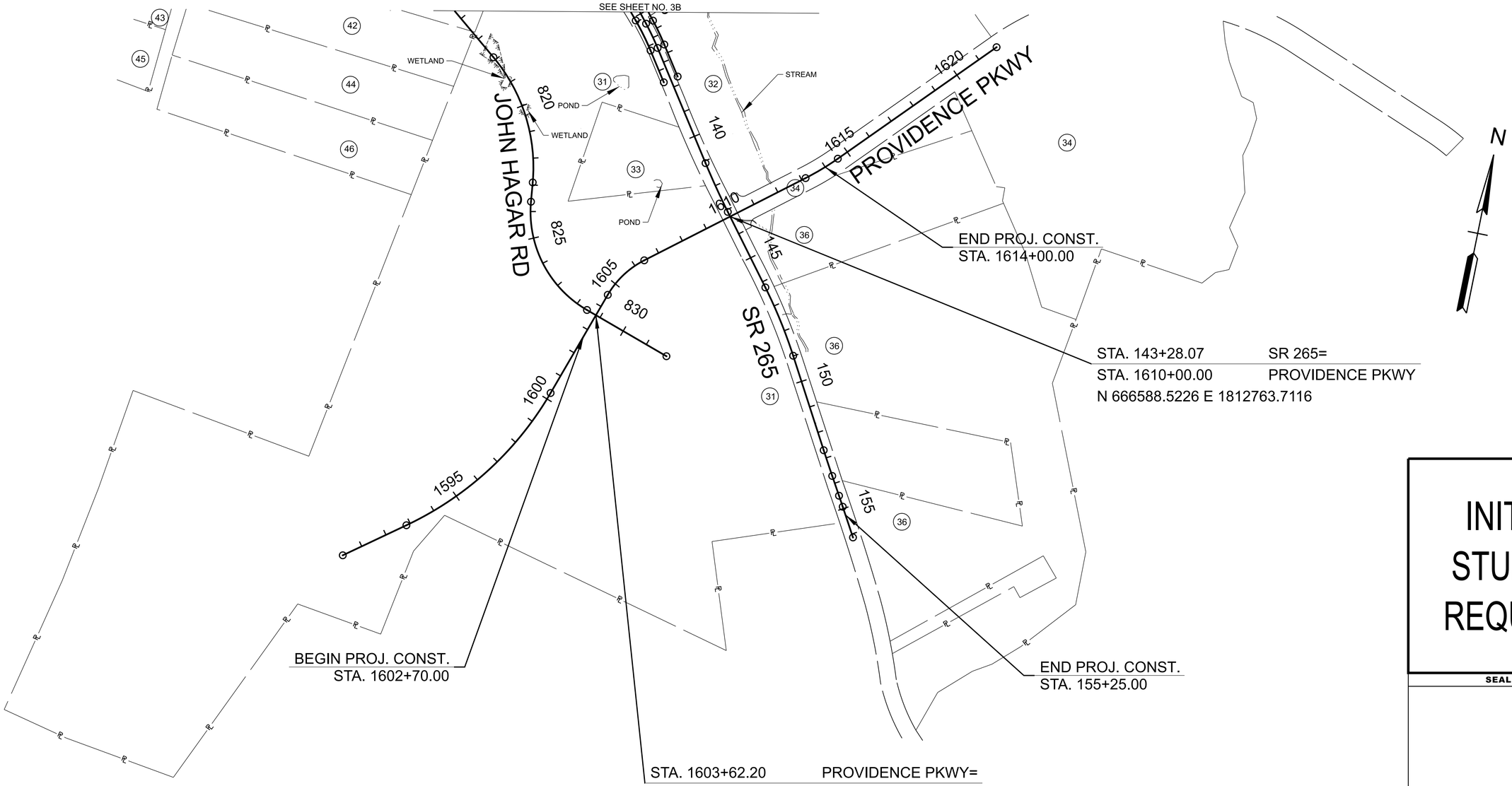
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	3C



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPERTY MAP
SCALE 1" = 200'

2/4/2023 7:58:14 AM
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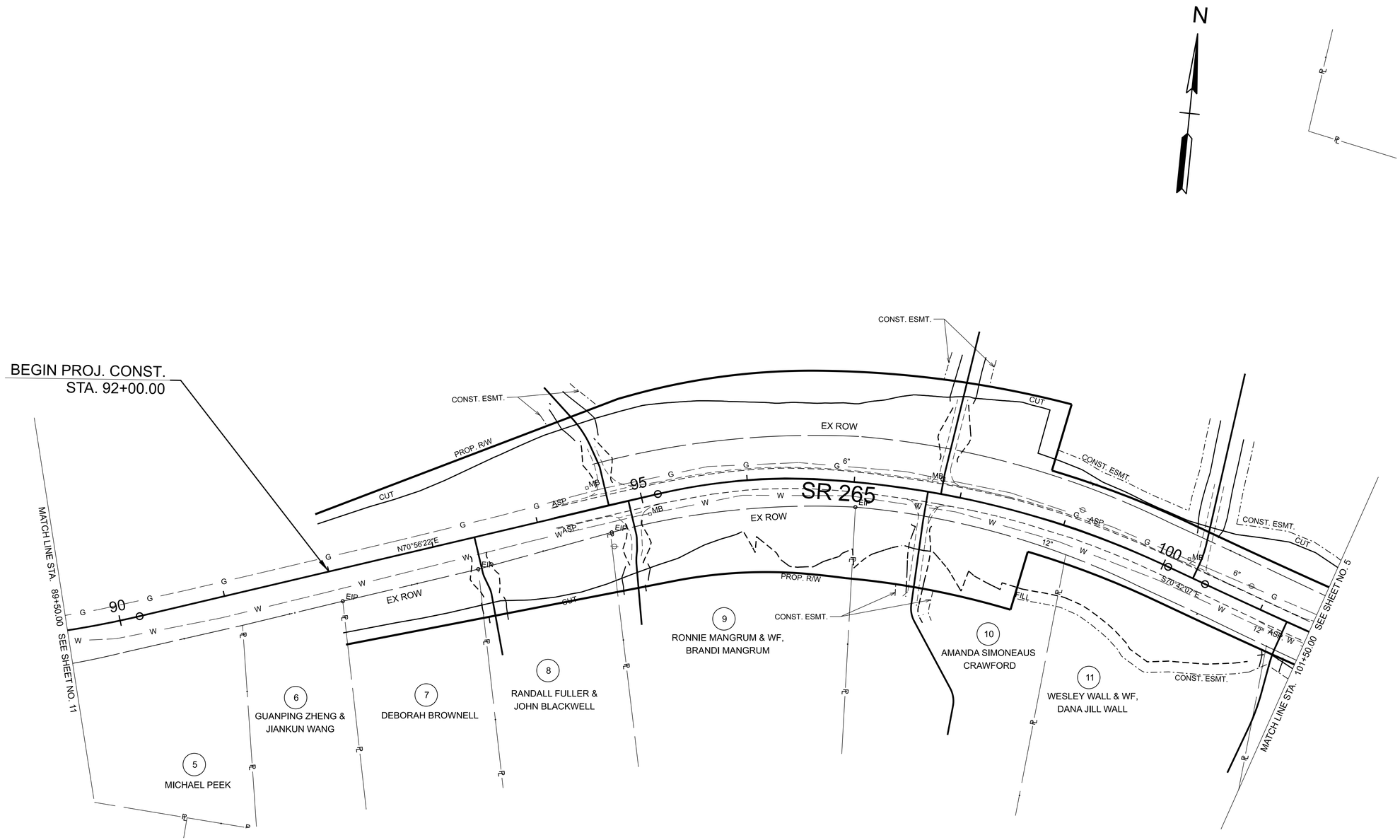
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 89+50 TO STA. 555+50
SCALE: 1" = 50'

2/4/2023 7:58:52 AM
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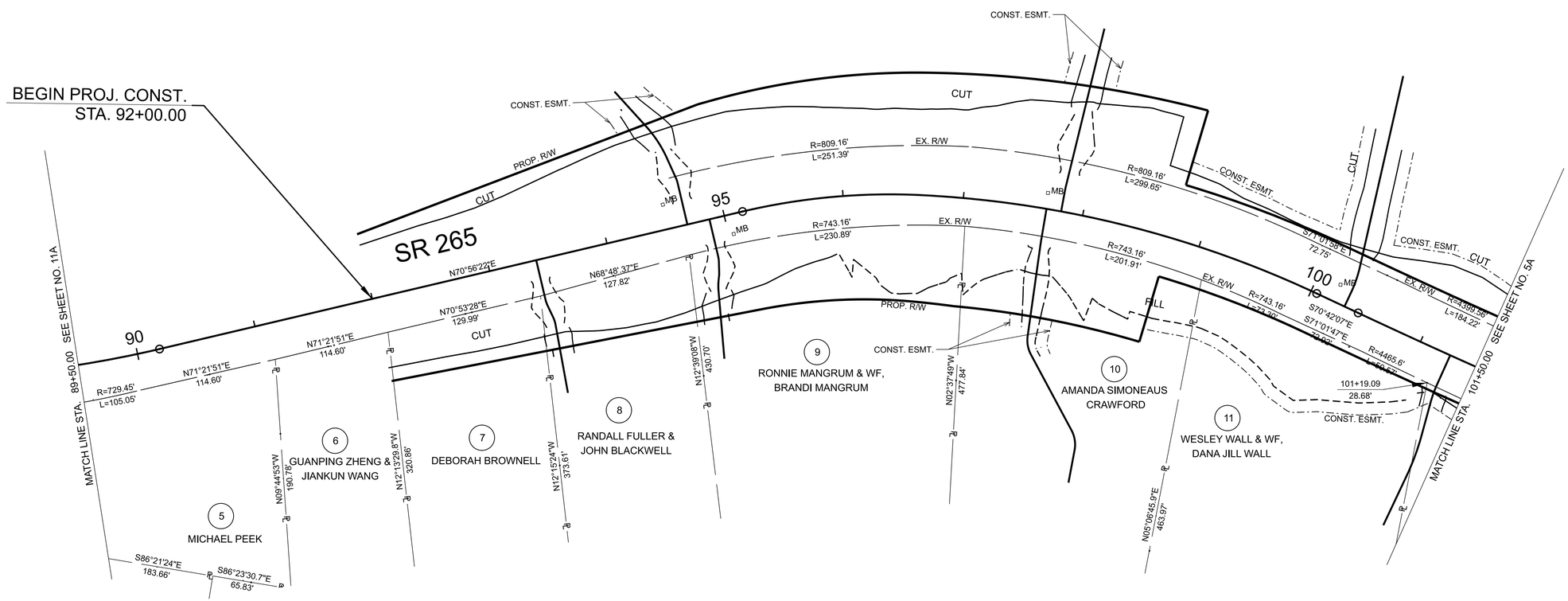
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4A



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 89+50 TO STA. 101+25
SCALE: 1" = 50'

2/4/2023 7:59:30 AM
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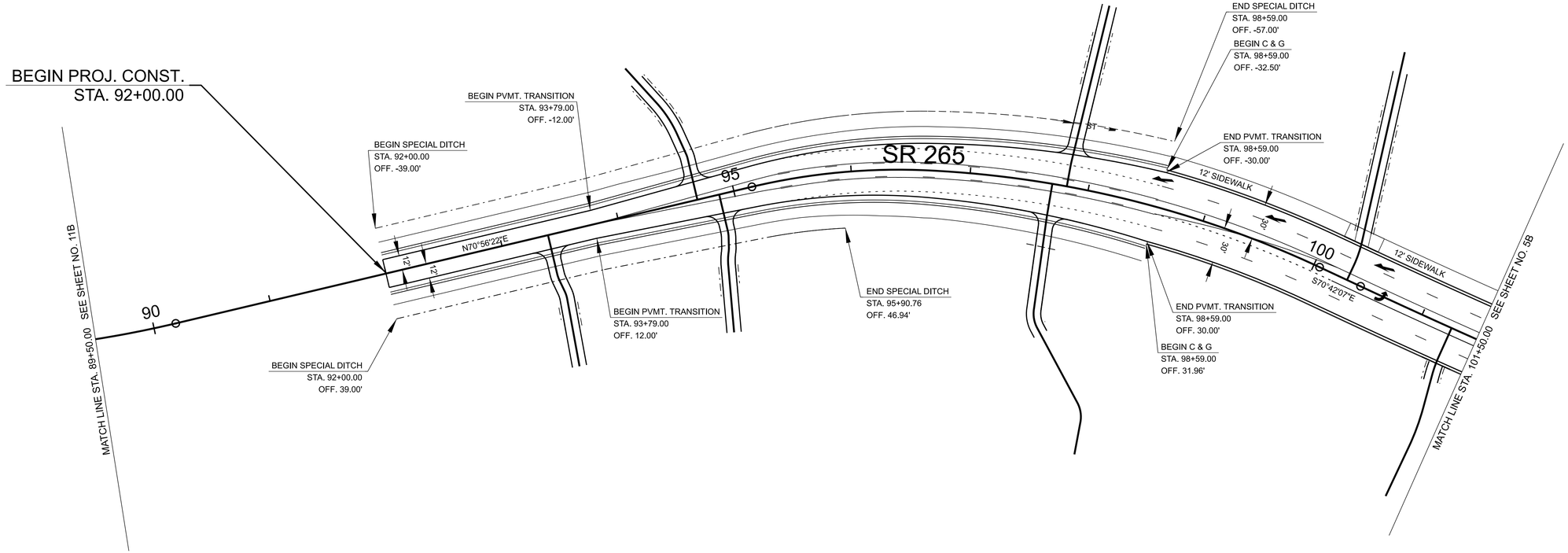
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	4B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 92+00 TO STA. 101+50
SCALE: 1" = 50'

2/4/2023 8:00:08 AM
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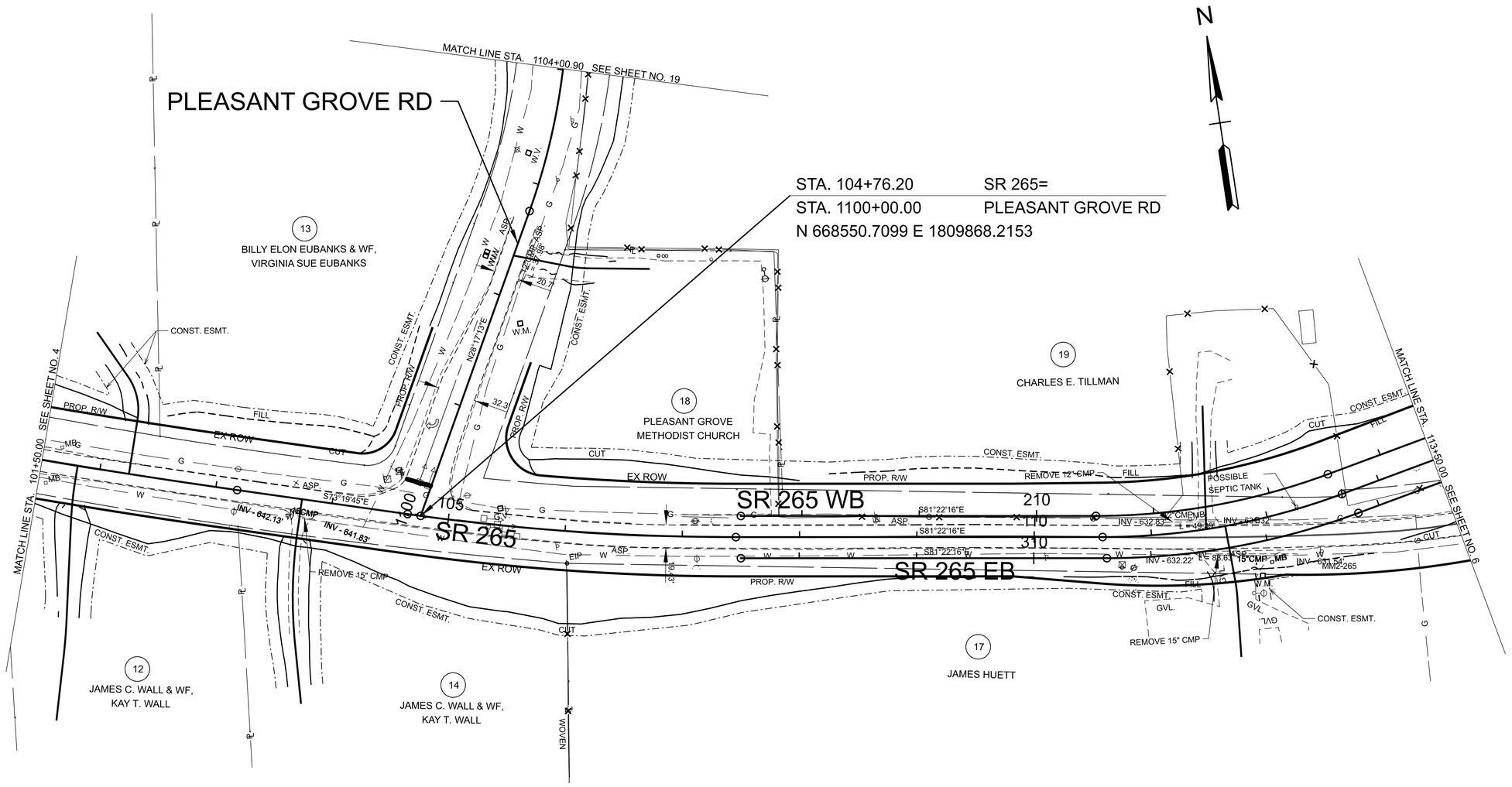
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:01:47 AM
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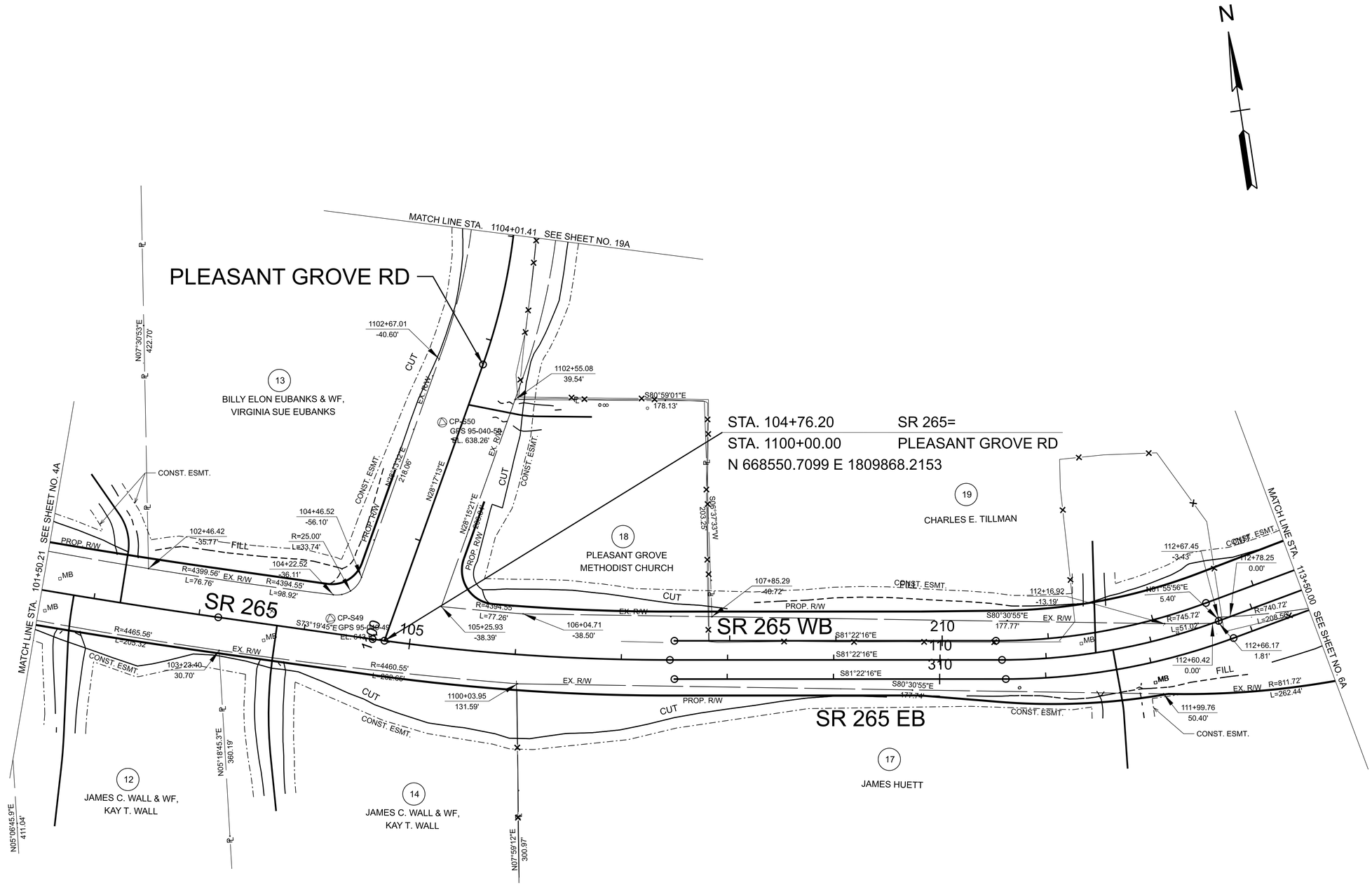
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5A

REV. ***DATE***
TEXT



INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

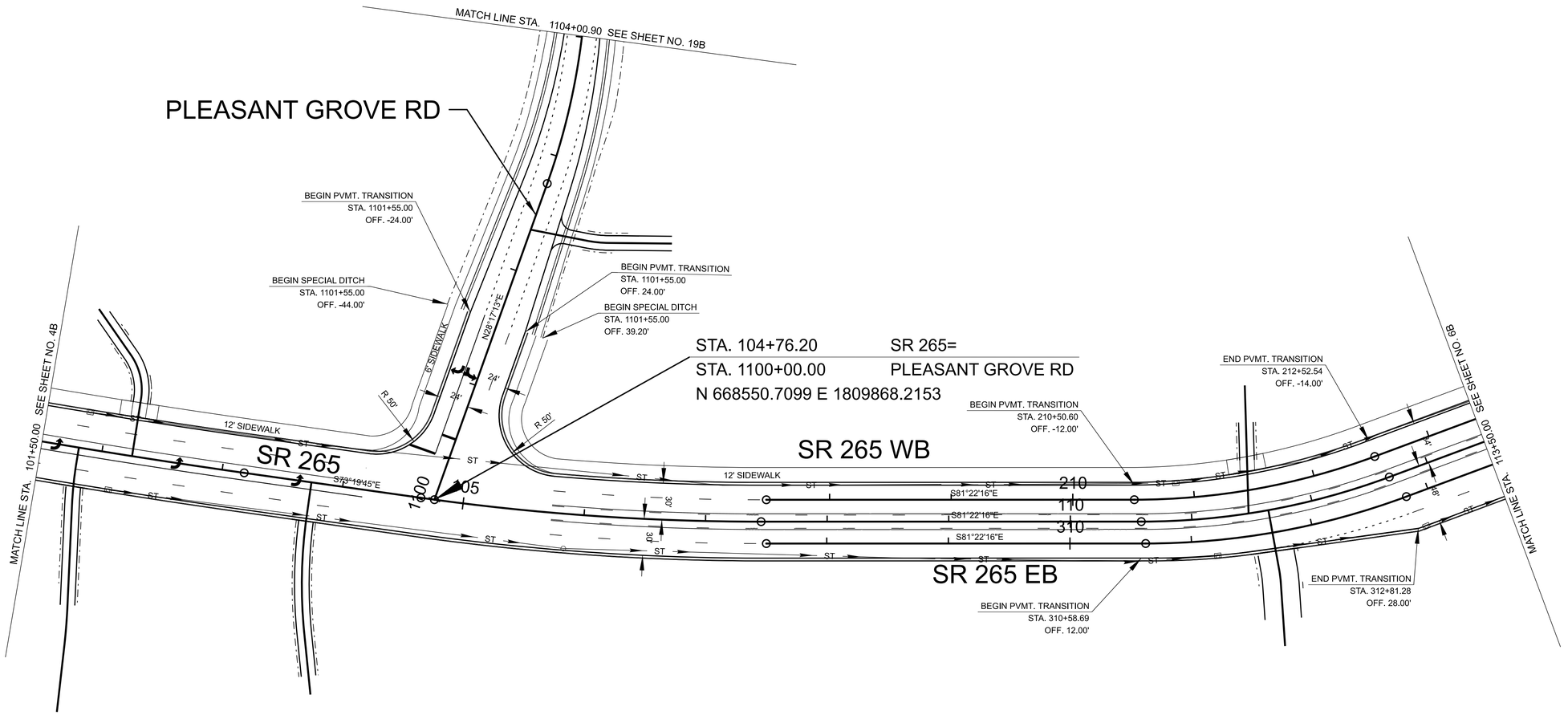
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 102+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:02:22 AM
C:\PWWORKING\EAST01\D2328414\950\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	5B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 101+50 TO STA. 113+50
SCALE: 1" = 50'

2/4/2023 8:03:02 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6

STA. 122+06.97 SR 265=
STA. 321+94.93 SR 265 EB
N 668311.2545 E 1811534.1560

STA. 121+53.18 SR 265=
STA. 221+63.84 SR 265 WB
N 668345.2678 E 1811492.5014

STA. 222+07.03 SR 265 WB=
STA. 321+82.73 SR 265 EB
N 668313.9797 E 1811522.2647

N

MATCH LINE STA. 507+00.00 SEE SHEET NO. 14

CUT

PROP. R/W

505 S87°14'28"E

RAMP B

RAMP BB

S87°14'28"E

FILL

W

W.M.

W.V.

WOVEN FENCE WIRE

INV - 592.36'

30" ST

60" CMP

L = 125.58'

TOP - 592.27'
BOT - 592.27'

60" RCP 6.0

POSSIBLE SINKHOLE

1500

325

CONST. ESMT.

PROP. R/W

FILL

19

CHARLES E. TILLMAN

SR 265 WB

220

120

500 S57°31'00"E

N79°08'36"E

27

CHARLES E. TILLMAN

SR 265

EX ROW

ASP.

W

12"

S77°05'32"E

SR 265 EB

215

115

315

S59°50'50"E

320

N59°50'50"W

RAMP DD

24" CMP
L = 109.15'
INV - 593.83'

EP

ASP.

21

CHARLES E. TILLMAN

FILL

REMOVE 24" CMP

INV - 595.82'

12"CMP INV - 601.22'
L = 21.39'
INV - 600.51'

INV - 601.22'

20

CHARLES E. TILLMAN

PROP. R/W

17

JAMES HUETT

MATCH LINE STA. 833+25.00 SEE SHEET NO. 13

N78°15'32"E

N78°15'32"E

N78°15'32"E

MATCH LINE STA. 113+50.00 SEE SHEET NO. 5

VL

pMP

19 L.F.

ASP.

ASP.

ASP.

W

V

TOP - 606.64'
BOT - 599.59'

W

TOP - 604.89'
INV - 600.04'
INV - 598.89'
BOT - 599.04'

N76°16'29"E

835

RAMP D

C.A. FENCE

FILL

INV - 602.30'
INV - 602.30'

INV - 600.31'

MATCH LINE STA. 591+50.00 SEE SHEET NO. 13

CONC

16" CMP

INV - 621.58'

INV - 621.58'

EXIST. BRIDGE B510040000011

INV - 598.77'

S 38°06'06"E

S 38°06'06"E

JERSEY ST

MATCH LINE STA. 125+50.00 SEE SHEET NO. 7

SEE SHEET NO. 7

I-40

V

W

18'

ASP.

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

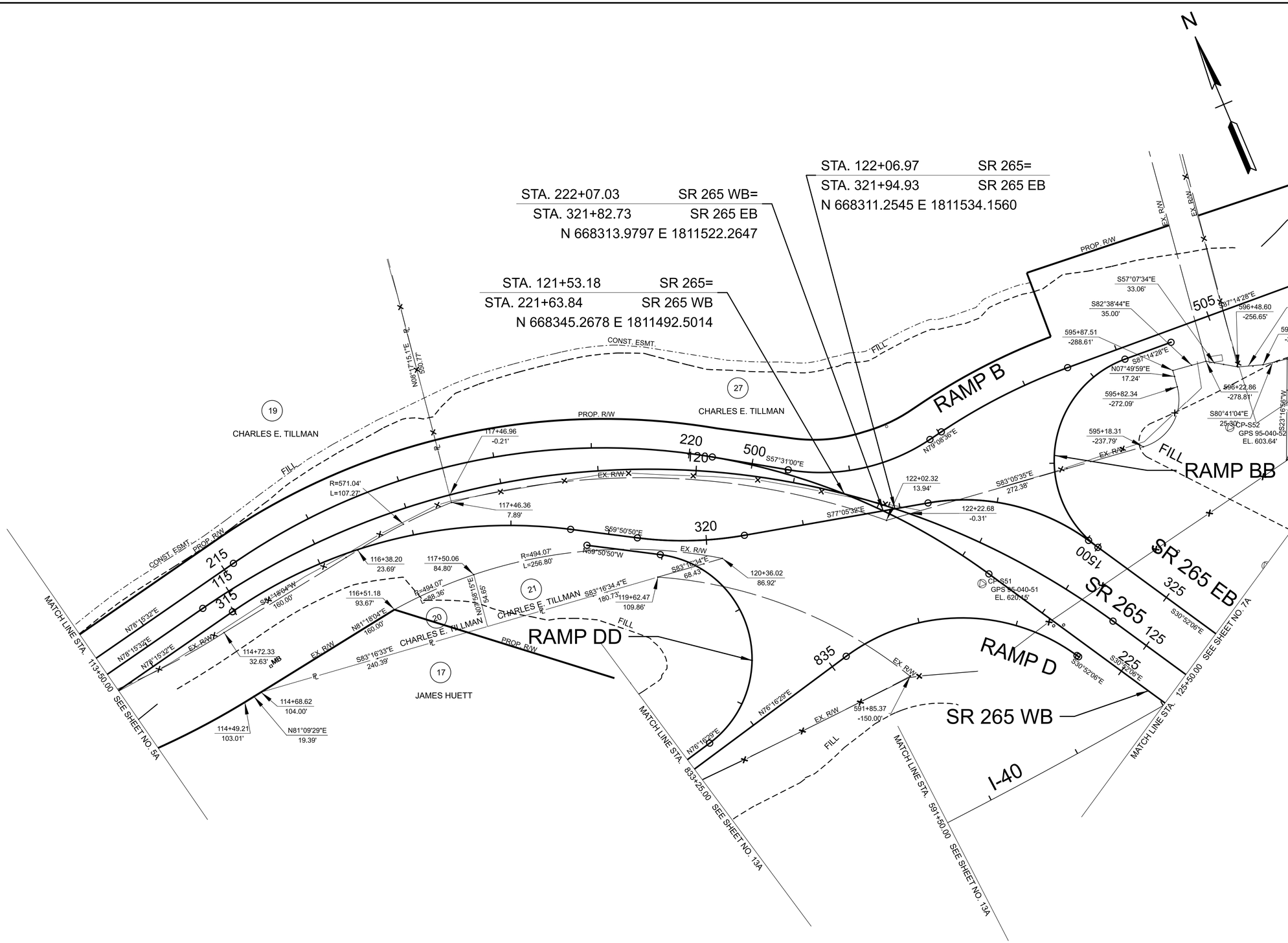
PRESENT LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:06:01 AM
C:\PWWORKING\EAST01\D2328414195\I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:06:38 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	6B

STA. 321+82.73 SR 265 EB=
STA. 222+07.03 SR 265 WB
N 668313.9797 E 1811522.2647

SR 265 WB
SR 265
SR 265 EB
RAMP B
RAMP BB
RAMP D
RAMP DD
I-40

BEGIN SPECIAL DITCH
STA. 505+75.00
OFF. -45.00'

MATCH LINE STA. 507+00.00 SEE SHEET NO. 14B

END C & G
STA. 503+42.25
OFF. -22.54'

BEGIN PVMT. TRANSITION
STA. 501+78.47
OFF. -12.57'

END PVMT. TRANSITION
STA. 1502+36.89
OFF. -12.00'

END C & G
STA. 1502+36.89
OFF. 4.54'

END Sidewalk
STA. 501+25.95
OFF. -33.93'

END PVMT. TRANSITION
STA. 500+37.27
OFF. -14.00'

END Sidewalk
STA. 322+73.42
OFF. -18.75'

BEGIN PVMT. TRANSITION
STA. 1500+64.36
OFF. -13.00'

CONNECT PROP. RAMP TO EXS. STORM

BEGIN C & G
STA. 1500+16.05
OFF. 14.93'

CURVE DATA SHOWN ON SHEETS 1C1-1C2

MATCH LINE STA. 113+50.00 SEE SHEET NO. 5B

MATCH LINE STA. 833+25.00 SEE SHEET NO. 13B

MATCH LINE STA. 591+50.00 SEE SHEET NO. 13B

MATCH LINE STA. 125+50.00 SEE SHEET NO. 7B

BEGIN PVMT. TRANSITION
STA. 1803+00.00
OFF. -13.80'

END PVMT. TRANSITION
STA. 836+98.42
OFF. -13.45'

BEGIN PVMT. TRANSITION
STA. 835+17.72
OFF. -12.01'

END PVMT. TRANSITION
STA. 1800+44.57
OFF. -12.00'

END C & G
STA. 1800+47.85
OFF. -22.54'

END C & G
STA. 837+46.37
OFF. 15.86'

BEGIN PVMT. TRANSITION
STA. 835+17.72
OFF. 12.00'

END PVMT. TRANSITION
STA. 837+71.58
OFF. 14.00'

BEGIN C & G
STA. 834+79.35
OFF. 16.54'

BEGIN RETAINING WALL
STA. 592+31.00
OFF. -72.00'

GRASS
CURB
12' SIDEWALK

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

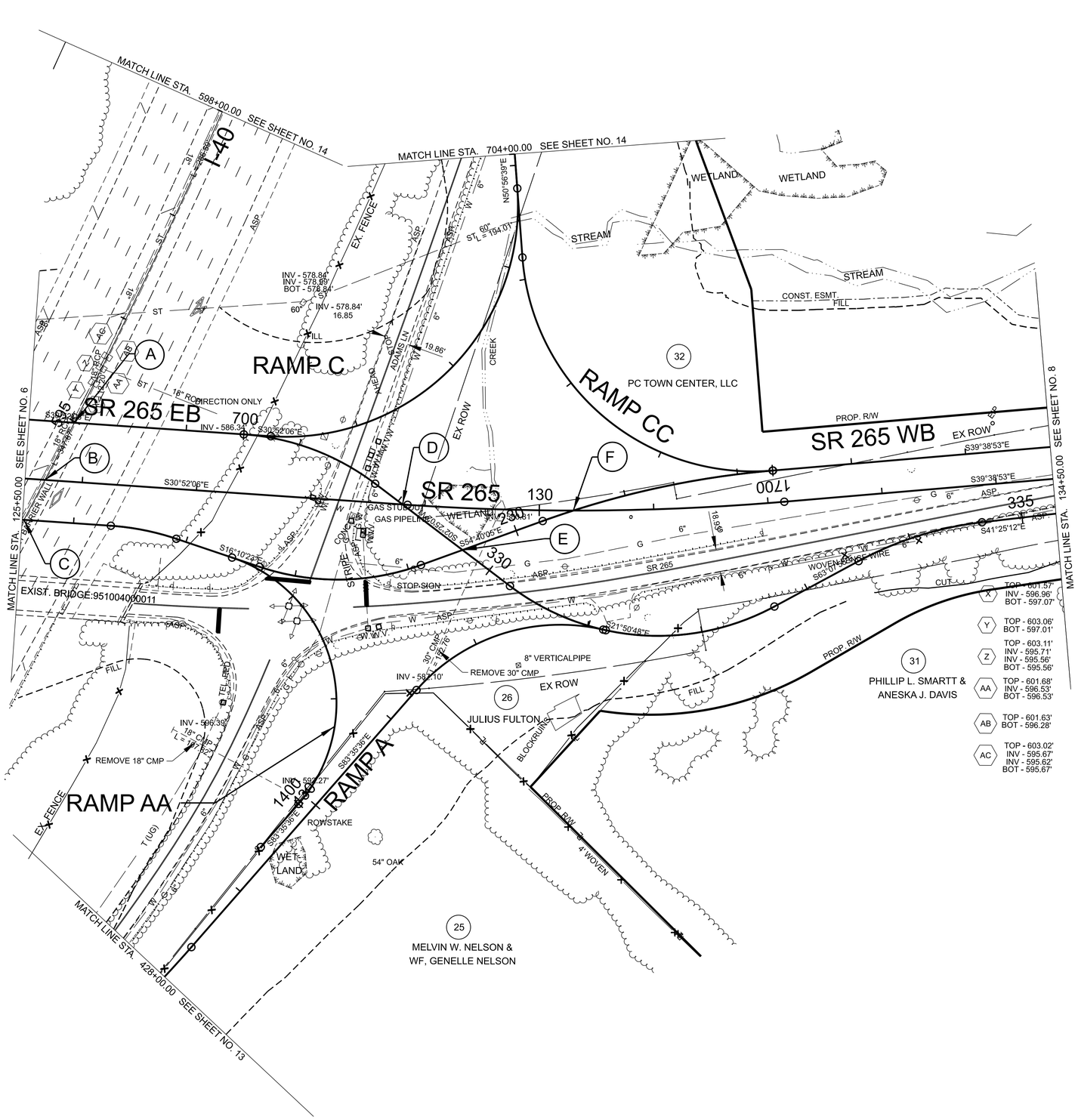
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 113+50 TO STA. 125+50
SCALE: 1" = 50'

2/4/2023 8:07:16 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 329+70.57 SR 265 EB=
STA. 229+50.16 SR 265 WB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

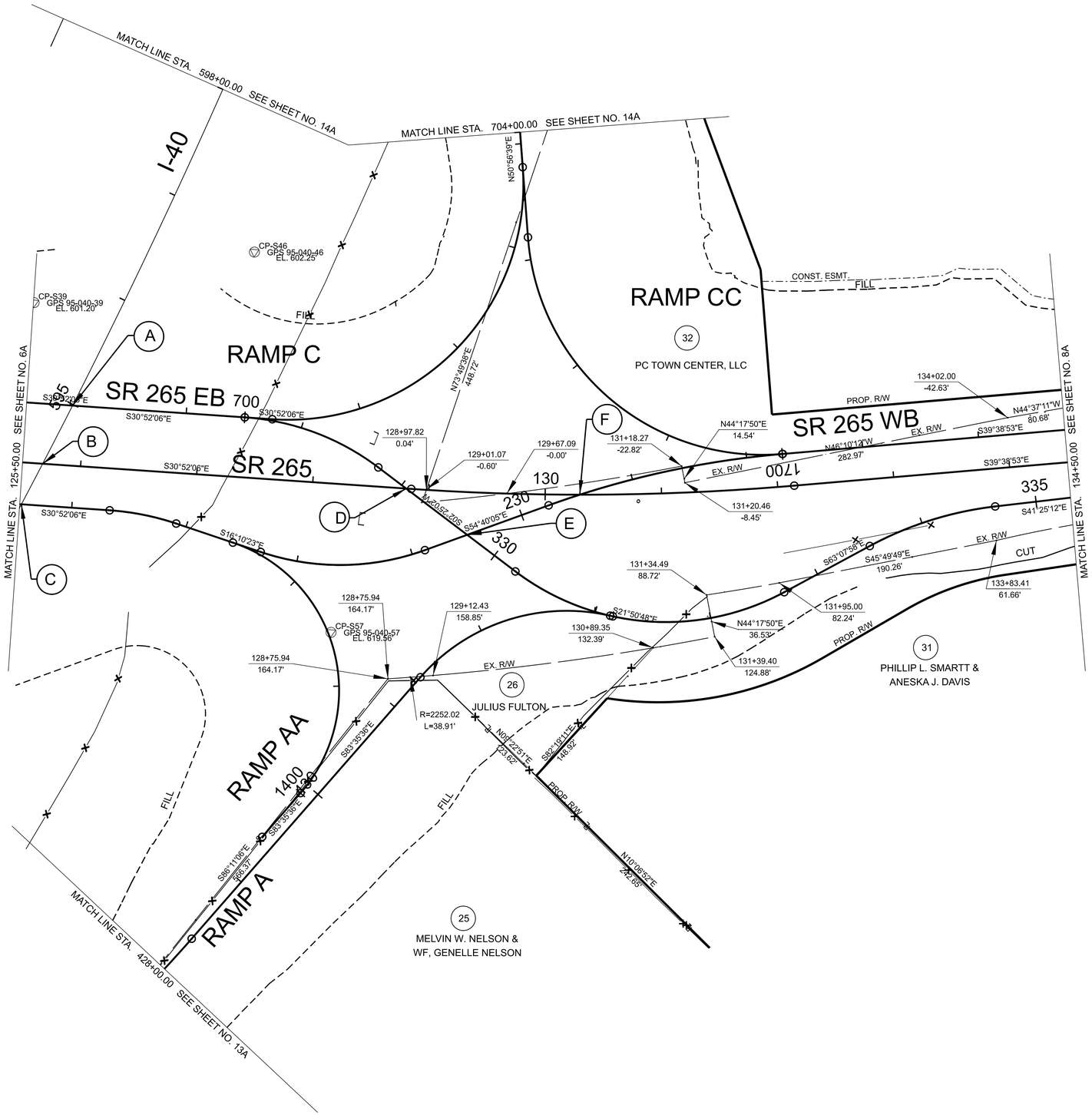
PRESENT LAYOUT
SR 265

STA. 125+50 TO STA. 335+50
SCALE: 1" = 50'

2/4/2023 8:11:34 AM
C:\PW\WORKING\EAST\T01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7A

REV. ***DATE***
TEXT



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 229+50.16 SR 265 WB=
STA. 329+70.57 SR 265 EB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

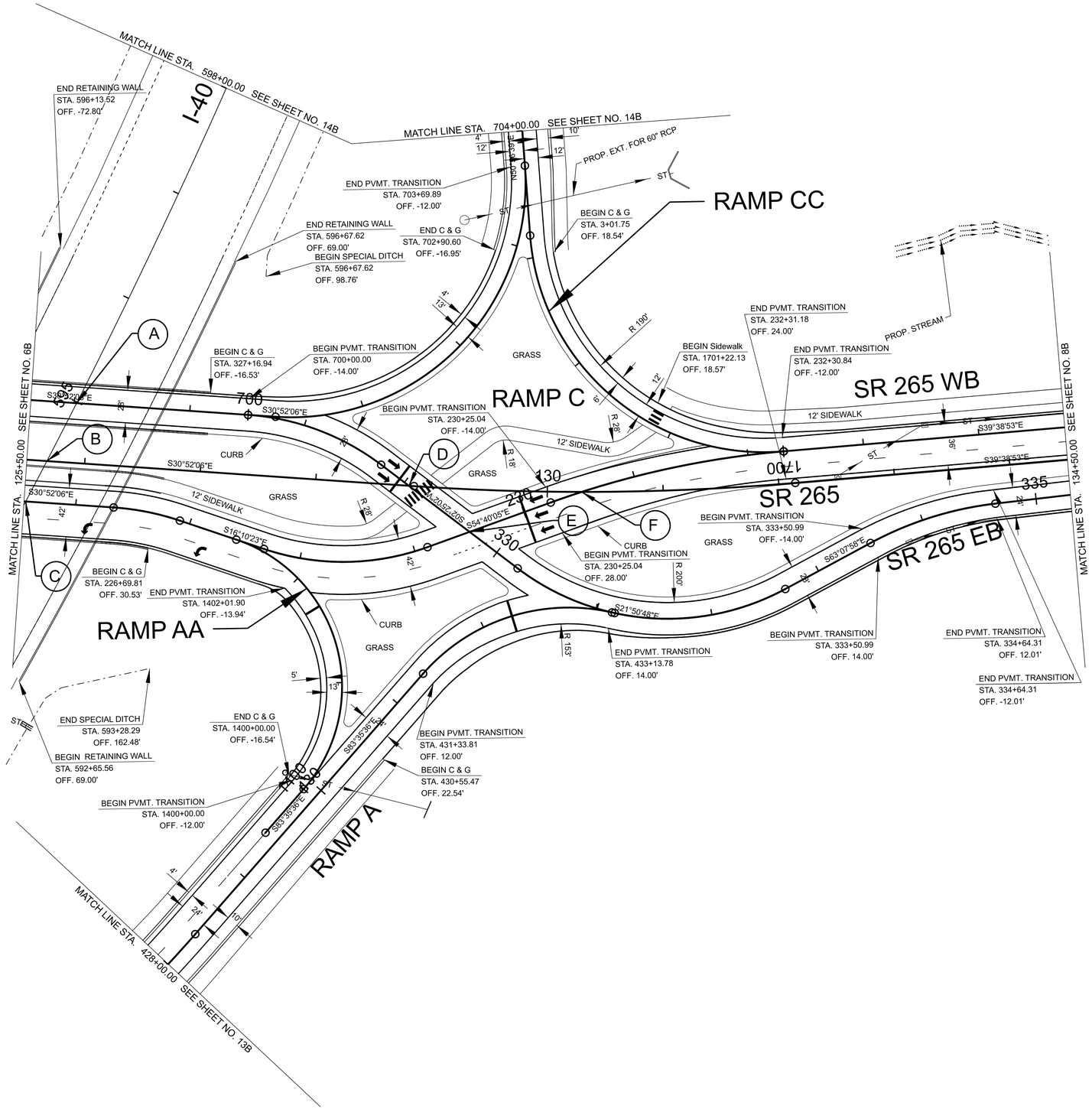
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 125+50 TO STA. 134+50
SCALE: 1" = 50'

2/4/2023 8:12:09 AM
C:\PW\WORKING\EAST01\D2328414195\l040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	7B



(A) STA. 594+99.07 I-40=
STA. 326+02.07 SR 265 EB
N 668032.8876 E 1811806.1333

(B) STA. 594+42.89 I-40=
STA. 125+67.32 SR 265
N 668025.4896 E 1811750.4440

(C) STA. 594+03.55 I-40=
STA. 225+56.61 SR 265 WB
N 668020.6344 E 1811711.4051

(D) STA. 128+80.44 SR 265=
STA. 329+04.78 SR 265 EB
N 667756.7194 E 1811911.0979

(E) STA. 229+50.16 SR 265 WB=
STA. 329+70.57 SR 265 EB
N 667690.9892 E 1811908.3233

(F) STA. 130+29.74 SR 265=
STA. 230+52.89 SR 265 WB
N 667631.1705 E 1811991.8312

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 125+50 TO STA. 134+50
SCALE: 1" = 50'

2/4/2023 8:12:48 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8

END PROJ. CONST.
STA. 1614+00.00

STA. 143+28.07 SR 265=
STA. 1610+00.00 PROVIDENCE PKWY
N 666588.5226 E 1812763.7116

SR 265 WB

SR 265

SR 265 EB

PROVIDENCE PKWY

PC TOWN CENTER, LLC

THE ENCLAVE AT PROVIDENCE PROPERTY, LLC

PHILLIP L. SMARTT & WF, MARY R. SMARTT

PHILLIP L. SMARTT & ANESKA J. DAVIS

PHILLIP L. SMARTT, TRUSTEE

EXTEND 18.5' X5' RCBC

EXTEND 18.5' X 5' RCBC

RELCOATE STREAM

REMOVE 18" CMP

REMOVE EXS. 5.7'X 3.8' BOX CULVERT

REMOVE 15" CMP

REMOVE MULTIPLE 18" CMP PIPES

REMOVE 12" CMP

CONST. ESMT.

PROP. R/W

EX ROW

STREAM

POND

MATCH LINE STA. 134+50.00 SEE SHEET NO. 7

MATCH LINE STA. 146+50.00 SEE SHEET NO. 9

MATCH LINE STA. 1606+00.00 SEE SHEET NO. 17

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:17:07 AM
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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8A

REV. ***DATE***
TEXT

PROVIDENCE PKWY

END PROJ. CONST.
STA. 1614+00.00

STA. 143+28.07 SR 265=
STA. 1610+00.00 PROVIDENCE PKWY
N 666588.5226 E 1812763.7116

SR 265

PROVIDENCE PKWY

32 PC TOWN CENTER, LLC

34 THE ENCLAVE AT PROVIDENCE PROPERTY, LLC

36 PHILLIP L. SMARTT & WF, MARY R. SMARTT

31 PHILLIP L. SMARTT & ANESKA J. DAVIS

33 PHILLIP L. SMARTT, TRUSTEE

31 PHILLIP L. SMARTT & ANESKA J. DAVIS

MATCH LINE STA. 134+50.00 SEE SHEET NO. 7A

MATCH LINE STA. 146+50.00 SEE SHEET NO. 9A

MATCH LINE STA. 1606+00.00 SEE SHEET NO. 17A

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

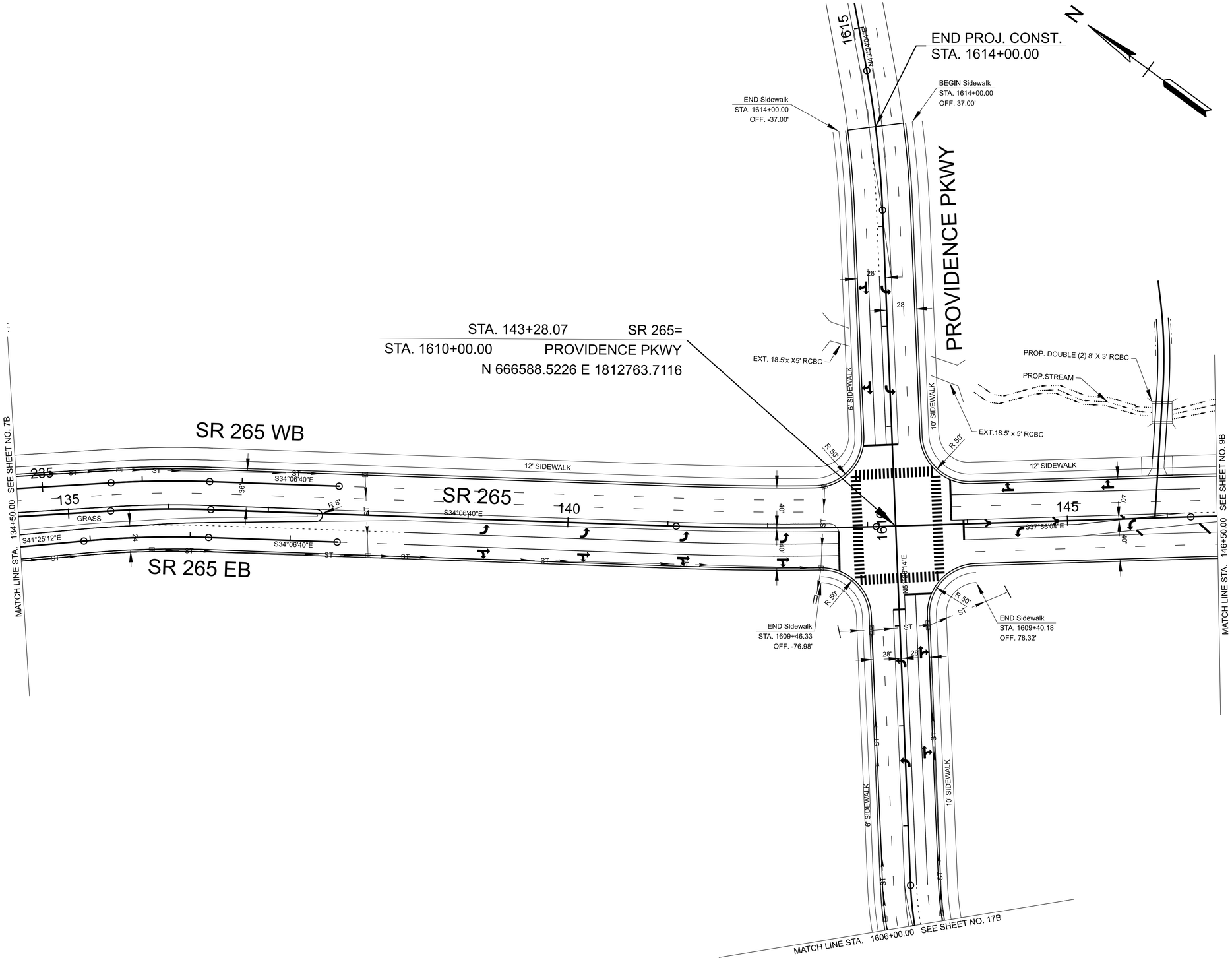
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:17:42 AM
C:\PWWORKINGIEAST01\D2328414\95\0040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	8B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

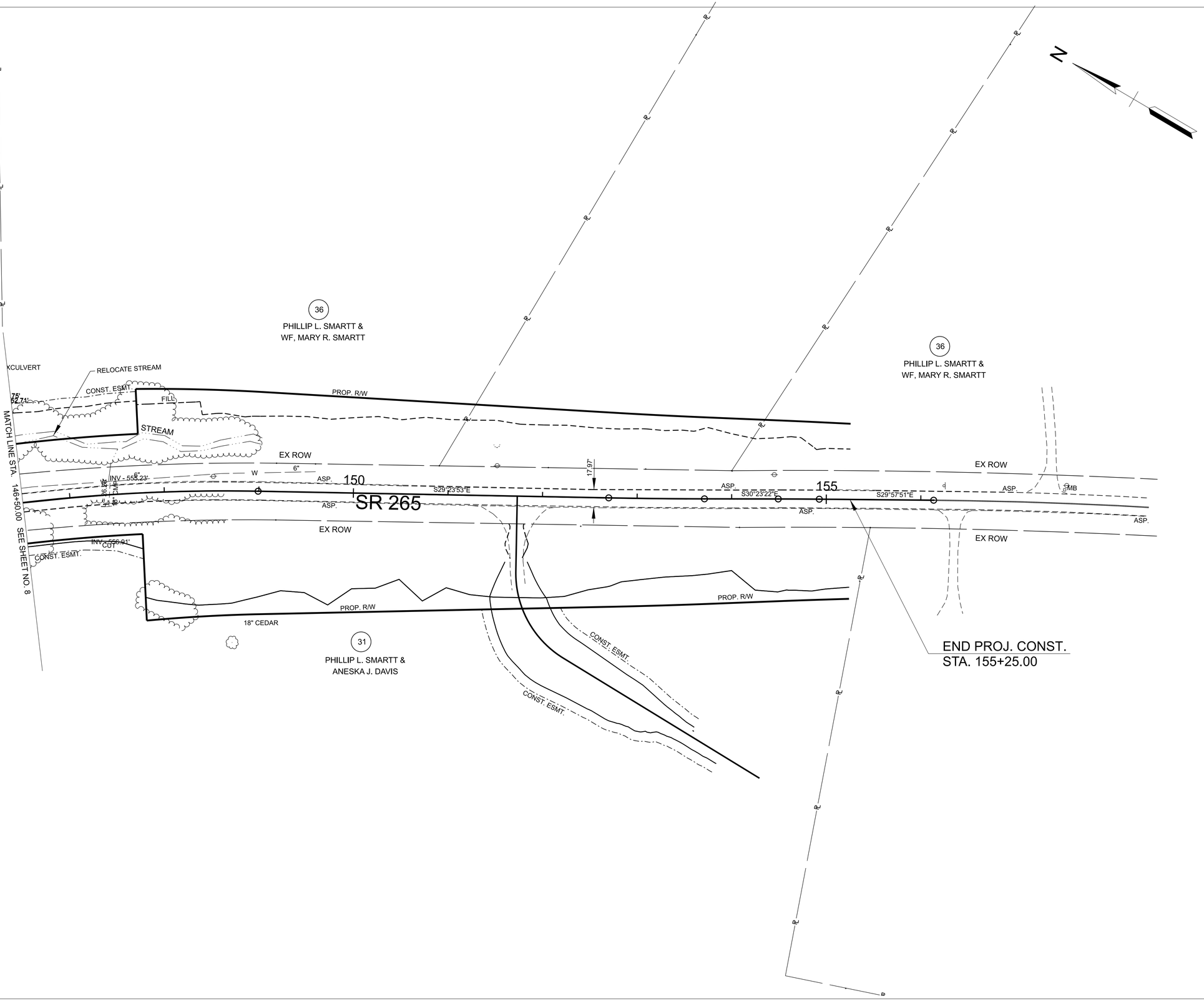
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 134+50 TO STA. 146+50
SCALE: 1" = 50'

2/4/2023 8:18:21 AM
C:\PW\WORKING\EAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
SR 265

STA. 146+50 TO STA. 149+50
SCALE: 1" = 50'

2/4/2023 8:21:16 AM
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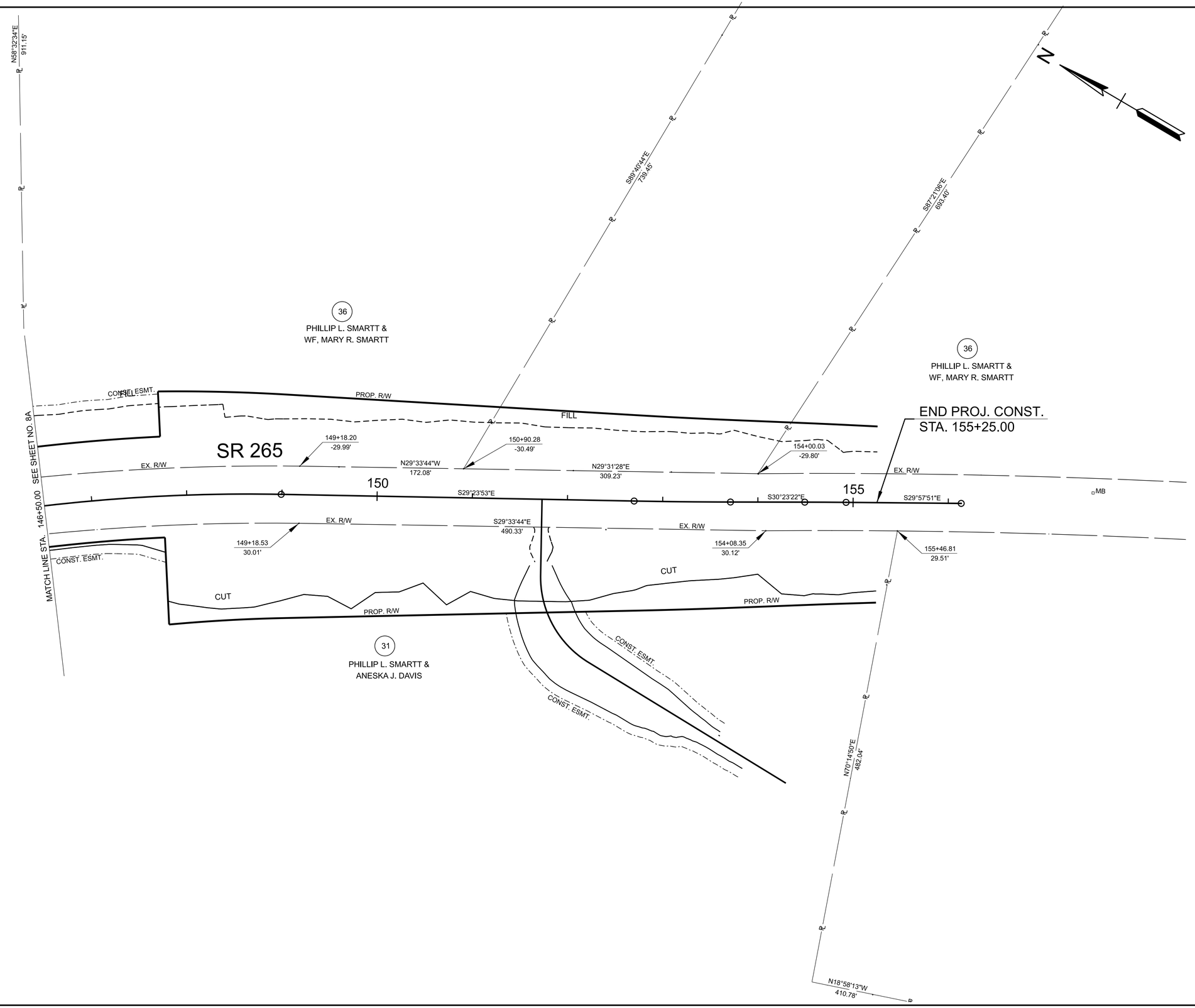
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

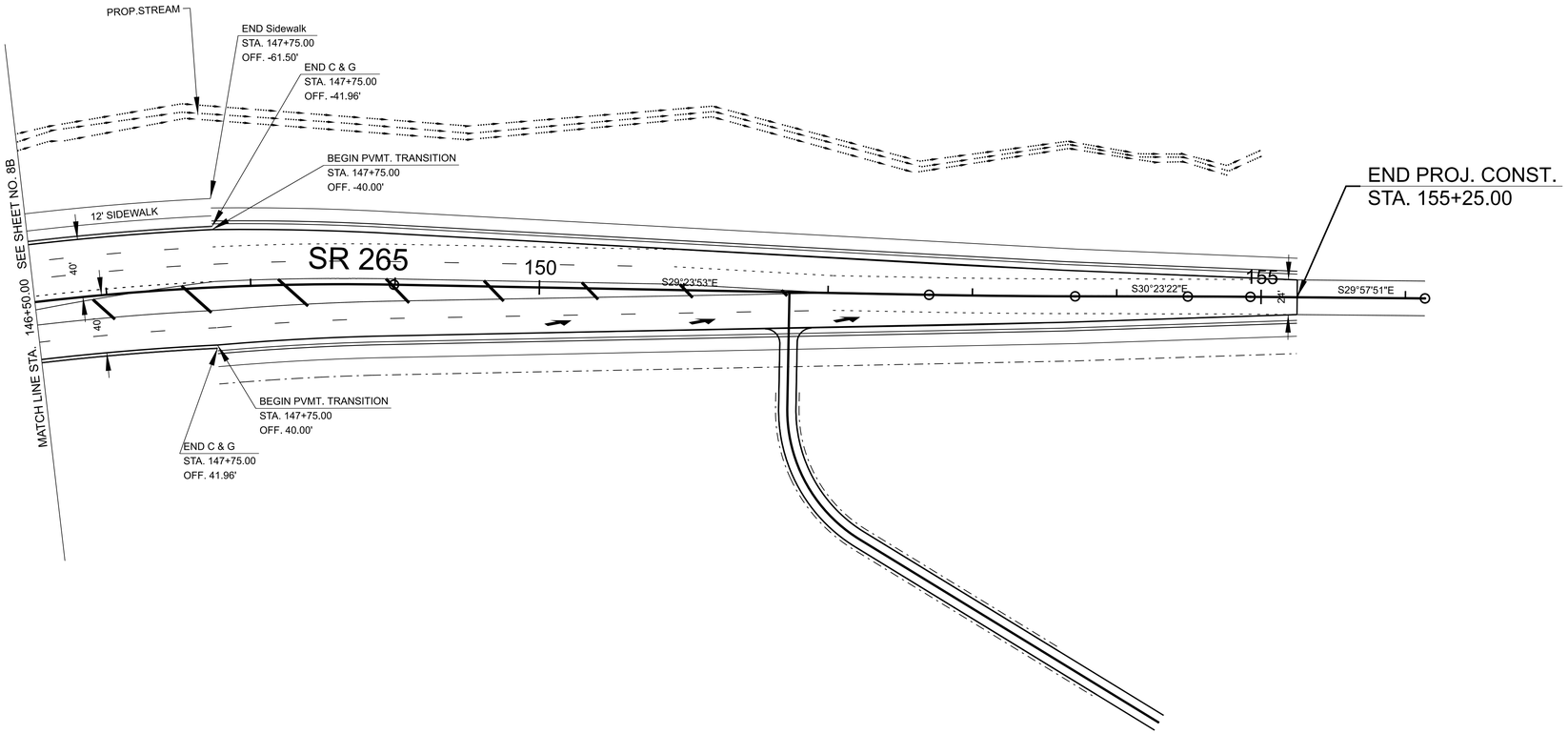
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
SR 265

STA. 146+50 TO STA. 155+25
SCALE: 1" = 50'

2/4/2023 8:21:50 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	9B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

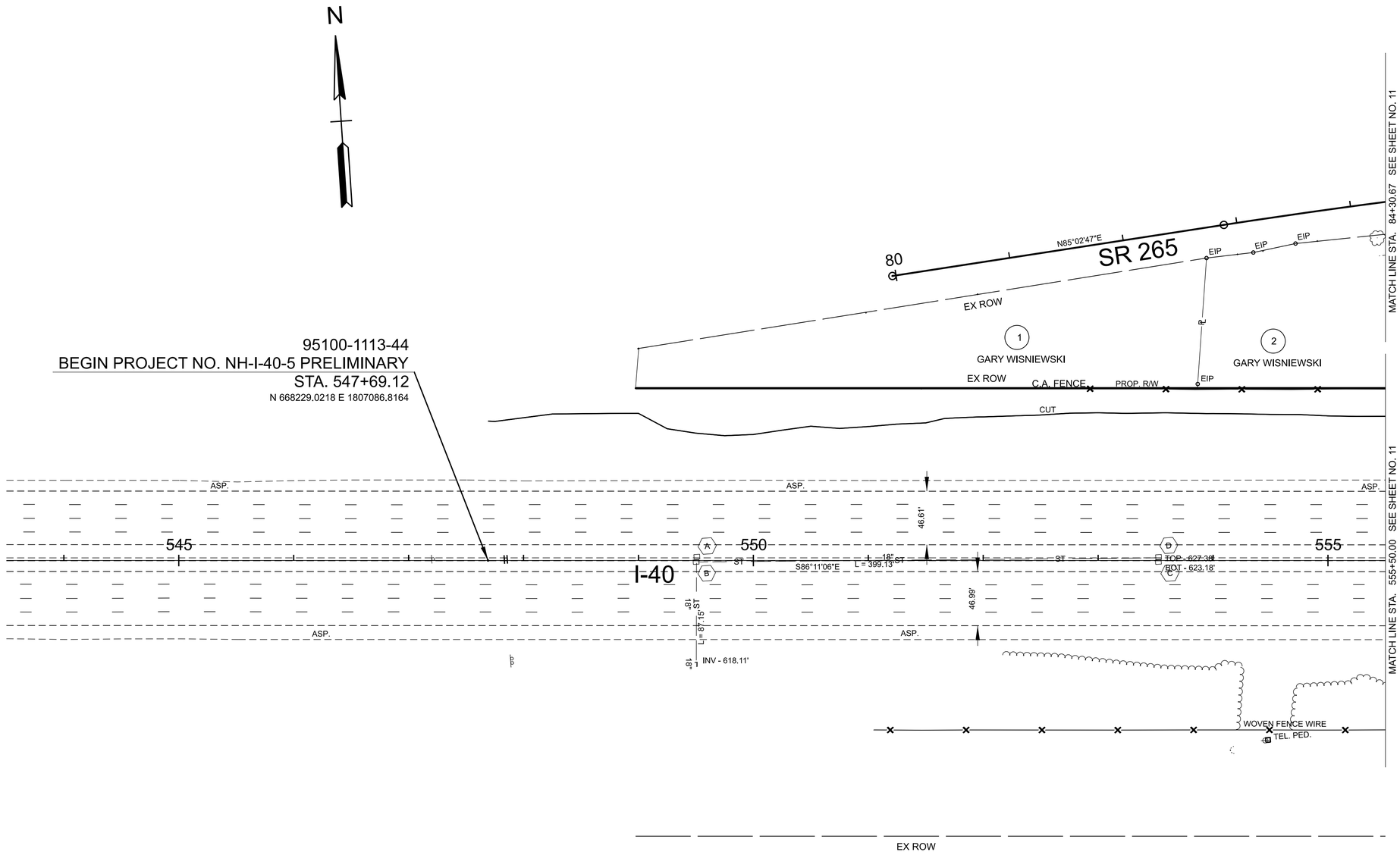
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
SR 265

STA. 146+50 TO STA. 155+25
SCALE: 1" = 50'

2/4/2023 8:22:29 AM
C:\PWWORKING\EAST01\D2328414\95l040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10



A TOP - 624.23'
BOT - 620.73'

B TOP - 624.33'
INV - 620.68'
INV - 620.48'
BOT - 620.68'

C TOP - 627.38'
BOT - 623.18'

D TOP - 627.42'
INV - 622.67'
BOT - 623.27'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

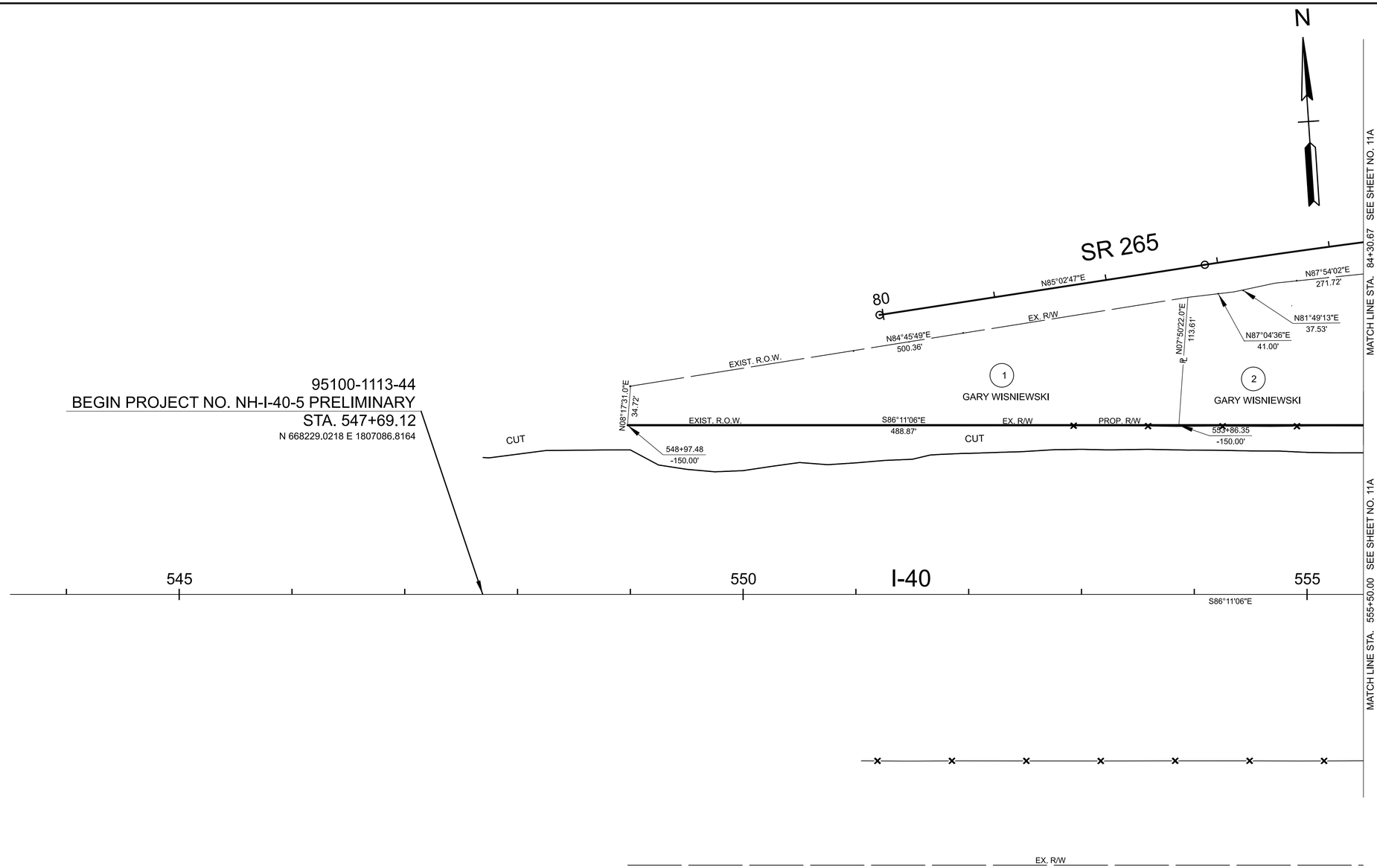
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 542+00 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:24:07 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10A



95100-1113-44
BEGIN PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 547+69.12
N 668229.0218 E 1807086.8164

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

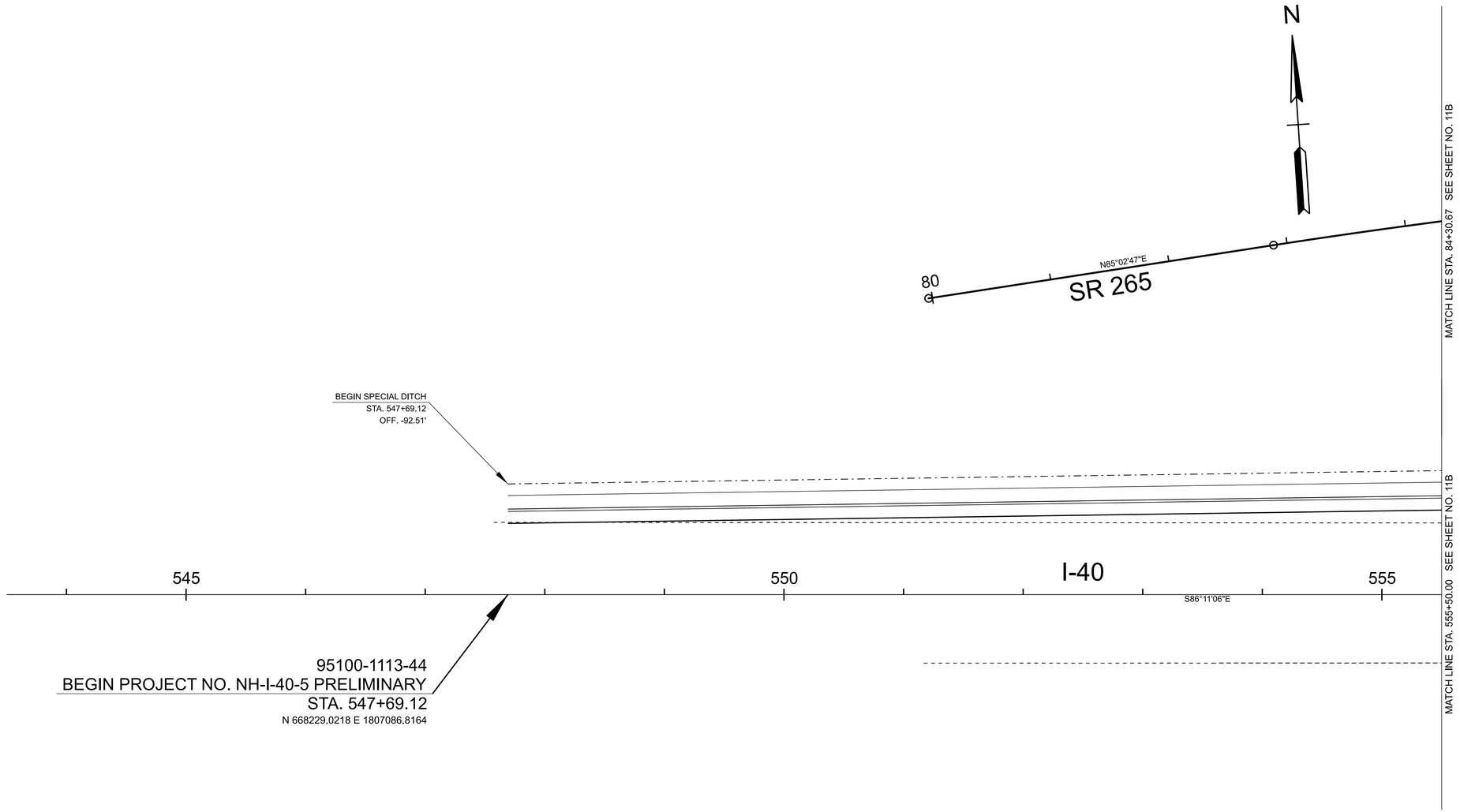
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 547+69 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:24:42 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	10B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

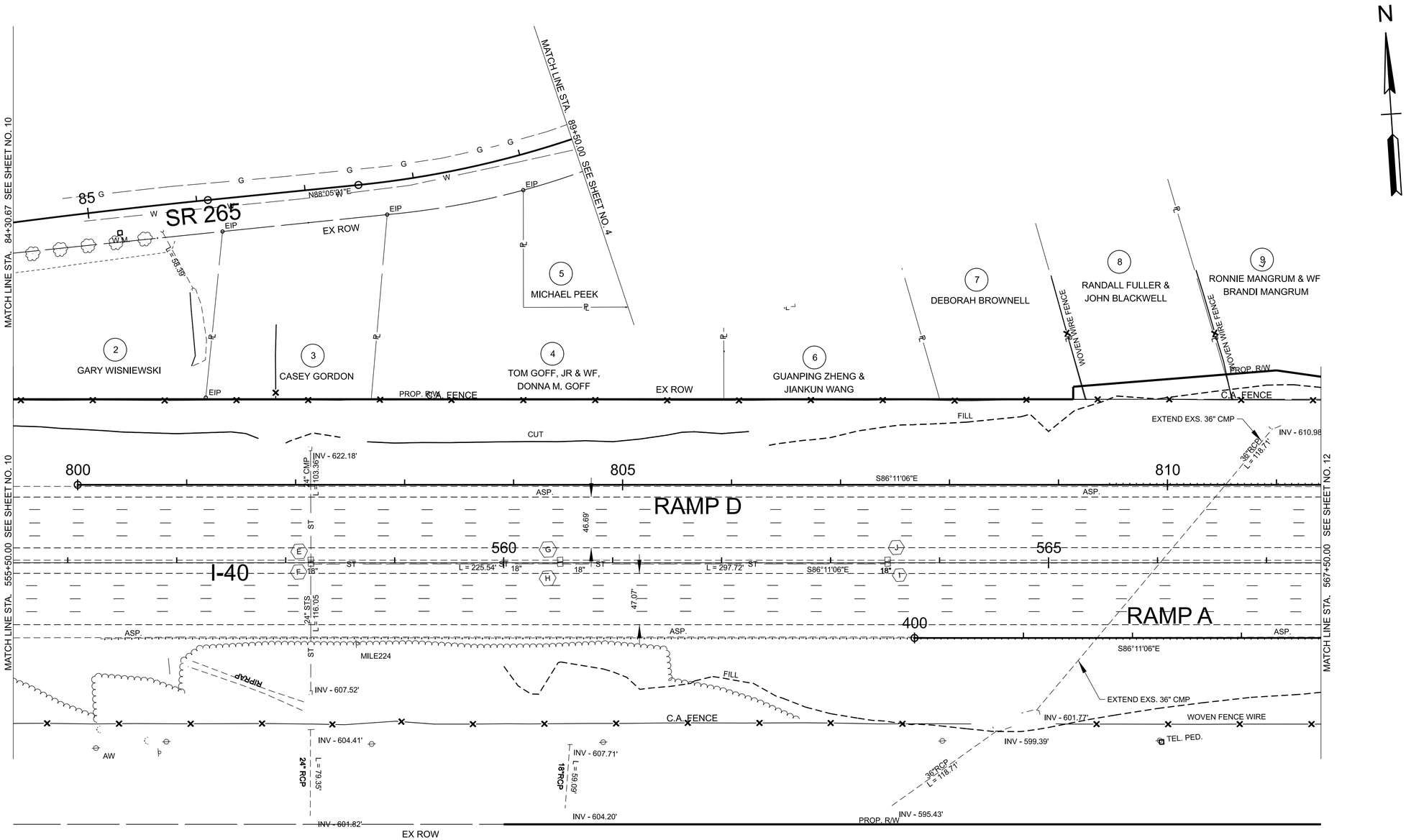
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 547+69 TO STA. 555+00
SCALE: 1" = 50'

2/4/2023 8:25:20 AM
C:\PWWORKING\EAST\01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11



E TOP - 631.06' INV - 615.66' BOT - 615.66'

F TOP - 631.19' INV - 615.64' INV - 615.74' INV - 619.34' BOT - 615.64'

G TOP - 632.95' INV - 627.25' INV - 627.20' BOT - 627.25'

H TOP - 632.99' BOT - 627.59'

I TOP - 635.42' BOT - 631.12'

J TOP - 635.48' INV - 630.58' BOT - 630.98'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

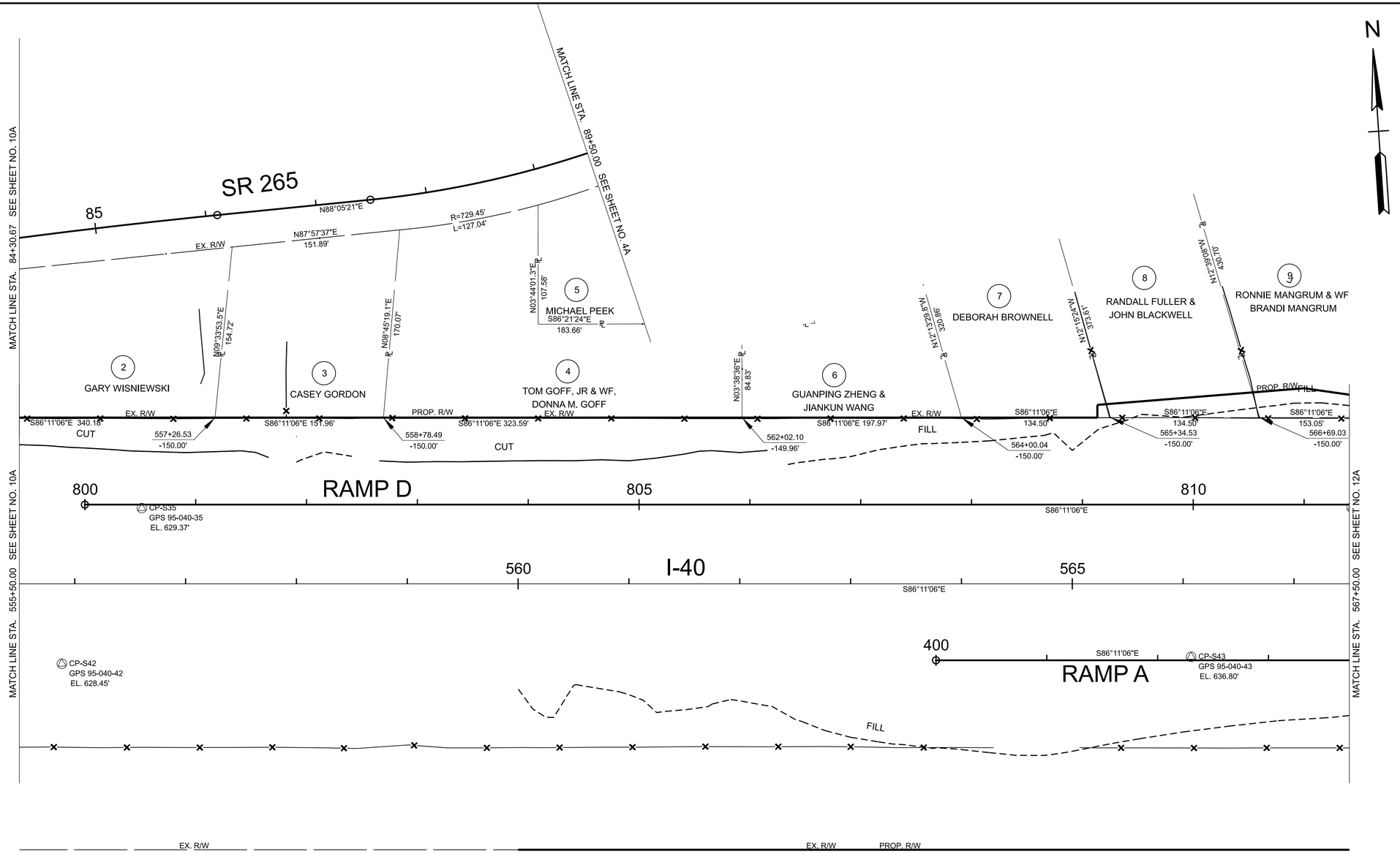
PRESENT LAYOUT
I-40

STA. 555+00 TO STA. 567+00
SCALE: 1" = 50'

2/4/2023 8:27:02 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

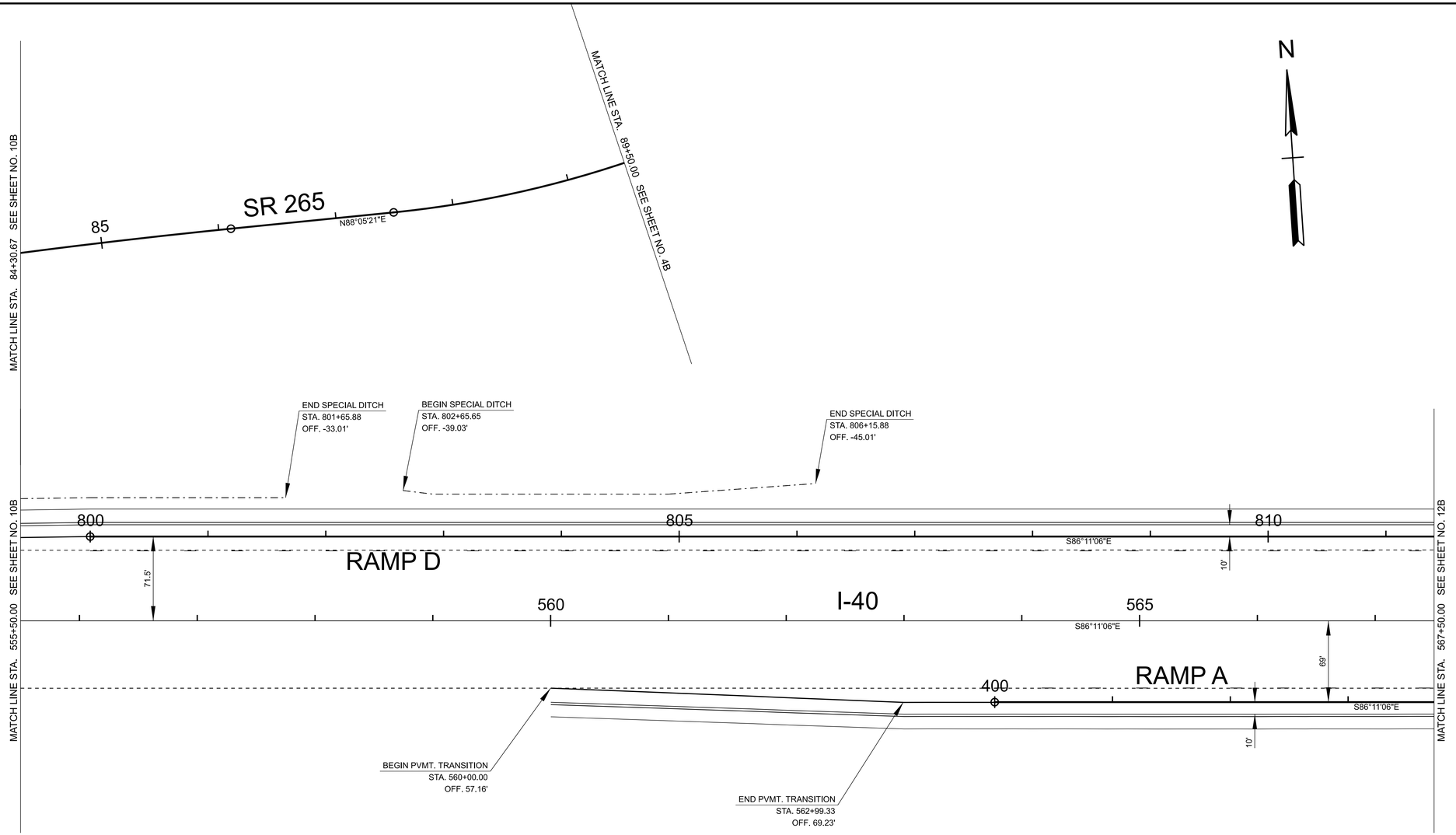
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 555+50 TO STA. 567+50
SCALE: 1" = 50'

2/4/2023 8:27:37 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	11B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

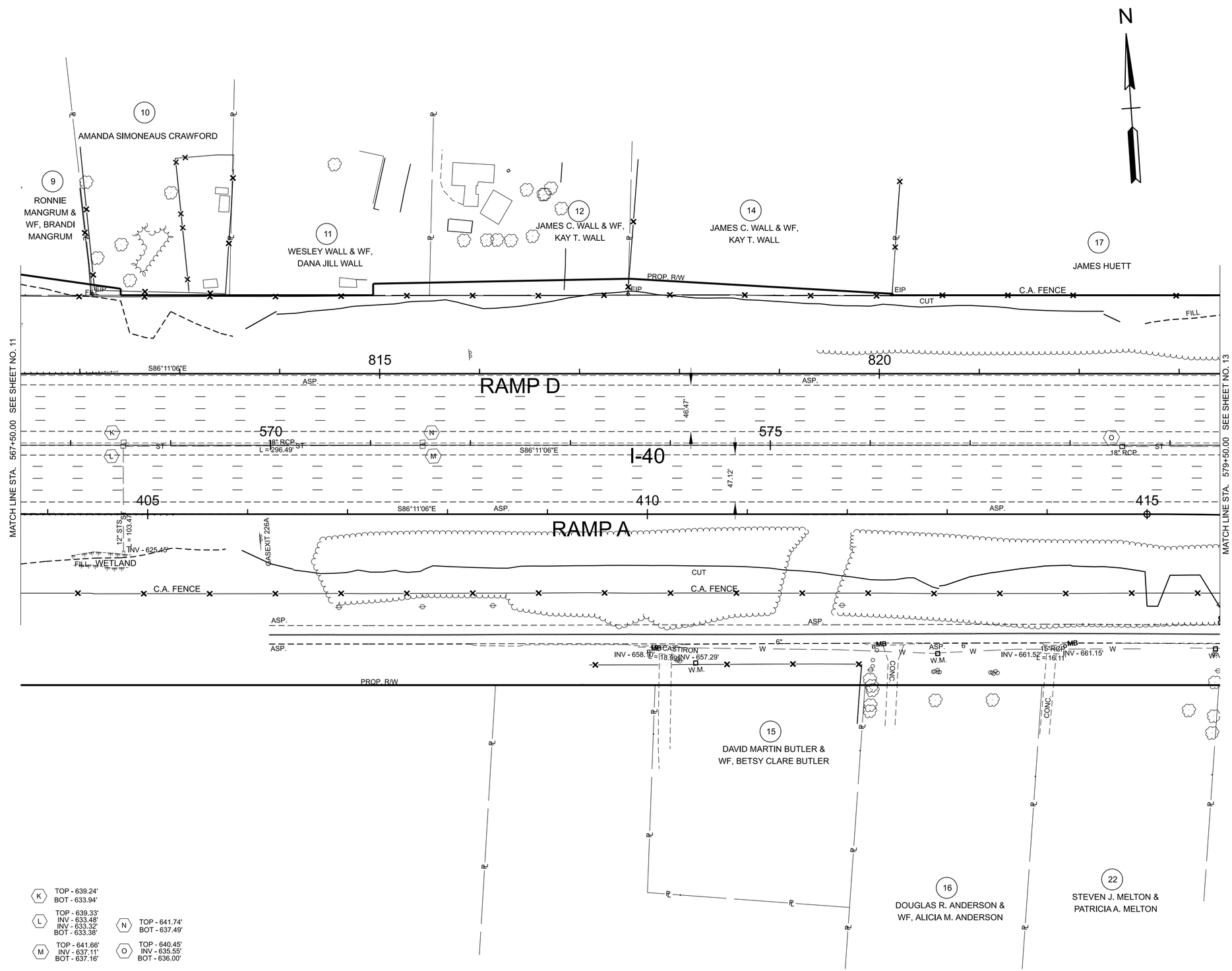
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 555+50 TO STA. 567+50
SCALE: 1" = 50'

2/4/2023 8:28:14 AM
C:\PWWORKING\EAST\T01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

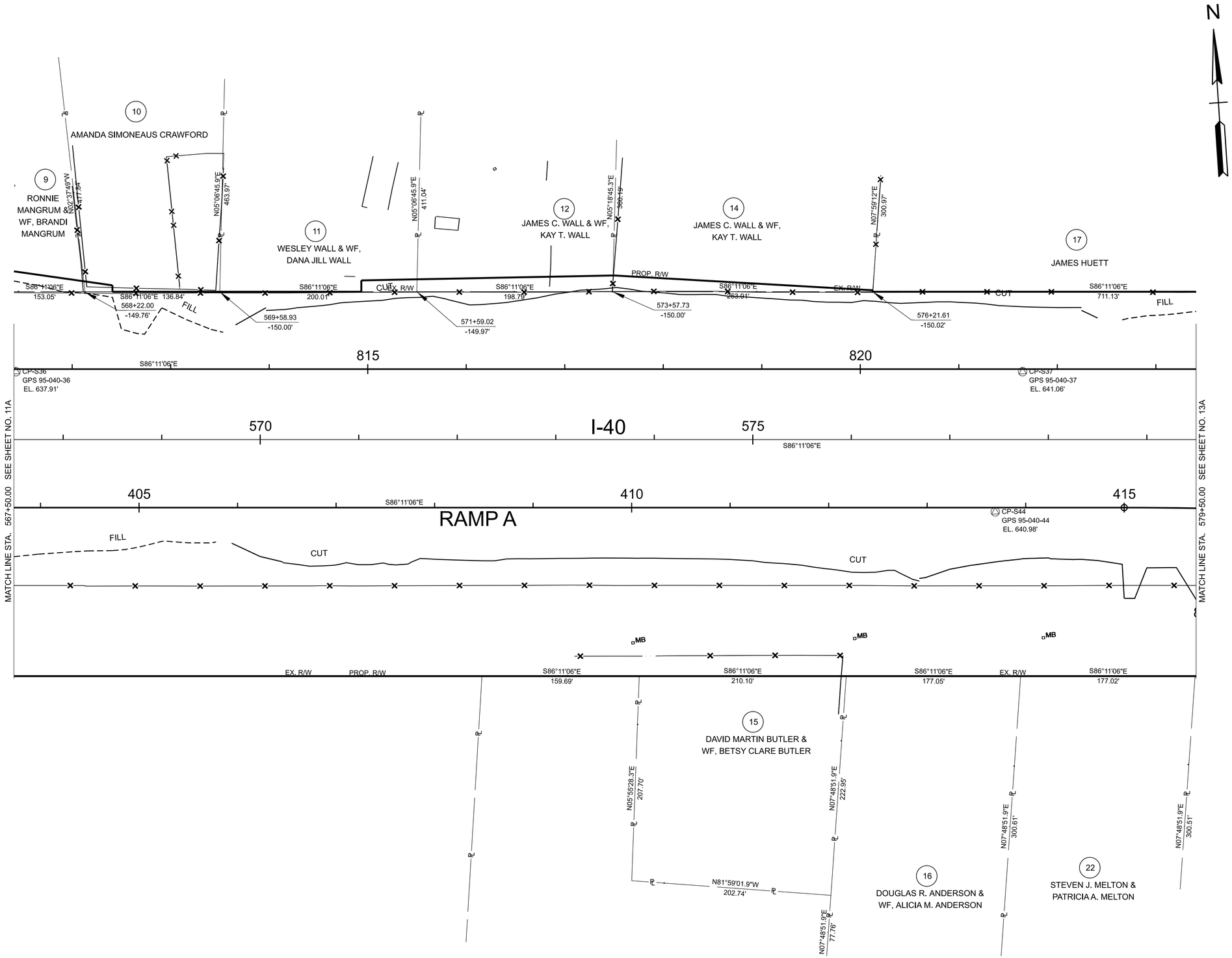
PRESENT LAYOUT
I-40

STA. 403+50 TO STA. 415+50
SCALE: 1" = 50'

2/4/2023 8:30:30 AM
C:\PW\WORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

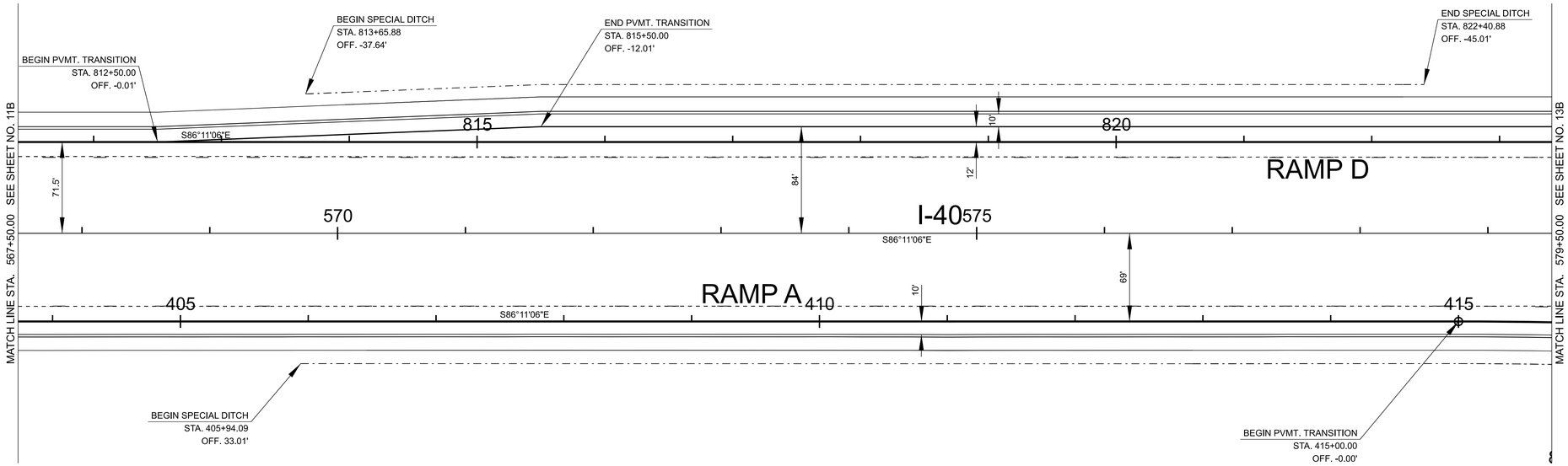
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 567+00 TO STA. 579+50
SCALE: 1" = 50'

2/4/2023 8:31:05 AM
C:\PWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	12B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 567+00 TO STA. 579+00
SCALE: 1" = 50'

2/4/2023 8:31:43 AM
C:\PWWORKING\EAST\01D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PREL IM.	2023	NH-I-40-5(150)	13

N

P TOP - 632.11' BOT - 627.56'
R TOP - 622.26' INV - 617.06'
T TOP - 611.18' INV - 605.33' BOT - 605.63'
Q TOP - 631.74' INV - 627.04' INV - 626.44' BOT - 626.74'
S TOP - 623.56' INV - 617.26' BOT - 617.41'
U TOP - 612.66' BOT - 606.01'

17 JAMES HUETT

17 JAMES HUETT

4"WOVEN WOVEN FENCE WIRE FILL

PROP. R/W C.A. FENCE CUT P/T/C

4"WOVEN WOVEN FENCE WIRE

WOVEN FENCE WIRE 4"WOVEN

PROP. R/W FILL

MATCH LINE STA. 833+25.00 SEE SHEET NO. 6

BOARD

180

825 830

ASP. RAMP D P/T/C G

CONC. DITCH INV - 614.57' FILL

ASP.

580 585 590

L = 397.90' S1 S86°11'06"E 18" JERSEY BARRIER WALL 18" L = 322.27' ST

ST L = 112.07' 18" 18" ST L = 322.27' ST

I-40

46.64' 46.91'

ASP. ASP.

MATCH LINE STA. 579+50.00 SEE SHEET NO. 12

MATCH LINE STA. 591+50.00 SEE SHEET NO. 6

6" G 420

CUT C.A. FENCE FILL

RAMP A

300 S86°09'02"E

6" W W.M. L = 20.05' 12"CMP L = 20.13' MB MB ASP. W

T (UG) ASP. T (UG) TEL. PED TEL. PED T (UG) T (UG) ASP.

PT/C PROP. R/W W W.V. G.V. GAS PIPE LINE 805 G W G 6" W W G 6" W W G

425 S72°50'39"E 2.36'

JOHN HAGAR RD EX ROW PROP. R/W ASP. ASP. EX ROW

23 RONALD CHRISTOPHER TANBER & KRISTIN TROMBLEY

24 RAYMOND E. DAVIS, JR & WF, PAMELA ANN DAVIS

P/T/C 35 MPH GUILL RD W 4' BARRIER E

FILL N19°54'10"E CUT PROP. R/W

ROWSTAKE 4"WOVEN

BEGIN PROJ. CONST. STA. 801+75.00

18" MAGNOLIA CONC. 2SB CLEANOUT 44" SWEETGUM ASP.

30" SWEETGUM AC 34" SWEETGUM

42" TULIP POPLAR

GUILL RD ×15

CONST. ESMT. CONST. ESMT.

25 MELVIN W. NELSON & WF, GENELLE NELSON

16" HACK

25 MELVIN W. NELSON & WF, GENELLE NELSON FILL

MATCH LINE STA. 14+00.00 SEE SHEET NO. 18

MATCH LINE STA. 808+50.00 SEE SHEET NO. 16

MATCH LINE STA. 428+00.00 SEE SHEET NO. 7

STA. 16+61.84 GUILL RD=
STA. 804+84.43 JOHN HAGAR RD
N 667769.5407 E 1810735.8757

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

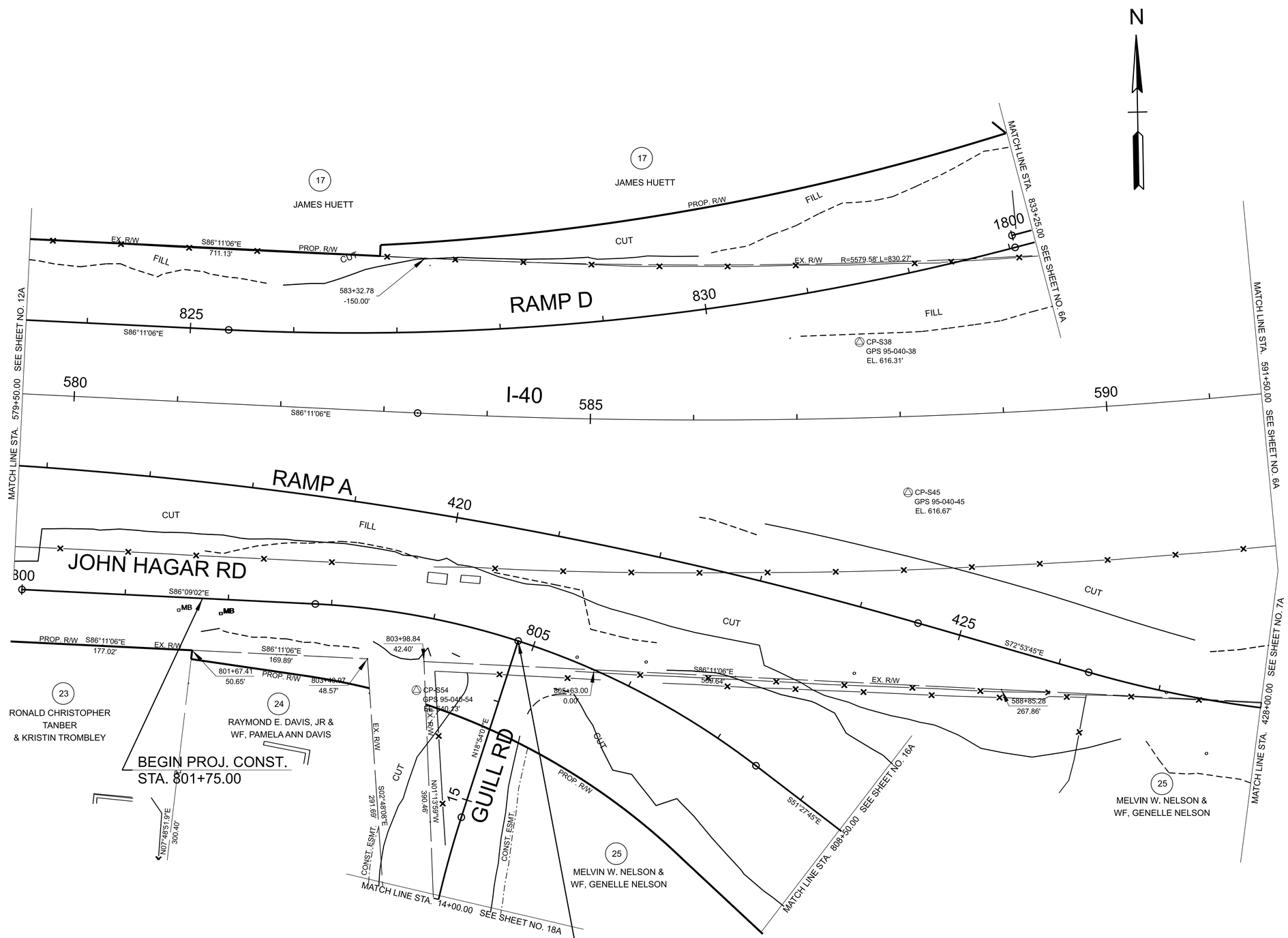
PRESENT LAYOUT
I-40

STA. 579+50 TO STA. 591+50
SCALE: 1" = 50'

2/4/2023 8:33:59 AM
C:\PW\WORKINGIEAST01\D2328414\951040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
DATUM ADJUSTED BY THE FACTOR
OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

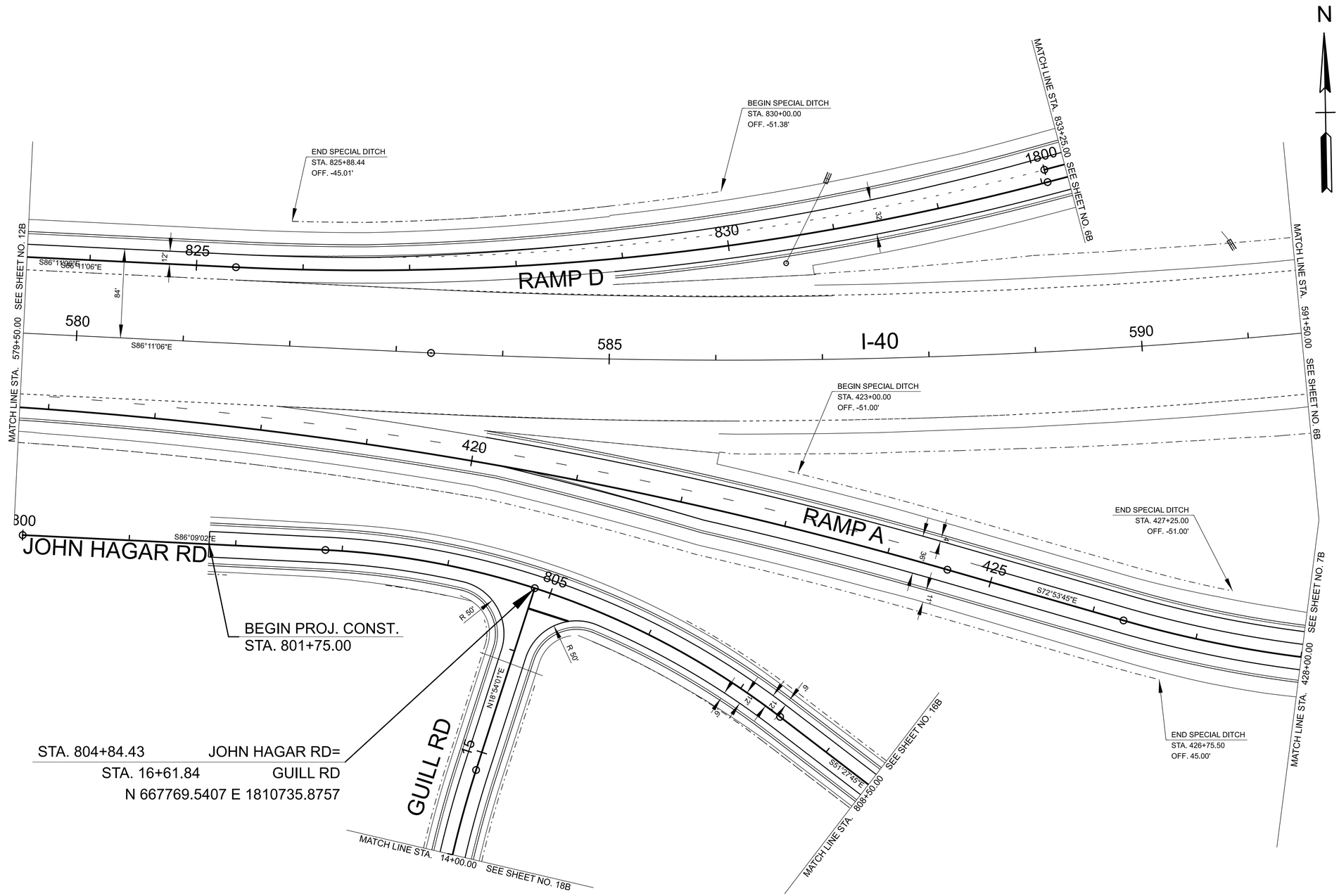
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 579+50 TO STA. 591+00
SCALE: 1" = 50'

2/4/2023 8:34:35 AM
C:\PWWORKING\EAST\01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	13B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

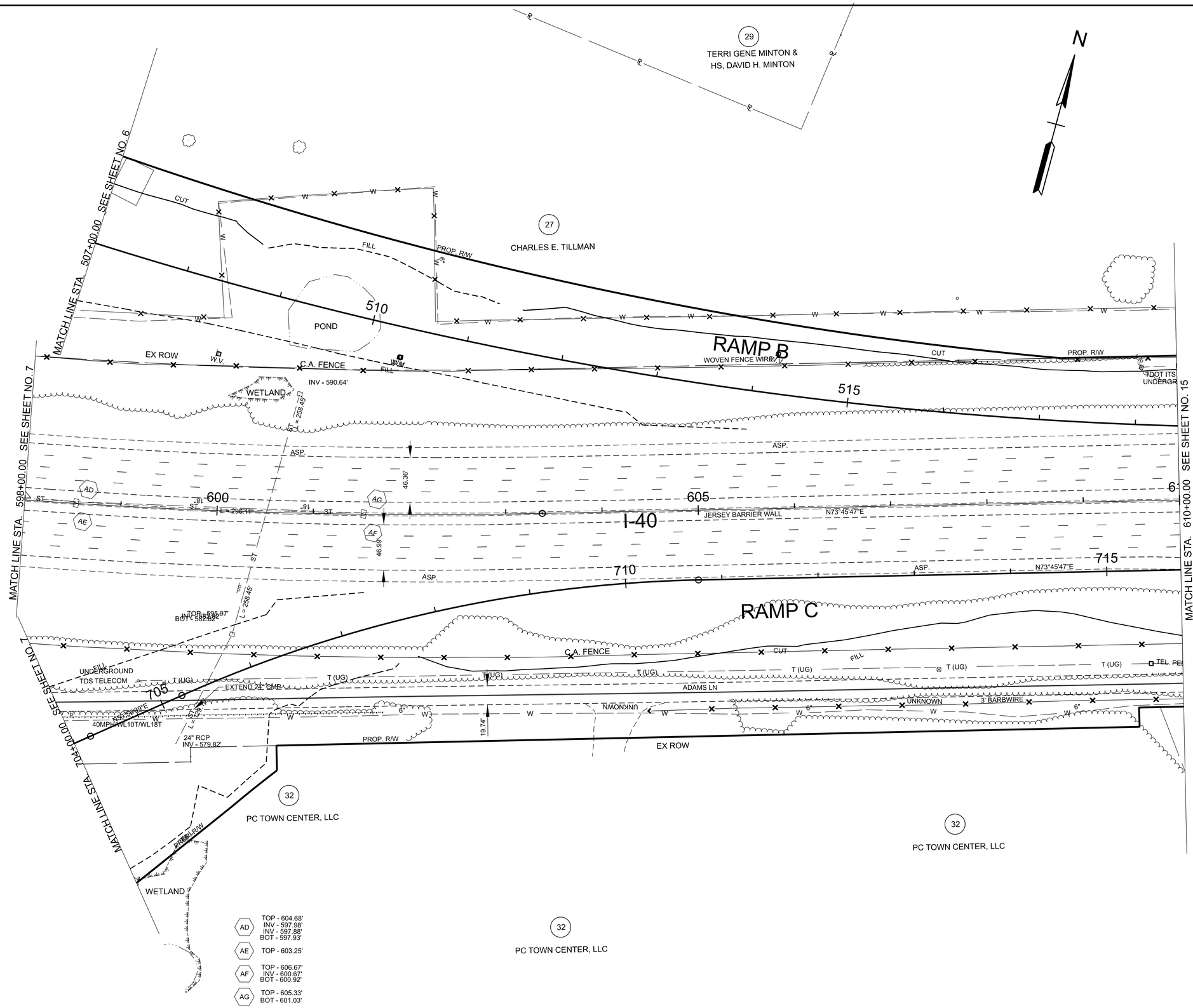
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 579+50 TO STA. 591+50
1" = 50'

2/4/2023 8:35:13 AM
C:\PWWORKING\EAST\01D2328414195\040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:22 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14A

REV. ***DATE***
TEXT

N

29
TERRI GENE MINTON &
HS, DAVID H. MINTON

N62°27'04"W
814.59'

S07°34'06"W
266.99'

27
CHARLES E. TILLMAN

MATCH LINE STA. 507+00.00 SEE SHEET NO. 6A

CUT
FILL
PROP. R/W
RAMP B
510
515
EX. R/W
N73°45'44"E
786.25'
603+37.97
-150.00'

CP-S40
GPS 95-040-40
EL. 603.66'

MATCH LINE STA. 598+00.00 SEE SHEET NO. 7A

600
605
I-40
N73°45'47"E
610+00.00 SEE SHEET NO. 15A

710
715
RAMP C
CP-S47
GPS 95-040-47
EL. 606.90'

MATCH LINE STA. 704+00.00 SEE SHEET NO. 7A

CP-S58
GPS 95-040-58
EL. 600.54'
N50°56'39"E
705

599+82.59
246.99'
599+83.40
261.97'
N15°55'32"W
15.00'

CP-S59
GPS 95-040-59
EL. 615.26'
N73°42'45"E
986.19'

N74°42'48"E
22.14'
609+75.64
215.00'
609+53.51
214.63'
N16°46'57"W
20.00'
609+53.70
234.63'
N36°08'58"W
548.45'

32
PC TOWN CENTER, LLC

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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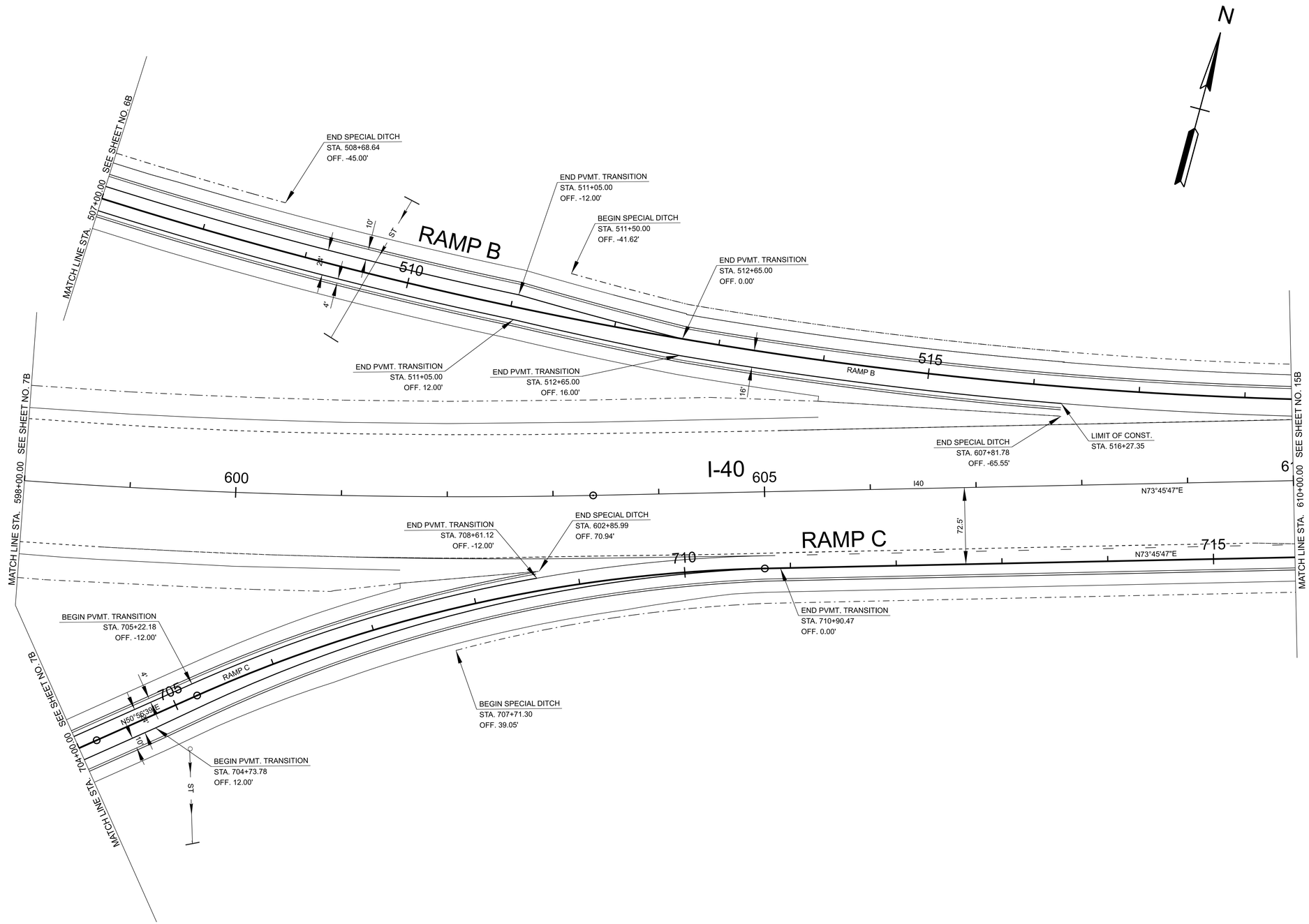
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:38:57 AM
C:\PWWORKING\EAST01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	14B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 598+00 TO STA. 610+00
SCALE: 1" = 50'

2/4/2023 8:41:19 AM
C:\PWWORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15

27
CHARLES E. TILLMAN

30
CHARLES E. (SONNY) TILLMAN

95100-1113-44
END PROJECT NO. NH-I-40-5 PRELIMINARY
STA. 615+76.94
N 668554.1848 E 1813815.3892

MATCH LINE STA. 610+00.00 SEE SHEET NO. 14

RAMP B

RAMP C

I-40

520 615 620

N73°45'47"E

L = 296.11' L = 247.49' L = 95.61' L = 348.32'

L = 122.57'

60.26' 60.21'

18.95'

ASP.

ST

AH AI AJ AK AL AM AN AO

MM225

C.A. FENCE

PROP. R/W

CUT

FILL

F (UG)

UNDERGROUNDFO

TDOTITS

TDOT ITS

BURIEDFIBEROPTIC

FIBEROPTICMARKER

POSSIBLE SINKHOLE

INV - 581.48'

INV-571.09'

INV-570.10'

STREAM

WATERLINE

W.V. BELOW

EX ROW

E/P

ESA FLAG

GREEN

CHAINLINK

T (UG)

TEL. PED.

CATV PED.

UNKNOWN

W.M.

W.V.

P/T/C

38
A.H. JOHNSON FAMILY, LLC

AH	TOP - 606.25' INV - 601.45' BOT - 601.45'	AL	TOP - 601.61' INV - 595.81' INV - 595.76' BOT - 595.96'
AI	TOP - 606.18' BOT - 601.38'	AM	TOP - 601.69' INV - 595.54' BOT - 601.61'
AJ	TOP - 603.12' BOT - 598.12'	AN	TOP - 602.14' INV - 597.24' INV - 597.14' BOT - 597.39'
AK	TOP - 602.99' INV - 598.09' INV - 597.84' BOT - 597.99'	AO	TOP - 601.97' BOT - 597.17'

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

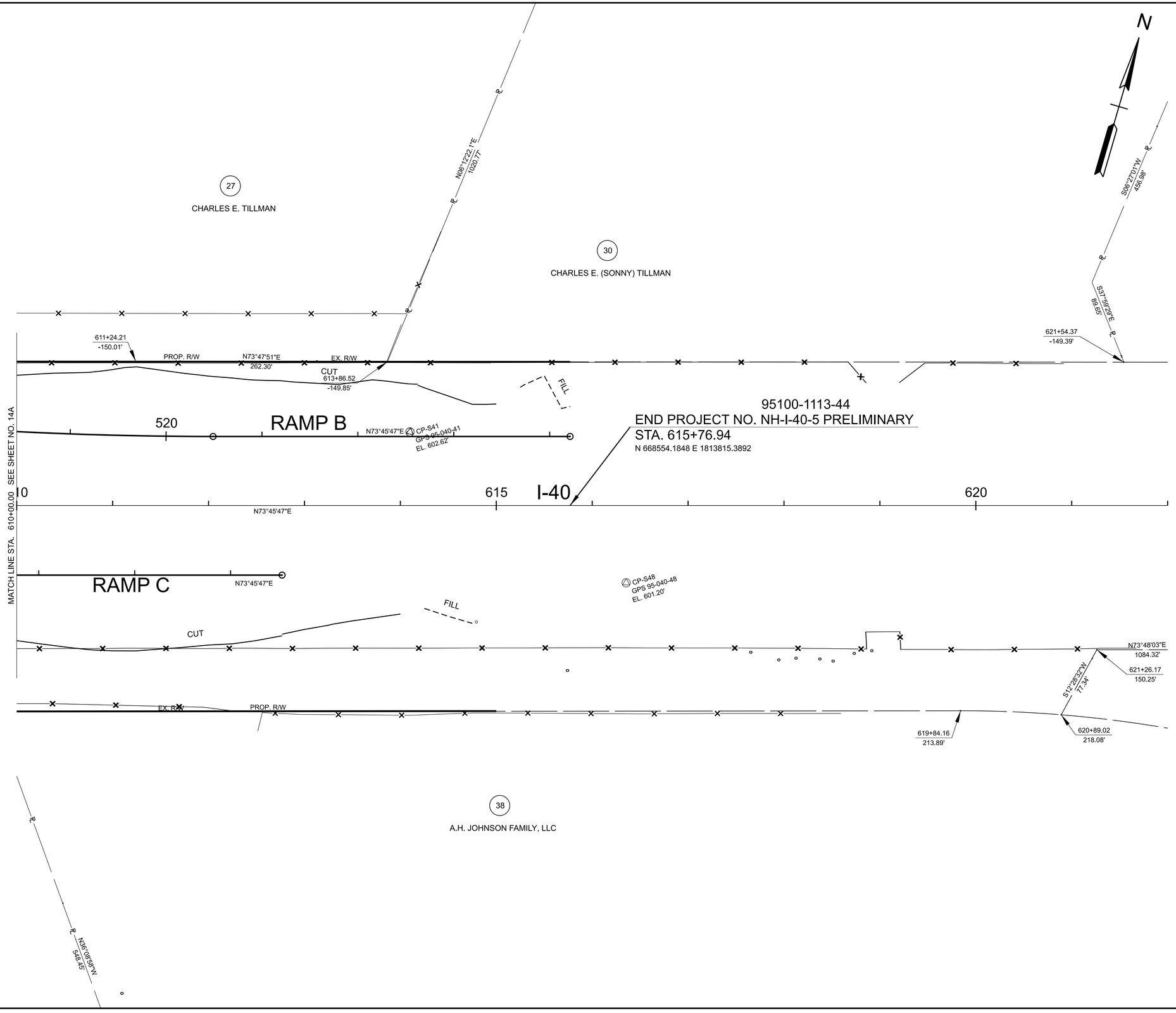
PRESENT LAYOUT
I-40

STA. 610+00 TO STA. 622+00
SCALE: 1" = 50'

2/4/2023 8:43:38 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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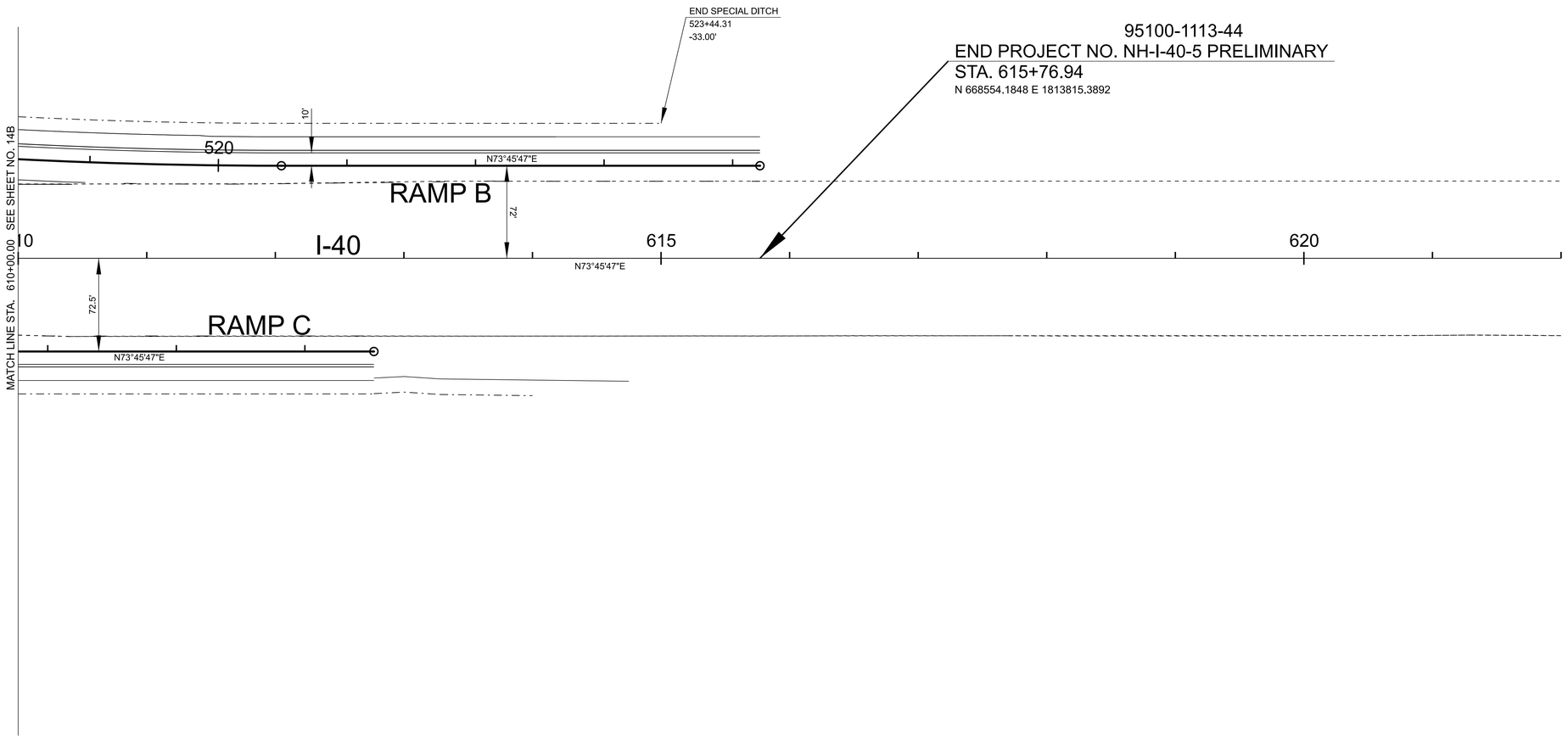
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
I-40

STA. 610+00 TO STA. 615+76
SCALE: 1" = 50'

2/4/2023 8:44:12 AM
C:\PWWORKING\EAST\T01\D2328414\95I040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	15B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
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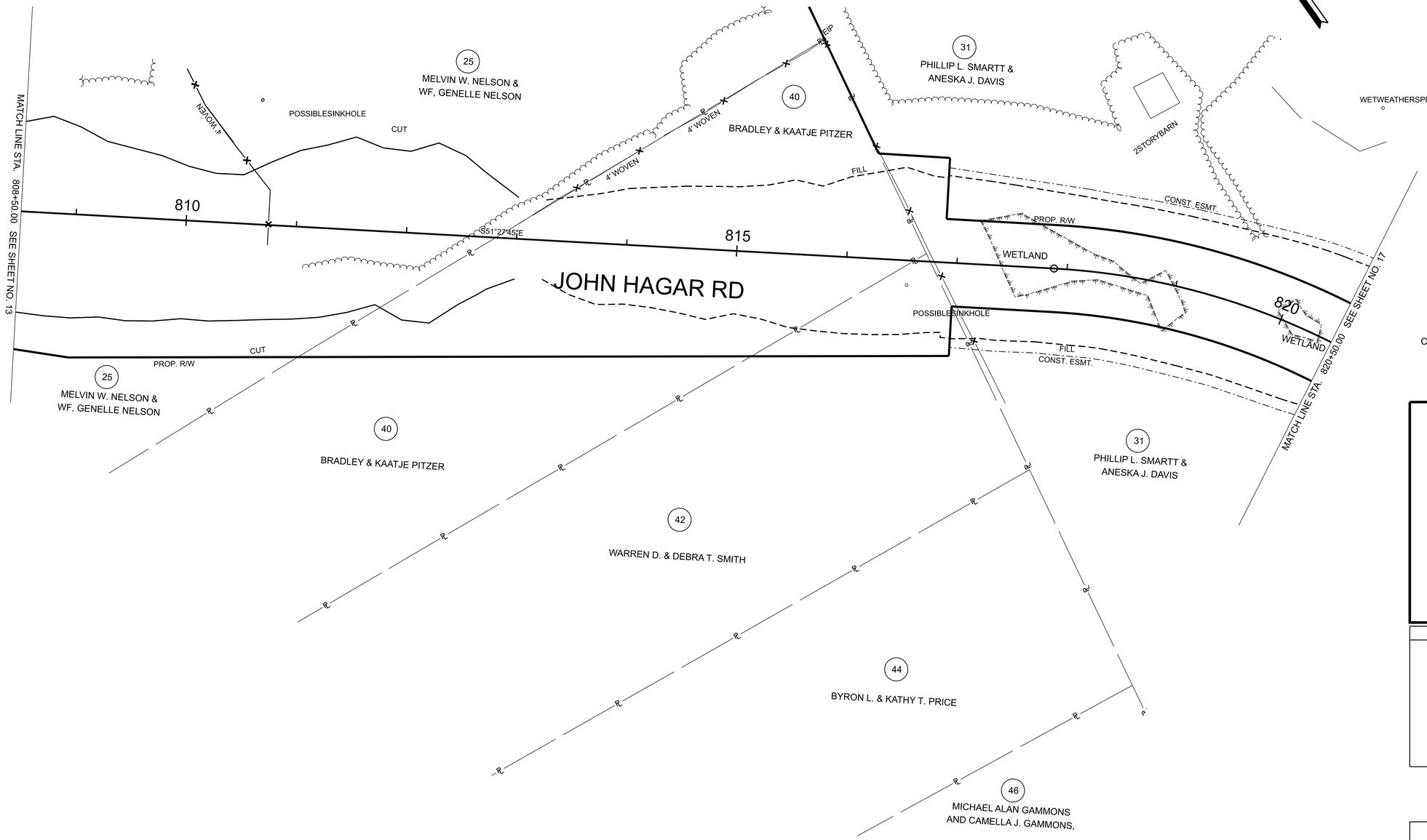
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
I-40

STA. 610+00 TO STA. 615+76
SCALE: 1" = 50'

2/4/2023 8:44:49 AM
C:\PW\WORKINGIEAST01\D2328414\95I040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

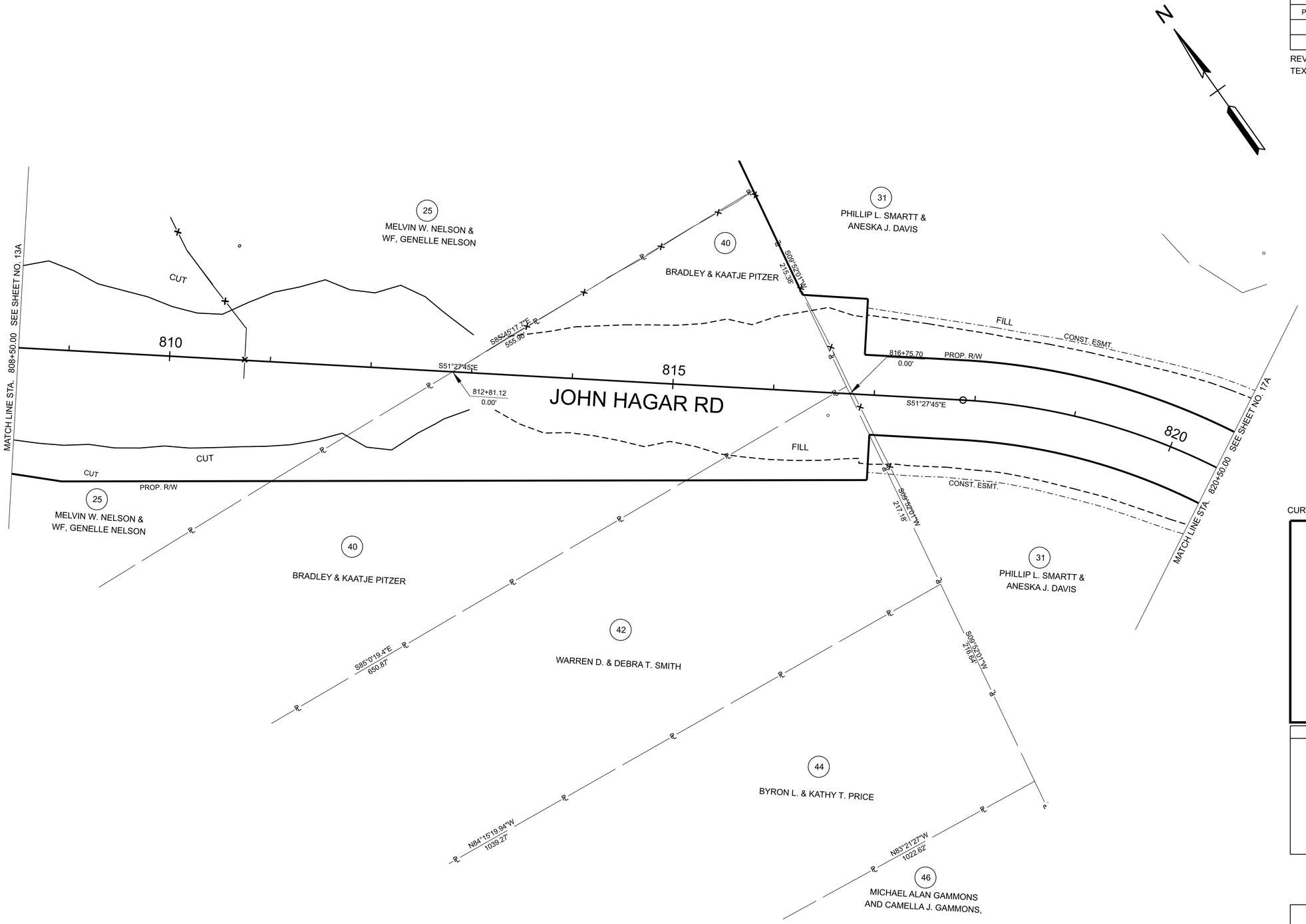
PRESENT LAYOUT
JOHN HAGAR RD

STA. 808+50 TO STA. 820+50
SCALE 1" = 50'

2/4/2023 8:47:10 AM
C:\PWWORKING\EAST\01D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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TO THE NAVD 1988 WITH GEOID G2012BU7.

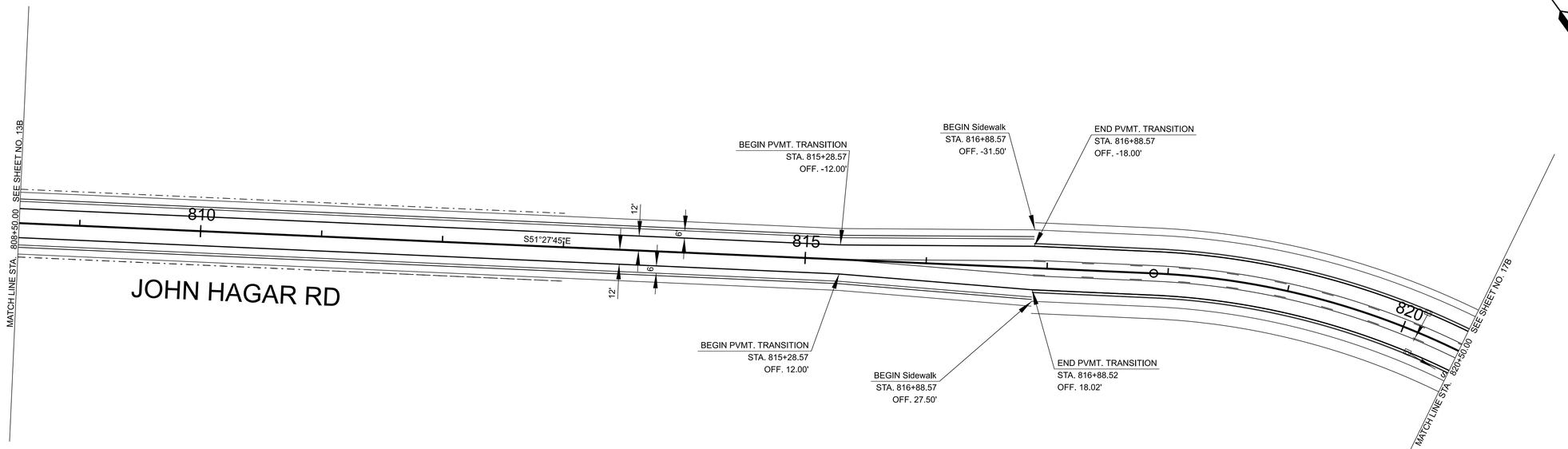
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
JOHN HAGAR RD

STA. 805+50 TO STA. 820+50
SCALE: 1" = 50'

2/4/2023 8:47:45 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN ROW DETAILS.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	16B



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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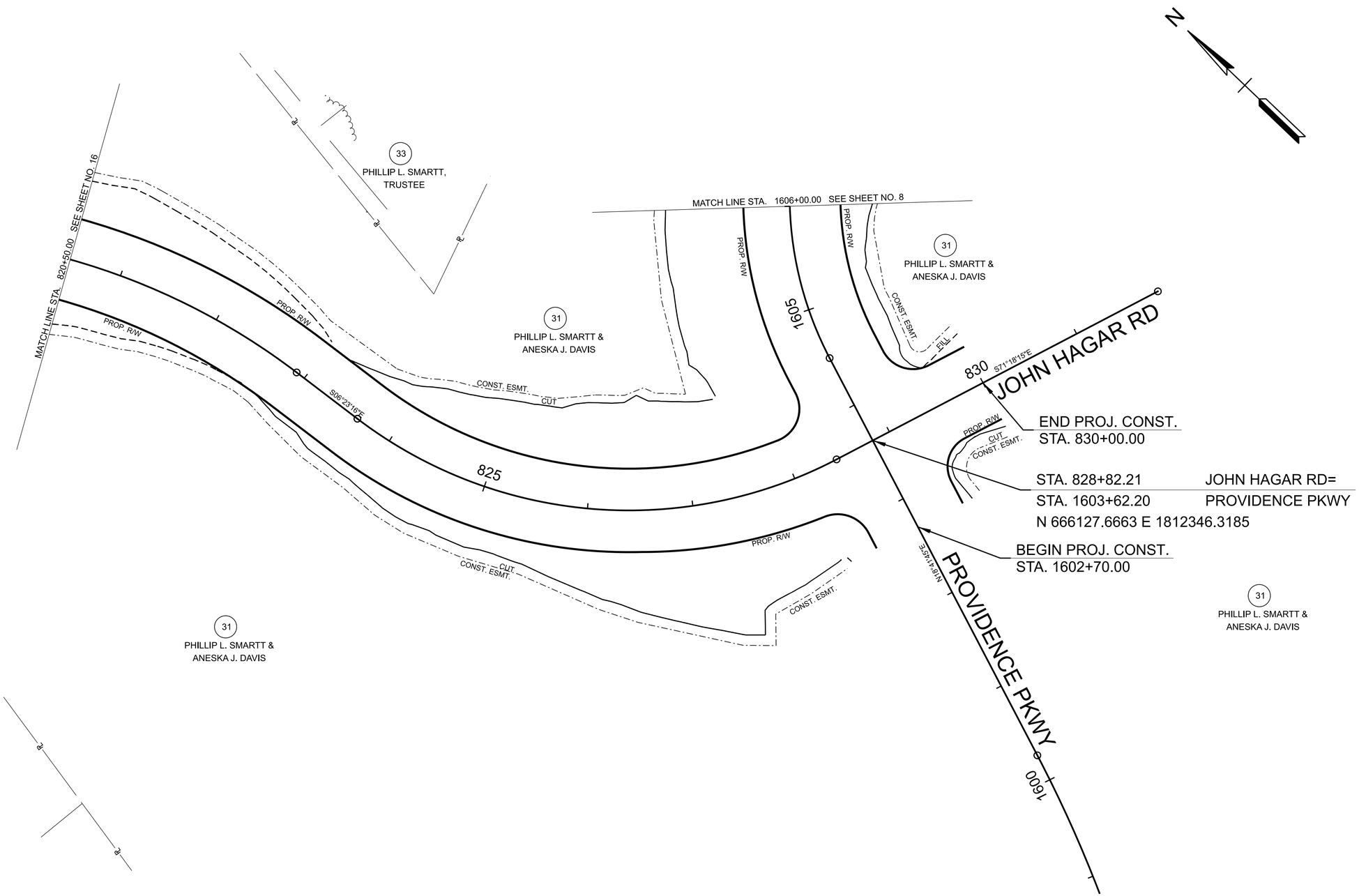
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
JOHN HAGAR RD

STA. 806+50 TO STA. 820+50
SCALE: 1" = 50

2/4/2023 8:48:23 AM
C:\PWWORKING\EAST\T01\D2328414\95\040-SHT-PLAN PROPOSED LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17



CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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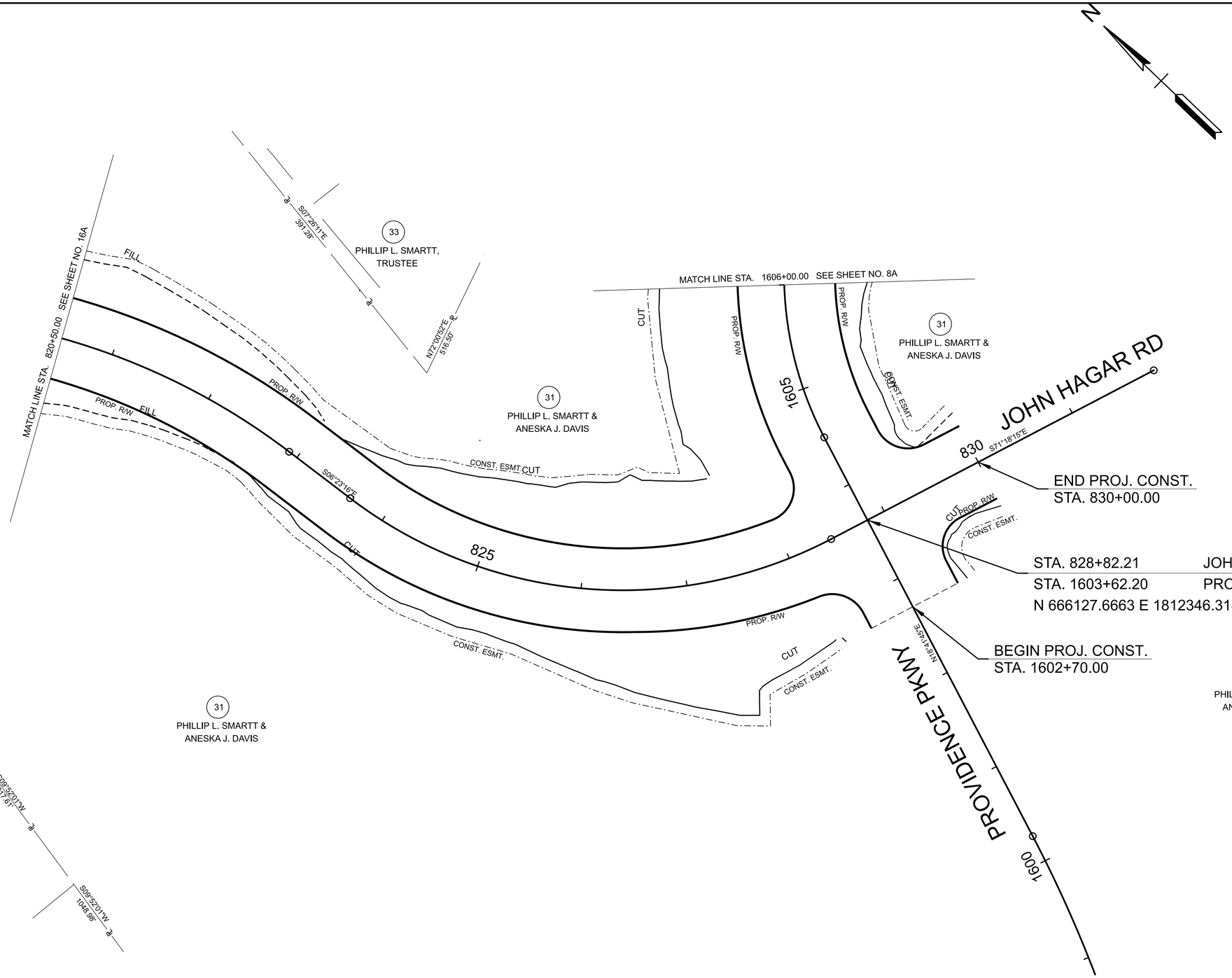
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:07 AM
C:\PWWORKING\EAST01\D2328414\95\040-SHT-PLAN PRESENT LAYOUT.DGN

TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	17A



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
JOHN HAGAR RD

STA. 820+50 TO STA. 830+00
SCALE: 1" = 50'

2/4/2023 8:50:43 AM
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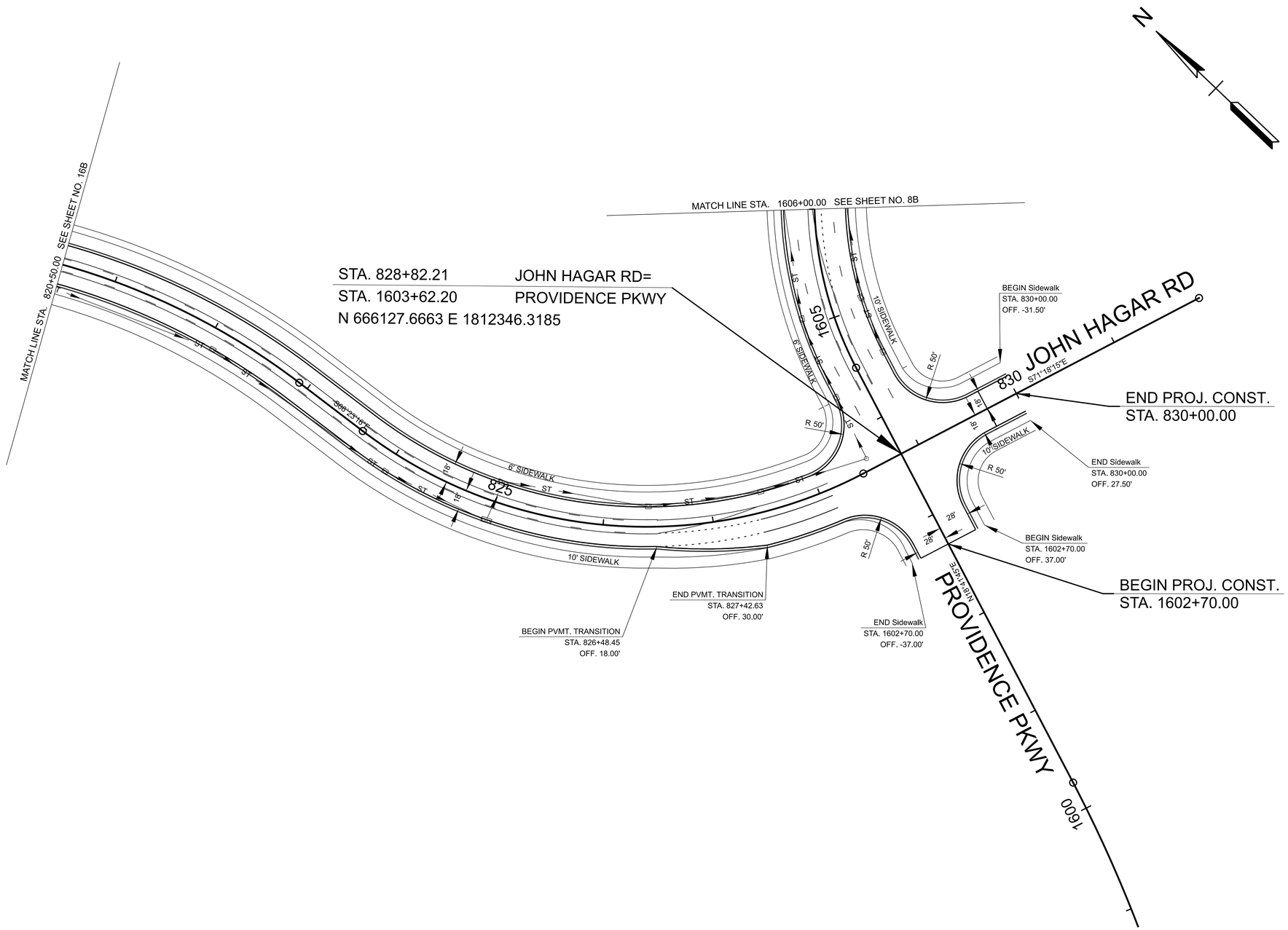

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INITIAL STUDIES REQUEST

SEALED BY

COORDINATES ARE NAD 83(2011), ARE DATUM ADJUSTED BY THE FACTOR OF 1.00006 AND TIED TO THE TGRN. ALL ELEVATIONS ARE REFERENCED TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
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SCALE: 1" = 50'

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TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	18

N

45
BEAU D. & KENDRA FLEENOR

43
PETER J. & PATRICIA L. HICKS

41
JOSEPH & JENNY PEWITT

39
ALDO A. JACOBOGODOY
& ALDO MELISSA JACOBO

23
RONALD
CHRISTOPHER
TANBER
& KRISTIN TROMBLEY

24
RAYMOND E. DAVIS,
JR & WF,
PAMELA ANN DAVIS

END PROJ. CONST.
STA. 11+00.00

CONST. ESMT.

EX ROW

EIP

10

N04°15'53"E

GUILL RD

6" W

EX ROW

CONST. ESMT.

MATCH LINE STA. 14+00.00 SEE SHEET NO. 13

25
MELVIN W. NELSON &
WF, GENELLE NELSON

46
MICHAEL ALAN GAMMONS
AND CAMELLA J. GAMMONS,

44
BYRON L. & KATHY T. PRICE

42
WARREN D. & DEBRA T. SMITH

40
BRADLEY & KAATJE PITZER

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
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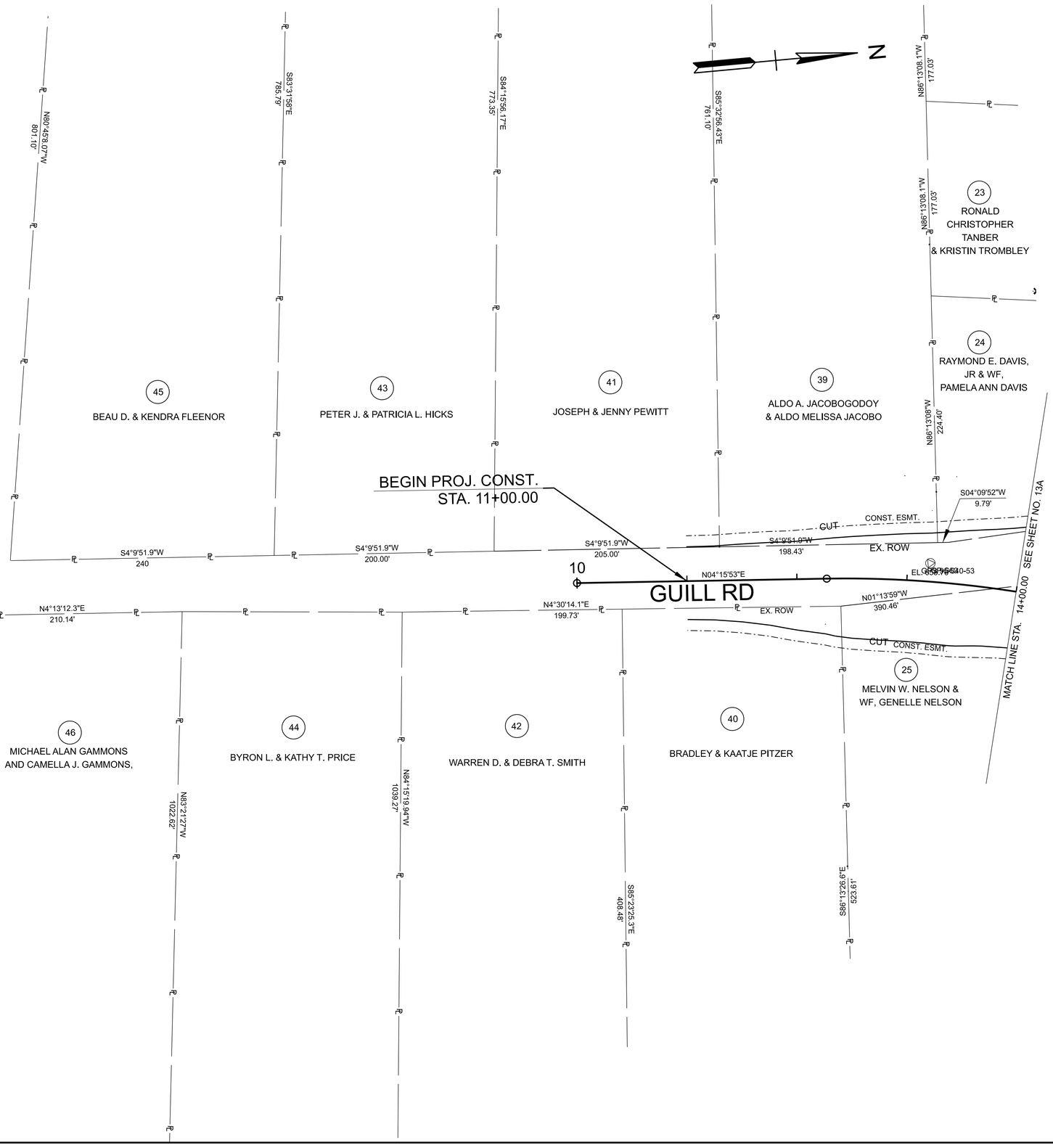

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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DATUM ADJUSTED BY THE FACTOR
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ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID .

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
GUILL RD

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SCALE: 1" = 50'

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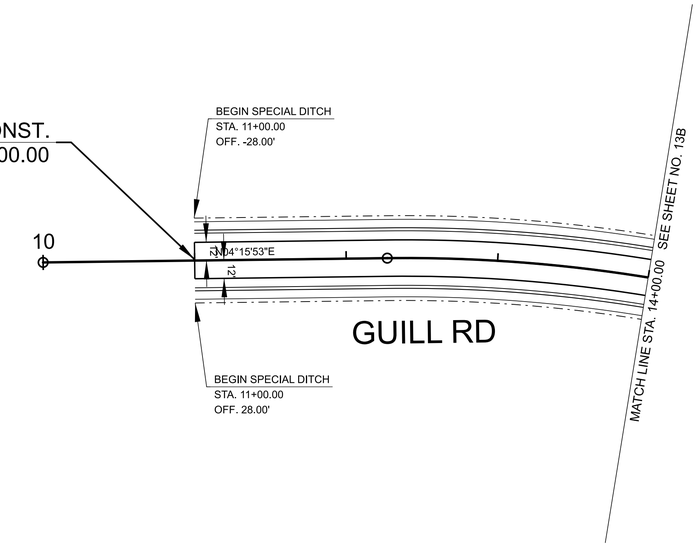

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

SEALED BY

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OF 1.00006 AND TIED TO THE TGRN.
ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
GUILL RD

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SCALE: 1" = 50'

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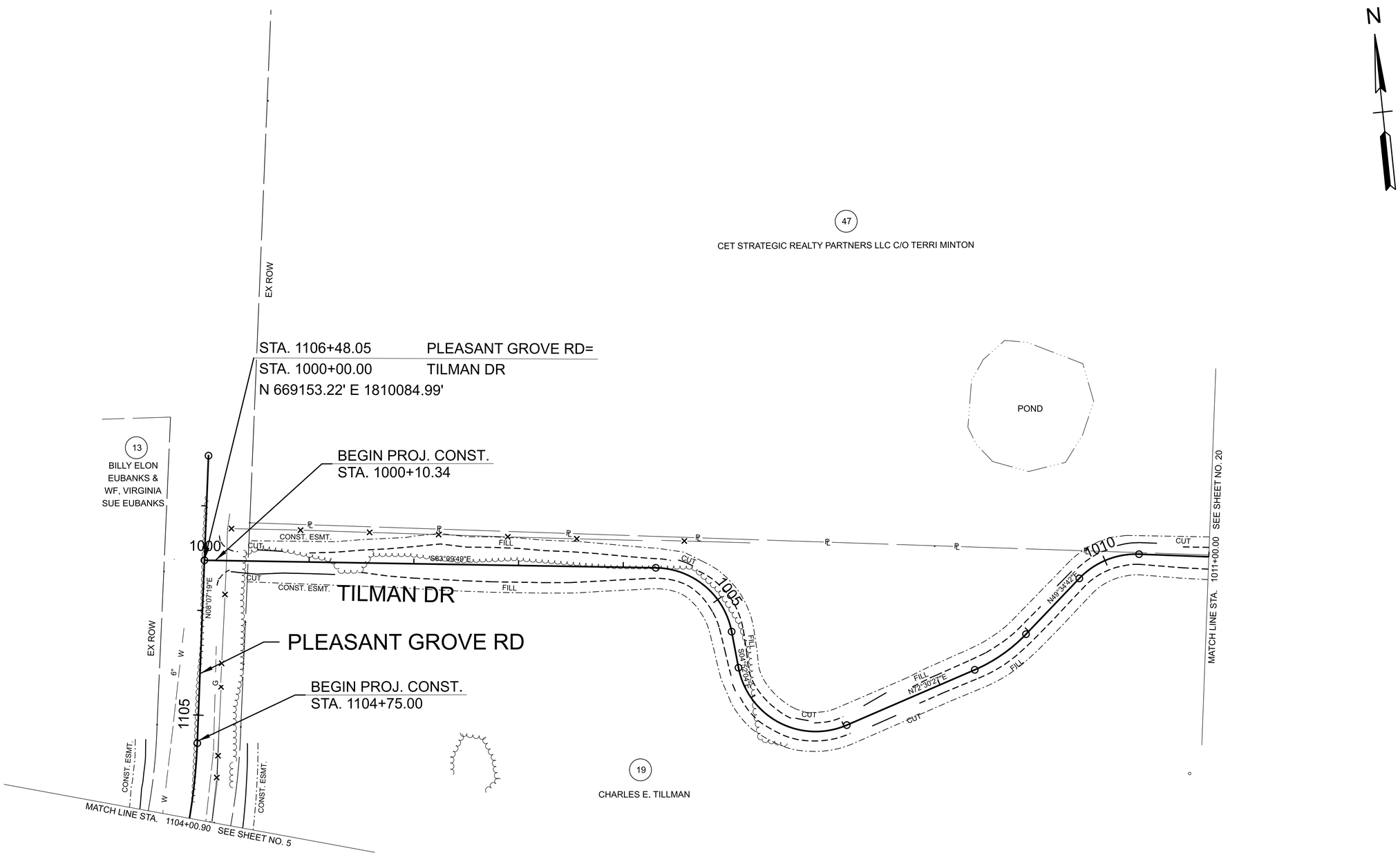

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
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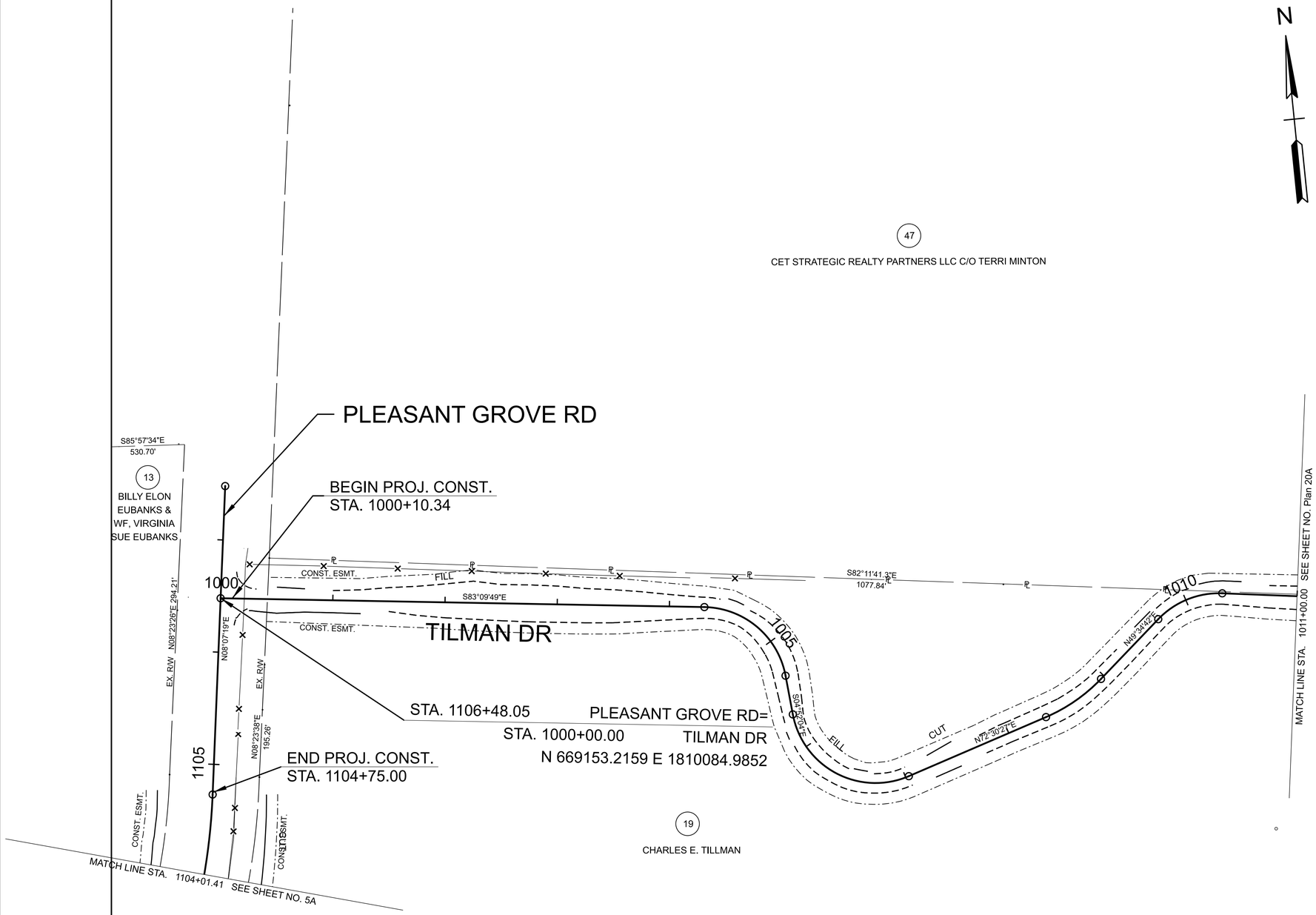
REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
TILMAN DR

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SCALE: 1" = 50'

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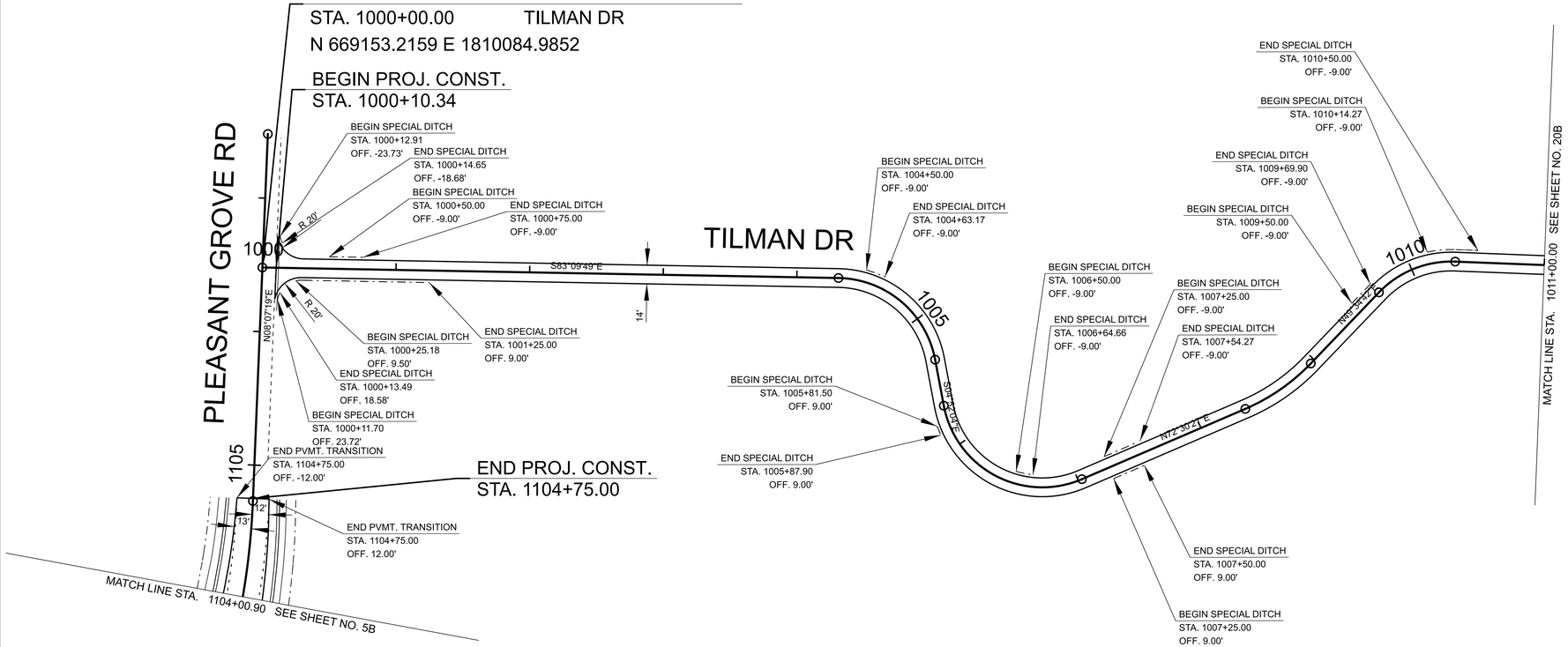

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

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STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
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SCALE: 1" = 50'

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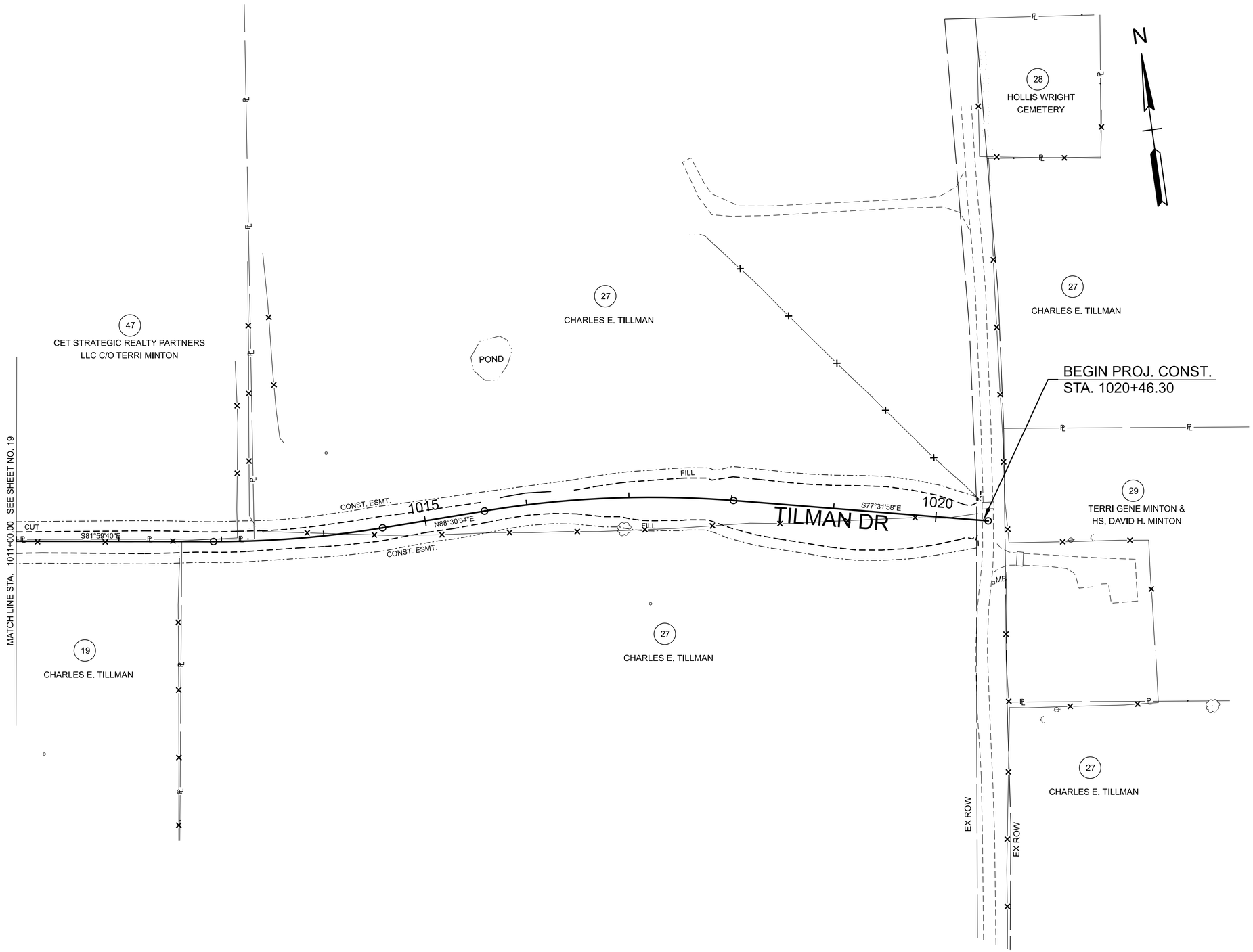

CURVE DATA SHOWN ON SHEETS 1C1-1C2.

INITIAL STUDIES REQUEST

SEALED BY

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ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PRESENT LAYOUT
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SCALE: 1" = 50'

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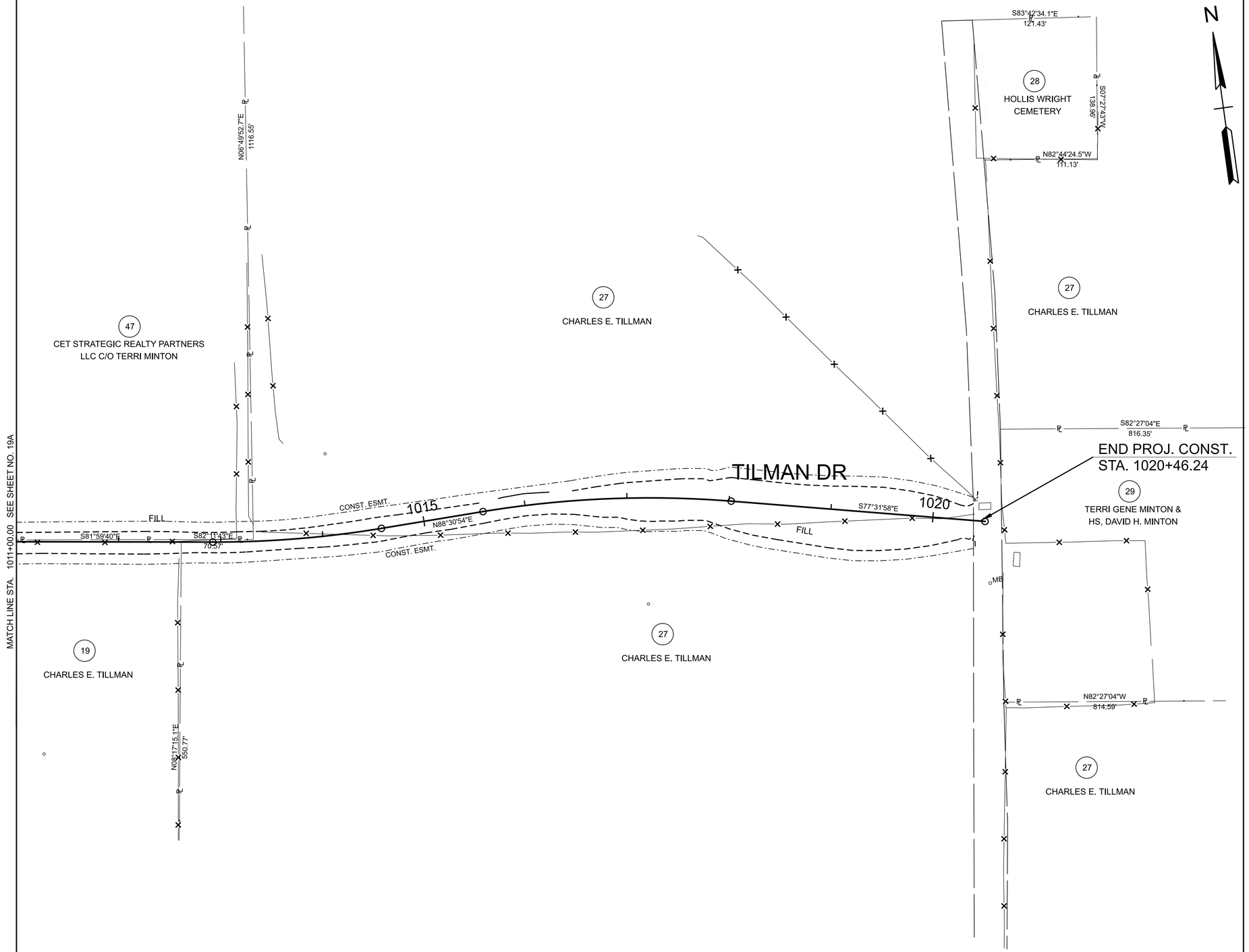
TYPE	YEAR	PROJECT NO.	SHEET NO.
PRELIM.	2023	NH-I-40-5(150)	20A

REV. ***DATE***
TEXT



CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

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ALL ELEVATIONS ARE REFERENCED
TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY
DETAILS
TILMAN DR

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SCALE: 1" = 50'

2/4/2023 9:00:35 AM
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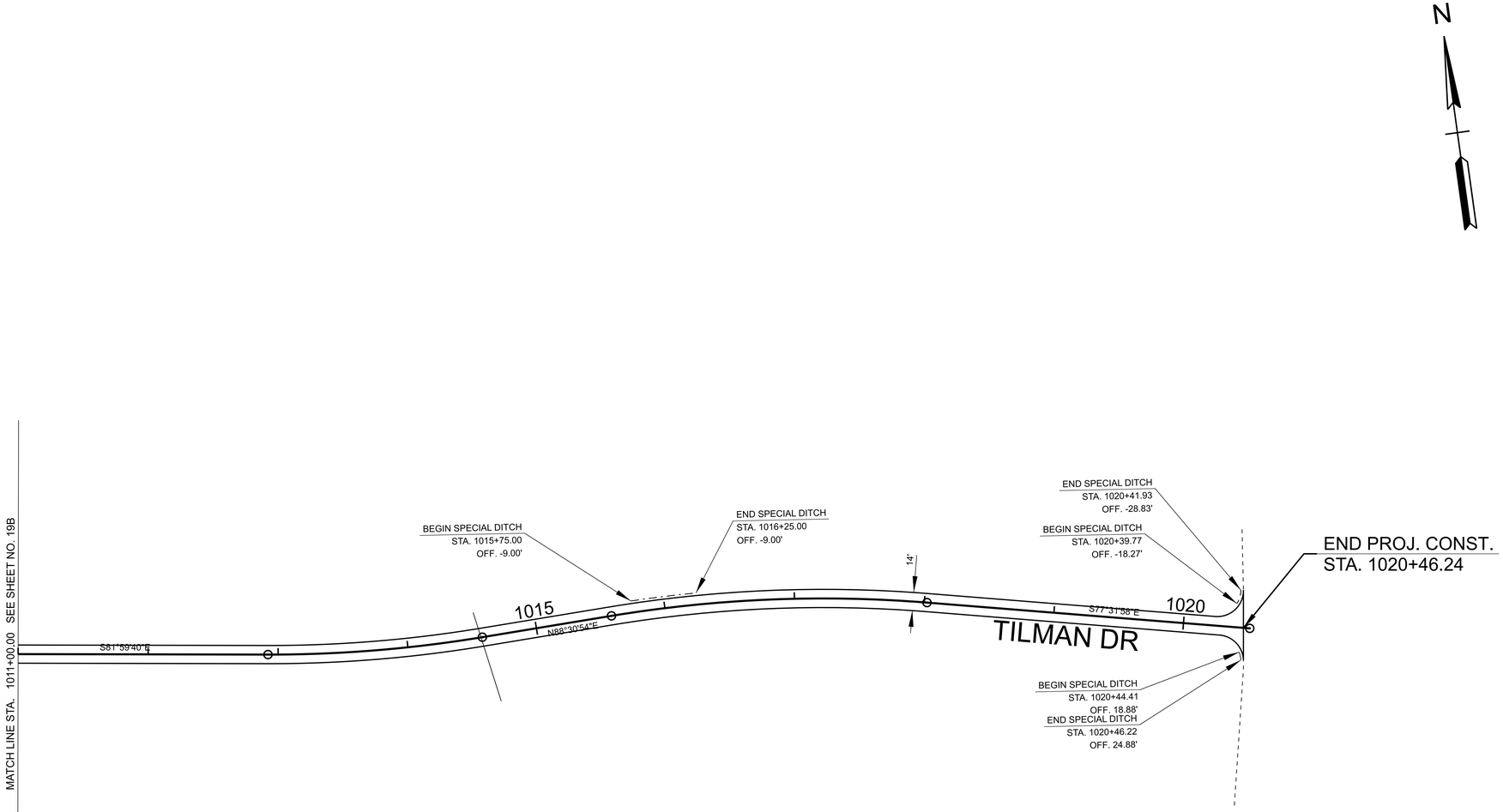

CURVE DATA SHOWN ON SHEETS 1C1-1C2

INITIAL STUDIES REQUEST

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TO THE NAVD 1988 WITH GEOID G2012BU7.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PROPOSED
LAYOUT
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SCALE: 1" = 50'

2/4/2023 9:01:14 AM
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From:	TN Help
To:	Haley Seger; K.Brandon Chance
Cc:	Kimberly Vasut-Shelby
Subject:	New Interchange along Interstate 40 from Interchange at SR-265 (Central Pike), TDOT PIN 124884.00 - Project # SHPO0003305
Date:	Tuesday, August 1, 2023 9:06:04 AM
Attachments:	State Seal for TDEC.pngx patricksignature.pngx

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2023-08-01 00:44:07 CDT

K. Chance
Tennessee Department of Transportation
k.brandon.chance@tn.gov

RE: Federal Highway Administration (FHWA), Architecture Review, New Interchange along Interstate 40 from Interchange at SR-265 (Central Pike), TDOT PIN 124884.00, Project#: SHPO0003305, Mt. Juliet, Wilson County, TN

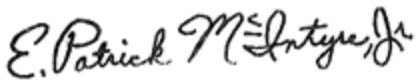
Dear K. Chance:

In response to your request, we have reviewed the architectural survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no architectural resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please include the Project # when submitting additional information regarding this undertaking. Questions or comments may be directed to Casey Lee, who drafted this response, at Casey.Lee@tn.gov, +16152533163.

Your cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG9289921_vcfcCozA7QedjgecLT1L

Native American Coordination

Environmental Studies

Native American Coordination

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Native American Coordination

Study Results

An invitation to participate in the Section 106 process was sent to all federally recognized Native American tribes with interests in the subject county on July 20, 2020.

The Muscogee (Creek) Nation responded on July 29, 2020. No copy of the letter attached in the Muscogee (Creek) Nation's email message could be obtained, but the Muscogee (Creek) Nation is being treated as a consulting party. As such, reports were sent to this consulting party on October 28, 2020. Updated cultural resources reports were sent to the Muscogee (Creek) Nation on August 14, 2023.

To date, no other responses have been received.

TDOT will re-initiate consultation if additional cultural resources studies are required or if archaeological materials or human remains are discovered during construction.

Commitments

Did the study of this project result in any environmental commitments? **No**

Additional Information

Is there any additional information or material included with this study? **Yes**

Type: Native American Coordination

Location: Email Attachment

Certification

Responder: John MacLeod

Title: Native American Coordination

Signature: John MacLeod

Digitally signed by John MacLeod
Date: 2023.08.14 17:16:21 -04'00'

Environmental Justice

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION

NEPA PROGRAMS OFFICE

SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

October 10, 2023

Ms. Cynthia Howard
Title VI Program Director

Subject: I-40 Interchange at SR-265 (Central Pike) Wilson County, Tennessee
TDOT PIN: 124884.00

Dear Ms. Howard:

Attached for your review is the Environmental Justice (EJ) analysis for the above referenced project's National Environmental Policy Act (NEPA) D-List Categorical Exclusion (CE).

In summary, based on the EJ analysis completed for this D-List CE, TDOT acknowledges that minority and low-income persons are present within the project limits of the Selected Alternative, and that minority populations within Census Tracts (CT) CT 303.10, BG 2; and CT 309.06, BG 1 are considered EJ populations. While there would be some adverse impacts from the project, including impacts from construction and other minor environmental impacts, there would not be a disproportionately high or adverse effect to the EJ populations when compared to the impacts borne by all populations within the limits of the project area. In addition, both EJ and non-EJ populations would receive the benefits resulting from the project, which include improved crosswalks, new sidewalks, and ADA compliant curb ramps.

If you have any questions or comments regarding this matter, please feel free to contact me by telephone at (615) 391-9840 or email at Brian.Kluttz@tn.gov.

Sincerely,

Brian Kluttz

Digitally signed by Brian Kluttz
Date: 2023.10.10 08:29:00 -05'00'

Brian Kluttz
Environmental Studies Specialist Advanced
Environmental Division, NEPA Programs Office

List of Appendices:
Appendix A: 2017-2021 American Community Survey 5-Year Estimates Data

Overview

The Federal Highway Administration (FHWA) and the Tennessee Department of Transportation (TDOT) are preparing a D-List Categorical Exclusion for the I-40 Interchange at SR-265 (Central Pike) in the City of Mt. Juliet, Wilson County, Tennessee (TDOT PIN 124884.00).

The Tennessee Department of Transportation (TDOT) initiated study of a request for new interchange access on I-40 at State Route (SR) 265 (Central Pike) (LM 2.01 to LM 2.03) in Wilson County, Tennessee at the request of the Nashville Area Metropolitan Planning Organization (MPO), the City of Mt. Juliet, and Wilson County. The purpose of the new interchange access is to accommodate future traffic demands and relieve existing and anticipated capacity deficiencies at the Exit 226 (SR 171) Interchange. See Figure 1 for the project location map.

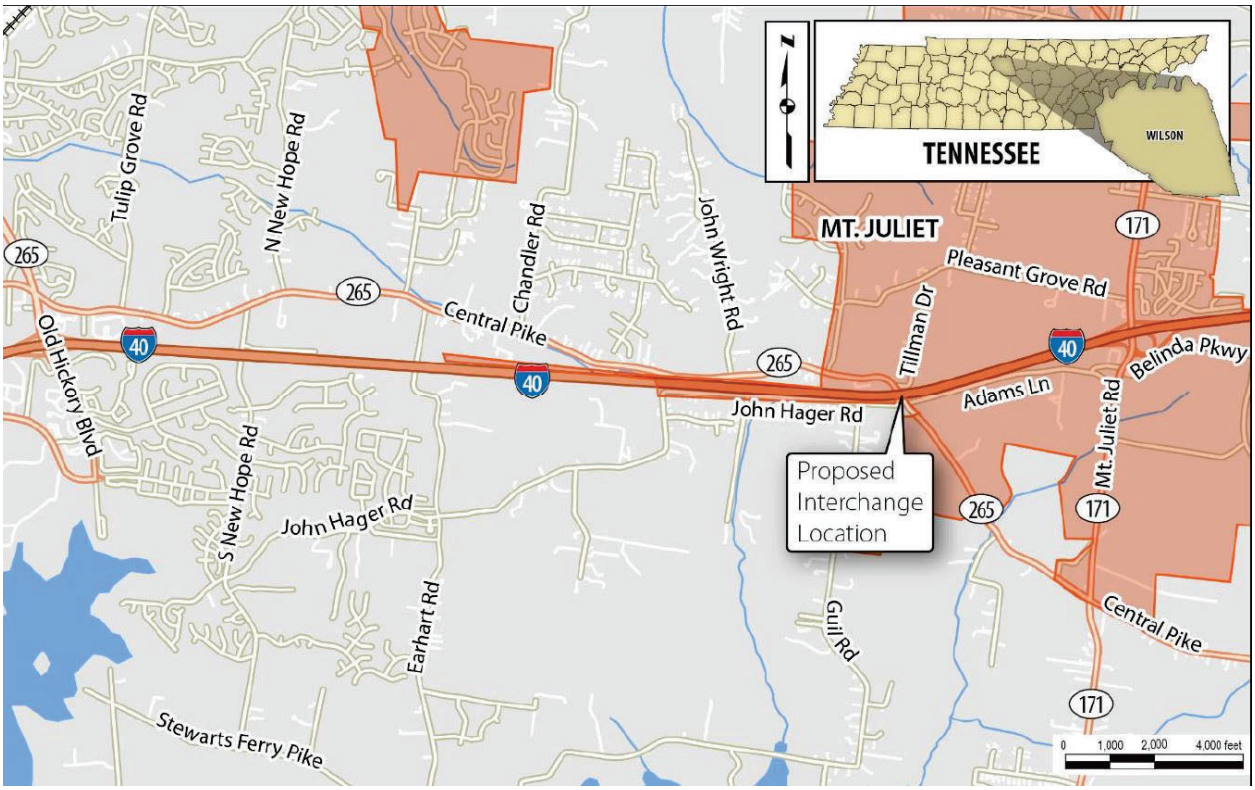


Figure 1. Project Overview Location Map

Project Description of the Selected Alternative

Based on the Preliminary Plans dated 02/04/2023, a Diverging Diamond Interchange is proposed, connecting SR-265 (Central Pike) to I-40 from west of Pleasant Grove Rd to east of Providence Parkway. Central Pike would be widened from two lanes to four lanes, and a maximum of seven lanes through the proposed interchange with I-40. A total of eight (8) acceleration and deceleration lanes (ramps) would accommodate the anticipated traffic demand at the interchange. In addition, a frontage road realignment is proposed for the existing John Hagar Rd.

Environmental Justice (EJ) Analysis

For this D-List CE, an EJ analysis was conducted for the project limits of the Selected Alternative utilizing recent (2017-2021) U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates data. This analysis was completed to identify the census block groups within the limits of the project area, and to determine whether any minority or low-income populations present within the census block groups qualify as EJ populations.

This analysis identified the following three (3) Census Tracts (CT) census block groups (BG) within the project area limits of the Selected Alternative (see Figure 2):

- CT 303.10 , BG 1, BG 2; and
- CT 309.06, BG 1.

Two threshold indicators are used by TDOT to identify and report EJ populations:

1) The minority and/or low-income population percentage for a given census block group exceeds the county's minority and/or low-income population average by 10 percentage points or more; and/or
2) The minority and/or low-income population exceeds 50 percent of the overall census block group population.

Refer to Table 1 for the minority and low-income population percentages and EJ determination for the identified census block groups.

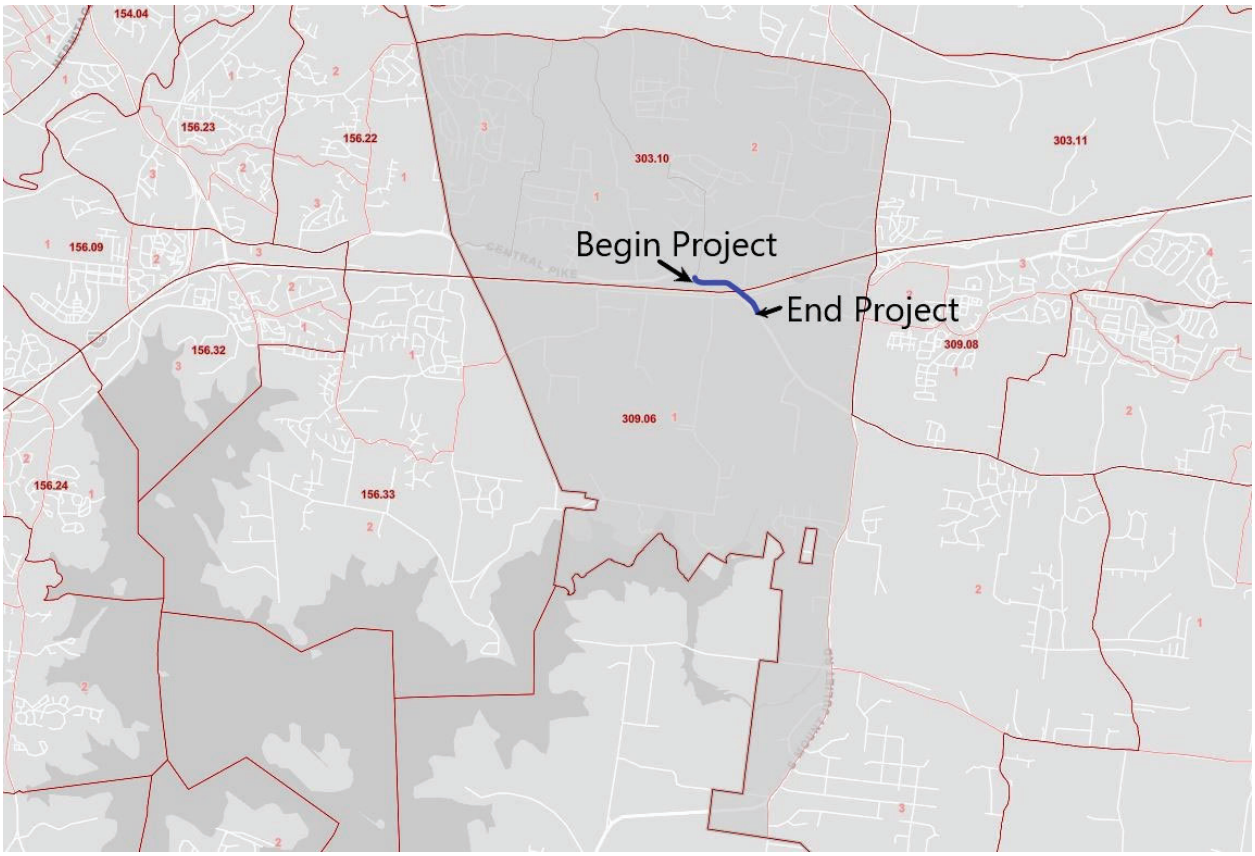


Figure 2. Minority/Low Income Block Groups. Sourced from the U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates.

Table 1

Environmental Justice Analysis Tables

Minority Populations				
Census Tract (CT)/ Block Group (BG)	CT 303.10 BG 1	CT 303.10 BG 2	CT 309.06 BG 1	Wilson Co.
% Minority/Non-White	3.6%	33.6%	36.9%	17.1%
Exceeds County Average by 10% or More	No	Yes	Yes	
Is BG Population Avg. >50%	No	No	No	
Meet EJ Criteria?	**No**	**Yes**	**Yes**	
Low-Income Populations				
Census Tract (CT)/ Block Group (BG)	CT 303.10 BG 1	CT 303.10 BG 2	CT 309.06 BG 1	Wilson Co.
% Low-Income/Below Poverty Line	5.6%	2.6%	3.1%	8.4%
Exceeds County Average by 10% or More	No	No	No	
Is BG Population Avg. >50%	No	No	No	
Meet EJ Criteria?	**No**	**No**	**No**	

Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates. ACS data was accessed and reviewed on 09/07/2023 from the U.S. Census Bureau website.

Minority Populations
The updated FHWA Orders define five minority groups as potential EJ minority populations: Black; Hispanic or Latino; Asian American; American Indian or Alaskan Native; and Native Hawaiian or Other Pacific Islander. As shown in Table 1, the 2017-2021 ACS 5-Year Estimates data show that the minority population percentage for Wilson County is 17.1 percent. Within the project limits of the Selected Alternative, the minority population percentage ranges from 3.6 percent (CT 303.10, BG 1) to 36.9 percent (CT 309.06, BG 1).

Based on this updated EJ analysis, the minority population percentages of the Selected Alternative are noticeably higher than the county average. CT 303.10, BG 2, and CT 309.06, BG 1 are higher by 10 percentage points of the County total percentage. Therefore, the minority populations located within CT 303.10, BG 2, and CT 309.06, BG 1 are considered EJ populations.

Low-Income Populations
The Federal Highway Administration (FHWA) Environmental Justice (EJ) Order 664.23 defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services (HHS) poverty guidelines." As shown in Table 1, the 2017-2021 ACS 5-Year Estimates data shows that the low income population percentage for Wilson County is 8.4 percent. Within the project limits of the Selected Alternative, the low-income population percentage ranges from 2.6 percent (CT 303.10, BG 2) to 5.6 percent (CT 303.10, BG 1).

Based on this updated EJ analysis, the low-income population percentage of the Selected Alternative is lower than the county average. Therefore, regarding low-income persons, none of the Selected Alternative are considered EJ populations.

Conclusion
In summary, based on the EJ analysis completed for the project limits of I-40 Interchange at SR-265 (Central Pike) Wilson County, Tennessee (TDOT PIN 124884.00), TDOT acknowledges that minority and low-income persons are present within the project limits of the Selected Alternative and that the following Block Group contains EJ minority populations:

- CT 303.10, BG2; and
- CT 309.06, BG 1.

While there would be some adverse impacts, including impacts from construction and other minor environmental impacts, there would not be a disproportionately high or adverse effect on the EJ populations when compared to the impacts borne by all populations within the project limits (I-40 Interchange at SR-265 (Central Pike) Wilson County, Tennessee.) of the Selected Alternative. In addition, both EJ and non-EJ populations would receive the benefits resulting from the project, which include improved crosswalks, new sidewalks, and ADA compliant curb ramps.

Appendix A:
2017-2021 U.S. Census Bureau American Community Survey 5-Year Estimates Data

HISPANIC OR LATINO ORIGIN BY RACE

Note: The table shown may have been modified by user selections. Some information may be missing.

DATA NOTES	
TABLE ID:	B03002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Total population
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	B03002
GEOS	Wilson County, Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

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TABLE NOTES	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.
	Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section. Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.
	Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates
	Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.
	The Hispanic origin and race codes were updated in 2020. For more information on the Hispanic origin and race code changes, please visit the American Community Survey Technical Documentation website.
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	Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

	Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.
COLUMN NOTES	None

Table: ACSDT5Y2021.B03002

	Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Total:	144,748	*****
Not Hispanic or Latino:	137,885	*****
White alone	119,952	±699
Black or African American alone	9,637	±510
American Indian and Alaska Native alone	130	±69
Asian alone	2,554	±255
Native Hawaiian and Other Pacific Islander alone	30	±52
Some other race alone	1,346	±669
Two or more races:	4,236	±636
Two races including Some other race	777	±310
Two races excluding Some other race, and three or more races	3,459	±586
Hispanic or Latino:	6,863	*****
White alone	3,159	±562
Black or African American alone	209	±191
American Indian and Alaska Native alone	335	±330
Asian alone	35	±47
Native Hawaiian and Other Pacific Islander alone	0	±31
Some other race alone	1,448	±472
Two or more races:	1,677	±489
Two races including Some other race	1,500	±478

Table: ACSDT5Y2021.B03002

	Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Two races excluding Some other race, and three or more races	177	±151

HISPANIC OR LATINO ORIGIN BY RACE

United States® Census Bureau

Note: The table shown may have been modified by user selections. Some information may be missing.

DATA NOTES	
TABLE ID:	B03002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Total population
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	B03002
GEOS	Block Group 1; Census Tract 303.10; Wilson County; Tennessee; Block Group 2; Census Tract 303.10; Wilson County; Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

WEB ADDRESS	https://data.census.gov/table?q=B03002:+HISPANIC+OR+LATINO+ORIGIN+BY+RACE&g=1500000US471890303101,471890303102&tid=ACSDT5Y2021.B03002
TABLE NOTES	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.
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	Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates
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	Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.
COLUMN NOTES	None

Table: ACSDT5Y2021.B03002

	Block Group 1, Census Tract 303.10, Wilson County, Tennessee		Block Group 2, Census Tract 303.10, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**
Total:	1,428	±303	3,269	±723
Not Hispanic or Latino:	1,428	±303	3,049	±747
White alone	1,376	±282	2,169	±566
Black or African American alone	0	±13	229	±199
American Indian and Alaska Native alone	6	±12	0	±13
Asian alone	39	±61	295	±214
Native Hawaiian and Other Pacific Islander alone	0	±13	0	±13
Some other race alone	0	±13	313	±355
Two or more races:	7	±13	43	±38
Two races including Some other race	0	±13	36	±36
Two races excluding Some other race, and three or more races	7	±13	7	±14
Hispanic or Latino:	0	±13	220	±259
White alone	0	±13	0	±13
Black or African American alone	0	±13	0	±13
American Indian and Alaska Native alone	0	±13	0	±13
Asian alone	0	±13	0	±13
Native Hawaiian and Other Pacific Islander alone	0	±13	0	±13
Some other race alone	0	±13	0	±13
Two or more races:	0	±13	220	±259
Two races including Some other race	0	±13	220	±259

	Block Group 1, Census Tract 303.10, Wilson County, Tennessee		Block Group 2, Census Tract 303.10, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**
Two races excluding Some other race, and three or more races	0	±13	0	±13

HISPANIC OR LATINO ORIGIN BY RACE

United States® Census Bureau

Note: The table shown may have been modified by user selections. Some information may be missing.

DATA NOTES	
TABLE ID:	B03002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Total population
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	B03002
GEOS	Block Group 1; Census Tract 309.06; Wilson County; Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

WEB ADDRESS	https://data.census.gov/table?q=B03002:+HISPANIC+OR+LATINO+ORIGIN+BY+RACE&g=1500000US471890309061&tid=ACSDT5Y2021.B03002
TABLE NOTES	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.
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	Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates
	Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.
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	Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.
COLUMN NOTES	None

Table: ACSDT5Y2021.B03002

	Block Group 1, Census Tract 309.06, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Total:	1,445	±736
Not Hispanic or Latino:	1,113	±537
White alone	912	±523
Black or African American alone	30	±48
American Indian and Alaska Native alone	0	±13
Asian alone	0	±13
Native Hawaiian and Other Pacific Islander alone	0	±13
Some other race alone	60	±71
Two or more races:	111	±104
Two races including Some other race	0	±13
Two races excluding Some other race, and three or more races	111	±104
Hispanic or Latino:	332	±473
White alone	13	±23
Black or African American alone	0	±13
American Indian and Alaska Native alone	0	±13
Asian alone	0	±13
Native Hawaiian and Other Pacific Islander alone	0	±13
Some other race alone	319	±473
Two or more races:	0	±13
Two races including Some other race	0	±13

	Block Group 1, Census Tract 309.06, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Two races excluding Some other race, and three or more races	0	±13

RATIO OF INCOME TO POVERTY LEVEL IN THE PAST 12 MONTHS

United States® Census Bureau

Note: The table shown may have been modified by user selections. Some information may be missing.

DATA NOTES	
TABLE ID:	C17002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Population for whom poverty status is determined
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	C17002
GEOS	Wilson County, Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

WEB ADDRESS	https://data.census.gov/table?q=C17002:+RATIO+OF+INCOME+TO+POVERTY+LEVEL+IN+THE+PAST+12+MONTHS&g=050XX00US47189&tid=ACSDT5Y2021.C17002
TABLE NOTES	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.
	Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section. Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.
	Source: U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates
	Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.
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COLUMN NOTES	None

Table: ACSDT5Y2021.C17002

	Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Total:	142,560	±563
Under .50	6,577	±1,367
.50 to .99	5,354	±1,093
1.00 to 1.24	4,084	±909
1.25 to 1.49	3,936	±846
1.50 to 1.84	6,587	±1,097
1.85 to 1.99	2,606	±734
2.00 and over	113,416	±2,234

RATIO OF INCOME TO POVERTY LEVEL IN THE PAST 12 MONTHS

United States® Census Bureau

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DATA NOTES	
TABLE ID:	C17002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Population for whom poverty status is determined
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	C17002
GEOS	Block Group 1; Census Tract 303.10; Wilson County; Tennessee; Block Group 2; Census Tract 303.10; Wilson County; Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

WEB ADDRESS	https://data.census.gov/table?q=C17002:+RATIO+OF+INCOME+TO+POVERTY+LEVEL+IN+THE+PAST+12+MONTHS&g=1500000US471890303101,471890303102&tid=ACSDT5Y2021.C17002
TABLE NOTES	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.
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COLUMN NOTES	None

Table: ACSDT5Y2021.C17002

	Block Group 1, Census Tract 303.10, Wilson County, Tennessee		Block Group 2, Census Tract 303.10, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**
Total:	1,428	±303	3,269	±723
Under .50	29	±45	33	±37
.50 to .99	51	±88	51	±81
1.00 to 1.24	89	±151	0	±13
1.25 to 1.49	0	±13	43	±66
1.50 to 1.84	0	±13	0	±13
1.85 to 1.99	0	±13	417	±392
2.00 and over	1,259	±319	2,725	±606

RATIO OF INCOME TO POVERTY LEVEL IN THE PAST 12 MONTHS

United States® Census Bureau

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DATA NOTES	
TABLE ID:	C17002
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Population for whom poverty status is determined
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TABLES	C17002
GEOS	Block Group 1; Census Tract 309.06; Wilson County; Tennessee
EXCLUDED COLUMNS	None
APPLIED FILTERS	None
APPLIED SORTS	None
PIVOT & GROUPING	
PIVOT COLUMNS	None
PIVOT MODE	Off
ROW GROUPS	None
VALUE COLUMNS	None

WEB ADDRESS	https://data.census.gov/table?q=C17002:+RATIO+OF+INCOME+TO+POVERTY+LEVEL+IN+THE+PAST+12+MONTHS&g=1500000US471890309061&tid=ACSDT5Y2021.C17002
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COLUMN NOTES	None

Table: ACSDT5Y2021.C17002

	Block Group 1, Census Tract 309.06, Wilson County, Tennessee	
Label	**Estimate**	**Margin of Error**
Total:	1,445	±736
Under .50	32	±52
.50 to .99	13	±50
1.00 to 1.24	319	±473
1.25 to 1.49	235	±220
1.50 to 1.84	0	±13
1.85 to 1.99	0	±13
2.00 and over	846	±523

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
CIVIL RIGHTS OFFICE
SUITE 1800, JAMES K. POLK BUILDING
505 DEADERICK STREET, NASHVILLE, TENNESSEE 37243-1402
(615) 741-3681 TOLL FREE (888) 370-3647

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

October 10, 2023

Tennessee Department of Transportation
James K. Polk Building
505 Deaderick Street
Environmental Division
Susannah Kniazewycz, Director
Nashville, TN 37243-0334

Subject: Environmental Justice Analysis for I-40 Interchange at SR-265 (Central Pike) Wilson County, Tennessee
TDOT PIN: 124884.00

Dear Ms. Kniazewycz:

The Civil Rights Division's Title VI Program staff reviewed Environmental Justice Analysis for I-40 Interchange at SR-265 (Central Pike) Wilson County, Tennessee, TDOT PIN: 124884.00.

Actions and steps taken are found to be in accordance with the mandates of Title VI of the 1964 Civil Rights Act, the National Environmental Policy Act of 1969, and 42.U.S.C. 4332(2), and Executive Order 12898. There does not appear to be any Title VI nor Environmental Justice issues.

Thank you for the opportunity to review the updated analysis. Should you have questions or comments, please do not hesitate to contact me at 615-253-1066 or Cynthia.Howard@TN.GOV.

Best Regards,

Cynthia Howard
Cynthia Howard
Title VI Program Director

CC: Pamela Sharp, Title VI Specialist

Hazardous Materials

Environmental Studies

Hazardous Materials

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

County: Wilson

PIN: 124884.00

Request

Request Type: Initial Environmental Study

Project Plans: Preliminary

Date of Plans: 02/04/2023

Location: TNCloud

Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Hazardous Materials

Study Results

Based on the Preliminary Initial Studies Plans dated 4 February 2023, no known hazardous materials sites affect this project as it is currently planned, and no additional hazardous material studies are recommended at this time. The asbestos bridge survey has been completed and the following project commitment has been submitted. In the event hazardous materials or wastes are encountered within the right-of-way, notification shall be made per TDOT Standard Specifications for Road and Bridge Construction (January 1, 2021) Section 107.08.C. Disposition of hazardous materials or wastes shall be subject to all applicable regulations, including the applicable sections of the Federal Resource Conservation and Recovery Act, as amended; the Comprehensive Environmental Response, Compensation, and Liability Act, as amended; and the Tennessee Hazardous Waste Management Act of 1983, as amended. Databases reviewed include Google Earth imagery, EPA National Priorities List, EPA EnviroMapper (Envirofacts), TDEC Registered Underground Storage Tanks Public Data Viewer and Data and Reports, TDEC Division of Water Resources Public Data Viewer and Oil and Gas Wells database, TDEC Division of Remediation Sites Public Data Viewer, TDOT Integrated Bridge Information System, and others, as necessary.

Commitments

Did the study of this project result in any environmental commitments? **Yes**

EDHZ001. An Asbestos Containing Material (ACM) survey was completed on Bridge No. 95I00400001 SR-265 over I-40 LM 2.24 (95-SR265-02.24). No ACM was detected. Please see the report for further details and photographs. No special accommodations for demolition and waste disposal are anticipated for these structures and the material can be deposited in a C&D landfill. Prior to the demolition or rehabilitation of any structure (bridge or building), the contractor is required to submit the National Emission Standards for Hazardous Air Pollutants standard 10-day notice of demolition to the TDEC Division of Air Pollution Control (per TDOT Standard Specifications for Road and Bridge Construction (January 1, 2021) Sections 107.08 D and 202.03).

Additional Information

Is there any additional information or material included with this study? **No**

Certification

Responder: Kyle Kirschenmann

Signature: Kyle Kirschenmann Digitally signed by Kyle Kirschenmann Date: 2023.02.22 08:19:41 -05'00'

Title: Environmental Manager Hazardous Materials Section

Multimodal

Environmental Studies

Multimodal

Environmental Studies Request

Project Information

Route: Interstate (I) 40

Termini: I-40 at Central Pike (SR-265) New Interchange

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Certification

Requestor: Brian Kluttz

Title: Environmental Studies Specialist Advanced

Signature: Brian Kluttz Digitally signed by Brian Kluttz Date: 2023.02.21 13:55:40 -06'00'

Environmental Study

Technical Section

Section: Multimodal

Study Results

This project accomodates both bicyclists and pedestrians with a sidewalk and a shared use path.

Commitments

Did the study of this project result in any environmental commitments? No

Additional Information

Is there any additional information or material included with this study? No

Certification

Responder: Masonya Osei

Title: Multimodal Planning Monitor

Signature: Masonya B. Osei

Digitally signed by Masonya B. Osei
Date: 2023.07.11 10:07:03 -05'00'

TN TDOT Department of Transportation

MULTIMODAL ACCESS POLICY

EFFECTIVE DATE:

July 31, 2015

AUTHORITY:

TCA 4-3-2303

If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

PURPOSE:

To create and implement a multimodal transportation policy that encourages safe access and mobility for users of all ages and abilities through the planning, design, construction, maintenance, and operation of new construction, reconstruction and retrofit transportation facilities that are federally or state funded. Users include, but are not limited to, motorists, transit-riders, freight-carriers, bicyclists and pedestrians.

APPLICATION:

The policy applies to Department of Transportation employees, consultants and contractors involved in the planning, design, construction, maintenance, and operation of state and federally funded projects, and local governments managing and maintaining transportation projects with funding through TDOT's Local Programs Development Office.

DEFINITIONS:

Highway:	A main road or thoroughfare, such as a street, boulevard, or parkway, available to the public for use for travel or transportation.
Multimodal:	For the purposes of this policy, multimodal is defined as the movement of people and goods on state and functionally-classified roadways. Users include, but are not limited to, motorists, transit-riders, freight-carriers, bicyclists and pedestrians, including those with disabilities.
Reconstruction:	Complete removal and replacement of the pavement structure or the addition of new continuous traffic lanes on an existing roadway.

Retrofit:	Changes to an existing highway within the general right-of-way, such as adding lanes, modifying horizontal and vertical alignments, structure rehabilitation, safety improvements, and maintenance.
Roadway:	The portion of a highway, including shoulders, that is available for vehicular, bicycle or pedestrian use.

POLICY:

The Department of Transportation recognizes the benefits of integrating multimodal facilities into the transportation system as a means to improve the mobility, access and safety of all users. The intent of this policy is to promote the inclusion of multimodal accommodations in all transportation planning and project development activities at the local, regional and statewide levels, and to develop a comprehensive, integrated, and connected multimodal transportation network. TDOT will collaborate with local government agencies and regional planning agencies through established transportation planning processes to ensure that multimodal accommodations are addressed throughout the planning, design, construction, maintenance, and operation of new construction, reconstruction and retrofit transportation facilities as outlined in TDOT's Multimodal Access Policy Implementation Plan.

TDOT is committed to the development of a transportation system that improves conditions for multimodal transportation users through the following actions:

1. Provisions for multimodal transportation shall be given full consideration in new construction, reconstruction and retrofit roadway projects through design features appropriate for the context and function of the transportation facility.
2. The planning, design and construction of new facilities shall give full consideration to likely future demand for multimodal facilities and not preclude the provision of future improvements. If all feasible roadway alternatives have been explored and suitable multimodal facilities cannot be provided within the existing or proposed right of way due to environmental constraints, an alternate route that provides continuity and enhances the safety and accessibility of multimodal travel should be considered.
3. Existing multimodal provisions on roadways shall not be made more difficult or impossible by roadway improvements or routine maintenance projects.
4. Intersections and interchanges shall be designed (where appropriate based on context) to accommodate the mobility of bicyclists and pedestrians to cross corridors as well as travel along them in a manner that is safe, accessible, and convenient.
5. While it is not the intent of resurfacing projects to expand existing facilities, opportunities to provide or enhance bicycle and pedestrian facilities shall be given full consideration during the program development stage of resurfacing projects.
6. Pedestrian facilities shall be designed and built to accommodate persons with disabilities in accordance with the access standards required by the Americans with Disabilities Act

(ADA). Sidewalks, shared use paths, street crossings (including over- and under-crossings) and other infrastructure shall be constructed so that all pedestrians, including those with disabilities, can travel independently.

7. Provisions for transit-riders, pedestrians, and bicyclists shall be included when closing roads, bridges or sidewalks for construction projects where pedestrian, bicycle, or transit traffic is documented or expected.

EXCEPTIONS:

It is TDOT's expectation that full consideration of multimodal access will be integrated in all appropriate new construction, reconstruction and retrofit infrastructure projects. However, there are conditions where it is generally inappropriate to provide multimodal facilities. Examples of these conditions include, but are not limited to:

1. Controlled access facilities where non-motorized users are prohibited from using the roadway. In this instance, a greater effort may be necessary to accommodate these users elsewhere within the same transportation corridor.
2. The cost of accommodations would be excessively disproportionate to the need and probable use. Excessively disproportionate is defined as exceeding twenty percent (20%) of the total cost of the project. The twenty percent figure should be used in an advisory rather than an absolute sense, especially in instances where the cost may be difficult to quantify. Compliance with ADA requirements may require greater than 20% of project cost to accommodate multimodal access. Costs associated with ADA requirements are NOT an exception.
3. Areas in which the population and employment densities or level of transit service around the facility, both existing and future, does not justify the incorporation of multimodal alternatives.
4. Inability to negotiate and enter into an agreement with a local government to assume the operational and maintenance responsibility of the facility.
5. Other factors where there is a demonstrated absence of need or prudence, or as requested by the Commissioner of the Department of Transportation.

Exceptions for not accommodating multimodal transportation users on State roadway projects in accordance with this policy shall be documented describing the basis and supporting data for the exception, and must be approved by TDOT's Chief Engineer and Chief of Environment and Planning or their designees.

DESIGN GUIDANCE:

The Department recognizes that a well-planned and designed transportation network is responsive to its context and meets the needs of its users. Therefore, facilities will be designed and constructed in accordance with current applicable laws and regulations, using best practices and guidance, including but not limited to the following: TDOT Standard Drawings and guidelines, American Association of State Highway and Transportation Officials (AASHTO) publications, Institute of Transportation Engineers (ITE) publications, the Manual on Uniform Traffic Control Devices (MUTCD), National Association of City Transportation Officials (NACTO) publications, the Public Rights-of-Ways Accessibility Guidelines (PROWAG), and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Signed:

PAUL DEGGES
Chief Engineer/Deputy Commissioner

TOKS OMISHAKIN
Chief of Planning/Deputy Commissioner

JOHN SCHROER
Commissioner

Quality Assurance Review

Project Information

Route: I-40

Termini: Interchange at SR-265 (Central Pike)

County: Wilson

PIN: 124884.00

Preparer: Brian Kluttz

Certification

By signing below, you certify that this document has been reviewed for compliance with all applicable environmental laws, regulations and procedures. The document has been evaluated for quality, accuracy, and completeness, and that all source material has been verified, compiled and included in the attachments and technical appendices.

Reviewer:	Sam Patterson	**Signature:**	Sam Patterson Digitally signed by Sam Patterson Date: 2023.11.09 12:09:57 -06'00'
Title:	Environmental Supervisor	**Comment:**	Comments Made.

Reviewer:	Sam Patterson	**Signature:**	Sam Patterson Digitally signed by Sam Patterson Date: 2023.11.30 11:41:20 -06'00'
Title:	Environmental Supervisor	**Comment:**	Comments Addressed.

Reviewer:	Sam Patterson	**Signature:**	Sam Patterson Digitally signed by Sam Patterson Date: 2023.12.05 13:19:52 -06'00'
Title:	Environmental Supervisor	**Comment:**	FHWA Comment Addressed.

Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment

Reviewer:	Enter Reviewer Name	**Signature:**	
Title:	Enter Reviewer Title	**Comment:**	Enter Comment