Environmental Assessment

State Route 109 (Portland Bypass)

From State Route 109 near State Route 76 to State Route 109 North of Downtown Portland Sumner County, Tennessee

Submitted Pursuant to the

National Environmental Policy Act of 1969

42 U.S.C. 4332(2)(c)

Lead Agencies:

U.S. Department of Transportation
Federal Highway Administration

Tennessee Department of Transportation

Cooperating Agency:

U.S. Army Corps of Engineers, Nashville District

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Submitted Pursuant to 42 U.S.C. 4332(2)(C)
by
U.S. Department of Transportation,
Federal Highway Administration
and
Tennessee Department of Transportation, Environmental Division

Cooperating Agency:

U.S. Army Corps of Engineers, Nashville District

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Date

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SUMMARY

General Project Description

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), proposes to construct a new segment of State Route (SR) 109 from existing SR-109 located south of the City of Portland to SR-109 north of Portland in Sumner County, Tennessee (hereafter referred to as the Portland Bypass). This project was initiated at the request of the City of Portland due to the growth of new industry and the inherent increase of truck and employee traffic in and around Portland's downtown and industrial park areas.

The proposed project would be constructed in part with funding from the FHWA, and is therefore subject to the requirements of the National Environmental Policy Act (NEPA). This Environmental Assessment (EA) is prepared to meet NEPA requirements.

The primary purpose of the proposed project is to improve local, regional, and statewide mobility by improving traffic flow on the SR-109 corridor through Portland. In addition to addressing concerns due to localized growth and inherent increased traffic, this project would provide regional transportation benefits by helping finalize long-term improvements to the SR-109 corridor between Interstate 40 (I-40) in Wilson County and Interstate 65 (I-65) in Robertson County.

Alternatives

The No-Build Alternative and one Build Alternative are considered in this Environmental Assessment (EA). Two additional build alternatives were considered for a bypass route located west of Portland's downtown but were removed from consideration. Other concepts, such as shifting the proposed bypass route to the east of Portland and/or construction of Transportation System Management (TSM) projects, including widening the existing SR-109 through Portland's downtown, were also considered. All of these alternatives and/or concepts were removed from further consideration, because they were not able to fully meet the purpose and need for the project, or because of known environmental constraints that would have caused more substantial impacts to sensitive resources when compared to the Build Alternative that was carried forward for further study. Input from local officials, agencies, and the public was also considered when determining which alternatives should be carried forward for further study. More information regarding alternatives previously considered is located in Section 2.3 of this document.

No-Build Alternative: The No-Build Alternative, as the name implies, denotes that only minor improvements, such as normal maintenance and possibly spot safety improvements, would be made to the existing road or intersection areas.

Build Alternative: In addition to the No-Build Alternative, one Build Alternative is being studied in this EA. The proposed Build Alternative includes the construction of a four-lane, partial access controlled facility extending from existing SR-109 south of SR-76 northward to existing SR-109 (North Broadway) north of downtown Portland. The southern terminus of the proposed project would tie into the recently constructed four-lane segment of relocated SR-109. The northern terminus would tie into the southern end of a separate SR-109 relocation/extension project that is part of the new I-65/SR-109 Interchange (TDOT PIN #: 107338.00). That project is currently in the design phase.

A grade separated interchange is proposed at SR-52. Two preliminary design options are being considered for that interchange, including a partial folded diamond and a folded diamond interchange. In addition to the SR-52 interchange, a flyover ramp is proposed at the southern terminus of the project to provide unimpeded access for southbound traffic on the existing SR-109 to merge with the proposed Portland Bypass.

The Build Alternative includes realignment and/or reconfiguration of several local roads intersected by the proposed bypass route, including a Kirby Drive connector that would extend the existing Kirby Drive westward to connect to the Portland Bypass on new alignment. A section of SR-52 would be widened to five lanes from near West Market Street westward to west of the proposed SR-52/Portland Bypass interchange. This widening is necessary due to an increase in traffic expected on that section of SR-52 once the Portland Bypass is constructed.

Sidewalks would be considered for inclusion along a portion of SR-52 that is proposed to be widened as part of the overall Portland Bypass project. Sidewalks constructed between West Market Street and Searcy Lane would correspond with existing and planned sidewalks within the City of Portland. Final plans for sidewalks will be determined during the final design phase in coordination with local officials.

Environmental Impacts

The No-Build Alternative would have minimal environmental impacts, but it would not meet the proposed project's identified purpose and need.

The primary potential impacts of the Build Alternative are outlined in Table S.1. Please note that these impact assessments are preliminary and would be more specifically defined in the permitting and design phases. The Build Alternative has two design configuration options for the proposed interchange at SR-52. The first option is a partial folded diamond interchange that has ramps in three quadrants of the interchange, including the southern two quadrants and the northwest quadrant. The second option is a folded diamond option that includes ramps only in the southern two quadrants of the interchange. Differences in potential impacts between the two interchange options are shown in separate columns in Table S.1, where applicable.

The analysis has not identified any significant environmental impacts.

Table S.1. Summary of Potential Impacts Associated with the Build Alternative.

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
ESTIMATED ROW ACQUISITION	210 acres	214 acres
TRANSPORTATION	• Improved Level of Service; • Improved regional transportation network; • Reduced traffic, especially trucks, through downtown Portland; and • Changes in access to and from local roadways.	
LAND USE	Conversion of approximately 210 acres to highway ROW	Conversion of approximately 214 acres to highway ROW
SOCIAL ENVIRONMENT		
Social and Community Resources	No impact	
Environmental Justice	• One minority population identified (Block Group 1, Census Tract 202.05). • No disproportionate or adverse impact to any minority or low-income populations.	
DISPLACMENTS		
Residential Displacements	13	
Business Displacements	3	
Non-Profit Displacements	No impact	
ECONOMIC ENVIRONMENT	Improved regional transportation network could enhance area for new and existing businesses	
FARMLAND		
Prime and Unique Farmland (acres)	183	193
Farmland Conversion Impact Rating (Score)	158	159
NATURAL RESOURCES		
Wildlife Habitat Impacted		
Forest/Shrub-scrub (acres)	24	23
Agriculture/Old Field (acres)	166	171
Developed/Disturbed (acres)	20	
Aquatic Resources Present		
Streams Present/Impacted	20 streams present, 19 streams impacted	
Stream Channels Crossed/Encapsulated	18 streams totaling approximately 5,387 linear feet of impact	18 streams totaling approximately 4,836 linear feet of impact
Ponds Present (number)	14 ponds present, approximately 2.3 acres impacted	
Wild and Scenic Rivers	No impact	
Wetlands (number/acres)	11 wetlands present, approximately 2.36 acres impacted	
Floodplains (number/acres)	1 floodplain crossed, approximately 1.7 acres impacted	

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
Threatened and Endangered Species	Federally-Listed Species: • Indiana bat (*Myotis sodalis*) - Not likely to adversely affect. • Northern long-eared bat (*Myotis septentrionalis*) – Not likely to adversely affect. • Gray bat (*Myotis grisescens*) – Best management practices (BMP's) to protect water quality along travel/feeding corridors would be sufficient to minimize potential harm. State-Listed Species: • Orangefin darter (*Etheostoma bellum*) – Suitable habitat present, but BMP's would be sufficient to minimize potential harm. • Splendid darter (*Etheostoma barrenense*) – Suitable habitat present, but BMP's would be sufficient to minimize potential harm. • Teardrop darter (*Etheostoma barbouri*) – No suitable habitat present, not likely to adversely affect.	
INVASIVE SPECIES	No impact	
GEOLOGY and SOILS	Two sinkholes were identified within the limits of the Build Alternative. Detailed geotechnical studies will be conducted during the design phase of project development.	
CULTURAL RESOURCES		
Architectural/Historical Resources	No architectural resources eligible or currently listed on the National Register of Historic Places would be impacted.	
Archaeological Resources	• No archaeological resources eligible or currently listed on the National Register of Historic Places would be impacted. • Site 40SU279 (the Fulghum Cemetery) should be avoided by all ground disturbing activities. However, this site would not be directly impacted by the project.	
AIR QUALITY	No impact	
NOISE (Receptors Impacted)	29	
HAZARDOUS MATERIALS	No impact	
PEDESTRIANS and BICYCLISTS	• Beneficial impact due to new sidewalks along the widened section of SR-52 from W. Market St. to Searcy Lane. • Removal of some of the traffic from existing SR-109 in downtown Portland would improve safety. • The 10-foot paved portion of the proposed shoulders along the Build Alternative would provide a safer route for pedestrians and bicyclist compared to the existing	

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
	route, especially north of downtown Portland.	
VISUAL RESOURCES	Minimal adverse impact because existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources, and the proposed project would introduce few, if any, noticeable changes to the viewshed.	
ENERGY RESOURCES	No impact	
SECTION 4(f) RESOURCES	No impact	
SECTION 6(f) RESOURCES	No impact	
CONSTRUCTION	• Temporary traffic detours may be necessary. • Temporary utility disruptions could occur. • The use of BMPs could avoid or minimize air/noise and sedimentation/erosion impacts.	

Areas of Controversy and Unresolved Issues

There are no known major areas of controversy or any substantial unresolved issues related to the proposed highway project.

Other Major Actions

One other TDOT programmed project is located adjacent to the proposed project. A new grade separated interchange and roadway improvement project is planned that would extend/relocate the northern terminus of existing SR-109 and connect it to I-65 near the existing Lake Springs Road crossing of I-65. This area is located just to the southwest of the northern terminus of SR-109 at SR-41 (U.S. 31W) near the Sumner/Robertson County line. The I-65 interchange project is included in the Nashville Area Metropolitan Planning Organization's (MPO) *2014-2017 Transportation Improvement Program (TIP)* (Project #2006-416). A Finding of No Significant Impact (FONSI) was approved by the Federal Highway Administration (FHWA) for the I-65 Interchange project on October 26, 2010. The project is currently in the design phase. Several other sections of SR-109, including sections of SR-109 in southern Portland, and other sections to the south have already been improved and are either under construction or constructed.

Other Required Federal Actions

The acquisition of permits would occur prior to initiation of construction activities, pursuant to Section 69-3-108(a) of the *Tennessee Water Quality Control Act of 1977* and other State and Federal laws and regulations. These permits could include:

- Individual or Nationwide 404 Permit from the U.S. Army Corps of Engineers (USACE);
- Section 401 Water Quality Certification from the Tennessee Department of Environment and Conservation (TDEC);
- Aquatic Resource Alteration Permit (ARAP) from TDEC;
- National Pollutant Discharge Elimination System (NPDES) Permit from TDEC;
- Tennessee Construction General Permit for Storm Water Discharges from Construction Activities (TNCGP) from TDEC; and

- Class V Injection Well Permit from TDEC.

TDOT would undertake further coordination with the regulatory agencies before preparing mitigation plans and submitting permit applications if the Build Alternative is selected. Permit requirements and mitigation plans will be based on these discussions.

Statute of Limitations

The FHWA may publish a notice in the *Federal Register*, pursuant to 23 USC §139(l), indicating that one or more Federal agencies have taken final action on permits, licenses, or approvals for the subject transportation project. If such notice is published, claims seeking judicial review of those Federal agency actions will be barred unless such claims are filed within 150 days after the date of publication of the notice or within such shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the Federal laws governing such claims will apply.

ENVIRONMENTAL COMMITMENTS

☒ Commitments are involved on the project.

List of Environmental Commitments

1. If the Build Alternative is selected, additional surveys will be completed prior to construction for Indiana bats (*Myotis sodalis*) and the northern long-eared bats (*Myotis septentrionalis*).

2. Additional geotechnical studies will be completed during the design phase of the project to determine the extent of the sinkholes observed within the Build Alternative right-of-way (ROW), and whether any sinkhole treatments would be needed.

3. Archaeological Site *40SU279*, the Fulghum Cemetery, will be avoided by all ground disturbing activities.

TABLE OF CONTENTS

List of Tables

List of Figures

List of Attachments

List of Appendices

LIST OF ACRONYMS

ACS	American Community Survey
ADT	Average Daily Traffic
AADT	Average Annual Daily Traffic
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
ARAP	Aquatic Resource Alteration Permit
BMP	Best Management Practices
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CBD	Central Business District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CMA	Corridor Management Agreements
CSRP	Conceptual Stage Relocation Plan
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted Decibels
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ETW	Exceptional Tennessee Water
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GAP	Gap Analysis Program
GHG	Greenhouse Gas
ICI	Indirect and Cumulative Impacts
$L_{Aeq\ (1h)}$	A-Weighted Equivalent Sound Level Averaged over One Hour
L_{eq}	Equivalent Continuous Sound Level
LWCFA	Land and Water Conservation Fund Act
LOS	Level of Service
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
mph	Miles Per Hour
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
MVM	Million Vehicle Miles
NAA	Noise Analysis Area
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAGPRA	Native American Grave Protection and Repatriation Act
NEPA	National Environmental Policy Act
NGA	National Governors Association
NHS	National Highway System
N_2O	Nitrous Oxide
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	Ozone
ONRW	Outstanding National Resource Water
Pb	Lead
PGA	Planned Growth Area

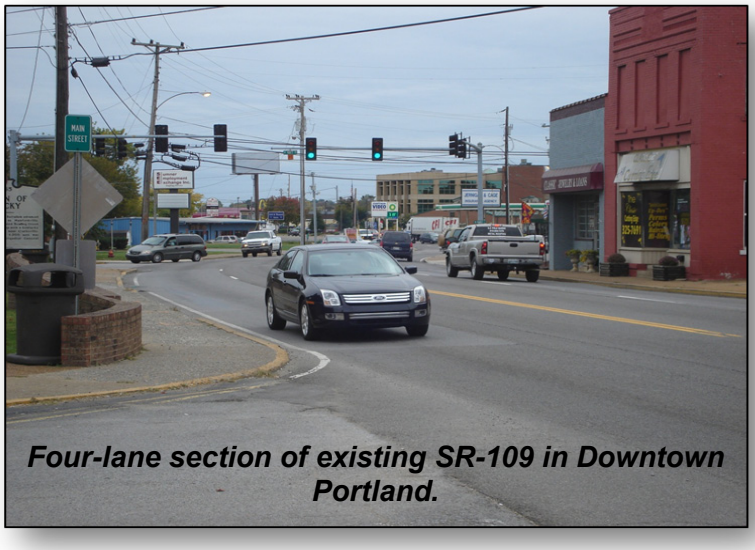
PND	Pond
PM	Particulate Matter
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SEP	Seep
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SNK	Sinkhole
SOW	Scope of Work
SPG	Spring
SR	State Route
SO_x	Sulfur Oxides
STIP	State Transportation Improvement Program
STR	Stream
SWL	Swale
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TEMA	Tennessee Emergency Management Agency
TESA	Tennessee Environmental Streamlining Agreement
THC	Tennessee Historical Commission
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TNECD	Tennessee Department of Economic and Community Development
TNM	Traffic Noise Model
TPR	Transportation Planning Report
TSM	Traffic Systems Management
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
UGB	Urban Growth Boundary
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VMT	Vehicle Miles Traveled
VPD	Vehicles Per Day
WTL	Wetland
WWC	Wet Weather Conveyance

1.0 PURPOSE AND NEED

1.1 Project Description

The Tennessee Department of Transportation (TDOT) proposes to construct a new segment of State Route (SR) 109 from existing SR-109 south of the City of Portland to SR-109 north of Portland in Sumner County, Tennessee (henceforth referred to as the Portland Bypass). Figure 1-1 shows the project vicinity in Sumner County, Tennessee. This project was initiated at the request of the City of Portland due to the growth of new industry and the inherent increase of truck and employee traffic in and around Portland's downtown and industrial/warehousing areas.

In addition to addressing concerns due to localized growth and inherent increased traffic, this project would provide regional transportation benefits by helping TDOT finalize the long-term improvements to the SR-109 corridor between Interstate 40 (I-40) in Wilson County and Interstate 65 (I-65) in Robertson County.



Four-lane section of existing SR-109 in Downtown Portland.

The proposed study area is located west of downtown Portland and east of I-65 and consists primarily of rural land used for agricultural purposes. The area contains scattered farmsteads with small residential developments and local roads interspersed. Industrial/warehousing areas are present to the north and to the east of the study area. These areas are located along Vaughn Parkway and Fred White Boulevard near I-65 in Robertson County, and off of Kirby Drive just north of Portland's downtown.

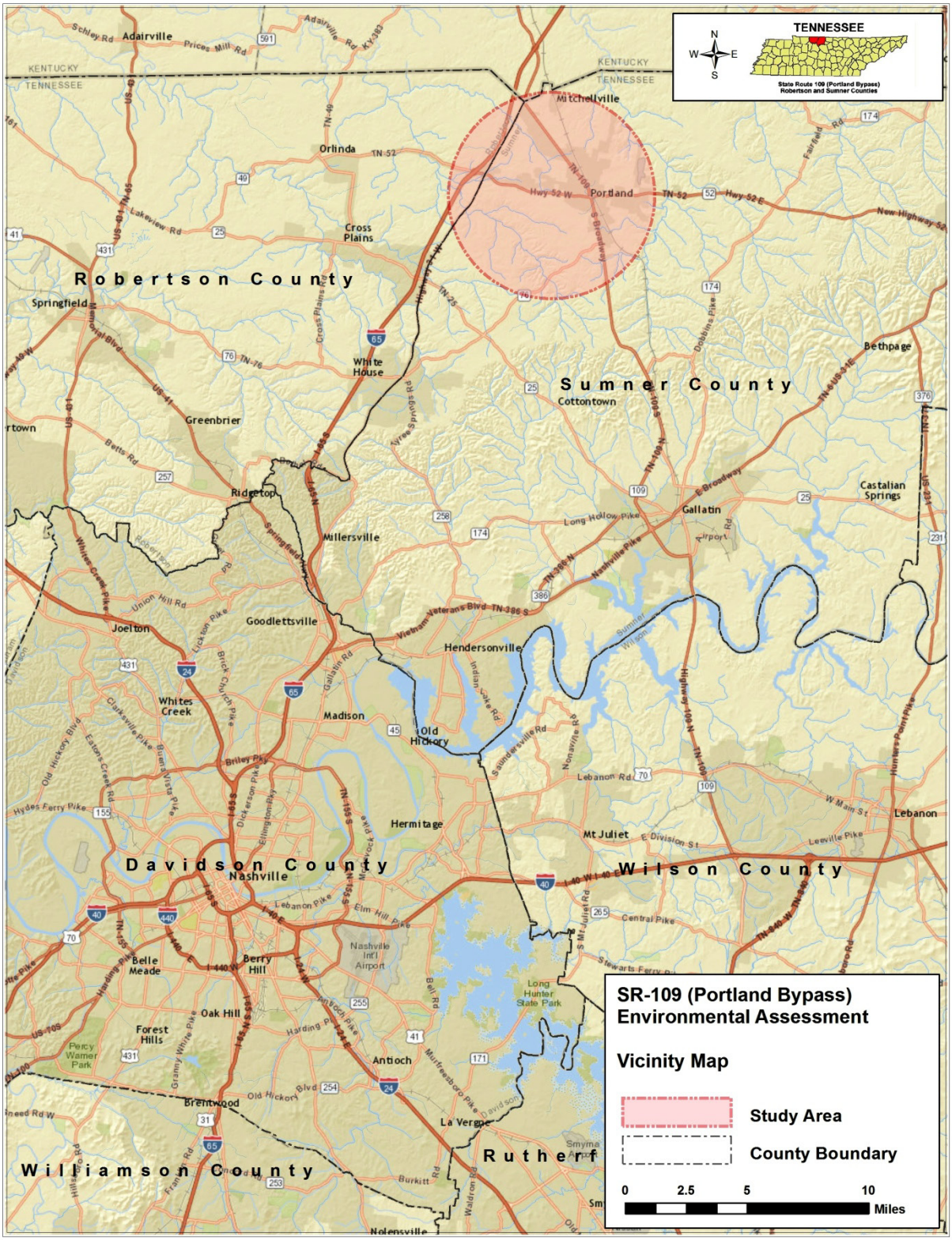
The project is included in the Nashville Area Metropolitan Planning Organization's (MPO) *Transportation Improvement Program (TIP) for Fiscal Years 2014-2017* adopted on December 11, 2013 (TIP Project #2011-51-108). The project is consistent with the MPO's *2035 Regional Transportation Plan* (*RTP*) adopted December 15, 2010 (RTP Project #1051-222). Attachment A contains a copy of the TIP and RTP sheets for this project.

1.2 Project Background

Existing SR-109 is a non-access controlled highway functionally classified as an Urban Principal Arterial on the state highway system within the city limits of Portland and a Rural Principal Arterial outside of the city limits. SR-109 is also on the National Highway System (NHS) as a Principal Arterial. The NHS consists of roadways important to the nation's economy, defense, and mobility. Under the NHS, Principal Arterials are highways in rural and urban areas which provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.

SR-109 begins south of I-40 at SR-265/840 east of Nashville in Wilson County and terminates at SR-41 (U.S. 31W) at the Sumner/Robertson County line north of Portland. The roadway has a total distance of approximately 37.5 miles.

Figure 1-1. Project Vicinity Map for the SR-109 (Portland Bypass) in Sumner County.



A Transportation Planning Report (TPR), which was approved by TDOT in August 2006, involved a detailed look at various options of constructing a bypass around Portland. The objectives of the TPR were to define the preliminary purpose and need for the project and provide guidance for the implementation of options to meet the purpose and need. The TPR also provided a preliminary look at traffic data, project costs, and other data to aid in the decision-making process.

Based on the findings of the TPR, it is not anticipated that the widening of existing SR-109 would be capable of serving future traffic volumes nor reducing truck traffic through the City of Portland's Central Business District (CBD). The widening of existing SR-109 through the city would necessitate acquisition of costly right-of-way (ROW) and utility relocations due to the existing developed commercial and residential areas. Instead, the TPR envisioned the proposed project would realign SR-109 from near SR-76 south of Portland northward to I-65 using an alignment to the west of downtown Portland.

In June 2011, TDOT began studying the proposed project in an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969. An EA was considered the appropriate environmental documentation for this project due to the scope of the project and the uncertainty regarding the potential for significant impacts for the project.

Environmental Assessment/Finding of No Significant Impact

The National Environmental Policy Act of 1969 requires that projects receiving federal funding that have uncertainty regarding their potential for significant adverse environmental effects be reviewed in an EA to determine if any significant impacts are expected.

An EA:

- Identifies alternative solutions that meet the project's purpose and need;
- Provides an assessment of the context and intensity of effects of the alternatives on the natural and human environment to determine if significant impacts may occur;
- Documents sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS);
- Lists agencies, stakeholders, and persons consulted; and
- Identifies any commitments to avoid, minimize, or mitigate negative effects.

If no significant impacts are identified, a Finding of No Significant Impact (FONSI) is prepared to document the reasons why the agency has concluded there are no significant environmental impacts projected to occur upon implementation of the project and is considered the final environmental document for the project. If a significant impact(s) is discovered during the preparation of an EA, an EIS is prepared.

In March 2010, the State of Tennessee began participating in the National Governors Association (NGA) Center for Best Practices Policy Academy on Shaping a New Approach to Transportation and Land Use Planning. As a result of this program, Tennessee's project management team, which consisted of TDOT, the Tennessee Department of Environment and Conservation (TDEC), and the Tennessee Department of Economic and Community Development (TNECD), developed objectives that would be best accomplished by exploring and advancing the concept of Corridor Management Agreements (CMA). The concept is that CMAs will better coordinate transportation and land use decisions along the state's highway corridors.

Strategic Corridors

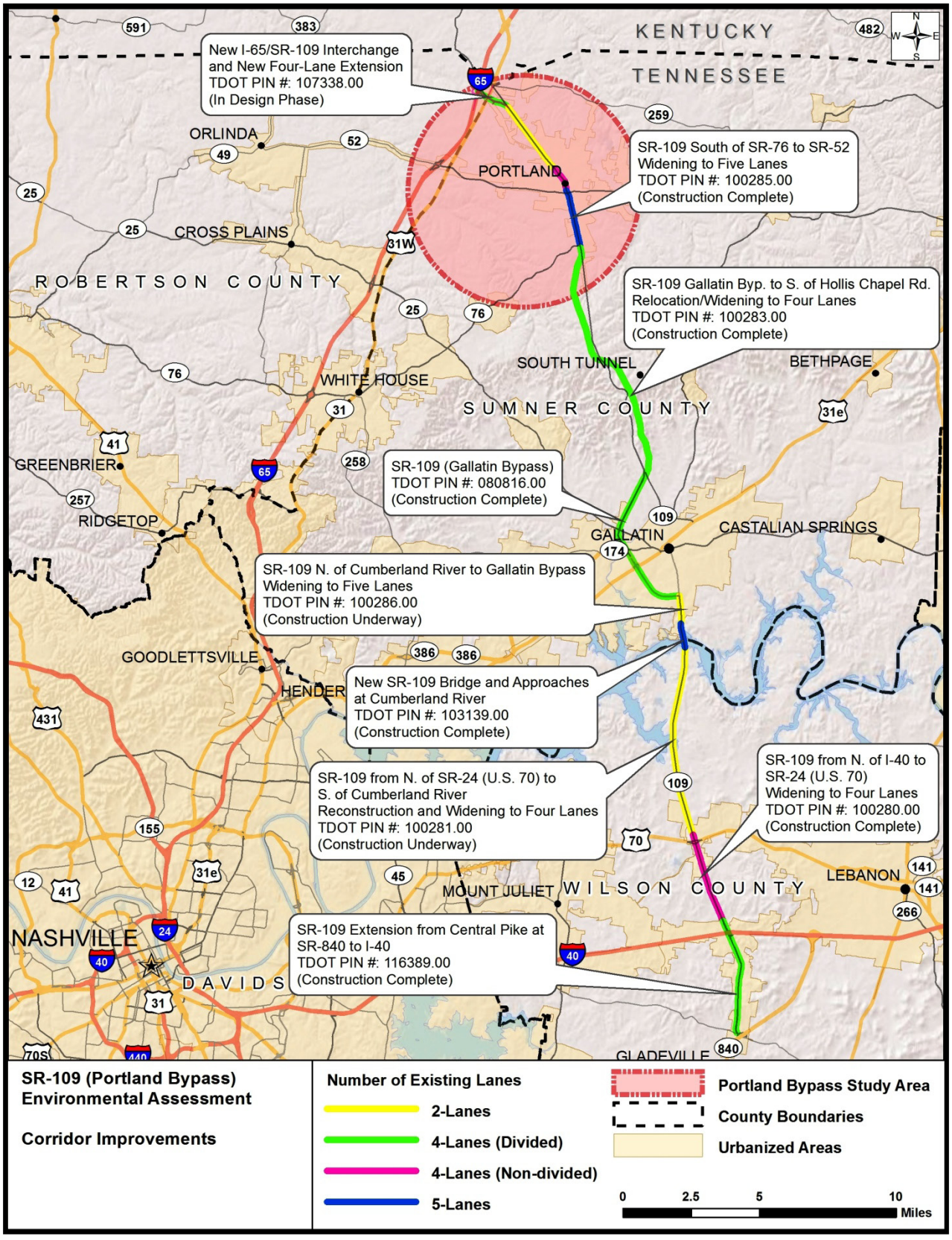
The strategic corridors concept emphasizes the need to improve, protect, and maximize the capacity of existing highway corridors that are critical to statewide mobility and regional connectivity. A small segment of the Tennessee's overall highway system forms the foundation of the State's transportation system, carrying most of the goods and freight and connecting major urban areas and growing smaller cities. By identifying these strategic corridors, the state and its stakeholders have an opportunity to consider long-term vision, decision making consistency, and improved partnerships. SR-109 is considered a key regional corridor that is critically important to regional economies.

One of two pilot studies selected for this approach was SR-109 in Sumner and Wilson Counties (TDOT Region 3). A series of workshops was held in which stakeholders developed and prioritized goals, strategies, and actions that were considered the most critical to future development along the SR-109 corridor. The corridor management goals for SR-109 developed to date through the SR-109 CMA are: (1) improve regional transportation for local residents, commuters and freight; (2) promote economic development; and (3) preserve community character.

SR-109 is currently a four-lane divided highway from SR-265/840 to just north of I-40 where it becomes a four-lane non-divided highway to U.S. 70. It then becomes a two-lane highway northward to the recently completed new five-lane bridge that was constructed over the Cumberland River (Old Hickory Lake) just south of Gallatin, replacing the old two-lane bridge constructed in the 1950s. Approximately one mile of SR-109 was widened to five lanes as part of the bridge replacement project. North of the new Cumberland River Bridge, the roadway is two lanes until it intersects with Airport Road and South Water Avenue in Gallatin, where the SR-109 Gallatin Bypass begins. The SR-109 Gallatin Bypass is a four-lane divided highway that travels around Gallatin to the west. North of Gallatin, SR-109 continues as a recently improved, four-lane divided highway to just south of the intersection of SR-109 and SR-76 in Portland. From SR-76 north to SR-52, the roadway consists of a newly constructed five-lane section (two through lanes in each direction separated by a continuous center left-turn lane). From SR-52 through downtown Portland, the roadway is four lanes with a series of signalized and unsignalized intersections. North of downtown Portland the roadway transitions back to two-lanes through its terminus at SR-41 (U.S. 31W).

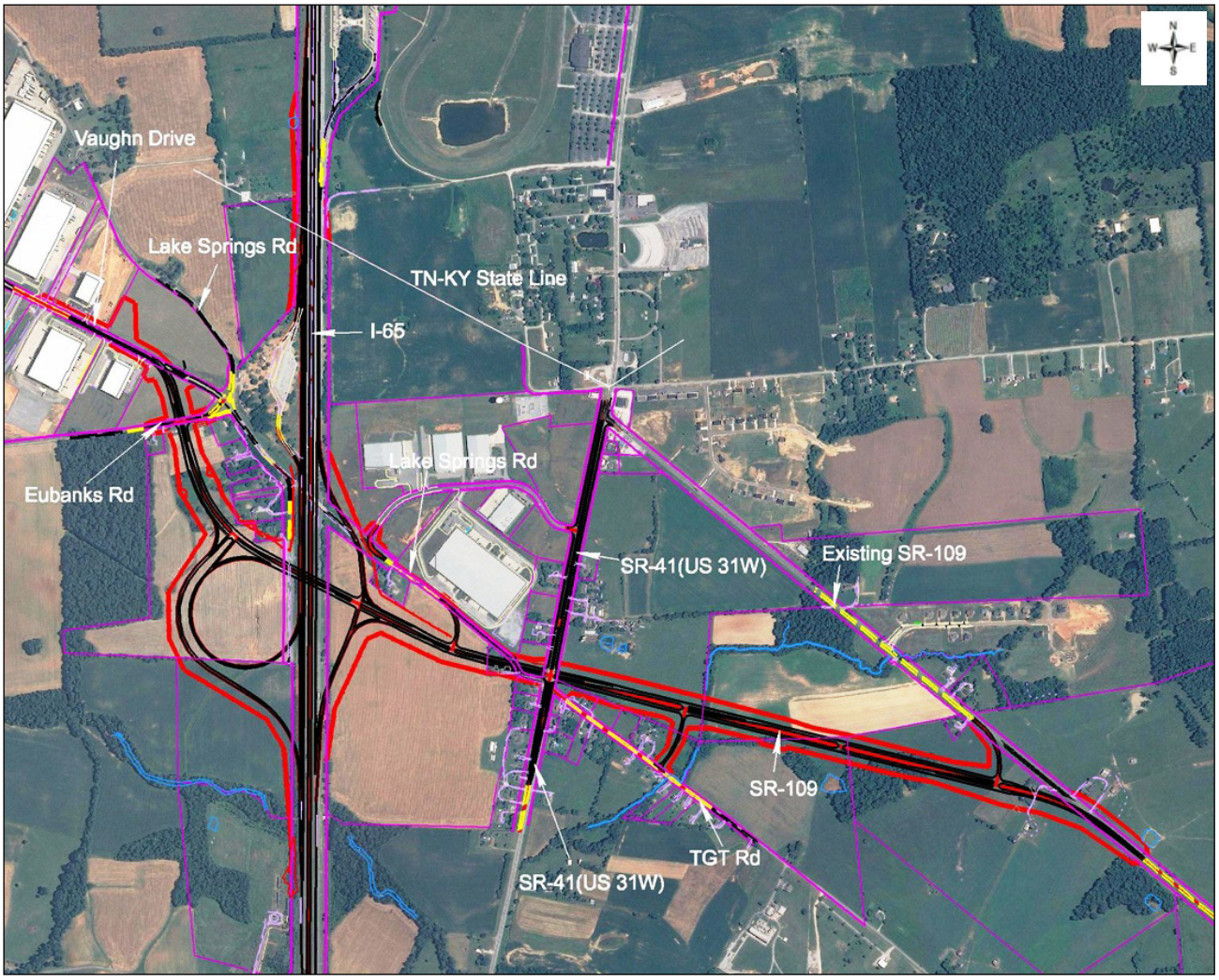
Two separate SR-109 projects (TDOT PIN #'s 100286.00 and 100280.00) are underway to widen the remaining two-lane segments of SR-109 to four or five lanes (four-lane highway with a continuous center 12-foot turn lane) between the south end of the completed SR-109 Gallatin Bypass (TDOT PIN #: 080816.00) and the new Cumberland River Bridge (TDOT PIN #: 103139.00) in Sumner County and south of the new bridge through the completed four-lane section in Wilson County that ends just north of U.S. 70 (Lebanon Road) (TDOT PIN #: 100280.00). Each of these projects is considered independent and has its own purpose and need. Figure 1-2 shows the general layout of existing SR-109, along with the improvements that are completed and/or underway throughout its corridor (Note: The "Urbanized Areas" shown on Figure 1-2, and several other figures in this document, include populated areas that represent census designated places, consolidated cities, and incorporated places in the U.S. identified by the U.S. Bureau of the Census).

Figure 1-2. State Route 109 Corridor Map.



A separate project is also underway that will relocate and extend the current northern terminus of SR-109 westward to intersect with I-65 (TDOT PIN #: 107338.00). This project, currently in the design phase, will extend SR-109 across SR-41(U.S. 31W) to intersect with I-65 just south of the Tennessee-Kentucky border near Lake Springs Road in Robertson County. The I-65 Interchange project is an independent project with its own purpose and need. The relocated/extended section of SR-109 associated with the I-65 Interchange project is expected to be a four-lane divided highway. A Finding of No Significant Impact (FONSI) was approved by FHWA for that separate project on October 26, 2010. Figure 1-3 depicts the conceptual layout of the I-65 Interchange and associated SR-109 relocation. This new terminus will provide a direct connection for SR-109 to I-65 helping reach the overall goal of an improved SR-109 corridor that connects I-40 east of Nashville and I-65 north of Nashville.

Figure 1-3. Conceptual Layout of the I-65 Interchange and Associated SR-109 Relocation in Robertson and Sumner Counties, Tennessee.



Source: TDOT, 2013.

1.3 Need for the Project

The need for this project is based on the following (and is described in the sections below):

- System Linkage;
- Transportation Demand;
- Traffic and Capacity;
- Roadway Deficiencies; and
- Safety.

1.3.1 System Linkage

Improving system linkage by providing a better north/south route to connect the SR-109 improvements that have been completed south of Portland and the new I-65 Interchange and associated SR-109 improvements north of Portland are some of the primary needs for the project. The existing transportation system in the project vicinity consists of I-65 as the main artery connecting the study area to Nashville, Tennessee, to the south, Bowling Green, Kentucky, and eventually Louisville, Kentucky, to the north.

The principal arterial routes in the area include SR-109, which provides the main north/south route into and out of Portland; and SR-52, which provides east/west access into and out of Portland and the current primary access route to and from I-65. A collector route, SR-41 (U.S. 31W) running parallel to the east of I-65, provides access to and from various points along the route, including portions of northwest Portland, Franklin, Kentucky, to the north and the Nashville area to the south. Another collector route, SR-76 located in southern Portland, provides a connection between the Cities of Portland and White House located to the southwest. Figure 1-4 shows the existing highways near Portland and the locations of the primary industrial/warehousing areas in the vicinity.

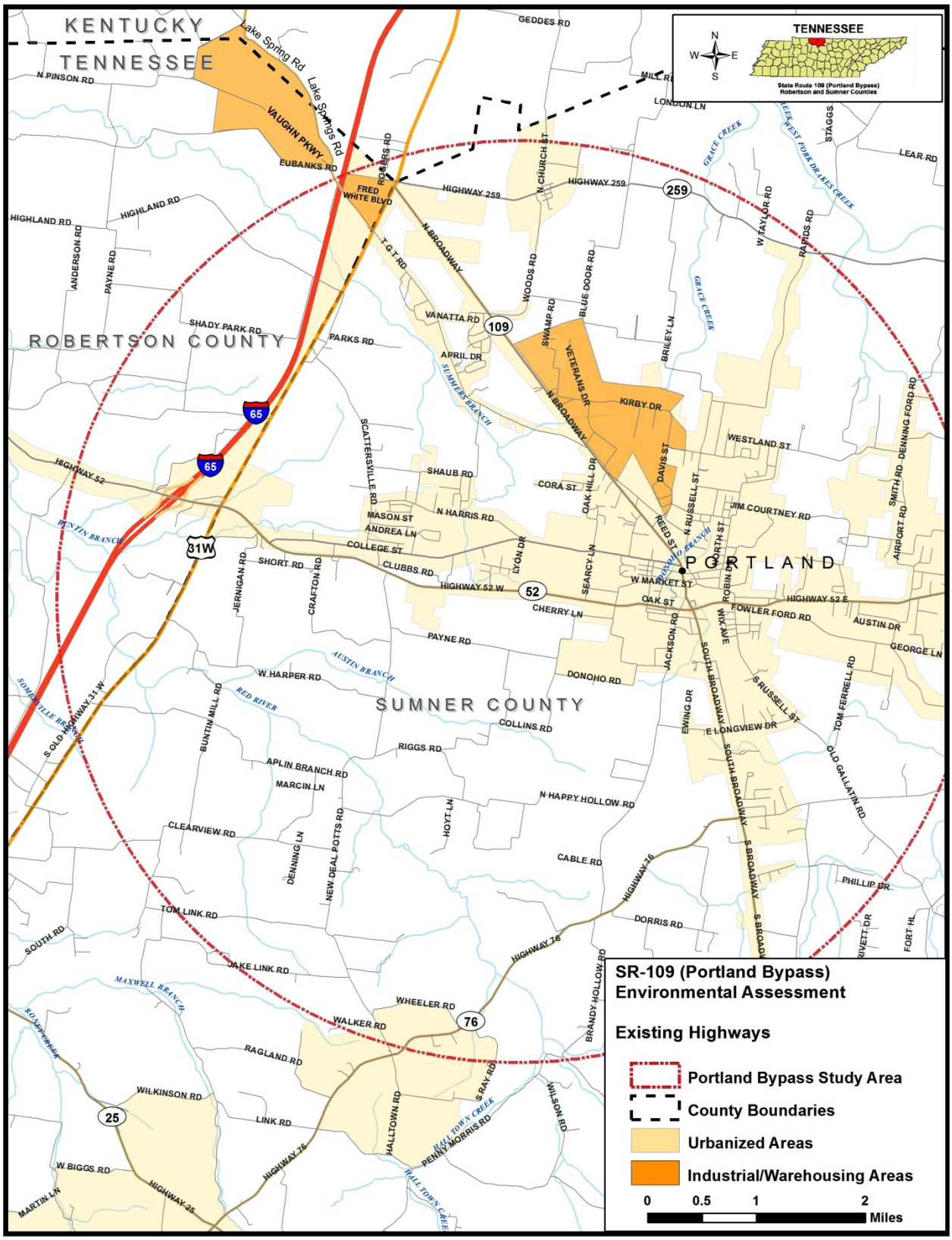
1.3.2 Transportation Demand

Demand for transportation within a region is directly related to the demographic, economic, and land use characteristics of the area. According to the MPO's *2035 RTP*, population and employment growth are expected to continue in the Nashville region. Much of the projected growth for Middle Tennessee is expected to occur within the seven counties that are included, at least in part, in the planning area of the Nashville Area MPO, including Portland. From 2006 to 2035, the seven-county area is expected to see a 56 percent increase in population and jobs.

According to the MPO's *2035 RTP*, Sumner County is expected to increase in population from an estimated 148,534 people in 2006 to 223,124 people in 2035, and Robertson County is expected to grow from 61,708 people in 2006 to 101,324 people in 2035. The number of jobs is also expected to increase during the same period in Sumner County from 57,236 to 83,053 and in Robertson County from 29,573 to 47,049. The increases in people and jobs would continue to increase transportation demand in the area and region.

Sumner County is characterized by a concentration of commercial and industrial uses within or near primary cities and towns and low-density residential developments in surrounding areas. The same land use trends are evident in the Portland area with industrial developments continuing to occur, especially in northern sections of the city, and commercial/retail developments occurring within Portland and along the major highways in the area.

Figure 1-4. Existing Highways in the Portland, Tennessee Vicinity.



Because the area is within approximately 40 minutes travel time to the Nashville CBD, it is anticipated that residential development would continue to occur in this area. Residential development in the immediate area would likely become denser as more planned neighborhoods become established on subdivided properties. These land use trends would continue to result in increased transportation demand in the area.

1.3.3 Traffic and Capacity

The projected base year 2020 annual average daily traffic (AADT) for the existing SR-109 through downtown Portland is 15,270 vehicles. The projected design year 2040 AADT on SR-109 through Portland is 22,000 vehicles. Figure 1-5 depicts the 2020 and 2040 AADT projections for the Portland area roadways.

Base Year and Design Year

The Base Year of a project is generally the year following the expected opening of the roadway to traffic. For this project, the base year was estimated to be 2020.

The Design Year of a project is generally 20 years after the roadway opens, assuming the roadway is designed to function well (i.e., accommodate traffic demand) for 20 years into the future. The design year for this project was estimated to be 2040.

Average Daily Traffic (ADT)

ADT is the total traffic volume during a given period divided by the number of days in that period. For roadways having traffic in two directions, the ADT includes traffic in both directions unless specified otherwise.

Annual Average Daily Traffic (AADT)

An AADT traffic volume is used throughout the project planning process to provide projected volumes of traffic. It is based on a 24 hour, two directional count at a given location. This raw traffic volume is then mathematically adjusted for vehicle type, determined by an axle correction factor. Then this volume is statistically corrected by a seasonal variation factor that considers time of the year and day of the week.

Table 1.1 shows the AADT in both the base year 2020 and design year 2040 for additional sections of SR-109 and SR-52 in the Portland vicinity. These numbers represent the traffic expected for the No-Build conditions, under which the proposed project would not be constructed.

It is estimated that up to 15 percent of the AADT through Portland on SR-109 would be truck traffic. Trucking is a dominant means for moving goods to and from local businesses, warehouses, and industries. This is in addition to the freight shipped to and from local industry using the CSX Railroad.

The anticipated character of future traffic flow was investigated using a process called "capacity analyses," which provides operational characteristics of a highway facility in terms of "Levels of Service" (LOS). The LOS estimates reflect the ability of roads to accommodate motor vehicle traffic and the subsequent physical and psychological comfort levels of drivers. The LOS analysis is a qualitative measure that describes the character of traffic conditions related to speed and travel time, freedom to maneuver, and traffic interruptions.

Figure 1-5. Traffic Volume and Capacity Projections for SR-109 and SR-52 for Base Year 2020 and Design Year 2040 under the No-Build Alternative.

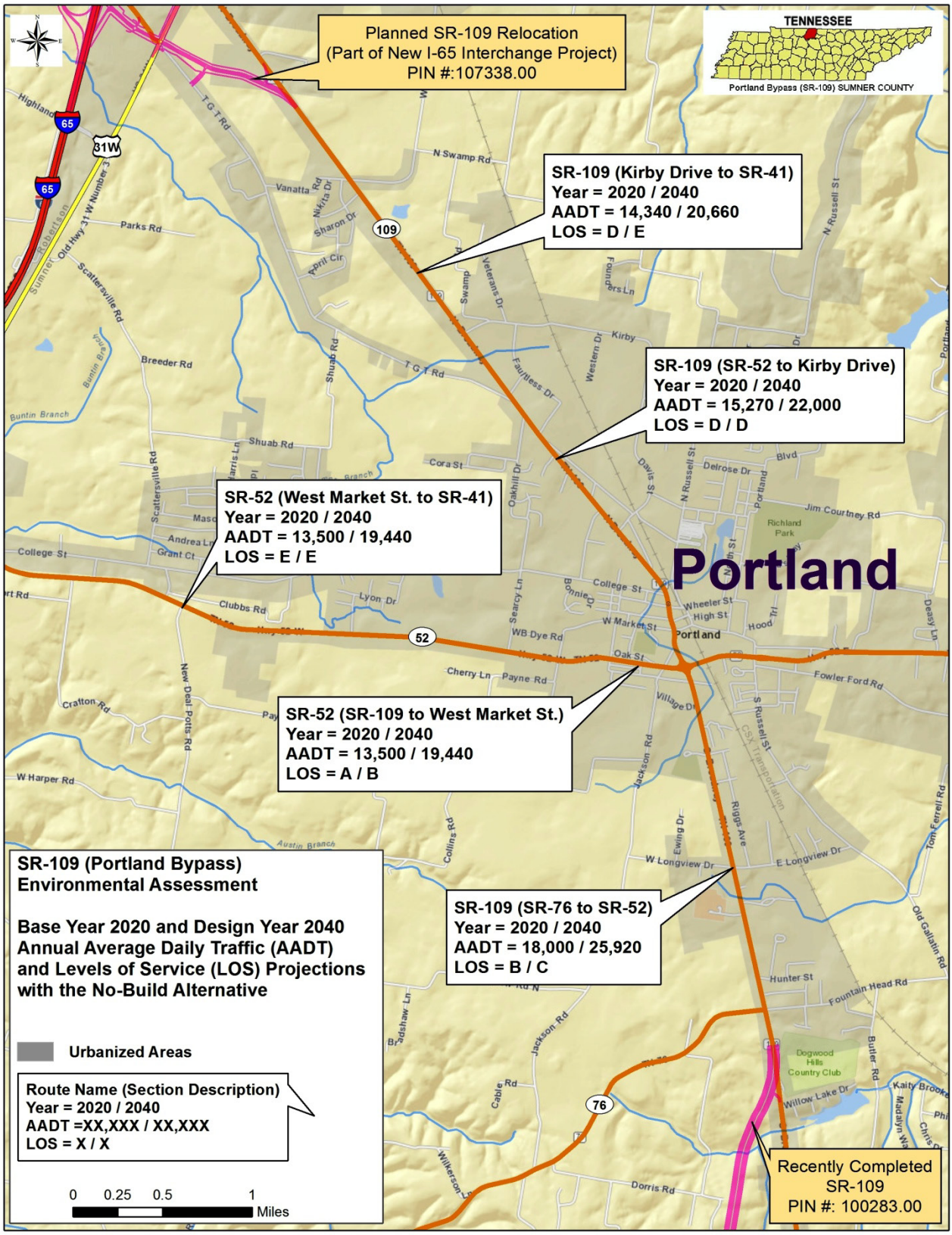


Table 1.1. Traffic Volume and Capacity Projections for SR-109 and SR-52 for Base Year 2020 and Design Year 2040 Under the No-Build Alternative.

	Base Year (2020)		Design Year (2040)		Percent Trucks in AADT
Roadway	**AADT**	**LOS**	**AADT**	**LOS**	
SR-109 (from SR-76 to SR-52)	18,000	B	25,920	C	12%
SR-109 (from SR-52 to Kirby Drive)	15,270	D	22,000	D	14%
SR-109 (from Kirby Drive to SR-41)	14,340	D	20,660	E	14%
SR-52 (from SR-109 to West Market Street)	13,500	A	19,440	B	10%
SR-52 (from West Market Street to SR-41)	13,500	E	19,440	E	10%
AADT = Annual Average Daily Traffic (number of vehicles); LOS =Level of Service Source: TDOT, 2015.					

There are six levels used to describe LOS ranging from “A” to “F” with “F” being the worst. Each level represents a range of operating conditions. Figure 1-6 contains a graphical representation of the LOS to show what each may look like in an everyday situation.

Capacity analyses were conducted for SR-109 and SR-52 in the Portland vicinity to determine the anticipated base year 2020 and design year 2040 LOS without the proposed project being constructed to reroute traffic through the area. The LOS estimates are provided in Table 1.1.

Figure 1-5 above displays the 2020 and 2040 LOS projections for the Portland area roadways under the No-Build condition. The estimated LOS for existing SR-109 through downtown Portland without any substantial improvements, including the proposed project, is estimated to be a LOS D in both the base year 2020 and the design year 2040. Roadways with LOS D typically have periods of unstable flow and are characterized by drivers being restricted in maneuverability. This can result in increased travel times, congestion, and safety issues. Safety issues that can occur in areas with low LOS include increased number of congestion related crashes, especially rear-end and side-swipe crashes.

Figure 1-6. Graphical Depiction of the Levels of Service Used to Describe Roadway Capacity.

LOS A

Represents the best operating conditions and is considered free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

LOS D

Represents traffic operations approaching unstable flow with high passing demand and passing capacity near zero, characterized by drivers being severely restricted in maneuverability.

LOS B

Represents reasonably free-flowing conditions but with some influence by others.

LOS E

Represents unstable flow near capacity. LOS E often changes to LOS F very quickly because of disturbances (road conditions, accidents, etc.) in traffic flow.

LOS C

Represents a constrained constant flow below speed limits, with additional attention required by the drivers to maintain safe operations. Comfort and convenience levels of the driver decline noticeably.

LOS F

Represents the worst conditions with heavily congested flow and traffic demand exceeding capacity, characterized by stop-and-go waves, poor travel time, low comfort and convenience, and increased accident exposure.

1.3.4 Roadway Deficiencies

The existing SR-109 in downtown Portland exhibits both horizontal and vertical deficiencies. SR-109 is lacking in sufficient shoulder widths and sidewalks along much of the route, thereby inhibiting pedestrian and bicycle traffic. In addition, sight distances are obstructed due to existing structures and curvature of the roadway, especially in downtown Portland. The anticipated increases in traffic volumes are expected to result in more congestion and safety issues if these deficiencies are not corrected or a substantial amount of traffic is not diverted from the deficient sections of roadway.

SR-109 deficiencies include lack of shoulders and turn lanes and poor sight distances.

1.3.5 Crashes/Safety

Safety concerns were mentioned by residents that provided comments at the 2012 public meeting held for the project. Many of those concerns were due to the number of large trucks traveling through the downtown area, in addition to the through traffic using SR-109. Residents stated that a large number of trucks travel to and from the industrial/warehousing areas, which are located primarily along the general SR-109 corridor off of Kirby Drive, Vaughn Parkway, and Fred White Boulevard.

Based on the future traffic projections (refer to Table 1.1), traffic volume, including large trucks, is expected to continue to worsen in the area. The increased traffic would eventually cause more traffic flow issues and subsequent declines in LOS and safety.

Crash Rate

Section crash rates are calculated based on the number of crashes on a specified section of roadway, the average daily traffic on the roadway, the timeframe for which the crash data was taken, and the length of the roadway section. Crash rates are expressed in terms of crashes per one million vehicle-miles.

Statewide Average Crash Rate

This rate is based on the number of crashes statewide for a specific highway type, such as urban divided highways, urban roadways with turn lanes, urban freeways and rural divided highways.

Statewide Critical Crash Rate

A section's crash rate is compared to a critical crash rate, which is derived from a formula using the statewide average crash rate, average daily traffic on the roadway section, length of the section, and the timeframe for which the crash data was taken. The comparison is expressed as a ratio of the section crash rate to the critical crash rate (resulting in a critical crash rate factor). The critical crash rate is the threshold above which it can be statistically certain (at a 99 percent confidence level) that the section crash rate exceeds the average crash rate and is not mistakenly shown as higher than the statewide average due to randomly occurring crashes. Sections with a critical crash rate factor greater than one are considered to have crash rates that are statistically higher than the statewide average rate.

Improving traffic safety is one of the needs identified for this project. Since the proposed project could influence traffic volumes and safety on existing roadways in the area, traffic crash data for the latest three years available (2012-2014) was reviewed for each of the state routes traversing the Portland vicinity. Table 1.2 contains crash rate data for roadways in the Portland vicinity. Figure 1-7 depicts the crash rates for roadways included in the safety analyses in the Portland vicinity.

In addition to comparing the crash rates on local highways to statewide average rates, additional analyses were conducted using the 2012-2014 crash data to provide a better understanding of the types, locations, and severity of crashes that occurred along the roadways. Although the actual crash rates on some segments of SR-109 remained below the statewide average, the crash data analyses did highlight other potential safety concerns. One of those concerns is the severity of the crashes.

The severity of crashes was relatively high on all segments of all four routes studied within the Portland area when compared to statewide rates, resulting in a total of 193 people being injured. Table 1.3 contains crash severity data and details on the types of accidents that occurred on roadways in the Portland vicinity.

Severity Index

A severity index is used to determine how severe the crashes that occur on a section of roadway are relative to similar roadways. This index is calculated by a formula of the sum of four times the number of fatal crashes plus two times the number of incapacitating injury crashes plus the number of other injury crashes divided by the total number of crashes that occurred during the period. The weighting of the fatal and incapacitating injury crashes gives a higher ranking to locations with a large number of more severe crashes to identify areas that may require more immediate attention. The higher the severity index, the more severe the crashes.

Table 1.2. Crash Rates and Analyses Results for Crashes on Portland Area Roads during 2012-2014.

Route	SR-109	SR-109	SR-109	SR-109	SR-52	SR-52	SR-52	SR-41 (U.S. 31W)	SR-76
Section Description	N. Centerpoint Rd. to Academy Rd.	Academy Rd. to SR-52	Downtown Portland from SR-52 to Morningside Dr.	Morningside Dr. to SR-41 (U.S. 31W)	W. Market St. to SR-109	SR-41 to West Market St.	I-65 to SR-41 (Robertson Co.)	SR-52 to SR-109	Jackson Rd. to SR-109
Functional Class	Rural Principal Arterial	Urban Principal Arterial	Urban Principal Arterial	Urban Principal Arterial	Urban Principal Arterial	Urban Principal Arterial	Urban Principal Arterial	Urban Collector	Rural Major Collector
Roadway Type	Rural Four-lane Divided	Urban Four-lane w/ Center Turn Lane	Urban Four-lane Undivided	Urban Two-lane	Urban Four-lane w/ Center Turn Lane	Urban Two-lane	Urban Two-lane	Urban Two-lane	Rural Two-lane
Total Number of Crashes (2012-2014)	14	29	85	66	71	34	29	33	9
Total Number of Crashes for Route	**194**				**134**			**33**	**9**
Avg. AADT (2012-2014)	11,569	14,625	15,832	10,257	11,438	8,430	9,742	4,680	1,759
Section Length (Miles)	1.374	2.234	1.014	4.019	0.719	3.847	0.450	3.380	1.666
VMT	15,896	32,672	16,054	41,223	8,224	32,430	4,384	15,818	2,930
Exposure (M) (1 MVM)	17.41	35.78	17.58	45.14	9.01	35.51	4.80	17.32	3.21
Statewide Average Crash Rate (2008-2010)	0.73	2.47	3.22	2.33	2.47	2.33	2.33	2.33	1.59
Actual Section Crash Rate (A)	0.80	0.81	4.84	1.46	7.88	0.96	6.04	1.91	2.80

Route	SR-109	SR-109	SR-109	SR-109	SR-52	SR-52	SR-52	SR-41 (U.S. 31W)	SR-76
Statewide Critical Crash Rate (C)	1.24	3.09	4.24	2.87	3.74	2.94	4.06	3.22	3.38
Critical Crash Rate Factor (A/C)	*0.65	0.26	1.14	0.51	2.11	0.33	1.49	0.59	0.83
Actual Section Rate/ Average Statewide Rate	1.10	0.33	1.50	0.63	3.20	0.41	2.59	0.82	1.76
Total Killed	0	0	0	0	0	0	0	0	0
Total Injured	4	19	36	41	31	20	16	22	4
Total Injured for Route	**100**				**67**			**22**	**4**
Total Inured on Portland State Routes	**193**								

= Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)
= Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate
= Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate

Exposure (M) = (ADT x 365 x 3 years analysis period x Section Length)/1,000,000

Section Crash Rate = Total Crashes/Exposure(M); Crash rates are expressed in crashes per 1 MVM (1 million vehicle miles traveled)

Statewide Critical Crash Rate = Statewide Average Crash Rate + K x [sqrt(Statewide Average Crash Rate/M]+1/(2M); Where K = 2.327 which is equal to a probability of 0.99.

Critical Crash Rate Factor = Section Crash Rate/Statewide Critical Crash Rate

AADT = Annual Average Daily Traffic; MVM = Million Vehicle Miles; VMT = Vehicle Miles Traveled

Source: Crash data for 1/1/2012 to 12/31/2014 provided by TDOT Project Planning Division 3/6/2015.

Figure 1-7. Crash Rating for Portland Area Highways included in the Proposed Project's Safety Analyses in Sumner and Robertson Counties.

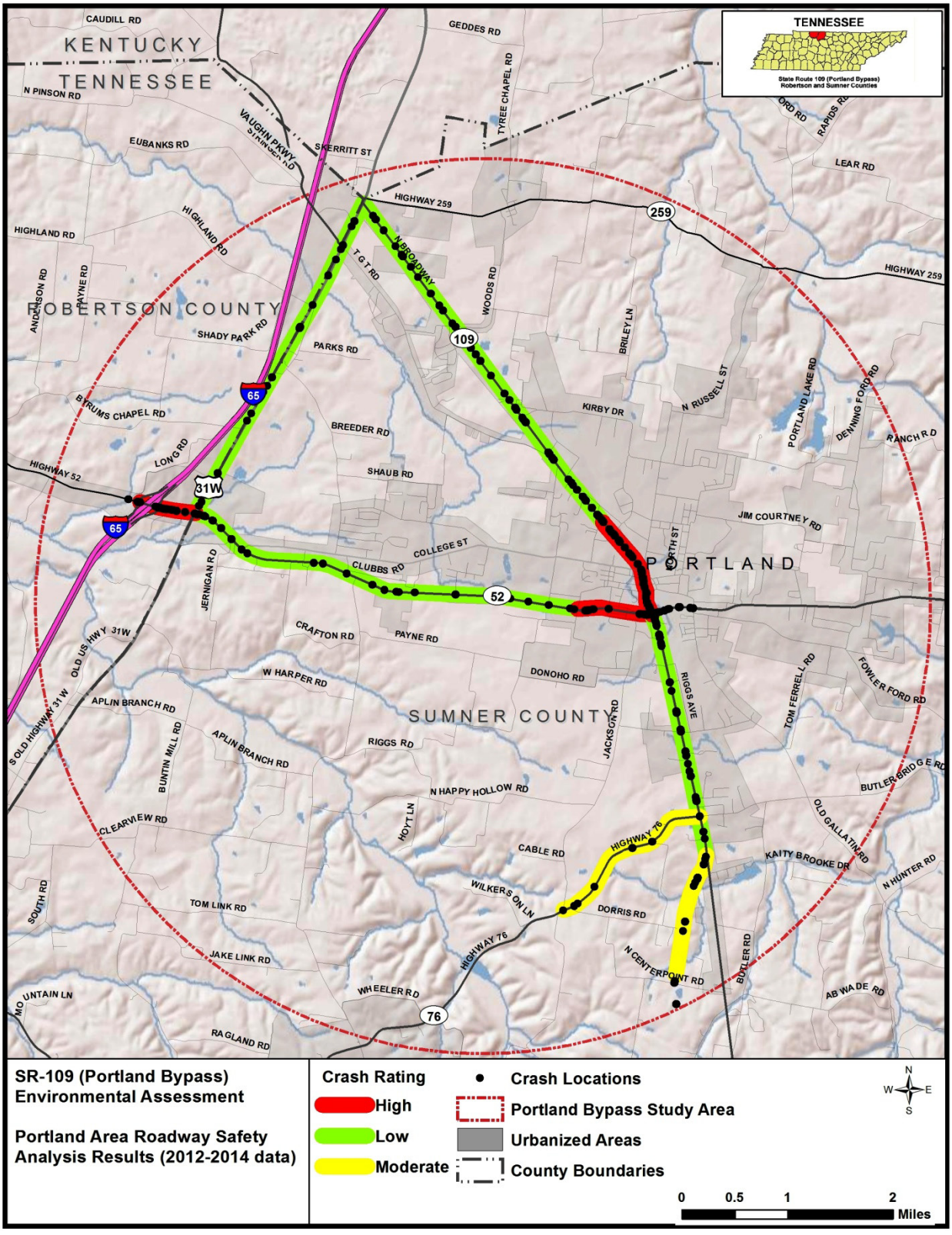


Table 1.3. Crash Severity Rates and Analyses Results for Crashes on Portland Area Roads during 2012-2014.

Route	SR-109	SR-109	SR-109	SR-109	SR-52	SR-52	SR-52	SR-41 (U.S. 31W)	SR-76	Total
Section Description	N. Centerpoint Rd. to Academy Rd.	Academy Rd. to SR-52	Downtown from SR-52 to Morningside Dr.	Morningside Dr. to SR-41 (U.S. 31W)	W. Market St. to SR-109	SR-41 to West Market St.	I-65 to SR-41 (Robertson Co.)	SR-52 to SR-109	Jackson Rd. to SR-109	
Total Severe Crashes*	0	0	3	2	0	3	1	5	0	14
Section Severity Rate (Weighted Severity Rate)	0.29 (0.29)	0.45 (0.45)	0.33 (0.36)	0.42 (0.45)	0.30 (0.30)	0.38 (0.47)	0.34 (0.38)	0.45 (0.61)	0.33 (0.33)	
Statewide Average Severity Rate	0.06	0.06	0.09	0.09	0.06	0.09	0.09	0.09	0.13	
Accident Location:										
Along Roadway	10	16	29	36	12	21	16	17	10	
At an Intersection	4	13	54	30	59	13	10	16	6	
Ramp	0	0	2	0	0	0	3	0	0	
Bridge	0	0	0	0	0	0	0	0	0	
Accident Type										
Angle	3	6	37	10	36	9	11	11	2	N/A
Head on	1	0	4	3	2	2	0	1	0	
No Other Vehicle (involving animal)	10 (9)	10 (5)	3	13 (3)	3 (1)	12 (2)	3	10 (1)	2	
Rear to Rear	0	1	0	0	0	0	0	0	0	
Rear End	0	9	22	30	20	7	12	7	2	
Rear to Side	0	1	1	0	0	2	0	0	0	
Side Swipe Opposite Direction	0	2	9	4	3	1	0	0	2	
Side Swipe Same Direction	0	0	6	6	6	1	2	3	0	
Unknown/ Other	0	0	2	0	1	0	1	1	1	

*Severe Crashes in this row include all crashes involving fatalities or incapacitating injuries in the sections of roadway studied. All injury crashes are considered in the severity rate calculations included in this table, but severe crashes are provided more emphasis in the weighted severity rate defined below:

Severity Rate = (F+I)/N; Where: F = total number of fatal crashes, I = total number of injury crashes (not including fatal crashes), and N = total number of crashes.

Weighted Severity Rate = (4 x F+2 x II+OI)/N; Where: N =total number of crashes; II =the total number of incapacitating injury crashes; F=total number of fatal crashes, OI=total number of other injury crashes (not including fatal and incapacitating crashes). The weighted severity rate was calculated by the formula of the sum of four times the number of fatal crashes plus two times the number of incapacitating injury crashes plus the number of other injury crashes divided by the total number of crashes. This weighting of the fatal and incapacitating injury crashes gives a higher ranking to locations with a large number of more severe crashes.

Source: Crash data for 1/1/2012 to 12/31/2014 provided by TDOT Project Planning Division 3/6/2015.

SR-109

As shown on Table 1.2, there were a total of 194 crashes on the 8.64-mile section of SR-109 between North Centerpoint Road and SR-41 (U.S. 31W) over the three year period, resulting in no fatalities, but 100 people injured. Most of the crashes on the overall section of SR-109 included in the study were at intersections.

Based on the 2012-2014 data, the crash rates on SR-109 through downtown Portland between SR-52 and Morningside Drive was higher than the statewide average rate and exceeded the statewide critical crash rate for similar roadway types. The new section of SR-109 south of Academy Road to near North Centerpoint Road had crash rates that were higher than statewide average rate, but did not exceed the statewide critical crash rate for similar roadway types.

Table 1.3 shows that the majority of those incidents on the section of SR-109 between SR-52 and Morningside Drive involved rear end crashes and angle crashes, which are typical of congested urban areas with traffic signals and numerous access points for local streets, parking lots, and driveways.

The high crash rates observed along the new section of SR-109 between Academy Road and North Centerpoint Road appear to be the result of a high number of collisions with deer and other larger animals. As shown on Table 1.3, a total of 9 of the 14 crashes that occurred in that section were due to animals. This is potentially the result of that section of highway being new and the animals in the area not having had time to have adjusted their travel patterns after the new roadway was put into operation.

The proposed project could potentially improve safety on existing SR-109 through downtown Portland by shifting vehicles to the new roadway, which would have a safer design capable of handling higher volumes of traffic. Chapter 2 contains discussion on the proposed improvements to SR-109, and the projected changes in local traffic volumes expected with the proposed project.

SR-52

The crash data for SR-52 contained on Table 1.2 shows that there were a total of 134 crashes on the 5.02-mile section between SR-109 and I-65 over the three year period, resulting in no fatalities, but 67 people injured. As shown on Table 1.3, most of the crashes on SR-52 were at intersections and involved rear end crashes and angle crashes.

The section of SR-52 from SR-109 westward to West Market Street, and the section of SR-52 between SR-41 (U.S. 31W) and the SR-52/I-65 Interchange, had high crash rates that were higher than the statewide average rate and exceeded the statewide critical crash rate for similar roadway types. The section of SR-52 between SR-109 and West Market Street has higher traffic volumes than other sections of the roadway to the west and is utilized as one of the access routes to the Portland High School.

Similar to SR-109, the crash rates in the high crash rate sections of SR-52 could also be reduced by the proposed Portland Bypass project due to potential improvements to SR-52 associated with the proposed project west of West Market Street, and due to the anticipated changes in overall traffic patterns in the area. The high crash rate on SR-52 near the I-65 interchange may be improved by the completion of Portland Bypass in combination with the new I-65 Interchange near Lake Springs Road currently under design. These projects are expected to remove some of the traffic from the existing SR-52/I-65 interchange. Chapter 2 contains

discussion on the proposed improvements to SR-52, and the projected changes in local traffic volumes expected with the proposed project.

SR-41 (U.S. 31W)

As shown on Table 1.2, there were a total of 33 crashes on the 3.4-mile section of SR-41 (U.S. 31W) studied between SR-52 and SR-109 that resulted in 22 injuries, but no fatalities. Almost half of the crashes throughout the length of this occurred at intersections as shown on Table 1.3.

The moderate crash rates on SR-76 may require further investigation in the future to determine if the design of the roadway needs to be improved in that area due to higher traffic volumes as the City of Portland continues to grow and traffic continues to increase in the area.

SR-76

There were a total of 9 crashes on the 1.7-mile section of SR-76 studied that resulted in four injuries, but no fatalities. The majority of accidents occurred at intersections.

The section of SR-76 from SR-109 to Jackson Road had a crash rate that was higher than the statewide average rate, but did not exceed the statewide critical crash rate for similar roadway types.

The following points summarize the safety and crash analyses in relation to the need for the proposed project:

- Crash rates on portions of SR-109 and SR-52 within the immediate study area were higher than the statewide average rate and exceeded the statewide critical crash rate for similar roadway types indicating potential problem areas along those routes. The proposed project is expected to divert some traffic off of these roadways as discussed in Chapter 2.
- The severity of crashes on all four routes studied was higher than the statewide rate raising safety concerns in the area.
- Traffic volumes are expected to continue to increase on SR-109 resulting in reduced LOS and a higher potential for congestion-related crashes.
- Local residents and officials have stated concerns related to safety due to the frequent traffic congestion and large number of heavy trucks in downtown Portland. One of the main needs of the proposed project is to divert through traffic, especially large trucks, off of the existing routes, including SR-109 in downtown Portland. Separating local traffic from through traffic, and removing large trucks from the downtown Portland area, should improve safety on the existing route for drivers, bicyclists, and pedestrians using the existing facilities.
- With 193 people being injured on the Portland-area state highways alone during the three-year study period (see Table 1.2), any improvement in transportation infrastructure that can lead to improved safety and help to reduce the number of roadway related fatalities and injuries are considered meaningful.

1.4 Purpose of Project

The primary purpose of the proposed project is to improve local, regional, and statewide mobility by improving traffic flow on the SR-109 corridor through Portland. . Specific goals of this project include:

- Enhancing transportation system linkage by providing an improved north/south route to link the SR-109 improvements that have been completed south of Portland and the new I-65 Interchange and associated SR-109 improvements north of Portland;
- Providing a roadway system that will adequately serve present and future transportation demand in the region capable of supporting additional economic and population growth in Portland and Sumner County;
- Reducing the volume of traffic, especially trucks, on existing SR-109 through downtown Portland in order to improve traffic flow and overall capacity (LOS);
- Providing a roadway that meets the current roadway design standards to provide a route without the roadway deficiencies associated with the existing SR-109 in downtown Portland; and
- Reducing the number and severity of crashes in the local area by providing a safer route and reducing traffic volumes on some of the existing roadways that are not designed to handle high volumes of traffic in a safe and efficient manner.

1.5 Consistency with Plans

The Portland Bypass project is consistent with the following plans:

- Nashville Area MPO's *Transportation Improvement Program (TIP) for Fiscal Years 2014-2017* adopted on December 11, 2013 (TIP Project #2011-51-108);
- Nashville Area MPO's *2035 Regional Transportation Plan* (*RTP*) adopted December 15, 2010 (RTP Project #1051-222); and
- Sumner County *2035 Comprehensive Plan: Sumner County's Blueprint to the Future* (2010).

Attachment A contains a copy of the TIP and RTP sheets for this project.

1.6 Logical Termini and Independent Utility

FHWA regulation (23 CFR 771.111(f)) outlines the following three criteria for selecting the end points of a transportation project:

- The end points should connect logical termini (rational end points) that encompass a corridor of sufficient length to ensure that environmental effects are addressed on a broad scope;
- The project limits should represent a project that has independent utility. This means that the project must be usable and a reasonable expenditure even if no other transportation improvements are made in the area; and
- The project limits must not restrict consideration of alternatives for other reasonably foreseeable transportation projects.

The proposed project would have logical termini and independent utility even if no additional transportation improvements are made in the area. The project would connect existing SR-109 south of downtown Portland to existing SR-109 north of downtown Portland providing a bypass route of the CBD for through traffic and large trucks. This project would not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. Instead, this project would provide a final step in completing an overall improved SR-109 corridor from I-40 in Wilson County to I-65 in Robertson County. The defined study area is of sufficient size to address environmental concerns on a broad scope.

2.0 ALTERNATIVES

Details regarding alternatives considered and the alternatives analysis for the proposed project are discussed in this chapter. Ultimately it was determined that a No-Build Alternative and one Build Alternative would be studied as part of this EA. TDOT coordinated with local government officials, state and federal agency representatives that participate in the Tennessee Environmental Streamlining Agreement (TESA) for the alternative development process. This section describes the No-Build Alternative, the Build Alternative and alternatives previously considered.

2.1 The No-Build Alternative

Under the No-Build Alternative, the proposed project would not be constructed, and no other major improvements would be constructed in the project vicinity. The No-Build Alternative includes only regular maintenance and minor safety improvements. The No-Build Alternative would not result in any construction efforts that would potentially result in adverse impacts to the environment. However, the beneficial impacts to local and regional traffic flow and safety offered by the proposed project would also not occur. With the improvements to sections of SR-109 to the south and with the new I-65/SR-109 Interchange currently being designed north of downtown Portland, it is expected that additional traffic will be utilizing this corridor. This would result in increased traffic volumes that would result in continued reductions in LOS and reduced safety on SR-109 through Portland.

The No-Build Alternative will serve as a baseline comparison for the proposed Build Alternative.

2.2 The Build Alternative

In addition to the No-Build Alternative, one Build Alternative is being studied in this EA. The Build Alternative meets the purpose and need of the project, because it would:

- Enhance transportation system linkage by providing an improved north/south route to link the SR-109 improvements that have been completed south of Portland and the new I-65 Interchange and associated SR-109 improvements north of Portland.
- Help to serve present and future transportation demand in the region and be capable of supporting additional economic and population growth in Portland and Sumner County;
- Reduce the volume of traffic, especially trucks, on existing SR-109 through downtown Portland to help improve traffic flow and overall capacity (LOS);
- Provide a roadway that meets the current roadway design standards; and
- Provide a safer route and reduce traffic volumes on some of the existing roadways that are not designed to handle high volumes of traffic in a safe and efficient manner.

2.2.1 Proposed Design of the Build Alternative

The proposed Build Alternative includes construction of a four-lane, partial access-controlled facility extending from existing SR-109 between SR-76 and North Centerpoint Road, northward to existing SR-109 (North Broadway) north of downtown Portland near Vannatta Road. Figure 2-1 contains a depiction of the approximate centerline proposed for the Build Alternative. Appendix A contains a more detailed conceptual layout of the Build Alternative.

The southern terminus of the project would tie into the recently constructed four-lane segment of relocated SR-109 (TDOT PIN #: 100283.00) and the northern terminus would tie into the southern end of the proposed SR-109 extension associated with the I-65/SR-109 Interchange project (TDOT PIN#: 107338.00). The proposed project would complement the other improvements that have been completed or are currently being planned and/or developed along the SR-109 corridor from I-40 in Wilson County to I-65 in Robertson County.

The typical section for the Build Alternative's mainline includes four 12-foot traffic lanes, 12-foot outside shoulders (10-foot paved, 2-foot gravel), and a 48-foot depressed grass median, which includes 6-foot inside shoulders (4-foot paved, 2-foot gravel), within an approximate 250-foot right-of-way (ROW). The design speed of the roadway will be 60 mph, with the posted speeds to be lower. Figure 2-2 contains a graphical depiction of the typical section of the proposed the Build Alternative.

A grade separated interchange is proposed at SR-52 to provide better traffic flow on both the Build Alternative and SR-52. Two preliminary design options are being considered for that interchange, including a partial folded diamond and a folded diamond interchange. Most of the proposed ramps for both of the interchange options would be located south of SR-52, except that with the partial folded diamond interchange, one ramp would be required in the northwest quadrant of the interchange. In addition to the SR-52 interchange, a flyover ramp is proposed at the southern terminus of the project to provide unimpeded access for southbound traffic on the existing SR-109 to merge with Build Alternative's traffic before continuing south on existing SR-109.

The Build Alternative includes realignment and/or reconfiguration of several local roads intersected by the proposed bypass route, including a Kirby Drive connector that would extend the existing Kirby Drive westward to connect to the Build Alternative on new alignment. A section of SR-52 will be widened to five lanes from near West Market Street westward to west of the proposed SR-52/Build Alternative interchange. This widening is necessary due to an increase in traffic expected on that section of SR-52 once the Build Alternative is constructed. The typical section of the SR-52 widening will be determined during the design phase of the project taking into consideration any input from local officials and the public.

Access is expected to be provided to many of the existing roads in the area. However, some minor roads may no longer have direct access to the proposed project. Roads that are not provided direct access to the Build Alternative would still have access to other existing routes in the area to which they currently connect, or where possible, would be provided new connections to adjacent roadways. Details of the design will be determined during the future project phases.

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Figure 2-1. SR-109 Build Alternative.

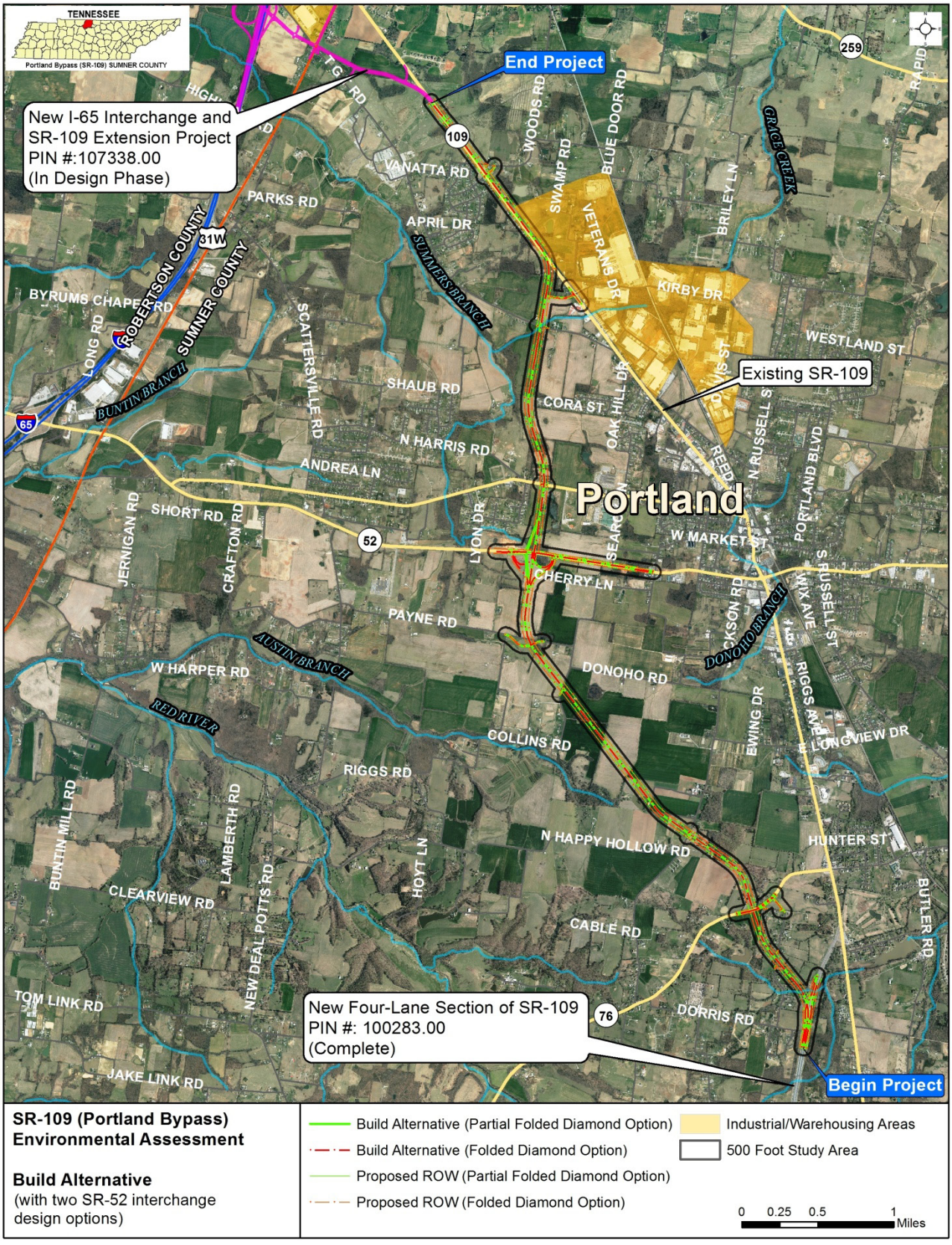


Figure 2-2. Build Alternative Typical Section.

Source: Parsons, 2015.

At this time, there are no plans to construct bicycle lanes along the Build Alternative. However, the shoulders of the proposed roadway would be wide enough to provide sufficient space to accommodate bicycles.

Sidewalks would be considered for inclusion along a portion of SR-52 that is proposed to be widened as part of the overall project. Sidewalks constructed between West Market Street and Searcy Lane would correspond with existing and planned sidewalks within the City of Portland. Details regarding bicycle and pedestrian accommodations would be finalized during the design phase of the project in coordination with local officials.

2.2.2 Traffic Analyses for the Build Alternative

Traffic analyses were conducted for the Build Alternative in the base year of 2020 and design year of 2040 to determine what effect the Build Alternative would be expected to have on traffic volumes in the Portland area. Traffic volumes and LOS were estimated under the Build Alternative conditions for the proposed project, existing SR-109, and existing SR-52 since those are the primary routes this project is expected to affect. Table 2.1 contains traffic volume and capacity projections under the Build Alternative conditions, and includes the No-Build Alternative projections discussed in Chapter 1 for comparison. Figure 2-3 shows the projected traffic volumes and LOS for Portland area highways under the Build Alternative.

The traffic analyses revealed that the current and projected traffic operations for SR-109 through downtown Portland discussed in Chapter 1 would be substantially improved with the construction of the Build Alternative. With the proposed project in place, traffic volumes on existing SR-109 through downtown Portland would be reduced by half in the base year of operation (2020). The number of trucks traveling through downtown Portland would also be reduced.

The new four-lane Build Alternative is projected to operate at LOS B or better through 2040. The section north of Kirby Drive would accommodate all SR-109 traffic coming from downtown Portland on the existing route, combined with the traffic that diverts around downtown Portland on the bypass route. With the proposed project in place, that section of SR-109 would consist of four-lanes compared to the current two-lane design. This improvement would result in a much better LOS and would more adequately accommodate the truck traffic, which is higher in that area due to the industrial areas in northern Portland. Under the No-Build Alternative, this section of SR-109 would exhibit a LOS E in 2040, compared to the LOS B under the Build Alternative.

The proposed project would not only improve regional travel conditions for through traffic and daily commuters, it would also improve conditions for local traffic going to and from businesses and other facilities in Portland. The Build Alternative would help separate local traffic from through traffic, including trucks traveling to and from industrial/warehousing areas in northern portions of Portland. Removing truck traffic and other vehicles from the existing downtown section of SR-109 would improve traffic flow and safety and potentially reduce noise in the CBD.

Table 2.1. Traffic volume and capacity projections for base year 2020 and design year 2040 under the Build Alternative.

	Build Alternative Base Year (2020)		Build Alternative Design Year (2040)		Percent Trucks in Total AADT	**No-Build Alternative Base Year (2020)		No-Build Alternative Design Year (2040)	
Roadway	**AADT**	**LOS**	**AADT**	**LOS**		**AADT**	**LOS**	**AADT**	**LOS**
Portland Bypass (from SR-76 to SR-52)*	12,600	A	18,150	B	14%	NOT APPLICABLE		NOT APPLICABLE	
Portland Bypass (from north of SR-52 to Existing SR-109 north of Kirby Drive)	10,890	A	15,690	A	15%				
Portland Bypass on Existing SR-109 Alignment (from Kirby Drive to SR-41)	13,890	A	20,020	B	14%				
Kirby Drive Connector (from Existing SR-109 to Portland Bypass)	8,590	D	12,350	D	30%				
Existing SR-109 (from SR-76 to SR-52)	5,400	A	7,770	A	7%	18,000	B	25,920	C
Existing SR-109 (through CBD Portland from SR-52 to Kirby Drive)	3,840	C	5,520	C	8%	15,270	D	22,000	D
SR-52 (from SR-109 to Portland Bypass)***	13,490	A	19,420	B	10%	13,500***	A	19,440	B
SR-52 (from Portland Bypass to SR-41)***	13,500	E	19,440	E	10%	13,500***	E	19,440	E

AADT = Annual Average Daily Traffic (number of vehicles)

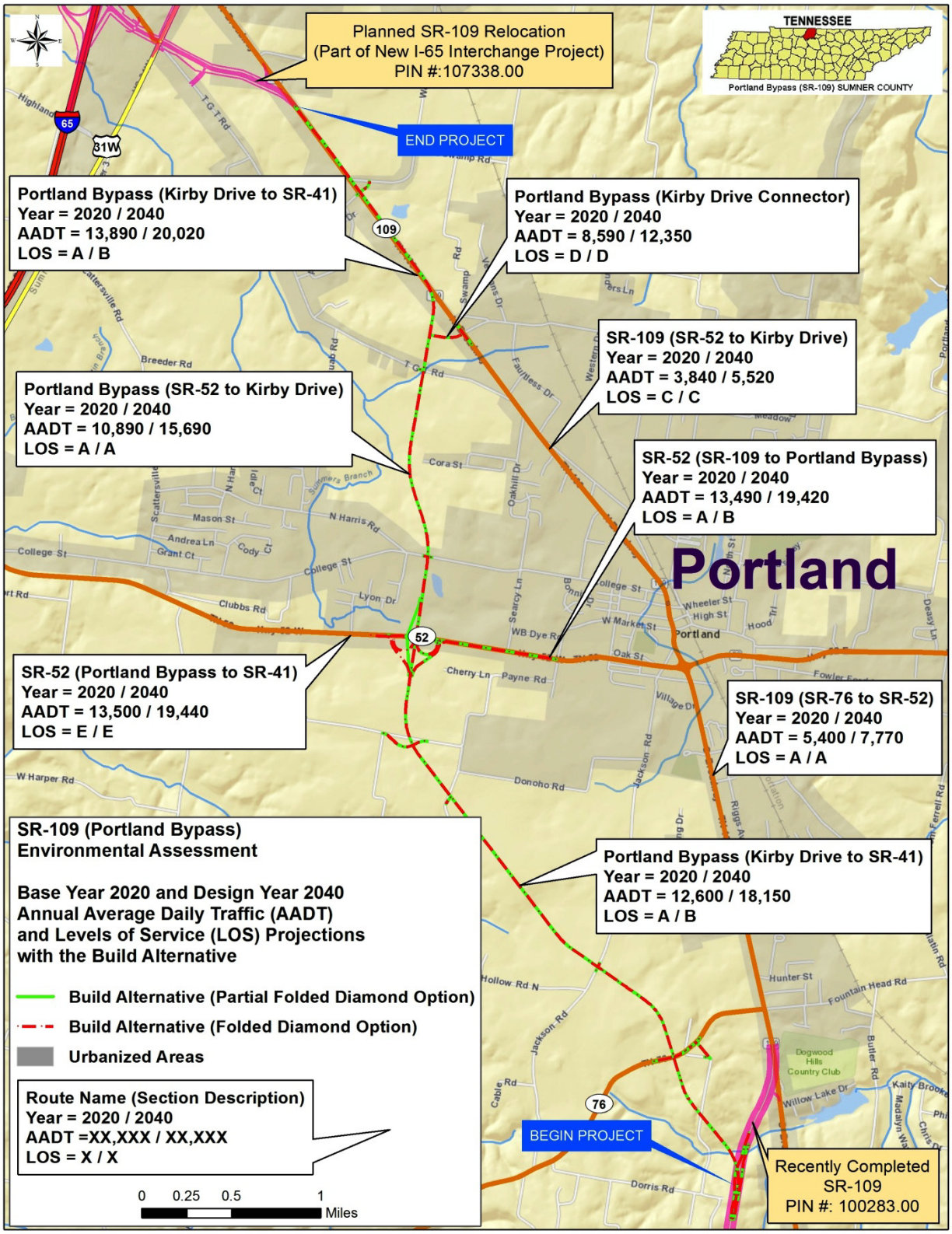
** AADT and LOS would be the same under either of the SR-52/Portland Bypass interchange options being considered.

** Traffic data for the No-Build Alternative is presented here for comparison purposes. Chapter 1 includes more information regarding traffic and LOS for the No-Build Alternative.

*** The SR-52 data shown in this table for the No-Build Alternative is for the segments located from SR-109 to Market Street, and from Market Street to SR-41. This information is presented to provide a general comparison to the similar/overlapping SR-52 segments shown for the Build Alternative.

Source: TDOT, 2015.

Figure 2-3. Traffic volume and capacity projections for the Build Alternative, SR-52, and Existing SR-109 for base year 2020 and design year 2040.



A grade-separated interchange is proposed to be constructed where the Build Alternative crosses existing SR-52. There are currently two options being considered for the interchange ramp configurations. The LOS would be the same under both interchange configurations. For both options, the exit ramp intersections with SR-52 are the primary point of reduced LOS. The northbound exit ramp at the intersection with SR-52 can be expected to operate at LOS F during the peak hour by 2040. This is due to delay, but volumes are not anticipated to be high enough for large queues to form. Volumes at the intersection are not expected to be high enough to meet signal warrants. Entrance ramps for the interchange were evaluated using peak hour volumes. Both the northbound and southbound entrance ramps can be expected to operate at LOS A through 2040.

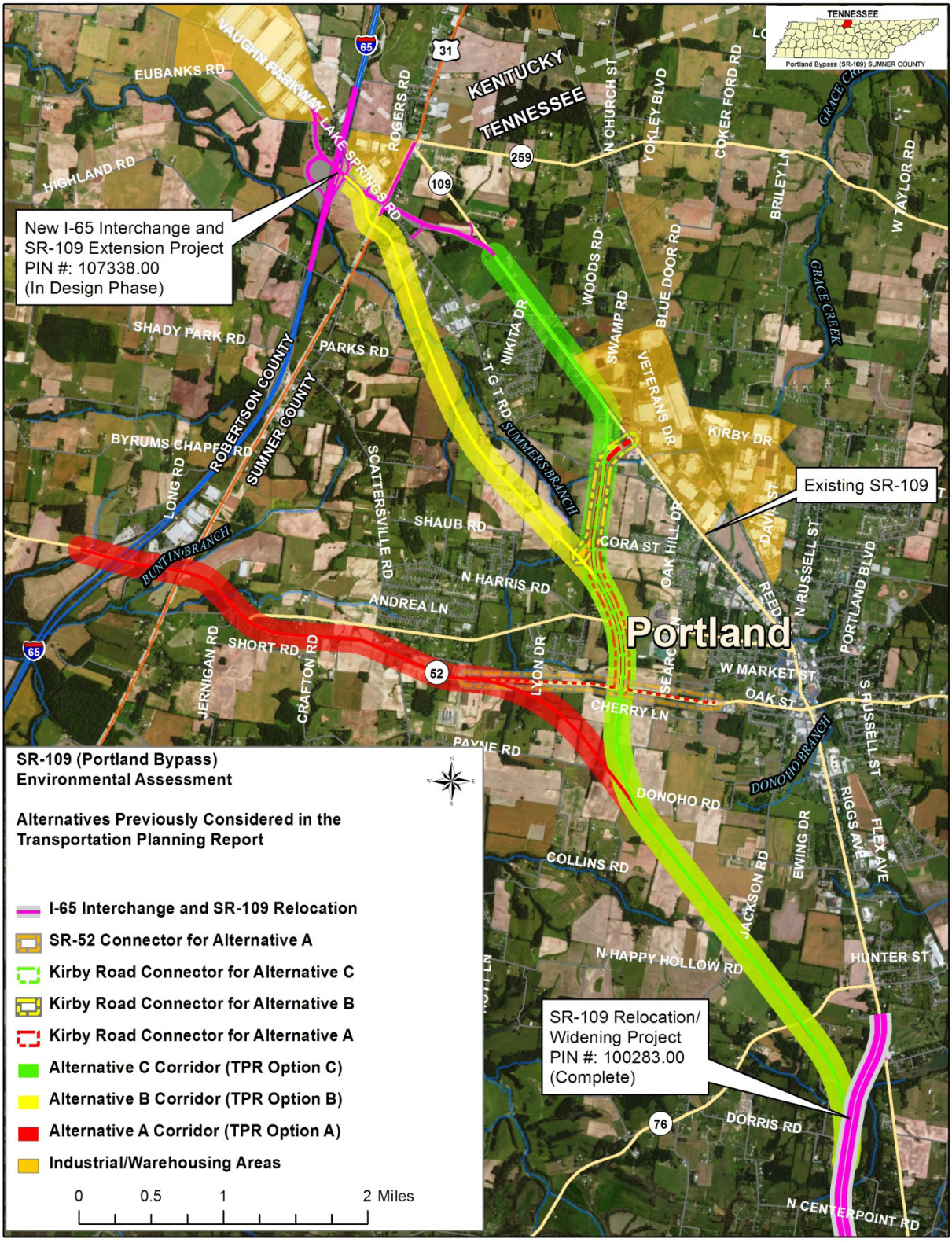
2.3 Alternatives Previously Considered but Eliminated

In addition to the previously described Build Alternative, several additional alternatives were considered but were removed from consideration for various reasons. Some alternatives were eliminated from further study because: they were not able to fully meet the purpose and need for the project, and were not expected to substantially improve north-south traffic flow, reduce truck traffic, and/or improve safety along SR-109 in Portland. Another reason for eliminating alternatives from further consideration was due to known environmental constraints that would have caused more substantial impacts to sensitive resources when compared to the Build Alternative that was carried forward for further study. Finally, input from local officials, agencies, and the public was also considered when determining which alternative should be recommended to be carried forward for further study in this EA. The alternatives previously considered but eliminated are described in this section.

2.3.1 TPR Alternatives

The proposed project was studied in the August 31, 2006 TPR. The TPR recommended three alternative options to be evaluated in the environmental study: Options A, B, and C. The Build Alternative recommended for study in the EA is based on TPR Option C; however, some minor modifications to the general alignment were made to minimize impacts to known constraints and existing developments. Figure 2-4 shows the general layout of the TPR options.

Figure 2-4. Previously Considered TPR Option A, Option B, and Option C.



Note: The current Build Alternative follows the general alignment of Option C, but with some minor modifications.

The reasons TPR Option A and Option B were not carried forward for further study in this EA are as follows:

1. Public Input - Based on a February 16, 2012, public meeting, Option C was supported by 78 percent of individuals that expressed their support for individual alternatives when given the choice of the No-Build and the three TPR options being presented. The official record from the meeting had a total of 24 people providing comments. Of the 23 people who expressed a preference on the official comment cards, three people supported the No-Build Alternative as their first choice, six people supported Option A, three people supported Option B, and 18 people supported Option C/current Build Alternative (some people supported two or more build options equally).
2. Agency Coordination - Based on discussions of the options with the TESA Participating Agencies at a March 20, 2012, Field Review and at a subsequent meeting in April 10, 2012, the consensus among the agency participants was to eliminate Option B from further study based upon impacts to farmland, natural resources (including many stream crossings), and potential impacts to the Tennessee Gas Pipeline facilities. During the April 10, 2012, TESA meeting in Nashville, the agencies confirmed their recommendation to eliminate Option B (referred to as the Yellow Alternative at that meeting) from further consideration.
3. Ability to Meet Purpose and Need - Option C would meet the purpose and need of the project better than the other two TPR alternatives because it would provide a more direct, seamless route allowing for the best overall efficiency and movement of north-south traffic through the area, including trucks.

   Option A would have required construction of a new connector road from the proposed SR-109 to near Kirby Drive north of downtown Portland (the “Kirby Drive Connector”), plus a second route to the west to connect SR-109 traffic to I-65. Option A would have required additional turning movements to direct traffic around downtown Portland making it a less efficient option than Option C. It would have also increased traffic on SR-52 potentially causing additional traffic flow concerns along that route, especially at the SR-52/I-65 Interchange. Modification of the existing SR-52 and its interchange with I-65 would have been required.

   The TPR Option B would also have required an additional “Kirby Drive Connector” road from existing SR-109 near Kirby Drive to the proposed SR-109. Option B would not have provided a good connection with the proposed I-65 Interchange and proposed relocated section of SR-109 north of Portland.

   Option C (the current Build Alternative) provides one main route serving as a bypass around downtown Portland, requires a very short “Kirby Drive Connector” road, and the northern termini connects directly to the proposed SR-109 relocation associated with the new I-65 Interchange north of Portland. Option C effectively serves the primary industrial areas north of downtown Portland, providing them with a convenient, more efficient, and direct connection between I-40 and I-65.

4. Potential for Environmental Impacts – The TPR Alternatives were screened to estimate their potential for environmental impacts. Based on the preliminary environmental screening, Option B would have had the greatest environmental impacts to farmland, streams, especially Summers Branch, which is a 303d-listed stream[1], natural habitats, and utilities (Tennessee Gas Pipeline Facilities). Option B would have required construction of the new roadway on all new alignment, whereas Options A and C were expected to have fewer impacts to farmland, natural resources, and utilities because each option would have utilized at least some existing ROW for a portion of their alignment, including SR-52 for Option A and existing SR-109 for Option C. Option A would have had more environmental impacts than Option C due to its additional length and amount of new construction required.
5. Costs –The proposed Build Alternative (TPR Option C) would be less expensive than the other alternatives. It would cost approximately $30,100,000 less than Option A, or a 45 percent reduction in costs. The Build Alternative would cost approximately $3,310,000 less than Option B, for an eight percent reduction in costs.

2.3.2 Alternatives that Bypass Portland to the East

Constructing SR-109 to the east of its current location and around the east side of Portland is not considered in this EA due to the additional associated environmental constraints and costs when compared to other options available. Constraints for eastern options include the existing railroad paralleling SR-109 to the east, which would require at least two railroad crossings and could affect known populations of three state-listed fish species deemed-in-need-of-management. Finally, the length of any eastern bypass option would need to be much longer than alternatives to the west of Portland due to the angle at which existing SR-109 travels and to be able to ultimately tie the route back into I-65 to the west.

2.3.3 Transportation System Management Alternatives

Implementation of Transportation System Management (TSM) projects can often provide both improved traffic conditions and safety. Such improvements may include interchange improvements, addition of turning lanes, and/or changes to signal locations and timing. Minor localized TSM projects, including projects identified in the RTP and/or TIP, may be implemented to improve existing roadways in the region, including SR-109, either with or without the proposed project. However, TSM projects alone would not be capable of meeting the purpose and need of the proposed project in terms of improving the north-south traffic flows through Portland and removing trucks from the downtown area. In addition, implementing only TSM alternatives within the Portland section of SR-109 would not allow for full realization of an improved SR-109 corridor from I-40 to I-65.

Widen Existing SR-109 through Downtown Portland

The widening of existing SR-109 is consistent with TDOT's goal of preserving the existing transportation system, but would fail to service future traffic volumes and fail to reduce truck traffic through the CBD of Portland. The widening of existing SR-109 through the City would necessitate acquisition of very expensive ROW in a developed commercial and residential area

[1] Section 303(d) of the *Clean Water Act* (CWA) requires states to develop a list of streams and lakes that are "water quality limited." "Water quality limited" waters do not meet one or more water quality standards and are not supporting designated uses" (see Section 3.7.2.1 of this document for more information regarding Section 303d-listed waters in the study area).

that would involve significant property and environmental impacts, including impacts to historic buildings. Utility relocations would also be more costly than with the other options considered.

3.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing conditions of social/community, economic, cultural, and natural resources in the project vicinity (affected environment). It is followed by a discussion of the potential environmental consequences (hereafter referred to in this document as an impact) that the No-Build Alternative and Build Alternative may have on those resources. Following the discussion of impacts, mitigation measures are discussed, where appropriate, to explain what efforts have been or would be taken to avoid, minimize, and/or mitigate for impacts resulting from this project.

An impact is defined as a noticeable change in a resource from the existing environmental baseline conditions caused by the proposed action. The discussion concentrates on aspects of the environment that could potentially be affected by construction and operation of the proposed project. Impacts to individual resources can be beneficial and/or adverse.

The analysis of impacts associated with each project alternative has been further divided into direct, indirect, and cumulative impacts. Direct impacts anticipated to occur with implementation of this project are discussed under each resource category discussed in Chapter 3.

Types of Impacts

Direct Impacts are caused by the action and occur at the same time and place.

Indirect Impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Cumulative Impacts are the impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Discussions related to potential indirect and cumulative impacts of the proposed project are included in Section 3.18, *Indirect and Cumulative Impacts*.

Impacts identified in this document are potential and are based on NEPA concept plans. After the potential impacts of the proposed project were identified, a determination was made as to whether mitigation would be appropriate or required. Potential mitigation measures expected to be implemented are discussed in Chapter 3 for those resources with impacts requiring mitigation. The potential mitigation measures discussed in this document are also based on the impacts identified through use of the concept plans. Final mitigation plans will not be developed for the project until more detailed design plans have been prepared if the Build Alternative is selected to move forward to the design phase.

3.1 Land Use

The proposed project is located in northwest Sumner County within the Highland Rim physiographic region. Sumner County in general is characterized by a concentration of residential, commercial, and industrial uses within or near primary cities and a mixture of low-density residential developments, agricultural land, and open space in surrounding areas. Land use within and immediately adjacent to the study area consists of heavily developed areas within the city limits of Portland consisting of dense residential, commercial, and industrial developments surrounded by a combination of agriculture and low to medium density residential land uses. Industrial development is located east of SR-109 near Kirby Drive in northern portions of Portland. Additional industrial and warehousing developments are located near the existing northern terminus of SR-109 and would be more directly connected to SR-109 after completion of the proposed new I-65 Interchange planned in that area.

Approximately 80 percent of the land within the proposed project ROW contains agriculture, pasture, or early stages of old-field succession. Nearly 11 percent of the land contains scattered forest fragments and shrub/scrub habitats. The remaining land contains a mixture of commercial, industrial, and residential developments and the associated infrastructure. The aerial photo in the background of Figure 2-1 in Chapter 2 shows the general land cover in the study area.

3.1.1 Land Use Plans and Policies

Industrial area along Kirby Drive in Portland.

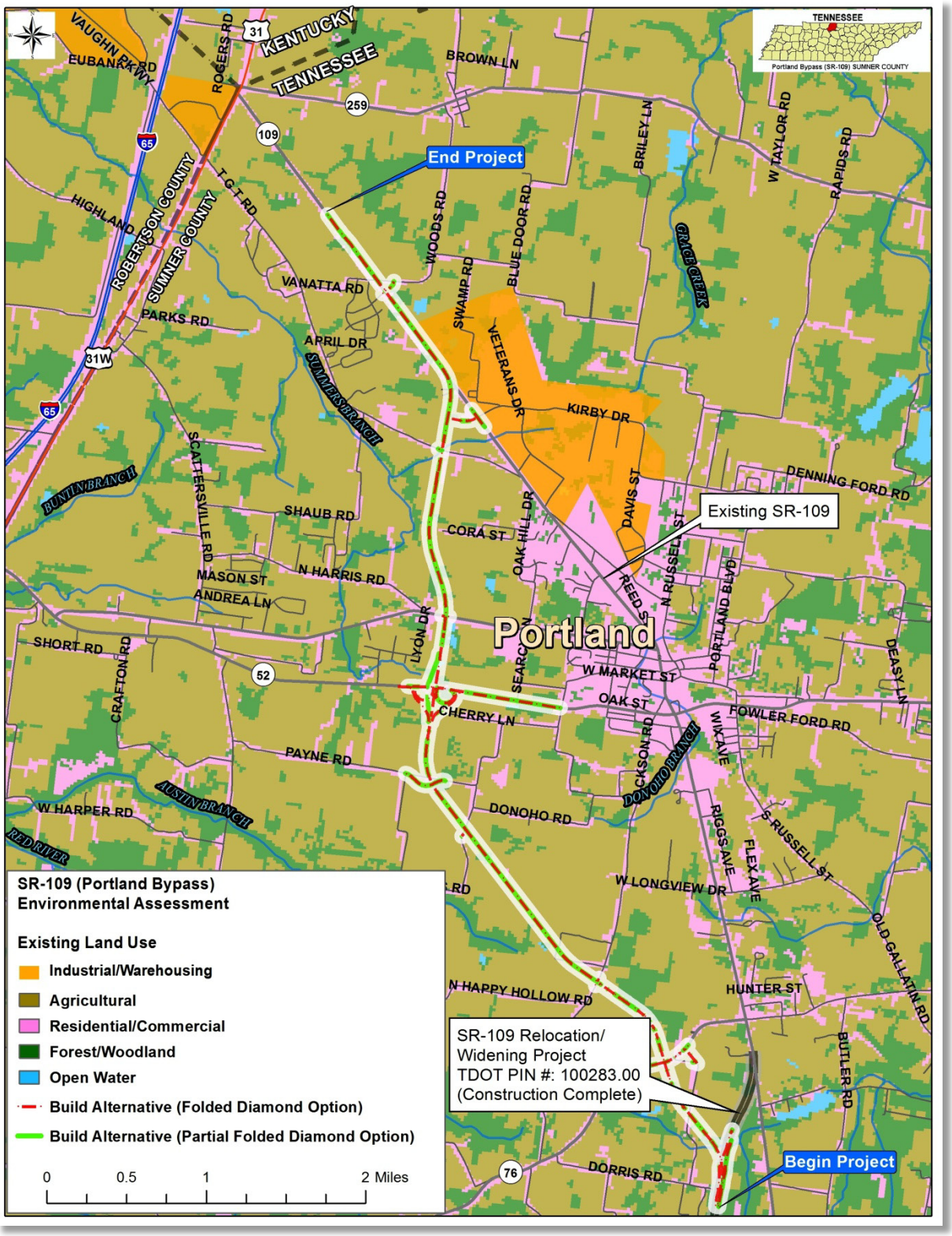
The existing land use within and adjacent to the study area are shown on Figure 3-1. Approximately 80 percent of the land within the study area is considered agricultural land and consists of a combination of actively farmed row crops, pastures, and/or idle farmland/old field areas. The remaining 20 percent of land in the study area contains a mixture of forest and developed areas.

The future land use map within the City of Portland indicates that most of the areas impacted by the proposed project, both within and outside of the current city limits, are planned and/or zoned for additional residential and commercial developments. Figure 3-2 contains the future land use map for the Portland area, based on a map available on the City of Portland website[2]. The City of Portland website also contains a detailed zoning map.

The state growth policy law (Public Chapter 1101, Growth Management Law, 1998) mandates all city and county governments to designate an Urban Growth Boundary (UGB) to anticipate and plan for 20 years of growth and change within and around a municipality. A UGB contains those areas that are within a municipality's corporate limits, and adjoining unincorporated land where growth is expected to occur that can be provided infrastructure and other urban services by the municipality. The UGB also includes areas where annexation or new incorporations may occur.

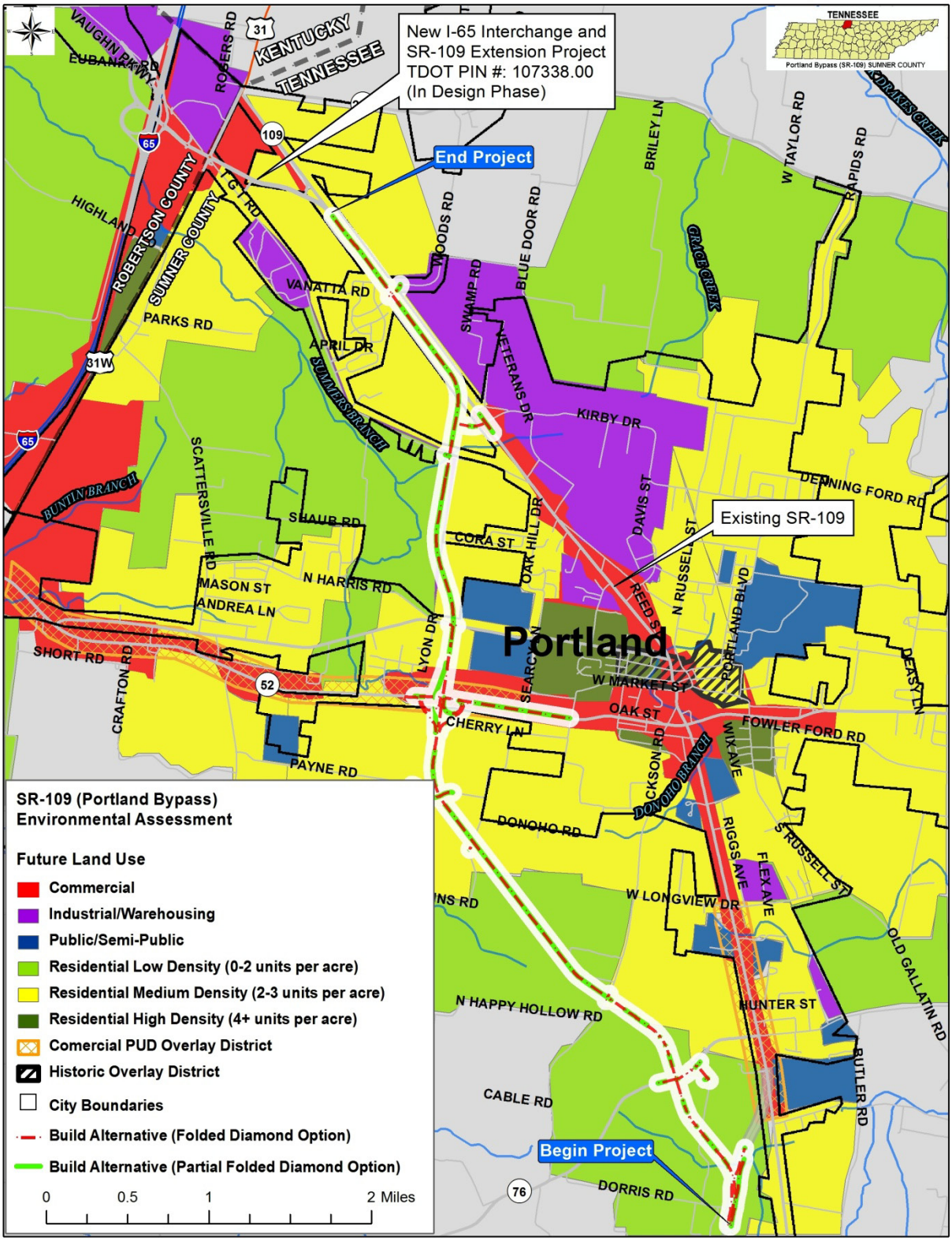
[2]The City of Portland website is located at: http://www.cityofportlandtn.gov/. The future land use and zoning maps are located under the "Planning/Code's tab on the City's homepage.

Figure 3-1. Existing Land Uses within the Study Area.



Source: U.S. Geological Survey (USGS) Gap Analysis Program (GAP), 2015; Note: Some of the GAP land use categories were adjusted/combined for use in this EA.

Figure 3-2. Future Land Uses within the Study Area.



Source: Adapted from City of Portland *Future Land Use Plan Map* available at: http://media.wix.com/ugd/c01e94_5217cefc9d7a4c6e99d0782f2320b3be.pdf.

Figure 3-3 shows the City of Portland's UGB. The entire Build Alternative corridor is located either within the existing Portland city limits or in the proposed UGB where urban development is most likely to occur in the reasonably foreseeable future according to Sumner County's *2035 Comprehensive Plan*. Local planners can facilitate controlled growth in the area by implementing local zoning and helping to identify important growth corridors or likely transportation needs as early as possible.

Sumner County and the City of Portland both have mechanisms in effect to minimize, mitigate, or avoid adverse impacts of project implementation for developments within their jurisdiction. Such issues as land use, buffering, and noise mitigation, can be addressed through implementation and application of the county growth policy plan, city zoning, and any subdivision ordinances, design guidelines, and other special ordinances and/or policies that may be in effect or that may be developed as the area continues to grow.

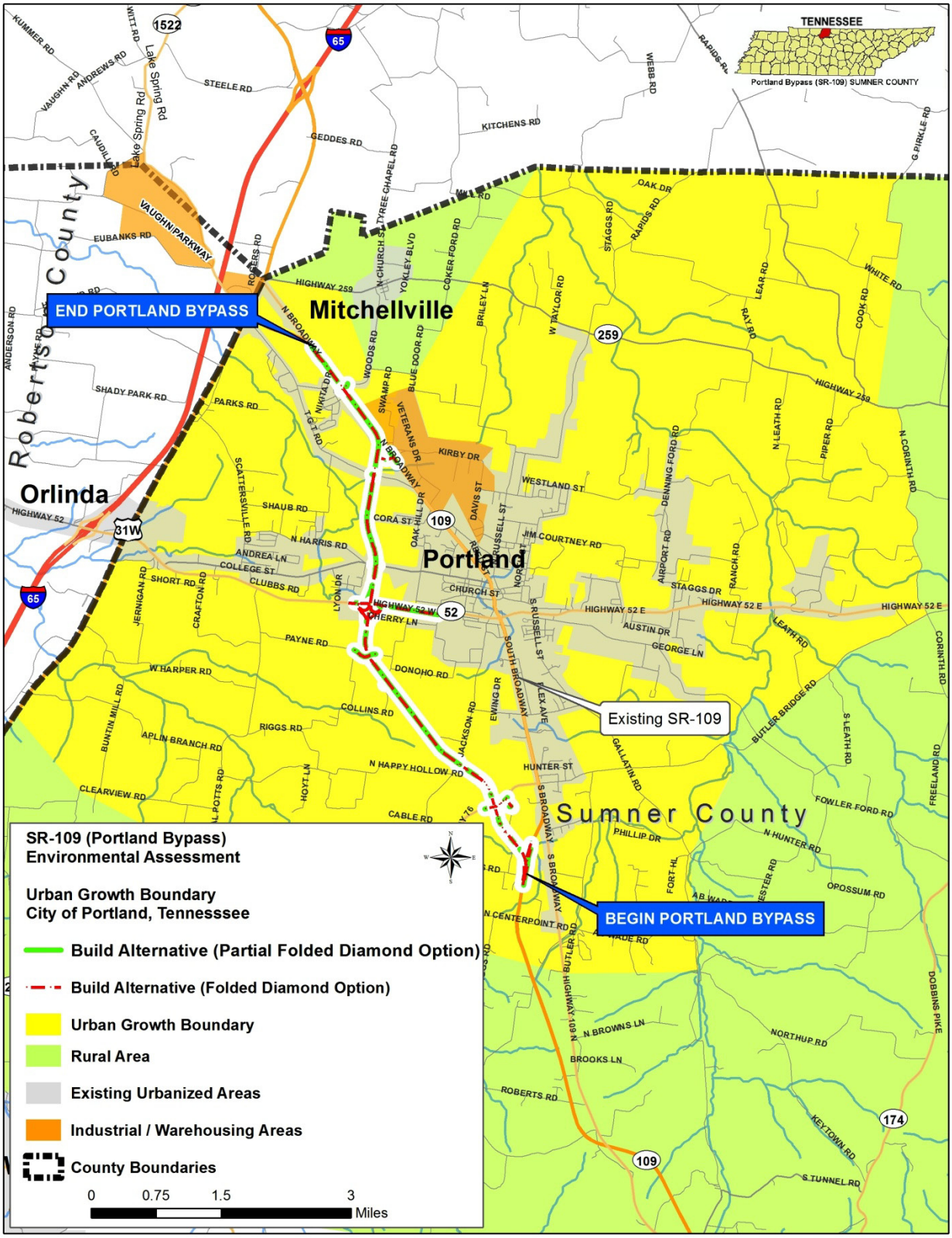
3.1.2 Land Use Impacts

No-Build Alternative: The No-Build Alternative would not result in any immediate substantial changes from baseline conditions in terms of land use.

Build Alternative: Construction of the proposed project would convert approximately 211 to 214 acres (partial folded diamond and folded diamond interchange options at SR-52, respectively) of land to highway ROW, changing the use of the land acquired to highway use. The primary adverse land use impact would be the loss of agricultural land.

Implementation of the project under the Build Alternative would be consistent with, and an important component of, the planned growth and associated land use changes in the northwest portion of Sumner County, including planned growth within the Portland UGB. It is consistent with the land use plans and policies adopted by the City of Portland and Sumner County's *2035 Comprehensive Plan*.

Figure 3-3. Urban Growth Boundary within the Study Area.



Source: *Sumner County 2035 Comprehensive Plan (2010); Note:* Graphic adjusted for EA.

3.2 Infrastructure

3.2.1 Highway and Roadway Network

The existing transportation facilities within the project vicinity include a network of federal, state, county, and local highways and streets. This system of roadways provides a well-developed interconnection between the rural residential areas and surrounding urban areas, including Nashville, Tennessee and Franklin, Kentucky.

SR-109 is an important part of the overall regional roadway system and for the local community of Portland. As mentioned in Chapter 1, the existing SR-109 between SR-52 and SR-41 (U.S. 31W), including the section through downtown Portland, contains several horizontal design deficiencies, including narrow lanes, lack of shoulders, and poor visibility. Improving SR-109 from I-40 to I-65, including construction of a bypass around downtown Portland is considered a high priority in Sumner County's *2035 Comprehensive Plan*.

3.2.2 Utility Infrastructure

The proposed project crosses a number of local utilities, including gas lines, water lines, and sanitary sewer. TDOT will coordinate with the City of Portland Public Works Department and any other necessary agencies to provide data needed to deal with conflicts.

It is standard policy for TDOT to coordinate all utility relocations with the affected utility companies. Due to several gas pipelines in the study area, TDOT has conducted preliminary coordination with the owners of the pipelines to determine the location of their infrastructure and gather input on how the proposed project may impact their operations.

There are two major gas pipeline companies in the vicinity of the proposed project. These companies are Oneok Partners (Midwestern Gas Transmission) and Kinder Morgan (Tennessee Gas Transmission). Both companies were contacted via telephone by TDOT representatives in August 2013 to inform them of the potential project. Each company was subsequently provided maps showing the location of the Build Alternative and a typical section for the proposed roadway and asked to provide input regarding the project's possible impacts to their operations. Oneok Partners responded in an e-mail dated September 10, 2013 stating that their pipelines are not in conflict with the Build Alternative as the pipelines pass northwest of the impact area of this project. A copy of the e-mail is included in Attachment B.

The Build Alternative crosses four pipelines belonging to Kinder Morgan at the northern end of the study area. No written response was received from Kinder Morgan after the initial coordination effort. TDOT will coordinate with Kinder Morgan during the remainder of the planning, design, and construction phases of the project to make sure that any concerns are addressed. Roadway and ditch crossing elevations will be provided by TDOT so that any pipe cover adjustments can be made.

3.2.3 Infrastructure Impacts

No-Build Alternative: The No-Build Alternative would not result in any immediate substantial changes from baseline conditions in terms of infrastructure. However, not constructing the proposed project would have long-term direct adverse impacts in terms of transportation infrastructure. First, the anticipated benefits that the proposed project would provide would not be realized under the No-Build Alternative. The adjacent improvements to SR-109 completed south of Portland, and the ongoing improvements north of Portland, may not reach their full potential benefit in terms of regional connectivity or route continuity since the remaining section

of SR-109 through downtown Portland would continue to be a bottleneck for an otherwise much-improved roadway throughout its length from I-40 to I-65; unless other projects are identified that could provide traffic relief through the area.

Build Alternative: Construction of the proposed project would play an important role in the regional and local transportation system by providing a safer, more efficient route through the Portland area. This would help reduce traffic through downtown Portland, especially heavy truck traffic. The project would complement other improvements to SR-109, which is designated as a strategic, or key, corridor in the state transportation system. The overall improvement of SR-109 would provide a more efficient connection between I-65 north of Nashville and I-40 east of Nashville, providing an alternative route for through traffic attempting to avoid traffic congestion in downtown Nashville.

The Build Alternative is anticipated to complement projected growth within the northwest portion of Sumner County, including planned growth within Portland's UGB. A more efficient and safer transportation infrastructure would yield greater user benefits in respect to vehicle operating costs and travel time.

The Build Alternative crosses a number of local utilities and pipelines, including gas lines, water lines, and sanitary sewer. TDOT will coordinate with the City of Portland Public Works Department, pipeline companies, and any other necessary agencies to ensure that impacts are adequately addressed to ensure public safety and to minimize any impacts to the operation of the utilities.

3.3 Social Environment

The geographic areas considered for analysis of existing social conditions and environmental consequences consist of Sumner County and the City of Portland. Environmental Justice issues were analyzed in further detail at the census tract, block group, and/or block level.

3.3.1 Population and Housing

In 2010, Sumner County completed the *2035 Comprehensive Plan: Sumner County's Blue Print to the Future.* Sumner County has been experiencing steady and increasing growth since 1960. From 2000 to 2025, Sumner County is projected to be in the top 10 counties with the highest growth rate in the state (Sumner County Regional Planning Commission, 2010). The population of Sumner County is projected to increase by over 62,400 residents by 2035 based upon 2010 population estimates. At that time, approximately 223,100 people are expected to live in Sumner County, a 39 percent increase in population. By 2025, over 15,000 residents are projected to live in the City of Portland, a 31 percent increase from 2010 (Sumner County Regional Planning Commission, 2010).

According to the 2010 U.S. Census, the population in Sumner County was 160,645 and the population of the City of Portland was 11,480. The population density within the 529.45 square mile area of Sumner County was 303 persons per square mile. Population density within the 14.26 square mile area of the City of Portland was 805 persons per square mile. The City of Portland population had a higher percentage of population growth between 2000 and 2010 than Sumner County and the State of Tennessee. Population projections for 2020 and beyond indicate continuing steady population growth within the study area. Table 3.1 contains population data for Sumner County and the City of Portland.

Table 3.1. Population Data: Tennessee, Sumner County and the City of Portland, Tennessee.

Geographic Area	Population			Percent Change	Percent Change
	2000	2010	2020	2000-2010	2010-2020
Tennessee	5,689,283	6,346,105	7,107,296	11.5	12.0
Sumner County	130,449	160,645	190,261	23.1	18.4
City of Portland	8,458	11,480	N/A	35.7	N/A

N/A – 2020 Population Projections for the City of Portland are not available.
Source(s): Tennessee Department of Economic and Community Development 2014 Data Sheets (http://www.tnecd.com/county-profiles/), Tennessee State Data Center http://tndata.utk.edu/sdcdemographics.htm), and U.S. Census Bureau: State and County QuickFacts. (http://quickfacts.census.gov/qfd/index.html)

3.3.2 Environmental Justice

On February 11, 1994, President Clinton issued *Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.* This EO stated that "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Minority populations include Black or African American, Hispanic, Asian American, American Indian or Alaskan Native, and Native Hawaiian or Pacific Islander. Low-income populations include those with a household income at or below the poverty guidelines published yearly by the U.S. Department of Health and Human Services.

As shown below in Table 3.2, there are four block groups within the study area, which are being analyzed for this EJ assessment. The 2009-2013 ACS data shows that the minority population for the City of Portland is 11.1 percent, while Sumner County is 10.5 percent. Within the study area, minority populations range from 21.7 percent (Block Group 1, Census Tract 202.05) to 0.9 percent (Block Group 1, Census Tract 202.07). Table 3.2 displays the block groups in the study area and their minority population percentages, while Figure 3-4 shows their geographic location.

Table 3.2. Minority Population Percentages and EJ Determination.

Census Tract/ Block Group	Block Group 2, Census Tract 202.04, Sumner County	Block Group 1, Census Tract 202.05, Sumner County	Block Group 1, Census Tract 202.06, Sumner County	Block Group 1, Census Tract 202.07, Sumner County	Sumner County	City of Portland
Percent Minority	4.5%	21.7%	8.5%	0.9%	10.5%	11.1%
>10% of County Average?	No	Yes	No	No	N/A[1]	N/A
>50% of Block Group Population?	No	No	No	No	N/A	N/A
Meet EJ Criteria?	No	Yes	No	No	N/A	N/A

[1] N/A = Not applicable.
Source: U.S. Census Bureau-ACS, 2009-2013.

As shown, one of the four block groups within the study area exceeds the county average by 10 percent or more. None of the minority populations are greater than 50 percent of the total population within any of the block groups. Block groups that satisfy either of these two criteria are considered to be EJ populations as defined in "*Effective Methods for Environmental Justice Assessment"* report (National Cooperative Research Program Report 532). Therefore, Block Group 1, Census Tract 202.05 is considered an EJ population. A discussion of the potential project impacts in relation to the EJ population in Census tract 202.05, Block Group 2 is discussed in more detail in Section 3.3.4 below.

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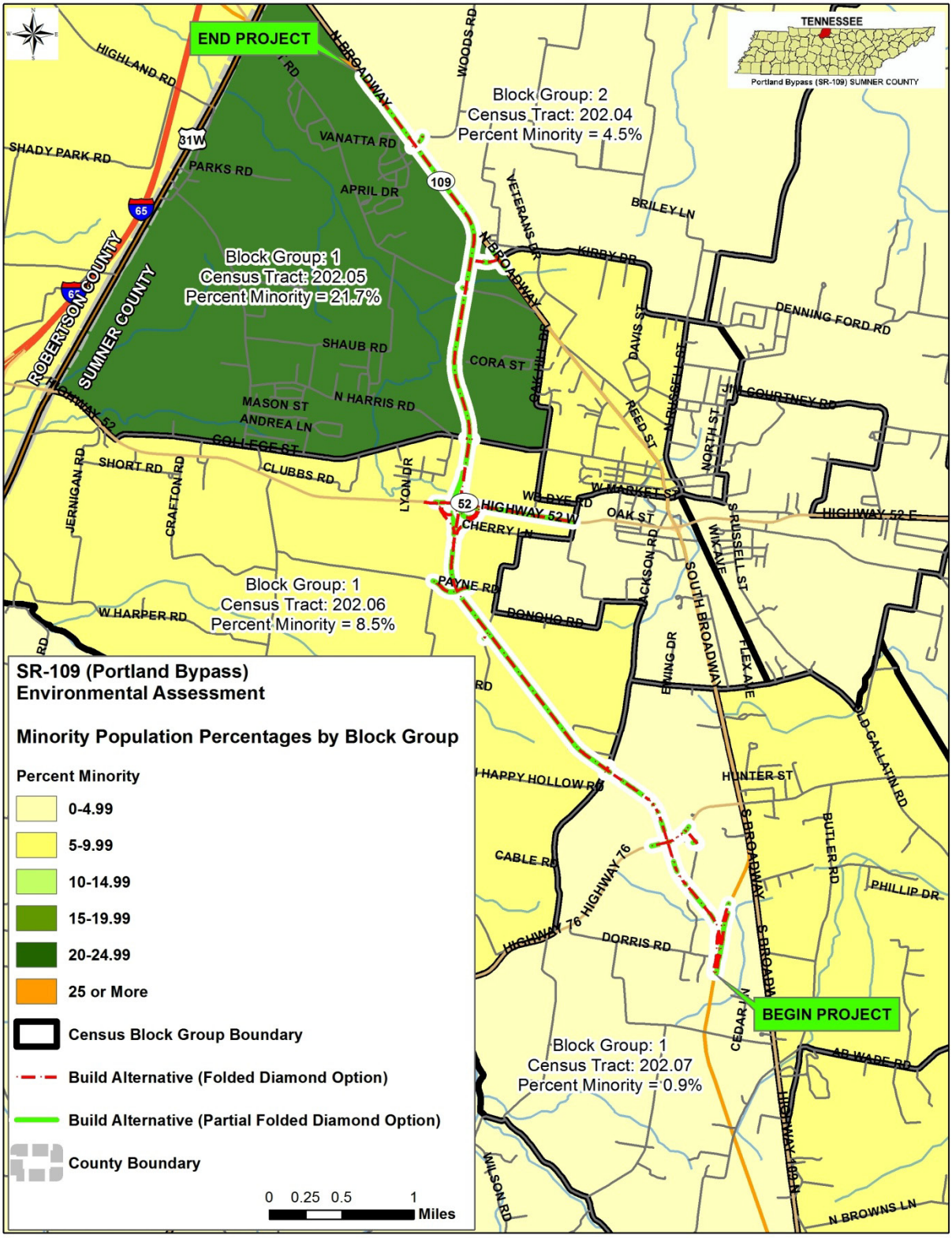
Figure 3-4. Minority Population Percentages by Block Group.



Source: Map based on U.S. Census Bureau-ACS, 2009-2013.

As stated above, 2009-2013 ACS data was used to determine low-income populations (percent below poverty). According to the five-year data, low-income populations for Sumner County and the City of Portland are 10.3 percent and 13.7 percent, respectively. Within the study area, low-income populations range from 10.3 percent (Block Group 1, Census Tract 202.06) to 6.0 percent (Block Group 1, Census Tract 202.07). Table 3.3 displays the block group in the study area and their low-income population percentages, and Figure 3-5 shows their geographic location.

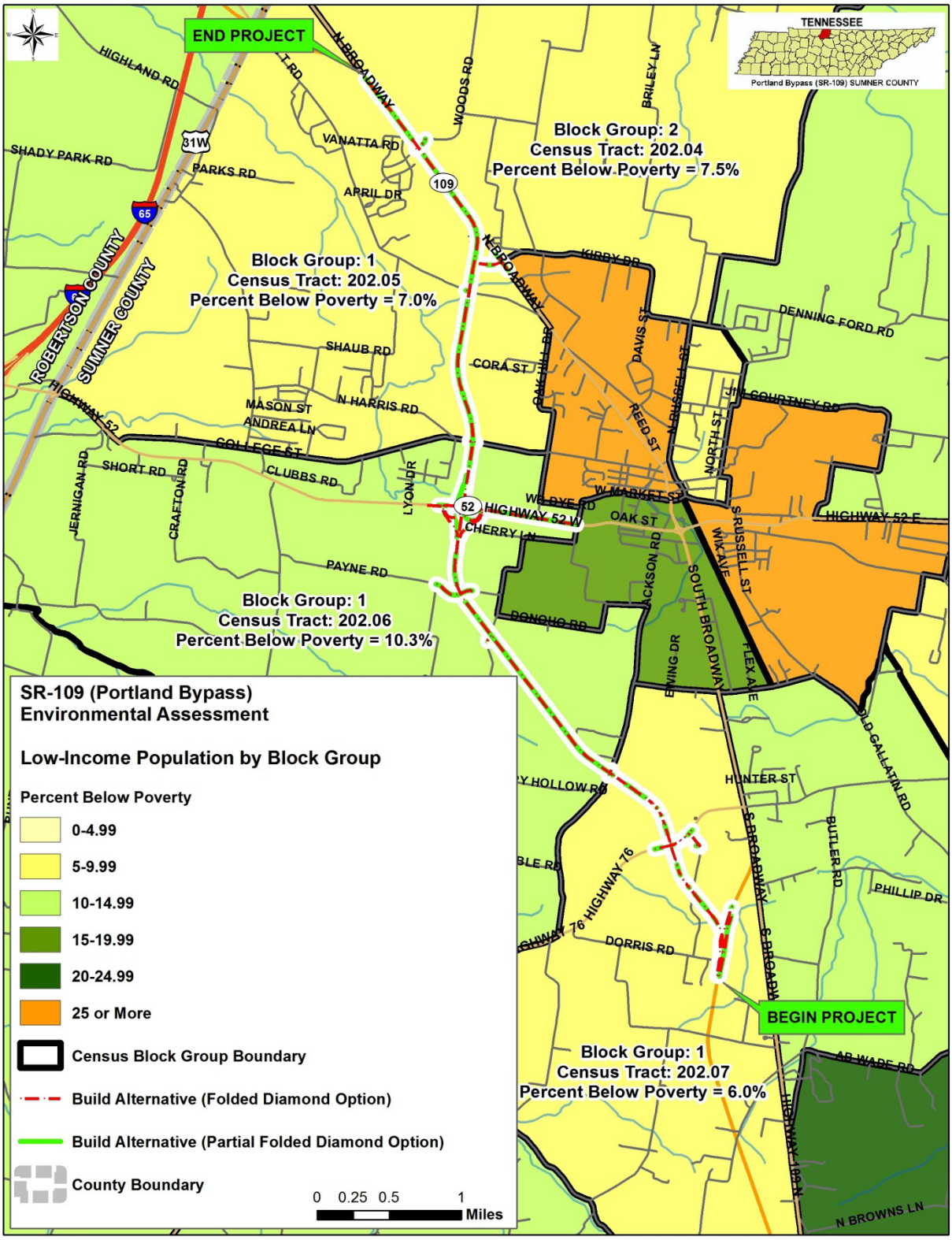
Table 3.3. Low-Income Population Percentages and EJ Determination.

Census Tract/ Block Group	Block Group 2, Census Tract 202.04, Sumner County	Block Group 1, Census Tract 202.05, Sumner County	Block Group 1, Census Tract 202.06, Sumner County	Block Group 1, Census Tract 202.07, Sumner County	Sumner County	City of Portland
Low-Income %	7.5%	7.0%	10.3%	6.0%	10.3%	13.7%
>10% of County Average?	No	No	No	No	N/A[1]	N/A
>50% of Block Group Population?	No	No	No	No	N/A	N/A
Meet EJ Criteria?	No	No	No	No	N/A	N/A

[1] N/A = Not applicable.
Source: U.S. Census Bureau-ACS, 2009-2013.

As shown, no block groups within the study area either exceed the county average by 10 percent or more, or contain low-income populations that are greater than 50 percent of the total population for each block group.

Figure 3-5. Low-Income Population by Block Group.



Source: Map based on U.S. Census Bureau-ACS, 2009-2013.

3.3.3 Community Services

The City of Portland contains a variety of community services, including police and fire protection, a public library, and public schools. The City of Portland is currently in the design process for a new fire station near the northern end of the Build Alternative. It will be located near the intersection of Woods Road and SR-109 North. TDOT will continue to coordinate with the City of Portland regarding the location of the building in relation to the proposed project ROW.

Portland High School and Portland West Middle school are located along College Street approximately 0.3 miles east of the proposed ROW of the Build Alternative. Both schools have access off of College Street and Searcy Lane. There are currently no sidewalks along these two local roadways; however, the City of Portland has plans to construct sidewalks in these areas in the future. Sidewalks would be considered for inclusion along a portion of SR-52 between West Market Street and Searcy Lane that is proposed to be widening as part of the overall Portland Bypass project. These sidewalks would correspond with existing and planned sidewalks within the City of Portland and would help to improve pedestrian access to and from both schools. Final plans for sidewalks would be determined during the final design phase in coordination with local officials.

3.3.4 Social Environment Impacts

No-Build Alternative: The No-Build Alternative would not result in any immediate, direct adverse impacts to the community. However, the beneficial impacts of improving the SR-109 corridor through the Portland area would also not be realized under the No-Build Alternative. The No-Build Alternative would not meet the purpose and need of the project in terms of improving traffic flow and removing much of the heavy truck traffic in downtown Portland. This would result in continued decreases in LOS and safety on SR-109 and secondary routes in Portland. The reduced LOS and travel efficiency on local roadways could adversely impact response times for emergency vehicles and travel times for residents.

Build Alternative: There would be minor adverse impacts to Census Tract 202.05, Block Group 2, which is 21.7 percent minority. Census Tract 202.05, Block Group 2 is below the statewide average of 21.8 percent minority, but it is greater than 10 percent of the county average of 10.5 percent and is considered an EJ population. The minority population is less than 50 percent of the block group population. Census Tract 202.05, Block Group 2 is comprised of residents with a mixture of income levels, and includes both minority and non-minority households. In total there are 13 residential displacements associated with the Build Alternative with 7 residential displacements coming from within this block group alone. According to the City of Portland Public Works Department, three of the potential seven displacements in Census Tract 202.05, Block Group 2 are minority-owned at this time, one of which is currently a rental property.

No neighborhoods in Census Tract 202.05, Block Group 2 would be bisected or severed by the Build Alternative and community cohesion would remain intact. Any burden associated with the project would be shared relatively equal among all demographics including minority and non-minority populations. The benefits of the project would also be shared equally.

Based on demographic data, the Build Alternative would not result in a disproportionately high or adverse effect to minority or low-income populations. TDOT has made every effort to minimize impacts to the surrounding community, including minority and low-income populations, by implementing minor shifts to the Build Alternative in order to minimize displacements and by

the elimination of Option B discussed in the TPR. This document was reviewed by the TDOT Civil Rights Office and was determined to be in accordance with Title VI of the *Civil Rights Act of 1964*. An August 24, 2015 response letter from the TDOT Civil Rights Office acknowledging compliance with the *Civil Rights Act of 1964* is included in Attachment B. TDOT will comply with Title VI to ensure that "No person shall be, on the grounds of race, color, or national origin, excluded from participation in, denied the benefits of, or subject to discrimination under any program or activity receiving federal assistance."

Further, continued outreach to these populations and additional opportunities for their involvement in the project will occur. Public meetings have occurred as part of the project and at least one additional public hearing will take place once this EA has been approved. Minority and low-income populations will have an opportunity to review and comment on the Build Alternative and its effects.

Long-term direct and indirect beneficial impacts are anticipated to improve community connectivity, travel efficiency, traffic safety, public services, and facilities. Current traffic and future traffic demands would be served in a more efficient and safe manner by construction of the proposed new roadway. As discussed in the purpose and need section above, safety could be improved by removing some of the traffic, especially large trucks, from the downtown Portland area. Under the No-Build Alternative, the AADT on the existing SR-109 through the downtown area in 2040 would be 22,000 with 14 percent (3,080) of that attributed to truck traffic (See Table 2.1). The Build Alternative projected AADT for that same portion of roadway through the downtown is 5,520 with 8 percent (442) of that attributed to truck traffic (See Table 1.1) Also, based on traffic projections, the section of SR-52 between existing SR-109 and the proposed project's intersection to the west would have reduced traffic volumes. This area showed a high crash rate during the three year crash analysis study period. Removing traffic from this section of roadway is anticipated to reduce crash potential and provide safety benefits.

Constructing the Build Alternative would be the final link in the overall improvements to the SR-109 corridor between I-40 and I-65. Once complete, the SR-109 corridor is anticipated to be used more heavily due to the improved traffic efficiency. This would result in both direct beneficial and direct adverse social impacts. The direct beneficial impacts include improved community connectivity and reduced travel times for commuters. The direct adverse impacts to the local community and residents include increased noise, in areas where roadways do not currently exist, and loss of farmland and undeveloped land.

Improved accessibility and increased efficiency in the transportation system would result in faster response times for police, fire, and emergency medical services resulting in long-term, direct and indirect beneficial impacts. Overall, direct and indirect accessibility to public services and facilities would not be adversely impacted under the Build Alternative.

3.4 Displacements

A *Conceptual Stage Relocation Plan* (CSRP) was prepared for this project in 2015. A copy of the CSRP is contained in Attachment C. Field surveys were conducted along the proposed ROW of the Build Alternative to determine residential, business, and public/non-profit displacements that could potentially occur because of the proposed construction of the Build Alternative.

3.4.1 Displacement Impacts

No-Build Alternative: There would be no displacements associated with the No-Build Alternative.

Build Alternative: The CSRP surveys indicated that there are 13 single-family residential displacements associated with the Build Alternative. The number of residential displacements would be the same regardless of which of the two potential SR-52/Build Alternative interchange configurations is considered. The dwellings appeared to be in average condition, and most are expected to be owner occupied. A study of the real estate market in the Sumner County study area indicates that the market is adequate to provide housing for sale and for rent to accommodate those residents displaced by this project.

The Build Alternative is expected to cause three business displacements. The number of business displacements would be the same regardless of which of the two potential SR-52/Build Alternative interchange configurations is considered. One of the businesses is a boat repair shop and one is a barber shop. The third business could not be determined at the time of the field surveys. The displaced businesses are believed to employ fewer than 12 employees each. A study of the real estate market in the study area indicates sufficient property both for sale and for rent to accommodate the three business displacements.

No mobile homes, multi-family units, non-profit, or farm operation displacements are expected.

3.4.2 Procedures and Assurance for Assistance to Displaced Persons

The Build Alternative was developed in a manner to minimize displacements. TDOT will continue to work to avoid and minimize displacements through the design phase to the extent practical. However, due to the existing development in the area there would be some unavoidable displacements.

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 TDOT 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; t*he Uniform Relocation Assistance Act of 1972*; implementing federal regulations TCA 13-11-101 through 119; *The State of Tennessee Relocation Assistance Brochure*; and Chapter Nine of the TDOT *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. TDOT will work with the residents and business owners to ensure that the relocation process is efficient and fair.

3.5 Economic Environment

3.5.1 Economic Conditions and Trends

Various key indicators of economic conditions and growth within an area include changes in labor force, employment, capital investment, retail sector, and property values. These economic variables are discussed in the context of the Sumner County study area.

In the last ten years, the annual labor force of Sumner County has been increasing despite a small decline in 2009. The annual labor force in Sumner County was 85,191 in 2014 compared to 73,439 in 2004 (Bureau of Labor Statistics, 2014). This represents a 16.0 percent increase from 2004. The biggest fluctuation in labor force in Sumner County occurred during the 2007-

2009 recession. Between 2008 and 2009, the labor force decreased by 1,673 persons, but the following year it increased by 1,540. The unemployment rate in the County increased rapidly from 5.7 percent in 2008 to 9.9 in 2009. Since the end of the recession in 2009, the rate has been decreasing. The annual unemployment rate in Sumner County in 2014 was 5.3 percent compared to a statewide unemployment rate of 6.7 percent.

In 2014, the government, manufacturing, and retail trade sectors employed the most people in Sumner County. These occupation types comprised 42 percent of the total employment in Sumner County. Overall, the study area has a diversified employment base. The top ten employers for Sumner County are listed on Table 3.4.

Table 3.4. Top Ten Employers in Sumner County, Tennessee, 2014.

Employer	City	Number of Employees
Sumner County Board of Education	Gallatin	2,375
Sumner Regional Medical Center	Gallatin	875
RR Donnelley and Sons Company	Gallatin	600
Hendersonville Medical Center	Hendersonville	500
Xtend Healthcare LLC	Hendersonville	500
Unipres U.S.A. Inc.	Portland	500
Peyton's-Southeastern, Inc.	Portland	400
ABC Group Fiel Systems Inc.	Gallatin	299
Kirby Building Systems, Inc.	Portland	293
Gallatin Health Care Associates	Gallatin	250
Source: Tennessee Department of Economic and Community Development, Sumner County Data Sheets, 2014.		

3.5.2 Development Trends

Housing: Recent development trends indicate that building permits have been on the decline in Sumner County since the recent recession. Between 2005 and 2009, new privately owned residential building permits were issued for 6,154 single-family homes (U.S. Census Bureau 2005, 2006, 2007, 2008, and 2009[3]). Between 2010 and 2014, there were only 3,143 building permits issued for single-family homes, for an average of 628 per year during the 5-year period (U.S. Census Bureau 2010, 2011, 2012, 2013, and 2014). The majority of the residential permits issued in the last five years have been for single-family residential buildings. Only four permits were issued for building with two or more families, compared to 58 permits for two family or higher buildings between 2003 and 2007. In the last 10 years, the most permits

[3] Building permit data was obtained from the U.S. Census Bureau Censtats Database available at the following website: http://censtats.census.gov/bldg/bldgprmt.shtml.

(1,739) were issued in 2005. The year with the lowest permits issued (422) was in 2011. Since 2012, the number of building permits issued each year has steadily been on the rise, which may indicate recovering economic growth in the area.

Industrial: Trends in industrial growth investment (i.e., manufacturing, distribution and selected service projects) during a six-year period from 2003-2009 were evaluated for approximately 233 projects. The majority (approximately 89 percent) were expansion projects in Sumner County while the remaining 11 percent were capital improvement projects. The projects created approximately 4,650 jobs in the county (TNECD, 2011). The 2003-2009 TNECD data was the most recent available.

The manufacturing sector employs nearly 14 percent of Sumner County. Portland is home to over 50 industries that comprise distribution, warehousing, and manufacturing (City of Portland 2015). In 2013, Japan-based U.S. Tsubaki Automotive invested 1.9 million dollars in Portland to expand their current plant (Nashville Area Chamber of Commerce, 2015). Hatch Stamping announced in 2014 the opening a plant in Portland creating job for 101 workers (Williams, 2014).

3.5.3 Economic Impacts

No-Build Alternative: Improvements in regional/local accessibility and traffic movement would not occur under the No-Build Alternative, thereby not realizing a potential increase in travel efficiency and associated travel cost savings in the area.

Without the proposed project, it is anticipated that as the population in the areas continues to increase the existing transportation network may become strained. This is evidenced by the poor LOS anticipated for the No-Build Alternative (refer to Table 1.5). This may lead to slower economic growth, which would impact total revenues for Sumner County, Portland, and adjacent communities in the area. The potential for an increased tax base and tax revenues could be decreased as a result of the lack of improved accessibility and enhanced movement of goods and people.

Build Alternative: Short-term benefits would result during the construction phase of the project due to employment generated by project construction activities and due to potential retail sales for local businesses while construction activities are occurring.

There are two basic categories of economic impacts of major highway investments or improvements, such as the proposed project. These categories are: transportation user (operational impacts) and economic impacts. The Build Alternative would result in beneficial operational impacts by providing a more efficient roadway system that reduces operating costs, improves travel times, and enhances safety.

Long-term economic benefits may be realized by implementation of the Build Alternative. Improved accessibility and travel efficiency would likely enhance the potential for new highway-oriented and community-based development. Thus, it can logically be expected that the proposed project could cause some relocation of existing business activity in addition to the generation of new business activity within the immediate area. Much of the land in the project vicinity would be considered suited for development, except some areas within the 100-year floodplain along Summers Branch and its tributaries, or other areas with natural or man-made constraints, including gas pipeline corridors in the area.

The Build Alternative could provide increased opportunities for commercial and industrial growth, and an associated expanded employment base. Business growth can occur in the manufacturing, service, wholesale, and retail sectors of the economy through the expansion of existing businesses, attraction of new businesses to the area, reduction in the cost of moving goods and raw materials, and the servicing of inter-regional traffic flows that can encourage development of travel-related businesses. The impacts on business are reflected in increases in sales, income, employment, and other economic indicators. An overall growth in employment could attract additional workers and families to an area, thereby creating an increased demand for housing.

3.6 Farmland

The *Farmland Protection Policy Act of 1981* (FPPA) seeks to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to insure that federal programs are administered in a manner that, to the extent practicable, would be compatible with state and local government, and private programs and policies to protect farmland."

Existing farmland within the study area.

In a letter dated September 8, 2011, the USDA Natural Resources Conservation Service (NRCS) agreed to provide the necessary assistance and review of resources including soils and prime farmland reviews. A copy of this initial coordination with the NRCS is included in Attachment B.

In accordance with the FPPA, a Farmland Conversion Impact Rating Form was submitted to the NRCS on March 25, 2015, and a site assessment score was determined for the Build Alternative under each SR-52/Build Alternative interchange option being considered. The NRCS provided the completed forms on April 3, 2015. Some soils classified as prime or unique farmland are found within the study area. A copy of the April 3, 2015 correspondence letter from NRCS along with the Farmland Conversion Impact Rating Form containing the final assessment scores for the Build Alternative under each SR-52/Build Alternative interchange option is included in Appendix B.

The site assessment score, determined by numerous criteria including the agricultural value of the land, is used to determine which areas should receive the highest level of protection from conversion to non-agricultural uses. The higher the numerical score given to a proposed alternative, the more protection the farmland affected by it would receive. The highest rating possible is 260. The USDA recommends that sites receiving a score totaling 160 or more be given increasingly higher levels of consideration for protection and the consideration of additional alternatives with fewer impacts. Sites receiving a total score of less than 160 points need not be given further consideration for protection and no additional sites need to be evaluated. The site assessment criteria used for scoring the Build Alternative are included in Appendix B.

3.6.1 Potential Farmland Impacts

No-Build Alternative: The No-Build Alternative would not result in any farmland impacts.

Build Alternative: There would be unavoidable farmland impacts due to construction of the new highway. A total of 183 to 193 acres of prime or unique farmland could be impacted by the project under the partial folded diamond and folded diamond interchange options at SR-52, respectively. Most farmland impacts associated with the Build Alternative would involve direct loss of farmland located within the proposed ROW. However, the farmland impact rating score for the Build Alternative of 158 and 159 points for the partial folded and folded diamond interchanges, respectively, is below the 160-point threshold previously discussed. Therefore, no further evaluation is necessary.

3.7 Natural Resources

3.7.1 Terrestrial Resources

Most of the land in the project corridor has been disturbed by past land uses and consists mostly of agricultural, commercial, and residential lands that have limited terrestrial habitat values. There are some forested habitats and areas containing earlier stages of succession consisting of dense scrub/shrub thickets or old fields. The old field habitat is found in areas that typically have been idle from farming activities from two to five years and have not yet become dominated by woody vegetation such as shrubs and saplings.

Plant communities found in the area are characteristic of communities formed over limestone. Different communities may develop on different limestone strata; elevation differences also have an influence. The terrestrial habitats present in the area, especially the remaining forested areas, provide food, cover, and nesting opportunities for small mammals, including rabbits, squirrels, and other rodents, as well as reptiles, native birds, and an assortment of insects. Old-field habitats in various stages of succession are also useful to many types of wildlife. These areas are most often dominated by grasses and legumes, blackberries (*Rubus spp*.), young eastern red cedar (*Juniperus virginiana*), and privet (*Ligustrum spp*.). The study area exhibits substantial human disturbance in and adjacent to most of the remaining habitats, which minimizes the overall habitat quality.

Commercial and residential lands generally have limited wildlife value, as they are usually paved or mowed, except for undisturbed vegetation along fencerows or boundaries. Agricultural lands in the area have slightly better wildlife values with more cover and food opportunities depending on the time of year and what farming methods are used in a given area. The larger, more open agricultural areas that dominate the study area provide low quality habitat due to lack of cover for protection from predators and the elements, monotypic stands of vegetation or bare soil, and use of pesticides and herbicides.

Typical resident species in the general study area include mammals such as white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), opossum (*Didelphis virginiana*), and several small rodent species. Resident birds likely include wild turkeys (*Meleagris gallopavo*), northern cardinals (*Cardinalis cardinalis*), and American robins (*Turdus migratorius*). Some of the migratory species that frequent the study area include raptors, such as red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*), sharp-shinned hawks (*Accipiter striatus*), and American kestrels (*Falco sparverius*); and numerous small neotropical migrant songbirds. Reptiles, including snakes, lizards, and turtles, are also present within the study area.

3.7.1.1 Potential Impacts to Terrestrial Resources

No-Build Alternative: Because no new construction activities would occur under the No-Build Alternative, no changes from the baseline conditions of terrestrial resources would occur within the immediate study area.

Build Alternative: The study area used to determine potential project impacts for terrestrial resources included an approximately 250-foot wide corridor (125 feet on each side of the centerline of the Build Alternative). Areas within existing highway ROW were not included in the impacted acreage estimates. There is a total of approximately 210 to 214 acres of terrestrial area estimated to be impacted within the Build Alternative corridor under the partial folded and folded diamond interchange options at SR-52, respectively. The Build Alternative would result in the loss of approximately 166 to 171 acres of pasture, agricultural, or early stages of old-field succession for the partial folded and folded diamond interchange options at SR-52, respectively. There are also approximately 23 to 24 acres of forested and scrub/shrub habitats that would be impacted due to construction of the new roadway. There would be direct long-term adverse impacts due to conversion of productive forests and old-field areas to roadway. Table 3.5 contains the estimated acreages for terrestrial habitats in the study area.

Table 3.5. Terrestrial Habitats Potentially Impacted by the Build Alternative.

Alternative	Forested, Scrub/shrub (acres)*	Pasture, Agricultural, or Old Field (acres)	Commercial/ Industrial/ Residential (acres)	Total Terrestrial Area in New ROW (acres)
Build Alternative (Partial Folded Diamond Option)	24	166	20	210
Build Alternative (Folded Diamond Option)	23	171	20	214
* The acreages reported in this table do not include areas within existing highway ROWs. Source: TDOT, 2015 (*Ecology Report*).				

There would be minor long-term adverse impacts to terrestrial habitats due to the clearing of existing forests, old fields, pastures, and shrub/scrub areas for conversion to roadway ROW. Due to the limited value of the habitats in the immediate study area and because most of the habitats have been altered/disturbed in the past, it is not expected that the loss of these habitats would have a substantial influence on fish and/or wildlife populations in the area. Only a small amount of the existing habitats would actually need to be cleared for this project. After project construction and revegetation, areas that remain undisturbed within the highway ROW may provide some degree of refuge for wildlife as surrounding areas continue to be developed and other habitats are destroyed. Those habitats within the ROW would provide temporary refuge, foraging areas, and/or travel corridors between larger blocks of habitats.

Mortality of individual wildlife may occur during construction, especially for less mobile species. Operation of the highway would continue to result in mortality to wildlife due to wildlife-vehicle collisions.

Although roadway mortality is generally not believed to substantially affect animal populations under normal conditions, if the population is experiencing other sources of stress (disease, habitat degradation or elimination, etc.), then traffic-related mortality can contribute to the demise of local populations.

Highway noise may affect the utilization of some habitats by wildlife. Noise is already a factor within most of the existing habitats due to noise from farm equipment, traffic noise on existing highways, and noise associated with other land uses, such as industrial areas. Therefore, most species in the area are already tolerant of human-generated noise and would not be affected.

3.7.2 Water Quality and Aquatic Resources

3.7.2.1 Water Quality

Section 303(d) of the *Clean Water Act* (CWA) requires states to develop a list of streams and lakes that are "water quality limited." "Water quality limited" waters do not meet one or more water quality standards and are not supporting designated uses.

There are three streams within the project that are listed on the 303(d) list. Summers Branch and one of its smaller tributaries crossed by the Build Alternative are listed on the 303(d) list as not meeting their designated uses due to nutrients, siltation, and pathogens [*Escherichia coli* (*E. coli*)]. In addition, an unnamed tributary to West Fork Drakes Creek located near the southern termini of the project is listed on the 303(d) list due to flow alterations from upstream impoundment. Figure 3-6 shows the location of the 303(d) listed streams.

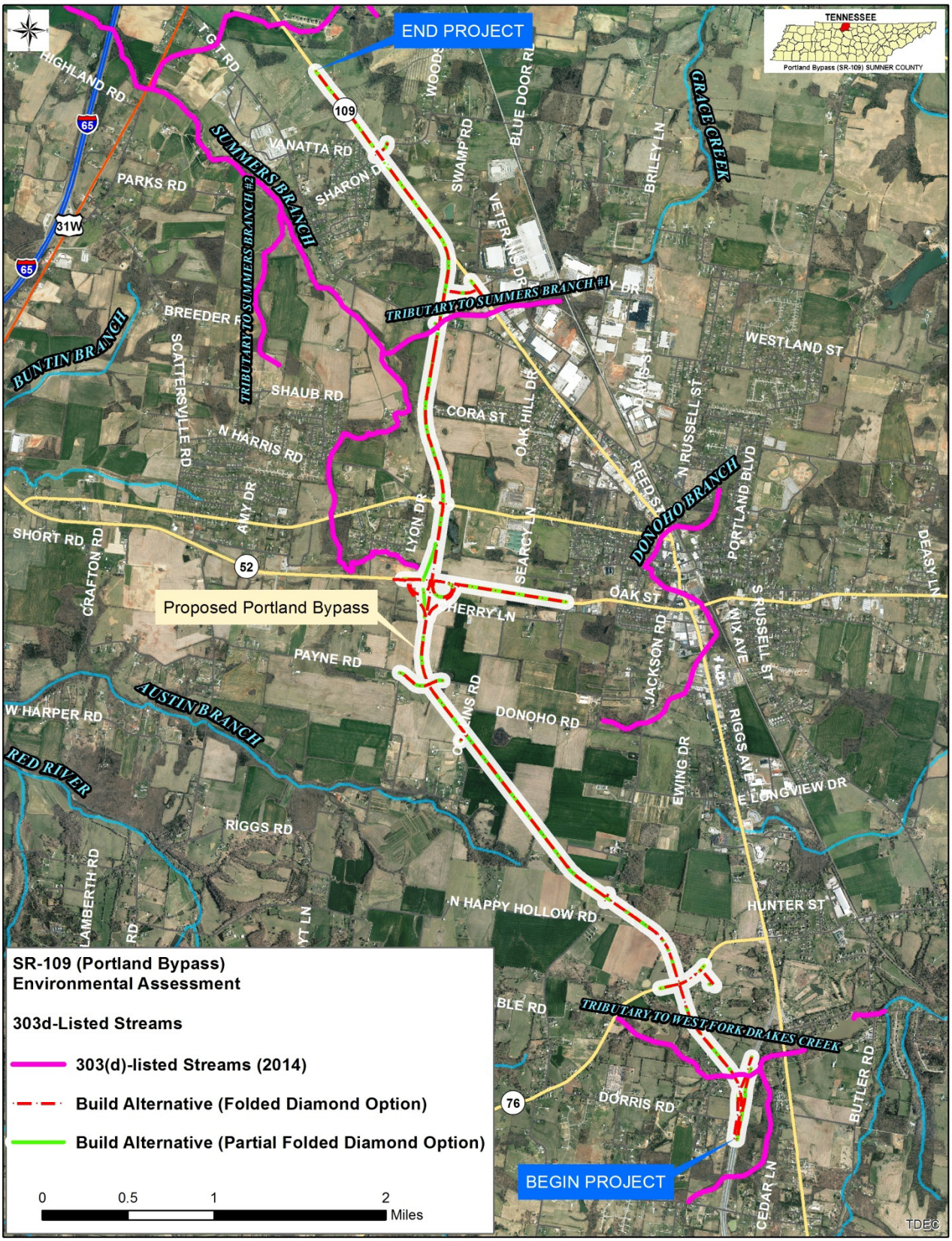
Section 303(d) includes the Total Maximum Daily Load (TMDL) program. TDEC developed and EPA approved a TMDL for the Red River Watershed, which includes Summers Branch. Implementation of this plan has reduced some of the known pollutants in the Red River Watershed. No TMDL is associated with the tributary to West Fork Drakes Creek because the impairment is not caused by a pollutant. More information regarding the potential impacts to water quality for the No-Build and Build Alternatives, along with measures that would be taken to avoid and/or minimize those impacts, are discussed in Sections 3.7.2.3 and 3.7.2.4 below.

Exceptional Tennessee Waters and Outstanding National Resource Waters

Tennessee water quality standards require the incorporation of the antidegradation policy into regulatory decisions (*Chapter 1200-4-3-.06*). The TDEC Division of Water Pollution Control (WPC) has been delegated the responsibility of identifying Exceptional Tennessee Waters (ETW; previously known as Tier 2) and Outstanding National Resource Waters (ONRW); Tier 3). In ETW, degradation cannot be authorized unless (1) there is no reasonable alternative to the proposed activity that would render it non-degrading and (2) the activity is in the economic or social interest of the public. In ONRW, no new discharges, expansions of existing discharges, or mixing zones will be permitted unless such activity will not result in measurable degradation of the water quality.

There are no known ETW or ONRW within the study area that would be impacted under the No-Build or Build Alternative.

Figure 3-6. 303(d) Listed Streams Found within the Study Area.



3.7.2.2 Streams and Waterbodies

Detailed information regarding the streams, springs, seeps, impoundments and other watercourses and waterbodies that are potentially affected by the project is contained in the *Ecology Report* prepared for the project (See Appendix C). Figure 3-7 shows detailed mapping of the aquatic resources within the proposed project study area. The determinations as to which are waters of the State and/or of the U.S. have not been confirmed by either TDEC or the U.S. Army Corp of Engineers (USACE). Table 3.6 contains information regarding the aquatic resources within the study area.

A total of 20 streams (including perennial, intermittent, and ephemeral streams), 11 wet weather conveyances, 14 ponds, three springs, and one seep were identified within and adjacent to the limits of the Build Alternative. These numbers are the same for both of the SR-52/Build Alternative interchange options being considered.

Aquatic habitats within the study area consist of a mixture of perennial streams, intermittent streams, ephemeral streams, wet weather conveyances, wetlands, and man-made ponds. Most of the streams located in the study area contain a limited amount of aquatic habitat due to their small size and narrow band of riparian habitat. The perennial streams contain several small fish species, reptiles, amphibians, mammals, and various invertebrates that are common in streams of this size in the project vicinity. Several terrestrial species also utilize the aquatic habitats for drinking and foraging.

Codes Used for Naming Ecological Resources Features

Stream = STR

Wet Weather Conveyance = WWC

Wetland = WTL

Pond = PND

Spring = SPG

Seep = SEP

Swale = SWL

Sinkhole = SNK

Most of the aquatic habitats in the study area are of somewhat reduced quality due to past and present human disturbances including development of infrastructure and agricultural practices, such as row crop production, hay production, and cattle grazing; and other land uses that tend to degrade natural communities. These disturbances have resulted in a combination of impacts to local aquatic habitats and water quality resulting from removal of riparian vegetation, substantial channel modifications, increased erosion, and changes in hydrology.

Figure 3-7. Aquatic Resources within the Study Area.

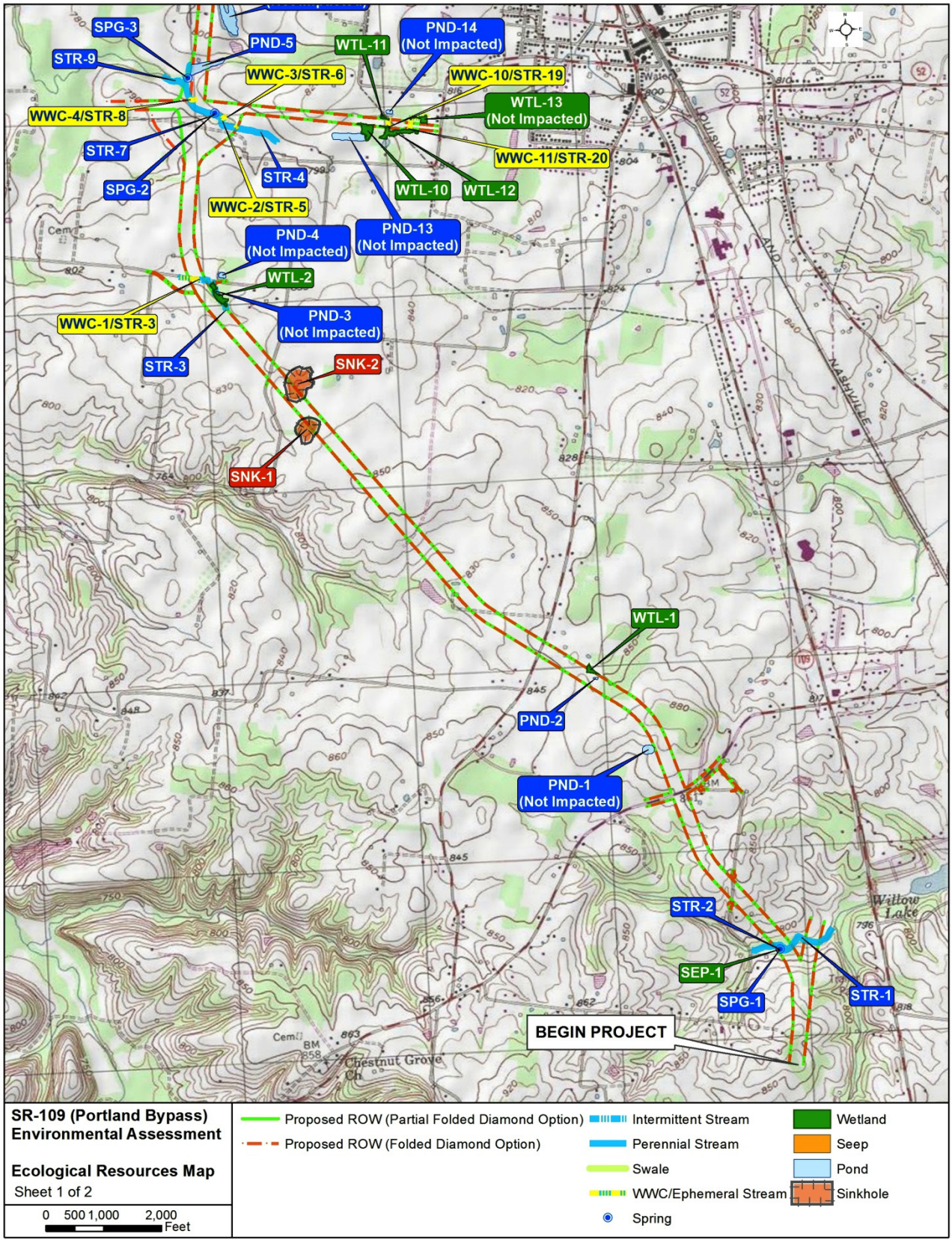


Figure 3-7 (cont.). Aquatic Resources within the Study Area.

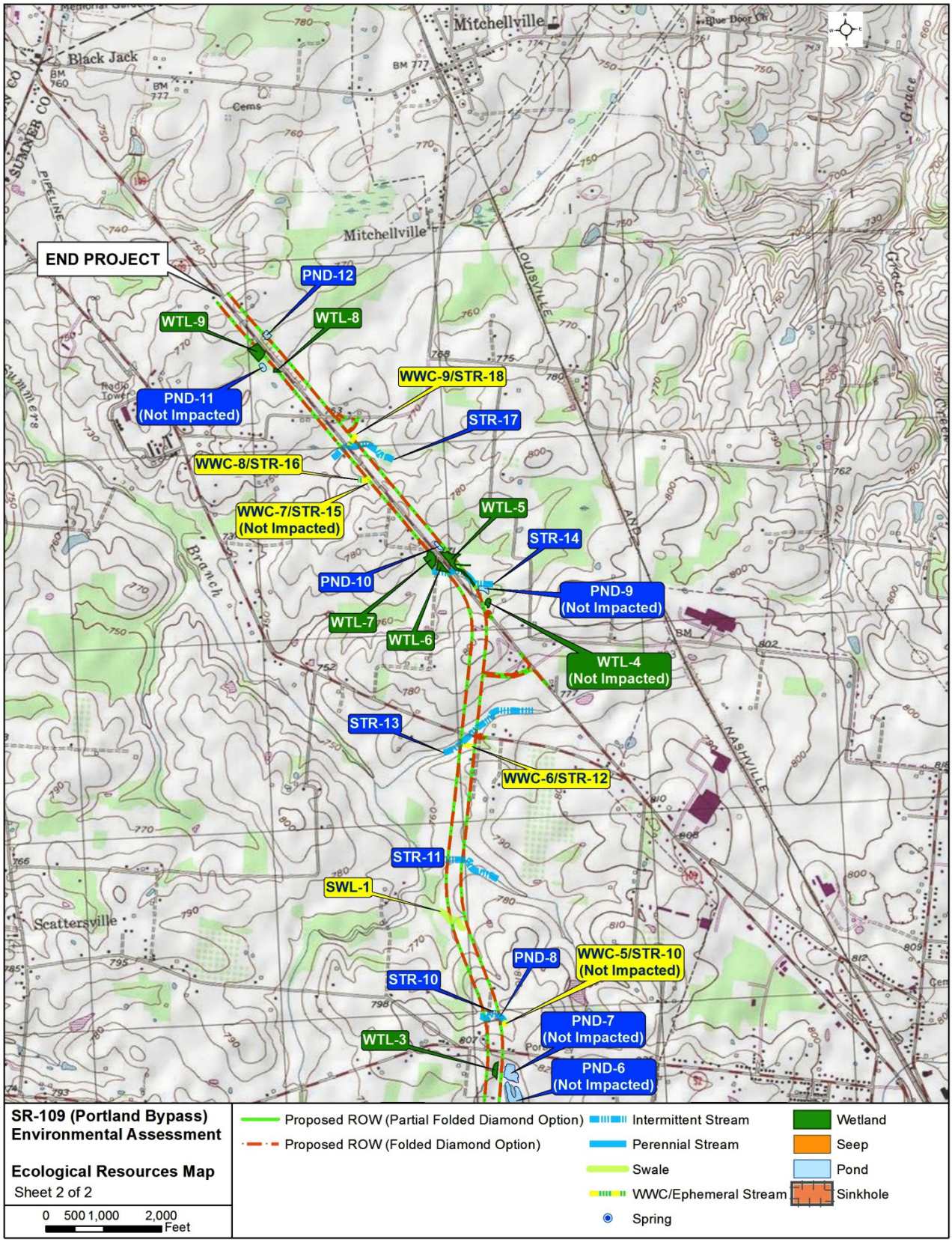


Table 3.6. Aquatic Resources Potentially Impacted by the Build Alternative.

Map Label/ Feature Name	Feature Designation	Potential Impact	Estimated Impact Quantity (linear feet)		303d-Listed [(Y/N), Reason for Listing]
			Partial Folded Diamond Option at SR-52	Folded Diamond Option at SR-52	
STR-1	Perennial Stream	Crossing/ Encapsulation/ Runoff	372’	372’	Y, flow alteration from upstream impoundment
STR-2	Intermittent Stream	Fill	142’	142’	N
STR-3	Intermittent Stream	Crossing/ Encapsulation/ Relocation/ Runoff	176’	176’	N
STR-3*	Ephemeral Stream	Crossing/ Encapsulation/ Runoff	181’	181’	N
STR-4*	Perennial Stream	Crossing/ Encapsulation/ Runoff	1,403’	1,115’	Y, downstream for nutrients, siltation, and pathogens
STR-5	Ephemeral Stream	Fill	46’	46’	N
STR-6	Ephemeral Stream	Fill or Runoff	95’	95’	N
STR-7	Intermittent Stream	Fill or Runoff	58’	58’	N
STR-8	Ephemeral Stream	Fill	130’	130’	N
STR-9	Intermittent Stream	Crossing/ Encapsulation/ Relocation/ Runoff	518’	255’	N
STR-10*	Ephemeral Stream	Runoff	0	0	N
STR-10	Intermittent Stream	Crossing/ Encapsulation/ Runoff	316’	316’	N
STR-11	Intermittent Stream	Crossing/ Encapsulation/ Runoff	251’	251’	N
STR-12	Ephemeral Stream	Fill	203’	203’	N
STR-13	Intermittent Stream	Crossing/ Encapsulation/ Runoff	344’	344’	Y, nutrients, siltation, and pathogens

Map Label/ Feature Name	Feature Designation	Potential Impact	Estimated Impact Quantity (linear feet)		303d-Listed [(Y/N), Reason for Listing]
			Partial Folded Diamond Option at SR-52	Folded Diamond Option at SR-52	
STR-14	Intermittent Stream	Crossing/ Encapsulation/ Runoff	435’	435’	N
STR-15	Ephemeral Stream	Runoff	0’	0’	N
STR-16	Ephemeral Stream	Crossing/ Runoff	52’	52’	N
STR-17	Intermittent Stream	Crossing/ Encapsulation/ Runoff	290’	290’	N
STR-18	Ephemeral Stream	Crossing/ Encapsulation/ Runoff	130’	130’	N
STR-19	Ephemeral Stream	Crossing/ Encapsulation/ Runoff	143’	143’	N
STR-20	Ephemeral Stream	Crossing/ Encapsulation/ Runoff	102’	102’	N
Total Stream Impact Quantity			**5,387’**	**4,836’**	
WWC-1	Wet Weather Conveyance	Crossing/ Encapsulation/ Runoff	181’	181’	N
WWC-2	Wet Weather Conveyance	Fill	46’	46’	N
WWC-3	Wet Weather Conveyance	Fill or Runoff	95’	95’	N
WWC-4	Wet Weather Conveyance	Fill	130’	130’	N
WWC-5	Wet Weather Conveyance	Runoff	0	0	N
WWC-6	Wet Weather Conveyance	Fill	203’	203’	N
WWC-7	Wet Weather Conveyance	Runoff	0’	0’	N
WWC-8	Wet Weather Conveyance	Crossing/ Runoff	52’	52’	N
WWC-9	Wet Weather Conveyance	Crossing/ Encapsulation/ Runoff	130’	130’	N
WWC-10	Wet Weather Conveyance	Crossing/ Encapsulation/ Runoff	143’	143’	N

Map Label/ Feature Name	Feature Designation	Potential Impact	Estimated Impact Quantity (linear feet)		303d-Listed [(Y/N), Reason for Listing]
			Partial Folded Diamond Option at SR-52	Folded Diamond Option at SR-52	
WWC-11	Wet Weather Conveyance	Crossing/ Encapsulation/ Runoff	102’	102’	N
Total Wet Weather Conveyance Impact Quantity			**1,082’**	**1,082’**	
PND-1	Pond	Runoff	0 ac	0ac	N
PND-2	Pond	Drain/Fill	0.06 ac	0.06 ac	N
PND-3	Pond	Runoff	0 ac	0ac	N
PND-4	Pond	Runoff	0 ac	0ac	N
PND-5	Pond	Drain/Fill	1.55 ac	1.55 ac	N
PND-6	Pond	Runoff	0 ac	0ac	N
PND-7	Pond	Runoff	0 ac	0ac	N
PND-8	Pond	Drain/Fill	0.12 ac	0.12 ac	N
PND-9	Pond	Runoff	0 ac	0ac	N
PND-10	Pond	Drain/Fill	0.25 ac	0.25 ac	N
PND-11	Pond	Runoff	0 ac	0ac	N
PND-12	Pond	Drain/Fill	0.32 ac	0.32 ac	N
PND-13	Pond	Runoff	0 ac	0ac	N
PND-14	Pond	Runoff	0 ac	0ac	N
Total Pond Impact Quantity			**2.30 ac**	**2.30 ac**	
SEP-1	Seep	Fill	.01 ac	.01 ac	N/A
Total Seep Impact Quantity			**.01 ac**	**.01 ac**	
SPR-1	Spring	Fill	N/A	N/A	N/A
SPR-2	Spring	Fill or Runoff	N/A	N/A	N/A
SPR-3	Spring	Fill/Spring-box (Partial Folded Diamond Option Only)	N/A	N/A	N/A
SWL-1	Swale	Fill/Runoff	N/A	N/A	N/A

* Note: Two streams (STR-3 and STR-10) are listed twice in this table, because their channels transitioned from ephemeral to intermittent within the study area. These streams were only counted once in the total number of streams discussed in the EA, however, the impacts were calculated separately for each stream type to provide more detail for future permitting considerations.

N/A = Not applicable.

Source: TDOT, 2015 (*Ecology Report*).

3.7.2.3 Potential Impacts to Water Quality and Aquatic Resources

No-Build Alternative: Because no new construction activities would occur under the No-Build Alternative, no changes from the baseline conditions of aquatic resources would occur within the study area.

Build Alternative: The information presented in this EA represents the anticipated worst-case impact associated with the construction of the Build Alternative, with the assumption that these impacts would be reduced, where possible, during the project design phase. Detailed plans will be developed in the post-NEPA phase after a land survey of the area is completed. However, for comparison purposes, estimated impacts to aquatic resources are documented using an estimated ROW boundary of approximately 250-feet along the mainline of the Build Alternative as shown on the conceptual plans in Appendix A.

The Build Alternative could potentially directly impact 19 streams, nine wet weather conveyances, five ponds, one seep area, and one swale, regardless of which of the two SR-52 interchange configuration options is considered. A total of three springs could be directly impacted by the Build Alternative under the partial folded diamond interchange option at SR-52. One of those springs would be avoided under the folded diamond interchange option resulting in a total of two springs being impacted under that option.

It appears that 19 of the streams would be crossed and existing culverts replaced or extended where applicable. Approximately 4,836 to 5,387 feet of stream channel may be directly impacted under the folded diamond and partial folded diamond interchange options respectively. In addition, approximately 1,082 feet of wet weather conveyance channel may be directly impacted under both interchange options. All of these amounts include the length of stream channels (perennial, intermittent, and ephemeral streams) and wet weather conveyances already encapsulated at existing roadways. Impacts would be reevaluated and refined once final design plans are available showing the proposed structure types at each crossing.

A total of 2.3 acres of ponds may be impacted by the Build Alternative regardless of which of the two SR-52/Build Alternative interchange options is considered. Approximately 0.01 acres of seep area would also be impacted by the Build Alternative under each interchange option.

Channelization/encapsulation of streams within the study area could result in long-term adverse impacts to aquatic habitats and species living in downstream habitats. These long-term adverse impacts would mainly result from potential changes in aquatic habitat conditions associated with changes in hydrology and water quality. Changes in hydrology may impact microhabitat conditions, such as substrate type, stream channel depth and width, and vegetation in portions of these streams. Removal of canopy cover increases sun exposure to the water surface, which can raise stream water temperature. Increased water temperature and other microhabitat changes can alter species composition in the stream. These adverse impacts have potential to affect spawning and larval fish due primarily to the decreased water quality and subsequent decrease in benthic invertebrates.

Sedimentation from stormwater runoff could impact all of the project streams to varying degrees. However, implementation and maintenance of effective erosion and sediment control measures throughout the construction process would keep the overall impacts to these aquatic resources to a minimum. The Build Alternative is also located in an area where sediment could enter solution cavities and affect springs in the area. The TDOT hydraulics section will address this in project design and construction.

Section 3.7.7 contains additional information regarding the geology in the area, including the presence of solution cavities or sinkholes and how those features will be addressed.

The new roadway would increase the amount of paved or impervious area resulting in increased runoff. Pollutants usually contained in highway runoff include de-icing salts, pesticides, and herbicides used for the control of unwanted roadside vegetation. De-icing salts are used relatively sparingly in this area and would not likely impact water quality, and pesticides and herbicides can be applied in a manner designed to minimize introduction of these chemicals into the surrounding water bodies.

Although Summers Branch and some of its tributaries would be crossed by the proposed project alignment, it is not expected that the project would influence the ability of these streams to meet their designated uses in relation to the Section 303(d) list. Mitigation measures described in Section 3.7.2.4 are expected to be adequate to protect the streams from any substantial further degradation due to this project. The project would therefore not counteract with the ongoing improvements to the Red River Watershed being accomplished through implementation of TDEC's TMDL plan for the area.

The Build Alternative would directly impact at least five small man-made ponds. Some of these ponds would need to be completely or partially drained and filled for this project. Draining of the ponds may have short-term impacts to downstream watercourses depending on the amount of water in the pond at the time of construction and the water quality within the pond.

3.7.2.4 Mitigation of Aquatic Resources Impacts

The Build Alternative will be designed to avoid major impacts to waters of the state to the extent practicable. Efforts to further minimize impacts will continue throughout the design, permitting, and construction phases. Pursuant to TESA, TDOT has determined that it does not have enough information to make a recommendation on final mitigation measures at this phase of the project. Final mitigation measures will be developed and confirmed as part of TESA Concurrence Point 4 and the permitting process.

Unavoidable impacts will be mitigated as required by applicable laws and regulations. Specific mitigation measures for this project will be developed during the permitting phase once final design plans have been developed, but prior to any construction activities. All construction activities and associated mitigation requirements will need to be approved by the appropriate agencies responsible for protecting water resources in the study area. As part of the permit process, all watercourses designated as ephemeral streams and/or wet weather conveyances in this EA will be further assessed and defined to indicate whether each feature is considered to be an ephemeral stream, wet weather conveyance, or upland area based on specific guidance and definitions developed by each regulatory agency with possible jurisdiction over these resources. Continued coordination with appropriate regulatory agencies will occur during final planning and construction of the project and extend through required monitoring periods that may be established during the initial permit acquisition process.

In an effort to minimize sedimentation impacts, erosion and sediment control plans will be included in the project construction plans. TDOT will also implement measures as described in its *Standard Specifications for Road and Bridge Construction*, which includes erosion and sediment control standards for use during construction. The State of Tennessee sets water quality criteria for waters of the state; these standards must be met during the construction of the project.

Stream channels requiring relocation or channelization will be replaced on-site to the extent possible, using techniques that would replace existing stream characteristics such as length, width, gradient, and tree canopy. Use of "Natural Channel Design" may be required if the portion of affected stream is generally greater than 200 feet long. Stream or waterbody impacts that cannot be mitigated on site, such as impacts of culverts greater than 200 feet, or impacts to springs or seeps that require rock fill to allow for movement of water underneath the roadway, will either be mitigated off-site by improving a degraded system or by making a comparable payment to an in-lieu-fee program which would perform such off-site mitigation under the direction of state and federal regulatory and resource agencies.

A spill prevention, control, and counter measures (SPCC) plan will be developed for the project. This plan will define the emergency response plan in cases where accidental releases of hazardous substances occur, including potential spills or releases adjacent to streams or other environmentally sensitive areas.

It is expected that the combined use of water quality protection measures during construction and appropriate mitigation measures would result in a reduction in potential impacts to fish and wildlife. When possible, streamside and in-stream construction activities will be performed during dry periods, when stream flow is at a minimum. The unnecessary removal of existing vegetation will be avoided as much as possible. Canopy removal along all working or staging areas will be limited to the extent practicable. Where removal of vegetation is necessary, bank stabilization and sediment control measures will be employed immediately prior to the start of construction. Bank stabilization measures will include seeding with native species and placing of silt fences or rip-rap. Control structures will be inspected and properly maintained throughout the life of the project.

3.7.3 Wetlands

Section 404 of the CWA extends authorization to the USACE to regulate activities that affect waters of the United States, including wetlands. The USACE issues Section 404 permits for the discharge of dredged or fill material into waters of the U.S. including special aquatic sites, such as wetlands.

The project study area was surveyed in January 2013 and February 2015 to determine if wetlands were present. The specific objectives of the wetland surveys were to identify potential jurisdictional wetlands occurring within and immediately adjacent to the Build Alternative's ROW; to characterize the wetland resources in terms of wetland type, size, and functional value; and to make a preliminary determination of the impacts of each alternative on wetland resources. Jurisdictional wetlands are defined by the USACE as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE, 1987). The final jurisdictional determinations for the potential wetlands identified for this study will be made by the USACE and TDEC as part of the permitting process for the project.

Potential wetlands were preliminarily identified within the study area by reviewing existing United States Geological Survey (USGS) topographic maps, NRCS soil survey maps, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, and aerial photographs. Preliminary wetland determinations were made utilizing the technique as described in the *Corps of Engineers 1987 Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0) (USACE, 1987).

This approach requires an on-site inspection of the vegetation, soils, and hydrology of an area to make wetland determinations. At least one positive wetland indicator for each of the three parameters must be evident for a positive wetland determination.

Detailed information regarding the wetlands that are potentially affected by the project is contained in the 2015 *Ecology Report* prepared for the project. This report is in Appendix C. The *Ecology Report* contains maps, photos, and detailed data for each feature. Figure 3-7 shows the locations of wetlands in relation to the Build Alternative.

Thirteen potential wetlands (totaling >7.85 acres) were identified during the site visit within or adjacent to the project limits as shown on the current conceptual plans. Location and size of the wetland areas were estimated; therefore, a survey to determine the exact size and location within the project ROW would be needed should the Build Alternative be selected. Table 3.7 contains information regarding the wetlands in the study area.

3.7.3.1 Potential Impacts to Wetlands

No-Build Alternative: Because no new construction activities would occur under the No-Build Alternative, no changes from the baseline conditions of wetlands would occur within the immediate project site.

Table 3.7. Wetlands Potentially Impacted by the Build Alternative.

Map Label/ Feature Name	Likely Project Impact on Wetland	Primary Functions of Wetland	Wetland Size (acres) (estimated)		Type/ Description of Wetland
			Total Within or Adjacent	Likely Permanently Eliminated or Drained	
WTL-1	Likely fill/ and temporary impacts	Wildlife habitat and wildlife watering	> 0.29 ac	0.12 ac	Forested wetland on a slight hillslope; wetland extends beyond the project corridor
WTL-2	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation; field drainage	>0.77 ac	0.10 ac	Forested wetland; connected to PND-3, extends beyond ROW
WTL-3	Likely fill/ destruction	Wildlife watering, field drainage	0.40 ac	0.40 ac	Emergent wetland; Wetland is located completely inside ROW
WTL-4	Likely none, Temporary impacts possible	Wildlife habitat and possible flood attenuation	0.22 ac	0.0 ac	Emergent wetland; connected to PND-9 on the southwest corner; wetland not located inside the project ROW
WTL-5	Likely fill/ destruction, and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation; field drainage	> 1.21 ac	0.94 ac	Emergent scrub/shrub wetland surrounding STR-14; wetland extends beyond the project ROW

Map Label/ Feature Name	Likely Project Impact on Wetland	Primary Functions of Wetland	Wetland Size (acres) (estimated)		Type/ Description of Wetland
			Total Within or Adjacent	Likely Permanently Eliminated or Drained	
WTL-6	Likely fill/ and temporary impacts	Wildlife habitat and wildlife watering	>0.43 acres	0.18 ac	Forested wetland; wetland extends beyond the project ROW
WTL-7	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation	>0.85 acres	0.12 ac	Forested and scrub shrub wetland; wetland extends beyond the project ROW
WTL-8	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation	>0.12 ac	0.05 ac	Scrub/shrub wetland; wetland extends beyond the project ROW
WTL-9	Likely fill/ and temporary impacts	Wildlife habitat and wildlife watering	> 1.10 ac	0.27 ac	Forested wetland; wetland extends beyond the project ROW
WTL-10	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation	>0.94 ac	0.11 ac	Emergent wetland in recently cleared area that was forest. Portion of wetland has been filled by others. Wetland extends into existing and proposed ROW along SR-52 and continues outside of ROW to south.
WTL-11	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation	>0.10 ac	0.02 ac	Emergent/Shrub-scrub/Forested wetland extends into existing and proposed ROW along SR-52 and continues outside of ROW to north
WTL-12	Likely fill/ and temporary impacts	Wildlife habitat, wildlife watering, and flood attenuation	>1.12 ac	0.05 ac	Half Forested/half Emergent wetland adjacent to recently cleared area that was forest. Portion of wetland has been filled by others. Wetland extends into existing and proposed ROW along SR-52 and continues outside of ROW to south.

Map Label/ Feature Name	Likely Project Impact on Wetland	Primary Functions of Wetland	Wetland Size (acres) (estimated)		Type/ Description of Wetland
			Total Within or Adjacent	Likely Permanently Eliminated or Drained	
WTL-13	Likely none, Temporary impacts possible	Wildlife habitat, wildlife watering, and flood attenuation	0.33 ac	0.0 ac	Emergent/Shrub-scrub/Forested wetland located outside of proposed ROW along SR-52. Adjacent to STR-20.
		Total Acres:	**>7.85**	**2.36**	
*Note-All wetland impacts are the same for both SR-52/Build Alternative interchange options (partial folded and folded diamond options). Source: TDOT, 2015 (*Ecology Report*).					

Build Alternative: A total of 2.36 acres of wetlands are estimated to be permanently impacted (filled or drained) if the Build Alternative is constructed, regardless of which interchange configuration option is constructed at SR-52. Direct impacts to wetlands have been estimated, because the exact ROW and cut and fill lines have not been developed to date. The estimated impact quantity depicts the total acreage for each wetland located inside or near the preliminary ROW boundary shown on the conceptual plans in Appendix A. Efforts would be made during further project design to avoid or minimize impacts as much as possible. Impacts to wetlands located within the cut or fill lines would be mitigated as required by the appropriate permitting agencies.

The drainage patterns of the remaining (unfilled) wetland areas may be affected resulting in localized changes in water levels and vegetation patterns. Efforts would be made during further project design to minimize these effects.

Construction of the Build Alternative would introduce new paved impervious area that would result in increased runoff. Pollutants usually contained in highway runoff include de-icing salts, pesticides, and herbicides used for the control of roadside vegetation. De-icing salts are used relatively sparingly in this area and would not likely impact water quality in the wetland areas.

3.7.3.2 Mitigation of Wetland Impacts

The alignment has been located to avoid wetlands to the extent possible. It is not practical to fully avoid all of the wetlands due to other constraints, including residences and other important social and cultural resources in the vicinity. All practical measures to minimize harm to existing wetlands, such as steepening of slopes to reduce the footprint of the project, minor shifts in the alignment, and other efforts will be made during the final design of the project. In addition, further efforts will be made to minimize impacts to wetlands remaining adjacent to the ROW during project design. This includes efforts to reduce changes in drainage patterns and water levels in those adjacent wetlands that may not be directly impacted by the project, but that may be temporarily and/or indirectly impacted. In addition, the issues of stormwater and where it drains in relation to wetlands will be addressed in the permitting process as part of the Stormwater Pollution Prevention Plan (SWPPP).

Mitigation is required for all wetland impacts that do not meet requirements for general (Aquatic Resource Alteration Permit) ARAP (State of Tennessee) or for certain Nationwide Section 404 permits (USACE). The minimum replacement ratio for wetlands is 2:1 and may be higher depending on hydrogeomorphic analyses or whether optimum mitigation sites are unavailable. The first option for any substantial replacement mitigation is on-site (near the project, and within the watershed). Enhancement of an existing but degraded wetland may also be an option, but higher replacement ratios are generally required. Both the site selection and the mitigation, when proposed, will be subject to the approval of regulatory agencies. In the event that no acceptable mitigation site can be obtained locally, the regulatory agencies may allow mitigation further away, or allow use of credits in a mitigation bank. Mitigation will be performed in accordance with current permitting agency rules and regulations.

3.7.4 Floodplains

Floodplains perform a variety of important natural functions including storage of floodwater, moderation of peak flows, maintenance of water quality, and groundwater recharge. Encroachment significance as defined in 23CFR650.105(q), refers to a highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction- or flood-related impacts: (1) a significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route; (2) a significant risk; or (3) a significant adverse impact on natural and beneficial floodplain values.

The Build Alternative would traverse the 100-year floodplain of a tributary to Summers Branch. Figure 3-8 shows the designated 100-year floodplain within the study area. Ecological values associated with the affected floodplain include overflow floodwater conveyance and storage and a narrow band of riparian vegetation that provides a limited amount of water filtration, shading, bank stabilization, and wildlife habitat. Copies of the Flood Insurance Rate Map (FIRM) panels for Sumner County within the study area are contained in the *Ecology Report* located in Appendix C.

3.7.4.1 Potential Impacts to Floodplains

No-Build Alternative: The No-Build Alternative would not result in any changes to the baseline conditions relative to floodplains.

Build Alternative: Approximately 1.7 acres of floodplain associated with a tributary to Summers Branch would be impacted within the Build Alternative ROW regardless of which of the two SR-52 interchange configuration options are considered. A total of 260 linear feet of floodplain would be crossed by the Build Alternative centerline. It is not anticipated that the small amount of floodplain that would be impacted by the Build Alternative would result in any changes in base flood elevations for any adjacent areas. Also, the crossing would occur at a near-perpendicular angle and does not constitute a longitudinal encroachment.

Figure 3-8. 100-Year Floodplain within the Study Area.

3.7.4.2 Mitigation for Floodplain Impacts

The Build Alternative would be designed to allow adequate conveyance of floodwaters under the roadway and to minimize impacts to current drainage patterns. The roadway would not increase the base flood elevations upstream from the floodplain crossing. Where feasible, precautions will be taken during construction to minimize in-stream work and other stream disturbances that could alter flood flow. All stream work and mitigation measures would be in compliance with EO 11988, *Floodplain Management.* Regulatory floodway encroachments will be coordinated with Federal Emergency Management Agency (FEMA). Impacts to the affected floodplain will be minimized by crossing the floodplain at a near-perpendicular angle, with adequately sized bridges or culverts. TDOT will complete a hydraulic study to ensure that the base flood elevation does not change.

3.7.5 Threatened and Endangered Species

Certain species are given protection under the *Endangered Species Act of 1973* (ESA), as amended. The ESA provides Federal protection for all species designated as *threatened* or *endangered.*

Information from several sources, as well as prior experience with habitats in the area, was used to prepare for field surveys to locate protected species or habitats. These sources included a TDEC Natural Heritage Division database search performed by TDOT on November 14, 2012, and consultation with the USFWS and the Tennessee Wildlife Resources Agency (TWRA). All database searches and field surveys included both plant and animal species. The *Ecology Report* located in Appendix C contains more detailed information regarding protected species, including the TDEC database search.

Three state-listed species and two federally-listed species were documented within a four-mile radius of the project. Table 3.8 contains a listing of the species potentially occurring within the project vicinity.

Although not included in the original TDEC database search or through coordination with the USFWS, the northern long-eared bat (*Myotis septentrionalis*), has recently been added as a federally protected species. The study area is within the range of this species. Northern long-eared bats have similar habitat requirements to the Indiana bat (*Myotis sodalis*) and therefore may also be present in the areas where Indiana bats were previously recorded.

In October 2013, USFWS issued a proposal to list the northern long-eared bat as a protected species under the ESA. On April 1, 2015, the USFWS announced that the northern long-eared bat would be listed as a threatened species under the ESA, primarily due to the threat posed by white-nose syndrome; the listing was effective May 4, 2015. The USFWS also issued an interim special rule on April 1, 2015, that eliminates unnecessary regulatory requirements for landowners, land managers, government agencies, and others in the range of the northern long-eared bat. Comments on the proposed rule will be accepted until July 1, 2015 and the final 4(d) rule is expected to be finalized by the end of the 2015 calendar year.

Table 3.8. Protected Species Potentially Impacted by the Build Alternative.

Species	Status*		Suitable Habitat Present (Y/N)	Species Likely Present (Y/N)	Biological Assessment Required (Y/N)
	Federal	State			
Gray bat (*Myotis grisescens*)	LE	E	Y	Y**	N
Indiana bat (*Myotis sodalis*)	LE	E	Y	Y**	N
Northern long-eared bat (*Myotis septentrionalis)* ***	LT	-	Y	Y	N
Orangefin darter (*Etheostoma bellum*)	-	D	Y	Y	N
Splendid darter (*Etheostoma barrenense*)	-	D	Y	Y	N
Teardrop darter (*Etheostoma barbouri*)	-	D	N	N	N

* Federal Status - LE = Listed Endangered, LT = Listed Threatened;
State Status - E = Endangered, D = Deemed in Need of Management,

** Bat mist net and acoustical surveys were conducted July 2012. No Indiana bats or northern long-eared bats were found, but 12 gray bats were captured. The area provides foraging habitat for gray bats, but no hibernacula or maternity colonies are known to occur in the immediate study area.

*** Northern long-eared bats - The final rule listing the northern long-eared bat as threatened and the interim 4(d) rule were published in the Federal Register on April 2, 2015 and effective May 4, 2015.

Source: TDOT, 2015 (*Ecology Report*); Note: The TDEC Natural Heritage Division database search was completed on November 14, 2012.

3.7.5.1 Federally-Listed Species

Gray bat - The federally-listed endangered gray bat lives in caves year round and breeds from late May to early June. A mist net bat survey and acoustical sampling was conducted from July 9, 2012, through July 15, 2012, and 12 gray bats were captured within the study area. The study area provides suitable foraging habitat for gray bats, but the nearest known gray bat colony resides in Dry Cave, approximately 9.4 miles west of the proposed alignment. Detailed information regarding the bat surveys conducted for the project is contained in the *Indiana Bat (Myotis sodalis) Survey Report* included in Appendix D.

Indiana bat - The federally-listed endangered Indiana bat typically spends its winter months in caves or mines. Bottomland and floodplain forests were once thought to be the most important habitats during the summer, but subsequent studies have shown that upland forest habitats may be equally important. These bats are known to roost, and form maternity colonies, in areas containing trees with loose, peeling tree bark. The young bats stay with the maternity colony throughout their first summer. Some suitable Indiana bat habitat is present within the study area within some of the scattered forest fragments along the proposed route. A mist net bat survey and acoustical sampling effort was conducted from July 9, 2012, through July 15, 2012. The species was not found within the study area. See the *Indiana Bat (Myotis sodalis) Survey Report* in Appendix D.

Northern long-eared bat – The northern long-eared bat typically spends its winter months in caves or mines. During summer, northern long-eared bats roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically greater than three inches in diameter).

As stated previously, the northern long-eared bat was recently listed by the USFWS as a protected species. As such, no formal acoustic survey for this species has been conducted by TDOT to date for this project. However, a bat mist net survey was conducted from July 09, 2012 through July 15, 2012 in the potential suitable habitats for Indiana bats. These same areas would be considered suitable habitat for northern long-eared bats. However, no northern long-eared bats were captured as part of that effort. See the *Indiana Bat (Myotis sodalis) Survey Report* in Appendix D. .

3.7.5.2 State-Listed Species

In a letter dated December 9, 2011, TWRA stated their concerns for three state-listed fish species shown on Table 3.8. TWRA stated that all three of the listed darter species were documented within the West Fork Drakes Creek watershed and its tributaries. A copy of the TWRA coordination letter is included in Attachment D. West Fork Drakes Creek is located approximately two miles east of the proposed study area. However, STR-1, a tributary to West Fork Drakes Creek is crossed by the Build Alternative alignment near the southern termini of the project.

In a letter dated February 25, 2013, the TDEC Natural Heritage Division stated that they anticipated no impacts to known rare species in the vicinity, but noted that there had been few aquatic surveys completed in the affected area and advised TDOT to consider the aquatic resources present in the streams along the project corridor. TDEC also acknowledged that there are some state-listed fishes present in other parts of the Red River Watershed. Most of the streams within the study area, including Summers Branch and its tributaries, are part of the Red River Watershed. A copy of the TDEC letter is included in Attachment D.

Orangefin darter - The orangefin darter occurs only in the upper Green and Barren River watersheds in Kentucky and northern central Tennessee. The West Fork Drakes Creek watershed, including STR-1 crossed by the project, is located within the larger Barren River system. The orangefin darter inhabits fast, rocky riffles of creeks and is locally abundant in small to medium-sized clear streams over gravel substrate. There is only one stream (STR-1) within the project corridor within the range of the orangefin darter, and marginal habitat is present within this stream.

Splendid darter - The splendid darter can be found locally abundant in rocky pools and adjacent riffles of small to moderate streams. It is most common in pools and occasionally occurs along riffle and raceway margins over bedrock, clean gravel, or around large rocks. The range of this species includes the Barren River watershed. As mentioned above, STR-1, a tributary to West Fork Drakes Creek, is within the Barren River watershed. There is marginal splendid darter habitat present within STR-1.

Teardrop darter - The teardrop darter can be found in sandy pools in small to medium streams with slabrock cover in the Barren River watershed. This darter frequently stays close to the stream margin where rocks, overhanging banks, or brush offer cover; it is common only in 2nd, 3rd, and 4th-order streams at depths of less than 1 meter. STR-1 is within the species range since it is within the Barren River watershed. However, this species likely does not occur in

STR-1 within the immediate project corridor due to lack of appropriate habitat in that area. Therefore, no impacts to this species would be expected.

3.7.5.3 Potential Impacts to Threatened and Endangered Species

No-Build Alternative: The No-Build Alternative would not result in any changes to the baseline conditions in regard to threatened and endangered species.

Build Alternative: Although there is suitable habitat present for two state- and three federally-listed species, including three bat species and two darter species, the Build Alternative is not likely to adversely affect populations of those species.

Federally-Listed Species

Coordination letters from the USFWS on November 27, 2012 and July 2, 2014 both stated that "Based on the best information available at this time, we believe that the requirements of Section 7 of the *Endangered Species Act of 1973*, as amended, are fulfilled." However, since the northern long-eared bat became listed after those letters were received, TDOT conducted additional coordination with the USFWS in July 2015 to ensure that Section 7 requirements are met by the project. In a response from the USFWS on July 6, 2015, they stated that the Section 7 clearance for this project would be covered throughout the duration of the NEPA process based on TDOT's commitment to recoordinate all species concerns within two years of project letting. Copies of the USFWS letters and correspondence are included in Attachment D.

Indiana bat - The November 27, 2012, USFWS letter concurred with TDOT's finding of "not likely to adversely affect" the Indiana bat based on the negative mist-net survey results. The July 2, 2014 letter and July 6, 2015 e-mail also acknowledged the negative mist net survey results for the Indiana bat and stated no other concerns for the Indiana bat. Although this project would not likely affect the Indiana bat, in their November 2012 letter, the USFWS recommended clearing and grubbing of trees five inches or greater in diameter during the winter months when Indiana bats are in the hibernacula caves to help further eliminate the possibility of any direct mortality to this species. Additional Indiana bat surveys would be conducted prior to any construction taking place if the Build Alternative is selected.

Northern long-eared bat – In the July 6, 2015 response from the USFWS they concurred with TDOT's determination that this project is "not likely to adversely affect" the northern long-eared bat. This finding was based primarily on no northern long-eared bats being captured during the 2012 bat mist net survey effort, and because there was no acoustic information suggesting this species was present in the project area. Additional northern long-eared bat surveys would be conducted prior to any construction taking place if the Build Alternative is selected.

Gray bat - Letters from the USFWS dated November 27, 2012 and July 2, 2014, acknowledge the occurrence of gray bats. Copies of these letters are included in Attachment D. Although the gray bats forage in the area, there are no known maternity or hibernacula colonies within the study area. USFWS concerns are primarily related to water quality along travel/feeding corridors for gray bats. They further state that best management practices (BMPs), to include stringent erosion and sediment control measures, should be implemented throughout the project to minimize potential for harm to the gray bat. Additional gray bat surveys would be conducted prior to any construction taking place if the Build Alternative is selected.

State-Listed Species

Orangefin darter -Because only marginal suitable habitat is present in STR-1, the orangefin darter is unlikely to be adversely affected by the proposed project with the proper use of BMPs.

Splendid darter - Because only marginal suitable habitat is present in STR-1, the splendid darter is unlikely to be adversely affected by the proposed project with the proper use of BMPs.

Teardrop darter – No suitable habitat is present within the study area for the teardrop darter. Therefore, the proposed project is not expected to have any impact on this species.

As mentioned above, in a letter dated February 25, 2013, the TDEC Natural Heritage Program stated that they anticipated no impacts to known rare species in the vicinity. In a letter dated July 1, 2014, TWRA stated their appreciation that TDOT is addressing their concerns for the state listed species and for the efforts to minimize potential adverse impacts by employing BMPs. Copies of the TDEC and TWRA letters are included in Attachment D.

Based on the field investigations completed for the project, and the analyses conducted as part of the *Ecology Report* included Appendix D, TDOT does not anticipate any substantial impacts to state-listed species. However, TDOT will continue to coordinate with TWRA and TDEC to ensure that all concerns related to potential impacts to state-listed species are addressed.

3.7.5.4 Mitigation for Threatened and Endangered Species Impacts

If any protected species or their habitats are identified as project development continues, they will be addressed in accordance with applicable laws and regulations. If the Build Alternative is selected, additional surveys for the Indiana bat, gray bat, and northern long-eared bat will be completed prior to construction.

In their November 2012 letter, the USFWS recommended clearing and grubbing of trees 5 inches or greater in diameter during the winter months when Indiana bats are in the hibernacula caves to help further eliminate the possibility of any direct mortality to this species. Due to the similar summer habitat requirements for northern long-eared bats, these same recommendations would likely apply to the northern long-eared bat. TDOT will continue to coordinate with the USFWS regarding any tree clearing restrictions for either species before any construction activities are to begin.

Some forests considered to be potential Indiana bat and northern long-eared bat habitat would be permanently removed along the construction corridor. Although no Indiana bats or northern long-eared bats were detected during the 2012 survey effort, should those forests provide habitat for any undetected populations of either of these bats, it is anticipated that there is enough suitable habitat remaining in adjacent areas to provide roosting sites for those individuals should they return to the area during subsequent summer months. As mentioned above, additional surveys will be conducted to determine if either of these species is present prior to construction of the project.

Implementation of BMPs to protect water quality, to include stringent erosion and sediment control measures will minimize impacts to aquatic species, including aquatic insects that provide food for gray bats documented in the study area. BMPs will also help to minimize any impacts to orangefin darters and splendid darters and their potential habitats within and downstream of the study area.

3.7.6 Invasive Species

Executive Order 13112 calls for the prevention and control of invasive species (non-native exotics)[4]. In accordance with *EO 13112*, field surveys in the study area included visual observations for invasive species populations.

No widespread populations of invasive species were observed within the ROW of the Build Alternative. However, small, isolated populations of invasive species were identified in the study area during the field surveys. Some of the most common non-native plant species observed in the proposed project corridor included Japanese honeysuckle (*Lonicera japonica*), sericea lespedeza (*Lespedeza cuneata*), and multiflora rose (*Rosa multiflora*). Isolated populations of other invasive plants are possibly present within the study area as well, but no evidence of widespread infestations was observed during the field surveys.

3.7.6.1 Potential Invasive Species Impacts

No-Build Alternative: The No-Build Alternative would not result in any substantial changes in the baseline conditions of invasive species. Therefore, the scattered populations of invasive species would continue to occur in the general study area. Populations of such species would not be expected to spread rapidly unless other projects that result in major land disturbances are implemented.

Build Alternative: Construction activities associated with the Build Alternative would potentially increase the chance of spreading invasive plant species in the study area, due primarily to soil disturbance and removal of native or other established non-invasive vegetation during construction. Many invasive species thrive in newly disturbed areas and effectively out-compete native and/or non-invasive vegetation before populations can become reestablished. Areas that already contain a population of invasive species are the areas of most concern. Even if no noticeable populations of invasive species occurs in an area, it is possible for seeds from nearby populations to lie idle on the surface awaiting disturbances that remove the native vegetation and allow them to germinate.

3.7.6.2 Mitigation of Invasive Species Impacts

The FHWA has developed guidance to implement *EO 13112*[5]. It provides a framework for preventing the introduction of and controlling the spread of invasive plant species on highway ROWs.

[4] More information regarding EO 13112 and related FHWA guidance is available on the FHWA website at: http://www.environment.fhwa.dot.gov/ecosystems/vegmgmt_row.asp.

[5] For more information regarding FHWA's guidance on invasive species management visit: http://www.environment.fhwa.dot.gov/ecosystems/vegmgmt_rdsduse.asp. This information is based off of the following reference: Bonnie Harper-Lore, editor. *Roadside Use of Native Plants*, Federal Highway Administration, Washington, D.C., 1999. This handbook includes vegetation maps and lists of native trees, shrubs, vines, grasses, and other plants indigenous to each state. In addition, the handbook lists environmental, academic, scientific, and other organizations in each state.

Controlling invasive plants on ROWs can often be a complex effort involving various governmental jurisdictions, adjacent landowners, and the general public. Incorporating elements of the FHWA guidance into planning and implementation of construction, erosion control, landscaping, and maintenance activities, would facilitate the use of BMPs. Key elements of this guidance would include inspection and cleaning of construction equipment, commitments to ensure the use of invasive-free mulches, topsoils, and seed mixes, and eradication strategies to be deployed should an invasion occur.

The following measures would be used to the extent possible to help prevent the introduction and spread of invasive species:

- Native grasses, shrubs, and trees would be planted for beautification purposes or to prevent erosion, wherever needed. Native species would be consistent with local community types;
- Whenever possible, all disturbed soil would be seeded with temporary annual species to reduce the ability of exotics to become established. This would also act to reduce erosion potential during rain events; and
- Consideration would be given to the types and quality of plants and soils at borrow sites. Soil from borrow sites used as study area fill could contain viable plant parts or seeds and could increase the spread of invasive species to new locations.

3.7.7 Geology and Soils

A preliminary geotechnical study was conducted for the proposed project in March 2012 during the alternatives development phase of the project to determine if there were any known geotechnical or geologic conditions along the corridor that would require altering the location of the project. Based on the preliminary review, all potential corridors studied in the 2006 TPR were generally the same from a geotechnical perspective and no geologic conditions were identified that would require altering the location of the project. A copy of the Preliminary Geotechnical Report is contained in Appendix E.

The project is located in the northern portion of Central Tennessee within the Highland Rim Physiographic Region. Geologic maps show the underlying bedrock within the study area to be mostly St Louis Limestone with the Warsaw Limestone Formation outcropping in the southern portion. The St. Louis Formation is a gray, medium- to thick-bedded, cherty, silty limestone. It is very susceptible to sinkholes, caves, solution channels, and other such karst features. The Warsaw Formation is a gray, thin- to thick-bedded, cherty, silty limestone. The Warsaw formation is less susceptible to karst formations. Both Formations weather to produce reddish to yellowish brown silty, clayey soil. Due to the wetlands and ponds observed within and adjacent to the Build Alternative ROW, soft soils may be encountered. No known pyrite or other acid producing rock was identified within the study area.

Subsequent to the completion of the preliminary geotechnical study, more detailed on-site field investigations associated with the *2015 Ecology Report* for the project revealed two potential sinkhole areas that will require further investigation prior to construction. The location of the sinkhole areas is shown on Figure 3.7. A full Geotechnical Investigation will be conducted during the design phase should the Build Alternative be selected. Additional information regarding the sinkholes that are potentially affected by the project is contained in the *Ecology Report* prepared for the project. This report is in Appendix C. The *Ecology Report* contains maps, photos, and detailed data for each feature. Figure 3-7 shows the locations of sinkholes in relation to the proposed Build Alternative.

3.7.7.1 Potential Geology and Soils Impacts

No-Build Alternative: The No-Build Alternative would not result in any changes to the baseline conditions in regard to geology and soils. Agricultural practices within, and surrounding the sinkholes located in the study area would continue to have potential to cause excess nutrients to drain into any solution cavities that may be underlying the area.

Build Alternative: Construction activities associated with the Build Alternative would potentially impact two sinkholes located within and adjacent to the proposed ROW, regardless of which of the two SR-52/Build Alternative interchange options is considered. Additional geotechnical studies will be required during the design phase of the project to determine the extent of the sinkholes and whether any sinkhole treatments would be needed. Treating the sinkholes if required may help to reduce some of the nutrients and other contaminants that could be entering groundwater through the sinkholes due to the farming that takes place within those areas at the present time.

3.7.7.2 Mitigation of Geology and Soils

Soft soils encountered in the ROW may require extra manipulation to obtain the proper moisture range prior to compaction. Additionally, measures may need to be taken to support the road foundation such as installing geotextile fabric with rock fill.

Sinkhole treatments generally involve excavating the sinkhole to find the throat, installing keystone rocks and type IV geotextile fabric, then backfilling with graded solid rock and covering the area with either a geotextile fabric or membrane.

A TDEC *Class V Injection Well Permit* could be required for the possible impacts to sinkholes. This process involves obtaining a permit before the project is let if open sinkholes are known to exist. If other sinkholes are encountered after construction has begun, the appropriate TDOT offices will be notified and the appropriate steps taken to comply with laws, regulations, and permits.

3.8 Cultural Resources

Due to the federal funding involvement, the project must comply with Section 106 of the *National Historic Preservation Act (NHPA) of 1966*, as amended. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. It requires identification of above-ground buildings, structures, objects, or historic sites or below ground archaeological sites within the project's area of potential effect (APE) that are eligible for or listed in the National Register of Historic Places (NRHP).

A project's APE is defined in *36 CFR 800.16 (d)* as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist.

The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

The *U.S. Department of Transportation Act of 1966*, as amended, also requires FHWA to assess the applicability of Section 4(f). Section 4(f) impacts to cultural resources are discussed in Section 3.15.

Section 106 requires consultation with the Tennessee State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), federally recognized Native American tribes that may attach cultural or religious significance to properties within the project study area, and local governments. On September 21, 2012, TDOT mailed letters to the mayors of the City of Portland and Sumner County requesting their participation in the historic review process as consulting parties.

In addition, TDOT mailed letters to the following tribes requesting their participation as consulting parties in the Section 106 process:

- The Cherokee Nation;
- Eastern Band of Cherokee Indians;
- Eastern Shawnee Tribe of Oklahoma;
- Shawnee Tribe;
- Chickasaw Nation;
- Absentee Shawnee Tribe of Oklahoma, and
- United Keetoowah Band of Cherokee Indians.

TDOT received two responses to the initial Section 106 coordination letters. The United Keetoowah Band of Cherokee Indians in Oklahoma provided a response indicating that they had no objection or comment regarding the project. However, they requested that if any human remains or funerary items are inadvertently discovered, that all work cease and that they be contacted immediately. The Mayor of Portland also responded and indicated that the City of Portland would participate as a consulting party in the historic review process. Attachment E of this document contains Section 106-related coordination for this project.

3.8.1 Architectural/Historical Resources

TDOT architectural historians surveyed the proposed study area in 2011 to determine if any properties in the project impact area were either eligible for or listed in the NRHP. The *Historic/Architectural Assessment* dated September 2013 is included in Appendix F.

TDOT also checked the survey records of the Tennessee SHPO to determine if any previous surveys had identified historic properties in the area. The SHPO had previously surveyed parts of the study corridor for the project and found no properties listed or eligible for listing in the NRHP.

Based on the August 2011 field surveys and research, TDOT, in a September 2013 *Historical/Architectural Assessment,* found that no properties within the APE are listed in or eligible for listing in the NRHP.

All consulting and local parties with historic preservation interests, historic groups, and owners of surveyed properties were mailed a copy of the *Historical/Architectural Assessment Report* on October 9, 2013. To date, TDOT has received no responses or comments concerning the report or historic resources.

3.8.2 Archaeological Resources

Pursuant to regulations set forth in *36 CFR Part 800*, TDOT conducted an archaeological resource evaluation of the APE. The study involved a literature search, informant interviews,

field investigation, and shovel testing. The purpose of the study was to identify and determine the spatial limits of archaeological sites within the APE that are listed, eligible, or potentially eligible for inclusion in the NRHP. The *Archaeological Survey Report* dated August 2012 is on file with the TDOT Environmental Division. Appendix G contains the SHPO approval letter and cover page of the *Archaeological Survey Report*.

Field assessment data revealed no archaeological sites within the APE of the Build Alternative, regardless of which of the two SR-52/Build Alternative interchange options is considered. Two new archaeological sites recorded as part of the study, Sites *40SU276* and *40SU277,* were not fully assessed to determine eligibility for listing in the NRHP, because they are outside the APE and would not be impacted. Three nearby cemeteries, *40SU278, 40SU279,* and *40SU280,* are also outside of the APE of the Build Alternative and would be fully avoided by the proposed TDOT undertaking.

3.8.3 Potential Impacts to Cultural Resources

No-Build Alternative: The No-Build Alternative would not result in any substantial changes in the baseline conditions of cultural resources, so no NRHP listed or eligible architectural/historical or archaeological resources would be impacted.

Build Alternative: Construction of the proposed project is not expected to affect any known NRHP listed or eligible architectural/historical or archaeological resources, as none are present in the APE.

In a letter dated October 17, 2013, the SHPO concurred that no architectural/historical resources would be affected by the project. In a letter dated September 27, 2012, the SHPO also agreed with TDOT's determinations that no archaeological sites would be affected, but that site *40SU279*, the Fulghum Cemetery, should be avoided by all ground disturbing activities. Copies of both SHPO letters are included in Attachment E.

3.8.4 Post-Review Discoveries

If the Build Alternative is selected and human remains or historic property is inadvertently discovered during construction, the construction operations will cease in the area of the discovery and procedures under *36 CFR §800.13(2)(b)*, (Post Review Discoveries), and under *T.C.A. 11-6-107* (Discovery of sites, artifacts, or human remains) shall be followed. TDOT cultural resource personnel, the SHPO, and tribal representatives shall be contacted to assess the site and to determine the most appropriate course of action.

3.9 Air Quality

An analysis of the project's potential impacts to the air quality in the study area is required under the *Clean Air Act* (CAA). The CAA was amended in 1977 and most recently in 1990 under the *Clean Air Act Amendments* (CAAA).

The purposes of the air quality analysis conducted for this project were to address the transportation conformity requirements for the project, the potential Mobile Source Air Toxics (MSATs) effects, and the relationship of this project to global climate change. Construction impacts to air quality are also discussed. The *Air Quality Technical Report* is included in Appendix H.

3.9.1 National Ambient Air Quality Standards

The EPA has established allowable concentrations and exposure limits called the National Ambient Air Quality Standards (NAAQS) for various "criteria" pollutants. These pollutants include carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb).

In accordance with the CAAA of 1990, EPA identified areas that did not meet the NAAQS for the criteria pollutants and designated them as "nonattainment" areas. Once a nonattainment area meets the NAAQS, it is redesignated as a "maintenance" area. Areas with concentrations of criteria pollutants that are below the levels established by the NAAQS are considered either attainment or unclassifiable areas.

Sumner County is currently in attainment for all NAAQS.

3.9.2 Transportation Conformity

Transportation conformity is a process required of MPOs pursuant to the CAAA. CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the FHWA be in conformity with the State Implementation Plan (SIP), which represents the State's plan to either achieve or maintain the NAAQS for a particular pollutant. Conformity does not apply to this project since Sumner County is in attainment for the NAAQS.

3.9.3 Mobile Source Air Toxics

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*" This guidance was superseded on September 30, 2009, and most recently on December 6, 2012, by FHWA's "*Interim Guidance Update on Air Toxic Analysis in NEPA Documents*" (FHWA, 2012). The purpose of FHWA's guidance is to advise on when and how to analyze MSATs in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance. Attachment F contains more background information related to MSATs.

The qualitative analysis presented in Section 3.9.5 provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*" (Claggett and Miller, 2006). Additional information regarding MSATs is provided in the *Air Quality Technical Report*.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and
- Projects with Higher Potential MSAT Effects.

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT.

As described previously, the Build Alternative includes the construction of the proposed project on new alignment. Design year 2040 traffic projections for the proposed project are projected to be between 15,690 and 20,020 vehicles per day (vpd). These volumes are substantially lower than the FHWA criterion. As a result, the project is considered to be a "Project with Low Potential MSAT Effects."

3.9.4 Greenhouse Gas Emissions (Climate Change)

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) greenhouse gas (GHG) emissions contribute to this rapid change. Carbon dioxide (CO_2) makes up the largest component of these GHG emissions. Other prominent transportation GHGs include methane (CH_4) and nitrous oxide (N_2O).

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two-thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities could add to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. GHGs trap heat in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

To date, no national standards have been established regarding GHGs, nor has EPA established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO_2 under the Clean Air Act. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the US National Academy of Sciences, and the EPA and other Federal agencies. GHGs are different from other air pollutants evaluated in Federal environmental reviews, because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The *affected environment* for CO_2 and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad scale actions, such as actions involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Furthermore, presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

Under NEPA, detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making. [6] FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the proposed action, as discussed below and shown in Table 3.9, that the GHG emissions from the proposed action would not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 CFR 1502.22(b)). The GHG emissions from the project's Build Alternative would be insignificant, regardless of which SR-52/Build Alternative interchange option is considered, and would not play a meaningful role in a determination of the environmentally

[6] *See* 40 CFR 1500.1(b), 1500.2(b), 1500.4(g), and 1501.7

preferable alternative or the selection of the preferred alternative. More detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)). For these reasons, no alternatives-level GHG analysis has been performed for this project.

Table 3.9. Statewide and Project Emissions Potential, Relative to Global Totals.

Year	CO_2 Emissions, MMT*			Million Vehicle Miles of Travel (VMT)			
	Global[7]	Tennessee Motor Vehicles[8]	Tennessee Contribution to Global Total	Tennessee Statewide	Project Study Area	Change Due to Project	Change in Statewide VMT Due to Project
2015	33,800	38.5	0.114%	72,933	---	---	---
2040	45,500	35.0	0.077%	93,820	88	2	0.003%

*Note: MMT = million metric tons. Global emissions estimates are interpolated from International Energy Outlook 2010, data for Figure 104. Tennessee emissions and statewide VMT estimates are from MOVES2014.

Source: TDOT, 2015 (*Air Quality Technical Report*).

The context in which the emissions from the proposed project would occur, together with the expected GHG emissions contribution from the project, illustrate why the project's GHG emissions would not be significant and will not be a substantial factor in the decision-making. The transportation sector is the second largest source of total GHG emissions in the U.S., behind electricity generation. The transportation sector was responsible for approximately 27 percent of all anthropogenic (human caused) GHG emissions in the U.S. in 2012.[9] CO2 makes up the largest component of these GHG emissions. U.S. CO2 emissions from the consumption of energy accounted for about 17 percent of worldwide energy consumption CO2 emissions in 2011[10]. U.S. transportation CO2 emissions accounted for about 6 percent of worldwide CO2 emissions in 2012.[11]

While the contribution of GHGs from transportation in the U.S. as a whole is a large component of U.S. GHG emissions, as the scale of analysis is reduced the GHG contributions become

[7] These estimates are from the EIA's *International Energy Outlook 2010*, and are considered the best-available projections of emissions from fossil fuel combustion. These totals do not include other sources of emissions, such as cement production, deforestation, or natural sources; however, reliable future projections for these emissions sources are not available.

[8] MOVES projections suggest that Tennessee motor vehicle CO_2 emissions may decrease by 9% between 2014 and 2040; even though VMT increases; this is due to the effect of EPA's GHG emissions standards and tighter fuel economy standards.

[9] Calculated from data in U.S. Environmental Protection Agency, Inventory of Greenhouse Gas Emissions and Sinks, 1990-2012, http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Main-Text.pdf, Table ES-2 (1,739.5 million metric tons/6,525.6 million metric tons)

[10] Calculated from data in U.S. Energy Information Administration International Energy Statistics, Total Carbon Dioxide Emissions from the Consumption of Energy, http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8 (5,490.631 million metric tons/32,578.645 million metric tons).

[11] Calculated from data in EIA figure 104: http://www.eia.gov/forecasts/archive/ieo10/emissions.html (30,480 million metric tons) and EPA table ES-3: : http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Chapter-Executive-Summary.pdf (1,743.4 million metric tons)

quite small. Using CO_2 because of its predominant role in GHG emissions, Table 3.9 above presents the relationship between current and projected Tennessee highway CO_2 emissions and total global CO_2 emissions, as well as information on the scale of the project relative to statewide travel activity.

The values for Tennessee in Table 3.9 were derived from EPA's Motor Vehicle Emissions Simulator (MOVES2014) model[12], and global CO_2 estimates and projections from the Energy Information Administration. As shown, CO_2 emissions from motor vehicles in the entire state of Tennessee are projected to contribute less than one half of one percent of global emissions in 2015 (0.114%). These emissions are projected to contribute an even smaller fraction (0.077%) in Design Year 2040[13]. Vehicle miles traveled (VMT) in the study area in Design Year 2040 represents 0.094% of total Tennessee travel activity; and the project itself would increase statewide VMT by 0.003%. (Note that the study area includes travel on many other roadways in addition to the proposed project.) As a result, for the Build Alternative[14], FHWA estimates that the proposed project could result in a potential increase in global CO_2 emissions in Design Year 2040 of 0.0002% (approximately two ten- thousandths of one percent), and a corresponding increase in Tennessee's share of global emissions in 2040 from 0.0770% to 0.0772%. This very small change in global emissions is well within the range of uncertainty associated with future emissions estimates[15,16].

EPA issued the Federal Notice of Availability for MOVES2014 for official purposes on October 7, 2014. While the use of MOVES2014 was not required for this analysis, it was used instead of MOVES2010b because it incorporates the effects of the most recent greenhouse gas and fuel economy rulemakings since the last MOVES release, as well as updated travel and emissions data and would, therefore, provide more accurate estimates of future emissions and the effects of the project.

[12] http://www.epa.gov/otaq/models/moves/index.htm. EPA's MOVES model can be used to estimate vehicle exhaust emissions of carbon dioxide (CO_2) and other GHGs. CO_2 is frequently used as an indicator of overall transportation GHG emissions because the quantity of these emissions is much larger than that of all other transportation GHGs combined, and because CO_2 accounts for 90-95% of the overall climate impact from transportation sources. MOVES includes estimates of both emissions rates and VMT, and these were used to estimate the Tennessee statewide highway emissions in Table 3.9.

[13] Tennessee emissions represent a smaller share of global emissions in 2040 because global emissions increase at a faster rate.

[14] Selected to represent a "worst case" for purposes of this comparison; the Build Alternative may have a smaller contribution.

[15] For example, Figure 114 of the Energy Information Administration's *International Energy Outlook 2010* shows that future emissions projections can vary by almost 20%, depending on which scenario for future economic growth proves to be most accurate.

[16] When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency is required make clear that such information is lacking (40 CFR 1502.22). The methodologies for forecasting GHG emissions from transportation projects continue to evolve and the data provided should be considered in light of the constraints affecting the currently available methodologies. As previously stated, tools such as EPA's MOVES model can be used to estimate vehicle exhaust emissions of carbon dioxide (CO_2) and other GHGs. However, only rudimentary information is available regarding the GHG emissions impacts of highway construction and maintenance. Estimation of GHG emissions from vehicle exhaust is subject to the same types of uncertainty affecting other types of air quality analysis, including imprecise information about current and future estimates of vehicle miles traveled, vehicle travel speeds, and the effectiveness of vehicle emissions control technology. Finally, there presently is no scientific) methodology that can identify causal connections between individual source emissions and specific climate impacts at a particular location.

3.9.4.1 Mitigation for Global GHG Emissions.

To help address the global issue of climate change, USDOT is committed to reducing GHG emissions from vehicles traveling on our nation's highways. USDOT and EPA are working together to reduce these emissions by substantially improving vehicle efficiency and shifting toward lower carbon intensive fuels.

The agencies have jointly established new, more stringent fuel economy and first ever GHG emissions standards for model year 2012-2025 cars and light trucks, with an ultimate fuel economy standard of 54.5 miles per gallon for cars and light trucks by model year 2025. Further, on September 15, 2011, the agencies jointly published the first ever fuel economy and GHG emissions standards for heavy-duty trucks and buses.[17] Increasing use of technological innovations that can improve fuel economy, such as gasoline- and diesel-electric hybrid vehicles, will improve air quality and reduce CO_2 emissions in future years.

Consistent with its view that broad-scale efforts hold the greatest promise for meaningfully addressing the global climate change problem, FHWA is engaged in developing strategies to reduce transportation's contribution to GHGs (particularly CO_2 emissions) and to assess the risks to transportation systems and services from climate change. In an effort to assist States and MPOs in performing GHG analyses, FHWA has developed a *Handbook for Estimating Transportation GHG Emissions for Integration into the Planning Process*. The Handbook presents methodologies reflecting good practices for the evaluation of GHG emissions at the transportation program level, and will demonstrate how such evaluation may be integrated into the transportation planning process. FHWA has also developed a tool for use at the statewide level to model a large number of GHG reduction scenarios and alternatives for use in transportation planning, climate action plans, scenario planning exercises, and in meeting state GHG reduction targets and goals. To assist states and MPOs in assessing climate change vulnerabilities to their transportation networks, FHWA has developed a draft vulnerability and risk assessment conceptual model and has piloted it in several locations.

3.9.4.2 Summary of GHGs in Relation to the Project Alternatives

This document does not incorporate an analysis of the GHG emissions or climate change effects of each of the alternatives because the potential change in GHG emissions is very small in the context of the affected environment. Because of the insignificance of the GHG impacts, those impacts will not be meaningful to a decision on the environmentally preferable alternative or to a choice among alternatives. As outlined above, FHWA is working to develop strategies to reduce transportation's contribution to GHGs (particularly CO_2 emissions) and to assess the risks to transportation systems and services from climate change. FHWA will continue to pursue these efforts as productive steps to address this important issue.

3.9.5 Potential Air Quality Impacts

For both the Build and No-Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same. The VMT for the No-Build and Build Alternatives was determined for the affected roadway network as shown in Table 3.10.

[17] For more information on fuel economy proposals and standards, see the National Highway Traffic Safety Administration's Corporate Average Fuel Economy website: http://www.nhtsa.gov/fuel-economy/.

Table 3.10. Design Year VMT Projections on the Affected Roadway Network.

Alternative	Year 2040 VMT
No-Build Alternative	235,374
Build Alternative*	242,080
Change	***6,700***
* The VMT for the Build Alternative is the same for both of the SR-52/Portland Bypass interchange options being considered. Source: TDOT, 2015 (*Air Quality Technical Report*).	

As indicated, the projected VMT for the No-Build Alternative is approximately 235,374 miles per day. The VMT for the Build Alternative, regardless of which of the two SR-52/Build Alternative interchange options is considered, is approximately 242,080 miles per day and only about 6,700 miles per day (3%) higher than for the No-Build Alternative. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

Also, regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

No-Build Alternative: The No-Build Alternative would not result in measurable impacts to air quality. However, traffic congestion may become worse by the design year. The slower speeds and longer idling times for vehicles may result in increased emissions in the area than would occur if the area was provided with a new partial access controlled four-lane bypass route around the western side of Portland.

There may be minor adverse impacts to air quality under the No-Build Alternative, because there would be more potential for traffic delays along existing secondary routes in the region as the area continues to grow and traffic volumes increase. The increased congestion on normal routes used by commuters may result in those commuters taking alternate routes and result in increased VMT. Those increases in VMT could result in increased MSATs emissions. However, this impact is not measureable at this time. The projected VMT for the No-Build Alternative is approximately 235,374 miles while the projected VMT for the Build Alternative is approximately 242,080 miles. Therefore, the VMT for the No-Build Alternative is approximately 6,700 miles lower in the design year resulting in only slightly fewer MSATs emissions than the Build Alternative.

Build Alternative: It is expected that the Build Alternative would increase VMT by only about 6,700 miles in the design year. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

Under the Build Alternative there may be localized areas where VMT would increase, and other areas where VMT would decrease. The localized increases in MSAT concentrations would likely be most pronounced at locations near the segments of the proposed project that would be constructed on new alignment. However, even if these increases do occur, they too would be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

Substantial construction-related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the study area.

The forecasted traffic volumes for most projects typically account for any redistribution of traffic that would occur as a result of the project. Therefore, the air quality analysis addresses any indirect traffic-related air quality impacts that might occur. Additionally, the forecasted traffic volumes include expected traffic growth and other planned and programmed projects in the area. As a result, the air quality analysis addresses the traffic-related cumulative air quality impacts of the project.

3.10 Noise

The noise analysis was completed in accordance with FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise, 23 CFR 772* and TDOT's *Policy on Highway Traffic Noise Abatement* effective July 2011. More details regarding the noise study for the project are contained in the *Noise Technical Report for State Route 109 Portland Bypass*. This report is in Appendix I.

3.10.1 Fundamentals of Sound and Noise

The intensity or loudness of sound is measured in units called decibels (dB). However, because the human ear does not hear sound waves of different frequencies at the same subjective loudness, an adjustment or weighting of the high-pitched and low-pitched sounds is made to approximate how an average person hears sounds. When such adjustments to the sound levels are made, they are called "A-weighted levels" and are labeled "dBA". Figure 3-9 shows some common indoor and outdoor sound levels.

Noise is defined as unwanted sound. Since highway traffic sound is normally unwanted, it is usually called highway traffic noise. The level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level (L_{eq}) is the statistical descriptor used in a noise impact analysis. The L_{eq} sound level is the steady A-weighted sound level, which would produce the same A-weighted sound energy over a stated period of time.

3.10.2 Criteria for Determining Impacts

FHWA regulations establish Noise Abatement Criteria (NAC) that are used to determine if noise-sensitive land uses would be impacted by a project. The regulation requires that noise abatement be evaluated for noise-sensitive land uses when predicted traffic noise levels, using future traffic volumes and roadway conditions, approach or exceed the NAC shown in Table 3.11. TDOT's Noise Policy defines "approach" as one decibel below the NAC, or 66 dBA for Category B and C land uses.

Figure 3-9. Typical Sound Levels for Common Indoor and Outdoor Noises.

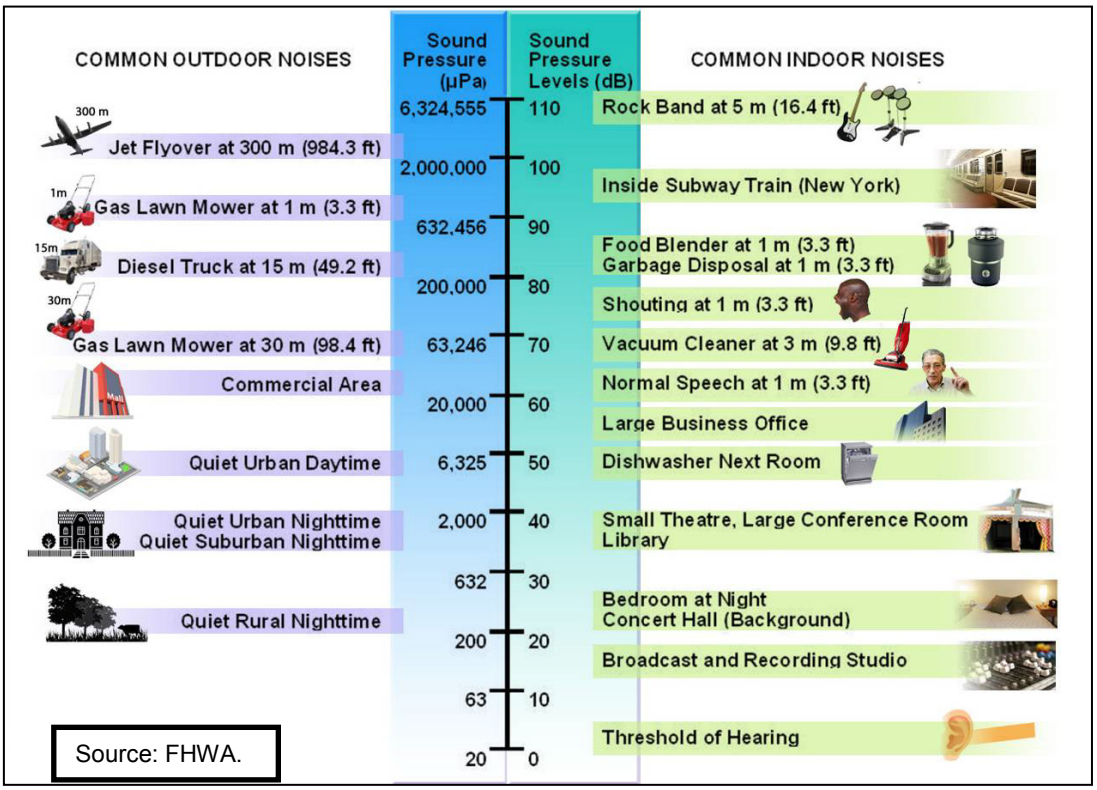


Table 3.11. FHWA Noise Abatement Criteria in 23 CFR 772.

Activity Category	$L_{Aeq(1h)}$	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 sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care 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, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, 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.

Activity Category	$L_{Aeq(1h)}$	Evaluation Location	Activity Description
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. Source: TDOT, 2015 (*Noise Technical Report for SR-109*).			

The FHWA regulations and TDOT's noise policy also define impacts to occur if there is a substantial increase in design year sound levels over existing sound levels. Table 3.12 presents TDOT's criteria to define substantial noise increase.

Table 3.12. Substantial Noise Level Increase.

Existing Noise Level (dBA) [(1)]	Subjective Descriptor
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
Source: TDOT, 2015 (*Noise Technical Report for SR-109*).	

3.10.3 Identification of Noise-Sensitive Land Uses

Review of available electronic mapping and field reconnaissance revealed twelve areas that might be impacted by the project. These areas are called noise analysis areas (NAAs). The NAAs are shown on Figure 3-10. Eleven areas contain Category B residential uses, while NAA 7 includes athletic fields that are Category C land uses. Noise impacts will be identified and noise abatement will be considered if design year sound levels at these uses are 66 dBA or higher. Impacts will also be identified if there is a substantial increase in existing sound levels.

3.10.4 Determination of Existing Sound Levels

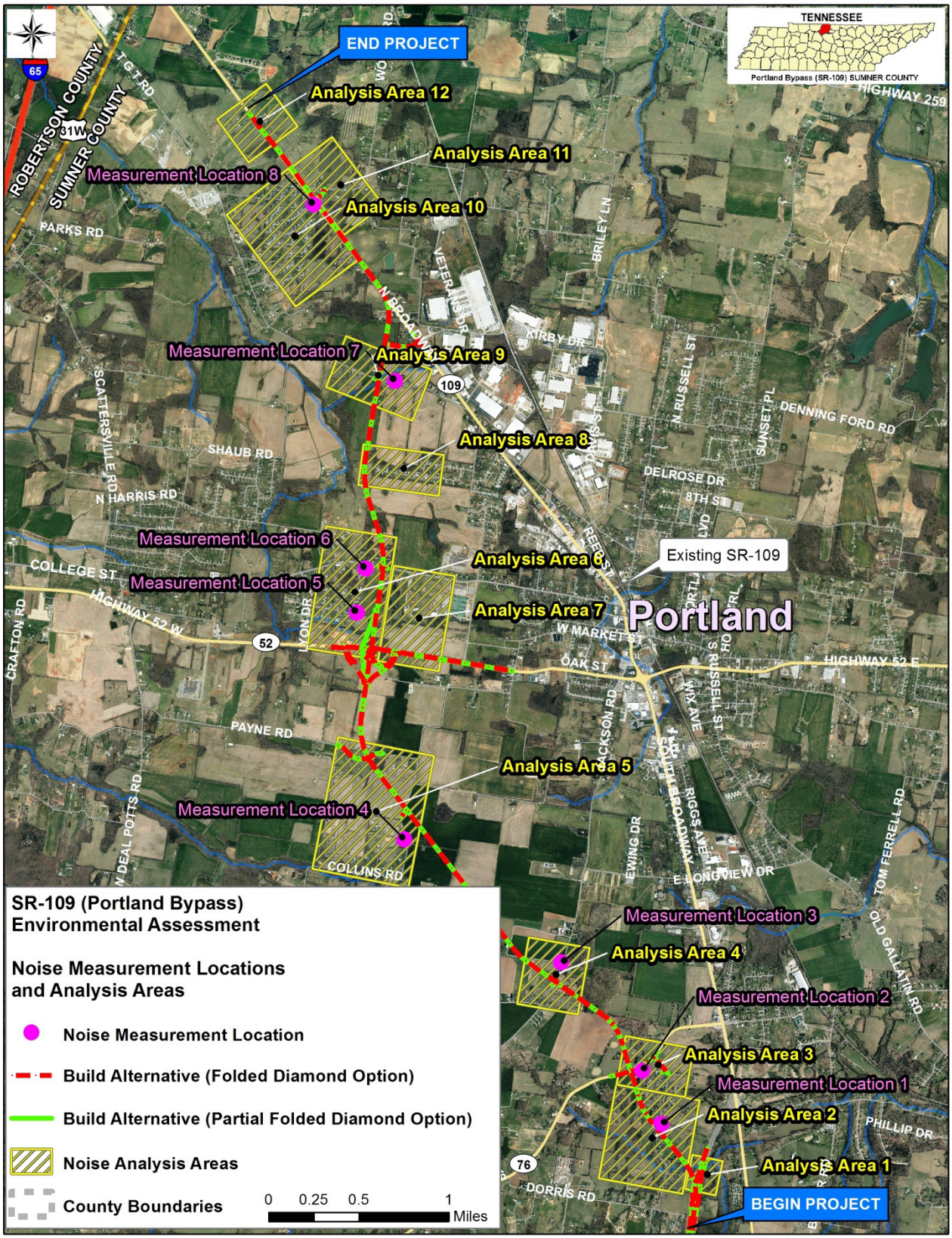
Noise measurements were conducted at several residences in the study area to characterize the existing noise environment. Existing peak hour sound levels at the measurement locations range from 40 dBA to 66 dBA depending on the proximity of the location to existing SR-109 and other local roadways. Figure 3-10 shows the locations of the noise measurements. Table 3.13 shows the existing noise measurements at several locations within the study area.

Table 3.13. Existing Sound Levels at Measurement Locations.

Noise Measurement Location ID	Measurement Location	Noise Analysis Area	Distance to Build Alternative (feet)*	Time Period**	L_{eq} (1h) (dBA)	Peak Hour L_{eq} (1h) (dBA)***
1	191 Dorris Road	3	230	3:41-4:01 PM	49	50
2	106 Dorris Road	3	280	4:12-4:37 PM	51	51
3	570 Jackson Road	4	390	2:50-3:10 PM	59	61
4	272 Collins Road	5	680	2:08-2:28 PM	40	42
5	208 Lyon Drive	6	520	1:30-1:45 PM	49	51
6	100 Lyon Drive	6	480	1:16-1:50 PM	54	56
7	123 TGT Road	9	400	12:36-12:56 PM	50	52
8	101 Kenwood Drive	10	90	4:00 5:00 PM	66	66

* From proposed edge of pavement.
** All noise measurements were collected on February17, 2013
*** Peak hour adjustments based on sound levels at reference microphone.
Source: TDOT, 2015 (Noise Technical Report).

Figure 3-10. Noise Analysis Areas and Existing Sound Level Measurement Locations.



Build Alternative: The predicted sound levels for each NAA for the Build Alternative are summarized in Table 3.14. As noted previously, a location is impacted if 1) the predicted worst hour noise level approaches or exceeds the NAC, or 2) there is a substantial increase in design year noise levels above existing noise levels. A total of 29 residences in eight NAAs are predicted to be impacted regardless of which design option is considered for the SR-52 interchange. The residences in NAAs 1 and 4, and the Portland High School Athletic Fields in NAA 7 are not predicted to be impacted.

Noise Impacts due to a substantial increase in existing sound levels only are predicted in NAAs 2, 5, and 8, where background sound levels are low and where the new alignment will not be close. Noise Impacts based on the NAC only (sound levels at or above 66 dBA) are predicted in NAAs 10, 11, and 12, where residences are close to existing SR-109. As indicated in Table 3.14, the project would actually reduce sound levels for some residences in NAA 10 due to the shifting of traffic from existing SR-109 to the Build Alternative.

Table 3.14. Impact Determination Analysis, Design Year 2040, Build Alternative.

Noise Analysis Area	Design Year Sound Levels (dBA)	Sound Level Increase(s) (dBA)	Impacted due to Substantial Increase?	Impacted Based on NAC?	Number of Impacts
1	60	4	0	0	0
2	55 - 65	4 - 14	1	0	1
3	56 - 67	5 - 16	6	2	6
4	52 - 63	2 - 9	0	0	0
5	49 - 57	9 - 17	3	0	3
8	55 - 62	13 - 20	4	0	4
9	53 - 68	1 - 16	1	1	1
10*	56 - 69	-4 - 5	0	9	9
11	58 - 70	3 - 6	0	3	3
12	71	5	0	1	1
Build Alternative with Partial Folded Diamond Interchange at SR-52					
6	52 - 69	1 - 11	1	1	1
7	53	2	0	0	0
Build Alternative with Partial Folded Diamond Interchange at SR-52					
6	52 - 69	1 - 11	1	1	1
7	54	3	0	0	0
			Total** (Same for both Interchange Options)**:		***29***

* Design year sound levels at residences between 898 and 906 North Broadway (SR-109) would actually be reduced with the project.

Source: TDOT, 2015 (*Noise Technical Report for SR-109*).

Noise Impacts due to the NAC as well as a substantial increase in existing sound levels are predicted in NAAs 3, 6, and 9, where sound levels are low and the new alignment will be close to some residences. The only residence that is predicted to be impacted in NAA 6 is at 631 College Street. This residence is currently located approximately 100 feet from the proposed ROW on the functional plans. However, this residence is not impacted due to a substantial increase in sound levels because existing sound levels in are approaching 60 dB due to local traffic on Old Highway 52 (College Street).

The only residence that is predicted to be impacted in NAA 9 is at 129 TGT Road. This residence is predicted to be impacted due to both a substantial increase in sound levels and the NAC because the residence is currently located approximately 25 feet from the proposed ROW on the functional plans and the existing sound level is 52 dBA.

3.10.5 Mitigation of Noise Impacts

3.10.5.1 Noise Abatement Evaluation

Abatement is generally evaluated when impacts are predicted to occur. Noise barriers were evaluated to reduce sound levels for impacted land uses. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT's Noise Policy.

As outlined in TDOT's Noise Policy, noise barriers are not reasonable for isolated residences, since the required area per benefited residence would greatly exceed the allowable area for benefited residence.

The following impacted residences are isolated:

- 225 Dorris Road, NAA 2;
- 901 Payne Road, NAA 5;
- 621 College Street, NAA 6;
- 129 TGT Road NAA 9; and
- 1025 N Broadway, NAA 12.

Therefore, noise barriers for NAAs 2, 6, 9, and 12 are not reasonable.

NAA 5 also includes two impacted residences on Collins Road that are not isolated.

Noise barriers were evaluated for feasibility and reasonableness for NAAs 3, 5, 8, 10, and 11. Because the impacted residences in NAAs 10 and 11have access to SR-109 via a private driveway or an adjacent intersecting local road, noise barriers for these areas are not feasible. Noise barriers for NAAs 3, 5, and 8 are considered to be acoustically feasible, so a determination was needed as to whether they were reasonable.

In order for a noise barrier to be reasonable, the following conditions must be met:

- TDOT's noise reduction design goal must be achieved;
- The required noise barrier area per benefited residence must be less than or equal to the allowable area per benefited residence; and
- The benefited residents and/or property owners must support the construction of the noise barrier.

The noise reduction design goal can be achieved for all three areas. Therefore, the required area per benefited residence was compared to the allowable area per benefited residence for each area to determine if the second reasonableness criteria could be met. The results are presented in Table 3.15. As indicated, the area per benefited residence is higher than the allowable area per benefited residence for all three areas. Therefore, noise barriers for these NAAs are not reasonable in accordance with TDOT's Noise Policy.

Table 3.15. Noise Barrier Reasonableness Analysis.

Area	Length (ft.)	Average Height (ft.)	Barrier Area (sq. ft.)	Benefited Residences	Area Per Benefited Residence (sq. ft.)	Allowable Area Per Benefited Residence (sq. ft.)	Reasonable Yes/No
3	1,465	14	20,650	4	5,163	1,900	No
5	3,500	17	60,400	8	7,550	1,900	No
8	1,750	13	23,000	7	3,286	1,900	No
Source: TDOT, 2015 (*Noise Technical Report for SR-109*).							

Conclusion: Noise barriers are not likely to be constructed for this project. However, the noise analysis was based on functional project plans. Final noise abatement decisions will be made based on an updated evaluation using the final design plans for the project. This evaluation will likely be conducted as part of the ROW or construction reevaluation for the project.

3.10.5.2 Information for Local Officials

There are tracts of undeveloped land adjacent to SR-109. TDOT encourages the local governments with jurisdiction over these lands as well as potential developers of these lands to practice noise compatibility planning in order to avoid future noise impacts. The following language is included in TDOT's Noise Policy:

> *"Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized."*

Table 3.16 presents design year sound levels for areas along the proposed project where vacant and possibly developable lands exist. Noise predictions were made at distances between 100 and 400 feet from the pavement edge of the near travel lane for the design year 2040. As indicated, sound levels within approximately 100 feet of the Build Alternative would approach or exceed the NAC of 67 dBA. Noise-sensitive land uses should generally not be constructed in these areas unless noise mitigation measures are provided.

The values in Table 3.16 do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels would vary with changes in terrain and would be affected by the shielding of objects such as buildings. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development would be compatible with these levels.

Any Type II project (construction of noise abatement on an existing highway) proposed in the future will not be eligible for Federal aid participation in accordance with 23 CFR §772.15(b).

Table 3.16. Design Year 2040 Sound Levels for Undeveloped Lands.

Distance from SR-109[(1)]	L_{eq} (1h) (dBA)[(2)]
100 feet	67
200 feet	62
300 feet	58
400 feet	56

[(1)] Perpendicular distance to the pavement edge of the near travel lane
[(2)] At-grade situation
Source: TDOT, 2015 (*Noise Technical Report for SR-109*).

3.11 Hazardous Materials

3.11.1 Hazardous Materials Background Information

TDOT conducted a site review and database search in December 2014 to determine whether the condition of properties within or adjacent to the study area indicated that hazardous substances or petroleum products may be present from past releases or land uses.

The site review and database search included reviews of aerial photographs, the EPA *Envirofacts* website[18], TDEC's Superfund Database and List of Underground Storage Tank (UST) Facilities, and a visual assessment of properties within and adjacent to the study area.

Based on this site investigation and known historical information, none of the properties within the ROW or 500-foot study area of the Build Alternative had any evidence of environmental concerns related to hazardous or toxic materials. No USTs were identified in the immediate study area. A copy of the hazardous materials coordination and summary is included in Appendix J.

3.11.2 Potential Impacts to Hazardous Materials Sites

No-Build Alternative: The No-Build Alternative would not result in any noticeable changes from the baseline conditions in relation to hazardous materials sites. There would be a slight increase in risks related to transportation of hazardous materials through the downtown Portland area as traffic volumes continue to gradually increase. There is a remote possibility that some trucks involved in these crashes could be carrying hazardous or toxic materials. For this reason, the No-Build Alternative would result in a slight increase in safety concerns related to hazardous materials when compared to the Build Alternative, which would shift a large number of trucks around the downtown area and provide their drivers with a safer roadway meeting modern design standards.

Build Alternative: The Build Alternative is not expected to result in any impacts to known hazardous materials sites or other EPA-regulated facilities in the region, regardless of which of the two SR-52/Build Alternative interchange options is considered.

[18] EPA's *Envirofacts* website is located at: http://www.epa.gov/enviro/index.html.

The Build Alternative is anticipated to provide a safer, more efficient route for transporting materials around the downtown Portland area, instead of through the area as would continue to occur under the No-Build Alternative.

There are several structures, including 13 residences, three businesses, and two bridges. The residences and businesses are shown on the marked-up plans included in the CSRP located in Attachment C. The impacted bridge structures are located at the SR-52 and TGT Road crossings within the proposed ROW of the Build Alternative. If any of these structures require partial or full demolition, Asbestos-containing Materials Surveys, with possible abatement activities, would be required prior to demolition in accordance with TDOT Roadway Design Division's *Instructional Bulletin NO. 14-17*, regarding hazardous materials surveys. A copy of the *Instructional Bulletin NO. 14-17* is included in Appendix J.

3.11.3 Mitigation for Hazardous Materials Sites

If any previously undocumented hazardous waste sites are encountered within the proposed ROW they would be remediated in accordance with the applicable sections of the *Federal Resource Conservation and Recovery Act* (RCRA), the *Federal Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), and the *Tennessee Hazardous Waste Management Act of 1983*. All project related activity that involves USTs would adhere to the *Tennessee Petroleum Underground Storage Tank Act of 1998* (Tennessee Code Annotated, section 68-215-101 et seq.) and the rules set forth by TDEC's *Underground Storage Tank Program* (Tennessee Code Annotated section 68-215-201 et seq).

For all structures, including residences, businesses, and bridges requiring partial or full demolition, TDOT would conduct Asbestos-containing Materials Surveys, with possible abatement activities in accordance with TDOT Roadway Design Division's *Instructional Bulletin NO. 14-17*, regarding hazardous materials surveys. A copy of the *Instructional Bulletin NO. 14-17* is included in Appendix J.

3.12 Pedestrians and Bicyclists

The November 2009 Nashville Area MPO's *Regional Bicycle and Pedestrian Study* and the Sumner County Regional Planning Commission's "*2035 Comprehensive Plan: Sumner County's Blueprint to the Future*" both contain information related to the existing and proposed Sumner County pedestrian and bicycle accommodations.

Due to the somewhat rural setting of the study area, there are no roadways being crossed by the proposed Build Alternative that have designated bicycle lanes. There are also few roadways with sidewalks that would be impacted by the project. Pedestrians and bicyclists are allowed to use existing roadways, but there are limited shoulders provided in most areas so they must use the existing traffic lanes or the unpaved shoulders.

Although there are currently no bicycle lanes along SR-52, the roadway is designated as a bike route, because it provides shoulders that are considered wide enough to provide a safe route for bicyclists traveling east/west through the area. In addition, the recently widened section of SR-109 between SR-76 and SR-52 now contains adequate shoulders and sidewalks to accommodate bicycles and pedestrians traveling through the area.

Sidewalks will be considered for inclusion along a portion of SR-52 that is proposed to be widened as part of the overall Build Alternative. Sidewalks constructed between West Market Street and Searcy Lane would correspond with existing and planned sidewalks within the City of Portland. Final plans for sidewalks will be determined during the final design phase in coordination with local officials.

3.12.1 Potential Impacts to Pedestrians and Bicyclists

No-Build Alternative: The No-Build Alternative is not expected to result in any substantial changes to the existing pedestrian and bicyclist facilities in the area. Pedestrian and bicycle safety would continue to be an issue through the downtown Portland area due to the existing roadway deficiencies, including lack of shoulders for bicycles to utilize. As traffic volumes gradually increase, safety issues for pedestrians and bicyclists in the area may continue to decline.

Build Alternative: The Build Alternative is not expected to sever any existing or proposed pedestrian or bicycle routes in the study area. Opportunities to include sidewalks along the proposed widened section of SR-52 will be evaluated in coordination with local officials. Construction of sidewalks could improve pedestrian safety in the area, especially for students walking to and from the nearby schools.

The typical section of the Build Alternative would have 12-foot stabilized outside shoulders (10 feet paved, 2 feet gravel). These dimensions are illustrated on the typical sections included in the preliminary functional plans attached as Appendix A. This would allow adequate space for pedestrian and bicycle use along the Build Alternative. Although speeds along the new roadway would be higher than along the existing SR-109 through downtown Portland, it is expected that the new roadway would provide a safer route for bicyclists through the area. This is because the shoulders of the new roadway would allow for more separation between the bicyclists and vehicles. In addition, removing traffic from the existing route through downtown Portland would also improve the safety for pedestrians and bicycles that continue to use that section of the roadway.

3.13 Visual Quality

A visual impact assessment was conducted to evaluate the positive and negative visual effects of the project on the area's visual resources. A visual assessment describes the existing visual character, visual quality, visually sensitive resources, and the viewers of the study area. These elements are discussed and evaluated in the following sections.

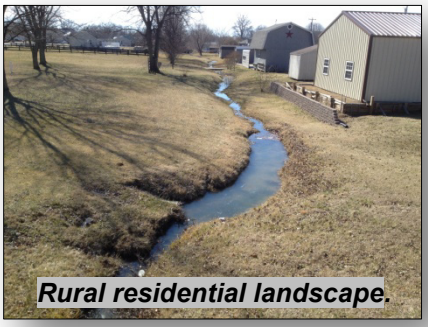
3.13.1 Visual Character

The visual character of an area consists of a combination of physical, biological, and cultural attributes that make a landscape identifiable or unique. The existing visual landscape of the study area can be described as predominately rural with pockets of scattered residential and commercial development.

Within this rural landscape, there are several other subcategories or landscaping units. These landscaping units are rural residential, rural suburban, natural, and agriculture. The landscaping units comprising the project are relatively large and remain consistent in their visual quality throughout their reach.

A description of each of the landscape units is provided below:

Rural Residential: This landscape unit consists of an interweaving of agriculture and residential land uses, which can be found throughout much of the study area. The landscape in the study area consists of modern buildings interspersed with farmland, scattered residences, and farm buildings. This area does not contain densely populated neighborhoods. This development is typical of the built-up areas found around small towns and does not indicate visual sensitivity or unique visual importance.



Rural residential landscape.

Rural and Suburban: This landscape is comprised of more densely populated rural and commercial areas. This landscape unit is a result of land being converted from the rural agriculture landscape unit to medium-density suburban neighborhoods and commercial and small industrial developments.

Commercial and industrial development is clustered around the existing SR-109 and SR-52 within the City of Portland and adjacent areas. There are more densely populated residential areas along Dorris Road, College Street, TGT Road, Kenwood Drive, and Woods Road.

Rural and suburban landscape.

Natural: The visual environment within a small portion of the study area falls into this landscape unit. Interspersed between the rural agriculture and agricultural tracts are tracts of isolated forested land. These areas consist of streams, wetland, and native vegetation. The visual sensitivity is considered low due to a loss of connectivity and an isolated pocketed appearance from encroaching residential/ commercial development and farming activities. There are small forest tracts remaining south of Payne Road, south of Jackson Road, near SR-52, and north of College Street.

Natural landscape.

Agriculture: This landscape is comprised, to a large degree, of open fields used for row crops, pastures, and fallow crop fields. Scattered between these fields are residences and farm buildings. The landscape is generally intact with a medium degree of unity. The visual sensitivity of this landscape is considered low since the components are relatively common in rural areas and do not generally combine in striking and distinctive visual patterns.

Agricultural landscape.

3.13.2 Visual Quality and Visually Sensitive Resources

The visual quality of a landscape relates to the relative excellence of a visual experience. The visual quality of the study area has been evaluated using three criteria recommended by FHWA in their 1981 publication, *Visual Impact Assessment for Highway Projects: Vividness, Intactness, and Unity*. All three criteria must be high for the landscape to be given a high quality rating. Vividness refers to the visual power or memorability of the landscape components as they combine to form striking and distinctive patterns. Intactness refers to the visual integrity of the landscape. The fewer the number of encroaching (out-of-character) elements, the higher the visual integrity. Unity refers to the visual coherence and compositional harmony of the landscape when it is considered as a whole.

Visually sensitive resources are those that are visually important for historic, architectural, recreational, or community associations. Noteworthy natural features that are visually important can also be categorized as visually sensitive resources.

There are no officially designated scenic areas within the study area, and the existing SR-109 does not have a scenic byway designation.

3.13.3 Viewer Groups

Viewer groups in the study area fall into two main categories: persons with a view of the surrounding area from the new roadway and persons with a view of the new roadway from the surrounding area. Viewer response to the visual quality of an area is evaluated by considering differing viewer groups and the number of viewers in a particular group, the duration and frequency of their exposure, their distance from the road, and their level of sensitivity, which is their activity or purpose as they use the road.

Those viewers who would be traveling though the study area include:

- The local user, who has long-term familiarity with the area's visual resources and will be acutely aware of changes;
- The commuter, who is somewhat less aware of his or her surroundings, due to the repetitive nature of the activity; and
- The tourist or traveler, who generally has a high awareness of visual resources, yet is less sensitive to specific changes in an unfamiliar environment.

Viewers of the SR-109 corridor include local residents, both from their homes, and from their vehicles as they travel the roadway to local destinations; employees and customers commuting to and from commercial/industrial areas within the City of Portland and surrounding communities; and tourists that may be passing through the area to get to the primary attractions in other parts of Tennessee (including Nashville) and Kentucky, or beyond.

3.13.4 Potential Visual Impacts

Visual impacts can be defined as changes to the visual landscape. Visual impacts can be categorized as minimal, moderate, or high.

Levels of Visual Impact

Minimal—Existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources, and the proposed project would introduce few, if any, noticeable changes to the viewshed.

Moderate—Changes are made to the existing viewshed that would be noticeable, but not substantial; and/or visually sensitive resources would undergo a noticeable change in view.

High—Substantial changes are made to the existing viewshed that would result in a greatly changed view; and/or visually sensitive resources would undergo a substantial change in view.

No-Build Alternative: The No-Build Alternative is not expected to result in changes to the existing visual quality in the area. The No-Build Alternative would not add or remove new transportation elements to the visual setting of the study area. The No-Build Alternative would not directly change the form, character, or quality of the visual environment in the study area. The expected shift from rural to commercial, residential, and industrial development would alter the rural character of the landscape over time.

Build Alternative: Regardless of which SR-52/Build Alternative interchange option is considered, the proposed project is not expected to result in substantial changes to the overall visual quality of the area when compared to the No-Build Alternative. The Build Alternative would introduce a new roadway, associated interchange ramps and structures, and other minor modifications and connections to existing local roads. However, no areas of high visual quality or visually sensitive resources exist in the study area. The visual setting in the study area has already been disrupted by man-made developments, roadways, and clearing of natural vegetation for agriculture. Additional loss of open space is expected to occur with or without the project being constructed due to continued growth of the area.

The study area lacks visually sensitive resources. The existing vegetation within the proposed ROW, which consists mostly of open cropland, fallow fields or old fields, and small forest fragments, would be lost. Due to loss of vegetation and addition of the roadway infrastructure, some residents living near the study area would have their viewshed altered by the new roadway. Local users and commuters of the new roadway would notice the changes to the viewshed, but the changes would not be substantially different from existing views in most areas.

The overall visual impacts to residents and travelers in the area would be considered minimal in the areas where existing roads and development is visible, to moderate in the most rural residential portions of the study area. The primary rural residential areas are located north of College Street to TGT Road, and between Jackson Road and SR-52. However, the existing viewsheds in most of those areas are primarily agriculture with scattered natural areas. Roads and or other development are visible in most of the study area, including the most rural portions of the study area.

3.14 Energy

3.14.1 Energy Considerations

The amount of energy required to construct a highway project of this type can be substantial, but it generally leads to reduced operating costs once the proposed project is completed and for an extended period beyond the design year. A reduction in costs and energy use can often be achieved from improved access, reduced travel time, and increased safety (i.e., fewer crashes that delay traffic and require emergency services).

3.14.2 Potential Energy Impacts

No-Build Alternative: The No-Build Alternative would potentially result in long-term adverse impacts to energy in terms of decreased fuel efficiency and increased fuel consumption due to continued decreases in LOS along existing SR-109 in downtown Portland, and secondary routes in the area normally used to bypass downtown Portland. Safety issues could result in more traffic delays and increased fuel consumption. These impacts would gradually become more of an issue as the area continues to grow and more traffic volume is introduced to the area.

The projected VMT for the No-Build Alternative is approximately 235,374 miles while the projected VMT for the Build Alternative is approximately 242,080 miles. Therefore, the VMT for the No-Build Alternative is approximately 6,700 lower in the design year. Fewer miles traveled could result in slightly less fuel consumption, based on miles traveled, than the Build Alternative. However, the decreased LOS, increased safety risk due to increased congestion, and decreased travel efficiency under the No-Build Alternative would likely offset any fuel consumptions savings from the lower VMT.

Build Alternative: The energy that would be used by the proposed project is characterized as follows:

- Construction - Energy would be used for the manufacturing and transport of the construction materials and by the heavy equipment used for roadway and bridge construction. Traffic delays could accompany the construction activities and could result in temporary increases in energy use.

- Maintenance - The project would require routine maintenance that would result in energy use. Traffic delays could result from maintenance activities and cause temporary increases in energy use.

- Motor Vehicle Use - Improved traffic flow and reduced travel time could decrease existing energy use. The Build Alternative would have potential to reduce energy consumption in the area by providing a more efficient route through the Portland area regardless of which of the two SR-52/Build Alternative interchange options is considered. Even though overall VMT is expected to have a slight increase when compared to the No-Build Alternative, overall fuel consumption would likely not differ substantially between the alternatives due to the more efficient travel through the area.

In summary, the amount of energy required to initially construct the Build Alternative could be substantial, but would be temporary. It is anticipated that the new roadway would lead to reduced operating costs once the project is completed. A long-term reduction in costs and energy use should result from improved access, reduced travel time, and increased safety.

3.15 Section 4(f) Properties

According to Section 4(f) of the *Department of Transportation Act of 1966*, and recodified as 4*9 United States Code Section 303*, the Secretary [of Transportation] shall not approve any program or project which requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of National, State, or local significance as so determined by such officials unless:

- There is no feasible and prudent alternative to the use of such land; and
- The project includes all possible planning to minimize harm to the land resulting from such use.

The project would not involve a use of Section 4(f) properties, as none exist in the study area.

3.16 Section 6(f) Involvement

Section 6(f) of the *Land and Water Conservation Fund Act (LWFCA) of 1965* (16 U.S.C. 4601-4) established a funding source for both federal acquisition of parks and recreation lands and matching grants to state and local governments for recreation planning, acquisition, and development. The project would have no involvement with lands purchased or facilities developed with Section 6(f) funds.

3.17 Construction Impacts

Roadway construction activities typically involve some level of inconvenience through disruptions to residents, businesses, and travelers. Adverse impacts from construction projects are short term in duration and include inconveniences such as noise, dust, and traffic conflicts, along with temporary increases in soil erosion and siltation in downstream watercourses. The primary construction impacts for the Build Alternative would be associated with grading activities and use of heavy equipment and trucks used to transport materials to and from the area.

The Build Alternative would be constructed primarily on new ROW, which would help to minimize impacts to existing infrastructure such as utilities and existing roadways. It is anticipated that most of the local roadways would remain open to traffic throughout the construction phase, with minor lane restrictions or possible short-term closures in some areas.

3.17.1 Potential Construction Impacts

No-Build Alternative: The No-Build Alternative would not have any physical construction-related impacts. However, future impacts may occur from maintenance work on the existing highway.

Build Alternative: Construction of the Build Alternative, regardless of which SR-52/Build Alternative interchange options is considered, would have several short-term adverse impacts. The following resources would be impacted:

- *Infrastructure*: The proposed project may result in temporary disruptions in utility service and gas pipeline operations as utilities are relocated or service is halted for safety purposes while construction activities are in progress.

- *Community Impacts*: The local community would be disrupted during the construction phase due to the construction activities. However, because this project would be constructed primarily on new alignment, many of the construction related impacts would not substantially inconvenience the local community or residents. Residents living near the construction area would be most impacted by construction noise, dust, and visual impacts.

  Primary impacts to the community as a whole would be due to traffic related issues, such as traffic delays and detours. These delays could temporarily impact response times for emergency vehicles. However since the existing routes would likely remain open during construction of the proposed project, this impact is not expected to be substantial.

- *Natural Resources*: Short-term adverse impacts to fish and wildlife could result from construction activities. Noise impacts could alter wildlife behavior and inhibit mating, breeding, nesting, and feeding/foraging activities. Construction activities could result in direct mortality to less mobile terrestrial and aquatic species.

  Short-term adverse impacts to aquatic resources would include interruption or modification of stream flow during construction, and water quality impacts associated with site preparation, grading, and construction activities. Other short-term adverse impacts would include increased sediment loading, disruption of bottom substrates and associated macroinvertebrate communities, and removal of tree cover and riparian vegetation resulting in increased erosion and habitat loss.

  Contaminant runoff from construction equipment and materials may adversely affect water quality. Construction-related impacts would be temporary and any affected aquatic communities would be expected to recover after construction had ceased. The degree of impact would vary depending on the width and depth of the stream, the distance of the stream to the primary construction or grading activities, the steepness of the newly established streambanks, and the typical level of flow within the stream.

  Short-term construction impacts to wetlands would include increased sediment loading and contaminant runoff from construction activities.

- *Cultural Resources*: Grading and earthwork associated with the project has potential to uncover previously unknown archaeological resources and/or human remains.

- *Noise*: Transportation projects would result in intermittent and temporary noise above existing ambient noise levels due to construction activities. The sound levels resulting from construction activities would be a function of the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses. However, the noise increases would be temporary and would not constitute a noise impact as defined by the FHWA noise regulation and TDOT's noise policy.

  Traffic noise impacts would occur along local roads used for traffic detours if needed.

- *Air Quality*: This project would result in the temporary generation of construction-related pollutant emissions and dust that could result in short-term air quality impacts.

- *Solid Waste*: There would be some solid waste produced during the construction period that would require use of landfills and/or other methods of disposal. This impact is not expected to be substantial.

- *Energy*: Equipment used to construct the Build Alternative would require additional energy in the short term when compared to baseline conditions.

There would be short-term adverse impacts to energy due to decreased fuel efficiency during construction activities related to potential construction-related traffic delays and detours. These temporary changes in traffic flow and increased VMTs would result in more energy consumption during the construction phase of the project. However, the short-term uses of extra energy during construction are expected to be offset by the energy resources saved due to improved travel efficiency for commuters using the improved facility in the long term.

3.17.2 Mitigation for Construction Impacts

In order to minimize potential detrimental effects from construction related impacts, the construction contractors will be required to comply with the special provisions of TDOT's *Standard Specifications for Road and Bridge Construction* and FHWA's *Best Management Practices for Erosion and Sediment Control*. These provisions implement the requirements of the FHWA's *Federal-Aid Policy Guide* (Subchapter G part 650b). Contractors will be required to conduct and schedule operations according to these provisions.

The following steps will be taken to avoid, minimize, and/or mitigate for construction-related impacts:

- *Infrastructure*: TDOT will coordinate with affected utility companies and owners of gas pipelines in the area to minimize disruption to utility services and operation of the gas lines.
- *Community*: TDOT will coordinate with local governments during the construction phase to minimize disruption to communities accepting detoured traffic.
- *Natural Resources*: All reasonable precautions will be taken to minimize short-term and long-term impacts to plants and wildlife and their habitat.

  A Sediment Control Plan will be developed for the project in accordance with TDOT's *Standard Specifications for Road and Bridge Construction* in order to reduce sedimentation in area streams and wetlands.

  Efforts will be made during the design phase to maintain hydrology to all streams and wetlands located downstream of the study area to reduce the potential for long-term impacts extending beyond the project limits. Permeable material, such as rock fill, may be used in some areas to allow movement of water underneath the roadway.

  TDOT could minimize potential impacts to Indiana bats and northern long-eared bats within the impacted area by timing the cutting of potential roost sites during winter months when both bat species would be in winter hibernacula and would not be present in trees.

  TDOT will continue to coordinate with the USACE to ensure that proper permits are obtained and that all stream and wetland impacts are minimized and/or mitigated to the extent possible.
- *Cultural Resources*: If any previously unknown archaeological resources or human remains are uncovered during construction of the Build Alternative, all construction activities will be halted in the immediate area until the area is cleared for further activities. TDOT will continue to coordinate with the SHPO should any new cultural resources be discovered.

- *Air Quality*: Any action involving open burning will be in accordance with Chapter 1200-3-4 ("Open Burning") of the *Tennessee Air Pollution Control Regulations*. Any action resulting in fugitive dust will be in accordance with Chapter 1200 3-8 ("Fugitive Dust"). The general contractor and all related subcontractors associated with the project will be required to have a valid operation permit from the Tennessee Air Pollution Control Division or to obtain an exception from the regulations through board action.

  Construction-related air quality impacts will be mitigated through the implementation of Best Management Practices, which are included in TDOT's *Standard Specifications for Road and Bridge Construction*. All construction equipment shall be maintained, repaired and adjusted to keep it in full satisfactory condition to minimize pollutant emissions.

- *Noise*: It is expected that TDOT's construction noise specifications will apply to this project. As a result, construction procedures shall be governed by the *Standard Specifications for Road and Bridge Construction* as issued by TDOT and as amended by the most recent applicable supplements. The contractor will be bound by Section 107.01 of the *Standard Specifications* to observe any noise ordinance in effect within the project limits and to maintain equipment.

  Detoured traffic shall be routed during construction so as to cause the least practicable noise impact on noise-sensitive areas.

- *Solid Waste*: Solid waste generated by construction activities will be disposed of in accordance with all state rules and regulations concerning solid waste management. Where possible, land debris will be disposed at a registered sanitary landfill site. If the use of a landfill is not possible, the contractor will dispose of the solid waste in a manner that is compliant with appropriate TDEC and/or EPA regulations.

3.18 Indirect and Cumulative Impacts

Sections 3.1 through 3.17 primarily describe the direct impacts anticipated to be associated with the No-Build Alternative and the Build Alternative for the proposed project. This section presents a summary of the potential indirect and cumulative impacts (ICI) associated with the project.

The NEPA and CEQ regulations require that the indirect and cumulative effects of a project be analyzed in addition to direct impacts (40 CFR §1508.25 (c)). Indirect effects (sometimes referred to as secondary) and cumulative effects were analyzed to determine how the Build Alternative, if selected, may affect the different resources in the study area.

The ICI analysis presents a comprehensive, long-term look at how the construction of the Build Alternative (if selected) and other past, present and future planned development and transportation projects might result in additional resource impacts. In general, resources within the ICI boundaries have experienced negative cumulative effects during the ICI time frame primarily due to the pressures caused by the population growth that the area has experienced.

It is expected that these trends would continue with additional growth in the present/near future and future time frames although not always at the same rate or with the same patterns due to the fluctuations in the economic climate and laws and regulations that could impact the rate and extent to which resources are affected.

3.18.1 Definitions

3.18.1.1 Indirect Effects

Indirect impacts are defined as impacts that may be caused by a project, but would occur in the future or outside the study area and are reasonably foreseeable. Indirect impacts may include growth-inducing effects and other effects related to changes in the pattern of land use, population density or growth rate and related effects on air and water and other natural systems (40 CFR 1508.7). Reasonably foreseeable actions/projects include:

- A project identified in a local or regional comprehensive land use plan;
- A subdivision plat that has been filed with the local government, county or other plat-approving agency;
- Population/development trends that are identified in local or regional comprehensive land use plans;
- Planned transportation improvements by city or county governments; and
- Local or regional infrastructure projects that could impact resources (schools, hospitals, etc.).

Actions that are not usually considered reasonably foreseeable include:

- Possible, but not likely actions/projects; and
- Actions that have little or no influence on the transportation decision.

Often, if a project does not have a direct effect on a resource, it will not have an indirect effect on that resource. Occasionally, however, a project may not have a direct effect but it will have an indirect effect. In general, highway projects most commonly result in indirect impacts to land use, community and economic resources, farmland, water resources, water quality, wetlands and terrestrial ecology.

3.18.1.2 Cumulative Effects

Cumulative impacts are the combined effects of all past, present and reasonably foreseeable projects (not just the current project and not just highway projects) on a given resource (e.g. wetlands); regardless of who has built the project (including developers, localities, etc., not just local or federal transportation agencies). If a project will not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on the resource.

3.18.2 Methodology

3.18.2.1 Indirect Effects

As mentioned above, indirect effects include impacts that are indirectly caused by the action (i.e., construction of the Build Alternative) and are later in time or farther removed in distance but are still reasonably foreseeable. The time used for the assessment of reasonably foreseeable indirect impacts was determined to be 2035, which is the planning horizon for most of the local and regional land use planning documents. The indirect analysis involved assessing impacts with growth-inducing effects of the Build Alternative.

3.18.2.2 Cumulative Effects

Cumulative environmental effects relate to the incremental impact of the project in the context of other past, present, and reasonably foreseeable future actions whether they are public or private actions. Therefore, cumulative effects take into account all past impacts that have occurred within the study area, impacts associated with the Build Alternative itself, impacts associated with present/future development and/or infrastructure projects, and impacts associated with anticipated future 2035 projects.

Past Actions: Past actions are defined as actions within the cumulative impact analysis area that occurred before the current NEPA study was initiated. These include past actions in the study area, and past demographic, land use, and development trends that surround the study area. In most cases, the characteristics and results of these past actions comprise the baseline conditions that set the framework for determining what impacts the proposed project would have on those existing or remaining resources.

Based on historic aerial photography, the most substantial changes in land use within the study area has been the conversion of agricultural lands to rural and low-density residential and scattered commercial and industrial development patterns in the areas immediately surrounding downtown Portland. Much of the development outside of the immediate downtown Portland vicinity has been along the SR-109 and SR-52 corridors, with additional development along SR-41 (U.S. 31W).

Present Actions: Present actions include:

- Current activities within the cumulative impact analysis areas; and
- Current resource management programs, land use activities, and development projects that are being implemented by other governmental agencies and the private sector (where they can be identified) within the cumulative impact analysis areas.

The affected environments of the social, economic, natural, and cultural resources occurring within the study area are discussed in Sections 3.1 through 3.16 of this EA. The affected environments of the various resources considered have resulted from all past and present actions in the study area. These actions have provided the baseline conditions against which to evaluate any cumulative impacts that could result from the proposed project.

Additional details regarding some of the resources are contained in the various technical study reports that have been prepared in support of the EA. These full reports are located in Appendix B through Appendix J, with the exception of the *Phase 1 Archaeological Report*, which is on file with the TDOT Environmental Division.

Reasonably Foreseeable Future Actions: Reasonably-foreseeable future actions may include those actions in the planning, budgeting, or execution phases. Actions may be those of the federal government, state government, local government, private organizations or companies, and/or individuals.

Cumulative effects can be analyzed with respect to all resource areas, including ecological resources, physical resources, historical and archaeological resources, economic resources, and social conditions. Cumulative effects can be both beneficial and adverse.

The following reasonably foreseeable future actions would likely occur near and within the study area regardless of whether the proposed project is implemented:

- Continuation of private project development and activity trends: Based on the City of Portland's future land use map (refer to Figure 3-2), much of the area within and adjacent to the Build Alternative will be converted from agricultural and open land to urban land uses including residential, commercial, and industrial uses. Development of new low density (0-2 units per acre) to medium density (2-3 units per acre) residential neighborhoods on subdivided tracts is one of the primary trends that would continue in the area based on the future land use map. Commercial developments will continue primarily along existing routes including SR-52 and SR-109. Industrial development is expected to remain primarily north of downtown Portland east of SR-109 near Kirby Road, and to the northwest in the vicinity of the proposed SR-109/I-65 interchange (TDOT PIN#: 107338.00).
- Minor improvements and/or maintenance of existing roadways and bridges: Routine roadway, bridge, and ROW maintenance activities and other minor improvements would continue to be required on existing local and regional roadways to improve safety and traffic flow, and to support the anticipated increases in vehicular traffic within the region.

  Maintenance activities may include resurfacing roadways, widening or repairing shoulders, repairing or replacing culverts and small bridges, improving intersections by adding turn lanes and/or signals, mowing, snow removal, and various other activities. Most of these activities are expected to have minor environmental impacts due to their small area of impact and short-lived construction period or duration. Therefore, those activities would not have a high potential to result in measurable cumulative impacts with other projects, such as the proposed project.
- Continuation of Urban Growth in Sumner County: Based on the UGB and PGA mapping for the City of Portland and surrounding areas contained in the *Sumner County 2035 Comprehensive Plan (2010),* urban growth is expected to continue in the project vicinity (refer to Figure 3-3). This development in Sumner County is part of the overall outward expansion of Nashville and its suburbs. All of the land in northwestern Sumner County falling within the study area falls within either the UGB of Portland or is considered to be PGA by Sumner County. Therefore, it is expected that this area would continue to become more developed in the reasonably foreseeable future.
- Construction of the I-65 Interchange/SR-109 Relocation Project (PIN #: 107338.00): The I-65 Interchange project would provide improved traffic flow and interstate access north of Portland. The new I-65 Interchange and SR-109 relocation/extension project (TDOT PIN #: 107338.00) is being constructed independent of the proposed project.

Cumulative Impact Analysis Area: Because the cumulative impacts analyses were focused on the individual resources present in the proposed project's vicinity, the analysis area studied varies in size by individual resource category. This differs somewhat from the direct and indirect impacts analyses because those analyses are focused more on the site specific impacts to those resources anticipated to be caused by the action of constructing the proposed project or the secondary developments anticipated to be induced by the new roadway. The cumulative impact analyses for this project included the area that had a reasonable potential to be noticeably affected by implementation of the proposed project, in combination with other past, present, and reasonably foreseeable future projects. The boundaries of the cumulative impact analysis area for each resource category are identified on Table 3.17.

Table 3.17. Analysis Area by Resource Category Considered in the Cumulative Impacts Analyses for the Proposed Project.

Resource Category	Analysis Area
Land Use	Assessed relative to Sumner County and the City of Portland planning areas.
Social Environment	Assessed relative to Sumner County and the City of Portland planning areas.
Economic Environment	Assessed relative to Sumner County and the City of Portland planning areas.
Farmland	Cumulative impacts to Farmland were assessed for Sumner County.
Natural Resources	
Terrestrial Resources	Cumulative impacts to terrestrial resources were assessed based upon a one-mile buffer surrounding the project center line.
Water Quality and Aquatic Resources	Assessed within the watersheds that drain the study area. Assessment of impacts considered reaches both upstream and downstream of the study area. Downstream consideration terminates four miles from the centerline of the Build Alternative stream crossing or modification.
Wetlands	Assessed relative to the immediate watershed containing them.
Floodplains	Considered based upon the Summers Branch floodplain and associated watershed. Downstream consideration terminated four miles downstream of the nearest Build Alternative floodplain impact.
Threatened and Endangered Species	Cumulative impacts to listed aquatic organisms were assessed to four miles downstream and one mile upstream of the project. Cumulative impacts to listed terrestrial species were assessed in a one-mile buffer from the project center line. Cumulative impacts to endangered bats were considered for any known populations within five miles of the project center line.
Geology and Soils	Cumulative impacts to geology and soils were assessed based upon a one-mile buffer surrounding the project center line.
Cultural Resources (Architectural and Archaeological Resources)	Assessed based upon the APE for Cultural Resources, including areas within and immediately adjacent to the proposed ROW of the Build Alternative.
Air Quality	Assessed relative to the attainment status of Sumner County.
Noise	Assessed based upon a 500-foot buffer from the project construction limits.
Hazardous Materials	Assessed based upon a one-mile buffer surrounding the Build Alternative center line.
Pedestrians and Bicyclists	Assessed relative to Sumner County and the City of Portland planning areas.
Visual Quality	Assessed relative to the viewshed of the immediate project corridor out to one mile from the project construction limits.

3.18.3 Indirect and Cumulative Impacts to Land Use

3.18.3.1 Indirect Effects to Land Use

Under the No-Build Alternative, the anticipated growth in Sumner County, including the City of Portland, would continue to result in land use changes in the area. Eventually the land within the study area is expected to become more developed as it is within the UGB of Portland. The agricultural land uses that dominate the area would be replaced by residential, commercial, and/or industrial land uses based on the City of Portland's future land use maps (refer to Figure 3-2).

Implementation of the Build Alternative could cause a redistribution of traffic on the surrounding roadway network and might affect development and land use patterns in the study area (refer to Section 2.2.2 for the Build Alternative traffic analysis). The Build Alternative may therefore promote secondary development and land use changes in the area. Land use changes, especially conversion of agricultural land and other open spaces to other uses, would occur in areas where induced growth occurs. The improved interstate access provided by the proposed project, along with the new proposed I-65 Interchange located north of Portland (TDOT PIN #: 107338.00), may serve to accelerate residential, commercial, and industrial development in the long-term. More immediate secondary developments would be expected to occur along the proposed SR-109 north of downtown Portland near the new SR-109 interchange with I-65 that is planned to be constructed in the near future. Secondary development would occur at other strategic points along the Build Alternative, such as near the SR-52 intersection. Highway-oriented commercial development, such as service stations, fast food restaurants, truck stops, and motels, would most likely be the initial types of development. Because the study area is within approximately 40 minutes travel time to the Nashville CBD, it is anticipated that residential developments could occur in this area.

It is likely that much of the developable open space in this area would be converted to more dense residential developments in the foreseeable future regardless of the new roadway being constructed due to the expected growth of the area and its proximity to Nashville. Therefore, the land use changes associated with the Build Alternative may not differ substantially from the No-Build Alternative in the long-term. However, the development of some areas would occur sooner than under the No-Build Alternative.

It is not possible at this time to predict the amount or timing of any secondary development that may be attributed to the presence of the Build Alternative. Growth in the area is primarily under the jurisdiction of local government agencies, primarily the City of Portland. The extent of land use changes would be the responsibility of the local governments under their local ordinances and land use planning policies.

3.18.3.2 Cumulative Impacts to Land Use

Under the No-Build Alternative, the planned growth in northern Sumner County, including the lands adjacent to Portland and Mitchellville, would likely occur at a slower rate than would be expected if the Build Alternative were constructed to provide improved travel efficiency and access to and from the area. Therefore, overall land use changes in the area would be slower to occur under the No-Build Alternative when compared to the Build Alternative.

Growth in northern Sumner County, including the areas within and adjacent to Portland and Mitchellville, would likely occur at a faster rate if the Build Alternative is constructed, because travel efficiency and access to the surrounding lands would be improved.

This faster growth in the area would result in land use changes that would result in loss of open space and agricultural land. The surrounding area would eventually become more urbanized. Local land use planners can help ensure that the growth in the area occurs in a controlled manner so that adverse impacts to local communities and other resources can be minimized.

If the Build Alternative is constructed, new developments could be promoted, especially near intersections with existing roads such as SR-76, Jackson Road, SR-52, College Street and TGT Road where access to the Build Alternative would be provided. Any development promoted by the project would be cumulative to the other expected growth within the City of Portland, and/or within the UGB surrounding the City of Portland (refer to Figure 3-3), that would be expected to occur with or without the project based on the City of Portland future land use map (refer to Figure 3-2) and the *Sumner County 2035 Comprehensive Plan (2010)*.

3.18.4 Indirect and Cumulative Impacts to the Social and Community Resources

3.18.4.1 Indirect Effects to Social and Community Resources

The No-Build Alternative would contribute to increased traffic congestion and reduced LOS in the Portland area (refer to Section 1.3.3). The increase in traffic congestion is anticipated to occur due to growth expected to occur within the UGB surrounding the City of Portland (refer to Figure 3-3) based on the City of Portland future land use map (refer to Figure 3-2) and the *Sumner County 2035 Comprehensive Plan (2010)*. The anticipated population growth and urban development within the UGB of Portland would continue to result in increased traffic volumes in the reasonably foreseeable future, especially on SR-109, SR-52, and SR-41 (U.S. 31W) (refer to Table 1.1 and Figure 1-5). The increased numbers of vehicles on those routes could result in increased traffic delays and decreased safety. These conditions could contribute to delayed response times for emergency vehicles in the area.

Secondary local roads could continue to become more crowded as population levels and traffic volumes increase. By 2025, over 15,000 residents are projected to live in the City of Portland, a 31 percent increase from 2010 (Sumner County Regional Planning Commission, 2010). Section 3.3.1 of this document contains more discussion regarding population trends in the project vicinity. Several small local roadways could become more heavily used by drivers trying to avoid the congested section of SR-109 in downtown Portland. This could cause secondary traffic and safety issues on the local streets in the area, including local streets that could be more heavily used by pedestrians and children walking/biking to and from the area schools.

The Build Alternative is expected to provide beneficial impacts for the community by improving traffic flow and safety. This may improve travel times for emergency vehicles due to improved traffic flow and better access to areas near the Build Alternative when compared to the No-Build Alternative. Section 2.2.2 contains a discussion of the potential traffic improvements anticipated to occur under the Build Alternative.

3.18.4.2 Cumulative Impacts to Social and Community Resources

The No-Build Alternative would generally have adverse impacts to the community when the effects are combined with other past, present, and reasonably foreseeable future projects or actions in the area, primarily due to continued increases in traffic volumes (refer to Table 1.1 and Figure 1-5) in the area. Traffic volumes would be expected to increase as a result of continued urban development, population growth, and improvements to other portions of the SR-109 corridor.

The continued growth and development within the area is expected to occur within the UGB surrounding the City of Portland (refer to Figure 3-3), based on the City of Portland future land use map (refer to Figure 3-2) and the *Sumner County 2035 Comprehensive Plan (2010)*. The population growth associated with the residential developments would likely result in continued increases in traffic congestion and reduced LOS in the Portland area, especially on SR-109 in downtown Portland. The reduced LOS on SR-109 and other local routes would result in increased traffic delays and decreased safety. These conditions could also contribute to delayed response times for emergency vehicles in the area.

Traffic flow and safety would improve in downtown Portland under the Build Alternative (refer to Section 2.2.2 for Build Alternative traffic analyses). These improvements would be cumulative to other projects in the area, such as the completed improvements to other portions of SR-109 as discussed in Section 1.2 (refer to Figure 1-2). Response times for emergency vehicles would likely improve due to the improved travel efficiency and access provided by the Build Alternative (refer to Section 2.2.2). Each of these improvements would complement other traffic and safety improvements that would likely occur as the area continues to become more developed due to growth expected to occur within the UGB surrounding the City of Portland (refer to Figure 3-3) based on the City of Portland future land use map (refer to Figure 3-2) and the *Sumner County 2035 Comprehensive Plan (2010)*.

Improvements anticipated to be needed to support the population growth associated with the expected residential development within the UGB of the City of Portland, along with any additional growth promoted by the proposed Build Alternative, include new fire stations, ambulance stations, and transportation and utility infrastructure (refer to Figure 3-2 for the City of Portland future land use map and Section 3.3.1 for discussions related to anticipated land use and population trends). Cumulative impacts of this growth, in combination with any secondary growth promoted by the Build Alternative, may also strain the capacities of local community resources, such as schools, and potentially stress local government budgets, depending on the new development's impact on City and County tax revenues. Potential residential development is likely to have a greater impact on schools and other infrastructure requirements. However, if the County and the City follow their growth policies and their urban growth plans, then the development anticipated to occur would likely occur within areas that have been targeted for growth.

3.18.5 Indirect and Cumulative Impacts to the Economic Environment

3.18.5.1 Indirect Effects to the Economic Environment

The traffic congestion, reduced LOS, and reduced access to some areas under the No-Build Alternative may limit economic growth by slowing or inhibiting potential commercial and industrial development in the area. Section 1.3.2 and 1.3.3 discuss some of the potential concerns related to transportation demand and traffic capacity concerns that would be expected under the No-Build Alternative.

Under the Build Alternative, the proposed project is expected to provide beneficial impacts due to improved transportation efficiency as discussed in Section 2.2.2 of this document. The improved transportation efficiency and access to surrounding areas, could promote secondary development and/or speed up the economic development in the area providing additional economic benefits for the local community and residents. If the Build Alternative is constructed, it is likely that new developments could be promoted, especially near intersections with existing roads such as SR-76, Jackson Road, SR-52, College Street and TGT Road where access to the Build Alternative would be provided.

Any secondary developments could have potential to result in increased numbers of jobs in the area and provide additional sales taxes. If this occurred, the proposed project could have a net positive indirect economic impact resulting from the new development. However, the number of jobs and amount of tax revenues cannot be predicted at this time.

Secondary development and economic growth in the area could be perceived as negative for residents that live in the more rural portions of the study area. This is because the rural setting would become more suburban due to more dense residential developments. However, because much of the area is expected to become more developed based on future land use plans (refer to Figure 3-2) and growth planned within the UGB of Portland (refer to Figure 3-3), these impacts would not substantially differ from the No-Build Alternative.

Potential residential development is likely to have a much greater impact on budgets for schools and other infrastructure requirements. However, if the County and the City follow their growth policies, including their future land use and urban growth plans mentioned previously, then the development anticipated to occur would likely occur within areas that have been targeted for growth.

3.18.5.2 Cumulative Impacts to the Economic Environment

Economic growth could slow in the project vicinity under the No-Build Alternative due to declining transportation efficiency, and limitations on some of the local routes in terms of their capability in supporting increased traffic (refer to Section 1.3.3 for discussions related to traffic projections for the No-Build Alternative). These limitations in the transportation infrastructure could adversely impact the local economy and community by slowing or inhibiting some of the anticipated growth and job creation that is expected based on future land use mapping (refer to Figure 3-2) and urban growth planned within the UGB of Portland (refer to Figure 3-3).

Transportation infrastructure improvements are needed to support the planned growth in the area. This is evidenced by the poor LOS projected under the No-Build Alternative as discussed in Section 1.3.3 (refer to Table 1.1 and Figure 1-5). Not providing improvements to roadways in the area that provide better travel efficiency and reduced congestion, such as would occur under the Build Alternative, could potentially inhibit development and associated economic growth. Any decrease in the planned development of much of the land in the study area, as anticipated by the City of Portland based on their future land use map (refer to Figure 3-2), could result in slower economic growth for the City of Portland and Sumner County.

3.18.6 Indirect and Cumulative Impacts to Farmland

3.18.6.1 Indirect Effects to Farmland

The anticipated growth in Sumner County, regardless of alternative selected, could have potential adverse impacts on existing farmland in the area. Eventually the land within the study area is expected to become more developed as it is within the UGB of Portland (refer to Figure 3-3). Future land use maps provided by the City of Portland (refer to Figure 3-2) suggest much of the farmland in the study area would eventually be replaced by more dense residential development with some additional commercial, and or industrial developments closer to existing roadways.

The proposed Build Alternative may result in secondary developments that could result in additional impacts to farmland. However, since the lands immediately adjacent to the proposed route for the project are within the UGB of Portland, it is expected that much of the land in this area could eventually be converted to other land uses as urban growth occurs. Therefore, the Build Alternative is not expected to differ substantially from the No-Build or baseline conditions.

3.18.6.2 Cumulative Impacts to Farmland

All of the study area is within the UGB of Portland (refer to Figure 3-3). Most of the land within the study area is planned for residential and commercial development based on the City of Portland's zoning and future land use maps(refer to Figure 3-2). Therefore, it is anticipated that much of the land in this area is expected to become developed in the reasonably foreseeable future. Any new developments that do occur could possibly result in a cumulative conversion of farmland into non-farm-related uses. Conversion of farmland could continue to occur in the project vicinity regardless of whether or not the Build Alternative is constructed. However, the conversion would most likely occur at a slower rate than would occur if the proposed project is built. Therefore, the No-Build Alternative may have a minor beneficial impact to farmland in the reasonably foreseeable future when compared to the Build Alternative.

Some of the impacts to farmland in the area could be controlled by local zoning and land use planning efforts. In most cases, the landowners would more than likely have the choice whether or not to stop farming their land to convert it to other uses or to sell their property to private developers.

3.18.7 Indirect and Cumulative Impacts to Natural Resources

3.18.7.1 Indirect Effects to Natural Resources

In general, natural resources including streams, forests, wetlands, and other fish and wildlife habitats would likely continue to be impacted in the project vicinity due to the continued growth and development of the area that is anticipated regardless of whether or not the new roadway is constructed based on the City of Portland future land use map (refer to Figure 3-2) and urban growth plans (refer to Figure 3-3) provided by Sumner County. However, the conversion of undeveloped areas to developed areas could occur at a slower rate under the No-Build Alternative than would occur if the Build Alternative is built due to the potential for more immediate secondary development. Secondary developments could be promoted under the Build Alternative where access to the Build Alternative is provided, especially near its intersection with SR-76, Jackson Road, SR-52, College Street, and TGT Road. Therefore, the No-Build Alternative may have fewer impacts to natural resources in the near future, but in the long-term the impacts would likely not differ substantially between the No-Build and Build Alternatives. Human activity has already extensively modified most of the natural resources of the study area, and virtually all of the land in the study area has been developed or otherwise altered to some extent by agricultural practices.

Terrestrial Resources: The anticipated growth in Sumner County would likely continue to have potential adverse impacts on the terrestrial resources in the area in terms of loss or continued fragmentation of habitat, along with increased human disturbance. Eventually much of the land within the study area is expected to become more developed as it is within the UGB of Portland. The overall habitat alterations are not expected to differ substantially between the No-Build and Build Alternatives. This is because most of the areas that would be expected to become developed due to secondary impacts from the Build Alternative are within the UGB of Portland (refer to Figure 3-3), and/or are shown as residential, commercial, or industrial areas on the City of Portland's future land use plans (refer to Figure 3-2).

Loss of terrestrial habitat initially displaces wildlife from the area, forcing them to concentrate into a smaller area, which causes over-use of the habitat. This ultimately lowers the carrying capacity of the remaining habitat and can be manifested in some species as becoming more susceptible to disease, predation, and starvation. Many of the species present within the study area are adapted to human disturbance and fragmented habitats due to the past land uses that have shaped the existing habitats. During the initial construction of the roadway it is anticipated that there would be adequate habitat in the immediate vicinity for the maintenance of populations that could be displaced. However, as the area continues to become developed, some habitats may become too isolated or too small to support some of the species currently using the area.

All of these potential indirect impacts are anticipated to be minimal as a result of the Build Alternative when compared to the No-Build Alternative.

Water Quality and Aquatic Resources: The anticipated growth in Sumner County could have potential adverse impacts on wetlands in the area in terms of indirect sedimentation impacts under both the No-Build and Build Alternatives.

The Build Alternative could result in sedimentation impacts due to any secondary developments promoted by the project. Secondary developments would be expected to occur where access to the Build Alternative is provided, especially near its intersection with SR-76, Jackson Road, SR-52, College Street, and TGT Road. Minor long-term adverse impacts could occur due to highway runoff containing petroleum products and other roadway contaminants entering remaining aquatic resources adjacent to the roadway.

Secondary developments may result in additional impacts to water quality and aquatic resources, due to stream channel modifications or loss, and loss of associated aquatic habitat. However, since the lands immediately adjacent to the proposed route for the project are within the UGB of Portland (refer to Figure 3-3), it is expected that a similar amount of development would occur in the foreseeable future. Therefore, the Build Alternative is not expected to differ substantially from the No-Build Alternative. In addition, federal, state, and local regulations would help to off-set the anticipated indirect impacts associated with the proposed project. Section 404 of the CWA, a federal regulation, is administered and enforced by the USACE and requires entities seeking impact to jurisdictional Waters of the U.S. to obtain various permits prior to impacting these resources. These permits require the use of minimization measures and for many projects obtaining some form of mitigation for impacting these jurisdictional waters, such as purchasing mitigation credits from a mitigation bank that serves the same watershed or an adjacent watershed, and/or preserving, creating and/or restoring jurisdictional Waters of the U.S. within the same watershed.

Some of the secondary development impacts to aquatic resources could occur sooner due to the improved access provided by the Build Alternative, especially near its intersection with SR-76, Jackson Road, SR-52, College Street, and TGT Road. Based on the City of Portland's future land use map (Refer to Figure 3-2) most of these areas are expected to be developed into low to medium density residential areas. The area along SR-52 is expected to be developed with commercial uses.

Wetlands: The anticipated growth in Sumner County could have potential adverse impacts on wetlands in the area in terms of indirect sedimentation impacts under both the No-Build and Build Alternatives. The Build Alternative could result in some downstream sedimentation impacts to adjacent wetlands during construction and due to any secondary developments

promoted by the project, especially near the local roadways that are provided access to the proposed roadway mentioned previously.

Secondary developments associated with the Build Alternative may result in additional impacts to wetlands, due to fill and/or modifications to hydrology. However, federal, state, and local regulations would help to off-set the anticipated indirect impacts associated with the proposed project as described above under the aquatic resources discussion.

Since the lands immediately adjacent to the proposed route for the project are within the UGB of Portland (refer to Figure 3-3) and are expected to be developed primarily for residential uses based on the City of Portland future land use map (refer to Figure 3-2), it is expected that a similar amount of development would occur in the foreseeable future. Therefore, the Build Alternative is not expected to differ substantially from the No-Build Alternative. As discussed above, some of the development impacts to wetlands may occur sooner with the improved transportation system, which could promote faster development in the immediate area.

Floodplains: The proposed Build Alternative would increase the amount of impervious surface area within the study area. This increase in impervious surface area could indirectly impact floodplains and flood prone areas. The most notable effect would be the increased volume and velocity of storm water runoff. To minimize these indirect effects from flooding, the proposed project would be designed to control the increase in velocity of storm water run runoff. The design measures may include urban curb and gutters, minimization of storm water discharge locations, storm water runoff directed into the median, grassed ditches, and limits on direct storm water discharge into stream channels if feasible.

Additionally, any secondary developments promoted by the project, especially near TGT road where the nearest floodplain occurs, could have potential adverse impacts to floodplains in the area in terms of increased impervious surface area. However, impacts from the secondary developments would be minimized by federal, state, and local laws that have been established to control development within floodplain and flood prone areas.

Threatened and Endangered Species: The primary indirect impact that the proposed project could have on the state-listed aquatic species, including the orangefin darter, splendid darter, and teardrop darter, is the potential to increase silt and sediment within STR-1 and other West Fork Drakes Creek Watershed tributaries located near the southern end of the study area. Similar potential for indirect impacts would occur for other streams impacted by the project, even though no known populations of listed species occur in the project vicinity.

Secondary developments promoted by the project could lead to additional indirect impacts to three state-listed darter species known to occur in the West Fork Drakes Creek watershed downstream of the study area. These impacts would primarily be due to silt and sedimentation impacts within the streams. Any secondary developments that occur near the southern end of the proposed Build Alternative, especially those near SR-76 and southward, would have potential to impact the West Fork Drakes Creek watershed.

Secondary development in other areas, such as near the new SR-109 access points that would be provided under the Build Alternative at Jackson Road, Payne Road, SR-52, College Street, and TGT Road, could lead to increased silt and sedimentation impacts in streams in those areas. Other than STR-1 located near the south termini of the project, all of the streams crossed by the proposed Build Alternative, and within the general project corridor, are considered part of the Red River watershed. This could have potential adverse impacts for any

unknown populations of listed species in those streams. According to TDEC in a February 25, 2013 coordination letter, some state-listed fish are known to occur within the Red River watershed (see TDEC letter in Attachment D).

For terrestrial species, including the federally listed Indiana bat, northern long-eared bat, and gray bat, indirect impacts could occur due primarily to additional loss or continued fragmentation of potential suitable habitat, along with increased human disturbance, associated with secondary developments. For Indiana and northern long-eared bats the indirect impacts may include removal of potential suitable roosting trees and/or removal of potentially suitable foraging habitat. For gray bats, secondary impacts to water quality within the stream corridors used by gray bats for foraging would be the primary concern related to secondary impacts promoted by the project. Eventually much of the land within the study area is expected to become more developed based on the City of Portland's future land use map and the UGB mapping provided by Sumner County (refer to Figures 3-2 and 3-3). Therefore, overall habitat alterations are not expected to differ substantially between the No-Build and Build Alternatives. This is because most of the areas that would be expected to become developed due to secondary impacts from the Build Alternative are within the UGB of Portland, and/or are shown as residential, commercial, or industrial areas on the City of Portland's future land use plans.

3.18.7.2 Cumulative Impacts to Natural Resources

In general, the impacts to natural resources that could occur under the No-Build or Build Alternative would be relatively minor. This is because past and present human activity has already extensively modified the natural resources of the study area, and virtually all of the land in the study area has been developed or otherwise altered to some extent. However, any impacts to the remaining natural resources in the area would be cumulative to all of the other past, present, and reasonably foreseeable impacts associated with other developments and activities that have impacted, and/or continue to impact, those same natural resources. Overall, there is not anticipated to be any substantial long-term difference in the cumulative impacts to the natural resources remaining in the area between the No-Build and Build Alternatives. This is because most of the area is planned to be developed more heavily, regardless of the new roadway being constructed based on the City of Portland's future land use map (refer to Figure 3-2) and the UGB mapping provided by Sumner County (refer to Figure 3-3).

Terrestrial Resources: The terrestrial habitats in the area are already fragmented and modified by the existing agricultural land uses, residential developments, and construction of the existing roadways and other infrastructure. Consequently, there are no substantial reasonably foreseeable cumulative impacts to these resources associated with the proposed project when compared to the No-Build Alternative.

Water Quality and Aquatic Resources: There is some potential for cumulative impacts to water quality and aquatic resources from the proposed project in combination with other projects and actions in the area, such as additional residential and commercial developments that are anticipated based on the City of Portland's future land use map (refer to Figure 3-2). As more development occurs, there would be additional access roadways, parking lots, and driveways built. This would result in an increase in the percentage of impervious surface in the study area. As the amount of impervious surfaces increases, stormwater runoff would increase. Stormwater runoff often carries chemicals associated with roads and lawn fertilizer from new residences, which would degrade downstream water quality and aquatic habitats.

Local governments and regulatory agencies with jurisdiction over water resources can minimize many of these impacts through proper planning, permitting, and compliance monitoring as the area continues to grow.

Future actions that could occur in and around the study area may result in encapsulation of streams, erosion and sedimentation, and the addition of impervious surfaces. Such actions occurring in a geographic area tend to degrade overall quality of aquatic habitats and water quality resulting in cumulative impacts. The placement of lengths of stream in culverts is considered by TDEC to be a permanent impact. While the water quality impacts of culverts over 200 feet in length are mitigated by either on-site or off-site programs, increases in numbers of culverts associated with highways, private driveways, and industrial and commercial development may cumulatively reduce available habitats over time.

Wetlands: Any loss of wetlands associated with the project would result in cumulative impacts when combined with the loss of wetlands due to other past, present, and reasonably foreseeable future projects in the area. Since much of the area within the UGB is expected to become developed, the impact of the Build Alternative is not expected to differ substantially from the No-Build Alternative. However, TDOT would be required to mitigate for wetland impacts to help offset any long-term impacts to wetlands in the area.

Floodplains: The continued growth and development expected in the City of Portland and surrounding areas, based on the City's future land use plan map and the County's UGB map (refer to Figures 3-2 and 3-3), could result in some construction near floodplains. This would result in an increase the amount of impervious surface area and increases in the velocity and amount of storm water run-off. However, much of the development will be subject to federal, state, and local floodplain regulations that will prohibit or limit the development within floodplain areas.

Threatened and Endangered Species: As discussed in Section 3.7.5.3, the Build Alternative is not anticipated to adversely affect populations of federal and/or state-listed species known to occur in the vicinity. Therefore, the potential for cumulative impacts is considered low. The anticipated growth that is expected to occur, based on the City of Portland future land use map (refer to Figure 3-2) and UGB map (refer to Figure 3-3) provided by Sumner County, would continue to have potential adverse impacts to any populations of threatened and endangered species that may be present in the vicinity under both the No-Build Alternative and Build Alternative.

Prior to the ESA, there was no legislation that gave federal protection to plant and animal species that were in danger of becoming extinct. Without this legislation, many plant and animal species with specific habitat requirements and/or that are sensitive to various forms of disturbance became extinct or were reduced in number. A major contributor to plant and animal extinction is due to loss of habitat, which is typically attributed to conversion of land use from its native state. Such land use conversions have taken place in this region of Tennessee with agriculture being the major land use type. The agricultural land uses have already fragmented and modified most of the terrestrial and aquatic habitats in the study area.

Current trends and future plans indicate a conversion of land use from agriculture to residential, commercial, and/or industrial as the region experiences an increase in population (refer to Figure 3-2). The federally-listed Indiana bat and northern long-eared bat may be impacted by further reduction of suitable roosting and foraging habitat caused by the anticipated growth and development. The gray bat, along with the three state-listed fish species known to occur in the

project vicinity, could be impacted by degradation of water quality that may be associated with this growth and development. The proposed project is expected to facilitate some secondary development due to improved access and travel efficiency and would likely contribute to the ongoing trend of land use conversion. However, it is unlikely that the proposed project would have cumulative effects on any populations of these federal or state protected species. This is because the potential impacts associated with ongoing development in the area are expected to occur regardless of the proposed project, and would therefore not be considered a cumulative impact of the Build Alternative.

Impacts to federal- and state-listed species will continue to be coordinated with the appropriate agencies, and any project specific requirements will be complied with should the Build Alternative be selected.

3.18.8 Indirect and Cumulative Impacts to Geology and Soils

3.18.8.1 Indirect Effects to Geology and Soils

The anticipated growth in Sumner County could have potential adverse impacts to existing geological features and productive soils in the area under both the No-Build and Build Alternatives. The primary impact of that development would be removal of productive soils and/or covering of those areas with structures such as homes, driveways, and local roadways.

In terms of geological features, there are sinkholes in the region that could be impacted by developments primarily due to runoff carrying contaminants into the solution cavities associated with those features. This includes two sinkholes in the proposed Build Alternative ROW (refer to Figure (3-7). At least some of these features are already impacted by current land uses, especially agricultural practices. Fertilizers, pesticides, and herbicides are used within or adjacent to at least some of the sinkholes in the immediate area and are likely transported into any underlying groundwater features.

Indirect impacts could be related to the collapse of a sinkhole and/or introduction of pollutants to unknown underground streams. Additionally, sinkholes outside of the proposed study area, that were not investigated, may provide habitat for threatened and endangered species.

Therefore, disturbances to any off-site sinkholes from transportation projects and land development activity could impact habitat for the listed threatened and endangered species that utilize these environments.

To reduce/avoid potential impacts to sinkholes from future TDOT transportation projects, a field survey would be conducted on the proposed areas and the results of those surveys would be documented in associated technical reports.

A subsurface program with auger drilling will be conducted prior to the construction of the proposed project. The oversight of TDEC on land development activities would also help reduce/avoid impacts to sinkholes.

Secondary developments associated with the Build Alternative may result in potential for impacts to these resources sooner due to the improved transportation system, which could promote faster development in the immediate area. However, since much of the area is expected to be more heavily developed in the long-term there would be minimal differences between the No-Build and Build Alternatives.

The Build Alternative could have a minor beneficial impact to sinkholes and associated groundwater underlying those areas. This is because there is potential that the sinkholes affected by the Build Alternative could be treated or capped, in part to reduce the chance of roadway contaminants being carried into those areas. Under the No-Build Alternative it is likely that those same sinkholes would continue to be farmed or otherwise impacted allowing contaminants to readily enter any groundwater resources that may underlie those areas.

3.18.8.2 Cumulative Impacts to Geology and Soils

The cumulative impacts on sinkholes resulting from the direct and indirect impacts of the Build Alternative, in combination with future land development (refer to Figure 3-2), would have the potential to create impacts to sinkholes within the surrounding areas. Given the presence of limestone within the area, it is possible that sinkholes would be encountered by future road and land construction activities facilitated by the proposed project. The potential impacts would be related to the collapse of a sinkhole and/or introduction of pollutants to the associated underground streams.

Additionally, sinkholes outside of the proposed study area, that were not investigated, may provide habitat for threatened and endangered species. Therefore, disturbances to any off-site sinkholes from transportation projects and land development activities could impact habitats utilized by listed threatened and endangered species.

The Build Alternative would result in the loss or removal of some productive soils. However, since a large area of these same soils are anticipated to be removed or disturbed in the reasonably foreseeable future for residential and commercial developments, based on the City of Portland's future land use map (refer to Figure 3-2), this would not be considered a substantial cumulative impact of the Build Alternative.

3.18.9 Indirect and Cumulative Impacts to Cultural Resources

3.18.9.1 Indirect Effects to Cultural Resources

Architectural/Historical Resources: While no NRHP-eligible resources were identified in the proposed ROW of the Build Alternative, there may be some unidentified eligible properties located near the study area. Indirect impacts to cultural resources could therefore result due to secondary residential and commercial development. Impacts to historic resources are only afforded federal protections with regards to impacts from projects with federal funding, such as federal-aid highways. Historic resources are not typically protected from private development unless local historic ordinances/overlay zones with specific provisions are in place. However, there are no local historic ordinances/overlay zones in place for the study area.

Archaeological Resources: While no NRHP-eligible archaeological resources were identified in the proposed ROW of the Build Alternative, there were two prehistoric archaeological sites and three cemeteries documented in the project vicinity outside of the proposed ROW that could be impacted by secondary developments. Secondary development associated with the proposed project may also result in impacts to unknown archaeological resources. The primary impact of that development would be disturbance of soils that could contain buried artifacts. This secondary private development would not generally be required to comply with the cultural resource protections afforded by Section 106 for federal actions. Therefore, the Build Alternative may indirectly contribute to the loss of archaeological resources within the area of influence, especially near local roadways that are provided direct access to the proposed route. However, in the long-term there would not be a substantial difference between the No-Build and Build Alternatives due to the anticipated growth within the UGB of Portland, especially areas

shown for residential and commercial development on the City of Portland future land use map (refer to Figures 3-2 and 3-3).

3.18.9.2 Cumulative Impacts to Cultural Resources

Architectural/Historical Resources: The past and future development, along with the potential indirect effects from the Build Alternative, could cumulatively contribute to the loss of any unidentified architectural resources in the study area.

Archaeological Resources: The anticipated growth in Sumner County could have potential adverse impacts to any unknown archaeological resources in the area under both the No-Build and Build Alternatives. The primary impact of that development would be disturbance of soils that could contain buried artifacts.

As mentioned in the above section, the secondary developments associated with the proposed project could result in potential impacts to unknown archaeological resources due to additional land disturbance activities. Therefore, the past and future development, along with the indirect effects from the Build Alternative, could cumulatively contribute to the loss of any remaining unidentified archaeological resources in the study area.

3.18.10 Indirect and Cumulative Impacts to Air Quality

3.18.10.1 Indirect Effects to Air Quality

The forecasted traffic volumes for most projects typically account for any redistribution of traffic that would occur as a result of the project. Therefore, the air quality analysis discussed in Section 3.9 addresses any indirect traffic-related air quality impacts that might occur. The summary of the air quality study was that the Build Alternative is expected to have a slight increase in VMT, but with reduced congestion in the area. Therefore, air quality impacts would be comparable to the No-Build Alternative.

3.18.10.2 Cumulative Impacts to the Air Quality

It is anticipated that the No-Build Alternative could result in potential adverse impacts to air quality in the area due to continued reduction in travel efficiency and increased congestion on secondary routes, especially those used to bypass existing SR-109 through downtown Portland. These adverse impacts could offset some of the beneficial impacts to air quality expected to occur due to other programs aimed at improving the regional air quality, including EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020.

The forecasted traffic volumes include expected traffic growth and other planned and programmed projects in the area. As a result, the air quality analysis discussed in Section 3.9 addresses the traffic-related cumulative air quality impacts of the project. Overall VMTs are expected to be slightly higher when compared to the No-Build Alternative. This would mean the Build Alternative would result in slightly higher MSATs impacts. However, the improved transportation would combine with the positive impacts of other programs aimed at improving the regional air quality, including EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020.

3.18.11 Indirect and Cumulative Impacts to Noise

3.18.11.1 Indirect Effects to Noise

The growth and development in the study area that is expected based on future land use plans (refer to Figure 3-2) and the UGB surrounding the City of Portland (refer to Figure 3-3) could result in potential for increased noise levels due to addition of more human developments and disturbance, including additional traffic noise on local roads.

As mentioned previously, implementation of the project could cause a redistribution of traffic on the surrounding roadway network and might affect development and land use patterns in the study area. These situations could result in higher traffic volumes and indirect noise impacts at locations near roadways beyond the project limits. However, as described earlier, a doubling of the traffic volume is required to increase the hourly equivalent sound level by 3 dBA, which is usually the smallest change in sound levels that people can detect without specifically listening for the change. Traffic volumes are not anticipated to double as a result of the redistribution of traffic or changes in development, therefore any increases in sound levels beyond the project would not be substantial in accordance with TDOT's Noise Policy. As a result, the project is not predicted to cause measurable indirect noise impacts.

3.18.11.2 Cumulative Impacts to Noise

Noise could increase in the study area under the No-Build Alternative as the expected growth and development occurs in the area, especially areas within the city limits of Portland and areas immediately adjacent to existing roadways. This development is anticipated based on the City of Portland future land use map (refer to Figure 3-2) and the UGB provided by Sumner County (refer to Figure 3-3). The increased noise from any additional developments could be cumulative to other past developments that have already increased the ambient noise levels in some areas. Some of the past developments that have increased noise levels include the existing industrial and commercial developments primarily located within the City of Portland, along with the establishment of the area roadway network, including primarily I-65, SR-109, SR-52, SR-76, and SR-41 (U.S. 31W). As discussed in Section 3.10, it is anticipated that the Build Alternative would result in higher noise levels for some residences along the Build Alternative. This increased noise could combine with any other new noise generators that may be developed in the project vicinity. Local planners can help reduce cumulative impacts due to noise by proper land use planning that results in placement of new residential areas and other noise sensitive land uses in areas that are away from noise generating land uses such as highways, industrial sites, railroads, etc., which are known or expected to conflict with the sensitive land uses.

3.18.12 Indirect and Cumulative Impacts to Hazardous Materials

3.18.12.1 Indirect Effects to Hazardous Materials

The anticipated growth in Sumner County, including the City of Portland, could have potential adverse impacts in terms of potential for hazardous waste impacts. This is based primarily on the City of Portland's future land use map (refer to Figure 3-2) and the UGB provided by Sumner County (refer to Figure 3-3). Areas that become developed with commercial and industrial/warehousing land uses could result in increased potential for use, storage, and transport of hazardous materials in the area. This could increase the risk of hazardous materials releases or contamination in nearby streams.

The proposed project is expected to facilitate at least some secondary development in the study area. However, because private developers are required to comply with all applicable laws and regulations concerning the removal of toxic or hazardous materials, the project is not expected to indirectly affect hazardous material sites.

In general, development in areas where hazardous materials are present would have a long-term beneficial impact due to the removal of the harmful materials. In most cases, cleanup of these sites would involve the removal of old USTs or ASTs or old equipment containing greases, oils, or other potential contaminants.

The improved transportation provided by the Build Alternative may attract additional trucks to the SR-109 corridor, some of which may be transporting hazardous materials. Therefore, the Build Alternative could result in a slight increase in the amount of hazardous materials transported through the study area.

3.18.12.2 Cumulative Impacts to the Hazardous Materials

The continued growth and development in the City of Portland and surrounding areas could result in a potential increase in the amount of hazardous materials used, stored, or transported through the study area. The increase could be cumulative to increases that have already occurred or are occurring due to the industrial/warehousing growth in the Portland region, as well as commercial growth in the downtown Portland vicinity.

Construction of the proposed project in combination with the continued growth and development of industrial and commercial areas, as indicated on the City of Portland's future land use map (refer to Figure 3-2), could attract more industries handling hazardous materials to the study area. However, these industries would be required to comply with all applicable laws and regulations concerning the removal of toxic or hazardous materials. Therefore, there is not expected to be a negative cumulative impact to hazardous materials.

3.18.13 Indirect and Cumulative Impacts to Pedestrians and Bicyclists

3.18.13.1 Indirect Effects to Pedestrians and Bicyclists

No-Build Alternative could contribute to increased traffic congestion and reduced LOS in the Portland area, especially on SR-109 and SR-52 in the City of Portland) (refer to Section 1.3.3 for discussion of the No-Build Alternative traffic projections). Not implementing projects, such as the proposed Build Alternative, to improve traffic conditions and reduce traffic volumes in pedestrian areas could have indirect impacts due to decreased safety for pedestrians and bicyclists along these routes.

Secondary local roads could become more crowded as population levels and traffic volumes increase. Several small local roadways could become more heavily used by drivers trying to avoid the congested section of SR-109 in downtown Portland. This could cause secondary traffic and safety issues on the local streets in the area, including local streets used more heavily by pedestrians and children walking/biking to and from the area schools.

New developments facilitated by the Build Alternative could result in increased traffic volumes in some areas, especially near the proposed intersections of the existing local roads and the Build Alternative. Some of these secondary developments could cause additional safety issues for pedestrians and bicyclists. The primary areas that may affect pedestrians and bicyclists would be developments that occur near SR-52 and College Street, where pedestrian and bicycle traffic is higher due to the nearby schools.

3.18.13.2 Cumulative Impacts to Pedestrians and Bicyclists

The anticipated population growth and urban development within the City of Portland based on future land use mapping (refer to Figure 3-2), and within the UGB surrounding the City of Portland provided by Sumner County (refer to Figure 3-3), would continue to result in increased traffic volumes in the reasonably foreseeable future, especially on SR-109, SR-52, and SR-41 (U.S. 31W). The increased numbers of vehicles on the existing roadways, especially SR-109 in downtown Portland, could result in decreased safety for pedestrians and bicyclists along these routes. The growth could result in potential decreases in safety on other routes in the area that do not have sidewalks or other safe areas for pedestrians and bicyclists.

Secondary local roads could continue to become more crowded as population levels and traffic volumes increase. Several small local roadways could become more heavily used by drivers trying to avoid the congested section of SR-109 in downtown Portland. This could cause cumulative safety issues on the local streets in the area, including local streets used more heavily by pedestrians and children walking/biking to and from the area schools.

The new roadway would provide a safer route for pedestrians and bicyclists because it would have 10-foot of paved shoulder that could be used by pedestrians and bicyclists. In addition, new sidewalks would be provided along the widened portion of SR-52 between West Market Street and Searcy Lane. Eventually this new sidewalk would likely connect with other planned sidewalks within the City of Portland providing more connectivity and a longer stretch of pedestrian and bicycle facilities resulting in beneficial cumulative impacts to pedestrians. This would improve safety for students traveling to and from the nearby schools located at College Street and Searcy Road. The cumulative benefit provided by the Build Alternative in combination with all existing and future sidewalks and other facilities would provide a safer place for walking or bicycling in this area.

3.18.14 Indirect and Cumulative Impacts to Visual Resources

3.18.14.1 Indirect Effects to Visual Resources

Based on the City of Portland's future land use map (refer to Figure 3-2), much of the existing open space in the study area is expected to become developed as the Portland region continues to become more developed or urbanized.

Secondary residential and/or commercial development associated with the project may result in minimal impacts to the visual quality of the area. This development is expected to occur near the proposed intersections at SR-76, Jackson Road, Payne Road, SR-52, College Street, and TGT Road initially. However, there are no known visually sensitive areas that would be impacted. Impacts are not expected to differ substantially from the No-Build or Build Alternatives. Only minimal adverse impacts from secondary developments would be expected, because existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources, and the proposed project would introduce few, if any, noticeable changes to the viewshed.

3.18.14.2 Cumulative Impacts to Visual Resources

Impacts to visual resources under the No-Build Alternative are expected to be minimal because there are no known existing high quality visual resources within the study area. Although the continued development may have minor adverse impacts, the changes could likely be gradual and less noticeable than the changes under the Build Alternative, especially in the more rural residential and agricultural portions of the study area.

3.19 Summary of Environmental Consequences

Table 3.18 contains summary environmental consequences information for the Build Alternative.

Table 3.18. Environmental Impact Summary for the Build Alternative.

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
ESTIMATED ROW ACQUISITION	210 acres	214 acres
TRANSPORTATION	• Improved Level of Service; • Improved regional transportation network; • Reduced traffic, especially trucks, through downtown Portland; and • Changes in access to and from local roadways.	
LAND USE	Conversion of approximately 210 acres to highway ROW	Conversion of approximately 214 acres to highway ROW
SOCIAL ENVIRONMENT		
Social and Community Resources	No impact	
Environmental Justice	• One minority population identified (Block Group 1, Census Tract 202.05). • No disproportionate or adverse impact to any minority or low-income populations.	
DISPLACMENTS		
Residential Displacements	13	
Business Displacements	3	
Non-Profit Displacements	No impact	
ECONOMIC ENVIRONMENT	Improved regional transportation network could enhance area for new and existing businesses	
FARMLAND		
Prime and Unique Farmland (acres)	183	193
Farmland Conversion Impact Rating (Score)	158	159
NATURAL RESOURCES		
Wildlife Habitat Impacted		
Forest/Shrub-scrub (acres)	24	23
Agriculture/Old Field (acres)	166	171
Developed/Disturbed (acres)	20	
Aquatic Resources Present		
Streams Present/Impacted	20 streams present, 19 streams impacted	
Stream Channels Crossed/Encapsulated	18 streams totaling approximately 5,387 linear feet of impact	18 streams totaling approximately 4,836 linear feet of impact
Ponds Present (number)	14 ponds present, approximately 2.3 acres impacted	

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
Wild and Scenic Rivers	No impact	
Wetlands (number/acres)	11 wetlands present, approximately 2.36 acres impacted	
Floodplains (number/acres)	1 floodplain crossed, approximately 1.7 acres impacted	
Threatened and Endangered Species	Federally-Listed Species: • Indiana bat (*Myotis sodalis*) - Not likely to adversely affect. • Northern long-eared bat (*Myotis septentrionalis*) – Not likely to adversely affect. • Gray bat (*Myotis grisescens*) – Best management practices (BMP's) to protect water quality along travel/feeding corridors would be sufficient to minimize potential harm. State-Listed Species: • Orangefin darter (*Etheostoma bellum*) – Suitable habitat present, but BMP's would be sufficient to minimize potential harm. • Splendid darter (*Etheostoma barrenense*) – Suitable habitat present, but BMP's would be sufficient to minimize potential harm. • Teardrop darter (*Etheostoma barbouri*) – No suitable habitat present, not likely to adversely affect.	
INVASIVE SPECIES	No impact	
GEOLOGY and SOILS	Two sinkholes were identified within the limits of the Build Alternative. Detailed geotechnical studies will be conducted during the design phase of project development.	
CULTURAL RESOURCES		
Architectural/Historical Resources	No architectural resources eligible or currently listed on the National Register of Historic Places would be impacted.	
Archaeological Resources	• No archaeological resources eligible or currently listed on the National Register of Historic Places would be impacted. • Site 40SU279 (the Fulghum Cemetery) should be avoided by all ground disturbing activities. However, this site would not be directly impacted by the project.	
AIR QUALITY	No impact	
NOISE (Receptors Impacted)	29	
HAZARDOUS MATERIALS	No impact	

Impact Category	Build Alternative	
	Partial Folded Diamond Interchange Option at SR-52	Folded Diamond Interchange Option at SR-52
PEDESTRIANS and BICYCLISTS	• Beneficial impact due to new sidewalks along the widened section of SR-52 from W. Market St. to Searcy Lane. • Removal of some of the traffic from existing SR-109 in downtown Portland would improve safety. • The 10-foot paved portion of the proposed shoulders along the Build Alternative would provide a safer route for pedestrians and bicyclist compared to the existing route, especially north of downtown Portland.	
VISUAL RESOURCES	Minimal adverse impact because existing transportation facilities are already part of the viewshed, the view has few or no visually sensitive resources, and the proposed project would introduce few, if any, noticeable changes to the viewshed.	
ENERGY RESOURCES	No impact	
SECTION 4(f) RESOURCES	No impact	
SECTION 6(f) RESOURCES	No impact	
CONSTRUCTION	• Temporary traffic detours may be necessary. • Temporary utility disruptions could occur. • The use of BMPs could avoid or minimize air/noise and sedimentation/erosion impacts.	

3.20 Environmental Permits

The acquisition of permits would occur prior to initiation of construction activities, pursuant to TCA Section 69-3-108(a) (*Tennessee Water Quality Control Act of 1977*) and other State and Federal laws and regulations. These permits could include:

- Clean Water Act Section 404 Permit: required for construction that involves placement of dredge and fill material in Waters of the U.S. Typical Waters of the U.S. include rivers, blueline streams, headwaters streams, and special aquatic sites, such as wetlands. Section 404 Permits are issued by the USACE and may include individual or nationwide permits depending on the activity and resource;
- Section 401 Certification: required to ensure that activities requiring Federal permits or licenses will not cause pollution in violation of State water quality standards;
- Aquatic Resource Alteration Permit (ARAP): required for any alterations of State waters, including wetlands that do not require a Federal (Section 404) permit. The ARAP permits are required for construction at locations where the proposed project involves placement of fill in the following: a pond that is spring fed or impacts springs; reservoirs; wetlands; blue line streams; intermittent blueline streams on the USGS 7.5 quadrangle map; any stream that supports any form of aquatic life; or is in the vicinity of a State-listed endangered species. TDEC, Division of Water Pollution Control issues ARAP permits;
- National Pollutant Discharge Elimination System (NPDES) Stormwater Construction Permit: required for grubbing, clearing, grading, or excavation of one or more acres of land and for stormwater discharges. TDEC's Division of Water Pollution Control issues NPDES permits;
- Tennessee Construction General Permit for Storm Water Discharges from Construction Activities (TNCGP): required by operators of construction sites in Tennessee; and
- TDEC Class V Injection Well Permit; for possible impacts to sinkholes. This process involves obtaining a permit before the project is let if open sinkholes are known to exist. If other sinkholes are encountered after construction has begun, the appropriate TDOT offices will be notified and the appropriate steps taken to comply with laws, regulations, and permits.

TDOT would undertake further coordination with the regulatory agencies before preparing mitigation plans and submitting permit applications if the Build Alternative is selected.

4.0 PUBLIC INVOLVEMENT

4.1 Initial Coordination with Federal, State, and Local Agencies and Others

On August 3, 2011, 43 agencies/agency divisions, local officials, and organizations were sent an initial coordination package. This package consisted of a letter describing the project and requesting comments, a project data summary, and a copy of the project's Coordination Plan.

This initial coordination effort afforded concerned agencies, local officials and other interested parties an opportunity to provide input into the project planning process during the early stages of project development. This process helps to ensure that all foreseeable impacts and concerns are considered in the environmental and location studies.

Federal, state, and local agencies were sent letters regarding their Participating Agency status. In addition, the contact for the USACE was sent a letter regarding their Participating and Cooperating Agency status. A list of all agencies, organizations, and other community representatives that were sent an initial coordination package is shown in Table 4.1.

Cooperating and Participating Agencies

Cooperating Agencies are those governmental agencies specifically requested by the lead agencies (FHWA and TDOT) to participate during the environmental evaluation process for the project because of their jurisdictional authority, special expertise, and/or statewide interest.

Participating Agencies are federal, state and local governmental agencies that "may have an interest in the project."

Table 4.1. List of Agencies and Others Involved in Initial Coordination

Agency Type[(1)]	Name	Response Received
Federal (**C** and **P**)	U.S. Army Corps of Engineers, Nashville District-Regulatory Branch	X
Federal (P)	U.S. Environmental Protection Agency	
Federal (**P**)	U.S. Department of Agriculture-NRCS	X
Federal	Federal Emergency Management Agency	X
Federal (P)	U.S. Department of Housing and Urban Development	
Federal (P)	U.S. Department of the Interior-Office of Environmental Policy and Compliance	
Federal (P)	U.S. Department of the Interior-USGS	X
Federal (P)	U.S. Department of the Interior-USGS Water Resources Division	
Federal (**P**)	U.S. Department of the Interior-USFWS	X
Federal (P)	U.S. Department of the Interior-Office of Surface Mining	
Federal (P)	U.S. Department of Agriculture-NRCS Wetland Reserve Program Coordinator	
Federal (P)	Federal Energy Regulatory Commission	
Federal (P)	Federal Aviation Administration	

Table 4.1. List of Agencies and Others Involved in Initial Coordination

Agency Type[(1)]	Name	Response Received
Federal	U.S. Department of Energy	
Federal	Federal Railroad Administration	
Federal	National Oceanic and Atmospheric Administration	
State (**P**)	Tennessee Department of Environment and Conservation-	X
State (P)	Tennessee Department of Economic & Community Development-NEPA Contact	
State (P)	Tennessee Department of Economic & Community Development-Local Planning Assistance Office	
State (**P**)	Tennessee Wildlife Resources Agency	X
State (P)	Tennessee Department of Agriculture	
State (P)	Tennessee Department of Education	
State (P)	Tennessee Housing Development Agency	
Local (P)	Nashville Area Metropolitan Planning Organization	
Local (P)	Robertson County-Office of the Mayor	
Local (P)	Sumner County-Office of the Mayor	
Local (**P**)	City of Portland- Office of the Mayor	X
Local	Metropolitan Planning Commission of Nashville	
Local	Middle Tennessee Regional Planning	
Local	Sumner County Planning Commission	
Local	Robertson County Planning Commission	
Local	Greater Nashville Regional Council	
Local	Portland Chamber of Commerce	
Local	Robertson County Chamber of Commerce.	
Private	NAACP-Gallatin-Sumner County Branch	
Private	Tennessee Trails Association	
Private	Tennessee Conservation League	
Private	Sierra Club	
Private	Chickasaw Group-Sierra Club	
Private	The Nature Conservancy	
Private	Tennessee Wildlife Federation	
Private	Tennessee Environmental Council	
Private	World Wildlife Fund-Southeast Rivers and Streams Project	
Private	Tennessee Chapter of the Sierra Club.	
(1) C-Invited to become a Cooperating Agency; **C**-Accepted Invitation; P- Invited to become a Participating Agency; **P** – Accepted Invitation.		

Section 7 Coordination

TDOT sent an initial coordination letter to the USFWS inviting them to become a Participating Agency for the Portland Bypass project on August 3, 2011. The USFWS responded in a letter on September, 1, 2011 accepting the invitation to be a Participating Agency. A copy of the USFWS response letter is included in Attachment B.

On October 29, 2012, TDOT sent a transmittal letter to the USFWS to provide the acoustic and mist netting survey results for the project conducted earlier that year. The USFWS responded on November 27, 2012 with a concurrence with TDOT's determination that the Build Alternative project is "not likely to adversely affect" the Indiana bat. The USFWS suggested that TDOT consider not removing trees with a DBH of five inches or greater from October 15 through March 31 to further minimize potential harm to the Indiana bat. A copy of the November 27, 2012 USFWS letter is included in Attachment D.

The November 27, 2012 response letter from USFWS also acknowledged the occurrence of gray bats in the study area. Although the gray bats forage in the area, there are no known maternity or hibernacula colonies within the study area. USFWS concerns were primarily related to water quality along travel/feeding corridors for gray bats. They further stated that BMPs, to include stringent erosion and sediment control measures, should be implemented throughout the project to minimize potential for harm to the gray bat.

TDOT coordinated with the USFWS on May 22, 2014 regarding the Portland Bypass project. A response letter from the USFWS on July 2, 2014 contained similar language to the November 27, 2012 response letter, except that in addition to the Indiana bat and gray bat discussions; the northern long-eared bat was mentioned due to the species being proposed to be added as a protected species under the ESA in October 2013. The USFWS requested that additional coordination would be required. A copy of the July 2, 2014 USFWS letter is included in Attachment D.

On April 1, 2015, the USFWS announced that the northern long-eared bat would be listed as a threatened species under the ESA, primarily due to the threat posed by white-nose syndrome; the listing was effective May 4, 2015. The USFWS also issued an interim special rule on April 1, 2015, that eliminates unnecessary regulatory requirements for landowners, land managers, government agencies, and others in the range of the northern long-eared bat. Comments on the proposed rule were accepted until July 1, 2015 and the final 4(d) rule is expected to be finalized by the end of the 2015 calendar year.

The USFWS November 27, 2012 and July 2, 2014 letters both stated that "Based on the best information available at this time, we believe that the requirements of Section 7 of the *Endangered Species Act of 1973*, as amended, are fulfilled." They also stated that "Obligations under Section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect the 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 the consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action." Copies of the USFWS letters are included in Attachment D.

Due to the recent listing of the northern long-eared bat as a Federally-threatened species, and due to some minor project modifications/additions that occurred subsequent to the July 2, 2014 letter, TDOT conducted additional coordination with the USFWS in July 2015 to ensure that Section 7 requirements are met by the project. In a response from the USFWS on July 6, 2015,

they stated that the Section 7 clearance was provided for this project for all three federally-listed bat species (Indiana bat, northern long-eared bat, and gray bat), and that the Section 7 clearance would be covered throughout the duration of the NEPA process. The Section 7 clearance was based on TDOT's commitment to recoordinate all species concerns within two years of project letting if the Build Alternative is selected. Therefore, TDOT would coordinate with the USFWS within two years of project letting, and before any construction activities would occur if the Build Alternative is selected. A copy of the July 6, 2015 USFWS correspondence is included in Attachment D.

Section 106 Coordination

On September 21, 2012, TDOT mailed letters to the mayors of the City of Portland and Sumner County requesting their participation in the historic review process as consulting parties. In addition, TDOT mailed letters to the following seven tribes representing Native American interests to request their participation as consulting parties in the Section 106 process:

- The Cherokee Nation;
- Eastern Band of Cherokee Indians;
- Eastern Shawnee Tribe of Oklahoma;
- Shawnee Tribe;
- Chickasaw Nation;
- Absentee Shawnee Tribe of Oklahoma, and
- United Keetoowah Band of Cherokee Indians.

TDOT received two responses to the initial Section 106 coordination letters. The United Keetoowah Band of Cherokee Indians in Oklahoma provided a response indicating that they had no objection or comment regarding the project. However, they requested that if any human remains or funerary items are inadvertently discovered, that all work cease and that they be contacted immediately. The Mayor of Portland also responded and indicated that the City of Portland would participate as a consulting party in the historic review process. Attachment E of this document contains Section 106-related coordination for this project.

The following consulting and local parties with historic preservation interests, historic groups, and owners of surveyed properties were mailed a copy of the *Historical/Architectural Assessment Report* on October 9, 2013.

- City of Portland Mayor;
- Sumner County Mayor;
- Sumner County Courthouse;
- Sumner County Archives;
- Greater Nashville Regional Council;
- Highland Rim Historical Society;
- Sumner County Historian;
- Sumner County Chapter, Preservation of Tennessee Antiquities;
- Sumner County Historical Society; and
- Owners of three surveyed properties.

To date, TDOT has received no responses or comments concerning the report or historic resources.

4.2 Summary and Disposition of Comments Received from Initial Coordination

Eight agencies replied to the initial coordination package. Table 4.2 contains a brief summary of the comments received and a discussion of how the comments will be addressed. Copies of the full response letters and/or e-mails are provided in Attachment B.

Table 4.2. Summary of Initial Coordination Comments and Responses

AGENCY	DATE	COMMENT	RESPONSE
U.S. Army Corps of Engineers, Nashville District	August 10, 2011	We agree to participate as a cooperating agency in the preparation of your and the Federal Highway Administration's EA for the subject proposal. I am available to participate in onsite inspections or preliminary meetings for the proposed corridor in an effort to identify waters of the U.S. that would be subject to the Corps Regulatory authority and to discuss aquatic resource impact avoidance and minimization. It is not likely that the proposed project would have an effect, either favorable or adverse on any other programs being planned or executed by our agency. The USACE requested that they be afforded the opportunity to review plans, when they are available.	TDOT acknowledges the USACE's acceptance to become a Cooperating and Participating Agency for the project. TDOT would conduct more detailed field investigations during the permitting phase of the project if the Build Alternative is selected as the preferred alternative. TDOT would continue to coordinate with the USACE throughout the remainder of the project planning and permit stages to disclose what the anticipated impacts to waters of the U.S. would be, and to develop methods to avoid, minimize, and/or mitigate those impacts.
U.S. Fish and Wildlife Service	September 1, 2011	TDOT and FHWA have requested that the USFWS be a Participating Agency with the development of the EA. Acceptance of this request does not imply that the USFWS supports the proposal or has any special expertise with respect to the evaluation of the project.	TDOT acknowledges the USFWS's acceptance to become a Participating Agency for the project and appreciates their input for this project. TDOT would continue to work with the USFWS to determine ways to avoid and/or minimize impacts to listed species.
Natural Resources Conservation Service	September 8, 2011	The NRCS accepts the invitation to become a Participating Agency for the proposed Portland Bypass. At this time, the Agency has no comments relative to the initial Coordination Plan.	TDOT acknowledges the NRCS's acceptance to become a Participating Agency for the project and appreciates their input for this project.

Table 4.2. Summary of Initial Coordination Comments and Responses

AGENCY	DATE	COMMENT	RESPONSE
		In response to the request to provide any potential NRCS ongoing or future projects for which the proposed highway project may impact, there is no Wetlands Reserve Program (WRP), Grassland Reserve Program (GRP), or other conservation easements currently filed or pending. The NRCS will provide the necessary assistance and review of resources, such as soils, prime farmland, and wetlands, of which the Agency may have the information during the development of the EA.	TDOT has provided the NRCS with a Farmland Conversion Impact Rating Form and the NRCS provided an estimated acreage of prime farmland expected to be impacted by the project. This information is discussed in Chapter 3 and a copy of the form is contained in Attachment B.
U.S. Geological Survey	August 4, 2011	As a rule, the USGS does not participate in NEPA processes as they have no jurisdiction. They are happy to provide technical assistance and information as needed.	TDOT appreciates the USGS response and will only coordinate with USGS to inform the agency if there are any specific data needs.
Federal Emergency Management Agency	August 8, 2011	Please contact us if there are any questions about the EO 11988 (Floodplain Management) 8-step process and the lead federal agency's EO 11988 determination; or about the projects' potential positive and negative impacts on the National Flood Insurance Program (NFIP), any affected jurisdiction's ratings in the Community Rating System (CRS), any resulting changes in flood insurance policy holder's insurance premiums, and your coordination with and approval from the Local Floodplain Management Administrator for all affected jurisdictions; or about related documents for your official records.	TDOT acknowledges FEMA's response and will continue to coordinate floodplain impacts with the agency. Floodplain impacts are discussed in Chapter 3 of this EA. It is not expected that this project would have any substantial impact to floodplains and would therefore not impact the NFIP.
Tennessee Wildlife Resources Agency	September 13, 2011	Current concerns are associated with potential stream and wetland impacts, potential impacts to floodplains, and potential impacts to listed species under our authority that may occur due to the construction of this project. The agency requests	TDOT acknowledges the TWRA's acceptance to become a Participating Agency for the project and appreciates their input for this project.

Table 4.2. Summary of Initial Coordination Comments and Responses

AGENCY	DATE	COMMENT	RESPONSE
		that for all floodplain crossings, stream crossings, and wetland crossings; linear feet and acreages of impacts be illustrated and tabulated for each alternative proposed for consideration in future correspondence that will be forthcoming from your agency once alignments are determined. There are several state listed species under TWRA authority within the proposed area of study for this project that potentially could be affected by this project depending on the alternative that is chosen for construction. We accept the invitation to be a Participating Agency for the proposed Portland Bypass.	TDOT will continue to work with the USFWS and TWRA to determine ways to avoid and/or minimize impacts to streams, floodplains, wetlands, and federally and state-listed species that may occur in the study area. The proposed Build Alternative being carried forward in the EA will be further refined during the design phase to help avoid or minimize direct impacts to these natural resources to the extent possible. Linear feet of impact to streams and acreage of impact to wetlands and floodplains are included on Table 3.18 within this EA. In addition, TDOT will coordinate more specific impacts to TWRA once more detailed design plans have been developed.
Tennessee Department of Environment and Conservation	September 7, 2011	We are hereby advising you that TDEC does intend to be a Participating Agency in the development of this project. At this time, we do not have specific comments.	TDOT acknowledges TDEC's acceptance to become a Participating Agency for the project and appreciates their input for this project. TDOT will continue to work with TDEC through the NEPA and future permitting processes.
City of Portland	August 5, 2011	In response to your invitation to become a Participating Agency for the previously mentioned project, the City of Portland does wish to participate. We feel that this bypass is a much needed route for our area.	TDOT acknowledges the City of Portland's acceptance to become a Participating Agency for the project and their support for building the proposed project.

4.3 Public Involvement

TDOT held a public meeting for the proposed project on February 16, 2012, from 5:00 p.m. to 7:00 p.m. at the Portland High School in Portland, Tennessee. The purpose of the meeting was to review the project purpose and need, to discuss the NEPA process, and to review the preliminary alternatives or options as identified in the August 31, 2006 TPR. Appendix K contains additional information related to public involvement for this project.

Sixty-seven people signed the attendance sheet for the public meeting. Thirteen TDOT representatives were present to assist the public. Public officials present at the meeting included a State Representative, the Mayor of Portland, and the Sumner County Executive.

Comments were taken from the public in the form of written comments turned in at the meeting, recorded comments made to the court reporter, and comments submitted by mail and e-mail within the comment period. All forms of comments were made part of the official transcript of the meeting.

The official record had a total of 24 people providing comments. There were nine people that made oral comments during the question-and-answer period, and two people made oral comments to the court reporter. Additionally, 22 comment cards were completed and submitted at the meeting or were mailed or e-mailed within the 21-day comment period.

Of the 23 people who expressed a preference on the official comment cards, three people preferred the No-Build Alternative with two of those people suggesting that the Red Alternative (TPR Option A) would be their second choice. Overall, there were six people that favored the Red Alternative (TPR Option A), three people supported the Yellow Alternative (TPR Option B), and 18 people favored the Green Alternative (TPR Option C). The Green Alternative (TPR Option C) is the option that was carried forward as the Build Alternative in this EA.

The most commonly discussed issues or concerns discussed at the public meeting or on comment cards received following the meeting are outlined and addressed in Table 4.3.

Table 4.3. Summary of Comments from the February 2012 Public Meeting.

Comment	Disposition
Opposition to the project or a preference for the No-Build Alternative. (3 comments)	The comments were considered during the alternative analysis process.
Support for the Build Alternative and/or the beneficial effects of the proposed project. (27 comments)	The comments were considered during the alternative analysis process, and they are consistent with the purpose and need of the project.
Concerns about impacts to the overall environment. (8 comments)	Environmental impacts are discussed in Chapter 3 of this EA.
Concerns about air and noise impacts due to traffic and/or construction in the area. (8 comments)	Air and noise impacts are discussed in sections 3.9 and 3.10 in Chapter 3 of this EA and the associated Air Quality and Noise Technical Study Reports.
Concerns about the loss of farmland. (3 comments)	Impacts to farmland are discussed in Section 3.6 in Chapter 3 of this EA. TDOT coordinated with the NRCS through the farmland (AD-1006) coordination process.

Comment	Disposition
Concerns about impacts to homes and businesses. (12 comments)	An analysis based on preliminary plans indicates that approximately 13 homes and three businesses would be displaced by the Build Alternative. If the Build Alternative is selected, TDOT would carry out a ROW and Relocation Program in accordance with Tennessee's U*niform Relocation Assistance Act of 1972*, and the *Federal "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (PL91-646), as amended. Owners of property to be acquired would be offered and paid fair market value, based on comparable sales and land use values in the area, for their property rights. Each person or business to be relocated would be contacted to determine individual needs and desires and to provide replacement property. Relocation services and payments are provided without regard to race, color, religion, or national origin.
Concerns related to historic or archaeology resources. (8 comments)	Impacts to historic or archaeology resources were evaluated during the NEPA process in accordance with Section 106 of the NHPA. No historic or archaeological resources impacts were identified. Historic and archaeological resources are discussed in Section 3.8 of Chapter 3.
Support for purpose and need that include more direct routes to destination, economic development, and improved access. (46 comments)	The overall support for the purpose and need for the project was noted and considered in the development of this EA.
Concerns related to congestion in Portland and safety especially related to truck traffic through downtown Portland. (13 comments)	The concerns expressed were noted and are consistent with the purpose and need for the project. The Build Alternative would address these concerns.
Source: Parsons, 2013.	

4.4 Tennessee Environmental Streamlining Agreement

This project is being developed following the procedures set forth in the Tennessee Environmental Streamlining Agreement (TESA). The purpose of the TESA is to establish a coordinated planning and project development process for transportation projects in Tennessee in order to ensure agency participation/involvement early and throughout the project development process.

To date, TESA Concurrence Points 1 and 2 have been completed. This EA serves as the Concurrence Point 3 document.

4.4.1 Concurrence Point 1 – Purpose and Need and Study Area

The Concurrence Point 1 (CP-1) portion of the project included development of the project purpose and need. The CP-1 document was submitted to the TESA agencies with final concurrence on December 30, 2011. All of the agencies provided concurrence with the purpose and need and two of them provided comments they wanted to see addressed in future concurrence points.

The comments suggested by TESA agencies during CP-1 included concerns regarding environmental impacts associated with streams, wetlands, listed species, and floodplains and requests that those resources be studied and considered during the NEPA process. TDOT has included information pertaining to all of these issues in the EA and will continue to address these concerns throughout the remainder of the environmental phase and during the design, permitting, and construction phases.

4.4.2 TESA Field Review

Following the end of CP-1, TDOT invited the participating agencies to attend a Field Review to introduce them to the project location and to discuss the preliminary options that were identified in the TPR. The agencies met near the study area on March 20, 2012, for the agency field review. Attending were 13 people representing FHWA, TDOT, and several TESA agencies. Following a discussion of the alternatives, a tour of the study area and the proposed alternative corridors was completed. The consensus amongst the TESA agency field review participants was to eliminate the TPR Yellow Alternative (Option B) from further study based upon impacts to farmland, natural resources (including many stream crossings), and potential impacts to the Tennessee Gas Pipeline facilities. During a follow-up TESA meeting on April 10, 2012, in Nashville, the TESA agencies confirmed their recommendation to eliminate the TPR Yellow Alternative (Option B) from further consideration.

4.4.3 Concurrence Point 2 – Project Alternatives to be Evaluated in the Environmental Document

The CP-2 package containing potential project alternatives was submitted to the TESA agencies with final concurrence following on February 25, 2013. All of the agencies provided concurrence with the alternatives being proposed for the project. The agencies agreed that the proposed Build Alternative presented in the CP-2 package was the appropriate alternative to carry forward for further study in this EA. No other alternatives were recommended for consideration.

Two agencies provided comments regarding the project alternatives and/or information they wanted to see included in the EA related to environmental impacts. All of the requested information is contained in the EA, or would be covered in later phases of the project, including the design phase and/or construction phase, should the project proceed with the Build Alternative presented in CP-2.

4.4.4 Concurrence Point 3 –Preliminary Draft EA and Preliminary Mitigation

Based on the output of CP-1 and CP-2 and the subsequent detailed investigation of alternatives and analysis of impacts, TDOT prepared the original version of the Preliminary Draft EA and Preliminary Mitigation document and submitted it to the TESA agencies for their review and comment prior to publishing the EA for public review. The final concurrence for the original CP-3 submittal was on July 7, 2014. Four agencies provided concurrence with the CP-3 document indicating their approval to publish the EA for public review. One agency did not respond, and per the TESA agreement it was assumed that they concurred with the CP-3 document.

Four agencies provided comments regarding the project and/or information they wanted to see considered in the EA related to environmental impacts. All of the requested information is contained in the current document, or would be covered in later phases of the project, including the design phase and/or construction phase, should the project proceed with the Build Alternative.

Subsequent to the July 2014 completion of the original CP-3, TDOT modified the original Build Alternative primarily to provide more detailed information regarding the proposed conceptual design of the project as described in Chapter 2 of this document. This included addition of the two SR-52 interchange options, a flyover ramp at the southern termini of the project, and more detail regarding the connections or access to local roadways.

Due to the modifications to the Build Alternative presented in 2014, TDOT prepared a revised version of the Draft EA and Preliminary Mitigation document and submitted it to the TESA agencies for their review and comment prior to publishing the EA for public review. The final concurrence for the revised CP-3 submittal was on August 24, 2015. Four agencies provided concurrence with the revised CP-3 document indicating their approval to publish the EA for public review. One agency did not respond, and per the TESA agreement it was assumed that they concurred with the revised CP-3 document.

Three of the agencies that provided concurrence with the revised CP-3 document made general comments regarding environmental commitments, requirements, and/or best management practices/procedures that TDOT should consider or adhere to in later phases of the project, including the design phase and/or construction phase, should the project proceed with the Build Alternative.

4.5 Approval of Draft Environmental Assessment

Following approval of the Draft EA by the FHWA, TDOT will advertise and hold a public hearing. Results of the public hearing will be incorporated into the Finding of No Significant Impact (FONSI).

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Note: Appendix L contains copies of website materials/data cited within the body of this EA.

Attachment A:

State Route 109 (Portland Bypass) Project Sheets

from the

Nashville Area Metropolitan Planning Organization's (MPO)

Transportation Improvement Program (TIP) for Fiscal Years 2014-2017

and

2035 Nashville Area Regional Transportation Plan (RTP)

Transportation Improvement Program for FYs 2014-2017

Project Name	**SR-109 Portland Bypass**			**TIP #**	2011-51-108
Improvement Type	New Road			**Lead Agency**	TDOT
County	Sumner County	**Length**	6.80	**Regional Plan ID**	1051-222
Air Quality Status	Non-Exempt	**TDOT PIN**	106634.01	**Project Cost**	$46,000,000.00
Route	SR-109				
Location	Proposed SR-109 - Portland Bypass				
Project Description	Construct new 4 lane roadway				

Fiscal Year	Type of Work	Funding Type	Total Funds	Federal Funds	State Funds	Local funds
2014	PE-D	NHPP	$2,000,000.00	$1,600,000.00	$400,000.00	$0.00

REVISION HISTORY

PROJECT NOTES

Nashville Area Metropolitan Planning Organization

2011-2035 Cost-Feasible Projects

Adopted December 15, 2010

2035ID	Old ID	FY 11-15 TIP ID	COUNTY	LEAD AGENCY	TYPE OF WORK	PROJECT/ ROADWAY NAME	FROM	TO	DESCRIPTION	TOTAL COST	FEDERAL	GRANT
1045-338		2011-45-114	Rutherford	Murfreesboro Public Transit	Transit Capital	5307 Urban capital Funding for Rover Public - Station/Operations/Admin/Training Facility	City of Murfreesboro		Construct new or renovate and rehabilitate existing facility for Multipurpose Transit Facility	$ 1,697,095	$ 1,357,676	5307
1046-269	8006	2008-46-075	Rutherford	City of La Vergne	Bike/Ped	Chaney Blvd	Town of Smyrna-City of La Vergne line	Old Nashville Highway	Construct 5,600 linear feet of sidewalk Project will likely include drainage improvements	$ 154,000	$ 123,200	ENH
1046-270	4015	223	Rutherford	City of La Vergne	Bike/Ped	Fergus Road	Murfreesboro Road	Heritage Valley Circle	Project will extend sidewalks from Murfreesboro Road to Heritage Circle	$ 154,000	$ 123,200	ENH
1046-292		2011-46-056	Rutherford	Town of Smyrna	Bike/Ped	Threet Industrial Boulevard	Sam Ridley Parkway	Town limits (near airport)	Construct greenway along Threet Industrial Boulevard from Sam Ridley Parkway to the Town limits	$ 700,000	$ 560,000	HPP-TN100
1046-293		2011-46-057	Rutherford	Town of Smyrna	Bike/Ped	Smyrna Greenway (Stewart's Creek)	Old Nashville Hwy	S. Lowry St.	Construct greenway along Stewart's Creek from Old Nashville Highway to north of S Lowry St	$ 756,000	$ 604,800	ENH
1046-294		AM-006	Rutherford	City of La Vergne	Bike/Ped	Hurricane Creek Greenway	City Hall to Corps Property		Greenway/ bike trail connecting City Hall with residential areas	$ 147,000	$ 112,000	ENH
1046-295		2006-304	Rutherford	Town of Smyrna	Bike/Ped	Jefferson Springs Greenway	Sharp Springs Park/Percy Priest Lake	Jefferson Springs Recreation Area	Construct 12' pedestrian and bikeway from Sharp Springs Natural Area to Jefferson Springs Recreation Area to make connection toward Murfreesboro	$ 2,988,084	$ 2,390,467	ENH, HPP
1046-296		2006-202	Rutherford	City of Murfreesboro	Bike/Ped	Stones River Battlefield - Natl Park Service Interior	Stones River Battlefield		Plan and design a self-guided interpretive tour route and facility for Stones River Battlefield	$ 4,023,107	$ 4,023,107	PLHD
1046-297		2006-203	Rutherford	City of Murfreesboro	Bike/Ped	Downtown Eagleville	Downtown Eagleville	Downtown Eagleville	Plan and construct a bicycle and pedestrian trail, including enhancments	$ 200,000	$ 160,000	HPP
1046-298		226, 2006-201	Rutherford	City of Murfreesboro	Bike/Ped	Stones River Greenway	Barfield-Crescent Road	Leanna Swamp	Middle Tennessee alternative transportation system along Stones River Portions have been completed	$ 12,102,264	$ 9,681,811	HPP-TN146, ENH,
1047-279		2004-014	Rutherford	City of Murfreesboro	ITS	CCTV and Traffic Signal Connect	SR-96W, US-231N (SR-10), SR-99S		Install fiber optic interconnect cable and associated CCTV & traffic signal support, operations & communications equipment at the traffic operations center and various locations along SR1/2, SR10, SR96, Middle TN Blvd, Fortres Blvd and Medical Center Pkwy	$ 241,000	$ 192,800	M-STP
1047-290		203	Rutherford	City of Murfreesboro	Road Widening, ITS	Middle Tennessee Blvd	Greenland Drive	Main Street	Closed Loop Signal Coordination System and related road widening (widen from 4 to 5 lanes), including bike lanes and reconstruction of sidewalks	$ 7,872,001	$ 6,297,601	HPP, DEMO, M-ST
1051-222	5019, 5020	2011-51-108	Sumner	TDOT	New Road	SR-109 Bypass	New SR-109 South of Portland	Kirby Drive	Construction of new Portland bypass, from new alignment of SR-109 south of Portland to SR-109/ Kirby Drive north of Portland	$ 123,806,957	$ 2,400,000	NHS
1051-233	5043	AM-019	Sumner	TDOT	New Road	SR-109	Hollis Chapel Rd	SR-76	2 to 4 lanes Let 9/18/09 Estimated completion 11/15/11	$ 2,000,000	$ 1,600,000	STP
1051-268		2004-019	Sumner	Millersville	New Road	Cartwright Parkway	SR-41	US-31W	Extend Cartwright Parkway	$ 202,650	$ 162,120	U-STP
1052-120	5004	2008-51-032	Sumner	Gallatin, TDOT	Road Widening	Albert Gallatin Avenue / Hatten Track Road Extension	SR-109	N Water Avenue (SR-174)	Widen existing roadway to five lanes with curb and gutter between Blythe Avenue and North Water Avenue Construct new (2-lane, divided median with turn lanes or 3-lane cross section) roadway connection between Blythe Avenue and SR-109 Acquire right of w	$ 21,512,501	$ 17,210,001	U-STP
1052-174	18	99-New-28	Sumner	Hendersonville	Road Widening	Drakes Creek Road/Indian Lake Blvd.	SR-386 (Vietnam Veterans)	SR-174 (Long Hollow Pike)	Widen from 2-lane rural to 4-lane urban with median from SR 386 to SR-174 Construct new 4-lane street with median from Anderson Rd to SR 174	$ 1,400,000	$ 1,120,000	U-STP
1052-176	5009	2006-014	Sumner	Hendersonville	Road Widening	New Shackle Island Road	SR 6 (W. Main)	SR 386 (Vietnam Veterans)	Widen from 2/3 lanes to 5	$ 3,975,030	$ 3,180,024	U-STP
1052-177	31	2002-028	Sumner	Hendersonville	Road Widening	Rockland Rd	Center Point Rd	Imperial Blvd	Widen/construct 3- lanes Extend New Shackle Island Road across CSX to Rockland Road	$ 11,903,960	$ 9,511,668	U-STP
1052-180	36	2002-029	Sumner	Hendersonville	Road Widening	Walton Ferry Rd	Imperial Blvd/Gail	SR 6 (W. Main)	Widen from 2 to 5 lanes, including intersection re-alignment at SR 6	$ 6,404,785	$ 5,123,828	U-STP
1052-223	32	AM-018	Sumner	TDOT	Road Widening	SR-109	Cumberland River	SR-109 Bypass (S of Gallatin)	Widen from 2 to 5 including center turn lane PE completed 9/19/08 ROW underway	$ 10,646,317	$ 1,686,184	NHS
1052-273		2011-510-017	Sumner	Gallatin	Realignment	Airport Road	Steam Plant Road	Gregory Drive	Relocate of a portion of Airport Road and all associated costs to allow for runway and hangar expansion at the Sumner County Regional Airport to meet FAA safety regulations and to attract business and industry to Gallatin and Sumner County	$ 1,500,000	$ 1,500,000	HPP
1052-276	58	99-New-23	Sumner	Gallatin	Realignment	E Broadway Ave (SR-6)	N Water Ave	College Street	E Broadway Avenue (SR-6) - Realignment of N Water Avenue and signalization, roadway and streetscape improvements on SR-6 from W Eastland Avenue to College Street	$ 768,000	$ 742,800	U-STP
1053-240	5017	2006-416	Robertson, Sumner	TDOT	Interchange	I-65 @ SR-109 Interchange	SR-109		New interchange at I-65 and the relocated SR-109 PE scheduled 3rd qtr 2010 EA completed 1/6/10	$ 42,074,464	$ 60,800	NHS
1054-255	5032	2011-54-156	Sumner	White House	Intersection	Tyree Springs (SR-258)	South Palmers Chapel Rd		Center turn lane construction on Tyree Springs onto South Palmers Chapel Roadway and center left turn lane and right turn lane improvements and widending on South Palmers Chapel Road adjacent to Intersection	$ 350,000	$ 187,916	U-STP, Safety
1054-263	18	2008-52-034	Sumner	Hendersonville	Interchange	Indian Lake Blvd	SR 386		Widen Indian Lake Blvd bridge over SR 386 from 2 to 6 lanes; widen approaches; improve ramps; install signal	$ 5,775,000	$ 4,620,000	U-STP
1054-275	8004	2008-54-033	Sumner	Gallatin, TDOT	Intersection	SR-6 (Various Intersection Improvements)	SR-25	Locust St	Improve and upgrade existing signalization infrastructure at the intersection of SR-6/SR-25 and SR-6/Locust Street Add turn lane on SR-25	$ 341,000	$ 333,000	U-STP
1054-280		2004-020	Sumner	City of Portland	Intersection	SR-109	Kirby Drive		Install traffic signal and turn lanes from SR-109 onto Kirby and from Kirby onto SR-109	$ 665,845	$ 665,845	L-STP, U-STP
1056-299		2008-56-082	Sumner	Sumner County	Bike/Ped	Lower Station Camp Greenway	Parallel Lower Station Camp Creek Rd		Convert a portion of the roadway to non-motorized transportation use The project will be a combination of new alignment and existing roadway It begins at Big Station camp Blvd and extends to Lower Station Camp Creek Road	$ 554,810	$ 443,848	HPP-TN239, CMAC
1056-300		2009-56-027	Sumner	City of Gallatin	Bike/Ped	Town Creek Greenway	Generally along US 31E/SR-6		Pedestrian and bike trail into downtown Gallatin along Town Creek from Triple Creek Park to Smith Street Project includes multiple segments with access to Municipal Park and residential neighborhoods as well as a connection to the Gallatin Civic Center	$ 33,750	$ 27,000	U-STP

Attachment B:

Initial Coordination Responses

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
3701 Bell Road
NASHVILLE, TENNESSEE 37214

REPLY TO
ATTENTION OF:

August 10, 2011

Regulatory Branch

SUBJECT: File No. 2011-00758; Initial Coordination on Proposed SR 109 Portland Bypass, around the City of Portland, in Sumner and Robertson Counties, TN (PIN 106634.01)

Ms. Ann Andrews
Tennessee Department of Transportation
Environmental Planning Office
Suite 900, James K. Polk Building
Nashville, TN 37243-0334

Dear Ms. Andrews:

In response to your August 3, 2011, request, we agree to participate as a cooperating agency in the preparation of your and the Federal Highway Administration's Environmental Assessment (EA) for the subject proposal.

I am available to participate in onsite inspections or preliminary meetings for the proposed corridor in an effort to identify waters of the US that would be subject to the Corps Regulatory authority and to discuss aquatic resource impact avoidance and minimization.

It is not likely that the proposed project would have an effect, either favorable or adverse, on any other programs being planned or executed by our agency.

Thank you for the opportunity to participate in your planning process. When your preliminary plans are developed, please submit your information to me directly. Until that time, if you have any questions or comments please contact me at the above address or phone (615) 369-7504.

Sincerely,

Lisa R. Morris

Lisa R. Morris
Project Manager
Operations Division

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

September 1, 2011

Mr. David H. Thompson
Tennessee Department of Transportation
Environmental Planning and Permits Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subject: FWS# 11-CPA-0743. Initial Coordination for the proposed construction of the State Route 109 (Portland Bypass) project from near State Route 76 to the proposed Interstate 65 Interchange; PIN# 106634.01, P.E. 72005-0217-14, Sumner and Robertson counties, Tennessee.

Dear Mr. Thompson:

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration (FHWA), is initiating National Environmental Policy Act (NEPA) documentation and analysis for the proposed construction of the State Route 109 (Portland Bypass) project from near State Route 76 to the proposed Interstate 65 Interchange in Sumner and Robertson counties, Tennessee. The purpose of this project is to reduce traffic density in downtown Portland by providing an alternative route, support economic development, improve traffic safety, and provide for a north/south route for accessibility to the interstate highway system.

TDOT and the FHWA have requested that the U.S. Fish and Wildlife Service (Service) be a participating agency with the development of the Environmental Assessment. Acceptance of this request does not imply that the Service supports the proposal or has any special expertise with respect to the evaluation of the project.

We have reviewed the project summary and the possible role that our agency would have in the development of the State Route 109 (Portland Bypass) project in Sumner and Robertson counties, Tennessee. We accept the invitation to be a participating agency in the development of this project. Our office will strive to provide timely input, participate in coordination meetings, and comment on all alternatives.

Thank you for the opportunity to participate in this process. 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,

Mary E. Jennings
Field Supervisor

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
675 US Courthouse
801 Broadway
Nashville, Tennessee 37203

September 8, 2011

Ms. Ann Andrews
Tennessee Department of Transportation
Environmental Division
505 Deadrick Street, Suite 900
Nashville, Tennessee 37243-0334

Dear Ms. Andrews:

The Natural Resources Conservation Service (NRCS) accepts the invitation to become a Participating Agency for the proposed new State Route 109 (SR-109) Bypass around the City of Portland in Sumner and Robertson Counties, Tennessee. At this time, the Agency has no comments relative to the initial Coordination Plan.

In response to the request to provide any potential NRCS ongoing or future projects for which the proposed highway project may impact, there is no Wetlands Reserve Program (WRP), Grassland Reserve Program (GRP), or other conservation easements currently filed or pending. In the event an application is received and considered for enrollment within the proposed project area, the Agency will take into consideration the proposed Bypass project before proceeding with the easement.

The NRCS will provide the necessary assistance and review of resources, such as soils, prime farmlands, and wetlands, of which the Agency may have the information during the development of the Environmental Assessment.

Thank you for the opportunity to comment.

Susan Hopkins, Acting

KEVIN BROWN
State Conservationist

cc: Carolyn Dillard, DC, NRCS, Gallatin, TN
Chris Hancock, RC, NRCS, Nashville, TN
Michelle Beasley, SE, NRCS, Nashville, TN
Phillip Wilson, DC, NRCS, Springfield, TN
John Rissler, SRC, NRCS, Nashville, TN
Craig Ellis, ATCP, NRCS, Nashville, TN

Budnik, Joel

From: David.H Thompson [David.H.Thompson@tn.gov]
Sent: Monday, August 08, 2011 7:50 AM
To: Budnik, Joel; Eggering, Luke
Subject: Fwd: RE: Sent on Behalf of TDOT - Coordination Package; State Route 109 (Portland Bypass) Environmen

fyi

>>> "Straw, William" <william.straw@dhs.gov> 8/5/2011 1:03 PM >>>

Ms. Andrews: Good afternoon & thank you for the opportunity to comment on this proposed project.

With this office's workloads & small staff, we must use email whenever possible. Since this email is from an official, sole access email address, it serves as sufficient for most legal purposes. We can mail signed hardcopy if requested.

DHS/FEMA Region IV's initial comments: Your project summary data sheet, page 11, Hydrological Impacts section mentions floodplain impact evaluation. Please feel to contact us if there are any questions about the Presidential Executive Order (EO) 11988 (Floodplain Management) 8-step process and the lead federal agency's EO 11988 determination; or about the projects' potential positive & negative impacts on the National Flood Insurance Program (NFIP), any affected jurisdiction's ratings in the Community Rating System (CRS), any resulting changes of flood insurance policy holders' insurance premiums, and your coordination with and approval from the Local Floodplain Management Administrator (or State Floodplain Coordinator if there's no local administrator) for all affected jurisdictions; or about related documents for your official records.

Thanks again for the opportunity to comment on this proposed project.

Sincerely,

[signed]

"William" R Straw

Regional Environmental Officer &

EO 11988 External Consultation Lead

DHS/FEMA Region IV

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

September 13, 2011

Ann Andrews
Environmental Division, TDOT
James K. Polk Building - Suite 900
505 Deaderick Street
Nashville, TN 37243-0334

Re: **Invitation to Participate** – State Route 109 from near State Route 76 to Interstate 65 in Sumner and Robertson Counties, Tennessee

Dear Ms. Andrews:

The Tennessee Wildlife Resource Agency has received and reviewed the information your office provided to us regarding the proposed project listed above. Our current concerns are potential environmental impacts associated with stream and wetland impacts, potential impacts to floodplains, and potential impacts to listed species under our authority that may occur due to the construction of this project. We therefore request that for all floodplain crossings, stream crossings, and wetland crossings; linear feet and acreages of impacts be illustrated and tabulated for each alternative proposed for consideration in future correspondence that will be forthcoming from your agency once alignments are determined. There are several state listed species under our authority within the proposed area of study for this project that potentially could be affected by this project depending upon the alternative that is chosen for construction.

We accept the invitation to be a Participating Agency for the proposed State Route 109 from near State Route 76 to Interstate 65 in Sumner and Robertson Counties, Tennessee. We thank you for the opportunity to participate during the coordination process and look forward to working with TDOT personnel in the future to reduce potential impacts to fish and wildlife resources associated with this project.

Sincerely,

Robert M. Todd

Robert M. Todd
Fish and Wildlife Environmentalist

cc: Ed Harsson, Wildlife Biologist/West TN TDOT Liaison
David Sims, Region II Habitat Biologist
Tim Cleveland, Region II Manager

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
7TH FLOOR, L&C ANNEX
401 CHURCH STREET
NASHVILLE, TENNESSEE 37243-1534

September 7, 2011

Ms. Ann Andrews
Tennessee Department of Transportation
Environmental Division
Suite 900, J.K. Polk Bldg
Nashville,, TN 37243

Re: Coordination package for the proposed State Route 109 (Portland Bypass) from near State Route 76 to Interstate 65 in Sumner and Robertson Counties, Tennessee.

Dear Ms. Andrews:

We are in receipt of the above referenced material and are hereby advising you that the Tennessee Department of Environment and Conservation does intend to be a participating agency in the development of this project. At this time, we do not have specific comments on the Coordination Plan.

Thank you for the opportunity to participate in the planning of this project.

Sincerely,

Daniel C. Eagar

Daniel C. Eagar,
Manager, Natural Resources Section

Cc: File copy

OFFICE OF THE MAYOR
100 SOUTH RUSSELL STREET
PORTLAND, TENNESSEE 37148
Telephone 615/325-6776
Fax 615/325-5345
Email Address: Kmayor@cityofportlandtn.gov

August 5, 2011

Ms Ann Andrews
Tennessee Department of Transportation
Environmental Division
James K. Polk Building, Suite 900
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: State Route 109 (Portland Bypass) Environmental Assessment
Sumner and Robertson Counties --- PIN 106634.01

Ms Andrews:

In response to your invitation to become a *Participating Agency* for the above mentioned project, the City of Portland does wish to participate. We feel that this bypass is a much-needed route for our area.

Please contact my office should you have questions or concerns regarding our participation.

Sincerely,

Kenneth Wilber
Mayor

Oneok Partners (Midwestern Gas Transmission) Email

Subject: FW: (External) SR 109 Bypass of Portland, TN
Attachments: Portland Bypass March 2013 with MGT Lines 9-10-2013.pdf

Importance: High

From: Dailey, Steven L. [mailto:Steven.Dailey@oneok.com]
Sent: Tuesday, September 10, 2013 9:21 AM
To: Abel, Kevin
Cc: Cline, Kenneth D.; Gadid, Amir; MGT Portland
Subject: RE: (External) SR 109 Bypass of Portland, TN
Importance: High

Kevin,

I have sketched our pipelines on your drawing. According to your drawing the Portland Bypass is not in conflict with either of our pipelines. There will be a conflict with the SR-109 Relocation.

Regards,
Steve Dailey
Sr. Engineer
815-467-4633 x130

From: Abel, Kevin [mailto:Kevin.Abel@parsons.com]
Sent: Thursday, August 22, 2013 9:32 AM
To: Williamson, Jerry W.
Cc: Cline, Kenneth D.; Gadid, Amir; Dailey, Steven L.; MGT Portland
Subject: RE: (External) SR 109 Bypass of Portland, TN

Jerry,

That's fantastic. I look forward to hearing from someone. Thanks again for all of your help.

Kevin L. Abel, P.E.
PARSONS
6750 Lenox Center Court, Suite 117
Memphis, TN 38115
Phone: (901) 248-6181
Fax: (901) 248-6180

From: Williamson, Jerry W. [mailto:Jerry.Williamson@oneok.com]
Sent: Thursday, August 22, 2013 9:30 AM
To: Abel, Kevin
Cc: Cline, Kenneth D.; Gadid, Amir; Dailey, Steven L.; MGT Portland
Subject: RE: (External) SR 109 Bypass of Portland, TN

Kevin: I have forwarded both letter to management and engineering for review one of them will contact you to provide an official answer to your concerns.

From: Abel, Kevin [mailto:Kevin.Abel@parsons.com]
Sent: Thursday, August 22, 2013 9:14 AM
To: Williamson, Jerry W.
Subject: (External) SR 109 Bypass of Portland, TN

Jerry,

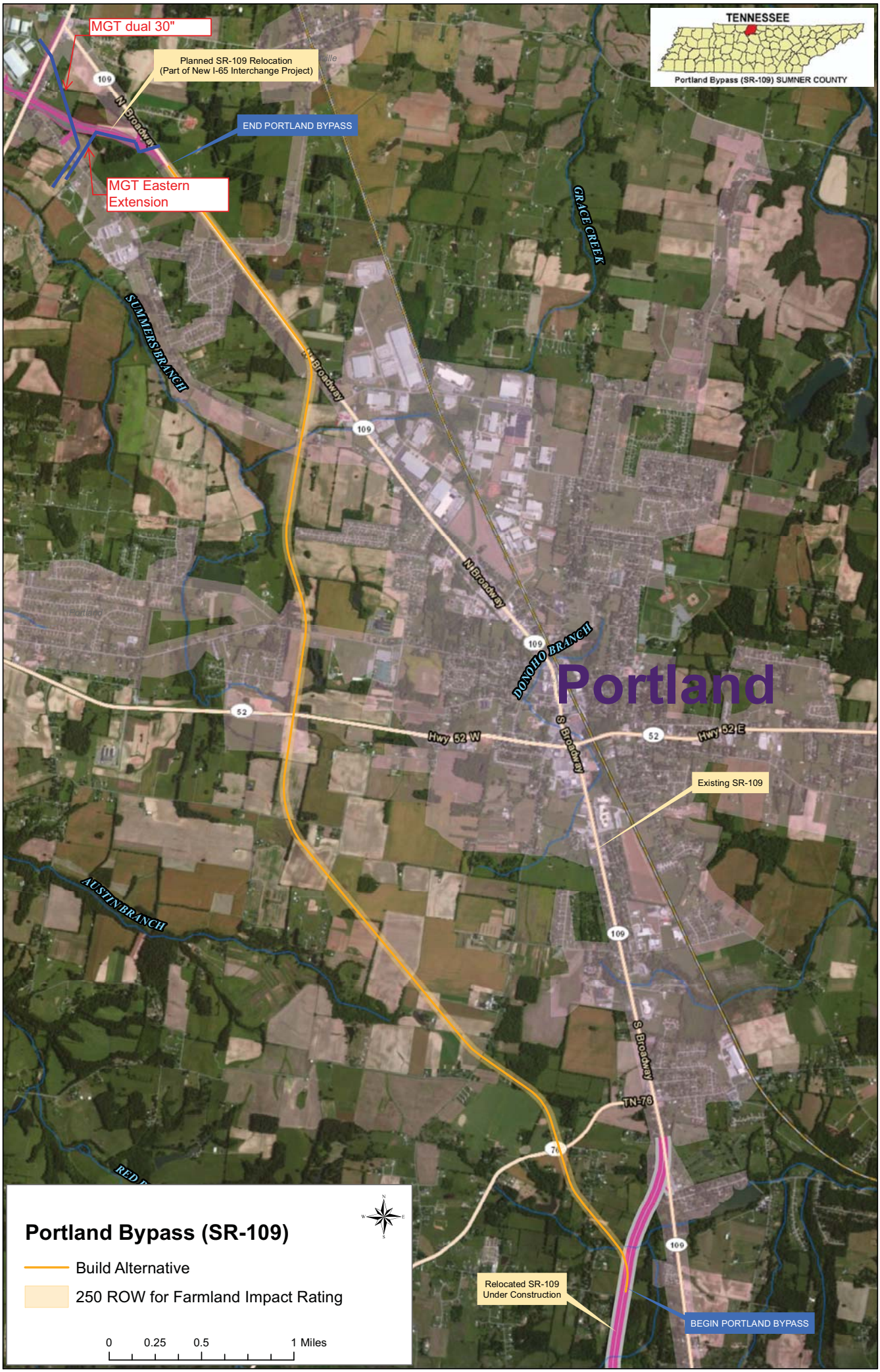
As we talked about by phone, Parsons is preparing an Environmental Assessment for the State Route 109 Bypass of Portland. We would like to document any concerns Midwestern Gas may have regarding the construction of a new four-lane divided highway across your pipelines, if it does in fact cross you somewhere. The roadway could potentially be cutting down to you or adding fill on top of your lines. We need to know for our report what kinds of things this may trigger, if you will require any special considerations and what concerns you may have for your operations or production facilities due to the construction of this road.

Ideally, Midwestern Gas will provide a letter on company letterhead voicing these concerns and provide contact information for future communications. This letter will be included in the environmental document as a record of our coordination.

Feel free to contact me with any questions, or if you need additional information. You have the pdf showing the bypass alternative and I have attached a pdf of the typical roadway section for your reference.

Thank you for your assistance with moving this project forward.

Kevin L. Abel, P.E.
PARSONS
6750 Lenox Center Court, Suite 117
Memphis, TN 38115
Phone: (901) 248-6181
Fax: (901) 248-6180


TENNESSEE
Portland Bypass (SR-109) SUMNER COUNTY
MGT dual 30"
Planned SR-109 Relocation
(Part of New I-65 Interchange Project)
END PORTLAND BYPASS
MGT Eastern
Extension
GRACE CREEK
SUMMERS BRANCH
N Broadway
DONOHO BRANCH
Portland
Hwy 52 W
Hwy 52 E
S Broadway
Existing SR-109
AUSTIN BRANCH
TN-76
Relocated SR-109
Under Construction
BEGIN PORTLAND BYPASS
Portland Bypass (SR-109)
Build Alternative
250 ROW for Farmland Impact Rating
0 0.25 0.5 1 Miles

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
Civil Rights Division
Suite 1800, James K. Polk Building
505 Deaderick Street, Nashville, Tennessee 37243
Telephone No. 615-741-3681, Fax No. 615-741-3169

August 24, 2015

Tennessee Department of Transportation
Environmental Division
Attn: Meridith Krebs
505 Deaderick Street, Suite 900
James K Polk Building
Nashville, TN 37243-0334

Re: Preliminary Draft Environmental Assessment and Preliminary Mitigation for SR-109 (Portland Bypass) CP3

Dear Ms. Krebs:

After reviewing the Preliminary Draft Environmental Assessment and Preliminary Mitigation for SR-109 (Portland Bypass) CP3, the TDOT Civil Rights Division found the assessment and the methodology used is in keeping with the spirit of the laws that govern programs/projects that are federally funded, specifically, Title VI of the 1964 Civil Rights, Executive Order 12898, FHWA Order 6640.23A, and the National Environmental Policy Act (NEPA).

Thank you for the opportunity to review and comment on the Preliminary Draft Environmental Assessment and Preliminary Mitigation for SR-109 (Portland Bypass) CP3. Should you have questions or comments, please do not hesitate to me at Cynthia.Howard@tn.gov or 615-253-1066.

Sincerely,

Cynthia Howard
Title VI Program Director

Attachment C:

TDOT Conceptual Stage Relocation Plan (CSRP)

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

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

CONCEPTUAL STAGE RELOCATION PLAN

County:	**Sumner**
Route:	**SR-109 (Portland Bypass)**
NEPA Project Number:	**83078-0201-14**
Design Project Number:	**83078-1201-14**
Federal Project Number:	**NHE-109(27)**
PIN Number:	**106634.01**

Termini: From: Near Dorris Road To: Ronnie McDowell Parkway (SR-109)

This CSRP will address the potential impact that the recent design changes listed below will have on the number of anticipated relocations. The design changes are shown on the referenced pages of the CSRP Marked Plans.

- Redesign of the interchange with flyover at the beginning of the project (Sheet 3.1)
- Removal of the Payne Road - SR-109 intersection (Sheet 3.7)
- Replacement of the "diamond" interchange option at SR-52 & SR-106 with a partial cloverleaf (Sheet 3.8)
- Inclusion of a second design option for the College Street - SR-109 intersection (Sheet 3.9A)
- Redesign of the Kenwood Drive and Woods Road intersections with SR-109 (Sheet 3.13)
- Redesign of the Kenwood Drive and Woods Road intersection (Sheet 3.13)

None of the above changes will have any influence on the anticipated number of relocations.

PROJECT INFORMATION: The Tennessee Department of Transportation (**TDOT**) is proposing to realign and extend 6.8± miles of SR-109 (US-412) in order to improve safety, relieve traffic congestion in the city of Portland, and promote economic growth. SR-109 is the major connector between Gallatin (the Sumner County Seat) and I-65, 20± miles to the northwest in Robertson County. A location map of the proposed project area is shown on Page 4 of this report.

Typical sections as shown on the submitted plans indicate two 12 foot traffic lanes in each direction separated by a 48 foot depressed median, 6 foot inside shoulders (4 feet stabilized), and 12 foot outside shoulders (10 feet stabilized). The width of the proposed right-of-way will be 250 feet. Width of the proposed right-of-way will vary according to construction requirements.

AREA INFORMATION: The subject area is located in the northwest portion of Sumner County and to the immediate west of the city of Portland. Current land use in the project area is primarily agricultural and residential.

According to the U. S. Census Bureau, the estimated population for Sumner County in 2013 was 168,888. This reflects a 5.1% increase since the 2010 census. In 2013, the population of Portland was estimated to be 11,993, reflecting a 4.4% increase since the 2010 census.

DISPLACEMENTS:

ANTICIPATED RELOCATIONS	
SINGLE FAMILY RESIDENCES	**13**
BUSINESSES	**3**

DISPLACEMENT EFFECTS AND ANALYSIS

Single Family

Construction of this project is expected to result in the displacement of 12 (twelve) single family residences and 1 (one) single bedroom efficiency apartment. Based on field observation, the single family residences appear to be typical for the area in terms of size and style. A majority of the single family displacees are expected to be owner occupants.

The number of single family residences being displaced will be unaffected by construction of any of the design options or changes.

Businesses

Construction of this project is expected to result in the displacement of 3 (three) businesses. The locations are labeled on Sheet 3.11 (barber shop), Sheet 3.12 (unknown business activity), and Sheet 3.13 (boat repair), of the CSRP Marked Plans. None of the affected business is expected to have more than 12 employees.

The number of businesses being displaced will be unaffected by construction of any of the design options or changes.

Other

No mobile homes, multi-family units, or farming operations are expected to be displaced by this project or any of the design options or changes.

Availability of Replacement Housing

A survey of the Sumner County real estate market in the immediate project area was conducted to determine the availability of residential and commercial real estate for either sale or lease. Results of the survey indicate that the supply of available property in the project area appears to be adequate to satisfy the relocation requirements of the 13 households and three affected businesses.

ENVIRONMENTAL: Although the proposed improvement will potentially result in the displacement of 13 families and three businesses, the immediate area should experience only minor impact. No neighborhoods will be disrupted nor will access from areas on either side of the roadway be significantly affected.

Because of the unknown nature of the business activity shown on Sheet 3.12 (914 North Broadway), the site should be inspected as a precaution for any surface or subsurface contamination. A boat repair business appears to be operating at the "Business Relocation" shown on Sheet 3.13 (939 North Broadway.) As such, the site should be inspected for any surface or subsurface contamination.

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:

_____

David S. Goodman
Transportation Specialist 1

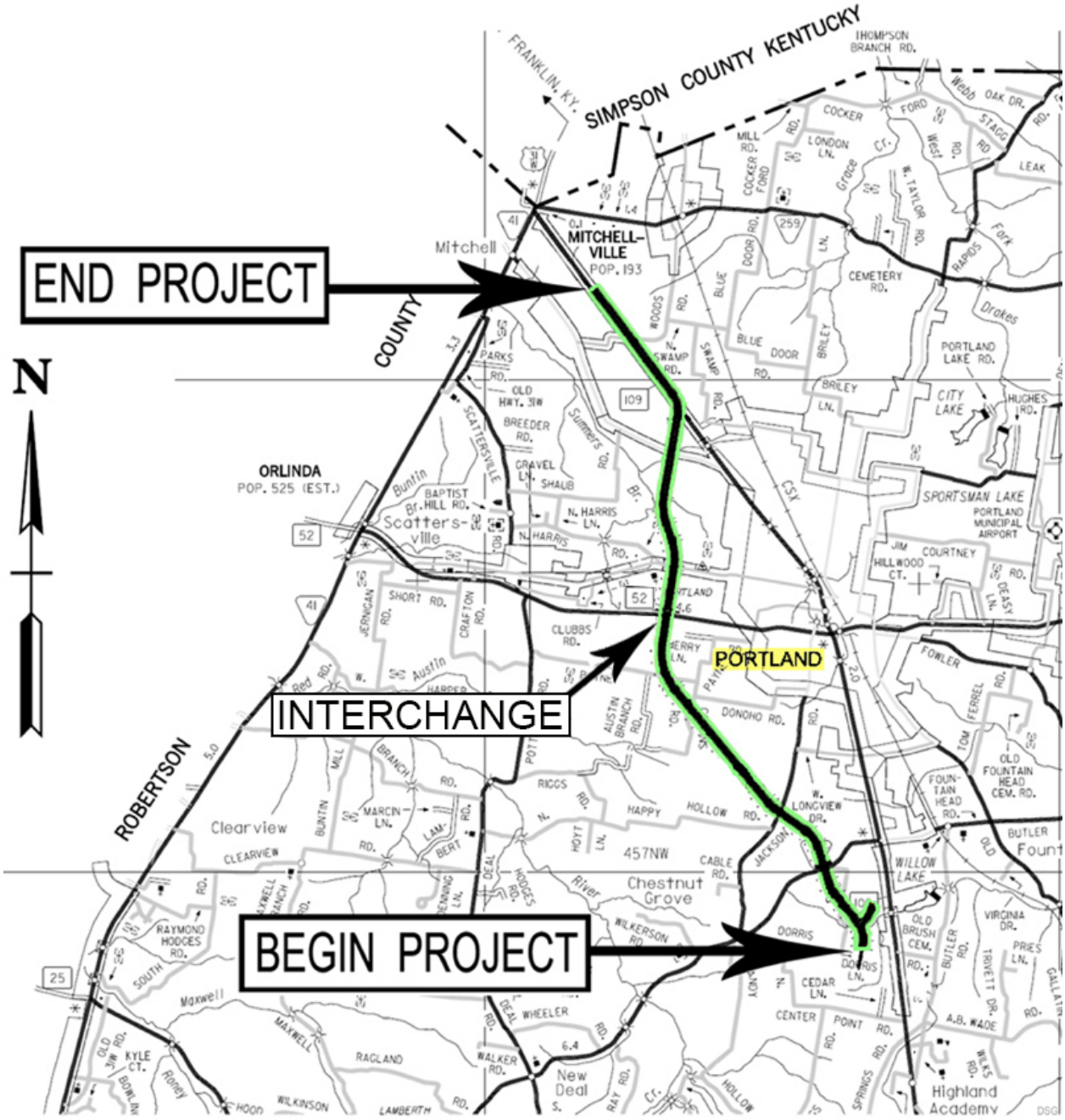
Approved by:

_____

Gale Wagner
Transportation Manager

LOCATION MAP

(For Illustration Only)



TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

CSRP MARKED PLANS - PIN 106634.01

Updated to Include:

A Redesigned Interchange With Flyover At The Beginning Of The Project (Sheet 3.1)
Removal Of The Payne Road - SR-109 Intersection (Sheet 3.7)
Replacement Of The "Diamond" Interchange Option At SR-52 & SR-106 With A Partial Cloverleaf (Sheet 3.8)
Inclusion Of A Second Design Option For The College Street - SR-109 Intersection (Sheet 3.9A)
Redesign Of The Kenwood Drive and Woods Road Intersections With SR-109 (Sheet 3.13)
Redesign Of The Kenwood Drive and Woods Road Intersection (Sheet 3.13)

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.1

Note: Typical Sections are shown on the last page of this plan set

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.1
S.R. 109
BYPASS

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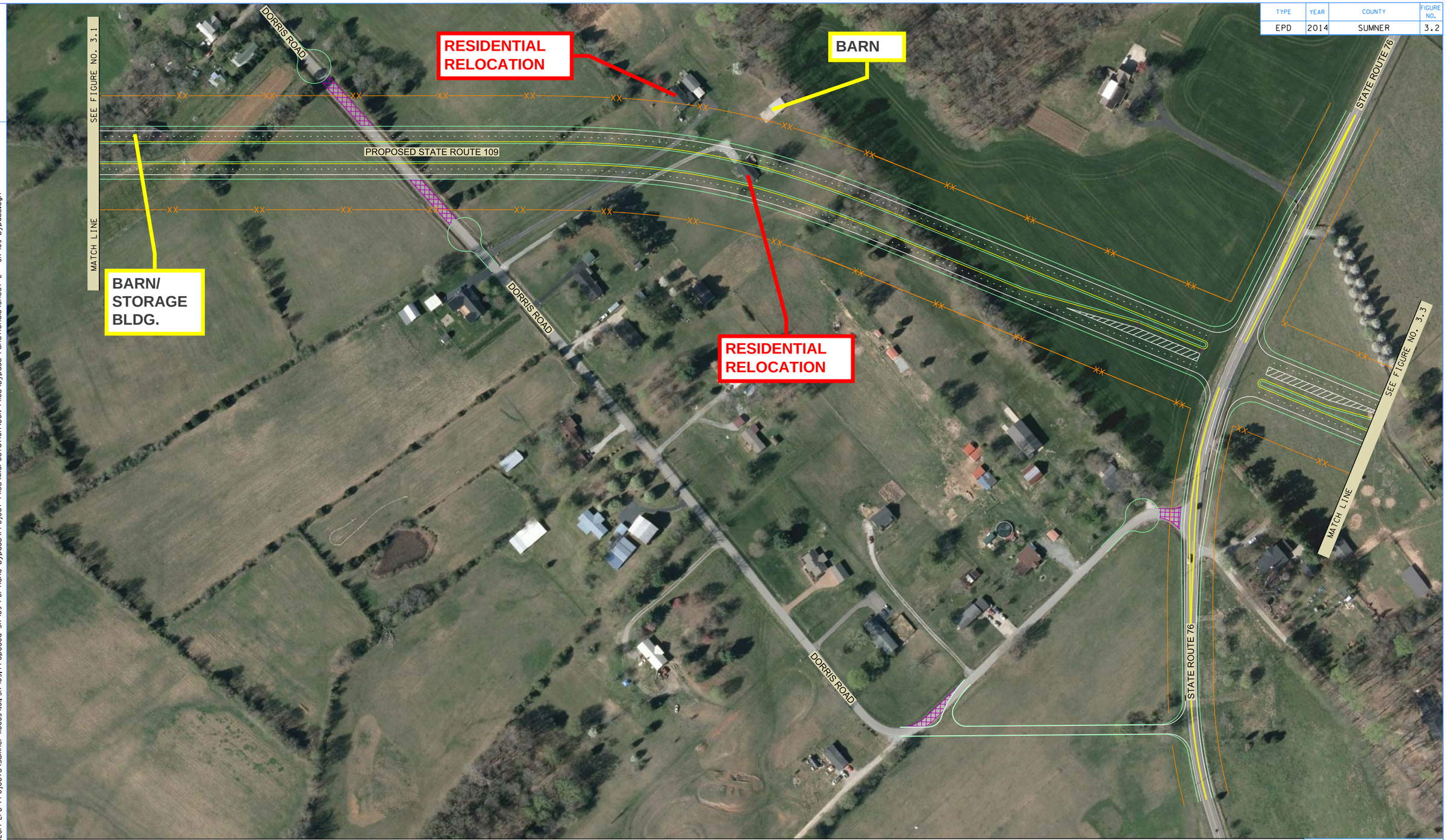
TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.2



0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.2
S.R. 109
BYPASS

TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.3

RESIDENTIAL RELOCATION

BARN

RESIDENTIAL RELOCATION

SEE FIGURE NO. 3.2

MATCH LINE

PROPOSED STATE ROUTE 109

SEE FIGURE NO. 3.4

MATCH LINE

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.3
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ____

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.4

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.4
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ____

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.5

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.5
S.R. 109
BYPASS

TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ____

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.6

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.6
S.R. 109
BYPASS

TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.7

PAYNE ROAD

PROPOSED STATE ROUTE 109

SEE FIGURE NO. 3.9

MATCH LINE

PAYNE ROAD

SEE FIGURE NO. 3.8

MATCH LINE

INTERCHANGE OPTION #1

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.7
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.7A

PAYNE ROAD

PROPOSED STATE ROUTE 109

SEE FIGURE NO. 3.9

MATCH LINE

SEE FIGURE NO. 3.8A

MATCH LINE

PAYNE ROAD

INTERCHANGE OPTION #2

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.7A
S.R. 109
BYPASS

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TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

PARTIAL "CLOVERLEAF" INTERCHANGE OPTION

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.8

STATE ROUTE 52

SEE FIGURE NO. 3.7

MATCH LINE

PROPOSED STATE ROUTE 109

PROPOSED STATE ROUTE 109

SEE FIGURE NO. 3.9

MATCH LINE

STATE ROUTE 52

MATCH LINE

SEE FIGURE NO. 3.15

INTERCHANGE OPTION #1

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.8
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.8A

MATCH LINE SEE FIGURE NO. 3.17

STATE ROUTE 52

SEE FIGURE NO. 3.7A

SEE FIGURE NO. 3.9A

PROPOSED STATE ROUTE 109

PROPOSED STATE ROUTE 109

MATCH LINE

MATCH LINE

STATE ROUTE 52

MATCH LINE SEE FIGURE NO. 3.15

INTERCHANGE OPTION #2

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.8A
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.9

SEE FIGURE NO. 3.10

MATCH LINE

SEE FIGURE NO. 3.8

MATCH LINE

COLLEGE STREET

COLLEGE STREET

PROPOSED STATE ROUTE 109

RESIDENTIAL RELOCATION

RESIDENTIAL RELOCATION

RESIDENTIAL RELOCATION

INTERCHANGE OPTION #1

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.9
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ____

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.9A

SEE FIGURE NO. 3.8A

MATCH LINE

SEE FIGURE NO. 3.10

MATCH LINE

COLLEGE STREET

PROPOSED STATE ROUTE 109

RESIDENTIAL RELOCATION

RESIDENTIAL RELOCATION

RESIDENTIAL RELOCATION

INTERCHANGE OPTION #2

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.9A
S.R. 109
BYPASS

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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.10

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.10
S.R. 109
BYPASS

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TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.11

TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ____

SEE FIGURE NO. 3.10
MATCH LINE
T G T ROAD
PROPOSED STATE ROUTE 109
SEE FIGURE NO. 3.12
MATCH LINE
BARN
RESIDENTIAL RELOCATION
RESIDENTIAL RELOCATION (One Bedroom Apartment)
BUSINESS RELOCATION (Barber Shop)
EXISTING STATE ROUTE 109
KIRBY ROAD
EXISTING STATE ROUTE 109

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.11
S.R. 109
BYPASS

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TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.12

Possible Environmental Contamination

BUSINESS RELOCATION

Utility Structure

RESIDENTIAL RELOCATION

SEE FIGURE NO. 3.11

MATCH LINE

PROPOSED STATE ROUTE 109

EXISTING STATE ROUTE 109

STATE ROUTE 109

SEE FIGURE NO. 3.13

MATCH LINE

0′ 200′ 400′ 600′

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.12
S.R. 109
BYPASS

TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.13

RESIDENTIAL RELOCATION

Utility Structures

RESIDENTIAL RELOCATION

KENWOOD DRIVE

VANNATTA RO.

SEE FIGURE NO. 3.12

SEE FIGURE NO. 3.14

STATE ROUTE 109

STATE ROUTE 109

MATCH LINE

MATCH LINE

RESIDENTIAL RELOCATION

BUSINESS RELOCATION

Possible Environmental Contamination

WOODS ROAD

BARN

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.13
S.R. 109
BYPASS

2/12/2015 2:24:58 PM
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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.14

END PROJECT

STATE ROUTE 109

SEE FIGURE NO. 3.13

MATCH LINE

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.14
S.R. 109
BYPASS

1/16/2015 8:57:22 AM X:\Expedited Project Delivery\2014 EPD Projects\Sumner\106634.01, SR-109, Proposed SR-109 Portland Bypass\Project Files\Microstation\DGN Files\Bypass Functionals\Sheet 14 - SR 109 Bypass.dgn

TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ____

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.15

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.15
S.R. 109
BYPASS

12/2/2015 2:04:49 PM
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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.16

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.16
S.R. 109
BYPASS

1/21/2015 2:32:21 PM
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TENNESSEE D.O.T.

S.T.I.D.

FILE NO. ——

TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.17

INTERCHANGE OPTION #2

0′ 200′ 400′ 600′

N

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
PORTLAND BYPASS
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.17
S.R. 109
BYPASS

10/21/2015 2:42:23 PM
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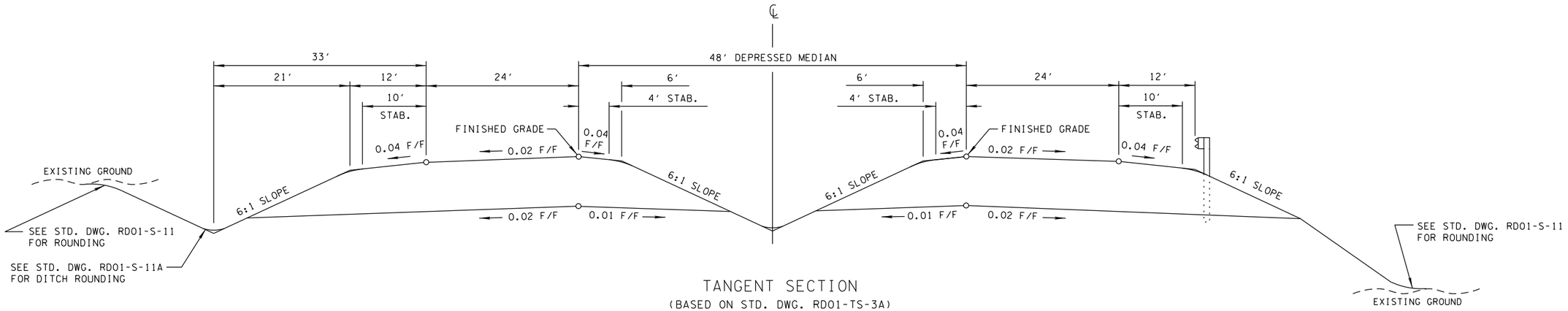
TYPE	YEAR	COUNTY	FIGURE NO.
EPD	2014	SUMNER	3.15



TANGENT SECTION
(BASED ON STD. DWG. RD01-TS-3A)

EXPEDITED PROJECT DELIVERY

STATE ROUTE 109
RECOMMENDED TYPICAL SECTION
SUMNER COUNTY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
S.T.I.D.

FIGURE 3.18
S.R. 109
BYPASS

TENNESSEE D.O.T.
S.T.I.D.
FILE NO. ——

1/21/2015 2:50:18 PM
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Attachment D:

Threatened and Endangered Species/Section 7 Coordination

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

November 27, 2012

Mr. Dennis Crumby
Tennessee Department of Transportation
Environmental Planning and Permits
James K. Polk Building, Suite 900
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subject: FWS# 2012-I-0578. Proposed construction of the State Route 109 (Portland Bypass) project from near State Route 76 to the planned Interstate 65 Interchange; P.E. 83078-0201-14, PIN# 106634.01, Sumner County, Tennessee.

Dear Mr. Crumby:

Thank you for your letter dated October 29, 2012, transmitting acoustic and mist netting survey results for the proposed construction of the State Route 109 (Portland Bypass) project from near State Route 76 to the planned Interstate 65 Interchange in Sumner County, Tennessee. Because suitable summer roosting habitat would be removed for the project, surveys were conducted along the proposed corridor to determine if the area is being utilized by the federally endangered Indiana bat (*Myotis sodalis*). TDOT requests our concurrence on the determination of "not likely to adversely affect" based on survey results indicating probable absence of Indiana bats from the project area. Personnel of the U.S. Fish and Wildlife Service (Service) have reviewed the subject proposal and offer the following comments.

Mist netting and acoustical studies were performed from July 9 through June 15, 2012, at six sites determined to contain suitable habitat for the Indiana bat. The acoustical study resulted in the recording of 8,181 bat calls, of which none were identified as Indiana bat. Mist netting efforts resulted in the capture of 69 bats, of which 12 were federally endangered gray bats (*Myotis grisescens*). The Tennessee Department of Transportation (TDOT) has concluded that the project is "not likely to adversely affect" the Indiana bat because no Indiana bats were recorded during the surveys.

Due to negative survey results for the Indiana bat, we concur with TDOT's determination of "not likely to adversely affect" for this species. Unless new information otherwise indicates Indiana bat use of the area, this survey will be valid until April 1, 2015. Although it is likely that this project would have an insignificant effect on the Indiana bat, we would appreciate consideration given to the

removal of trees with a DBH (diameter at breast height) of five inches or greater from October 15 through March 31 to further minimize potential for harm to the Indiana bat. Based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under the 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 designated that might be affected by the proposed action.

The capture of twelve gray bats during survey efforts would indicate that this species utilizes the area streams as travel/feeding corridors. Our database indicates that the nearest gray bat colony resides in Dry Cave, approximately 9.4 miles west of the proposed alignment. We are unaware of any caves that would be impacted by the project and are concerned mainly for water quality along travel/feeding corridors. Best management practices, to include stringent erosion and sediment control measures, should be implemented throughout the project to minimize potential for harm to the gray bat.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/528-6481 (ext. 228) or by email at *john_griffith@fws.gov*.

Sincerely,

Mary E. Jennings
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 2, 2014

Ms. JonnaLeigh Stack
Tennessee Department of Transportation
Environmental Division
505 Deaderick Street, Suite 900
James K. Polk Building
Nashville, Tennessee 37243-0334

Subject: FWS# 14-CPA-0524. Concurrence Point 3. Proposed construction of the State Route 109 (Portland Bypass) project from near State Route 76 to the relocated State Route 109; PIN# 106634.01, P.E. 72005-0217-14, Sumner County, Tennessee.

Dear Ms. Stack:

The Tennessee Department of Transportation (TDOT), in cooperation with the Federal Highway Administration, has prepared a *Preliminary Draft Environmental Assessment and Preliminary Mitigation* document for the proposed construction of the Portland Bypass project in Sumner County, Tennessee. The purpose of this project is to reduce traffic density in downtown Portland by providing an alternative route, support economic development, improve traffic safety, and provide for a north/south route for accessibility to the interstate highway system.

This document was developed by TDOT to disclose the impacts of the subject project in accordance with the National Environmental Policy Act and the Tennessee Environmental Streamlining Agreement (TESA). In accordance with TESA, TDOT has requested that the U.S. Fish and Wildlife Service (Service) review and provide concurrence (or nonconcurrence) on Concurrence Point 3, *Preliminary Draft Environmental Assessment and Preliminary Mitigation.*

Mist netting and acoustical studies were performed from July 9 through July 15, 2012, at six sites along the Build Alternative to determine potential impacts to the federally endangered Indiana bat (*Myotis sodalis*). No Indiana bats were detected during the survey, but mist netting efforts resulted in the capture of 12 federally endangered gray bats (*Myotis grisescens*). Unless new information otherwise indicates Indiana bat use of the area, these survey results are valid until April 1, 2015. Proper implementation of best management practices throughout construction should be sufficient to address our concerns for the gray bat. Based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled for all species that currently receive protection under the

Act. Obligations under section 7 of the 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 designated that might be affected by the proposed action.

The northern long-eared bat was proposed for federal listing under the Endangered Species Act (ESA) on October 2, 2013. No designated critical habitat has been proposed at this time. While proposed species are not afforded protection under the ESA, if/when the species is listed, the prohibition against jeopardy, and the prohibition against taking a listed species under section 9 of the ESA, becomes effective immediately, regardless of the proposed action's stage of completion. The listing decision for this species should be announced on or before April 2, 2015. If clearing of trees would occur after listing, we would need to coordinate for potential impacts.

We have reviewed the *Preliminary Draft Environmental Assessment and Preliminary Mitigation* document and **concur** that it is adequate and that TDOT should proceed to Concurrence Point 4, *Draft Final Mitigation*. The signed TESA Concurrence Point 3 for this project is attached.

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,

T. B. Watt

acting
Mary E. Jennings
Field Supervisor

Enclosure

From: John Griffith [mailto:john_griffith@fws.gov]
Sent: Monday, July 06, 2015 11:30 AM
To: Dennis Crumby
Subject: RE: Sumner Co. SR-109 Bypass, Bat Survey Information

Dennis,
Good speaking with you earlier. Although we were requiring joint acoustic/mist netting efforts in 2012, we have this year and last viewed mist netting efforts alone sufficient to establish probable absence of listed bats. Because we have no acoustic information suggesting whether northern long-eared bat (NLEB) (*Myotis septentrionalis*) is present in the project area and none of the 69 bats captured during the 2012 mist netting surveys were NLEB, we additionally concur with TDOT's determination of "not likely to adversely affect" for this species. As provided in previous correspondence, TDOT addressed our project concerns for potential impacts to the federally endangered Indiana bat (*Myotis sodalis*) with a probable absence survey in the summer of 2012. The capture of twelve gray bats during survey efforts indicates use of area streams as travel/feeding corridors. Our database indicates that the nearest gray bat colony resides in Dry Cave, approximately 9.4 miles west of the proposed alignment. We are unaware of any caves that would be impacted by the project and are concerned mainly for water quality along travel/feeding corridors. Best management practices, to include stringent erosion and sediment control measures, should be sufficient to minimize potential for harm to the gray bat.

Due to the need to maintain valid section 7 clearance prior to the signing of the FONSI or ROD, our office agrees to extend the section 7 coverage provided in this email for the NLEB and in prior correspondence for the Indiana bat and gray bat throughout the duration of the NEPA process based on TDOT's commitment to recoordinate all species concerns within 2 years of project letting. Our office has determined that there is no biological justification for requiring TDOT to keep bat surveys current for projects that are indefinitely shelved or years out from construction. Please let me know if you have any questions. Thanks,

John Griffith
Transportation Biologist
U.S. Fish and Wildlife Service
Tennessee Field Office
931-525-4995 (office)
931-528-7075 (fax)

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

December 9, 2011

Kelly Garrett
TDOT Project Management Division
505 Deaderick St. Suite 600
Nashville, TN 37243

Re: Tennessee Environmental Streamlining Agreement – Concurrence Point 1 (Purpose and Need and Study Area) for State Route 109 (Portland Bypass) from near State Route 76 to Interstate 65 in Sumner and Robertson Counties, Tennessee. Project #: 83078-0201-14; PIN #: 106634.01.

Dear Ms. Garrett:

The Tennessee Wildlife Resource Agency has received and reviewed the information your office provided to us regarding the proposed project listed above. Our current concerns are potential environmental impacts associated with stream and wetland impacts, potential impacts to floodplains, and potential impacts to listed species under our authority that may occur due to the construction of this project. We therefore request that for all floodplain crossings, stream crossings, and wetland crossings; linear feet and acreages of impacts be illustrated and tabulated for each alternative proposed for consideration in future correspondence that will be forthcoming from your agency once alignments are refined.

We would like to make you aware that three state listed deemed-in-need-of-management fish: the splendid darter (*Etheostoma barrenense*), the orangefin darter (*Etheostoma bellum*), and the teardrop darter (*Etheostoma barbouri*) have been documented in the West Fork Drakes Creek watershed and its tributaries. West Fork Drakes Creek watershed is located east of Portland and north of Portland.

We concur on Concurrence Point 1 regarding the purpose and need for the proposed State Route 109 (Portland Bypass) project from near State Route 76 to Interstate 65 in Sumner and Robertson Counties, Tennessee. We thank you for the opportunity to participate during the coordination process and look forward to working with TDOT personnel in the future to reduce potential impacts to fish and wildlife resources associated with this project.

Sincerely,

Robert M. Todd

Robert M. Todd
Fish and Wildlife Environmentalist

cc: Ed Harsson, Wildlife Biologist/West TN TDOT Liaison
David Sims, Region II Habitat Biologist
Tim Cleveland, Region II Manager

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

July 1, 2014

JonnaLeigh Stack
Tennessee Department of Transportation
Environmental Division
505 Deaderick Street, Suite 900
James K. Polk Building
Nashville, TN 37243-0334

Re: TESA Concurrence Points 3 Package
Preliminary Draft Environmental Assessment and Preliminary Mitigation
State Route 109 (Portland Bypass) Sumner County, TN
From State Route 109 near State Route 76 to State Route 109 North of Downtown Portland
PIN: 106634.01, TDOT Project No: 83078-0201-14

Dear Ms. Stack:

The Tennessee Wildlife Resource Agency has received and reviewed the information your office provided to us regarding the proposed Preliminary Draft Environmental Assessment and Preliminary Mitigation for State Route 109 (Portland Bypass) from State Route 109 near State Route 76 to State Route 109 North of downtown Portland in Sumner County, Tennessee. We have completed the requested concurrence form, which is attached.

We appreciate the Tennessee Department of Transportation for addressing our concerns and including a discussion of the state listed species, the Orangefin Darter (*Etheostoma bellum*) and the Splendid Darter (*Etheostoma barrenense*) in the Preliminary Draft Environmental Assessment and the commitment to employ best management practices to minimize potential adverse impacts to these species.

Sincerely,

Robert M. Todd

Robert M. Todd
Fish and Wildlife Environmentalist

cc: Ed Harsson, Wildlife Biologist/West TN TDOT Liaison
David Sims, Region II Habitat Biologist
Tim Cleveland, Region II Manager

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
7TH FLOOR, L&C ANNEX
401 CHURCH STREET
NASHVILLE, TENNESSEE 37243-1534

February 25, 2013

Ann Andrews
Tennessee Department of Transportation
Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: TESA Concurrence Point **#2**
Portland Bypass, State Route 76 to Interstate 65, Sumner County
Project #: 83078-0201-14; PIN #: 106634.01

Dear Ms. Andrews:

The Tennessee Department of Environment and Conservation (TDEC) has reviewed Concurrence Point **#2**, for the subject project. The signed TESA concurrence form is attached.

The following advisory comments were received from TDEC Divisions/Offices and should be considered during development and design of the project to avoid, minimize, and mitigate impacts to the natural environment. Where environmental impacts cannot be avoided, information needed to complete the appropriate TDEC permit applications should be composed during project development. A summary of TDEC environmental permit requirements is available on the TDEC website, http://state.tn.us/environment/permits.

DIVISION OF UNDERGROUND STORAGE TANKS
The Division of Underground Storage Tanks (Division) has reviewed the request for comments regarding the environmental impact for the referenced project. Our records indicate that there are no known circumstances relative to our program in the designated area which may adversely affect the proposed project.

NATURAL HERITAGE PROGRAM
Based on the selected alternative, we anticipate no impacts to known rare species in the vicinity.However, note that aquatic surveys appear to be few in the affected area, and as such, we strongly advise the applicant to determine what aquatic resources are present in the streams along the project corridor. Some state listed fishes are present in other parts of the Red River watershed.

Our data are limited in this region, and we do not have access to rare species data from the abutting part of the Red River watershed of Kentucky. For this reason we may not be able to provide the most comprehensive assessment of species that may currently reside in the area.

DIVISION OF REMEDIATION
There appear to be no DoR sites (non-DCERP) in the proposed right of way for the SR-109 Portland by-pass.

DIVISION OF WATER RESOURCES
The Natural Resources Section has reviewed the subject concurrence point package. We recommend that impacts to aquatic resources, such as streams and wetlands, be minimized and avoided to the greatest extent practicable. Compensatory mitigation should be provided for impacts to aquatic resources that cannot be avoided. To our knowledge there are not existing compensatory mitigation sites located near the project site. We recommend exploring potential compensatory mitigation sites near project site.

Thank you for the opportunity to participate in the planning of this project. If you have any questions regarding the information provided, please email TDEC.TESA@state.tn.us or contact Benjamin Brown, at 615-532-0645.

Sincerely,

Robert Baker

Robert D Baker, Assistant Manager
Natural Resources Section

Attachments: TESA Concurrence Form

Attachment E:

Section 106 Coordination

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

September 27, 2012

Mr. Gerald Kline
TDOT – Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-1402

RE: FHWA, ARCHAEOLOGICAL ASSESSMENT, PROPOSED SR-109 PORTLAND BYPASS, UNINCORPORATED, SUMNER COUNTY, TN

Dear Mr. Kline:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we find that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places. In addition, as stated in your correspondence, site 40SU279, The Fulghum Cemetery, should be avoided by all ground-disturbing activities.

If project plans are changed or archaeological remains are discovered during 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.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON ROAD
NASHVILLE, TENNESSEE 37214
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

October 17, 2013

Ms. Holly Barnett
Tennessee Department of Transportation
505 Deaderick St/900
Nashville, Tennessee, 37243-0349

RE: FHWA, ARCHITECTURAL SURVEY REPORT, SR-109/DORRIS RD.-SR-109, UNINCORPORATED, SUMNER COUNTY

Dear Ms. Barnett:

In response to your request, received on Thursday, October 10, 2013, we have reviewed the documents you submitted regarding your proposed 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 applicant 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. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

Considering the information provided, we find that the area of potential effects contains no architectural resources eligible for listing in the National Register of Historic Places affected by this undertaking. You should notify interested persons and make the documentation associated with this finding available to the public.

All borrow areas outside proposed rights-of-way will require separate certification as specified under Section 107.06-Federal Aid Provisions. If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact us to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jyg

Sample Letter to
Native American Groups

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

September 21, 2012

The Cherokee Nation
17675 South Muscogee
Tahlequah, OK 74465
Attn: Dr. Richard Allen, Policy Analyst

SUBJECT: Section 106 Initial Coordination for Proposed SR-109 (Portland Bypass), Sumner and Robertson Counties, Tennessee

Dear Dr. Allen:

The Tennessee Department of Transportation (TDOT), in coordination with the Federal Highway Administration (FHWA), is proposing to construct the SR-109 (Portland Bypass) primarily on new location from near SR-76 south of the City of Portland and extending northward to I-65 in Sumner and Robertson Counties (maps attached). The project will construct a four-lane divided highway with two 12-foot lanes in each direction separated by a 48-foot depressed median, paved inside and outside shoulders, and a minimum 250-foot right-of-way. There are three build alternatives (Options A-C) varying in length from 6.9 to 10.08 miles. Approximately 61 to 88 acres of additional right-of-way will be required.

The National Historic Preservation Act (NHPA) recognizes that federally funded undertakings, like the subject project, can affect historic properties to which your tribe attaches religious, cultural, and historic significance. In accordance with 36 CFR 800 regulations implementing compliance with Section 106 of the NHPA, I would like to know if you have information you could share with me about tribal concerns in the project area and if you wish to be a consulting party on the project? Early awareness of your concerns can serve to protect historic properties valued by your tribe.

If you act as a consulting party you will receive archaeological assessment reports and related documentation, be invited to attend project meetings with FHWA, TDOT, and the Tennessee State Historic Preservation Office (TN-SHPO), if any are held, and be asked to provide input throughout the process. If you choose to not act as a consulting party at this time, you can do so at a later date simply by notifying me.

Please respond to me via letter, telephone (615-741-5257), fax (615-741-1098), or E-mail (Gerald.Kline@tn.gov). I respectfully request responses (email is preferred) to project reports and other materials within thirty (30) days of receipt if at all possible. Thank you for your assistance.

Sincerely,

Gerald Kline

Gerald Kline
Transportation Specialist I
Archaeology Program Manager

Enclosure

cc Robin Dushane, Eastern Shawnee Tribe of Oklahoma
Kim Jumper, Shawnee Tribe
Lisa LaRue-Baker, United Keetowah Band of Cherokee Indians
Tyler Howe, Eastern Band of Cherokee Indians
LaDonna Brown, Chickasaw Nation
Joseph Blanchard, Absentee Shawnee Tribe of Oklahoma

TDOT PIN# 106634.01 – Region 3

Sample Letter to Local Government Officials

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
SUITE 900, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-3655

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

September 21, 2012

Anthony Holt, County Executive
Sumner County
355 Belvedere Drive, Room 102
Gallatin, TN 37066

SUBJECT: Section 106 Initial Coordination for Proposed SR-109 (Portland Bypass), Sumner and Robertson Counties, Tennessee

Dear Mr. Holt:

The Tennessee Department of Transportation (TDOT) in cooperation with the Federal Highway Administration is proposing to improve the above referenced project. Its location is shown on the enclosed maps.

The Advisory Council on Historic Preservation regulations stipulate that TDOT invite local government representatives to participate in the historic review process as a consulting party. TDOT would like to invite you, as the local government official, to participate as a consulting party for the proposed project.

If you choose to participate as a consulting party, you will receive copies of TDOT's environmental reports and will be invited to attend project-related meetings between TDOT and the Tennessee State Historic Preservation Office (TN-SHPO), if any are held. As a consulting party, you should be prepared to attend any such meetings between TDOT and the TN-SHPO and provide a response to TDOT's reports in written form within 30 days upon receipt of the report. TDOT also wishes to seek your comments on the identification and evaluation of historic properties that the proposed project might impact.

If you would like to participate as a consulting party, please write to me at the above address. To facilitate our planning process, please respond within 30 days of receipt of this letter. Thank you for your assistance.

Sincerely,

Martha Carver

Martha Carver
Historic Preservation Program Manager

Enclosure

cc: Ken Wilber, Mayor of Portland

TDOT PIN# 106634.01 – Region 3

Robbie D. Jones

From: Lisa LaRue-Baker - UKB THPO <ukbthpo-larue@yahoo.com>
Sent: Sunday, September 30, 2012 3:39 PM
To: Robbie D. Jones
Cc: lstapleton@unitedkeetoowahband.org
Subject: Re: Section 106 Coordination, Sumner/Robertson Co., TN #106634.01

The United Keetoowah Band of Cherokee Indians in Oklahoma has reviewed your projects for Section 106 NHPA purposes, and cultural resources. At this time, we have no objection or comment. However, if any human remains or funerary items are inadvertently discovered, please cease all work and contact us immediately.

Lisa LaRue-Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952 f 918.458.6889
ukbthpo-larue@yahoo.com

--- On **Fri, 9/21/12, Robbie D. Jones <*Robbie.D.Jones@tn.gov*>** wrote:

From: Robbie D. Jones <Robbie.D.Jones@tn.gov>
Subject: Section 106 Coordination, Sumner/Robertson Co., TN #106634.01
To: "'ukbthpo-larue@yahoo.com'" <ukbthpo-larue@yahoo.com>
Cc: "Robbie D. Jones" <Robbie.D.Jones@tn.gov>
Date: Friday, September 21, 2012, 4:00 PM

Dear Ms. LaRue-Baker:

I'm sending this email communication on behalf of Gerald Kline, Archaeology Program Manager for the Tennessee Department of Transportation. Please see the attached letters and maps for the following project:

SR-109 Portland Bypass, Sumner & Robertson Counties, Tennessee (PIN# 106634.01)

If you have any questions or need additional information, please contact Gerald Kline at (615) 741-5257 or Gerald.Kline@tn.gov.

Thank you for your assistance in this matter.

Robbie

Robbie D. Jones

Native American Coordinator

TDOT Environmental Division

Suite 900, J.K. Polk Building

Nashville, TN 37243-0334

Telephone: 615-741-3655

Fax: 615-741-1098

Email: robbie.d.jones@tn.gov

OFFICE OF THE MAYOR
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October 1, 2012

Ms Martha Carver
Tennessee Dept of Transportation
Environmental Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-1402

RE: Section 106 Initial Coordination for Proposed SR-109 (Portland Bypass) Sumner and Robertson Counties, Tennessee

Dear Ms Carver:

In response to your letter of September 21, the City of Portland will participate in the historic review process for the above mentioned project as a consulting party and is formally accepting your invitation to do so with this letter.

We understand that participation will require our attendance at project related meetings if any are held, and written response to your reports within 30 days of receipt of the report(s).

We appreciate the opportunity to be involved in projects that impact our communities.

Sincerely,

Kenneth Wilber
Mayor

Attachment F:

Air Quality Mobile Source Air Toxics (MSATs) Evaluation

Mobile Source Air Toxics (MSATs)

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents."* This guidance was superseded on September 30, 2009, and most recently on December 6, 2012, by FHWA's "*Interim Guidance Update on Air Toxic Analysis in NEPA Documents."* The purpose of FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

The qualitative analysis presented below provides a basis for identifying and comparing the potential differences among MSAT emissions (if any) from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled *"A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives."* Additional information regarding MSATs is provided in the Air Quality Technical Report.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and
- Projects with Higher Potential MSAT Effects.

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT.

The Build Alternative includes the construction of SR 109 Bypass on a new alignment. Design year 2040 traffic projections on SR 109 Bypass are projected to be between 13,170 and 20,660 vehicles per day (vpd). These volumes are substantially lower than the FHWA criterion. As a result, the project is considered to be a "Project with Low Potential MSAT Effects."

For both the Build and No-Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same. The VMT for the No-Build and Build Alternatives was determined for the affected roadway network as shown in Table 1.

Table 1: Design Year VMT Projections on Affected Roadway Network

Alternative	***Year 2040 VMT***
No-Build	235,374
Build	242,080
Change	***6,706***

As indicated, the projected VMT for the No-Build Alternative is approximately 235,374 miles per day. The VMT for the Build Alternative is approximately 242,080 miles per day and only about 6,700 miles per day (3%) higher than for the No-Build Alternative. Therefore, it is expected that

there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under the Build Alternative there may be localized areas where VMT would increase, and other areas where VMT would decrease. The localized increases in MSAT concentrations would likely be most pronounced at locations near the segments of SR 109 Bypass that will be constructed on new alignment. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under the Build Alternative in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the increased speeds associated with more direct routing, and due to EPA's MSAT reduction programs.

Substantial construction-related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area.

MOBILE SOURCE AIR TOXICS (MSATS)

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES improves upon the previous MOBILE model in several key aspects: MOVES is based on a vast amount of in-use vehicle data collected and analyzed since the latest release of MOBILE, including millions of emissions measurements from light-duty vehicles. Analysis of this data enhanced EPA's understanding of how mobile sources contribute to emissions inventories and the relative effectiveness of various control strategies. In addition, MOVES accounts for the significant effects that vehicle speed and temperature have on PM emissions estimates, whereas MOBILE did not. MOVES2010b includes all air toxic pollutants in NATA that are emitted by mobile sources. EPA has incorporated more recent data into MOVES2010b to update and enhance the quality of MSAT emission estimates. These data reflect advanced emission control technology and modern fuels, plus additional data for older technology vehicles.

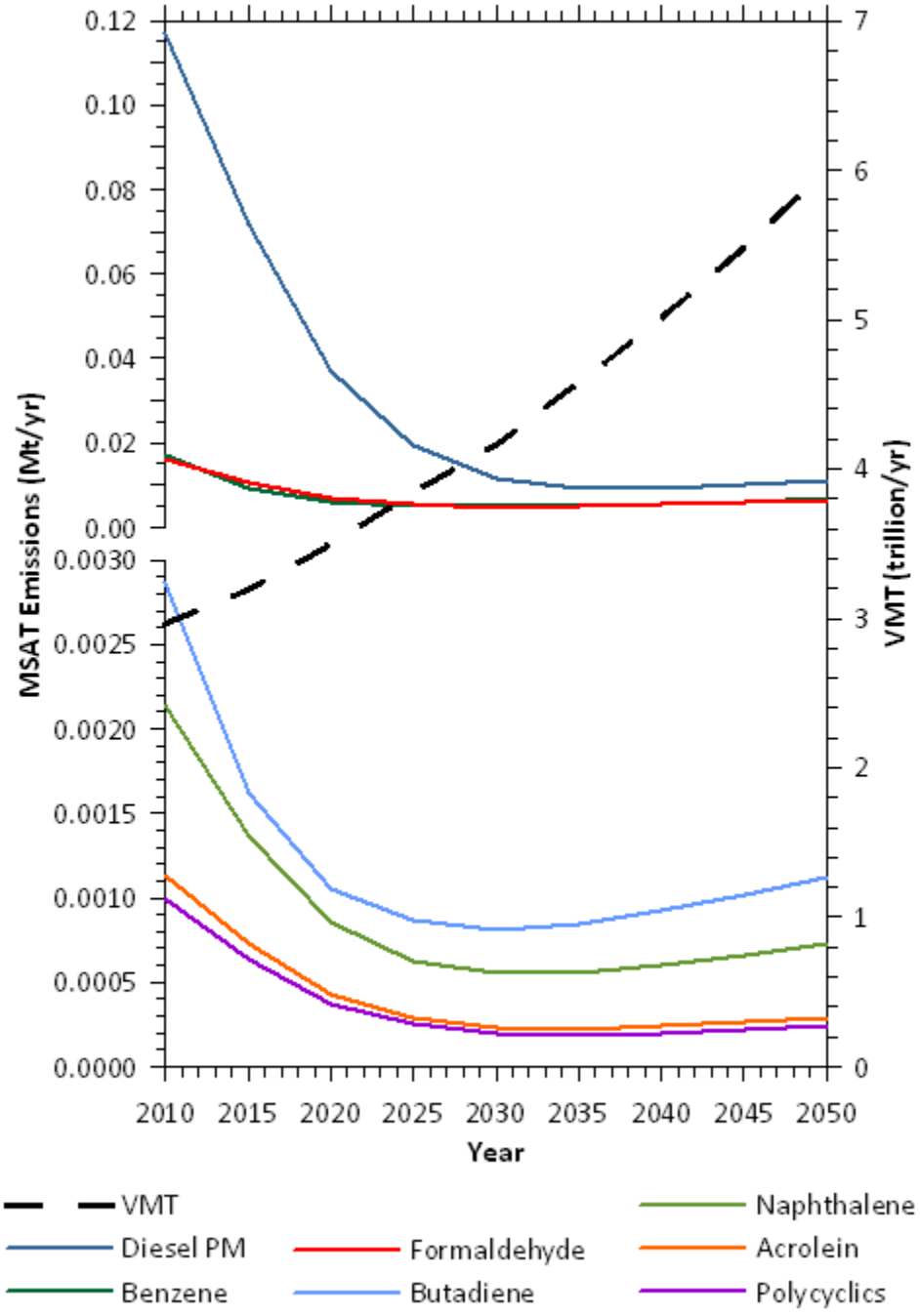
Based on an FHWA analysis using EPA's MOVES2010b model, as shown in Figure 1, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

The implications of MOVES on MSAT emissions estimates compared to MOBILE are: lower estimates of total MSAT emissions; significantly lower benzene emissions; significantly higher diesel PM emissions, especially for lower speeds. Consequently, diesel PM is projected to be the dominant component of the emissions total.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Figure 1: NATIONAL MSAT EMISSION TRENDS 1999 - 2050 FOR VEHICLES OPERATING ON ROADWAYS USING EPA's MOVES2010b MODEL



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors
Source: EPA MOVES2010b model runs conducted during May - June 2012 by FHWA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPA Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires Federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest. The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.
It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific

location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Design Year VMT Projections on Affected Roadway Network
SR 109 Bypass from SR 109 South of SR 76 to SR 109 North of Portland
Sumner County
PIN 106634.00
Traffic Projections Dated January 2015

Year:	***2040***
Alternative:	***No-Build***

Road	***From***	***To***	***AADT***	***Length (miles)***	***VMT***
Existing SR 109	N Centerpoint Rd	SR 109 Bypass	27,000	0.8	20,520
	SR 109 Bypass	SR 76/Fountain Head Rd	27,000	0.9	24,030
	SR 76/Fountain Head Rd	SR 52	25,920	2.0	51,840
	SR 52	College Street	22,000	0.4	8,800
	College Street	TGT Road	19,400	1.4	27,160
	TGT Road	Kirby Road	18,570	0.5	9,285
	Kirby Road	Kenwood Dr	20,660	1.0	20,660
	Kenwood Dr	Vanatta Road	20,510	0.1	2,051
SR 109 Bypass	Existing SR 109	SR 76	0	0.8	0
	SR 76	SR 52	0	3.0	0
	SR 52	College Street	0	0.5	0
	College Street	TGT Road	0	1.0	0
	TGT Road	Kirby Road	0	0.2	0
	Existing SR 109	Kenwood Dr	0	0.9	0
	Kenwood Dr	Vanatta Road	0	0.1	0
SR 76	Jackson Road	SR 109 Bypass	3,020	1.1	3,352
	SR 109 Bypass	Existing SR 109	3,020	0.6	1,661
	Existing SR 109	Butler Rd	3,700	0.7	2,405
SR 52	New Deal Post Rd	SR 109 Bypass	19,440	1.3	25,272
	SR 109 Bypass	Existing SR 109	19,440	1.6	30,326
	Existing SR 109	S Russel Street	19,540	0.4	8,011
				19.1	***235,374***

Alternative:	***Build***

Road	***From***	***To***	***AADT***	***Length (miles)***	***VMT***
Existing SR 109	N Centerpoint Rd	SR 109 Bypass	27,000	0.8	20,520
	SR 109 Bypass	SR 76/Fountain Head Rd	8,090	0.9	7,200
	SR 76/Fountain Head Rd	SR 52	7,770	2.0	15,540
	SR 52	College Street	6,310	0.4	2,524
	College Street	TGT Road	5,520	1.4	7,728
	TGT Road	Kirby Road	5,400	0.5	2,700
	Kirby Road	Kenwood Dr	140	1.0	140
SR 109 Bypass	Existing SR 109	SR 76	18,910	0.8	15,128
	SR 76	SR 52	18,150	3.0	54,450
	SR 52	College Street	15,690	0.5	7,845
	College Street	TGT Road	13,880	1.0	13,880
	TGT Road	Kirby Road	13,170	0.2	2,634
	Existing SR 109	Kenwood Dr	20,660	0.9	18,594
	Kenwood Dr	Vanatta Road	20,020	0.1	2,002
SR 76	Jackson Road	SR 109 Bypass	3,020	1.1	3,352
	SR 109 Bypass	Existing SR 109	3,380	0.6	1,859
	Existing SR 109	Butler Rd	3,700	0.7	2,405
SR 52	New Deal Post Rd	SR 109 Bypass	19,440	1.3	25,272
	SR 109 Bypass	Existing SR 109	19,420	1.6	30,295
	Existing SR 109	S Russel Street	19,540	0.4	8,011
Kirby Road	Existing SR 109	SR 109 Bypass	12,350	0.2	2,470
				19.0	***242,080***
				Change	***6,706***