TDOT
Department of Transportation

Project Delivery Network (PDN)

Version 4.0 | June 2025

Integrated Program Delivery (IPD)

Read First: How to Use the PDN

The TDOT Project Delivery Network (PDN) is a scalable guide for those involved with the delivery and management of projects. This *How To* answers some of the typical questions regarding purpose and use of the PDN, alongside defining the common terms used throughout.

What is the purpose of the PDN?

The PDN was developed to provide consistency and transparency throughout the project delivery process, enabling project teams to improve reliability and efficiency. The PDN outlines the stages, activities, tasks, deliverables, and (links to) references to accomplish these ends.

Specifically, the PDN assists technical teams and Project Managers, to achieve the following:

- Maintain consistency via a logical progression of activities throughout the planning, environmental, and design phases.
- Clearly define the construction scope of work and programmed amount at the beginning of the project.
- Streamline steps and procedures throughout the project development process.
- Define key project deliverables and activities to build an MS Project schedule that a Project Manager and team follow to deliver the project.
- Identify opportunities for multidisciplinary collaboration throughout each stage of the process.
- Provide a systematic quality process for key deliverables.

PDN Common Terms

Stage: A major step of the project development process that concludes with a milestone.

Activity: The overall action(s) completed by a discipline or Project Manager to move to the next stage of the PDN. An activity is represented by an identifier (e.g., 2EN1, 3RW2) as shown on the PDN Activity Diagram (discussed further below).

Task: The step(s) and process(es) necessary to complete an activity.

Detail: The task description to explain what and why of a task.

PDN Activity Diagram: A "map" of all PDN's activities that could be used to deliver a project.

Navigation Tip to Use Bookmarks & Internal Links within the PDN

- Download the PDN document to use the PDF bookmarks or internal links for easy navigation.
- Within an activity, click a blue link (see examples below) to go to an internal link in the document. Examples:
  - (*see 1ST2* for related information)
  - **Related section:** *1ST2*
  - (*see Appendix F* for an example template)
- Click the ← button in the PDF program to go back to the previous page or click **alt key + left arrow key** to go back to the previous page once you have read the section in question.

What role does the project team play in the PDN?

Coordination is essential for project success. The Project Manager leads team integration and communication necessary to deliver a successful project, which meets the project's goals on

schedule and within budget. One of the foundational elements of the PDN is that it can be used by multiple audiences (TDOT staff, consultants, and construction contractors) to understand the roles and responsibilities of each team member.

The project team works in a matrix organization to achieve the goal of project delivery where various disciplines and expertise are required. This fosters a team approach to solve challenges, optimize innovation, incorporate efficiency, and develop employees. Team members often have responsibilities across multiple projects at different stages within the PDN. The matrix provides flexibility in managing workload and understanding priorities. This structure incorporates dual managerial reporting responsibilities along functional lines and project delivery along project team lines. See **Figures 1 & 2** and footnoted terms below for how this interaction is structured.

A project team may consist solely of TDOT employees, a combination of TDOT employees and consultant team members, or solely consultant staff with oversight from assigned TDOT staff.

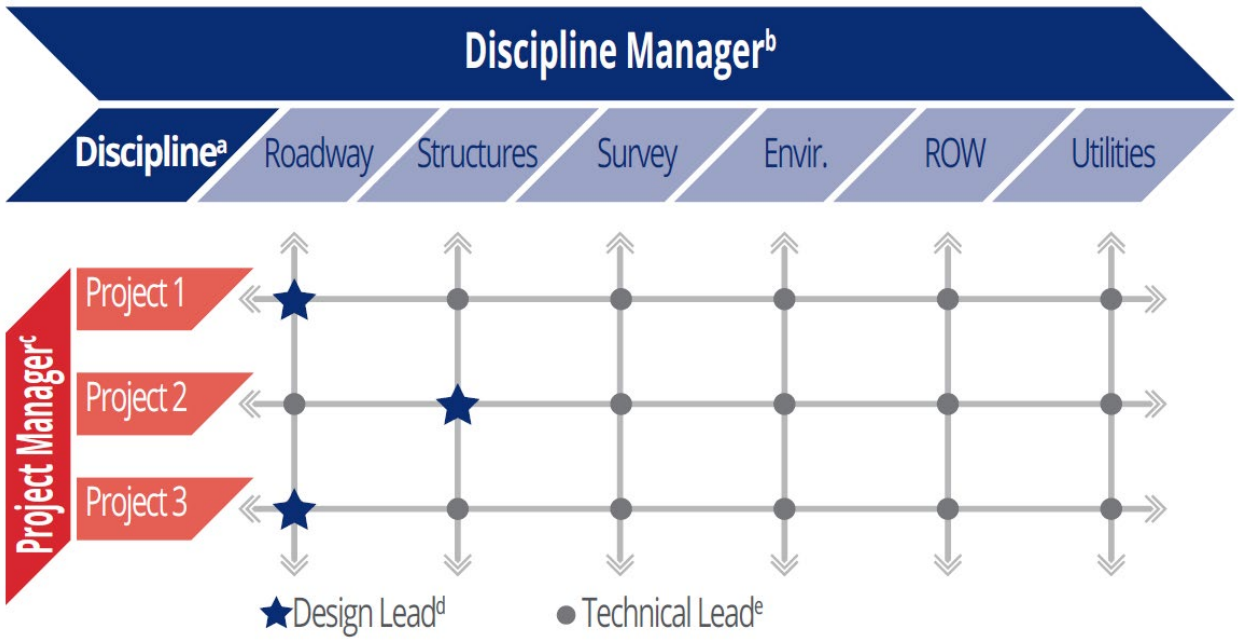


Figure 1: Matrix Organization for Projects

[a] **Discipline** is a branch of knowledge for a technical specialty (e.g., planning, environmental, right-of-way, utilities, design-related specialties).

[b] **Discipline Manager** is a TDOT employee responsible to lead, establish, and manage the operations, processes, quality delivery, and people (including staff workload) associated with a specific discipline. The Discipline Manager ensures their staff understands and adheres to policies, procedures, and standards related to their discipline.

[c] **Project Manager** is typically a TDOT employee responsible to establish and lead a team in delivery of a defined project or program within an agreed upon schedule and budget. Consultant Project Managers, if hired, report to the TDOT Project Manager.

[d] **Design Lead** is designated by the project manager (typically at the beginning of the project) and is responsible to organize all disciplines' technical design and associated plans, specifications and estimates for review and submittal. For example, on **Figure 1**, the Design Lead for a roadway-led project would be the Roadway Design Lead; for structures-led project, this would be the Structural Design Lead. Another example on **Figure 2** identifies design leads from various disciplines depending on the program.

[e] **Technical Lead** is responsible for the technical expertise, deliverables, interdisciplinary reviews, and coordination of their discipline's technical portion of the project or program with the Project Manager and other technical disciplines. This role may be performed by a TDOT employee and/or consultant staff.

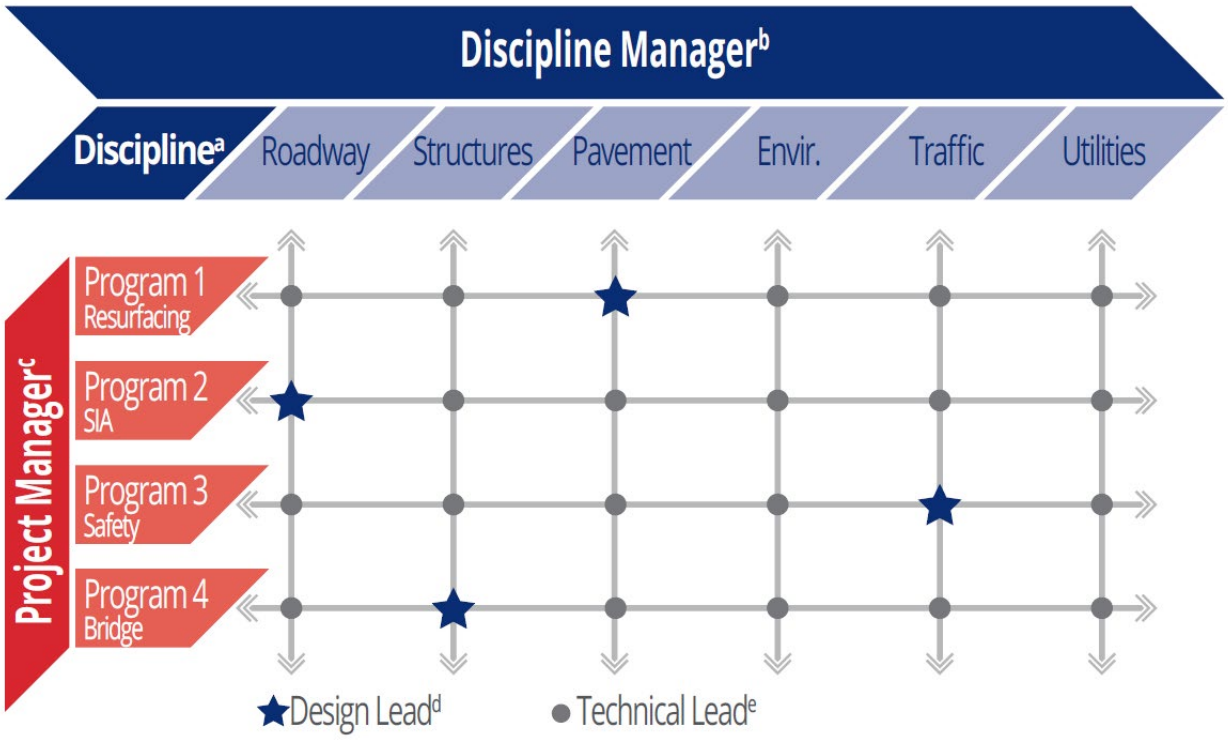


Figure 2: Matrix Organization for Programs

The Project Manager oversees this interactive and collaborative team to meet scope, schedule, and budget goals, while considering available resources and risks and without sacrificing quality. Final decisions impacting scope, schedule, and budget ultimately fall to the Project Manager.

How is a project delivered using the PDN?

The PDN takes a project through the following stages. (**Note:** Each stage is defined in terms of high-level goals that can be accomplished at any point in the stage ***and*** a milestone [represented on the PDN as a diamond] to assess the status of the project, review the project schedule, and memorialize when the stage is completed.)

Stage 1: Context/Scoping

- **Goal:** Establish the team and define critical project goals and intended outcomes for scope, schedule, budget, quality, and risks.
- **Milestone:** Upon completion of the Scoping Meeting (*see 1PM5* for related information) or Line and Grade Field Review, the team has collectively defined the project details (scope, schedule, budget, quality, and risks) and the team is ready to move into the Footprint Established phase (Stage 2).

Stage 2: Footprint Established

- **Goal:** Set the horizontal and vertical alignment (if not already completed in Stage 1) and initiate work related to environmental, right-of-way (ROW), utilities, and construction.
- **Milestone:** Upon completion of the Functional Design Plans Field Review (*see 2PM5* for related information), the team has defined the alignment and established the footprint.

Stage 3: Plan-in-Hand

- **Goal:** Complete all plans, specifications, and estimates to be packaged for letting and prepare the project for advertisement.
- **Milestone:** Upon completion of the Plan-in-Hand Field Review (*see 3PM2* for related information), the team has **completed all design work** (with remaining comments to be resolved in Stage 4) and progressed or completed the necessary environmental permits, secured the local municipality agreements, relocated impacted utilities, and acquired needed right-of-way.

Stage 4: PS&E

- **Goal:** Finalize the project's plans, specifications, and estimates (PS&E) and ensure all agreements, permits, and certifications are in place for letting.
- **Milestone:** Upon completion of the PS&E Review (*see 4PM2* for related information), the project is ready to be advertised for letting.

Stage 5: Construction Advertisement, Letting and Award

- **Goal:** Prepare, advertise, and award the construction contract.
- **Milestone:** After the project is advertised, TDOT awards and executes a contract to complete project construction.

How is the PDN updated?

The PDN is intended to be dynamic and continually improved upon and updated to ensure process refinement. As such, TDOT encourages suggestions and comments from users to improve the process or identify opportunities for further acceleration or streamlining.

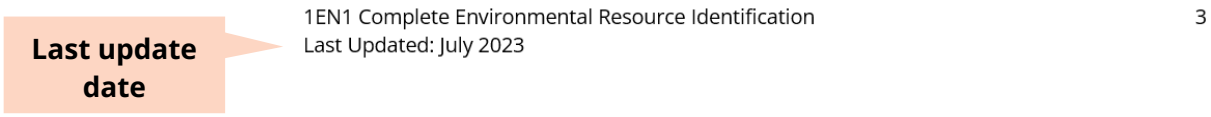
Submitted comments will be reviewed on a regular basis for incorporation into the document. While an update to the PDN can take place at any time depending on the critical nature of the change, updates are planned annually. This will be an opportunity for all users to review and update their processes.

Submit PDN questions, comments or revisions to *TDOT.IPD@TN.gov*.

How are PDN updates communicated?

PDN updates are memorialized in three ways:

1) The version's decimal number (e.g., Version 2.2, Version 3.1) is revved up for each PDN update within a calendar year, with whole number updates being done annually.
2) A summary narrative and a "redline" compilation of changes (comparing the previous version to the new version) allow the reader to quickly review what was changed from one version to the next.
3) The reader can also note the last time an activity/section has been updated by referencing the "last update date" in the section's footer.



How are project stages and activities presented in the PDN?

Each stage consists of multiple activities, consisting of five parts:

1) Activity identifier and brief descriptor (defined further below)
2) Overview of the activity
3) Reference list and links to commonly used documents that guide a user on completing the activity
4) Responsibility table that lists all deliverables that may need to be developed/completed for the activity (defined further below)
5) Details for each task that further describe how to apply the steps, processes, and reference materials to complete the activity

More information about these five parts follows **Figure 3**.

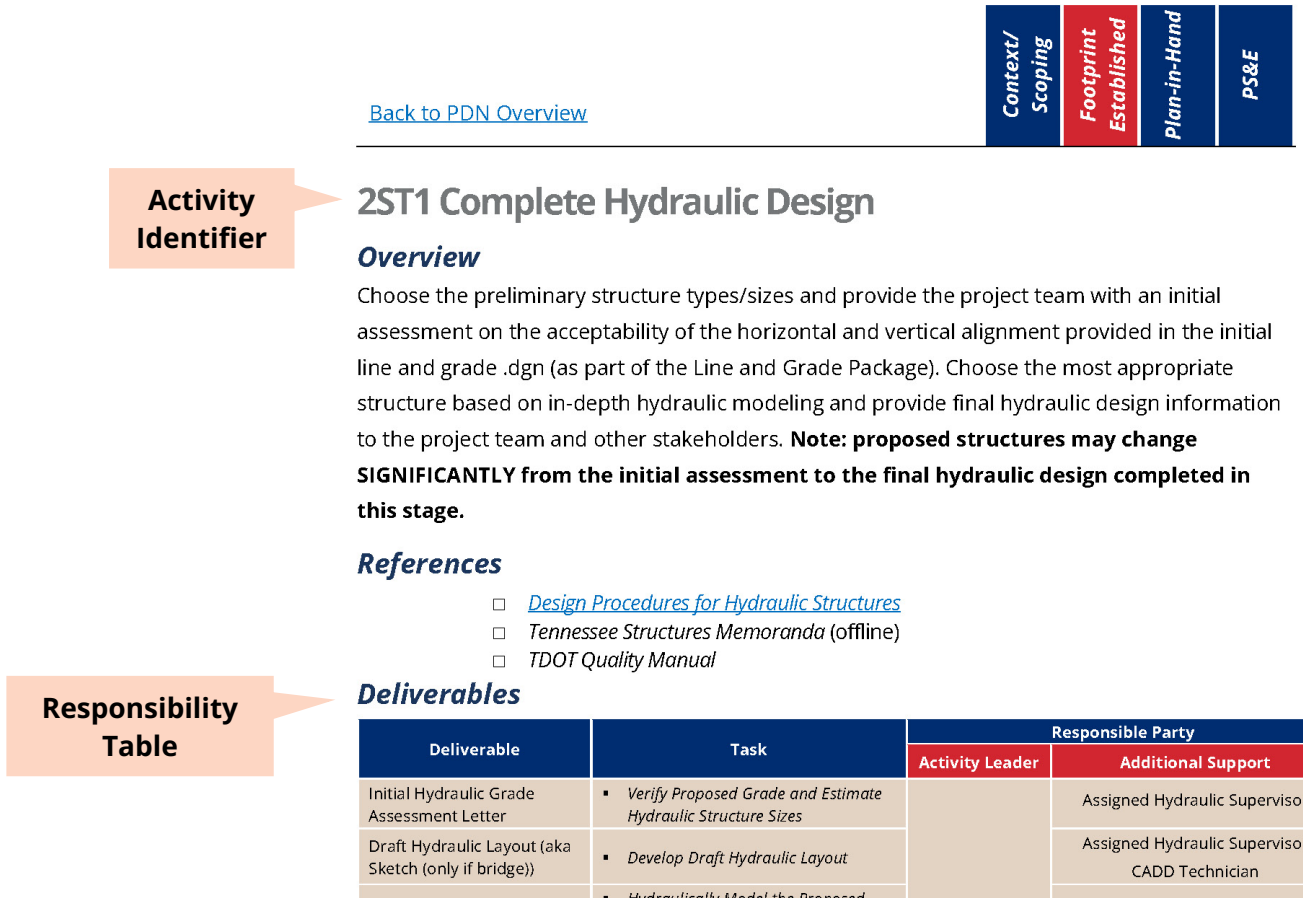


Figure 3: Example PDN Activity Breakdown

Activity Identifier

As identified on **Figure 3**, each activity has a unique "Activity Identifier" for scoping the services to be provided and tracking progress in MS Project as the project evolves. The activity identifiers consist of the following: (Stage Number) (Discipline Abbreviation) (Identifying Activity Number)

Using **Figure 3** as an example, the identifier is "2ST1."

- The "2" indicates that the activity is completed in the Footprint Established Stage (Stage 2).
- The "ST" identifies the abbreviation for the Structures discipline as the lead for this activity.
- The "1" represents this as the first activity for that discipline in Stage 2.

The Activity Identifier includes the following abbreviations (and color coding) for all the disciplines represented in the PDN.

AT – Active Transportation	**RD – Roadway**	**TD – Traffic Design**
EC – Engineering Concepts	**RR – Railroad**	**UT - Utility**
EN – Environmental	**RW – Right-of-Way**	
GT – Geotechnical	**ST – Structures**	
PM – Project Management	**SY – Survey (Geodetics)**	

Responsibility Table

The Responsibility Table for each activity identifies the deliverables, associated task(s) to complete, and the responsible party(ies) for each task(s). The listed tasks do not represent all task(s) needed to complete an activity and are ***not necessarily the chronological order for completion***. Tasks are completed in accordance with the agreed upon durations and logic in the MS Project schedule.

As listed under the "Responsible Party" column, the "Activity Leader" is the member of the project team responsible for ensuring that the task is completed successfully, and the "Additional Support" is anyone other than the Activity Leader who has responsibility for or can help support task completion. The table is not intended to list all team members involved with a task, and the Activity Leader may delegate advancement of specific tasks or deliverables to other team members.

> **Note:** The "Responsible Party" for the project management activities are not listed because the Project Manager leads each activity, with additional support provided by the project team. When a specific team member is needed to support the Project Manager to complete a task, the narrative identifies that team member.

What is the PDN activity diagram/overview?

From the earliest project activities through letting, the following (see the two-page overview *PDN Activity Diagram*) illustrates a "map" of all the PDN's activities that could apply when delivering a project (because not all projects require every activity). The Project Manager has the responsibility and authority to work with the project team to identify the appropriate activities for a specific project.

The PDN Activity Diagram/Overview includes various unique features to guide the user.

- The Discipline Legend shown at the bottom of each figure denotes an individual color for each discipline that has an activity to complete. These colors follow suit in the Concept Report as well.
- Major milestones (denoted by diamonds) conclude each stage.
- Each stage is organized by a column and represents a series of activities that may need to be completed before moving onto the next stage.
  - The activities are not laid out chronologically but are generally grouped by discipline. The Project Manager works with technical leads to select project-relevant activities and to develop a project schedule that defines the logical relationships and order of activities for a specific project.
  - The Project Manager coordinates and ultimately determines the order and dependencies of project activities (including finalizing the logic when developing the project's MS Project schedule), keeping in mind multidisciplinary activities that could occur in the same or different stage(s) to optimize project delivery.
- Each activity box is interactively linked to its associated section in the PDN.
  - By clicking on an activity box, a user is directed to that discipline's section for further details on the required activity's tasks and/or deliverables.
  - The header of each discipline's section includes a "Back to PDN Overview" link that takes the user back to the PDN Activity Diagram/Overview.

Using the PDN to Deliver Efficiency

Flexibility: Many PDN activities can and should be completed simultaneously.

Collaboration is key: The network requires collaboration between disciplines as part of the matrix organization to determine how best to order activities.

Do not hold to stage orientation: It is often advantageous to advance certain activities earlier within a stage or even advance activities to earlier stages. Consider efficiency and project demands to make this call.

Summary: Think outside the MS Project template and PDN graphical orientation when establishing logic ties and the most efficient order of the work.

TN TDOT Department of Transportation

June 2025

TDOT Project Delivery Network

STAGE 1
CONTEXT/SCOPING

- Set Up Project (1PM1)
- Build Project Team (1PM2)
- Stage 1 Concepts Activities (see next page)
- Hold Kickoff Meeting (1PM3)
- Conduct Design-Level Survey (1SY1)
- Initiate Roadway Design (1RD2)
- Complete Existing and No Structure Modeling (1ST2)
- Begin Utility Coordination (1UT2)
- Develop Geotechnical Work Plan (1GT2)
- Begin Railroad Coordination (1RR2)
- Conduct Initial Risk Workshop (1PM4)
- Conduct Traffic Analysis, Warrants, & Significance Determination (1TD2)
- Complete Environmental Resource Identification (1EN2)
- Hold Scoping Meeting and L&G Field Review (1PM5)
- Context/Scoping Complete

STAGE 2
FOOTPRINT ESTABLISHED

- (2PM1)
- Develop Functional Design Plans (2RD1)
- Complete SUE and Request Staking (2SY1)
- Provide Pavement Design (2PV1)
- Conduct Design Public Meeting (2RD2)
- Complete Hydraulic Design (2ST1)
- Develop Preliminary Bridge Plans (2ST2)
- Conduct ROW Strategy Meeting(s) (2PM3)
- Initiate Utility Pre-Acquisition Activities (2UT1)
- Complete the Soils and Geology Report (2GT1)
- Complete Foundation Reports (2GT2)
- Initiate ROW Pre-Acquisition Activities (2RW1)
- Execute ROW Proposal (2RW2)
- Conduct Permit Assessment (2EN3)
- Prepare ITS, Signals, and Lighting Sheets (2TD1)
- Complete Environmental Document (2EN2)
- Complete Environmental Resource Effects/Impacts Studies (2EN1)
- Conduct Mitigation Assessment & Initiate Mitigation Design(2EN4)
- Hold Functional Design Plans Field Review Meeting (2PM5)
- Complete Project Commitment Document (PCD) (2PM2)
- Footprint Established

STAGE 3
PLAN-IN-HAND

- Manage Project (3PM1)
- Complete Plan-in-Hand Design (3RD1)
- Complete Structural Design (3ST1)
- Perform Utility Coordination (3UT1)
- Perform Railroad Coordination (3RR1)
- Complete Appraisal and Initiate Acquisition (3RW1)
- Conduct Permit Strategy Meeting(s) (2PM4)
- Complete and Obtain Aquatic Permit (3EN2)
- Complete Signal, Lighting, and ITS Device Design (3TD1)
- Finalize Stream and Wetland Mitigation Design (3EN1)
- Hold Plan-in-Hand Field Review Meeting (3PM2)
- Plan-in-Hand Complete

STAGE 4
PS&E

- (4PM1)
- Finalize Construction Documents (4RD1)
- Finalize Structural Plans (4ST1)
- Prepare and Submit Utility or Railroad Certification (3UT2 or 3RR2)
- Finalize Geotechnical Plans (4GT1)
- Prepare and Submit ROW Certification (3RW2)
- Finalize Signal, Lighting, and ITS Plans (4TD1)
- Complete and Obtain Stormwater Permit (4EN1)
- Hold PS&E Review Meeting (4PM2)
- Contract Letting (5CN1)

DISCIPLINE LEGEND

ENG. CONCEPTS | ENVIRON | PAVEMENT | GEOTECH | ROADWAY | PROJECT MGT | ROW | RAILROAD | STRUCTURES | SURVEY/GEODETICS | TRAFFIC DESIGN | UTILITY

QUALITY CHECK

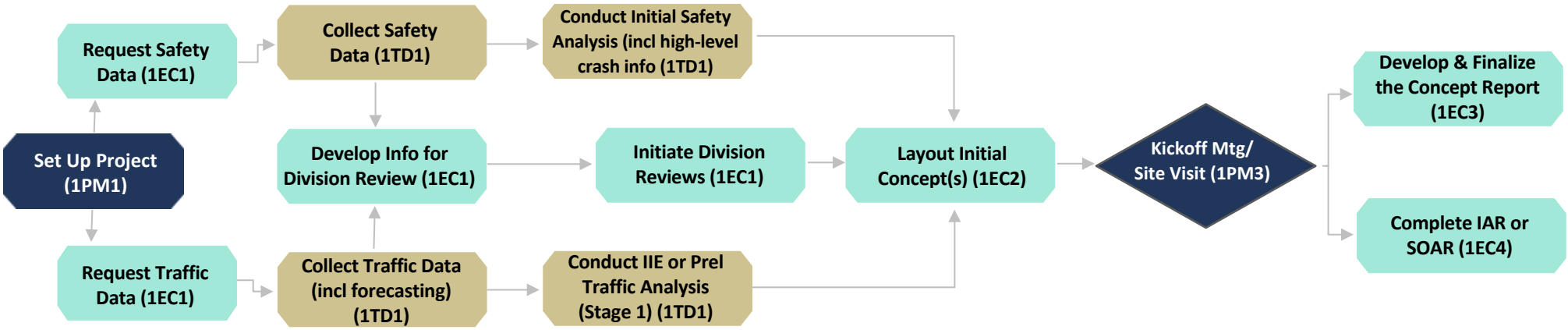
COST ESTIMATE CHECK

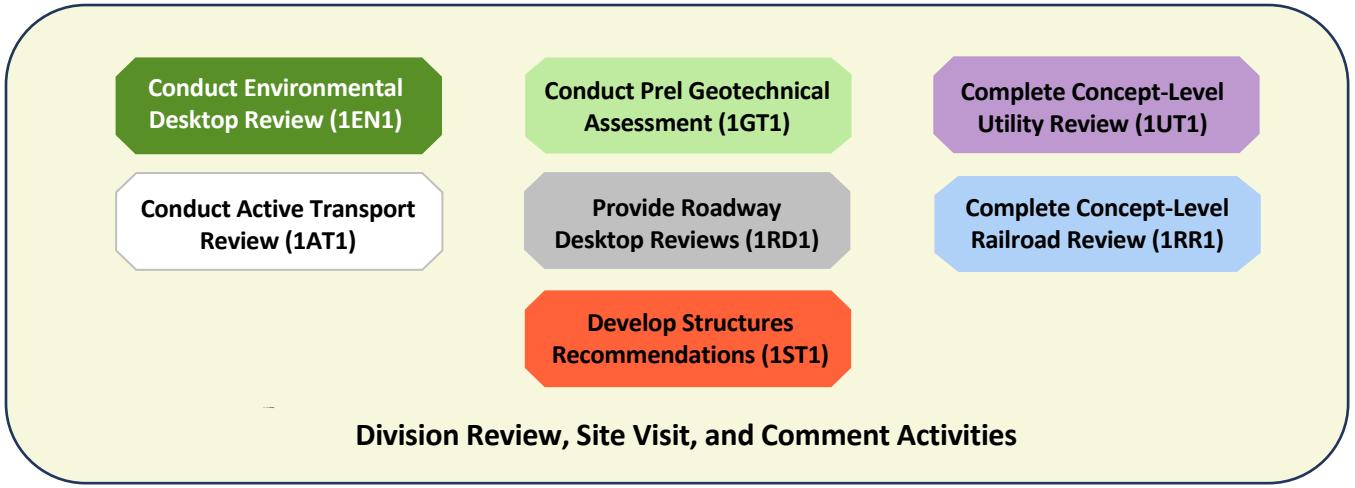
TN TDOT Department of Transportation

June 2025

TDOT Project Delivery Network

Stage 1 Concept Activities





1AT1 Conduct Active Transportation Review

Overview

Conduct an active transportation review to ensure compliance with the *TDOT Multimodal Access Policy*, *Multimodal Scoping Manual*, *Multimodal Design Guidelines,* and Standard Drawings and to coordinate existing and planned state and local active transportation projects.

References

- ☐ *TDOT Multimodal Access Policy*
- ☐ *TDOT Multimodal Project Scoping Manual*
- ☐ *TDOT Multimodal Design Guidelines*
- ☐ *TDOT Multimodal Priority Index Tool*
- ☐ *Concept Comment Resolution Form*
- ☐ *Project Scoping Guide*
- ☐ *TDOT Multimodal Standard Drawings*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Active Transportation Considerations & Recommendations	▪ *Conduct Active Transportation Review* ▪ *Develop Considerations and Recommendations*	Active Transportation Lead	Project Manager, Planning (Local Programs)
Concept Report Comments	▪ *Review the Concept Report*		

Conduct Active Transportation Review

The purpose of an active transportation review is to ensure compliance with the listed references and to coordinate with existing and planned state and local active transportation and multimodal projects. This process is initiated when the Active Transportation Lead:

- Receives initial project information and a review request from the Engineering Concepts Lead. This information typically includes:
  - A project location map or .kmz file
  - Relevant traffic and safety data
  - Draft project purpose and need or reason for the project
- Reviews the information provided and requests additional information, if needed.

To evaluate the information provided and develop appropriate considerations and recommendations, the Active Transportation Lead:

- Determines if the project is within a priority corridor based on the *TDOT Multimodal Priority Index Tool*.
- Identifies any overlapping or nearby TDOT active transportation or multimodal projects, both existing and planned.
- Coordinates with the Office of Community Transportation and Local Programs to identify any overlapping or nearby local agency active transportation or multimodal projects, both existing and planned.
- Identifies opportunities for active transportation accommodations based on the *TDOT Multimodal Project Scoping Manual* and opportunities for collaboration with other existing and planned state and local multimodal projects.

Within two weeks of receiving the request, the Active Transportation Lead provides comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the internal divisions and external stakeholders to discuss the proposed improvement, challenges, and requests to consider as the concept is defined and Concept Report is drafted.

While the Active Transportation Lead provides comments (notably whether a project is a candidate for active transportation/multimodal accommodations) for all projects, the Active Transportation Lead only attends a site visit for projects where recommendations have been identified or are anticipated. When receiving notification from the Engineer Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the Active Transportation Lead reviews the site visit packet to prepare for the site visit. Any discussion from the site visit becomes informative for the Draft and Final Multimodal Considerations & Recommendations deliverable.

Review the Concept Report

Within two weeks of receiving the Concept Report, the Active Transportation Lead provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Develop Considerations & Recommendations

The primary deliverable associated with this activity is the Active Transportation Considerations & Recommendations. This deliverable informs the Concept Report in the short term and the

project's active transportation/multimodal commitments to be confirmed during Stage 1 when finalizing the project's scope.

To complete this task, the Active Transportation Lead:

- Develops draft Active Transportation Considerations & Recommendations to be coordinated with the Project Manager, Engineering Concepts Lead, and Roadway Design Lead.
- Discusses with the project team how the draft considerations and recommendations can be feasibly integrated into the project, considering the overall project scope and purpose/need.
- Requests input from the ADA Coordinator as needed.
- Modifies the Active Transportation Considerations & Recommendations based on feedback from the project team, as needed.
- Develops Final Active Transportation Considerations & Recommendations to be included in the conceptual layout and Concept Report. This includes a determination if the project complies with the TDOT Multimodal Access Policy. If the project does not comply, the Active Transportation Lead documents the exceptions.
    - The Active Transportation Lead or Engineering Concepts Lead coordinates with the NEPA Lead, as needed, so that he/she is aware of the Final Active Transportation Considerations & Recommendations and compliance documentation for the NEPA or TEER Document.
- The Engineering Concepts Lead and the Active Transportation Lead coordinate on how the Final Active Transportation Considerations & Recommendations integrate into the Conceptual Layout and documented in the Concept Report. The NEPA Lead requests that the Active Transportation Lead review the current design and provide the Active Transportation Considerations and Recommendations (*see 2EN1* for related information).

The Active Transportation Lead uploads the Draft and Final Active Transportation Considerations & Recommendations to the project folder. The Engineering Concepts Lead is responsible for including the Final Active Transportation Considerations & Recommendations in the Concept Report. The Active Transportation Lead saves the Final Active Transportation Considerations & Recommendations in the Active Transportation Division Shared Drive.

1EC1 Initiate Concept Evaluations

Overview

Initiate development of the Concept Report. Once traffic and safety data are finalized, initiate coordination with assigned Division staff to gather information and kick off project-specific reviews to inform the subsequent Site Visit.

References

- ☐ *Traffic Request Form*
- ☐ *Crash Data Request Form*
- ☐ *Environmental Technical Study Area (ETSA) Guide*
- ☐ *Feasibility Studies Guidelines*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Location Map (or kmz file of project location)	▪ *Request Safety Data* ▪ *Request Traffic Data*	Engineering Concepts Lead	Project Manager and Related Project Team Members

[a] Unless noted, all references to the Engineering Concepts Lead may be completed by a Consultant.

Request Safety Data

Analyzing high-level safety data associated with the project location to help determine the project's scope and related recommendations to improve safety and operations. To request the high-level safety data, the Engineering Concepts Lead:

- Develops a map of the project location (typically a screenshot of the area with notes and log mile limits), a .kmz file, or any additional files to denote project details.
- Submits a request to the Workzone and Safety Office to complete an initial safety evaluation under *1TD1*.

Once the data is received, the Engineering Concepts Lead reviews the crash information to inform potential conceptual layout(s) and estimate(s) from a safety perspective.

Coordinate with the Planning Division

Coordination with the Planning Division informs the project team of any past studies or long-range plans that could provide a project history and past analysis to determine project need,

improvement alternatives, and initial cost. This information may also be helpful when initiating Division involvement as part of a review request.

To initiate this request, the Engineering Concepts Lead contacts the Regional Office of Community Transportation (OCT) to request any past studies, reports, or plans within the project area. Additionally, the Engineering Concepts Lead (as supported by the Project Manager) works with the OCT to initiate coordination with the local officials and/or regional agencies (RPO/MPO) with interest in the project.

Upon receipt of the information, the Engineering Concepts Lead files the studies, reports, and/or plans within the project folder for the project team to reference when developing and reviewing the conceptual layout(s), estimate(s), and draft Concept Report.

Request Traffic Data

The required traffic data for a project's traffic analysis is to encompass a base year (5 year) and design year (20 year) traffic projections (including project-specific AADT and design-hour volumes). This task may also involve gathering traffic counts to generate the required data.

To make a request to TDOT's Road Inventory Office and the Forecast and Visualization Office under the Planning Division, the Engineering Concepts Lead:

- Develops a map of the project location (typically a screenshot of the area with notes and log mile limits), .kmz files, or any additional files with the request
- Submits the data request to the Traffic Data Lead with a direct link to a project file location where the data can be uploaded.

The Traffic Data Lead provides the team with volume counts (e.g., AADT and design-hour volumes, vehicle classification counts, and speed data) that the Engineering Concepts Lead, Engineering Team Lead (from the Workzone and Safety Office), and Traffic Design Engineer use when:

- Developing the preliminary purpose and need (for safety and operational improvements),
- Informing potential conceptual layout(s) and estimate(s), and
- Conducting additional traffic analysis, such as the Stage 1 modeling and signal warrants detailed in *1TD2*.

Initiate Division Reviews

Early coordination with assigned Division staff is critical to inform the site visit (and Kickoff Meeting, if combined), in addition to establishing project-specific recommendations for the

conceptual layout(s), estimate(s), and the Concept Report. This input also supports the project team when:

- Developing the preliminary purpose and need
- Determining the feasibility of various improvement alternatives and the eventual conceptual layout to move forward in the design development process
- Developing a more accurate initial cost estimate

While each project is unique and may require different levels of engagement from different Divisions, typically the Engineering Concepts Lead emails the following Divisions to inform them that a conceptual layout, initial estimate, and draft Concept Report are in development and to request any past studies, reports, or plans within the project area. Additionally, each request is unique to the Division based on what information is requested, how the team uses the information, and some additional items that supplement the overall process. The Engineering Concepts Lead and Project Manager determine which Divisions to coordinate with based on project needs and anticipated scope.

- Environmental (also *see 1EN1*): To initiate the review, the Engineering Concepts Lead emails an Environmental Desktop Review Form request to TDOT.ENV.SpecialProjects@tn.gov.
  - *What is requested:* Data related to known environmental resources, constraints, and documentation of overall environmental challenges and features, including extent of implications or consequences if an identified resource is impacted.
  - *How it is used:* To develop the preliminary purpose and need and conceptual layout/alignment.
  - *Additional Items:* Begins the coordination process on the Environmental Technical Study Area (ETSA) in accordance with the *Environmental Technical Study Area (ETSA) Guide.*
- Geotechnical (also *see 1GT1*):
  - *What is requested:* High-level review (e.g., Google street view) for potential or major geotechnical risks (e.g., are the project limits within an area of acid producing rock) and mitigation opportunities in the project area.
  - *How it is used:* To develop the project's scope, cost estimate, and reduce future geotechnical risks.
  - *Additional considerations:* To allow Geotechnical staff an early review of the project.
- Active Transportation (also *see 1AT1*):
  - *What is requested:* Identification if the project is within an active transportation (or multimodal bicycle and pedestrian) priority corridor and/or opportunities for active transportation accommodations.
  - *How it is used:* To develop the project's scope and cost estimate.

  - *Additional Considerations:* To confirm any known local agency or municipality active transportation (bicycle and pedestrian) plans or preferences.
- Railroad (also *see 1RR1*):
  - *What is requested:* Railroad involvement and infrastructure in the project area.
  - *How it is used:* To develop the project's scope and information to inform any early cost estimate.
  - *Additional Considerations:* To develop additional coordination needs with the Railroad(s) moving forward.
- Roadway (also *see 1RD1*):
  - *What is requested:* High-level review (e.g., Google street view) for major roadway considerations or design options in the project area.
  - *How it is used:* To develop the project's scope and cost estimate and to reduce future roadway risks.
  - *Additional considerations:* To allow roadway staff an early review of the project so that they better understand the project's concepts and can provide input on the roadway design options and/or assumptions to inform the conceptual layout.
- Structures/Hydraulics (also *see 1ST1*):
  - *What is requested:* Preferred bridge type and configuration and a list of hydraulic crossings meeting the established hydraulic criteria.
  - *How it is used:* To develop the project's scope and cost estimate.
  - *Additional considerations:* To discuss unique structural situations and potential design options that may impact the initial recommendations.
- Traffic Design (also *see 1TD1*):
  - *What is requested:* Existing signal, lighting and Intelligent Transportation Systems (ITS) infrastructure inventories and potential future system needs.
  - *How it is used:* To develop the project's scope and cost estimate.
  - *Additional items:* To vet innovative concepts/alternatives against realistic data and application.
- Utilities (also *see 1UT1*):
  - *What is requested:* Utility involvement and infrastructure in the project area.
  - *How it is used:* To develop the project's scope and information to inform any early cost estimate.
  - *Additional Considerations:* To develop additional coordination needs with potentially impacted utilities moving forward.

Additional participants could include the following Divisions/staff, with the following focus during their respective review:

- Construction staff, considering constructability and if/how the project could be built
- Regional traffic staff, considering maintenance of traffic (MOT) and potential closures
- Regional Traffic Design and Traffic Operations staff, considering corridor or project location history and existing construction or maintenance difficulties/issues

- Geodetics (i.e., survey), considering initial survey requests and to establish the critical-path survey limits to be completed under 1SY1
- Freight and Logistics, considering implications of truck and freight movement
- Occupational Health and Safety Division

To initiate this coordination, the Engineering Concepts Lead directs the project team to the project folder that includes the following information:

- A project location map or .kmz file
- Relevant traffic and safety data
- Preliminary purpose and need (or reason for the project) and known measures of effectiveness (MOEs)
- A customizable Concept Comment Resolution Form (in native file .xlsx or .docx format)

Upon receipt of information from the Division staff, the Engineering Concepts Lead confirms all studies, comments, reports, and/or plans are within the project folder for developing the conceptual layout(s), estimate(s), and draft Concept Report. The information received is also used to develop the Divisional Review Summaries and related Site Visit Packet.

1EC2 Develop the Conceptual Layout and Complete Site Visit

Overview

Develop the conceptual layout(s), estimate(s), and complete the site visit.

References

- ☐ *Concept Report Manual* (in development)
- ☐ *Concept Report Template*
- ☐ *Road Safety Audit (RSA) Manual*
- ☐ *TDOT Highway System Access Manual (HSAM)*
- ☐ *Site Visit Coordination List*
- ☐ *Project Scoping Guide*
- ☐ *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)*
- ☐ *TDOT Quality Manual*
- ☐ *Concept Comment Resolution Form*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Conceptual Layout	▪ *Develop Draft Conceptual Layouts and Estimates for the Site Visit*	Engineering Concepts Lead	Division Leads, Engineering Concepts Manager
Division Review Summaries	▪ *Compile Initial Divisional Reviews for the Site Visit*		
Site Visit Packet	▪ *Prepare Site Visit Packet and Participate in Site Visit*		Engineering Concepts Manager
Compiled Site Visit Comments			
IAR Documentation with letter from the Engineering Concepts Manager	▪ *Initiate IAR Concept Coordination with FHWA* ▪ *Develop, Compile and Distribute the Draft Concept Report*	Engineering Concepts Manager	Engineering Concepts Lead, Project Manager

[a] Unless noted, all references to the Engineering Concepts Lead may be completed by a Consultant.

Develop Draft Conceptual Layouts and Estimates for the Site Visit

Most projects will require various draft conceptual layouts and high-level estimates to address constrained conditions or a complex widening project, with the team benefiting from reviewing options prior to the site visit. These layouts are not intended to be fully detailed, but rather

provide a high-level depiction and rough order of cost magnitude for potential improvements so that the team can assess potential impacts and cost implications.

The Engineering Concepts Lead, via ConceptStation or equivalent software, develops the conceptual layout(s) consisting of:

- Aerial imagery
- Parcel lines
- Labels (such as the roadway, streams, environmental features, lane widths, bridge information)
- Centerlines
- Proposed outside edge of pavement lines
- Corridor offset lines

The focus of the conceptual layout should be to develop a conservative horizontal layout to identify and initially evaluate potential impacts and risks, like:

- Impacts to critical, sensitive environmental features
- Loss of access or extensive impacts to right-of-way
- Conflicts with known, major utilities
- Access and incident management issues
- Degrading of project-established measures of effectiveness (MOEs)

On certain projects, the Engineering Concepts Lead may need to evaluate a preliminary vertical layout, but at whatever level of detail, the engineering advanced for the conceptual layout should not inhibit the project team from making enhancements, refinements, or changes in scope as the project progresses through Stage 1 and beyond. With that said, **the goal of the subsequent Division reviews and site visit are to accomplish these same ends in selecting one concept (or at most two) that should be advanced in Stage 1 based on design and construction feasibility, reduction or elimination of project risks and impacts, and a reasonable option to meet the project's purpose and need—all within the established budget.**

The Engineering Concepts Manager completes a quality control (QC) check of the layouts using the quality process outlined in the *TDOT Quality Manual*.

After the review is completed and comments resolved, the Engineering Concepts Lead uploads the layouts in the project folder for the project team's review and for the Site Visit Packet.

For projects that may require right-of-way (ROW) acquisition along corridors (non-bridge), the Engineering Concepts Manager and Project Manager may provide an advanced/early draft of

the conceptual layout to the Regional ROW Manager to conduct a high-level, ROW cost estimate for the Line and Grade estimate. The Engineering Concepts Lead coordinates with the Regional Appraisal Team Lead on the advancement of the concept for an accurate estimate compared to the timing and ROW staff resources needed to complete both the estimate and actual ROW acquisition work.

Compile Initial Divisional Reviews for Site Visit

Based on those listed on the Kickoff Meeting and Site Visit invite (and as relevant for the project), the various Division leads provide a "desktop" review of constraints, known commitments, conflicts, political items, estimate considerations, and recommendations that are then summarized in the site visit packet. The Engineering Concepts Lead coordinates any findings and/or recommendations from the Divisional reviews with the project team prior to the site visit, all to ensure any recommendations are feasible and meet the need for the project. The Engineering Concepts Lead summarizes the initial Divisional reviews in a Word format for use in the Site Visit Packet. The compiled Divisional reviews are filed in the project folder and used to create the Site Visit Packet.

Prepare Site Visit Packet and Participate in Site Visit

Building on the work previously completed, a project site visit (which may be coupled with the Kickoff Meeting in 1PM3) allows the project team and external stakeholders to discuss the proposed improvement, challenges, and specific project requests. Some of the work conducted during the site visit may include:

- Taking/confirming measurements
- Documenting the site via pictures or video
- Verifying environmental features
- Visibly locating existing utilities
- Discussing the project with local officials
- Soliciting local and/or regional feedback

As part of early coordination with any local official or the Local Programs Development Office, the Engineering Concepts Lead and Project Manager are to discuss the need for and process to execute ensuing maintenance agreements for infrastructure improvements, such as lighting and signals.

Before each site visit, the Engineering Concepts Lead creates a site visit packet to solicit additional comments from the project team, stakeholders, and other interested parties on the project. To compile this site visit packet, the Engineering Concepts Lead includes:

- An initial Divisional review summary developed under the above task
- Draft conceptual layout(s) and related estimate(s)
- Location-specific crash information and traffic data
- Existing bridge details (if a Bridge Concept Report)
- Site Visit Sign-In Sheet

The Engineering Concepts Lead develops a summary sheet, outlining the project information and potential improvements for discussion. All documents are compiled in .pdf format, with the Engineering Concepts Manager completing a QC check before the packet is distributed.

Once ready for distribution, the Engineering Concepts Lead coordinates the site visit date with the Project Manager and distributes the packet (at least one to two weeks prior to the Site Visit) to those on the Kickoff Meeting and Site Visit invite list and any additional stakeholders.

The Engineering Concepts Lead attends the site visit and introduces the project. The Engineering Concepts Lead drafts minutes of the site visit, distributing the meeting minutes to all attendees and filing the document in the project folder. These minutes will also be used as an appendix to the Concept Report.

Initiate IAR/SOAR Concept Coordination with FHWA

When a project requires an Interstate Access Request (IAR) or Safety and Operational Analysis Report (SOAR), early coordination with FHWA's assigned leads is recommended as detailed in the *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)*.

Any early coordination includes engaging FHWA to inform the agency that TDOT is exploring improvements that could impact an interstate interchange (either via the regular monthly meetings or via a specific meeting, as needed). The coordination provides a forum for exploring, developing, and responding to initial comments on a proposed concept and to help develop the "Framework" document under Stage 1 of the process (see the Framework Document Prompt List in Appendix 1 of the SOP). The intent of creating an early Framework document is to verify with appropriate stakeholders the:

- Project/concept objectives depending on if an IAR or SOAR
- Study limits and area of influence depicted on a project map
- Data requirements

- Modal needs
- Operational and safety analysis level of effort and tools to be used (in addition to those used for evaluation under *1TD1*)
- Measures of effectiveness (MOEs) to be evaluated in line with *1TD2*
- Project schedule

The Engineering Concepts Lead drafts the Framework document to include what is listed on the SOP's Prompt List and presents the study limits, area of influence, and initial concepts (if available at the time of drafting the Framework). The Regional Project Manager, Alternative Delivery Project Manager, Project Management Executive Director, and Engineering Concepts/Statewide Programs Director review the document(s) prior to submittal to FHWA.

The Engineering Concepts Manager (or Engineering Concepts/Statewide Programs Director) continues to update FHWA on status of the concept, requesting any further engagement with reference to Stage 1 of the process (see the SOP for related information).

1EC3 Develop and Finalize the Concept Report

Overview

Draft, review, and finalize the Concept Report and associated deliverables.

References

- ☐ *Concept Report Manual* (in development)
- ☐ *Concept Report Template*
- ☐ *TDOT Quality Manual*
- ☐ *Comment Resolution Form*
- ☐ *TDOT Highway System Access Manual (HSAM)*
- ☐ *Environmental Technical Study Area (ETSA) Guide*
- ☐ *Project Scoping Guide*
- ☐ *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Concept Report	▪ *Develop, Compile and Distribute the Draft Concept Report*	Engineering Concepts Lead	Project Engineer
Internal Review Form	▪ *Develop, Compile and Distribute the Draft Concept Report*		Engineering Concepts Manager
ETSA layout(s)	▪ *Develop Environmental Technical Study Area (ETSA)*	Engineering Concepts Lead	Engineering Concepts Manager; CADD Tech

[a] Unless noted, all references to the Engineering Concepts Lead may be completed by a Consultant.

Develop, Compile, and Distribute the Draft Concept Report

Using the Concept Report Template, the Engineering Concepts Lead completes the required actions on the checklist (saving a copy of the draft checklist to the project file) and then compiles the applicable information (data, reports, emails, etc.) to create the draft Concept Report. This report includes the following information previously developed:

- Technical Report, Bridge Transportation Investment Report, and/or other engineering study(ies) developed in accordance with the *Concept Report Manual* (in development)
- A conceptual cost estimate developed using the TDOT Cost Estimating Tool

The Engineering Concepts Manager completes a QC check of the draft Concept Report, with the Engineering Concepts Lead verifying all components of the document are accounted for and in the correct format. The draft Concept Report is filed in the project folder.

Prior to distribution, the Engineering Concepts Lead ensures the termini in the document matches what Programming has on record. If the termini do not match, the Engineering Concepts Lead contacts Programming to correct any discrepancy.

After this, the Engineering Concepts Lead:

- Distributes the .pdf document via a file share link to internal and external reviewers.
  - The Engineering Concepts Lead sets at least a two-week turnaround time for review (noting a longer review time based on concept complexity or other extenuating circumstances that limit review turnaround).
  - Note: this timing may align with the kickoff meeting or may be sent after the kickoff meeting (with a focus on addressing comments from the project team).
- Compiles all comments received and revises the Concept Report based on comments from the internal (e.g., Divisions) and external reviewers.
  - The Engineering Concepts Lead should check the respective "no comments received" box on the Concept Report Form if no comments are received from a specific Division.

Develop Environmental Technical Study Area (ETSA)

Developed in collaboration with the NEPA Lead, Roadway Design Lead, and Environmental Technical Leads, the purpose of the Environmental Technical Study Area (ETSA) is to provide a base project footprint for the environmental team to:

- Begin scoping the project.
- Identify avoidance opportunities.
- Initiate the environmental technical studies early in Stage 1.

The Engineering Concepts Lead:

- Develops the ETSA boundary figures in accordance with the *Environmental Technical Study Area (ETSA) Guide*.
- Requests that the Roadway Design Lead completes a QC check of the ETSA layout(s).
- Includes the ETSA in the draft Concept Report for comment from the project team, including the NEPA Lead and Environmental Technical Leads.

The Engineering Concepts Lead resolves any comments received and finalizes the ETSA in collaboration with the NEPA Lead, Environmental Technical Leads, and Roadway Design Lead. The Engineering Concepts Lead files the ETSA figures in the project folder to be included in both the final Concept Report and the Line and Grade Package so that:

- Resource identification can begin under 1EN2,
- The initial permit assessment can be completed under 2EN3, and
- The mitigation assessment can be completed under 2EN4.

Finalize the Conceptual Layout

Based on review comments on the draft conceptual layout(s), the Engineering Concepts Lead resolves major concerns in coordination with the Project Manager and Engineering Concepts Manager that pertain to potential scope changes. The Engineering Concepts Manager and Roadway Design Lead then complete a quality control (QC) check of the final layout, with the Project Manager and Engineering Concepts/Statewide Programs Director providing a high-level review of the layout using the quality process outlined in the *TDOT Quality Manual*.

After the review is completed and comments resolved, the Engineering Concepts Lead files the final conceptual layout in the project folder to be included in the final Concept Report.

Address Comments and Finalize the Concept Report

Referencing the draft review comments, the Engineering Concepts Lead resolves the noted comments and incorporates agreed-upon changes into the Concept Report, discussing major comments with the Project Manager and Engineering Concepts Manager that pertain to potential scope changes.

The Engineering Concepts Lead compiles the final report using the Concept Report Template. This report includes the final conceptual layout, ETSA footprint, and conceptual cost estimate. The Engineering Concepts Lead updates or completes the required actions on the Action Checklist (saving a copy of the final checklist to the project file) and then compiles the applicable information (data, reports, emails, etc.) to finalize the report. The Engineering Concepts Manager conducts a final QC check, once comments are resolved, the Engineering Concepts Lead notifies the Engineering Concepts Manager and Project Manager that the final Concept Report and completed Action Item checklist have been filed in the project folder.

Request for Concept Report Signature(s) and Distribution

Upon approval, the Engineering Concepts Lead submits the final Concept Report for review and signature to those listed on the Concept Report signature page. The Engineering Concepts Lead also forwards the Concept Report for any additional signatures. Additional signatures are needed for Bridge Concept Reports as identified on the Concept Report template. The Engineering Concepts Lead files the executed, final Concept Report, along with each signature request, in the project folder.

Upon execution, the Engineering Concepts Lead updates the status by inserting the distribution date, uploading the document, and marking the document complete in the project management software for all Concept Reports developed by Engineering Concepts. The Engineering Concepts Lead then uploads the document, with the .dgn, ETSA, .kmz, and report files to the project folder.

1EC4 Complete an Interstate Access Request (IAR) or Safety and Operational Analysis Report (SOAR)

Overview

Complete an IAR or SOAR for any proposed new interstate interchange or for any proposed modification to the type or configuration of an existing interchange based on the Framework Document developed in 1EC2.

References

- ☐ *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Interstate Access Request (IAR)	▪ *Obtain IAR Approval*	Engineering Concepts Lead	Engineering Concepts Manager
Safety and Operational Analysis Report (SOAR)	▪ *Obtain SOAR Concurrence*		

[a] Unless noted, all references to the Engineering Concepts Lead may be completed by a Consultant.

If a project includes a new interstate interchange or any proposed modification to the type or configuration of an existing interchange, either an Interstate Access Request (IAR) or Safety and Operational Analysis Report (SOAR) may be required based on the Framework Document developed in 1EC2. The following tasks outline the general process for obtaining FHWA approval of an IAR or concurrence for a SOAR.

Obtain IAR Approval

An IAR is a comprehensive operational and safety analysis report prepared following both TDOT and FHWA guidelines for any proposed new interchange, or for any proposed modification to the type or configuration of an existing interchange.

As described under Stage 2 and the related prompt lists in Appendix 1 of the *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP),* drafting an IAR involves information from several sources:

- The conceptual layout
- Crash Summary Report (and crash diagrams) (*see 1TD1* for related information)

- Traffic and Safety Analysis Report (including the Safety Alternative Report and traffic analysis model) (*see 1TD2* for related information)
- Project purpose and need statement

The Engineering Concepts Lead compiles the above-listed information to develop an IAR summary packet for TDOT and FHWA review. TDOT then invites FHWA to attend a Site Visit (or virtual meeting) to discuss the interchange options being explored and analysis methodologies. The Engineering Concepts Lead (alongside noted TDOT leadership listed previously in 1EC1) presents the packet's materials and initial findings, incorporating any comments received into the draft IAR documentation.

The Engineering Concept Lead completes all additional documentation listed in the respective prompt list (see Appendix 1 of the SOP for related information), requesting that the Engineering Concepts Manager (and others as identified) review the draft IAR to ensure all checklist items have been addressed. This step may include scheduling another review meeting with FHWA (if there are major comments from the summary packet or if options have changed significantly), where TDOT presents highlights in the IAR.

When the IAR is complete, the Engineering Concepts Manager submits the draft IAR and supporting information to FHWA's assigned leads. One more round of review and revisions likely follows, where the Engineering Concepts Lead confirms with the Concepts Group and TDOT leadership that all comments have been addressed.

The Engineering Concepts Lead submits the final IAR to FHWA for approval in accordance with the SOP. The Engineering Concepts Lead files all related correspondence, FHWA's approval letter, and the IAR documentation in the project folder for the project team's reference.

IAR/SOAR Schedule Considerations

Any FHWA action related to an IAR or SOAR requires the project to fall under NEPA requirements. Development and review of an IAR or SOAR may run concurrently as the design and NEPA documents advance, but the IAR or SOAR must be completed prior to NEPA approval. Similar to the environmental review process, a reevaluation of IAR or SOAR is required five years after approval or concurrence and reflective of changes to the design during that time.

Obtain SOAR Concurrence

A SOAR is a traffic impact and/or safety analysis for minor access modifications to ramps, ramp termini, or traffic control that do not modify the geometrics or layout of the access point but require an operational and safety analysis to ensure continued safe operations of the

interchange. The determination to complete a SOAR is based on the Framework Document developed in 1EC2.

Coordination and development of a SOAR follows a similar process to that of an IAR, but the process involves fewer steps (i.e., no development of a summary packet, no formal site visit, and fewer reviews cycles), all of which conclude with FHWA's concurrence on the SOAR (as opposed to a letter of approval for an IAR).

The Engineering Concepts Lead files all related correspondence, the SOAR documentation, and FHWA concurrence email in the project folder for the project team's reference.

1EN1 Conduct Environmental Desktop Review

Overview

Identify known environmental resources and coordinate with Engineering Concepts and the project team to inform the design/alignment of a proposed project to avoid or minimize serious environmental limitations.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)
- ☐ *Concept Comment Resolution Form*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Environmental Desktop Review Form	▪ *Identify Known Environmental Resource Information*	Environmental Technical Leads	Environmental Administrative Lead
Concept Report Comments	▪ *Review the Concept Report*		

Identify Known Environmental Resource Information

Identification of environmental resources is critical to avoid or minimize impacts early in the process to identify and potentially avoid serious environmental limitations. When considering environmental resources, there is a hierarchy in preservation efforts that starts with avoiding the resources. To facilitate avoidance, the assigned Environmental Technical Lead(s) identifies and communicates known resource information to the project team, via the Environmental Desktop Review Form, to help in defining the draft conceptual layout (*see 1EC2* for related information).

To initiate, an environmental desktop review request is emailed to TDOT.ENV.SpecialProjects@tn.gov, following the process outlined in the *TDOT Technical Handbooks*. Once the request is received, the assigned Environmental Technical Lead(s):

- Reviews the project location map (or .kmz), draft purpose and need or reason for the project, and all relevant information available to identify known resources. This could include:
  - Regulatory agency databases
  - GIS layers

  - TDOT legacy documentation
  - All other potential data sources for previously identified environmental resources
- Inputs information about the identified resources into the Environmental Desktop Review Form and attaches relevant supporting documentation related to the type, area, size, location, and boundaries of sensitive environmental resources.

Within two weeks of receiving the request, the Environmental Administrative Lead returns the Environmental Desktop Review and/or provides comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the project team and external stakeholders (as applicable) to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report are drafted. While the Environmental Technical Lead(s) provides comments for all projects, the Leads only attend a site visit for projects if there are known resources that need to be avoided or if resources and potential project impacts are better discussed in person.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the assigned Environmental Technical Lead(s) reviews the site visit packet to prepare for the site visit. Any discussion or findings from the site visit may set or refine the Environmental Technical Study Area (ETSA), potentially adjust the conceptual layout, and/or establish the scope of the environmental technical studies to kick off early in Stage 1.

Review the Concept Report

As requested, and within two weeks of receiving the draft Concept Report, the Environmental Administrative Lead provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

1EN2 Complete Environmental Resource Identification

Overview

Investigate the Environmental Technical Study Area (ETSA) to locate, identify and document environmental resources, including initiating coordination of resource findings with appropriate regulatory agencies and assisting in development of the concept design or Line and Grade Package to avoid or minimize environmental impacts.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader Environmental Technical Lead	Additional Support
Environmental Boundaries Report for Historic Preservation	▪ *Identify Historic Property Boundary(ies) and Initiate Agency Coordination*	Historic Lead	Environmental/ NEPA Lead, Roadway Design Lead, Structural Design Lead
Section 106 Identification Study			
Environmental Boundaries Report for Archaeology	▪ *Identify Boundary(ies) for Potentially Eligible Archaeology Sites and Initiate Agency Coordination*	Archaeological Lead	
Section 106 Phase One Identification Study			
Native American Early Coordination Package and Correspondence	▪ *Conduct Native American Coordination to Identify Consulting Parties*	Native American Coordination Lead	
Environmental Boundaries Report for Ecology	▪ *Identify the Ecology Site Boundaries*	Ecology Lead	
Air Quality Study	▪ *Establish Air Quality Designation*	Air Quality Lead	
Environmental Boundaries Report for Noise	▪ *Identify Potential Noise Receptor Locations*	Noise Lead	
Environmental Boundaries Report for Hazardous Materials	▪ *Identify Potential Hazardous Materials Sites*	Hazardous Materials Lead	
Phase 1 Environmental Site Assessment			
Environmental Boundaries Report for Section 4(f) Resources and Section 6(f) Resources	▪ *Identify Section 4(f) and Section 6(f) Resources*	Historic Lead or NEPA Lead	
Conceptual Stage Relocation Plan (CSRP)	▪ *Analyze the CSRP*	Environmental/ NEPA Lead	
NEPA Class of Action	▪ *Determine the NEPA Class of Action*	Environmental/ NEPA Lead	

Technical studies' goal is to identify environmental resources that could be impacted by the proposed project and inform the project team of potential impacts. The project team determines if avoidance and minimization of impacts to environmental resources is possible. Depending on the project team's determination of avoidance or minimization efforts, the NEPA Lead determine if further study in Stage 2 is required to finalize the schedule for the Project Commitment Document (PCD).

To that end, when scoping a project's environmental efforts, the Environmental Technical Leads and/or National Environmental Policy Act (NEPA) Lead identify resources that could be impacted by the project. These resources will be provided to the project team for inclusion on the plans and to determine if avoidance measures are possible. Depending on the avoidance and minimization efforts, the Environmental Technical Leads and/or National Environmental Policy Act (NEPA) Lead determine the technical studies required to be completed for the project in Stage 2, which may add activities and time to the schedule not originally known during Stage 1.

The revised Line and Grade plans are required to complete the NEPA tasks under this 1EN1 activity. If appropriate revisions to the Line and Grade Package/plans are not provided prior to the end of Stage 1, the NEPA Class of Action and related time frame for clearance will be determined after receipt of the revised Line and Grade plans. After receipt of the Conceptual Stage Relocation Plan (CSRP) and preliminary information on the impacts to environmental resources, the NEPA Lead determines if the project will be a Categorical Exclusion (either c-list, PCE, or d-list), an Environmental Assessment (EA), or Environmental Impact Statement (EIS). The NEPA Lead reports out during 1PM5 on the tentative schedule for the NEPA document based on the Class of Action and the preliminary impacts to environmental resources.

Upon review of relevant project information, each Environmental Technical Lead determines next steps for evaluation, documenting those resources that:

- Fall under the Programmatic Agreement or an MOU/MOA, or
- Do not exist in the ETSA and, therefore, do not require further study, or
- Need further study in Stage 2 for inclusion in the Environmental Document and environmental boundaries depicted on the plans as soon as the location information is available.

Identify Historic Property Boundary(ies) and Initiate Agency Coordination

The purpose of this task is to identify preliminary historic property boundaries, pending agency and final reviews, within the ETSA. In accordance with the *Environmental Guidelines*, *Cultural Resources Handbook* and *Cultural Resources Toolkit*, the Historic Lead:

- Conducts fieldwork to identify National Register-listed or eligible above-ground resources.
- Identifies historic property boundaries and provides location details to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package.
- This step aids the Roadway Design Lead/Engineer when documenting their avoidance and minimization efforts as the design progresses (*see 1RD2* for related information).
  - These boundaries must remain intact throughout the life of the design plans.
- Completes an Environmental Boundaries Report that identifies the National Register boundaries for each of the historic properties within the ETSA.
- Initiates coordination with the State Historic Preservation Officer (TN-SHPO) for concurrence on the National Register Boundary(ies) of historic property(ies) in the ETSA. Note: Only TDOT Environmental staff can complete this step.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to potentially eligible site(s) when evaluating the concept design and/or developing the Line and Grade Package.

The Historic Lead files the Section 106 Identification Study, TN-SHPO concurrence, Environmental Boundaries Report and all other related documentation at the designated location in the project folder.

Identify Boundary(ies) for Potentially Eligible Archaeology Sites and Initiate Agency Coordination

The purpose of this task is to identify preliminary archaeology site boundaries, pending agency, and final reviews, of eligible archaeology sites within the ETSA. In accordance with the *Environmental Guidelines*, *Cultural Resources Handbook* and *Cultural Resources Toolkit*, the Archaeological Lead:

- Conducts fieldwork to identify eligible archaeology sites/resources.
- Identifies site boundaries and provides location details (identified in accordance with *TDOT Environmental Guidelines* for archaeological sites) to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package.
- This step aids the Roadway Design Lead/Engineer when documenting their avoidance and minimization efforts as the design progresses (*see 1RD2* for related information).
  - These boundaries must remain intact throughout the life of the design plans.

- Completes an Environmental Boundaries Report that identifies the boundaries for each of the archaeology sites within the ETSA.
- Initiates coordination with the State Historic Preservation Officer (TN-SHPO) for concurrence on the potential archaeology sites in the ETSA. Note: Only TDOT Environmental staff can complete this step.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to potentially eligible site(s) when evaluating the concept design and/or developing the Line and Grade Package.

The Archaeological Lead files the Section 106 Phase One Identification Study, TN-SHPO concurrence, Environmental Boundaries Report and all other related documentation at the designated location in the project folder.

Conduct Native American Coordination to Identify Consulting Parties

The purpose of this task is to coordinate with federally recognized Native American tribes within the project area and identify which tribes are Section 106 Consulting Parties. In accordance with the *Environmental Guidelines, Cultural Resources Handbook and Cultural Resources Toolkit*, the Native American Coordination Lead:

- Completes an Early Coordination Packet.
- Corresponds with federally recognized Native American Tribes.

The Native American Coordination Lead files all related documentation at the designated location in the project folder.

Identify Ecology Site Boundaries

The purpose of this task is to identify preliminary ecology boundaries, pending agency and final reviews, within the ETSA. In accordance with the *Environmental Guidelines*, *Ecology Handbook and Ecology Toolkit*, the Ecology Lead:

- Conducts fieldwork to identify water, species and habitat resource feature boundaries within the ETSA.
- Identifies site boundaries and provides shapefiles or location details to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package.
- This step aids the Roadway Design Lead/Engineer when documenting their avoidance and minimization efforts as the design progresses (*see 1RD2* for related information).
  - These boundaries must remain intact throughout the life of the design plans.
- Completes an Environmental Boundaries Report that identifies the boundary for each ecological feature within the ETSA.

- Initiates coordination with all state and federal regulatory agencies for concurrence on the water, species and habitat resources identified. Note: Only TDOT Environmental staff can complete this step.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to potentially eligible site(s) when evaluating the concept design and/or developing the Line and Grade Package.

The Ecology Lead files the EBR, ecology shapefiles or location details and all other related documentation at the designated location in the project folder.

Establish Air Quality Designation

To initiate an air quality study to determine if there are impacts to air quality, the Air Quality Lead determines the study area's air quality designation (e.g., attainment, non-attainment, maintenance area) in accordance with the *Environmental Guidelines*, *Air & Noise Handbook and Air & Noise Toolkit*.

The Air Quality Lead notifies the Project Manager and Roadway Design Lead of the designation so that the team can complete needed documentation if no further study is needed or account for the time required to complete further study and analysis using the Line and Grade Package in Stage 2.

Identify Potential Noise Receptor Locations

The purpose of this task is to identify potential noise receptors within the ETSA. In accordance with the *Environmental Guidelines*, *Air & Noise Handbook and Air & Noise Toolkit*, the Noise Lead:

- Conducts fieldwork to identify potential noise-sensitive receivers/receptors within the ETSA.
- Identifies receiver/receptor and provides location details to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package. These boundaries must remain intact throughout the life of the design plans.
- Completes an Environmental Boundaries Report that identifies the potential noise-sensitive receivers/receptors.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to potential receiver(s)/receptor(s) when evaluating the concept design and/or developing the Line and Grade Package.

In accordance with FHWA guidance the Noise Lead may elect to conduct a noise screening based on site conditions, project scope, and available project information to inform decisions in Stage 1.

- This screening viability is limited by project site conditions and proposed build alternatives, use of this screening is completely at the discretion of the Noise Lead.
- As the Line and Grade Package is solidified by the Roadway Design Lead at the end of Stage 1, the Noise Lead reviews the plans and other required information to determine if a detailed noise model is required.
- If a detailed noise study, including modeling, is required, the Noise Lead provides the Project Manager with a document containing all the information required to build and conduct the modeling. This list includes information that is more detailed than the Line and Grade Package and will be required to proceed with a Stage 2 Noise Analysis.
- The steps to complete a required noise analysis are further detailed in Stage 2.

The Noise Lead files the Environmental Boundaries Report and all other related documentation (*see 2EN1* for related information) at the designated location in the project folder.

Related section: *2GT2, 2RD1*

Identify Potential Hazardous Materials Sites

The purpose of this task is to identify and avoid hazardous materials locations within the ETSA. In accordance with the *Environmental Guidelines* and *Hazardous Materials Handbook*, the Hazardous Materials Lead:

- Completes appropriate level of Hazardous Materials review within the ETSA, based on information available, and conducts any initial (e.g., Phase 1) Environmental Site Assessments or other studies, as required.
- Identifies site boundaries and provides location details to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package.
- This step aids the Roadway Design Lead/Engineer when documenting their avoidance and minimization efforts as the design progresses (*see 1RD2* for related information).
  - These boundaries must remain intact throughout the life of the design plans.
- Completes an Environmental Boundaries Report that identifies the boundary for each site within the ETSA.
- Initiates coordination, as needed, with all state and federal regulatory agencies. Note: Only TDOT Environmental staff can complete this step.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to site(s) when evaluating the concept design and/or developing the Line and Grade Package.

The Hazardous Materials Lead files the Environmental Boundaries Report and all other related documentation at the designated location in the project folder.

Identify Section 4(f) and Section 6(f) Resources

The purpose of this task is to identify, avoid and minimize harm to Section 6(f) and Section 4(f) resources within the ETSA. In accordance with the *Environmental Guidelines* and *NEPA Handbook*, the Historic Lead or NEPA Lead (depending on the resource):

- Conducts fieldwork to identify potential Section 4(f) and/or Section 6(f) resources within the ETSA.
- Identifies site boundaries and provides location details to the Roadway Design Lead/Engineer for inclusion in the Line and Grade Package.
- This step aids the Roadway Design Lead/Engineer when documenting their avoidance and minimization efforts as the design progresses (*see 1RD2* for related information).
  - These boundaries must remain intact throughout the life of the design plans.
- Completes an Environmental Boundaries Report that identifies the boundary for each site within the ETSA.
- Initiates coordination with the Official with Jurisdiction (OWJ) and FHWA for concurrence on the type of 4(f) impact (*de minimis*, full 4(f), temporary occupancy, etc.).
  - Note: Only TDOT Environmental staff can complete this step.
  - This step can be completed if the impacts are known at the time of submittal. This may occur in Stage 2.
- Initiates coordination with the Tennessee Department of Environment and Conservation (TDEC) and National Park Service (NPS), as needed, for any identified potential impacts to 6(f) resources identified.
  - Note: Only TDOT Environmental staff can complete this step.
  - This step can be completed if the impacts are known at the time of submittal. This may occur in Stage 2.
- Coordinates with the Roadway Design Lead and/or Structural Design Lead to strategize efforts to avoid or minimize impacts to potentially eligible site(s) when evaluating the concept design and/or developing the Line and Grade Package.

The Historic Lead or NEPA Lead files the Environmental Boundaries Report and all other related documentation at the designated location in the project folder.

Analyze the CSRP

The purpose of this task is to inform the NEPA class of action, which could be a Categorical Exclusion (c-list, PCE, or d-list), an Environmental Assessment, or an Environmental Impact Statement. The NEPA Lead is notified that a CSRP has been prepared by HQ ROW. In

accordance with the *Environmental Guidelines* and *NEPA Handbook*, the NEPA Lead reviews the CSRP and technical studies impact analyses to inform the NEPA class of action.

Determine the NEPA Class of Action

The purpose of this task is to determine if the NEPA Class of Action is either a Categorical Exclusion (c-list, PCE, or d-list), an Environmental Assessment, or an Environmental Impact Statement. In accordance with the Environmental Guidelines and NEPA Handbook, the NEPA Lead:

- Reports out during the 1PM5 Scoping Meeting on the anticipated NEPA Class of Action and the timeframe needed to complete the NEPA document.
- Documents the class of action determination based on the information provided during Stage 1 and moves forward with 2EN2.

Note: If the project design changes significantly from the revised Line and Grade Package, the NEPA Class of Action determination is subject to change. The NEPA lead is the subject matter expert that will determine if design changes are significant.

2EN1 Complete Environmental Resource Effects/Impacts Studies

Overview

Ensure compliance with all relevant federal and state environmental laws and regulations via technical studies that document impacts to each environmental resource type as identified within the Environmental Technical Study Area (ETSA) and the immediate vicinity.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Resource Effect/Impact Evaluations	▪ *Complete Necessary Resource Effect/Impact Evaluations*	NEPA Lead	
Section 106 Effects Assessment and Concurrence	▪ *Complete Historic Preservation Effects Study*	Historic Lead	NEPA Lead, Roadway Design Lead, Structural Design Lead
Phase Two Archaeology Eligibility Study and Concurrence	▪ *Complete Phase Two Archaeological Eligibility Study*	Archaeological Lead	
Air Quality Impact Study	▪ *Complete Air Quality Impact Study*	Air Quality Lead	
Noise Abatement Study and Noise Barrier Locations	▪ *Complete Noise Abatement Study*	Noise Lead	
Ecology Reports and Concurrence	▪ *Finalize Ecology Environmental Boundaries Report*	Ecology Lead	
Hazardous Materials Study	▪ *Complete Hazardous Materials Study*	Hazardous Material Lead	

For the scoped technical studies, the assigned Technical Lead references:

- The ETSA to ensure the current alignment does not extend beyond the originally studied area, and
- The Line and Grade Package or Functional Design Plans (*see 1RD2* and *2RD1* for related information) to assess impacts to identified environmental resources within the proposed right-of-way.

If design changes alter the project footprint (horizontal and vertical) or modify a design feature or scope element that will impact environment resources (such as altering a bridge configuration to include bridge piers in the water) after the Environmental Document is approved, additional studies, documentation and coordination with the regulatory agencies may be required, and the Environmental Document would need to be re-evaluated so that construction funding may be obligated prior to letting the project.

The project team, led by the NEPA Lead, Roadway Design Lead and Project Manager, should regularly discuss impacts and consequences of potential design changes prior to finalization in order to discuss the risk to the project schedule in completing a NEPA re-evaluation.

Complete Necessary Resource Effect/Impact Evaluations

In addition to the identified studies completed by the various Technical Leads (see below), the NEPA Lead completes or requests all other required resource impact evaluations, which may include:

- Social/community impacts
- Farmland
- Economic and business impacts
- Land use planning and land use
- Visual quality
- Traffic and crash
- Section 4(f) and section 6(f) (completing coordination with the OWJ and obtaining FHWA concurrence on the type of 4(f) impact after Functional Design Field Review plans when all necessary ROW and easements have been provided)
- Wild and scenic rivers
- Floodplains
- Pedestrian and bicycle
- Construction

The NEPA Lead files the effects memos and all other related documentation at the designated location in the project folder, notifying the project team when complete. The NEPA Lead includes the relevant information with the Environmental Document in accordance with the *Environmental Guidelines* and *NEPA Handbook*.

Complete Historic Preservation Effects Study

If National Register listed or eligible properties are identified in the ETSA, the Historic Lead drafts an Historic Preservation Effects Study to document the effect the design would have on the impacted historic resource(s). The Study is based on the Line and Grade Package or a version of the Functional Design Plans (depending on project complexity and needed detail to complete the assessment) provided by the Roadway Design Lead and is subject to change if/when design plans change. If design plans change, the study may need to be conducted again.

The State Historic Preservation Officer (TN-SHPO) is provided an opportunity to comment on the Historic Preservation Effects Study and provides written comments about the project.

In accordance with the *Environmental Guidelines, Cultural Resources Handbook* and *Cultural Resources Toolkit,* the Historic Lead:

- Completes a Section 106 Effects Assessment and Memorandum of Agreement (if applicable).
- Continues to coordinate with the Roadway Design Lead and/or Structural Design Lead to strategize and document efforts to avoid, minimize and/or mitigate impacts to the potentially eligible site(s).
- Coordinates with the State Historic Preservation Officer (TN-SHPO) and consulting parties for concurrence on the effect the project would have on the historic resource(s). Note: Only TDOT Environmental staff can complete this step.

The Historic Lead files the Section 106 Effects Assessment, the TN-SHPO concurrence, and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Historic Lead provides this documentation to the assigned NEPA Lead for inclusion with the Environmental Document in accordance with the *Environmental Guidelines Cultural Resources Handbook and Cultural Resources Toolkit*.

Complete Phase Two Archaeological Eligibility Study

If potentially eligible archaeology sites identified in the ETSA cannot be avoided, a Phase Two Archaeological Study is required to determine if a site is eligible for listing in the National Register of Historic Places. The Phase Two Archaeological Eligibility Study is based on the right-of-way locations identified in the Line and Grade Package or a version of the Functional Design Plans (depending on project complexity and needed detail to complete the study). After phase two testing is completed, the State Historic Preservation Officer (TN-SHPO) is provided an

opportunity to determine if the site is eligible for listing in the National Register of Historic Places. If design plans change, the study may need to be conducted again.

In accordance with the *Environmental Guidelines Cultural Resources Handbook and Cultural Resources Toolkit*, the Archaeological Lead:

- Completes a Phase Two Archaeological Eligibility Study.
- Continues to coordinate with the Roadway Design Lead and/or Structural Design Lead to strategize and document efforts to avoid, minimize and/or mitigate impacts to the potentially eligible site(s).
- Coordinates with the State Historic Preservation Officer (TN-SHPO) for concurrence on the National Register eligibility of the archaeology site. Note: Only TDOT Environmental staff can complete this step.

The Archaeological Lead files the Phase Two Archaeological Eligibility Study, TN-SHPO Concurrence and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Archaeological Lead provides this documentation to the assigned NEPA Lead for inclusion with the Environmental Document in accordance with the *Environmental Guidelines* and *Cultural Resources Handbook*.

Complete Air Quality Impact Study

Depending on the air quality designation determined in Stage 1, the Air Quality Lead completes an Air Quality Impact Study, which may include a hot-spot analysis, using the Line and Grade Package in accordance with the *Environmental Guidelines* and *Air & Noise Handbook*. If design plans change, the study may need to be conducted again.

If a detailed Air Quality Impact Study is needed, the Air Quality Lead provides the Project Manager with a document containing all the information required to conduct the study. This list includes information that is more detailed than the Line and Grade Package and will be required to proceed with a Air Quality Impact Study.

The Air Quality Lead files the Air Quality Impact Study and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Air Quality Lead provides this documentation to the assigned NEPA Lead for inclusion with the Environmental Document in accordance with the *Environmental Guidelines* and *Cultural Resources Handbook*.

Complete Noise Abatement Study

To finalize noise abatement for impacted land use areas (provided that the previous study in Stage 1 identified noise-sensitive land use areas/receptors within the ETSA), the Noise Lead completes a Noise Abatement Study that evaluates (or confirms) the need for noise barriers and determines if barriers are feasible and reasonable in accordance with the *TDOT Noise Policy*, *Environmental Guidelines* and *Air & Noise Handbook*. If design plans change, the study may need to be conducted again.

If a detailed noise study, including modeling, is needed, the Noise Lead provides the Project Manager with a document containing all the information required to build and conduct the modeling. This list includes information that is more detailed than the Line and Grade Package and will be required to proceed with the Stage 2 Noise Analysis.

The Noise Lead files the Noise Abatement Study and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Noise Lead provides this documentation to the assigned NEPA Lead for inclusion with the Environmental Document in accordance with the *Environmental Guidelines* and *Cultural Resources Handbook*.

The Noise Lead coordinates with the Roadway Design Lead and Structural Design Lead on placement of any proposed noise barriers on the Functional Design Plans prior to the associated field review. The noise barriers remain throughout the life of the design plans and are refined in coordination with the Roadway Design Lead, Structural Design Lead and Lead Geotechnical Engineer/Geologist.

Related section: *2GT2*

Complete Ecology Environmental Boundaries Report

To identify impacts to the identified ecology features within the ETSA and in accordance with the *Environmental Guidelines* and *Ecology Handbook*, the Ecology Lead:

- Reviews the Line and Grade Package or a version of the Functional Design Plans (depending on project complexity and needed detail to complete the assessment) provided by the Roadway Design Lead.
- Completes any updates to the Environmental Boundary Report (EBR) that identify impacts to ecology features within the ETSA. If design plans change, the study may need to be conducted again.

- Coordinates with all state and federal regulatory agencies for concurrence on the impacted features within the ETSA. Note: Only TDOT Environmental staff can complete this step.

The Ecology Lead files the reports and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Ecology Lead distributes the EBR to all project team members, including the NEPA Lead, Environmental Mitigation Lead and Environmental Permit Lead in accordance with the *Environmental Guidelines* and *Cultural Resources Handbook*. The Ecology Lead coordinates with the Roadway Design Lead and Project Manager on any updates to the environmental boundaries on all applicable design plans.

Complete Hazardous Materials Study

To finalize project impacts to hazardous materials (if any), the Hazardous Materials Lead:

- Conducts any additional Environmental Site Assessments or other studies as required.
- Reviews the Line and Grade Package or a version of the Functional Design Plans (depending on project complexity and needed detail to complete the assessment) provided by the Roadway Design Lead.
- Completes any updates to the Environmental Boundary Report (EBR) that identify impacts to hazardous materials within the ETSA. If design plans change, the study may need to be conducted again.
- Coordinates with all state and federal regulatory agencies for concurrence on the impacted features within the ETSA. Note: Only TDOT Environmental staff can complete this step.
- Communicates any future remediation activities (e.g., asbestos abatement, removal or closure of Underground Storage Tanks (USTs), etc.) to the project team to incorporate into the delivery and construction schedule.

The Hazardous Materials Lead files the reports and all other related documentation at the designated location in the project folder, notifying the project team when complete. The Hazardous Materials Lead distributes the EBR to all project team members, including the NEPA Lead in accordance with the *Environmental Guidelines and Hazardous Materials Handbook*. The Hazardous Materials Lead coordinates with the Design Lead and Project Manager on any updates to the environmental boundaries on all applicable design plans.

Confirm Multimodal Compliance Determination

Based on the Final Multimodal Considerations and Recommendations in the Concept Report (including a compliance determination and any noted exceptions to the *TDOT Multimodal Access Policy*), the NEPA Lead (or as assigned) reviews the multimodal information to:

- Confirm that the *TDOT Multimodal Access Policy* has not changed since *and* that the plans/ETSA are generally consistent with the published Concept Report.
- If either item has changed, the NEPA Lead (or assigned) requests that the Active Transportation Lead review the current design and update the Multimodal Considerations and Recommendations and confirm the determination/justification in the multimodal section of the Environmental Document.
- Once confirmed, include the published compliance determination/justification to complete the multimodal section of the Environmental Document (*see 1AT1* for related information).

2EN2 Complete Environmental Document

Overview

Complete a categorical exclusion (CE) (C-list, PCE, or D-list), environmental assessment (EA), or Tennessee Environmental Evaluation Report (TEER) to document the environmental decision.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
NEPA Document or TEER	▪ *Complete Environmental Document* ▪ *Receive Approval*	NEPA Lead	Environmental Administrative Lead

Review/Finalize Purpose and Need Statement

As part of completing the Environmental Document, the NEPA Lead reviews the purpose and need, prepares additional studies (if needed) to support the purpose and need, and clarifies any language with the project team, as needed. The NEPA Lead includes the final purpose and need with the Environmental Document in accordance with the *Environmental Guidelines* and *NEPA Handbook*.

Complete Environmental Document

Compliance with the NEPA is required for all TDOT projects that have FHWA/federal funding. Compliance for state-funded projects (no FHWA/federal funding) is through a Tennessee Environmental Evaluation Report (TEER). The NEPA document or TEER must be completed prior to acquisition of any property for the project (*see 3RW1* for related information).

If potential impacts are possible, the Environmental Document is completed referencing the same design plans that Technical Studies used to evaluate resources under 2EN1 unless a more detailed design is needed to complete the Environmental Document.

If design changes alter the project footprint (horizontal and vertical) or modify a design feature or scope element that will change an impact to an environment resource(s) after the Environmental Document is approved, additional studies, documentation and

coordination with the regulatory agencies may be required, and the Environmental Document would need to be re-evaluated so that construction funding may be obligated prior to letting the project.

The project team, led by the NEPA Lead, Roadway Design Lead and Project Manager, should regularly discuss impacts and consequences of potential design changes prior to finalization in order to discuss the risk to the project schedule in completing a NEPA re-evaluation.

The NEPA Lead will determine the need for a re-evaluation, reporting any impact to the overall schedule to the Project Manager and project team as early as possible. The NEPA Lead completes the Environmental Document template in accordance with the *Environmental Guidelines*, *NEPA Technical Handbook* and *NEPA Toolkit*.

Additional Considerations for Environmental Assessments (EAs)

For projects where the significance of the environmental impacts is unknown, an Environmental Assessment (EA), would be required. The project team should be aware that the requirements for documenting the NEPA decision are more detailed for EAs than the requirements for a CE or TEER. Because the significance of the impacts is unknown, an EA requires more in-depth studies of the proposed project and more detailed information on the resources potentially impacted by the project. Additional coordination and involvement/outreach are also required with state and federal agencies, stakeholders, and the public.

The time to complete the EA begins when FHWA concurs with TDOT's Letter of Intent and can take 1 to 2 years to complete. The NEPA Lead works with the project team to ensure that enough information about the project is known and will send the Letter of Intent when sufficient information has been gathered. The NEPA Lead works with the project team to lay out a time frame for completing the EA dependent on specific project details and potential resource impacts.

After the EA is approved by FHWA, the NEPA Public Hearing is held. The NEPA Lead works with Communications at Headquarters and the Region and the project team to ensure that the NEPA Hearing is held in accordance with regulatory requirements. The NEPA Lead works with project team members to ensure that the appropriate people attend the NEPA Public Hearing. The *NEPA Public Involvement Requirements Document* includes more information on the NEPA Hearing requirements.

After the NEPA Public Hearing, the NEPA Lead completes or ensures completion of a Finding of No Significant Impact (FONSI). The time frame for completion of the FONSI is dependent on the documentation of mitigation measures for technical studies and responses to public comments. The NEPA Lead will work with the project team to address public comments and mitigation measures, as needed.

The NEPA Lead ensures that all regulatory requirements are met and keeps the project team apprised of the steps to EA/FONSI completion. The NEPA Lead reports to the project team on the progress of the NEPA process and will request assistance from subject matter experts, as needed.

The NEPA process is not complete until FHWA signs the FONSI.

Note: While the PDN may provide general direction to the workflow of a project involving an environmental impact statement (EIS), the EIS process should follow a separate workflow from PDN in accordance with the *Environmental Guidelines*.

Receive Approval

The NEPA Lead reviews and approves the NEPA Document or TEER or coordinates the approval of the NEPA Document with FHWA (including project-specific durations for initial submittal, response to FHWA comments and final approval process) in accordance with the *Environmental Guidelines*, *NEPA Technical Handbook*, and *NEPA Toolkit*.

The NEPA Lead distributes to applicable project team members (including the Roadway Design Lead, Programming Lead and Environmental Permit Lead) and then files the approved NEPA Document or TEER, with all other related documentation, into the designated location in the project folder.

2EN3 Conduct Permit Assessment

Overview

Complete a permit assessment referencing the environmental features/boundaries detailed in the Environmental Boundaries Report (EBR) as depicted on the Line and Grade Package or Functional Design Plans. Use the assessment to coordinate design options and permit sketches to support developing and submitting a project's permit applications.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)

Deliverables

Deliverable	Task	Responsible Party[a] Activity Leader
Permit Assessment (Redline Plans and request for Permit Sketches)	▪ *Conduct Permit Assessment*	Environmental Permit Lead
Permittable Plans Package	▪ *Finalize Plans and Sketch Review and Prepare Permittable Plans Package* ▪ *Evaluate Permittable Plans Package*	Environmental Permit Lead

[a] The Environmental Permit Lead may be staff from the TDOT Permit Section or Regional ETO staff (as assigned).

Conduct Permit Assessment

Federal and state aquatic resource permits are required for proposed impacts to streams and wetlands. A Permit Assessment:

- Ensures that the design complies with federal and state environmental regulations,
- Identifies required environmental permits for all TDOT projects, and
- Begins the coordination process with the Roadway Design Lead and other project team members on how to develop permittable plans and sketches that meet all regulatory requirements.

To conduct the assessment, the Environmental Permit Lead (assigned staff from the TDOT Permit Section or as assigned to the Regional ETO staff) reviews:

- The Environmental Boundaries Report (notably the features/boundaries depicted in the EBR),
- Current version of the Utility Coordination Plans (if available), and

- Line and Grade Package or Functional Design Plans (either of which must include the boundaries of the identified ecological features) to identify and communicate permit requirements.

This includes identifying potential design revisions (within the established footprint only), permit sketches and information describing alternatives considered to avoid and minimize impacts.

If there are no proposed impacts to stream or wetland areas in the EBR, then further action is not required and the assessment is submitted as noted below.

If there are potential impacts to streams and wetlands, the Environmental Permit Lead then:

- Reviews impacts to environmental features (streams and wetlands).
- Based on the impacts, identifies the types of environmental permits required.
- Redlines plans to identify required changes in accordance with the *Environmental Guidelines*, *Permits Technical Handbook* and *Permits Toolkit*.
- Coordinates with the Roadway Design Lead on all required design revisions/redlines to ensure the plans meet regulatory requirements for avoidance and minimization.
- Identifies the need for permit sketches and the location where permit sketches are required.
- Coordinates with the Mitigation Lead when mitigation credits or natural channel designs (*see 2EN4* and *3EN1* for related information) are required.

The Environmental Permit Lead submits the permit assessment for the Functional Lead review in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit*. Once approved, the Environmental Permit Lead provides the documentation to the Roadway Design Lead and Project Manager and files the documentation in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit*.

Related sections: *2RD1*, *1SY1*, *3UT1*

Finalize Plans and Sketch Review and Prepare Permittable Plans Package

When impacts to streams and wetlands are identified, the Environmental Permit Lead:

- Continues to coordinate with the Roadway Design Lead on all required design revisions/redlines to ensure the plans meet regulatory requirements for avoidance and minimization.
- Finalizes permit sketches in coordination with the Roadway Design Lead/Engineer.
- Prepares the permittable plans package(s).

The Environmental Permit Lead submits the permittable plans package to Headquarters Permitting for review in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit*.

Related section: *2RD1*

Evaluate Permittable Plans Package

Headquarters Permitting reviews the permittable plans package to ensure all federal and state requirements have been met in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit.*

Review EPSC Plans in the Functional Design Plans

To complete this task, the assigned Regional ETO Staff, Permit Section Staff, or SWPPP consultant (as assigned):

- Reviews the Functional Design Plans and EPSC plans for accuracy, redlining the plans to note changes.
  - **Note:** When using a SWPPP consultant, a good practice is to procure the consultant approximately ***six weeks prior to*** the Functional Design Plans submittal date so the consultant has an opportunity to comment on the Plans.
- Submits and coordinates comments with the Roadway Design Lead and applicable Roadway Engineer for revisions with enough time prior to the Plan-in-Hand Plans submittal for changes to be implemented that ensure regulatory requirements are met.

2EN4 Conduct Mitigation Assessment and Initiate Mitigation Design

Overview

Assess mitigation to offset identified and unavoidable stream and wetland impacts from the project in Stage 2. Initiate the mitigation design to offset and generate mitigation credits required for the "transportation project," as opposed to an off-site mitigation project (delineated throughout this section).

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Mitigation Assessment	▪ *Complete Mitigation Assessment*	Environmental Mitigation Lead	
Draft Mitigation Plans	▪ *Develop Preliminary Mitigation Plan*	Mitigation Designer	Environmental Mitigation Lead

[a] The Environmental Mitigation Lead is assigned staff from the TDOT Mitigation Office.

Complete Mitigation Assessment

To meet federal and state mitigation regulation, policy and guidance and to determine if there are impacts to environmental features that require mitigation, the Environmental Mitigation Lead (assigned staff from the TDOT Mitigation Office) reviews the Line and Grade Package (which must include boundaries of identified ecological features) and the Environmental Boundaries Report (EBR) as part of a Mitigation Assessment to:

- Identify stream and wetland areas requiring mitigation.
  - If there are no stream or wetland areas in the EBR, then the mitigation assessment and further action are not required.
- Identify the availability of a Mitigation Bank or In-Lieu Fee mitigation credits.
- Where Mitigation Bank or In-Lieu Fee credits are not available, identify potential locations on or adjacent to the transportation project for on-site permittee responsible mitigation (PRM) and associated needs for additional mitigation right-of-way.

If locations on or adjacent to the transportation project (as opposed to an off-site mitigation project) are suitable for on-site mitigation, then the Environmental Mitigation Lead identifies those areas on the plans and requests any additional mitigation right-of-way be identified on the Functional Design Plans as part of the mitigation assessment. The Environmental Mitigation Lead completes and submits the mitigation assessment to the Roadway Design Lead, Project Manager and the ROW Division.

The TDOT Mitigation Office reviews and approves the mitigation assessment in accordance with the *Environmental Guidelines*, *Mitigation Technical Handbook* and *Mitigation Toolkit*. Once approved, the Environmental Mitigation Lead provides the documentation to the Roadway Design Lead or Roadway Engineer, who coordinates possible changes to right-of-way needs with the Project Manager and ROW Lead. The Environmental Mitigation Lead also files the documentation in accordance with the *Environmental Guidelines*, *Mitigation Technical Handbook* and *Mitigation Toolkit*.

Develop Preliminary Mitigation Plan

Compensatory mitigation offsets unavoidable stream and wetland impacts from transportation projects, and the final mitigation design is a requirement of the state and federal permitting process to offset and generate mitigation credits required for the transportation project.

As part of the design development in Stage 2, the Mitigation Designer develops plans for the proposed on-site mitigation area(s) in accordance with the *Environmental Guidelines*, *Mitigation Technical Handbook* and *Mitigation Toolkit* and as directed by the Environmental Mitigation Lead. The plans are to depict the needed right-of-way for stream mitigation and preliminary stream channel design. The Environmental Mitigation Lead reviews the plans and then provides mitigation plan sheets to the Roadway Design Lead for incorporation into the Functional Design Plans. When mitigation needs cannot be fully addressed as part of the transportation project, an off-site mitigation project could be required. This requires a separate set of mitigation plans.

As the Roadway Engineer/Roadway Design Lead develops the Utility Coordination Plans, the project team should note that right-of-way used for mitigation typically is not to be used for utility relocations for the transportation project and/or future utility relocations; however, this situation may be allowed to reduce a project's cost and schedule risk (*see 3EN1* for related information). The Environmental Mitigation Lead coordinates with the Roadway Design Lead and Utility Coordinator for reference on the roadway plans and Utility Coordination Plans.

Once complete, the Environmental Mitigation Lead provides the documentation to the Roadway Design Lead and Environmental Permit Lead to incorporate into the permit application. The Environmental Mitigation Lead also files the documentation in accordance with the *Environmental Guidelines, Mitigation Technical Handbook and Mitigation Toolkit.*

Related sections: *3UT1, 2EN3, 3EN2*

3EN1 Finalize Stream and Wetland Mitigation Design

Overview

Finalize mitigation design to offset and generate mitigation credits required for the transportation project as soon as feasible, but no later than Stage 3.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Final Mitigation Plans	▪ *Finalize Mitigation Plans*	Mitigation Designer	Environmental Mitigation Lead[a]

[a] The Environmental Mitigation Lead is assigned staff from the TDOT Mitigation Office.

Finalize Mitigation Plans

To finalize the Stream and Wetland Mitigation Design Plan Sheets (the Mitigation Plans), the Mitigation Designer refines the sheets for the proposed on-site mitigation area(s) in accordance with the *Environmental Guidelines*, *Mitigation Technical Handbook* and *Mitigation Toolkit* and as directed by the Environmental Mitigation Lead (assigned staff from the TDOT Mitigation Office). The plans continue to depict the previously identified right-of-way for stream mitigation, final mitigation design and if there are utilities in the mitigation area (although not preferred, this may be allowed to reduce the project's cost and schedule risk).

Once ready for review, the Environmental Mitigation Lead and a supervisor from the TDOT Mitigation Office review and approve the Mitigation Plans in accordance with the *Environmental Guidelines*, *Mitigation Technical Handbook* and *Mitigation Toolkit*. Once approved, the Environmental Mitigation Lead provides the documentation to the Roadway Design Lead and Permits Section Designer for incorporation into the roadway plans after the U.S. Army Corp of Engineers (USACE) and Tennessee Department of Environment and Conservation (TDEC) review, comment and approval as part of the permit application (*see 3EN2* for related information). The goal is to include this information as part of the Plan-in-Hand Plans in Stage 3, but if completed sooner, this information is incorporated into the current design (Functional Design Plans). The

Environmental Mitigation Lead files the documentation in accordance with the *Environmental Guidelines, Mitigation Technical Handbook and Mitigation Toolkit*.

3EN2 Complete and Obtain Aquatic Permit

Overview

Complete and submit the necessary aquatic permit application(s). Obtain permit(s), review the conditions and distribute the permit(s) required to construct the projects.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)
- ☐ *TDOT Environmental Permitting Design Process*

Deliverables

Deliverable	Task	Responsible Party
		Activity Leader
Aquatic Permit Application	▪ *Complete Aquatic Permit Application* ▪ *Modify or Complete Aquatic Permit Applications (for Utility Relocations)*	TDOT Permit Section
Aquatic Resource Permit(s)	▪ *Obtain Aquatic Resource Permits*	TDOT Permit Section

Complete Aquatic Permit Application

If no permits are required based on *2EN3*, the Environmental Permit Lead (assigned staff from the TDOT Permit Section or as assigned to the Regional ETO staff) sends a "no permit required" notification/email to the Project Manager, Roadway Design Lead and others as detailed in the *Environmental Guidelines*, *Permits Technical Handbook,* and *Permits Toolkit*.

For impacts to environmental features (such as wetlands and streams), aquatic resource permits from the U.S. Army Corps of Engineers (USACE), the Tennessee Department of Environment and Conservation (TDEC), U.S. Coast Guard (USCG), and the Tennessee Valley Authority (TVA) are potentially required as identified in 2EN3 and listed with the permit assessment (see callout box on the next page for potential aquatic resource permits). Building off the permittable plans (*see 2RD1* for related information), a complete permit application and documentation is developed and submitted to the appropriate regulatory agencies to obtain the required permits.

To complete an application, the Environmental Permit Lead (assigned staff from the TDOT Permit Section):

- Determines the environmental impact details requiring a permit(s) and writes the permit application in accordance with the *Environmental Guidelines*, *Permits Technical Handbook* and *Permits Toolkit* and relevant regulatory agency requirements.
- Includes all supporting documentation with the application, including the permittable roadway plans, permit sketches, mitigation information, Environmental Boundaries Report and any other required agency coordination documentation.
- Submits the draft application to the TDOT Permit Section for review prior to submittal to the regulatory agency.

Potential Aquatic Resource Permits (by Agency)

Tennessee Department of Environment & Conservation (TDEC)
- General aquatic resource alternation permit (GARAP)
- Individual aquatic resource alternation permit (IARAP)

US Army Corp of Engineers (USACE)
- USACE non-notification
- Nationwide 404
- Individual 404
- Section 408

These permits may also involve specific permittee-responsible mitigation (PRM).

Other permits of note
- *Tennessee Valley Authority Section 26a*
- *US Coast Guard Bridge Permit*

The TDOT Permit Section reviews and approves the permit application in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit*. Once approved, the Environmental Permit Lead submits the application to the corresponding regulatory agency (i.e., TDEC, USACE, and TVA) and files the documentation in accordance with the *Environmental Guidelines, Permits Technical Handbook,* and *Permits Toolkit*.

The permit application submittal begins both the permitting process and review timeframes for the regulatory agency to confirm a complete application has been submitted.

Modify or Complete Aquatic Permit Applications (for Utility Relocation Impacts)

Considering when the aquatic permit application for the roadway project is submitted compared to when the Utility Relocation Plans (aka Rainbow Plans) are available for review (*see 3UT1* for related information), the Environmental Permit Lead may need to modify the previously submitted application or prepare an additional application to address impacts caused by unavoidable utility relocations to certain environmental features (such as wetlands and streams).

To do this, the Environmental Permit Lead follows the same process as listed above for completing an application.

Note: The need for this additional step may not be known until the Utility Relocation Plans (aka Rainbow Plans) have been received and reviewed. Depending on the extent of impacts, this step could considerably impact the project schedule (e.g., delay letting). To mitigate delay, the Project Manager, Roadway Design Lead, Utility Coordination Lead, and Environmental Permit Lead should coordinate as early and as often as possible to:

- Identify environmental features and potential areas not to be used for utility relocations, denoting these areas on the Utility Coordination Plans (*see 2RD1* for related information).
- Support the Utility Coordination Lead in his/her meetings and discussions with the Utility Owners on relocation impacts, notably if the relocation could impact an environmental feature.
- Evaluate schedule risk for either modifying the existing permit application or preparing and submitting a new application to address utility relocation impacts.

Related sections: *2RD1, 3UT1*

Obtain Aquatic Resource Permits

All aquatic resource permits must be obtained from the required state and federal regulatory agencies prior to work beginning in the coverage area. Once the permit(s) is obtained, the Environmental Permit Lead reviews the conditions and wording for accuracy, distributes and files the permits in accordance with the *Environmental Guidelines*, *Permits Technical Handbook*, and *Permits Toolkit*.

4EN1 Complete and Obtain Stormwater Permit

Overview

Complete and submit the necessary stormwater permit application(s). Obtain permit(s), review the conditions, and distribute the permit(s) required to construct the project.

References

- ☐ *TDOT Environmental Guidelines*
- ☐ *TDOT Technical Handbooks* (in development)
- ☐ *TDOT Toolkit* (in development)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Stormwater Application for CGP Coverage	▪ *Complete Stormwater Permit Application*	Regional ETO Staff or TDOT Permit Section (as assigned)	Regional ETO Staff or TDOT Permit Section
NPDES Coverage	▪ *Obtain NPDES Coverage*		

Complete Stormwater Permit Application

The National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit is regulated by the Environmental Protection Agency (EPA) and delegated to TDEC. The NPDES program requires that construction projects incorporate appropriate erosion prevention and sediment control (EPSC) on the project and that a Stormwater Pollution Prevention Plan (SWPPP) is submitted as part of the application process.

To complete this task and building from the review in 2EN3, the assigned Regional ETO Staff, Permit Section Staff, or SWPPP consultant (as assigned) develops a Stormwater Application, including the SWPPP and documentation, for submittal to TDEC for approval. Regional ETO Staff or Permit Section Staff applies for Construction General Permit (CGP) coverage.

For projects assigned to SWPPP Consultants, prior to submittal, the Regional ETO Staff or Permit Section Staff (as assigned):

- Reviews and approves the Stormwater Application (including the SWPPP, sealed EPSC plans, and other required documentation).
- Submits the application to the regulatory agency (i.e., TDEC). and

- Files the documentation in accordance with the *Environmental Guidelines*, *Permits Technical Handbook,* and *Permits Toolkit*.

Obtain NPDES Coverage

The NPDES permit must be obtained from the required state and federal regulatory agencies prior to letting the project. Once the permit is obtained, the assigned Regional ETO Staff or Permit Section Staff (as assigned) reviews the conditions and wording for accuracy, distributes, and files the permit in accordance with the *Environmental Guidelines*, *Permits Technical Handbook,* and *Permits Toolkit*.

1GT1 Conduct Preliminary Geotechnical Assessment

Overview

Complete a high-level review of the project for potential/major geotechnical risks or mitigation opportunities in the project area.

References

- ☐ *TDOT Geotechnical Guidelines*
- ☐ *MicroStation (.dgn) Design Templates*
- ☐ *Concept Comment Resolution Form*
- ☐ *Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications* (latest edition)

Deliverables

Deliverable	Task	Responsible Party Activity Leader
Site Review Comments	▪ *Complete Geotechnical Division Review*	Lead Geotechnical Engineer/Geologist
Concept Report Comments	▪ *Review the Concept Report*	

Complete Geotechnical Division Review

The Lead Geotechnical Engineer/Geologist completes a high-level review of the project (e.g., Google street view) for potential/major geotechnical risks or mitigation opportunities in the project area (*see 1EC1* for related information). Using the Concept Comment Resolution Form, this project review is an opportunity for the Lead Geotechnical Engineer/Geologist to offer technical input to:

- Reduce Geotechnical risks that may impact design, construction, right-of-way, environmental, and utilities (as applicable).
- Better understand design decisions that will affect the final design.
- Support development of the preliminary project scope, conceptual layout, and initial cost estimate.

To establish a general understanding of the project area, validate concept feasibility, and begin to define potential geotechnical risks, the Lead Geotechnical Engineer/Geologist references information provided by the Engineering Concepts Lead (e.g., a project location map or .kmz file, relevant traffic and safety data, and/or project purpose and need or reason for the project) when collecting/providing any relevant project information. This effort may include referencing:

- Previous geotechnical/geological investigations/reports
- Previous construction plans/As-Builts
- Construction monitoring data
- Research reports
- Historical photos
- Geologic map, topographic map, soils maps and relevant USGS maps
- Landslide/rock fall evaluations and studies

Within two weeks of receiving the request, the Lead Geotechnical Engineer/Geologist provides comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the internal divisions and external stakeholders to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report are drafted.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the Lead Geotechnical Engineer/Geologist reviews the site visit packet to determine if geotechnical staff should attend the site visit and then, if attending, prepare for the site visit. Any discussion from the site visit becomes informative for later project stages.

Review the Concept Report

Within two weeks of receiving the draft Concept Report, the lead Geotechnical Engineer/Geologist provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

1GT2 Develop Geotechnical Work Plan

Overview

Develop a geotechnical work plan based on field reconnaissance, study of geologic maps and possible limited subsurface investigations.

References

- ☐ *TDOT Geotechnical Guidelines*
- ☐ *MicroStation (.dgn) Design Templates*
- ☐ *Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications* (latest edition)
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party Activity Leader
Geotechnical Work Plan	▪ *Identify Project Type and Potential Mitigation Strategies* ▪ *Develop Geotechnical Work Plan*	Lead Geotechnical Engineer/Geologist

Gather Relevant Geotechnical Information

If not already gathered as part of 1GT1, the Lead Geotechnical Engineer/Geologist uses the conceptual layout or preliminary alignment to gather relevant project information that may include:

- Previous geotechnical/geological investigations/reports
- Previous construction plans/As-Builts
- Construction monitoring data
- Research reports
- Historical photos
- Geologic map, topographic map, soils maps and relevant USGS maps
- Landslide/rock fall evaluations and studies
- Site visit (see below)

Conduct Initial Field Visit (if needed)

As needed, the Lead Geotechnical Engineer/Geologist conducts a field visit, coordinating with the Survey Lead, Roadway Design Lead and Project Manager, to identify issues that may impact or affect the project design, construction and/or performance. This may involve:

- Coordination with Operations and Maintenance staff to discuss maintenance history and existing conditions
- Determining site accessibility and potential traffic problems
- Identifying topographical constraints that could inhibit geotechnical investigations
- Seismic studies (including site-specific analysis)
- Determine preliminary liquefaction/lateral spread potential
- Determining potential geotechnical subsurface investigation/locations that may conflict with utilities

Identify Project Type and Potential Mitigation Strategies

Depending on the nature of the project, early mitigation and associated costs are critical for project design decisions and budget considerations, both to establish a complete project context and scope. The Lead Geotechnical Engineer/Geologist:

- Develops a preliminary strategy to mitigate identified issues/risks
- Develops preliminary costs to implement mitigations

This is based on project type and considerations for:

- Extensive roadway improvement projects involving significant traffic capacity and safety improvements
- Bridge and approach projects
- Limited extent improvement projects (such as intersection improvements, state industrial access projects, or road safety audit review projects)

The *TDOT Geotechnical Guidelines* provide additional parameters for analysis based on project type. This preliminary information is included in the Geotechnical Work Plan.

Develop Geotechnical Work Plan

The Geotechnical Work Plan documents the necessary information to establish the needed reports and complete the geotechnical design. The Lead Geotechnical Engineer/Geologist develops the following information to provide guidance on geotechnical issues:

- A brief summary of the preliminary geotechnical findings, assumptions and possible risks
- Information needed to verify assumptions and complete the geotechnical reports and design

The *TDOT Geotechnical Guidelines* provide further details for preparing a preliminary boring layout plan and preliminary work plan requirements. Based on the site investigation, the Lead Geotechnical Engineer/Geologist may adjust this work plan based on site conditions.

The Lead Geotechnical Engineer/Geologist provides this information to the Project Manager, which helps to inform the overall project's scope, schedule and budget, and the Survey Lead (as necessary).

2GT1 Complete the Soils and Geology Report

Overview

Complete a Soils and Geology Report, including site exploration, laboratory testing, engineering analysis and recommendations. Additionally, develop Geotechnical Sheets (G-sheets) and supporting geotechnical addenda for the Functional Design Plans.

References

- ☐ *TDOT Geotechnical Guidelines*
- ☐ *MicroStation (.dgn) Design Templates*
- ☐ *National Cooperative Highway Research Program (NCHRP)'s Manual of Subsurface Investigations*
- ☐ *Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications* (latest edition)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Soils and Geology Report	▪ *Conduct Site Exploration for Soils and Geology Report* ▪ *Select the Appropriate Laboratory Testing Program* ▪ *Develop the Soils and Geology Report*	Lead Geotechnical Engineer/Geologist	Roadway Design Lead
Geotechnical Sheets (G-sheets)	▪ *Develop Associated Geotechnical Sheet (G-Sheets)*		
Supporting Geotechnical Addenda	▪ *Develop Supporting Project Addenda*		

Conduct Site Exploration for Soils and Geology Report

The level of effort needed to characterize the project's geotechnical subsurface conditions (for the Soils and Geology Report) varies based on the project's scope and design requirements. This could include drilling, sampling and geophysical testing. The Lead Geotechnical Engineer/Geologist determines the extent of the drilling and sampling program in coordination with the Roadway Design Lead and Project Manager, considering the:

- Depth of the proposed excavation cuts
- Height of the proposed embankment fills
- Variability of the local geological conditions

Smaller projects may only require a few test borings with a limited field investigation, whereas complex projects may require extensive drilling that could take multiple months of field testing and analysis.

Generally acceptable test borings and sampling frequencies are detailed in the *TDOT Geotechnical Guidelines*, with frequencies based on the proposed geometrics of the roadway cross sections.

Select the Appropriate Laboratory Testing Program

The Lead Geotechnical Engineer/Geologist determines the appropriate test methods required to attain the soil/rock parameters necessary to complete engineering analysis or recommendations. The *TDOT Geotechnical Guidelines* and other references (listed above) provide additional information.

Develop the Soils and Geology Report

The Soils and Geology Report verifies the slope design proposed in the initial roadway design (for the Line and Grade Package) and then the Functional Design Plans, considering all geotechnical elements of the roadway design (including undercutting, rock pads, slope reinforcement, geohazard mitigation, etc.). The Lead Geotechnical Engineer/Geologist informs the Project Manager and Roadway Design Lead of any project geotechnical considerations that will require bid item costs or changes in the project scope or footprint related to the report recommendations.

Developed by the Lead Geotechnical Engineer/Geologist following the elements detailed in the *TDOT Geotechnical Guidelines*, the Soils and Geology Report typically contains:

- Geologic features characterization
- Recommended slope design
- Evaluation of on-site borrow sources in the cut areas for structural fill
- Recommended shrink / swell factors
- All areas that require a “rock pad” (prior to embankment fill placement is identified and quantified)
- All areas that require “undercutting” and “backfilling” with more suitable material (to be identified, specified and quantified)
- Presence of sinkholes, acid-producing material, existing landslides, or rockfall risks
- Pavement subgrade evaluation and recommended design C.B.R. to support the project’s pavement design

- Geotechnical sheets that illustrate the recommendations for the Roadway Design Lead or Roadway Design Engineer to incorporate into the project plans
- Appendix containing all supporting information

Specific recommendations in this report typically relate project station interval segments that share proposed geometric roadway cross section characteristics, with each segment discussion to include:

- Recommended cut slope ratios and/or embankment slope ratios
- Rock pads / rock buttresses
- Undercutting and replacement of soft soils
- Mitigation of sinkholes
- Settlement issues and settlement mitigation options
- Earthwork compaction information (maximum density, shrink/swell factors)

Applying naming conventions in the *TDOT Geotechnical Guidelines*, the final Soils and Geology Report is uploaded to the project folder for distribution to the Roadway Design Lead, Pavement Design Engineer and NEPA Lead.

Related section: *2RD1*

Develop Associated Geotechnical Sheet (G-Sheets)

Using the .dgn from the Line and Grade Package submitted during Stage 1, the Lead Geotechnical Engineer/Geologist develops the Geotechnical Sheets (G-Sheets), which include:

- Geotechnical notes and estimated quantities
- Boring layout
- Boring profile
- Geotechnical typical sections
- Specialty sheets (e.g., acid-producing material, sinkhole treatments, rock cut treatments)
- Pay item quantities associated with construction

The Lead Geotechnical Engineer/Geologist coordinates design development directly with the Roadway Design Lead throughout this stage, with slope recommendations and updated G-sheets/CADD files linked or provided regularly throughout Stage 2.

Applying the appropriate naming conventions identified in the *TDOT Geotechnical Guidelines*, the G-sheets are uploaded to the project folder for distribution to the Roadway Design Lead, Pavement Design Engineer and NEPA Lead and for inclusion in the Functional Design Plans and the Plan-in-Hand Plans. To increase standardization and consistency of the plans, current cell templates should be used when developing the G-sheets.

Develop Supporting Project Addenda

As needed, the Lead Geotechnical Engineer/Geologist delivers supporting Project Addenda addressing additional issues to project/scope change. The noted memos or Addendums are uploaded to the project folder for distribution to the Roadway Design Lead and other project team members (e.g., the Structural Design Lead and Pavement Design Engineer).

2GT2 Complete Foundation Reports

Overview

Prepare foundations reports for required bridge foundations, retaining walls, noise walls and foundations for high-mast lighting, standard lighting, signing and signal structures. Advance the geotechnical design and draft the geotechnical special provisions to include with the Plan-in-Hand Plans finalized in Stage 3.

References

- ☐ *TDOT Geotechnical Guidelines*
- ☐ *MicroStation (.dgn) Design Templates*
- ☐ *National Cooperative Highway Research Program (NCHRP)'s Manual of Subsurface Investigations*
- ☐ *Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications* (latest edition)
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Retaining Wall Foundation Report	▪ *Complete and Submit Foundation Report for Retaining Wall(s)*	Lead Geotechnical Engineer/Geologist	Roadway Design Lead, Structural Design Lead
Noise Wall Foundation Report	▪ *Complete and Submit Foundation Report for Noise Wall(s)*		Structural Design Lead, Noise Lead
HML Foundation Report	▪ *Complete and Submit Standard Report for Signs, Lighting, ITS and Signals and High-Mast Lighting*		Lighting Design Engineer
Bridge Foundation Report	▪ *Complete and Submit Foundation Report for Bridges*		Structural Design Lead

Conduct Site Exploration for Structures

It is critical to understand subsurface characteristics for all structure foundations proposed for a project. The structure foundation request(s) is to contain proposed drilling locations. These locations may need to be adjusted because of utility conflicts or the inability to access the proposed hole.

When preparing for drilling, the Lead Geotechnical Engineer/Geologist defines a logical layout for the identified subsurface exploration techniques (developed in collaboration with the

Structural Design Lead, Roadway Design Lead, Survey Lead and Noise Lead), which often includes:

- Rock core drilling
- Soil Auguring
- SPT and Shelby Tube samples

While the drilling locations and depths performed for the site vary according to the proposed structure, soil variability and underlying rock conditions, the boring layout is to generally comply with the *TDOT Geotechnical Guidelines* and relevant AASHTO guidelines.

Complete and Submit Foundation Report for Retaining Wall(s)

The Retaining Wall Foundation Report recommends "Acceptable Retaining Wall" types and associated contractual design requirements that the contractor uses (as applicable) when selecting the wall type, design and installation methodology.

To initiate the process, the Roadway Design Lead refers to the conceptual layout, the Concept Report, or geometric/line and grade layout from the Line and Grade Package (*see 1RD2* for related information) to identify potential retaining wall locations in coordination with the Structural Design Lead and the Lead Geotechnical Engineer/Geologist (regarding feasibility) and the Survey Lead (to stake out points along the retaining wall).

Once the retaining wall locations are staked (*see 2SY1* for related information), the Lead Geotechnical Engineer/Geologist directs the necessary subsurface investigations and prepares a report for each proposed retaining wall, considering:

- Coordination with the Structural Design Lead and Roadway Design Lead when developing recommendations and category determination (*see 3ST1* for related information).
- Evaluation of different wall types in accordance with the *TDOT Geotechnical Guidelines*, current industry standards, relevant AASHTO guidelines and traffic control/phasing plans.
- Establishment of internal and external stability responsibilities via bid item descriptions and notes the contractor uses (as applicable) to estimate a bid.
- Constructability of the wall following the identified factors listed in the *TDOT Geotechnical Guidelines*, which may require coordination with other disciplines.

To include the content detailed in the *TDOT Geotechnical Guidelines*, the Retaining Wall Foundation Report provides typical recommendations for:

- Acceptable wall types in concert with the Retaining Wall Sheets (R series) with Geotechnical Design Notes and Design Parameters
- Discussion of foundation improvements

- Construction constraints, such as allowable temporary cut slopes, special drainage, or undercutting

The Lead Geotechnical Engineer/Geologist also develops associated R-sheets, in .dgn format, that generally detail design parameters, site notes and further guidance.

Applying the appropriate naming conventions identified in the *TDOT Geotechnical Guidelines*, the Lead Geotechnical Engineer/Geologist uploads the respective Retaining Wall Foundation Report(s) and R-sheet(s) to the project folder for distribution to the Structural Design Lead and Roadway Design Lead.

Complete and Submit Foundation Report for Noise Wall(s)

Similar to the Retaining Wall Foundation Report, the Noise Wall Foundation Report details the needed geotechnical investigations and foundation recommendations for all noise walls considered reasonable and feasible from the Noise Analysis (*see 1EN2* and *2EN1* for related information).

To initiate the process, the Structural Design Lead provides a set of conceptual plans identifying potential noise wall locations in coordination with the Roadway Design Lead and Noise Lead. Once identified, the Lead Geotechnical Engineer/Geologist directs the subsurface investigations (typically one boring for each proposed noise wall post) and prepares the report for each proposed noise wall in coordination with the Structural Design Lead, considering noise wall structural design elements and associated geotechnical values.

To include the content detailed in the *TDOT Geotechnical Guidelines*, the Noise Wall Foundation Report provides typical recommendations on:

- Type of foundations (typically 2-foot drilled shaft)
- Description of the foundation bearing strata
- Elevation where rock was encountered (or refusal elevation)
- Ultimate shear strength of all materials
- Angle of internal friction of all materials
- Effective unit weight of all materials
- Modulus design values of all materials
- Side friction and base resistance values for axial capacity check
- Recommended top of rock socket depth

The Lead Geotechnical Engineer/Geologist also develops foundation detail sheets, in .dgn format, that generally details the boring layout, geotechnical notes and boring profile sheets for the noise wall(s).

Applying the appropriate naming conventions identified in the *TDOT Geotechnical Guidelines*, the Lead Geotechnical Engineer/Geologist uploads the Noise Wall Foundation Report(s) and associated detail sheets to the project folder for use by the Structural Design Lead, Roadway Design Lead and Noise Lead.

Complete and Submit Standard Report for Signs, Lighting, Signals, ITS and High-Mast Lighting

Although design for standard signs, lighting, signal and ITS foundations are to be performed by the contractor, the Lead Geotechnical Engineer/Geologist is typically given the opportunity to review and comment on any geotechnical issues as part of the Functional Design Plan Field Review and to ensure the standard bid item notes are included in the Plan-in-Hand Plans and Construction Documents. For high-mast lighting, the Lighting Design Engineer initiates a request for the Lead Geotechnical Engineer/Geologist to develop a High Mast Lighting (HML) Foundation Report.

Once the pole locations are staked by the Survey Lead (*see 2SY1* for related information), the Lead Geotechnical Engineer/Geologist develops the report in accordance with the content detailed in the *TDOT Geotechnical Guidelines*. This includes recommendations that typically include:

- Type of foundations (typically 4-foot diameter drilled shaft)
- Description of the foundation bearing strata
- Elevation where rock was encountered (or refusal elevation)
- Ultimate shear strength of all foundation materials
- Angle of internal friction of all foundation materials
- Effective unit weight of all materials
- Side friction and base resistance values for axial capacity check
- Recommended top of rock socket depth (typical minimum is a factor of drilled shaft diameter and 1.5-2.0)

The Lead Geotechnical Engineer/Geologist also develops foundation detail sheets, in .dgn format, that generally detail the boring layout and geotechnical notes/parameters, boring profile sheet and foundation detail sheets for the HML lighting foundations.

Applying the appropriate naming conventions identified in the *TDOT Geotechnical Guidelines*, the Lead Geotechnical Engineer/Geologist uploads the respective Foundation Report(s) for signs, lighting, ITS and signal foundations or HML foundations to the project folder for distribution to the Structural Design Lead, Roadway Design Lead and respective Design Engineer.

Complete and Submit Foundation Report for Bridges

Initiated by the Structural Design Lead using information on the Foundation Data Sheet (e.g., bridge layout and estimated scour depths) (*see 2ST2* for related information), the Bridge Foundation Report and modified, unsealed Foundation Data Sheet provide the requisite analysis and recommendations for bridge foundation type and parameters.

Once the proposed bridge stakeout is completed by the Survey Lead (*see 2SY1* for related information), the Lead Geotechnical Engineer/Geologist directs the necessary subsurface investigations and prepares a report by:

- Reviewing the Foundation Data Sheet provided by the Structural Design Lead, including the location of any proposed retaining walls (if a retaining wall(s) is included; see related task above)
- Evaluating foundation alternates and developing project-specific recommendations based on identified subsurface conditions in accordance with the *TDOT Geotechnical Guidelines* and related AASHTO guidelines
- Documenting the analysis and recommendations in the report

To include the content detailed in the *TDOT Geotechnical Guidelines*, the Bridge Foundation Report provides typical recommendations on:

- Type(s) of foundations recommended
- Elevation of foundation bearing strata
- Elevation where rock was encountered (or refusal elevation)
- Nominal bearing resistance of rock/soil
- Side friction and base resistance factors (deep foundation)
- Depth of rock socket (deep foundation)
- Lateral capacity of soil or rock (deep foundation)

The Lead Geotechnical Engineer/Geologist also modifies and attaches a revised Foundation Data Sheet(s), in .dgn format, that includes a general boring layout, boring profile and elevation chart for each bridge.

Applying the appropriate naming conventions identified in the *TDOT Geotechnical Guidelines*, the Lead Geotechnical Engineer/Geologist uploads the respective Bridge Foundation Report(s) and

modified Foundation Data Sheet(s) to the project folder for distribution to the Structural Design Lead, Roadway Design Lead and Construction Engineer, who provides the report to the contractors at the time of letting the project.

4GT1 Finalize Geotechnical Plans

Overview

Compile the final Geotechnical Design Documents with any other required documentation to assist the Roadway Design Lead in compiling the Construction Documents needed to advertise and let the project.

References

- ☐ *TDOT Geotechnical Guidelines*
- ☐ *MicroStation (.dgn) Design Templates*
- ☐ *Federal Highway Administration (FHWA) Geotechnical Technical Guidance Manual*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications* (latest edition)
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Final Geotechnical Design Documents	▪ *Finalize Geotechnical Design Documents* ▪ *Finalize Geotechnical Special Provisions for Letting*	Lead Geotechnical Engineer/Geologist	Roadway Design Lead
Final Geotechnical Special Provisions			

Finalize Geotechnical Design Documents

To prepare the final Geotechnical Design Documents for the PS&E Review Meeting, the Lead Geotechnical Engineer/Geologist:

- Reviews comments from the Plan-in-Hand Field Review and addresses necessary design revisions and plan updates.
- Coordinates a QC review of the plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Prepares the plans for the PS&E Review Meeting, submitting these plans to the Roadway Design Lead for inclusion with the other design plans for review.
- Attends the PS&E Review Meeting.
- Resolves last comments from the meeting.

Once reviewed and comments are resolved, the Lead Geotechnical Engineer/Geologist:

- Assembles the final Geotechnical Design Documents for letting.

- Submits sealed plans (as allowed in accordance with TDOT standard procedures for signing and sealing plans) and CADD files to the Roadway Design Lead for inclusion with the Construction Documents.

Finalize Geotechnical Special Provisions for Letting

As part of finalizing the Construction Documents, the Lead Geotechnical Engineer/Geologist:

- Coordinates with the Construction Engineer during Stage 3 to initially draft the project's geotechnical special provisions, assembling the final special provisions for letting in this stage.
- Conducts a QC review on the special provisions as detailed in the *TDOT Quality Manual*.
- Submits the special provisions to the Roadway Design Lead for inclusion with the Construction Documents.

1PM1 Set Up Project

Overview

Confirm the project details and assignment and begin project setup. Assess the reliability of the data used to develop project planning documents (e.g., Concept Report), consider the amount of time since collection and/or the limitations of the data, and account for and resolve ambiguities.

Collaborate with the discipline managers and technical leads to develop preliminary project management documents and define expectations for how the project team manages risk, communicates as a team and delivers quality.

References

- ☐ *Department Policy 301-01 Standard Procurement, Management, and Administration of Engineering and Design Related Services* (revisions in development)
- ☐ *Local Government Guidelines for the Management of Federal and State-funded Transportation Projects, Seventh Edition, revised March 15, 2019*
- ☐ *TDOT Public Involvement Plan*
- ☐ *Funding Request Forms*
- ☐ *Concept Report Template*
- ☐ *MS Project Schedule Template*
- ☐ *Project Commitment Document Template*
- ☐ *TDOT Quality Manual*
- ☐ *Risk Management Guide* (in development)
- ☐ *Risk Management Plan (and Risk Register) Template*
- ☐ *TDOT PDN Scope and Schedule Generator*
- ☐ *TDOT PDN_Master Scope of Work*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Project Assignment Notice/Confirmation	▪ *Confirm Project Assignment* ▪ *Request Shared Project Folder*
Authorization of Funds (Preliminary Engineering/NEPA (PE-N) Funding Request Form & ROW Incidentals and Utility Coordination Request)	▪ *Verify Project Funding, Project Number, PIN, and Task Profile Numbers* ▪ *Request & Obtain Authorization of Funds*
Draft Project Scope Preliminary Schedule Preliminary Budget Draft Project Quality Management Plan Draft Risk Management Plan Draft Risk Register Draft Project Communication Plan	▪ *Prepare Draft Project Scope* ▪ *Prepare Preliminary Schedule* ▪ *Validate Preliminary Budget* ▪ *Prepare Draft Project Quality Management Plan* ▪ *Prepare Draft Risk Management Plan* ▪ *Prepare Draft Project Communication Plan*
Draft Project Commitment Document (PCD)	▪ *Prepare Draft Project Commitment Document (PCD)*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Confirm Project Assignment

The Project Manager confirms the project assignment upon notification. The date of this assignment becomes the constraint within the MS Project Schedule template.

Verify Project Funding, Project Number, PIN, and Task Profile Numbers

Under the Federal Highway Administration (FHWA) Directive 6640.1A and as described in *Appendix H*, TDOT may advance preliminary design activities prior to the conclusion of the National Environmental Policy Act (NEPA) process. This allows preliminary design work needed to complete the Environmental Document to proceed, while also allowing TDOT to complete other activities to streamline the overall project delivery process. Authorization for this work is categorized under preliminary engineering/NEPA (PE-N) funds.

In order for the project team to request their respective TX codes, begin work, and charge their time appropriately, the Project Manager must request and obtain authorization to use PE-N funds. The Project Manager completes the funding

Requesting Funds by Stage

Stage 1: Request preliminary engineering/NEPA (PE-N) funds (and ROW incidentals and Utility coordination funds).

Stage 2: Request Preliminary Engineering Final Design (PE-D) funds to use after the Environmental Document is complete (*see 2EN2*).

Stage 2: Request ROW/Utility funds for use after the completion of the Environmental Document.

request by using and then submitting a *Preliminary Engineering/NEPA (PE-N) Funding Request Form* to Programming.

Once funding has been authorized, each team member requests the Task Profile (TX) number for their department. The Project Manager notifies the project team members of the project information (including project number, PINs, and other details) so that the team can begin work on the data requests, conceptual layout(s) and estimate (if under Stage 1), and other information requests.

Request Shared Project Folder

The Project Manager sends a request to IT to provide administrative access to the shared project folder, then verifies if there are any planning documents with the Engineering Concepts Lead (see Stage 0: Planning for related information), ensures accessibility, and notifies the discipline managers.

Prepare Draft Project Scope

The purpose of developing a draft project scope in this activity is to understand the project goals and commitments, as well as what the project work includes and what it does not include. The draft also identifies opportunities for innovation and efficiencies, as well as potential risks by using information from the Concept Report and other planning documents.

Project Management Plan (PMP) Elements

Scope, schedule, budget, quality, risk, and communication are elements of the PMP, formalized in *2PM1*.

Drafting a Project's Scope

Consider drafting and modifying, throughout Stage 1, the scoping document titled the *TDOT PDN_Master Scope of Work*.

The Project Manager collects and reviews available project information to understand the proposed project's footprint, conceptual design and assumptions, potential impacts to right-of-way and utilities, and major items of construction work and associated risks. Relevant sources of information may include:

- Concept Report (or SIA Packet) and its supporting appendices
- Relevant planning, traffic, multimodal, Transportation System Management and Operations (TSMO), rail studies and recommendations
- Environmental documentation, the Environmental Technical Study Area (ETSA) and anticipated permits
- Other projects along the corridor or adjacent projects
- Built/natural/social environmental constraints

- Transportation plan and funding type and sources
- Proposed project delivery method (e.g., design-bid-build/DBB, design-build/DB, construction manager general contractor/CMGC)
- Stakeholder communications and agreements
  - Potential betterments, project area commitments, or future local government agreements (e.g., for signals or lighting)
  - **Note**: In the case of local government participation, the Project Manager meets with and discusses project funding and local match, cash flow requirements and local government funding approval processes. (See Local Government Guidelines for the Management of Federal and State-funded Transportation Projects).

This information informs the draft scope found in the *TDOT PDN_Master Scope of Work* and *TDOT PDN_Scope and Schedule Generator*, the latter of which is typically generated for Stage 1 scoping activities first and then for the remainder of the project's activities in Stage 2 (when finalizing the Project Commitment Document [PCD] in *2PM2*).

Prepare Preliminary Schedule

The purpose of developing a preliminary preconstruction schedule in this activity is to outline expectations required to meet project delivery commitments and prepare for staffing discussions with discipline managers or identified technical leads.

Using the *MS Project schedule template* or building a schedule using the *TDOT PDN_Scope and Schedule Generator*, the Project Manager creates the preliminary schedule by identifying the initial start date for project delivery and selected activities outlined in the PDN (e.g., 1EN2, 2RD2, 3GT1, 4ST1).

Project Scheduling Considerations

- Modify schedule logic and durations based on project needs.
- Use working days and a holiday calendar for schedule durations.
- Add subtasks for critical path activities where specificity helps manage the process.
- When deactivating or omitting an activity or task, discuss the change with the discipline managers before making the activity/task inactive.

Validate Preliminary Budget

The purpose of reviewing a preliminary budget in this activity is to:

- Validate the estimate in the Concept Report and update the estimate with new project details (known at the time).
- Prepare for discussions with the discipline managers and technical leads during project setup.
- Confirm the project is approved within the current Statewide Transportation Improvement Program (STIP) or Transportation Improvement Program (TIP), as appropriate.

The preliminary budget includes preliminary engineering (PE), right-of-way (ROW) and construction estimates. It also confirms the funding sources, type and programmed amounts allocated for the project are adequate to progress the work in the identified fiscal year. The budget will ultimately be memorialized in the Project Commitment Document, Stage 2 (*see 2PM2* for related information).

- **Note**: Processes and procedures for estimating costs (*see Appendix F* for estimating recommendations and an example template [in development]) vary based on funding type (federal, state and/or local government funds).
- Contact the Project Management Executive Director for preliminary budget guidance.

Prepare Draft Project Quality Management Plan

The purpose of developing a draft project quality management plan is to establish quality control and quality assurance expectations with discipline managers and technical leads. The Project Manager is responsible for developing the project quality management plan and overseeing the project's quality process to ensure project deliverables have met the appropriate quality checks on or before each milestone.

Quality management guidance is available under the *TDOT Quality Manual* to assist the Project Manager and technical leads in defining roles and responsibilities for critical quality tasks, as well as detailing the process and checklists each discipline follows to ensure a quality deliverable.

Prepare Draft Risk Management Plan

The purpose of developing a draft risk management plan is to clarify expectations with discipline managers and technical leads early and to discuss any risks (or opportunities/innovation) that may impact the project. Using the *Risk Register Template,* the Project Manager develops a draft risk management plan and register based on current project knowledge, the Concept Report and/or the Initial Risk Assessment developed previously.

The risk management plan and its associated register are updated periodically (no less than at each design field review) to reflect updates to the initial list of project risks, updates to mitigation strategies, or added risks or opportunities discovered as the project evolves.

Risk management guidance is available under the *Risk Management Guide* to assist the Project Manager and technical leads in initially developing and continuing to update the risk management plan and register.

Prepare Draft Project Communication Plan

The purpose of developing a draft *Project Communication Plan* is to begin to identify the communication needs and expectations of the project team.

The Project Communication Plan (*see Appendix C* for an example template), outlines several operating guidelines that describe how the project team plans to work together. These guidelines address some or all of the following:

- Team decision-making
- Team project meetings (structure, frequency, documentation, etc.)
- Communication (method, frequency, protocols, etc.)
- Team issues and conflict management
- Project status and reporting (recipient, requirements, frequency, etc.)

In addition, it establishes clear guidelines for project team members addressing the needs of external stakeholders, members of the public and the media.

The Project Manager and designated project team members conduct proactive stakeholder engagement throughout the life of the project in accordance with the established *TDOT Public Involvement Plan (PIP)*.

Prepare Draft Project Commitment Document (PCD)

The purpose of preparing a draft *Project Commitment Document* is to align both the project team and department leadership early by defining the scope, schedule and budget.

The Project Manager works with the project team during the Kickoff Meeting and Scoping Meeting to develop a project scope, inclusive of commitments, to define the project's goals, as well as to list major improvements that define the construction work to satisfy the project goals.

After Stage 1, and once the team has identified and confirmed schedule constraints and budgetary considerations, the Project Manager completes the PCD during the "Complete Project Commitment Document" process (*see Appendix A* for an example template and *see 2PM2* for related information).

Request and Obtain Authorization of Funds (Incidentals)

At this time in Stage 1 or early in Stage 2, the Project Manager may also request funds to advance certain Right-of-Way (ROW) and Utility activities (typically known as ROW incidentals and Utility coordination that are further described in *2RW1*, *2RW2*, *3RW1* [through the task to review appraisal] and *1UT2*, *2UT1,3UT1* [through the task to distribute utility coordination

plans]). The Project Manager completes the funding request by using and then submitting a *ROW Incidental and Utility Coordination Funding Request Form* to Programming.

See the link in the *Reference list* above to download the appropriate funding request forms.

1PM2 Build Project Team

Overview

Identify project team needs, understand the roles required to deliver the project and allow enough lead time to secure the necessary resources.

References

- ☐ *Department Policy 301-01 Standard Procurement, Management, and Administration of Engineering and Design Related Services* (revisions in development)
- ☐ *Project Team Contact List*
- ☐ *TDOT PDN Scope and Schedule Generator*
- ☐ *TDOT PDN_Master Scope of Work*

Deliverables

Deliverables[a]	Tasks
Project Team Contact List	▪ *Identify Project Team Resources* ▪ *Build Project Team*
Consultant Contract(s)	▪ *Determine Type of Consultant(s)* ▪ *Obtain Consultant(s)*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Identify Project Team Resources

The Project Manager coordinates with applicable discipline managers to identify the initial list of PDN activities (e.g., 1EN2, 2RD2, etc.) needed to deliver the project based on the project scope and understanding of the risks. The project team may consist solely of TDOT employees, a combination of TDOT and consultant team members or solely consultant staff.

Build Project Team

The Project Manager, in consultation with the discipline managers and/or technical lead(s), determines if the work is performed by TDOT staff, by a consultant or by a combination of both. Considerations for determining the type of consultant and business need to employ consultant services are outlined in *Department Policy 301-01 Standard Procurement, Management and Administration of Engineering and Design Related Services* (revisions in development).

If one or more consultants are needed to support the disciplines, the Project Manager and the applicable discipline manager(s) determine the best method for acquiring and managing the necessary consultant resources.

Generally, consultants are assigned *both* a technical role reporting to the design lead or a discipline manager for functional direction *and* the Project Manager for project direction and contractual needs. The design lead and discipline manager collaborate with the Project Manager to clearly define the consultant's role(s) and responsibilities; then the Project Manager submits the request to hire one or more consultants to the Regional Director of Project Management for approval.

Once project team resources and stakeholders are identified, the Project Manager or a designated staff member creates a project team contact list, (*see Appendix C* for an example template) and uploads it to the shared project folder.

Determine Type of Consultant(s) and Contract(s) Required

The Project Manager works with the respective discipline managers to determine the type of consultant(s) and consultant contract required. The timing of consultant selection and execution of each contract may vary for each discipline.

The Project Manager coordinates with Professional Services to secure consulting services throughout the selection process.

Consideration for Obtaining Consultants

Securing consultants may take 4 to 6 weeks to request an on-call consultant or 4 to 6 months to complete a consultant procurement. The Project Manager should consider this timing when scheduling the kickoff and scoping meetings, Stage 1 activities, etc.

Look ahead to *2PM3*, Conduct ROW Strategy Meeting(s), to determine if the project requires ROW Acquisition Consultant Services.

Obtain Consultant(s)

Following Department Policy 301-01 Standard Procurement, Management and Administration of Engineering and Design Related Services, the Project Manager completes the following:

- Prepare a scope of work using the *TDOT PDN Scope and Schedule Generator*
- Request contract for on-call consultants or follow the process for selected consultants
- Prepare an Independent Cost Estimate
- Select a consultant
- Negotiate consultant documents with consultant(s)

- Request approval for consultant and associated documentation
- Obtain funding approval
- Prepare and obtain contract approvals
- Execute contract
- Distribute copies of the contract (discipline managers hold the contracts)

1PM3 Hold Kickoff Meeting

Overview

Organize, lead and facilitate the Kickoff Meeting with the project team and external stakeholders as needed. **Note**: Before the Kickoff Meeting, review any prior discussions with local stakeholders that occurred during Stage 0: Planning. While most Project Managers will hold a Kickoff Meeting, some simpler projects may commence via email or other coordination and other projects may combine the Kickoff and Scoping Meetings.

References

- ☐ *Agenda and Meeting Minutes Template*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Draft Risk Register	▪ *Set Up Meeting and Develop Agenda* ▪ *Hold Meeting and Document/Distribute Minutes*
Revised Project Management Plan	▪ *Update Project Management Plan*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of the Kickoff Meeting is to introduce and align the project team members with a clear understanding of the project and expectations of the team members' roles, commitments and involvement. The project team discusses the project scope (inclusive of commitments), schedule, budget, quality, risks and communication.

Developing an Agenda

For all team meeting agendas, consider including discipline-specific discussion points and sending the agendas 2 to 3 days in advance of each meeting.

The Project Manager works with the project's Design Lead (e.g., the Roadway Design Lead, Structural Design Lead) to gather all relevant materials (e.g., the Project Management Plan, project mapping, preliminary concept designs, etc.) in the shared project folder and distributes to the meeting invitees prior to the Kickoff Meeting.

To prepare for the meeting, the Project Manager organizes this meeting and develops the agenda (*see Appendix C* for an example template), which typically includes:

- Team member introductions and roles on the project (the respective scope of work)

- Project overview
- Draft Project Commitment Document (PCD)
- Known measures of effectiveness (MOEs) for the project and draft purpose and need statement (*see 1TD2* for related information)
- Construction and maintenance input
- Draft Project Management Plan elements
  - Scope
  - Schedule
  - Cost estimate and budget
  - Project Communication Plan (determine need for a formal public involvement meeting)
  - Risk Management Plan
  - Project Quality Management Plan
- Other projects along the corridor or adjacent projects
- Need for Value Engineering study

The Project Manager invites the team members and necessary stakeholders to the meeting, which may include a site visit. Depending on the project's scope, potential invitees include:

Kickoff Meeting Invitees	
Community Relations Representative	State Railroad Coordinator/Railroad Office Designee
Construction Manager (HQ, Region)	Engineering Concepts Lead
Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead)	Structural Design Lead
Lead Geotechnical Engineer/Geologist	Survey Lead (TDOT Geodetics)
Hydraulics Lead	Traffic (Signal Design Engineer, Lighting Design Engineer, ITS Design Engineer and/or Traffic Design Engineer)
Active Transportation Lead	Traffic Safety
Regional Director of Project Management	TSMO Coordinator
Project Management Executive Director	Utility Coordinator (Senior Technical Specialist)
Region Maintenance Representative	Headquarters Utility Representative (e.g., Headquarters Technical Coordinator 1)
Regional Preconstruction Director	VE Program Coordinator (if applicable, *see 2PM1*)
Regional Transportation Engineer	Stakeholders to consider: Municipality Representative, FHWA, Municipal and Rural Planning Organizations (MPO, RPO), Local Government, SIA, etc.
Right-of-Way (ROW) Lead	
Roadway Design Lead	
Roadway Engineer(s)	

Note: Consultants working on the project's design phase should be selected and under contract prior to project kickoff, so that they can attend this meeting.

Hold Meeting and Document/Distribute Minutes

The Project Manager facilitates the discussions outlined in the agenda and encourages team interaction. The Project Manager (or designee):

- Presents the draft risk register (drafted in *1PM1* and advanced under *1PM4*).
- Documents comments, decisions and actions in the meeting minutes.

The draft risk register and meeting minutes are distributed to the meeting invitees and applicable team members, then uploaded to the shared project folder. **Note**: If this is a local government project, the Local Government Representative schedules and conducts the meeting, provides agendas, keeps meeting minutes and distributes them after the meeting. The Project Manager verifies that these tasks are completed.

Verify the ETSA

Around the time of or during the Kickoff Meeting, the project team reviews the current Environmental Technical Study Area (ETSA) to confirm the study area is sufficient to address any known modifications to the project limits or design scope.

While further adjustments to the ETSA may be needed as the design progresses into Stage 1 or 2, the Project Manager confirms with the Environmental Technical Leads, NEPA Lead, and the Roadway Design Lead or Structural Design Lead that the ETSA is adequate for fieldwork to begin.

1PM4 Conduct Initial Risk Workshop

Overview

Conduct risk analysis early in the project in preparation for the Initial Risk Workshop and the subsequent workshops to identify, minimize and/or eliminate risks or maximize opportunities that may negatively or positively impact the schedule and/or budget. Updates to the register are repeated as often as necessary throughout the project (but minimally at each design field review).

References

- ☐ *Agenda and Meeting Minutes Template*
- ☐ *Risk Management Guide*
- ☐ *Risk Management Plan (and Risk Register) Template*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes	▪ *Set Up Meeting and Develop Agenda* ▪ *Hold Meeting and Document/Distribute Minutes*
Updated Risk Register	▪ *Update and Monitor Risk Register*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of the Initial Risk Workshop is to:

- Identify risks and associated resolution strategies.
- Formalize the draft risk register to aid in tracking risk probabilities and confirming the resolution of each risk.
- Incorporate mitigation strategies into the project documents as appropriate.

The Project Manager confirms all relevant materials (e.g., the Concept Report, Project Commitment Document, current version of the Line and Grade Package/line and grade.dgn, etc.) are in the shared project folder and shares them with the meeting invitees (as needed) prior to the Initial Risk Workshop.

To prepare for the workshop, the Project Manager organizes this meeting and develops the agenda (*see Appendix C* for an example template). The initial Risk Workshop discussions may include:

- Overview of the project
- Draft schedule
- Draft project cost estimate
- Risk identification for preconstruction, construction and post-construction (operations and maintenance)
- Site visit (all project team members attend one site visit)
- Initial Risk Assessment (if completed previously)

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

Initial Risk Workshop Invitees	
Active Transportation Lead	Roadway Design Lead
Community Relations Representative	State Railroad Coordinator/Railroad Office Designee
Construction Manager (HQ, Region)	Structural Design Lead
Drainage Design Lead	Survey Lead
Engineering Concepts Lead	Traffic (Signal Design Engineer, Lighting Design Engineer ITS Design Engineer, and Traffic Design Engineer)
Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead)	Traffic Safety
Estimating Representative	TSMO Coordinator
Hydraulics Lead	Utility Coordinator (Senior Technical Specialist)
Lead Geotechnical Engineer/Geologist	VE Program Coordinator (if applicable, *see 2PM1*)
Pavement Design Lead	FHWA (notify FHWA at a minimum if a federal-aid project)
Region Maintenance Representative	Stakeholders to consider: Municipality Representative, Municipal and Rural Planning Organizations (MPO, RPO), Local Government, Utility Owners, etc.
Regional Transportation Engineer	
Right-of-Way Lead	
Right-of-Way Acquisition Lead	

Hold Meeting and Document/Distribute Minutes

The Design Lead facilitates the discussion and encourages team interaction. The Project Manager:

- Leads the meeting and selects a staff member to update the draft risk register
- Documents all comments, decisions and actions in the meeting minutes

Meeting minutes are distributed to the invitees and project team and uploaded to the shared project folder.

Update and Monitor Risk Register

The purpose of the risk register is to evaluate the effects and status of the risks as the project progresses. **Note**: This could include updating or advancing the Initial Risk Assessment (if completed previously) or could be formalized using the risk register drafted during *1PM1*.

The Project Manager, in consultation with the project team, updates the project risk register during the meeting(s). Key considerations include:

- Pre-construction phase delivery risks topics:
  - Resource (staff and funding) availability and level of experience
  - Communication
  - Political and regulatory
  - Schedule and budget expectations
  - Project-related risks (e.g., technical engineering/construction, social and cultural resources, ecology, utilities, difficult and/or special ROW acquisitions (RR, TVA) and/or relocations and other long lead items such as lengthy permit applications and time to secure needed permits)

Risks are identified and assessed relative to their impact and probability of affecting the proposed budget and schedule at the time of the meeting. The Project Manager confirms assignments for team members to document and resolve risks in the risk register. Each team member informs the Project Manager (or designee) of the status of their assigned risk resolution.

End of Activity

Update the Executive Status Report and Project Commitment Document (PCD) with major risks, then as appropriate, notify the Regional Director of Project Management, Project Management Director and Regional Director of any major risks that impact the budget or schedule.

1PM5 Hold Scoping Meeting and L&G Field Review

Overview

Organize, lead, and facilitate the project Scoping Meeting and Line and Grade Field Review. For smaller or less complex projects, determine whether to combine these meetings once the Line and Grade Package is ready for review.

References

- ☐ Roadway Design Value Engineering
- ☐ Agenda and Meeting Minutes Template
- ☐ Comment Resolution Form Template

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Updated Comment Resolution Form	▪ *Set Up Meeting and Develop Agenda* ▪ *Review and Complete Comment Form* ▪ *Compile Comments, Hold Meeting and Document/Distribute Minutes*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of the Scoping Meeting is to solidify the project's scope of work, schedule, and budget (project cost) to reduce scope "creep" and rework in subsequent stages. It also informs the commitments to be memorialized in the Project Commitment Document (PCD). The purpose of the Line and Grade Field Review initially defined the project's footprint (namely the horizontal alignment) for advancement of other disciplines' plans and related design work.

Attended by a multi-discipline team, this meeting identifies any issues, opportunities, challenges, conflicts, and/or omissions in the proposed scope of work, preliminary schedule, and proposed project team scope of services to accomplish the work. Right-of-way, utilities, additional environmental technical studies, permitting and mitigation, constructability, and local jurisdiction needs and commitments are also discussed and considered.

The Project Manager organizes the meeting and develops the agenda (*see Appendix C* for an example template), which typically includes:

- Draft Risk Register
- Draft project scope of work
- Project-specific design criteria (*see 1RD2* for related information)

- Draft Project Commitment Document (PCD)
- The conceptual layout or Line and Grade .dgn review from the Line and Grade Package (see 1RD2 for related information)
- Other projects along corridor or adjacent projects
- Technical leads' findings from respective Context/Scoping (Stage 1) activities (issues, challenges or opportunities), including:
  - Environmental avoidance, minimization or mitigation needs
  - Required permits, agreements and commitments (environmental, right-of-way, utility, local agency maintenance agreements and public involvement/engagement)
  - Preliminary design exceptions
  - Need for formal Value Engineering study
- Construction and maintenance input
- Next iteration of the project schedule, as confirmed through the technical leads' Context/Scoping (Stage 1) activities
- Project cost estimate and budget (inclusive of preliminary engineering, utility, railroad, right-of-way and construction estimates)
- Quality control and assurance procedures

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

Scoping Meeting Invitees	
Community Relations Representative	Roadway Design Lead
Construction Manager (HQ, Region)	State Railroad Coordinator/Railroad Office Designee
Drainage Design Lead	Engineering Concepts Lead
Estimating Representative	Structural Design Lead
Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead)	Survey Lead
Lead Geotechnical Engineer/Geologist	Traffic (Signal Design Engineer, Lighting Design Engineer, ITS Design Engineer, Traffic Engineer, Traffic Safety)
Hydraulics Lead	Traffic Safety
Active Transportation Lead	Transportation Planning
Pavement Design Lead	TSMO Coordinator
Regional Director of Project Management	Utility Coordinator (Senior Technical Specialist)
Region Maintenance Representative	VE Program Coordinator (if applicable, see 2PM1)
Regional Preconstruction Director	Stakeholders to consider: Municipality Representative, FHWA, Municipal and Rural Planning Organizations (MPO, RPO), Local Government, Utility Owners, etc.
Regional Transportation Engineer	
Resident Engineer	
ROW Lead	

The Project Manager works with the project's Design Lead (e.g., the Roadway Design Lead, Structural Design Lead) to gather all relevant materials (e.g., concept documents, Project Management Plan, project-specific design criteria, Line and Grade Package/line and grade .dgn, *Comment Resolution Form,* etc.) in the shared project folder and distributes to the meeting invitees (as needed) prior to the Scoping Meeting or the Line and Grade Field Review.

Review and Complete Comment Form

The Project Manager (or designated team member) informs the invitees/project reviewers of the timeframe allotted for review. Reviewers document their comments on the *Comment Resolution Form* (*see Appendix D* for an example template) or other approved document and return it to the Project Manager and/or Roadway Design Lead prior to the meeting.

Compile Comments, Hold Meeting, and Document/Distribute Minutes

The Project Manager works with the project's Design Lead (Roadway Design Lead, Structural Design Lead, etc.) to compile the comments provided by the team and identify the responsible technical lead to review and recommend resolution of comments received.

The Project Manager facilitates the meeting and encourages team interaction, with the Design Lead leading the technical comment resolution discussions. The Project Manager selects a staff member to update the risk register and to document comments, decisions and actions in the meeting minutes. Meeting minutes are distributed to the invitees (and other relevant project team members) and uploaded to the shared project folder.

Estimate the Project Using the Line and Grade Package

The Project Manager (in collaboration with the Design Lead) compiles the information needed to complete the Line and Grade Estimate. For Highway Program and/or High-Risk High-Profile Projects, estimated quantities shall be submitted as described in Chapter 1 of TDOT's *Roadway Design Guidelines*. All other projects should utilize the Line and Grade Estimate Form (see [insert link]). This worksheet generates an initial project estimate using known quantities in the Line and Grade Package, applying discipline recommendations, and accounting for typical early estimate best practices (*see Appendix F* for further guidance).

In addition to the roadway quantities provided, the Project Manager and Design Lead should also account for (and quantify whenever possible):

- The number of structures (hydraulic and non-hydraulic structures) considering the span configuration and bridge length recommendations in the Concept Report (see 1ST1 and the Project's Concept Report for related information).
- Geotechnical risks and associated design and construction mitigation options (see 1GT1 for related information).
- Number of proposed signals and lighting features based on documented warrants and initial or updated TSMO and ITS scope and estimate (see 1TD2 for related information).
- Multimodal recommendations that have been incorporated into the Line and Grade Package (see 1AT1 for related information).
- The initial ROW and utility estimate using the Line and Grade Package.
- All other items listed in the "Line and Grade Plans" column in Appendix F.

The Project Manager and Design Lead use this estimate to complete the PCD in Stage 2 (see 2PM2 for related information).

Determine Need for Value Engineering

The purpose of Value Engineering (VE) in Stage 1 is to identify any recommendations and benefits early to allow sufficient time for the team to incorporate changes into the project without impacting the budget or schedule.

The Project Manager works with the Design Lead to notify the VE Program Coordinator as early as practicable regarding the project's use of federal-aid highway funding as defined and in accordance with the policy and procedures defined on the Roadway Design Value Engineering webpage.

End of Stage 1

A quality review of the deliverables for Stage 1 may include quantities and any items that may have changed since concept documents were completed. Ensure documents are uploaded to the shared project folder.

Design Lead/Project Manager notifies the project team that Context/Scoping Milestone is complete.

2PM1, 3PM1, 4PM1 Manage Project

Overview

Lead the project team to ensure the project remains on schedule, within allocated resources (budget and staff) and within the project scope of work. Provide project oversight through the entire design phase and proactively facilitate regular coordination between project team members to improve quality, resolve issues and mitigate risks. **The deliverables and tasks in this activity repeat throughout Stages 2, 3 and 4.**

References

- ☐ *Department Policy 301-01 Standard Procurement, Management, and Administration of Engineering and Design Related Services* (revisions in development)
- ☐ *Local Government Guidelines for the Management of Federal and State-funded Transportation Projects, Seventh Edition, revised March 15, 2019*
- ☐ *TDOT Public Involvement Plan*
- ☐ *Roadway Design Value Engineering*
- ☐ *Funding Request Forms*
- ☐ *Executive Project Status Report Template*
- ☐ *MS Project Schedule Template*
- ☐ *Project Commitment Document Template*
- ☐ *Project Communication Plan*
- ☐ *TDOT Quality Manual*
- ☐ *Risk Management Guide*
- ☐ *Risk Management Plan (and Risk Register) Template*
- ☐ *TDOT's Cost Estimating Guidelines* (in development)

Deliverables

Deliverables[a]	Tasks
Project Management Plan Scope Schedule Budget Project Quality Management Plan	▪ *Develop Project Management Plan* o *Develop and Monitor Scope* o *Develop and Monitor the Project Schedule* o *Manage and Administer Budget* o *Develop Project Quality Management Plan and Perform Quality Reviews*

(table continues)

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Deliverables[a]	Tasks
Project Management Plan (continued) Risk Management Plan Updated Risk Register Project Communication Plan Public Involvement Plan Team Meeting Agendas & Minutes	▪ *Develop Project Management Plan (continued)* ○ *Develop Risk Management Plan and Update Risk Register* ○ *Develop and Facilitate Project Communication Plan*
Project Status Reports	▪ *Report Project Status*
Agreements	▪ *Finalize Local Government Agreements*
Letting Readiness Assessment	▪ *Perform Letting Readiness Assessments*
Value Engineering Study (as applicable)	▪ *Support Value Engineering Efforts*
Process Consultant Invoices Consultant Contracts and Modifications	▪ *Manage Consultant Contracts (as applicable)*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Develop Project Management Plan

The Project Management Plan (PMP) acts as the project's "guide" for how the project team delivers the project and affirms the team's commitments related to their roles, responsibilities and involvement. The PMP provides critical information to help new and existing project team members become acquainted with the project specifics quickly.

The Project Manager, in consultation with the discipline managers and technical leads, develops a project scope, schedule and budget, and defines an approach to manage risk, communication and quality. These deliverables, collectively, are considered the Project Management Plan. These documents may be developed by the TDOT Project Manager or consultant project manager as assigned and are distributed to the project team for review and acceptance after the project Scoping Meeting (*see 1PM5* for related information).

Develop and Monitor Scope

The Project Manager monitors the project scope, inclusive of commitments, in each stage to minimize surprises that result from scope "creep," and ensure the project remains within the agreed-upon project scope outlined in the Project Commitment Document.

Based on the draft project scope developed during project setup and documentation from the Scoping Meeting, the Project Manager assigns discipline managers or identified technical leads to develop their discipline's scope of work using activities outlined in the PDN. To align the

project team's understanding and reduce scope creep during project delivery, consider including the following items in the scope of work for each discipline.

- Specific activities and deliverables (what each discipline is responsible for delivering)
- Clearly written description of the tasks and subtasks to complete their responsibilities
- Comprehensive list of project unknowns, risks and assumptions that may affect the discipline's scope of work delivered within the project's schedule and budget
- Documentation of what is not included in the scope of work

The Project Manager collects each discipline's draft scope of work, reviews and reconciles differences and uploads it to the shared project folder. Each team member, including consultants, references this information to better understand the expectations of each discipline's efforts and coordinates to resolve gaps and overlaps.

If issues arise that create potential changes to the project's scope, milestone delivery dates/field reviews or programmed budget as compared to the agreed-upon Project Commitment Document (PCD), the Project Manager works with technical leads to address and mitigate issues to bring the project back in line with the signed PCD (*see 2PM2* for completing or changing the PCD).

Develop and Monitor the Project Schedule

The Project Manager confirms the project start date and works with the project team to verify the activity linkages (predecessor and successor relationships) and time durations based on the activities, deliverables and tasks identified in the scopes of work.

Items to consider when developing the project schedule include:

- Project milestones and associated deliverables (committed project delivery dates do not extend beyond the assigned letting date)
- Timeframes/durations (in working days) to complete identified project activities, tasks and deliverables (reverify prior to signing the PCD)
- Sequencing of activities (successors and predecessor relationships), building off of the standard sequencing/relationships identified in the MS Project schedule template or as built using the TDOT PDN_Scope and Schedule Generator
- Adequate quality review durations
- Incorporation of key stakeholder (regulatory, agency, utility, etc.) constraints, seasonal limitations and schedule needs
- Adequate time to obtain right-of-way, utility and railroad agreements; third-party permits; and associated approvals

- Adequate time to complete necessary on-site or off-site environmental mitigation projects and obtain required environmental permits and approvals
- Adequate time for acquiring funding, particularly on local partnering projects
- Prerequisites or constraints associated with the use of the funding

If activity durations and/or sequencing fail to align with efficient and logical project delivery in Stage 1, the Project Manager facilitates discussions with the technical leads to address adjustments that bring the project into alignment, or schedules multidisciplinary project team meetings to assist with aligning project team members' expectations regarding deliverables, sequencing and durations.

The Project Manager monitors the progress of each discipline's activities, throughout all stages of the project, as they inform and receive feedback from the technical leads during project team meetings. The project team meets regularly to discuss ongoing work, as well as which deliverables and tasks are coming due. It is advisable for the project team to consider a one to three-month look ahead using an up-to-date project schedule.

Particular attention is given to the identification and monitoring of the project's critical path. Based on updates to the schedule, the critical path may change throughout the project. As a result, the Project Manager regularly monitors the entire project and shares updates with the project team.

If updates to the schedule result in changes to milestone delivery dates committed to in the PCD, the Project Manager works with technical leads and discipline managers to resolve misalignments and bring the project back on schedule. If no resolution to maintain the milestone dates can be achieved, the Project Manager obtains schedule change approval as described in *2PM2*. It is advised that the Project Manager engage the Regional Director of Project Management, Project Management Executive Director and Regional Director in discussions to avoid the necessity of a change request prior to initiating one.

Manage and Administer Budget

The Project Manager manages and administers project funding and costs, and assists all project team members in understanding, communicating and mitigating budget risks and challenges that occur as the project progresses through each activity. Together, the Project Manager and project team review the estimates and explore cost savings opportunities in accordance with *TDOT's Cost Estimating Guidelines* (*see Appendix F* for an example process [in development]).

Additionally, the Project Manager has the responsibility to understand, and document prerequisites and constraints associated with the use of funds when:

- Assessing the scope of work, inclusive of commitments
- Developing the project scope, schedule and budget
- Assessing risks

The team confirms the total project cost, which allows the Project Manager to verify the estimated construction cost, ensure it includes costs for construction management, and is in alignment with the project scope of work. The total project cost consists of a Preconstruction Cost Estimate and Construction Cost Estimate.

- **Preconstruction Cost Estimate**. Obtain and evaluate the cost estimates for preliminary engineering: third-party utilities, permits and mitigation; as well as right-of-way acquisition from the project team.
- **Construction Cost Estimate**. Review the current construction cost estimate to understand the anticipated construction costs for the project, identify gaps and overlaps, and revise the estimate as necessary.

The Project Manager and Design Lead (e.g., Roadway Design Lead, Structures Design Lead) evaluate the total project cost verifying it is within the programmed amount at each milestone throughout project delivery. In accordance with Federal Highway Administration (FHWA) Directive 6640.1A, the Project Manager requests and obtains Preliminary Engineering/Final Design (PE-D) funding to track preliminary engineering costs after the environmental document is complete.

Additionally, the Project Manager submits a Right-of-Way Acquisition and/or Utility Relocation funding request(s) around the same time as the PE-D request to Programming for authorization to acquire necessary right-of-way (*see 3RW2* for related information) and for utility relocations (*see 3UT1* for related information).

Stage 2 & 3 Funding Request Logistics

Use the *Prel Eng Funding Request Form* to request funding for Preliminary Engineering Final Design (PE-D).

Use the *ROW Acq and Utility Relo Funding Request Form* to request funding for right-of-way acquisitions and/or utility relocations.

See link in the *Reference list* above to download the appropriate funding request forms.

If project costs are estimated to overrun the funding/programmed amount, as committed to in the PCD, the Project Manager works with the project team to find solutions to bring the estimated costs into alignment with the PCD.

If no resolution to maintain the budget can be achieved, the Project Manager engages the Regional Director of Project Management, Project Management Executive Director and Regional Director in discussions to avoid the necessity of a change request prior to initiating one.

Develop Project Quality Management Plan and Perform Quality Reviews

The Project Manager oversees quality in accordance with the *TDOT Quality Manual* and the project's *Quality Management Plan*. The Project Manager and Design Lead's roles are to perform a quality review on project deliverables prior to the completion of each milestone, including:

- Ensure it is consistent with the project's scope (inclusive of commitments), schedule and budget.
- Confirm that all comments from previous reviews and the risk register have been addressed or resolved.
- Ascertain the effects of any changes to legislation, policies or TDOT standards on the delivery or documentation for the project.
- Verify that each technical lead completes their respective quality process and that the project team has implemented and documented an interdisciplinary review. (**Note:** each discipline signs their respective title sheets and sealed plans).

Develop Risk Management Plan and Update Risk Register

The Project Manager determines the type and frequency for conducting risk management discussions and workshops and records it in the *Risk Management Plan*. The Project Manager or designated team member organizes and facilitates risk workshops and discussions. Often risk identification can be an opportunity to look for innovative solutions resulting in a better project.

The Project Manager and designated Design Lead confirm project team members are assigned to specific project risks, monitor progress, assess impact and close out risks upon resolution, in accordance with the *Risk Management Guide* (in development). The Project Manager or designated project team member regularly updates the risk register formalized during *1PM4*.

Develop and Facilitate Project Communication Plan

The Project Manager facilitates continuous communication among disciplines. This includes working with technical leads to conduct regular discipline meetings, exploring informal forms of coordination and ensuring all pertinent technical leads have the latest updates and revisions. The Project Manager keeps project team members informed and regularly gathers stakeholder feedback in an effort to reduce surprises and identify potential risks early.

The Project Manager revises the draft *Project Communication Plan* (*see Appendix C* for an example template) immediately following the Kickoff Meeting, based on project team input. Updates include:

- Meeting frequency and coordination
- Agenda format and meeting minutes
- Communicating project decisions
- Issue resolution process

The Project Manager and designated team members continue to conduct proactive stakeholder engagement throughout the life of the project as outlined in the *Project Communication Plan* and in accordance with *TDOT's Public Involvement Plan* (PIP). The development of a PIP is at the discretion of the Project Manager and may include supporting and/or leading external public involvement meetings (i.e., NEPA hearings, design public meetings, informational meetings, etc.) in coordination with assigned Public Involvement & Communication Office and NEPA Office staff.

Report Project Status

Regularly reporting project status throughout the four stages keeps TDOT leadership, team members and stakeholders aware of project progress, provides an opportunity to solicit feedback and helps identify issues outside the project team's control.

The Project Manager monitors and reports the status of project performance, which includes:

- Adhering to the project's scope
- Meeting project milestones according to the agreed-upon schedule
- Accounting for expended and proposed costs within the approved budget
- Tracking major risks that impact schedule and budget

An *Executive Project Status Report* template is available (*see Appendix B* for an example template).

Finalize Local Government Agreements

Developing local government agreements creates a partnership with external stakeholders resulting in appropriate levels of planning and budgeting for betterments.

The Project Manager works with the Local Programs and Community Investments Office to complete/execute any local government agreements (including maintenance agreements for signals and lighting) for local government-led projects (*see 1PM1 and 1PM3* for related information), and later stages where agreements for inclusion of work on behalf of the municipality is incorporated within the project. To create and complete agreements refer to *Local Government Guidelines for the Management of Federal and State-Funded Transportation Projects, Seventh Edition, March 15, 2019 Revisions*.

Local Government

Have local government stakeholders been contacted? Letters must be on file prior to beginning any work.

Perform Letting Readiness Assessment

Regularly preparing for letting in each stage keeps scope, schedule and budget on track, ensures each work product is complete and meets quality standards, and proactively addresses risks as they arise.

The Project Manager assesses the readiness for letting prior to Plan-in-Hand Field Review (*3PM2*) and PS&E Review (*4PM2*) Meetings, and confirms the status of the design and schedule to complete all required permits, agreements and certifications with the:

- Roadway Design Lead
- Structural Design Lead
- Traffic Lead
- ROW Lead
- Utility Coordinator and Railroad Coordinator
- Program Development and Scheduling Office (PDSO)
- NEPA Lead
- STIP/TIP
- Local Programs and Community Investments Office
- Environmental Permits Lead
- Headquarters Construction Office

Technical leads are responsible to notify the Project Manager if permits, agreements or certifications are delayed, denied or returned.

Support Value Engineering Efforts

The Project Manager and Design Lead/Manager confirm the need for a Value Engineering (VE) Analysis, then work with the VE Program Coordinator to determine the plan and schedule for conducting the Value Engineering analysis. The Project Manager works with the Design Lead to

implement approved recommendations and associated documentation, in accordance with the *Roadway Design Value Engineering* page. The Design Lead notifies the VE Program Coordinator of changes made to the project scope during project development.

Manage Consultant Contracts and Modifications (as applicable)

The Project Manager manages professional services contracts, ensures consultant contracts comply with TDOT's contract standards, verifies the terms and conditions are met on both sides and processes invoices and contract modifications in accordance with the Department Policy 301-01 Standard Procurement, Management, and Administration of Engineering and Design Related Services. The Project Manager and discipline manager(s) annually evaluate consultants against established performance criteria.

Prepare for End of Stage 2

Compile the Project Management Plan documents and update the Project Commitment Document.

2PM2 Complete Project Commitment Document (PCD)

Overview

Complete the Project Commitment Document (PCD) to memorialize the scope of work (inclusive of commitments), schedule, budget and quality.

References

- ☐ *Project Commitment Document (PCD) Template*

Deliverables

Deliverables[a]	*Tasks*
Signed Project Commitment Document (PCD) Updated Schedule	▪ *Verify Schedule* ▪ *Verify Estimates* ▪ *Finalize Project Commitment Document (PCD)*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Verify Schedule

The Project Manager:

- Verifies the activity linkages (predecessor and successor relationships) and time durations based on the activity's deliverables and tasks.
- Ensures consistency with the discipline's scope of work (*see 2PM1* task, Develop and Monitor Project Schedule, for a list of items to review).
- Updates/finalizes the project schedule to include all the team's input to date.

Verify Estimates

The Project Manager works with the appropriate design leads to verify all project cost estimates, including construction, permits/mitigation credits, utility relocations and right-of-way cost estimates (*see Appendix F* for an example process [in development] and *1PM5* for what will likely be the estimate used for the PCD).

Note: Finalizing the PCD should occur after the Project Manager has been able to verify that all estimates (construction, ROW and utilities) are complete and the project schedule is solidified with the team in Stage 2.

Finalize Project Commitment Document (PCD)

The finalized PCD (*see Appendix A* for an example template) represents the project team's agreement to the project's scope, schedule, and budget. As such, the Project Manager and

project team must fully evaluate all modifications to the agreed-upon scope, schedule and budget when considering potential scope “creep” and risk/opportunities. The PCD is drafted during project setup, reviewed with the project team during the project Kickoff Meeting and Scoping Meeting, then finalized in Stage 2 using information verified during the Manage Project activity.

To complete the PCD, the project team agrees to the project scope of work, budget and delivery schedule. The PCD consists of various components as outlined:

- Project Scope
  - Define the project goals.
  - Develop a short work statement that expresses purpose (e.g., improve capacity by widening corridor, pavement preservation, and safety).
  - Anticipate the beginning and duration of construction.
- Project Work Components
  - List major improvements that define the construction work to satisfy the project goals.
  - Include statements of what the project will not address or include, referred to as "does not include" statements.
- Project Delivery Type/Method
  - List the delivery method (e.g., design-bid-build/DBB, design-build/DB and construction manager general contractor/CMGC).
- Environmental Document Type
- Identify the class of action to be completed for the project (categorical exclusion (CE), NEPA document or Tennessee Environmental Evaluation Report (TEER)) that documents the environmental decision.
- Schedule
  - Confirm the proposed letting date.
  - Update the project delivery schedule.
  - Provide commitment dates for key milestones.
- Budget
  - Verify total project cost.
  - Develop a project budget inclusive of funding requirements and total cost estimates at the time of letting (not current costs).
  - Estimates include preconstruction and construction costs to complete the project work through construction.
- Risks
  - Document major risks, those with high impact and high probability, which may affect project budget and/or schedule.
  - These may include project delivery or technical engineering/construction-related risks.

Once finalized, the Project Manager obtains signatures from the project team, which represent a commitment to the components therein. The Project Manager also obtains signatures from the Regional Director of Project Management, Project Management Executive Director and Regional Director representing their approval and commitment to support the team.

After the PCD is signed, the Project Manager and project team members may not deviate from the defined project scope, schedule or budget as identified within the PCD without prior written approval by the Project Management Executive Director and Regional Director. The Project Management Executive Director and Regional Director, together, have final authority for any changes to the PCD through all stages of project delivery.

The Project Manager reviews the PCD at least at each milestone/field review meeting to verify the project is on the planned course. If significant changes to the project appear to warrant revisions to the scope, schedule or budget, the Project Manager and project team notify each other as soon as practical and find solutions to maintain alignment and keep the commitments agreed to in the PCD.

If changes cannot be avoided, the Project Manager notifies the Regional Director of Project Management, Project Management Executive Director, and Regional Director and as soon as practical if the **budget increases by 10% or more** and/or if the **letting date is forecasted to be missed**.

Approved changes are shared with all project team members, each remains accountable for delivery of the project within parameters of the latest-approved PCD.

End of Activity

If the PCD is not completed by the end of Stage 2, notify the Regional Director of Project Management and Project Management Director.

2PM3 Conduct ROW Strategy Meeting(s)

Overview

Work with the Design Lead (e.g., the Roadway Design Lead, Structural Design Lead) and ROW Lead to organize and facilitate the Right-of-Way (ROW) Strategy Meeting(s). **The deliverables and tasks in this activity continue into Stage 3.**

References

- ☐ *Local Government Guidelines for the Management of Federal and State-funded Transportation Projects*
- ☐ *ROW Policy & Procedures Manual*
- ☐ *Comment Resolution Form Template*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Updated Risk Register Updated Comment Resolution Form	▪ *Set Up Meeting and Develop Agenda*
	▪ *Hold Meeting and Document/Distribute Minutes* • *Verify Initial ROW Requirements* • *Identify High-Risk Parcels and Develop Mitigation Strategy* • *Verify Initial Acquisition Schedule*
	▪ *Attend ROW Site Visit and Collect Feedback*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of the ROW Strategy Meeting(s) is to develop a strategy to:

- Optimize the right-of-way acquisition schedule and minimize project costs.
- Identify design changes that minimize right-of-way impacts.
- Identify critical parcels that affect the timely delivery of the project.
- Develop strategies to prioritize critical parcels.
- Acquire all right-of-way parcels.

The Project Manager works with the ROW Lead and Design Lead (e.g., Roadway Design Lead, Structural Design Lead) to gather all relevant materials, (e.g., current design plans/Functional Design Plans for all disciplines with existing right-of-way, property ownership right-of-way estimate, *Comment Resolution Form*, etc.) and distributes to the meeting invitees (as needed) prior to the ROW Strategy Meeting.

The Project Manager informs the project reviewers of the timeframe allotted for review. Team members review documents to identify the potential right-of-way requirements and identify risks prior to the meeting.

The Project Manager organizes this meeting and develops the agenda (*see Appendix C* for an example template), which typically includes:

- Scope of work
- Project Commitment Document (PCD)
- Permits, agreements and commitments (Environmental, right-of-way, Utility and public involvement/engagement)
- Construction and maintenance input
- Risks and resolutions
- Potential design modifications to minimize risk
- Project schedule and right-of-way acquisition schedule
- Project cost estimate and budget (specifically for right-of-way)
- TDOT staff or consultant resource(s) needed for right-of-way acquisition
- Quality control and assurance
- Site visit (optional)

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

ROW Strategy Meeting Invitees	
Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead) FHWA (as may be helpful to support the process) State Railroad Coordinator/Railroad Office Designee Region Construction Representative Region Maintenance Representative Resident Engineer Region Transportation Engineer Region ROW Appraisal Team Lead	Region ROW Acquisition Team Lead Region ROW Manager ROW Lead Roadway Design Lead Roadway Engineer Structural Design Lead Utility Coordinator (Senior Technical Specialist) Stakeholders to consider: Municipality Representative, FHWA, Municipal and Rural Planning Organizations (MPO, RPO), Local Government, Utility Owners, etc.

Hold Meeting and Document/Distribute Minutes

The Project Manager leads the meeting and encourages team interaction. The Project Manager selects a staff member to document comments, decisions and actions in the meeting minutes

and update the risk register. Meeting minutes are distributed to the project team and uploaded to the shared project folder.

The Project Manager facilitates team interaction with the Design Lead and ROW Lead to identify:

- Any priority tracts that may take longer to acquire, such as commercial properties
- Relocations
- Any tracts which are not ready to acquire

The team brainstorms design alternatives to minimize risk, develops an acquisition schedule, and reviews a preliminary right-of-way cost estimate in accordance with *ROW Policy & Procedures Manual.*

The following items are discussed during the ROW Strategy Meeting(s) and completed by the technical leads as soon as possible after the meeting.

Verify Initial ROW Requirements

- Funding sources (federal versus state)
- Number of parcels for various project alternatives
- Number of total acquisitions versus partial acquisitions
- Any/all relocations required by type (business versus non-business)

Identify High-Risk Parcels and Develop Mitigation Strategies

The Project Manager works with the ROW Lead and other applicable stakeholders and project team members to track and mitigate risks.

- High-risk parcels with potential to delay the project schedule may include historic properties, unwilling property owners, properties with hazardous or contaminated materials, total versus partial acquisitions, etc.
- Design alternatives that might avoid or mitigate risks, considering:
  - Can a straight ROW setback be used on this project?
  - Can the ROW be widened to one side or the other?

Hazardous Materials
Consider that TDOT Hazardous Materials Unit Staff may need property information and access for each impacted locations prior to the project letting date (e.g., roughly 12 months for underground storage tank remediation and four months for asbestos containing material abatement) to complete testing, remediation, abatement, and document compliance with federal and state regulations.

Related section: *2RW1*

The ROW Lead documents mitigation strategies, then distributes them to applicable project team members and stakeholders and uploads this document to the shared project folder. The

Project Manager or an assigned team member updates the risk register with right-of-way issues that could affect the project schedule or budget.

Verify Initial Acquisition Schedule

- Number of exhibits to be generated
- Parcels eligible for acquisitions
- Prioritized order of acquisition, prioritizing those acquisitions that may take the longest, such as commercial properties and relocations
- Timelines and schedules for acquisitions

Related section: *3RW1*

Attend ROW Site Visit and Collect Feedback

Pertinent project team members conduct a physical drive-through or virtual visit of the project site to assess possible acquisition risks for each parcel within the project limits.

2PM4 Conduct Permit Strategy Meeting(s)

Overview

Organize and facilitate the Permit Strategy Meeting. Review permits required to construct the project(s). **The deliverables and tasks in this activity continue into Stage 3.**

References

- ☐ *Agenda and Meeting Minutes Template*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Updated Risk Register	▪ *Set Up Meeting and Develop Agenda* ▪ *Hold Meeting and Document/Distribute Minutes*
Permit Application(s)	▪ *Verify Permit(s) Are Complete and Submitted*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of this meeting is to review and resolve potential permit conflicts. The Project Manager facilitates the meeting(s) and develops the agenda(s) (*see Appendix C* for an example template) with the Design Lead (e.g., Roadway Design Lead) and Environmental Permit Lead. The agenda typically includes:

- Schedule for permits and agreements
- Permit conflicts
- Construction and maintenance input
- Risks and resolutions
- Quality control and assurance

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

Permit Strategy Meeting Invitees	
Construction Manager (HQ, Region) Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead) FHWA (as may be helpful to support the process) Permit Section or Regional ETO Staff	State Railroad Coordinator/Railroad Office Designee Region Maintenance Representative Resident Engineer Roadway Design Lead Engineering Concepts Lead (if needed)

The Project Manager works with the Design Lead (e.g., Roadway Design Lead) and Environmental Permit Lead to gather all relevant materials in the shared project folder and distribute them to the meeting invitees (as needed) prior to the meeting.

Related section: *3EN2*

Hold Meeting and Document/Distribute Minutes

The Project Manager, in coordination with the technical leads, discusses agreements, stakeholder commitments, cost estimates and cost for credits, schedules for obtaining the permits and agreements, as well as outstanding issues. Permits and/or agreements may include environmental permits, municipal agreements, railroad encroachment agreements, utility agreements, land transfer and conservation easement agreements.

The Project Manager facilitates the discussion and encourages team interaction. The Project Manager selects a staff member to update the risk register and document comments, decisions and actions in the meeting minutes. Meeting minutes are distributed to the project team and uploaded to the shared project folder.

Verify Permit(s) Are Complete and Submitted

The Project Manager works with the appropriate technical leads to verify the status of applications/permit(s). The Project Manager confirms all permit applications necessary for the project are complete and verifies they are on file and submitted to the appropriate agency.

End of Activity

Remain aware of permits with long-lead times and track them through Stages 2, 3 and 4. This is a common issue that remains on the critical path.

2PM5 Hold Functional Design Plans Field Review Meeting

Overview

Organize and facilitate the Functional Design Plans Field Review Meeting, with support from the Design Lead (e.g., the Roadway Design Lead, Structural Design Lead) to lead specific design and technical discussions to solidify the project's footprint.

References

- ☐ *Agenda and Meeting Minutes Template*
- ☐ *Comment Resolution Form Template*
- ☐ *TDOT Quality Manual*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Comment Resolution Form Updated Risk Register	▪ *Set Up Meeting and Develop Agenda* ▪ *Review and Complete Comment Form* ▪ *Compile Comments, Hold Meeting and Document/Distribute Minutes*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The Functional Design Plans Field Review ensures that the multidiscipline design and associated plans have been advanced to finalize the project's footprint and supports the advancement of other disciplines' plans and related design work for similar ends.

The goal of the Review Meeting is to reduce the opportunity for scope "creep" and rework (namely of changes to the project's horizontal and vertical alignment) in the subsequent stages of delivery. It also looks to understand and resolve any issues of adherence with scope, schedule and budget commitments established in the Project Commitment Document (PCD).

This multidiscipline review team identifies:

Footprint

Finalize the project footprint via a "preliminary" level of design that allows right-of-way, utilities, and permits activities to continue in confidence that the horizontal and vertical alignment will remain consistent throughout the duration of the design phase.

The team should consider the footprint to be both the extent of limits for the project improvements, but also that there may be internal footprint limits (e.g., for a wetland) where impacts may still occur and would need to be addressed.

- Issues, opportunities, challenges, conflicts or omissions in the project work and plans
- ROW, utilities, mitigation, permitting, constructability and local jurisdiction needs, or commitments
- Risk of rework during subsequent project delivery stages
- Potential obstacles during construction that lead to errors, delays and/or overruns

The Project Manager coordinates with the Design Lead (e.g., Roadway Design Lead, Structural Design Lead) to confirm all disciplines have completed quality checks and the Functional Plans will be ready for a multidisciplinary review. Then the Project Manager organizes the meeting and develops the agenda (*see Appendix C* for an example template) in coordination with the Design Lead (*see 2RD1* for related information). Agenda items typically include:

- Project scope of work (defining project work components)
- Project-specific design criteria and design exceptions
- Functional Design Plan review by discipline (*see 2RD1* for related information)
- Identification of design conflicts among disciplines
- Permits, agreements and commitments (environmental mitigation and permits, right-of-way, utility and public involvement/engagement)
- Quantity pay items and updated cost estimate
- Construction and maintenance input
- Risks and resolutions
- Constructability and biddability
  - Construction phasing
  - Staging areas
  - Location and placement of equipment
  - Temporary shoring
  - Traffic control requirements
  - Availability of resources
  - Methods of construction
- Review results from Value Engineering Study (if conducted)
- Project schedule
- Overall project cost estimate and budget (Inclusive of preliminary engineering, utility, railroad, right-of-way and construction estimates)
- Quality assurance and control
- Site visit (optional)

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

Functional Design Plans Field Review Meeting Invitees	
Active Transportation Lead Bid Analysis / Estimating Representative Community Relations Representative Construction Manager (HQ, Region) Drainage Design Lead Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead) FHWA (for a Risk-Based Involvement project) Information Technology (for ITS system integration) Lead Geotechnical Engineer/Geologist Hydraulics Lead Pavement Design Lead Roadway Design Lead Regional Director of Project Management Regional Preconstruction Director Regional Quality Team	Regional Transportation Engineer ROW Lead Resident Engineer Region Maintenance Representative Regional Traffic Ops (TMC) State Railroad Coordinator/Railroad Office Designee Structural Design Lead Traffic (Signal Design Engineer, Lighting Design Engineer, ITS Design Engineer and Traffic Design Engineer) Traffic Safety Utility Coordinator (Senior Technical Specialist) VE Program Coordinator (if applicable, *see 2PM1*) Stakeholders to consider: Municipality Representative, FHWA (if not a Risk-Based Involvement Project), Municipal and Rural Planning Organizations (MPO, RPO), Local Government, Utility Owners, etc.

The Project Manager works with the Design Lead to gather all relevant materials (e.g., Functional Design Plans, estimates, *Comment Resolution Form,* etc.) in the shared project folder and distributes to the meeting invitees (as needed) prior to the Functional Design Plans Field Review Meeting.

Review and Complete Comment Form

The Project Manager (or designee) informs the invitees/project reviewers of the timeframe allotted for review. Reviewers document their comments on the *Comment Resolution Form* (*see Appendix D* for an example template) or other approved document and return it to the Project Manager and/or Roadway Design Lead prior to the meeting.

Compile Comments, Hold Meeting and Document/Distribute Minutes

The Project Manager works with the Design Lead to compile the comments provided by the team and identify the responsible disciplines to review and recommend resolution of comments received (*see 2RD1* for related information).

The Project Manager facilitates the discussion and encourages team interaction, with the Design Lead leading the technical comment resolution discussions. The Project Manager selects

a staff member to update the risk register and to document comments, decisions and actions in the meeting minutes. Meeting minutes are distributed to the project team and uploaded to the shared project folder.

After the meeting, the Design Lead compiles a comprehensive list of review comments, distributing the comments to the invitees and uploading the comments to the shared project folder (*see 2RD1* for related information).

End of Stage 2

Confirm ROW acquisition/Utility relocation funds and PE-D funds are authorized for use after the Environmental Document is complete.

The Design Lead notifies the project team that the Footprint Established Milestone is complete ***after*** all Functional Design Plans Field Review comments affecting the project's footprint have been resolved and the plans updated (*see 2RD1* for related information).

3PM2 Hold Plan-in-Hand Field Review Meeting

Overview

Organize and facilitate the Plan-in-Hand Field Review Meeting with support from the Design Lead (e.g., the Roadway Design Lead, Structural Design Lead) to lead specific design and technical discussions to produce a complete design.

References

- ☐ *Agenda and Meeting Minutes Template*
- ☐ *Comment Resolution Form Template*
- ☐ *TDOT Quality Manual*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Updated Comment Resolution Form Updated Risk Register	▪ *Set Up Meeting and Develop Agenda* ▪ *Review and Complete Comment Form* ▪ *Compile Comments, Hold Meeting and Document/Distribute Minutes*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The Plan-in-Hand Field Review Meeting ensures that a multidiscipline design and associated plan set are complete well in advance of letting.

Prior to coordinating the meeting, the Project Manager determines the need for an additional constructability review depending on the complexity of the project or significant changes identified since the Functional Design Plans Field Review Meeting (*see 2PM5* for related information), when the Project Manager initially checked for constructability.

Related section: *3RD1*

The goal of this review meeting is to collaboratively:

- Review the complete design, which includes compiled plans, specifications and estimates from all impacted disciplines.
- Confirm that all previous comments from past field reviews have been addressed and closed.

- Discuss comments provided from the team's interdisciplinary and constructability review of the plans, agreements, special provisions, quantities and cost estimate developed during this stage.
- Identify issues, challenges, conflicts or omissions in the project plans to ensure a biddable and constructable project.

The Project Manager coordinates with the Design Lead (e.g., Roadway Design Lead, Structural Design Lead) to confirm all disciplines have completed quality checks and the Functional Plans will be ready for a multidisciplinary review. Then the Project Manager organizes the meeting and develops the agenda (*see Appendix C* for an example template) in coordination with the Design Lead (*see 3RD1* for related information).

Agenda items typically include:

- Project scope of work (defining project work components)
- Project-specific design criteria and design exceptions
- Plan-in-Hand review, including plans and specification/special provisions by discipline
- Identification of design conflicts among disciplines
- Construction and maintenance input
- Quantity pay items and updated cost estimate
- Permits, agreements and commitments (environmental mitigation and permits, right-of-way, utility and public involvement/engagement)
- Risks and resolutions
- Project schedule
- Overall project cost estimate and budget (including preliminary engineering, utility, railroad, right-of-way and construction estimates)
- Quality assurance and control

The Project Manager invites the project team members and necessary stakeholders to the meeting. Depending on the project's scope, potential invitees include:

Plan-in-Hand Field Review Meeting Invitees	
Active Transportation Lead	Regional Quality Team
Bid Analysis / Estimating Representative	Regional Transportation Engineer
Community Relations Representative	Regional Traffic Ops (TMC)
Construction Manager (HQ, Region)	Resident Engineer
Drainage Design Lead	ROW Lead
Environmental Leads (NEPA Lead, Environmental Mitigation Lead, Mitigation Designer, Environmental Technical Leads, Environmental Permit Lead)	Roadway Design Lead
FHWA (for Risk-Based Involvement project)	State Railroad Coordinator/Railroad Office Designee
Information Technology (related to ITS system integration)	Structural Design Lead
Lead Geotechnical Engineer/Geologist	Traffic (Signal Design Engineer, Lighting Design Engineer, ITS Design Engineer and Traffic Design Engineer)
Hydraulics Lead	Traffic Safety
Pavement Design Lead	Utility Coordinator (Senior Technical Specialist)
Region Maintenance Representative	Headquarters Utility Representative (e.g., Headquarters Technical Coordinator 1)
Regional Director of Project Management	VE Program Coordinator (if applicable, *see 2PM1*)
Regional Preconstruction Director	Stakeholders to consider:
	Municipality Representative, FHWA (if not a Risk-Based Involvement Project), Municipal and Rural Planning Organizations (MPO, RPO), Local Government, Utility Owners, etc.

The Project Manager works with the Design Lead(s) to gather all relevant materials (e.g., Plan-in-Hand plans, quantities and estimates, specifications/special provisions, *Comment Resolution Form,* etc.) in the shared project folder and distributes to the meeting invitees (as needed) prior to the Plan-in-Hand Field Review Meeting.

Review and Complete Comment Form

The Project Manager (or designee) informs the project reviewers of the timeframe allotted for review. Reviewers document their comments on the comment resolution form (*see Appendix D* for an example template) or other approved document and return it to the Project Manager prior to the meeting.

Compile Comments, Hold Meeting and Document/Distribute Minutes

The Project Manager works with the Design Lead to compile the comments provided by the team and identify the responsible disciplines to review and recommend resolution of comments received (*see 3RD1* for related information).

The Project Manager facilitates the discussion and encourages team interaction. The Project Manager selects a staff member to update the risk register and document comments, decisions and actions in the meeting minutes. Meeting minutes are distributed to the meeting invitees and applicable project team members and uploaded to the shared project folder.

The Design Lead assists in leading specific design and technical discussions. After the meeting, the Design Lead compiles a comprehensive list of review comments, distributes the comments to the invitees and uploads them to the shared project folder (*see 3RD1* for related information).
Note: The Project Manager should assess the need for a Revised Plan-in-Hand Submittal with all comments addressed in advance of the PS&E Review. If there are no significant changes or minimal time between the PS&E Review, then the PS&E Review submittal serves this purpose.

End of Stage 3

Confirm ***all design is complete***. At the PS&E Review confirm that all previous comments from past field reviews have been addressed and closed. (see 3RD1 for related information).

4PM2 Hold PS&E Review Meeting

Overview

Organize and facilitate the Plans, Specifications and Estimates (PS&E) Review Meeting and ensure all comments have been resolved so that the PS&E Plans (i.e., the Construction Documents) are ready to be advertised.

References

- ☐ *Contractor Letting Files*
- ☐ *Right-of-Way Division for Acquisition Office and Procedures*
- ☐ *Utilities Office for Utilities Forms and Resources, Accommodating Utilities*
- ☐ *Bid Analysis & Estimating Office for Construction, Price Information and Roadway Design Links*
- ☐ *Agenda and Meeting Minutes Template*
- ☐ *Comment Resolution Form Template*
- ☐ *TDOT Quality Manual*
- ☐ *Appendix H: FHWA Summary of Actions in the PDN*

Deliverables

Deliverables[a]	Tasks
Meeting Agenda Meeting Materials Meeting Minutes Updated Comment Resolution Form Updated Risk Register	▪ *Set Up Meeting and Develop Agenda* ▪ *Hold Meeting and Finalize Project Documentation*

[a] The Project Manager is the Activity Leader responsible for completing the listed deliverables.

Set Up Meeting and Develop Agenda

The purpose of the PS&E Review Meeting is to:

- Review and ensure that the final set of Construction Documents, including the plans, specifications and estimates for all disciplines, is consistent with the Project Commitment Document (PCD), specifically the intended scope and budget.
- Confirm that all environmental, right-of-way, utility and railroad permits, agreements and related documentation are complete ***or*** will be completed on schedule ***prior to*** the Construction Document turn-in.
  - **Note:** Often holding the PS&E Review Meeting ***prior to*** receipt of all environmental, right-of-way, utility and railroad permits, agreements and related documentation benefits the schedule. In these instances, the review meeting serves, in part, as a status update verifying that all non-design documentation is still on schedule for turn in.

- Verify from the technical leads that all post-meeting comments from the Plan-in-Hand Review Meeting have been addressed/fully resolved and implemented, as appropriate, into the final Construction Documents.
- Prepare the contractual documents for letting.

The Project Manager organizes the meeting and develops the agenda (*see Appendix C* for an example template) in coordination with the Design Lead (e.g., Roadway Design Lead, Structural Design Lead) (*see 4RD1* for related information). Agenda items typically include:

- Verification that all previous review comments have been addressed and incorporated and that the plans and specifications/special provisions are finalized and ready for turn in (*see 4RD1* for related information)
- Outstanding issues (risks, commitments, mitigation)
- Project cost estimate finalization

The Project Manager invites the following (as appropriate based on the comments received) to the PS&E Review Meeting:

PS&E Review Meeting Invitees	
Construction Manager (HQ, Region) District Operations Engineer (and other local construction staff) Project Management Executive Director Regional Director Regional Director of Project Management Regional Preconstruction Director Regional Quality Team Regional Transportation Engineer Resident Engineer	ROW Lead Roadway Design Lead Structural Design Lead Traffic (Signal Design Engineer, Lighting Design Engineer, ITS Design Engineer and Traffic Engineer) Traffic Safety Utility Coordinator Lead Utility Owners (as needed) FHWA (for a Risk-Based Involvement project or as needed for projects not under a Risk-Based Involvement)

Review and Complete Comment Form

The Project Manager informs the invitees of the timeframe allocated for this final review. The intent of this last review is only to verify that previous comments on the Plan-in-Hand Plans have been addressed in the revised Construction Documents. A reviewer provides any last comments on the *Comment Resolution Form* (*see Appendix D* for an example template) or other approved document and returns it to the Project Manager prior to the meeting.

Compile Comments and Hold Meeting

The Project Manager works with the Design Lead to compile the final comments provided by the team and to identify the responsible discipline to review and recommend resolution of comments received (*see 4RD1* for related information).

The Project Manager, in coordination with the Design Lead, holds the PS&E Review Meeting with the Regional Director of Project Management, Project Management Executive Director and Regional Director. The Design Lead and/or technical leads update the plans and provide a response to each comment, if applicable at this late stage of review. The Project Manager verifies that all comments are resolved, distributes the meeting minutes to the project team, and uploads the minutes to the shared project folder.

Finalize Project Documentation

The Project Manager then confirms the following to ensure the Construction Documents are complete (*see 5CN1* for related information).

- Are all water quality permits complete/ready or are there no water quality permits on the project?
- Are the design plans, including structures and utilities plans (as applicable), uploaded to the shared project folder?
- Is this a chapter 86 project?
- Have all special provisions (including, as applicable, SP105C, SP107C and SP725) been coordinated or uploaded to the shared project folder?
- Are all geotechnical reports uploaded to the shared project folder?
- Is the Transportation Management Plan (TMP) signed? Has the TMP been uploaded to the shared project folder?
- The Project Manager should be prepared to discuss the answers to these questions (or if an item is *not applicable* for the project) as part of the first letting meeting in 5CN1.

End of Stage 4

The Project Manager notifies the project team when the Contract Letting Milestone is complete.

The Project Manager notifies team members assigned of construction and post-construction support responsibilities.

2PV1 Provide Pavement Design

Overview

Complete the project's pavement design and associated tasks to support the advancement of other disciplines' plans and related design work.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Pavement Design	▪ *Provide Pavement Design*	Pavement Team Lead	Roadway Design Lead, Roadway Design Engineer

Provide Pavement Design

A critical element in defining the project footprint is an established pavement structural design that considers:

- Traffic loading
- Soil characteristics
- Material availability
- Construction consideration/constructability
- Past performance/quality
- Engineering judgment
- Current TDOT policy

Initiated when receiving a Pavement Design Request Form and/or related information from the Roadway Design Lead or Project Manager, the Pavement Team Lead evaluates the structural capacity and life-cycle cost to complete the project's pavement design. After the pavement design is complete, perform a quality control review as detailed in the *TDOT Quality Manual*.

Once the design is provided for the Functional Design Plans, the Pavement Team Lead continues to support the Roadway Design Lead and Project Manager throughout the remainder of Stages 3 and 4 to confirm the original pavement recommendations, provide any needed approvals for changes to the design and/or submit any updated pavement designs (if needed) in accordance with the *TDOT Roadway Design Guidelines*.

Related section: *2RD1*

1RD1 Provide Roadway Desktop Review

Overview

Complete a high-level review of major roadway assumptions or design options as requested by Engineering Concepts.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Instructional Bulletins*
- ☐ *American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets*
- ☐ *AASHTO Roadside Design Guide*
- ☐ *Concept Comment Resolution Form*
- ☐ *Federal Highway Administration (FHWA) 10 Controlling Design Criteria*
- ☐ *TDOT Roadway Design Documents*
- ☐ *Project Scoping Guide*

Deliverables

Deliverable	Task	Responsible Party Activity Leader
Site Review Comments	▪ *Complete Roadway Division Review*	Regional Roadway Engineer
Concept Report Comments	▪ *Review the Concept Report*	

Complete Roadway Division Review

A regional Roadway Engineer may receive a request from the Engineering Concepts Lead to complete a high-level review (e.g., Google Street View) of major roadway assumptions, potential fatal flaws, deviations from standards, or design options in the project area (*see 1EC1* for related information). Using the Concept Comment Resolution Form, this high-level project review is an opportunity for the Roadway Engineer to offer technical input to:

- Reduce project risks that may impact design, construction, right-of-way, environmental, or utilities (as applicable).
- Better understand and direct conceptual design decisions that will affect the final design.
- Support development of the preliminary project scope, conceptual layout, and initial cost estimate.

To establish a general understanding of the project area and validate the feasibility of the conceptual design, the Roadway Engineer references the information provided by the Engineering Concepts Lead (e.g., a project location map or .kmz file, relevant traffic and safety data and/or project purpose and need or reason for the project) when collecting/providing any relevant project information. This effort may include referencing:

- Previous construction plans/As-Builts in or around the project area
- Public input received (complaints, issues identified along the corridor, etc.)
- Understanding of the corridor/project area from past reports, studies or historical photos

Within two weeks of receiving the request, the Roadway Engineer provides comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the internal divisions and external stakeholders to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report is drafted.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the review and a packet of information), the Roadway Engineer reviews the site visit packet to determine if Roadway staff should attend the site visit and then, if attending, prepare for the site visit. Any discussion from the site visit becomes informative for later project stages.

Review the Concept Report

Within two weeks of receiving the draft Concept Report, the Roadway Engineer provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Complete the Decision-Making Worksheet

Detailed in the *Project Scoping Guide*, the Regional Roadway Engineer completes and then tracks (through each stage) the decision-making framework that applies a performance-based approach to develop, evaluate, and select a concept and inform the design criteria in 1RD2.

1RD2 Initiate Roadway Design

Overview

Ensure that the roadway design is consistent with the conceptual layout developed as part of the Concept Report and represents sound roadway design principles and practices.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Instructional Bulletins*
- ☐ *American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets*
- ☐ *AASHTO Roadside Design Guide*
- ☐ *Federal Highway Administration (FHWA) 10 Controlling Design Criteria*
- ☐ *TDOT Standard Design and Survey CADD Files and Documents*
- ☐ *TDOT Standard Drawings*
- ☐ *TDOT Standard Specifications for Road and Bridge Construction*
- ☐ *TDOT Roadway Design Documents*
- ☐ *TDOT OpenRoads Designer*
- ☐ *Project Scoping Guide*
- ☐ *TDOT Highway System Access Manual*
- ☐ *Work Zone/Temporary Traffic Control*
- ☐ *Work Zone Significance Determination Form*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Project-Specific Design Criteria Document	▪ *Establish Project-Specific Design Criteria*	Roadway Design Lead	Roadway Engineer
Work Zone Significance Determination	▪ *Determine Work Zone Significance*	Roadway Design Engineer	Traffic Design Engineer, Regional Traffic Engineer
Driveway Deviation	▪ *Request Driveway Deviations*	Roadway Design Lead	Regional Traffic Design Engineer, Regional Traffic Operations Engineer
Line and Grade Package (Initial Roadway Plans)	▪ *Develop Line, Grade and Cross Sections (Line and Grade Package)* ▪ *Lead the Line and Grade Package Field Review*	Roadway Design Lead	Roadway Design Engineer
Updated Preliminary Project Estimate			Project Manager

Establish Project-Specific Design Criteria

Considering that every project is unique, but every project also requires consistent application of established design criteria, the Roadway Design Lead drafts a project-specific design criteria document, following guidance from AASHTO's *A Policy on Geometric Design of Highways and Streets,* TDOT's *Roadway Design Guidelines,* TDOT's *Project Scoping Guide and* FHWA's *Controlling Design Criteria*. The document establishes the following criteria for all roadways within the project limits:

- Design speed (as coordinated with the Traffic Design Engineer)
- Lane and shoulder widths, as well as other typical section elements
- Minimum horizontal curve radius and degree of vertical curvature (K-values)
- Maximum grade
- Maximum superelevation rate
- Sight distance (e.g., stopping sight distance, intersection sight distance, passing sight distance)
- Cross slope
- Vertical clearance
- Design loading structural capacity
- Design vehicle

The document also defines additional standards and relevant project data that typically include:

- Clear zone requirements
- Existing and future traffic volumes developed in coordination with the Project Manager and Traffic Design Engineer (*see 1TD1* for related information)
- Functional (and context) classification and access management requirements
- Type of terrain
- Requirements for permanent post-construction stormwater control measures
- Potential design exceptions or waivers from TDOT standards, which are formalized during the development of the Line and Grade Package and Functional Design Plans (see 2RD1 for related information)

Once drafted, the Roadway Design Lead submits the document for a quality control (QC) review as detailed in the *TDOT Quality Manual,* to ensure appropriate references are used and values for each element are correct.

Once comments are resolved, the Roadway Design Lead uploads the document to the project folder. This document becomes the key reference to develop the Line and Grade Package in this Stage 1 and then advance the Functional Design Plans in Stage 2.

Determine Work Zone Significance

The work zone significance determination is completed as the project footprint (developed via the Line and Grade Package) is established to manage work zone impacts from the project and help determine mitigation strategies to consider in the project's Transportation Management Plan (TMP).

With support/oversight from the Traffic Design Engineer, Traffic Operations Engineer, and/or Regional Traffic Engineer, the preparer (typically a Roadway Design Engineer) completes the Work Zone Significance Determination Form to classify all operations (highway construction projects, utility projects, maintenance work, right-of-way use permits, etc.) as significant, non-significant or exempt. (*See 1TD2* for related information on classifications and associated requirements and documents.)

Once ready for submittal, the Roadway Design Lead signs the form, uploading the form to the project folder. If the Roadway Design Lead is a consultant, he/she submits the form to the assigned TDOT Design Manager for signature and distribution within TDOT.

Request Driveway Deviations

Once the line and grade.dgn advances to a point where all proposed driveway locations have been identified, the Roadway Design Lead reviews the proposed locations and any needed exceptions with the Regional Traffic Design Engineer, considering the requirements in Volume III of the Highway System Access Manual.

Of note, there are potential impacts for altering driveways on ROW scope and cost, damage documentation, and design refinements if a deviation request is required and/or not approved during the monthly Deviation Committee meeting.

Once identified, the Roadway Design Lead coordinates with the Regional Traffic Design Engineer and the Regional Traffic Operations Engineer to ensure the deviation has been submitted for Committee review.

Develop Line, Grade and Cross Sections (Line and Grade Package)

Certain disciplines, such as Environmental, Geotechnical and Multimodal, typically begin their work using the Conceptual Layout. However, other disciplines (e.g., Traffic Design, Structures, Right-of-Way/ROW and Hydraulics) require electronic design files that define the basic roadway alignment and footprint to begin their respective preliminary designs.

Using the final survey files and digital terrain model (DTM) provided by the Survey Lead (*see 1SY1* for related information) and incorporating any preliminary information provided by the NEPA Lead, Environmental Technical Lead(s), Structural Design Lead or Lead Geotechnical Engineer (see respective activities), the Roadway Design Lead or Engineer (as assigned) develops the horizontal and vertical alignments and roadway footprint by:

- Setting the horizontal alignment for mainline, ramps (if applicable), sidewalks, multimodal infrastructure (as verified with the Active Transportation Lead using the recommendation developed under *1AT1*) and sideroads (if applicable).
- Setting the vertical alignment for mainline, ramps (if applicable) and sideroads (if applicable).
- Establishing cross sections of mainline, ramps (if applicable) and sideroads (if applicable).
- Setting driveway profiles for key driveways to assess property access.
- Creating the initial, proposed TIN file and displaying present and proposed contours.
- Establishing preliminary/proposed right-of-way limits and easement locations documented in a completed ROW acquisition table submitted with the Line and Grade Package.
- Incorporating certain environmental resource shapefiles or locations details (e.g., for ecological features such as streams, ephemerals and wetlands streams or for historic or archaeological resources) in the Line and Grade Package and labeling the environmental features on the plans (*see 1EN2* for related information).
- Coordinating with the NEPA Lead and Environmental Technical Leads to document efforts where the design avoids or minimizes impacts to potential resources when developing the Line and Grade Package (or subsequent Functional Design Plans) (*see 1EN2* for related information).
    - Note: The Roadway Design Lead should continue to document design modifications that avoid or minimize impacts for use by the NEPA Lead and Environmental Technical Leads when completing their agency coordination (e.g., SHPO, USFWS).
    - Note: The Roadway Design Lead should also document any design changes that reduce or alter impacts to all ecological features (e.g., streams, ephemerals. and wetlands) in

the ETSA for use by the Environmental Permit Lead and Environmental Mitigation Lead (*see 2EN3* and *2EN4* for related information).

- Incorporating all other elements listed in the Roadway Line and Grade Design Checklist.

To do this, the designer references TDOT's *Roadway Design Guidelines*, TDOT's *Standard Drawings*, TDOT's *Roadway Design Checklists* and AASHTO's *A Policy on Geometric Design of Highways and Streets*, following the Conceptual Layout (including the alignments and typical sections) in the Concept Report (if developed), to create the initial Line and Grade Package.

To finalize the package, the Roadway Design Lead creates/oversees the development of a package/zip folder containing the following information:

- Title sheet .pdf
- Survey and proposed alignment, contours and cross section .dgn files
- TIN file
- GPK file
- KMZ file
- All other necessary MicroStation, GEOPAK and Microsoft files
- A .pdf of the proposed alignment as a roll plot (or sheets), profile and cross sections
- All other elements listed in the Roadway Line and Grade Design Checklist

Included with the Line and Grade Package, the Roadway Design Lead submits quantities for major roadway items (*see Appendix F* and the Line and Grade Design Checklist [In development] for additional guidance on items to quantify).

Coupled with other discipline input, the Roadway Design Lead and Project Manager use this information to validate the initial assumptions and costs from the preliminary project estimate in the Concept Report and then to establish the first formal project estimate for the Project Commitment Document (PCD) (*see 1PM5* and *2PM2* for related information).

The Roadway Design Lead coordinates a QC review on the design as detailed in the *TDOT Quality Manual*. Once comments are resolved, the Roadway Design Lead uploads the package to the project folder and sends an email notification to the Project Manager and project team members that the package is ready to review/use. If the Roadway Design Lead is a consultant, he/she submits the package to the assigned TDOT Design Manager for distribution within TDOT.

The initial Line and Grade Package is used by the following disciplines to prepare for the Scoping Meeting (*see 1PM5*) and to advance their respective activities in Stage 2:

- The Hydraulic Lead and Structural Design Lead use the package to confirm the proposed grade and begin their respective layouts (*see 2ST1* and *2ST2* for related information).
- Traffic Design uses the package to prepare a preliminary signal layout (including pole locations and additional turn lane recommendations at major intersections), lighting layout (including pole locations and photometric plans) and ITS/TSMO layout (including device and conduit locations) for inclusion in the Functional Design Plans (*see 2TD1* for related information).
- The Active Transportation Lead and Lead Geotechnical Engineer use the information to confirm the findings from their initial reviews and further advance their early work completed for the Concept Report.
- The NEPA Lead and Environmental Technical Lead help inform resource impact avoidance or minimization strategies that could alter the design based on known resources in the ETSA (*see 1EN2* for related information).
- The Environmental Permit Lead and Environmental Mitigation Lead references/reviews the package to help advance the project's permit application(s) and mitigation design (*see 2EN3* and *2EN4* for related information).
- The Regional ROW Appraisal Team Lead/Regional ROW Office (i.e., the project-assigned ROW Lead) uses the information to initiate title searches and begin to confirm right-of-way impacts, identify possible relocations and determine loss-of-access tracts (*see 2RW1* for related information).
- The Senior Technical Specialist (i.e., the project-assigned Utility Coordinator) uses the information to confirm utility impacts, identify possible relocations and begin to coordinate the Utility Coordination Plans with the Roadway Design Lead (*see 2UT1* for related information).

Compile the Line and Grade Package and Participate in the Field Review

The Line and Grade Package Field Review ensures that the roadway design plans have advanced to set the horizontal and vertical alignments and roadway footprint in compliance with current TDOT, AASHTO, and FHWA guidance, policies and procedures.

In advance of the meeting, the Roadway Design Lead compiles and notifies the team that the Line and Grade Package is available for download in the project folder. If the Roadway Design Lead is a consultant, he/she submits the package to the assigned TDOT Design Manager for distribution/notification within TDOT.

In coordination with the Project Manager, the Roadway Design Lead leads the technical discussions, and after the meeting, the Roadway Lead compiles a comprehensive list of review

comments and meeting minutes (if applicable), distributes each document to the attendees and uploads these documents to the project folder (*see 1PM5* for related information).

2RD1 Develop Functional Design Plans

Overview

Complete the project's Functional Design Plans and associated roadway tasks to set the project footprint, define the data to be incorporated into the environmental document, and support the advancement of other disciplines' plans and related design work for similar ends.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Instructional Bulletins*
- ☐ *American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets*
- ☐ *AASHTO Roadside Design Guide*
- ☐ *Federal Highway Administration (FHWA) 10 Controlling Design Criteria*
- ☐ *TDOT Standard Design and Survey CADD Files and Documents*
- ☐ *TDOT Standard Drawings*
- ☐ *TDOT Standard Specifications for Road and Bridge Construction*
- ☐ *TDOT Design Exception Request Form*
- ☐ *FHWA Design Exception Process/FAQ*
- ☐ *TDOT Roadway Design Documents*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Utility Impact/Conflict Matrix	▪ *Develop a Utility Impact/Conflict Matrix*	Roadway Design Lead	Roadway Design Engineer, Utility Coordinator, Various Technical Leads
Test Hole List	▪ *Identify Initial Subsurface Utility Engineering (SUE) Needs*	Roadway Design Lead/Engineer	
Pavement Design Request Form (and associated information)	▪ *Request Pavement Design*		Pavement Designer
Design Exception Request Form	▪ *Document Design Exceptions and Waivers*	Roadway Design Lead/Engineer	
Design Waiver Request Form			
Internal Deconfliction Meeting Minutes	▪ *Incorporate SUE Data and Lead Internal Design Deconfliction Meetings*	Roadway Design Lead	Utility Coordinator

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Utility Coordination Plans	▪ *Develop Utility Coordination Plans*	Roadway Design Lead/Engineer	Utility Design Engineer, Utility Coordinator
Permit Application Design Plans/Sketches	▪ *Develop Design and Sketches for Permit Applications*		Environmental Permit Lead
Functional Design Plans	▪ *Develop the Functional Design Plans*	Roadway Design Lead	Roadway Design Engineer; Various Technical Leads
Compiled Review Comments & Meeting Minutes	▪ *Participate Compile the Functional Design Plans and Participate Field Review*		Project Manager
Updated Functional Design Plans	▪ *Revise and Submit Updated Functional Design Plans*	Roadway Design Lead	

Develop a Utility Impact/Conflict Matrix

Based on the complexity of the project and potential utility impacts, the Roadway Design Lead, in collaboration with the Utility Coordinator, may develop a project-specific Utility Impact/Conflict Matrix for internal coordination and external reference (*see 2UT1* for related information). This matrix minimally documents:

- Utility name and contact information
- Location of potential conflict based on the current version of the Roadway plans
  - Note: The matrix is a living/working document that the Roadway Design Lead updates as the design advances in coordination with the Utility Coordinator.
- Type of aboveground and underground utility and infrastructure in conflict (hydrant, manhole, conduit, stormwater/sewer, etc.)
- Proposed disposition (protect in place, relocate, adjust to grade, remove, abandon, etc.)
- Additional actions needed

The Roadway Design Lead develops and files the Utility Impact/Conflict Matrix in the project folder, notifying the project team that this is a living/working file and is available for reference. The project team uses this list to:

- Identify all utilities and related owners on the project
- Further understand and eliminate known conflicts
- Proactively direct relocation strategies

Identify Initial Subsurface Utility Engineering (SUE) Needs

Accurate subsurface utility exploration (SUE) data can minimize utility conflicts and avoid unnecessary costs and delays when advancing design and relocating utilities. As soon as possible in Stage 2, the Roadway Design Lead (or assigned Roadway Design Engineer):

- Performs a utility conflict analysis to identify potential subsurface conflicts with proposed design elements.
- Coordinates with the Structural Design Lead, Hydraulic Lead, Roadway Drainage Designer and Signal/Lighting/ITS Design Engineers to determine their anticipated subsurface components to further refine preliminary utility conflicts.
- In collaboration with the Utility Coordinator,
- Identifies utility owners within the project limits and inventories utility facilities to identify those that are costly to relocate or have long design and construction durations (*see 1UT2* and *2UT1* for related information).
    - Develops a list of potential utility conflicts (e.g., the Utility Impact/Conflict Matrix described previously).

The Roadway Design Lead, Project Manager and Utility Coordinator then determine appropriate SUE test hole locations at conflict points to verify anticipated conflicts. The project team then coordinates with the Survey Lead to complete the more in-depth quality level of surveys for utility depiction (scheduled strategically based on when information is needed):

- SUE Quality Level B: Information obtained via surface geophysical methods (marking its horizontal position on the ground) determines the presence and designates the approximate horizontal position of subsurface utility.
- This effort is best completed during the initial survey efforts (*see 1SY1*) or soon after the Line and Grade Package has identified specific areas of impact, likely early in Stage 2 as the other disciplines are developing their respective designs.
- SUE Quality Level A: Obtaining precise utility horizontal and vertical location by physical exposure/potholing and subsequent measurement of the subsurface utility, usually at a specific point.
- This effort is best completed/coordinated to identify utility conflicts of concern during Stage 2 (when developing the Functional Design Plans), but can also be advanced early in Stage 3 (right after the Functional Design Plan Field Review).
    - Specific pothole location data are presented on individual data sheets that include type, size and depth to utility.

Based on the available SUE data, the Roadway Design Lead and Utility Coordinator use the information to inform the ensuing deconfliction meetings and respective roadway design plans and Utility Coordination Plans to eliminate conflicts and proactively direct relocation strategies.

Request Pavement Design

A critical element in defining the project footprint is an established pavement structural design that considers the items listed in 2PV1. To initiate a request for pavement design, the Roadway Design Lead submits a Pavement Design Request Form to TDOT.PavementDesign@tn.gov (see TDOT *Roadway Design Guidelines* and *2PV1* for related information). The Roadway Design Lead includes the following information with the request:

- Title sheet
- Traffic information, including average daily traffic (ADT) and average daily loading (ADL)
- Soils and geology report, as available at the time of the request (*see 2GT1* for related information)
- Typical sections
- Present and proposed layout sheets
- Cross sections
- Traffic phasing (including locations of temporary run-arounds or use of shoulders)

If the Roadway Design Lead is a consultant, he/she sends the request to the TDOT Design Manager, who submits the Pavement Design Request Form and related information to the Pavement Team Lead.

Document Design Exceptions and Waivers

Despite the range of flexibility for the controlling elements of a design, there are situations in which accepted design criteria (established per *1RD2*) are not applicable or where design exceptions or waivers are needed for circumstances in the field that cannot reasonably be met within the project footprint. When appropriate, the design exception or waiver process allows the use of criteria or standards other than the accepted/established values. Design exceptions or waivers can be opportunities to add design practicality or value and are not necessarily considered violations of TDOT policy.

To identify and document potential exceptions or waivers, the Roadway Design Lead completes a Design Exception or Design Waiver Request Form (described further in TDOT's *Roadway Design Guidelines*), considering:

- The design exception process requires formal approval for exceptions relating to the 10 controlling design criteria listed in TDOT's *Roadway Design Guidelines* and as defined by FHWA.
- The design waiver process requires approval for variances from the TDOT Standard Drawings.

- The Roadway Design Lead documents all relevant information for the request, including the:
  - Project data sheet
  - Roadway geometric design data sheet
  - Geometric design controlling criteria
  - Bridge design features (if applicable)
  - Standard Plan deviation (if applicable)
  - Crash history summary report
  - Guidance justification checklist

The Roadway Design Lead submits the letter, checklist and location of the design plans (i.e., plan sheets, location map and other related information) to the Regional Director of Project Development for review, who reviews the package for accuracy and completeness.

- Written comments and associated documents are provided to the Roadway Design Lead (for action) and the Project Manager (for information).
- If deemed necessary, a follow-up meeting ensures clarity of comments and responses.

Once comments have been addressed and the form is recommended for approval, the Regional Director of Project Development forwards the Request Form to the Roadway Design Division Director, who either provides final approval or forwards it to FHWA (as applicable and likely for roadways on the Appalachian Development Highway System or for FHWA Projects of Division Interest [PODI]) for final approval. The approved Request Form is uploaded to the project folder.

If either Request Form is completed by a consultant, then he/she completes the form and sends it to the assigned TDOT Design Manager, who sends it to the appropriate parties for review and approval.

Incorporate SUE Data and Lead Internal Design Deconfliction Meetings

Based on the available SUE data, the Roadway Design Lead and Utility Coordinator use the data/information to lead the necessary deconfliction meetings, and as soon as the SUE data is received, the Roadway Design Lead reviews and distributes the information to the project team for discussion during the Internal Design Utility Deconfliction Meetings (*see 2UT1* for related information) or as part of the periodic team meetings.

The purpose of these internal deconfliction meetings is to discuss and resolve utility conflicts early in the design development process (i.e., this Stage 2). Prior to the meeting, the Roadway

Design Lead coordinates with the Project Manager and Utility Coordinator on a meeting agenda and then sends to all attendees the:

- Agenda
- Updated project plans/files
- The updated Utility Impact/Conflict Matrix

Meeting topics typically include:

- Project scope
- Design and construction schedule
- Constructability issues
- Utility outage windows and limitations
- Utility conflicts and strategies to relocate or mitigate noted conflicts
- Note: If the decision is to mitigate certain conflicts, the Roadway Design Lead engages the design team using industry utility avoidance methodologies, working with the Utility Coordinator to receive approval for the relocations from the utility owner.

For the meeting and after, the Roadway Design Lead:

- Leads the meeting
- Distributes and uploads to the project folder the meeting notes/minutes that document all decisions, discussion points and action items
- Schedules follow-up meetings, as needed

Develop Utility Coordination Plans

TDOT is required, by law, to send complete Utility Coordination Plans to all known utility owners impacted by the project, allowing each owner 120 days to respond with:

- A set of relocations plans
- Schedule of calendar days to relocate
- Estimate of relocation costs

Building from the utility design and coordination efforts to this point, the Roadway Design Lead or Roadway Design Engineer (as assigned) develops a .pdf and .dgn set or "snapshot" of the plans with a "Utility Coordination Plan Phase" stamp, sending these plans to the Utility Coordinator. These plans are ultimately provided to the utility owners or their designated design representatives to initiate their relocation design.

The Utility Coordination Plans are to consist of:

- Title sheet, plan and profile sheets, typical sections and cross section sheets
- SUE Quality Level C: Representation of known (surveyed) utilities

- Traffic control sheets (if available)
- Drainage sheets, including storm drain system and culvert crossing locations
- Structure sheets, including retaining wall sheets that depict the location and type of retaining walls and bridge foundation and utility impacts with foundations
- Signal and lighting poles, cabinets and electrical circuit locations
- Signing sheets
- Stream and wetland mitigation design and clearly marked resource areas not to be used for utility relocations (*see 2EN3* and *2EN4* for related information) (if available and as applicable)
- Proposed cut and fill lines
- Present and proposed right-of-way linework
- Any underground improvements that have a potential to impact the utility relocation design

Once the plans have been drafted, the Roadway Design Lead coordinates a QC review on the exhibits, and once comments are resolved, the Roadway Design Lead uploads the plans to the project folder, sending the package of plans to the Utility Coordinator. (The TDOT Design Manager completes this step if the Roadway Design Lead is a consultant.)

Note: Revisions to the design may require that the Roadway Design Lead update and resubmit the Utility Coordination Plans. At the request of the utility owner and as approved by TDOT, this may add days (but no more than 45 days) to the utility owner's response time. The Roadway Design Lead should discuss schedule impacts with the Project Manager and Utility Coordinator before proceeding with any design changes.

Related section: *3UT1*

Develop Design and Sketches for Permit Applications

The time it takes to obtain certain permits prior to letting often requires the team to advance its application submittal as soon as possible. However, the process is complicated by the level of design/detail required by regulatory agencies to consider an application complete.

As discussed during the ongoing Permit Strategy Meetings (*see 2PM4* for related information), once the plans are developed far enough to present to the regulatory agencies (as part of a permit application), but as soon as possible (during development of the Functional Design Plans or right after the Functional Design Plans Field Review), the Roadway Design Lead or Roadway Design Engineer (as assigned) generates a "snapshot" set of plans with a "Permit Application Plans" stamp on all sheets.

These plans may include, as coordinated with the Environmental Permit Lead and Environmental Mitigation Lead, a:

- Title sheet
- Project commitments and environmental notes
- Present and proposed layouts
- Roadway and sideroad profiles
- Haul road layouts and profiles
- Drainage maps and culvert cross sections
- Erosion prevention and sediment control (EPSC) plans
- Bridge preliminary plans
- Sinkhole remediation plans
- Location(s) of existing environmental features, proposed impacts to these environmental features and environmental mitigation plans
- Natural stream design plans
- Proposed right-of-way, easement and slope lines

Areas of impacts to consider, as identified by the Environmental Mitigation Lead and Environmental Permit Lead during their respective assessments (*see 2EN3* and *2EN4* for related information), could include:

- Bridges and bridge piers
- Culverts
- Stream relocations
- Permanent and temporary wetland impacts
- Placement of riprap
- Sinkhole remediation measures
- Canopy loss
- Riparian zone encroachment
- Installation of riparian zone buffers
- Temporary stream diversions
- EPSC measures

Once the plans have been drafted, the Roadway Design Lead coordinates a QC review on the exhibits, and once comments are resolved, the Roadway Design Lead uploads the plans to the project folder, sending a cover letter via email informing the Environmental Permit Lead of the submittal. (The TDOT Design Manager completes this step if the Roadway Design Lead is a consultant).

In addition to the plans, the Roadway Design Lead or Roadway Design Engineer (as assigned) creates certain permit sketches, as requested by the Environmental Permit Lead, as part of the

Permit Assessment (*see 2EN3* for related information). Developed in accordance with TDOT's *Environmental Permit Sketch Guide*, the permit sketches consist of maps and drawings on 8 ½" x 11" sheets depicting individual impact locations. Once a QC review is completed and comments resolved, the Roadway Design Lead coordinates the permit sketch development directly with the Environmental Permit Lead and Environmental Mitigation Lead to finalize the permittable plans that are included with the permit application(s). (The TDOT Design Manager completes this step if the Roadway Design Lead is a consultant.)

Related sections: *1SY1, 2EN3, 2EN4, 3EN2, 3UT1*

Develop Conceptual Traffic Control Strategies

To determine the conservative extents of potential work zone impact management strategies, the Roadway Design Engineer develops conceptual strategies or Temporary Traffic Control (TTC) concepts in accordance with the *Work Zone Safety and Mobility Manual.* This information helps establish potential impacts to the project footprint and needed right-of-way to accommodate traffic control. This detail also becomes foundational for the ensuing TTC plans and TMP (*see 2TD1* and *3TD1* for related information).

To do this, the Roadway Design Engineer:

- Reviews the line and grade .dgn in the Line and Grade Package and the layout sketch (if developed previously).
- Develops conceptual TTC strategies only to a level of design that identifies/defines potential extents that will increase or modify the project footprint and/or require additional right-of-way to accommodate temporary construction easements, staging ingress and egress, bypass roadways or other temporary construction operational impacts.
- Coordinates a QC review of any concepts as detailed in the *TDOT Quality Manual*.

Once reviewed, the Roadway Design Engineer provides the information and any CADD files (if available) to the Roadway Design Lead for inclusion with the Functional Design Plans. Throughout this stage, any design effort is continually coordinated with the Roadway Design Lead and Traffic Design Engineer via updated sheets and CADD files provided regularly for collaboration and further development of the strategies.

Develop the Functional Design Plans

The Functional Design Plans are a collaborative set of designs and a cost estimate that incorporates input from all project disciplines. The goal for the Functional Design Plans is to

solidify the project footprint via a "preliminary" level of design that allows environmental, right-of-way, utilities and permits activities to move forward in confidence that the horizontal and vertical alignment will remain consistent throughout the duration of the design phase.

> *If design changes alter the project footprint (horizontal and vertical) or modify a design feature or scope element that will change an impact to an environmental resource(s)* ***after*** *the Environmental Document is approved, additional studies, documentation and coordination with the regulatory agencies may be required, and the Environmental Document may need to be re-evaluated so that construction funding is obligated prior to letting the project.*
>
> *The project team, led by the NEPA Lead, Roadway Design Lead and Project Manager, should regularly discuss impacts and consequences of potential design changes as the Functional Design Plans and Plan-in-Hand Plans (see 3RD1) are advanced in order to discuss the risk to the project schedule in completing a NEPA re-evaluation.*

In coordination with the Project Manager, the Roadway Design Lead directs this multidiscipline effort, coordinating as needed with all other disciplines to develop the preliminary design in accordance with TDOT's *Roadway Design Guidelines,* TDOT's *Roadway Design Checklists* and TDOT's *Standard Design and Survey CADD Files and Documents*.

To complete the Functional Design Plans, the Roadway Design Lead, with support from his/her Roadway Design Engineer(s), minimally:

- Revises the title sheet and updates the plan, profile sheets and cross section sheets from the Line and Grade Package.
- Incorporates geotechnical recommendations for slopes into the design plan, profile and cross section sheets.
- Refines the typical sections that now include the project's pavement design.
- Develops conceptual traffic control strategies/TTC concepts with input from Traffic Design (*see 2TD1* and the associated task above for related information).
- Includes preliminary placement of roadway safety features (e.g., barrier, guardrail, attenuators, crash cushions).
- Develops a preliminary drainage design that depicts the horizontal and limited profile layouts for features such as storm drains, pipe culverts, drop inlets, catch basins, headwall and wingwall extents (for box culvert or pipe culverts), permanent post-construction stormwater control measures, and detention/retention basin locations.

- Develops preliminary erosion prevention and sediment control (EPSC) design to only a level that identifies any outfall locations, stream diversion locations and major devices that could impact right-of-way or require temporary construction easements.
- Drafts the initial Signing and Pavement Marking sheets that include:
  - Locating all signs on the project, especially those that will need a substantial foundation (overhead or larger side mount signs)
  - Design any specialty size signs as needed (again, typically overhead or side mount signs)
  - Include general pavement marking details (e.g., striping, stop bars and crosswalks) that define curb ramp/sidewalk widths, signal head placement/pole foundations, lane layout, and pavement messages.
- Includes existing easements and establishes any right-of-way, permanent easements, slope easements and temporary construction easements to be documented in the ROW Acquisition Exhibits (*see 3RD1* for related information).
- Incorporates environmental recommendations for avoidance and minimization of impacts to identified environmental resources, which includes labeling of the environmental features on the plans.
  - Note: The Roadway Design Lead should continue to document design modifications that avoid or minimize impacted resources for use by the NEPA Lead and Environmental Technical Leads when documenting impacts and completing agency coordination (e.g., SHPO, USFWS).
  - Note: The Roadway Design Lead should also document any design changes that reduce or alter impacts to ecological features (e.g., streams, ephemerals. and wetlands) in the ETSA for use by the Environmental Permit Lead and Environmental Mitigation Lead (*see 2EN3* and *2EN4* for related information).
- Creates pay item quantities associated with construction and generates an updated cost estimate.
- Evaluates the roadway design to determine if any incompatibilities exist with other discipline's designs.
- Incorporates all other elements listed in the Roadway Functional Design Checklist.

The Roadway Design Lead also evaluates the design for locations where retaining walls may be a cost-effective solution to reduce impacts. Any assessment involves discussions with the Hydraulic Lead, Lead Geotechnical Engineer, Structural Design Lead, Utility Coordinator, NEPA Lead and ROW Lead.

As detailed in the *TDOT Quality Manual,* the Roadway Design Lead coordinates a QC review on the design, plan sheets and quantities, and once comments are resolved, the Roadway Design Lead notifies the Project Manager to schedule the Functional Design Plans Field Review.

Coordinate Geotechnical Analysis for Noise and Retaining Walls

It is critical to understand subsurface characteristics for all noise and retaining wall locations proposed for a project. Integral to developing the associated geotechnical reports, the Roadway Design Lead (in discussions with the Structural Design Lead and Lead Geotechnical Engineer) coordinates borings via a request letter and MicroStation files of the proposed wall layouts.

The request letter and layouts are compiled and submitted to the Lead Geotechnical Engineer/ Geotechnical Engineering Section at TDOT.Geotech@tn.gov. The Roadway Design Lead copies the Regional Survey Office and Survey Lead on the submittal for the purpose of staking the points in the field (*see 2SY1* for related information).

Compile the Functional Design Plans and Participate in the Field Review

The Functional Design Plans Field Review ensures that the multidiscipline design and associated plans have been advanced to establish the project's footprint in compliance with current TDOT, AASHTO and FHWA guidance, policies and procedures.

In advance of the meeting, the Roadway Design Lead compiles and notifies the team that a set of project plans/sheets and estimate from all disciplines is available for download in the project folder. If the Roadway Design Lead is a consultant, he/she submits the package to the assigned TDOT Design Manager for distribution/notification within TDOT.

While the Project Manager facilitates the meeting, the Roadway Design Lead supports by leading the technical discussions, and after the meeting, the Roadway Lead compiles a comprehensive list of review comments and meeting minutes, distributes each document to the attendees and uploads these documents to the project folder.

The field review may also involve an in-person site visit (which is recommended) to ensure the Functional Design Plans are complete and existing site elements have been addressed in the plans. What may be a combined field review and site review, the Roadway Design Lead:

- Distributes plans and questions in advance of the site review.
- Meets onsite to verify that existing site conditions are addressed in the plans.
- Compiles a comprehensive list of review comments and meeting minutes.

The Roadway Design Lead distributes the review comments and meeting minutes to site review attendees and uploads each to the project folder.

Revise and Submit Updated Functional Design Plans

For the purposes of establishing the project footprint, this activity is not complete (and the footprint is not established) until ***after*** all field review comments on the Functional Design Plans have been resolved and the plans updated and resubmitted. Refer to the TDOT's *Roadway Design Guidelines* for additional information.

2RD2 Conduct Design Public Meeting

Overview

Determine whether a Design Public Meeting is required for the project in accordance with TDOT's *Public Involvement Plan*. If needed, lead the meeting as part of Stage 2 and as the Functional Design Plans are being developed. **Note:** The Design Public Meeting is not the same as a public hearing process, which may be required as part of completing the NEPA action.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Public Involvement Plan*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Public Meeting Plans, Displays and Handouts	▪ *Prepare for the Design Public Meeting*	Roadway Design Lead	Design Engineer, Project Manager, Other Technical Staff
Public Meeting Transcript	▪ *Hold the Design Public Meeting* ▪ *Process the Design Public Meeting Transcript*		Design Engineer, Project Manager, Project Development Director

Prepare for the Design Public Meeting

The *TDOT Roadway Design Guidelines* provides guidance related to public meetings on necessary forms, presentations and other communications to be coordinated with the Community Relations Division.

In preparation for the meeting, the Roadway Design Lead, in coordination with the Project Manager and assigned Community Relations Division staff:

- Determines a tentative location and date for the meeting.
- Confirms the attendance of a court reporter and TDOT Divisions who are needed at the meeting.
- Completes the required Public Meeting Notice Request and Public Meeting Checklist, sending both to the Community Relations Division a minimum of eight weeks in advance of the meeting date. **Note:** these items are completed by the TDOT Design Manager if the Roadway Design Lead is a consultant. If a Public Hearing is needed, the Public Meeting Notice Request and Public Meeting Checklist are to be completed a minimum of 10 weeks in advance of the meeting date.

Typically, the Roadway Design Lead then prepares the following to present at the meeting:

- Design Public Meeting Plans: Full and half-size sets of plans are printed and available during the meeting to describe the relevant items from the current version of the Functional Design Plans (see the TDOT's *Roadway Design Guidelines* and 2RD1 for related information).
- Displays: The proposed project layout, including proposed right-of-way and easements, are printed and available during the meeting on roll-plot displays over an aerial background.
- A formal presentation (e.g., PowerPoint, Prezi) of relevant project details, design options, etc.
- Handouts, signs and any other materials developed, printed, and available at the meeting.

The Roadway Design Lead coordinates a QC review of these items prior to publication. Once comments are resolved, the Roadway Design Lead uploads the completed package containing the Design Public Meeting Plans and Displays in the project folder. (The TDOT Design Manager completes this step if the Roadway Design Lead is a consultant.)

Hold Design Public Meeting

During the meeting, the Roadway Design Lead, in coordination with the Project Manager and assigned Community Relations Division staff, leads a presentation explaining the

- Project's purpose and need
- Major proposed design elements (including termini, alignment, typical sections, etc.)
- Proposed design, right-of-way acquisition and construction schedule(s)

Members of the project team, including design, right-of-way and environmental (e.g., the NEPA Lead or relevant Environmental Technical Leads dependent on resource impacts), are also present to answer questions. A court reporter and comment cards are available to meeting attendees to provide comments.

Process Design Public Meeting Transcript

Following the meeting, the Roadway Design Lead, in coordination with the Project Manager and assigned Community Relations Division staff:

- Reviews the meeting transcript, determines what actions (if any) need to be taken and provides responses to all comments.
- Sends a letter, including the transcript and responses to the Project Development Director for a QC review and approval. The Director then forwards to the Roadway Design Director for approval. If the Roadway Design Lead is a consultant, he/she sends the letter to the TDOT Design Manager to be forwarded to appropriate parties.

- Distributes the final approved letter to the project team and uploads to the project folder.
- Immediately coordinates any design changes because of comment/input received during the Design Public Meeting with the project team.

3RD1 Complete Plan-in-Hand Design

Overview

Complete the project's Plan-in-Hand design and the associated roadway tasks (i.e., all design complete) to facilitate a multidiscipline plan set review of the entire design at the conclusion of the stage. To be completed at any time during this stage, develop the ROW acquisition exhibits, advance the Utility Coordination Plans, coordinate the permit application design/sketches, and finalize the Transportation Management Plan (TMP).

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Instructional Bulletins*
- ☐ *American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets*
- ☐ *AASHTO Roadside Design Guide*
- ☐ *TDOT Standard Design and Survey CADD Files and Documents*
- ☐ *TDOT Standard Drawings*
- ☐ *TDOT Standard Specifications for Road and Bridge Construction*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*
- ☐ *TDOT Roadway Design Documents*
- ☐ *TDOT Environmental Permitting Design Process*
- ☐ *Construction Special Provisions*
- ☐ *Special Provisions Order Form*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
ROW Acquisition Exhibits	▪ *Develop ROW Acquisition Exhibits*	Roadway Design Lead	Roadway Design Engineer, ROW Lead
Final TMP (including TTC Plans and coordinated SP108B)	▪ *Finalize the TMP & Complete the Temporary Traffic Control Plans*		Roadway Design Engineer, Design Engineer, Construction Engineer
Special Provisions Order Form	▪ *Complete the Plan-in-Hand Plans*		All impacted design leads, Construction Engineer
Plan-in-Hand Plans	▪ *Complete the Plan-in-Hand Plans*		Roadway Design Engineer
Compiled Review Comments & Review Meeting Minutes	▪ *Compile the Plan-in-Hand Plans and Participate in the Field Review*		Project Manager

Develop ROW Acquisition Exhibits

The amount of time needed to complete the right-of-way acquisition process varies significantly from project to project. Factors affecting this duration often include the number of:

- Tracts the project requires
- Commercial properties
- Extent of the business and residential relocations

The Roadway Design Lead or Roadway Design Engineer (as assigned) develops exhibits and related plans (with the goal of having 80% to 90% of the tracts finalized as part of the submittal) that the assigned ROW Lead references to complete the right-of-way acquisition process (*see Appendix G* for an example exhibit). To begin the acquisition process as early as possible, these exhibits are completed once the footprint is established, and the amount of right-of-way required is defined in the Line and Grade Package (for accelerated projects involving limited other-discipline input or a need for additional right-of-way) or the Functional Design Plans (more likely based on the level of discipline input required to set the footprint).

These exhibits include:

- Tract owner information, including name, deed book and page.
- Total tract area, area to be acquired (both right-of-way and easements) and area to remain after acquisition.
- Tract exhibits showing the present layout and proposed right-of-way and easement lines for each tract.
- One exhibit is to be displayed using the design plans and survey. The other is to be displayed using an aerial background.
- Bearings/distances, stations/offsets and right-of-way markers.
- Legal descriptions (as coordinated with the ROW Lead to ensure that appropriate boilerplate language is included with different acquisition types) for any right-of-way, permanent easements, slope easements and temporary construction easements.
- Driveways and driveway profiles.

During the Right-of-Way/ROW Strategy Meeting (*see 2PM3* for related information), the Project Manager, Roadway Design Lead and ROW Lead tailor a project-specific strategy to:

- Optimize the right-of-way acquisition schedule and minimize project costs.
- Identify design changes that minimize right-of-way impacts.
- Identify critical tracts that that may take longer to acquire, such as commercial properties and relocations and identify any tracts which are not yet ready to be acquired.
- Develop mitigation strategies to prioritize both the critical tracts, in addition to all other right-of-way tracts needed to complete the project.

Once the exhibits have been drafted, the Roadway Design Lead coordinates a QC review on the exhibits, and once comments are resolved, the Roadway Design Lead uploads each package of exhibits to the project folder with a cover letter detailing any tracts not included in the submittal and a list of the agreed to priority tracts. The cover letter is sent by email to the ROW Lead and assigned staff at the Right-of-Way Division, notifying them of the submittal. (The TDOT Design Manager completes this step if the Roadway Design Lead is a consultant.)

Over the course of the project, it may become necessary to revise the plans and exhibits due to negotiations with property owners during the acquisition process or because of an addition of an uneconomic remnant. If that is the case, the Roadway Design Lead revises the tract exhibits based on the Revision Request Forms received from the ROW Lead. The revised exhibits include revision notes detailing the changes. The Roadway Design Lead uploads the revised tract exhibits to the project folder with a revision letter. The revision letter is sent via email to the ROW Lead and assigned staff from the Right-of-Way Division, notifying them of the submittal.

Revised right-of-way plans will impact other disciplines' design work—the extent of which is dependent on the change and the discipline. In coordination with the Project Manager, the Roadway Design Lead is responsible for communicating all revisions to the effected disciplines, either via a formal meeting or informal means that reach all parties impacted.

Finalize the TMP & Complete the Temporary Traffic Control Plans

For both significant and non-significant projects, the Roadway Design Engineer, in coordination with the Traffic Design Engineer and/or Traffic Operations Engineer, finalizes the TMP in accordance with the *Work Zone Safety and Mobility Manual.* The final TMP and related TTC plans memorialize the relevant project information regarding the:

- Project background
- Anticipated challenges
- Engineering judgement used in developing the work zone impact management strategies

To prepare the associated TTC plans (included as part of the TMP), the Roadway Design Engineer completes the conceptual TTC plans in accordance with *Work Zone Safety and Mobility Manual* and *TDOT Standard Drawings*, coordinating a QC review of the plans once complete. Once the plans have been reviewed, the Roadway Design Engineer submits the plans and CADD files to the Roadway Design Lead for inclusion with the Plan-in-Hand Plans.

The Roadway Design Lead or Engineer includes the latest version of the TTC plans with the TMP for a final compliance review and finalization (*see 3TD1* for related information). Once the TMP is signed, the Roadway Design Lead or Engineer uploads the documents to the project folder.

Complete the Plan-in-Hand Plans

The Plan-in-Hand Plans are a coordinated set of ***design plans and a cost estimate that represents a complete design from all project disciplines***. The goal for the Plan-in-Hand Plans is to present a complete design that includes compiled plans, specifications and estimates and to ensure that all previous comments from past field reviews have been addressed and closed.

In coordination with the Project Manager, the Roadway Design Lead directs the multidiscipline design effort and coordinates with the other disciplines to develop the plans according to TDOT's *Roadway Design Guidelines* and TDOT's *Standard Design,* TDOT's *Roadway Design Checklists and Survey CADD Files and Documents*.

To complete the Plan-in-Hand Plans, the Roadway Design Lead, with support from his/her Roadway Design Engineer(s):

- Refines and completes the roadway design based on comments received from the Functional Design Plans Field Review Meeting.
- Verifies geotechnical recommendations for slopes and walls are in the design, plan, profile, cross section and retaining wall sheets.
- Finalizes the title sheet, plan and profile sheets and cross section sheets.
- Finalizes the typical sections.
- Finalizes the TTC plans and coordinates with the Construction Engineer to ensure project-specific traffic control limitations/restrictions and liquidated damages are referenced in SP108B.
- Finalizes the pavement marking and signing (signing and striping) plans by:
  - Confirming all sign locations and pavement marking details
  - Creating and finalizing the sign schedule
  - **Note:** For identified projects, a Traffic Design Engineer may be assigned to complete the pavement and signing plans. The Roadway Design Lead, Project Manager, and assigned Traffic Design Manager should coordinate early in Stage 3 on who is responsible for completing these plans for the Plan-in-Hand submittal.
- Finalizes the drainage design plans.
- Finalizes the EPSC plans and any landscape and aesthetic plans.
- Incorporates/confirms inclusion of all environmental resource boundary identifiers into the design.

- Finalizes the roadway design of retaining walls and sheets in coordination with the Hydraulic Lead, Lead Geotechnical Engineer, Structural Design Lead, Utility Coordinator and ROW Lead.
- Evaluates the roadway design to determine if any incompatibilities exist with other discipline's designs.
- Incorporates all other elements listed in the Roadway Plan-in-Hand Design Checklist.
- Finalizes pay item quantities associated with construction and generates an updated cost estimate.
- Coordinates with the Construction Engineer to create the project's roadway special provisions, including submittal of the *Special Provision Order Form*.

As detailed in the *TDOT Quality Manual,* the Roadway Design Lead coordinates a QC review on the design, plan sheets, quantities and specifications. Once comments are resolved, the Roadway Design Lead notifies the Project Manager to schedule the Plan-in-Hand Field Review Meeting. When coordinating the meeting time, the Roadway Design Lead confirms with the Project Manager that the project team has enough time for a thorough review of the plans, specifications and estimate.

Compile the Plan-in-Hand Plans and Participate in the Field Review

The Plan-in-Hand Field Review ensures that a multidiscipline design and associated plan set are complete well in advance of letting, all in compliance with current TDOT guidance, policies and procedures.

In advance of the meeting, the Roadway Design Lead compiles and notifies the team that a set of project plans, specifications and estimate from all disciplines is available for download from the project folder. If the Roadway Design Lead is a consultant, he/she submits the package to the assigned TDOT Design Manager for distribution/notification within TDOT.

While the Project Manager facilitates the meeting, the Roadway Design Lead supports by leading the technical discussions, and after the meeting, the Roadway Lead compiles a comprehensive list of review comments and meeting minutes, distributes each document to the attendees and uploads the documents to the project folder.

4RD1 Finalize Construction Documents

Overview

Compile the final set of design documents/plans, specifications and the estimate (i.e., the Final PS&E package) to advertise and let the project.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Roadway Design Documents*
- ☐ *TDOT Instructional Bulletins*
- ☐ *TDOT Standard Design and Survey CADD Files and Documents*
- ☐ *TDOT Standard Drawings*
- ☐ *TDOT Standard Specifications for Road and Bridge Construction*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Draft Final Roadway Plans	▪ *Finalize the Roadway Plans for the PS&E Review Meeting*	Roadway Design Lead	Design Engineer
Final Construction Plans for Letting (Compiled and Sealed)	▪ *Compile the Final Construction Documents*		Structural Design Lead, Hydraulic Lead, Roadway Drainage Designer and Signal/ Lighting/ITS Design Engineer

Finalize the Roadway Plans for the PS&E Review Meeting

The PS&E Review Meeting ensures that all comments from the Plan-in-Hand Field Review Meeting have been addressed for Construction Document turn-in for letting.

To prepare the roadway plans for the PS&E Review Meeting, the Roadway Design Lead:

- Reviews comments from the Plan-in-Hand Field Review Meeting (or previous field review meeting) and addresses necessary design revisions to update the roadway plans.
- Incorporates all other elements listed in the Roadway PS&E Design Checklist.
- Updates/finalizes the specifications (including all related special provisions) and roadway quantities and cost estimate.
- Creates a .pdf of the files using the naming convention described in Chapter 1 of TDOT's *Roadway Design Guidelines*.
- Coordinates a QC of the roadway plans and resolves comments received as detailed in the *TDOT Quality Manual*.

In advance of the meeting and in accordance with the submittal package content and project folder submittal requirements detailed in TDOT's *Roadway Design Guidelines*, the Roadway Design Lead compiles and notifies the team that a conformed set of project plans, specifications and estimates from all disciplines is available for download from the project folder. While the Project Manager facilitates the meeting, the Roadway Design Lead supports by confirming all technical comments have been resolved and the plans are ready for turn in.

Compile the Final Construction Documents

To complete the last quality checks and package the Construction Documents for turn in, the Roadway Design Lead:

- Resolves any last roadway comments from the PS&E Review Meeting, if applicable at this late stage of review.
- Seals the roadway Construction Documents, including the plans, specifications and estimate, in accordance with Chapter 1 of TDOT's *Roadway Design Guidelines*.
- Creates a .zip of the roadway design CADD files using the naming convention described in Chapter 1 of TDOT's *Roadway Design Guidelines*.
- Compiles a final set of Construction Documents, including the sealed documents from all impacted disciplines, in the order listed in TDOT's *Roadway Design Guidelines*.
    - This final package compilation includes checks on sheet numbering, .pdf page orientation and sheet size, and indexing following Chapter 1 of TDOT's *Roadway Design Guidelines*.
- As determined by the Project Manager and Design Lead, initial sealing of the Construction Documents could occur ***before*** the PS&E Review Meeting.
- Uploads the final Construction Document package to the project folder and sends a submittal email to the Regional Quality Team that the package is available for a final review.

The Regional Quality Team provides a quality assurance review of the package to confirm it is ready for turn in.

Once the review is complete, the Regional Transportation Engineer:

- Confirms the approved final set of Construction Documents has been uploaded to the project folder.
- Sends a submittal email and notification to those identified on the email distribution list included in Chapter 1 of the TDOT's *Roadway Design Guidelines* and the PDN Team Contact List.

The Roadway Design Lead includes a copy of the email in the project folder to document the submittal of the construction estimate and that the Final PS&E package is ready for advertisement and letting.

The Roadway Design Lead coordinates, as necessary, with the Project Manager, Regional Transportation Engineer, and Construction Division to ensure the sealed Final PS&E package is advertised and let.

Related section: *3UT1*

1RR1 Complete Concept-Level Railroad Review

Overview

Complete high-level, railroad review to inform the conceptual layout and initial estimate.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Concept Comment Resolution Form*

Deliverables

Deliverable	Task	Responsible Activity Leader
Railroad Identification List	▪ *Provide Review for Potential Railroad in the Project Area*	Railroad Office Designee
Concept Report Comments	▪ *Review the Concept Report*	

Provide Review for Potential Railroad in the Project Area

This task focuses on whether there is railroad involvement on the project. If the project has railroad involvement, the Railroad Office receives notification from the Engineering Concepts Lead or Project Manager.

The Railroad Office Designee:

- Reviews the project location map (or .kmz), draft purpose and need or reason for the project, and all relevant information available to identify known railroads.
- Fills out the number of railroads, specific ownership, and any additional information related to any railroad that could be impacted by the project.

Within two weeks of receiving the request, the Railroad Office Designee provides a list of potentially impacted railroads or completes the Concept Comment Resolution Form with this same information, uploading to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the project team and external stakeholders (as applicable) to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report are drafted. While the Railroad Office Designee provides comments for all projects where a railroad may be impacted, the Designee only attends a site visit for projects if

potential project impacts are better discussed in person or involve specifically complex railroad operations.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the Railroad Office Designee reviews the site visit packet to prepare for the site visit. Any discussion or findings from the site visit may potentially adjust the conceptual layout and/or establish the scope of the railroad coordination tasks to kick off early in Stage 1 (*see 1RR2* for related information).

Review the Concept Report

As requested, and within two weeks of receiving the draft Concept Report, the Railroad Office Designee provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

1RR2 Begin Railroad Coordination

Overview

Contact the railroads in a project's vicinity to confirm all are aware of one another's plans, which reduces late-stage changes that can negatively impact the schedule and add unexpected costs.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Railroad Coordination Initiation Forms List of Stakeholders Preliminary Engineering Agreement	▪ *Initiate Railroad Coordination*	Statewide Railroad Coordinator	Region Railroad Coordinators
Preliminary Railroad Cost Estimate	▪ *Prepare Preliminary Railroad Cost Estimate*	Railroad Office Designee	

Initiate Railroad Coordination

The Project Manager informs or reconfirms (based on assumptions used under 1RR1) with the Railroad Office that TDOT has a planned project, which in the Project Manager's opinion, has Railroad involvement.

Each project that has Railroad involvement is unique, and those involved in the coordination process require different elements. For simplicity, the following major milestones are required for all Railroad-coordinated projects. The Statewide Railroad Coordinator (or designee):

- Identifies the Railroad entities involved and the impact types.
- Engages in property research.
- Searches for previous agreements.
- Sets up the project for coordination.
- Generates the required coordination initiation forms.
- Identifies all stakeholders.
- Develops the Preliminary Engineering Agreement.

Once the information is communicated, the Statewide and Region Railroad Coordinators work through the initiation requirements outlined in the *Utilities Manual* and assign the project to the Railroad.

Different Railroads require certain actions to assign a project, but the necessary items needed from the TDOT Regional or HQ staff are requested and distributed per the *Utilities Manual*. Although many different documents are transmitted between the Railroad and the Railroad Coordination Office, the main documents are the Preliminary Engineering Agreement and the Preliminary Engineering Force Account Estimate, both of which are foundational for the work to be done in Stage 2 and 3.

Prepare Railroad Cost Estimate

The HQ ROW Technical Coordinator (or designee) sends a request to the Statewide Railroad Coordinator (or designee) to generate the Railroad cost estimate.

If a railroad is not involved:

- The Statewide Railroad Coordinator (or designee) completes the final Form 44 and signs the document confirming there is no railroad involvement on the project, ensuring the railroad estimate is for zero ($0.00) dollars. The document is submitted to the HQ ROW Technical Coordinator (or designee).

If the project has railroad involvement:

- The Statewide Railroad Coordinator (or designee) fills out Form 44, including the number of railroads involved and the estimate related to all railroads involved.
- The document is reviewed, signed, and submitted to the HQ ROW Technical Coordinator (or designee) to compile with the ROW and Utility Estimates.

The Railroad Office is not involved with all project types. This process is reserved for the larger projects in which the ROW Division is engaged prior to sufficient plans being generated to start the railroad coordination process.

3RR1 Perform Railroad Coordination

Overview

Coordinate design plan review and comment resolution with the Railroad. Receive Railroad plans and estimates. Generate the special provisions and Construction Agreement.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Special Provisions 105C (SP105C) Construction Force Account Estimate Construction Agreement	▪ *Receive Railroad Plans and Estimates*	Statewide Railroad Coordinator	Assistant Statewide Railroad Coordinator

Receive Railroad Plans and Estimates

There are many different paths to the railroad coordination process. To advance the process in this Stage 3, the Statewide Railroad Coordinator:

- Receives plans (either the Functional Design Plans or the Plan-in-Hand Plans) from the Roadway Design Lead or other assigned design staff.
- Submits the plans for Railroad review.
- Receives Railroad plan review comments.
- Submits Railroad plan review comments to the Roadway Design Lead or assigned design staff to be addressed.

The above process is an iterative process. Once the review comments have been resolved, the State Railroad Coordinator:

- Receives a statement from the Railroad that there are no further exceptions to the plans.
- Submits the Special Provisions 105C (SP105C) to the Railroad for review and comment.
- Receives a statement from the Railroad that there are no further exceptions to the SP105C.
- Receives Construction Force Account Estimate from the Railroad. Note: If over $100,000.00, submits to external audit for approval.
- Approves the Force Account Estimate and returns to the Railroad.
- Request the generation of the Construction Agreement.
- Submits the Construction Agreement to the Project Manager and other stakeholders for execution.

All items listed above are further detailed in the *Utility Manual*.

3RR2 Prepare and Submit Railroad Certification

Overview

Verify required coordination steps have been completed and secure/finalize the railroad certification for letting.

References

- *TDOT Utility Manual* (Utility Procedures Manual)

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Certification Letter Final SP105C	▪ *Finalize the Railroad Agreement(s)*	Statewide Railroad Coordinator	Assistant State Railroad Coordinator

Finalize the Railroad Agreement(s)

Depending on the project type, the Railroad Office certifies the project, or the Railroad Office informs the Project Manager that the project is ready for certification after final review of the project plans and execution of the railroad agreement.

While most of the documentation and work accomplished on the project is between the State and the Railroad, there is one item the contractor needs to perform its work—SP105C. This document is submitted as part of the Construction Documents along with the Public Project Manual for CSXT and NSRR railroads if either railroad is involved with the project.

2RW1 Initiate ROW Pre-Acquisition Activities

Overview

Complete a right-of-way cost estimate, initiate title searches and potentially advance Preliminary Group Inspection (PGI) field work (as property is identified) based on the Line and Grade Package and recommendations from the ROW Strategy Meetings (*see 2PM3* for related information).

References

- ☐ *ROW Policy & Procedures Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Conceptual Stage Relocation Plan (CSRP)	▪ *Prepare a Conceptual Stage Relocation Plan (CSRP)*	HQ Relocation Lead	Project Manager
ROW Form 44	▪ *Prepare Right-of-Way Estimate*	Regional ROW Appraisal Team Lead	HQ Appraisal
ROW Form 49 (Title Report)	▪ *Perform Title Searches*	Regional or HQ Staff	Regional ROW Engineer
ROW Form 14	▪ *Initiate Private Property Owner Utility Adjustment*	Assigned ROW Agent	Review Appraiser

Prepare a Conceptual Stage Relocation Plan (CSRP)

The purpose of the Conceptual Stage Relocation Plan (CSRP) is to assist in the recognition and resolution of problems associated with the displacement of individuals, families, and businesses related to property relocations—with the goal of minimizing adverse impacts on displaced persons and to expedite project advancement and completion.

The HQ Relocation Lead (or designee) reviews the Line and Grade Package (and related ROW Acquisition Table) to determine if there are any potential relocations related to the project's design. If the project has any property relocations, the HQ Relocation Lead (or designee):

- Notifies the appropriate Regional ROW office to complete the Conceptual Stage Relocation Plan (CSRP) field study and submit the information to Headquarters.
- Directs staff to prepare the Conceptual Stage Relocation Plan (CSRP) in accordance with *ROW Policy & Procedures Manual*.
- Uploads the CSRP to the project folder, notifying the NEPA Lead and Project Manager via email when complete.

Prepare Right-of-Way Estimate

Referencing the Line and Grade Package, the Regional Right-of-Way (ROW) Appraisal Team Lead (or designee):

- Reviews the Line and Grade Package to determine the type of properties affected by the project and researches the market for data of comparable sales.
- Applies market-derived values to each tract's land acquisitions and inspects each tract to determine if additional values for improvements, incidentals, damages, and other factors may be appropriate.
- Submits valuation data to Headquarters Staff for evaluation and inclusion of relocation benefits, demolition costs, and acquisition/relocation services.
- The HQ ROW Technical Coordinator (or designee) sends a request to the Statewide Railroad Coordinator (or designee) to generate the Railroad cost estimate.
- The HQ ROW Technical Coordinator will combine completed appraisal costs estimate with the utility and railroad estimates (*see 2UT1* for related information) and submits the Form 44 for ROW funding.

The Regional ROW Appraisal Team Lead also ensures that the right-of-way cost estimate is maintained in IRIS, which generates the Form 44. Once generated, the document is automatically stored in IRIS. Additionally, the Regional ROW Appraisal Team Lead sends an electronic copy to the Project Manager and Program Development and Administrative Division.

Related section: *1RD2*

Perform Title Searches

Title searches are necessary to ensure that TDOT is acquiring property rights from the appropriate person, free and clear of any title defects.

To initiate and complete this process:

- The Regional ROW Manager (or ROW Acquisition/Relocation Team Lead as supported by TDOT headquarters) assigns the title searches to regional staff or contracts to an approved consultant.
- The assigned staff searches the public records to identify conveyance documents, indicating current ownership of the properties needed for the project.
  - Note: Public records searches may also identify if liens or clouds on title indicate that someone else is entitled to some of the proceeds from the sale of the property or if additional effort may be needed to obtain clear title.
- The assigned staff obtains copies of all pertinent documents identified in the public records search, attaching this information to the completed ROW Form 49 (Title Report).

- Upon submitting the ROW Form 49, the Regional ROW Manager (or designee) assigns review responsibilities to the Regional ROW Engineer.
- The Regional ROW Engineer completes a Right-of-Way Plan/Title check in accordance with Chapter VI of the *ROW Policy and Procedures Manual*.
- The reviewer returns the check to the Roadway Design Lead (if corrections are needed) and the Regional Administrative Assistant, who uploads the completed title report to IRIS.

Title reports are maintained in the IRIS database in the appropriate project file, as well as in the regional project files.

Initiate Private Property Owner Utility Adjustment

When a privately owned utility (well, septic system, water lines, etc.) is impacted, TDOT allocates funds to replace the function of the impacted utility. The assigned ROW Technical Specialist would identify these impacts using the Line and Grade Package (early in Stage 2) that has a completed survey fully incorporated or an advanced copy of the Functional Design Plans (near the end of Stage 2).

In the case of septic systems, the assigned ROW Technical Specialist:

- Consults with local health department/Tennessee Department of Environment and Conservation (TDEC) personnel to determine if suitable soils exist to repair or replace the impacted system.
  - If a septic system cannot be repaired or replaced, the ROW Supervisor requests a plan revision and notifies the Review Appraiser.
- Obtains estimates from qualified contractors to repair or replace the impacted utility. These estimates are used in completing ROW Form 14.
- Attaches ROW Form 14 and supporting documentation to the appraisal for inclusion in the approved offer.

The assigned ROW Technical Specialist is responsible for obtaining estimates, completing the ROW Form 14 and ensuring that each is uploaded to IRIS and added to the tract file. It is the Review Appraiser's responsibility to ensure that the utility adjustment costs become part of the approved offer.

Initiate PGI Fieldwork

The Regional ROW Appraisal Team Lead coordinates the field inspection on which the Preliminary Group Inspection (PGI) Report is based, discussing the logistics and timing of the

inspection with the project team to coordinate efforts that may impact multiple disciplines. The primary purpose of this effort is to:

- Identify appraisal problems.
- Identify relocations.
- Determine the type of report to be requested.
- Establish real vs. personal property inventory.
- Advise in the selection of consultant fee appraisers.

This task could be initiated during Stage 2 or early in Stage 3, depending on:

- Project and acquisition complexity
- Likelihood of changes to the project footprint originally proposed in the Line and Grade Package
- Further discussion of design progression that would impact the overall right-of-way
- The advancement for a full PGI report to be developed soon after this fieldwork for consistency

To determine the most appropriate time to start this field work, the Regional ROW Appraisal Team Lead and Regional ROW Acquisition/Relocation Team Lead coordinate this task with the Project Manager and Roadway Design Lead as part of scoping the project (*see 1PM1* for related information).

Upon receipt of the Line and Grade Package (early in Stage 2) that has a completed survey fully incorporated or using an advanced copy of the Functional Design Plans (near the end of Stage 2), the Regional ROW Appraisal Team Lead:

- Coordinates with, at a minimum, the ROW engineering and acquisition/relocation personnel to review the plans and perform a field inspection of the project.
- Works with the acquisition/relocation representative to identify relocations and determines the inventory of real vs. personal property.
    - Real property is valued by the Appraiser, while personal property is moved under the relocation assistance program.

This field inspection team identifies privately owned utilities that may be impacted by the project.

There are numerous other determinations made as a result of the PGI that are the responsibility of the Regional ROW Appraisal Team Lead, which involve little, if any, consultation with the other participants in the field inspection. These items are captured later with the final PGI Report.

As the responsibility of the Regional ROW Appraisal Team Lead, the resulting outputs from this task are notes, marked-up plans, photos, etc. that are used in the subsequent task of preparing the final PGI Report.

2RW2 Execute ROW Proposal

Overview

Execute the agreement between TDOT and all local governmental bodies having jurisdiction over the land impacted by a project on a state route. This activity is not applicable for projects on City or County roads.

References

- ☐ *ROW Policy & Procedures Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
ROW Proposal/Resolution	▪ *Prepare/Submit ROW Proposal* ▪ *Receive ROW Proposal and Distribute for Execution*	Regional ROW Manager	HQ ROW Acquisition/Relocation Manager

Prepare/Submit ROW Proposal

Developed in accordance with the ROW Policy & Procedures Manual, the ROW Proposal outlines roles and responsibilities of TDOT's Regional Offices and local governments relative to TDOT projects, including land transfer, zoning enforcement limitations, maintenance requirements, traffic control requirements and remnant roadways. This task outlines the roles of the regional ROW staff and local personnel in preparing and (partially) executing a proposal.

Upon receiving Authorization for Incidentals or ROW authorization (whichever comes first), the Regional ROW Manager (or designee):

- Generates the appropriate proposal (City/County/Metro Memphis/Metro Nashville) and necessary resolutions required by the project.
- Circulates the proposal for execution by the appropriate local governmental officials.
- Sends the partially executed proposal and resolutions to Headquarters for review.
- Retains a copy of the partially executed proposal until the document is fully executed.

Receive ROW Proposal and Distribute for Execution

Once the partially executed (by local officials) proposal is received, the HQ ROW Technical Coordinator circulates the proposal for legal review and signature by the Commissioner.

- Copies of the fully executed proposal are distributed to the Regional Office, who then forwards a copy to the appropriate local governmental body.
- The fully executed proposal is scanned and uploaded under the project in IRIS.

The Headquarters ROW Office ensures that a scanned copy is maintained in the electronic project records contained in IRIS, while the Regional ROW Office provides notice of the executed Proposal to the Project Manager.

3RW1 Complete Appraisal and Initiate Acquisition

Overview

Finalize the PGI Report (and complete fieldwork if still needed), complete appraisals, appraisal reviews and prepare a written offer of just compensation for the acquisition of needed property rights to complete the project. Update the Project Manager and project team (as applicable) on the status of the following tasks through regular team meetings or recurring ROW Strategy Meetings (*see 2PM3* for related information).

References

- ☐ *ROW Policy & Procedures Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
PGI Report	▪ *Produce Preliminary Group Inspection (PGI) Report*	Regional ROW Appraisal Team Lead	Additional ROW Staff
Work Order	▪ *Employ Fee Appraiser*	HQ ROW Appraisal Manager	HQ Admin Staff
Market Data Brochure	▪ *Appraise Property*	Assigned Appraiser	
Appraisal Report	▪ *Appraise Property*	Fee Appraiser	ROW Agent and Regional ROW Appraisal Team Lead
ROW Form 2/Appraisal Review	▪ *Review Appraisals*	Review Appraiser	Regional ROW Appraisal Team Lead, HQ Appraisal

Produce Preliminary Group Inspection (PGI) Report

As the culmination of the data gathered from the PGI fieldwork (either in Stage 2 or early Stage 3), the PGI Report is used primarily for the purpose of contracting for appraisals.

Developed by the Regional ROW Appraisal Team Lead in accordance with the *ROW Policy & Procedures Manual*, the PGI Report:

- Lists all tracts on which there is an acquisition.
- Indicates the type of appraisal report for each tract: formal or formal part affected.
- Identifies tracts that will not need an appraisal report and can be valued via an appraisal waiver or Nominal Payment Parcel (NPP).
- Identifies tracts considered relocations under the guidelines of the relocation assistance program.

- Sequences occupied tracts.
- Includes guidance to the appraiser regarding special circumstances, such as larger parcel questions or real vs. personal property issues.
- Indicates tracts that will be combined due to common ownership.
- Estimates appraisal fee.
- Identifies potential utility adjustments.
- Identifies necessary plan revisions.

The Regional ROW Appraisal Team Lead generates the PGI Report from data input in IRIS for review by the HQ ROW Appraisal Manager as part of the "Employ Fee Appraiser" task and for information to the Project Manager and project team. The Regional ROW Appraisal Team Lead corrects any errors or adjusts the report based on comments received. Once generated and fully executed, the document is automatically stored in IRIS and then used to initiate appraisal contracts.

Employ Fee Appraiser

Appraisers are selected from TDOT's "panel" of pre-qualified real estate appraisers under continuous contract with TDOT. The HQ ROW Appraisal Manager, in collaboration with the Regional ROW Appraisal Team Lead:

- Reviews the PGI Report and identifies potential appraisers from the "panel" for the appraisal assignment.
- Prepares an estimate of appraisal costs for the project.
- Solicits proposed work orders from the appraisers identified for the project.
  - Note: If the proposed work orders are within the project estimates, the ROW Director executes the work order.
- Processes the appraisals work orders, which are maintained electronically in the IRIS database under continuous contracts.

Additionally, assignment data is entered into IRIS at the project level.

Stake ROW

ROW staking extends over the length of the project to represent the location of the existing ROW and the extremities of the acquisition areas, making it simpler for the appraiser, landowner, agent, etc. to visualize the project's impact.

Upon receipt of the Functional Design Plans, the Regional ROW Manager (or designee):

- Requests that the Survey Lead stake the ROW (*see 2SY1* for related information). Generally, this would be at the time the PGI Report is submitted to HQ and as close to when the Appraiser's inspection is being completed.
- Once complete, verifies the staking in the field.

Appraise Property

The appraisal of property is the first part of the valuation process that ultimately determines the approved offer. Except for uncomplicated, low-value acquisitions, appraisals are performed almost exclusively by contracted appraisal personnel.

To do this, the assigned Appraiser:

- Notifies impacted landowners that the Appraiser has been employed by TDOT to appraise their property for the project.
- Offers the landowner the opportunity to accompany them on the inspection of the property.
- Prepares and submits a market data brochure indicating comparable sales ("comps") that are expected to be used in completing the assigned appraisals.
- Completes the Appraisal Report and submits it to the Regional ROW Office (typically the Review Appraiser) for transmittal to the Review Appraiser.

The Staff Review Appraiser (or TDOT designee) uploads the appraisal into IRIS upon receipt and circulates copies to the main tract file and Review Appraiser. The landowner's copy (including comparable sales used in determining value) is set aside for the negotiator's file.

If an appraisal extension is needed within six months of the Construction Document turn-in, the Regional ROW Office (typically the Regional ROW Appraisal Team Lead), Project Manager and HQ ROW Appraisal Manager discuss any schedule impacts for delayed turn-in.

Review Appraisals

The appraisal review process ensures that all appraisal products are written in compliance with applicable laws, rules, procedures, standards and guidelines. It also determines if the appraisal provides a sound basis for a fair market value determination.

As part of his/her review, the Review Appraiser:

- Performs a desk audit of the appraisal and a field inspection of the parcel.
- Works with the Appraiser to obtain additional information, correct errors and provide further explanation, when necessary.

- In consideration of the appraiser's determination of damages, determines if the remainder property qualifies as an uneconomic remainder and prepares ROW Form 2 accordingly.
- Produces an appraisal review document and an approved offer (on ROW Form 2).

Hard copies of the appraisal review and approved offer are maintained at the regional level in the tract file. These forms are generated from data input into IRIS, and when generated in that manner, an editable word document (.doc file) is saved in IRIS. The Review Appraiser is responsible to sign and save the document in a non-editable form.

3RW2 Prepare and Submit ROW Certification

Overview

Submit the ROW Certification affirming that the land rights necessary for the construction of a project have been obtained in adherence to the State and Federal rules and regulations governing acquisition and relocation.

References

- ☐ *ROW Policy & Procedures Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Recorded Deed/Order of Possession	▪ *Perform/Finish Acquiring Property* ▪ *Perform/Finish ROW Relocation*	ROW Technical Specialist or Sr.	Regional ROW Manager
ROW Form 10 (Project Certification Data)	▪ *Perform/Finish ROW Relocation* ▪ *Review ROW Acquisition Process, Verify/Update Schedule and Issue ROW Certification*	Regional ROW Manager (or designee)	
ROW Certification Public Interest Justification Letter	▪ *Review ROW Acquisition Process, Verify/Update Schedule and Issue ROW Certification*	HQ ROW Acquisition Manager (or designee)	Regional ROW Manager (or designee)

Perform/Finish Acquiring Property

The construction of most TDOT projects requires the acquisition of various property rights, in addition to the property already held by the State. These may include:

- Fee ownership
- Permanent usage easements (e.g., slope or drainage)
- Temporary usage easements (e.g., construction)
- Air rights
- Access rights

The regional ROW staff is generally responsible for acquisition of these property rights, although there are times when the ROW Headquarters staff, or a fee consultant leads the acquisition process.

The assigned ROW Technical Specialist makes an offer to acquire necessary property rights from the owner. The offer includes the:

- Itemized written offer (17B)
- ROW Acquisition Exhibits (*see 3RD1* for related information), including:
  - Legal descriptions
  - Tract map
- Appraisal
- Acquisition brochure
- Seller's acknowledgment of sales price (30a)

After the written offer is made, the assigned ROW Technical Specialist negotiates the tract with the landowner. This process includes allowing the landowner time to consider the offer, answering questions that arise about the acquisition/offer and considering any counteroffers.

Successful negotiations conclude with a signed option. Unsuccessful negotiations are transmitted to the Attorney General's office for condemnation proceedings.

- Optioned tracts are closed (deed, releases, etc.)
- Condemned tracts get an order of possession

The Regional ROW Office (typically the responsibility of the Regional ROW Manager) records the fully executed deeds in the Register of Deeds office in the county where the project takes place. Likewise, orders of possession are maintained in the court of appropriate jurisdiction. Copies of the fully executed deeds, closing documents and orders of possession are maintained in the Regional and Headquarters ROW offices, as well as digitally in IRIS.

Related section: *2EN2*

Perform/Finish ROW Relocation

The acquisition of necessary property rights at times results in the displacement of a residence, business, farm, non-profit organization or personal property. The relocation assistance program exists to mitigate impacts of this displacement.

The assigned ROW Agent:

- Conducts preliminary interviews with those being displaced to determine their relocation needs and the benefits for which they are eligible.
- Confirms the Acquisition Stage Relocation Plan (ASRP) has been completed.
- Obtains estimates and conducts market studies to determine specific relocation benefits to be offered.
- Makes a relocation offer and establishes eligibility.
- Obtains possession of the underlying tract, after which the displacee has 90 days to relocate.

The Regional ROW Office verifies that all moves are completed and that the needed properties are vacated. This information is reported on ROW Form 10 (Project Certification Data).

Validated by the assigned ROW Agent, the paperwork resulting from relocation activities is maintained in the Regional ROW Office with digital copies uploaded to IRIS.

Review ROW Acquisition Process, Verify/Update Schedule and Issue ROW Certification

When a project appears in the current letting, the TDOT Headquarters ROW Acquisition Manager (or designee) reviews the project file to verify that all ROW activities are completed, the process has been followed, and the schedule is still valid to issue a ROW certification so that the project can advance to the construction phase.

To do this, the Headquarters ROW Acquisition Manager (or designee):

- Requests ROW Form 10 from the Regional ROW Office for all projects which required the acquisition of property rights.
  - Form 10 provides a project summary of the acquisition and relocation status of all project tracts.
- Reviews the digital files in IRIS (if the Form 10 indicated that ROW acquisition and relocation activities have concluded) to verify that a fully executed and recorded deed, an order of possession or a right of entry are included for each tract.

When all tracts have been verified as acquired, relocations completed or it has been determined that no additional ROW was needed for the project, the Headquarters ROW Acquisition Manager (or designee) certifies that the ROW is available for the project prior to letting. If certification is made without rights to occupy and use of all necessary ROW, the Headquarters ROW Acquisition Manager (or designee) prepares a letter outlining why moving forward with the project is in the best interest of the public (i.e., a public interest justification [PIJ]). The *ROW Policy & Procedures Manual* details further requirements for the certification and PIJ process.

The Headquarters ROW Acquisition/Relocation Manager (or designee) maintains electronic copies of certification documents and projects with ROW acquisition are also stored under that project in IRIS. Additionally, electronic copies are sent to the Program Development and Administrative Division, Regional ROW Manager, Federal Highway Administration, Regional Director of Project Management, and Project Manager.

1ST1 Develop Structures Recommendations

Overview

Investigate proposed bridge and culvert locations and provide structure type and size recommendations to the project team to inform the conceptual layout and Concept Report.

References

- ☐ *Design Procedures for Hydraulic Structures*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *Concept Comment Resolution Form*

Deliverables

Deliverable	Task	Responsible Party Activity Leader
Site Review Comments (including Structural Recommendations)	▪ *Recommend Structure Type*	Assigned Structures Division Staff
Site Review Comments (including Hydraulic Recommendations)	▪ *Provide Hydraulic Recommendations*	State Hydraulic Engineer or Hydraulic Regional Manager (as assigned)
Comments on the Concept Report	▪ *Review Concept Report*	Assigned Structures Division Staff
		State Hydraulic Engineer or Hydraulic Regional Manager (as assigned)

Recommend Structure Type

The Structures Division assists the Engineering Concepts Lead in developing the conceptual layout(s) and draft Concept Report, completing the Concept Comment Resolution Form to review all proposed bridge locations and advise on preferred bridge type and configuration.

The process for providing non-hydraulic structural recommendations is initiated when the assigned Structures Division staff:

- Receives initial project information and a review request from the Engineering Concepts Lead. This information typically includes:
  - A project location map or .kmz file
  - Relevant traffic and safety data
  - Draft project purpose and need or reason for the project
- Reviews the information provided and requests additional information, if needed.

For each identified location, the assigned staff:

- Examines any existing bridge inspection reports.
- Reviews proposed typical section and requirements for traffic control.

- Provides a recommendation for span configuration, bridge length, beam type, and out-to-out width.

Within two weeks of receiving the request, the assigned staff provides comments, including the structural recommendations, using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

Provide Hydraulic Recommendations

A structure is considered a hydraulic crossing if the 50-year (2%) flow is 500 cubic feet per second (cfs) or higher. Culverts with flows below 500 cfs are the responsibility of Roadway Design. The Structural Design Lead handles bridges with no hydraulic crossing or bridges that have a flow below 500 cfs.

The process for providing hydraulic structural recommendations is initiated when the State Hydraulic Engineer or assigned Hydraulic Regional Manager:

- Receives initial project information and a review request from the Engineering Concepts Lead. This information typically includes:
  - A project location map or .kmz file
  - Relevant traffic and safety data
  - Draft project purpose and need or reason for the project
- Reviews the information provided and requests additional information, if needed.

For each identified hydraulic crossing, the State Hydraulic Engineer or assigned Hydraulic Regional Manager uses the Concept Comment Resolution Form and:

- Gathers data on the location from existing information sources, such as:
  - TDOT bridge inspection reports
  - Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS)
  - Tennessee Valley Authority (TVA)
  - Army Corps of Engineers (USACE)
  - United States Coast Guard (USCG)
  - Others, as available
- Initiates basic coordination with USCG or TVA if the waterway is navigable. Due to timelines at these federal agencies, this is often ongoing well into the design phase and generally begins by determining basic requirements.
- Reviews existing bridge reports for long-term issues, such as:
  - Scour
  - Stream migration
- Reviews for offset issues due to TVA or USACE reservoirs and provides offset elevations.

- Provides a recommendation for span configuration and bridge length and any necessary grade changes (see below).

Within two weeks of receiving the request, the assigned staff provides comments, including the hydraulic recommendations, using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete. Additionally, potential hydraulic issues, such as longitudinal encroachments, navigation clearances, structures in potential floodplain, or grade changes, if applicable, are also noted in the response.

Attend Site Visit

A project site visit allows the internal divisions and external stakeholders (as applicable) to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report are drafted. While assigned structures staff provide comments for all projects, structures staff may choose to only attend a site visit for projects where there is a structure of concern or complex structural issues.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the assigned structures staff review the site visit packet to prepare for the site visit. Any discussion from the site visit becomes informative for the recommendations and to advance the design in Stage 1 and beyond.

Review the Concept Report

As requested, and within two weeks of receiving the draft Concept Report, the structural and hydraulics lead (as applicable) provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

1ST2 Complete Existing and No Structure Modeling

Overview

Complete existing and no structure modeling to inform the hydraulic design and grade selection.

References

- ☐ *Design Procedures for Hydraulic Structures*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *TDOT Quality Manual*

Deliverables

None.

Hydraulically Model Existing and No Structure Conditions

In accordance with the *Design Procedures for Hydraulic Structures*, the Hydraulic Lead references the final digital terrain model (DTM) developed by the Survey Lead and advances the following during this initial stage:

- Gather/confirm previously collected data (*see 1ST1* for related information) on the crossings from existing information sources, such as:
  - TDOT bridge inspection reports
  - Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS)
  - Tennessee Valley Authority (TVA)
  - Army Corps of Engineers (USACE)
  - United States Coast Guard (USCG)
  - Others, as available
- Determine flood flows through structure using USGS Stream Stats, USGS stream gage, any previous flood studies by FEMA or others, or more detailed methods.
- Create the existing structure hydraulic model in 1D or 2D modeling software.
- Create the No Bridge hydraulic model in 1D or 2D modeling software.

The assigned Hydraulic Supervisor provides a quality control (QC) review of the models, and once comments are resolved as detailed in the *TDOT Quality Manual*, the Hydraulic Lead uses this for future discussions regarding the hydraulic design and grade selection, updating the Project Manager, Roadway Design Lead and Structural Design Lead as the model is developed.

2ST1 Complete Hydraulic Design

Overview

Choose the preliminary structure types/sizes and provide the project team with an initial assessment on the acceptability of the horizontal and vertical alignment provided in the initial line and grade .dgn (as part of the Line and Grade Package). Choose the most appropriate structure based on in-depth hydraulic modeling and provide final hydraulic design information to the project team and other stakeholders. **Note: proposed structures may change SIGNIFICANTLY from the initial assessment to the final hydraulic design completed in this stage.**

References

- ☐ *Design Procedures for Hydraulic Structures*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Initial Hydraulic Grade Assessment Letter	▪ *Verify Proposed Grade and Estimate Hydraulic Structure Sizes*	Hydraulic Lead	Assigned Hydraulic Supervisor
Draft Hydraulic Layout (aka Sketch (only if bridge))	▪ *Develop Draft Hydraulic Layout*		Assigned Hydraulic Supervisor CADD Technician
Sealed Hydraulic Design File	▪ *Hydraulically Model the Proposed Conditions, Evaluate Proposals and Select Appropriate Structure*		Hydraulic Regional Manager and/or State Hydraulic Engineer
Sealed Hydraulic Layout	▪ *Finalize Hydraulic Layout*		Hydraulic Regional Manager and/or State Hydraulic Engineer CADD Technician
Final Hydraulic Letter	▪ *Finalize Hydraulic Design Information*		Hydraulic Regional Manager and/or State Hydraulic Engineer

Verify Proposed Grade and Estimate Hydraulic Structure Sizes

Any structure with the 2% Annual Exceedance Probability (AEP) flow of 500 cfs or higher requires a detailed hydraulic study by the Hydraulic Design Section. Culverts with flow below 500 cfs are the responsibility of Roadway Design. The Structural Design Lead handles bridges with no hydraulic crossing or bridges that have a flow below 500 cfs. For each project with an identified hydraulic crossing, the Hydraulic Lead:

- Reviews the final Conceptual Layout in the Concept Report, final digital terrain model (DTM) from the Survey Lead, the line and grade .dgn in the Line and Grade Package and any other relevant information received from the project team.
- References the existing structure hydraulic model and No Bridge hydraulic model developed in Stage 1 (*see 1ST2* for related information).
- Initiates/continues coordination with USCG or TVA if waterway is navigable or FEMA and the local community if the project is in a community participating in the National Flood Insurance Program (NFIP) and will need a conditional letter of map revision (CLOMR). Due to timelines at these federal agencies, this is often ongoing throughout the design phase.
- Reviews existing bridge reports for long-term issues, such as:
  - Scour
  - Stream migration
- Reviews for offset issues due to TVA or USACE reservoirs and provides offset elevations.
- Provides a preliminary estimate of span and bridge length and any necessary grade changes needed to accommodate the structure.
- Coordinates the hydraulic details (e.g., preliminary structural elevations) with the Roadway Design Lead as design is further developed in this Stage 2.

The Hydraulic Lead completes the Initial Hydraulic Grade Assessment Letter for review by the assigned Hydraulic Supervisor. Notes on the letter outline any potential hydraulic issues or required outside agency coordination, including:

- Longitudinal encroachments
- Navigation clearances
- Structures in potential FEMA floodplain
- Grade changes

Once complete, the Hydraulic Lead files a copy of the letter in the Hydraulic Design File (sealed later in this stage), which is uploaded to the project folder upon project completion. The Hydraulic Lead sends the letter to the Roadway Design Lead, Structural Design Lead, Project Manager and other relevant project team members via email.

Develop Draft Hydraulic Layout

Prior to finalizing the Initial Hydraulic Grade Assessment Letter and for each identified bridge crossing, the Hydraulic Lead:

- Completes as much of the CADD Request Form as possible by referencing the:
  - Estimated bridge length and span arrangement
  - Final Conceptual Layout in the Concept Report
  - The line and grade .dgn (in coordination with the Roadway Design Lead)
  - Final digital terrain model (DTM) from the Survey Lead

  - Any other relevant information received from the project team
- Submits the form via email to the assigned CADD supervisor responsible for the region.
- Reviews the returned Draft Hydraulic Layout for accuracy.

Once the CADD drawings are returned and reviewed, the drawings are attached to the project's Initial Hydraulic Grade Assessment Letter and sent to the Roadway Design Lead, Structural Design Lead and other relevant project team members.

The Draft Hydraulic Layout is considered a draft at this point and is subject to change until the final/sealed Hydraulic Layout is completed.

Related section: *1RD2*

Hydraulically Model Proposed Conditions, Evaluate Proposals and Select Appropriate Structure

In accordance with the *Design Procedures for Hydraulic Structures*, the Hydraulic Lead references the final digital terrain model (DTM) from the Survey Lead, the line and grade .dgn in the Line and Grade Package from the Roadway Design Lead, and the existing structure hydraulic model and No Bridge hydraulic model developed in Stage 1 (*see 1ST2* for related information), all to advance the following for each hydraulic crossing location:

- Create proposed hydraulic alternatives in 1D or 2D modeling software.
- Calculate ultimate scour for selected structure (N/A for 4-sided box culverts or streams with bedrock channels or bedrock very near the stream bed).
- Design deck drains if the selected structure is a bridge (N/A for all culverts).
- Continue coordination with USCG or TVA if the waterway is navigable or FEMA and the local community if the project is in a community participating in the National Flood Insurance Program (NFIP) and will need a CLOMR.
- Continue coordination with TVA or USACE regarding reservoir and offset requirements.
- Compile Hydraulic Design File consisting of all project correspondence, including:
  - Final Hydraulic Letter and Layout
  - Maps
  - Pictures
  - Summary
  - Analysis of the hydraulic crossings on the project

Finalize Hydraulic Layout

Prior to finalizing the Final Hydraulic Letter and for each identified bridge crossing, the Hydraulic Lead:

- Completes a CADD Request Form using the information from the selected structure, including scour and deck drains to update/replace the Draft Hydraulic Layout with the Hydraulic Layout.
- Submits the form via email to the assigned CADD supervisor responsible for the region.
- Reviews and revises the Hydraulic Layout received from the assigned CADD technician as needed.
- Coordinates the hydraulic details (e.g., preliminary structural elevations) with the Roadway Design Lead as the Functional Design Plans are being developed.

Once the CADD drawings are returned, reviewed and sealed (by the State Hydraulic Engineer or Hydraulic Regional Manager, depending on the level of project complexity), the Hydraulic Lead attaches the Final Hydraulic Layout to the project's Final Hydraulic Letter.

Finalize Hydraulic Design Information

For each project with an identified hydraulic crossing, the Hydraulic Lead provides the Roadway Design Lead, Structural Design Lead and other project team members a structure type with a hydraulic opening sufficient to comply with TDOT policy and applicable federal and state regulations.

To complete this task, the Hydraulic Lead:

- Writes the Final Hydraulic Letter, providing the relevant hydraulic information for the selected hydraulic crossings.
- Submits the letter to the State Hydraulic Engineer for review and signature (if needed).
- Resolves any comments and signs the letter.

Notes on the Final Hydraulic Letter outline any potential hydraulic issues or continued need for outside agency coordination.

The Hydraulic Lead completes the Hydraulic Design File to include the Final Hydraulic Letter and Final Hydraulic Layout, which is reviewed/QC'd and sealed by the State Hydraulic Engineer or Hydraulic Regional Manager (depending on the level of project complexity) and then uploaded to the project folder. The Hydraulic Lead sends a notification of this upload to the Project Manager, Roadway Design Lead, Structural Design Lead and other relevant project team members via email.

While this activity completes the project's hydraulic design, ongoing agency coordination may still be required, including:

- Obtaining a Coast Guard Permit
- Coordinating FEMA issues

- Coordinating offset requirements

The Hydraulic Lead continues to support the project team, including the Roadway Design Lead, Structural Design Lead and other project team members, as necessary, throughout the remainder of Stages 3 and 4.

2ST2 Develop Preliminary Bridge Plans

Overview

Review all projects with proposed non-hydraulics structures/crossings to evaluate clearances of the assumed structures for the proposed geometry. Develop preliminary bridge layout(s) for inclusion with the Functional Design Plans.

References

- ☐ *American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications*
- ☐ *AASHTO Guide Specifications for LRFD Seismic Bridge Design*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *TDOT Structural Design Guidelines*
- ☐ *TDOT Geotechnical Guidelines*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Grade Approval Letter and Draft Bridge Layout	▪ *Review Proposed Grade and Alignment for Non-Hydraulic Crossings*	Structural Design Lead	Lead Geotechnical Engineer/Geologist
Bridge Preliminary Layouts	▪ *Develop Preliminary Bridge Layouts*		
Structures Foundation Request	▪ *Coordinate Geotechnical Analysis for Bridges*		

Review Proposed Grade and Alignment for Non-Hydraulic Crossings

This task includes an evaluation and determination of preliminary structure types/sizes based on the Structural Design Lead's initial review/assessment of the horizontal and vertical alignment provided in the line and grade .dgn (as part of the Line and Grade Package).

For all identified non-hydraulic crossings, the Structural Design Lead:

- Reviews the proposed alignment, profile and typical section in the initial line and grade .dgn.
- Confirms (based on the initial recommendations provided in the Concept Report) and/or determines appropriate structure type and span arrangement for each crossing.
- Calculates vertical and horizontal clearances for each assumed structure, evaluating whether the proposed line and grade are acceptable.

- Develops draft layouts for each crossing if the line and grade are acceptable. These layouts should include basic plan and elevation views of the proposed structures but will not be as detailed as a full Preliminary Bridge Layout(s).
- Coordinates a QC check of the layouts and addresses all comments received as detailed in the *TDOT Quality Manual*.

The Structural Design Lead compiles the results of the review in a letter submitted to the Roadway Design Lead. The letter includes:

- Proposed geometry of the assumed structures, including structure type, span arrangement and skew
- Stationing (e.g., beginning and ending stations of the proposed bridge or the center station of the bridge)
- Results of the clearance check and how much additional clearance is required if the proposed grade is deemed unacceptable

If the Structural Design Lead determines the proposed grade is acceptable, the draft bridge layouts are attached to the letter and distributed to the Project Manager, Roadway Design Lead and other relevant project team members via email.

Related section: *1RD2*

Develop Preliminary Bridge Layouts

The Preliminary Bridge Layouts represent the initial structural design elements that are incorporated into the Functional Design Plans. Throughout this stage, the Structural Design Lead coordinates design development directly with the Roadway Design Lead, Utility Coordinator and Hydraulics Lead (as applicable), with updated preliminary layouts/CADD files linked or provided regularly.

To prepare final preliminary bridge layouts, the Structural Design Lead:

- Reviews the Final Hydraulic Layout or Draft Preliminary Layout to ensure all geometry matches the latest roadway plans and adjusts the proposed structure as necessary.
- Develops a typical cross section using beam type recommendations from the Hydraulics Designer or assumed beam type from the grade approval for non-hydraulic crossings.
- Coordinates the design of deck drains with the Hydraulic Lead for all non-hydraulic structures.
- Updates notes and project information.
- Develops preliminary/conservative bridge (and any known wall) estimates based on square footage and preliminary design assumptions.

- Coordinates a QC review of the layouts and addresses all comments received as detailed in the *TDOT Quality Manual*.
- Submits the preliminary bridge layouts to the Structures Division Team Lead for approval (for consultant-led design).

Once approved, the Structural Design Lead compiles and distributes the final Bridge Preliminary Layouts to the Roadway Design Lead, Project Manager and other project team members, as appropriate, for inclusion with the Functional Design Plans.

Coordinate Geotechnical Analysis for Bridges

It is critical to understand subsurface characteristics for all bridge foundations proposed for a project. Integral to developing the associated foundation reports, the Structural Design Lead, in coordination with the Lead Geotechnical Engineer and the Geotechnical Work Plan (*see 1GT2* for related information), establishes the boring locations via a request letter and MicroStation files of the proposed bridge layouts.

To prepare the *Foundation Data Sheets*, the Structural Design Lead:

- Removes unnecessary details from the Preliminary Bridge Layouts, leaving the plan and elevation views.
- Denotes investigation points at the ends of each substructure and prepares a table of points, which should include Station, Offset and Coordinates for each point.
- Includes notes describing proposed loading and required geotechnical information.
- Defines nearby benchmarks for the surveyors.

The Structures Foundation Request letter and layouts are compiled and submitted to the Lead Geotechnical Engineer/ Geotechnical Engineering Section at TDOT.Geotech@tn.gov. The Structural Design Lead also copies the Regional Survey Office and Survey Lead on the submittal for the purpose of staking the points in the field (*see 2SY1* for related information).

Related section: *2GT2*

3ST1 Complete Structural Design

Overview

Finalize the structural design (walls and bridge plans) for inclusion with the Plan-in-Hand Plans.

References

- ☐ *AASHTO LRFD Bridge Design Specifications*
- ☐ *AASHTO Guide Specifications for LRFD Seismic Bridge Design*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *TDOT Structural Design Guidelines*
- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Draft Wall Plans and Wall Estimate File	▪ *Complete Retaining/Noise Wall Sheets*	Structural Design Lead	Structures Division Team Lead
Draft Bridge Plans and Bridge Estimate File	▪ *Complete Design and Detail Bridge Plans and Estimate*		

Complete Retaining/Noise Wall Sheets

Retaining walls are categorized according to *Roadway Design Guidelines*, Chapter 2, Section 9. Category One walls are deemed to have constructability issues and are completely designed and detailed as part of the final Construction Documents. For Category One retaining walls, the Structural Design Lead:

- Designs the retaining wall, providing regular updates to the project team, in accordance with the *Geotechnical Design Notes and Requirements* shown on the wall preliminary plans, the current edition of *AASHTO Bridge Design Specifications* and *TDOT Structural Design Guidelines*.
- Details or coordinates (for internal-led design) the final wall drawings, which includes Structures Division drawing numbers obtained from the Structures Division Team Lead.
- Coordinates a QC review of the wall plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Submits final plans, quantities and calculations to the Structures Division Team Lead for review.

Category Two walls follow the conceptual layout model where the final design is the responsibility of the contractor. For Category Two walls, the Structural Design Lead reviews the

wall preliminary plans, adjusting the acceptable wall types, aesthetic finishes or other details as needed.

Noise walls follow a similar path as Category One retaining walls, being completely designed and fully detailed for the final Construction Documents. For noise walls, the Structural Design Lead:

- Designs the wall, providing regular updates to the project team, in accordance with the current edition of *AASHTO Bridge Design Specifications* and *TDOT Structural Design Guidelines*. This could include confirming aesthetic requirements of the noise wall with the Noise Lead.
- Details or coordinates (for internal-led design) the final wall drawings, which includes Structures Division drawing numbers obtained from the Structures Division Team Lead.
- Coordinates a QC review of the wall plans and resolves comments as detailed in the *TDOT Quality Manual*.
- Submits final plans, quantities and calculations to Structures Division Team Lead for review.

Once approved, the Structural Design Lead compiles all wall drawings into a final set with 'R' series sheet numbers as detailed in *Roadway Design Guidelines*, Chapter 2, Section 9. The Structural Design Lead submits the plans to the Roadway Design Lead and other project team members, as appropriate, for inclusion with the Plan-in-Hand Plans prior to the Plan-in-Hand Field Review (*see 3RD1* for related information).

Complete Design and Detail Bridge Plans and Estimate

For the bridge plans, the Structural Design Lead:

- Designs the bridge, providing regular updates to the project team, in accordance with the current edition of *AASHTO Bridge Design Specifications, AASHTO Guide Specifications for Seismic Design of Bridges* and *TDOT Structural Design Guidelines.*
- Compiles design calculation notebook in .pdf format.
- Prepares or coordinates (for internal-led design) the structures special provisions and detailed bridge plans in accordance with TDOT structures detailing standards.
- Coordinates a QC review of the plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Submits calculation notebook and plans sheets to Structures Division Team Lead for review.
- Prepares quantity cost estimate in the standard TDOT Excel format.

Once approved, the Structural Design Lead compiles and distributes the structure plans to the Roadway Design Lead and other project team members, as appropriate, for inclusion with the Plan-in-Hand Plans prior to the Plan-in-Hand Field Review (*see 3RD1* for related information).

4ST1 Finalize Structural Plans

Overview

Compile the final Structural Design Documents (walls and bridge plans), specifications and estimate with any other required documentation to assist the Roadway Design Lead (as applicable for the project type) in compiling the Construction Documents needed to advertise and let the project. For structure-led projects, the Structural Design Lead finalizes the Construction Documents for turn-in following the process described in in this section and 4RD1.

References

- ☐ *AASHTO LRFD Bridge Design Specifications*
- ☐ *AASHTO Guide Specifications for LRFD Seismic Bridge Design*
- ☐ *Tennessee Structures Memoranda* (offline)
- ☐ *TDOT Structural Design Guidelines*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Final Wall Plans and Estimate File	▪ *Finalize Retaining/Noise Wall Plans*	Structural Design Lead	Structures Division Team Lead
Final Bridge Plans and Estimate File	▪ *Finalize Bridge Plans*		

Finalize Retaining/Noise Wall Plans

To prepare retaining wall and noise wall plans for the PS&E Review Meeting, the Structural Design Lead:

- Reviews comments from the Plan-in-Hand Field Review and addresses necessary design revisions and plan updates.
- Coordinates a QC review of the plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Prepares the plans for the PS&E Review Meeting, submitting these plans to the Roadway Design Lead for inclusion with the other design plans for review.
- Attends the PS&E Review Meeting.
- Resolves last comments from the meeting.

Once reviewed and comments are resolved, the Structural Design Lead then:

- Submits final plans and specifications to the Structures Division Team Lead for final review.

- Once reviewed and comments are resolved, seals the final Category One retaining wall plans and noise wall plans in accordance with TDOT standard procedures.
- Updates the wall cost estimate file using the standard TDOT Excel spreadsheet.
- Coordinates with the project team (specifically the Roadway Design Lead and Project Manager) on any changes that may impact other design elements.

Once complete, the Structures Division Team Lead or Structural Design Lead uploads the Wall Construction Plans Set and Estimate/Documents to the project folder and sends a notification of the plans turn-in to the Project Manager, Roadway Design Lead and other identified discipline leads (as applicable for the project type) using the appropriate distribution list.

Finalize Bridge Plans

To prepare bridge plans for the PS&E Review Meeting, the Structural Design Lead:

- Reviews comments from the Plan-in-Hand Field Review and addresses necessary design revisions and plans updates.
- Coordinates a QC review of the plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Prepares the plans for the PS&E Review Meeting, submitting these plans to the Roadway Design Lead for inclusion with the other design plans for review (as applicable for the project type).
- Attends the PS&E Review Meeting.
- Resolves last comments from the meeting.

Once reviewed and comments are resolved, the Structural Design Lead then:

- Submits final plans and specifications to the Structures Division Team Lead for final review.
- Once reviewed and comments are resolved, seals the final bridge plans in accordance with TDOT standard procedures.
- Updates the bridge cost estimate file using the standard TDOT Excel spreadsheet.
- Coordinates with the project team (specifically the Roadway Design Lead and Project Manager) on any changes that may impact other design elements.

Once complete, the Structures Division Team Lead or Structural Design Lead uploads the Bridge Construction Plans Set and Estimate/Documents to the project folder and sends a notification of the plans turn-in to the Project Manager, Roadway Design Lead and other identified discipline leads (as applicable for the project type) using the appropriate distribution list.

1SY1 Conduct Design-Level Survey

Overview

Provide survey data that covers the project limits, as requested by the Roadway Design Lead or other technical leads to aid in the development of the Line and Grade Package and Functional Design Plans.

References

- ☐ *TDOT Survey Standards Manual*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party Activity Leader
Mapping product, including the topographical survey and digital terrain model (DTM)	▪ *Prepare the Ground Control for Aerial Survey* ▪ *Complete the Aerial Survey*	Aerial Geodetics Lead
Project Control Document (Word)	▪ *Prepare the Ground Control for Aerial Survey* ▪ *Set Control Ground Survey*	TDOT Geodetics (Regional Survey Office only)
Microstation drawing (DGN), Geopak file (GPK), Terrain Model (TIN), ROW Acquisition Table (Excel)	▪ *Conduct Survey Public Involvement and Ground Survey*	Survey Lead
ORD File Types: Microstation drawing (DGN) and associated survey data files		
Property packet (tax cards, deeds, property owner contact letters), roadway plans, One-Call tickets	▪ *Conduct Survey Public Involvement and Ground Survey*	Survey Lead (Consultant only)

Prepare the Ground Control for Aerial Survey

It is critical to establish pre-flight targets and horizontal and vertical control for an accurate aerial survey of a proposed corridor, whether flown by a fixed-wing aircraft or unmanned aerial vehicle.

To do this, the Aerial Geodetics Lead develops an aerial target layout that is provided to the Regional Survey Manager and Aerial Photographer. Once received, the Regional Survey Lead (or Consultant):

- Places aerial targets in accordance with the *TDOT Standards Survey Manual* and conducts GPS occupations.

- If static occupation is used, post-processes static data in accordance with the *TDOT Survey Standards Manual* to compute coordinates, tying horizontally to the Tennessee GNSS Reference Network (CORS) and vertically to North American Vertical Datum of 1988 (NAVD 88) and utilizes the appropriate Geoid model.
- Submits coordinate data and any other requested information to Aerial Survey Manager by placing the data on the Aerial Survey Server.

Complete the Aerial Survey

Once control is set and layout established, the Aerial Photographer completes the aerial mission (either via fixed-wing aircraft or unmanned aerial vehicle) to take aerial photographic images of the project corridor.

In accordance with the *TDOT Survey Standards Manual*, the Aerial Photographer:

- Creates a Flight and Ground Control Survey Plan that shows the proposed flight lines for the project with specific flying heights, forward overlap and side overlap that optimally facilitates aero triangulation to ensure horizontal and vertical mapping accuracies are achieved.
- Obtains/verifies ground control survey.
- Upon notification of completion of the panels, coordinates with the Aeronautics Division to fly the project.
- Completes aero triangulation using the ground surveyed panel coordinates to establish accurate exterior orientation parameters for each photograph.
- After the project has been flown, post-processes both the aerial photography and the GNSS-IMU data that was collected during the flight.

Once the aerial photography is obtained and all data post-processed, the Project Manager either uses in-house TDOT staff or a consultant to complete the mapping product, which includes the topographical survey and digital terrain model (DTM). The planimetric mapping and ground elevation data are also compiled alongside the mapping.

The Aerial Photographer or consultant submits the product to the TDOT Photogrammetrist for a quality control (QC) review as detailed in the *TDOT Quality Manual*. The Aerial Photographer or consultant resolves any comments, and then submits the final products to the Regional Survey Lead via file share link (depending on file size) for incorporation into the project's survey files. Filenames are formatted in accordance with the *TDOT Survey Standards Manual*. The mapping product may also be referenced in the state mapping database.

Set Control Ground Survey

To establish project control along the project corridor to provide horizontal and vertical positioning for ground survey, the TDOT Survey Lead (TDOT Regional Survey Office only):

- Places semi-permanent monuments in accordance with the *TDOT Survey Standards Manual* and conducts "to-reach" and referencing calculations, static GPS occupations, distance checks and leveling.
- Post-processes static data in accordance with the *TDOT Survey Standards Manual* to compute coordinates, tying horizontally to the Tennessee GNSS Reference Network (CORS) and vertically to North American Vertical Datum of 1988 (NAVD 88), and computes the Datum Adjustment (DA) factor and determines the appropriate Geoid model to utilize.
- Produces Project Control Document containing project information, location map and data sheets.

The Survey Lead files the Project Control Document on the local server and, if needed, the Regional Survey Manager distributes it to the consultant survey team during scoping of ground survey.

Conduct Survey Public Involvement and Ground Survey

To inform the Line and Grade Package (namely the line and grade .dgn) and other discipline's efforts in Stage 2, the Survey Lead (either from the Regional Survey Office or a consultant) conducts an initial ground survey in accordance with the *TDOT Survey Standards Manual*. This work typically includes:

- A survey preliminary centerline
  - Established preliminary centerlines may be sent to the Roadway Design Lead for review before finalizing survey files. Conversely, the Roadway Design Lead may establish the alignment and centerline using the preliminary survey files.
  - This is coordinated through the Regional Survey Manager.
- Existing right-of-way and/or adjacent properties
  - Property owner contact letters are sent out at least one week prior to entering private property.
  - Property owner contact letter templates can be found on the TDOT website under Roadway Design Documents.
- Existing topography, including the location of underground and/or above-ground utilities
- Profiles of survey centerlines
- Drainage information
- Digital Terrain Model (DTM)
- Subsurface Utility Engineering (SUE) data
- Other survey data, including:

- Environmental features identified in the Environmental Boundaries Reports and other requested survey data for the permit assessment plans/sketches (*see 2EN3* and *2RD1* for related information), such as wetland locations, stream and ephemeral crossings, ordinary high-water mark (OHWM) or top of bank. Coordinate with the NEPA Lead and Environmental Permit Lead on related requests.
- If the survey is to be delivered in Open Roads Design (ORD), provide the Microstation .dgn and associated survey data.

The Survey Lead submits survey files to the Regional Survey Manager for a QC review via email or file-sharing website, utilizing the quality processes detailed in the *TDOT Quality Manual*. The Survey Lead resolves any comments, and the Regional Survey Manager then submits or approves submittal of the survey files to the Roadway Design Lead via email or file share link (depending on file size). Filenames are formatted in accordance with the *TDOT Survey Standards Manual*.

If the survey is completed by a consultant, the Survey Lead also submits a property packet used to establish the existing right-of-way, One-Call tickets for utility location, and any other pertinent information via email or file sharing website to the Regional Survey Manager for the project file.

If the project requires additional survey, survey updates or alignment updates at any Stage in the process, the Roadway Design Lead or other technical lead submits a detailed request to the Regional Survey Manager or Consultant Project Lead.

Related section: *1RD2*

Incorporate SUE Request into Survey

Accurate SUE data often minimizes utility conflicts and avoids unnecessary costs and delays when advancing design and relocating utilities.

As part of the initial project survey efforts, the Survey Lead (either from the Regional Survey Office or a consultant) may incorporate SUE information to aid in early utility depiction as follows:

- Information obtained by surveying and then plotting visible above-ground features (SUE Quality Level C) and by using engineering judgment to correlate/validate the information gathered from a SUE Quality Level D review.
  - This effort may be completed in Stage 1 to provide a general understanding of utility locations and inform early design development for the Roadway Design Lead and Utility Coordinator (among other team members as needed).

- The Survey Lead contacts Tennessee One Call to obtain utility markings to be located and incorporated into the ground survey. If a utility company does not mark the utility, the Survey Lead contacts that utility to obtain GIS mapping of the utility.
- Data from this survey is typically incorporated into the existing topography deliverable for the stage.

As part of the survey files, the Survey Lead submits the information to the Regional Survey Manager for a QC review via email or file-sharing website, utilizing the quality processes detailed in the *TDOT Quality Manual*. The Survey Lead resolves any comments and submits the data and files to the Roadway Design Lead and Utility Coordinator via email or file share link (depending on file size). Filenames are formatted in accordance with the *TDOT Survey Standards Manual*.

2SY1 Complete SUE and Requested Staking

Overview

Complete requested subsurface utility engineering (SUE) and staking for proposed sounding holes and right-of-way to support the respective technical discipline's work.

References

- ☐ *TDOT Survey Standards Manual*
- ☐ *TDOT OpenRoads Designer*
- ☐ *TDOT Roadway Design Guidelines*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Supplemental DGN and Geopak Input File or Update to the Master Survey Files	▪ *Incorporate SUE Level A and B Request into Survey*	Survey Lead	
ORD File Types: Microstation drawing (DGN) and associated survey data files			
Pothole Data Sheets from SUE Level A Survey	▪ *Incorporate SUE Level A and B Request into Survey*		
Updated Layout Sheet with Ground Elevations (as provided) **or** Station Offset, Northern Easting, ground elevations	▪ *Stake Sounding Holes*		Structural Design Lead, Lead Geotechnical Engineer, or Roadway Design Lead
Notification for Completing ROW Staking	▪ *Stake ROW*		Region ROW Staff

Incorporate SUE Level A and B Request into Survey

Accurate subsurface utility engineering (SUE) data often minimizes utility conflicts and avoids unnecessary costs and delays when advancing design and relocating utilities. The Roadway Design Lead, Utility Coordinator, Project Manager or other team members (as needed) may identify SUE Level B and Level A needs to aid in utility deconfliction and design plan development (*see 2UT1* and *2RD1* for related information).

While the request is project-specific and survey scope may vary per project, the Survey Lead may complete two more in-depth quality level surveys for utility depiction (as coordinated with the project team and scheduled strategically based on when information is needed):

- SUE Quality Level B: Information obtained via surface geophysical methods (marking its horizontal position on the ground) determines the presence and designates the approximate horizontal position of subsurface utility.

- This effort is best completed when gathering initial survey data or after the line and grade .dgn has identified specific areas of impact, likely early in Stage 2 as the other disciplines are developing their respective design.
- Data from this survey is included in a supplemental MicroStation .dgn file and Geopak file or update to the Master Survey Files.

- SUE Quality Level A: Obtaining precise horizontal and vertical location of a utility by physical exposure/potholing and subsequent measurement of the subsurface utility, usually at a specific point.
  - This effort is best completed/coordinated among the Roadway Design Lead, Structural Design Lead and/or Utility Coordinator to strategically identify utility conflicts of concern during Stage 2 (when developing the Functional Design Plans) but can also advance early in Stage 3 (right after the Functional Design Plan Field Review).
  - Data from this survey is included in a supplemental MicroStation .dgn file and Geopak file or update to the Master Survey Files.
  - Specific pothole location data is presented on individual data sheets that typically include type, size and depth to utility.

The Survey Lead submits the information to the Regional Survey Manager for a QC review via email or file-sharing website, utilizing the quality processes detailed in the *TDOT Quality Manual*. The Survey Lead resolves any comments and submits the data and files to the Project Manager, Roadway Design Lead and Utility Coordinator via email or file share link (depending on file size). Filenames are formatted in accordance with the *TDOT Survey Standards Manual*.

Related sections: 2GT2, 2UT1, 2RD1

Stake Sounding Holes

Integral to developing the associated foundation reports, the Survey Lead provides staking of locations identified by the Structural Design Lead or Lead Geotechnical Engineer/Geologist on the proposed Layout Sheet. Completed in accordance with the *TDOT Survey Standards Manual,* the Survey Lead references the Layout Sheet's desired drilling site and sets the field markings to complete the following staking (including general staking parameters listed as follows):

- Proposed bridge foundations with existing elevations along key points along the abutment and pier(s)\bent(s). The typical boring layout would include one to three borings per substructure.
- Retaining wall locations at one boring per 50 to 100 feet of retaining wall length.
- Noise wall locations at one boring for each proposed noise wall post.
- High-mast lighting locations.
- The entire alignment.

Once complete, the Survey Lead updates the Layout Sheet to include assigned ground elevations, which is maintained in the project file. The Survey Lead also notifies the HQ Geotechnical Manager and the requestor that the staking is complete.

Related sections: *2GT2, 2RD1, 2ST2*

Stake ROW

As typically requested by a Region's Right-of-Way (ROW) Office after funding is approved and title reports are completed, the Survey Lead stakes the proposed right-of-way for use by the appraisers and buyers to field-locate parcel impacts, each prioritized and scheduled as determined during the ROW Strategy Meetings (*see 2PM3* for related information).

The Survey Lead completes the field staking and marks the stakes with a description, station and offset designations in accordance with the *TDOT Survey Standards Manual*.

Once complete, the Survey Lead emails the Regional ROW Manager and ROW Appraiser 4 that the ROW staking is complete.

Related sections: *3RW1, 2PM3*

1TD1 Initiate Traffic and Safety Analyses

Overview

Review existing traffic operational conditions (related to safety and operations) in and around the project area. Develop initial recommendations to meet traffic operational needs related to signal, lighting, and intelligent transportation systems (ITS).

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT ITS Project Development Guidelines*
- ☐ *Statewide and Regional ITS Architectures*
- ☐ *Manual on Uniform Traffic Control Devices (MUTCD)*
- ☐ *TDOT Traffic Design Manual*
- ☐ *Federal Highway Administration (FHWA) Lighting Handbook*
- ☐ *FHWA Standard Highway Signs*
- ☐ *FHWA 2012 Supplement to the 2004 Standard Highway Signs*
- ☐ *Tennessee Supplement to the Standard Highway Signs Book*
- ☐ *American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
- ☐ *TDOT Standard Traffic Operations Drawings*
- ☐ *ITS and Fiber Deployment Plan (in development)*
- ☐ *Highway System Access Manual*
- ☐ *TSMO/Traffic Operations Program Plan* (Future Policy Statement)
- ☐ *Future AASHTO Transportation Operations Manual*
- ☐ *Project Scoping Guide*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Crash Summary Report (and Crash Diagrams)	▪ *Conduct Initial Safety Analysis*	Region Traffic Designer	
Alignment/Operations Review	▪ *Alignment & Operations Review*	Region Traffic Designer (coordinator)	Cross-discipline team as listed below
Site Review Comments using the Concept Comment Resolution Form			
ITS Project Identification Form			ITS Design Engineer
Concept Comment Review Form	▪ *Review the Concept Report*	Assigned Traffic Design Staff	

Conduct Initial Safety Analysis

When requested by the Engineering Concepts Lead, the Region Traffic Designer collects and evaluates (using AASHTOWARE software) the existing crash and safety data for the project location. The AASHTOWARE output provides a Crash Summary Report that includes types of:

- Crashes,
- Injuries or fatalities, and
- Roadway or user characteristics that may have contributed to the crashes.

A Crash Summary Report is generated for all projects, with an additional crash diagram(s) created for any intersection that has notable safety concerns (based on safety-specific heat maps) or is operationally significant (e.g., for high-volume intersections). The Workzone and Safety Office and Region Traffic Designer (or as requested by the project team) determine which intersection(s) to study.

The Region Traffic Designer uploads the Crash Summary Report (including any associated crash diagrams) to the project folder for use by Engineering Concepts to develop and refine the proposed concepts for the Kickoff Meeting/site visit. The associated crash analysis summary table (i.e., the “yellow” sheet), which calculates the project’s safety results against the statewide ratio and crash rates, is also available upon request.

Conduct Intersection and Interchange Evaluation (IIE)

Although not needed for every project, an Intersection and Interchange Evaluation (IIE) helps determine conceptual operational options for a project. To complete the evaluation, the Traffic Design Engineer:

- Uses the TDOT IIE Screening Tool in conjunction with Federal Highway Administration (FHWA) Capacity Analysis for Planning of Junctions (CAP-X) Tool for a Stage 1 Scoping as noted in the *Highway System Access Manual (HSAM).*
- Discusses the results with the project team on or before the Kickoff Meeting/site visit.
- Advances the alternatives to the Stage 2 Selection Form, which summarizes the intersection/interchange options that could proceed forward for additional analysis under *1TD2*.

The Traffic Design Engineer uploads the summary form to the project file for use by Engineering Concepts to develop and refine the proposed concepts in advance of the Kickoff Meeting/site visit. The team should discuss options with TDOT Leadership when alternatives involve complex intersection/interchange design.

Alignment & Operations Review

The Alignment and Operations Review encourages an early assessment of a project's operational needs by both Headquarter and Regional Traffic Design teams. This assessment addresses how potential traffic design and operational elements are accounted for in the project's overall scope and estimate.

When requested by the Engineering Concepts Lead, the Region Traffic Designer organizes a cross-discipline review of the conceptual layout from Regional Traffic Design, HQ Traffic Design, Region Traffic Operations, and the IT Division. Additionally, input is sought from local maintaining agency and "first responder" stakeholders as the project may require. Using the Concept Comment Resolution Form and within two weeks of the initial request from Engineering Concepts, the review focuses on several areas:

- Consideration for existing operational elements (i.e., Traffic Signals, Lighting, Communications, and Traffic Management Center Operations)
- Review of potential planned operational elements
- Traffic and Safety review (i.e., Traffic Ops, pavement marking and signage, clear zone, incident management, target speed, and other)
- Software development
- Local agency coordination considerations
- Assessment of maintenance of traffic activities to reduce the need for design revisions later (a pre-traffic management plan [TMP] process). This assessment is foundational for the development of the TMP under *3TD1*.

ITS, signals, and lighting systems are typically installed within TDOT-owned rights-of-way and may require a warrant for inclusion in the project. Prior to preparing any warrants, the assigned

Lighting, Signal and/or ITS Engineer(s) conduct an evaluation of the existing systems and needs. The evaluation includes site investigation and an inventory of existing:

- Signal equipment and systems
- Lighting equipment and systems
- ITS equipment and systems

The assigned Traffic Design staff then:

- Compiles a list of all affected signal, lighting, and ITS systems, which includes:
  - Any new systems being constructed by the project or any system being integrated into the existing systems.
  - Identification of party/agency responsible for the existing signal and lighting maintenance along the corridor.
- Evaluates the need for signal, lighting, and ITS infrastructure within the project footprint.
- Completes the ITS Project Identification Form.
- Completes a preliminary cost estimate.

The assigned Traffic Design staff compiles a list of any relocated, upgraded, or new items being proposed for the project. The list is used to scope the number of traffic operation systems to be considered as further refined under *1TD2*. The assigned Traffic Design staff upload the list to the project file for inclusion with the Line and Grade package and related estimate.

Attend Site Visit

A project site visit allows the internal divisions and external stakeholders to discuss the proposed improvement, challenges, and requests to consider as the conceptual design is drafted. The assigned Traffic Design staff provides comments for all projects with a focus on:

- Existing signal, lighting, and ITS infrastructure-related elements of concern
- Proposed need for signal, lighting, and ITS infrastructure in the footprint
- Anticipated complexity for maintenance of traffic activities
- Potential for new or cutting-edge technologies or approaches to traffic management, including ramp metering, hard shoulder running, managed lanes, or transit priority

When receiving a request from the Engineering Concepts Lead or Project Manager (which includes the date of the site visit and a packet of information), the assigned staff reviews the site visit packet to prepare for the site visit. Any discussion from the site visit becomes informative for the recommendations that advance design in Stage 1 and beyond.

Review the Concept Report

If requested by Engineering Concepts, the assigned Traffic Design staff reviews the draft or final Concept Report to:

- Validate the traffic information and details in the Concept Report analysis for the base year (5 year) and design year (20 year) traffic projections.
- Confirm that the Traffic Design scope items and estimate have been accounted for.

Within two weeks of receiving the request, the reviewer(s) provides comments using the Concept Comment Resolution Form, returning a completed form to the Engineering Concept Lead via email or by uploading the form to the project folder.

Develop RSA Generated Projects

Upon the signed approval of the Road Safety Audit (RSA) that does not require design work, the Project Safety Office creates a No Plans Packet for advancement to construction letting, following the *Road Safety Audit (RSA) Manual*. The Project Safety Office requests that project team members from environmental, utility, and railroad review the No Plans Document to provide necessary clearances and certification. Once complete, the Project Safety Office distributes the document to the TDOT Construction Division for advertisement in the determined letting month.

Upon the signed approval of the Road Safety Audit (RSA) or when completing a Spot Safety Application that does require design work, the Project Safety Office develops a project team that includes region design leads, region traffic operations, and construction and maintenance staff. The Project Safety Office then develops the Safety Report that includes:

- Related safety and operational deliverables similar to what is described in this 1TD1
- Draft conceptual layouts similar to what is described in *1EC1*

Once the report is complete, the Project Safety Office files the report for future inclusion in the 3-year plan. Once assigned to a Project Manager, the project then follows the typical PDN preconstruction process starting with Stage 1 project management activities (e.g., setting of the kickoff meeting).

1TD2 Conduct Traffic Analysis, Warrants, and Significance Determination

Overview

Complete the project's traffic analysis, evaluate potential signal and lighting warrants, complete the necessary safety report, scope ITS relocation and/or expansion needs, and determine work zone significance to inform the subsequent Transportation Management Plan (TMP).

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT ITS Project Development Guidelines*
- ☐ *Statewide and Regional ITS Architectures*
- ☐ *TDOT Traffic Design Manual*
- ☐ *Federal Highway Administration (FHWA) Lighting Handbook*
- ☐ *TDOT Lighting Manual*
- ☐ *TDOT Standard Traffic Operations Drawings*
- ☐ *ITS and Fiber Deployment Plan (in development)*
- ☐ *Highway System Access Manual*
- ☐ *Highway Capacity Manual*
- ☐ *Work Zone/Temporary Traffic Control*
- ☐ *Work Zone Significance Determination Form*
- ☐ *Project Scoping Guide*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Traffic and Safety Analysis Report (including the Safety Alternative Report)	▪ *Complete the Traffic Operations Analysis*	Traffic Design Engineer	Roadway Design Lead
Work Zone Significance Determination	▪ *Determine Work Zone Significance*	Roadway Design Engineer	Traffic Design Engineer
SSEAF or SEAR	▪ *Complete Systems Engineering Analysis*	ITS Team Lead	ITS Design Engineer

Complete the Traffic Operations Analysis

The traffic operations analysis defines the measures of effectiveness (MOEs) for a project. As coordinated with the project team early in Stage 1, this step supports design development and

informs the environmental document's purpose and need related to congestion, connectivity, safety, or mobility.

Using the concept(s) from Engineering Concepts and vetted/refined through project team input during the Kickoff Meeting/site visit (to arrive at one to two concepts only), the Traffic Design Engineer evaluates (and models) the project area to develop recommendations for lane geometries, storage lengths, and certain design configurations and criteria (e.g., design speed and posted speed) for the line and grade .dgn in the Line and Grade Package (*see 1RD2* for related information).

To prepare the traffic analysis, the Traffic Design Engineer:

- Determines the level of project complexity.
- Verifies the limits of the analysis and intersections for inclusion to match those included in the traffic forecast.
- Includes the following scenarios in the analysis:
  - Base year no-build (based on existing conditions)
  - Future year no-build (based on existing conditions, without the proposed project but with any other fiscally constrained project(s) in place)
  - Future year build for the alignment in question
- Completes the analysis in accordance with the level of project complexity.
- Recommends innovative operational strategies to address system reliability improvements (beyond the traditional level of service when applicable).

The first step in the process confirms the base year and future year no-build scenarios, considering:

- These may be developed and submitted separately from the build analysis, if determined appropriate by the project team.
- Preliminary review of the no-build analysis may be helpful in validating the purpose and need for the environmental document.
- Preliminary review and approval can also be beneficial for complex projects where the build scenario expands on the no-build analysis and helps reduce re-analysis by identifying issues earlier in the process.

The next step evaluates the build analysis, considering:

- The analysis determines the recommended design layout and provides the required lane configuration and storage lengths.
- The environmental document's purpose and need
- The IAR purpose (if required)
- IIE Stage 2 results for documentation purposes

The design recommendations are provided to the Roadway Design Lead/Roadway Engineer for incorporation into the roadway plans (e.g., the Line and Grade package). If elements of the recommended design cannot be accommodated due to project constraints or limitations, then the Roadway Design Lead and the Traffic Operations Engineer coordinate to determine how the design can be revised and still meet the project goals. At the end of the process, a comparison of the traffic analysis and design analysis occurs to confirm each match. The last step in this task involves a review that could result in the recommendation of strategies aimed at addressing system reliability.

The Traffic Design Engineer finalizes the Traffic and Safety Analysis Report (including the Safety Alternative Evaluation Report), uploading the report to the project file and informing the Project Manager and Roadway Design Lead when complete.

Complete the Traffic Safety Evaluation

Building from the initial safety analysis in 1TD1, the Traffic Design Engineer advances a more detailed traffic safety evaluation based on the Highway Safety Manual for any project that alters traffic operations in the build condition compared to existing. This evaluation supports development of the design and where an environmental document's purpose and need includes safety-related needs.

Using the concept(s) developed by Engineering Concepts and vetted/refined through team input during the Kickoff Meeting/site visit (to arrive at one to two concepts only), the Traffic Design Engineer applies AASHTOWARE-specific crash modification factors when evaluating different safety alternatives. These factors generate recommendations for crash reduction and safety improvements documented through the Safety Alternative Evaluation Report.

The Safety Alternative Evaluation Report can act as a standalone report, but is often incorporated into the Traffic and Safety Analysis Report used to inform the Line and Grade Package and the environmental document. Once complete, the Traffic Safety Engineer either uploads the Safety Alternative Evaluation Report or the combined Traffic and Safety Analysis Report to the project file, informing the Roadway Design Lead, NEPA Lead, and Project Manager when complete.

Analyze Signal Warrants

Earlier identification of signal warrants helps determine infrastructure impacts and costs associated with adding a signal(s) to the scope of the project. If needed, the Signal Design

Engineer completes the traffic signal warrant following the current MUTCD and TDOT *Traffic Design Manual*. This work includes:

- Reviewing conceptual layout
- Collecting and analyzing traffic (and bike/ped) data
- Analyzing crash history
- Analyzing MUTCD signal warrants
- Preparing a layout sketch
- Performing a quality control review of the engineering study and signal warrant
- Preparing the final engineering study and warrant analysis

The Signal Design Engineer submits a final engineering study to the Signal Design Manager for approval. Once approved, the Signal Design Engineer uploads the documents to the project file.

Analyze Lighting Warrants

Lighting warrants help determine infrastructure impacts and costs associated with adding lighting to the scope of the project. The Lighting Design Engineer completes a lighting warrant following the current AASHTO *Roadway Lighting Design Guide,* FHWA *Lighting Handbook, and* TDO*T Lighting Manual*. This includes:

- Reviewing the conceptual layout
- Analyzing the current traffic data, including bicyclist and pedestrian data if available
- Analyzing crash history
- Preparing a layout sketch
- Performing a quality control review of the engineering study and lighting warrant
- Preparing the final engineering study and warrant analysis

The Lighting Design Engineer submits the final engineering study to the Lighting Design Manager for approval. Once approved, the Lighting Design Engineer uploads the documents to the project file.

Prepare Signals, Lighting, and ITS Scope and Estimate

Understanding the initial scope and estimate for the noted elements early, including ITS equipment, helps the project team plan for the costs and input needed to implement the applicable traffic design elements for the corridor. To prepare these items, the assigned Traffic Design Engineer:

- Reviews the conceptual layout(s).
- Coordinates with regional efforts and other statewide efforts, such as the ITS deployment plan, statewide safety plans, statewide fiber build-out plan, freight plan, etc. for

opportunities to add traffic design elements to support advancing these collaborative efforts.
- Coordinates with Regional TMC Managers and the IT Division to establish equipment needs and integration into the ITS system.
- Reviews the project area for existing ITS equipment and related components (e.g., conduit, pull boxes, vaults, electrical service, and communication).
- Prepares a scope and estimate for proposed equipment and related components.

The assigned Traffic Design Engineer provides the scope and estimate to the Project Manager for inclusion in the Line and Grade Package and estimate. The assigned Traffic Design Engineer uploads the documents to the project file when complete.

Complete Systems Engineering Analysis

Based on the level of project risk (low or high risk related to ITS implementation), the ITS Team Lead confirms that either a Simplified Systems Engineering Analysis Form (SSEAF) for low-risk ITS projects or a Systems Engineering Analysis Report (SEAR) for high-risk ITS projects is needed. The steps for ensuring ITS compliance and the process to complete either the report or form are detailed in Section 4 of the *TDOT ITS Project Development Guidelines*.

Determine Work Zone Significance

The work zone significance determination is completed as the project footprint (developed via the Line and Grade Package) is established to manage work zone impacts and help determine mitigation strategies to consider for the Transportation Management Plan (TMP).

The preparer (typically a Roadway Design Engineer) completes the Work Zone Significance Determination Form to classify all operations (highway construction projects, utility projects, maintenance work, right-of-way use permits, etc.) as significant, non-significant, or exempt. The resulting classification (along with needed details to be developed under later stages) is as follows:

- Significant Project
  - The TMP includes temporary traffic control (TTC) plans, transportation operations (TO) strategies, and public information (PI) strategies.
  - Coordination with TDOT's Community Relations Division is required.
  - The type of project includes opportunities to mitigate incidents (e.g., using smart work zones with queue warnings, emergency service provider coordination or emergency pullouts).
- Non-Significant Project

- The TMP includes TTC plans, but non-significant projects may not always include TO and PI strategies, depending on project-specific circumstances.
- Coordination with TDOT's Community Relations Division is required.

▪ Exempt project
- Does not require a formal TMP document, but all projects must comply with *MUTCD* and TDOT Standard Drawings with respect to the TTC plans.

The assigned Traffic Design Engineer provides support/oversight for the Roadway Design Engineer when determining significance and through the development of the TMP and TTC plans (*see 2TD1* and *3TD1* for related information).

Related section: *1RD2*

2TD1 Prepare ITS, Signals, and Lighting Sheets

Overview

Initiate preliminary design for all signal, lighting, and ITS sheets for the Functional Design Plans, ensuring early and ongoing coordination of the project's signal, lighting, and ITS scope and equipment locations with the Utility Coordinator, Structural Design Lead, and Roadway Design Lead to mitigate potential impacts. Coordinate with the ITS Team Lead and Roadway Design Lead in meeting all design requirements and when developing the ITS sheets.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT ITS Project Development Guidelines*
- ☐ *Statewide and Regional ITS Architectures*
- ☐ *TDOT Traffic Design Manual*
- ☐ *Federal Highway Administration (FHWA) Lighting Handbook*
- ☐ *TDOT Lighting Manual*
- ☐ *TDOT Standard Traffic Operations Drawings*
- ☐ *ITS and Fiber Deployment Plan (in development)*
- ☐ *Highway System Access Manual*
- ☐ *Highway Capacity Manual*
- ☐ *Manual on Uniform Traffic Control Devices (MUTCD)*
- ☐ *Traffic Operation Memorandums, TOM 2202*
- ☐ *FHWA Standard Highway Signs*
- ☐ *FHWA Supplement to the Standard Highway Signs*
- ☐ *Tennessee Supplement to the Standard Highway Signs Book*
- ☐ *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
- ☐ *Work Zone Safety and Mobility Manual*
- ☐ *TDOT Quality Manual*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
ITS Sheets	▪ *Prepare ITS Sheets*	ITS Design Engineer	ITS Team Lead
Signal Sheets	▪ *Prepare Signal Sheets*	Signal Design Engineer	Signal Team Lead
Lighting Sheets	▪ *Prepare Lighting Sheets*	Lighting Design Engineer	Lighting Team Lead

Prepare ITS Sheets

Based on the initial scope and estimate for ITS equipment identified during Stage 1, the ITS Design Engineer creates a preliminary ITS design and submits sheets for review in accordance

with the TDOT *Traffic Design Manual*. The goal is for the ITS Design Engineer to advance the ITS design to help the team set the overall project footprint and define all ITS-related impacts to the right-of-way. The ITS Design Engineer coordinates the design with the Roadway Design Lead throughout this stage, with updated ITS sheets/CADD files linked or provided regularly.

To do this, the ITS Design Engineer:

- Reviews the line and grade .dgn in the Line and Grade Package provided by the Roadway Design Lead.
- Prepares an ITS layout with ITS communication type; device, pole, and structural support locations; and power connection locations.
- Develops the preliminary ITS sheets and quantities in accordance with *TDOT Traffic Design Manual.*
- Coordinates with the Utility Coordinator to mitigate issues related to power and overhead/underground conflicts during construction.
- Coordinates with the Regional Traffic Ops (TMC) and IT section for ITS integration.
- Coordinates a quality control (QC) review of the design/sheets following the Roadway Design Checklist and *TDOT Quality Manual*.

Once the sheets have been reviewed, the ITS Design Engineer submits the ITS sheets and CADD files to the Roadway Design Lead for inclusion with the Functional Design Plans.

Related section: *2RD1*

Prepare Signal Sheets

If a signal is warranted or if the existing signal equipment conflicts with construction, the Signal Design Engineer creates a preliminary signal design and submits sheets for review in accordance with the TDOT *Traffic Design Manual*. The goal is for the Signal Design Engineer to advance the signal design to help set the overall project footprint and define all signal-related impacts to the right-of-way. The Signal Design Engineer coordinates the design with the Roadway Design Lead throughout this stage, with updated signal sheets and CADD files linked or provided regularly.

To do this, the Signal Design Engineer:

- Reviews the line and grade .dgn in the Line and Grade Package provided by the Roadway Design Lead.
- Prepares a signal layout with:
  - Pole locations and strain poles (station/offset/coordinates provided)
  - Power connection locations
  - Controller cabinet

  - Signal heads
  - Pull boxes and conduit
- Develops the preliminary signal sheets and quantities in accordance with *TDOT Traffic Design Manual* or Local Agency specifications/preferences.
- Coordinates with the Utility Coordinator to mitigate issues related to power and overhead/underground conflicts during construction.
- Verifies if there are signal maintenance agreements.
- Coordinates a QC review of the signal design/sheets following the Roadway Design Checklist and *TDOT Quality Manual*.

Once the sheets have been reviewed, the Signal Design Engineer submits the signal sheets and CADD files to the Roadway Design Lead for inclusion with the Functional Design Plans.

Related section: *2RD1*

Prepare Lighting Sheets

If lighting is warranted or if the existing lighting equipment conflicts with construction, the Lighting Design Engineer creates a preliminary lighting design and submits lighting sheets for review in accordance with the *TDOT Traffic Design Manual*. The goal is for the Lighting Design Engineer to advance the lighting design to help set the overall project footprint and define all lighting-related impacts to the right-of-way. The Lighting Design Engineer coordinates the design directly with the Roadway Design Lead throughout this stage, with updated lighting sheets and CADD files linked or provided regularly.

To do this, the Lighting Design Engineer:

- Reviews the line and grade .dgn in the Line and Grade Package provided by the Roadway Design Lead.
- Prepares a photometric layout replicated in MicroStation.
- Prepares a lighting layout with pole locations and identifies power connection locations.
- Determines underpass lighting.
- Develops the preliminary lighting sheets and quantities in accordance with *TDOT Traffic Design Manual.*
- Coordinates with the Utility Coordinator to mitigate issues related to power and overhead/underground conflicts during construction.
- Verifies any lighting maintenance agreement.
- Coordinates a QC review of the lighting design and lighting sheets following the Roadway Design Checklist and *TDOT Quality Manual*.

Once the sheets have been reviewed, the Lighting Design Engineer submits the lighting sheets and CADD files to the Roadway Design Lead for inclusion with the Functional Design Plans.

Related section: *2RD1*

Oversee Development of the Conceptual Traffic Control Strategies

To determine the conservative extents of potential work zone impact management strategies, the assigned Roadway Design Engineer, with support/oversight from the Regional Traffic Design Engineer, prepares conceptual strategies or Temporary Traffic Control (TTC) concept plans in accordance with the *Work Zone Safety and Mobility Manual.*

This information helps identify/define potential extents that will increase or modify the project footprint and/or the need for additional right-of-way to accommodate temporary construction easements, probable locations of haul roads, staging ingress and egress, and other construction operational impacts. This detail is foundational for the TTC plans and TMP (*see 2RD1* and *3TD1* for related information).

3TD1 Complete Signal, Lighting, and ITS Device Design

Overview

Complete all signal, lighting and ITS design work for the Plan-in-Hand Plans, ensuring early and ongoing coordination of the project's signal, lighting, and ITS scope and equipment locations with the Utility Coordinator, Structural Design Lead, and Roadway Design Lead to mitigate potential impacts.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT ITS Project Development Guidelines*
- ☐ *Statewide and Regional ITS Architectures*
- ☐ *TDOT Traffic Design Manual*
- ☐ *Federal Highway Administration (FHWA) Lighting Handbook*
- ☐ *TDOT Lighting Manual*
- ☐ *TDOT Standard Traffic Operations Drawings*
- ☐ *ITS and Fiber Deployment Plan (in development)*
- ☐ *Highway System Access Manual*
- ☐ *Highway Capacity Manual*
- ☐ *Manual on Uniform Traffic Control Devices (MUTCD)*
- ☐ *Traffic Operation Memorandums, TOM 2202*
- ☐ *FHWA Standard Highway Signs*
- ☐ *FHWA Supplement to the Standard Highway Signs*
- ☐ *Tennessee Supplement to the Standard Highway Signs Book*
- ☐ *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
- ☐ *Work Zone Safety and Mobility Manual*
- ☐ *TDOT Quality Manual*
- ☐ *Special Provision 725 (SP 725)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Signal Design Plans	▪ *Complete Signal Design*	Signal Design Engineer	
Lighting Design Plans	▪ *Complete Lighting Design*	Lighting Design Engineer	
ITS Design Plans	▪ *Complete ITS Design*	ITS Design Engineer	
Draft SP 725			
Final TMP (and TTC Plans)	▪ *Review the TMP for Compliance*	Roadway Design Engineer	Traffic Design Engineer Traffic Operations Engineer

Complete Signal Design

Based on the signals infrastructure for the project, the Signal Design Engineer advances the signal design to include:

- Finalized signal design plans and detail sheets
- Finalized Geotechnical Report for signal foundations (optional and *see 2GT2* for related information)
- Compiled signal communications plans and details (as applicable)
- Signal timing plans as coordinated with the Local Agency (as applicable), including development of the Special Provision 730 (SP 730)
- Compiled signal quantities

Prior to the Plan-in-Hand Field Review, the Signal Design Engineer coordinates a QC review of the design, signal sheets, and signal quantities as detailed in the *TDOT Quality Manual*. Additionally, although the intent is to complete the design by the end of Stage 3, at any point in this stage, the Signal Design Engineer may be asked to produce his/her current design for the ROW Acquisition Exhibits or the Utility Coordination Plans.

Once the plans have been reviewed, the Signal Design Engineer confirms with the Utility Coordinator and Roadway Design Lead that there are no impacts prior to submitting the plans and CADD files to the Roadway Design Lead for inclusion with the Plan-in-Hand Plans.

Complete Lighting Design

Based on the lighting infrastructure for the project, the Lighting Design Engineer advances the lighting design to include:

- Finalized lighting design plans and detail sheets
- Completed lighting circuit sheets
- Finalized Geotechnical Report for lighting foundations (optional and *see 2GT2* for related information)
- Completed voltage drop calculations based on the system operating voltage and loads
- Compiled lighting quantities

Prior to the Plan-in-Hand Field Review, the Lighting Design Engineer coordinates a QC review of the design, sheets, voltage calculations and quantities as detailed in the *TDOT Quality Manual*. Additionally, although the intent is to complete the design by the end of Stage 3, at any point in this stage, the Lighting Design Engineer may be asked to produce his/her current design for the ROW Acquisition Exhibits or the Utility Coordination Plans.

Once the plans have been reviewed, the Lighting Design Engineer submits the plans and CADD files to the Roadway Design Lead for inclusion with the Plan-in-Hand Plans.

Complete ITS Device Design

Based on the ITS infrastructure for the project, the ITS Design Engineer advances the ITS design and sheets to include a:

- Finalized ITS design plans and detail sheets
- ITS scope of work
- General notes
- Finalized ITS communication network design, power service details, and voltage calculations
- Finalized Geotechnical Report for ITS foundations (optional and *see 2GT2* for related information)
- Compiled ITS quantities
- ITS typicals (Standard Drawings)
- Special Provision 725 (SP 725)
- Traffic control (as applicable)

Prior to the Plan-in-Hand Field Review, the ITS Design Engineer coordinates a QC review of the design, sheets, and quantities and validates the design with the Systems Engineering Analysis Report (SEAR) or Simplified Systems Engineering Form (SSEAF). Additionally, although the intent is to complete the design by the end of Stage 3, at any point in this stage, the ITS Design Engineer may be asked to produce his/her current design for the ROW Acquisition Exhibits or the Utility Coordination Plans.

Once the plans have been reviewed, the ITS Design Engineer submits the plans and CADD files to the Roadway Design Lead for inclusion with the Plan-in-Hand Plans.

Review the TMP for Compliance

For both significant and non-significant projects, the Roadway Design Engineer, in coordination with the Traffic Design Engineer, finalizes the Transportation Management Plan (TMP) in accordance with the *Work Zone Safety and Mobility Manual.* The final TMP and related TTC plans memorialize the relevant project information regarding the:

- Project background
- Anticipated challenges
- Engineering judgment used in developing the work zone impact management strategies

Whether developed by a consultant or TDOT Roadway Design Engineer, various staff (including the Regional Traffic Design Engineer, State Work Zone Engineer, State Traffic Engineer, and Regional Communications Representative) review the TMP to ensure compliance with the *Work Zone Safety and Mobility Manual* and *TDOT Standard Drawings*. Once confirmed, each reviewer signs the TMP cover page, and the Roadway Design Engineer uploads a completed TMP (and associated TTC plans) to the project file (*see 3RD1* for related information).

4TD1 Finalize Signal, Lighting, and ITS Plans

Overview

Compile the sealed signal, lighting, and ITS design documents and estimate with any other required documentation to assist the Roadway Design Lead in compiling the Construction Documents needed to advertise and let the project.

References

- ☐ *TDOT Roadway Design Guidelines*
- ☐ *TDOT ITS Project Development Guidelines*
- ☐ *TDOT Traffic Design Manual*
- ☐ *Federal Highway Administration (FHWA) Lighting Handbook*
- ☐ *TDOT Lighting Manual*
- ☐ *TDOT Standard Traffic Operations Drawings*
- ☐ *Highway Capacity Manual*
- ☐ *Manual on Uniform Traffic Control Devices (MUTCD)*
- ☐ *Traffic Operation Memorandums, TOM 2202*
- ☐ *FHWA Standard Highway Signs*
- ☐ *FHWA Supplement to the Standard Highway Signs*
- ☐ *Tennessee Supplement to the Standard Highway Signs Book*
- ☐ *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
- ☐ *Work Zone Safety and Mobility Manual*
- ☐ *TDOT Quality Manual*
- ☐ *Special Provision 725 (SP 725)*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Signal Construction Plans Lighting Construction Plans ITS Construction Plans	▪ *Finalize Signals, Lighting, and ITS Design Documents*	Respective Design Engineer	Signal Design Manager, Lighting Design Manager
Final ITS Special Provisions	▪ *Finalize ITS Special Provision*	ITS Design Engineer	Construction Engineer, ITS Team Lead

Finalize Signals, Lighting, and ITS Design Documents

To prepare the final signal, lighting, and ITS design documents, the respective Design Engineer:

- Reviews comments from the Plan-in-Hand Field Review and addresses necessary design revisions and plan updates.

- Coordinates a QC of the plans and resolves comments received as detailed in the *TDOT Quality Manual*.
- Prepares the plans for the PS&E Review Meeting, submitting these plans to the Roadway Design Lead for inclusion with the other design plans for review.
- Attends the PS&E Review Meeting.
- Resolves last comments from the meeting.
- Submits the final plans and quantities to the applicable Design Manager for final review.
- Responds to review comments.

Once reviewed and comments are resolved, the respective Design Engineer then:

- Assembles the final Signal, Lighting and ITS Package for letting.
- Submits sealed plans (as allowed in accordance with TDOT standard procedures for signing and sealing plans) and CADD files to the Roadway Design Lead for inclusion with the Construction Documents.

Finalize ITS Special Provisions

As part of finalizing the Construction Documents, the ITS Design Engineer:

- Coordinates with the Traffic Operations Engineer in Stage 3 to finalize the project's ITS special provisions drafted in Stage 3, assembling the final ITS special provisions for letting.
- Conducts a QC review on the ITS Package, including the special provisions.
- Submits the special provisions to the Roadway Design Lead for inclusion with the Construction Documents.

1UT1 Complete Concept-Level Utility Review

Overview

Complete high-level, utility review to inform the conceptual layout and initial estimate.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Concept Comment Resolution Form*

Deliverables

Deliverable	Task	Responsible Activity Leader
Initial Utility Identification List	▪ *Review Project Area for Potential Utilities*	Utility Office Designee
Concept Report Comments	▪ *Review the Concept Report*	

Review Project Area for Potential Utilities

This task focuses on whether there is utility involvement on the project. If the project has utility involvement, the Utility Office receives notification from the Engineering Concepts Lead or Project Manager.

The Utility Office Designee:

- Reviews the project location map (or .kmz), draft purpose and need or reason for the project, and all relevant information available to identify known utilities.
- Fills out the number of utilities and any additional information related to any utility that could be impacted by the project.

Within two weeks of receiving the request, the Utility Office Designee provides a list of potentially impacted utilities or completes the Concept Comment Resolution Form with this same information, uploading to the project folder and notifying the Engineering Concepts Lead via email when complete.

Attend Site Visit

A project site visit allows the project team and external stakeholders (as applicable) to discuss the proposed improvement, challenges, and requests to consider as the conceptual layout and Concept Report are drafted. While the Utility Office Designee provides comments for all projects where a utility may be impacted, the Designee only attends a site visit for projects if potential project impacts are better discussed in person or involve specifically complex utility impacts.

When receiving notification from the Engineering Concepts Lead or Project Manager (which includes the date of the visit and a packet of information), the Utility Office Designee reviews the site visit packet to prepare for the site visit. Any discussion or findings from the site visit may potentially adjust the conceptual layout and/or establish the scope of the utility coordination tasks to kick off early in Stage.

Review the Concept Report

As requested, and within two weeks of receiving the draft Concept Report, the Utility Office Designee provides review comments using the Concept Comment Resolution Form, uploading a completed form(s) to the project folder and notifying the Engineering Concepts Lead via email when complete.

1UT2 Begin Utility Coordination

Overview

Contact the utility owners in a project's vicinity to confirm all are aware of one another's plans, which reduces late-stage changes that can negatively impact the schedule and add unexpected costs.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Buy America Presentation*
- ☐ *TDOT Guidebook for Utility Relocation*
- ☐ *TDOT Rules & Regulations Accommodating Utilities*
- ☐ *Other Utilities Resources*

Deliverables

Deliverable	Task	Responsible Party[a]
		Activity Leader
List of all utilities on project	▪ *Make Initial Utility Contact*	HQ Technical Coordinator 1
Coordination Kickoff Meeting Agenda	▪ *Conduct Utility Coordination Kickoff Meeting*	Senior Technical Specialist
Coordination Kickoff Meeting Minutes		
Utility Estimate	▪ *Prepare Utility Estimate*	

[a] Unless noted, all references to the Senior Technical Specialist may be completed by a Consultant. This title is referenced as the Utility Coordinator in the other sections of the PDN.

Make Initial Utility Contact

TCA 54-5-853 requires TDOT to notify all owners of utilities facilities that may occupy the rights-of-way affected by a project. To complete this task, the Headquarters Technical Coordinator 1 or designee (TDOT staff only):

- Sends notice of a project to all utilities in the project area and that the utility has 60 days to respond (include the Senior Technical Specialist and Project Manager when this notification).
- If there is no response within 60 days, sends a second 10-day notice to the utilities.

If the utility fails to respond to either notice, TDOT may presume the non-responsive utilities are not owners on the project, and TDOT and its contractor may proceed without liability to the utility owner for damages to the owner's facilities.

At the end of the 10-day notice, the Headquarters Technical Coordinator 1 compiles a list of the utilities that responded and sends it to the Roadway Design Lead. The Senior Technical

Specialist files this list in the project folder, notifying the project team that it is available for reference. The Roadway Design Lead uses this list, with the project's survey data, to create the utility table that identifies all utilities and related owners potentially impacted by the project. This list also identifies the utility owners by which to send the Utility Coordination Plans.

Related section: *1RD2*

Conduct Utility Coordination Kickoff Meeting

The purpose of this kickoff meeting is to facilitate early discussion and exchange of information for potential utility impacts with existing facilities and proposed plans for future facilities in the project area. Other projects may be discussed in this meeting or as a follow-up meeting immediately following, if possible and appropriate.

To lead the meeting, the Senior Technical Specialist invites the Project Manager, Roadway Design Lead, other relevant project team members (depending on the scope of the work) and all potentially impacted utility owners, preparing an agenda to cover the following topics:

- Describes the scope and location of the project.
- Details the general project schedule and expected project duration.
- Discusses the coordination/communication plan for working with the utility owners, including expectations of how and when the Utility Coordination Plans (*see 3UT1* for related information) are provided to each owner and the general expectations for utility relocation review and relocation scheduling (all consistent with State law and TDOT policy).
- Discusses rights/costs determination, documentation, and Chapter 86 eligibility.
- Discusses potential design options (at least generally) that may avoid conflicts.
- Requests that the utility owner (as applicable):
  - Provide a description of the type, size, and function of all facilities in the project area
  - Provide related as-builts, records, or plans for the utility owner's existing facilities
  - Identify critical facilities that have restrictions on service interruption for relocation or that may be difficult to relocate, noting difficulty in acquiring property for the relocation, difficulty in coordinating outages with customers, or difficulty in construction
  - Identify facilities with a high relocation cost
  - Provide a description of factors that may affect the project schedule, such as lengthy design times, the need to establish a construction budget, long-lead times when ordering materials, or long times between construction of the new facilities and abandonment of the old facilities
  - Provide protect-in-place or construction/removal/relocation buffer requirements or restrictions
- Discusses the expected impact of each of the utility facilities on the project and the impact of the project on the utility facilities.

This meeting may also involve a site visit to verify and correlate information provided by the utilities and to search for previously unknown utilities.

After the meeting, the Senior Technical Specialist prepares and distributes meeting minutes of all decisions, important discussions, and requests for information. The meeting minutes are sent to all utility owners in attendance and other invitees and filed in the project folder. It is at this time that the Region office can request early notification from Headquarters, with reference to the project location map and project description to kickoff this process.

Prepare a Utility Estimate

The Senior Technical Specialist or TDOT designee (TDOT staff only) is responsible for creating the utility estimates for their respective regions. These estimates are incorporated into the Form 44 for use by the project team, notably for the Line and Grade estimate.

To develop an accurate estimate in accordance with the *Utility Manual*, the Senior Technical Specialist or TDOT designee:

- Reviews the project's conceptual layout, draft technical report (e.g., the draft Concept Report), and/or the Line and Grade plans to determine which existing utilities could be in conflict.
- Compares projected relocations with past relocations costs to determine likely costs for each utility.
- Completes and coordinates review of the estimate from Statewide Technical Specialist under the Utilities Estimating Division (determining preliminary utility costs).
- Notifies the project manager and assigned ROW Lead that the utility estimate is complete.

2UT1 Initiate Utility Pre-Acquisition Activities

Overview

Provide updated estimates, coordinate subsurface utility exploration (SUE) needs, and advance third-party coordination efforts from previous stages.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Buy America Presentation*
- ☐ *TDOT Guidebook for Utility Relocation*
- ☐ *TDOT Rules & Regulations Accommodating Utilities*
- ☐ *Other Utilities Resources*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
ROW Form 44	▪ *Confirm Utility Estimate*	Regional Utility Coordinator, Statewide Technical Specialist	ROW Lead
Utility Impact/Conflict Matrix	▪ *Develop a Utility Impact/Conflict Matrix*	Senior Technical Specialist	Roadway Design Engineer

[a] Unless noted, all references to the Senior Technical Specialist may be completed by a Consultant. This title is referenced as the Utility Coordinator in the other sections of the PDN.

Coordinate/Request Needed SUE

Accurate SUE data often minimizes utility conflicts and avoids unnecessary costs and delays when advancing design and relocating utilities. As part of the initial project survey tasks, the Senior Technical Specialist, Project Manager, and Roadway Design Lead (and other team members if needed) strategize needed SUE quality level request(s) to aid in early utility depiction.

During Stage 1, the project team considers the value of:

- SUE Quality Level C: Information obtained by surveying and then plotting visible above-ground features and by using engineering judgment to correlate/validate the information gathered from a level D review.
  - This effort may be completed in Stage 1 to provide a general understanding of utility locations and inform early design development.
  - Data from this survey is typically incorporated into the existing topography deliverable for the stage.

Based on what is received from the Survey Lead, the Senior Technical Specialist and Roadway Design Lead use the data/information submitted as part of the survey files to inform the utility coordination efforts, ensuing deconfliction meetings, and respective roadway plans and Utility Coordination Plans.

Early in Stage 2 and referencing the Line and Grade Package, the project team coordinates with the Survey Lead on the potential to complete more in-depth quality level surveys for utility depiction (scheduled strategically based on when information is needed):

- SUE Quality Level B: Information obtained via surface geophysical methods (marking its horizontal position on the ground) determines the presence and designates the approximate horizontal position of subsurface utility.
  - This effort is best completed after the Line and Grade Package has identified specific areas of impact, likely early in Stage 2 as the other disciplines are developing their respective design.
- SUE Quality Level A: Obtaining precise horizontal and vertical location of a utility by physical exposure/potholing and subsequent measurement of the subsurface utility, usually at a specific point.
  - This effort is best completed/coordinated to strategically identify utility conflicts of concern either during Stage 2 (when developing the Functional Design Plans) or early in Stage 3 (after the Functional Design Plans Field Review).
  - Specific pothole location data is presented on individual data sheets that typically includes type, size, and depth to utility.

Based on what is received from the Survey Lead, the Senior Technical Specialist and Roadway Design Lead use the data/information submitted as part of the survey files to inform the utility coordination efforts, ensuing deconfliction meetings, and respective roadway plans and Utility Coordination Plans (*see 2RD1* and *2SY1* for related information on the SUE request and work completion process).

Confirm Utility Estimate

The Senior Technical Specialist or TDOT designee (TDOT staff only) is responsible for creating and confirming the utility estimates for their respective regions. These estimates are incorporated into the Form 44 for use by the Programming Division and project team for the Functional Design Plans.

To develop an accurate estimate, the Senior Technical Specialist or TDOT designee, in accordance with the *Utility Manual*:

- Reviews project features (earthwork, structures, etc.) and Functional Design Plans as coordinated with the Roadway Design Lead and compares/confirms with existing utilities to verify which utilities are likely to be in conflict and relocated.
- Compares projected relocations with past relocation costs to determine likely costs for each utility.
- Completes the estimate (determining utility costs) and submits to Region Utility Team Lead (or designee) for review and signature.

The Region Utility Team Lead (or designee) submits the signed estimate to the Statewide Technical Specialist for approval. Once approved, the Statewide Technical Specialist notifies the HQ ROW Technical Coordinator and the respective Region office that the utility estimate has been completed.

Related section: *2RW1*

Develop a Utility Impact/Conflict Matrix

Based on the complexity of the project and potential utility impacts, the Roadway Design Lead, in collaboration with the Senior Technical Specialist, develops a project-specific Utility Impact/Conflict Matrix for internal coordination and external reference. This matrix minimally documents:

- Utility name and contact information
- Location of a potential conflict based on the current version of the roadway plans
  - Note: The matrix is a living/working document that the Roadway Design Lead updates as the design advances in coordination with the Senior Technical Specialist
- Type of aboveground and underground utility and infrastructure in conflict (hydrant, manhole, conduit, stormwater/sewer, etc.)
- Proposed disposition (protect in place, relocate, adjust to grade, remove, abandon, etc.)
- Additional actions needed

Located in the project folder, the project team uses this list to:

- Identify all utilities and related owners on the project
- Further understand and eliminate known conflicts
- Proactively direct relocation strategies

Review SUE Data and Attend Internal Design Deconfliction Meetings

As needed, deconfliction discussions among the project team are critical to proactively address known conflicts as the project team advances the Functional Design Plans. These meetings (either as one-off meetings through Stage 2 or as part of a regular project team meeting)

reference the available SUE data (as received from the Survey Lead), the current Utility Impact/Conflict Matrix, and all relevant information received from the utility owners (*see 2RD1* and *2SY1* for related information).

Prior to the meetings, the Senior Technical Specialist:

- Coordinates agenda items with the Project Manager and Roadway Design Lead.
- Reviews any related information and/or list of conflicts to be discussed during the meeting.
- Attends the meeting.
- Supports/reviews the distribution of meeting minutes that document all decisions, important discussions, action items, and schedule.

3UT1 Perform Utility Coordination

Overview

Develop and execute a plan to address how each utility on a project is addressed (avoided, relocated, protected-in-place, etc.) so construction may move forward without any delays/issues.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Buy America Presentation*
- ☐ *TDOT Guidebook for Utility Relocation*
- ☐ *TDOT Rules & Regulations Accommodating Utilities*
- ☐ *Other Utilities Resources*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Utility Coordination Plans	▪ *Distribute Utility Coordination Plans*	Senior Technical Specialist	
Utility Owner Deconfliction Meeting Agenda	▪ *Lead 60-Day Deconfliction Meeting*		
Utility Owner Deconfliction Kickoff Meeting Minutes			
Consultant Authorization Letter	▪ *Approve Engineering Packages*		Headquarters Utilities
Executed Relocation Contract	▪ *Complete 120-day Utility Review and Process Relocation Contract Requests*		Headquarters Utilities; ROW Contracting Division
Utility Relocation Plans (aka Rainbow Plans)	▪ *Submit Rainbows to Environmental*		NEPA Lead
Put to Work (PTW) Letter	▪ *Put Utilities to Work*		Headquarters Utilities
U1s and possible U2s, U3s, etc.	▪ *Submit Construction Drawings to Design*		

[a] Unless noted, all references to the Senior Technical Specialist may be completed by a Consultant. This title is referenced as the Utility Coordinator in the other sections of the PDN.

Distribute Utility Coordination Plans

TDOT is required, by law, to send a complete set of Utility Coordination Plans to all known utility owners, allowing each utility owner at least 120 days to respond with:

- A set of relocations plans
- Schedule of calendar days to relocate
- Estimate of costs

For projects where the utility coordination tasks (namely this 3UT1) are on the critical or near critical path, the Roadway Design Lead may develop a separate set of Utility Coordination Plans during Stage 2 well before completing and submitting the Functional Design Plans. If an early plan set is not needed, the Utility Coordination Plans are to be based on the Functional Design Plans, which should be submitted to the utility owner as soon as possible after the updated Functional Design Plans have been submitted as the last task under 2RD1.

Upon receiving a .pdf or .dgn of the Utility Coordination Plans from the Roadway Design Lead (*see 2RD1* for related information), the Senior Technical Specialist:

- Reviews the plans, providing comments to the Roadway Design Lead of any changes prior to sending to the utility owner.
- Coordinates with the Roadway Design Lead and Regional Environmental Technical Office (ETO) staff (Permits) to integrate plan set callouts and markups of certain environmental features (such as wetlands and streams) for a utility owner to avoid with its utility relocation (*see 2EN3* and *2EN4* for related information).
- Sends the identified utility owner a complete set of plans.
- Uploads the approved plans to IRIS.

The submittal of this information begins a series of tasks to engage the utility owner on plan advancement and to solicit utility design comments.

Conduct Utility Plan Review Kickoff Meeting

Approximately one month after the utility owner/designated representative has been sent plans, the Transportation Project Specialist Senior sets a kickoff meeting to inform the utility owners of the various items they need to be aware of.

The agenda for this meeting may include:

- Discuss scope of the project
- Outline what is expected from the utility owners in terms of:
  - Relocation plans (aka rainbows plans)
  - Relocation cost estimate
  - Schedule of calendar days
  - Additional documents required if utility needs a consultant engineer
    - Any established MOUs
    - Certification of consultant
    - Scope of work
    - Estimate of cost
- Discuss Chapter 86 reimbursement and contract types

- Discuss deadlines for the A date (120-day deadline to submit relocation plans, estimate and schedule) and B date for submittal of construction plans, quantities and specifications
  - Note: The B date is included if the work is in the state contract
  - This date is usually six months prior to the letting
- Encourage utility owners to collaborate with one another

The Transportation Project Specialist Senior prepares and distributes meeting minutes of all decisions, important discussions and related information. The meeting minutes are sent to all utility owners in attendance and filed in the project folder for reference by the project team.

Approve Engineering Packages

When a utility owner does not have in-house staff to perform the engineering to accommodate a project's utility requests, the owner may request the use of a consultant. As part of the consultant review and approval process, the Senior Technical Specialist or designee (TDOT staff only):

- Reviews the applicable consultant documents, including:
  - Any established MOUs
  - Certification of consultant
  - Proposed scope of work
  - Estimate of costs
- Issues a consultant authorization letter to the utility owner, allowing them to proceed with hiring a consultant.

Once the Senior Technical Specialist sends the consultant authorization letter, the Senior Technical Specialist files the information in IRIS.

Complete 120-day Utility Review and Process Relocation Contract Requests

To reimburse utility owners or include their work into the state contract, TDOT and the utility owner must enter into a utility relocation contract prior to starting any work. This package is due within 120 days of the Utility Owner receiving the Utility Coordination Plans.

At some point in this 120-day timeframe, TDOT organizes a utility review/deconfliction meeting for TDOT and the utility owners to provide a high-level/initial review of the Utility Coordination Plans. The Transportation Project Specialist Senior sets this utility meeting anywhere between 60 to 90 days after initial submittal of the Utility Coordination Plans. The Transportation Project Specialist Senior also invites the Project Manager, Roadway Design Lead, associated Roadway Design Engineers, and Structural Design Lead/Engineer (as appropriate) to this meeting.

The agenda for this meeting may include:

- Review of the roll plot for all utility owners to review at the same time.
- Discussion of all proposed utility locations.
- Discussion of environmental commitments or potential environmental areas (e.g., streams and wetlands) **not** to be used for utility relocations (*see 2EN3* and *2EN4* for related information).

The Senior Technical Specialist (TDOT staff only) confirms/reviews that the following information has been received and completed by the deadline:

- A-date package from the Utility Owner, including:
  - Utility Relocation Plans, aka Rainbow Plans
  - Schedule of calendar days
  - Estimate of relocation cost

Once confirmed/processed, the Senior Technical Specialist (TDOT staff only) forwards the A-date package to the ROW Contracting Section for contract generation, which involves:

- Generating and sending the relocation contract to the utility owner.
- Receiving a contract signed by the utility owner and circulating for execution by the Commissioner.
- Sending the utility owner a letter (electronically and via certified mail) with the fully executed contract to authorize the owner to proceed with their relocation.

Once the contract is fully executed, the ROW Contracting Section "puts the utility to work".

Note: See the task "Put Utilities to Work" below prior to executing a contract.

Submit Rainbows to Environmental

When TDOT is performing the utility relocation (via a "move in state" contract), the Senior Technical Specialist or designee (TDOT staff only) continues the utilities permitting efforts by:

- Reviewing Utility Relocation Plans, aka Rainbow Plans
- Forwarding to the NEPA Lead and Environmental Permit Lead, who will continue the permit application process to obtain the necessary permits
  - The Senior Technical Specialist coordinates potential environmental reevaluations (for a utility relocation that alters impacts to environmental resources as described in the Environmental Document), additional environmental technical studies or changes needed to the permit sketches with the Roadway Design Lead and NEPA Lead as soon as possible in Stage 3 (*see 2RD1*, *2EN1*, *2EN2,* and *2EN3* for related information).
  - The Environmental Permit Lead (assigned staff from the TDOT Permit Section or as assigned to the Regional ETO staff) references the Utility Relocation Plans/Rainbow Plan to determine if a permit action is needed and to confirm that there are no

conflicts with compensatory mitigation of streams and wetlands (*see 2EN3, 2EN4,* and *3EN2* for related information).

Put Utilities to Work

Once TDOT and the utility owner agree on a plan of action, whether the relocation is covered under a relocation contract, or if the utility is moving on its own at their own cost, TDOT puts the owner to work to officially start their schedule.

To do this (and unless a relocation contract is required), the Senior Technical Specialist or TDOT designee (TDOT staff only):

- Gathers all approved documents (Relocation Plans/rainbows, schedule, etc.) to include as an attachment to the "Put to Work Letter."
- Sends the utility owner a signed letter (electronically and via certified mail) authorizing them to commence its relocation.
  - Note: Headquarters will send the Put to Work Letter for utilities with contracts.

Once the letter is issued, the District Construction Office helps with follow-up coordination to ensure that the relocations are progressing according to the plan.

Submit Construction Drawings to Design

Every project requires a set of U1 construction drawings that are incorporated into the final Construction Documents (*see 4RD1* for related information). These drawings show where utilities are present that are not included in the state contract, and where the utility owner intends to relocate its utility.

Typically based on the Utility Owners' B-date packages (submitted six months prior to letting), the Senior Technical Specialist or TDOT designee (TDOT staff only):

- Generates the U1 drawings that compile all relocations not done by the contractor in one set of drawings.
- Gathers all utility relocation plans for each utility, including the owner's work in the state contract.
  - This is initiated with U2 sheets for the first utility, U3 sheets for the second, and so on.
- Compiles all drawings together into a .pdf portfolio.
- Sends the compiled drawings to the Roadway Design Lead for incorporation into the Plan-in-Hand Plans (initially) and then final Construction Documents.

Note: If the project schedule requires submittal of the Plan-in-Hand Plans six months or more prior to letting, the Senior Technical Specialist may only be able to provide the Rainbow Plans

(and not the U sheets) for the plan submittal, which will not represent the most complete utility design for the Plan-in-Hand Plans. The U sheets will then be provided as part of Stage 4.

3UT2 Prepare and Submit Utility Certification

Overview

Verify required coordination steps have been completed and secure/finalize the utility certification for letting.

References

- ☐ *TDOT Utility Manual* (Utility Procedures Manual)
- ☐ *Buy America Presentation*
- ☐ *TDOT Guidebook for Utility Relocation*
- ☐ *TDOT Rules & Regulations Accommodating Utilities*
- ☐ *Other Utilities Resources*

Deliverables

Deliverable	Task	Responsible Party[a]	
		Activity Leader	Additional Support
Deposit Check or LGIP Transfer	▪ *Receive and Process Utility Deposits*	Senior Technical Specialist	Headquarters Utilities
Utility Certification	▪ *Verify Utility Coordination Is Complete*		Headquarters Utilities

[a] Unless noted, all references to the Senior Technical Lead may be completed by a Consultant. This title is referenced as the Utility Coordinator in the other sections of the PDN.

Receive and Process Utility Deposits

When a utility owner elects for the contractor to perform its relocation and any portion of that work is not reimbursable, the owner must submit a deposit to the State for the entire non-reimbursable amount. This task may be initiated and completed in Stage 3.

The Senior Technical Specialist (TDOT Staff only) confirms with Headquarters Utilities that the following has occurred as part of this task:

- Utility owner has sent a check or wires money via a Local Government Investment Pool (LGIP) account to TDOT for the amount specified in the executed relocation contract. This includes coordinating with the Project Manager as this is high-risk for schedule delay.
- If TDOT has not received the money 6 months prior to letting, the Transportation Engineering Specialist (TDOT Staff only) sends the utility owner a letter (electronically and via certified mail) informing them that TDOT will remove its work from the state contract if funds are not received.
- Upon receiving the check, the Utility Section delivers the funds and submits a copy of the contract to Central Accounting.

Verify Utility Coordination Is Complete

Utility certification is required on all projects with federal funding per the Code of Federal Regulations (CFR). To secure a utility certification for the project, the Senior Technical Specialist (TDOT Staff only) confirms with Headquarters Utilities:

- Reviews the project to verify all CFR, Tennessee Code Annotated (TCA), and TDOT rules, regulations, and policies were followed with respect to utility coordination.
- Checks that all contracts have been executed and utilities have been put to work.
- Verifies deposits, if any, have been sent to the Finance Division.
- Verifies that U1s, U2s, etc. have been sent to the Roadway Design Lead (cannot occur before 26 weeks prior to letting).

Upon verifying that everything needed for utility coordination has been completed, the Senior Technical Specialist (TDOT Staff only) issues the signed utility certification letter to the Programming Division, informing the Project Manager that the utility certification will be generated by Headquarters to be included in the letting package.

5CN1 Prepare the Construction Contract for Advertisement

Overview

Prepare the construction contract documents for advertising by reviewing the Construction Documents and related quantities/estimates (if needed), establishing contractual obligations and compiling special provisions.

References

- ☐ *Project Management Workflow - Specs-Special Provision Guidance*
- ☐ *Special Provision Order Form*
- ☐ *TDOT Special Provisions*
- ☐ *TDOT HQ Construction Processes Manual*
- ☐ *TDOT Quality Manual*
- ☐ *TDOT Roadway Design Documents*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Quantities and Estimate (in AASHTOWARE)	▪ *Verify Construction Documents and Finalize Quantities and Estimate*	HQ Construction	Senior Transportation Engineer; Contract Letting Manager; HQ Construction Technician; Estimating Manager; Statewide Transportation Engineer; Project Manager
Engineer's Estimate		Estimating Manager	Statewide Transportation Engineer; Transportation Engineer
Construction Contract Documents	▪ *Establish Contractual Obligations* ▪ *Verify and Compile Final Special Provisions* ▪ *Assemble the Contract for Advertisement*	Senior Transportation Engineer	Contract Letting Manager; Design Lead
Revision Letter, Estimate Revision Request and revised plans (PDF) ***(if needed)***	▪ *Verify Construction Documents and Finalize Quantities and Estimate*	Design Lead	Senior Transportation Engineer; Contract Letting Manager; Estimating Manager; Statewide Transportation Engineer; Project Manager; Other Design Leads

Verify Construction Documents and Finalize Quantities and Estimate

A critical step in preparing a project's construction contract for advertisement involves verifying the Construction Documents have been included and finalizing quantities and the engineer's

estimate for advertisement. As part of this step, the Project Manager is to document if the answers to the following questions (minimally) have changed at all to confirm the Construction Documents are complete.

- Are all water quality permits complete/ready or are there no water quality permits on the project?
- Are the design plans, including structures and utilities plans (as applicable), uploaded to the shared project folder?
- Is this a chapter 86 project?
- Have all project-specific special provisions (including, as applicable, SP105C, SP107C and SP725) been coordinated/uploaded to the shared project folder?
- Are all Geotechnical Reports uploaded to the shared project folder?
- Is the Transportation Management Plan (TMP) signed? Has the TMP been uploaded to the shared project folder?
- Are there any relevant, project-specific considerations listed in TMP and with the water quality permits?

The Project Manager is to discuss the answers to these questions (or if an item is not applicable to the project) as part of the first letting meeting.

Once the Construction Documents have been uploaded and the distribution email received (see Chapter 6 of the *Roadway Design Guidelines* and 4RD1 for related information), the Senior Transportation Engineer (or assigned HQ Construction staff) and Contract Letting Manager complete the following:

- Attend the first letting meeting (as led by the Project Manager or Design Lead who reports on project progress) to confirm completeness of the Construction Documents and the advertisement process, including inclusion of the plans, specifications/special provisions, estimates, certifications, agreements and permits (as applicable).
- Review the Constructions Documents for major issues.
- Note key elements of compliance or deficiency(ies) for the Project Manager to document.
- Download and confirm the project's quantities and estimate spreadsheet, exporting both to AASHTOWARE.

If any changes to the plans or quantities are needed (based on this meeting or prior to advertising the project), the Design Lead corrects the plans and quantities and notifies the Project Manager and team of any changes.

The Design Lead prepares the necessary documentation, uploads the revised plans and emails the project's distribution list the:

- Revision Letter
- Estimate Revision Request (if quantities and the estimate have changed)
- PDF of the revised sheets/plans only

When the files are uploaded to the assigned Design Letting folder, the Transportation Engineering Specialist and/or the HQ Construction Technician compiles the revised sheets and quantities/estimate within the construction contract.

The Project Manager regularly updates the team as deficiencies are resolved and to verify completeness in preparing for advertisement.

Throughout this task, the Estimating Manager oversees the development and finalization of the Engineer's Estimate to prepare for advertisement.

Establish Contractual Obligations

There are several provisions that need to be established for the construction contract to be ready for advertising. The *TDOT HQ Construction Processes Manual* provides more details on each, but these provisions typically include:

- Determining contract times/completion dates.
- Setting federal compliance goals (disadvantage business enterprise [DBE] and on-the-job training goals) in accordance with federal and state requirements.
- Assigning a contract number.

Verify and Compile Final Special Provisions

Using the special provisions developed with the Plan-in-Hand Plans and revised as part of Construction Document turn-in, the Design Lead and Senior Transportation Engineer verify that all of the special provisions needed for the project have been included (*see 3RD1* and *4RD1* for related information).

To finalize the special provisions, the Senior Transportation Engineer references the previously submitted Special Provision Order Sheet (in Excel format) to confirm the following:

- All project-specific special provisions are included.
- The correct funding-oriented boilerplate special provisions are included (for state-funded only, federal-funded only or mixed-funded projects).

- **Note:** The Project Manager is to notify HQ Construction if any federal funds have been used for certain pre-construction activities (to acquire ROW, obtain permits, etc.), as funding type directs which boilerplate to use.

This verification process involves checking pay items for provisions that may be missing and considering specific item numbers from what is listed in the *TDOT HQ Construction Processes Manual* and "Determination of Project Specifications/Special Provisions" as part of the *Project Management Workflow 1.0*.

The Senior Transportation Engineer saves a copy of the order sheet to the Contract Proposal folder with a reference to both the contract number in the file name and the marked order sheet for the special provisions that apply to the scope, duration and obligations in the contract.

Assemble the Contract for Advertisement

The final step to prepare a project for advertising is creating and updating the contract proposal in AWP and drafting and then finalizing the notice to contractors four weeks in advance of the advertisement date. The *TDOT HQ Construction Processes Manual* details specific steps and procedures on how to assemble the contract and advertise the project in AWP.

5CN2 Advertise and Let the Project

Overview

Prepare the project for advertisement, open the advertisement for bidding, post the Notice to Contractors (NTC), administer the advertisement period and let the project.

References

- ☐ *TDOT HQ Construction Processes Manual*
- ☐ *TDOT Quality Manual*
- ☐ *TDOT Roadway Design Documents*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Bid Authorization Sheet	▪ *Advertise/Let the Project*	Transportation Engineering Specialist; Senior Transportation Engineer	Regional Construction Representative; Assigned HQ Construction Staff; Contract Letting Manager
Revision Letter, Estimate Revision Request and revised plans (PDF) (if needed)	▪ *Administer the Advertisement Period*	Design Lead	Assigned HQ Construction Staff; Regional Construction Representative; Project Manager

Advertise the Project

Once a project's letting date has been established and the contract documents are ready (*see 5CN1* for related information), the Transportation Engineering Specialist and Senior Transportation Engineer complete the following to advertise the contract (all of which is detailed further in the *TDOT HQ Construction Processes Manual*):

- Complete/compile the Bid Authorization sheet, Instructions to Bidders and TN-DBE.bin file.
- Post all letting documents in the BidExpress system.
- Open BidExpress for contractor bidding.

Administer the Advertisement Period

The Contract Letting Manager oversees the advertisement period (typically four weeks [28 days], but no less than 21 days for federally funded projects or 14 days for state-funded projects).

His/her work includes:

- Confirming that the Project Bid staff and assigned Senior Transportation Engineer have completed the contractor bid authorization actions following *TDOT HQ Construction Processes Manual*.
- Responding to bidders' requests for information (RFIs) by:
  - Logging bidder emails received,
  - Following up on each RFI response via email and
  - Determining if an addendum is needed when answering the question.
- Administering any necessary design (Letting) revisions by coordinating with the Design Lead and Project Manager for completing plan revisions or the Estimate Revision Request (ERR).
  - Upon receipt of a revision request, the Design Lead follows the process in *5CN1* and the *Roadway Design Guidelines* for submitting updated plans and an ERR (if needed) to HQ Construction for issuance.
  - The Senior Transportation Engineer issues an addendum to the construction Proposal Contract.
- Finalizing the Engineer's Estimate as coordinated with Estimating Manager prior to the bid opening (the letting day).

On letting day, HQ Construction opens all the bids received and the team moves into *5CN3* to award and execute the construction contract.

5CN3 Award and Execute the Construction Contract

Overview

Initiate reviewing the bid, recommending an award and confirming all contractual elements are in place prior to executing the contract. Execute the contract so that the contractor can begin work. TDOT Policy 355-02, Award of Construction Contracts, is followed for this activity.

References

- ☐ *TDOT HQ Construction Processes Manual*
- ☐ *TDOT Policy 355-02*

Deliverables

Deliverable	Task	Responsible Party	
		Activity Leader	Additional Support
Summary of Bids Report	▪ *Review the Bid*	Transportation Engineering Specialist	Contract Letting Manager; Senior Transportation Engineer(s)
Award/Reject Recommendation	▪ *Recommend Award*	Senior Transportation Engineer	Construction Director; Contract Letting Manager; Estimating Manager
Awards Committee Review Letter			
Construction Contract (ready for execution)			

Review the Bid

The Contract Letting Manager and Senior Transportation Engineer(s) review the Summary of Bids Report generated from BidExpress to confirm the following (see Section 3.9 of the *TDOT HQ Construction Processes Manual* for additional items of note):

- There are no unbalancing/irregularities in the bid.
- The lowest bid is within the estimate target range of the respective engineer's estimate (within 10%).
- Confirmation that materially driven issues are not impacting the low bid.
- The DBE quote has been received.
- The apparent low bidder has an active Tennessee Contractor's license and is registered with the Secretary of State.

This bid review must be completed prior to the Bid Review Meeting.

Recommend Award

Following the processes described in Section 3.9 of the *TDOT HQ Construction Processes Manual*, the Senior Transportation Engineer prepares a recommendation on whether to accept (i.e., award) or reject the bid. This step includes:

- Attending the Bid Review Meeting to review the bids and discuss next steps.
- Contacting the Contractor if TDOT determines to reject a bid, discussing irregularities and issues of concern at that time.
- Finalizing the Award/Reject Recommendation prior to the Awards Meeting.
- Preparing (as needed) an Awards Committee Review Letter (as approved by the Construction Director, Contract Letting Manager, Estimating Manager, Senior Transportation Engineer) for all contracts that fell outside the target margins.
  - This is based on the Engineer's Estimate and whether the recommendation is to award or reject.
- This includes noting the appropriate justifications for the recommendation.
- Attending the Pre-Award and Award meetings and directing the administration of the AWP system for contracting purposes.

Execute the Contract

Following the processes described in the *TDOT HQ Construction Processes Manual*, the Transportation Engineering Specialist confirms the following before circulating the contract for signatures:

- The bid was signed by an authorized signatory.
- The proposed contractor has an active Tennessee Contractor's license and is registered with the Secretary of State.
- The proposed contractor's surety is registered as an eligible surety.
- The proposed contractor has submitted a bid bond and certificates of insurance consistent with the contract requirements.

Once the award has been approved, the Transportation Engineering Specialist, or Transportation Engineer, routes the contract for signature and completes the needed actions in AWP per Section 3.10 of the *TDOT HQ Construction Processes Manual*.

Documents Referenced in the Appendix

A. *Project Commitment Document (Word)*
B. *Executive Status Report (Word)*
C. *Project Communication & Collaboration Documents*
    a. Agenda & Meeting Minutes *(Word)*
    b. Project Team Contact List *(Word)*
    c. Project Communication Plan *(Word)*
D. *Comment Resolution Form (Excel)*
E. *Risk Management Plan and Risk Register (Excel)*
F. *Estimating Process (Excel)*
G. *ROW Exhibits (PDF)*
H. *FHWA Summary of Actions in the PDN*

Appendix A

Project Commitment Document

Click here for access to the Word document template

Project Commitment Document

TN

Project Name | Project # | PIN | Location	
TDOT Project Manager: Name, Phone, Email	Consultant PM: Name, Firm Name, Phone, Email

Project Description		
	Project Description	Project Type, Primary Funding Source, Short Description
	Project Goals and Metrics *Develop 3-5 "big picture" project goals that express results instead of project work items, include measurable metrics that are project specific.*	Ex. Improve capacity to LOS C and rehab pavement.
	Project Scope Statement *Define the work that needs to be accomplished to satisfy the Project Goals. Should include "do not statements".* *A short statement of:* • ***What** will be accomplished?* • ***When** will it be completed? Include construction period.* • ***How much** will it cost?*	Ex. Widen from 3 to 5 lanes from station XX to YY; rehab pavement from station XX to YY; provide ITS system from XX to YY. Construction period 18 months, complete by summer 20XX. Total construction cost $1.2m.

Project Delivery Method: ☐ Design/Bid/Build ☐ Design-Build ☐ Progressive Design-Build ☐ CMCG (Construction Manager/General Contractor) ☐ Other

Environmental Doc. Type: ☐ CE ☐ EA ☐ EIS ☐ TEER ☐ Other

Preliminary Budget Estimate *List budget estimates, validated by the project team.*	**Preliminary Engineering**		**Construction**	
	Design:	$	Construction Engineering Mgt:	$
	ROW:	$	Incentives, Misc., Contingency:	$
	Utilities:	$	Construction Contract Price:	$
	Other:	$	Other:	$
			Total Cost Estimate:	$
			Programmed Amount:	$

Potential Project Risks

List major project risks impacting scope, schedule, budget.

Schedule *List major proposed milestone dates.*	**Milestone**	**Scheduled Completion Date**
	Environmental Complete	MM/DD/YYYY
	Footprint Established	MM/DD/YYYY
	Plan In Hand Complete	MM/DD/YYYY
	Right of Way Certification	MM/DD/YYYY
	Contract Letting	MM/DD/YYYY

Acknowledgement

By signing below, I acknowledge that I have reviewed the scope, schedule, and budget, as well as the risks outlined herein. I agree that the information included in the PCD is representative, based on the knowledge I have at this time.

☐ Check if additional documentation is included.

Team Member	Project Role	Signature	Date
	TDOT Project Manager		

Appendix B

Executive Project Status Report

Click here for access to the Word document template

Appendix C

Project Communication and Collaboration Documents

Agenda & Meeting Minutes

Project Team Contact List

Project Communication Plan

Click here for access to the Word document templates

Agenda & Meeting Minutes

Project Name | Project # | PIN | Location		
Meeting Title	Meeting Date, Meeting Time	Meeting Location

1. Introductions/Sign-In Sheet

2. Discipline Discussion
    a. Roadway
    b. Environmental
    c. Drainage/Hydraulics
    d. Structures
    e. Survey
    f. Pavement
    g. ROW
    h. Signing & Striping
    i. Signals/Lighting
    j. Geotech
    k. Traffic
    l. Utilities

3. Project Schedule
    a. Upcoming Deliverables & Meeting(s) Summary
    b. Review MS Project Schedule

4. Budget / Project Costs / Estimate

5. Quality

6. Risk/Mitigation

7. Stakeholder Outreach

8. Action Items

Action / Decision / Impact	Responsible Party	Due Date

Project Team Contact List

TN

Municipality Rep. (MPO/RPO)			000-000-0000	Company Name Street City State Zip
Property Owners				
Utility Owners			000-000-0000	Company Name Street City State Zip

Project Communication Plan

Project Name | Project # PIN | Location	TDOT Project Manager	Consultant Project Manager
	PM Name Phone Email	PM Name Phone Email

Project Description: A summary that differentiates this project from other projects, primary funding source, high profile, maintenance, reconstruction, design bid build, design build, CMGC, etc.)

Important Links			
Project Commitment Document *[insert link]*	Executive Status Reports *[insert link]*	Project Team Contact List *[insert link]*	Other *[insert link]*

Project Delivery Success (Notify the PM if any of these success factors are at risk.)			
Project completed on schedule and on budget (see PCD.)	Internal and external stakeholder acceptance.	Change orders <3% of construction costs.	Other

Impacts to SSBQR

Report concerns or changes to scope, schedule, budget, quality or risk as follows.

- Directly notify the discipline/technical lead regarding issues that directly impact tasks and/or deliverables.
- Report issues that can/will be mitigated at the next scheduled project team meeting.
- Immediately report issues to the Project Manager that require a multidisciplinary solution or cannot be mitigated by the project team.
- Changes impacting the Project Commitment Document (PCD) must be approved by the Project Management Director and Regional Director.

Team Meetings & Project Updates

Team member communication varies based on topic and timing; however, all project updates are documented in writing as follows.

- Project team meetings occur every 4-6 weeks and include topics outlined and documented in the *agenda and minutes*.
- Time sensitive updates are reported as soon as possible to the Project Manager and the respective discipline lead(s) via email.
- Internal and external stakeholders attend project meetings (outlined in the PDN) and receive project information from the Project Manager.
- Comment resolution form is sent at least one week before the review meeting, all recipients respond regardless of their comments.

Team Collaboration & Conflict Resolution

The project team collaborates across disciplines on a variety of tasks and deliverables, in person/phone/video collaboration is preferred.

- Seven out of 11 project management activities are meetings, see activity meetings for a list of suggested invitees.
- Multidisciplinary conversations and meetings occur regularly outside of

Team Decision Making

The project team works in a matrix organization, reporting responsibilities and decision making may overlap.

- The Project Manager makes decisions regarding scope, schedule, budget, quality and risk as it relates to project delivery. Team members report to the Project Manager on project related matters.

project team meetings (we want to avoid surprises).
- Conflicts as well as differences in approaching risks and tasks are managed directly between team members. Project managers and discipline managers may assist in issue resolution as needed.
- Proactive communication with internal and external stakeholders is generally conducted as part of an assigned role or responsibility.

- The Design Lead(s) regularly make decisions regarding technical designs and documents, technical discussions and resolutions, costs and estimates, as well as risk mitigation.
- The Project Management Director and Regional Directors make decisions regarding changes to the Project Commitment Document impacting schedule and budget, as well as decisions regarding risks that escalate beyond the team's control.

Public, Community Media

The project team notifies the Public Involvement Lead and copies the Project Manager as soon as possible when team members receive:

- Messages from the public, business owners, public safety, or other local municipalities
- Public information requests, media requests and inquiries including membership and advisory boards, trade organizations, industry forums and personal blogs
- Public record requests (e.g., FOIA requests)
- General project information requests from outside the project team
- Concerns with or from external stakeholders

Naming Convention

Shared Project Files & Folders

Project ID_Document Name_YYYY.MO.DAY *[insert link]*

Project Emails

From: Last, First <firstname.lastname@tn.gov>
Sent: Tuesday, Month 15, 2022 11:38 AM
To: Name <name@companyname.com>
Cc: Name <name@companyname.com>
Subject: Project ID#, Project Name, Topic]

For the first email in a thread, provide a short summary statement (ideally in 50 words or fewer.)

Project Status Reporting

Project reports are sent to the recipients and uploaded to the *shared folder* for team review.

Report	Author	Frequency	Recipient(s)
Authorized Funds	TDOT Project Manager	Stage 1 – Confirm Authorization	Project Team, Project Management Director, Regional Director, Regional Director Project Management
Project Management Plan (PMP)	Project Manager	Stage 2 – Finalize PMP	Project Team
Project Commitment Document (PCD)	TDOT Project Manager	Stage 2 – Finalize PCD	Project Team Project Management Director Regional Director
Executive Status Report(s)	TDOT Project Manager	Monthly or frequency as requested	Project Management Director Regional Director

Appendix D

Comment Resolution Form

Click here for access to the Excel document template

Comment Resolution Form

TN

						Disposition Actions			
Project ID#:	Enter ##	Project Name:	Enter Project Name	Meeting Name		A - Accept Comment		C - TDOT To Evaluate	
Meeting Date:	MM/DD/YY	Project Desc.:	Short project description			B - Designer To Evaluate		D - Delete Comment	
Plan Page #	**Line #**	**Reviewer**	**Comment**	**Initial Disposition**	**Response / Clarification**	**Final Disposition**	**Responder's Name**	**Date**	**Verified By**
RD101	*if applicable*	*Commenter's Name*	*Is there an accessible pedestrian route leading from the ABC to the XYZ? Provide information on the updated plans to confirm this.*	*B*	*This will be evaluated with the modified parking plans by Month Year.*	*A*	*Responder's Name*	*MM/DD/YYYY*	*Verifier's Name*

Project Name _____ PIN _____

Appendix E

Risk Management Plan and Risk Register

Click here for access to the Excel document template

Appendix F

Estimating Process

Click here for access to the Excel document

TDOT Estimating Process within PDN Stages

		Stage 0	Stage 1 Cost Validation	Line and Grade Package	Functional Design Plans	Plan-in-Hand Plans	Plans, Specification & Estimate Plans/Letting
BID ITEMS	CONSTRUCTION ITEMS	Concept Report Estimate using template.	Validate Concept Report Estimate. - Scoping information - Statewide averages	Focus on **major** Items that include **80%** of the costs (see below) and considers a realistic inflation % for the year the project will be let.	Estimate all Project Items.	Estimate all Project Items based on inflation, market, etc.	Estimate Final Review and Update based on inflation, market, etc.
			Concept Report Estimate updated by Roadway Design Lead Engineer through Scoping Process.	Major items quantified and estimated by Discipline - Compiled by Roadway Design Lead Engineer. • Major Removals • Pavement (conservative pavement section assumptions) • Earthwork (excavation, borrow, geotech recommendation [e.g., graded solid rock, geotextiles], rock cuts) • Barrier/Guardrail • Drainage System • Structures (hydraulic and non-hydraulic) • Walls (retaining, sound) • Sign structures • TSMO (ITS, signals, and lighting)	All Items quantified and estimated by Discipline - Compiled by Roadway Design Lead Engineer.	All Items quantified and estimated by Disciplines, Headquarters and 3rd Party - Compiled by Roadway Design Lead Engineer.	Completed by Headquarters Construction.
				Statewide and Regional Averages for Unit Prices			
	% BASED ITEMS			**Recommended Values:** **Project < $5 M** / **Project > $5 M** **Mobilization** 8-11% of Construction / 6-8% of Construction **Traffic Control** 3-5% of Construction / 1-2% of Construction		Utilize production based unit price estimate process.	Completed by Headquarters Construction.
	CONTINGENCY FOR CONSTURCTION ITEMS			**Add Contingency to Bid Items Total** - Recommended Values: • 10% Rural minor pavement preservation without complications. • 15% Urban minor pavement preservation without complications. • 20% New construction, reconstruction, rehabilitation, widening, trails, landscaping, and enhancement. • 10% for construction change orders (on all types of projects). - Adjust per understanding of project Level of Detail (LOD).	**Lower Contingency Based on LOD** - Recommended Values: • 5% Rural minor pavement preservation without complications. • 8% Urban minor pavement preservation without complications. • 10% New construction, reconstruction, rehabilitation, widening, trails, landscaping, and enhancement. • 10% contingency for construction change orders (on all types of projects).	**Lowest Level of Contingency** - Recommended Values: • All items should be estimated with limited risk of project changes. • 5% to 10% contingency for construction change orders.	

Project Name _____ PIN _____

TDOT Estimating Process within PDN Stages

		Stage 0	Stage 1 Cost Validation	Line and Grade Package	Functional Design Plans	Plan-in-Hand Plans	Plans, Specification & Estimate Plans/Letting
NON-BID	OTHER			• ROW funded amount • Utilities and Railroad utilize Concept Estimate (0UT1) • Environmental mitigation (streams and wetland design or credits) • Incentives 2% of construction	• ROW funded amount • Utilities and Railroad updated estimate (2RW1/2UT1) • Final environmental mitigation (streams and wetland design or credit costs) • Incentives 2% of construction	• Final ROW costs • Final utility costs • Final incentive costs • Final environmental mitigation (streams and wetland design or credit costs)	
	PRELMINARY ENGINEERING			**PE Recommendations (as applicable):** 6% - Rural or Urban Pavement Rehab, and safety projects. 10% - New construction, reconstruction, roadway and bridge rehabilitation, widening, trails, landscaping, and enhancement. 20% - Local Government - Percentage is based on the design complexity vs. construction costs. Adjust the recommendations to fit the anticipated needs of the project. PE costs can range higher than 20% depending on design complexity and the size of the project. Small projects generally have a higher PE % than large projects.		Include actual PE costs	Completed by Headquarters Construction.
	CONSTRUCTION ENGINEERING			**CE Recommended Values:** Construction, Reconstruction, Rehabilitation: $500K - $1M: 12.0% $1M - $5M: 7.5% $5M - $15M: 7.0% >$15M: 6.5% Signals or TSMO only: 13.5%	Spot Improvement, Safety, Enhancements: $0 - $500K: 12.0% $500K - $5M: 8.5% $5M - $15M: 7.5% >$15M: 6.5% Local Goverment:16%	Included actual CE costs (as coordinated with Construction) in the estimate	Completed by Headquarters Construction.
	INFLATION FACTOR	5.5% per year until Programmed Construction Year					
		Update Project File at each stage of the project.					

Project Name _____ PIN _____

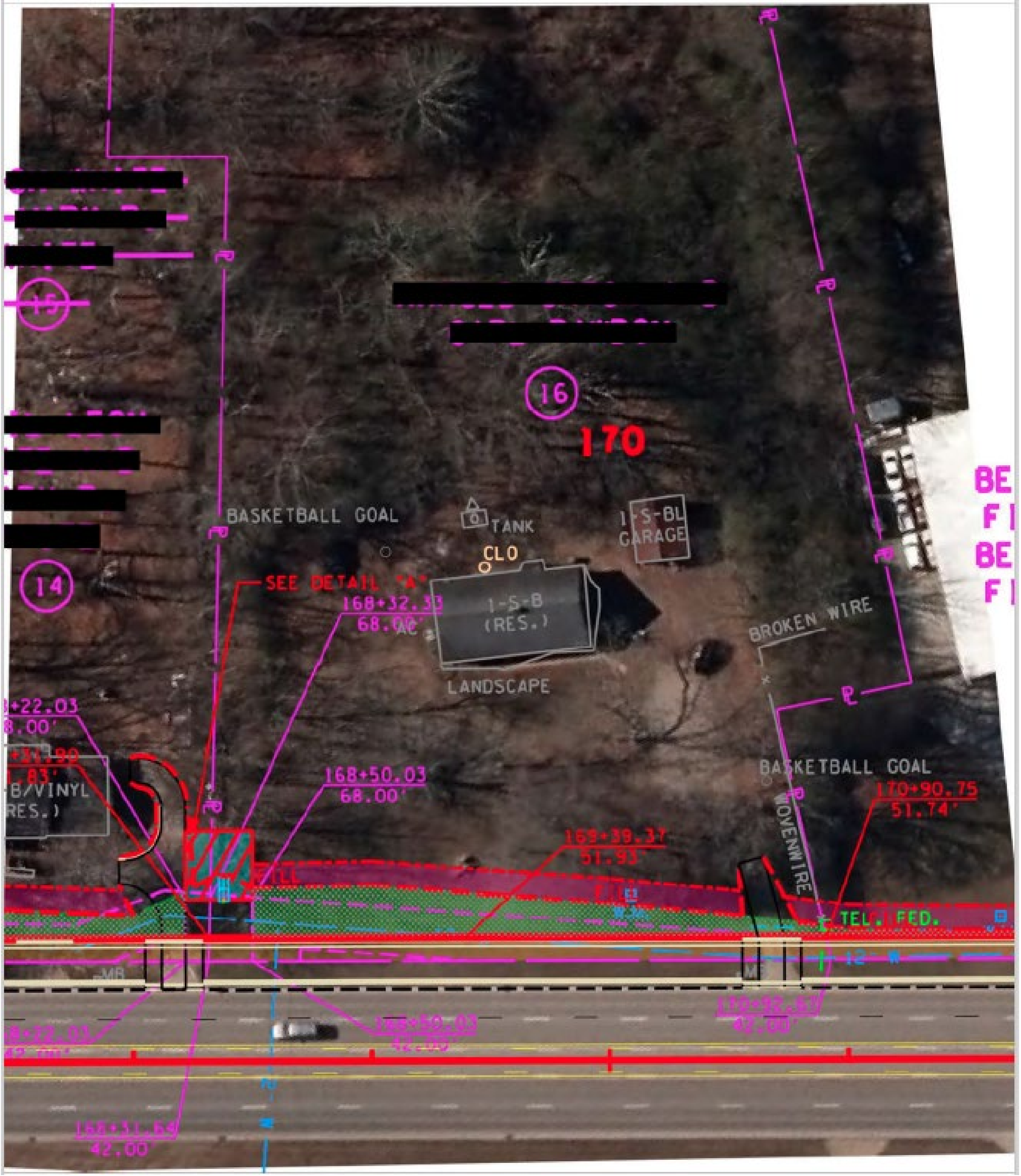
Appendix G

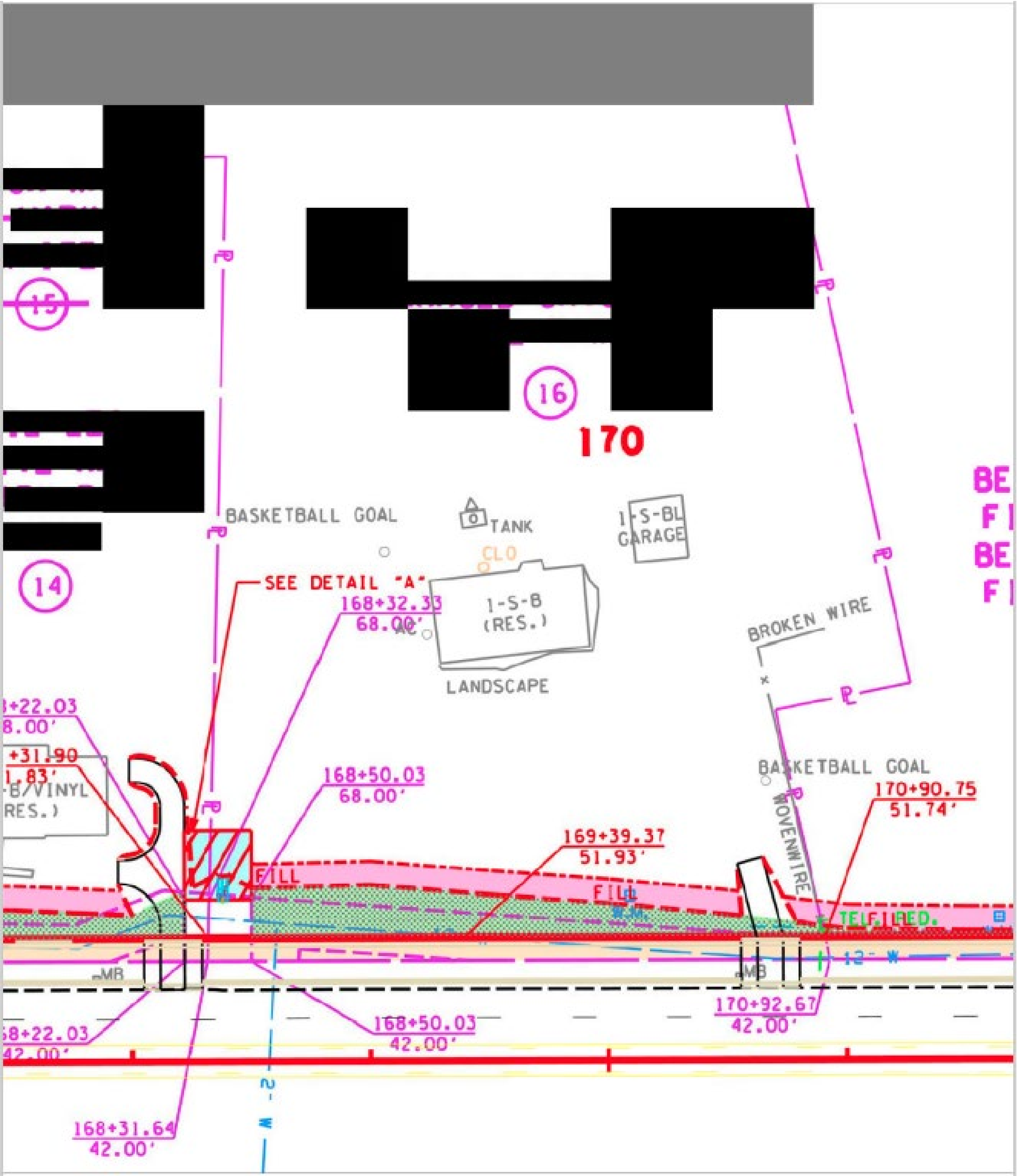
ROW Exhibits

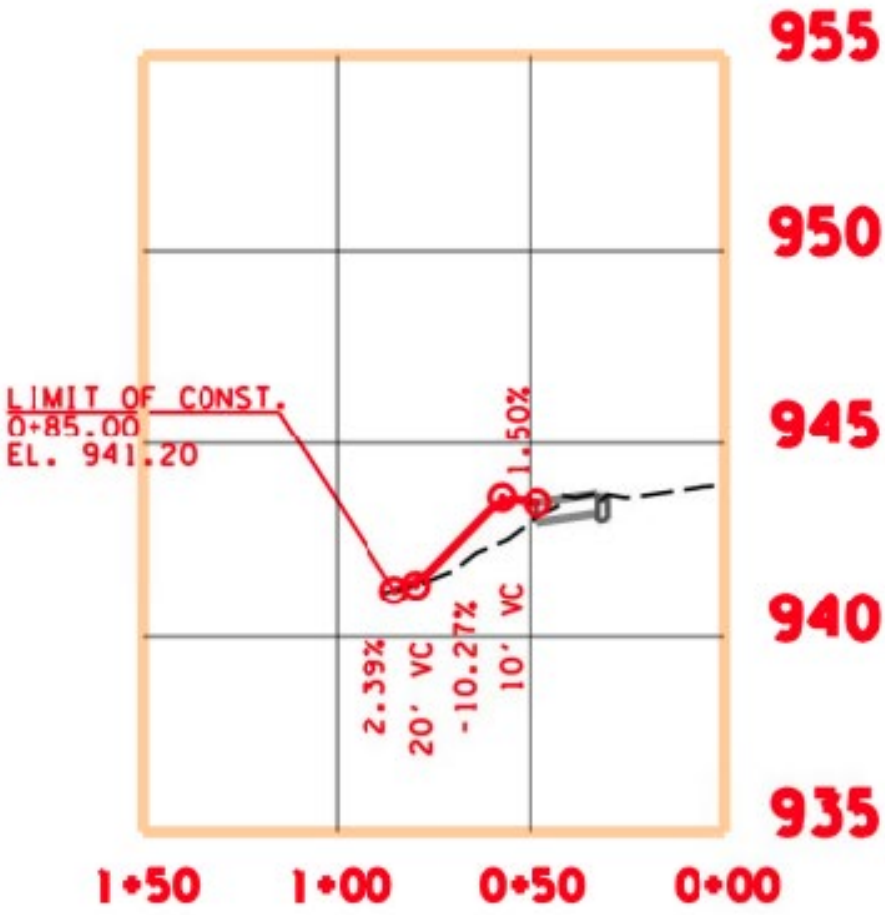
See the following pages

LEGEND

SYMBOL	AQUISITION TYPE
	FEE ACQUISITION
	PERMANENT DRAINAGE EASEMENT
	PERMANENT SLOPE EASEMENT
	TEMPORARY CONSTRUCTION EASEMENT


[redacted]
15
[redacted]
16
170
[redacted]
BASKETBALL GOAL
TANK
1-S-BL
GARAGE
CLO
14
SEE DETAIL "A"
168+32.33
68.00'
AC
1-S-B
(RES.)
BROKEN WIRE
LANDSCAPE
168+50.03
68.00'
BASKETBALL GOAL
170+90.75
51.74'
169+39.37
51.93'
WOVEN WIRE
FILL
TEL. FED.
170+92.67
42.00'
168+50.03
42.00'
168+31.64
42.00'


15
16
170
14
BASKETBALL GOAL
TANK
1-S-BL
GARAGE
CLO
SEE DETAIL "A"
168+32.33
68.00'
AC
1-S-B
(RES.)
LANDSCAPE
BROKEN WIRE
+22.03
8.00'
+31.90
1.83'
-B/VINYL
RES.)
168+50.03
68.00'
BASKETBALL GOAL
170+90.75
51.74'
169+39.37
51.93'
FILL
FILL
W.M.
WOVENWIRE
TEL.
FIL.
PED.
MB
MB
12" W
170+92.67
42.00'
168+50.03
42.00'
8+22.03
42.00'
2" W
168+31.64
42.00'
BE
F
BE
F



10' PVT. DR. LT. 170+70.50
TRACT NO. 16
NO S.D. REQ'D

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (ACRES)			
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE		LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERMANENT	SLOPE	CONSTRUCTION	AIR RIGHTS
				BOOK	PAGE												
~~1~~	[redacted]	~~71~~	~~41.01~~	~~RB474~~	~~310~~	~~2.480~~		~~2.480~~				~~2.480~~					
~~2~~		~~71~~	~~39~~	~~RB494~~	~~969~~	~~1.446~~		~~1.446~~				~~1.446~~					
~~3~~		~~71~~	~~39.01~~	~~RB411~~	~~109~~	~~2.859~~		~~2.859~~				~~2.859~~					
~~4~~		~~71~~	~~37.02~~	~~RB467~~	~~264~~	~~1.875~~		~~1.875~~				~~1.875~~					
~~5~~		~~71~~	~~37~~	~~RB277~~	~~524~~	~~5.568~~		~~5.568~~				~~5.568~~					
~~6~~		~~71~~	~~36~~	~~519~~	~~155~~	~~2.097~~		~~2.097~~				~~2.097~~					
~~7~~		~~71~~	~~33~~	~~10/278~~	~~384/350~~	~~2.742~~		~~2.742~~				~~2.742~~					
8		71	27	RB551	297	5.268		5.268	3401 S.F.		3401 S.F.	5.190			914 S.F.	1211 S.F.	
9		71	27.01	RB456	861	0.462		0.462	1483 S.F.		1483 S.F.	0.428			439 S.F.	668 S.F.	
10		71	26.01	280	329	1.333		1.333	3923 S.F.		3923 S.F.	1.243			376 S.F.	346 S.F.	
11		71	26	RB371	853	7.351		7.351	0.196		0.196	7.153		1172 S.F.	0.114	4239 S.F.	
12		71	28	RB522/70/210/43	466/694/275/328	6.125		6.125				6.125					
~~13~~		~~71~~	~~21~~	~~502~~	~~657-092~~	~~28.550~~		~~28.550~~				~~28.550~~					
13A		71	21	RB532	12	2.266		2.266	3346 S.F.		3346 S.F.	2.189		400 S.F.	2893 S.F.	3256 S.F.	
13B		71	21	RB532	12	1.794		1.794	3745 S.F.		3745 S.F.	1.708			0.147	2853 S.F.	
13C		71	21	RB532	12	7.428		7.428	2550 S.F.		2550 S.F.	7.369			0.148	0.120	
13D		71	21	RB532	12	12.996		12.996	0.183		0.183	12.813			0.305	0.154	
14		71	19	RB285/297	313/72	4.927		4.927	2346 S.F.		2346 S.F.	4.873		309 S.F.	2340 S.F.	1715 S.F.	
~~15~~		~~71~~	~~18~~	~~297~~	~~72~~	~~2.672~~		~~2.672~~				~~2.672~~					
16		71	17	RB257	685	5.456		5.456	2562 S.F.		2562 S.F.	5.397		503 S.F.	4005 S.F.	2184 S.F.	
17		72	1.01	RB363	202	4.748		4.748	2308 S.F.		2308 S.F.	4.695			501 S.F.	1518 S.F.	
18		59	31	108	308	1.327		1.327	1813 S.F.		1813 S.F.	1.285			610 S.F.	625 S.F.	
19		59	30	RB178	802	1.370		1.370	1630 S.F.		1630 S.F.	1.320			1146 S.F.	722 S.F.	

12/23/2020

LAWRENCE COUNTY

Fed. Project: STP-EN-NH-6(129)

State Project: 50001-2273-14

[redacted]

Tract 16

Tax Map: 71 , Parcel: 17.00

LOCATED IN LAWRENCE COUNTY, TENNESSEE

Beginning at the point of intersection of the existing west margin of S.R. 6 and the south boundary of the [redacted] (Tract 17) property, said point of intersection being 42.00' left of S.R. 6 proposed centerline station 170+92.67; thence with said existing margin [redacted] to a point, said point being 42.00' left of S.R. 6 proposed centerline station 168+31.64; thence with the north boundary of the [redacted] (Tract 14) property [redacted] to a point, said point being 51.83' left of S.R. 6 proposed centerline station 168+31.90; thence with the proposed west margin of said road as follows: (1) [redacted], (2) [redacted] to a point, said point being 51.74' left of S.R. 6 proposed centerline station 170+90.75; thence with said south boundary [redacted] to the point of beginning, containing 2562 square feet.

The above described property is hereby conveyed in fee simple.

Beginning at the point of intersection of an existing permanent drainage easement and the north boundary of said [redacted] property (Tract 14), said point of intersection being 68.00' left of S.R. 6 proposed centerline station 168+32.33; thence with said north boundary [redacted] to a point, said point being 97.00' left of S.R. 6 proposed centerline station 168+33.09; thence with the proposed margin of the herein described drainage facility as follows: (1) [redacted] (2) [redacted] to a point, said point being 68.00' left of S.R. 6 proposed centerline station 168+50.03; thence with said existing permanent drainage easement [redacted] to the point of beginning, containing 503 square feet.

The above described property is hereby conveyed as a permanent easement for construction and maintenance of a drainage facility. The land described above, on which the drainage facility is to be constructed, is to remain the property of the undersigned and may be used for any purpose desired, provided such use does not interfere with the use or maintenance of said facility.

Beginning at the point of intersection of the proposed west margin of S.R. 6 and the south boundary of said [redacted] property (Tract 17), said point of intersection being 51.74' left of S.R. 6 proposed centerline station 170+90.75; thence with said proposed west margin as follows: (1) [redacted] (2) [redacted] ± to a point; thence with the north margin of the existing permanent drainage easement [redacted] ± to a point, said point being 68.00' left of S.R. 6 proposed centerline station 168+50.03; thence with the proposed drainage facility described above, [redacted] ± to a point; thence with the meander of the slope northerly 241' ± to a point; thence with said south boundary [redacted] ± to the point of beginning, containing 4005 square feet.

The above described property is hereby conveyed as a permanent easement for construction and maintenance of slopes outside the existing right of way line. The land described above, on which the slopes are to be constructed, is to remain the property of the Grantor(s) and may be used for any purpose desired, provided such use does not interfere with the use or maintenance of said slopes.

Being a strip of land parallel to and at all point no greater than 10.00' from the slope easement described above, containing 2184 square feet.

The above described property is hereby conveyed as an easement for the construction of a working area and erosion control outside of the proposed right of way line. The title to the above described land remains vested in the Grantor(s), and is to be used by the State of Tennessee, its contractors or assigns for a period of 3 years, from and after the commencement of construction.

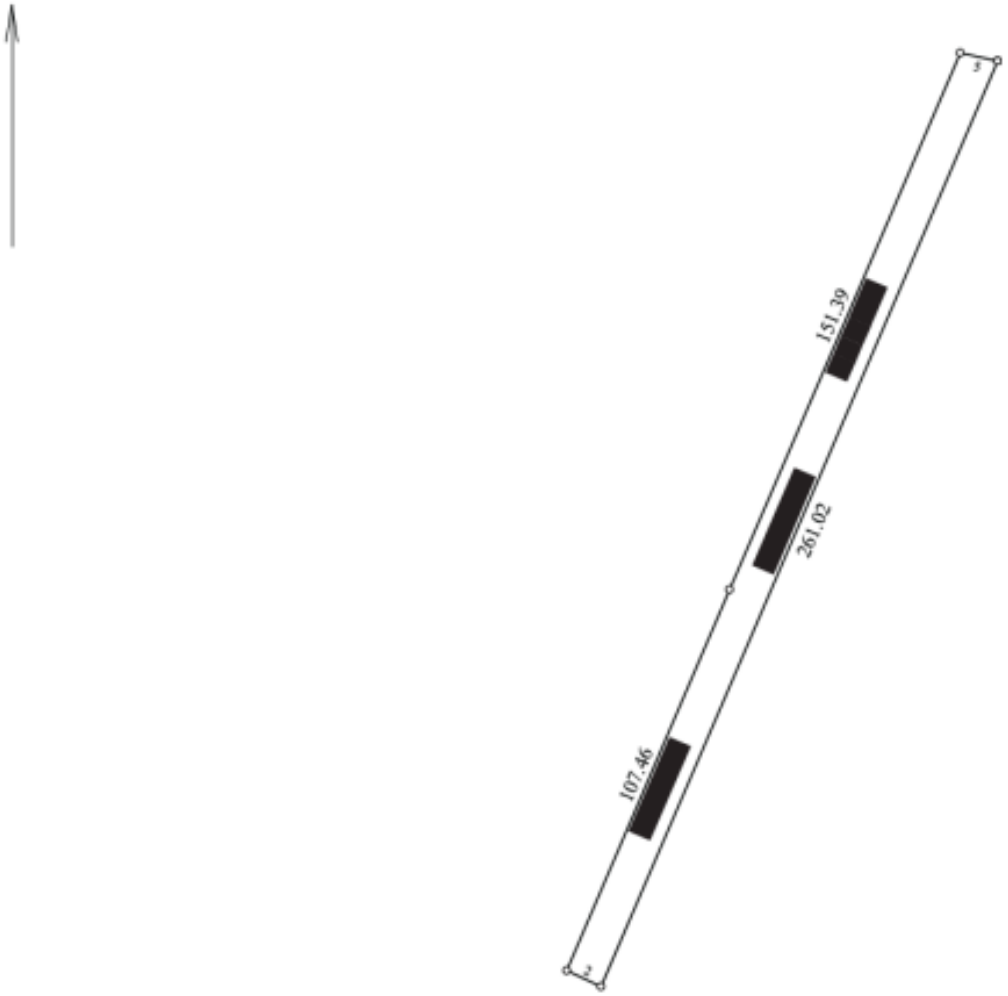
Reference

[redacted] in the Register's Office of Lawrence County, Tennessee.

Property Address:

[redacted]

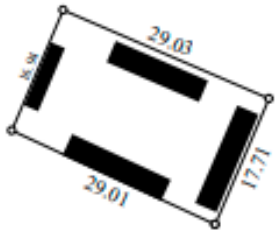
[redacted]



Title: Tr 16 Lawrence County, PIN 126899.00	Date: 12-22-2020
Scale: 1 inch = 50 feet	File: Fee Simple Tr 16.des

Tract 1: 0.059 Acres: 2561 Sq Feet: Closure = s45.3551w 0.00 Feet: Precision =1/125667: Perimeter = 540 Feet

[redacted] [redacted] [redacted]



Title: Tr 16 Lawrence County PIN 126899.00	Date: 12-22-2020
Scale: 1 inch = 25 feet	File: Drainage Eassement Tr16.des
Tract 1: 0.012 Acres: 503 Sq Feet: Closure = n44.4404e 0.00 Feet: Precision =1/21409: Perimeter = 93 Feet	
[redacted]	[redacted]

Appendix H

FHWA Summary of Actions in the PDN

See following pages

FHWA Summary of Actions in the PDN

Required Actions and Involvement

PDN Stage	FHWA Involvement	Regulatory Reference
Stage 0: Planning or Stage 1	Approval of TIP/STIP (Federally funded transportation projects must be approved in the STIP/TIP prior to environmental clearance. Projects cannot advance without satisfying this requirement.)	23CFR450.326(a)[1]
1PM1	Approval of funding authorization before beginning any phase of work (PE-NEPA, PE-Final Design, ROW, study, etc.) on any Federal-aid project.	23CFR630.106
1PM1	All actions are retained for Appalachian Development Highway System (ADHS) projects.	23 U.S.C. 106(g)(5)(B)
1EN2	Required action on all Federal-aid projects for Tribal consultations.	36CFR800.2(c)(2)(ii)[3]
1EC4 and *1RD2*	Required FHWA action for Interchange Access Request (IAR) approval prior to adding or modifying points of access on the Interstate System. See *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)* for additional details.	23 U.S.C. 111
2EN2	Required review and approval of D-list Categorical Exclusions (CEs) (except Programmatic Categorical Exclusions (PCEs)), Environmental Assessments (EAs), Environmental Impact Statements (EISs), and Environmental Re-Evaluations.	23CFR771.117(d)[4] 23CFR771.119(c)[5] and (h)[5] 23CFR771.123(g)[6] 23CFR771.125(b)[7] 23CFR771.125(c)[8] 23CFR771.127(a)[9] 23CFR771.129(c)[1] 23CFR774.7(d)[1] 23CFR774.9(b)[12]
2EN4	Required action if a Memorandum of Agreement (MOA) is needed.	36CFR800.6(c)
2ST2; 3ST1	Required action if the project includes unusual/complex bridges and/or structures.	23UCS109(a)
5CN1	Required action to authorize construction funding (including advanced construction) prior to TDOT issuing a notice to proceed to begin construction work on any Federal-aid project. **Note:** FHWA will issue the project authorization.	23CFR630.106

Required Actions and Involvement *(for Risk-Based Involvement Projects)*

Under the FHWA/TDOT Stewardship & Oversight Agreement of the Federal-aid program, FHWA may choose to review a project or elements of a project based on elevated risk potential. If chosen for Risk-Based Involvement (RBI), TDOT is to submit the project (or portion thereof) for FHWA Division office review.

PDN Stage	FHWA Involvement	Regulatory Reference
*Varies	RBI Preliminary Plan Review (TDOT's Functional Design Plans Field Review)	FHWA/TDOT Stewardship & Oversight Agreement
*Varies	RBI Constructability Review (occurs during Functional Design Plans and potentially Plan-in-Hand field reviews)	
*Varies	RBI Final Plan Review (TDOT's Plan-in-Hand Field Review)	
*Varies	RBI PS&E Plan Review (TDOT's PS&E Review)	

*Dependent on project-specific Stewardship and Oversight Plan. See the RBI Circular Letter.

Optional Involvement *(primarily in a support role to expediate process or decisions)*

PDN Stage	FHWA Involvement
1EC3	Optional involvement in development of IAR documents and processes. See *FHWA/TDOT Interstate Access Request (IAR) Standard Operating Procedure (SOP)* for additional details.
2PM3	Optional attendance at ROW strategy meetings.
2UT1; *3RR1*	Optional involvement in utility and railroad agreement development.
3EN2; 2PM4	Optional involvement in the permit coordination process.
3RW2	Review ROW certification on high visibility projects.
3UT2; *3RR2*	Review utility/railroad certification on high visibility projects.
XPMX	Optional attendance at the various field review meetings outlined in the PDN.
5CN1	DBE goal setting.

Back to PDN Overview