

Texas Department of Transportation **Digital Delivery Program**

QC Process PS&E Submittals

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This documentation is in draft form and is currently being piloted by TxDOT's Digital Delivery Program. For any questions, comments, or feedback please send to digital-delivery@txdot.gov.

1 See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

1 Overview

Digital Delivery (DD) projects differ from traditional projects in part because they include model (digital) files as contract documents. The model (digital) files require new methods of quality control and milestone review. This document provides instructions for establishing the roles, responsibilities, and workflows for quality control and milestone review during PS&E milestone submittals. The [TxDOT Digital Delivery Website](#) provides up-to-date training and guidance pertaining to DD.

Milestone frequencies can vary district to district and project to project. It is recommended that, at a minimum, DD projects consist of initial (30%), detailed (60%), final (90/95%), sealed (100%), and Ready To Let (RTL) milestone submittals. See the [TxDOT Digital Delivery Website](#) for guidance on QC requirements for each milestone.

This document has been developed to ensure conformance with established review processes while providing guidance on new roles and responsibilities and processes for model-based review during the following phases:

- [Project Setup](#)
- [Quality Control \(QC\)](#)
- [Milestone Review and Comment Period](#)
- [Milestone Review Meeting](#)
- [Submit Ready to Let Package](#)

Quality control and milestone review are defined throughout the document as separate functions of the project development process. They serve two distinct purposes and are defined below:

- Quality control (QC)- The process of checking the accuracy of calculations, consistency of design elements, and detecting and correcting design omissions and errors prior to finalizing design. This step should be performed *prior to submitting for district milestone review* and is often performed by qualified personnel within the design team or a third-party delegate.
- Milestone review - The process of the owner (district and/or division) reviewing and accepting the design submittal package in that it adheres to the standards and requirements setup for the project. This step is often performed by the TxDOT District or occasionally Division plan review personnel or a third-party delegate.

1 See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

2 Participants

The participants' roles and responsibilities are defined to provide clarity for Digital Delivery projects and work in cooperation with traditional QC roles and responsibilities.

The varying nature of the project scope, size of the design team, and district protocol require these roles and responsibilities to be adapted to each project. Flexibility in roles ensures adaptability to evolving project dynamics and differing team sizes. Project teams should ensure all responsibilities are assigned to ensure all projects have a thorough review and consistent deliverables.

The following roles have been presented as key individuals or groups in the QC process:

- Project Manager
- Model Manager
- Discipline Leads
- TxDOT Reviewers

2.1 PROJECT MANAGER

2.1.1 Responsibilities

- Coordinate between design team, reviewers, and other stakeholders.
- Ensure QC processes are maintained.
- Provide resolution for milestone review comments.
- Serves as point of contact for reviewers which represent varying backgrounds, including but not limited to design, pavement, bridge, construction, traffic, and maintenance.

2.1.2 Applicable steps within QC process

- [3.1.1 Develop project review schedule and identify project reviewers](#)
- [3.1.3 Create federated model for design review platform](#)
- [3.2.1 Quality Control of design and deliverables](#)
- [3.2.2 Ensure all comments are addressed](#)
- [3.3.1 Submit milestone design submittal package for review](#)
- [3.3.3 Provide initial response to comments](#)
- [3.4.1 Milestone review meeting and comment resolution](#)
- [3.5.1 Is the package ready to submit?](#)
- [3.5.2 Submit ready-to-let package](#)

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2.2 MODEL MANAGER

2.2.1 Responsibilities

- The model manager may also be the project manager, discipline lead, etc., depending on project size, scope, and district preference.
- Assist the design team in model development and delivery.
- Facilitate and ensure the project team understand expectations for new processes, software, and deliverables for model development and delivery as defined on TxDOT's [Digital Delivery Website](#).
- Provide technical expertise in the following:
 - Maintain a standard model origin, coordinate system, and units.
 - Coordinate template library and workspace management.
 - Manage processes, data files, and access rights.
 - Clash detection¹ and resolution.
- Ensure project-wide coordination for the following:
 - Submission and exchange of models.
 - Maintain model archives and consistent file naming conventions.

2.2.2 Applicable steps within QC process

- [3.1.2 Initiate project in design review platform](#)
- [3.1.3 Create federated model for design review platform](#)
- [3.2.1 Quality Control of design and deliverables](#)
- [3.3.1 Submit milestone design submittal package for review](#)

2.3 DISCIPLINE LEADS

2.3.1 Responsibilities

- The discipline lead may also be the project manager, model manager, etc., depending on project size, scope, and district preference.
- Perform quality control measures to ensure completeness and accuracy of design.
- Ensure QC and milestone review comments have been addressed and incorporated.
- Resolve interferences or conflict with other discipline designs.

2.3.2 Applicable steps within QC process

- [3.1.3 Create federated model for design review platform](#)
- [3.2.1 Quality Control of design and deliverables](#)
- [3.2.2 Ensure all comments are addressed](#)
- [3.3.3 Provide initial response to comments](#)
- [3.4.1 Milestone review meeting and comment resolution](#)

¹ See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

2.4 TXDOT REVIEWERS

2.4.1 Responsibilities

- Provide subject matter expertise in their areas of review.
- Represent TxDOT in confirming the design adheres to the design intent and design standards by completing a review in the area that is assigned to the individual.

2.4.2 Applicable steps within QC process

- [3.3.2 Milestone review period](#)
- [3.4.1 Milestone review meeting and comment resolution](#)

3 Process and Procedure

The following processes and procedures are necessary on all digital delivery projects. The flow chart provided in [figure 4.1](#) outlines the sequence of work for the QC and milestone review processes for a PS&E submittal. Descriptions of each step are provided in this section.

3.1 PROJECT SETUP

3.1.1 Develop project review schedule and identify project reviewers.

The [Project Manager](#) should establish a project schedule that considers district-specific review requirements. The review schedule should include:

- Date of submittal for each PS&E milestone design package,
- Time allocated for review period, and
- Date of review meeting for each milestone.

Milestone review meetings should be used to facilitate conversation between [TxDOT Reviewers](#) and the design team. The [Project Manager](#) should consider allocating additional time for model review to accommodate new review processes.

The [Project Manager](#) or Model Manager **should compile a list of [TxDOT Reviewers](#) to be shared at project kickoff so the Model Manager can assist in establishing access in the design review platform that is selected.** The list should include their area of expertise and contact information. If possible, the same reviewers should participate throughout project development.

[TxDOT Reviewers](#) offer subject matter expertise in the field they are reviewing and ensure representation across all areas of design, construction, and maintenance. If the [TxDOT Reviewers](#) are not familiar with the design review platform or digital delivery requirements, the [Project Manager](#) and Model Manager should assist in facilitating training.

1 See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

3.1.2 Initiate project in design review platform.

The Model Manager should setup, maintain, and coordinate access for the project in the selected design review platform. See TxDOT's [Digital Delivery Website](#) for guidance on preferred design review platform(s) and how to set up the project and establish access.

3.1.3 Create federated model for design review platform.

The Model Manager creates or oversees the creation of the federated model(s)¹, which is a conglomerate of multiple models in one view, for the design review platform that will serve as part of the milestone design submittal package. Combining the various model elements and files into a federated model¹ will require cooperation and guidance from [Discipline Leads](#). See [TxDOT Digital Delivery Website](#) for guidance on developing and displaying federated models.

The Model Manager serves as support for uploading and maintaining the federated model into the design review platform as new files are created or old files are eliminated. The design review platform should be set up once and updated with each submittal.

3.2 QUALITY CONTROL (QC)

3.2.1 Quality Control of design and deliverables.

The [Discipline Leads](#) are responsible for completing quality control of the design and deliverables before it is combined and submitted for milestone review. The Model Manager assists with clash detection, verifies DD requirements are met, and provides software support as needed.

See the [TxDOT Digital Delivery Website](#) for guidance on reviewing the digital design files and new model deliverables. It includes traditional QC elements while also providing requirements and direction for model-based deliverables, files to be submitted, and other project related documents. QC includes but is not limited to:

- Performing an interdisciplinary review including Clash Detection¹ of combined model elements.
- Ensuring design and modeling standards are maintained and deviations are documented.
- Verifying previous milestone or QC comments have been addressed.

The software(s) used as the QC platform may be the same or different as the design review platform identified in section [3.1.2](#). The [Project Manager](#) and Model Manager are responsible for coordinating any software requirements and expectations for QC documentation. See the [TxDOT Digital Delivery Website](#) for software application and version requirements.

The [Project Manager](#) is responsible for ensuring QC measures are maintained. **If the project team is unable to complete the QC prior to the Milestone Review period, the [Project Manager](#) may request additional QC support from a delegate or [TxDOT Reviewers](#) from the District or Design Division.**

¹ See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

3.2.2 Ensure all comments are addressed.

Before the package is submitted for district milestone review, all comments from previous milestone submittals and QC must be incorporated. The [Project Manager](#) and [Discipline Leads](#) are responsible for verifying all comments have been addressed.

3.3 MILESTONE REVIEW AND COMMENT PERIOD

3.3.1 Submit milestone design submittal package for review.

The [Project Manager](#) is responsible for compiling the design submittal package in the *ProjectWise* workspace with assistance from the Model Manager and [Discipline Leads](#). The Model Manager should be notified when the package is ready and will assist with transferring, syncing, and versioning the files within the design review platform.

See the [TxDOT Digital Delivery Website](#) for guidance on the minimum requirements for each milestone submittal. A future digital deliverable preparation manual will provide further guidance on model standards at each milestone. The project team should coordinate with the district for additional requirements beyond the minimums. **Completed [QC Checklists](#) and QC documentation should be provided in the submittal package.**

3.3.2 Milestone review period

The [TxDOT Reviewers](#) should start their review of assigned content and provide comments in the format required by the design review platform.

The Model Manager should provide training resources and guidance, as needed, to the [TxDOT Reviewers](#) during the review period. If the [TxDOT Reviewers](#) need more time or will not be reviewing the deliverables, they should notify the [Project Manager](#).

The TxDOT Reviewers may refer to the completed QC documentation provided by the design team. This documentation should include the QC checklists and any supporting calculations or documents.

3.3.3 Provide initial response to comments.

The [Discipline Leads](#) should review and respond to the comments either agreeing, disagreeing, or requesting resolution. The [Project Manager](#) should assist the [Discipline Leads](#) in this effort and is responsible for providing resolution for comments in question. All comments should have an “initial response” which can be changed to “final response” once resolution is agreed upon.

If it is decided that comments need more discussion, the design team should note it for discussion during section [3.4](#).

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3.4 MILESTONE REVIEW MEETING

3.4.1 Milestone review meeting and comment resolution

Milestone review meetings are highly recommended at each required milestone submittal. A dedicated meeting for review ensures the design team receives a thorough review and streamlines decisions for comments that require further discussion. All comments should have a response to indicate a comment being accepted or rejected.

The Milestone review meeting is set up by the [Project Manager](#) with the date provided during section [3.1](#). The [Project Manager](#), [Discipline Leads](#), and [TxDOT Reviewers](#) should attend this meeting. **The [Project Manager](#), or delegate, should facilitate the milestone review meeting using the design review platform to review the project and comments during the meeting.**

After the meeting, the [Discipline Leads](#) should incorporate any comments noted. If a comment requires further investigation beyond the meeting, the design team should ensure the comment is resolved in coordination with the [TxDOT Reviewers](#) before the next milestone review meeting.

3.5 SUBMIT READY-TO-LET PACKAGE

3.5.1 Is the package ready to submit?

The [Project Manager](#) is responsible for determining if the package is ready-to-let. If the project is not ready-to-let, the process will revert to section [3.2](#) and the project team will continue developing deliverables for the next milestone meeting or submittal.

If the project is ready-to-let, the project moves to section [3.5.2](#).

3.5.2 Submit ready-to-let package.

The [Project Manager](#) is responsible for ensuring all comments have been incorporated and the final submittal package is combined, signed and sealed, and sent to the district TP&D engineer or district responsible person for submittal to the Final PS&E Processing section within Design Division.

See the [TxDOT PS&E Preparation Manual](#), [TxDOT Project Development Process Manual](#), and [TxDOT Digital Delivery Website](#) for all supporting documents that are required for the 100% PS&E submittal to Design Division and other additional guidance.

1 See [TxDOT Digital Delivery Glossary of Terms](#) for terminology.

4 Resources

4.1 LIST OF REFERENCES

[*TxDOT Manuals System*](#)

[*TxDOT Design Summary Report \(DSR\) \(Form 2440\)*](#)

[*TxDOT Project Development Process Manual*](#)

[*TxDOT PS&E Preparation Manual*](#)

[*TxDOT Quality Assurance Program for Design-Bid-Build Projects*](#)

4.2 TxDOT DDP TRAINING MATERIAL

The [DDP website](#) is the repository for training material including self-guided videos and QC checklists. Materials will be added to the website as best practices are identified and documented.

[*TxDOT DD Design QC Checklist*](#)

[*TxDOT DD Schematic QC Checklist*](#)

[*TxDOT Digital Delivery Glossary of Terms*](#)

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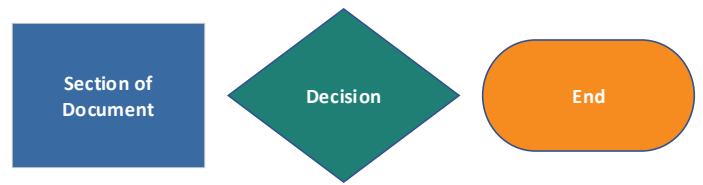
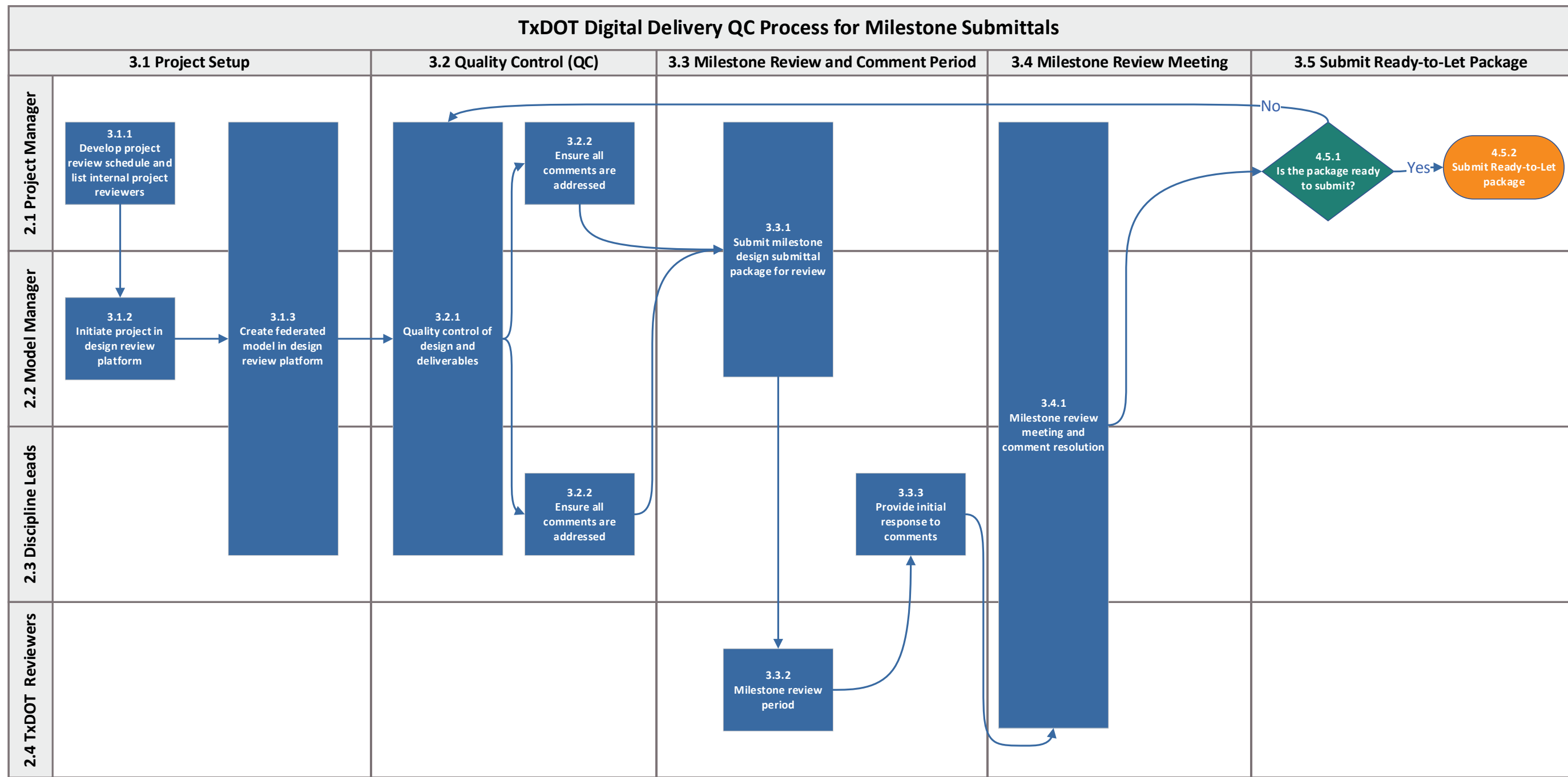


Figure 4.1 TxDOT Digital Delivery QC Process