



Project Delivery Network
Materials Design QC Checklist

Version
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QC Manager:
UDOT Central Materials Engineer

Introduction

The Project Delivery Network Materials Design QC Checklist is to be used with the [UDOT QC/QA Procedures](#). This checklist is a tool to assist the project team in verifying all work is produced with due diligence, using acceptable industry standard techniques, available resources and data, and reasonable decisions by competent professionals. The checklist is a tool and cannot replace the sound judgment and experience of competent professionals. It is the Design Team's responsibility to verify the quality of project documents **before** distribution.

For suggestions or answers to questions please contact:

George Lukes
UDOT Central Preconstruction Standards Engineer
Phone: 801-965-4986 Email: glukes@utah.gov

QC Documentation

Consistently documenting the QC process is an essential step to the QC procedures. The documentation provides the following benefits:

1. It confirms for project teams that each step in the QC process was completed correctly.
2. It confirms for UDOT that the QC procedures are followed consistently by all project teams.
3. It provides the opportunity for all to find ways of improving the QC/QA procedures.

Documentation has always been used by the project team to perform required quality assurance verification and has been maintained by the design team for reference during construction. It has also served as the way for UDOT to perform project audits to verify the design team followed the required QC/QA procedures. Providing this documentation in ProjectWise increases the opportunities to realize the benefits of QC documentation.

UDOT **requires** the Originator to upload all QC documentation for each deliverable into ProjectWise and attribute it as directed by this QC/QA Design Checklist (see *Recommended QC Documentation Table*). Every deliverable and applicable checklist item must have some form of documentation demonstrating the QC was completed. The QC documentation must be uploaded at or before each milestone review package distribution. The QC process is incomplete until all QC documentation is uploaded and attributed correctly.

The following recommendations are provided for creating QC documentation files:

- Provide all QC documentation required to review the QC process.
- Separate or combine QC documentation into files that are logical for the size and complexity of the project. For example, smaller projects can combine multiple disciplines' plan sheets into one QC file while larger projects should maintain separate files.
- Insert the entire final deliverable copy into the file before the QC check prints.
Example: M&P deliverable, M&P check prints
- Collate the plan sheets, specifications, and special provisions so that each sheet and spec. has the deliverable and check print redlines together.
Example: EC-01 deliverable, EC-01 check prints, EC-02 deliverable, EC-02 check prints, etc.

UDOT QC Documentation Recommendations and Instructions

A balance between consistency and flexibility is required to meet the demands of quality control and the variation in project scopes, teams, budgets, and methods. UDOT is not providing a list of requirements for QC documentation to help meet this balance. UDOT is only requiring that the project team provide all QC documentation, upload it to ProjectWise, and attribute it properly.

Recommended QC Documentation and *UDOT QC Instructions* are provided within the checklist to assist project teams, Checkers, and QA reviewers. These recommendations and instructions are given as guidance and are not meant to change the way a project team performs their QC process if the process meets all UDOT requirements. Project teams may adapt the recommendations and instructions as needed or use them to verify their process meets UDOT's requirements. The recommendations and instructions are not and cannot be completely comprehensive so it is necessary for project teams to make some alterations to the recommendations as needed to meet specific project challenges.

The *UDOT QC Instructions* for each checklist item or group of checklist items can be found italicized under the corresponding items followed by the right justified *Recommended QC Documentation*.

Not all checklist items have a recommended QC documentation. The completed checklist serves as the QC documentation for these items. Provide additional documentation when available.

Some checklist items require coordination, acceptance, or approval to be completed. A space has been provided for these items to identify the documentation being provided as evidence of completion.

The **Originator** is responsible to have all their work checked and to provide and upload all documentation. The **Checker** is responsible to complete a thorough check and provide all documentation to the Originator. Complete QC reviews **before** deliverable distribution.

QC Checklist Instructions

It is **required** to complete and upload into ProjectWise all 14 Design QC Checklists unless otherwise noted by the UDOT Project Manager on the Project QC/QA Plan (*see the UDOT QC/QA Procedures for the Project QC/QA Plan form and instructions*). The Checker must verify all items in the checklist are complete and correct for each deliverable listed along with any additional items the Checker deems necessary.

- The checklist items are not to be interpreted as the only items that need to be checked.
- The Checker places his or her name in the space provided at the beginning of the checklist. Fill out one checklist and include all names if multiple Checkers are used for the same deliverable. Place the Checker's initials next to each item they checked. Use the text box to the left of the item number provided in the form for the Checkers' initials unless the item is not applicable.
- Check the checkbox next to each item that has been checked. Place an **NA** in the checkbox or the text box provided to the left of each item number if the item is not applicable to the project. **ALL** items must have check mark or NA.
- Provide documentation demonstrating the action occurred for checklist items that recommend **Approval Documentation, Coordination Documentation, or Acceptance Documentation**. Documentation may be formal communications, emails, meeting notes, phone conversation logs, or other forms that document communication process. Place the file name in the space provided and follow the attributing convention in the Recommended QC Documentation Table.
- Provided at the end of each checklist is an Estimate Review Checklist. Complete and submit this checklist when checking the estimate as well as completing any checkboxes found on the activity checklist.
- A comments sheet is provided at the end of each discipline's checklist for the Originator and Checker to make comments, notes, and clarifications. Only one comment sheet is provided to minimize space and printing when printing the entire checklist. Use this sheet to document and consolidate the QC check comments.
- Each discipline checklist is separated into activity checklists. Complete the activity checklists necessary for the phase of the project. The Recommended QC Documentation table recommends uploading each activity checklist as a separate file. The checklists may be combined, but each

checklist must be included in the file name and attributed properly (example: QC_4U1_4U3_Checklist_dddmyy).

- Every checklist item in each section of all required Design QC Checklists (see the Project QC/QA Plan) must be completed. It is unacceptable to address an entire section with a blanket statement or a continuous line through all boxes. Each item must have “NA” next to it even if an entire activity or section is not applicable.
- Previously completed checklists may need to be completed again if, after a milestone, changes were made to elements checked on the previous checklist. Complete the necessary checklist items associated with the changed element and mark “NA” on all other items. Combine these checklists with the existing phase checklist into one file (example: QC_4R1_3R1_Checklist_dddmyy).
- Do not recheck items that have been QC checked previously and have not changed or are not affected by a change.

The Originator is required to upload the completed checklist into ProjectWise and attribute it correctly (see *Recommended QC Documentation Table*) once all items are checked and verified. Properly attributed documents can be verified by checking the QC Saved Search folders in ProjectWise.

The following explanations are to aid in completing the QC checklist items:

- A checklist item deemed “complete,” “correct,” or “accurate” does not denote that the item is perfect, but rather that the item satisfies design criteria based on known information, acceptable techniques, and sound judgment.”
- A checklist item deemed “addressed” denotes the item as “reviewed all known concerns and verified the concerns are appropriately mitigated and satisfy design criteria.” Addressed concerns are not necessarily incorporated into the design, but satisfactorily mitigated.
- A checklist item deemed “identified” denotes the item as “an acceptable and economical approach to satisfy design criteria based on known information.”
- A checklist item deemed “verified” denotes the item as “verified the approach/conclusion as acceptable based on known information.”

QC Documentation ProjectWise/Attributing Instructions

ALL QC documentation must be uploaded into ProjectWise and attributed correctly. Please see [UDOT ProjectWise Online Training](#) for more information on ProjectWise and attributing documents.

There are three potential attributing scenarios for all QC documentation in ProjectWise:

1. Not in ProjectWise initially (e.g. scanned documents that will be uploaded/attributed)
2. Already in ProjectWise but either not attributed or attributed incorrectly
3. Already in ProjectWise and correctly attributed for another reason but also in need of a supplemental attribute specifically for QC

No matter how the required documents initially exist, all must be attributed for QC as directed below or the QC documentation is not considered complete as required

It is **required** to properly attribute **ALL** QC documentation. To assist project teams properly name and attribute each document, the following table *Recommended QC Documentation* provides naming and attributing conventions for all recommended QC documentation. These naming and attributing conventions can be adapted for use with all additional documentation or altered for combining documents. Name a file logically with all elements included in the file and follow the naming and attributing convention if altering or combining files. Remember, the goal of naming and attributing is to make the document searchable by someone not intimately associated with the project.

Recommended QC Documentation

Recommended Documentation	Naming Convention	Document Type Filter	Document Type	Document Subtype	Document Phase*
Coordination Documentation	<i>PIN_QC_CoordDocID_mmddyy</i>	Materials	QC/QA +	Meeting	GR
Pavement Conditions Report Redlines	<i>PIN_QC_PavementConditonReport_mmddyy</i>	Materials	QC/QA +	Project Documents	GR
Pavement Design Report Redlines	<i>PIN_QC_PavementDesignReport_mmddyy</i>	Materials	QC/QA +	Project Documents	GR
Checklist 2M1	<i>PIN_QC_2M1_Checklist_mmddyy</i>	Materials	QC/QA +	QC Checklist	GR

* Use the appropriate document phase; this list is given as a guide.

2M1 Develop Pavement Design and Report

Evaluate the existing pavement condition and compare the results of the evaluation to the existing conditions documented in the concept phase's preliminary pavement design. If a concept pavement design is not available, evaluate the existing pavement conditions to assess the level of pavement design needed. Confirm the concept report pavement design remains applicable and update/create the pavement design.

References

1. [Pavement Management and Design Manual](#)
 2. [Ride Index](#)
 3. Distress Manual
 4. [Pavement Type Determination](#)
 5. [UDOT Project Delivery Network](#)
 6. [UDOT Practical Design Guide](#)
 7. [UDOT QC/OA Procedures](#)
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Pavement Conditions Report

Checker: _____

Date Completed: _____ PIN: _____

1. Maintenance concerns were identified and addressed.

Coordination Documentation: _____

2. Correct report format used. (1)
3. The summary of existing pavement data and subgrade information are accurate. (1)
4. The soil classification is appropriate.
5. Pavement history is clear and contains all known information about the life of the pavement.
6. The preliminary testing strategy was approved prior to being performed. (1)
7. The core logs were collected using approved methods. (2)
8. All appropriate tests were conducted and documented properly.
 - a. Falling weight deflectometer or structural measurements
 - b. Rut measurements, ride index, and cracking type and extent (2, 3)
 - c. Skid index (ASTM E274-06)
 - d. Traffic data (i.e. traffic projections) (1)
 - e. Ground penetrating radar
9. The Pavement Type Determination is appropriate. (1)
 - a. The Regional Corridor Determination List was checked. (4)
 - b. Pavement design analysis meets standards and project specific constraints.
 - c. Life cycle and other economic concerns correctly analyzed. (1)
 - d. Engineering analysis performed appropriately.

2M1 Continued

- 10. Possible project alternatives were considered using the following criteria. (1)
 - a. Reconstruction vs. Repave
 - b. Cost of alternatives
 - c. Design life
 - d. Maintenance
- 11. The conclusions and recommendations are clear and appropriate.

Check the report following the UDOT QC/QA Procedures Section 3.4.

Required QC Documentation: Pavement Conditions Report Redlines

Pavement Design Report

Checker: _____

Date Completed: _____ PIN: _____

- 1. The in-depth study of the pavement condition was accepted by the Region Pavement Manager and is included.
- 2. The recommendation of reconstruct or rehabilitate is appropriate.
- 3. The potential material sources and additional parameters, such as noise consideration, are verified.
- 4. The discussion about corridor designation is clear and correct.
- 5. The traffic data (projections) was reviewed and updated if necessary.
- 6. The appropriate methodology (i.e. ASHTO 93, MEPDG) is used.
- 7. All parameters are accurate and the Summary Report of Parameters is included in the Appendix.
 - a. Frost depth
 - b. Water table
 - c. Drainage
 - d. Noise
 - e. Assumed CBR
 - f. ESAL calculation
 - g. PG binder map
 - h. Soil classification
 - i. Climate data
 - j. All assumptions are listed
- 8. The conclusions and recommendations are complete, clear, and appropriate.
 - a. The selection is properly justified.
 - b. All alternatives are analyzed accurately.
 - i. Reconstruction vs. Repave

2M1 Continued

- ii. Cost of alternatives
 - iii. Design life
 - iv. Maintenance
 - c. The life cycle costs calculations are accurate.
 - d. Constructability sensitivity accurately calculated.
 - e. Adjustments for construction specifications are complete and correct.
9. If applicable, the Pavement Management Engineer (PME) has accepted the selected design.

Check the spreadsheet following the UDOT QC/QA Procedures Section 3.4.

Required QC Documentation: Pavement Design Report Redlines

QC Check Comments

Provide comments, methods, assumptions, explanations, file locations, and any other information needed to facilitate the QC check. Print and attach this sheet to the checklist. Upload this sheet with the associated checklist.

PIN: _____ Activity: _____ Deliverable(s): _____

Originator: _____

Checker: _____

Additional Commenter(s): _____