ORD File Exchange and Workflow – *Utilities*

During project development and delivery of an ORD project, it is anticipated that multiple disciplines will work on a project which will result in project file(s) being exchanged via the project team. The tables noted below detail the **.dgn** file names and types for the interaction between **Utility Coordination** and **External Utility Owners**. For a PDN project, Utility Coordination Plans are typically created by the Roadway Design Lead as early as Stage 2 – Footprint Established.

Utility design – as part of the development of Rainbow Plans (i.e., Location Approval Plans for a Utility's "A" date submittal package) and Utility Relocation Plans (for a Utility's "B" date submittal package)[1] – is the responsibility of the utility owner(s). Utility relocation drawings (typically referenced as "**U1** series sheets") are included in the Construction Planset (or PS&E for a PDN project).

A single workset with a single sheet index will be turned-in as part of the Construction Planset submittal (or PS&E for a PDN project). This single workset and associated sheet index will include the design files and sheet models of all applicable disciplines to complete a project's design. The **Roadway Design** Workset will be the master workset that all other disciplines' work will be added to. During the development of plans, the **Roadway Design** Workset should be provided via zip file, which includes the files noted in the tables below, as part of the handoff and interaction between **Utility Coordination** and **External Utility Owners**. The designated, project-specific Utility Coordinator should collaborate with the project's Roadway Design Lead to obtain the Roadway Design Workset (i.e. master workset).

Currently, there are three (3) different file-type scenarios for utility design within project development:

1. Utility owner works in and exchanges ORD dgn files.
2. Utility owner works in and exchanges non-ORD dgn files.
3. Utility owner works in and exchanges pdf utility design plans.

This document provides guidance for numbers 1 and 2, specifically. For number 3, the existing utility design workflow would apply where TDOT receives the relocation design plans from the utility owner(s) and then the TDOT Utility Coordinator would generate the comprehensive U1 sheets to be incorporated into the Construction Planset (or PS&E for a PDN project).

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[1] This applies for move in state contracts.

Utility owners use a variety of softwares to develop Utility Relocation Plans (i.e., Rainbow Plans), and it is not required for owners to utilize ORD. In order to accommodate the file exchange between ORD files and non-ORD files[2], a workflow has been developed for External Utility Owners which outlines the process of downgrading ORD files to V8i[3] as well as the corresponding upgrade back to ORD – once the Utility Coordinator has received the applicable file(s) from the External Utility Owner. Reference Appendix A and Appendix B of this document, which detail this procedure.[4] During this conversion process, there are two (2) assumptions which are reflected in these appendices:

- For "**A**" Date packages, the SS2 utility file will be completed in plan view only. The Utility Coordinator would assume appropriate depths when upgrading the files into the ORD utility model[5].
- For "**B**" Date packages, the SS2 utility file will be created in plan view with GEOPAK profiles (or profiles created by the utility owner in some fashion). The Utility Coordinator would then verify that profiles match up/align in the utility model, once the upgrade to ORD is complete[6].

The project-specific Utility Coordinator is the liaison between third-party utilities associated with a project and the Department. It should be noted, as a **statement of understanding**, that it is not the responsibility of the Utility Coordinator (or the Department) to provide a draft utility model as part of the file exchange *to the utility owner(s).* However, it is anticipated that the Utility Coordinator would update the base utility model based on the files and information received *from the utility owner(s).*

The file naming convention information noted in these tables references the TDOT ORD File Naming Convention Standards document. (**Note:** For example, SR-1 in Cheatham County would be **11S001-SHT-Proposed Layout.dgn**. This file will contain all proposed sheet models along with the motif model and drawing model(s).)

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[2] The current coordinate system used by TDOT is **TN83/2011F – NSRS11 (NAD83/ 2011) Tennessee State Plane Zone, US Foot**. Non-ORD files should be set to this coordinate system.
[3] This aligns with scenario #2 outlined above.
[4] This workflow is not comprehensive. There are a few attributes, such as custom linestyles, labels, etc., which do not come in as expected. Bentley has previously logged a defect.
[5] The Utility Coordinator should reference TDOT's Survey Standards Manual – Appendix A.6 Utilities which details assumed vertical offsets for a gas line, force main sanitary sewer, cable, fiber optic, power, telephone, and water line.
[6] Similar to footnote #5 related to "A" Date packages, the Utility Coordinator should verify that the Utility Owner(s) utilized the same assumed vertical offsets outlined in TDOT's Survey Standards Manual – Appendix A.6 Utilities for a gas line, force main sanitary sewer, cable, fiber optic, power, telephone, and water line.

UTILITY COORDINATOR >> EXTERNAL UTILITY OWNER(S)

As a reminder, the **Roadway Design** Workset will be provided. The files below will be most useful to the **External Utility Owner(s)** to complete their design.

Document Description	File Naming Convention	Notes
Existing Terrain	PRJ NAME-SUR-Terrain	Combined field survey TIN and aerial survey TIN, if applicable. TIN files available upon request. Utility discipline should not reproduce the TIN files.
Roadway Alignments / Profiles	PRJ NAME-DES-Alignments-Master	All Horizontal and Vertical Alignment(s).
Roadway Corridor	PRJ NAME-DES-Corridor-Master	All Corridor Models Including Roadways and Structures in the Project Area.
ITS Design File	PRJ NAME-DES-ITS	
Lighting Design File	PRJ NAME-DES-Lighting	
Proposed ROW Linework, Patterning and Text	PRJ NAME-DES-ROW	
Signalization Design File	PRJ NAME-DES-Signals	
All Proposed Terrain Files (complexed together)	PRJ NAME-DES-Terrain-PFG-Master	Required Terrain type. TIN files available upon request. Utility discipline should not reproduce TIN files.
Typical Sections for Plans	PRJ NAME-DES-Typical Sections	
Proposed Utility Model[7]	PRJ NAME-DES-Utility	
General Notes Sheet(s)	PRJ NAME-SHT-General Notes	File containing the sheet model(s) for Sheets 2C, 2C1 etc.
Roadway Layout Sheets	PRJ NAME-SHT-Proposed Layout	File containing the motif model, drawing model(s), and sheet model(s) for all Proposed Layout Sheets.

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[7] This may or may not be applicable – depending on project stage and scope. For example, if the Utility Coordinator has performed any preliminary utility work, this data could be reflected in the Utility Model.

EXTERNAL UTILITY OWNER(S) >> UTILITY COORDINATOR

The **External Utility Owner(s)** should provide the files listed below to the **Utility Coordinator**.

| Document Description	File Naming Convention	Notes
Proposed Utility Model	PRJ NAME-DES-Utility-*Utility Company Name-V8i*[8]	File containing all necessary proposed Utility model information created by the utility company that will be referenced into the Utility sheet models.
Signature Sheet	PRJ NAME-SHT-*Utility* Signature	Add the Utility signature and applicable sheets.
Utility Layout Sheets	PRJ NAME-SHT-*Utility Layouts*	As developed as part of the move in state contract – "B" date submittal package – applies only to utility design in ORD. Also referenced as Utility Relocation Plans.

RED TEXT = New file or new portion of file name.

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[8] Only include "-V8i" in the file name if MicroStation V8i was used. Otherwise, leave off.

# Appendix A. ORD Drainage and Utility Models in V8i[9]

The **Utility Coordinator** should provide all necessary ORD files that the utility company would need for reference, including the **PRJ NAME-DES-Utility.dgn** file. The utility company would then follow the process below.

1. Users first need to copy the ORD **rsc** files (**\Configuration\Organization-Civil\ TDOT_Standards\Dgnlib\Line Styles**) to the applicable location in the TDOT **V8i** workspace.

2. Then, open V8i and create a new file and name it **PRJ NAME-DES-Utility-*Utility Company Name-V8i*. Select the **seed2D.dgn** and click **Save**.

3. Before referencing in the ORD files, the color table reference preference needs to be set. Go to **Workspace >> Preferences >> Reference** and toggle off **Use Color Table**. Click **OK**. This will allow the color of all ORD reference files to be correct. **Note:** This is a <u>user preference</u> so will need to be toggled back on for other V8i projects, if necessary.

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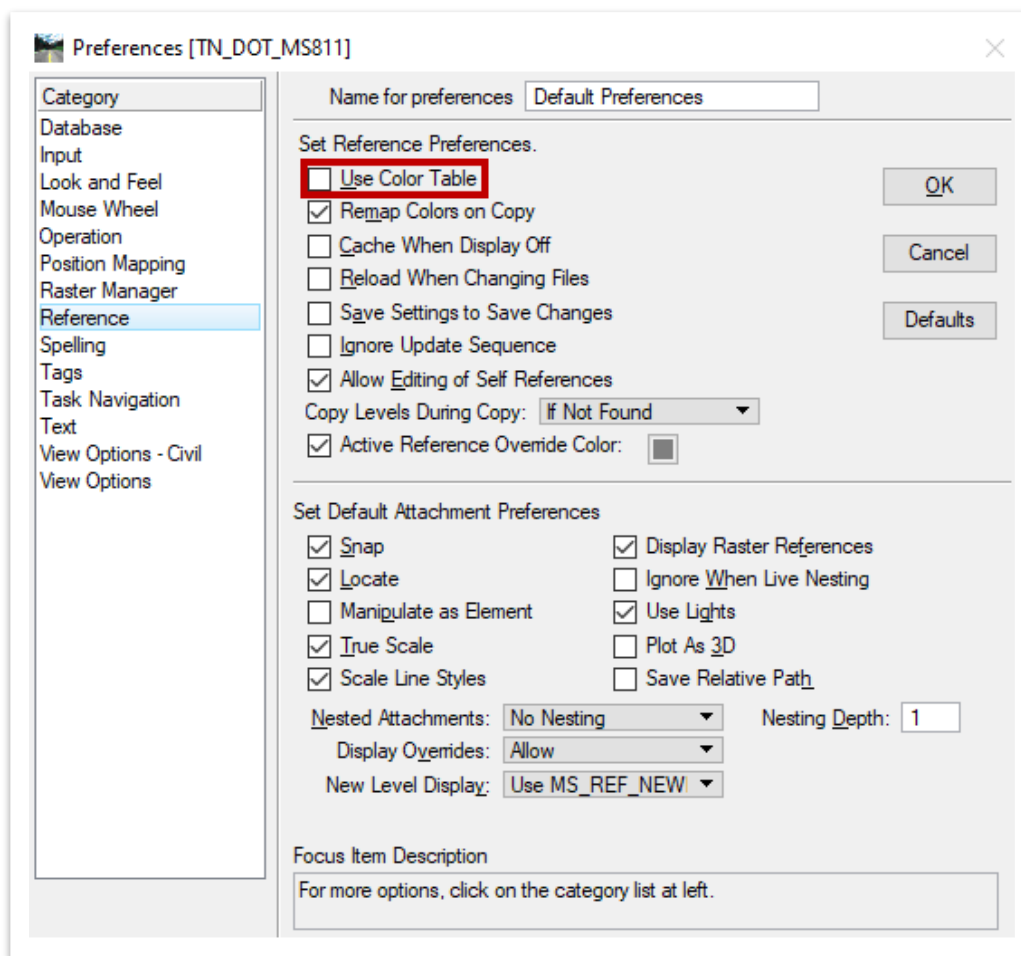
[9] The intent of this workflow is to translate ORD data and information to a SS2 level so that users who are NOT working within the ORD space can properly view project data.

4. For the user preference to be applied, close out of V8i and re-open the **PRJ NAME-DES-Utility-*Utility Company Name*-V8i.dgn** file. Attach the applicable ORD reference files and set the **Attachment Method** to **Coincident World**. Click **Fit View** and notice that the linestyle scales are incorrect.

5. **Right** click on the reference file and select **Settings**. Change the **Global LineStyle Scale** to **Reference** and click **OK**. **Note:** You must apply this setting update to each reference file individually.
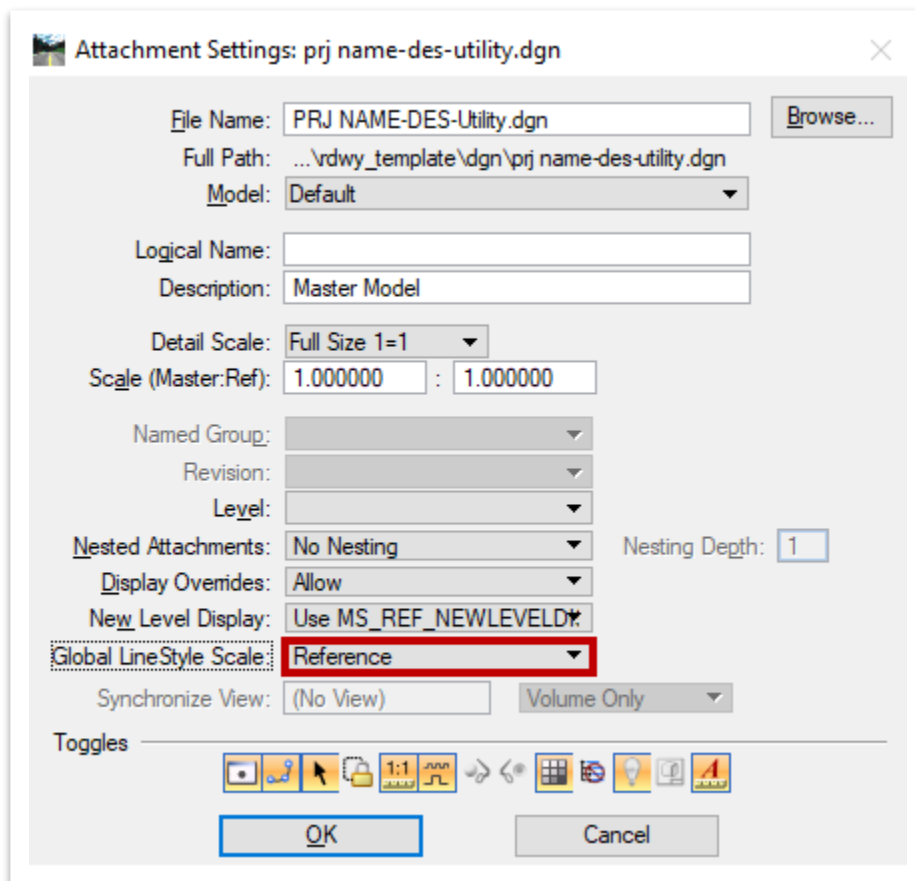

6. If utilities were drawn using the ORD Nodes and Conduits tools, additional steps will be needed to visualize the linework. Users will also need to reference the **3D** ORD utility model for conduits to visualize. However, the custom linestyles will be incorrect, so users will need to identify a utility by level and color. Users will also need to turn off the **Use Active Annotation Scale** setting in the **2D** reference file for cells with text in them to visualize properly.

7. Now that all references are attached and visualized, draw in any utility updates, as necessary, and then provide the **V8i** file back to the **Utility Coordinator**.

Appendix B. Upgrading V8i Files to ORD Drainage and Utility Model

Once the V8i utility file is submitted to the **Utility Coordinator** from the utility owner(s), follow the process below to incorporate any utility updates into ORD.

1. Open ORD and reference the **PRJ NAME-DES-Utility-*Utility Company Name-V8i*.dgn** that was created by the utility company.

2. Next, open the **Extract From Graphic** tool (**Drainage and Utilities >> Layout >> Layout**).
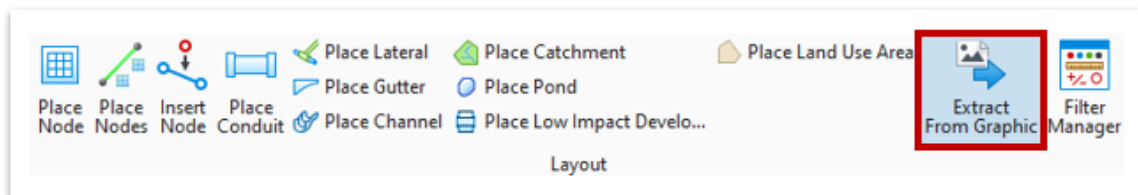
3. Within the **Extract Utilities From Graphics** dialog box, set the **Method** to **Selection**. Set the <u>Conduit</u> **Feature Definition** you would like to apply, and then select the <u>Node</u> **Feature Definition** you would like to apply.

4. Now, select the applicable line(s) in the V8i reference file that you would like to extract and then **right** click. Select the **Terrain** that needs to be referenced, which could either be existing or proposed based on the scenario. Accept the remaining prompts to place the nodes and conduit.

5. To accurately depict the proposed drainage and utilities, the elevations associated with the nodes and conduit might need to be adjusted, which would be done in the **Utility Properties**.