Project CADD file guidance for projects on hold

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CADD file Guide for projects on hold

Steps to take for CADD files before pausing project work:

Below is a set of recommended guidelines and considerations for Project Managers (PMs) and designers when deciding how to handle SS2 projects that may be shelved/paused due to STIP changes, and then later reactivated in OpenRoads Designer (ORD) or OpenBridge Designer (OBD). The objective is to minimize rework, ensure data fidelity, and provide a straightforward path for project completion upon reactivation.

Utilize minimum Conversion Strategy

A. **Import only two core files to ORD**
   - **Alignment and Existing TIN file**: Import all alignments, profiles, and existing tin file data to the latest version of ORD. This helps preserve geometry, survey basemaps, and ensures a stable starting point when the project is resumed.
   - If possible, involve a user familiar with both SS2 and ORD to verify the fidelity of the import.
   - See the Appendix at the end of this document for steps on importing the above files.

B. **Retain Legacy SS2 Files**
   - **Final Survey 2D File:** Maintain the original V8i Geopak Final Survey and reference to ORD design files.
   - Maintain the original SS2 files. This provides a fallback in the event of unforeseen CADD file transition issues.
   - Document any known CADD design decisions from all Disciplines for future reference.

Documentation for CADD files for Projects on hold

- **Rename imported Alignment and TIN files** as recommended by Roadway Design Manual chapter 13 section 13.11.3.1 titled “Design File Naming Convention”.
- **Documentation**
  - Create a “Project CADD Transition Document” detailing:
    1. Dates of last work done in SS2
    2. Dates of conversion to ORD
    3. Version of ORD software used for “imported” files
    4. Any known CADD issues or items to watch out for during reactivation
  - Store this document in the project preferably in:
    1. ProjectWise - Roadway > Design folder
    2. SharePoint - Project Management folder

Minimum Conversion Strategy:

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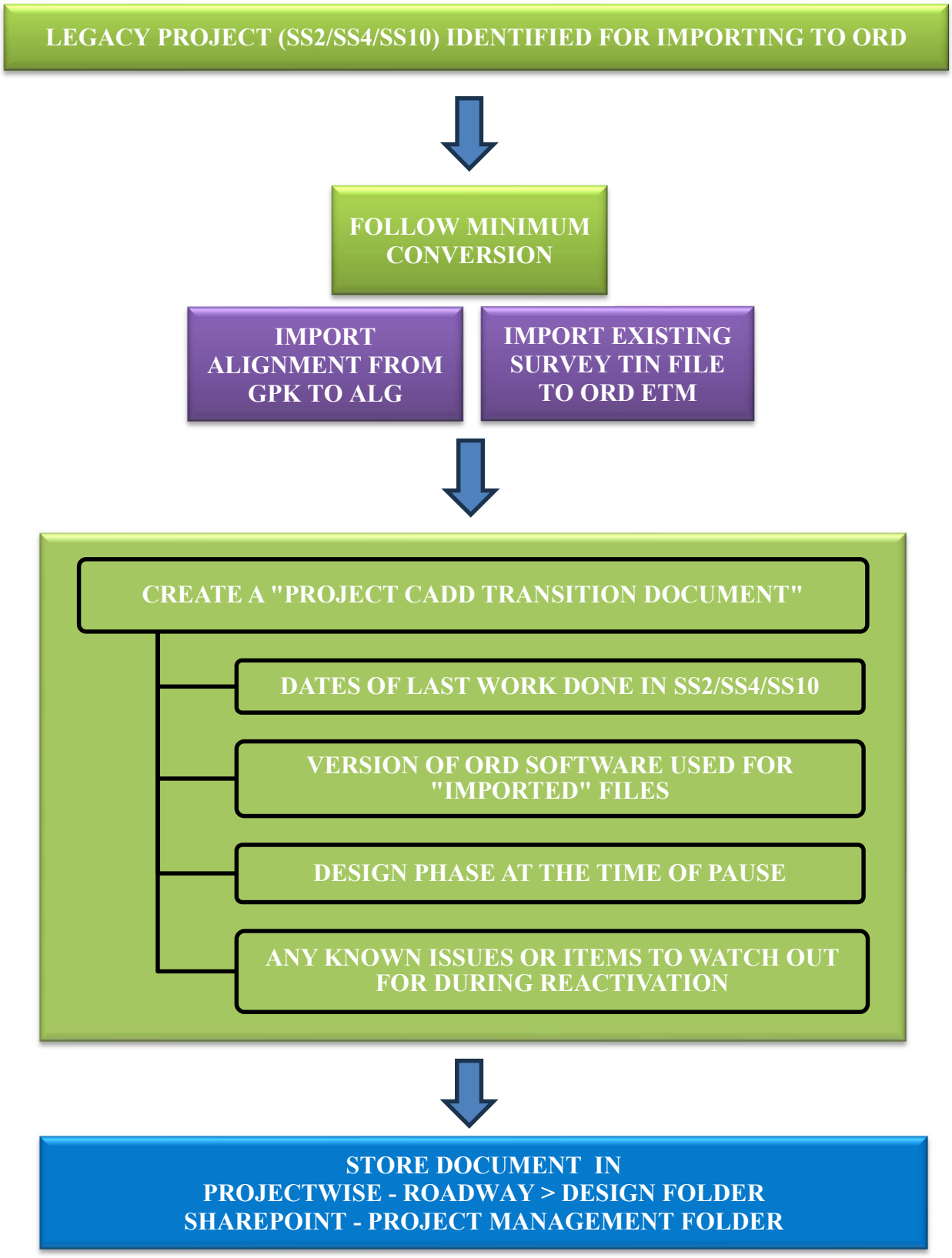
Steps for CADD file management for Projects on hold:



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APPENDIX

How does Project conversion affect all Disciplines

1. **Overview of 2D Workflow in OpenRoads Designer (ORD)**

OpenRoads Designer (ORD) generates a 3D model based on the horizontal alignments and profiles created by the designer. Cross sections in ORD can only be generated from the 3D model.

2. **Hydraulics calculations**

Hydraulics calculations utilize ORD features and tools for Project drainage design and requires usage of 3D model

3. **Structure plans**

To migrate MicroStation GEOPAK V8i (GEOPAK SS2/SS4/SS10) specifically to OpenBridge, for structure drawings, the policy linked below outlines the conversion process for V8 files to OpenBridge, emphasizing that while V8 files can be opened without data loss, certain attributes will not align with the OpenBridge workspace. When converting V8 drawings, users should accept the update prompt to transfer the V8 file to OpenBridge format, but no further changes to text or line styles are needed unless modifications are required. New drawings added to existing plan sets must be created in OpenBridge and saved separately, following SMU's file naming convention. Standard Drawings and Plans are largely imported, but will not be updated for OpenBridge consistency until content revisions are made. The policy, effective immediately, aims to streamline the conversion without requiring additional working days or project extensions.

Link : NCDOT Structure memo for V8 Dgn migration to OpenBridge Designer (OBD)

4. **All other Disciplines**

All project disciplines, except for Roadway and Hydraulics, can continue their work in 2D with the end goal of producing 2D PDF plan sets for imported projects. Hydraulic discipline requires a 3D workflow in ORD to generate drainage calculations, though the remainder of the tasks can be completed in 2D. For all other disciplines, the traditional 2D workflow remains applicable. MicroStation CADD is the core of ORD's functionality, offering the flexibility to deliver projects initially designed in Geopak V8i within ORD for 2D plan production. This ensures that the project can proceed using the conventional 2D PDF delivery format without the need for a complete 3D conversion.

5. **Plotting**

Plotting can be an issue when working with projects that have MicroStation GEOPAK V8i (GEOPAK SS2/SS4/SS10) files referenced in OpenRoads. Minor edits may be needed by the plot drivers.

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Import Alignments

Alignments can be imported from the GEOPAK COGO file (GPK).

In this section, we are focused on the import of the horizontal and vertical alignments which are roadway centerlines and baselines. The alignments being imported here will serve two purposes; the permanent alignment used for plans production and the alignments used for corridor modeling.

1. Create and open a DGN file for containing the alignments. Use a 2D seed file. In this document all alignments will be imported to a single DGN file. Having each alignment in a separate DGN may be preferred for some projects.
2. Set workflow to OpenRoads Designer Modeling and click on Geometry tab.

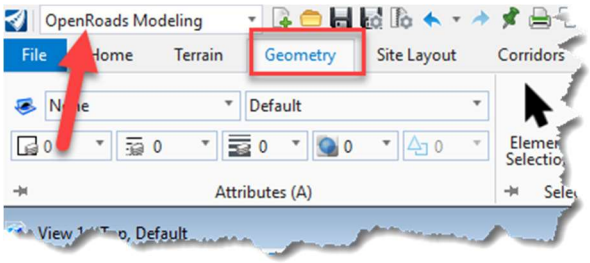

Figure 1 - Geometry Commands

3. In General Tools group click on Import

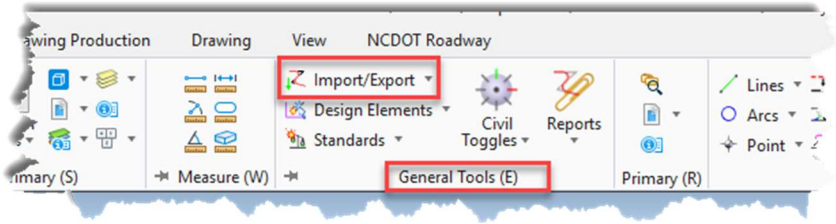

Figure 2 - Import Geometry

4. Choose the GPK or ALG file.

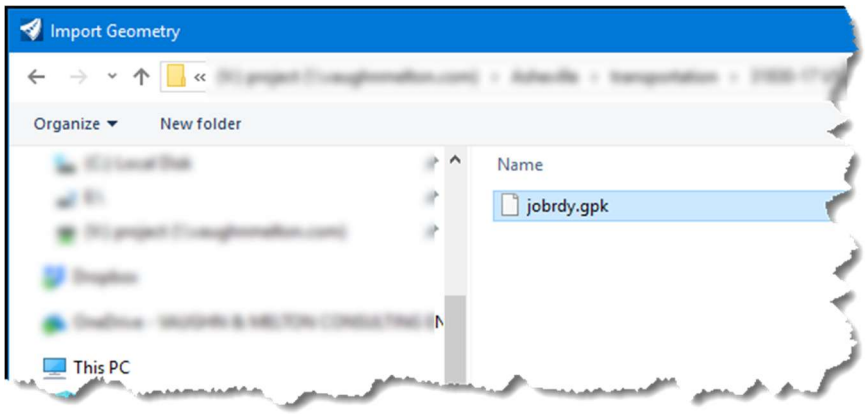

Figure 3 - Selecting GPK file

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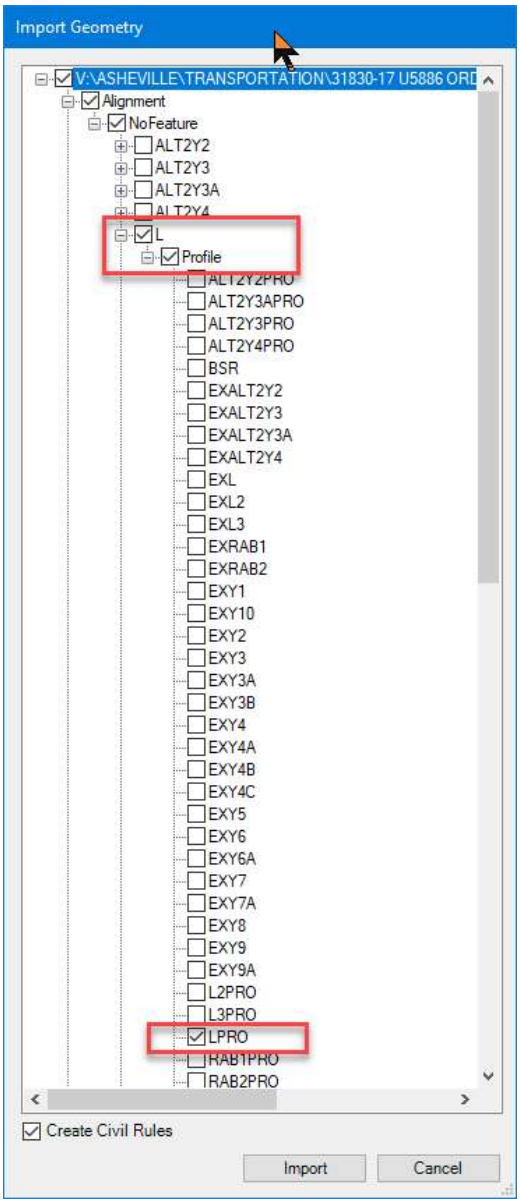
5. After selecting the GPK file, the Import Geometry dialog box opens. Expand Alignments then expand No Feature. If you are importing from GPK, then you must expand each alignment and select the profile which matches to the alignments.

Figure 4 Select Alignments to Import



6. Select each alignment and matching profile that is desired to import.

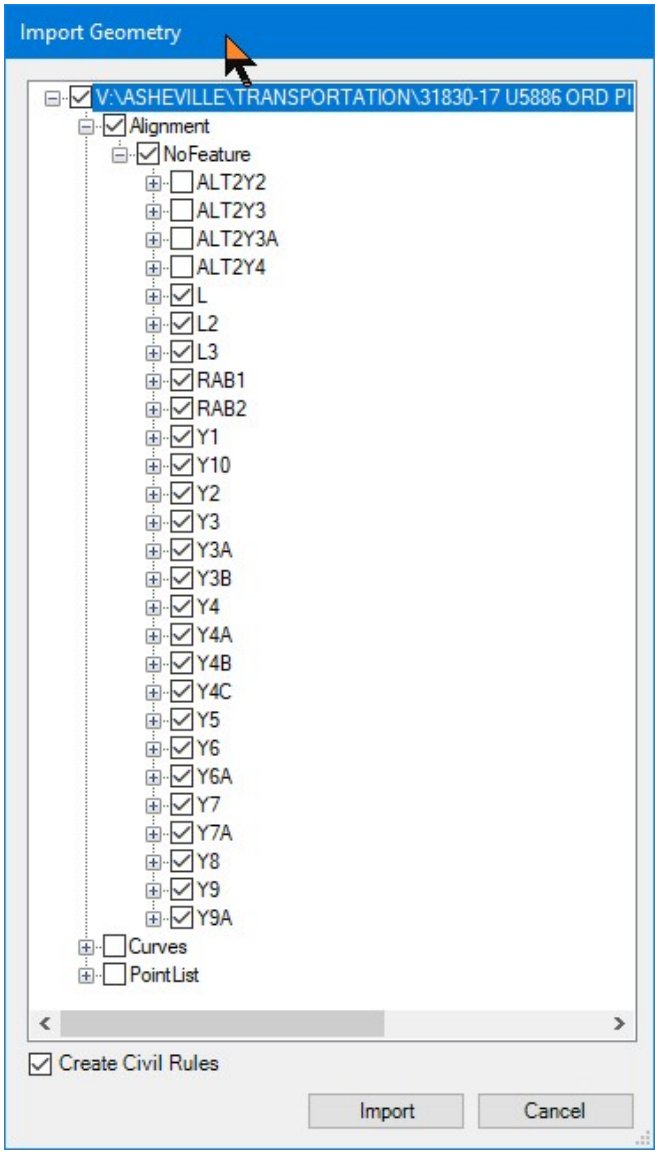


Figure 5 - All Desired Alignments Selected

7. At the bottom, **make sure the Create Civil Rules check box is toggled on**. This allows editing of the alignments using the OpenRoads Designer rules mechanisms later if needed. If this box is turned off, then the alignments are imported as plain graphic elements.
8. Click Import.

9. The alignments are imported. The centerline for the roadway is in the middle part of the terrain model and the other alignments are scattered throughout along the centerline.

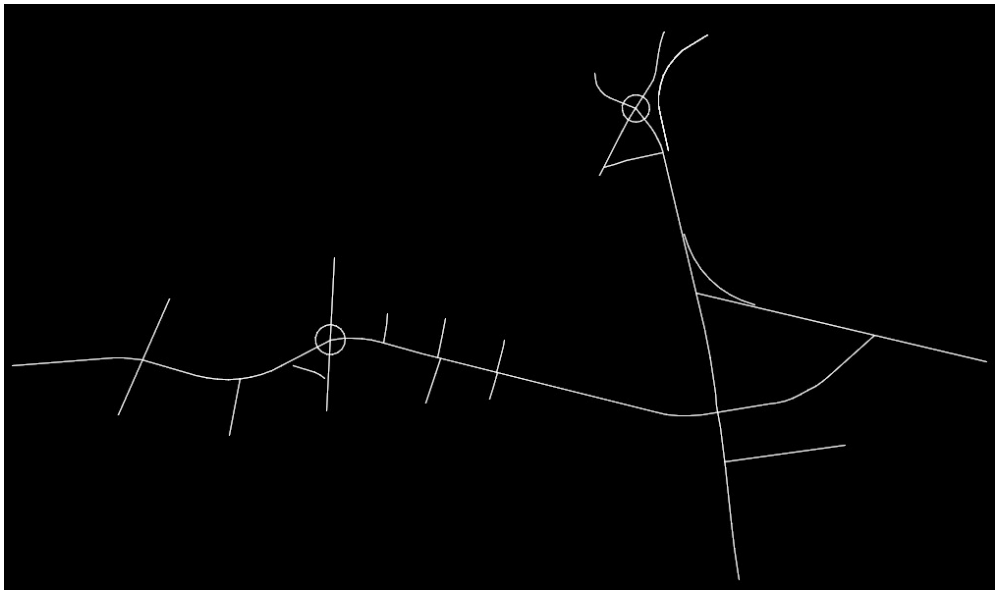


Figure 6 Imported Alignments Have No Feature Definitions

10. At this point, you may notice there appears to be duplicate elements shown in the view. This is because the 3D model created by OpenRoads is automatically referenced to the 2D model. In Reference Manager, turn off the display of Default 3D for better clarity in the view.

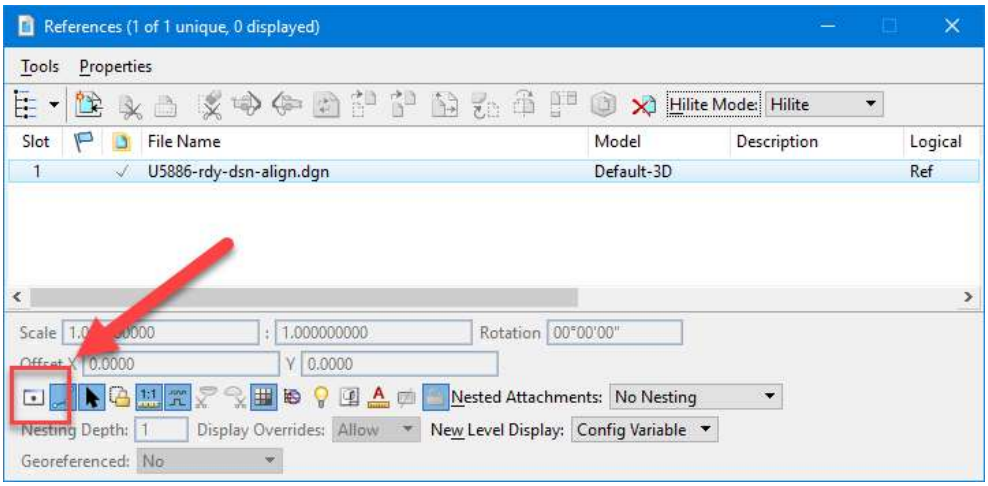


Figure 7 - Turn Off Display of 3D Reference

11. Select one of the alignments and open Element Information.

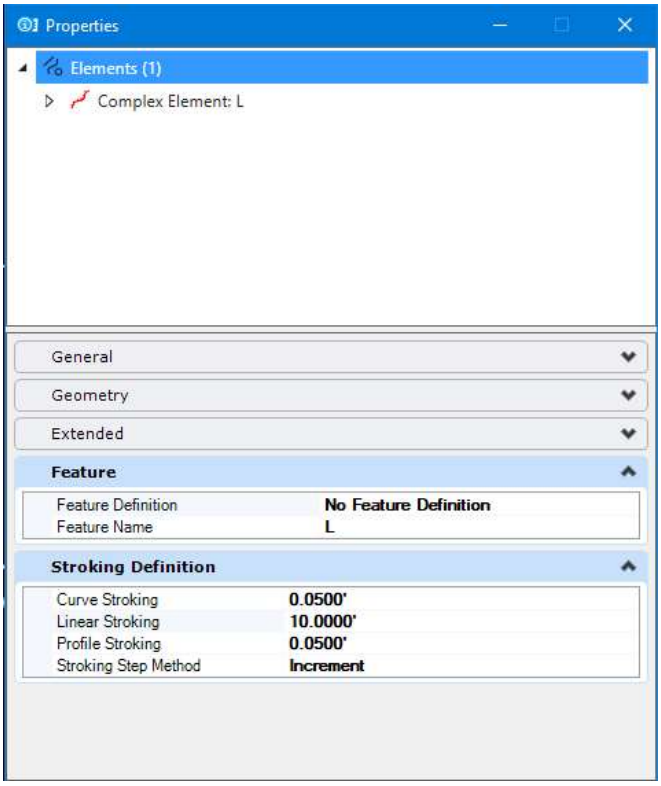


Figure 8 - Alignment Feature Definition

Note, the alignment name matches the name in the GPK/ALG file but the Feature Definition reads “No Feature Definition”. The feature definitions configured for OpenRoads Designer do not match the older DDB or XIN styles used, and no feature definition is assigned on import.

12. This can be easily solved if you select all the alignments, then use element information to change the feature definition for all of them at once.

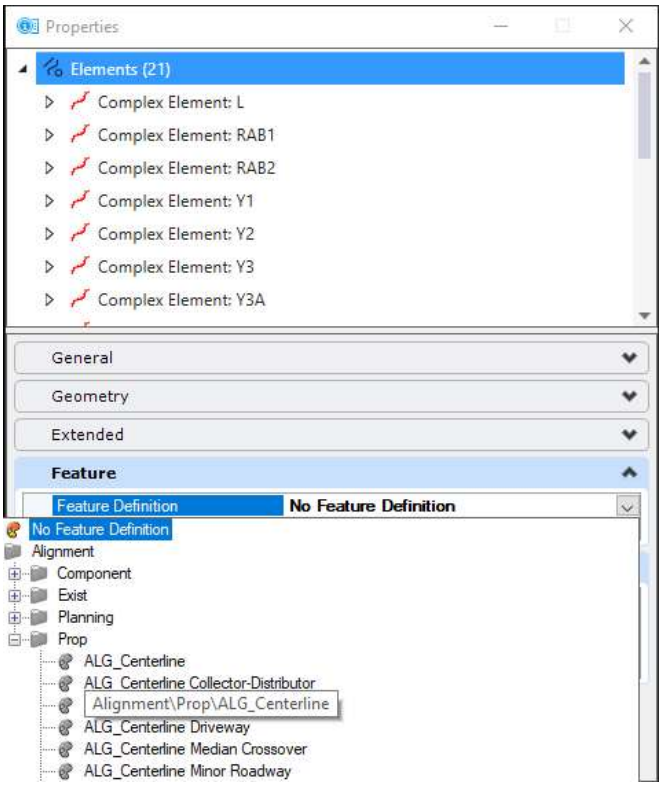


Figure 9 - Changing Alignment Feature Definitions

13. The centerlines will now appear in familiar symbology, although another change for OpenRoads Designer is that the curves in the alignments are now a different color than the tangents.

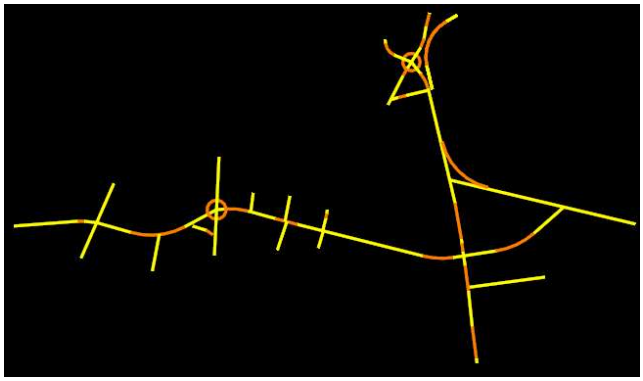


Figure 10 - Alignments with Correct Symbology

14. Select one of the centerlines and hover the cursor on the alignment until the context toolbox opens. Then click on the **Horizontal Geometry Report** icon.

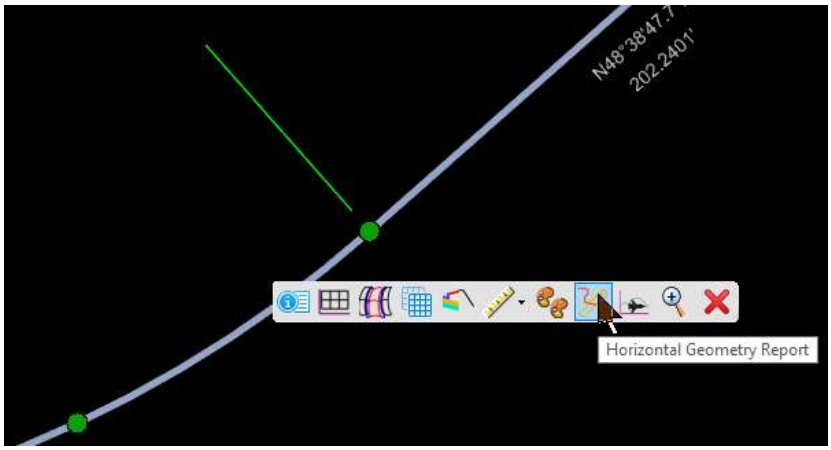


Figure 11 - Alignment Context Toolbox

The report can be used to verify the imports were successful.

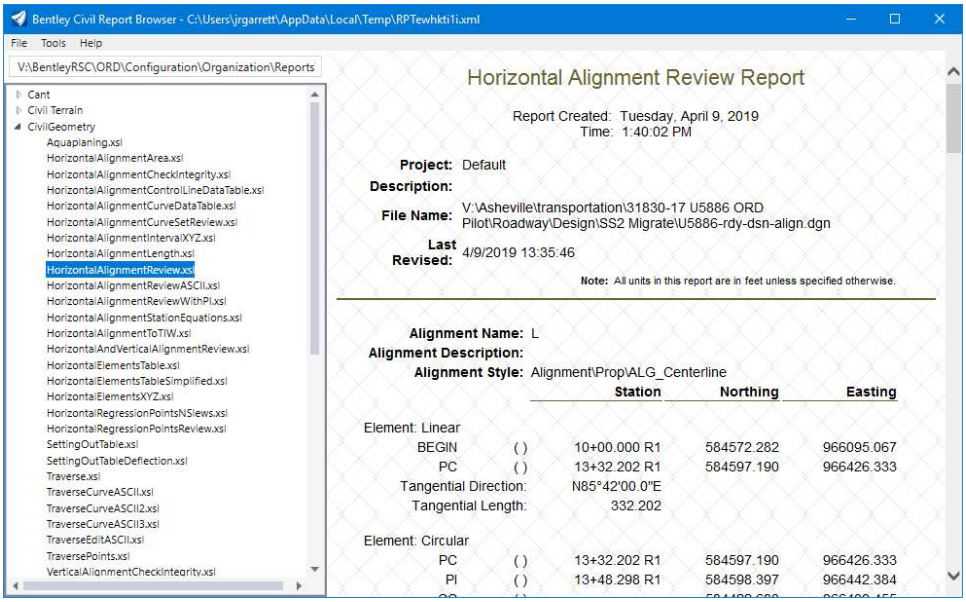


Figure 12 - Alignment Report

15. **Save a copy of the report for future reference and close** the alignment report.

16. With the centerline still selected, hover the cursor on the alignment until the context toolbox opens and click on **Open Profile Model**.

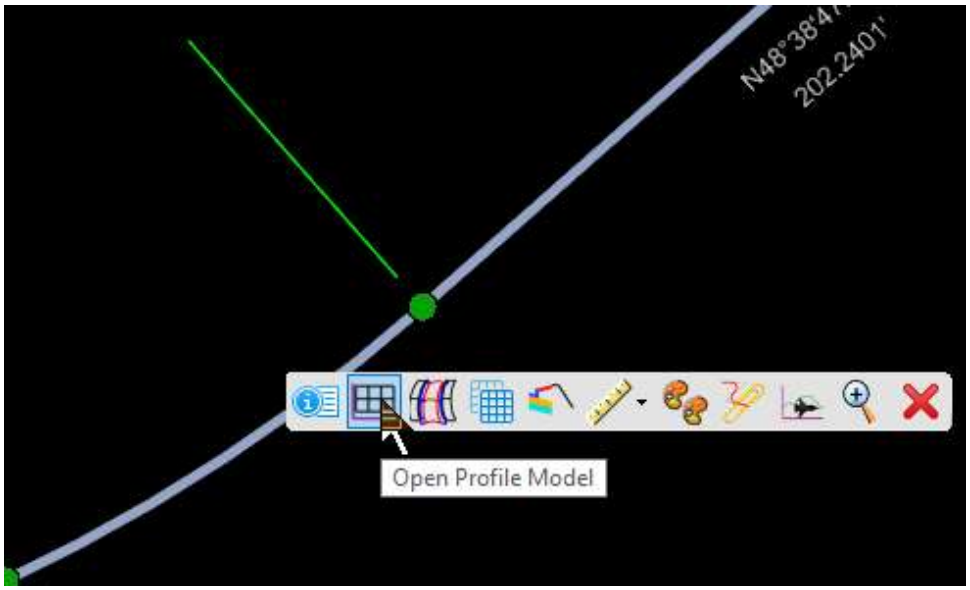


Figure 13 - Opening Profile View

17. The prompt reads ***Select or Open View***. Open **View 2** then left click in that view.

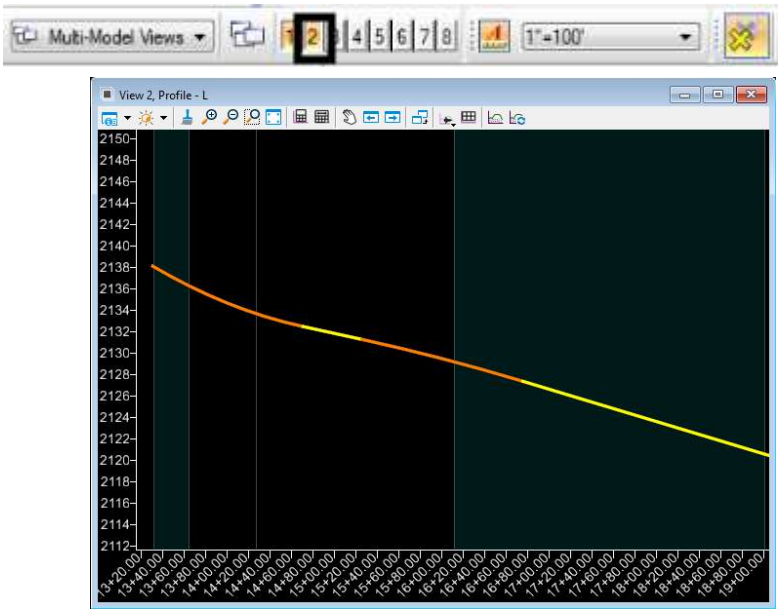


Figure 14 - Profile View

18. In the Profile View (View 2), select the vertical alignment element and open Element Information**,** where you can change the feature definition for the profile in a similar fashion as you did for the horizontal alignments above.

19. Select the vertical alignment and using the context menu, Open the Profile Report.

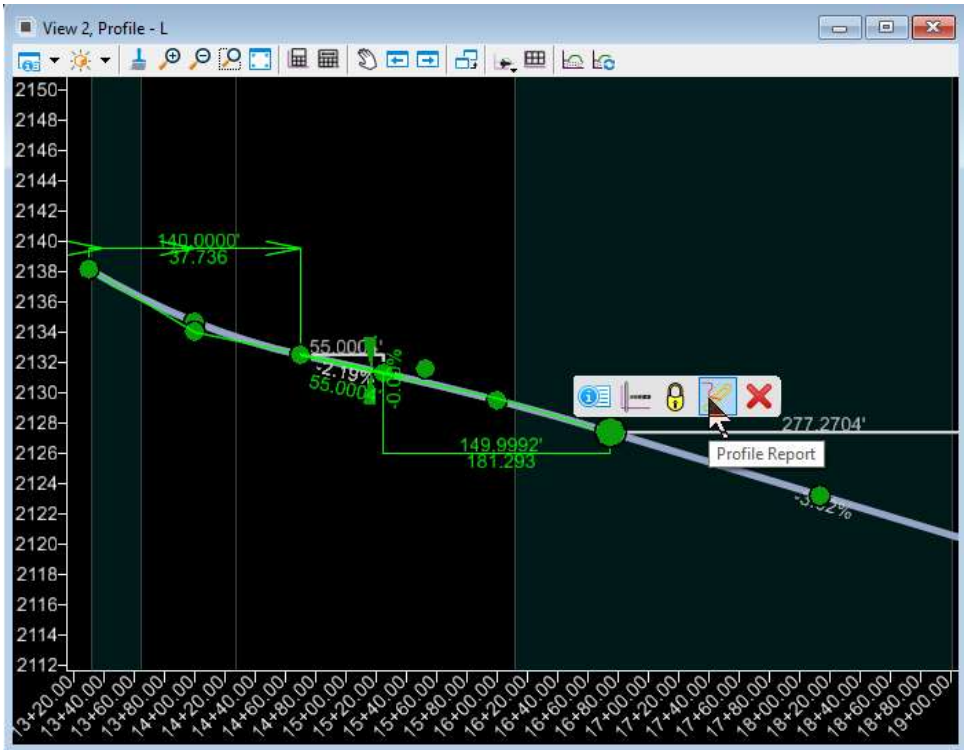


Figure 15 - Profile Context Toolbox

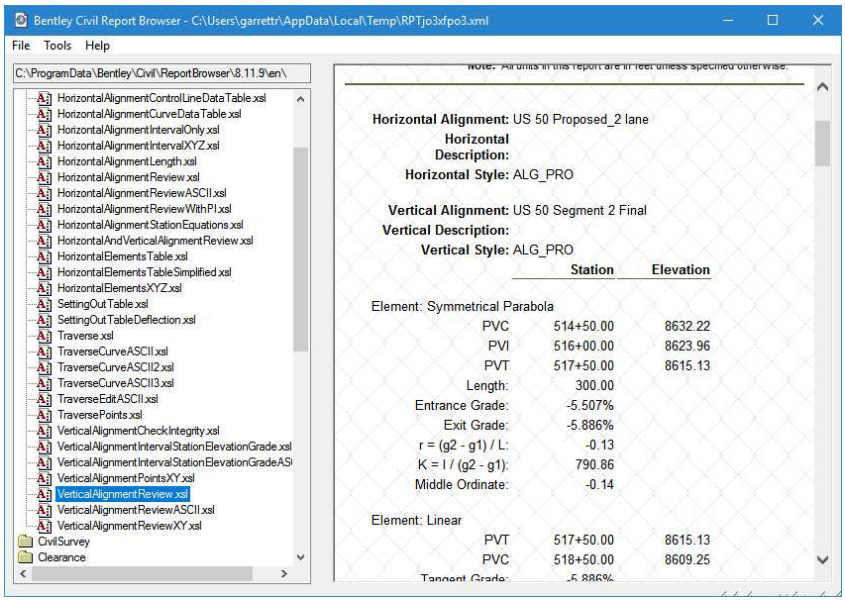


Figure 16 - Profile Report

At this point, we should have all the geometry we need to start migrating the Select Series 2 IRD corridor to an OpenRoads corridor.

Best Practices – Import GPK/ALG

- **It is a good idea to generate an alignment and profile report** after import to ensure a successful import has occurred.
- The alignment for roundabout circles is probably best to recreate in OpenRoads Designer tools. These circular alignments in GEOPAK were arcs of 360 degrees deflection not true circles. This can lead to problems later when you are trying to project slopes from the circle. Using the OpenRoads Designer geometry command for circle produces a true circular element.

Potential Errors and Problems – Import ALG

- Imported geometry will almost never have a proper feature definition assigned after import and will have to be edited.

Import TIN Files to OpenRoads Designer

At minimum, the TIN files used for existing ground must be imported to OpenRoads Designer. If there are other surfaces which serve as targets for corridors (rock surfaces for example) these must also be imported to OpenRoads Designer. The importation of TIN files is very simple. It requires only selecting the TIN file and choose an OpenRoads Designer feature definition which is assigned to the imported surface.

In the following exercise, the primary existing ground TIN will be imported to an OpenRoads Designer terrain model. The import process needs to be repeated for all required surfaces. The following workflow shows only one file being imported but the same process is repeated for all required surfaces. When importing terrain models, remember that it is **best practice to have only one OpenRoads Designer terrain model per DGN file**.

1. Create and open a new DGN file to contain the terrain model, using the 3D seed file.
2. Set the workflow to OpenRoads Modeling and click on the Terrain tab.

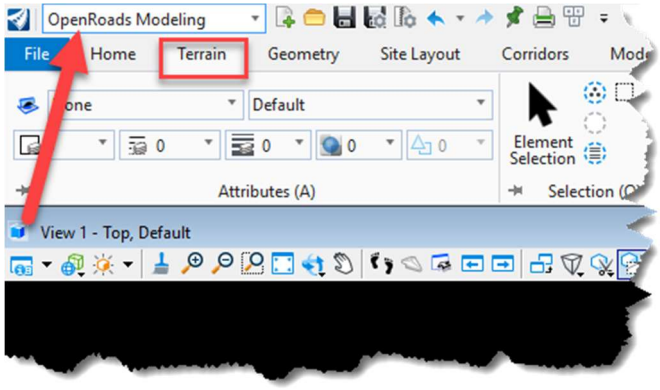


Figure 17 - Terrain Model Tools

3. In the Create Group of commands, click on From File.

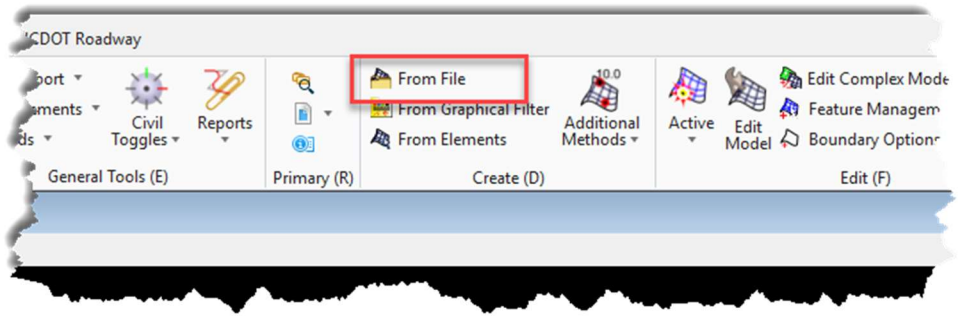


Figure 18 - Terrain Model from File

4. Choose the TIN file.

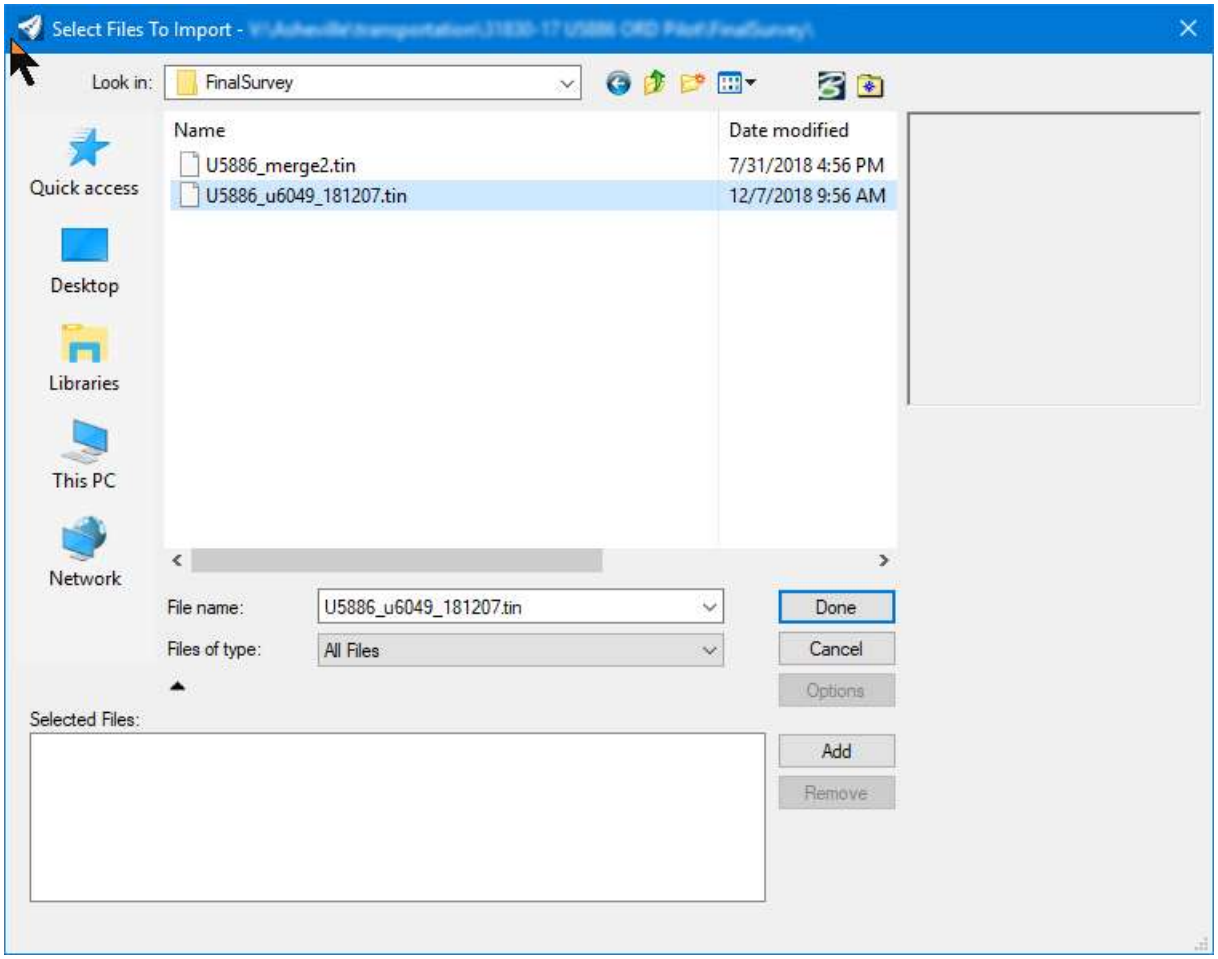


Figure 19 - Selecting TIN file

5. In the import dialog, set the feature definition to /Terrain/Exist/ET Boundary.

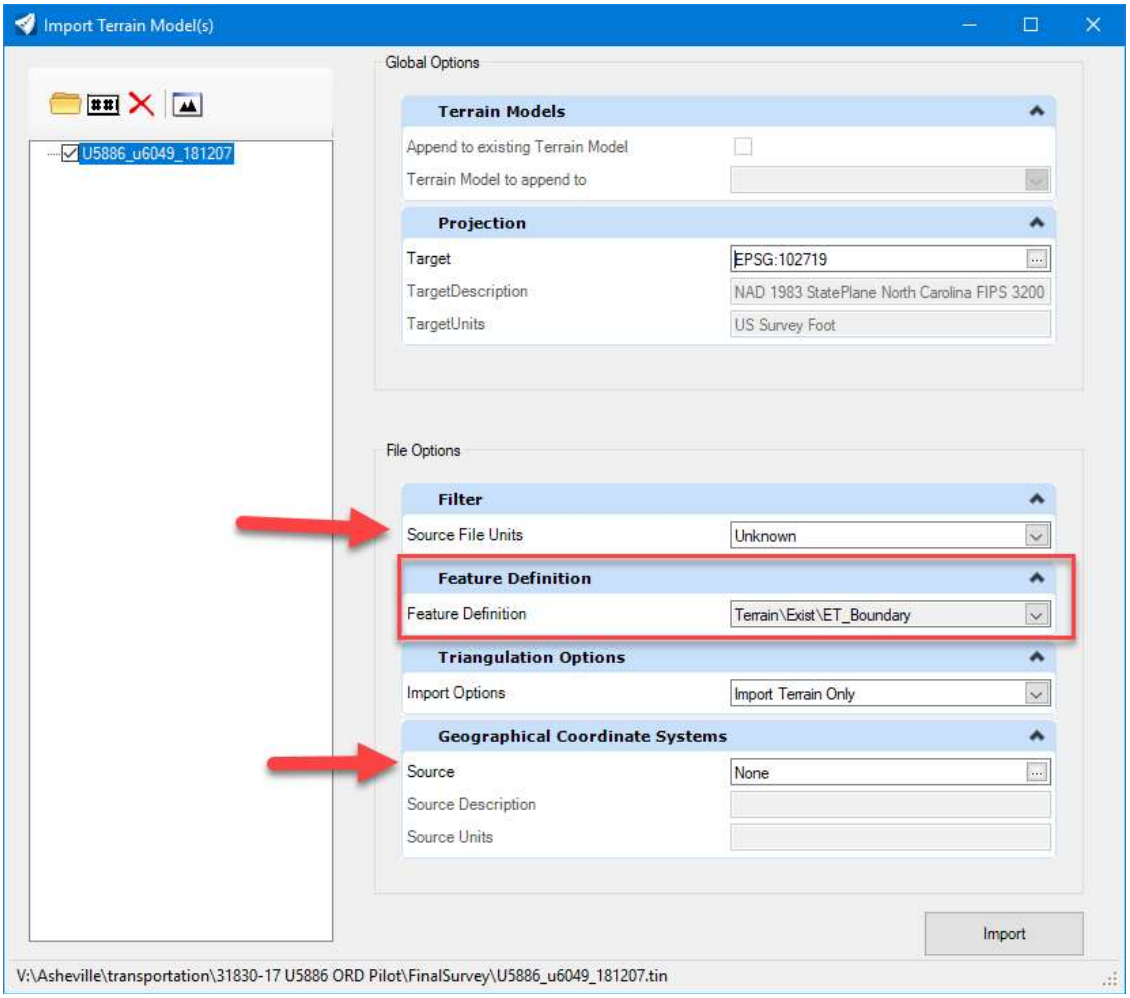


Figure 20 - Import Terrain Settings

6. Set the import option to import terrain only. This imports only the terrain model and not the Features. Normally, it is not required to import the features. Triangles and break lines are automatically created as components of the terrain model element.

7. If the TIN is in different units or coordinate system, then set the appropriate units and GCS in the dialog. This allows OpenRoads Designer to automatically transform the terrain model as it is being imported.

8. Click the Import button.

9. Once processing is complete, close the Import Terrain Model(s) dialog box.

10. **Fit View** to see the imported terrain model.

Figure 21 - Imported Terrain

Best Practices – Import TIN

- Use 3D seed files when starting a new DGN that will contain a terrain model.
- Generally, store only one terrain model per DGN file, unless they are small. This is for better performance.
- Assign a geographic coordinate system to the DGN file before importing the TIN file. This allows transformation of the TIN on the fly during the import process, if needed.
- When importing the TIN file, use a feature definition which displays the boundary only to start. Thus, there will be minimal delays in drawing time. TIN files which contain very large numbers of triangles or dense contours will take a while to draw if the feature definition shows these by default. After the TIN is imported and the boundary looks OK, then the feature definition can be changed.
- There is usually no need to import both the terrain model and the features (step 6 above). Ordinary features, such as triangles and break lines are automatically created as components of the terrain model element.

Potential Errors and Problems – Import TIN

- Picking the wrong feature definition for the terrain model, but this is easily changed in the properties of the terrain model after import.
- Choosing a feature definition at import which displays triangles or contours by default could be slow to draw on screen if the imported TIN is very large.

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Referencing SS2 files correctly in OpenRoads

Some files which were produced using V8i Select Series 2, will exhibit scaling issues when used as reference files in an OpenRoads Designer design. These scaling issues can occur in any DGN file originally generated in the V8i Select Series 2 product. The problem will manifest as line styles or cells which display at a massive size. The first indication that something is wrong is often realized when attaching the final survey file to one of the OpenRoads Designer design files. The first impression is often very dramatic.

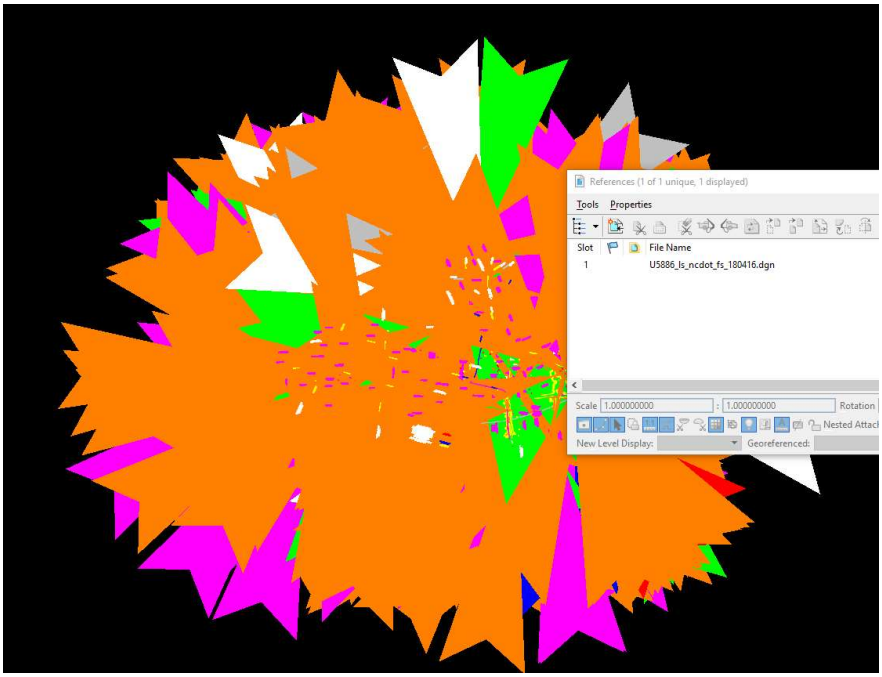

Figure 22 - First indication of scaling errors.

While this image looks very intimidating, once the cause is known then it is not a difficult problem to solve.
What we see in this image of a final survey file is all the hundreds of dimension lines and leader lines which are displayed 600 times too large because of the differences in how scale was defined in V8i Select Series 2 and how it is now defined in OpenRoads Designer. In many cases, a quick fix is available by simply adjusting a setting when attaching the file as reference. After attaching the reference and identifying the problem, then double click the reference file and change the setting shown in Figure 23.

Note: If the designer has experience with the reference file in question, then this setting can be defined during the file attachment process rather than edit afterwards.

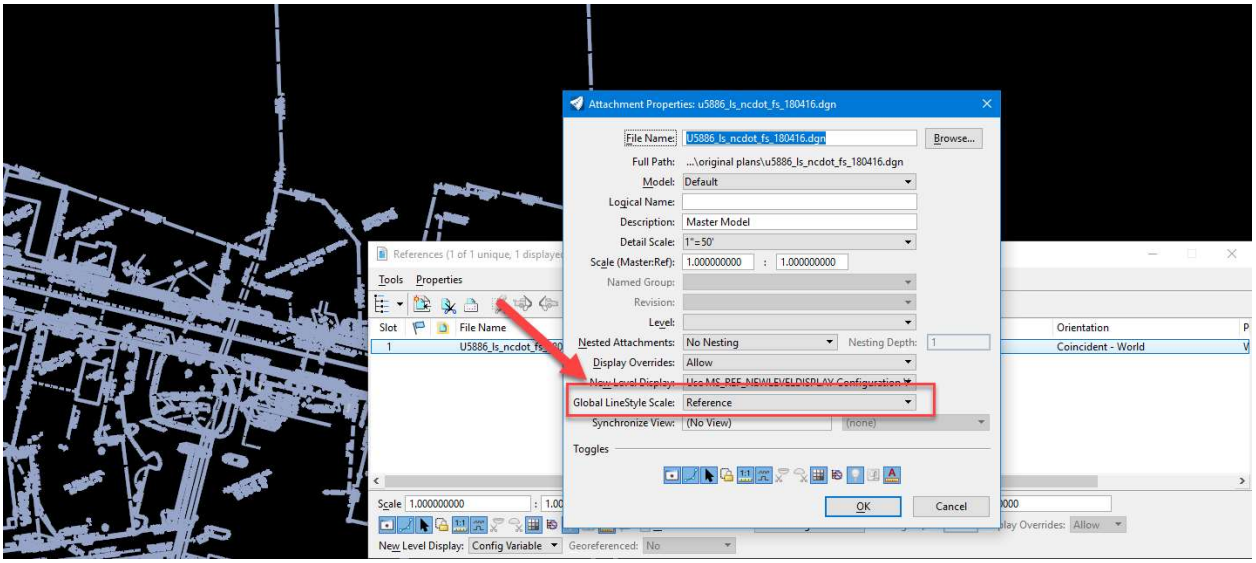

Figure 23 - Change Reference Setting Related to Line Style Scale.

The above-described setting must be applied in every instance that the V8i Select Series 2 file is used as reference. The setting may not prove completely adequate or if a more permanent solution is desired whereby the setting need not be set every time, then an alternative solution is to change the scaling method of the older file. This can be somewhat a lengthy process but may be desirable, especially for larger projects which may be expected to continue for an extended time. First, you would open the older file in OpenRoads Designer and change the model properties to use Annotation Scale for line styles rather than Global Scale.

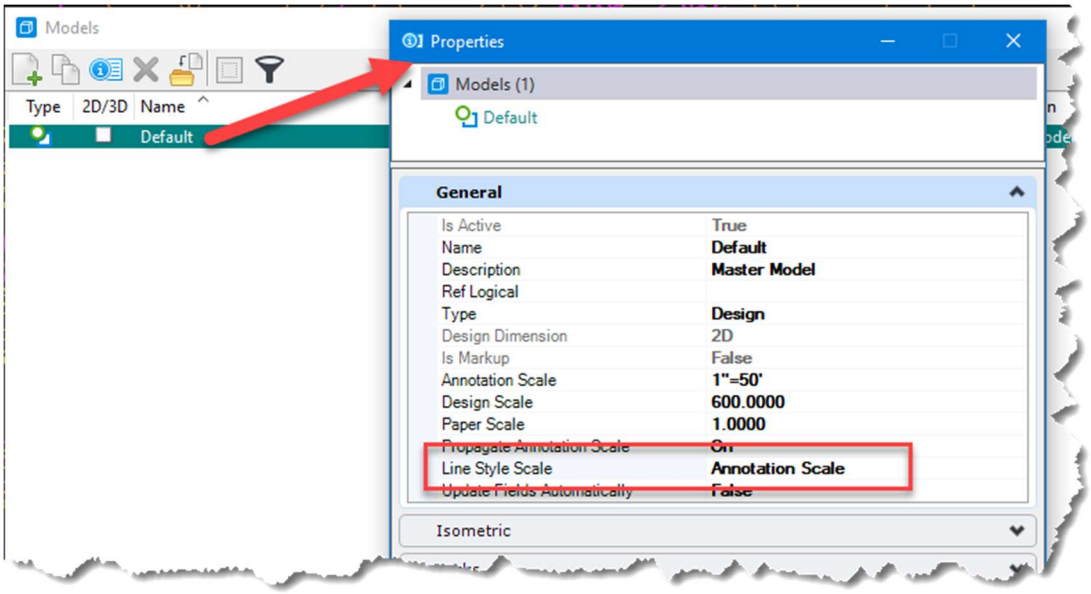

Figure 24 - Changing Model Properties

This will cause the lines in the older file to generate the same mess as shown in Figure 22. Then, each of the lines which utilize custom line styles must be selected and the scale changed from 50.0 to 0.083333.

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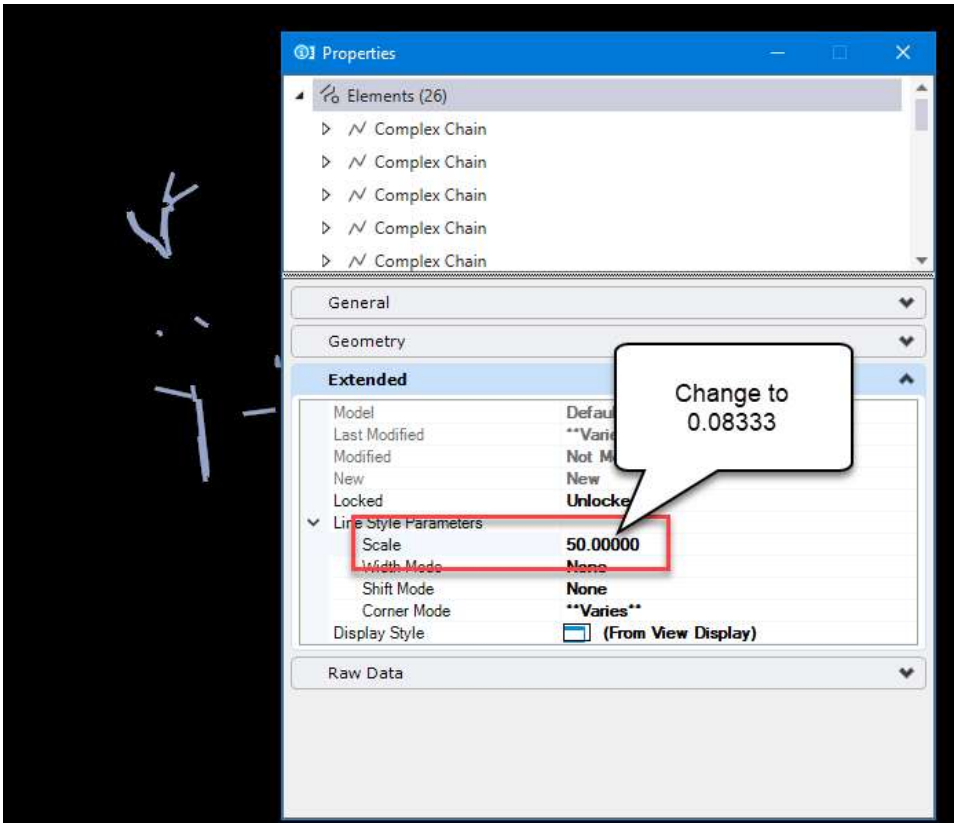

Figure 25 - Line Scale Change

One fairly efficient way of making this change for the hundreds of lines in a file is to first select all the linear elements in the file using the Selector tool or Select “By Attributes”.

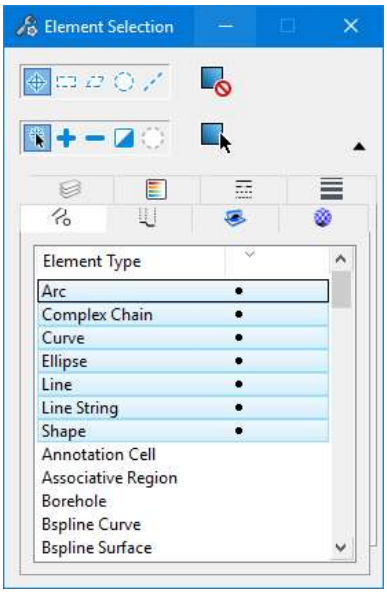

Figure 26 - All linear Elements Selected

Then, using element information, many lines can be adjusted at once.

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Note: Be patient since the Element Information tool in OpenRoads Designer is very slow when many elements are selected at once.

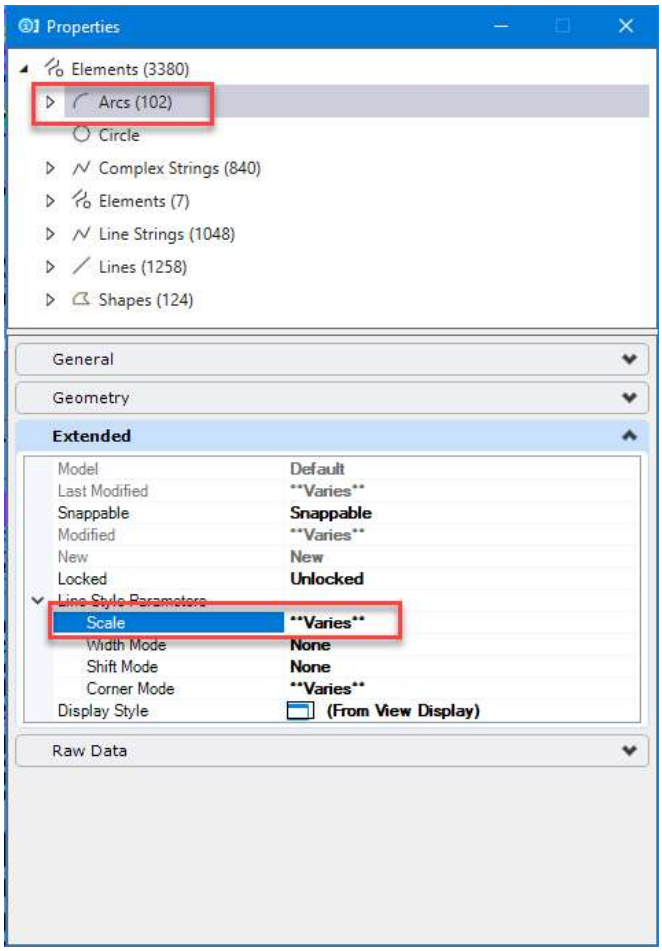

Figure 27 - Changing Line Sale for all Arcs in a File

In Figure 27, you will note that all linear elements have been selected, but it is necessary to make the actual edit one type at a time. Thus, as shown, Arcs are selected at the top of Element Information which allows me to change the scale of all the arcs. Then, I would move down to Circles, Complex Strings and so on. This will clean up the vast majority of the lines. This can be accomplished in just 5-10 minutes.

Then, some files have various dimensions placed in them. These dimension lines are created using cells. For example, in the final survey file, these cells are used extensively to label the existing right of way width. Each of these cells contains two lines, each of which may exhibit the line scaling issue.

At present the only known way to correct these is one cell at a time as follows:
Select all cells using Selector. Then, by using element information, expand each occurrence of the cells and change the scale to 0.08333. In Figure 28, there are 41 occurrences of the right of way width label. For each occurrence expand the cell and change the two lines scale factor.

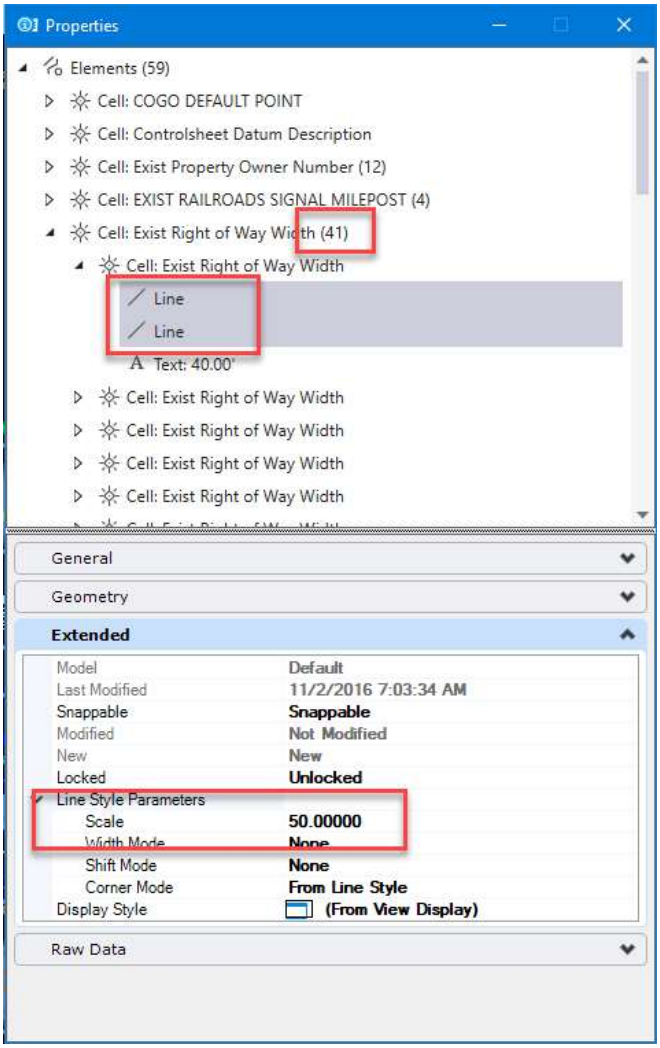

Figure 28 - Cells Used for Dimensions

Changing these 41 dimensions required another 10-15 minutes, which would of course take longer for larger projects. All told, the time required for this more permanent fix to older files is estimated at an hour or so per file. Besides the 20-30 minutes described in the above tasks, there will be several more minutes required to simply determine what problems exist. The advantage to these more permanent fixes is that the older file will now behave identically to brand new files created in OpenRoads Designer. This could be important for projects which are expected to extend for more than a few months. Making this change then adjusts the older file to behave in same manner as newer files created in OpenRoads Designer.