Bentley
Sustaining Infrastructure

Beyond Corridor Modeling in OpenRoads

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Benefits of 3D Modeling

"There are significant benefits associated with 3D design methods beyond support for AMG. ***The highest ranked additional benefit is detection and elimination of design errors prior to construction …"***

http://ntl.bts.gov/lib/46000/46500/46557/CFIRE_02-05_Final_Report.pdf

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Agenda

- Overview
  - Corridors
  - Civil Model
  - Template Technology
- It's Really about Modeling
  - Piers and Abutments
  - Tunnel Wall
  - Rails
  - Sleepers
- Going further…

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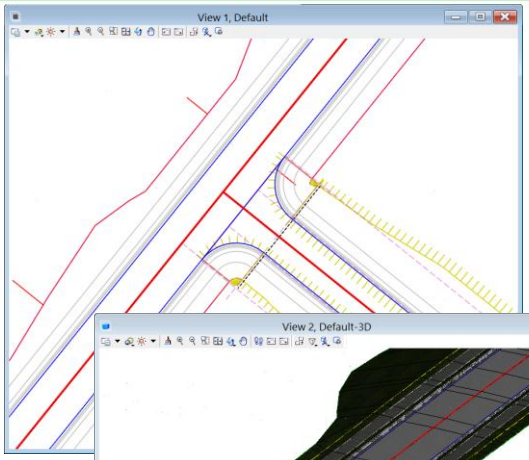
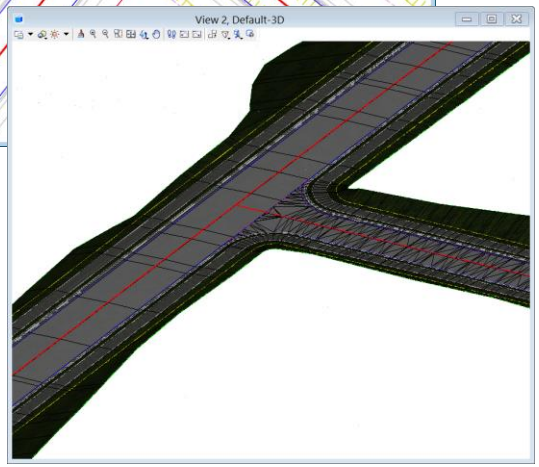
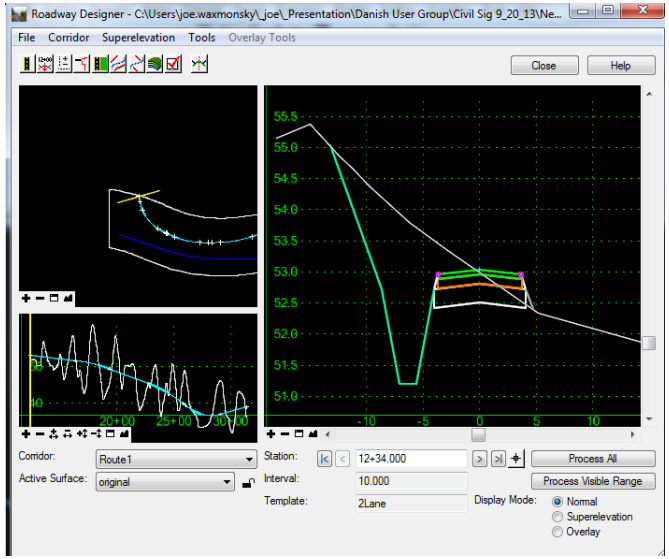
Overview - OpenRoads Corridors

- Start with a MicroStation 2D DGN.
- Allow Civil to Create/Manage the 3D
  - Separation of 2 Worlds but in same DGN
  - Doesn't mean you can't use 3D Environment
  - Think of it as…..







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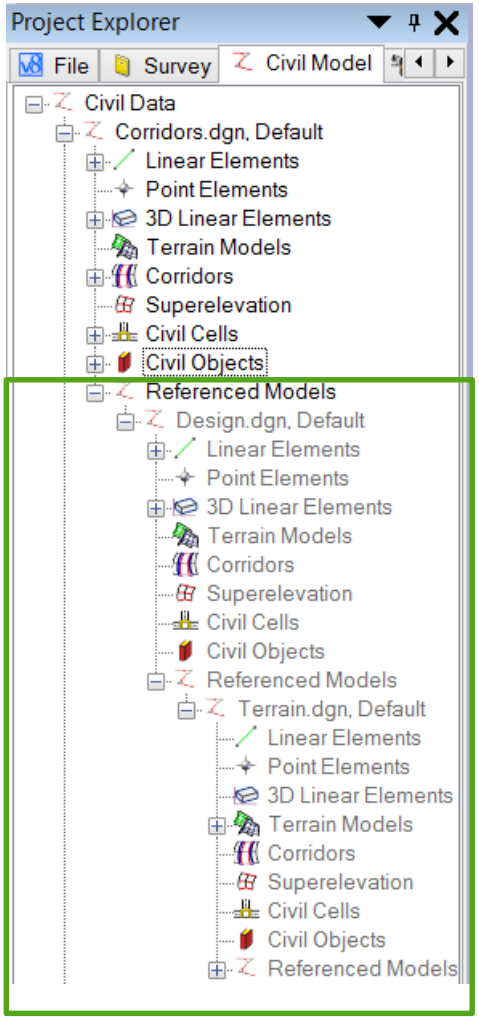
Understanding The Civil Model

Project Explorer > Civil Model

Provides the container for the Civil Model

- Linear Elements
- Point Elements
- 3D Linear
- Terrain Models
- Corridors
- Superelevation
- Civil Objects
- Civil Cells
- Reference Models

Read Only Access to reference files



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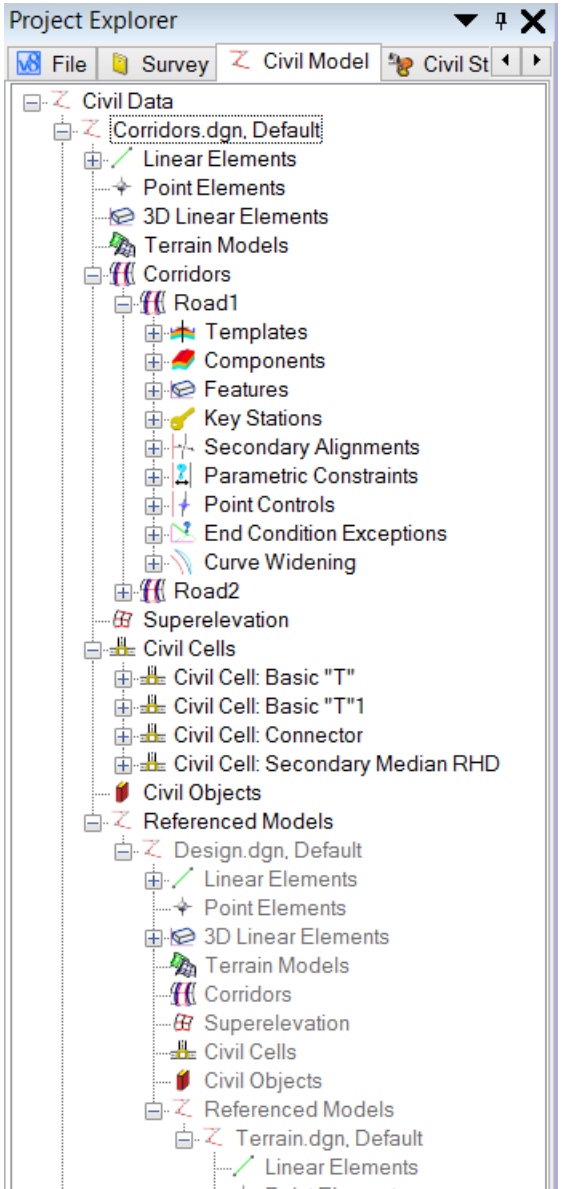
Understanding The Civil Model

Project Explorer > Civil Model

Special containers for the Civil Model

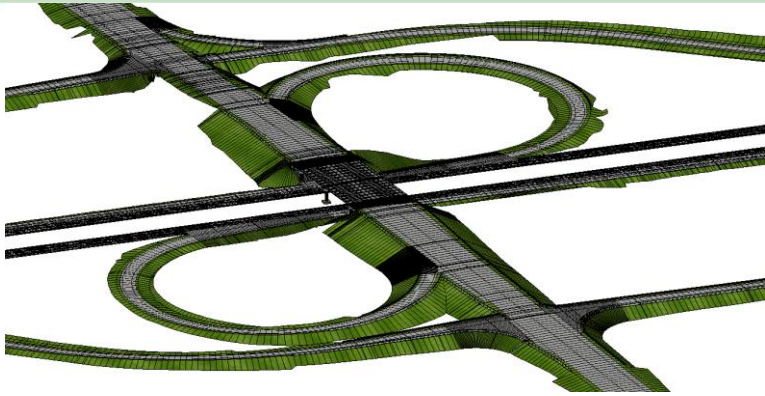
- Linear Elements
- Point Elements
- 3D Linear
- Terrain Models
- **Corridors**
- Superelevation
- **Civil Objects**
- **Civil Cells**
- Reference Models

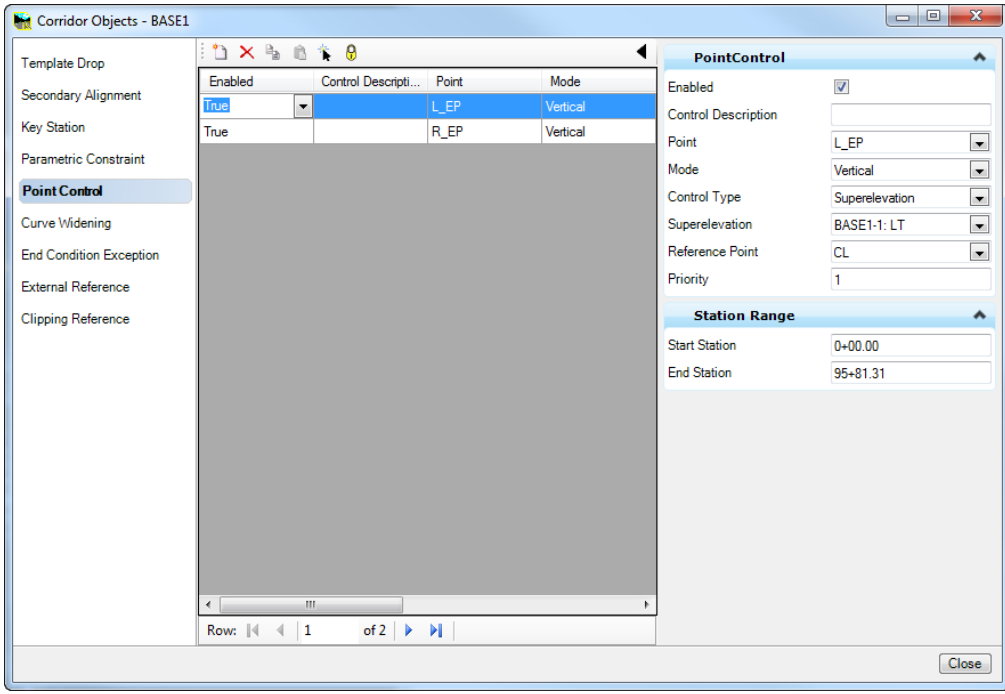
Container content not visible at the top level of the Civil Data Model



Template Technology - Corridors

- Provide a container for the model ingredients
  - Multiple Template Drops
  - Point controls
  - Parametrics
  - Curve Widening
  - End Condition Exceptions
  - Corridor References
- Model accuracy is based off Template Drop Interval and design stage critical sections





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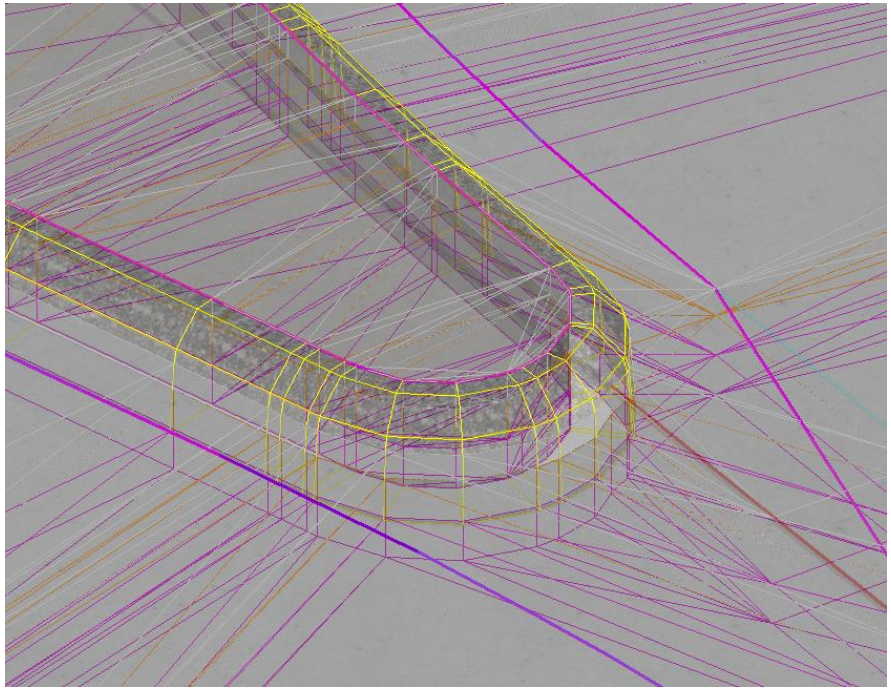
Template Technology - Linear Templates

- Subset of Corridor
- Single Drop with frequency of drop based off Stroking of Element hung upon
- Use of Site based entities where accuracy > scale

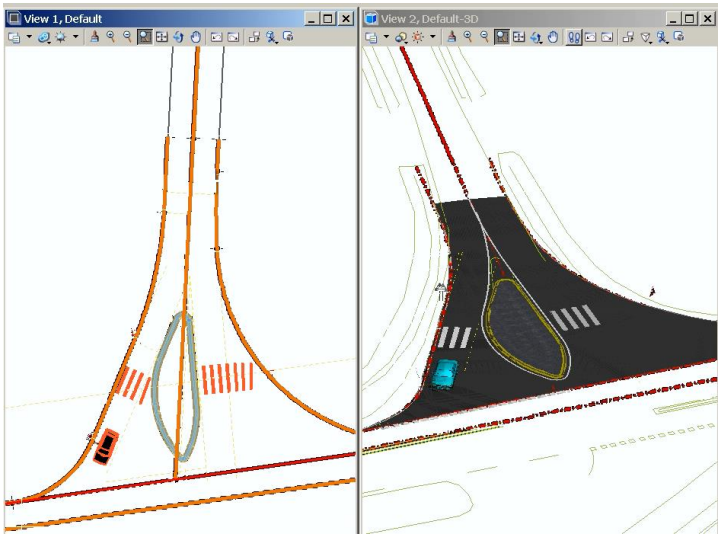


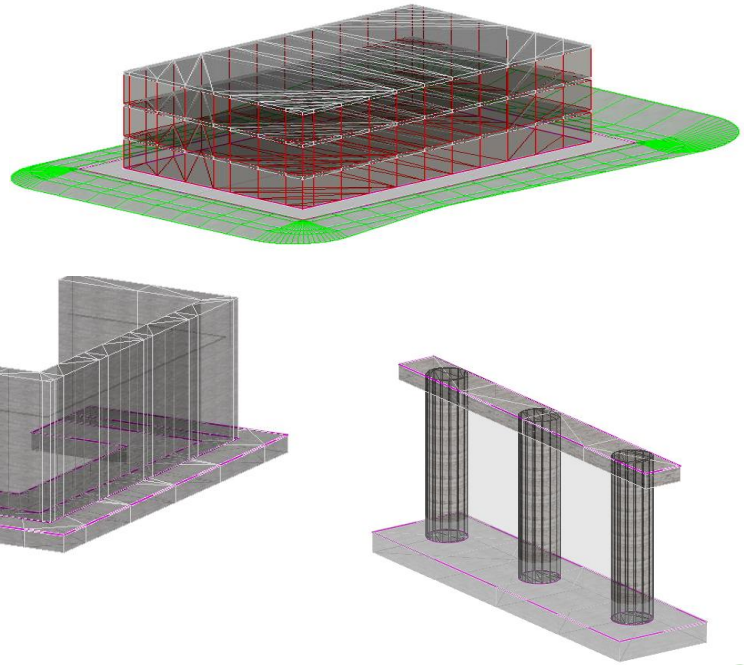
Linear Templates Delta from Corridor

- No Super
- No End Condition Exceptions
- No Secondary Alignment
- No Key Stations
- No Curve Widening
- Design Stage has no Template Management or Critical Sections

Template Technology - Surface Templates

- Apply a Template to a Terrain Model
- Reads template points & components at Origin
- More than Intersections!





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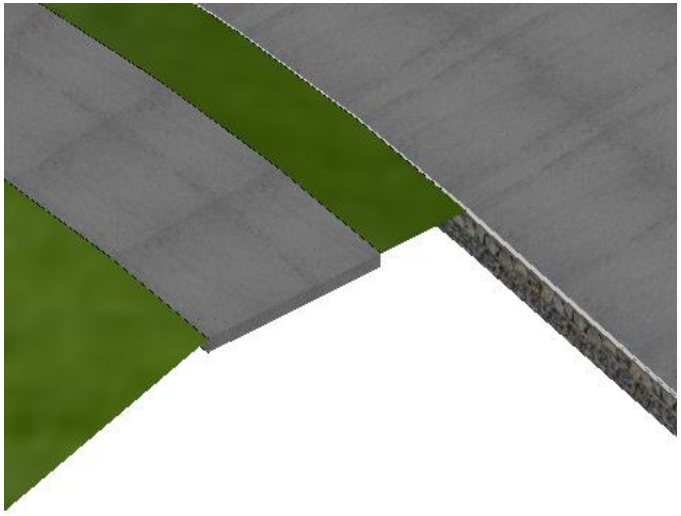
Corridor Modeling in Review



- Corridor Resides in the DGN
  - 2D and 3D Model
- Integrate Corridor and Site Modeling
  - Both work on same model
  - Use the tools that best fit the situation
- Target MicroStation Elements
- WYSIWYG
  - Use Reference Files to Control Display of Model
  - Drainage, Bridges, etc..

It's Really about Modeling

- Corridor Modeling is the "Core" but…

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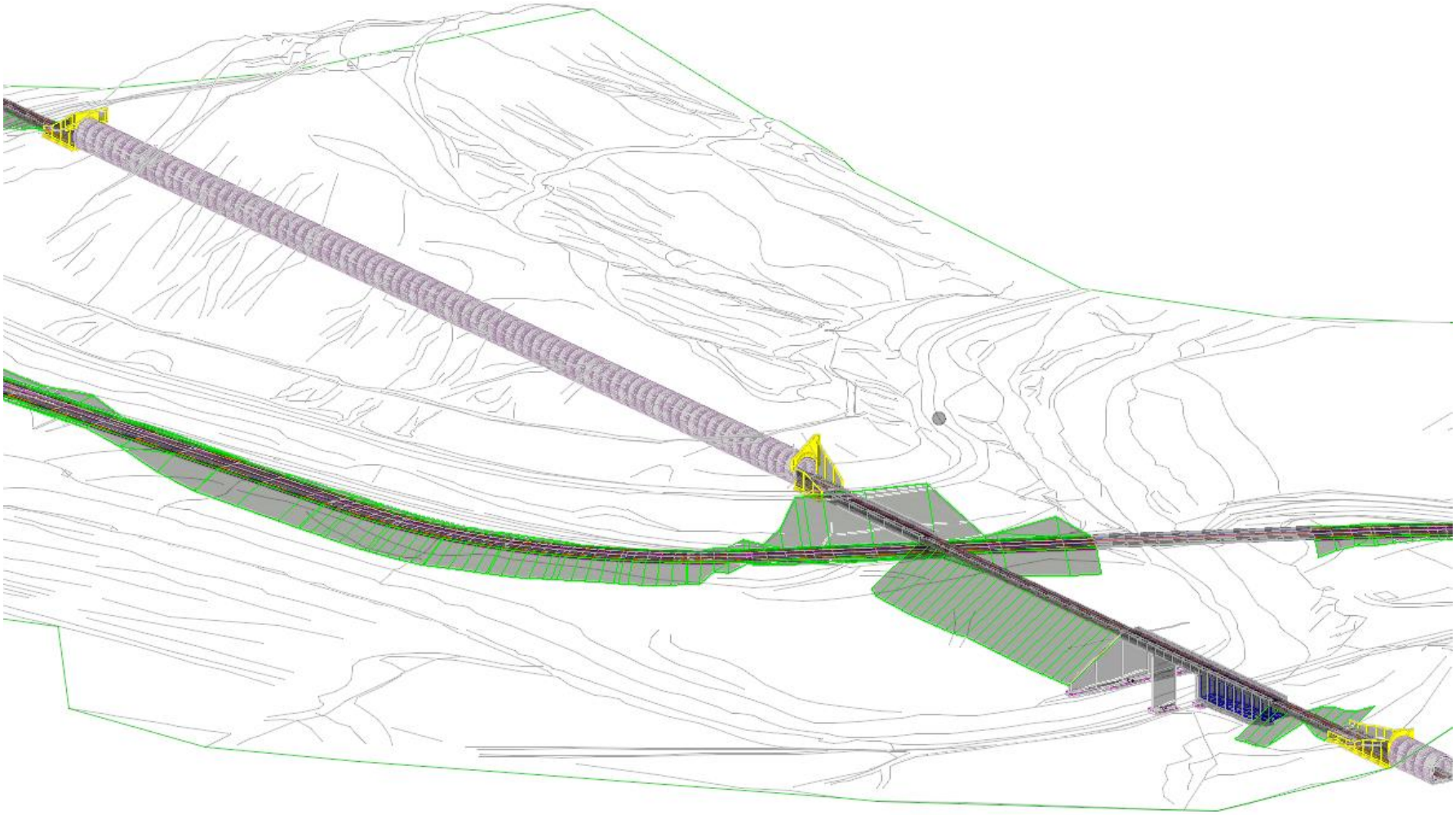
It’s Really about Modeling



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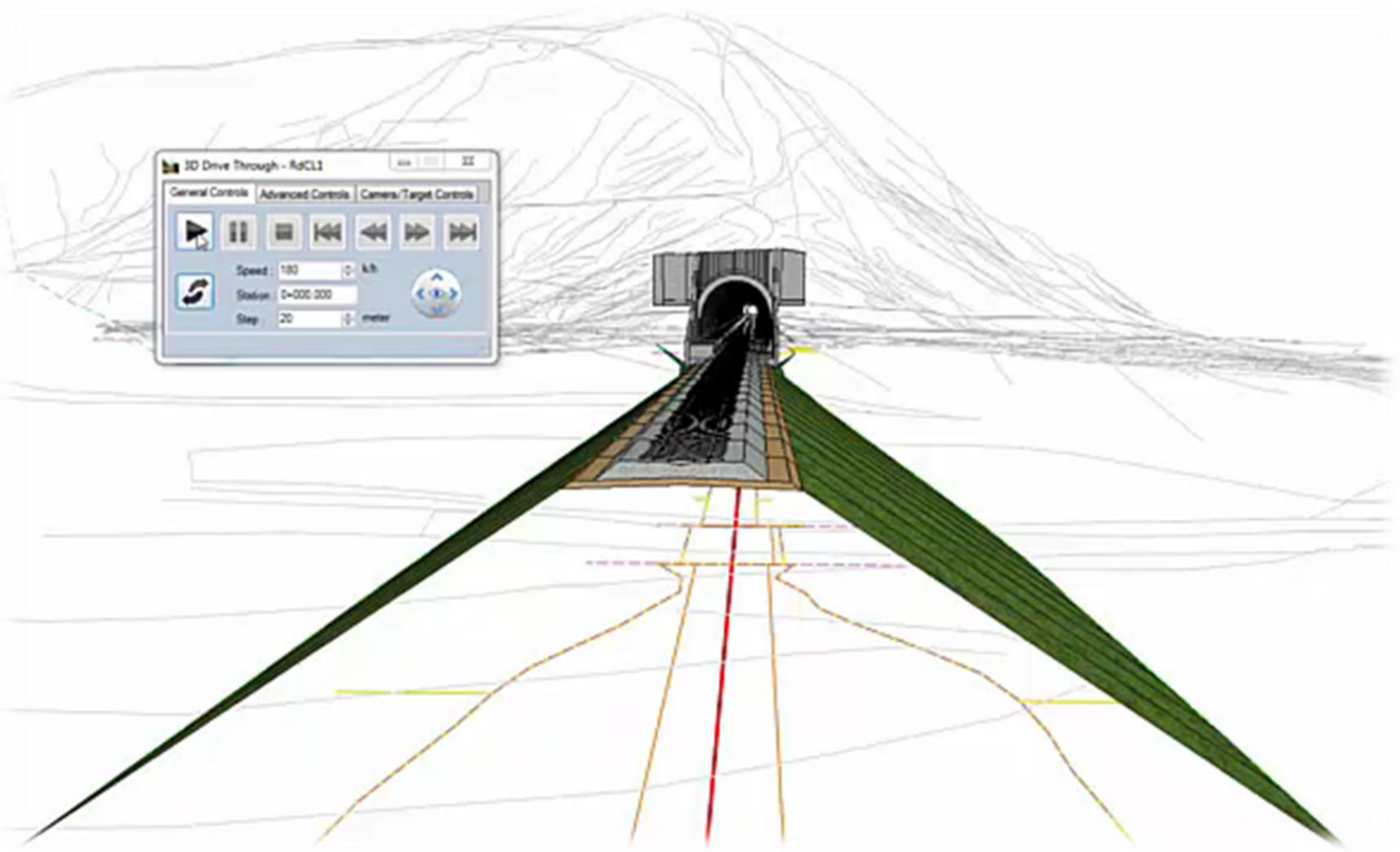
It’s Really about Modeling



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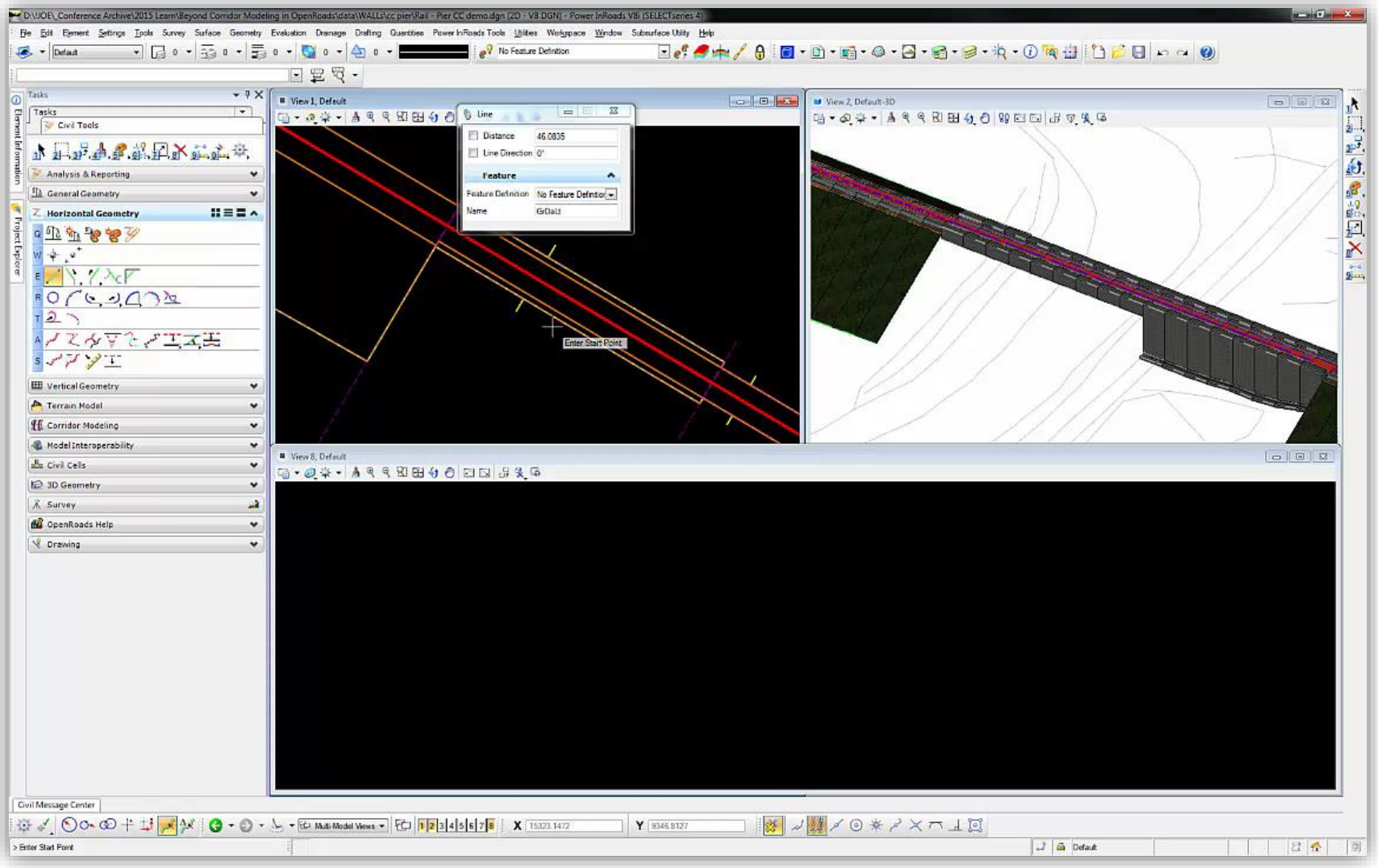
Piers and Abutments



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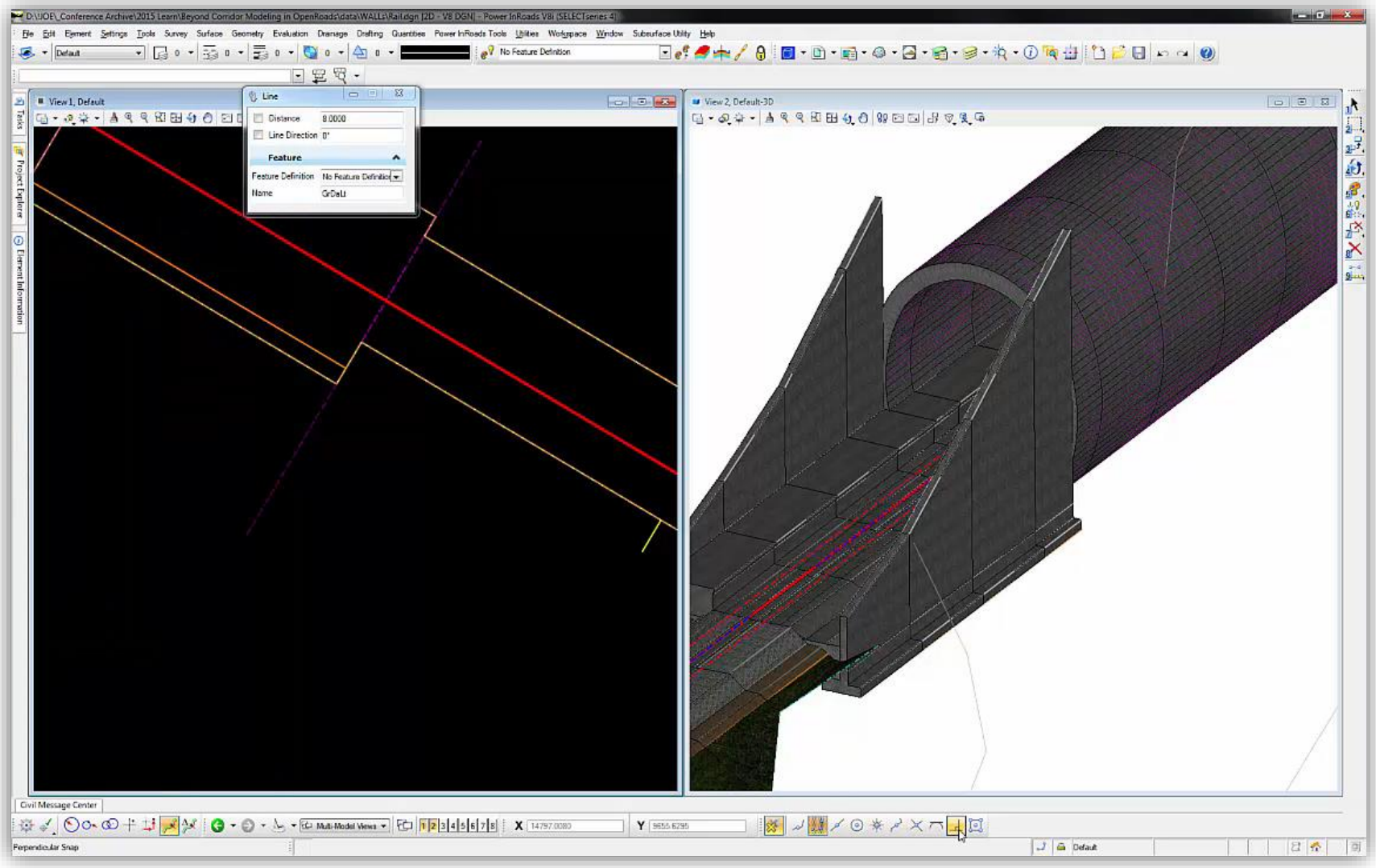
Tunnel Wall



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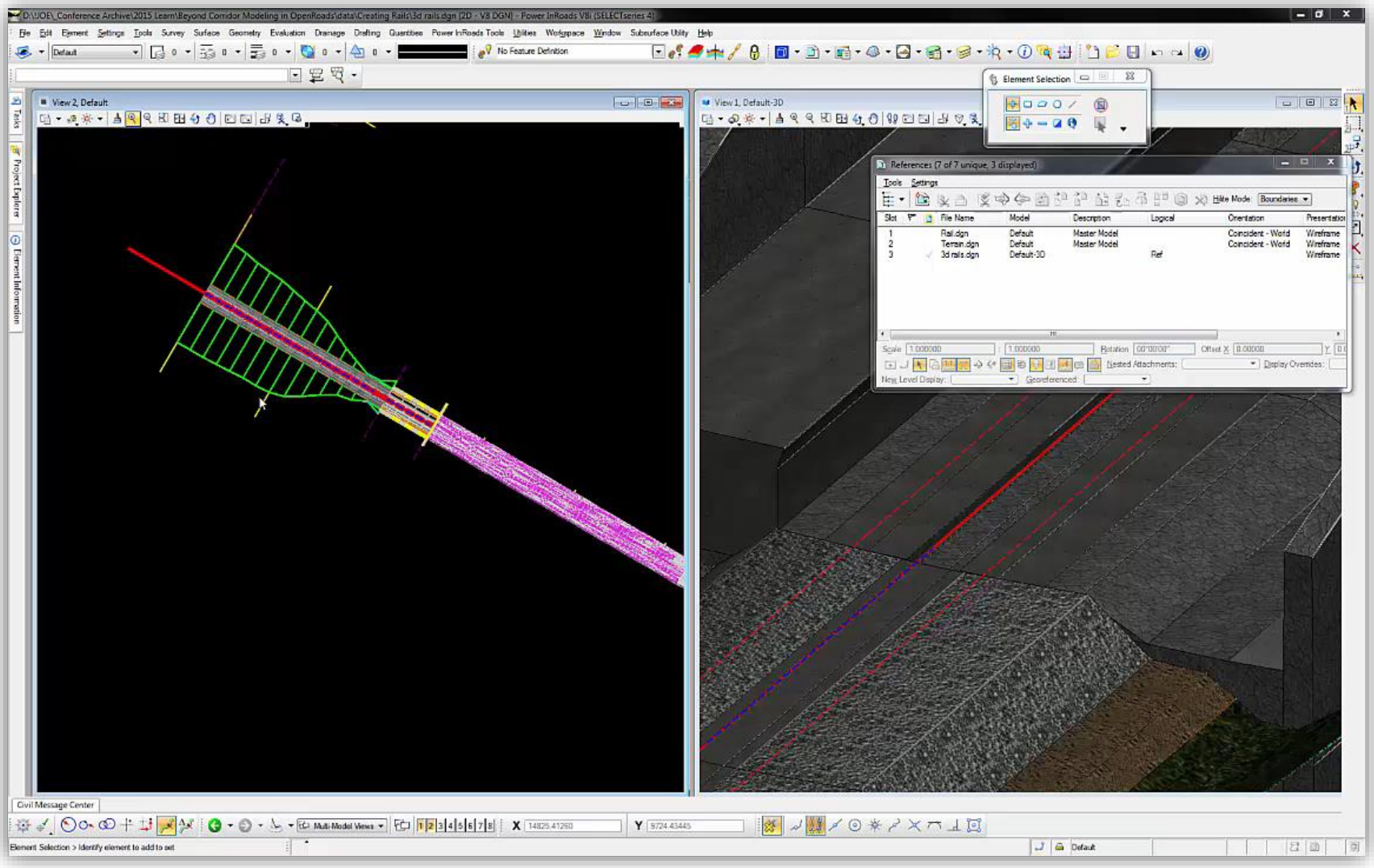
Rails



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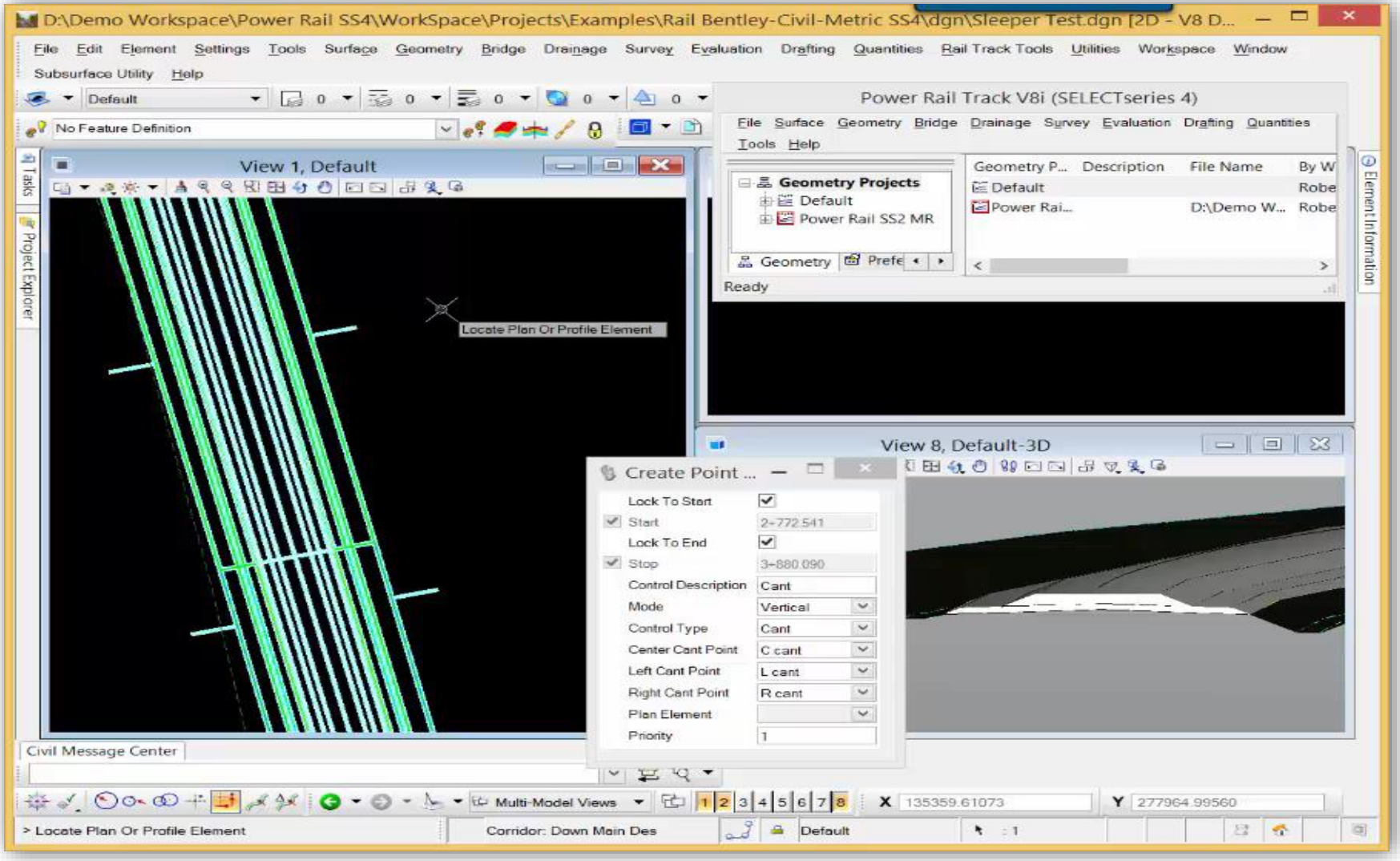
Sleepers



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What if you want to go a little further?

- Drape Images
- Materials
- Pavement Marking
- Vehicles
- Trees
- Signs
- Other Objects

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What if you want something like this?

Raster Draping

dcrape.pal vs. Scalable Terrain Models

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dcdrape.pal

Using this option, the workflow is as follows:

- Assign material ***dcdrape*** to terrain from ***dcdrape.pal***.
  - Note: This can be done automatically with Terrain Element Templates
- Attach images via Raster Manager and enable draping.
  - Note: Enable draping can be done during or after attachment
- Enable Smooth view mode.

Scalable Terrain Model

Using this option, the workflow is as follows:

- Create STM using Descartes
- Attach images via Raster Manager
- Drape using “Set Drape” option in STM dialog
- Enable Smooth mode

dcrape.pal vs. STM

dcrape.pal

STM

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Materials

How to make concrete look like concrete.

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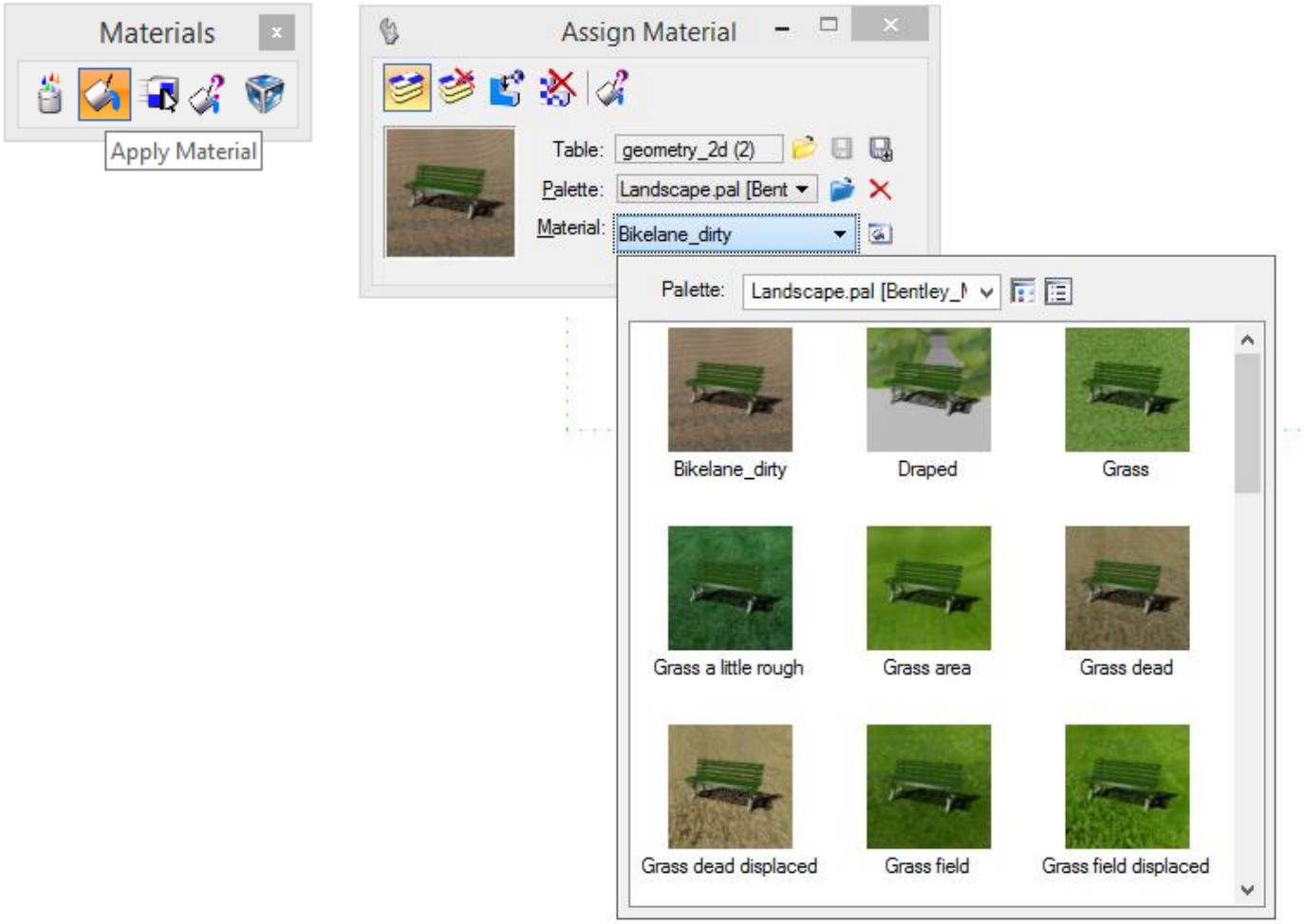
Manual Method

MicroStation *Tools* > *Visualization* > *Materials*



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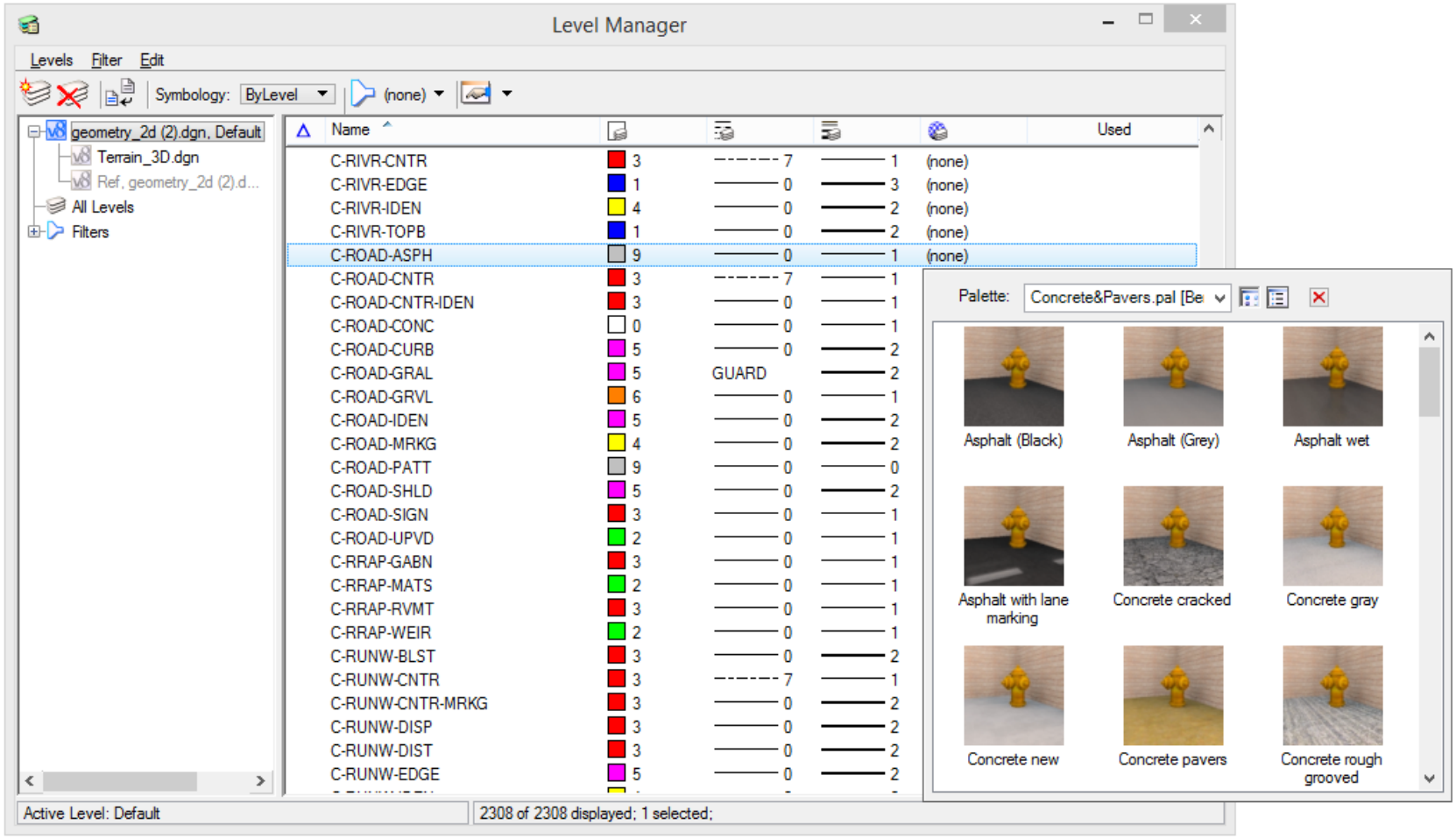
By Level

MicroStation *Level Manager*



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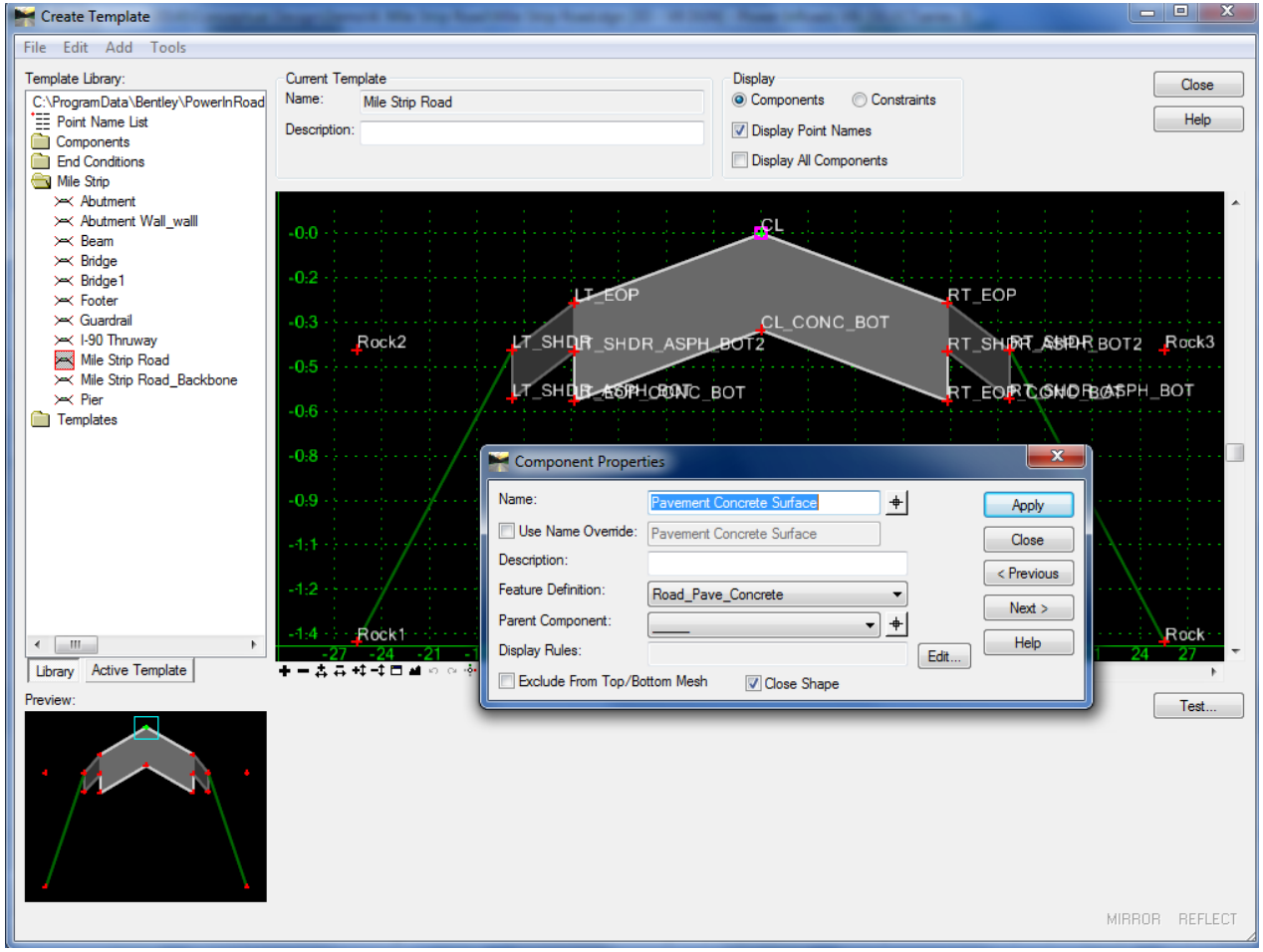
Element Templates

It's all based on the Feature Definition of the Component.



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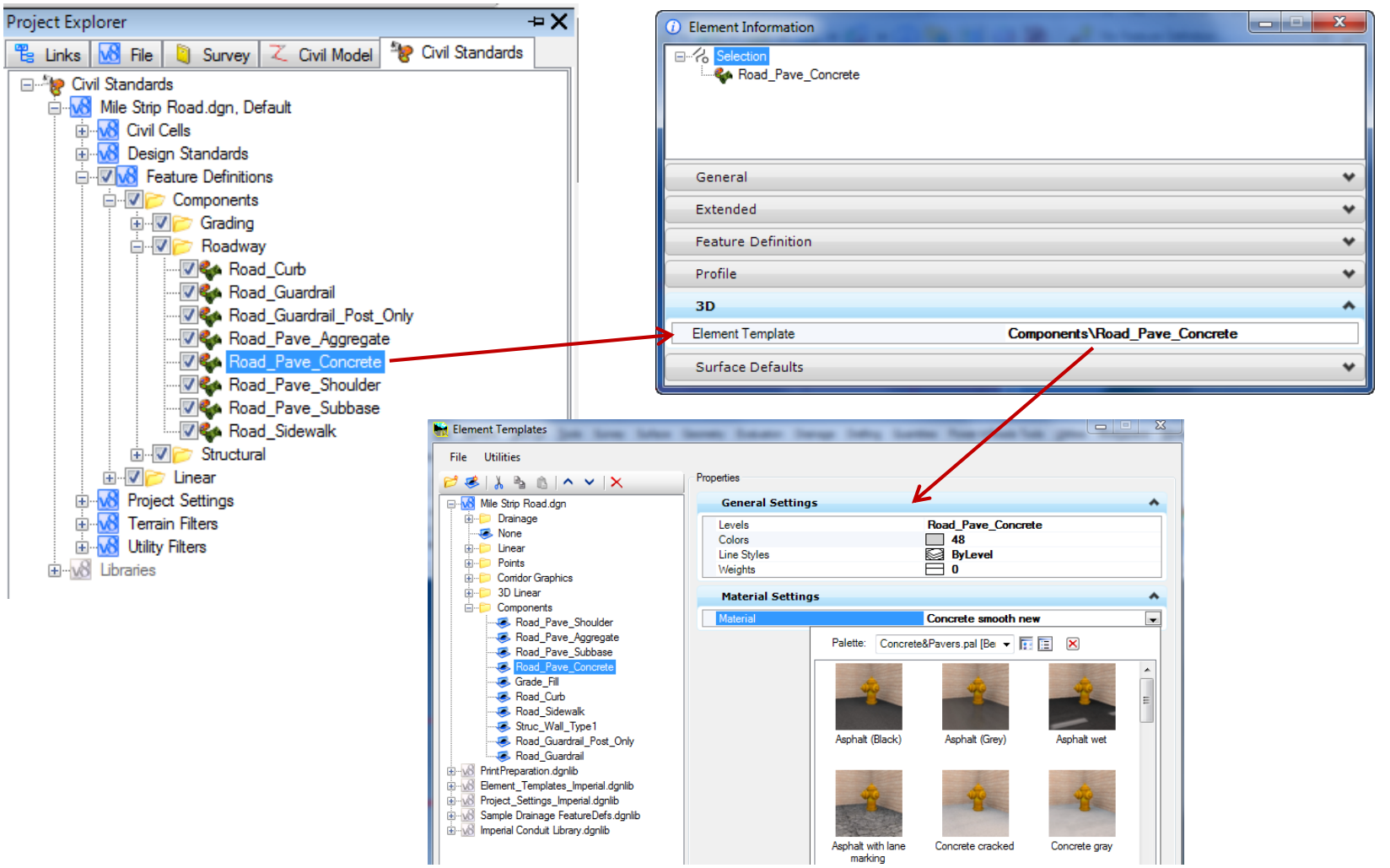
Element Templates

Surfaces Feature Definitions used for Proposed Components



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Terrain Clipping

Managing the Existing and Proposed Models

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Terrain Clipping

In order to create a realistic model, you will of course at some point in the process combine your existing and proposed models.

But what if the proposed is below the existing? In that scenario, you will have to ‘clip’ out portions of your existing terrain in order to realistically show the proposed model.

Pavement Marking

- Custom Line Styles (delivered)
- MicroStation's *Stencil 2D Element on 3D Geometry*

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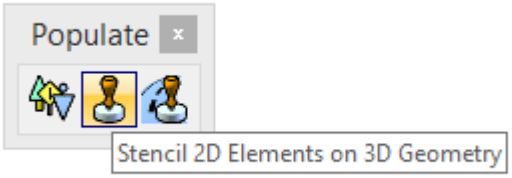
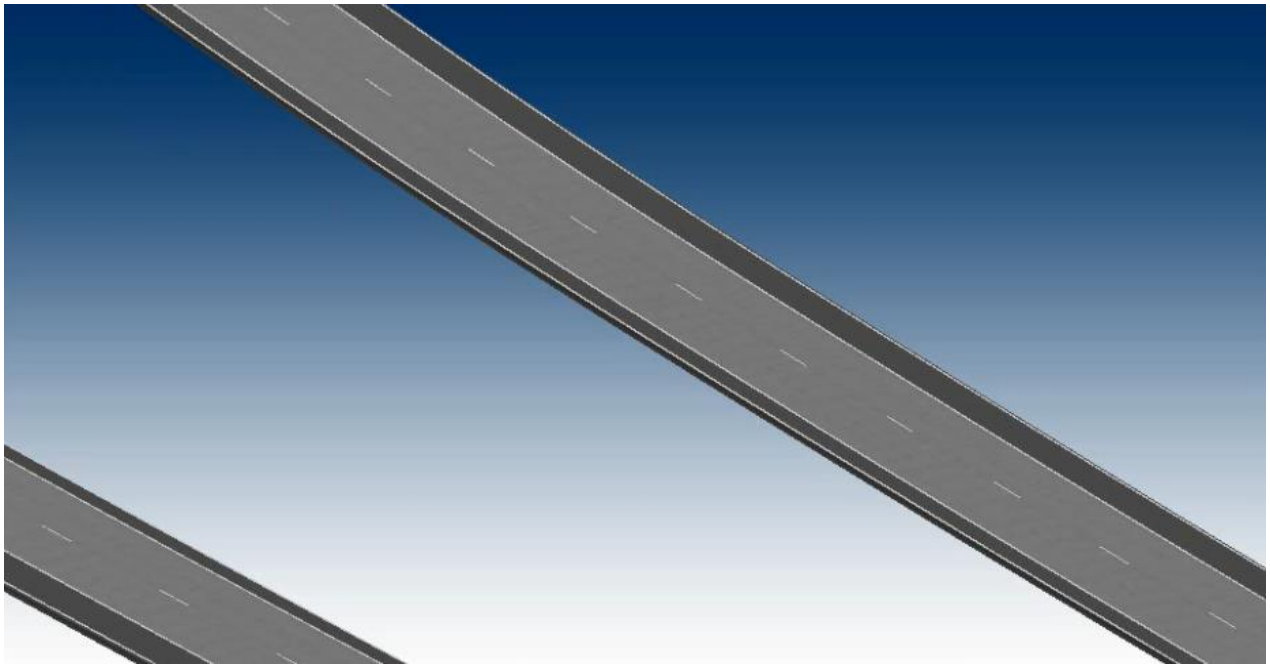
Stencil 2D Element on 3D Geometry

MicroStation Tools > Visualization > Populate





Traffic Animation

Using MicroStation Traffic Tools

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Traffic Animation

MicroStation *Tools* > *Animation* > *Traffic*

MicroStation *Tools* > *Animation* > *Traffic Lane Links*

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Traffic Animation

C:\ProgramData\Bentley\SharedContent

- Marlin_Studios_Vehicle_Library.cel
- Dosch_Design_Sample_Library.cel

Trees

Using MicroStation Populate Tools

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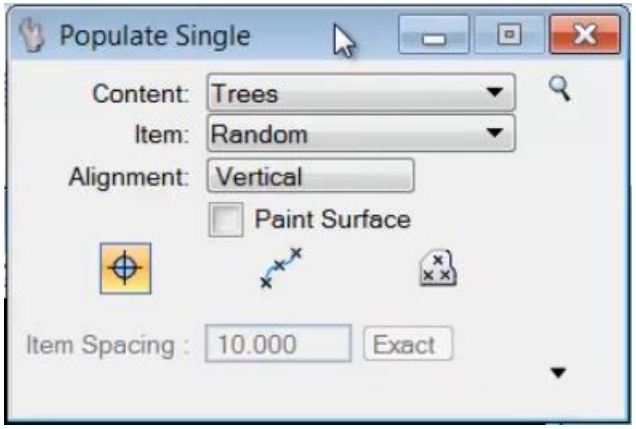
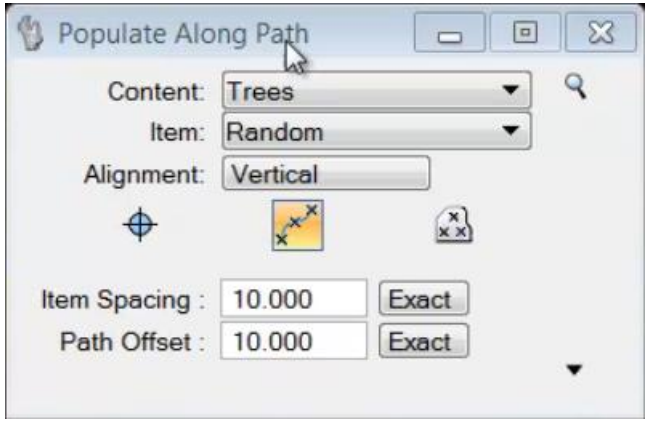
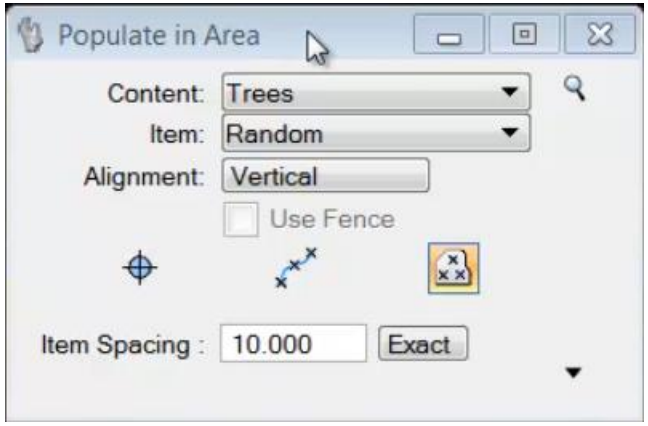
Populate Tools

MicroStation *Tools* > *Visualization* > *Populate*

- *Populate Single*
- *Populate Along Path*
- *Populate in Area*







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Trees

C:\ProgramData\Bentley\SharedContent

- Xfrog_Sample_Library.cel

Signs

MicroStation *Populate* Tools

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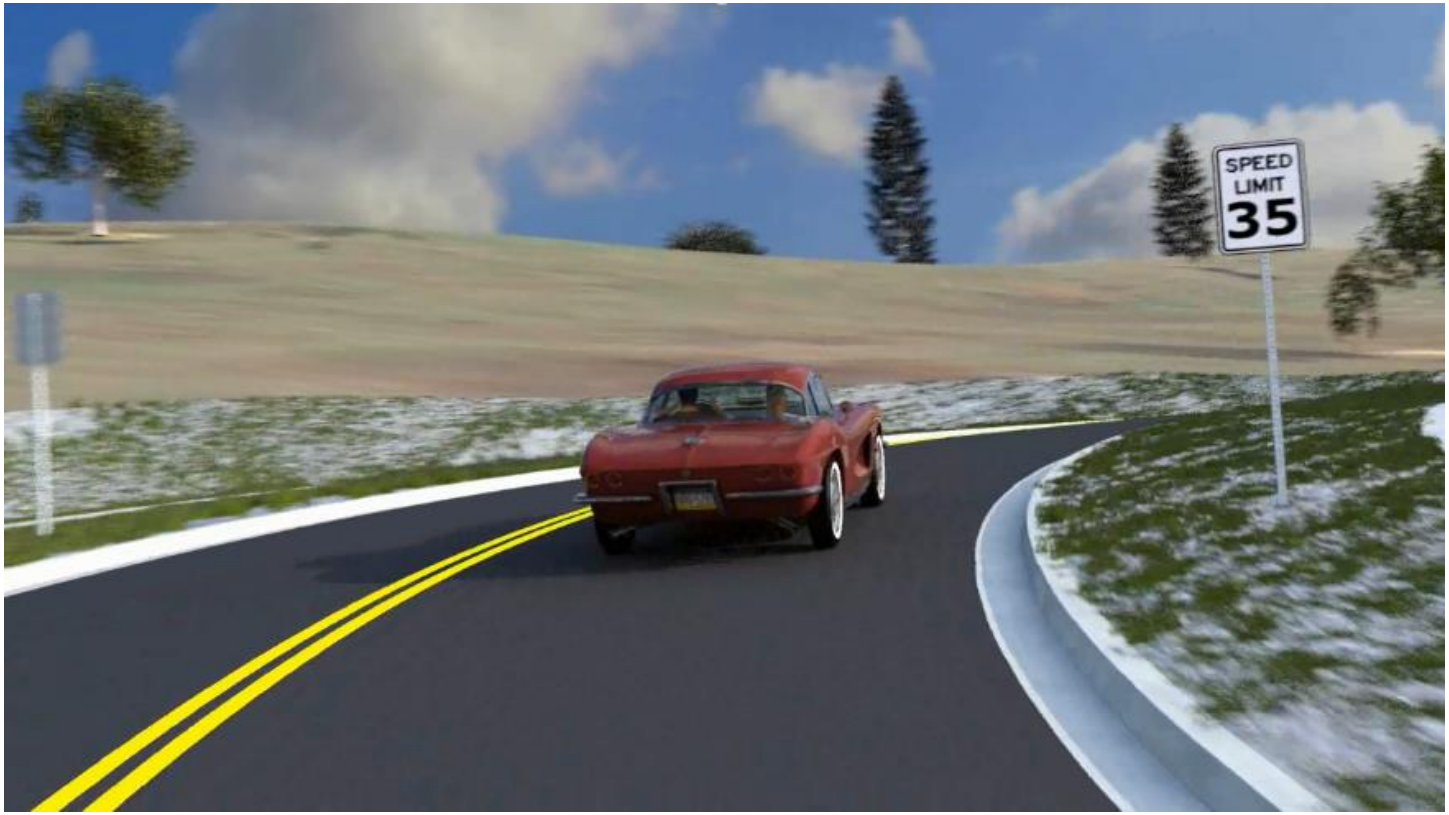
Signs

$(Product_Install_Directory)\WorkSpace\System\cell\roadsigns.cel



Populate Tools

MicroStation *Tools* > *Visualization* > *Populate*

- ~~*Populate Single*~~
- *Populate Along Path*
- ~~*Populate in Area*~~

Use this one to control the rotation of the signs

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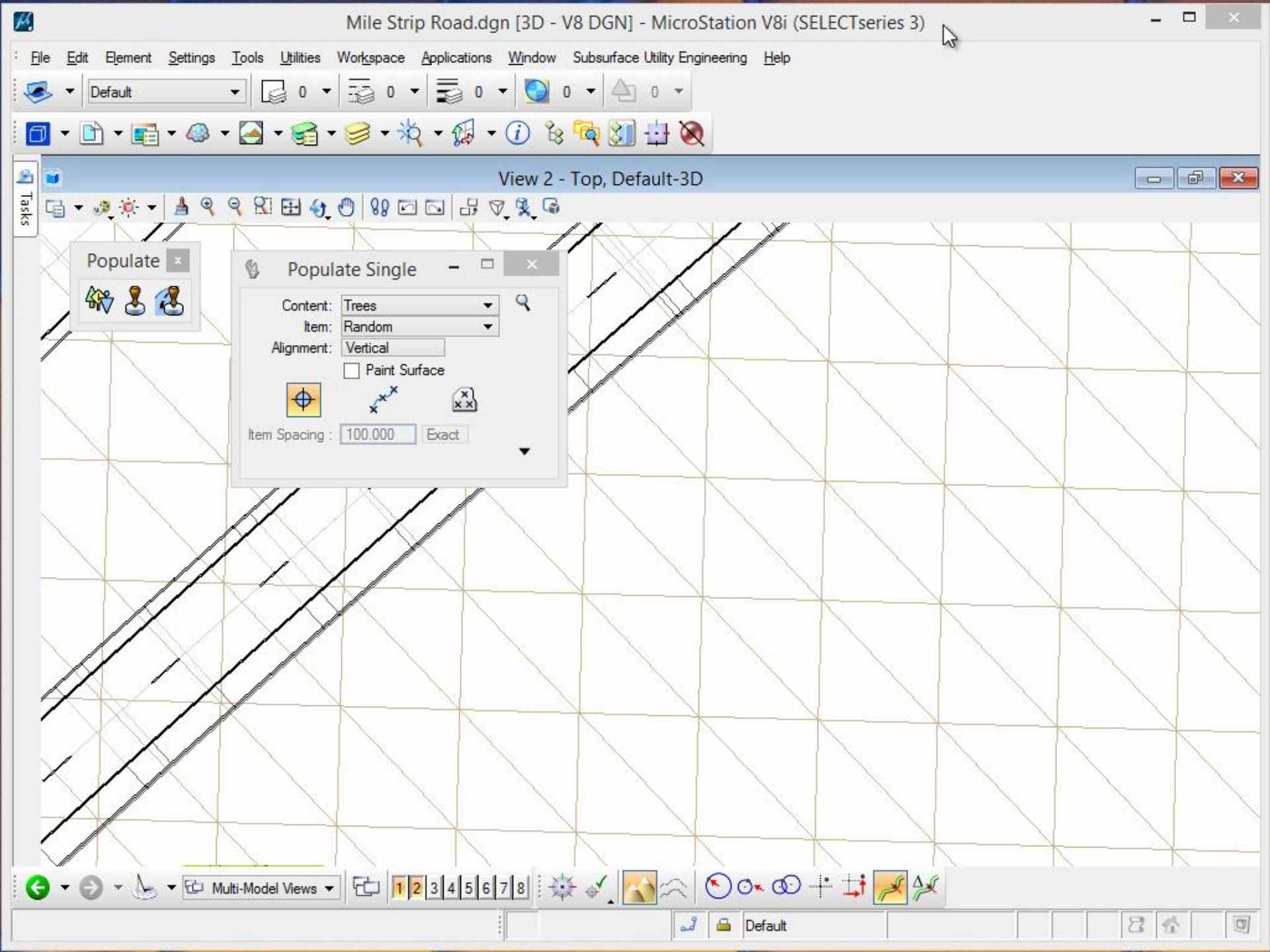
Mile Strip Road.dgn [3D - V8 DGN] - MicroStation V8i (SELECTseries 3)
File Edit Element Settings Tools Utilities Workspace Applications Window Subsurface Utility Engineering Help
Default
View 2 - Top, Default-3D
Tasks
Populate
Populate Single
Content: Trees
Item: Random
Alignment: Vertical
Paint Surface
Item Spacing : 100.000
Exact
Multi-Model Views
1 2 3 4 5 6 7 8
Default

Other Objects

- OpenRoads Templates
- MicroStation 3D Line Styles
- OpenRoads Civil Cells
- Trimble 3D Warehouse

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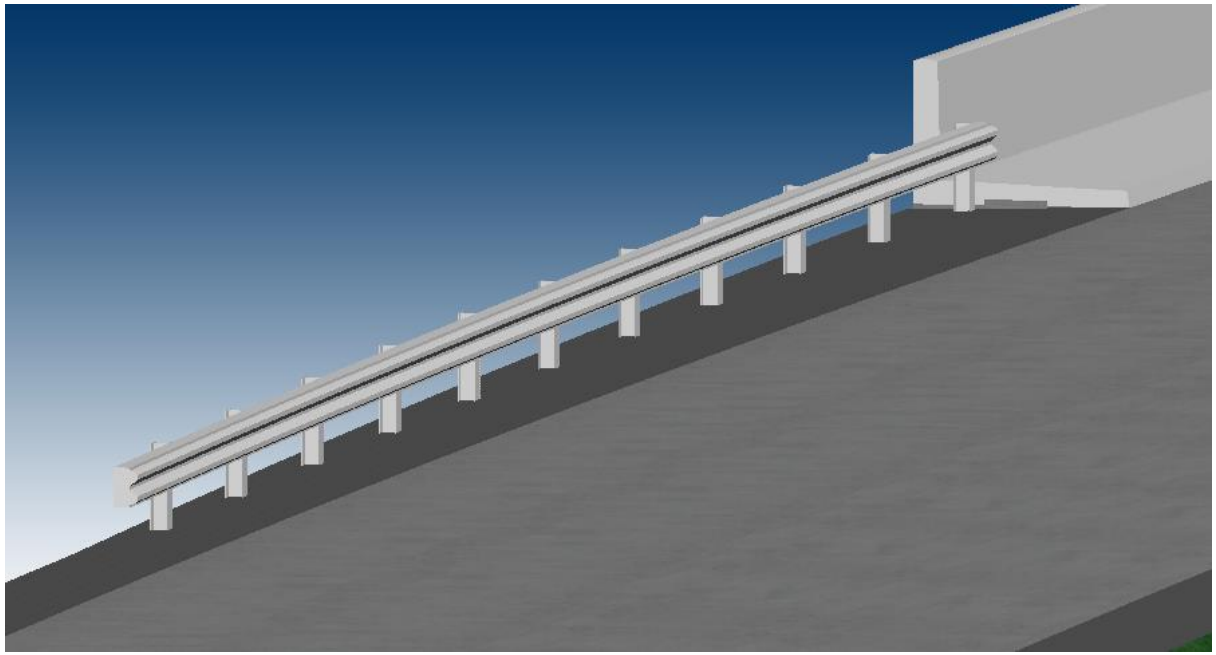
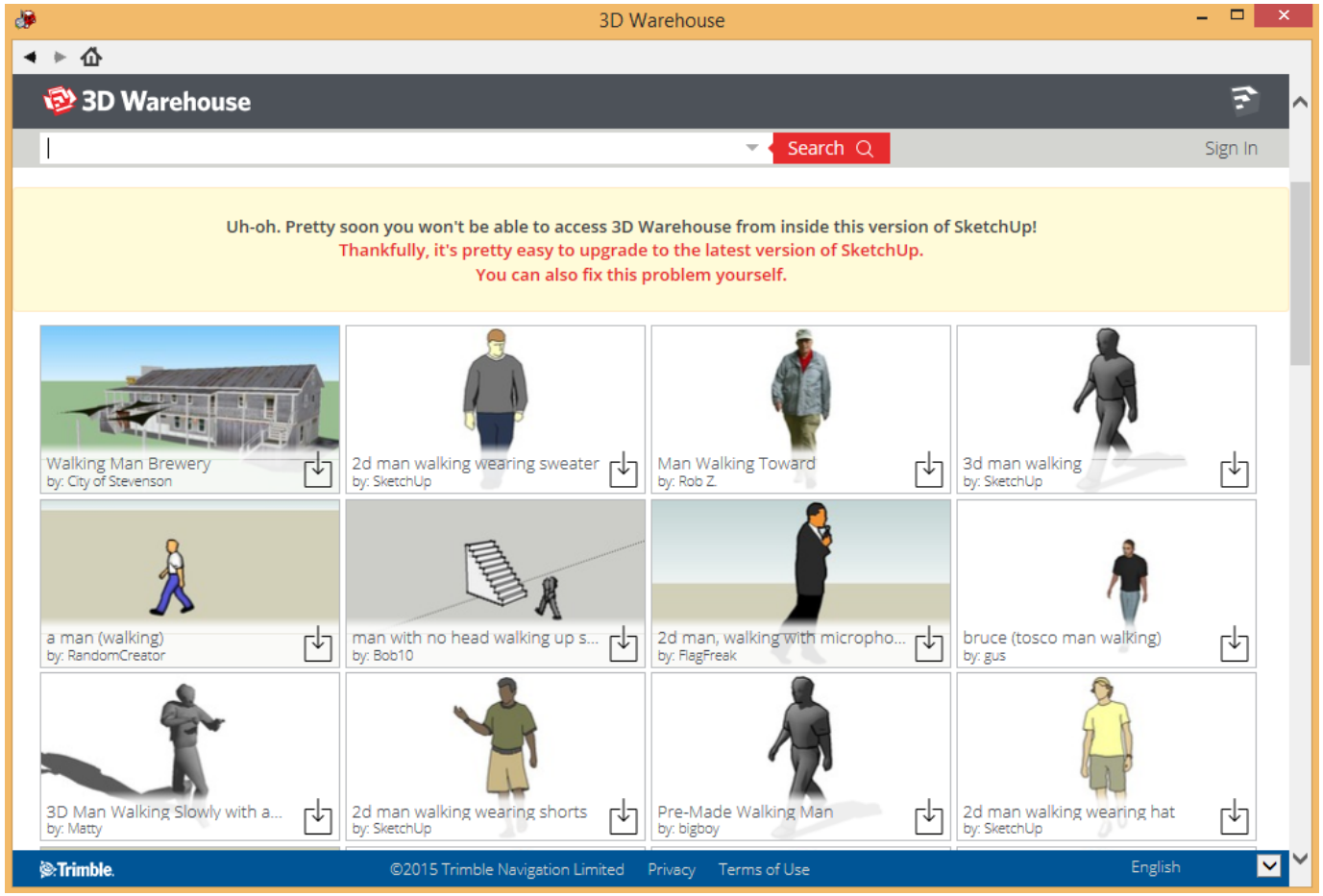
Guardrail and Fencing

- You can always use a MicroStation 3D line_style.
- However, keep in mind that using OpenRoads technology such as Corridors and Linear Templates give you the ability to use “design’ methods to create these types of items.
  - Best Fit Profiles
  - Projected Profiles
  - Etc.



Trimble 3D Warehouse

MicroStation *Utilities* > *3D Warehouse*



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Luxology

Realistic Rendering and Animation

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Luxology Rendering

- Produce high quality images using pre-configured settings to better balance speed and quality.
- Deliver photo-realistic views using lighting and textures that mirror project reality.
- Improve stakeholder insight and secure buy-in
- Secure project funding for design alternatives.
- Validate the fit and finish of a project.

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Seasons

Water

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Fog, Haze or Smog

Pavement Marking

Grass

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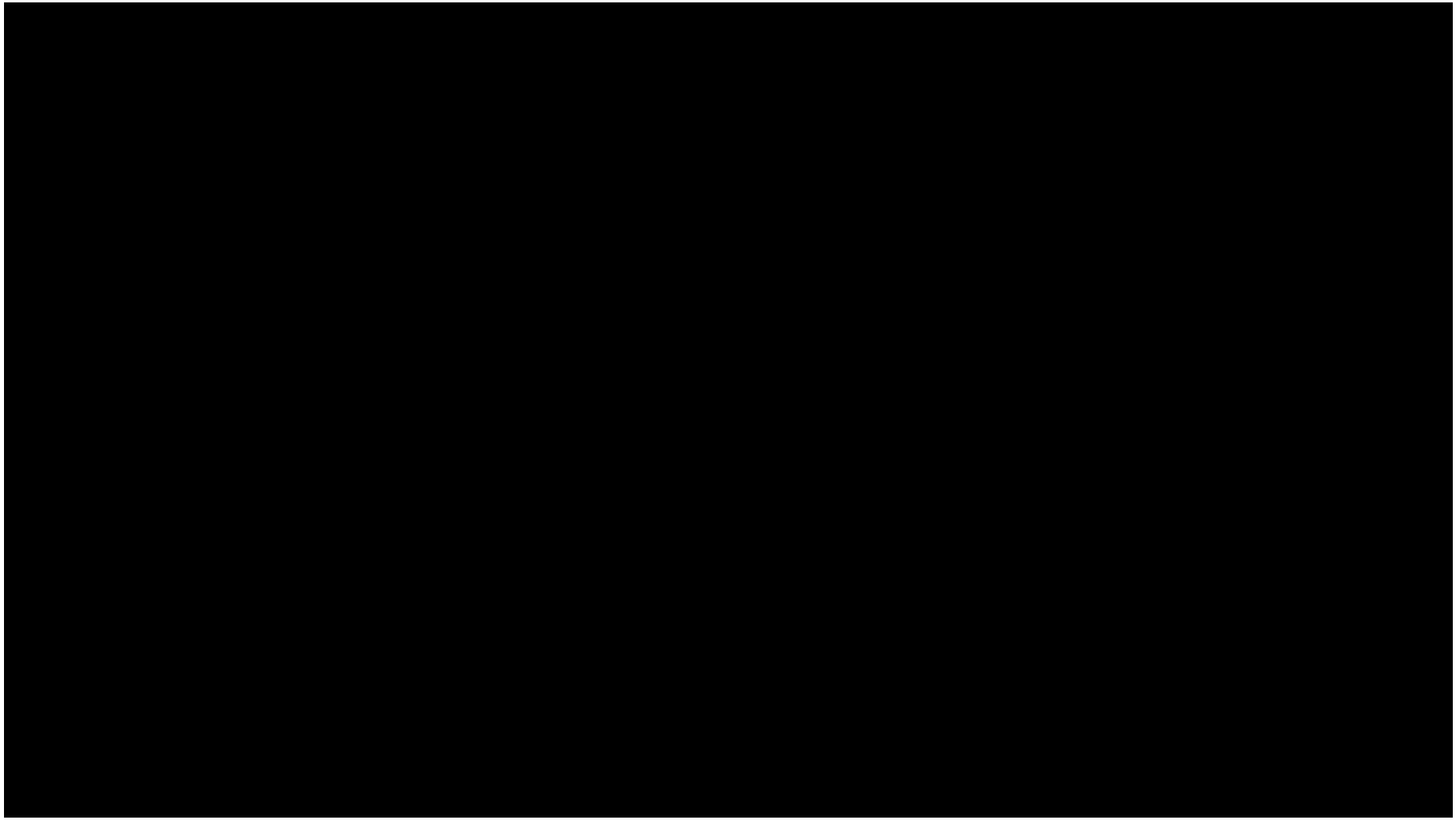
Washington DOT



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Thank you and have a great conference!

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