



OpenRoads Designer Best Practices – *Project Management*

Presented by:

Ian Rosam, Director Civil Product Management, Bentley Systems, Inc.



Project Management

Project Management can mean a lot of things. But for the purposes of this presentation, it means ***managing your project data so that OpenRoads Designer can operate in the most effective and efficient manner possible.***



Preface

- “*Best Practices*” are suggestions and good “*rules of thumb*” to go by, **not requirements**.
- There is no one size fits all.
- Processes can and do vary by:
 - *Organization*
 - *Project*
 - *Discipline*



Agenda

- *Seed Files*
- *Data Segregation*
- *Reference Files*

A red pen is shown writing the word "Agenda!" in a cursive script on a white surface. The pen is positioned at the top right, and the word is written diagonally across the frame.

Seed Files

Seed Files

Make sure they are clean!

- *No previous civil data*
- *No holdovers (e.g. line styles, fonts, etc.) from previous versions*



Seed Files

GeoCoordinate Systems

- *Assign coordinate system for the project.*
 - *Allows you to easily consume other similar data (e.g. DEM files)*
 - *Allows you to easily integrate with other software (e.g. Google Earth)*



Seed Files

2D and 3D Seed Files

- *3D for Survey and Terrains*
- *2D for all others (Geometry, Corridors, Superelevation, etc.)*
 - *Let ORD create and manage the 3d Models*



Data Segregation

Segregate your Data

- Topo / Survey
- Terrain
- Geometry
- Corridors
- Superelevation
- Utilities
- Cross Sections
- Plan-Profile Sheets
- Drainage
- Bridges
- Geotech
- Control Features
- Proposed Terrains
- Etc.

SEGREGATION IS A MUST



Why?

- Smaller files are inherently faster and more efficient.
- Easier to manage and recall where things are.
- More control later when you need to compile them for different scenarios (*e.g. create a composite model for LumenRT*).

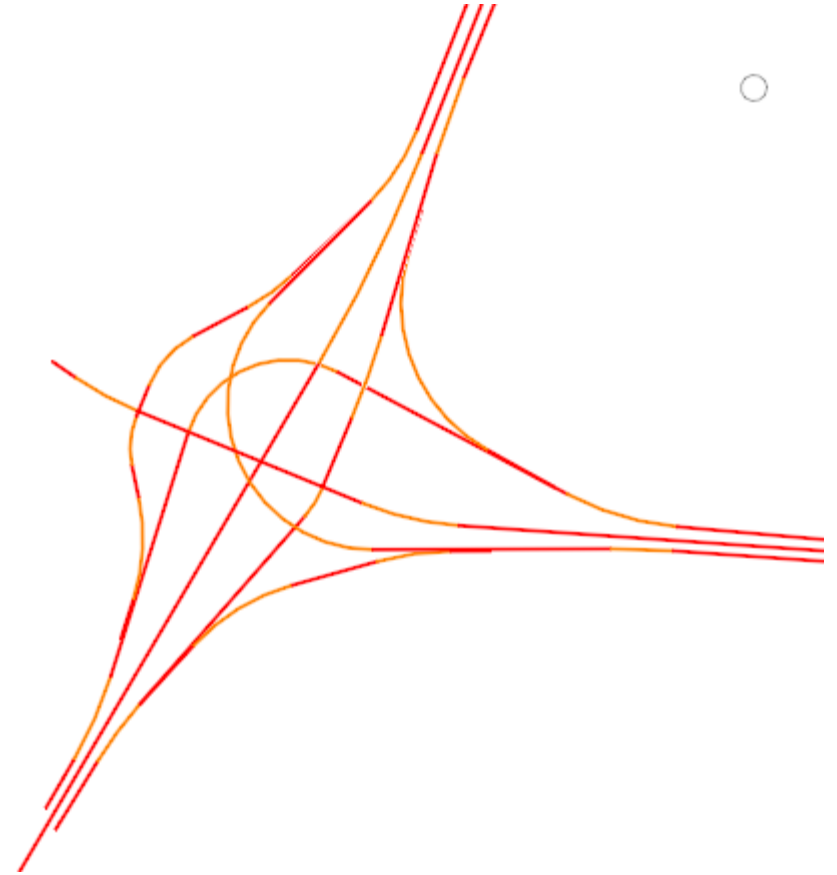


Common Mistakes

- **Creating 'linked' objects in the Corridor file**
 - Example: *Let's say you create a proposed terrain from the finish grade mesh. If you create it in the same file as the corridor, then it will be updated every time you process the corridor.*
 - Example: *Let's say you create civil cells for driveways in the corridor file. Then every time you process the corridor it has to update the civil cells.*
 - *Place these 'linked' objects in their own file.*
- **Creating extraneous data in the Corridor file**
 - *Superelevation*
 - *Cross Sections*
 - *Place these in their own file*

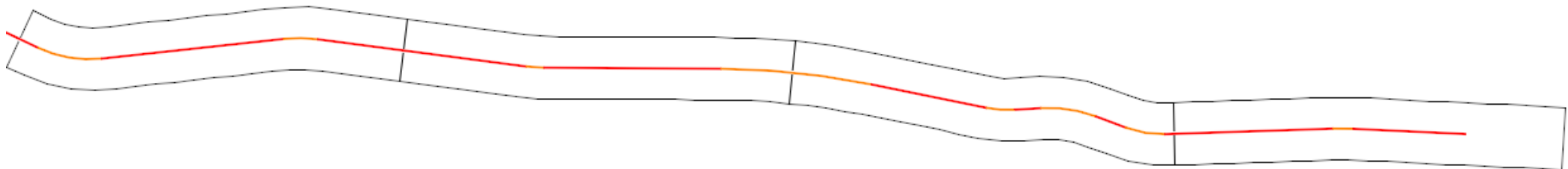
Alignments - *To segregate individually or not?*

- May be warranted if multiple team members want to work on different alignments at the same time.
- If using ProjectWise, would allow you to “*check out*” alignments.
- Can use a blank “*master*” file to get all geometry at once.
 - ✓ *Create blank master file*
 - ✓ *Reference each individual alignment dgn*
 - ✓ *Reference master file when you want all geometry*



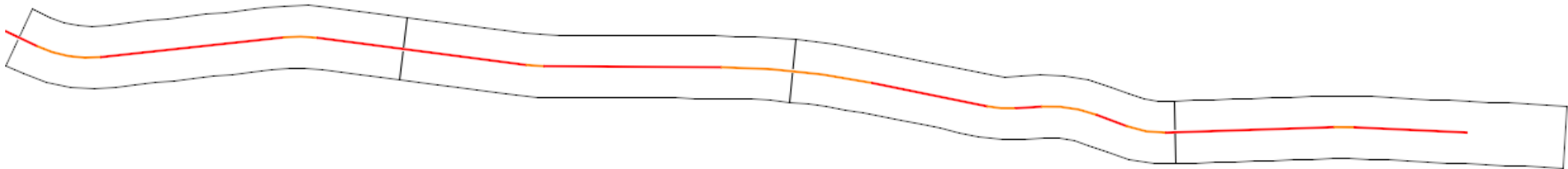
Corridors – *Break them up or not?*

- Rule of thumb? *Yes.*
- Why?
 - ✓ *Not because of any size/memory restrictions*
 - ✓ *Allows multiple team members to work at same time.*
 - ✓ *Smaller sections are faster and easier to work with.*
 - ✓ *You can still reference together when you need to see or utilize the project as a whole.*



Corridors – *What dictates where to break it?*

- This can be different from project to project.
 - ✓ *Based on engineering configuration (e.g. interchanges)*
 - ✓ *Based on size/scale of the project*
 - ✓ *Based on structures (e.g. bridge locations)*
 - ✓ *Based on geographical entities (e.g. intersections)*



Awareness

Whatever you decide to do, make sure your team is aware up-front of the plan, so everyone is on the same page.



Reference Files – *Live Nesting*

Live Nesting

- A file can have any number of reference attachments, and those attachments can have attachments, which in turn can have more attachments, and so on and so on.
- Enabling **Live Nesting** when referencing a file causes its children (and potentially their children) to be automatically referenced as well.
- To what 'depth' these children are located depends on the **Nesting Depth** value that you use.

Nested Attachments:

Live Nesting

Q: *What's the Advantage?*

A: Faster and more efficient method of attaching and displaying multiple files, just by attaching a single, parent reference to a model.



Live Nesting

Q: ***Are duplicate references a disadvantage?***

A: *No. Duplicate references are recognized and ignored.*



File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None, Default, 0, 0, 0, 0, 0

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

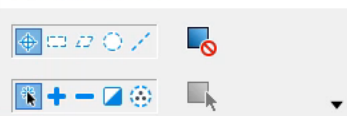
Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

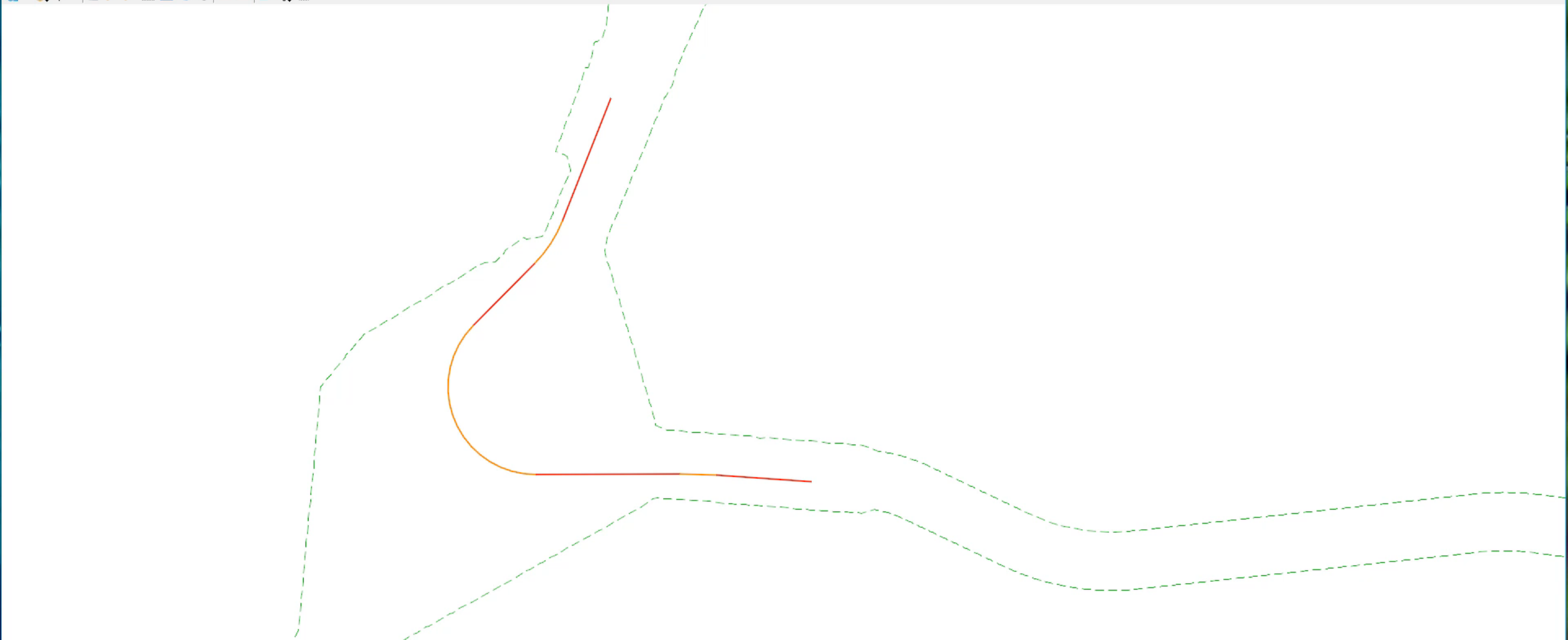

OpenRoads Help: OpenRoads Help, Open RSS Reader

Search Ribbon (F4) Sign in

Element Selection



View 1, Default



Element Selection > Identify element to add to set

File Compressed

Default



Live Nesting

Q: ***Are self-references a disadvantage?***

A: *No. Self-references are recognized and ignored.*



File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None, Default, 0, 0, 0, 0, 0

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

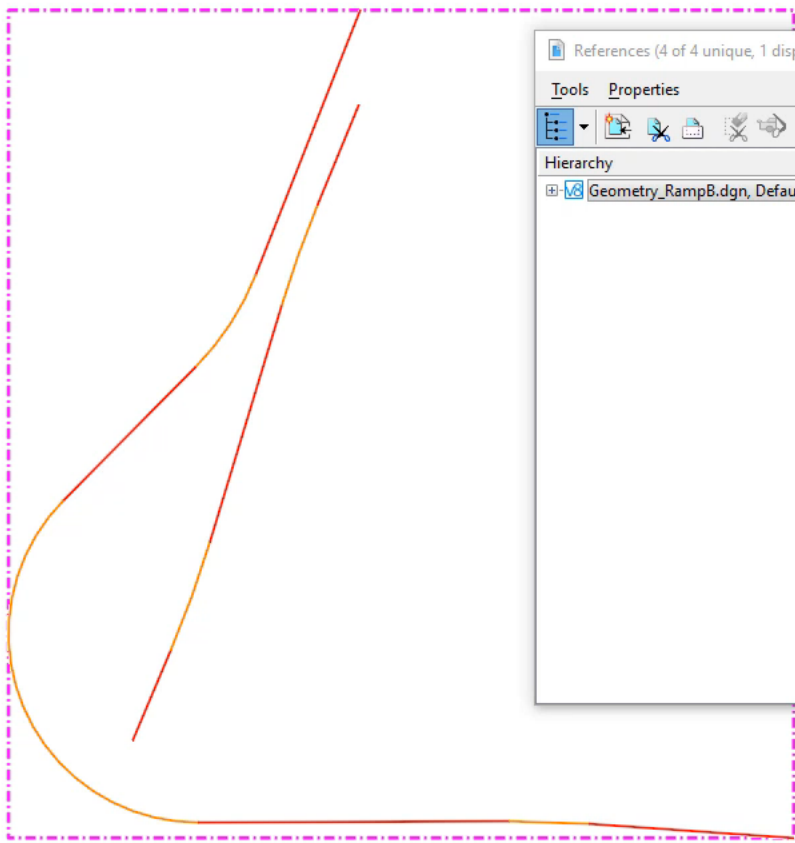
Model Import/Export: Terrain Import, Import Geometry, Import IRD

OpenRoads Help: OpenRoads Help, Open RSS Reader

Search Ribbon (F4) Sign in

Element Selection

View 1, Default



References (4 of 4 unique, 1 displayed)

Tools Properties

Hierarchy: Geometry_RampB.dgn, Default

Slot	File Name	Model	Description
2	Geometry_RampC.dgn	Default	Master Model
1	✓ Geometry_RampB.dgn	Default-3D	

Scale: 1.000000000 : 1.000000000 Rotation: 00°00'00"

Offset X: 0.00000 Y: 0.00000

Nested Attachments: No Nesting

Nesting Depth: 1 Display Overrides: Allow New Level Display: Config Variable

Georeferenced: No

Live Nesting

Q: ***What's the disadvantage?***

A: *Obviously, one disadvantage with live nesting is that you can get files showing up as references that you really don't need. But even this disadvantage can be easily handled if you understand Live Nesting.*



File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None | Default

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

OpenRoads Help: OpenRoads Help, Open RSS Reader

Element Selection

Search Ribbon (F4) | Sign in

Selection tools: Box, Lasso, Window, Polygon, Erase, Hide, Show, Lock, Unlock

No Feature Definition

View 1, Default

View navigation icons: Pan, Rotate, Zoom, etc.

Navigation and tool icons: Home, Back, Forward, Undo, Redo, etc.

Best Practice?

Different nesting depths may be used depending on the **USER** or the **discipline**.

For example, if I'm a road designer, I may want my default option to be "0" as it give me the most **control** over what is being attached as a reference.

But if I'm a traffic designer and I'm using files that other people have created, a nesting depth of 1 or greater allows me to easily get what I need with having to **hunt** for the files.

So there is no "one size fits all" answer to what depth should be used.

Best Practice?

But as most organizations will want to set a **default** option in their seed file, these are your options:

- **Set to 0**

- Let the user decide on a case by case basis if the value needs to be changed. This is the greatest level of control

- **Set to 1**

- This allows the user to have the flexibility of Live Nesting, yet limits the depth in order to limit the number of unwanted files.

- **Set to >1**

- Make Live Nesting even more flexible, but will greatly increase the number of unwanted files that are attached.

Awareness / Training

In the end, I cannot stress this enough.

Whatever you decide to do, make sure your users are aware and trained in how Live Nesting works and how to use it appropriately.

This is the 'real' Best Practice.



Reference Files – *Not Found*

What do I do?

- If a reference file is missing, there are different solutions depending on the circumstances.
 - **The file has been re-named.**

Attributes: None | Default | [0] | [0] | [0] | [0] | [0]

Primary: Explorer | Attach Tools | Models | Level Display

Selection: Element Selection

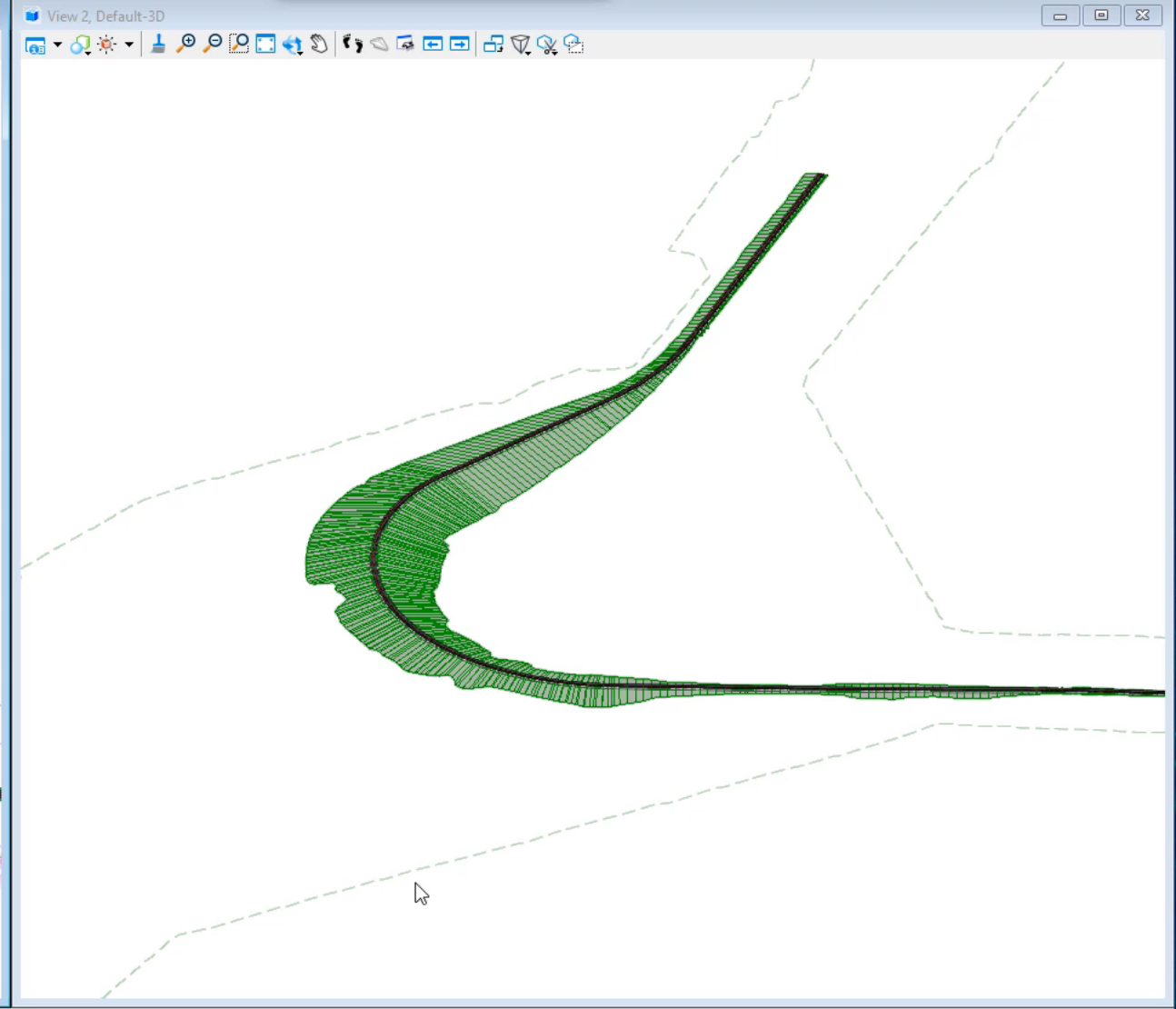
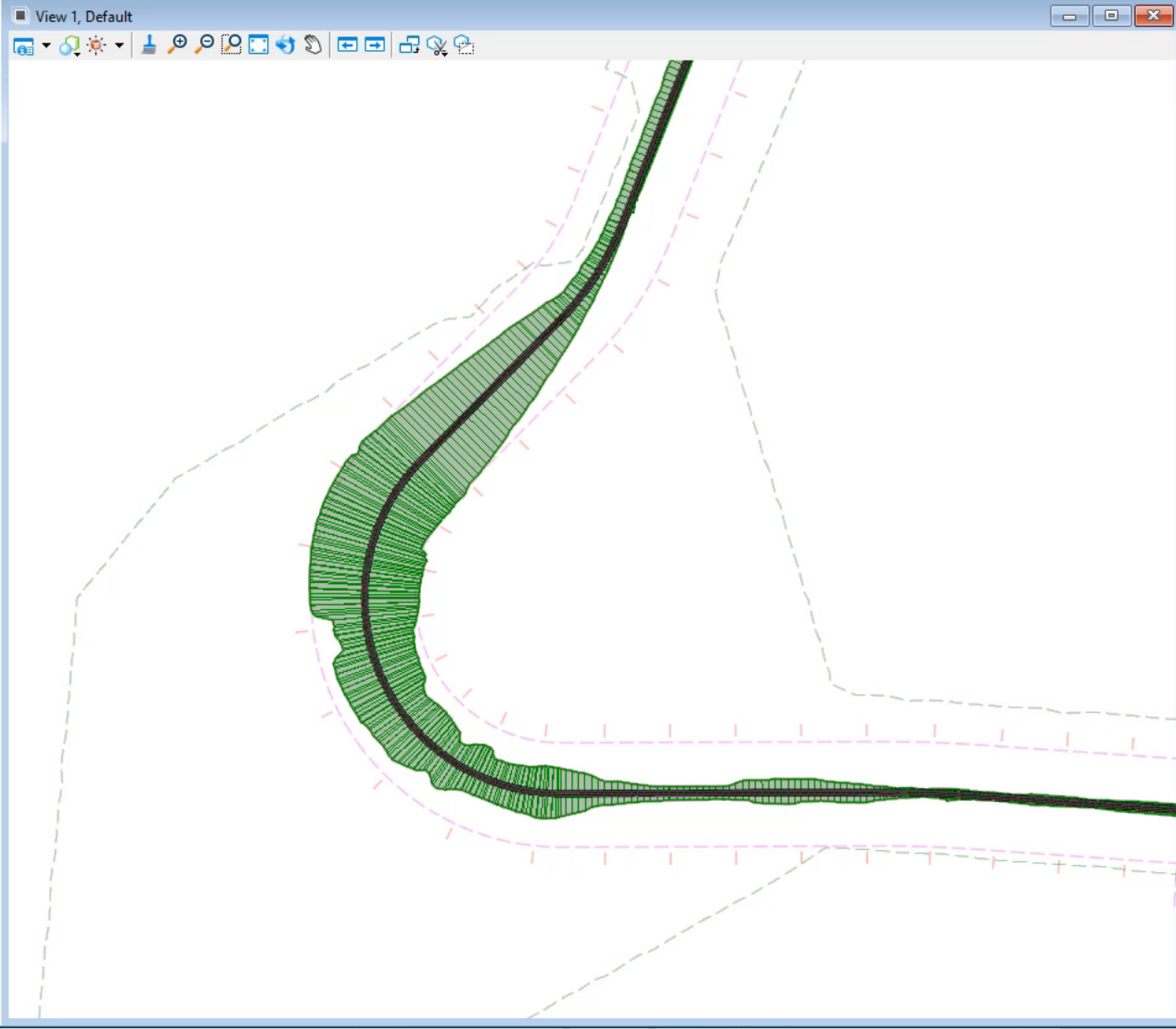
Model Analysis and Reporting: Reports | Civil Analysis | Corridor Reports

Model Import/Export: Terrain Import | Import Geometry | Import IRD

OpenRoads Help: OpenRoads Help | Open RSS Reader

Element Selection: [Pan] | [Zoom] | [Select] | [Filter] | [Close]

No Feature Definition



What do I do?

- If a reference file is missing, there are different solutions depending on the circumstances.
 - The file has been re-named.
 - **The file has been moved to a different location.**

File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None | Default

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

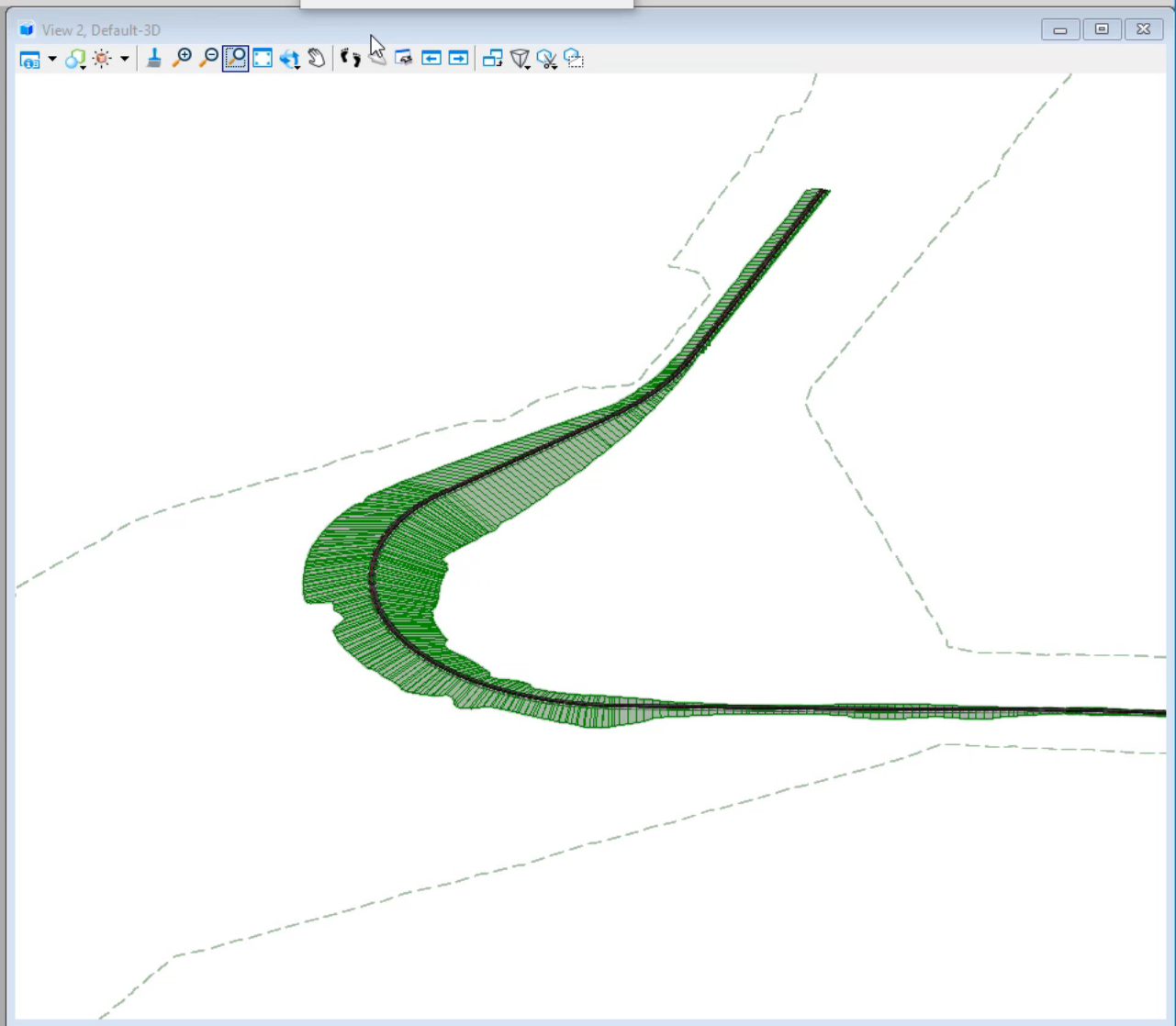
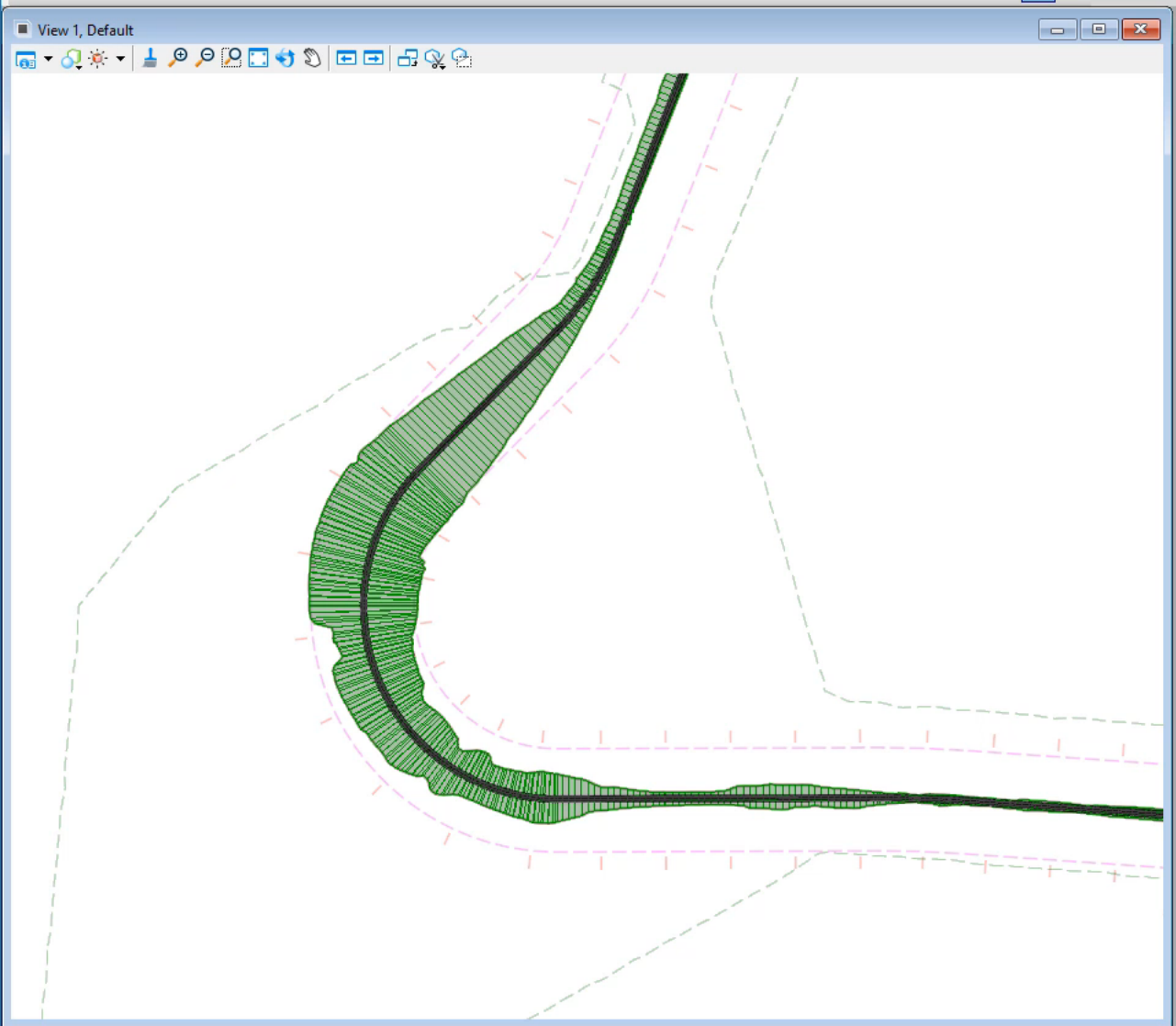
Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

OpenRoads Help: OpenRoads Help, Open RSS Reader

Search Ribbon (F4)

Element Selection: [Selection Tools]



What do I do?

- If a reference file is missing, there are different solutions depending on the circumstances.
 - The file has been re-named.
 - The file has been moved to a different location.
 - **The file has been deleted and cannot be restored.**

File Home Terrain Geometry Corridors Model Detailing Drawing Production Design Views

None Default

Attributes

Explorer Attach Tools Models Level Display

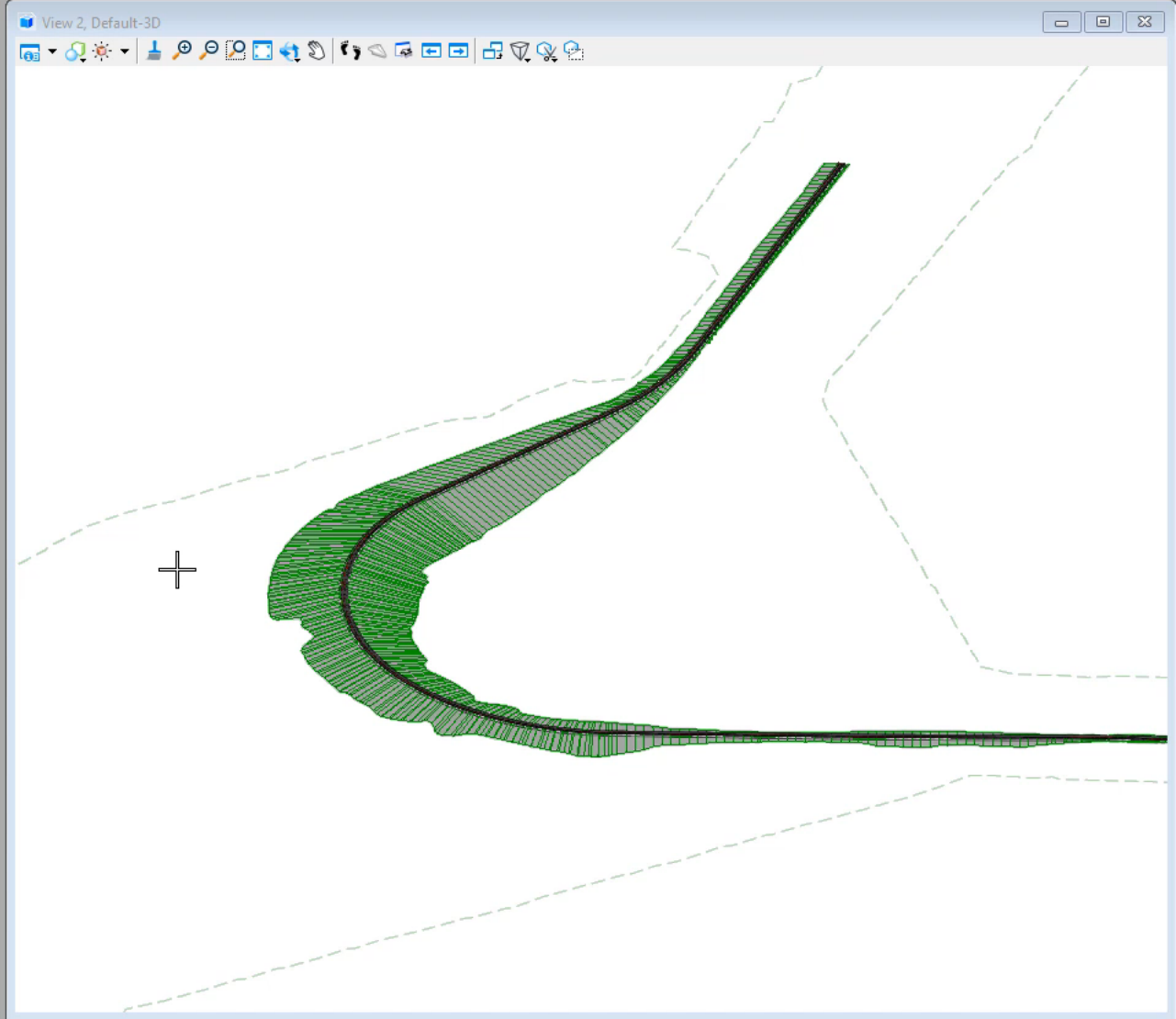
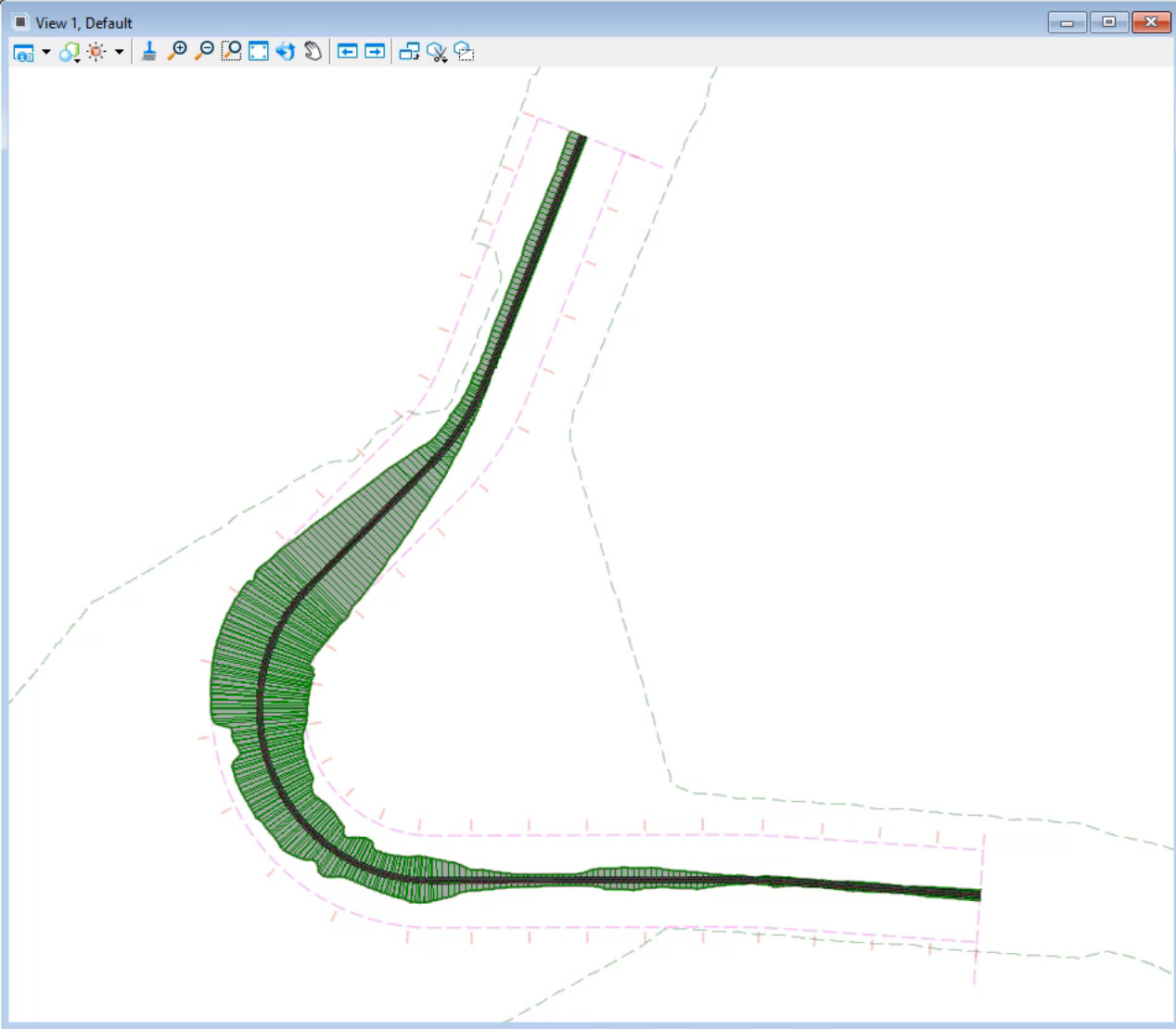
Change View Display Style

Display Style: Transparent

Selection Analysis Reports Terrain Import Import IRD

OpenRoads Help Open RSS Reader

No Feature Definition



Reference Files – *Missing Geometry?*

Missing Geometry

In order to help with missing geometry, a programming change was made so that corridors now include a 'copy' of the parent geometry.

- This way if a reference file is not available the corridor is still **viable**.
- This was first put in place in SELECTseries 4 (Update 2)
- Also exists in *OpenRoads Designer Connect Edition*



File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None | Default

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

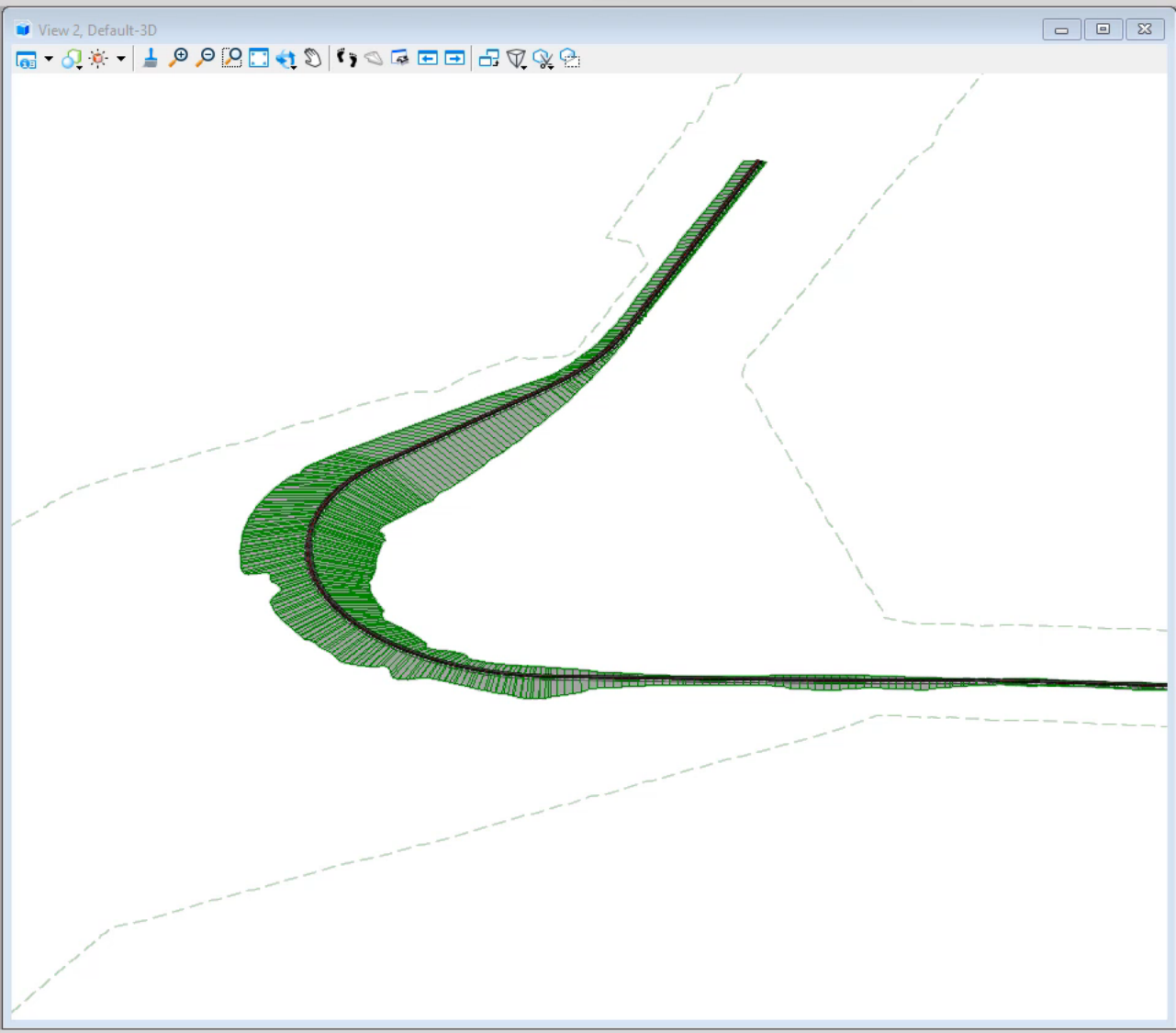
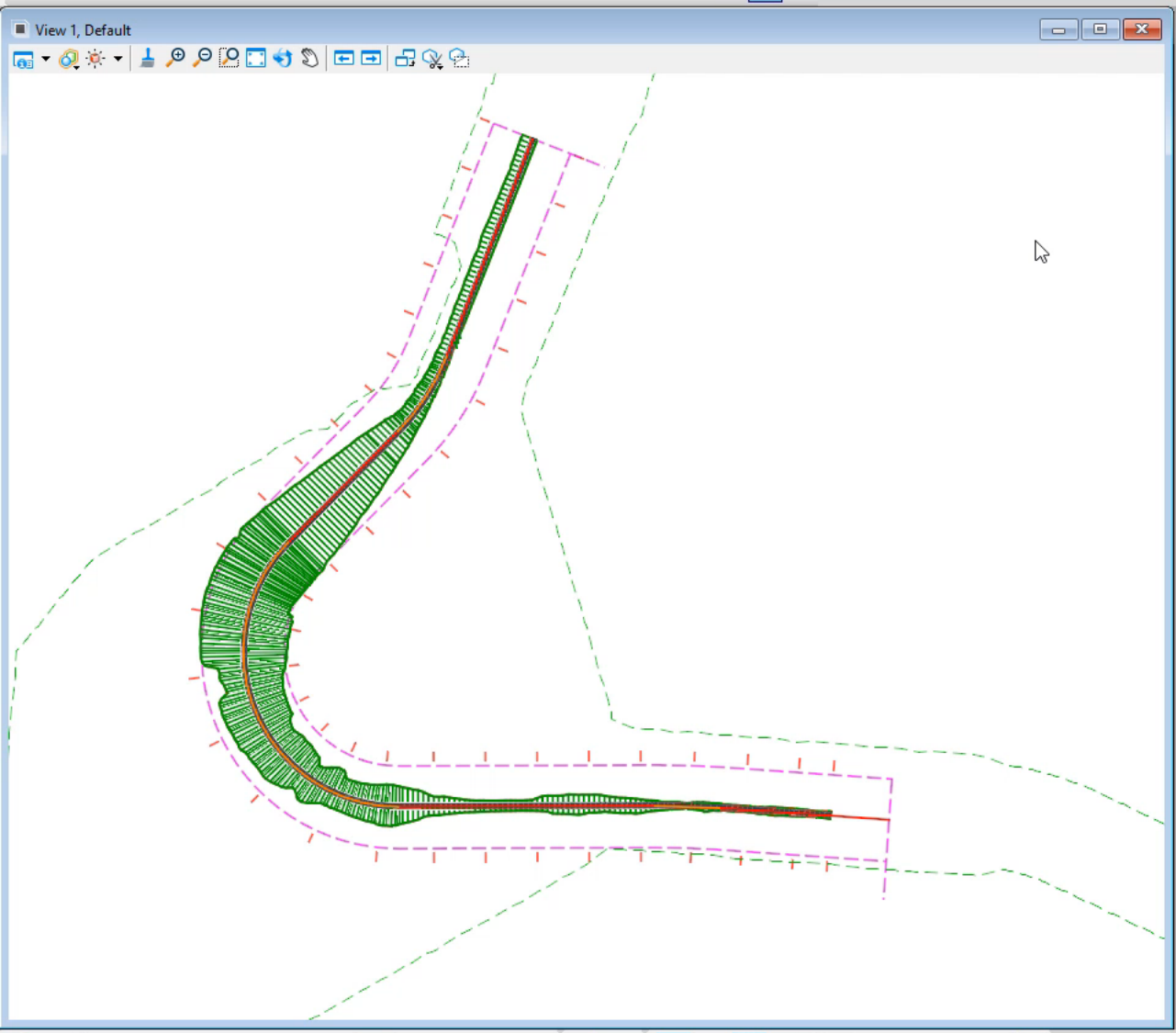
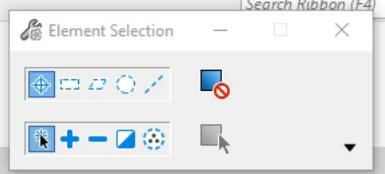
Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

OpenRoads Help: OpenRoads Help, Open RSS Reader

Element Selection

Search Ribbon (F4)



Replacing Missing Geometry

- If a geometry file has just been re-named or moved, then the solution is exactly the same as shown before.
 - **Put the file back in it's original named state or point to the re-named file.**
- If the geometry in the file has not been modified OR if the geometry in the file has been modified but *retains the original Element ID*, the corridor will heal itself.

File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None | Default

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

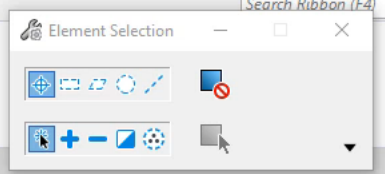
Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

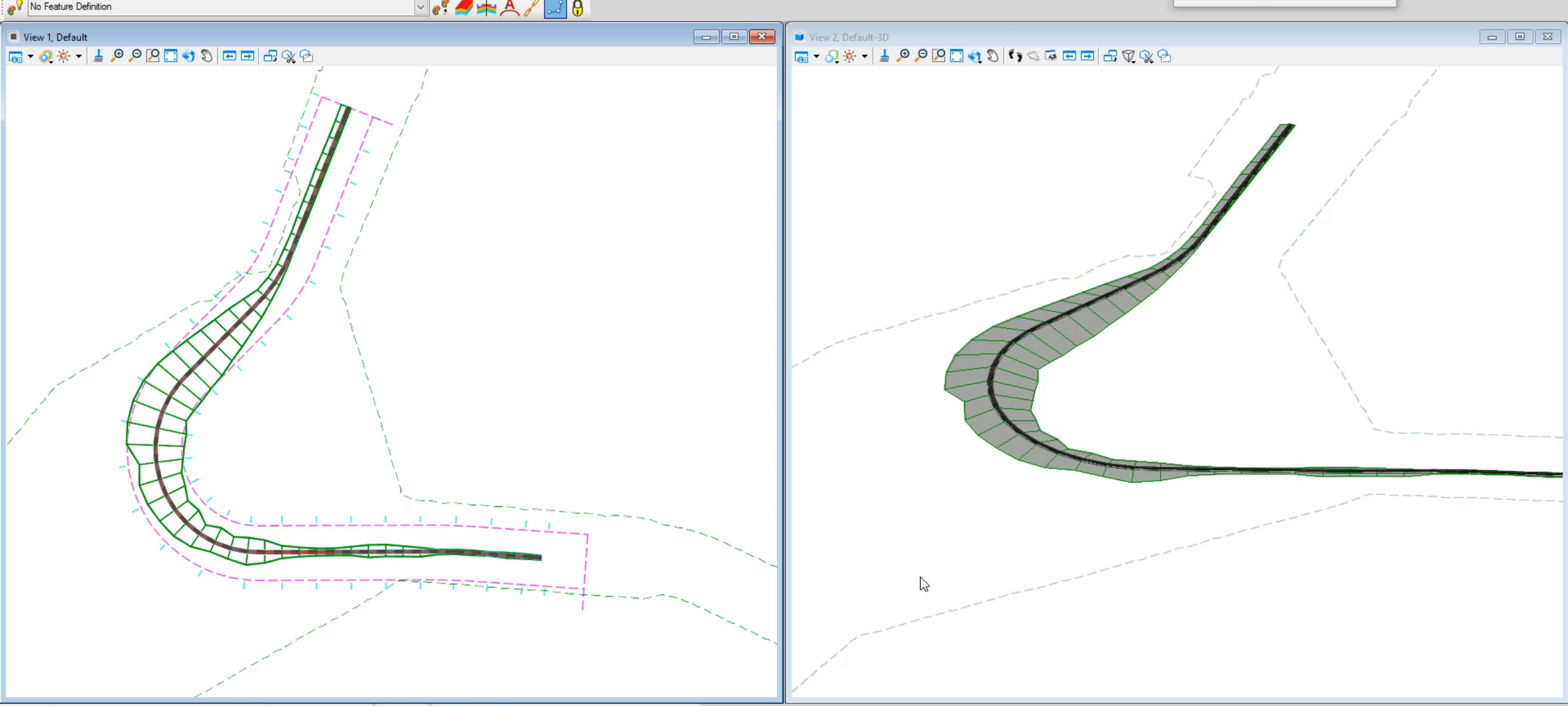
OpenRoads Help: OpenRoads Help, Open RSS Reader

Element Selection

Search Ribbon (F4)



View 1, Default | View 2, Default-3D



File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None, Default, 0, 0, 0, 0, 0

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection

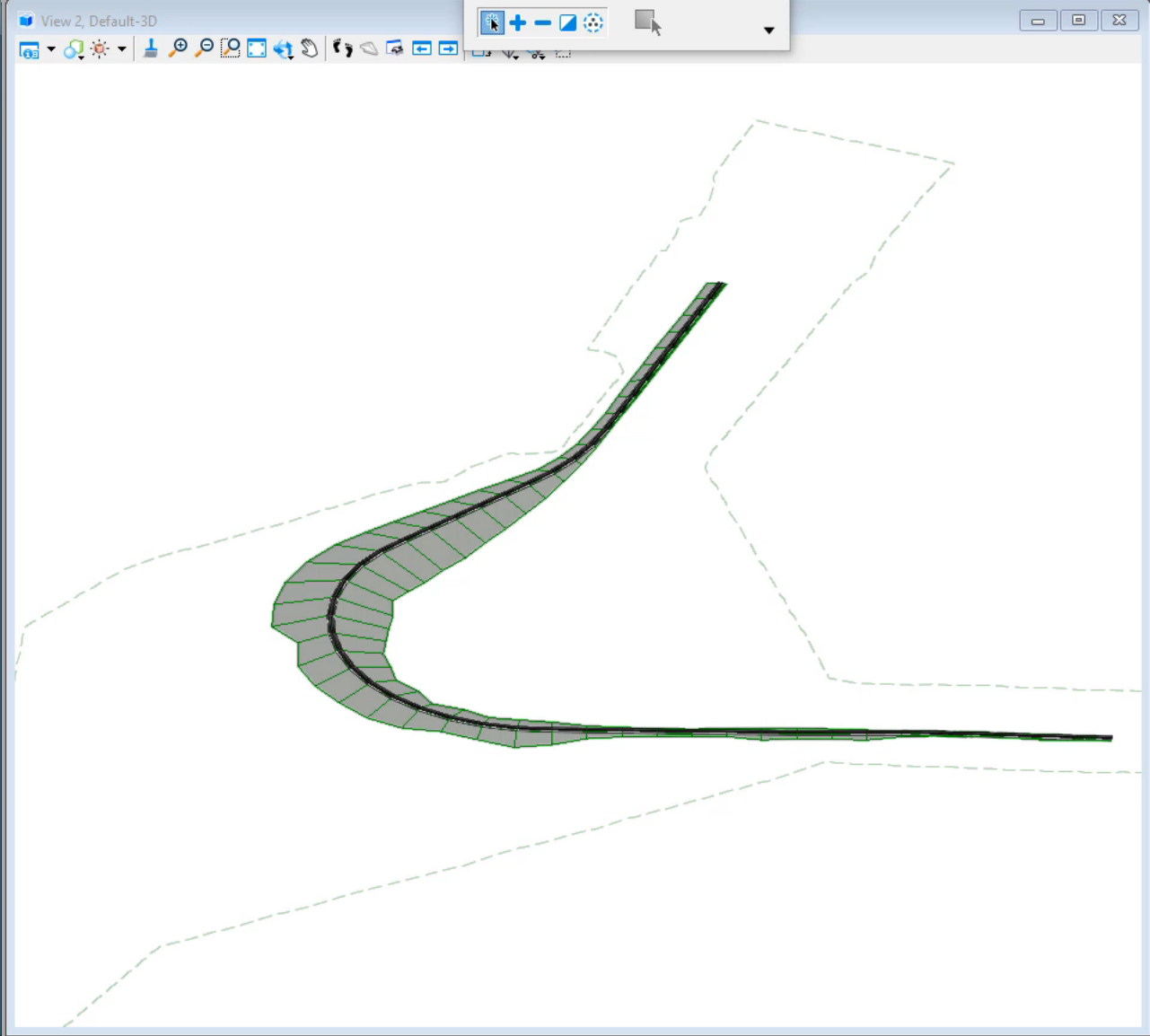
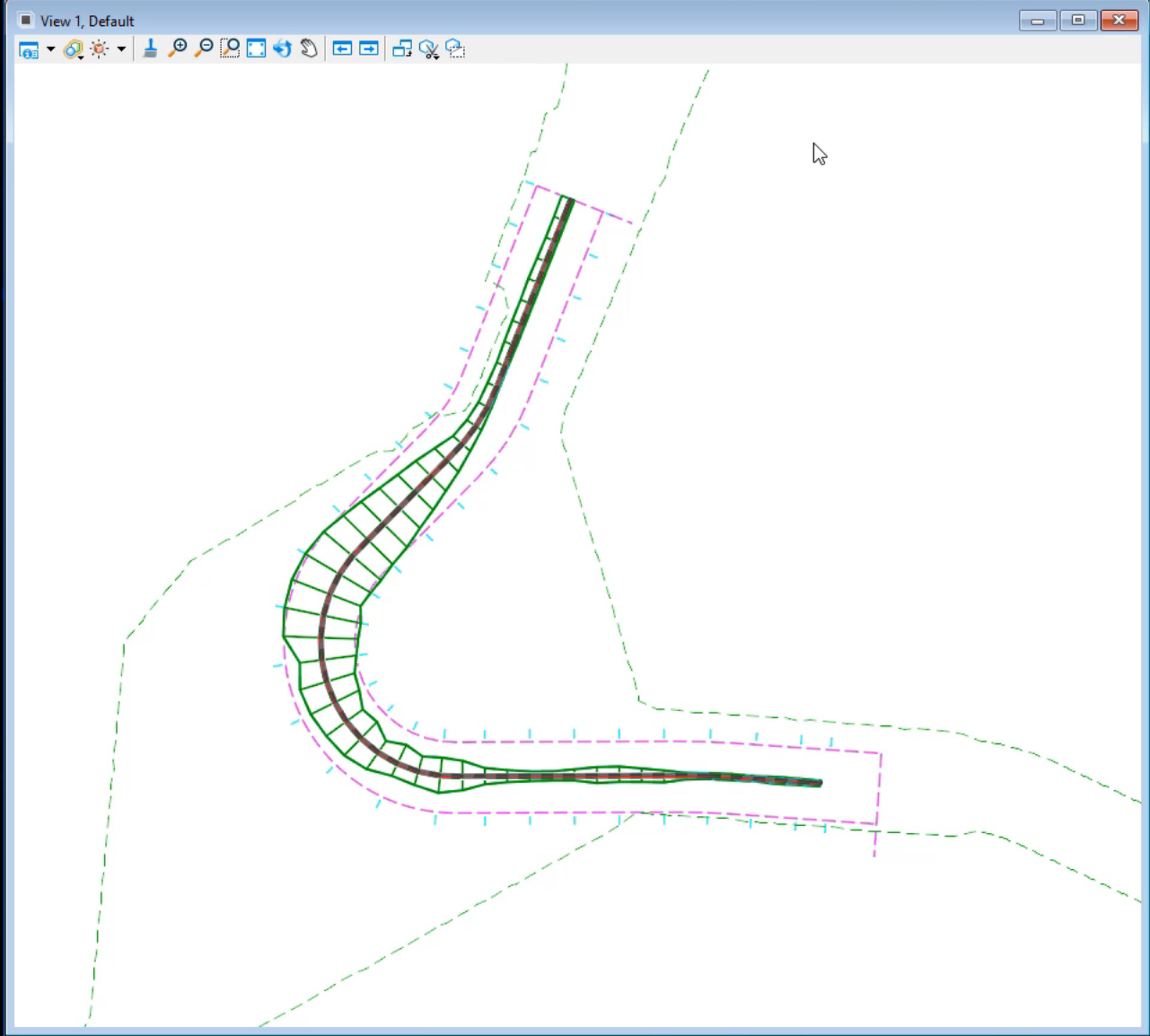
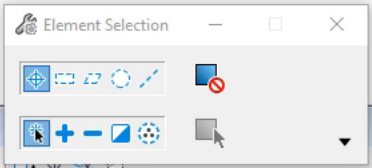
Model Analysis and Reporting: Reports, Civil Analysis, Corridor Reports

Model Import/Export: Terrain Import, Import Geometry, Import IRD

OpenRoads Help: OpenRoads Help, Open RSS Reader

Search Ribbon (F4)

Element Selection



Geometry

If the alignment is modified in a way that its Element ID is changed:

- *Alignment was dropped and then re-complexed*
- *Alignment was deleted, then re-imported.*
- *Alignment was imported or re-created in a new model or file.*

When this happens, use the key-in “**Corridor Reattach**” to re-establish the connection between the alignment and the corridor.

Remember: Rules and Snaps within ORD create a link to the **element id** – not the element’s name.

- Element ID’s are unique.

File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None Default

Primary: Explorer Attach Tools Models Level Display

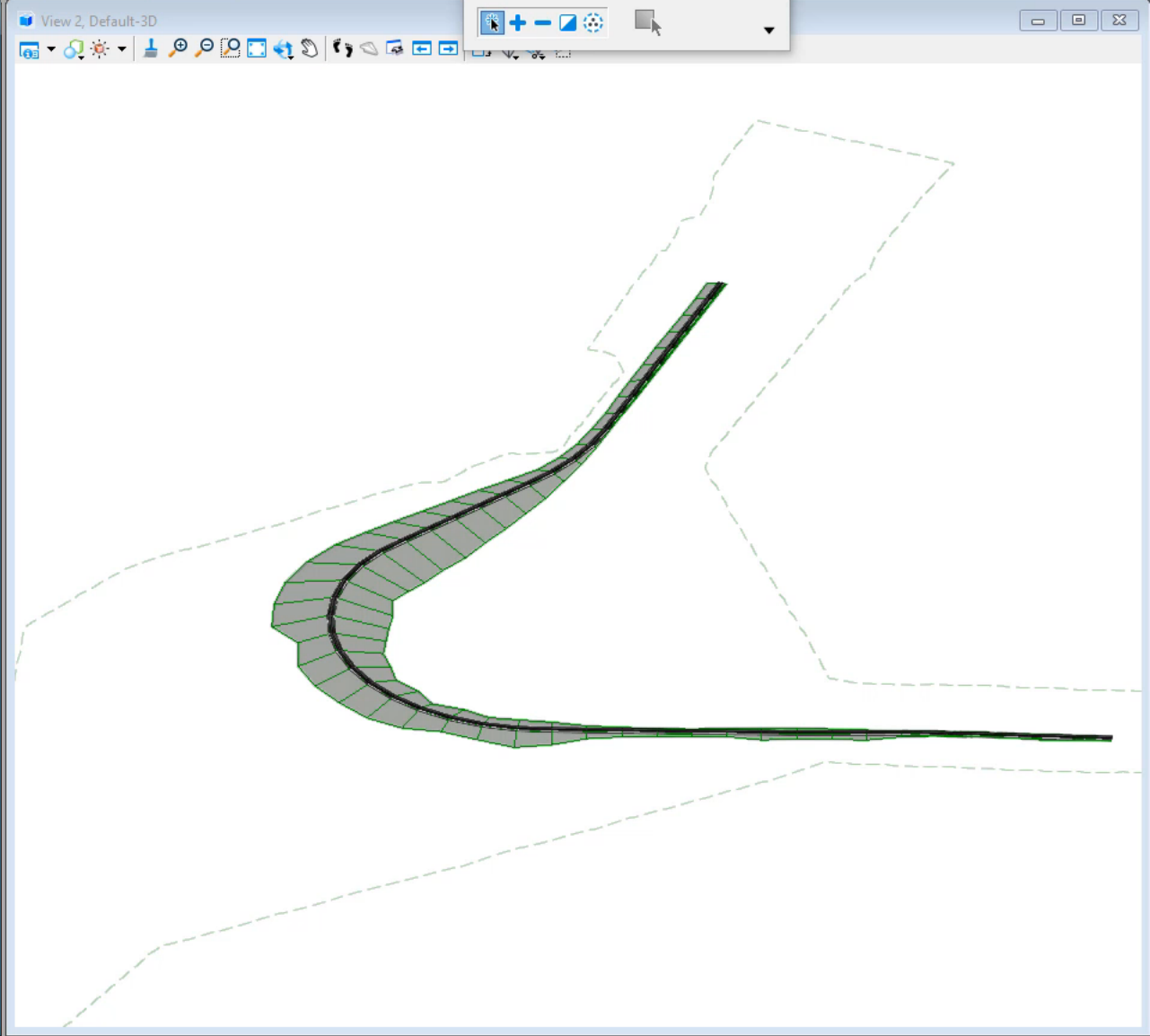
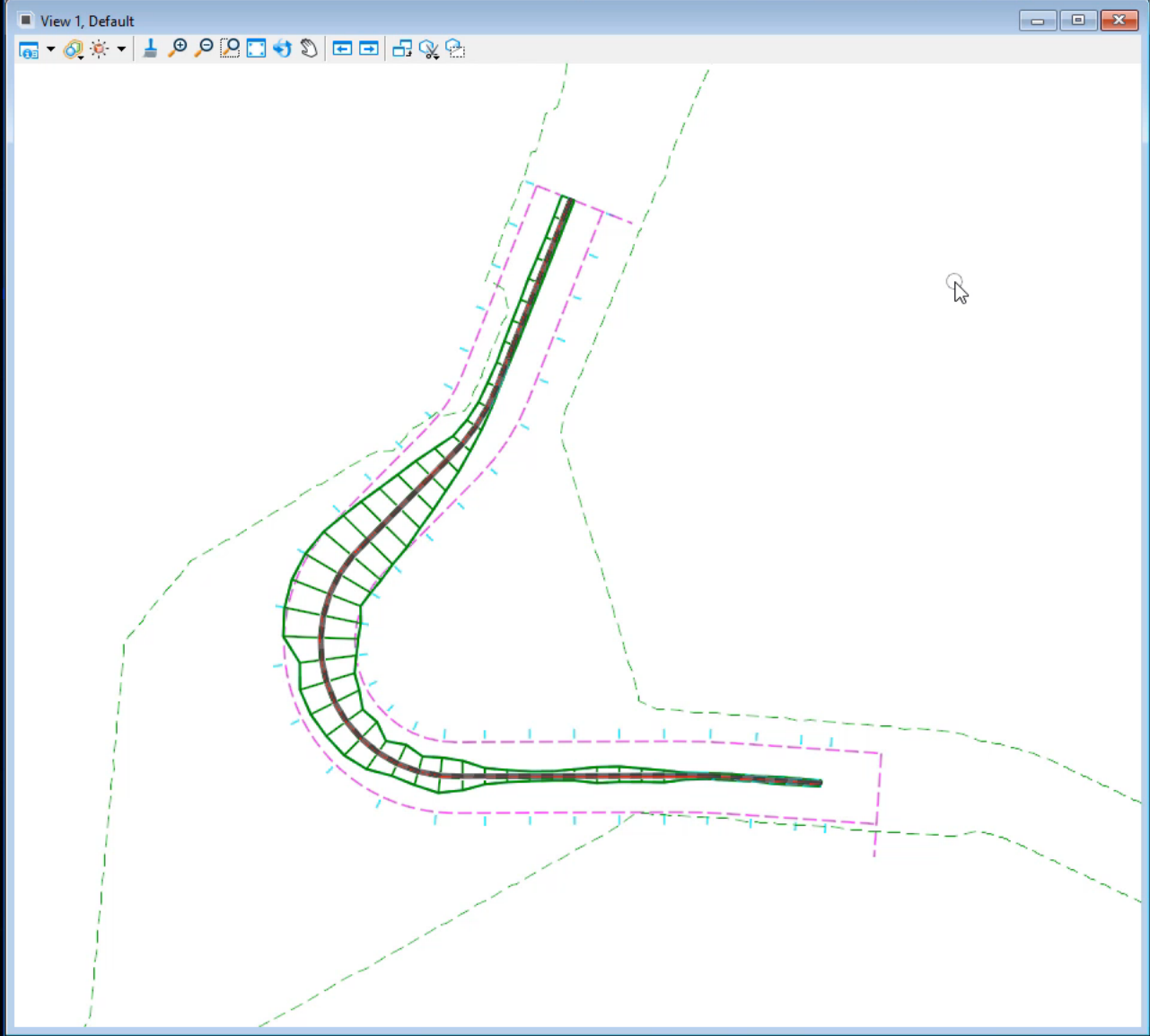
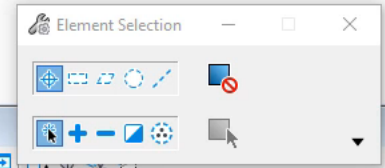
Selection: Element Selection

Model Analysis and Reporting: Reports Civil Analysis Corridor Reports

Model Import/Export: Terrain Import Import Geometry Import IRD

OpenRoads Help: OpenRoads Help Open RSS Reader

Element Selection



Reference Files – *Rules*

Reference File Rules

In OpenRoads, reference file **dependencies** are created in certain situations.

- e.g. *When the referenced terrain is made active*
- e.g. *When a corridor is built on referenced geometry*

Another action that creates a reference file dependency is **snapping to elements in a reference file.**

File Home Terrain Geometry Corridors Model Detailing Drawing Production Drawing View

Attributes: None Default

Primary: Explorer Attach Tools Models Level Display

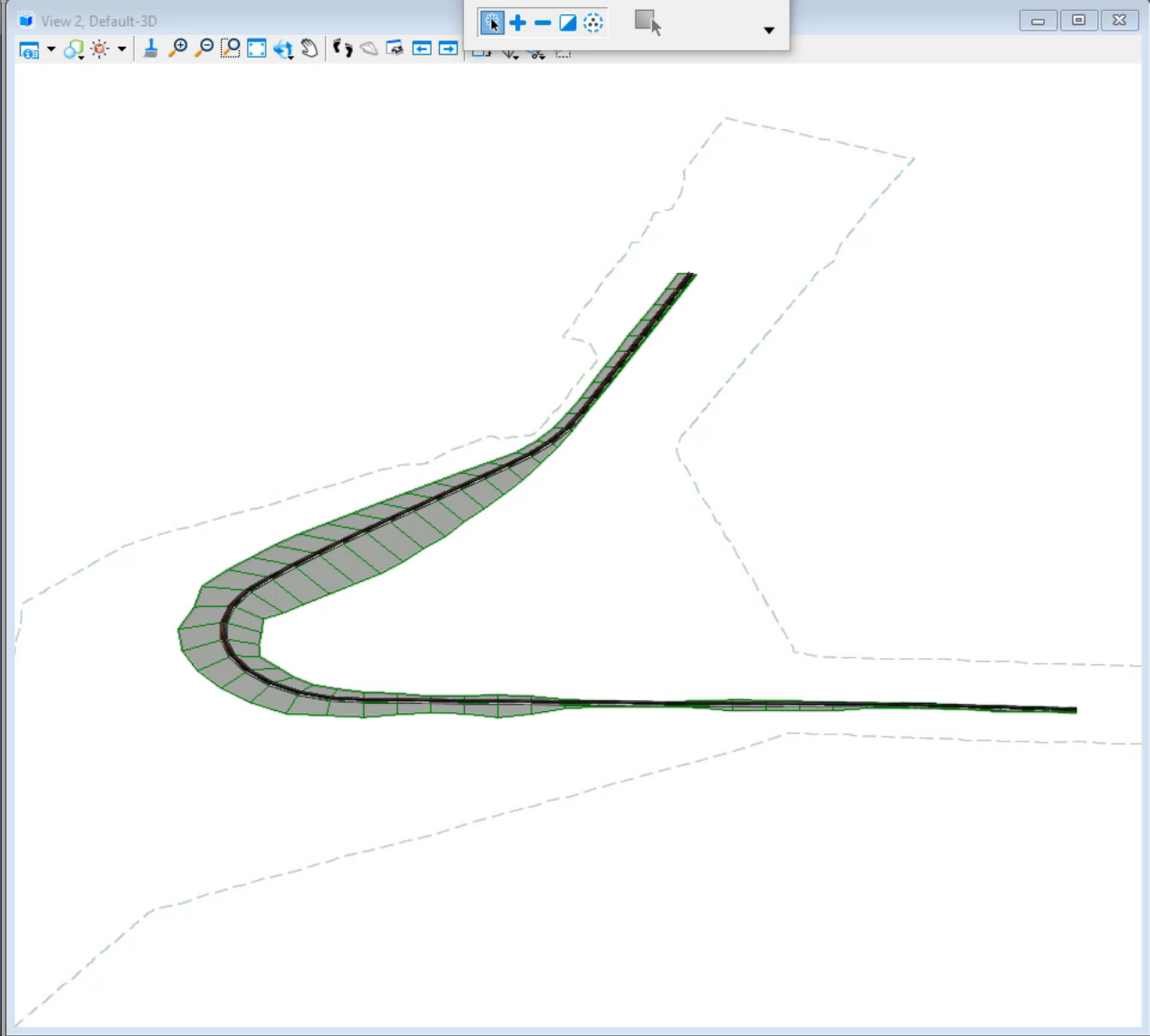
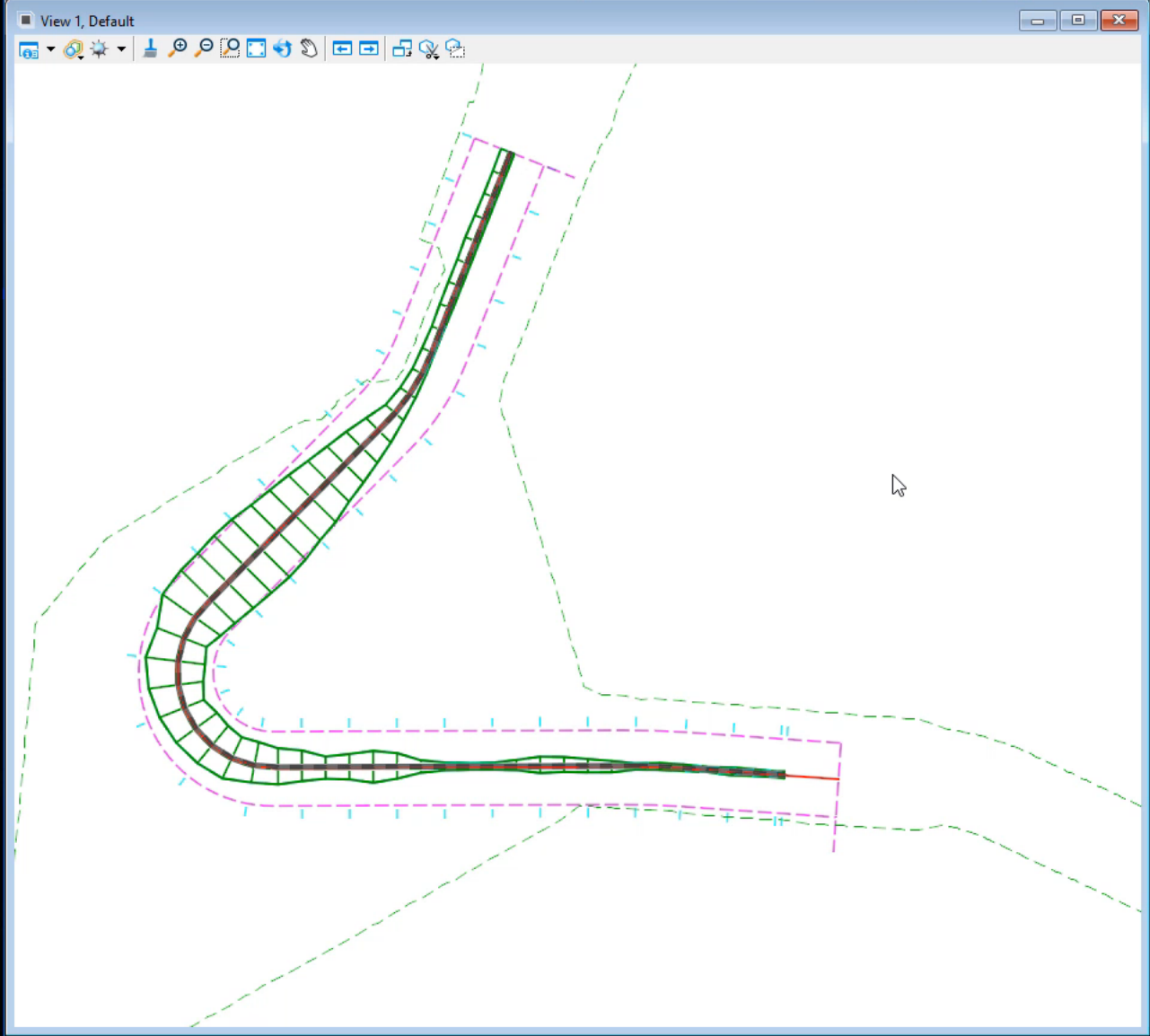
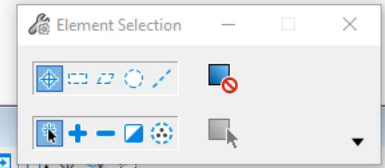
Selection: Element Selection

Model Analysis and Reporting: Reports Civil Analysis Corridor Reports

Model Import/Export: Terrain Import Import Geometry Import IRD

OpenRoads Help: OpenRoads Help Open RSS Reader

Element Selection

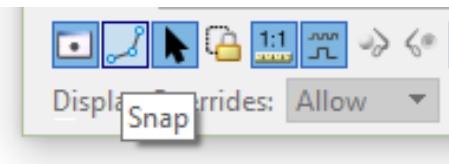


Reference File Rules

We have added an option to the Feature Definition Toggle Bar to help prevent unwanted snap rules.



However, you may also want to consider disabling the *Use Reference Snap Lock* to help prevent unwanted snaps.





Thank You

Have a great conference!

