Updating the Design - What Happens When Things Change?

Bentley
Advancing Infrastructure

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Design Changes

- Most roadway projects have many design changes throughout the lifecycle of the project
- OpenRoads Designer is designed to handle and accommodate design changes fairly easily
- Design Intent along with the rules and relationships that exist in the OpenRoads Model provide a means for dynamic updates when design changes occur
- It’s important to understand how to make changes and to be aware of what happens when changes are made

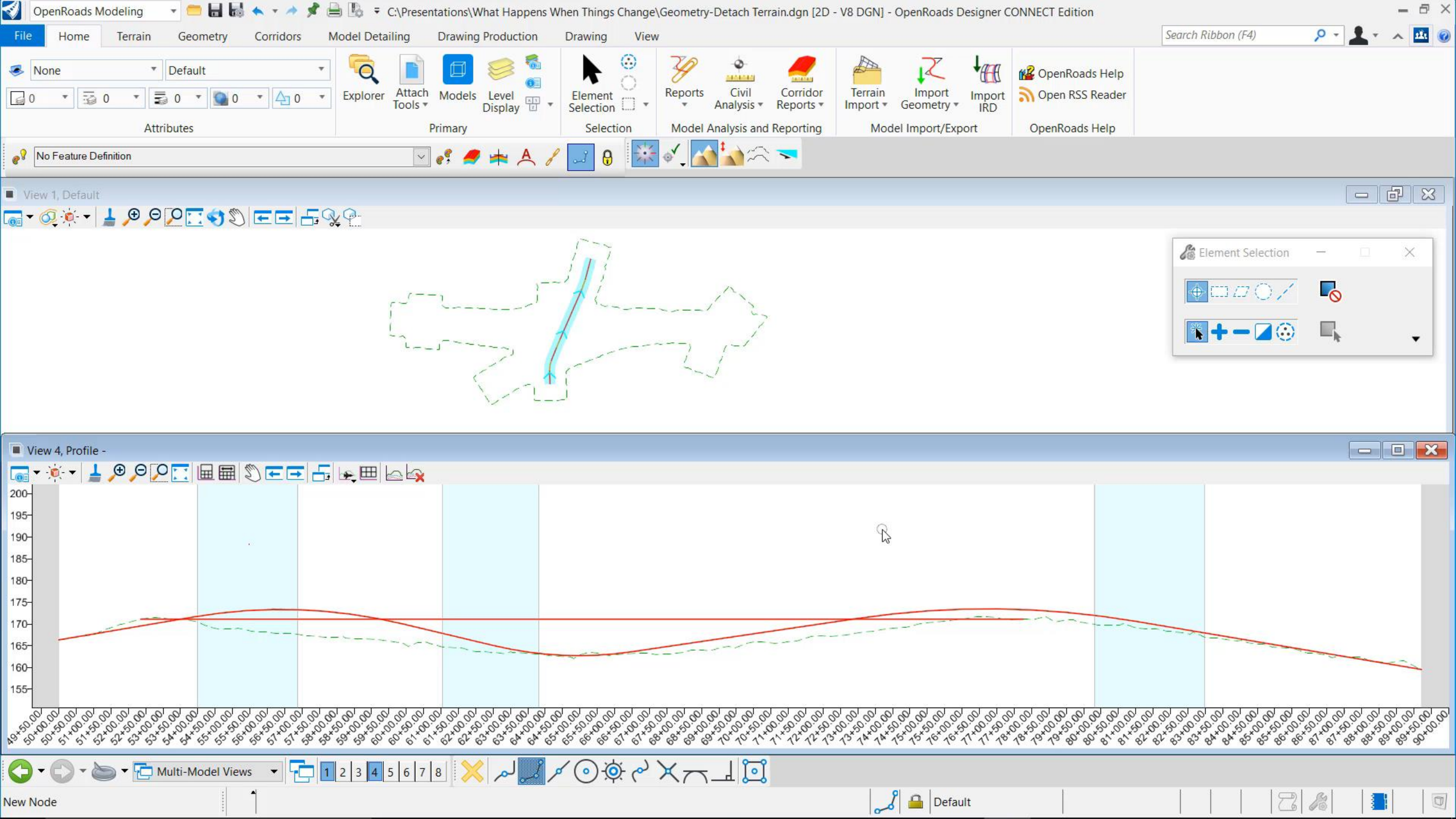
Design Changes

- How to make changes?
- What happens when you make changes and how the OpenRoads Model updates based on those changes?
    - Terrain Model
    - Horizontal Geometry
    - Vertical Geometry
    - Superelevation
    - Corridors

Terrain Model Updates and Changes

What Happens When the Terrain Model is Updated?

- Terrain model changes will typically affect vertical geometry, corridors, subsurface utilities and drainage structures
- OpenRoads elements are ruled and associated to the Active Terrain Model when an element is:
  1. Snapped to the terrain
  2. Elements are draped or offset from the terrain
  3. End Conditions target the terrain
- Even if the content within the Terrain Model changes the rules do not break because the Terrain Model, as a container, is still intact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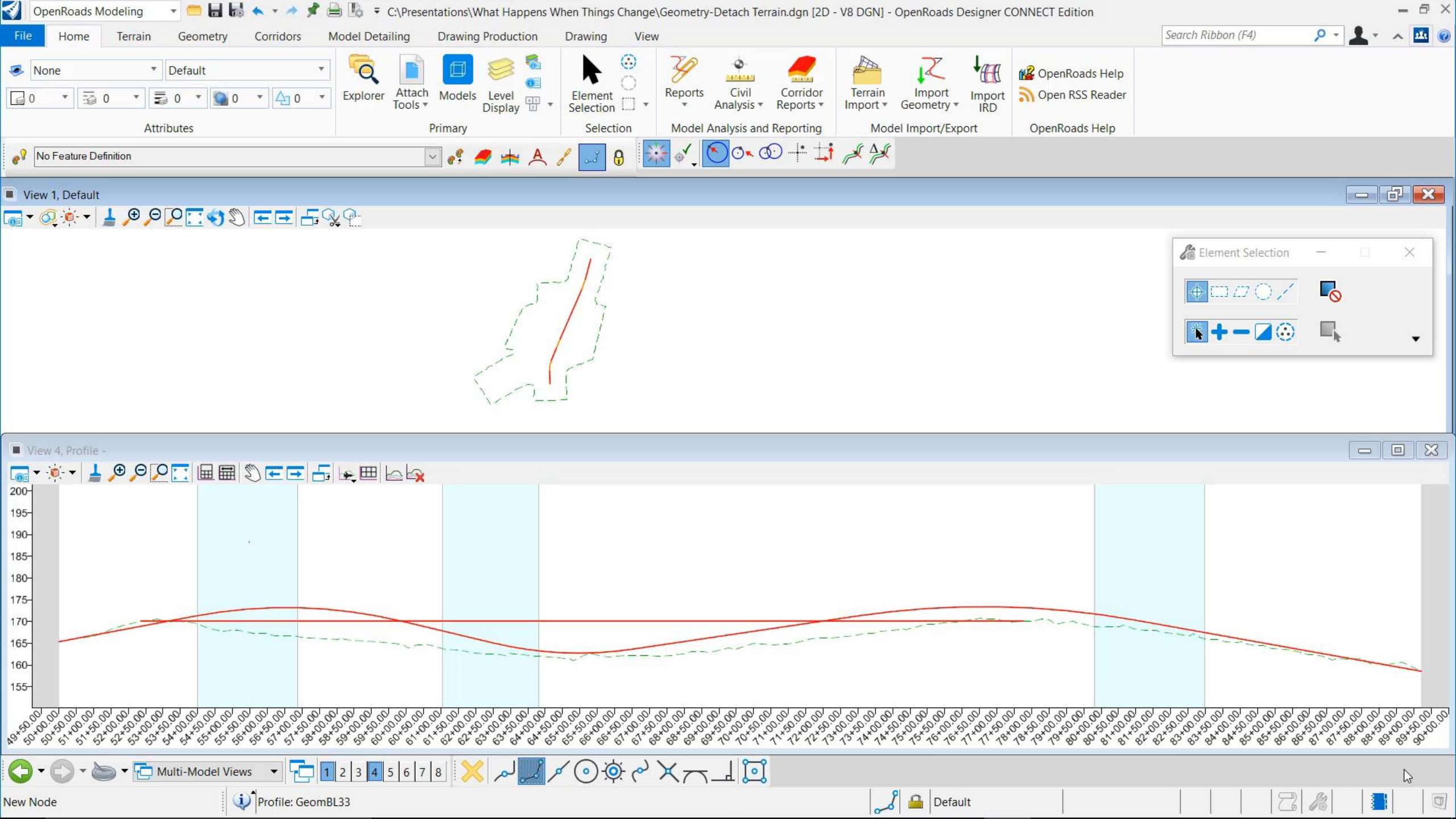
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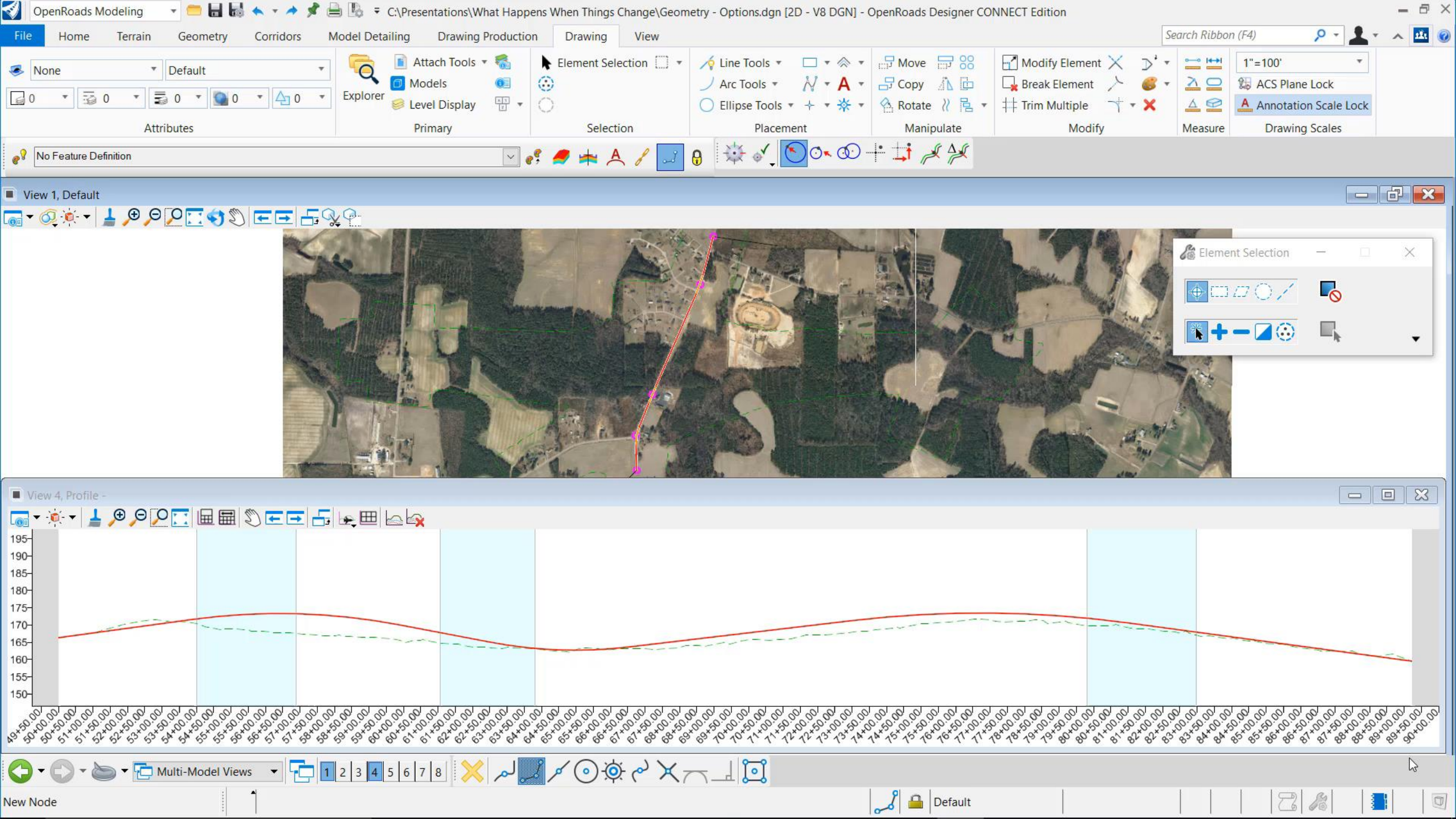
Horizontal Geometry Updates and Changes

How To…

- Insert PI
  - Use Insert Vertex to insert PI to horizontal alignment
- Delete PI and Remove Curves
  - Use Delete Vertex to remove PI’s which can also remove horizontal curves
- Insert Curves
  - Use Insert Fillet tool if you need to insert a curve or curve combinations between tangents on previously create alignment
- Append Elements
  - If you need to add additional elements to the beginning or end of alignment
- Really Mess Things Up
  - What not to do!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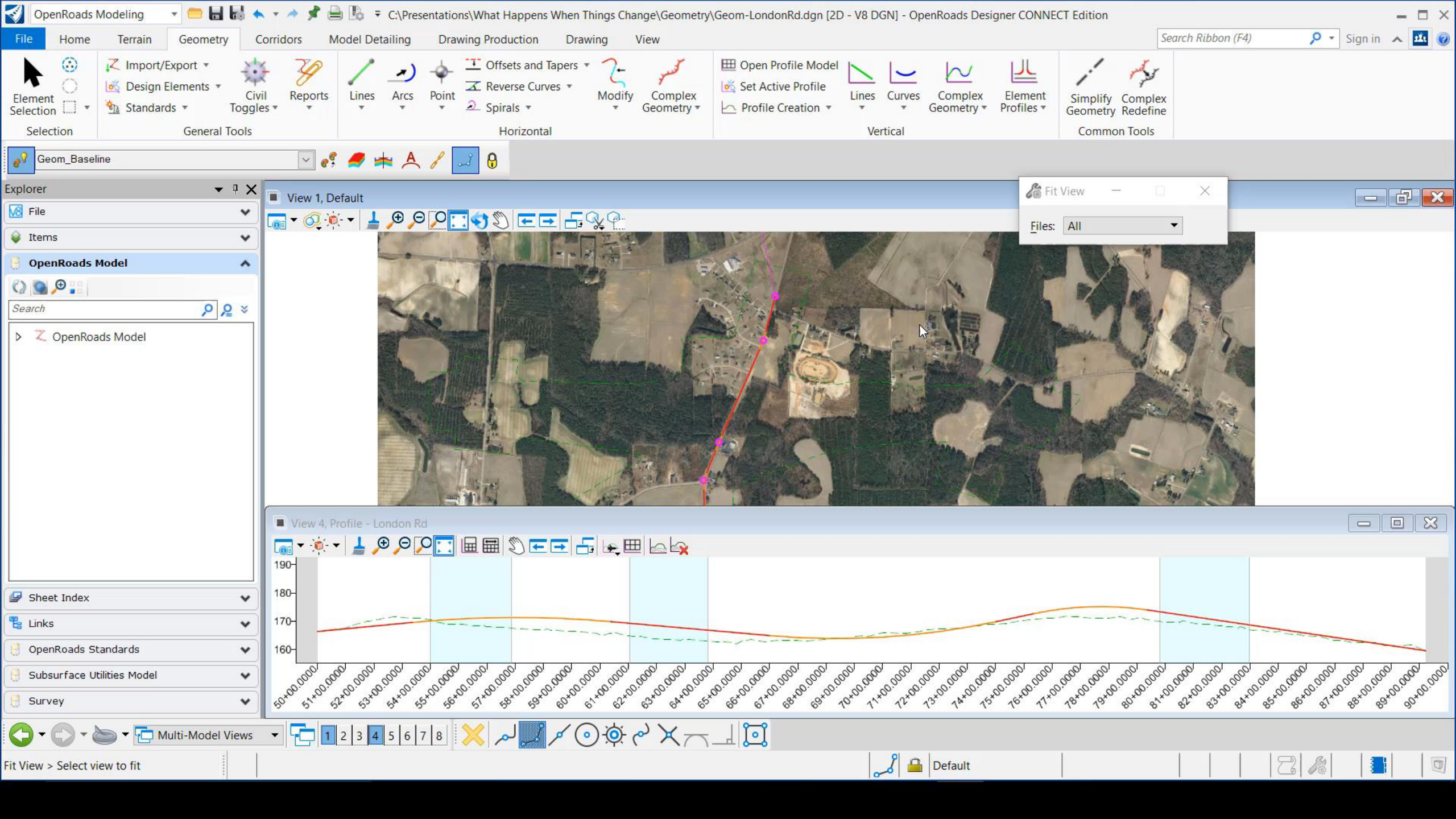
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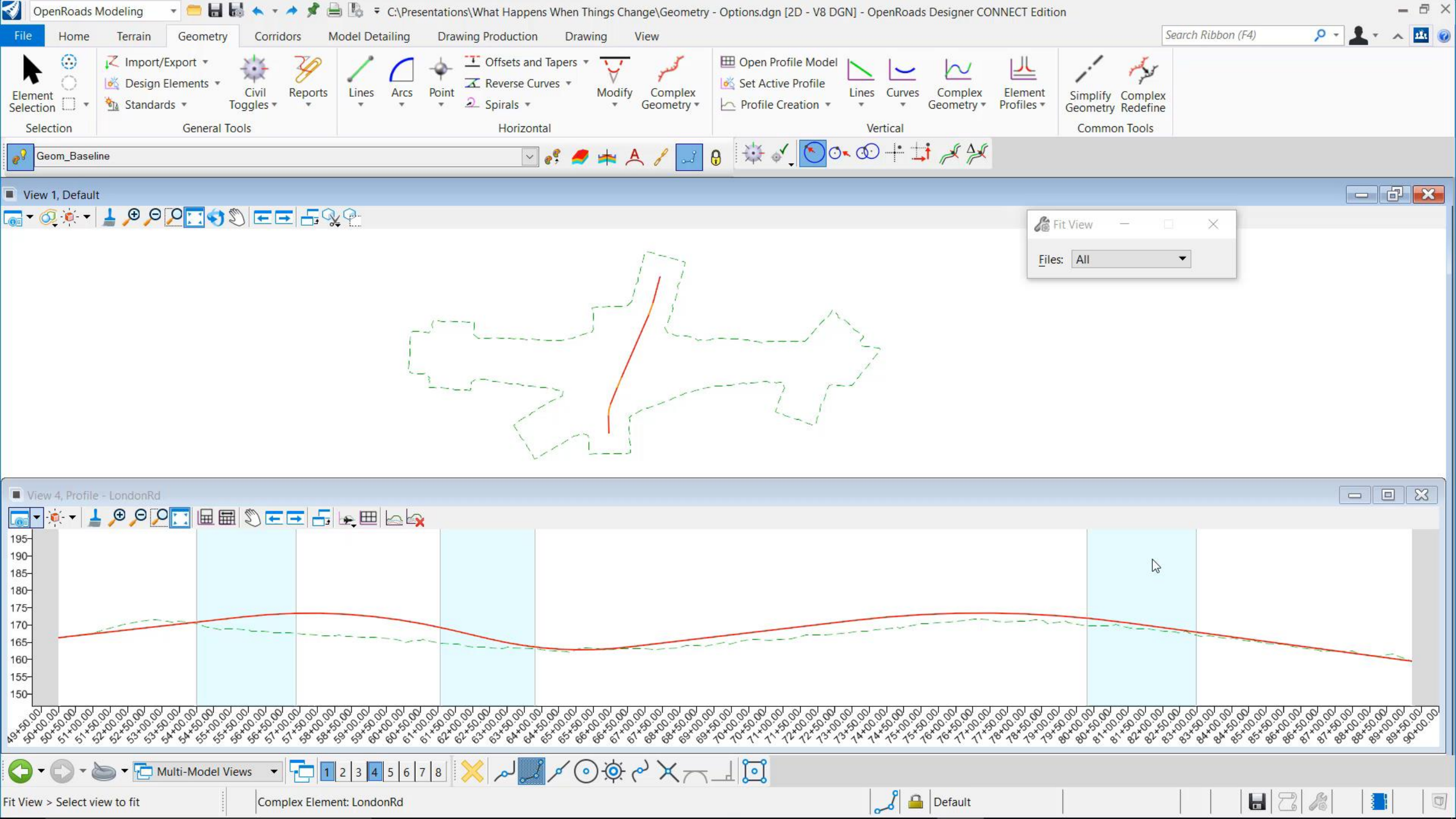
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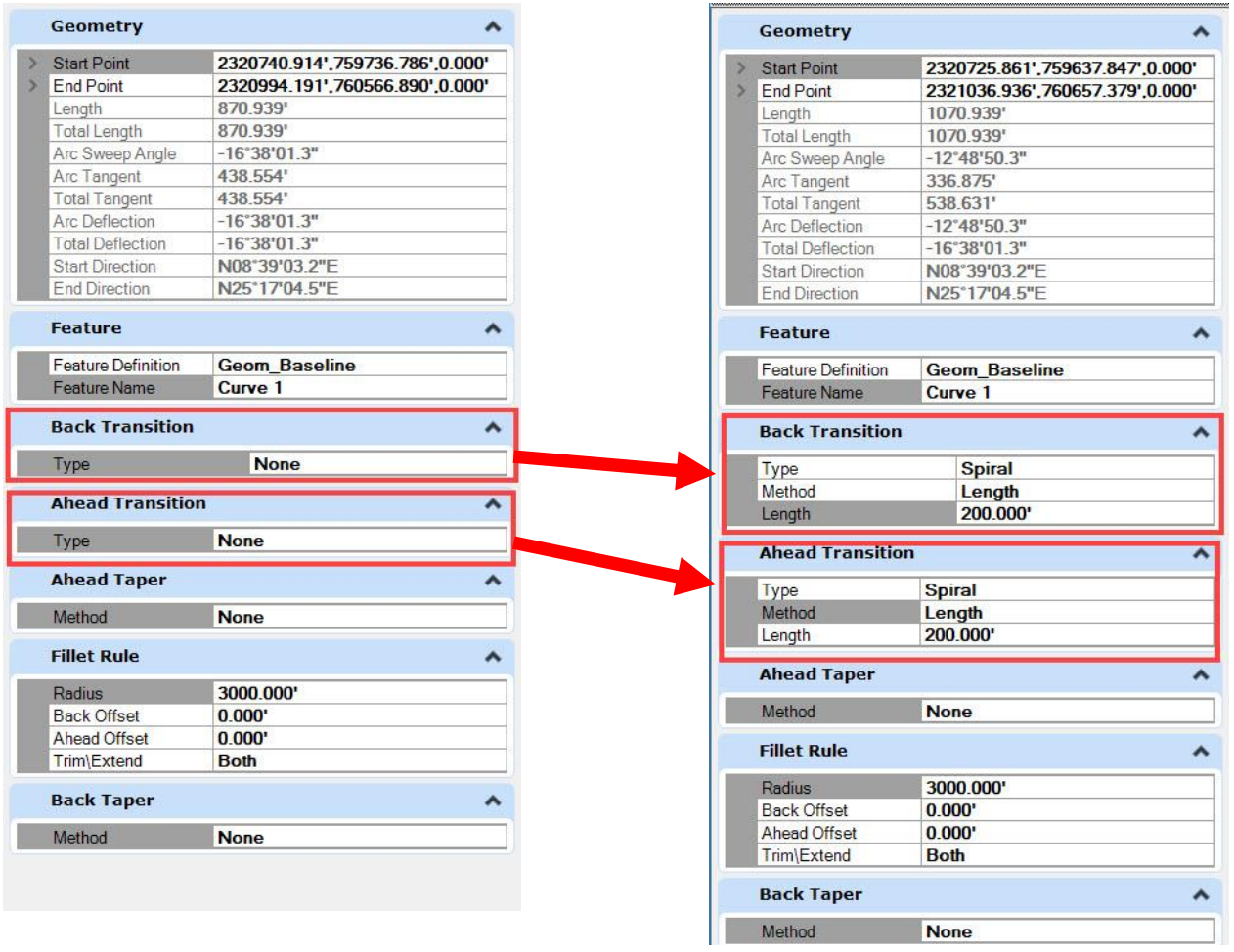
Horizontal Geometry Updates and Changes

- **Properties** tool can also be used to change simple curve to more complex curve combinations



Horizontal Geometry Updates and Changes

I have an existing complex alignment that I need to redefine over a certain range, substituting in new horizontal geometry. How can I do this yet preserve all rules built off the original geometry? (i.e. other geometry, superelevation, civil cells, etc.)

Answer: **Complex Redefine** command!

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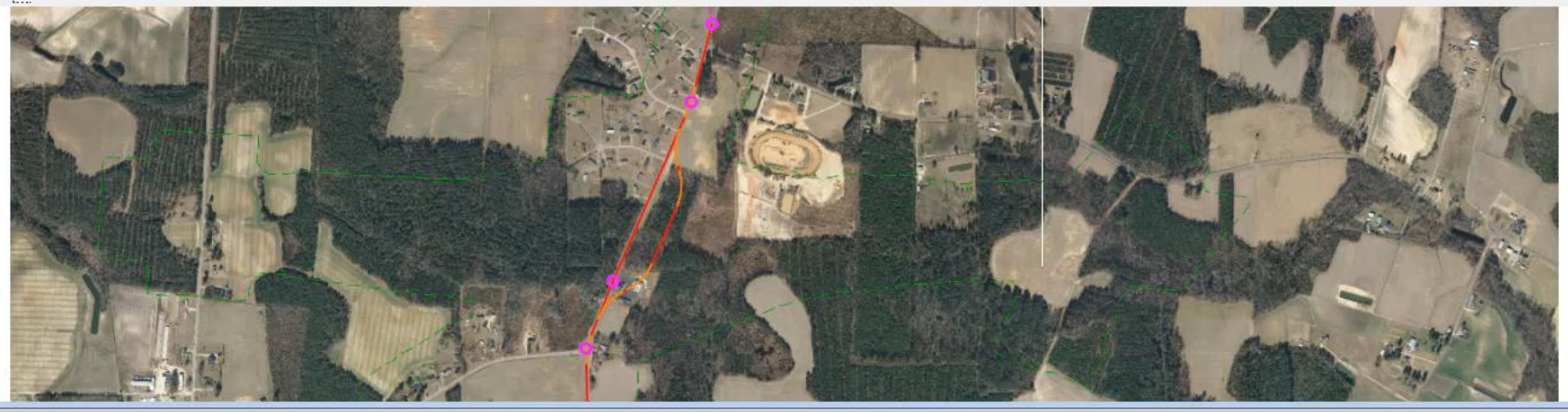
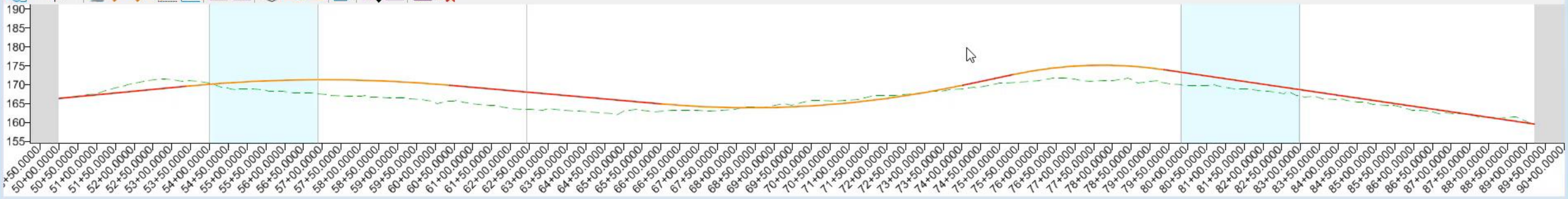


View 4, Profile - London Rd



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Horizontal Geometry Updates and Changes

Complex Redefine

- The command allows an existing complex alignment to be partially redefined over a range, substituting in a new horizontal geometry.
- The command reserves the original feature name, allowing all rules built off the original geometry to update.
- The command affects all rules relating to the alignment (Other geometry, superelevation, corridors, terrains, civil cells, etc. will reprocess to accept the revision.)
- Vertical geometry from the original alignment is preserved and carried forward to the newly formed alignment.
- Segment(s) from the original alignment that are replaced are retained in the model and are allocated a new name.
- Rules over reference files will need to be opened to initiate the update.

Horizontal Geometry Updates and Changes

Complex Redefine

What if I want to go back to my original horizontal alignment?

Answer:

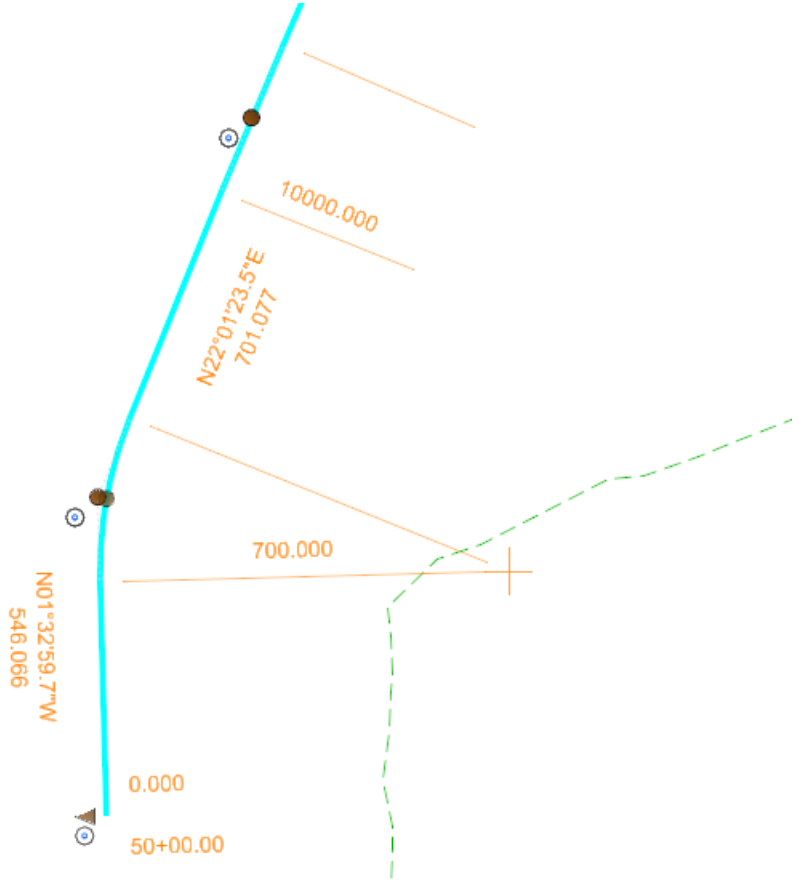
Run the command again and select the old geometry as the redefining element

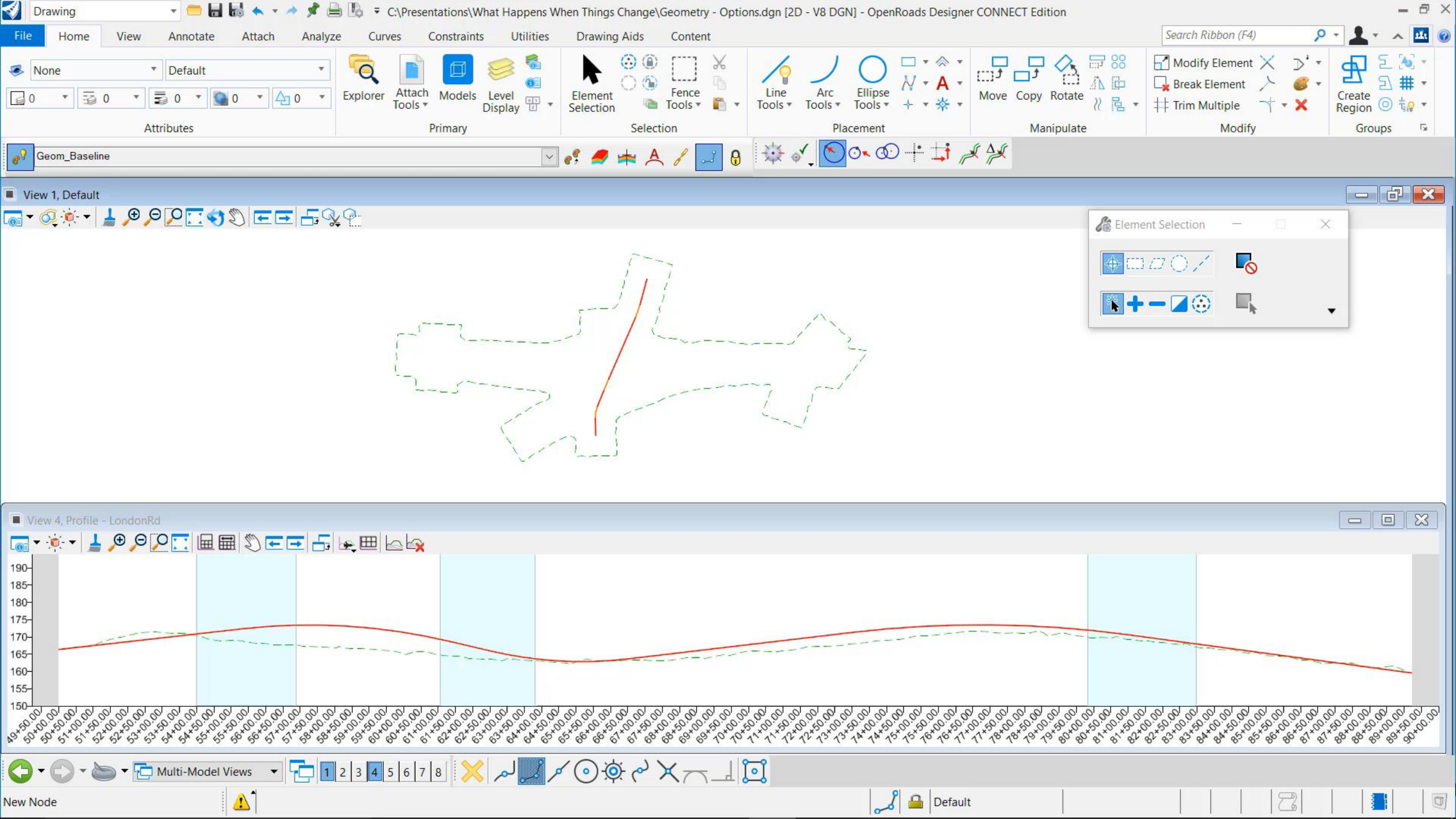
Let’s take a look…

Horizontal Geometry Updates and Changes

Dynamic Updates

Simple changes to horizontal geometry can be made via the dynamic text and drag handles for easy in place editing

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Multi-Model Views
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New Node
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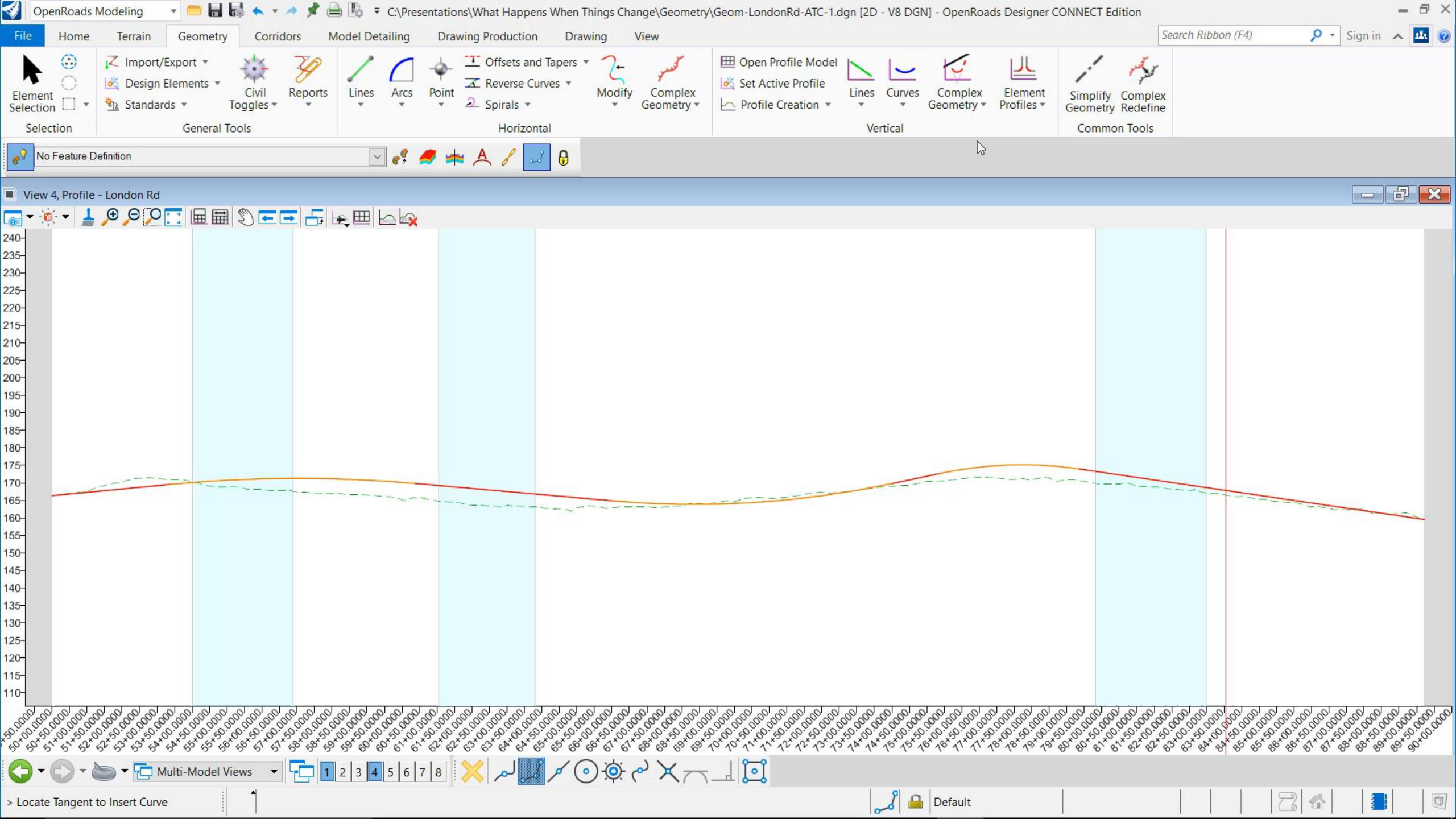
Vertical Geometry Updates and Changes

How To…

- Insert VPI
  - Use Insert Vertex to insert VPI to vertical alignment
- Delete VPI and Removes Curves
  - Use Delete Vertex to remove VPI’s which in turn remove vertical curves
- Insert Curves
  - Use Profile Insert Curve tool if you need to insert a curve
- Append Elements
  - If you need to add additional elements to the beginning or end of alignment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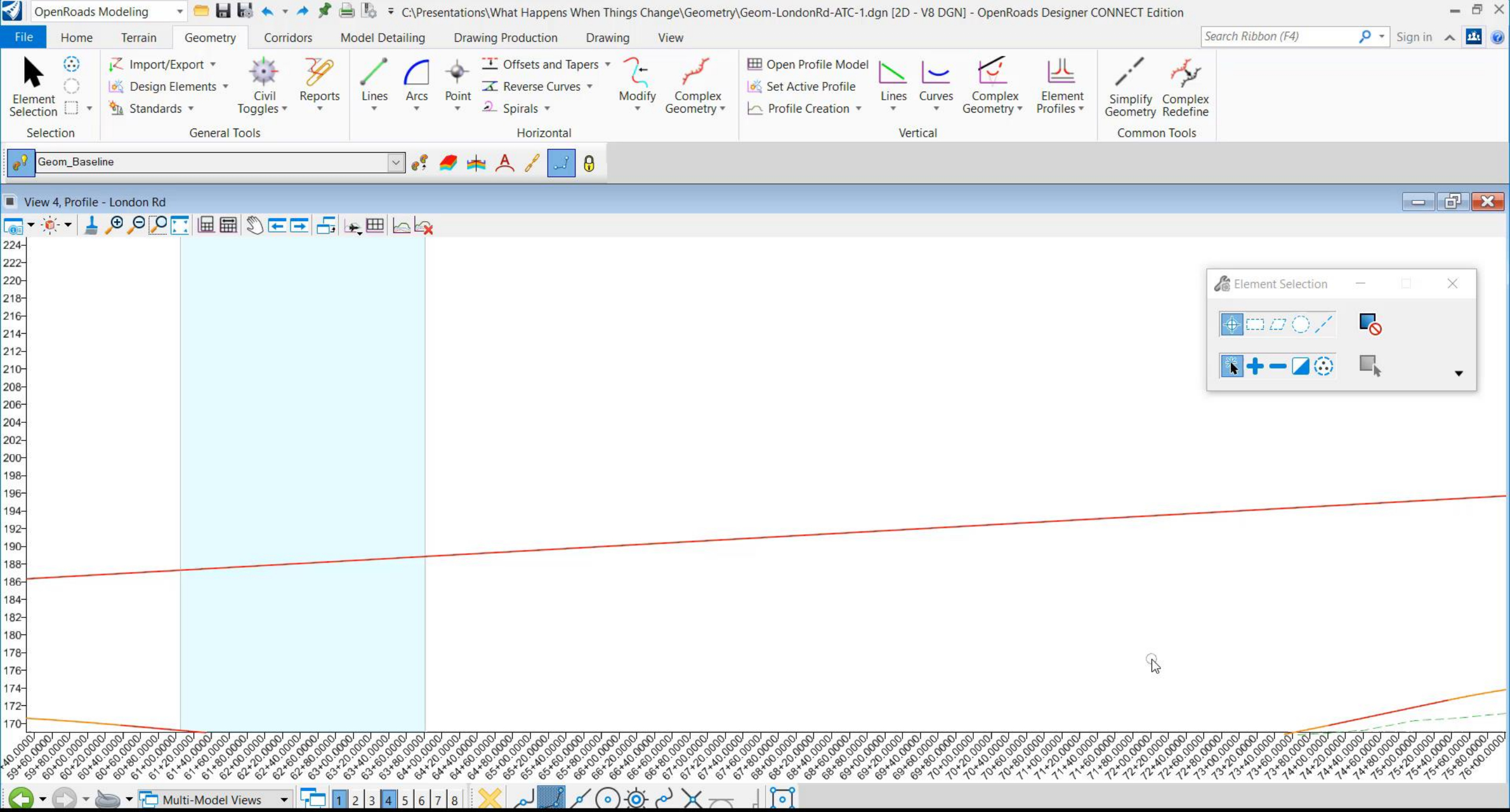
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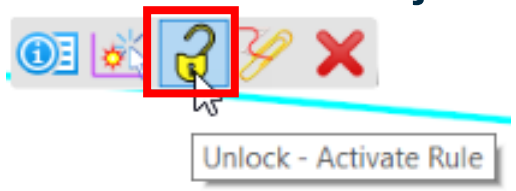
Vertical Geometry Updates and Changes

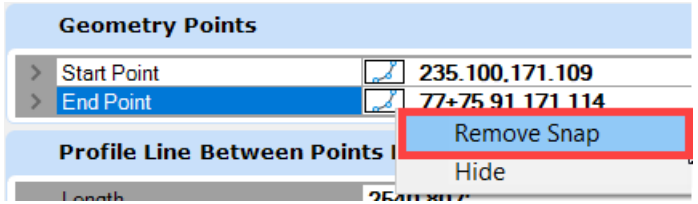
How do I prevent my vertical alignment from updating when I make a change to the horizontal alignment?

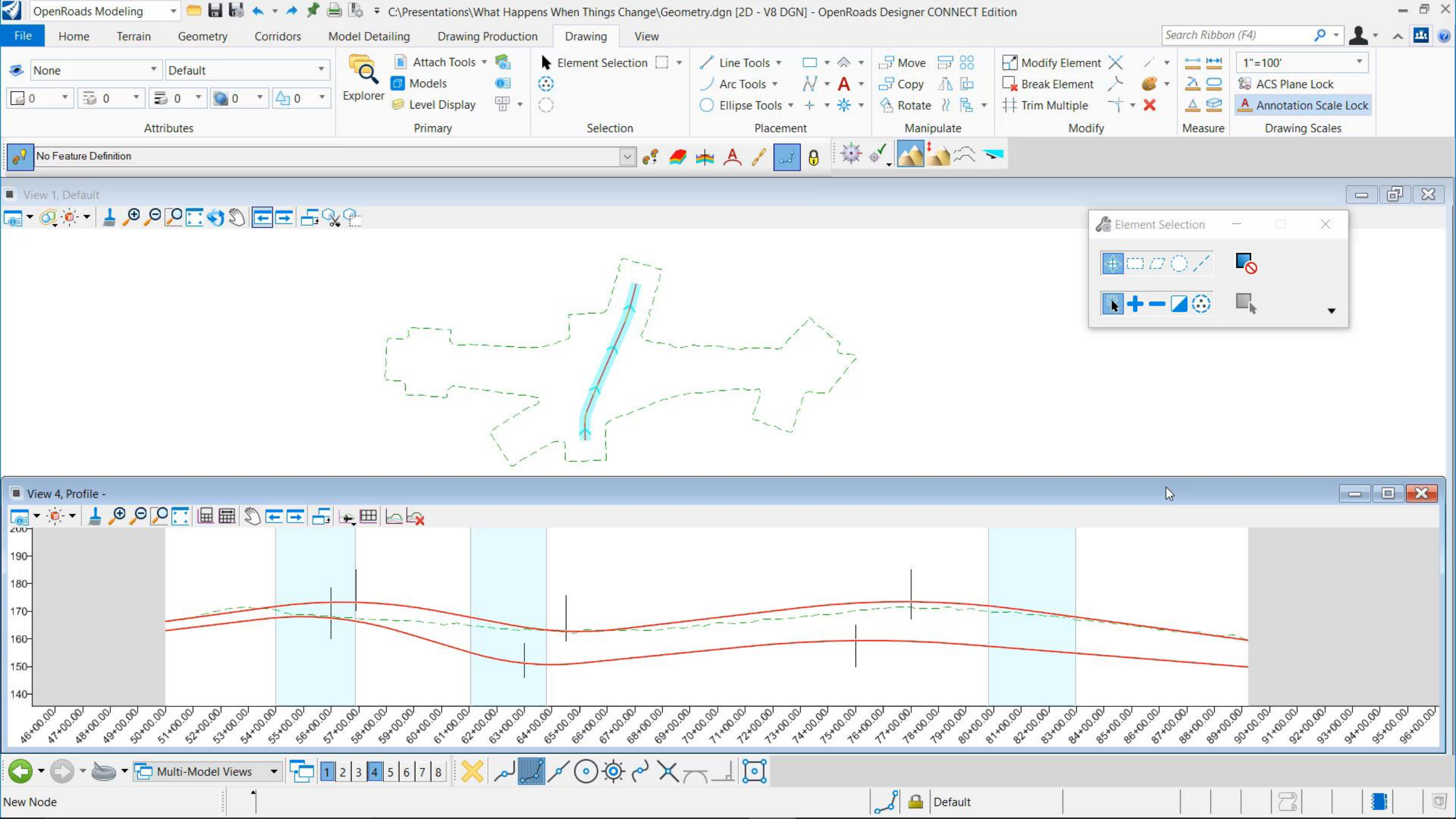
If you don't want the vertical alignment to move or adjust when you make changes to horizontal alignment:

1. Use Unlock to prevent the vertical from adjusting



2. Use *Civil AccuDraw* to place the vertical elements, this seems to keep the vertical elements in place when adjustments are made to the horizontal alignment
3. Remove any Snap Rules that would cause the vertical to adjust (i.e. snapping the existing terrain)

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Superelevation Updates and Changes

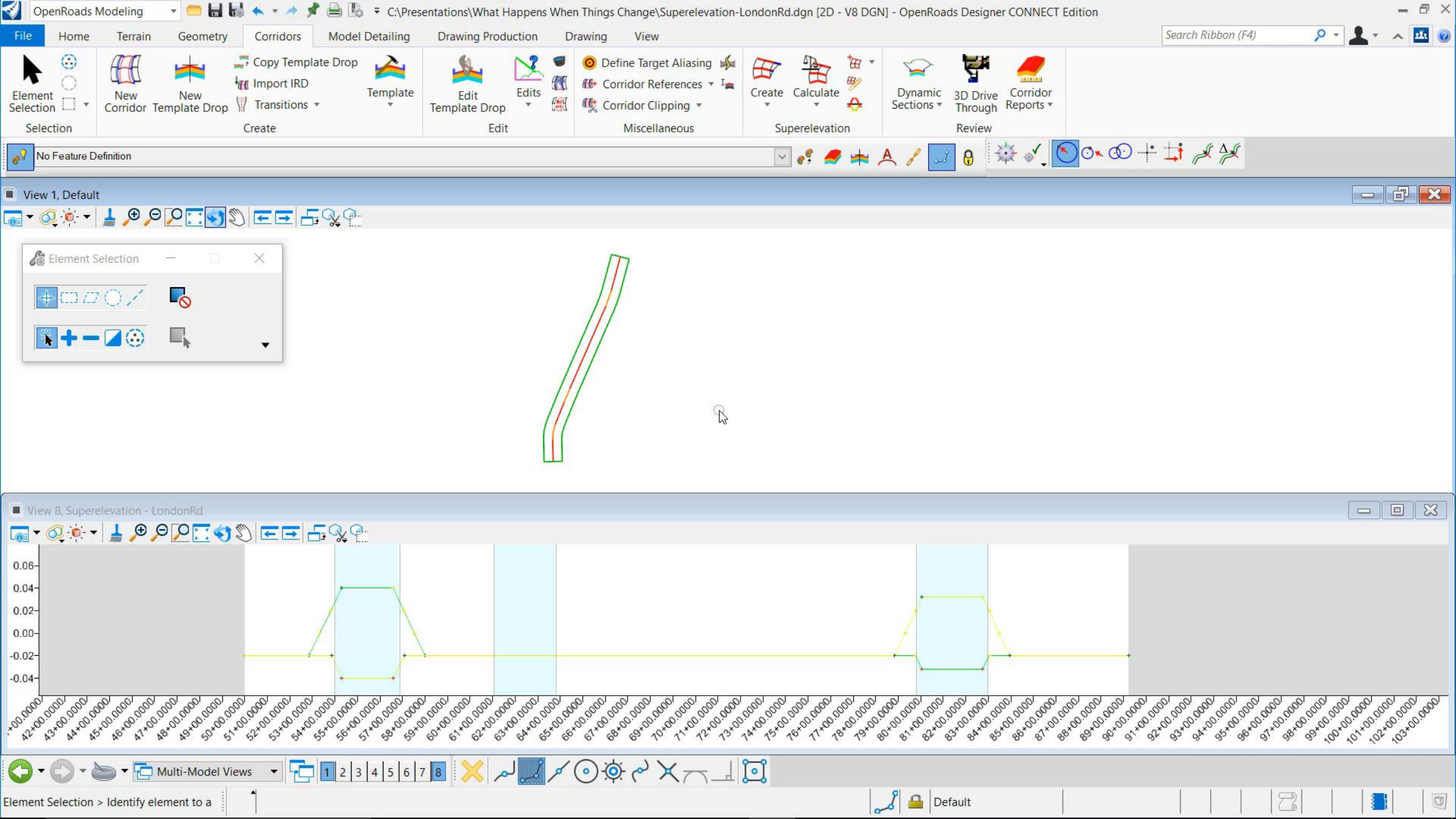
What happens to superelevation calculations if the horizontal alignment changes?

Superelevation will be re-calculated if it was created using the design standards rules file

What if I don't want my superelevation to be re-calculated?

Unlock the Superelevation Section prior to updating geometry

If superelevation transitions were imported from an external file or created manually without using the rules file the transitions ***will not*** re-calculate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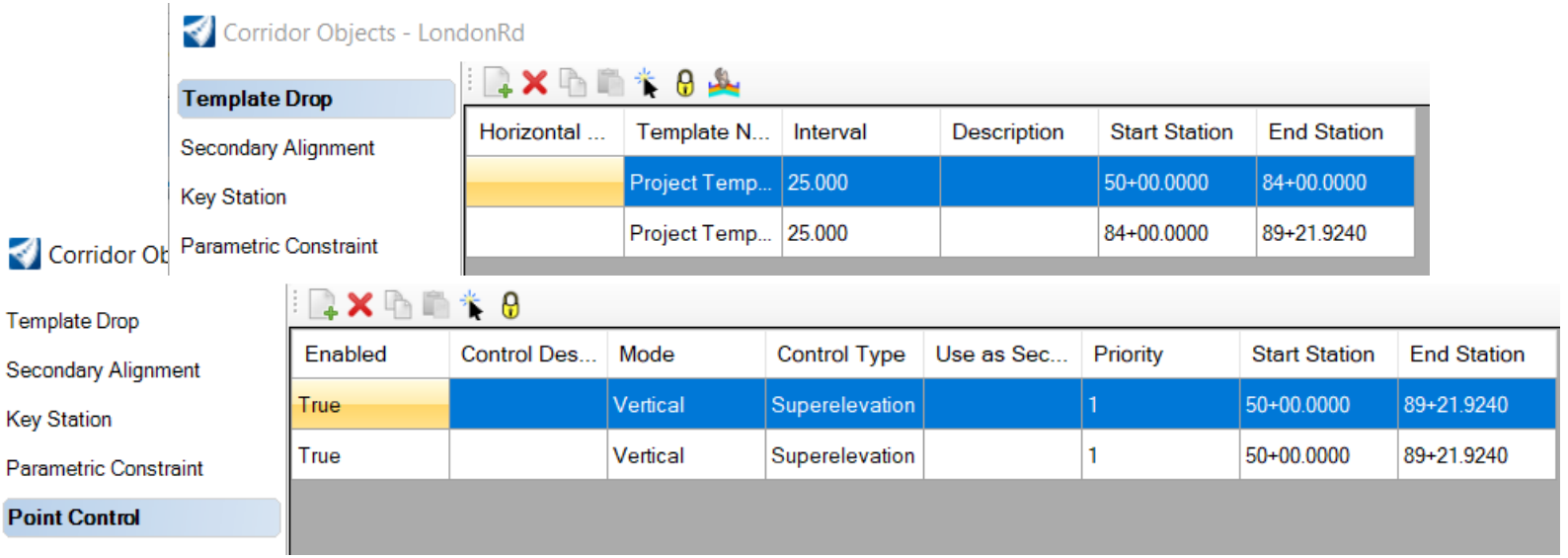
Corridors and Templates

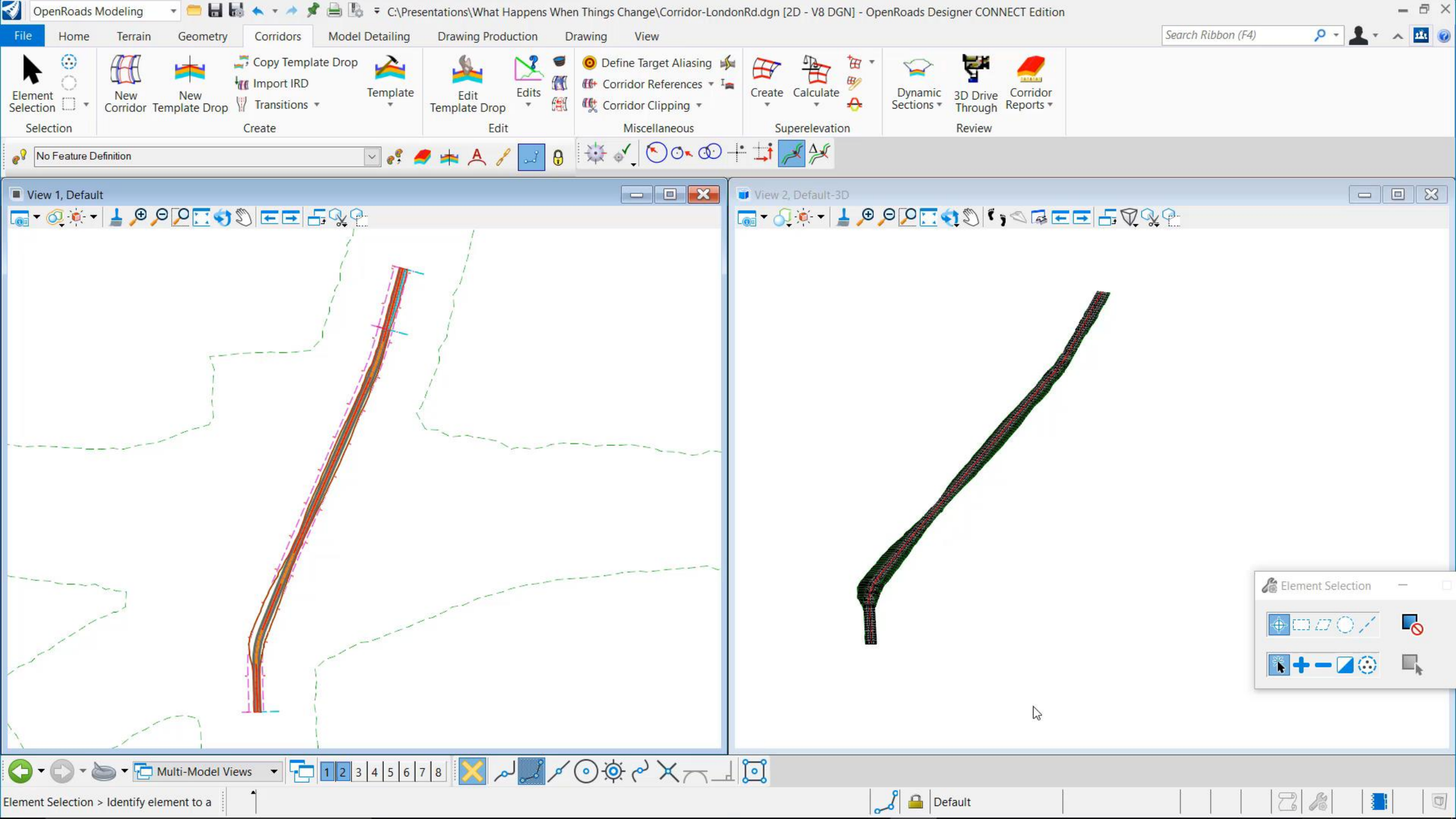
- As we saw previously, when the horizontal geometry changes the Corridor will follow the new geometry
- Corridors update when horizontal and vertical geometry changes

Corridors and Templates

What happens to template drops, point controls, parametric constraints, etc?

- Depends on how they were placed (keyed-in or snapped to specific locations)
- Keying in specific stations will hold that specific station even when the horizontal alignment is adjusted
- Snapping to specific locations or graphic elements creates rules thus maintaining the relative location of Template Drops, Points Controls, Parametric Constraints, etc.

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The End

Questions?