Models, Models, Models. Now What?

Bentley
Sustaining Infrastructure

Models, Models, Models. Now What?

- We have models from a variety of sources
- All authored with a variety of applications
- Authored by a variety of designers
- Authored by a variety of design firms
- Bottom line, project contents come from a number of disparate resources
- So how can we review the content?
- Let's take a discuss and take a look…

Business Trends

- It's all about project delivery
- Design-Build and Design-Build-Maintain
- Subcontracting is the norm today
- Multi-location teams engaged in project phases
- Find it in the office, not the field!
- Machine Control
- Shrinking timeframe for building new infrastructure
- Aging infrastructure can't be ignored

Technology Trends

- Inevitable shift to Machine Control and Construction Automation
- Traditional Design-Bid-Build linear paper-based workflows are quickly being superseded by dynamic, real-time digitally-based best practices
- Interoperability among technology platforms

Traditional Project Workflow

Survey → Design → Survey → Construct

Challenges

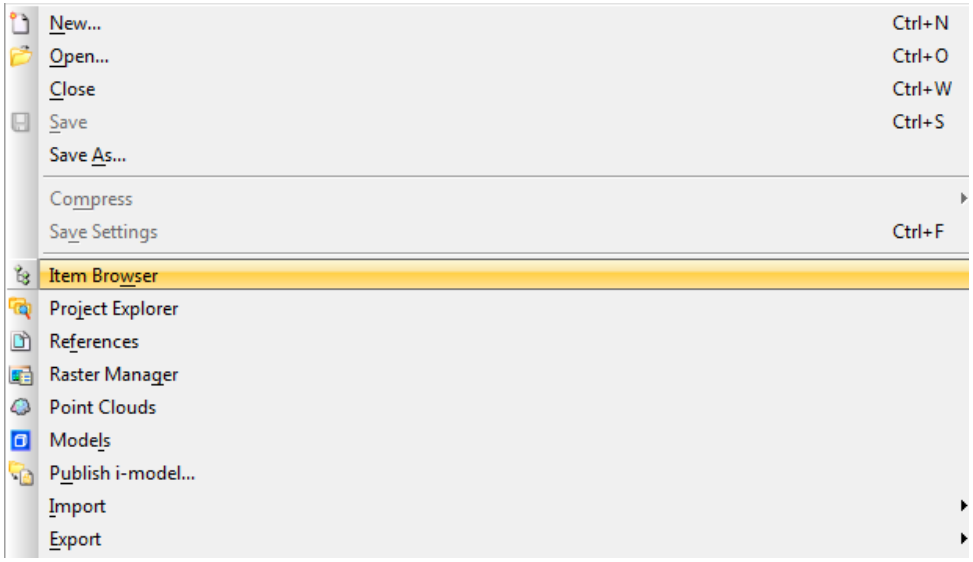
- Federated Information workflows
- Finding and merging project data from multiple sources in disparate formats
- Managing project revisions in real-time
- Communicating just-in-time decisions to project stakeholders
- Supplying project deliverables to diverse stakeholder personas
- Judging the constructability and long-term sustainability of the infrastructure

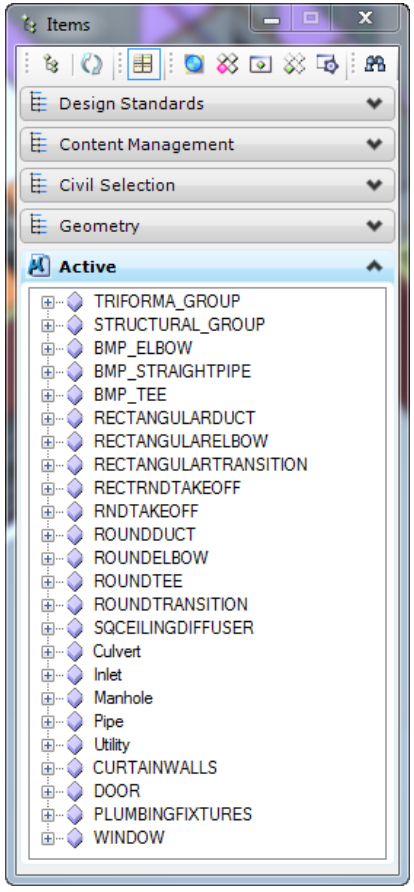
Tools to help…

- Let's look at a couple items available today within MicroStation that can help us with our issues

Items Browser

- Provides access to “real” **3D engineering data**
  - **produced by Roadway Designer, Storm & Sanitary**
  - **and others…**
- Ability to Isolate/Locate/Highlight/Search





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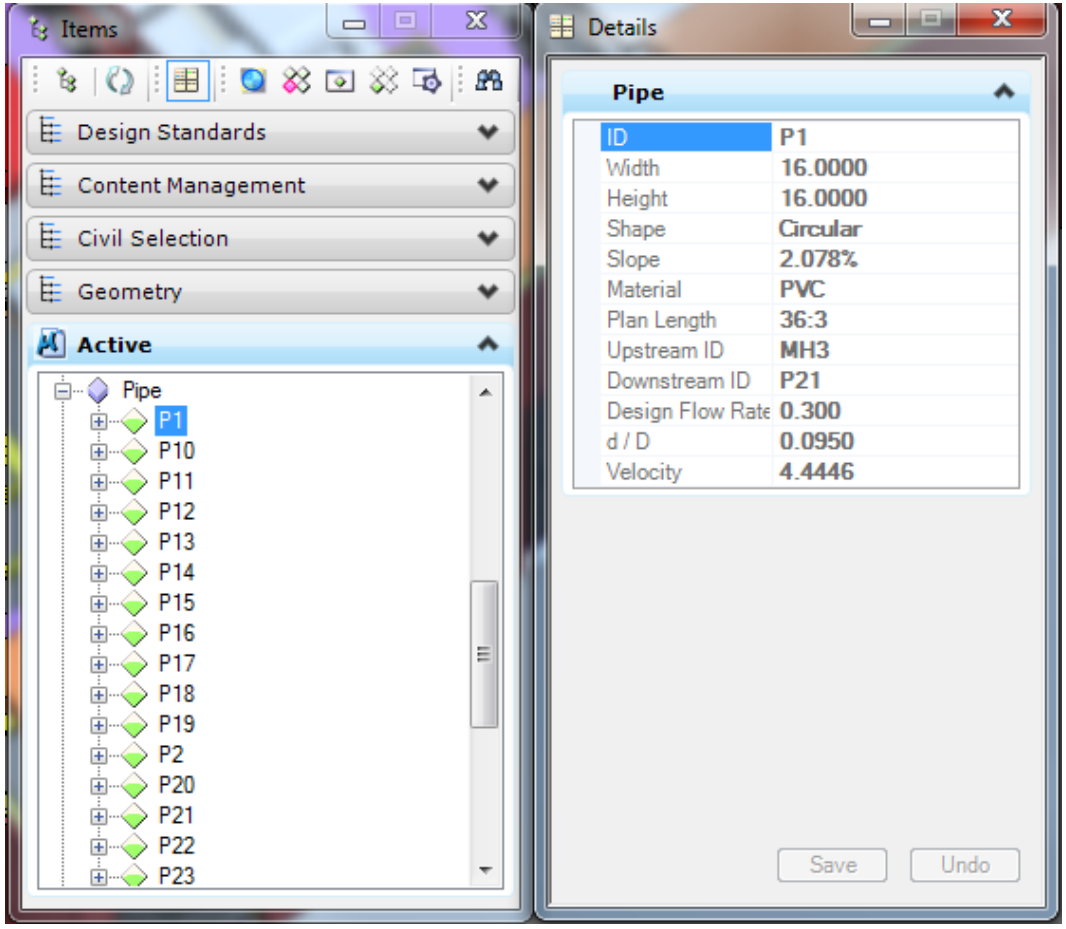
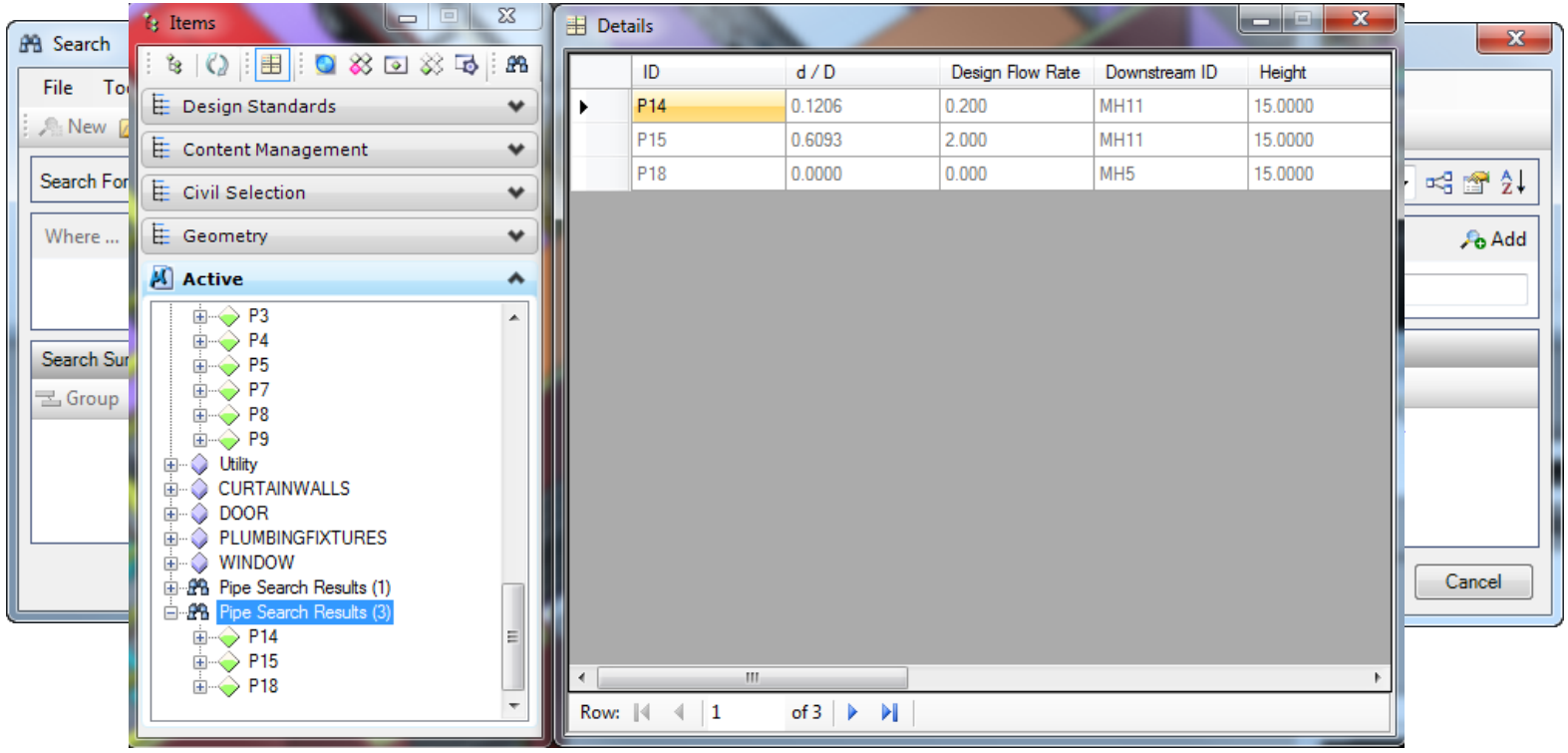
Items Browser

- Example: Locate P1 and highlight it in the model



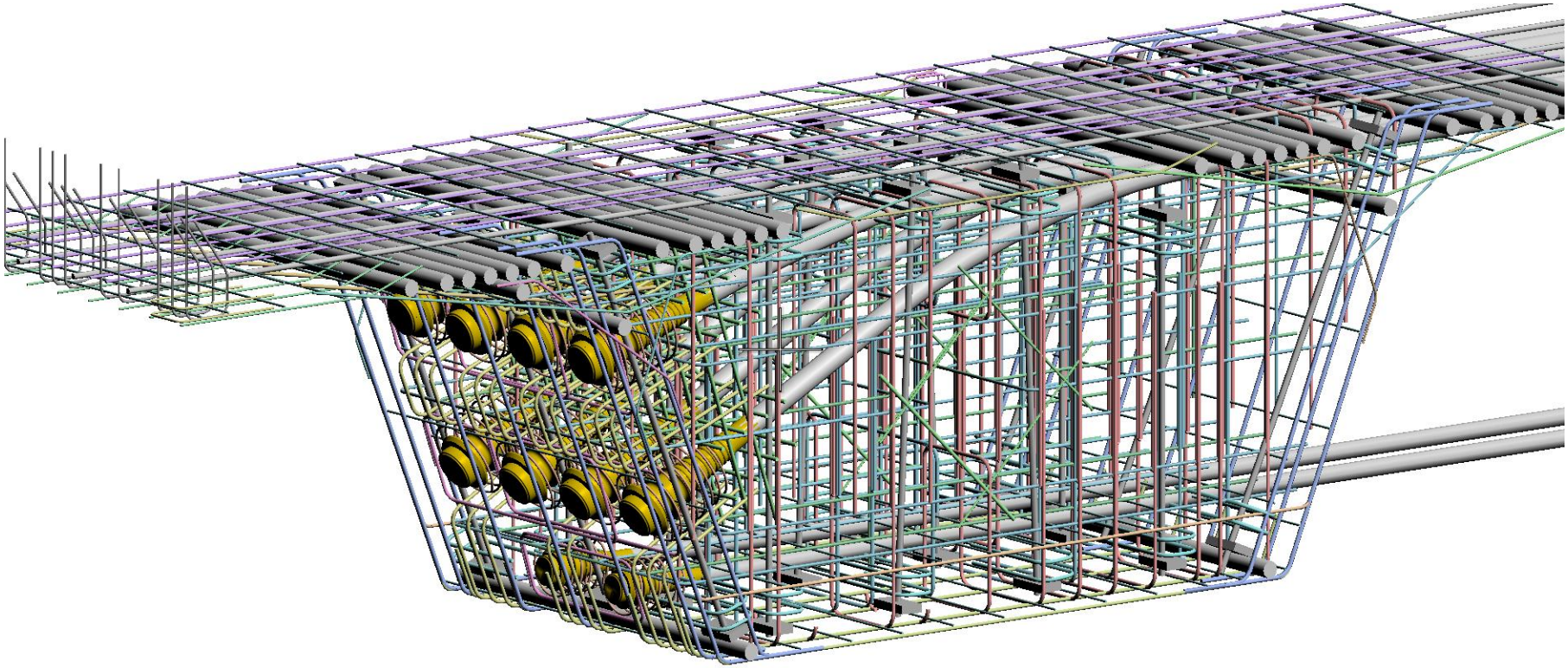
Items Browser and Searches

- Search Items
- Ability to search for specific Engineering items in DGN
  - Example: Search for all 15” RCP Pipes



Clash Detection

- How many conflicts are here?

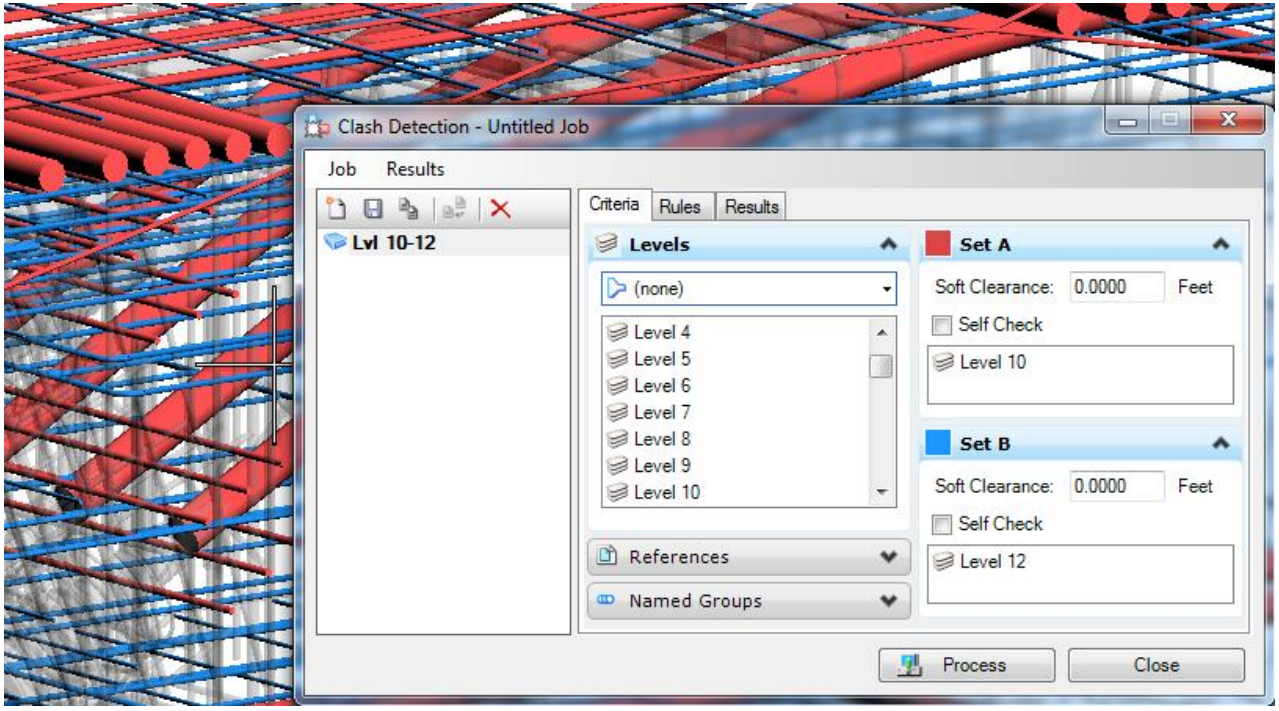


Clash Detection

- The real power of ProjectWise Navigator / MicroStation
- The clash detection tool allows you to identify sets of 3D graphical elements and to detect clashes between these 3D object element sets.
- Ability to interactively and graphically review these clashes, annotate or markup particular clashes, and assign them for follow-up.

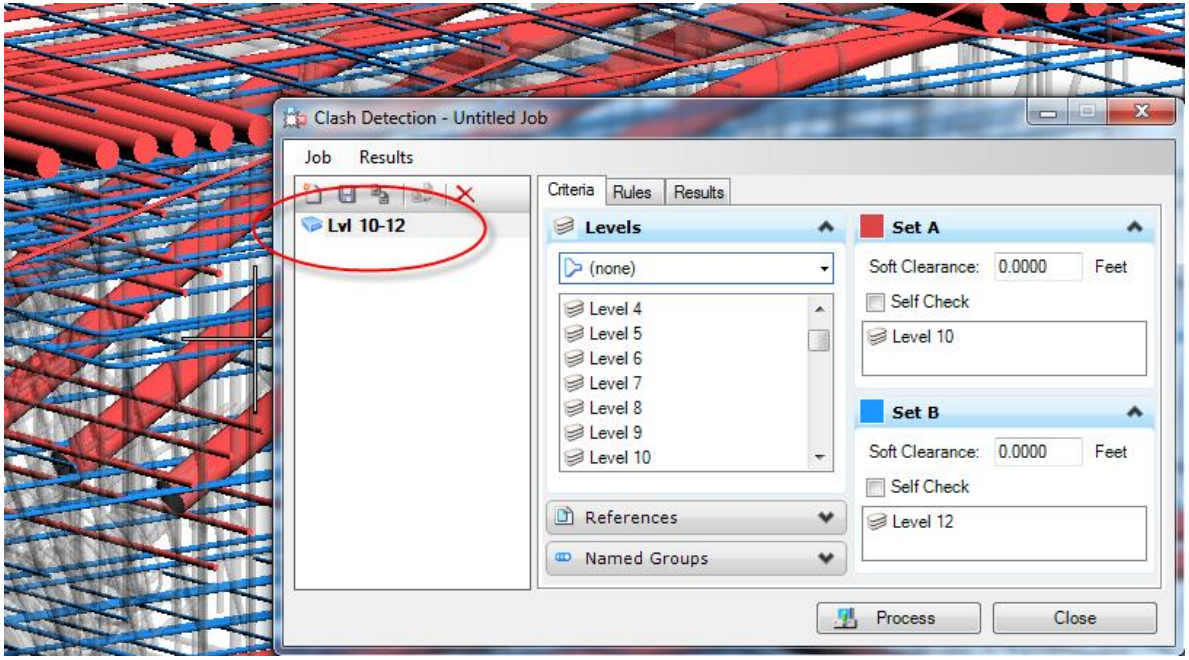
Clash Detection

- Clash Detection works by examining 2 separate groups of 3D data (i.e. Set A and Set B) to be used for the detection of physical clashes and clearance problems between the elements.



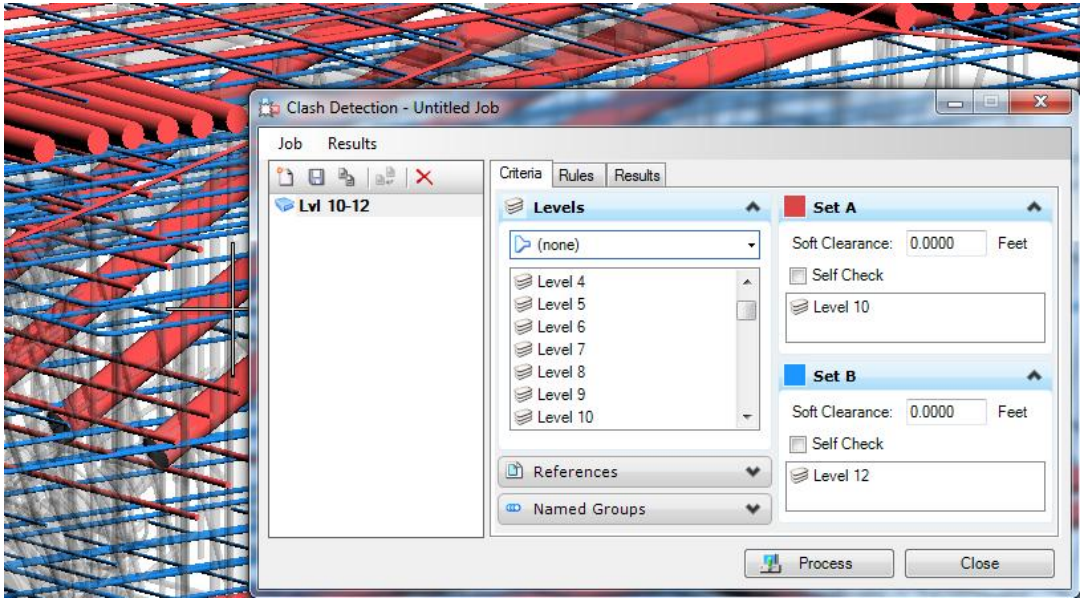
Clash Detection

- Each Clash analysis must be created as its own unique job.
- Each job will have a Set A group of elements and Set B group of elements



Clash Detection – Criteria Tab

- The Criteria tab is used to select Levels, References or Named Groups to be included in the clash detection job.
- Elements in Set A and Set B can be specified by dragging and dropping Levels, References or Named Groups into the appropriate set

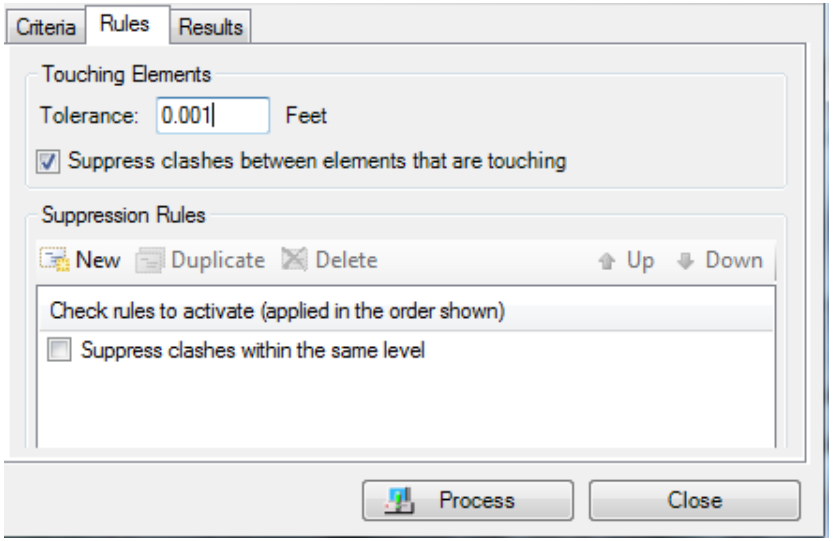


Clash Detection – Criteria Tab

- Soft Clearance specifies a “clearance window” around the 3D elements in Set A or Set B
- Example, if the elements in Set B get closer than the 1’ soft clearance value set for Set A then a clash will be reported, this is considered a “clearance clash”
- If elements in Set B physically touch elements in Set A the clash is considered a “hard clash”

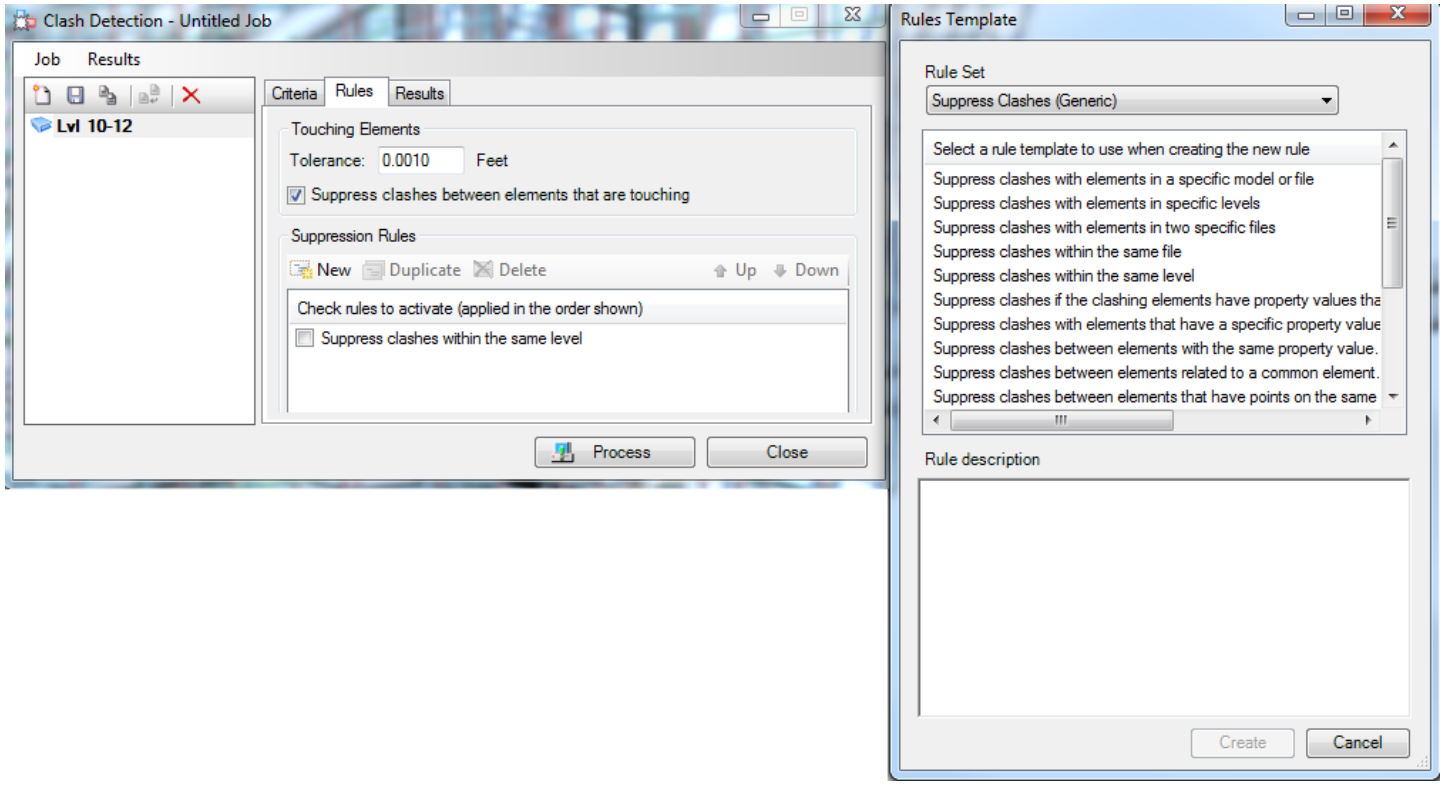
Clash Detection – Rules

- Tolerance -Sets the allowable distance used to eliminate interferences between components that only touch.
- Suppress Clashes between elements that are touching If on, ignores elements that are within the tolerance, such as when a bolt is connected to nut.



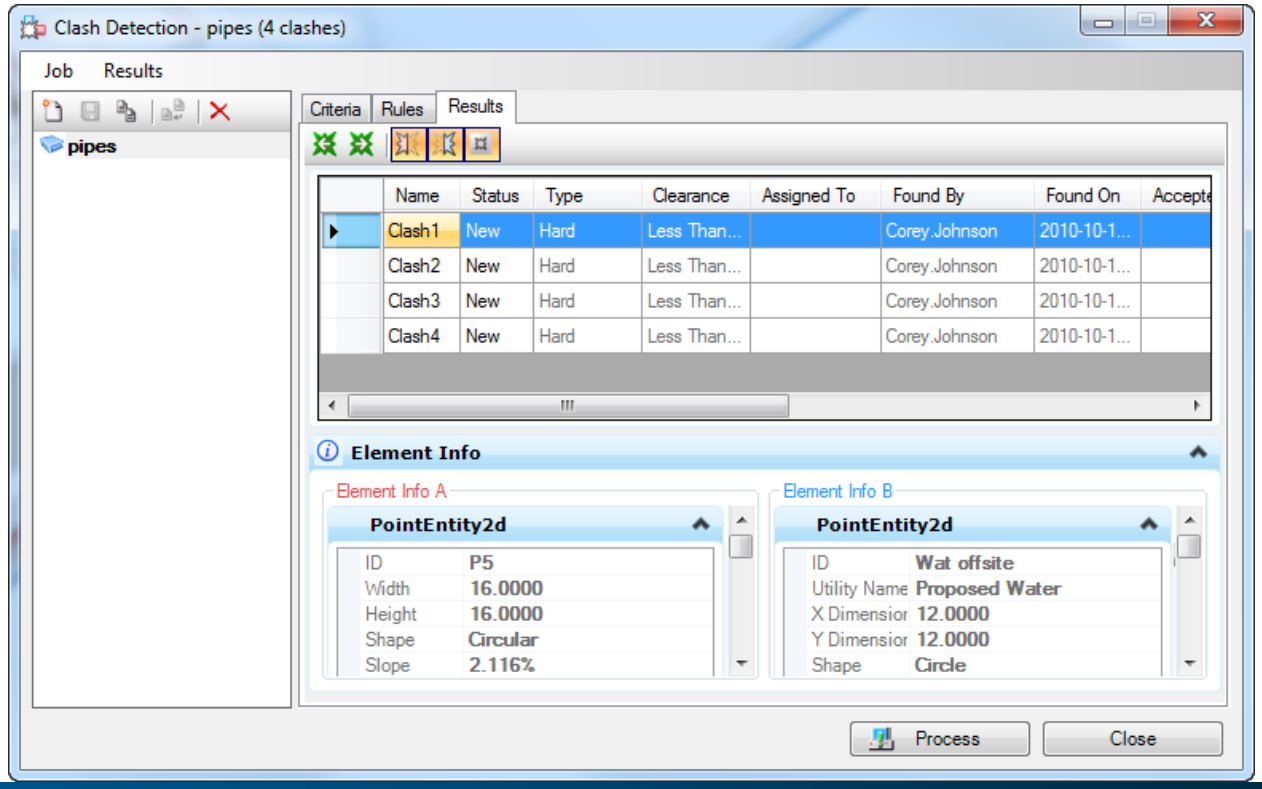
Clash Detection – Rules

- Suppression Rules -Used when a high number of clashes are found and more sophisticated analysis is needed to reduce the number of clashes.



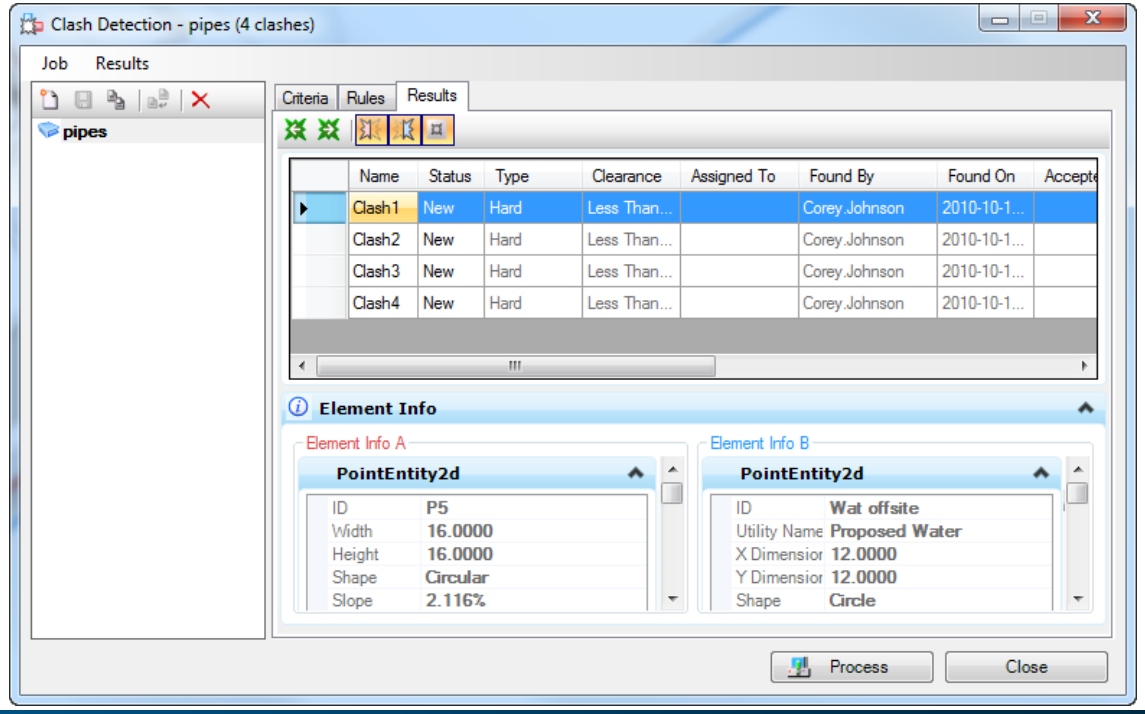
Clash Detection - Results

- Any clash that is found is reported in the Results tab
- Each clash is named and classified by type, Clearance clash or Hard clash



Clash Detection - Results

- Detailed information for conflicting elements is shown in the bottom portion of the dialog
- Notice, in this case a 16” storm sewer pipe is clashing with an 12” water line



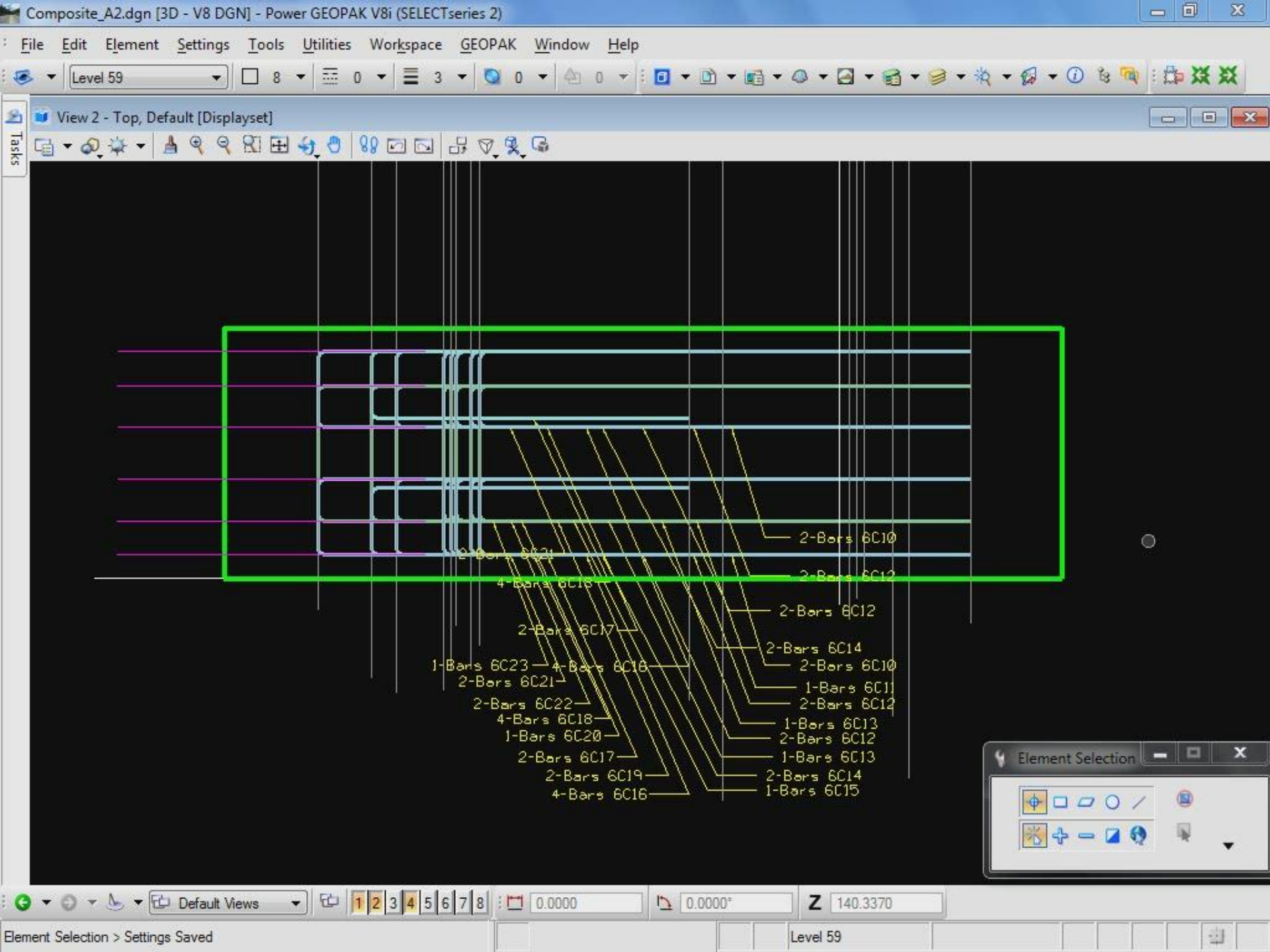
EC

- Stands for Engineering Content
- You hear all sorts of buzzwords like ECObjects, ECFramework, ECRepository, ECSchemas, ECServices,ECClassEditor, etc…
- ECXAttributes
  - A mechanism to associate data to a DGN Element
  - The data is the necessary business data for the business objects
  - It's the holder of the intelligence in the DGN file

Models, Models, Models

- Let's take a look at several models to better explain…

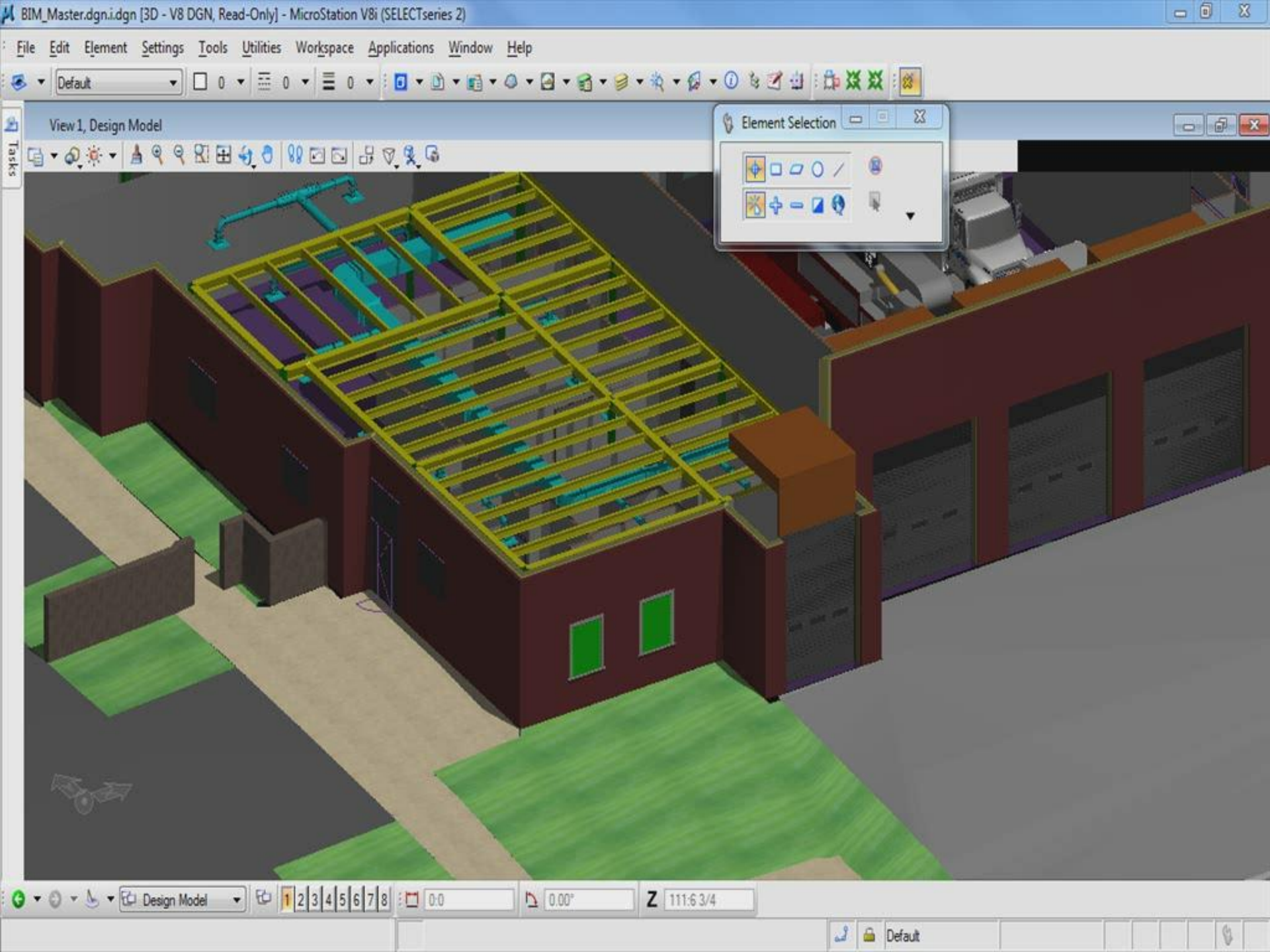
- This first model will shown how clash detection helps in reviewing the model


Composite_A2.dgn [3D - V8 DGN] - Power GEOPAK V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Level 59
View 2 - Top, Default [Displayset]
2-Bars 6C10
2-Bars 6C12
4-Bars 6C18
2-Bars 6C12
2-Bars 6C17
2-Bars 6C14
1-Bars 6C23
4-Bars 6C16
2-Bars 6C10
2-Bars 6C21
1-Bars 6C11
2-Bars 6C22
2-Bars 6C12
4-Bars 6C18
1-Bars 6C13
1-Bars 6C20
2-Bars 6C12
2-Bars 6C17
1-Bars 6C13
2-Bars 6C19
2-Bars 6C14
4-Bars 6C16
1-Bars 6C15
Element Selection
Default Views
1 2 3 4 5 6 7 8
0.0000
0.0000°
Z 140.3370
Element Selection > Settings Saved
Level 59

The Next Model…

- The next example contains design data from several Bentley applications
  - Building application for a firehouse
  - HVAC application
  - And Civil to layout the drainage network

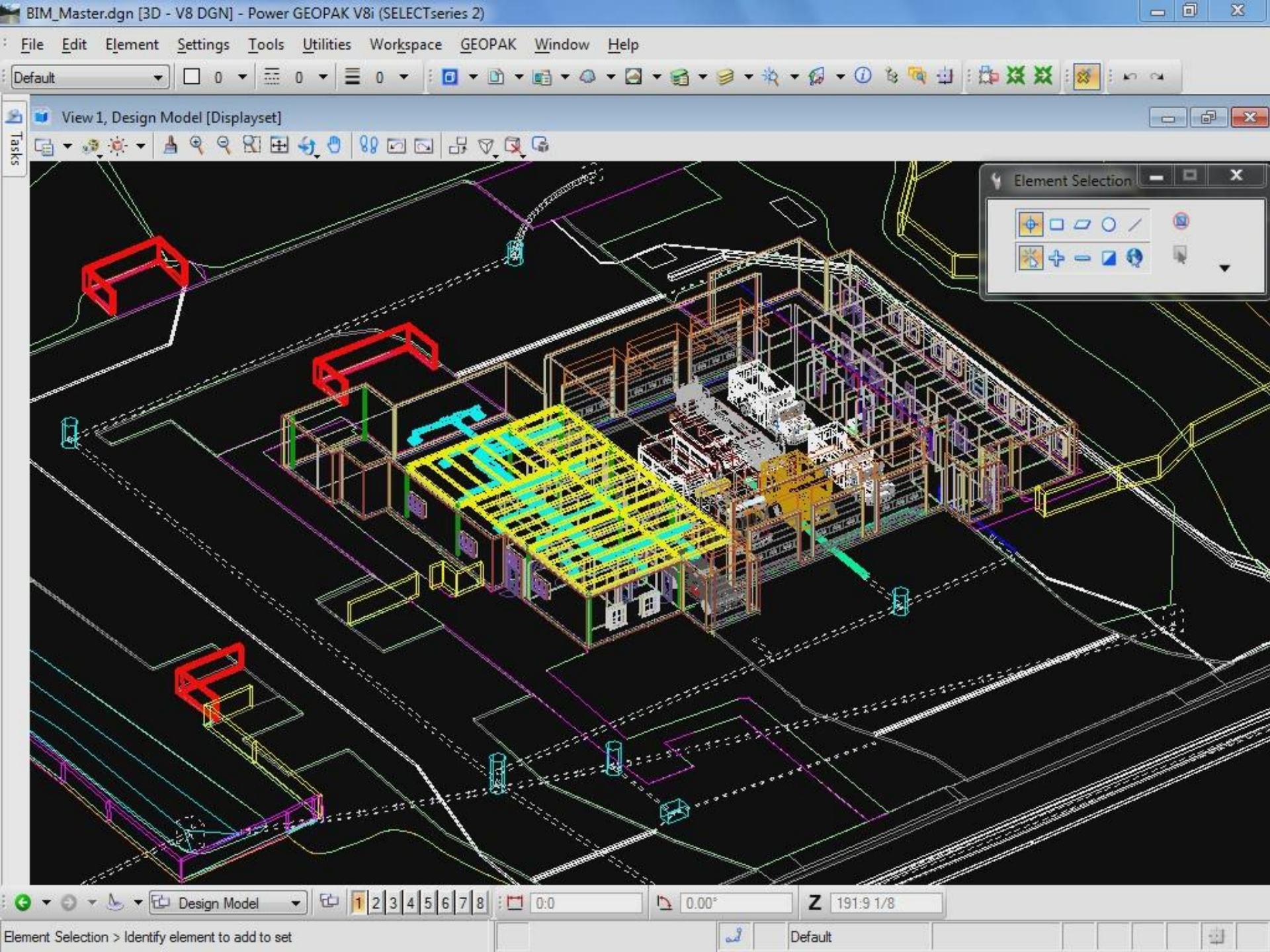
- Let's take a look…


BIM_Master.dgn.i.dgn [3D - V8 DGN, Read-Only] - MicroStation V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Applications Window Help
Default
View 1, Design Model
Element Selection
Tasks
Design Model
1 2 3 4 5 6 7 8
Z
Default

The Next Model…

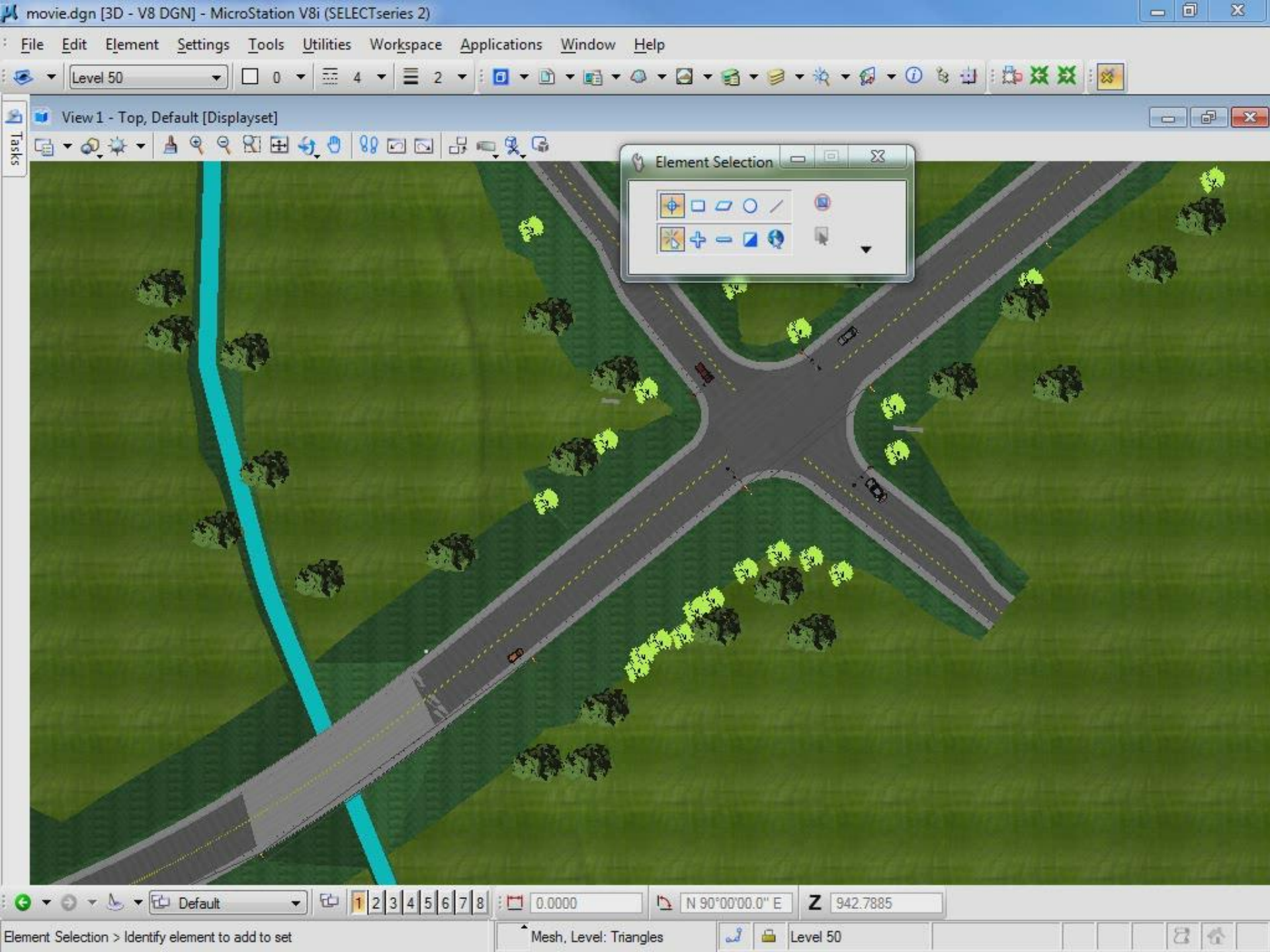
- This next example will show a variety of ways to "visualize" your model.

- Let's take a look…


BIM_Master.dgn [3D - V8 DGN] - Power GEOPAK V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace GEOPAK Window Help
Default
View 1, Design Model [Displayset]
Tasks
Element Selection
Design Model
1 2 3 4 5 6 7 8
0:0
0.00°
Z
191:9 1/8
Element Selection > Identify element to add to set
Default

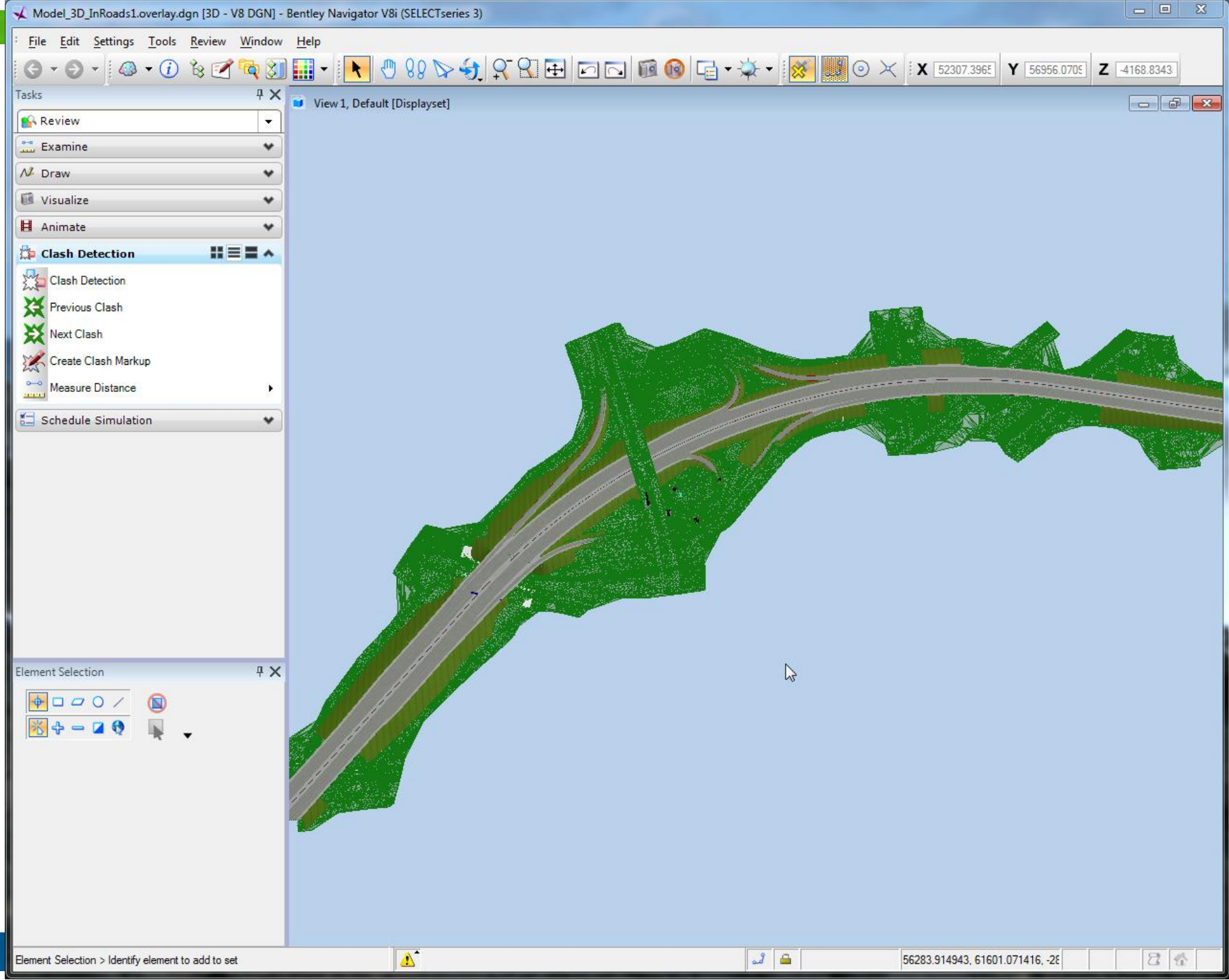
The Final Model…

- This model was created using Roadway Designer
- Look for
  - the Engineering Content options
  - MicroStation Walk
  - Using 3D Warehouse


movie.dgn [3D - V8 DGN] - MicroStation V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Applications Window Help
Level 50
View 1 - Top, Default [Displayset]
Element Selection
Tasks
Default
1 2 3 4 5 6 7 8
0.0000
N 90°00'00.0" E
Z 942.7885
Element Selection > Identify element to add to set
Mesh, Level: Triangles
Level 50

A last minute model…

- This one is interesting since it uses Google Earth
- Let's take a quick look



Models, Models, Models – Now What?

- Well that's just a little peek into the power of the Engineering Content contained within the MicroStation design file and the power of MicroStation
- All the examples shown were only using the capabilities/functionality of MicroStation
- Give it a try.

Thanks!