CitA
BIM GATHERING

Building Capabilities in Complex Environments

CitA BIM Gathering 2017, Croke Park, November 23rd & 24th, 2017

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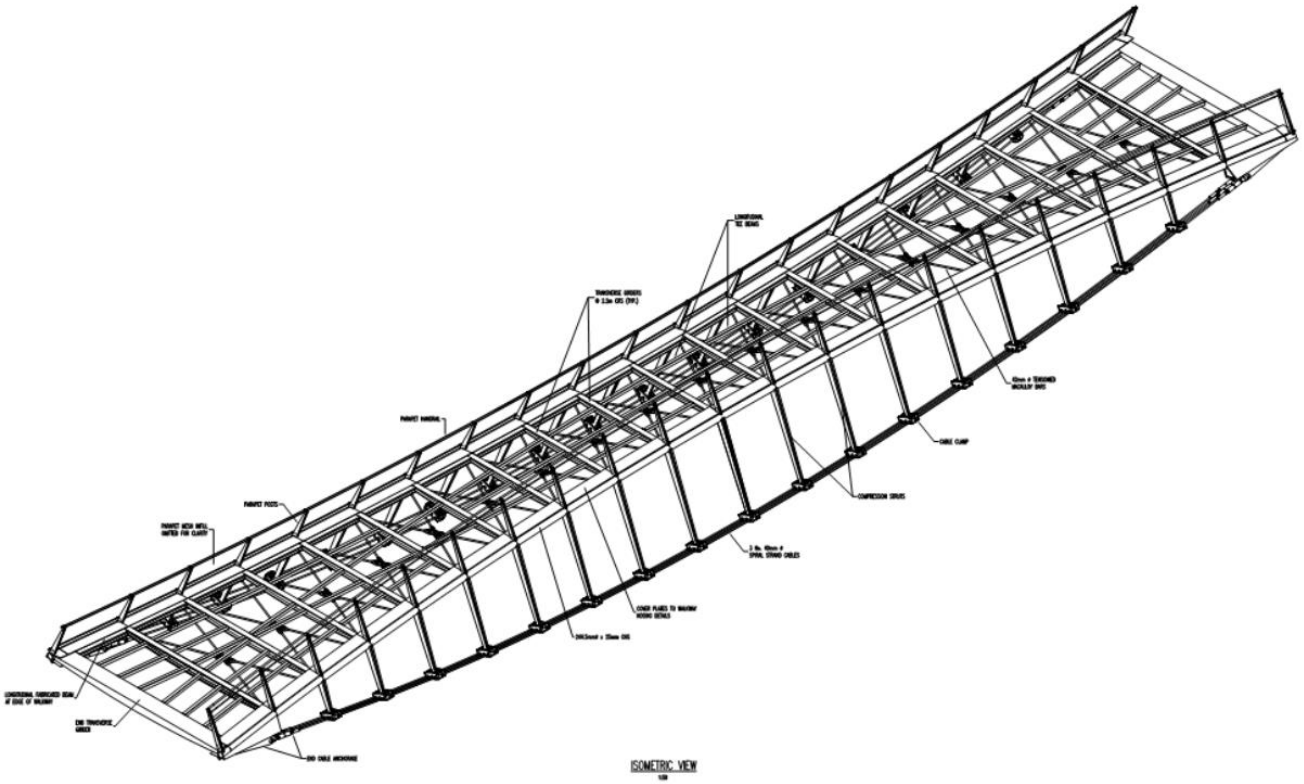
BIM GATHERING

BIM In Infrastructure - Challenges & Solutions


ISOMETRIC VIEW

✗ BIM is a software

✗ BIM is a 3D model

✗ BIM saves time and money

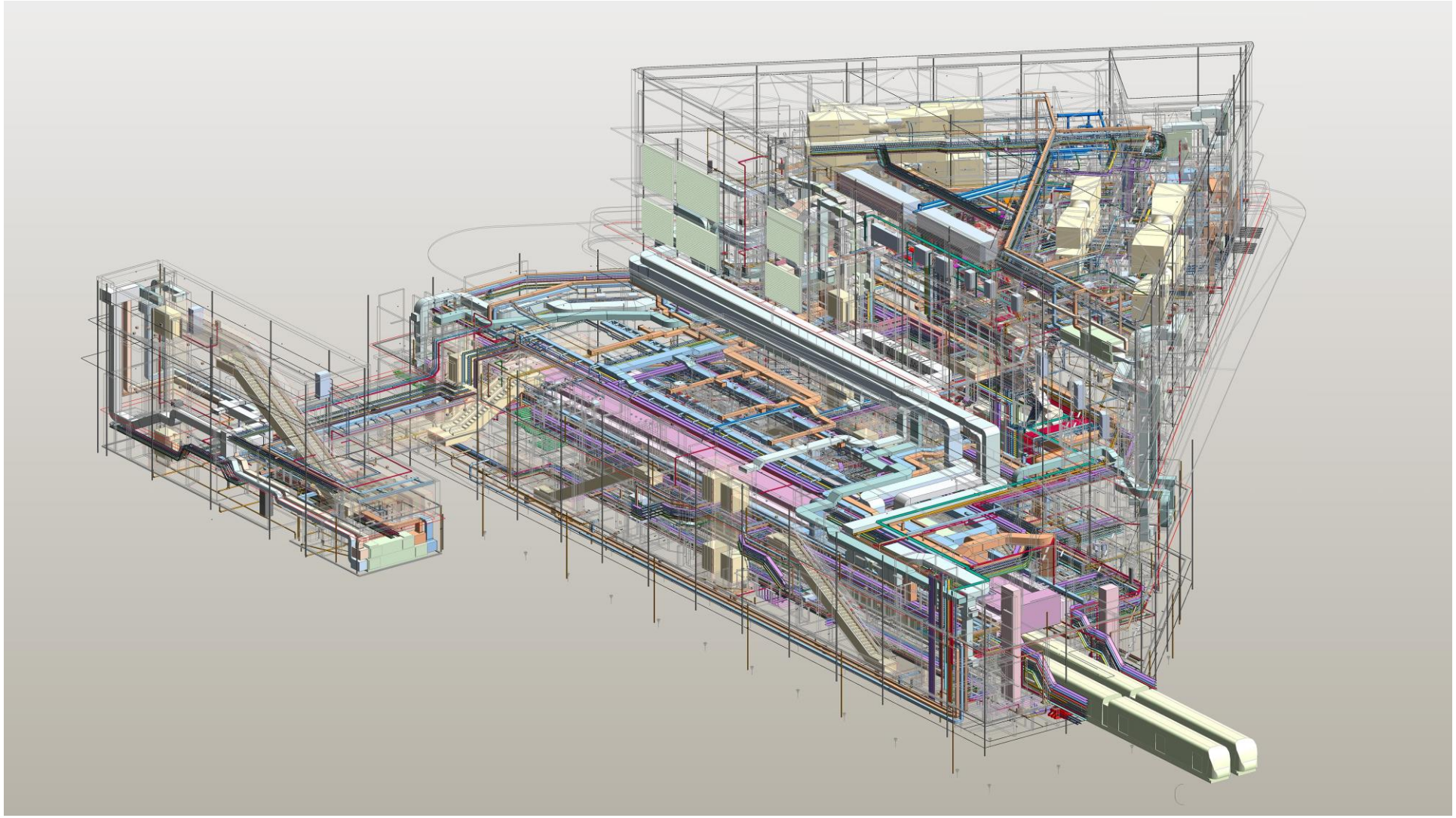
✓ BIM is a process

✓ BIM uses 3D models as tools

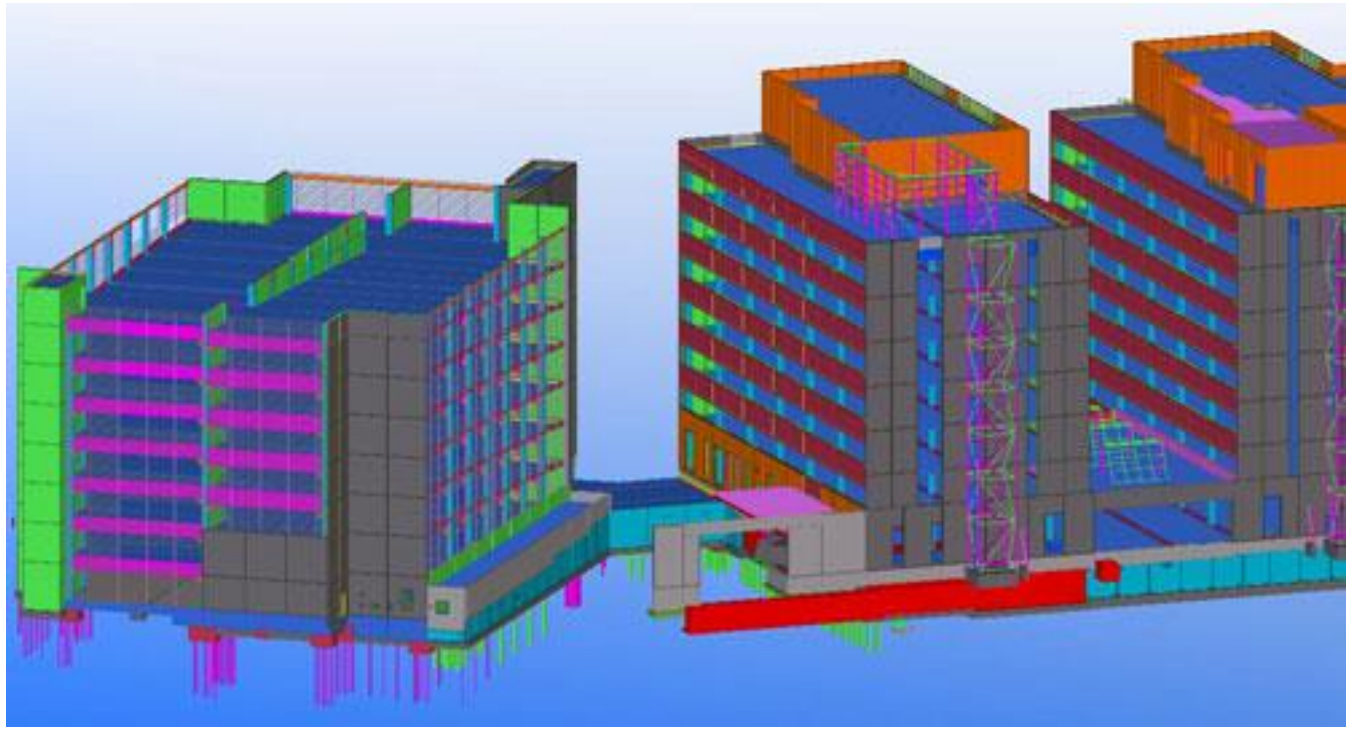
✓ BIM standardises mature and well definded process of project management

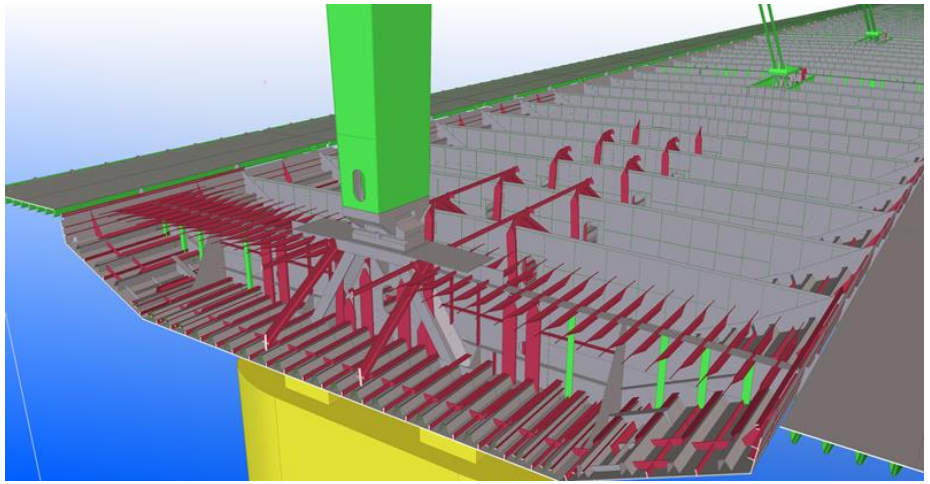
✓ BIM has a potential to achieve significant savings in time and money

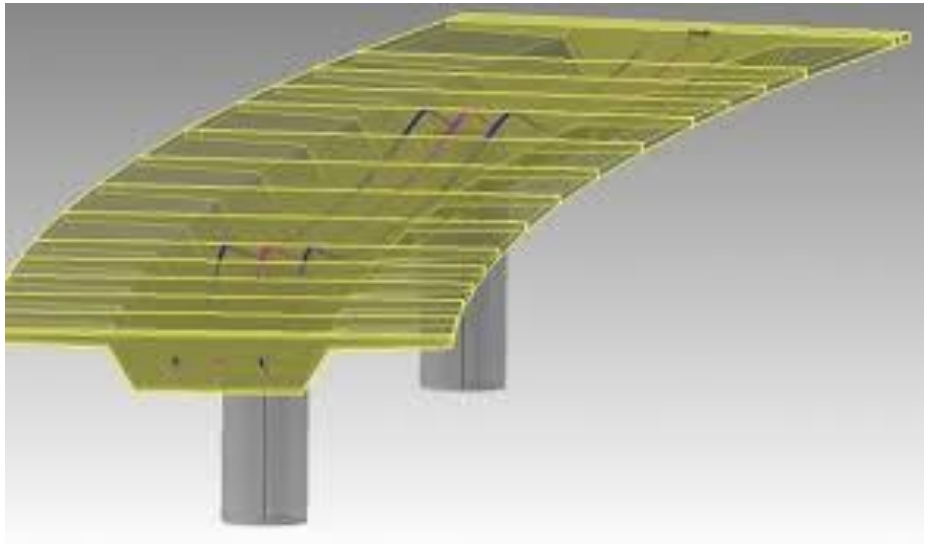
Efficient integration of models, design tools and data to increase collaboration and efficiency



The Challenges



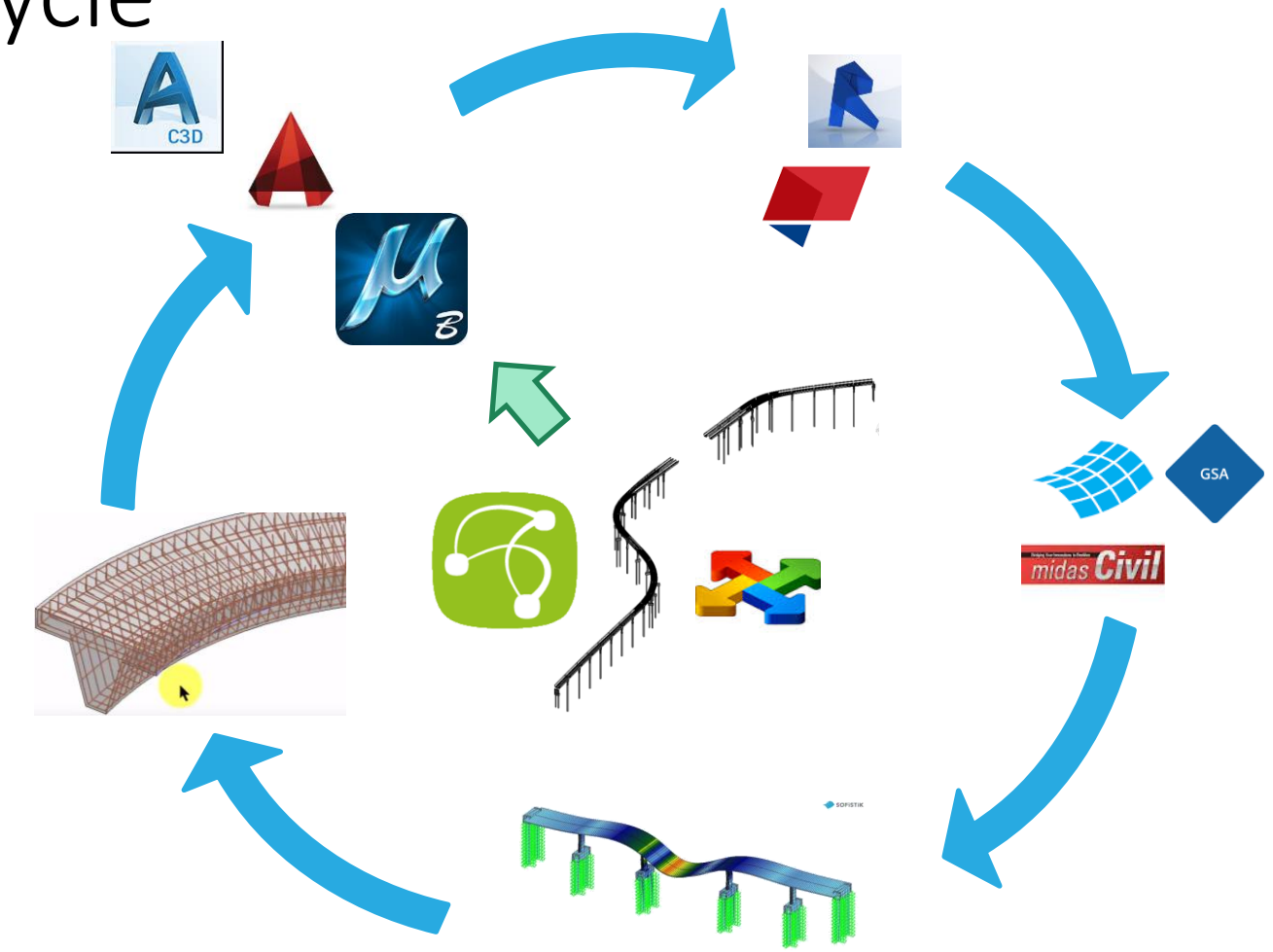


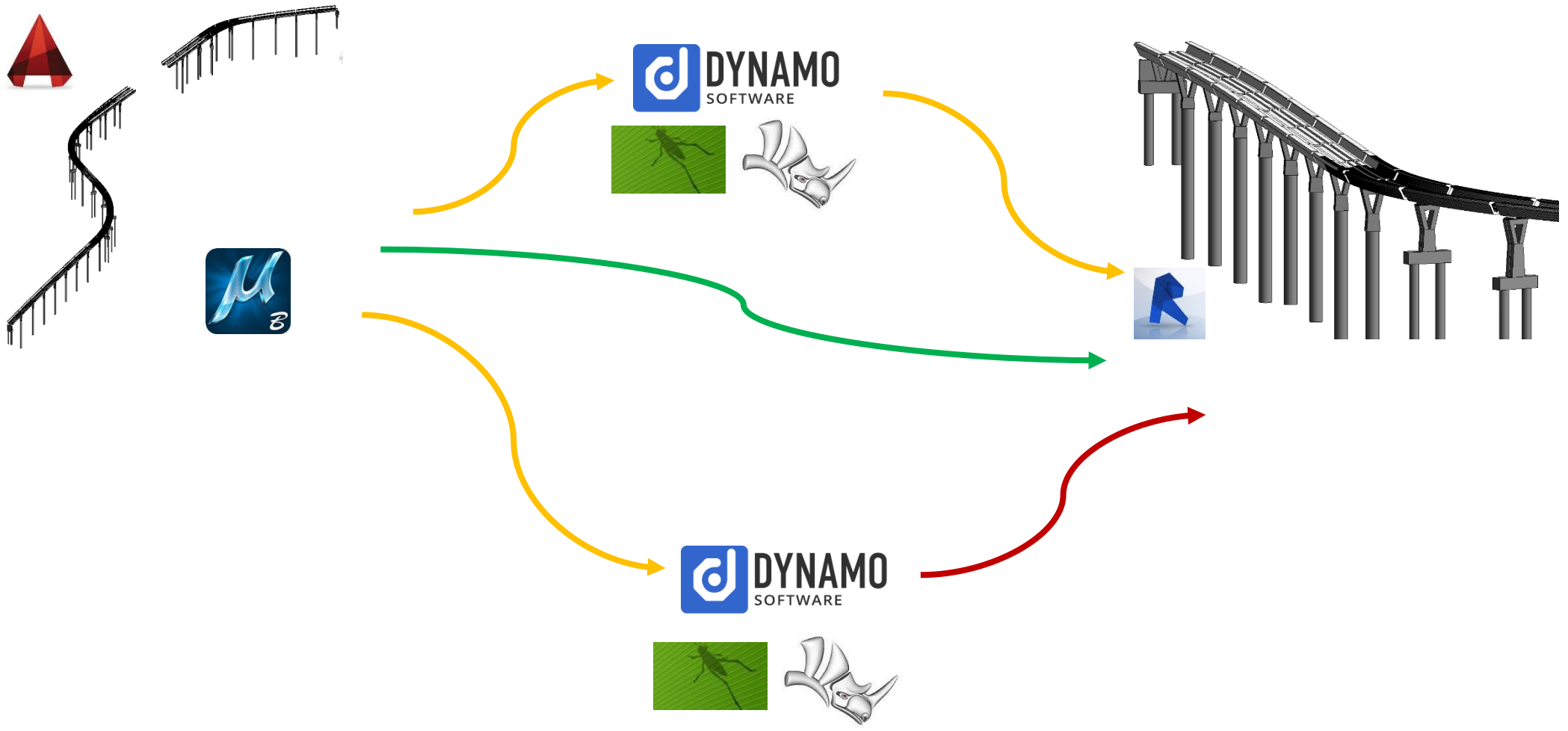


The Challenges

- Historic use of specialist software across disciplines
- Interoperability of software
  - Bridge
  - Rail
  - Highways
  - Geotechnical
- Difficulties handling geometrical variations over the length of linear alignment
- Tools maturity for infrastructure projects lower than buildings
- Reluctance of specialist disciplines to embrace new software

BIM Virtual Cycle

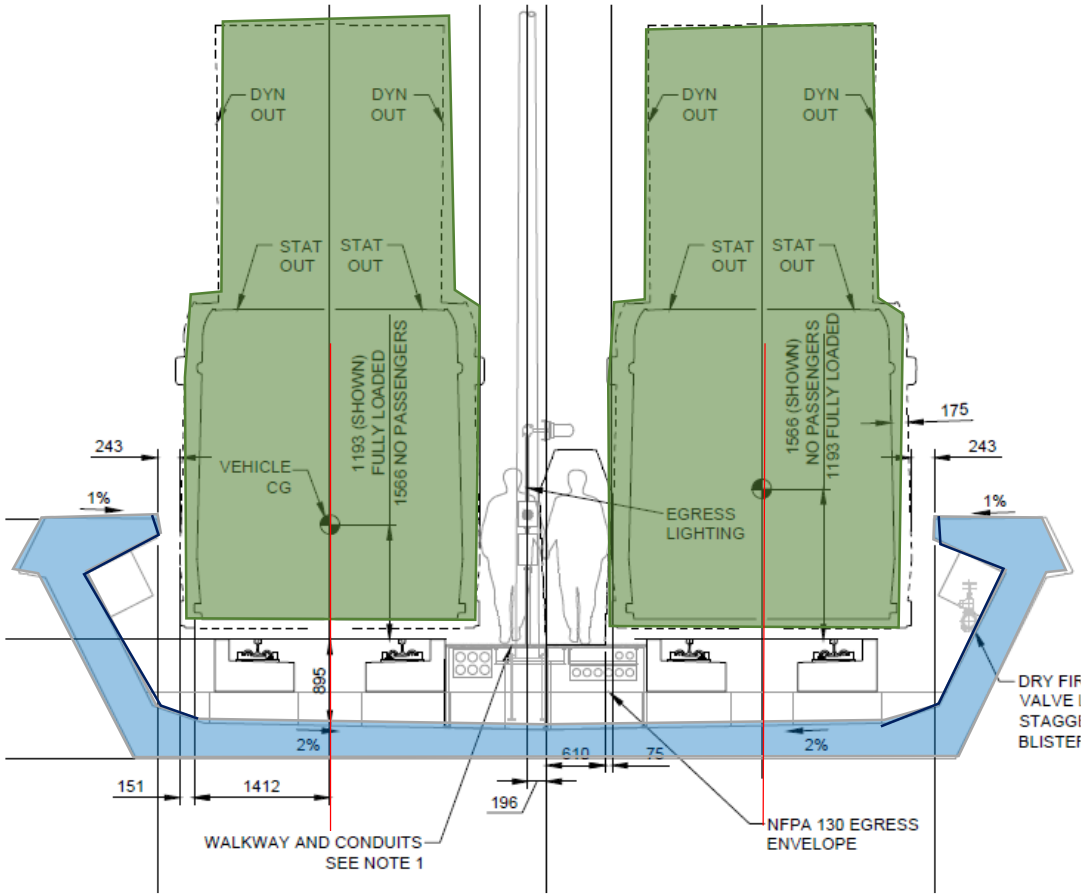


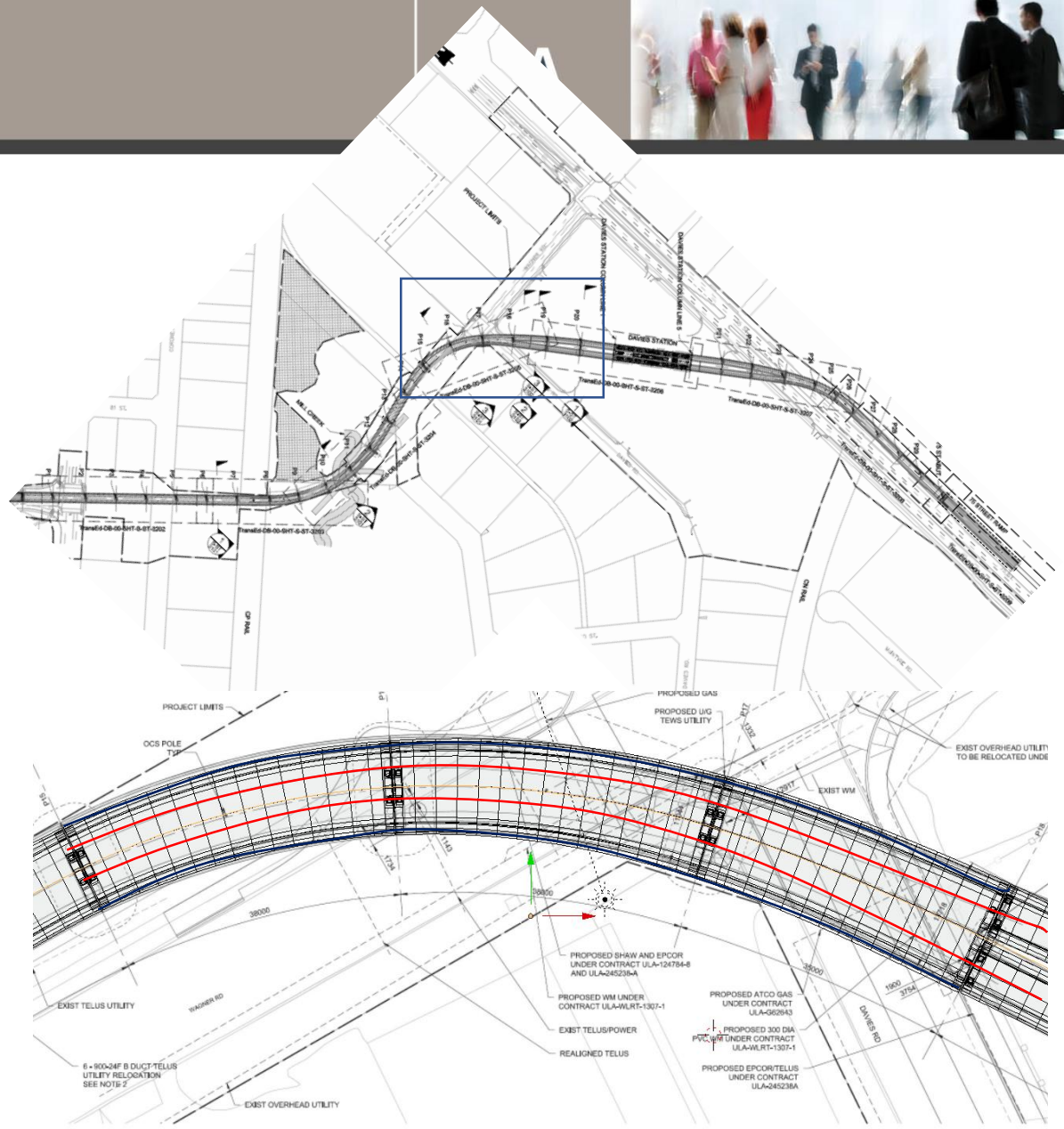

DYNAMO
SOFTWARE
DYNAMO
SOFTWARE

Edmonton LRT, Canada

- Over 1.3km of Elevated Guideway
- 38 no. Spans of varying geometry (length, width, radius)
- 36 no. Piers of varying height
- Complex rail alignment

Geometric complexity





Challenges:

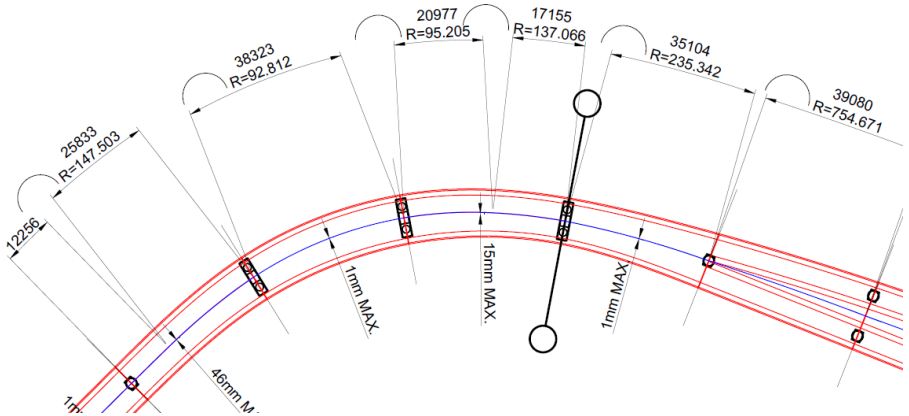
- Difficulties with parametric curved alignment
- Link between 3D Revit model and analysis model in Midas Civil

Approach:

- Set up model in C3D using rail envelope as input data.
- Set up a series of assemblies within C3D to model the deck form and run through corridor matching the rail alignment
- Import deck into Revit and link to Piers modelled parametrically with Revit Families
- Ground profiles set up within Revit to model foundation depths
- Import alignment control points Excel for Structural model Generation
- VBA coding to generate analysis model in Midas Civil

Current Investigations

- Use Dynamo programming to import from Excel to Dynamo to generate 3D Revit model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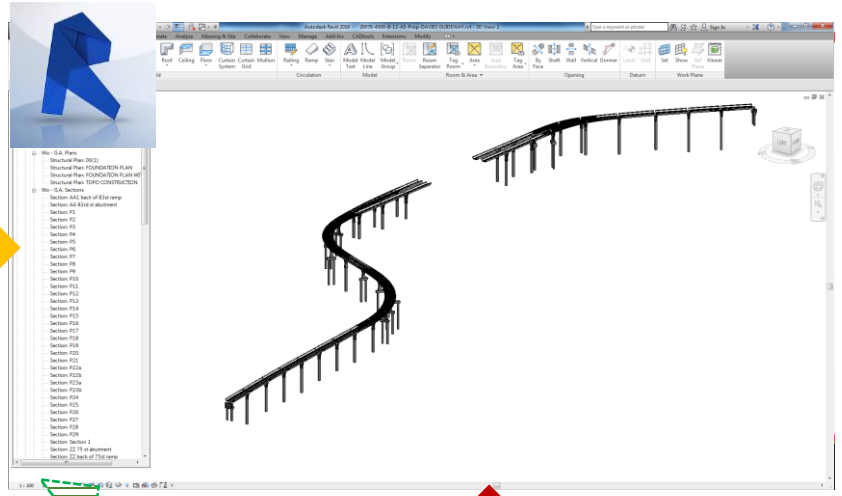
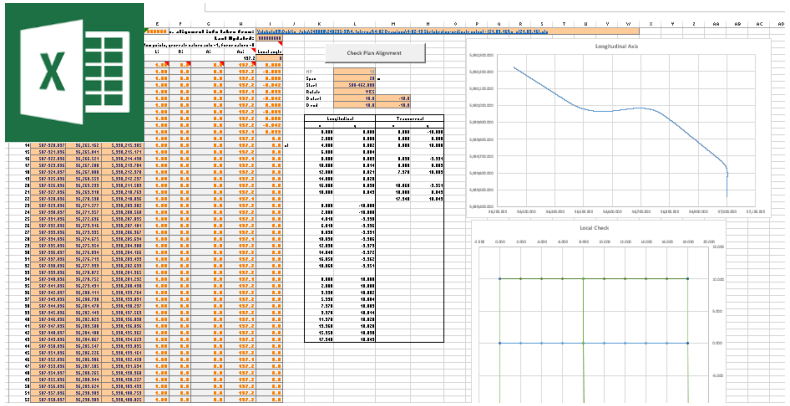
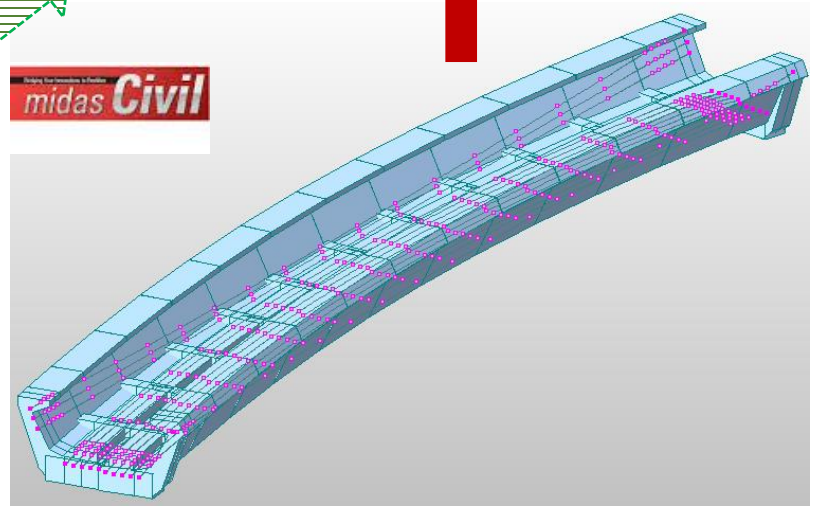
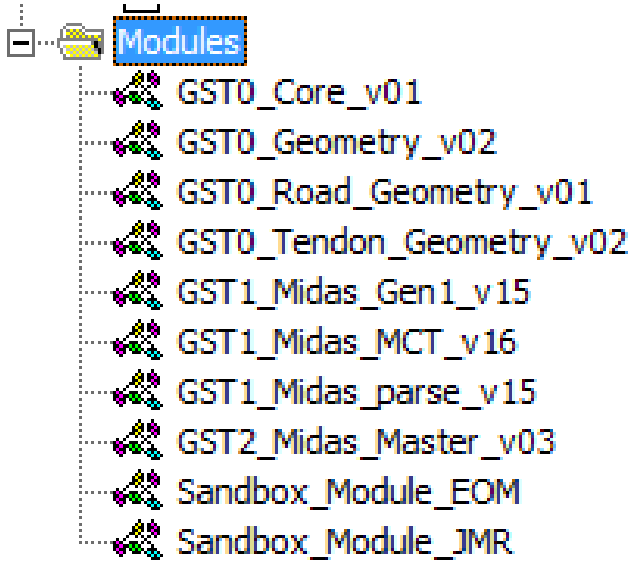
12256
1mm MAX.
15mm MAX.
1mm MAX.
46mm M

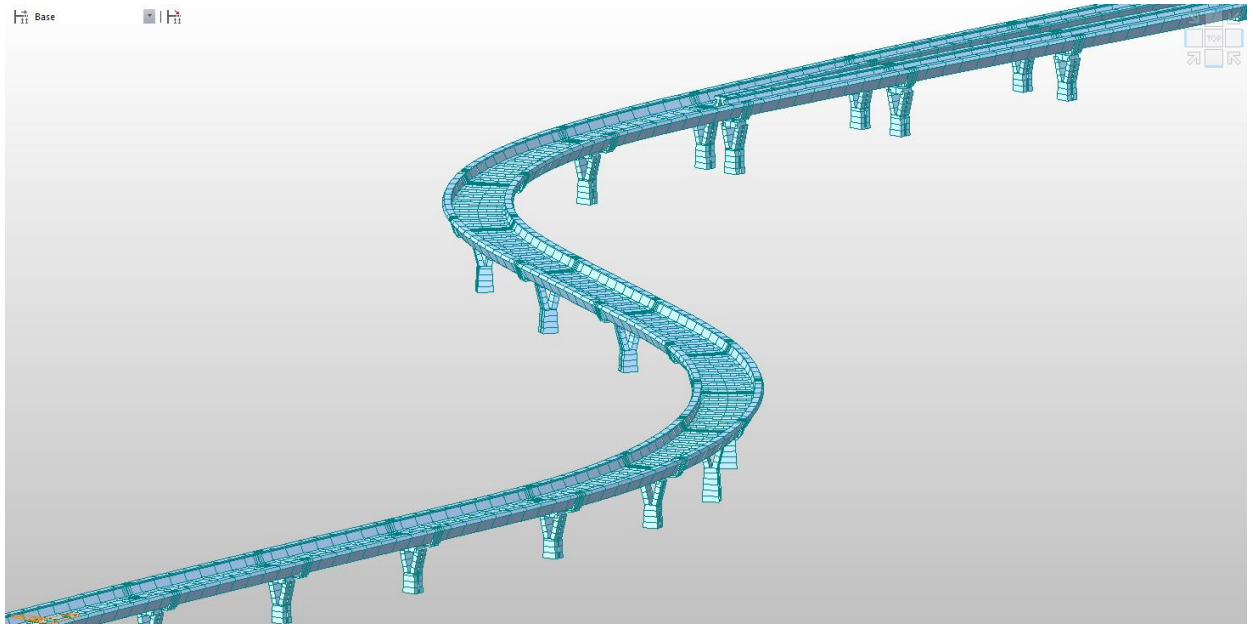




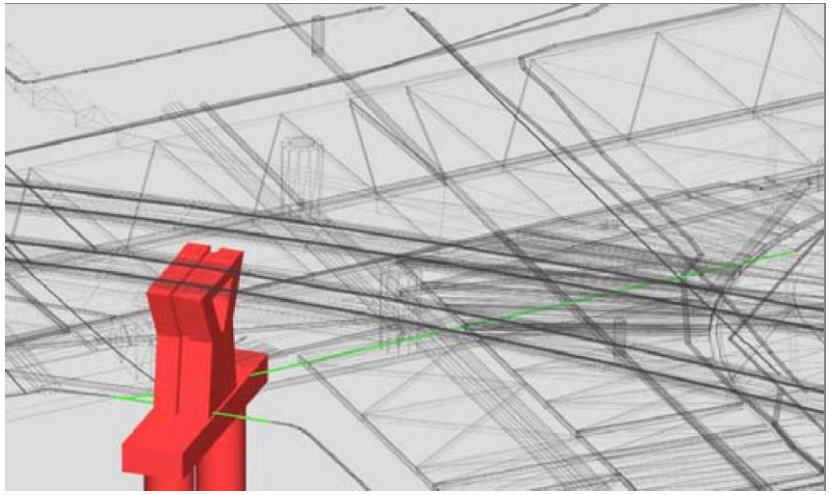

midas Civil

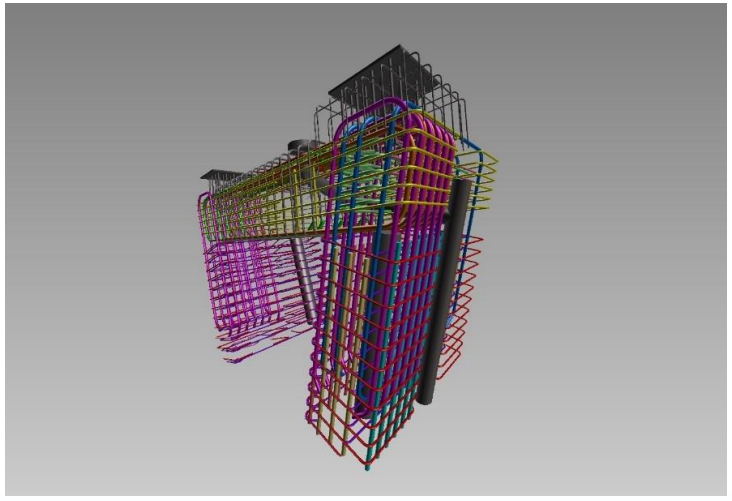
- Bridge Design through VBA architecture
- VBA family of modules operating in a hierarchy to pre-process ALL the information regarding the analysis of 31 spans
- Challenge is to make this parametric with 3D Revit Model

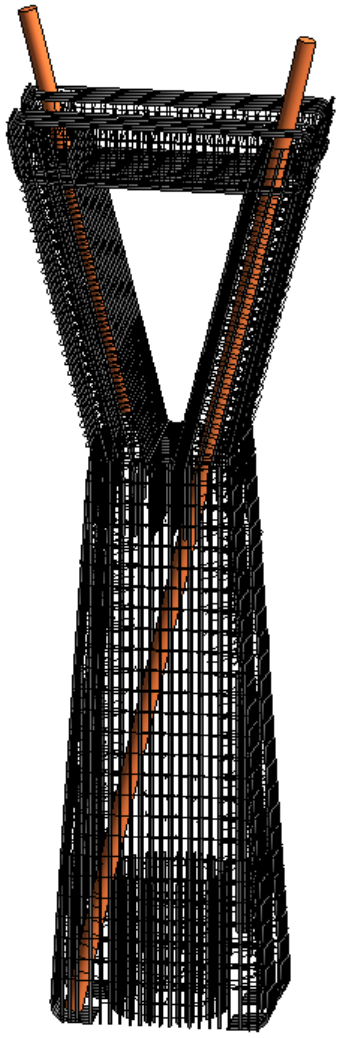


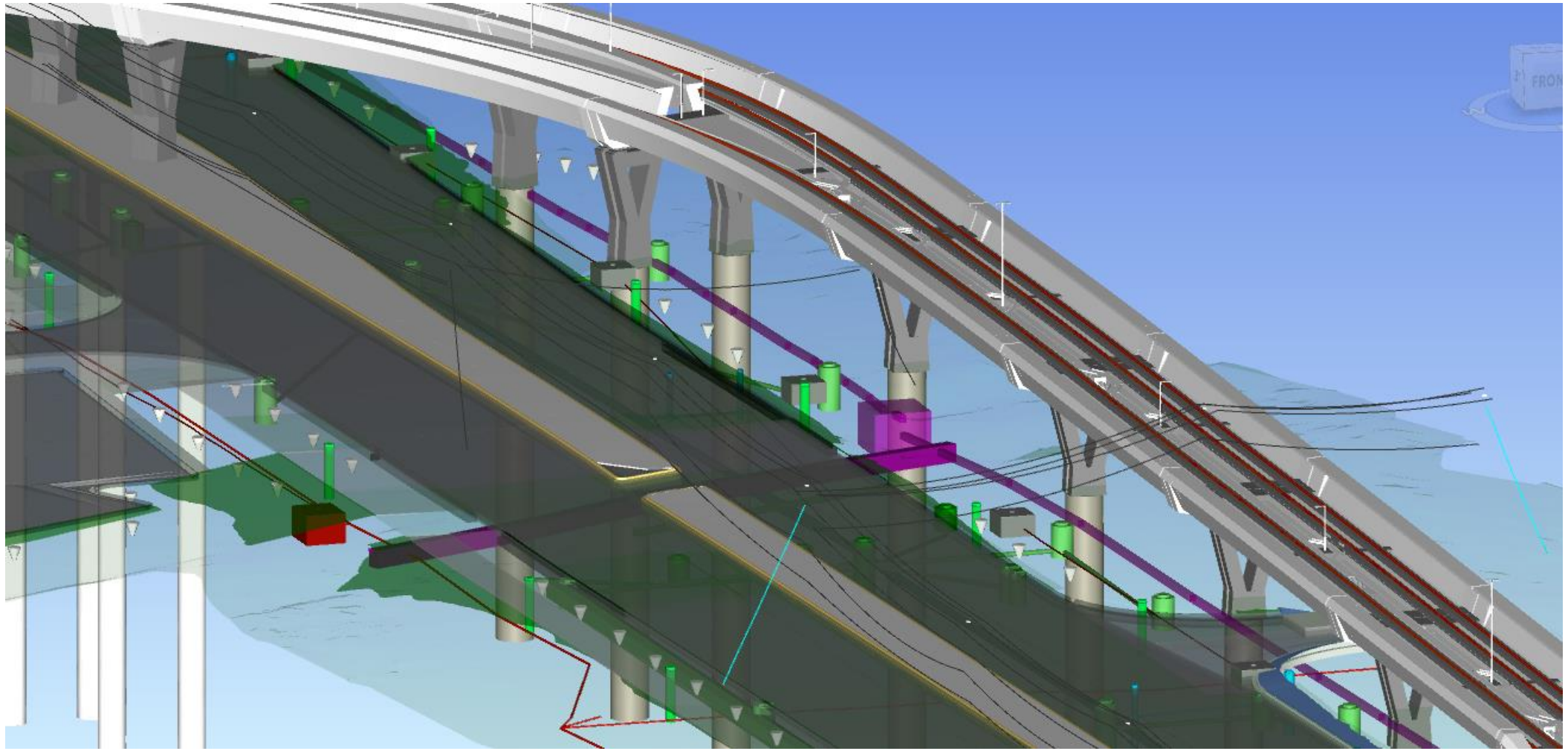


- Designers get a better understanding of their design
- Design teams have a better understanding of all the project challenges
- Contractors should be able to build more efficiently using the model
- Clients can fully visualise the design development
- Clash detection capabilities allows early identification of constraints using Navisworks

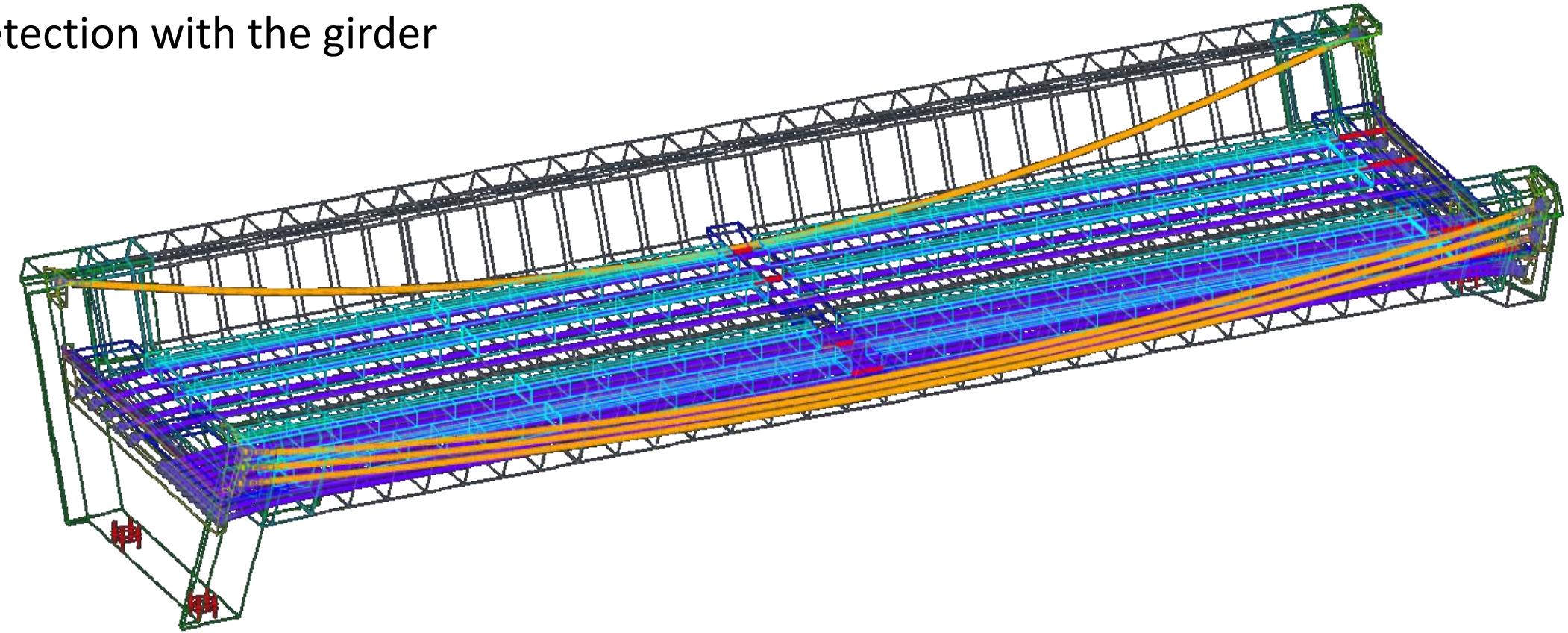




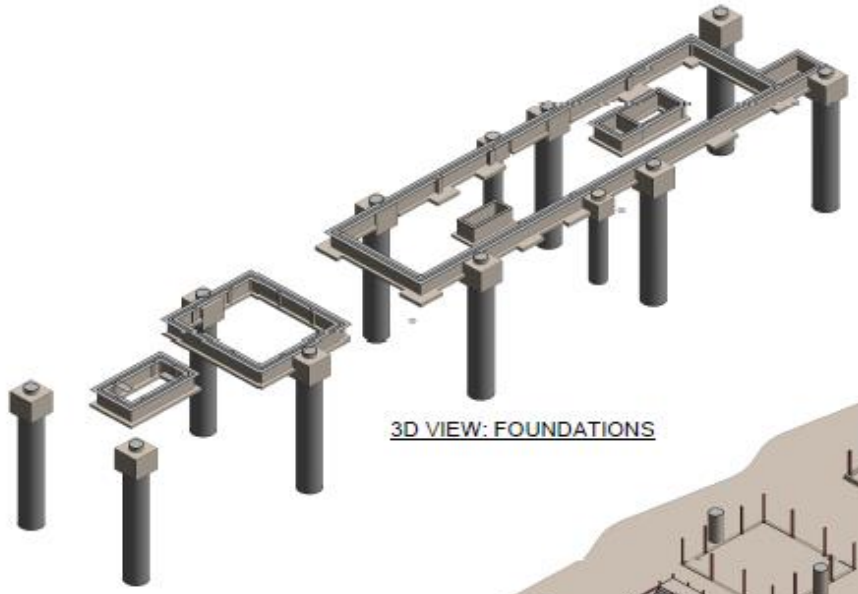




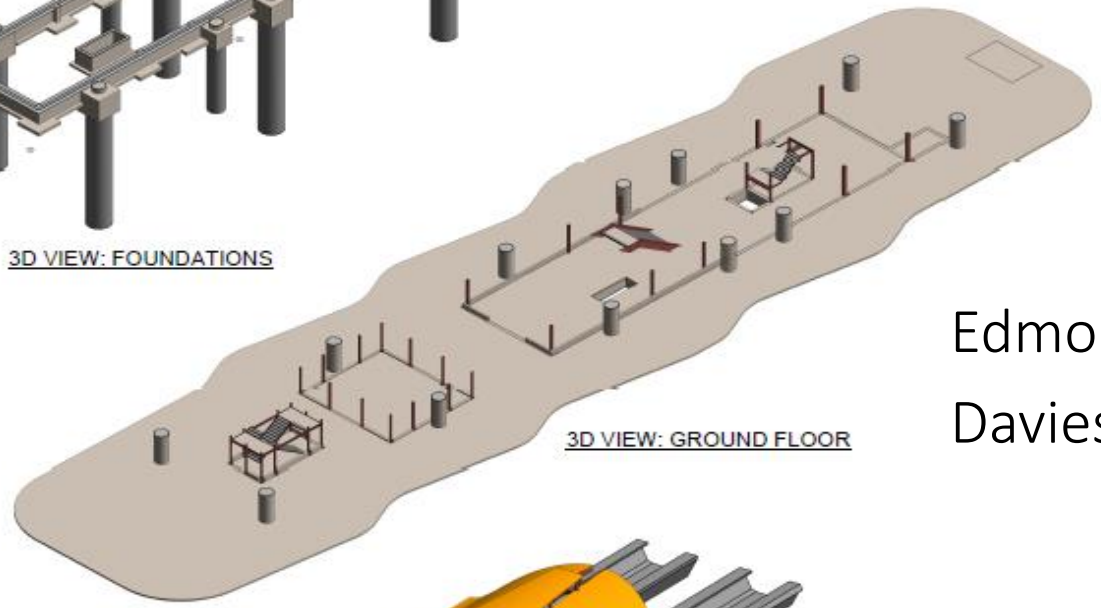
- PT tendons based on curved profile in plan and elevation
- Modelled using grasshopper to get the precise representation of the curves for clash detection with the girder



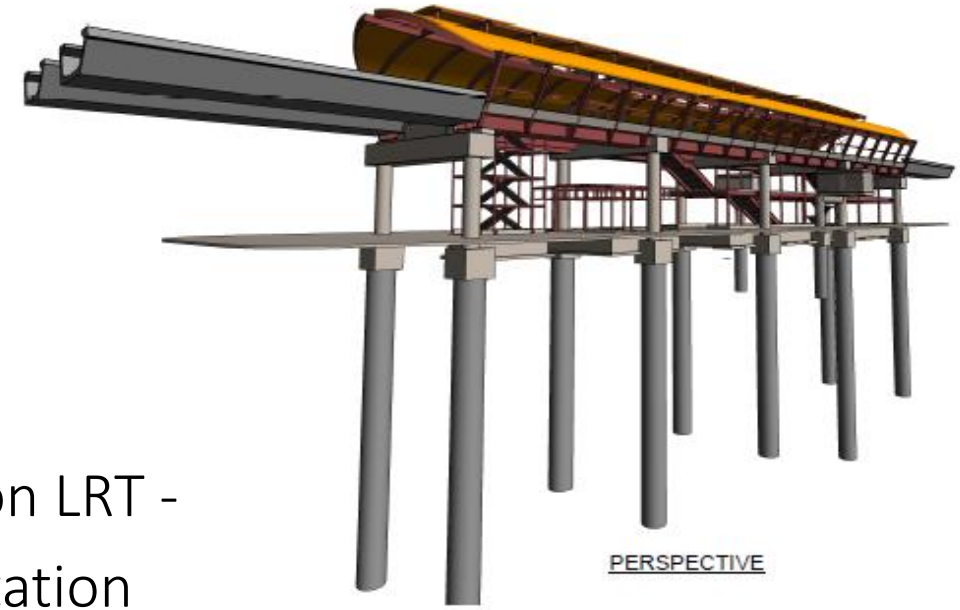
Edmonton LRT - Davies Station



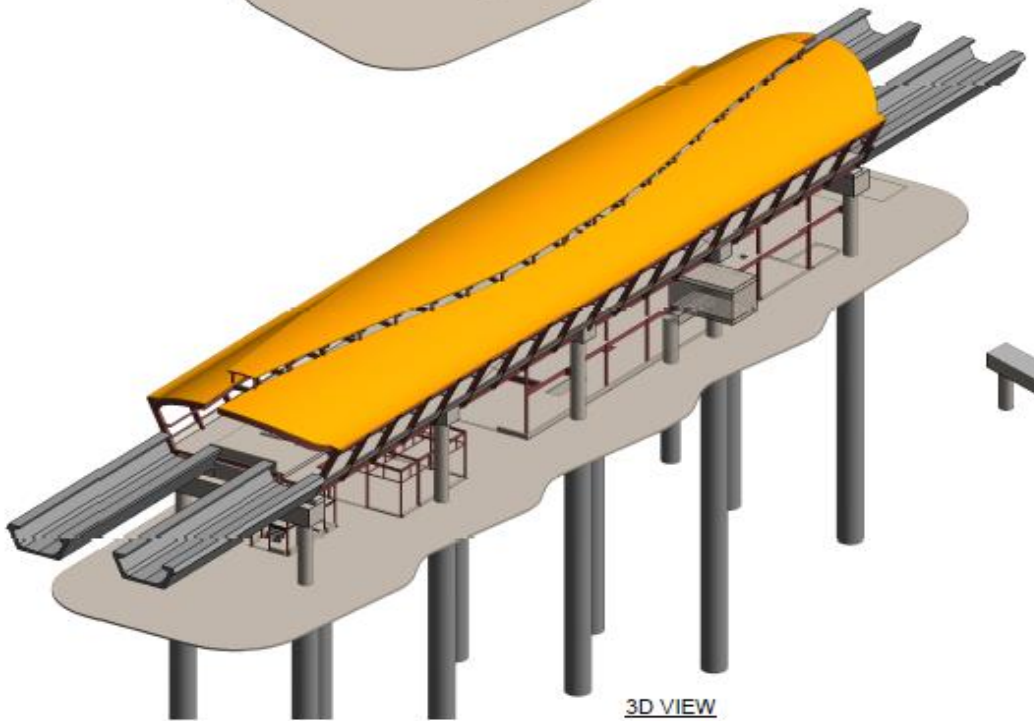
3D VIEW: FOUNDATIONS



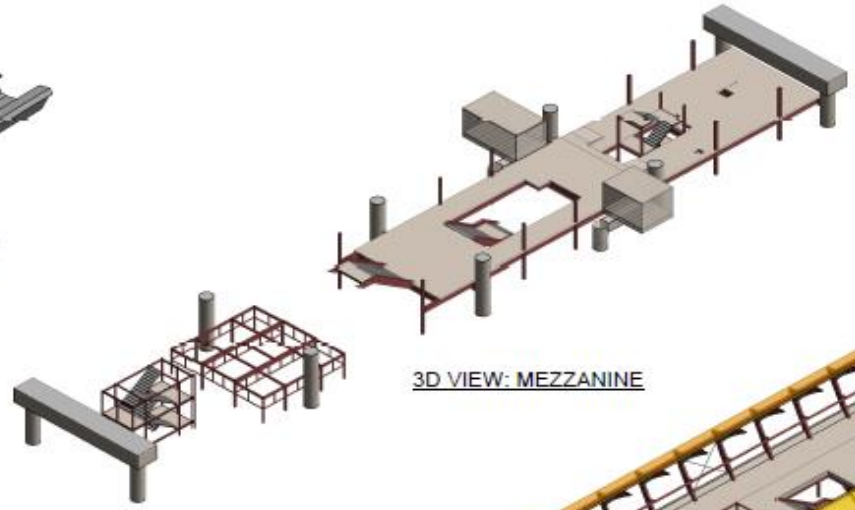
3D VIEW: GROUND FLOOR



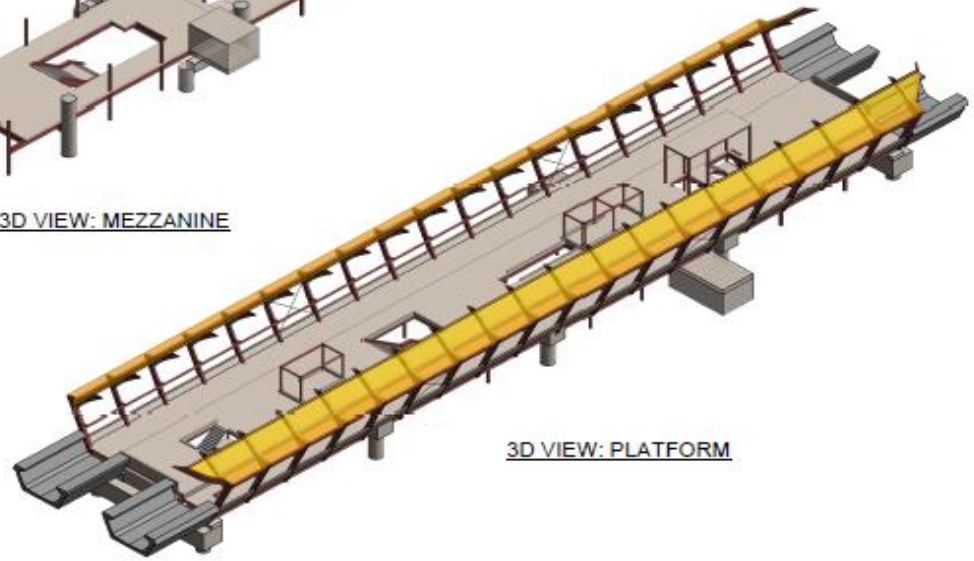
PERSPECTIVE



3D VIEW



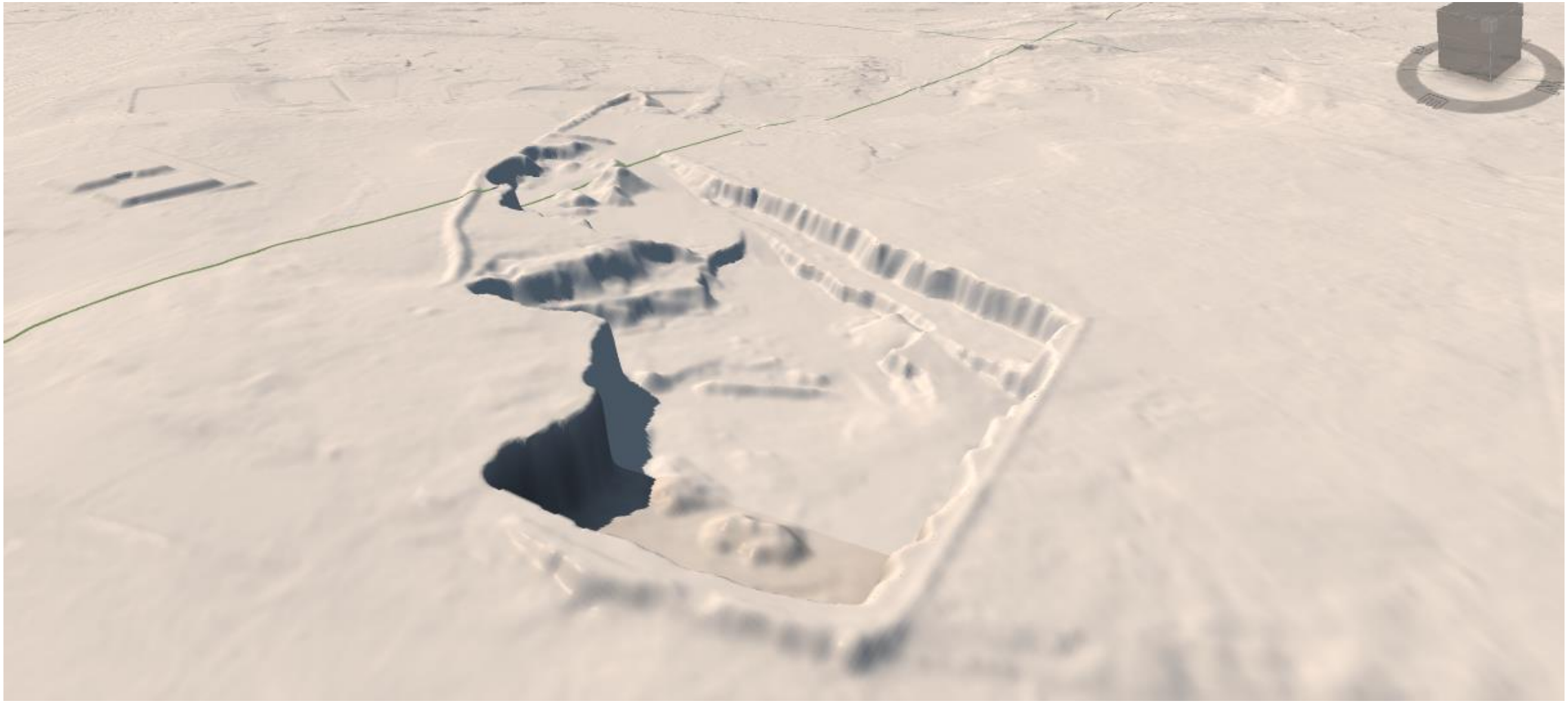
3D VIEW: MEZZANINE

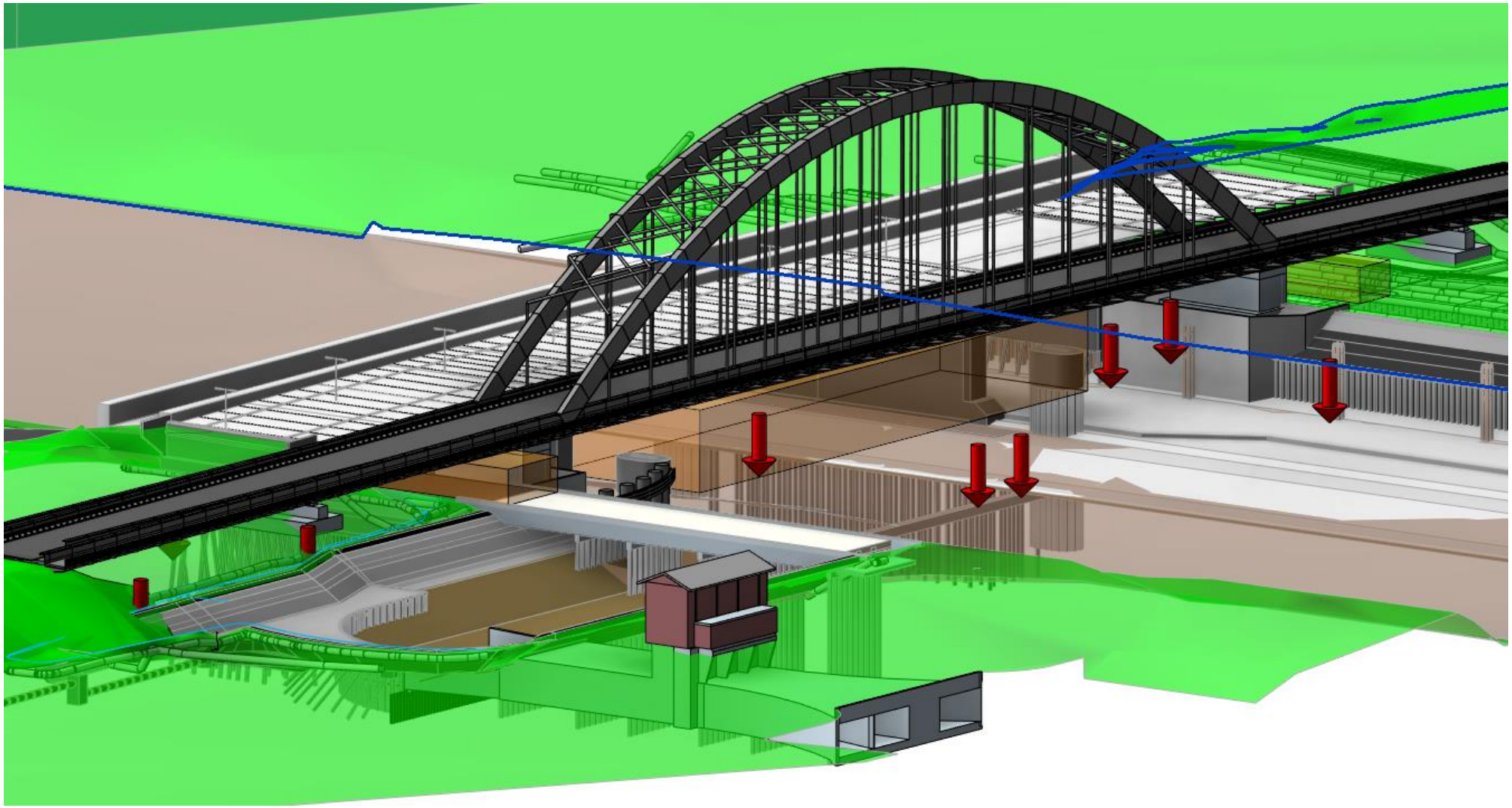


3D VIEW: PLATFORM

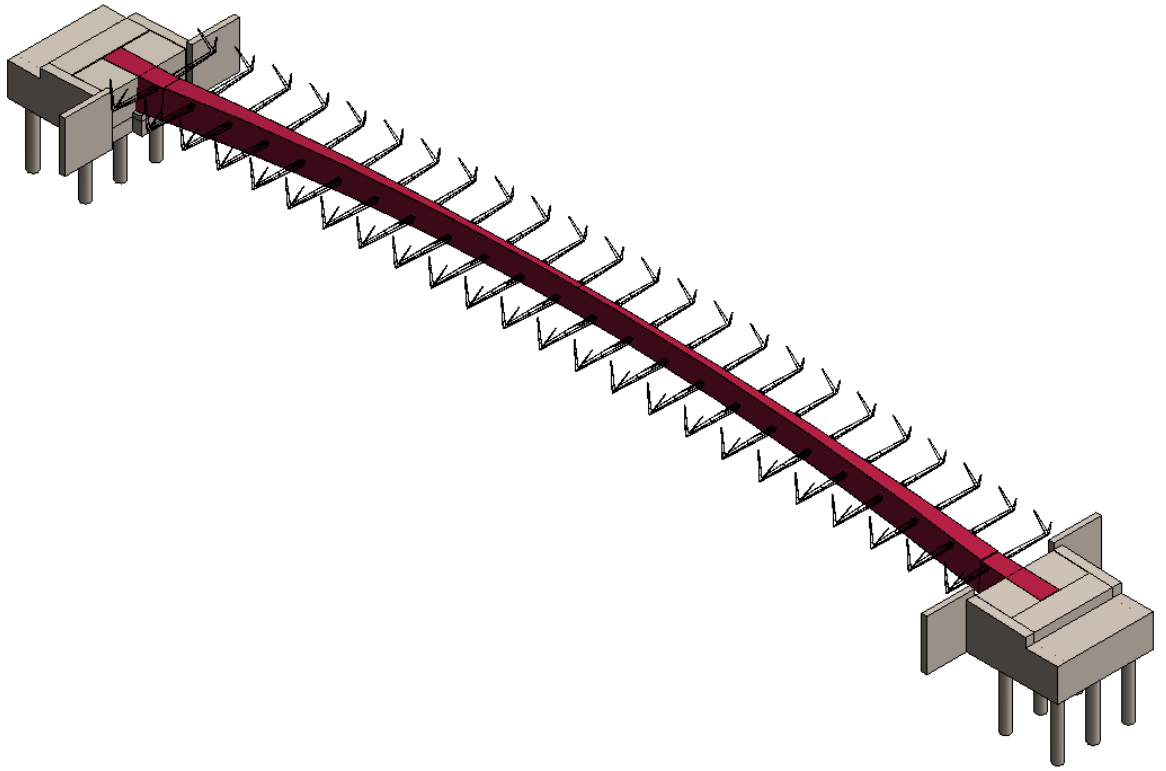
N6 Galway City

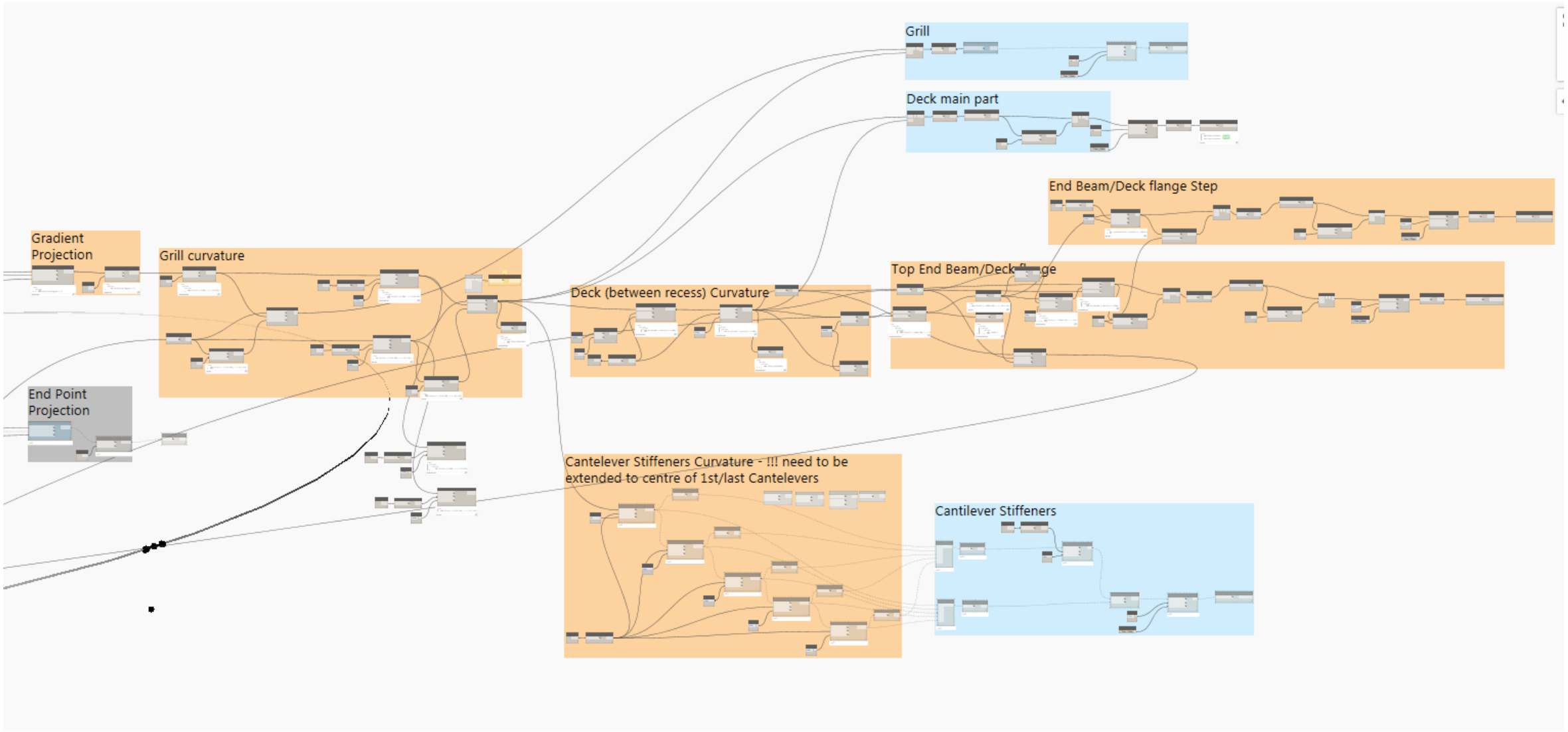
Galway City
Transport Project





THE METROPOLE HOTEL
P.J.O'HEA




Grill
Deck main part
End Beam/Deck flange Step
Gradient Projection
Grill curvature
Deck (between recess) Curvature
Top End Beam/Deck flange
End Point Projection
Cantelever Stiffeners Curvature - !!! need to be extended to centre of 1st/last Cantelevers
Cantilever Stiffeners

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Thank you

Robert Ryan, Arup