Enhancing Field Execution in Bridge Construction Using Revit, Civil 3D and Inventor

CI1435-R

Drew Teal P. Eng, LEED AP BD&C, Revit CP

PCL Construction Management

Class summary

This class uses a case study of the Saline Creek Bridge in Fort McMurray, Alberta, to demonstrate methods of using Autodesk Revit, Civil 3D, and Inventor to create digital prototypes of bridge infrastructure projects to enable efficient and accurate construction of complex elements. We explore the workflow used for passing model information between Revit, Civil 3D, and Inventor, as well as methods of integrating survey and layout.

Central Question: How did the computer model aid in better on site delivery?

Key learning objectives

At the end of this class, you will be able to:

- Pass model elements back and forth between Revit, Civil 3D and Inventor.
- Use Revit Component Tools to Create Complex Geometry
- Use Complex Model Geometry to Create Layout Points for RTS
- Use Revit and Inventor Building Elements in Civil 3D for Excavation Planning and Quantities

Class Format

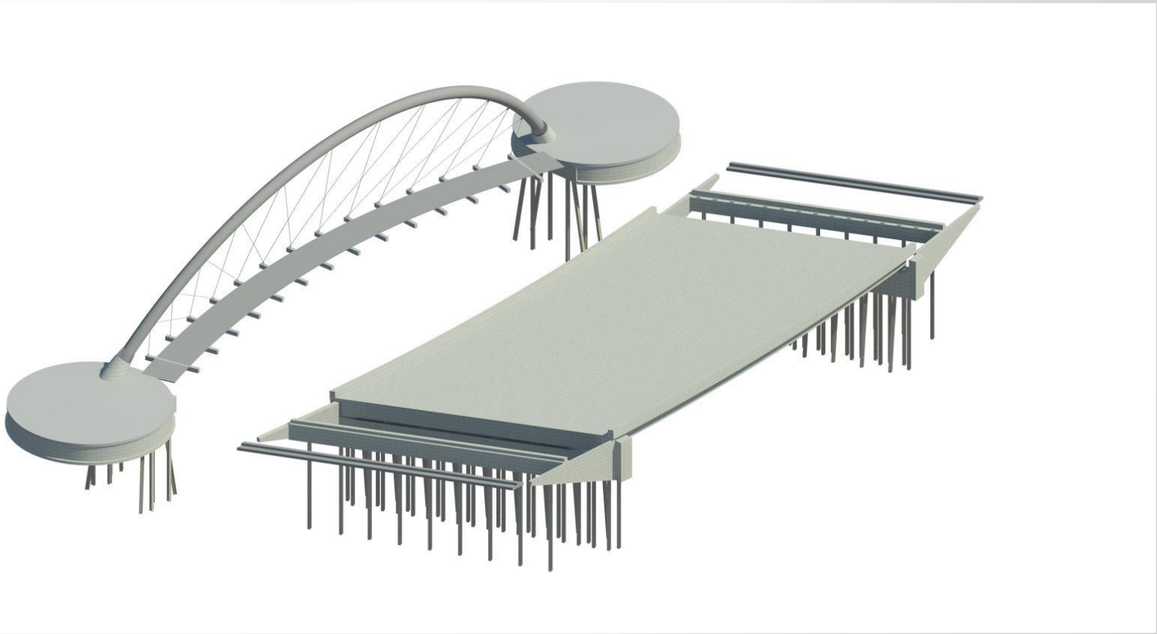
Round Table Discussion

- 50/50 presentation and discussion
- Please feel free to ask questions at any time
- Visit Autodesk Project Chronicle at https://chronicle.autodesk.com/ and search for the following videos:

Case Study: Saline Creek Vehicle and Pedestrian Bridge

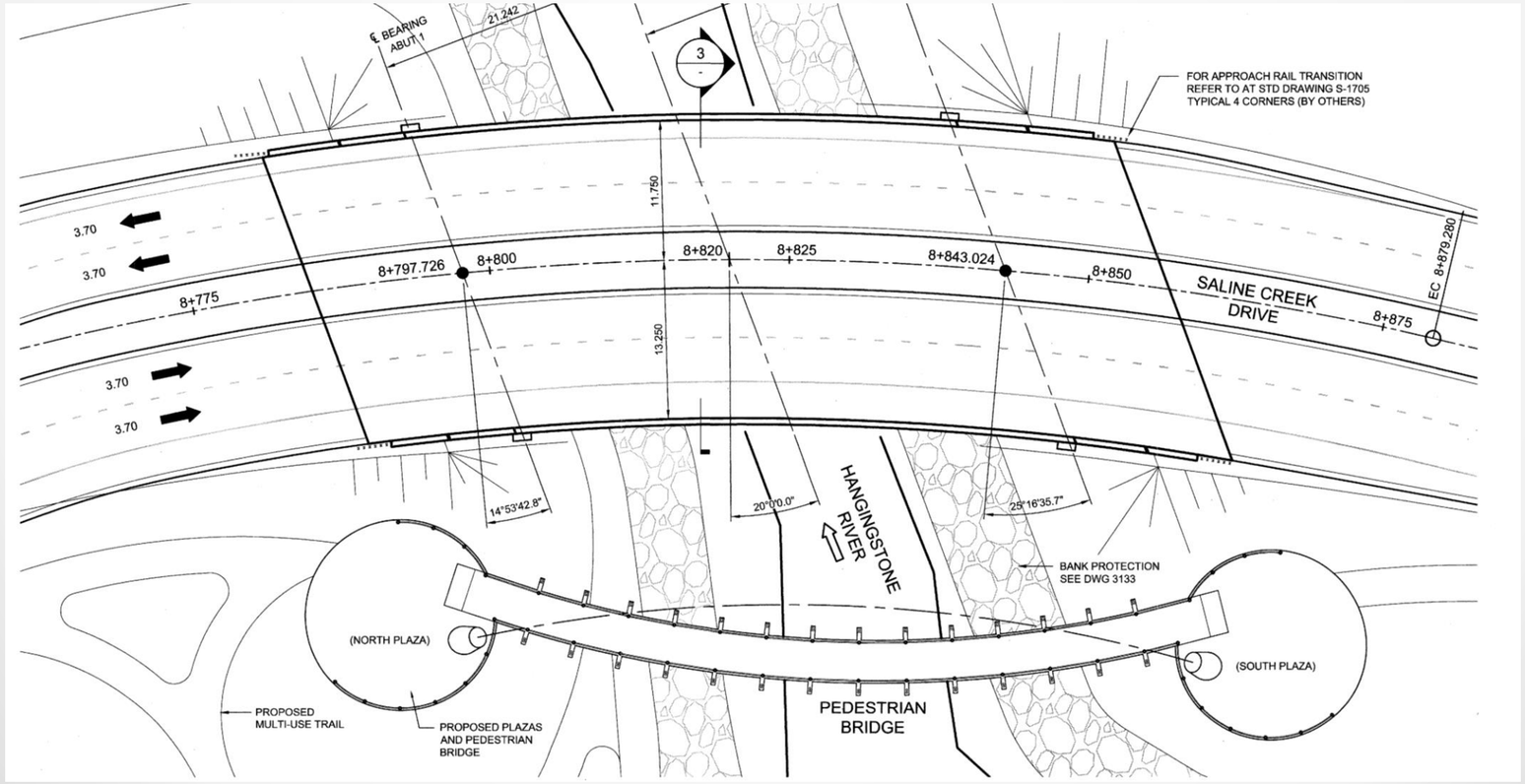
Project Details

- Located in Fort McMurray, Alberta



Case Study: Saline Creek Vehicle and Pedestrian Bridge

- Client: Regional Municipality of Wood Buffalo
- Design Consultants: Associated Engineering



Project Goals from Model

Goals

- Bridge Decks
  - Create Reference Surface for Falsework Construction
  - Create Reference Surface from Different Camber Profiles on Each Edge of Ped Bridge
- Pedestrian Structural Support
  - Verify Cone Geometry
  - Cone Formwork Modeling
  - Cone Rebar Modeling
- Pedestrian Bridge Arch
  - Scan and Compare As Built with Arch Model

Project Goals from Model

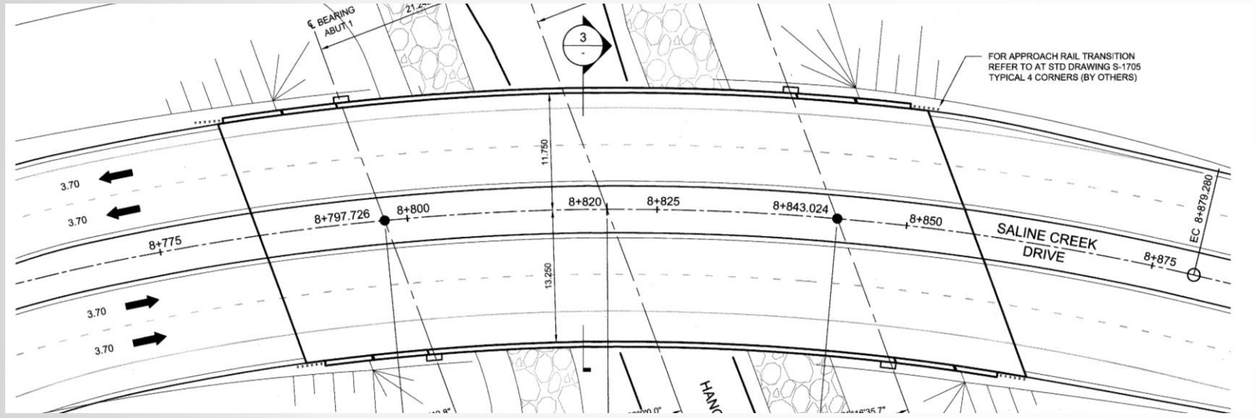
- Bridge Decks
  - Create Reference Surface for Falsework Construction
  - Used Civil 3D for Surface
    - Export Surface from Civil 3D into Revit
  - Use Robotic Total Station in the Field to Reference Surface

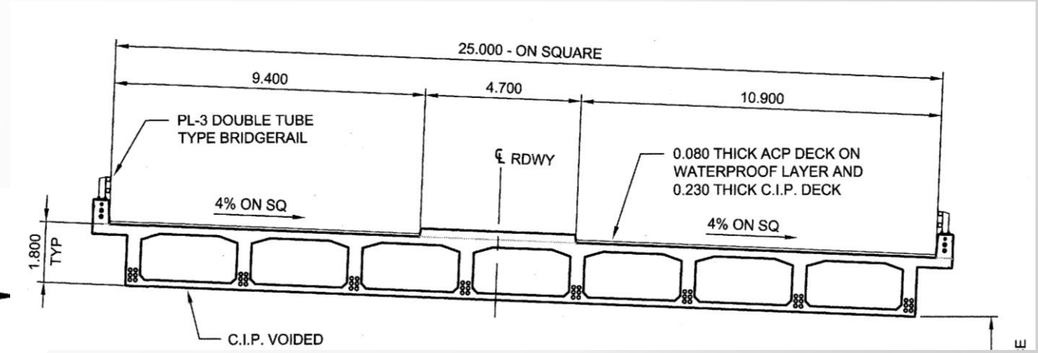
How did the computer model aid in better on site delivery?

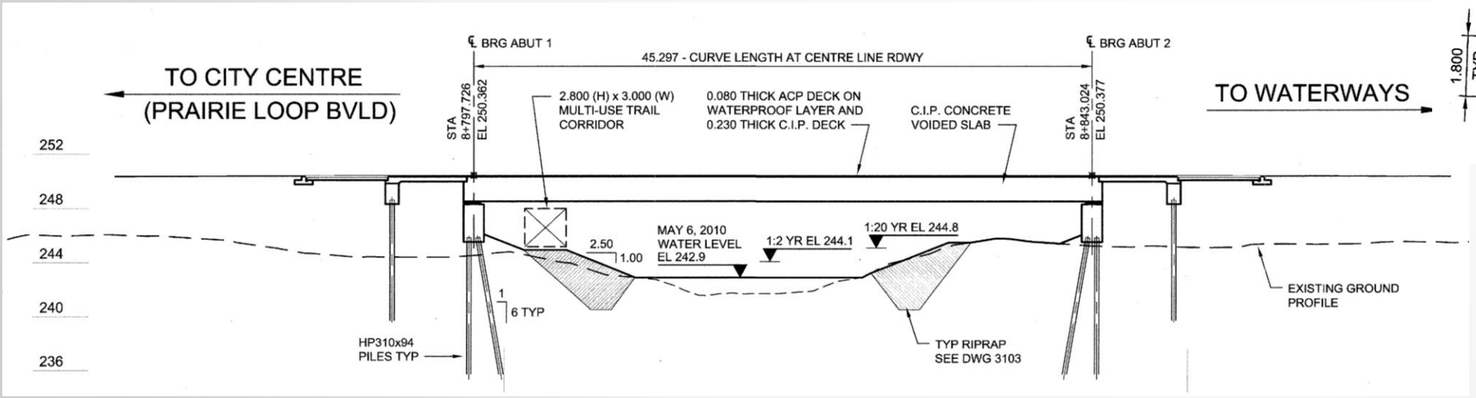
- Basically mimicked what a builders level does with a flat horizontal plan, except with a variable surface
- Better productivity, better quality

Project Goals from Model

- Vehicle Bridge Deck







Project Goals from Model

- Vehicle Bridge Deck

Project Goals from Model

- Vehicle Bridge Deck

Project Goals from Model

- Vehicle Bridge Deck

Project Goals from Model

- Vehicle Bridge Deck

Project Goals from Model

- Pedestrian Bridge Deck

Project Goals from Model

- Pedestrian Structural Support
  - Determine Cone Geometry
  - Cone Formwork Modeling
  - Cone Rebar Modeling
  - Why I would recommend using Inventor for this in the future
  - Bring inventor model into Revit

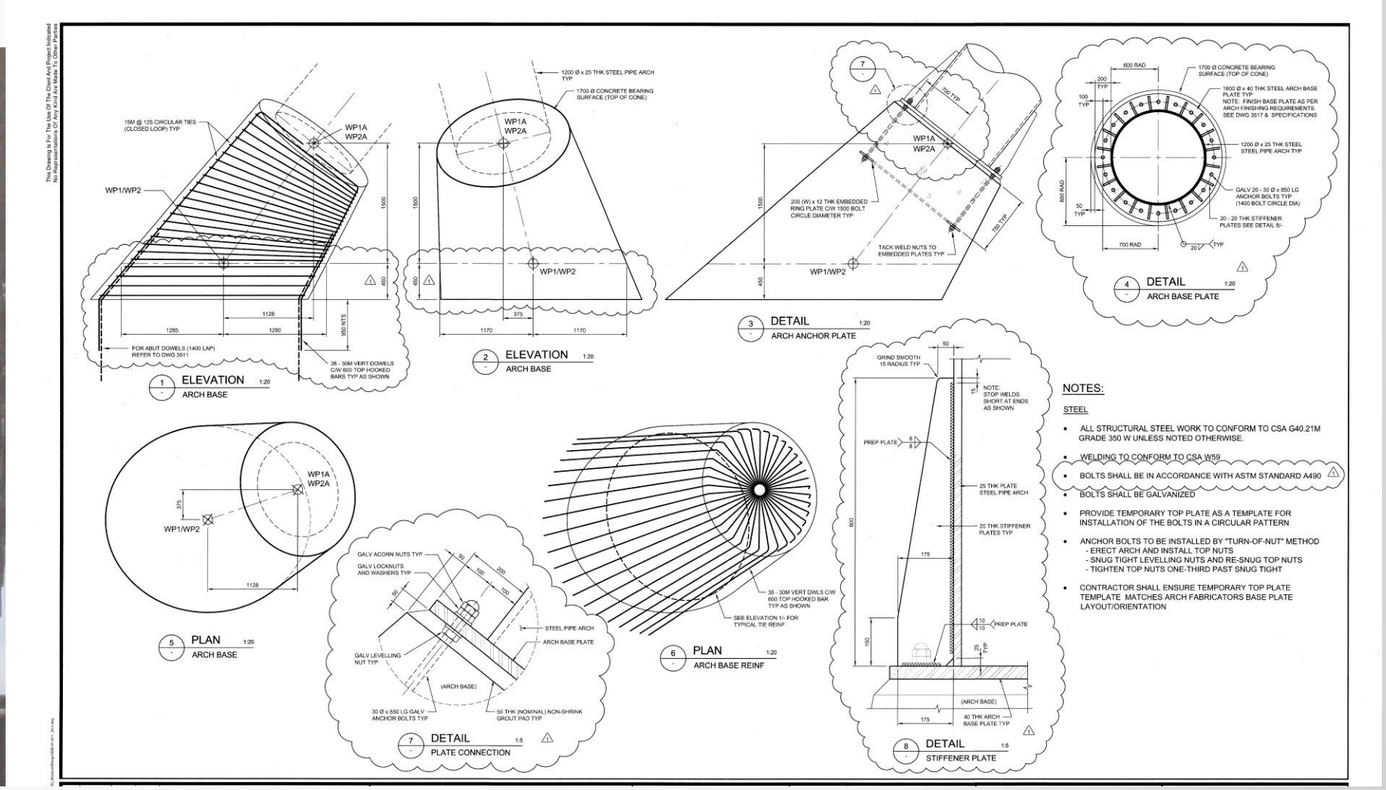
  - How did the computer model aid in better on site delivery?
    - Clarified design intent
    - Cut sheets provided instructions for formwork fabrication
    - Rebar model enabled rebar contractor to complete contract

Project Goals from Model

- Pedestrian Bridge Deck

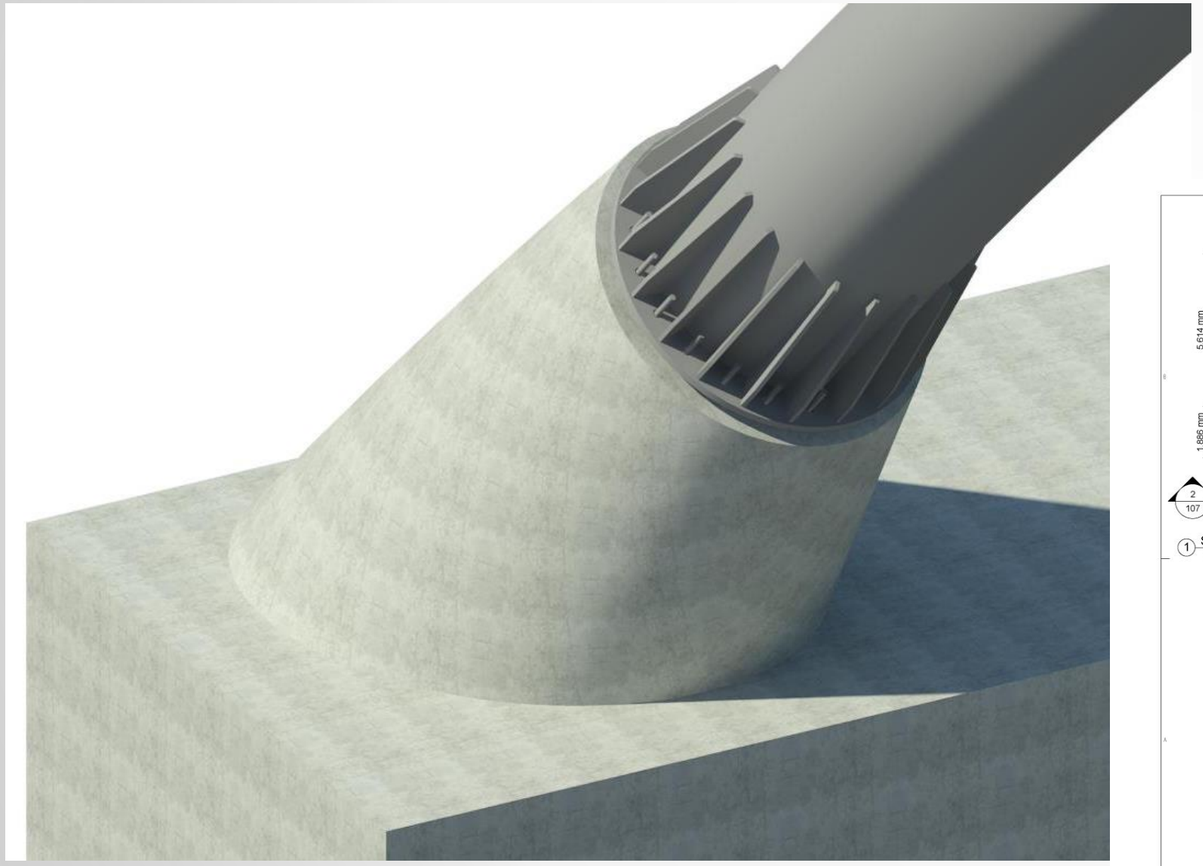
Project Goals from Model

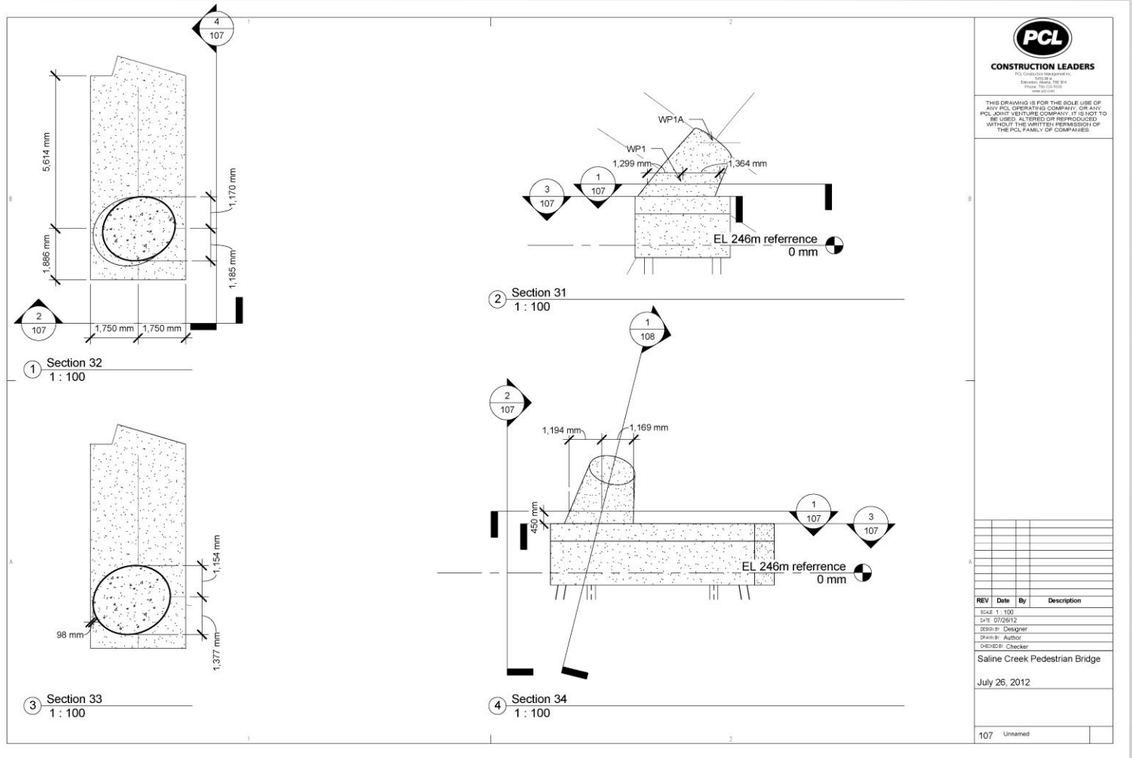
- Pedestrian Arch Cone Support



Project Goals from Model

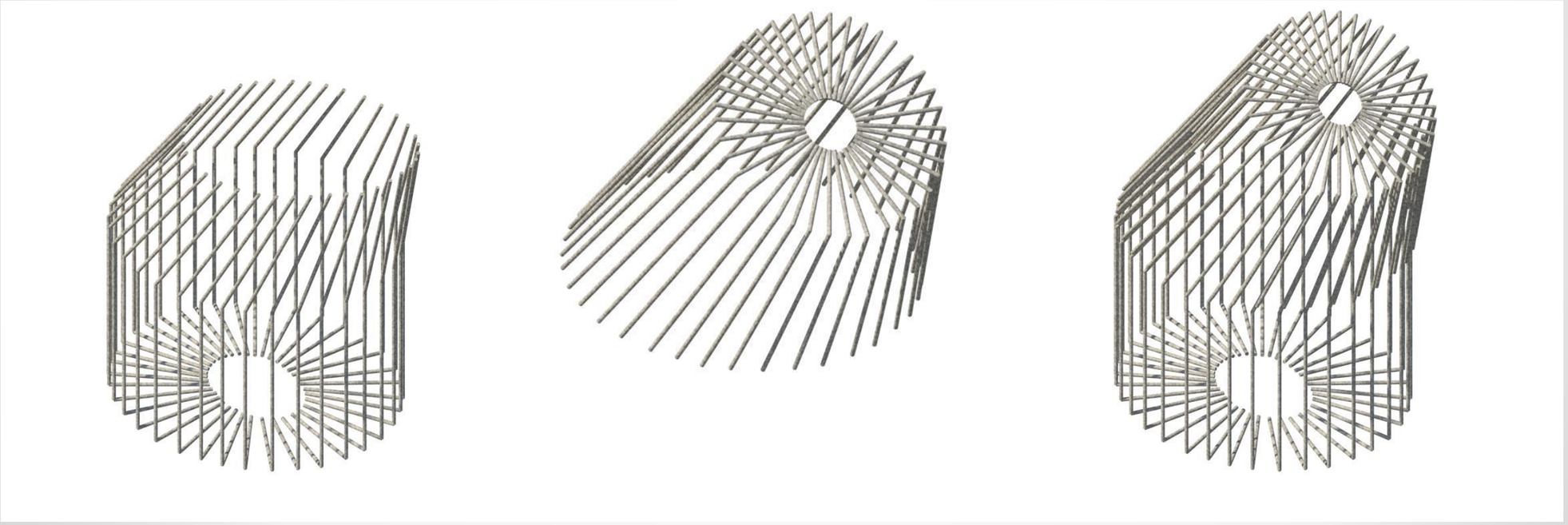
- Pedestrian Arch Cone Support – Shape of the Concrete Cone





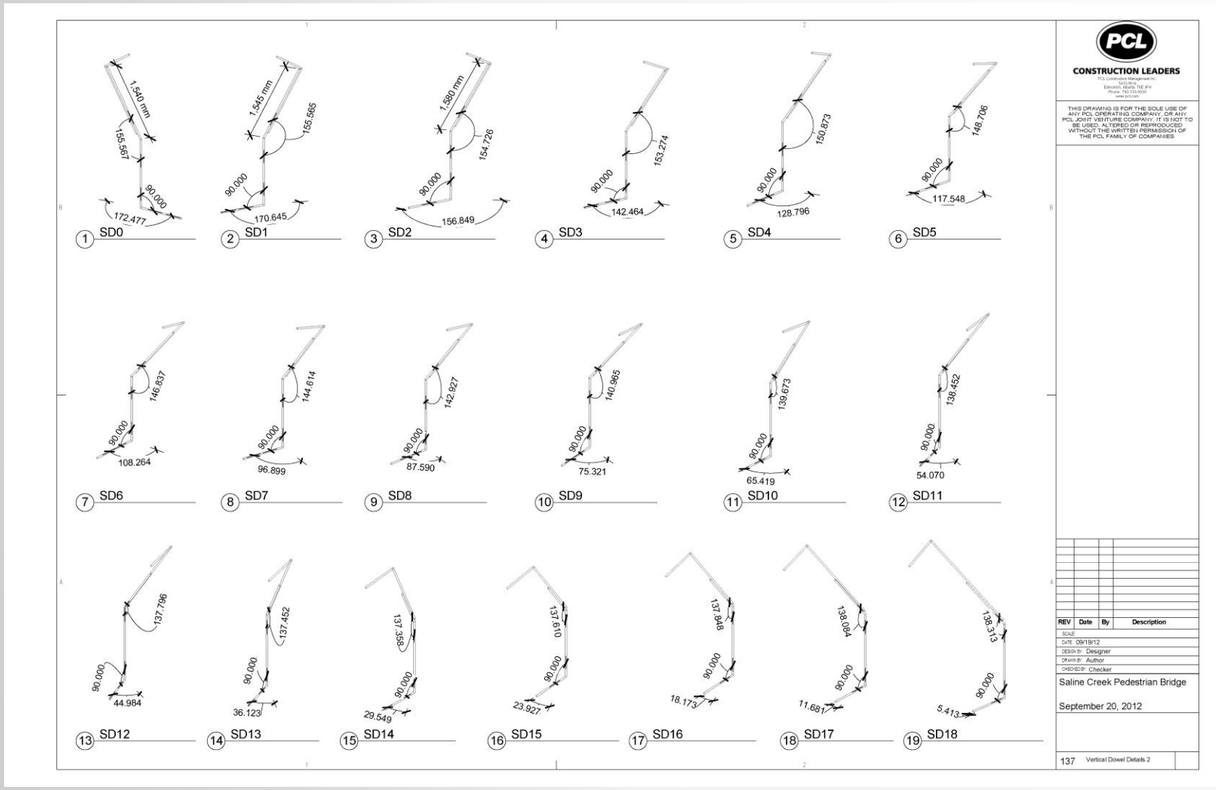
Project Goals from Model

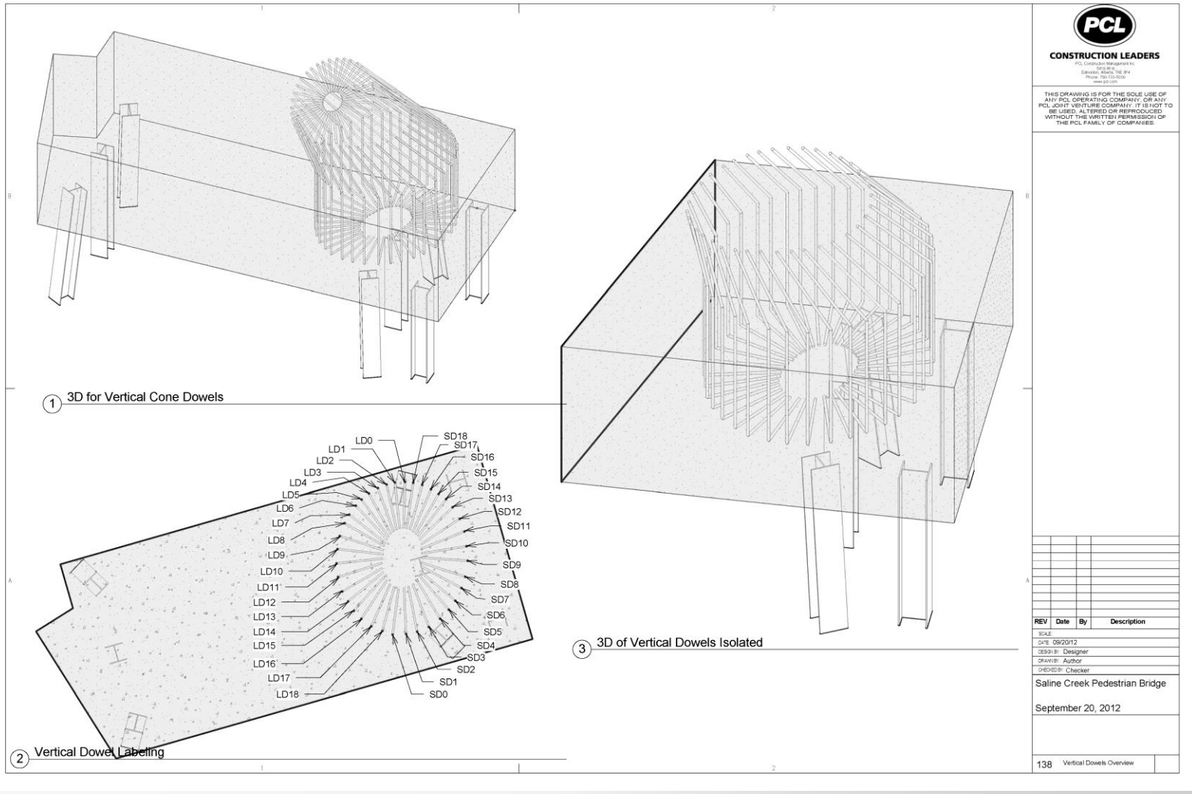
- Pedestrian Arch Cone Support – Rebar



Project Goals from Model

- Pedestrian Arch Cone Support – Rebar



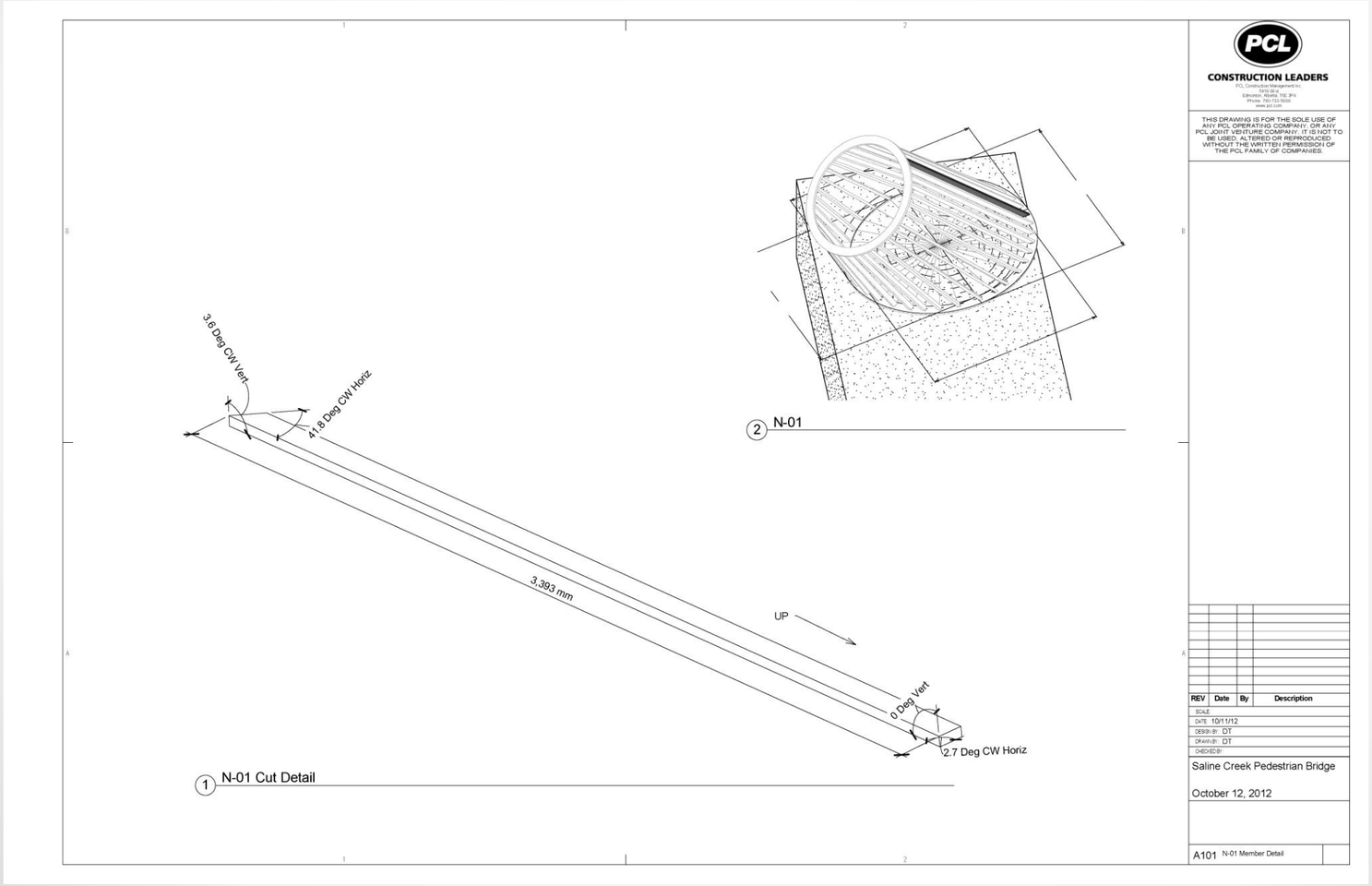


Project Goals from Model

- Pedestrian Arch Cone Support – Cone Formwork

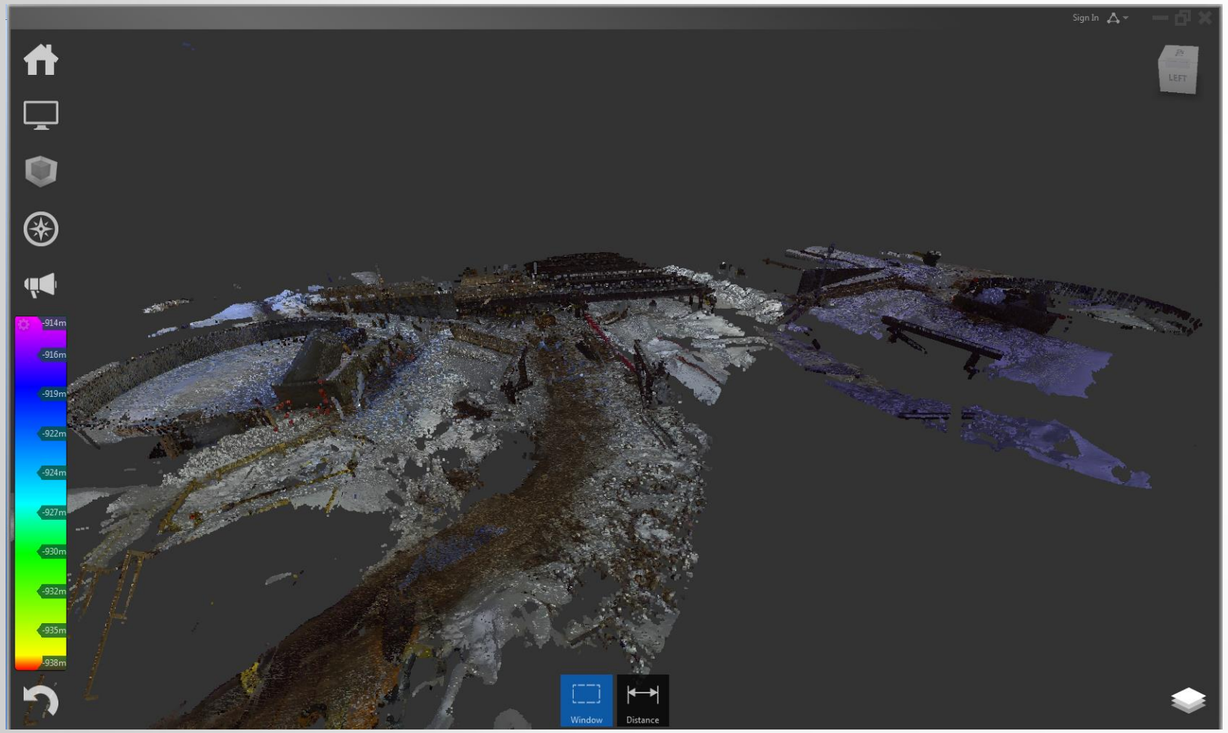
Project Goals from Model

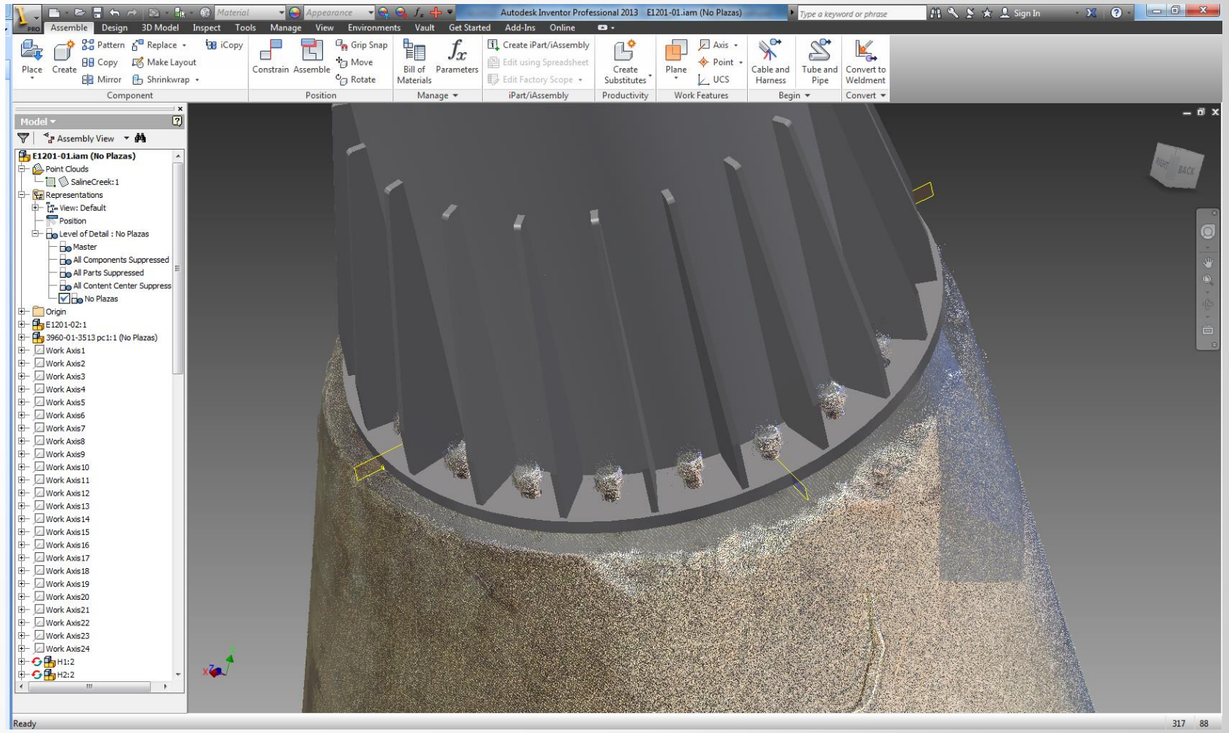
- Pedestrian Arch Cone Support – Cone Formwork



Project Goals from Model

- Pedestrian Arch Cone Support – Scan and Virtual Lift





Project Goals from Model

- Pedestrian Arch Cone Support