InfraWorks Bringing Your Bridge Project to Life - InfraWorks: Autodesk Connector for ArcGIS

Kenneth L. Driscol Sr.
Senior Civil Application Consultant
Applied Software Technology

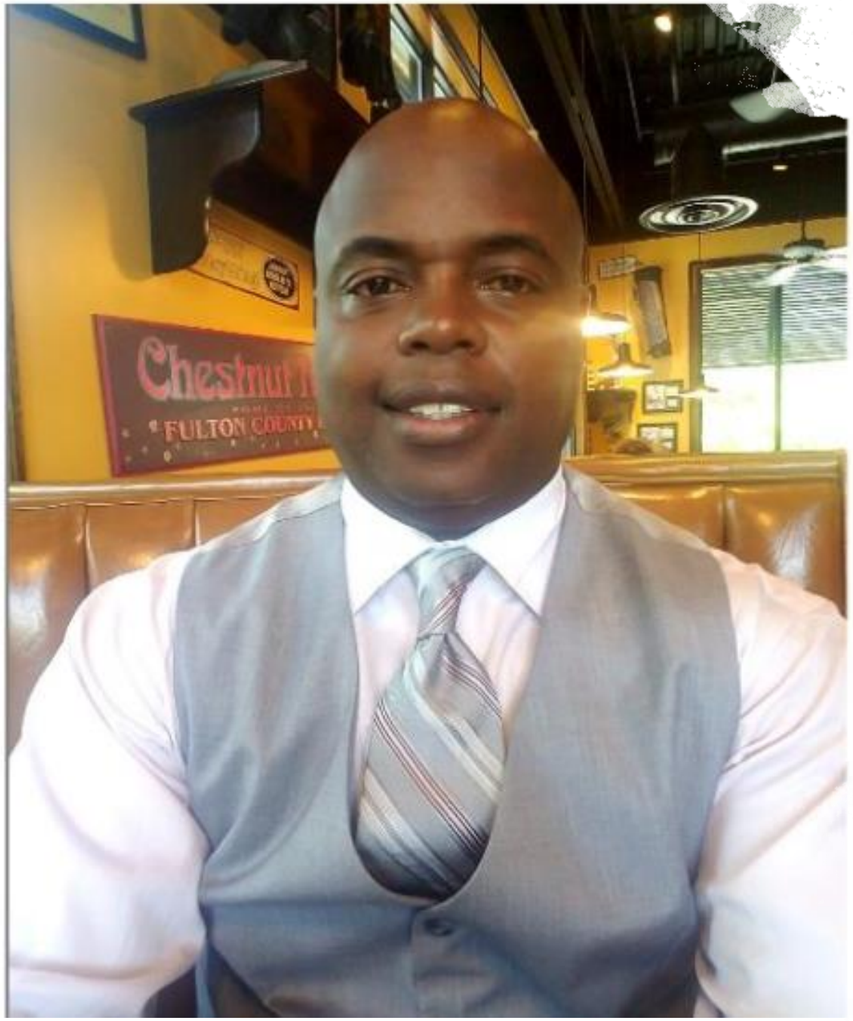
AUTODESK. UNIVERSITY

Agenda

At the end of this presentation, you will be able to: Understand the capabilities of Bridge layout from InfraWorks and the Autodesk Connector for ArcGIS

- About Bridge Design
- Clearance envelope
- Bridge components
- Decks
- Girders
- Bridge Substructure
- Piers
- Abutments
- Bridge Analysis tools

- About Autodesk connector for ArcGIS
- The Data Source Panel
- Add data from ArcGIS
- Manage ArcGIS
- Publish InfraWorks to ArcGIS
- Export InfraWorks Features to File Geodatabase (FGDB)
- Send Bridge to Revit
- Bridge Analysis tools



About the speaker

Kenneth L. Driscol

With a background in Civil Engineering, Survey and Construction Technology, Kenneth has over 20 years of experience in Autodesk Civil Infrastructure applications, is an Autodesk Certified Instructor at an Authorized Training Center. As an Senior Application Consultant concentrating in Civil 3D, InfraWorks, Surveying, Map 3D, Hydrology and GIS services and instruction. Kenneth is Applied Software's Senior Civil Consultant and provides software demonstrations, custom and standardized classroom training, mentoring and technical support. Kenneth has presented multiple classes and presentations at Autodesk University.

Innovation BIM & GIS

BIM & GIS - The power of location intelligence and design process, combined.

What if you could? With Autodesk You Can.

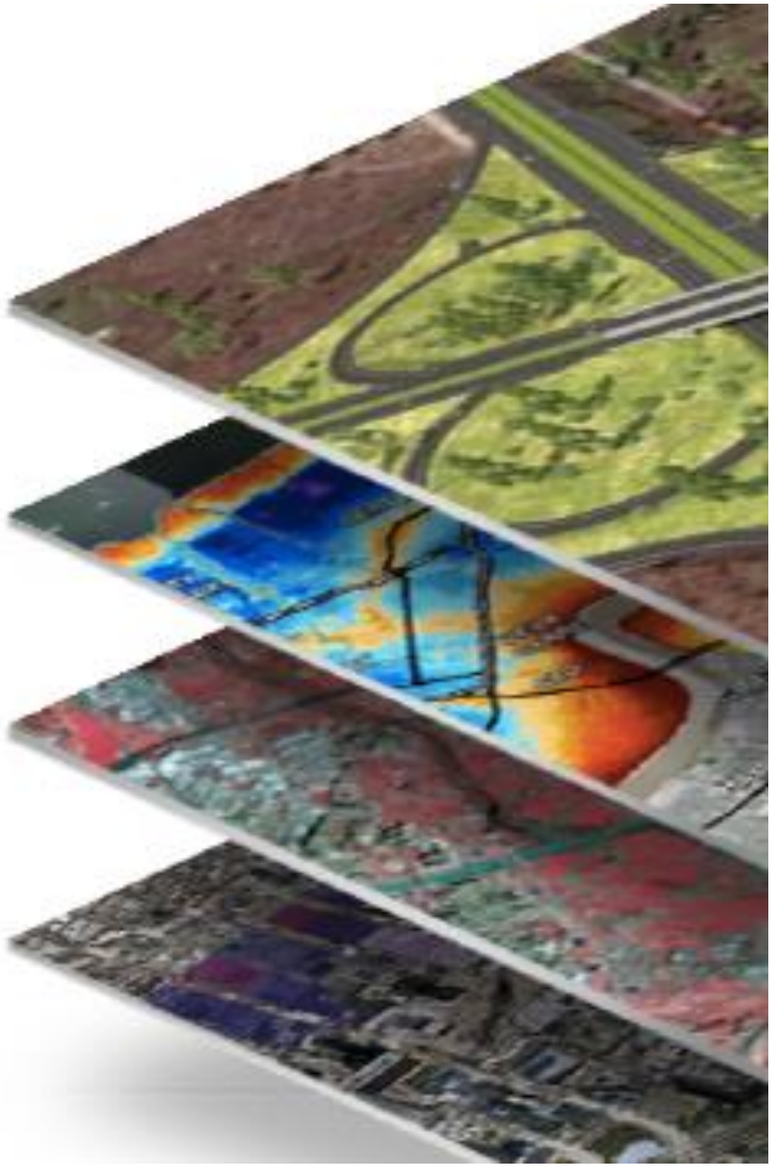
- What if you could bring different types of information together, including geospatial data, to create an information model that forms the basis for planning, analysis & simulation, sustainability, visualization and more?

Building Site Context with the Environment

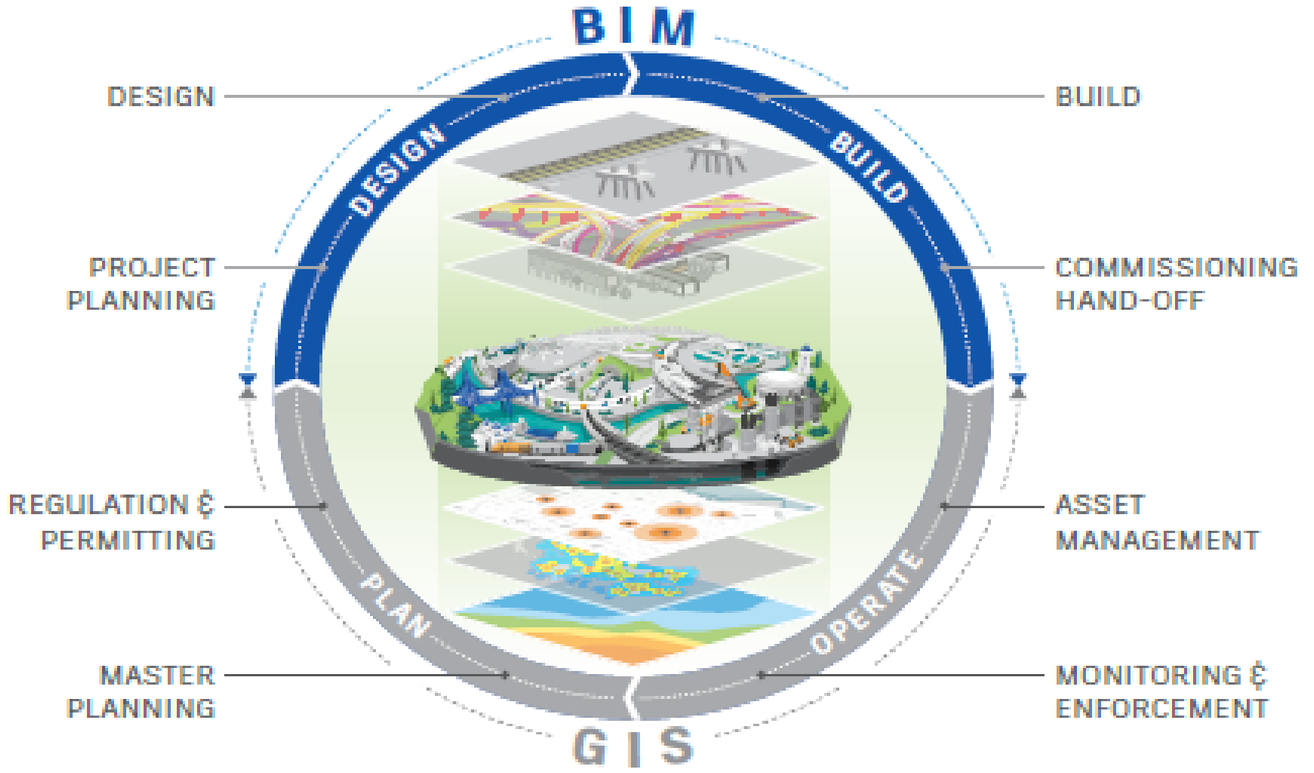
Sensing Site Change

Optimizing Infrastructure Operation Intelligence

Open and Extensible Systems



To deliver more, better, with less, the industry needs to think about things differently. Integrating BIM and GIS can result in workflows that move data seamlessly from one system to another. Let's take a look.



Seamless Collaboration

Esri and Autodesk are working together to provide an environment where GIS professionals and designers and engineers can **collaborate** across the project life cycle by integrating GIS and BIM.

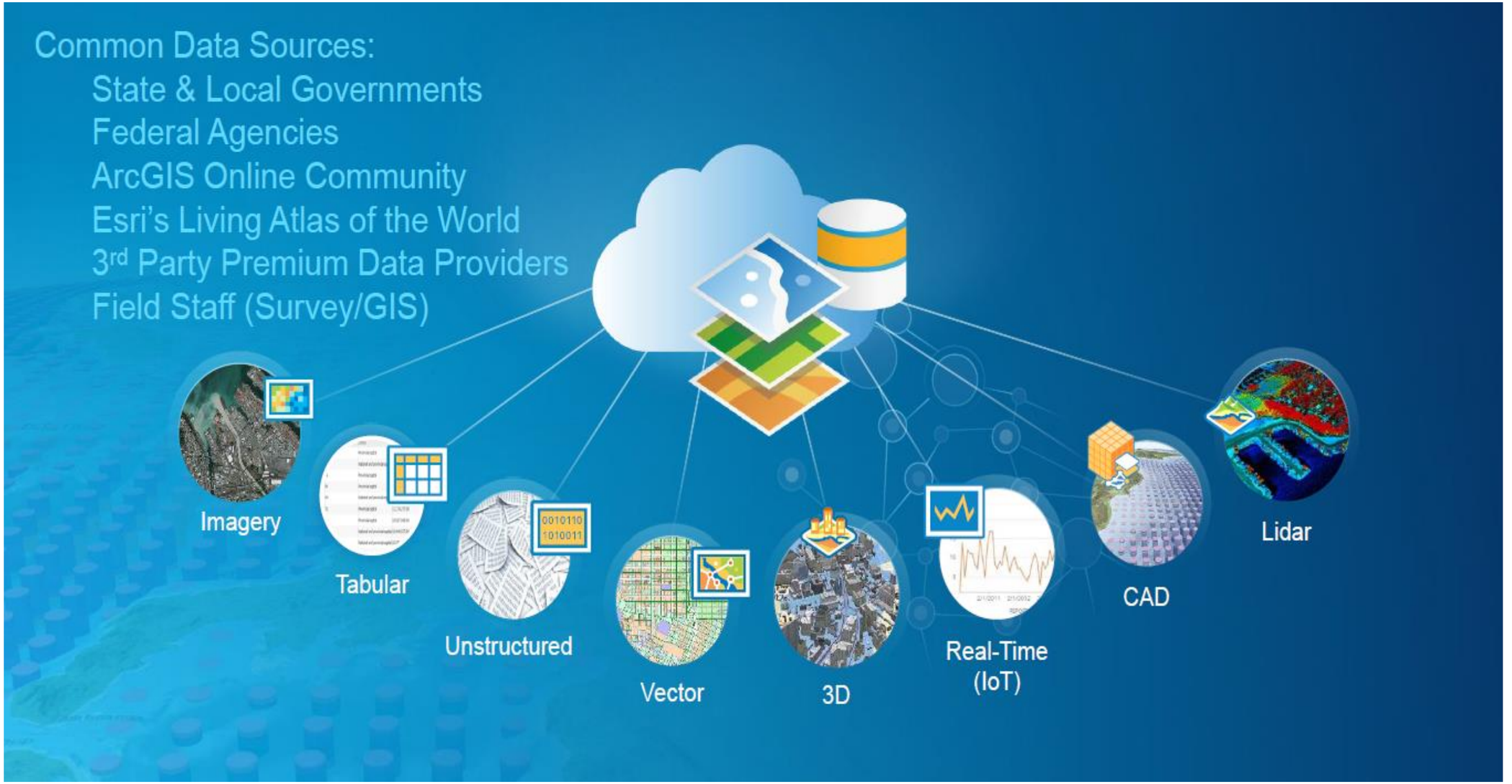
Deeper Understanding

"Data at the Center" creates a broader and deeper understanding of infrastructure in the **larger context** of our built and natural environments – enabling earlier and better-informed decision-making, improved stakeholder engagement, and accelerated approval processes.

Better Decision-Making

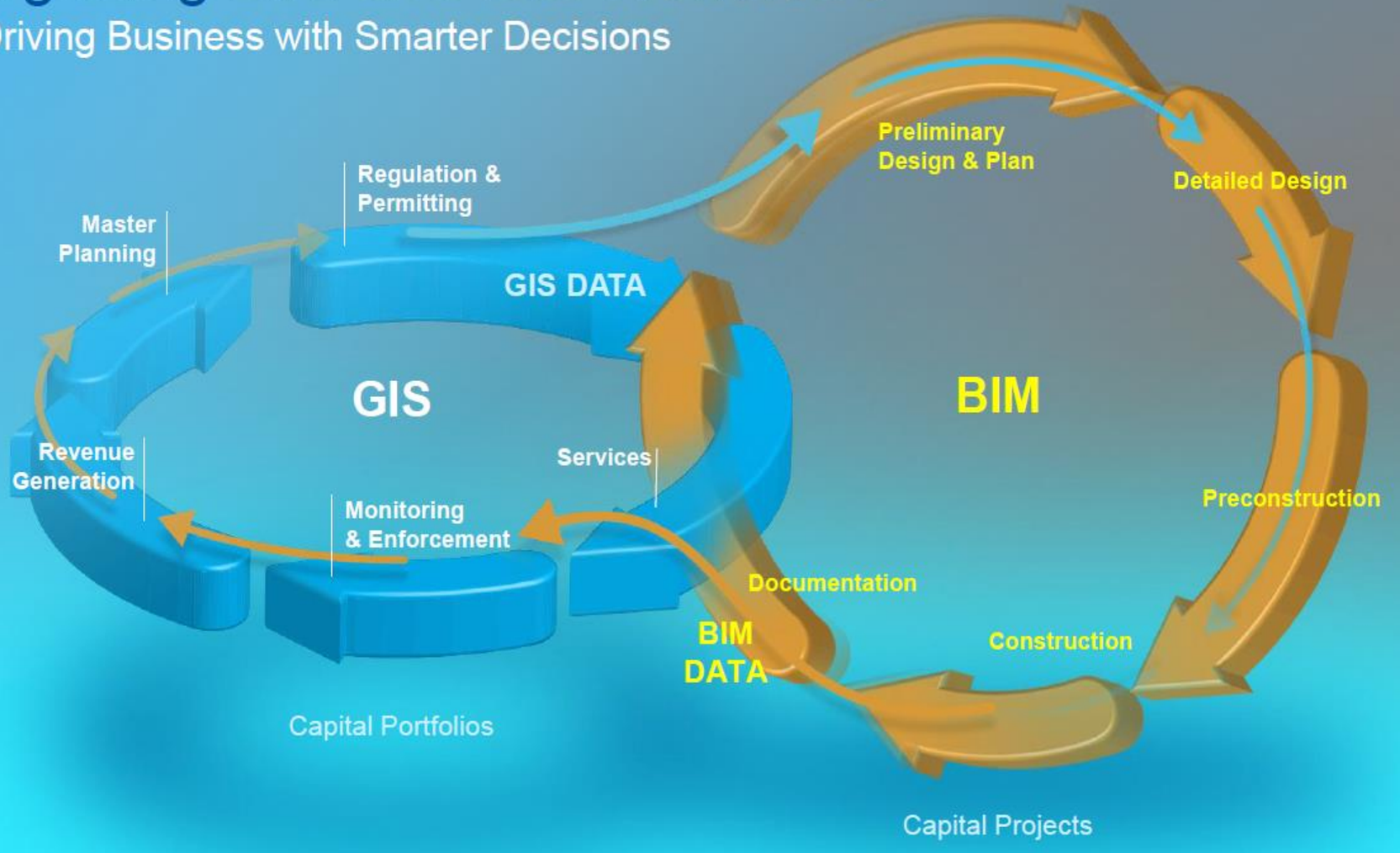
Stakeholders throughout project life cycles can **leverage digital information** that includes the built and natural environment, allowing everyone on a project to look at alternatives, see what the impacts are, and make better decisions.

GIS + AEC


Common Data Sources:
State & Local Governments
Federal Agencies
ArcGIS Online Community
Esri's Living Atlas of the World
3rd Party Premium Data Providers
Field Staff (Survey/GIS)
Imagery
Tabular
Unstructured
Vector
3D
Real-Time (IoT)
CAD
Lidar

Integrating BIM and GIS Workflows

Driving Business with Smarter Decisions



State of Integrations Today

AUTODESK. Make anything.

esri THE SCIENCE OF WHERE

AUTOCAD CIVIL 3D → ArcGIS Online

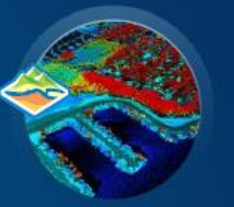
AUTODESK INFRAWORKS → ArcGIS Online

AUTODESK REVIT → ArcGIS Pro → ArcGIS Online

AUTODESK AUTOCAD → ArcGIS Online

AUTODESK BIM 360 ✕ ArcGIS Online


Imagery


Lidar


CAD


3D

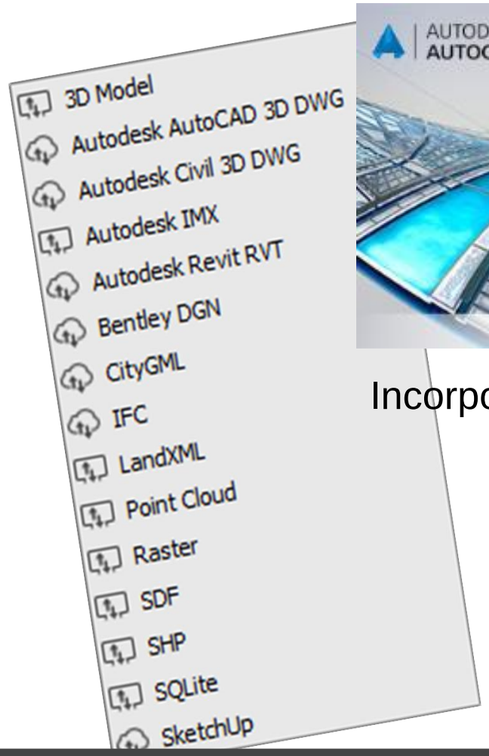

Real-Time (IoT)

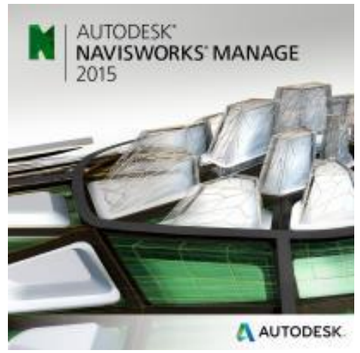

Tabular


Vector

Unstructured

Build large infrastructure models from existing CAD, 3D model, GIS, and raster data





Incorporate detailed models from other Autodesk® products

Quickly and easily engineer large-scale preliminary designs in the context of the built environment

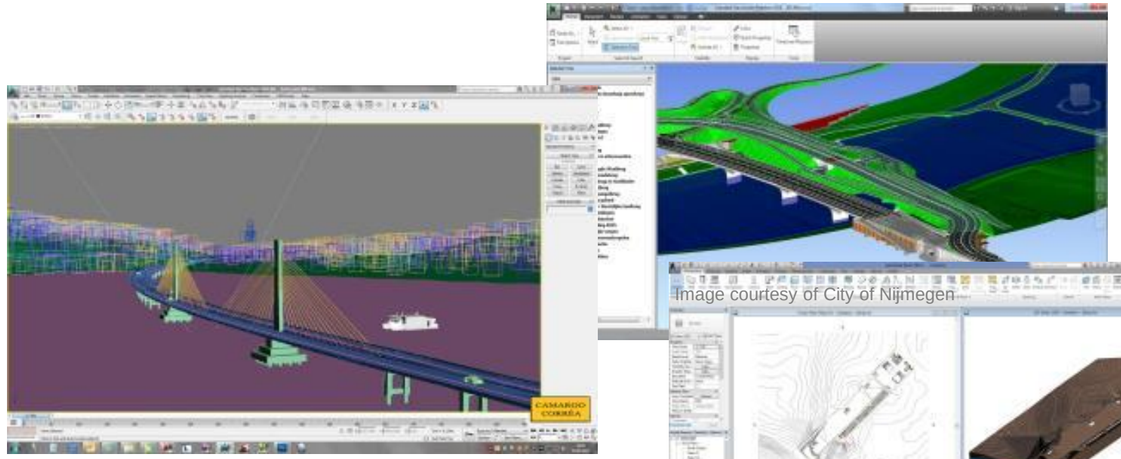


Image courtesy of City of Nijmegen

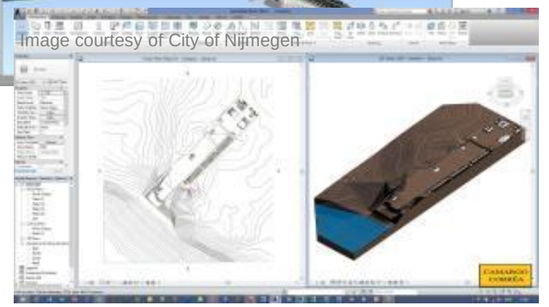
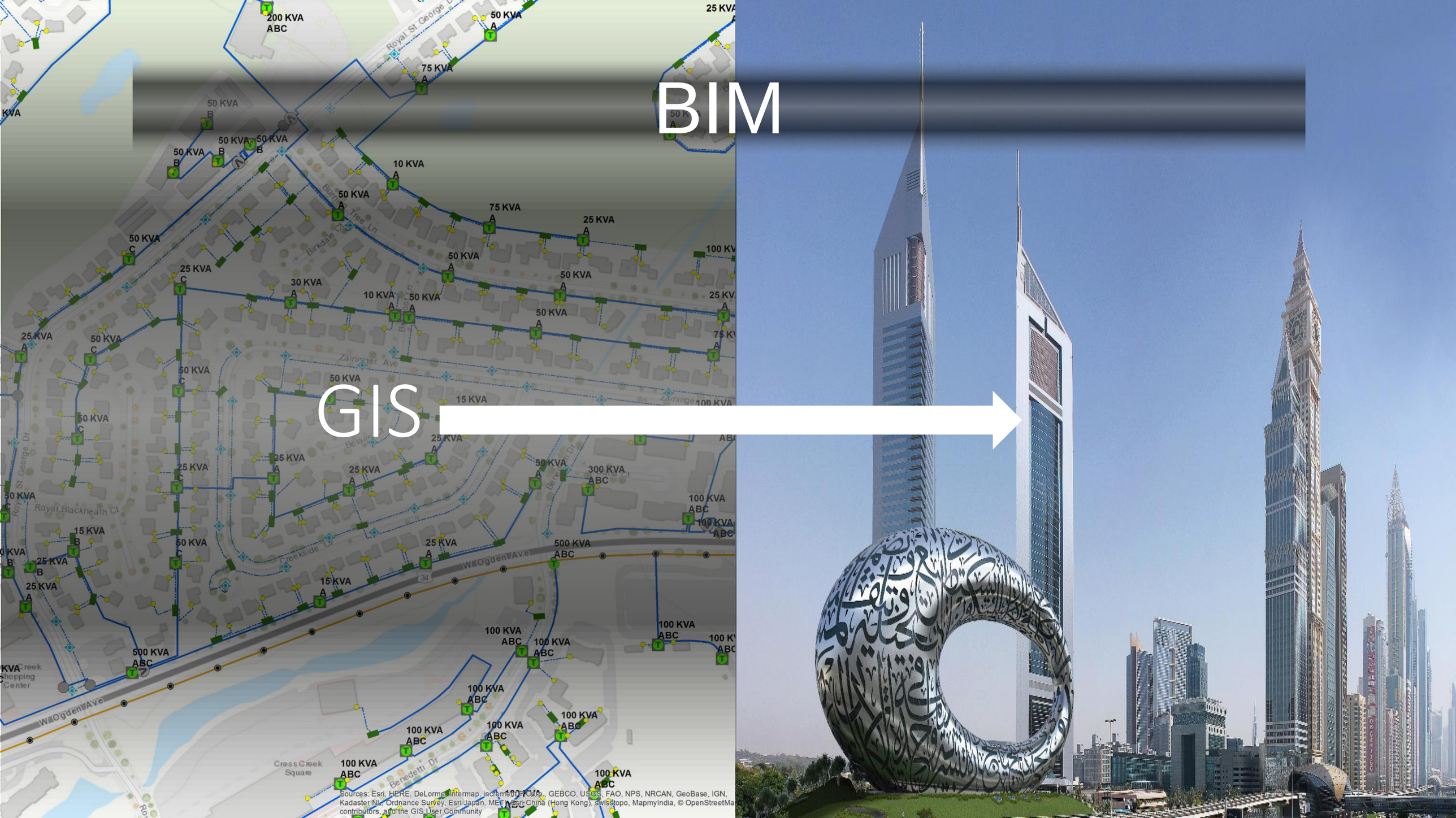


Image courtesy of Camargo Correa

GIS Informs BIM - BIM Fuels GIS

- Driving business with smarter decisions


BIM
GIS
Royal St George Dr
Birkdale Ct
Bunny Tree Ln
Zaininger Ave
Royal Blackheath Ct
Creekside Dr
W Ogden Ave
Benedetti Dr
Cress Creek Square
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

GIS Informs BIM. BIM Fuels GIS.

By providing a real-world context
of an asset’s existing environment
within which designers and engineers
can explore and evaluate design and
Construction


BIM is the process for collaboratively creating and using
detailed information about built assets throughout their lifecycle!

Why Now

More

Better

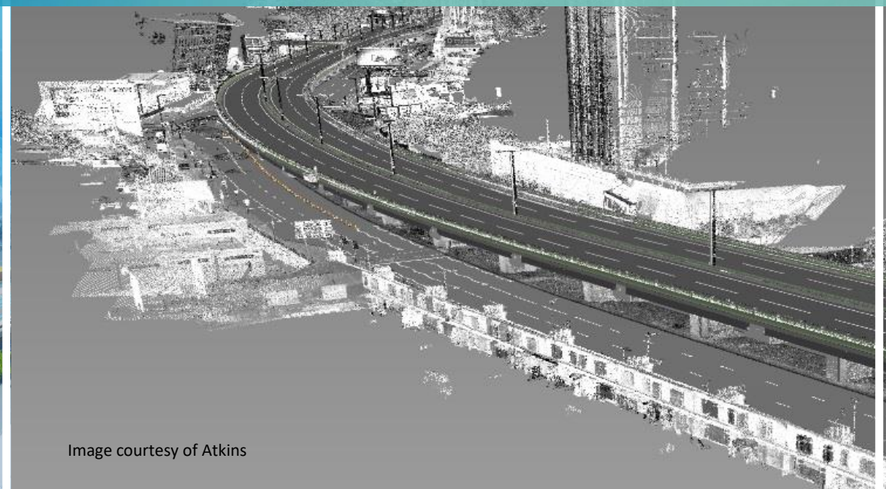
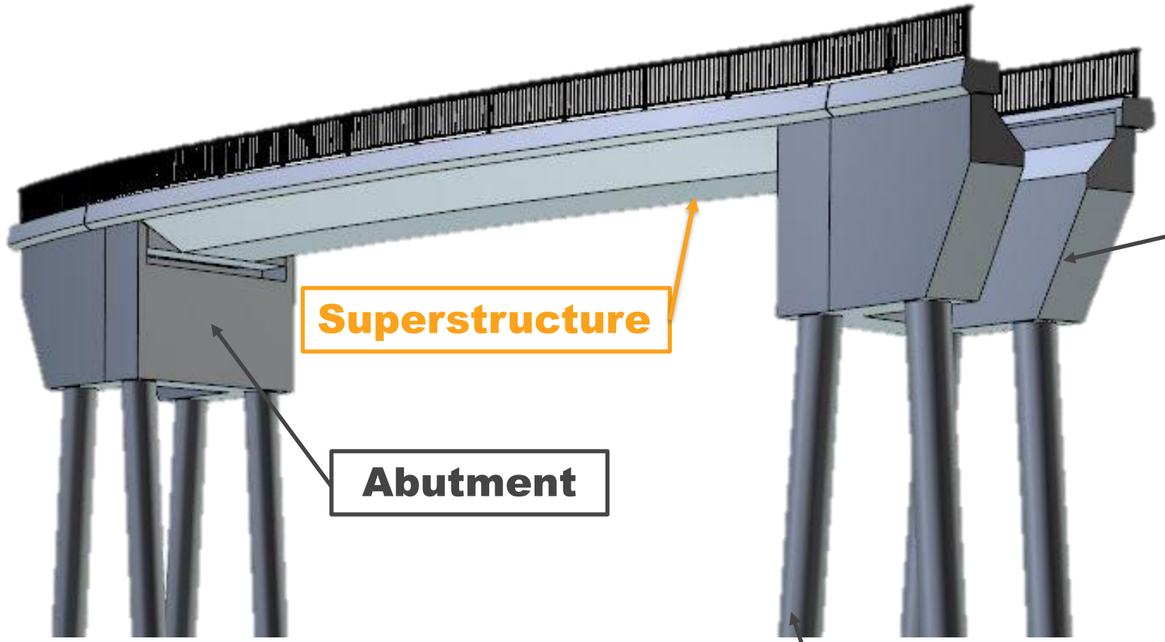


Image courtesy of Atkins

Less

Components of a bridge

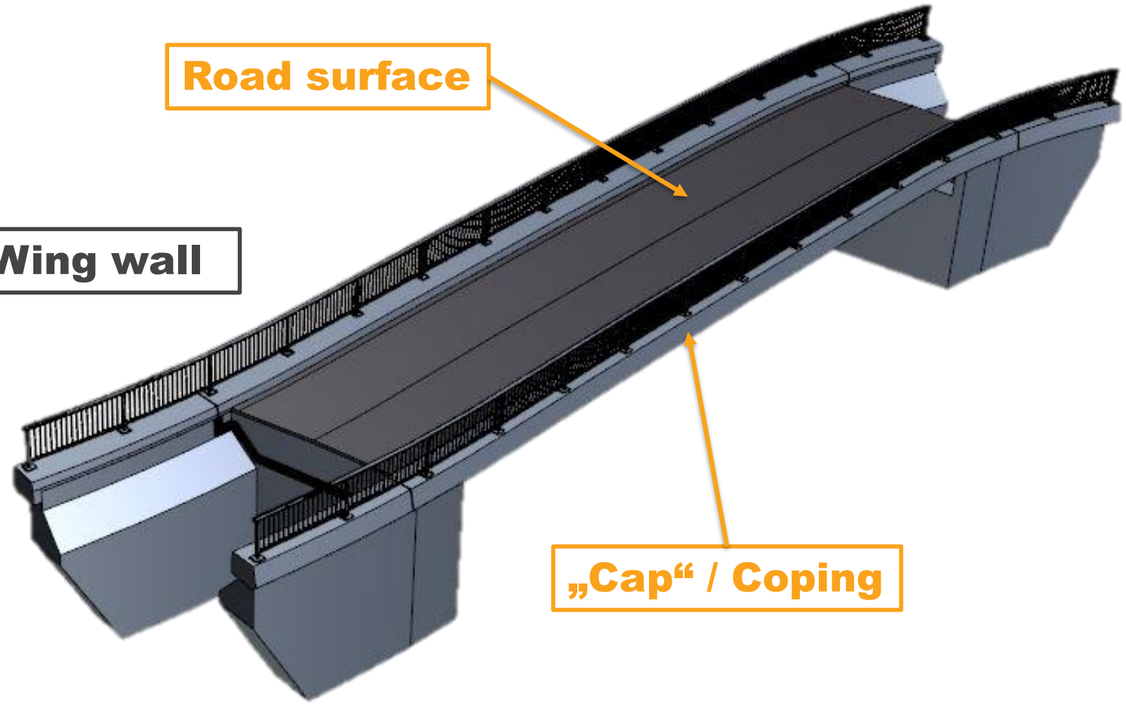


Superstructure

Abutment

Wing wall

Drilled pile /
(Foundation)



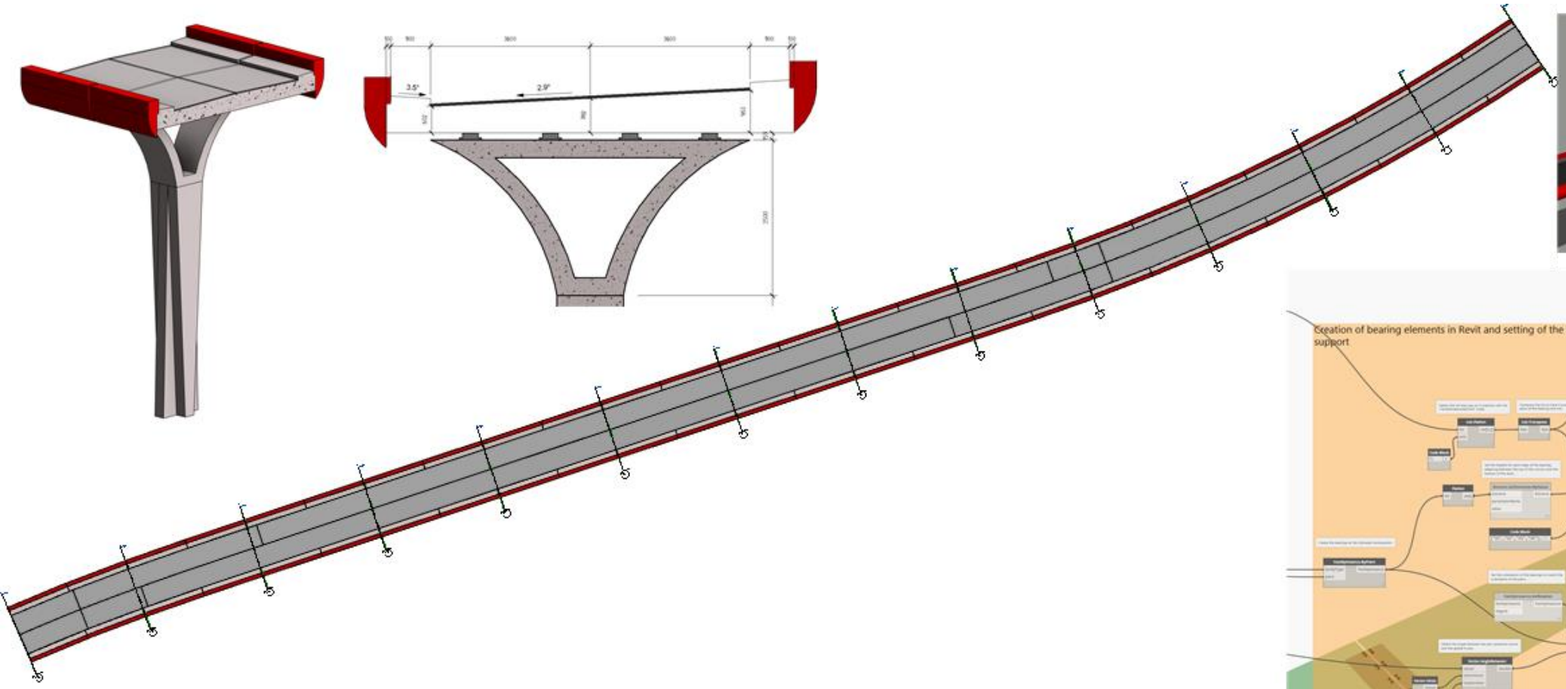
Road surface

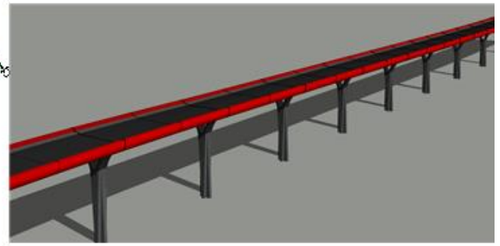
„Cap“ / Coping

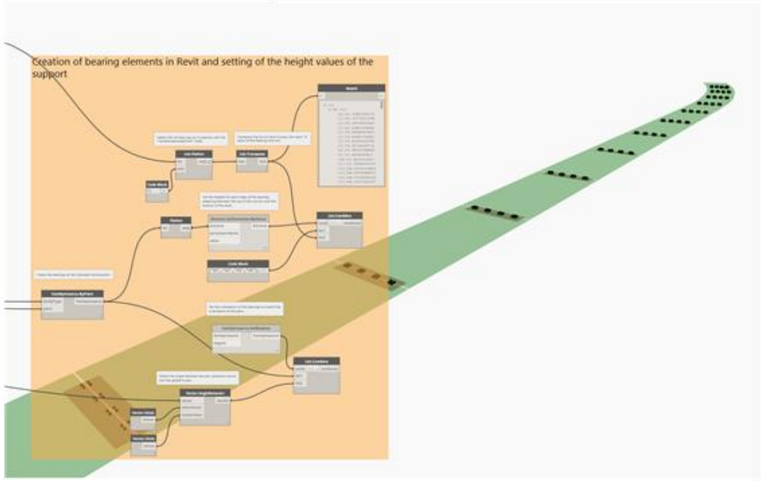
Superstructure

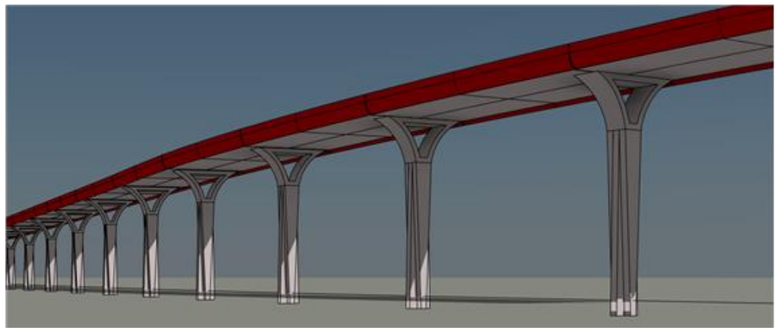
Substructure

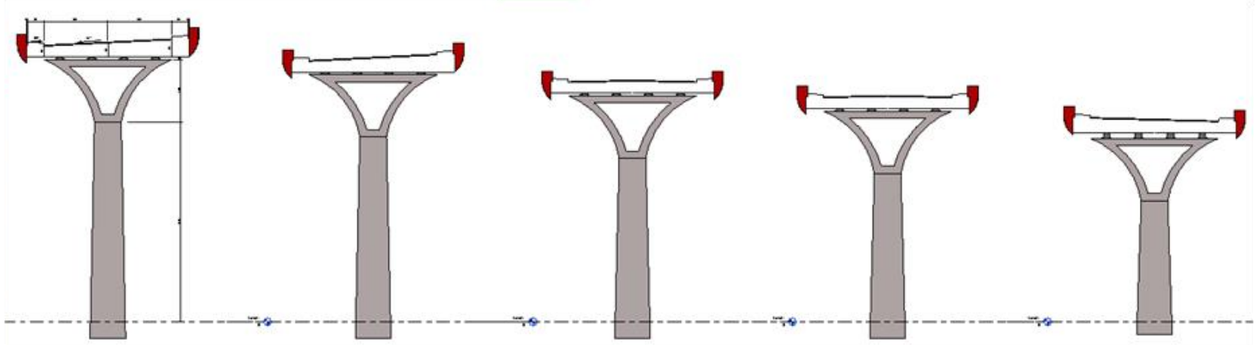
Concrete Deck Bridge





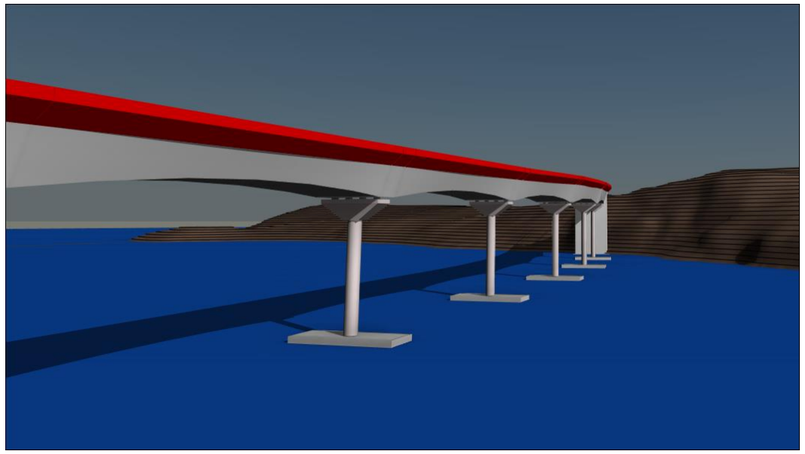


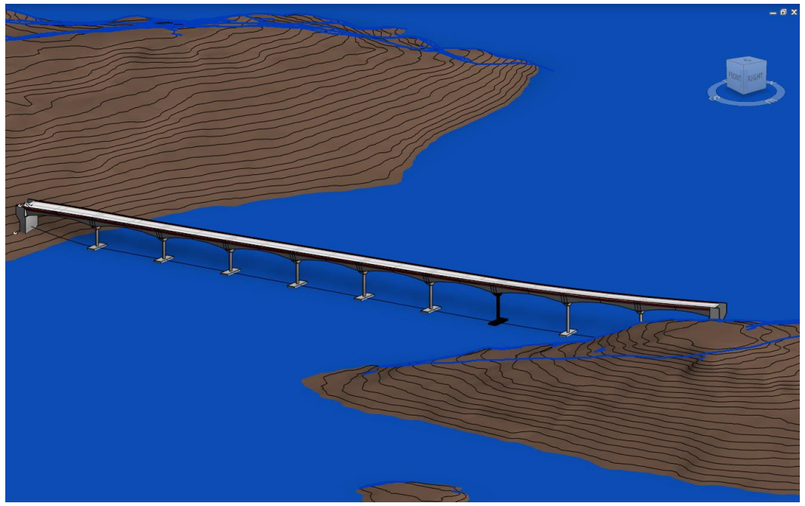


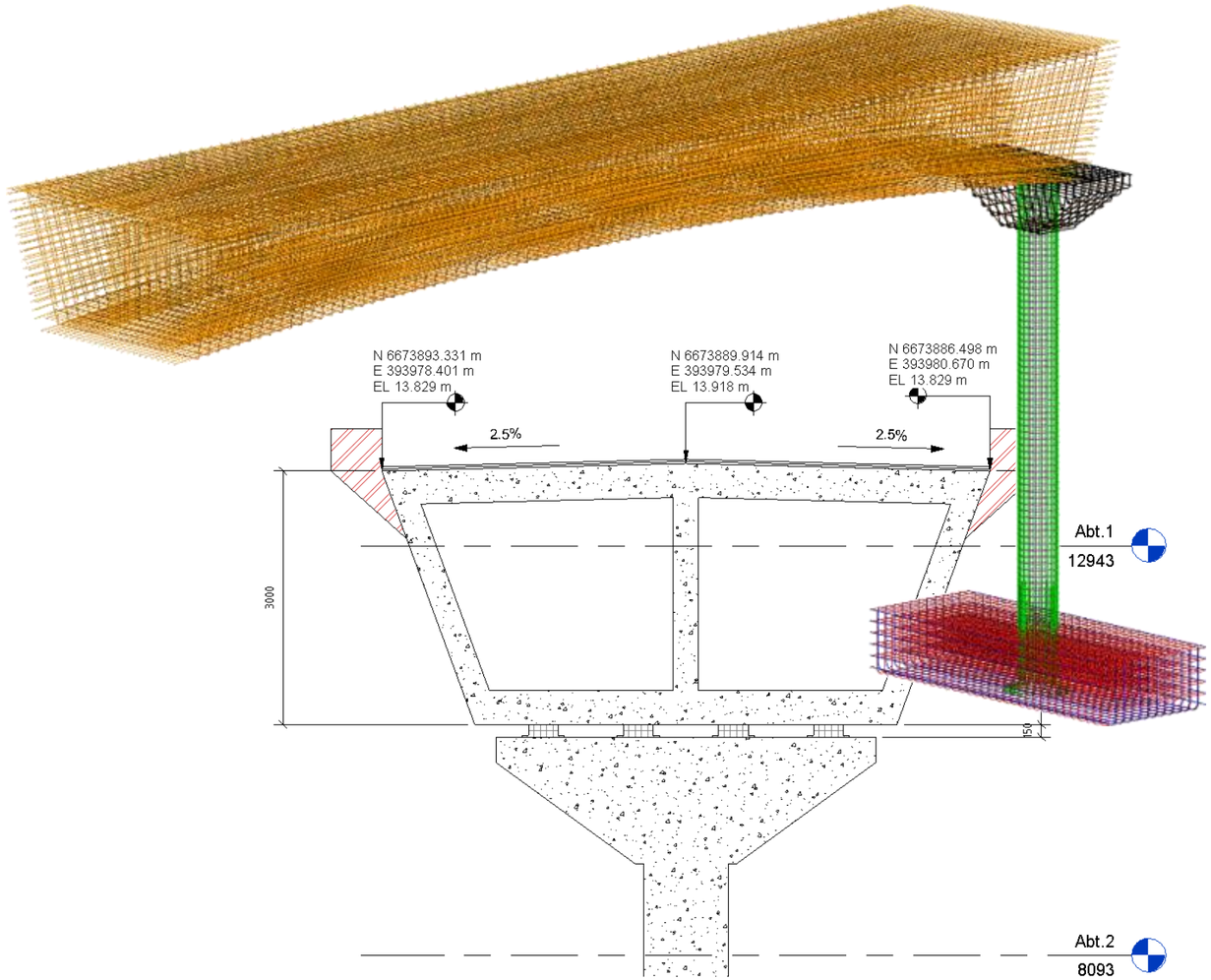


Concrete Box Girder Bridges

Concrete Box Girder Bridge







General Workflow for Bridge modelling

Conceptual Design
Road and Bridge

"Send to Revit"

Native rvt files

Civil 3D dwg

Direct Dbase Connection

Detailed Design and
Documentation
Bridge designer

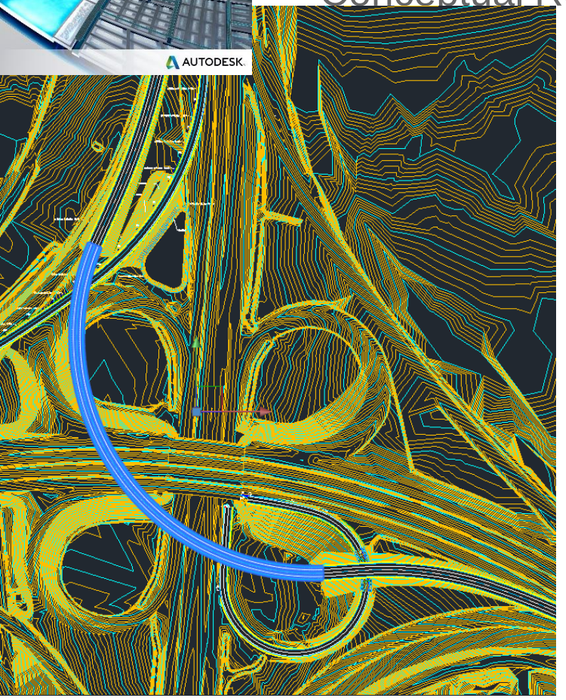
dwg

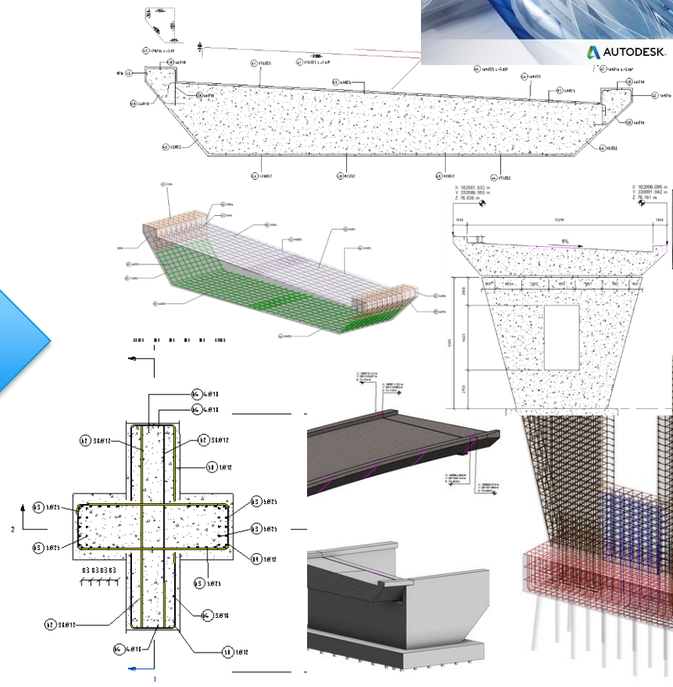
adsk, dwg

Detailed Design and
Documentation
Road designer

Conceptual to Detailed Design Workflow Overview

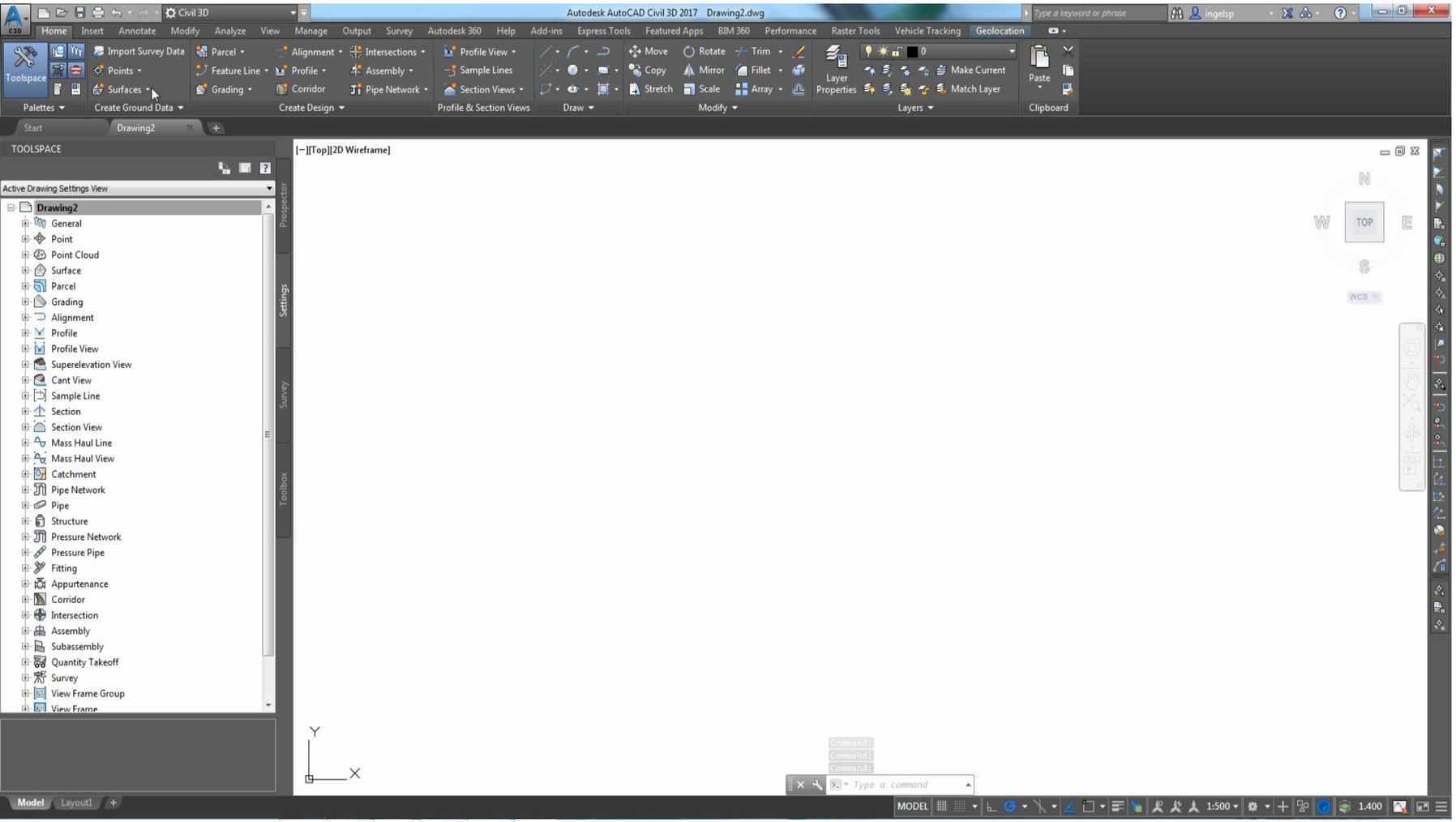
- Conceptual Road/ Bridge design and Analysis



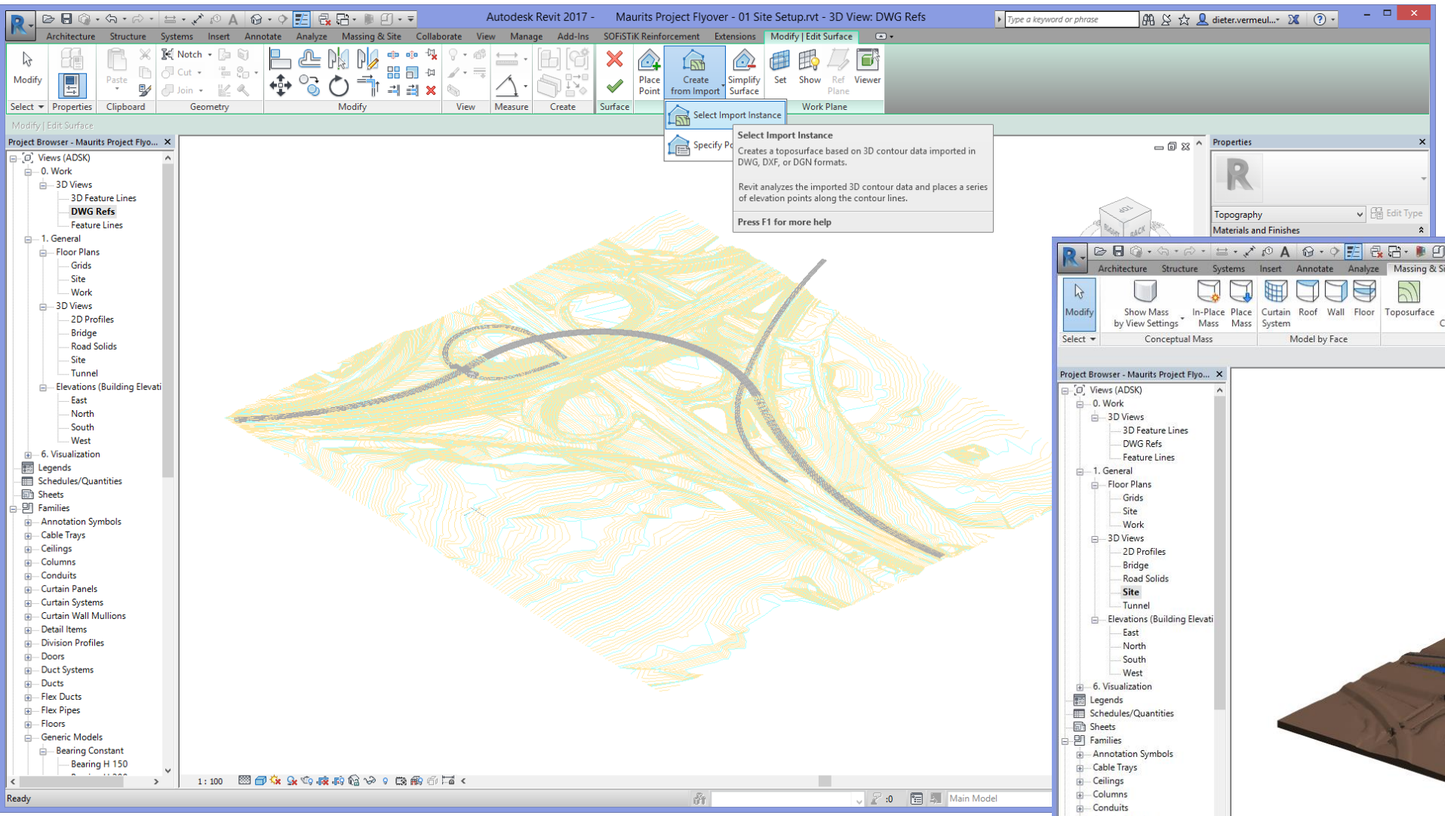


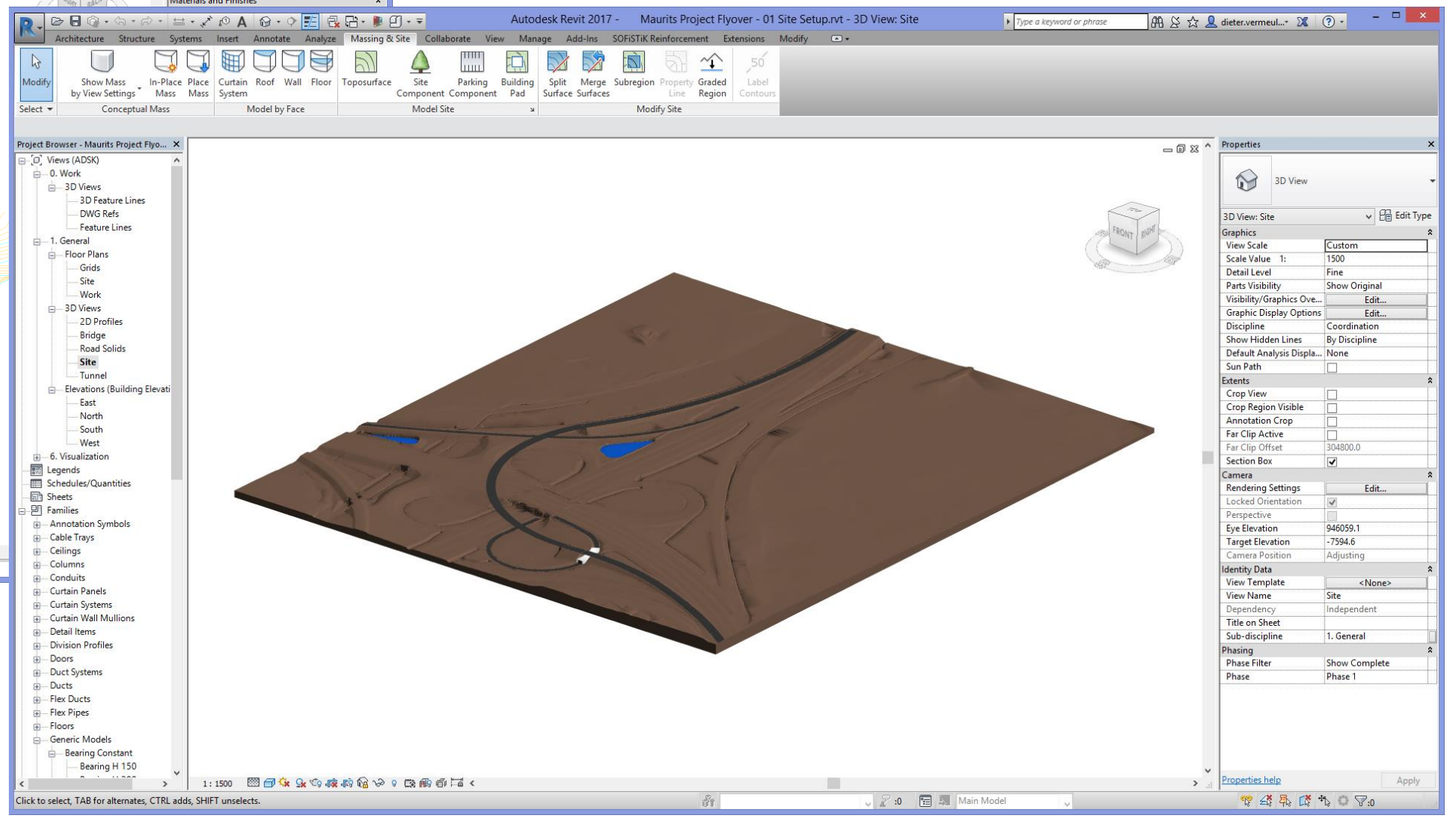
- Detailed Road Design
- Bridge Detailing

Detailed Road Design

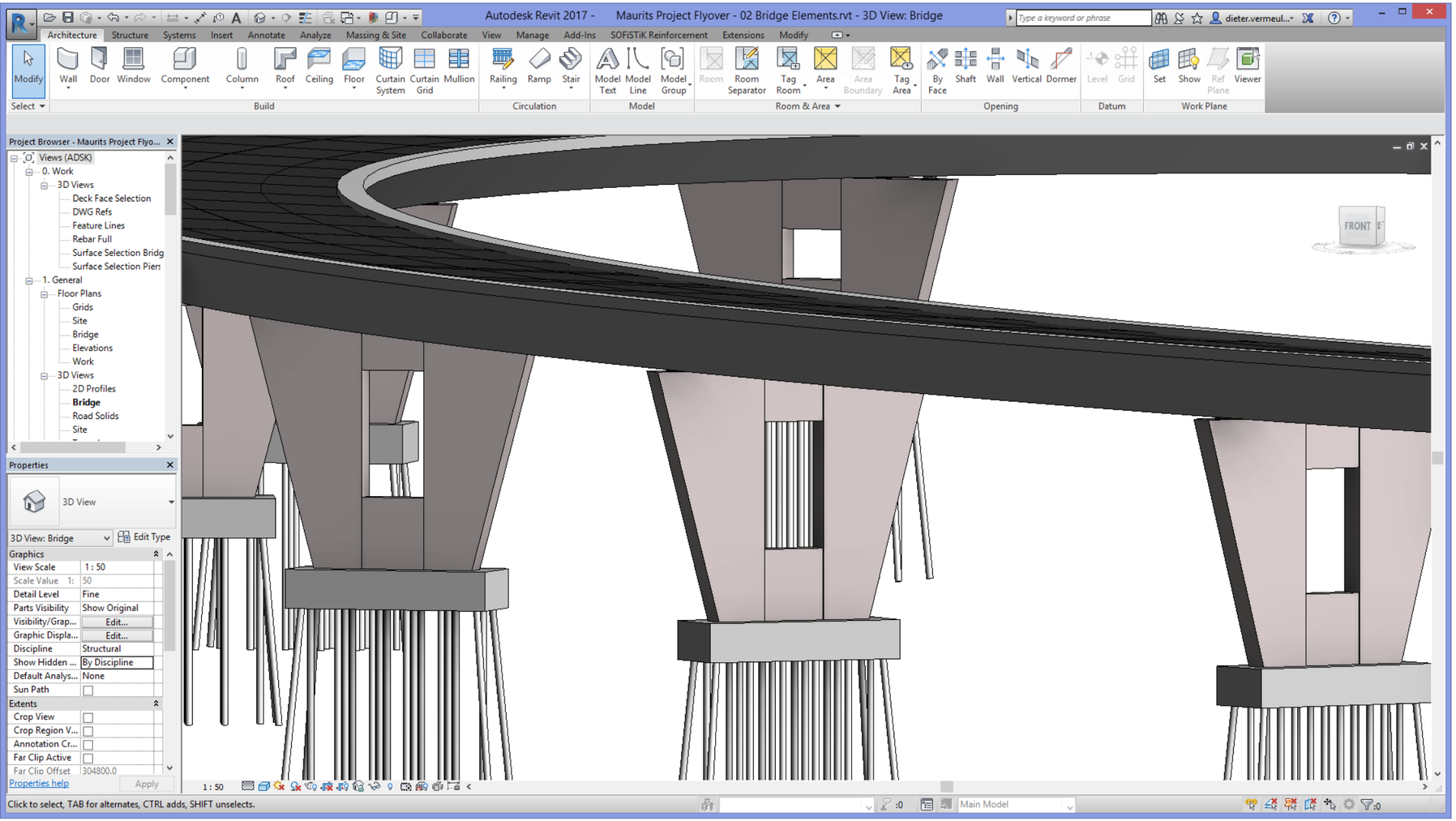


Topography creation





Manual placement of bridge elements



Real World Understanding

The fusion of BIM and GIS provides the power to build a robust context model where geographic information and infrastructure design data are brought together, helping to better understand how assets interact within the context of a real place and geography.

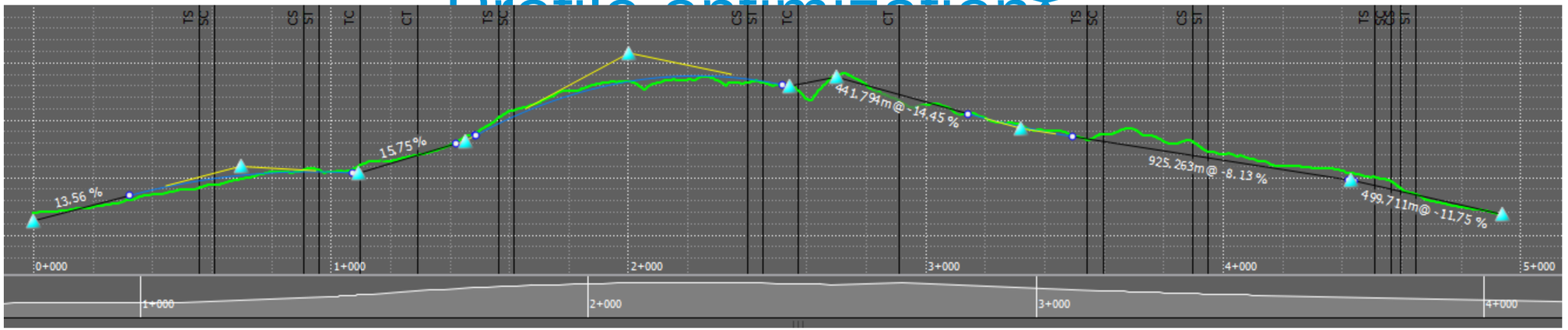
Merging Detailed with Conceptual Design

Reuse Conceptual Design data

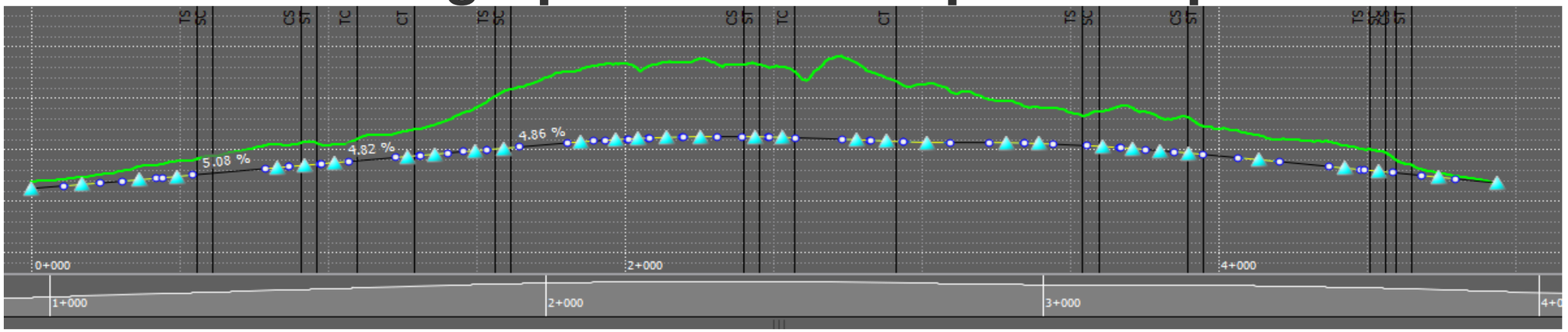
Don’t have GIS or existing content yet? The Model Builder!

Create models quickly with the Model Builder. Model Builder finds and acquires high-resolution data layers and then builds models for a specified area of interest (AOI). Model Builder stores and publishes models in the cloud.

Profile optimization*



A rough profile before profile optimization

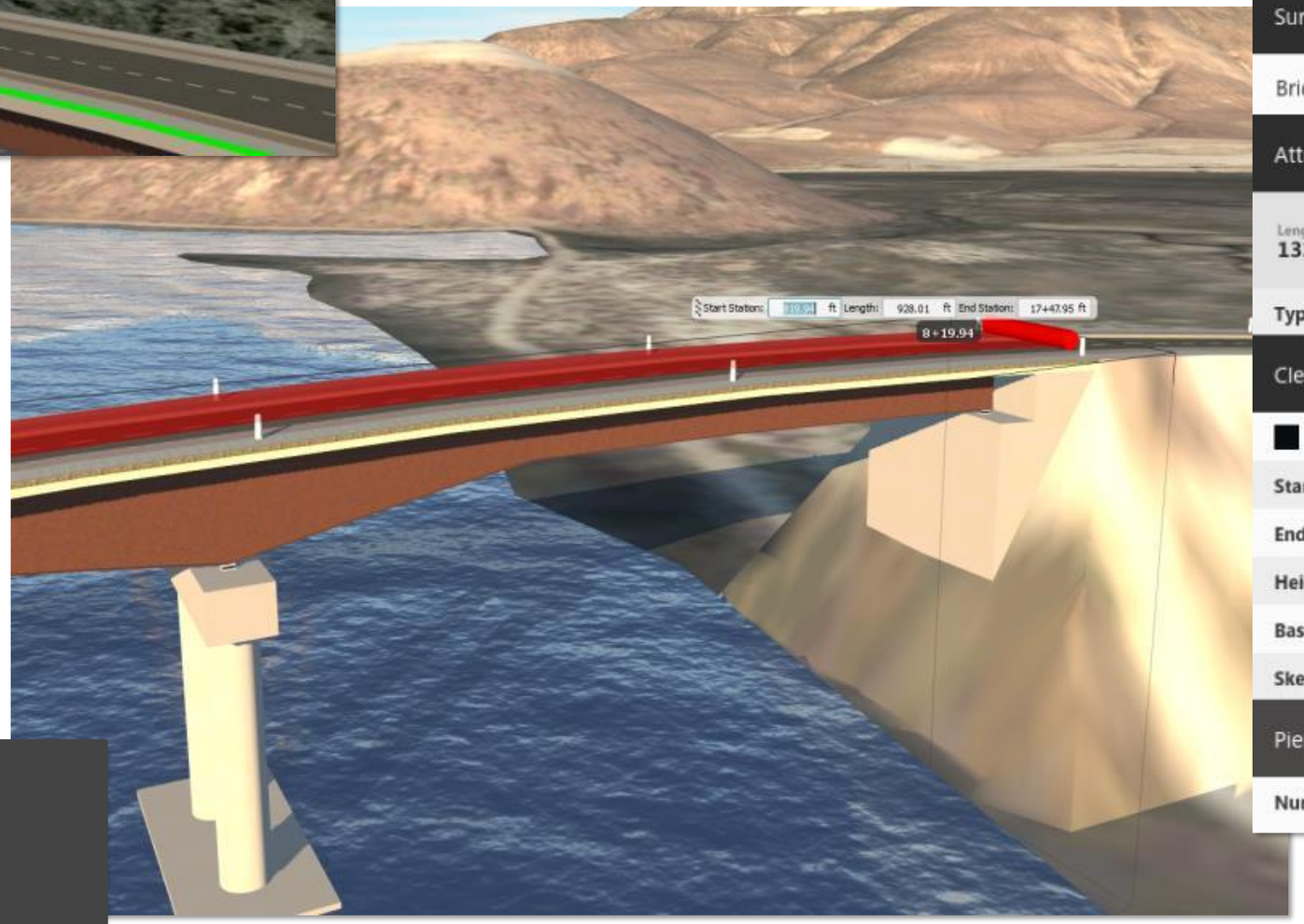


A profile after profile optimization

Quickly assess roadway profile options

*Profile optimization is a metered cloud service

Autodesk® Bridge Design for InfraWorks 360™



BRIDGE

Bridges > Bridge 2

Summary

Bridge 2

Attributes

Length	Deck Width
1326.72'	36.00'

Type: Steel Plate Gir...

Clearance

Show clearance envelope

Start Station	5+77.71
End Station	6+74.17
Height	32.81'
Base Elevation	0.00'
Skew	0.0°

Piers

Number of piers: 7

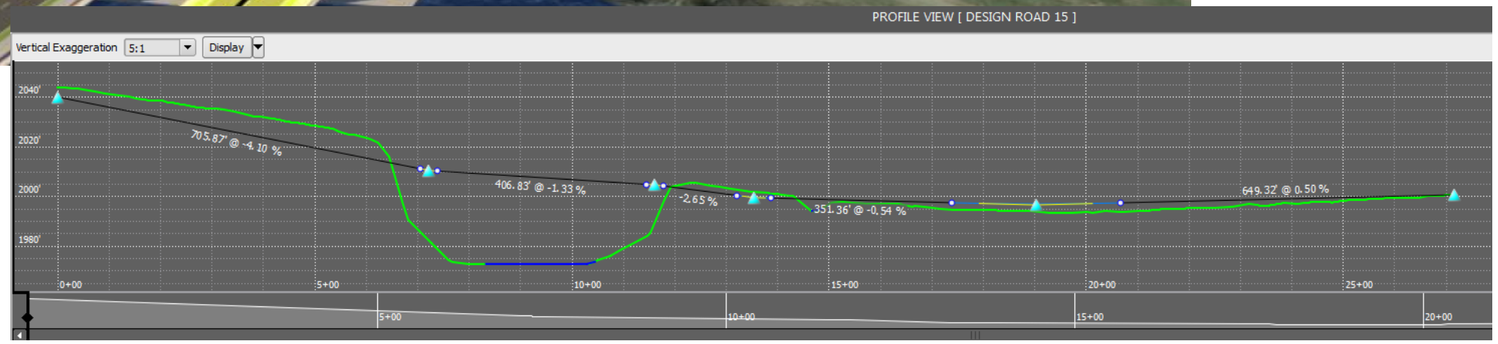
Simplify and accelerate the layout of girder bridges

More quickly explore preliminary bridge designs

PROPERTIES

Bridges (1) Auto Update Update

Property	Value
Common	
ID	2
Name	
Description	
External ID	7da9f33d-0707-43b8-ab...
Tag	
User Data	
Tooltip	
Link	
Stylization	
Manual Style	Bridge/Steel Girder
Deck	
AutoGenerated	false
Thickness	0.5 m
Lifespan	
Creation Date	
Termination Date	
Bearing	
Left Offset	0.0 m
Right Offset	0.0 m
Spacing	0.0 m
Round Bearings	false
Height	0.1 m
Width	0.4 m
Depth	0.4 m
Sole Plate Height	0.04 m
Sole Plate Width	0.5 m
Sole Plate Depth 1	0.25 m
Sole Plate Depth 2	0.25 m
Masonry Plate Height	0.04 m
Masonry Plate Width	0.5 m



Evaluate more options in less time

Create more realistic bridge structures

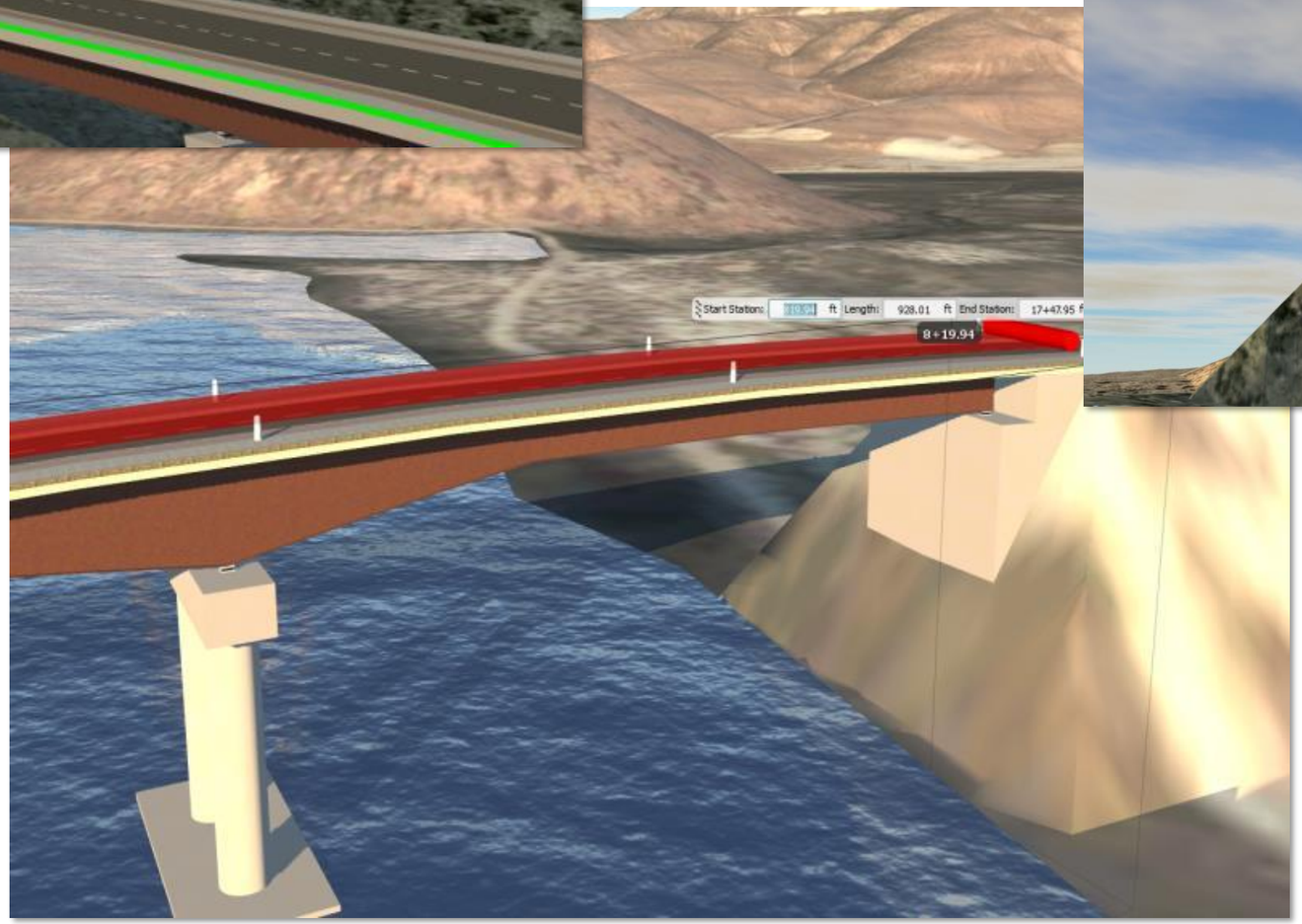
Improve feasibility studies

Maintain more consistent data

Gain a more complete understanding of how bridge design alternatives will perform

Planning
Concpetual Design
Collaboration
Presentation
Inform and Communicate

Autodesk Bridge Design for InfraWorks 360



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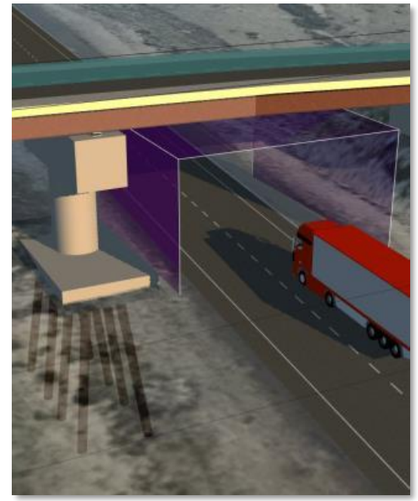


More, Better, with Less

To meet today’s macro-economic challenges and build more sustainable and resilient infrastructure, we need more seamless sharing of data and information between BIM design processes and GIS technologies.

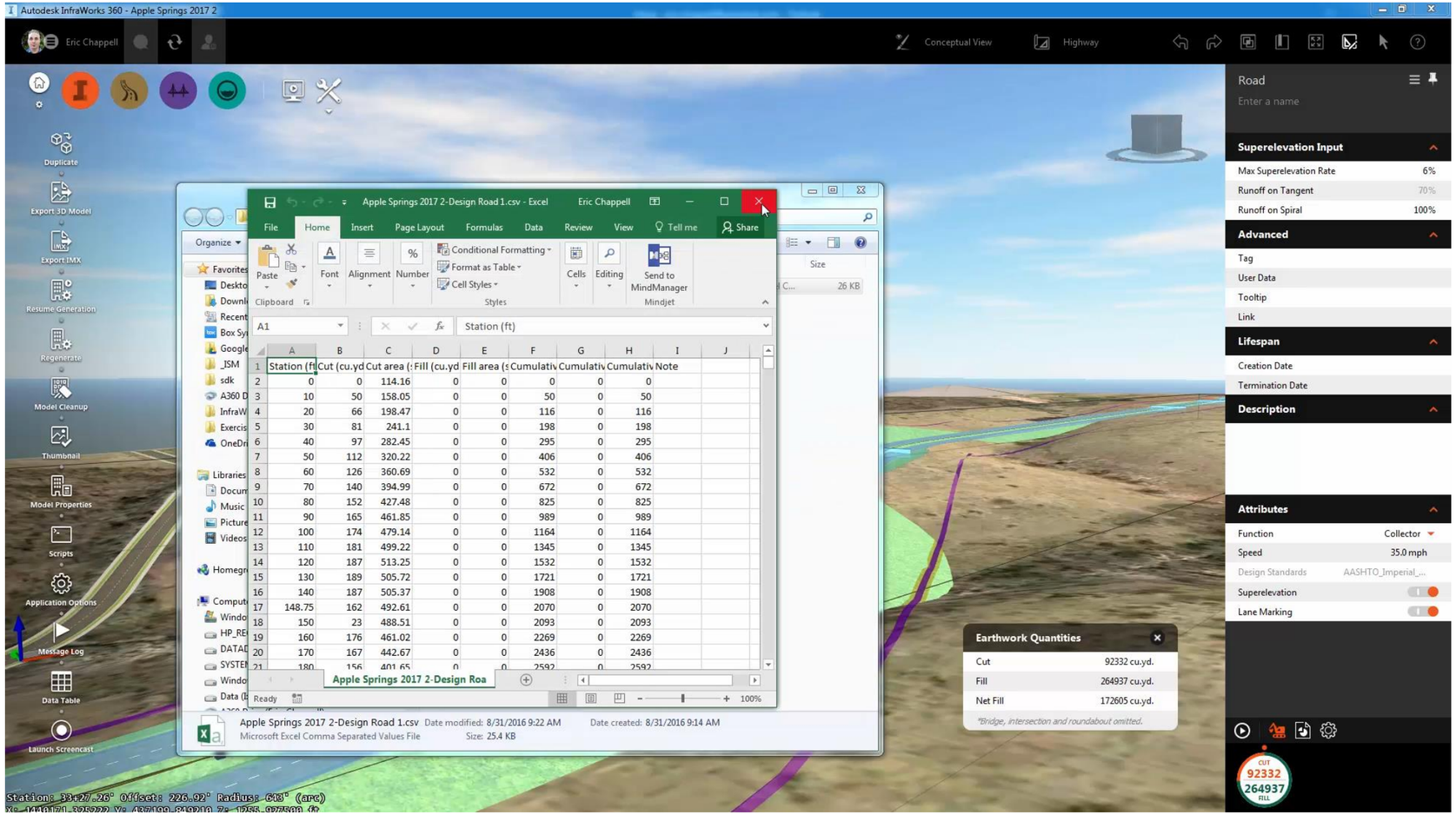
Road Cross Section View

- Easily view the cross section of a road
- Switch between different views
- Zoom and pan within the cross section window
- Control the aspect ratio

See the engineering detail in your design

Earthwork Quantities

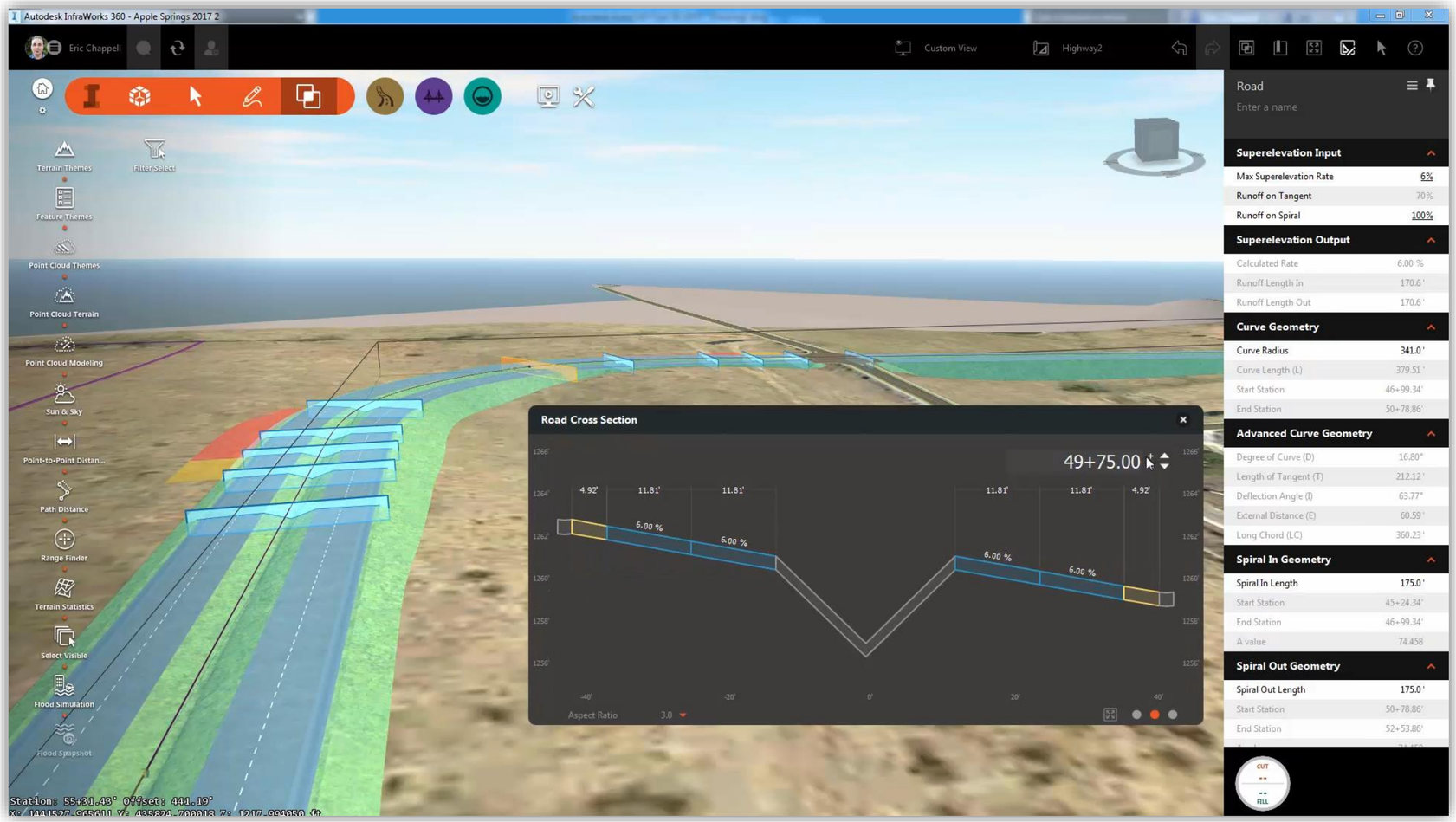
- Get cuts and fills at any time while you work
- View detailed values on screen or in a report
- Control key settings that affect earthwork quantity output



Easily assess cost impact of my design as I work

Superelevation

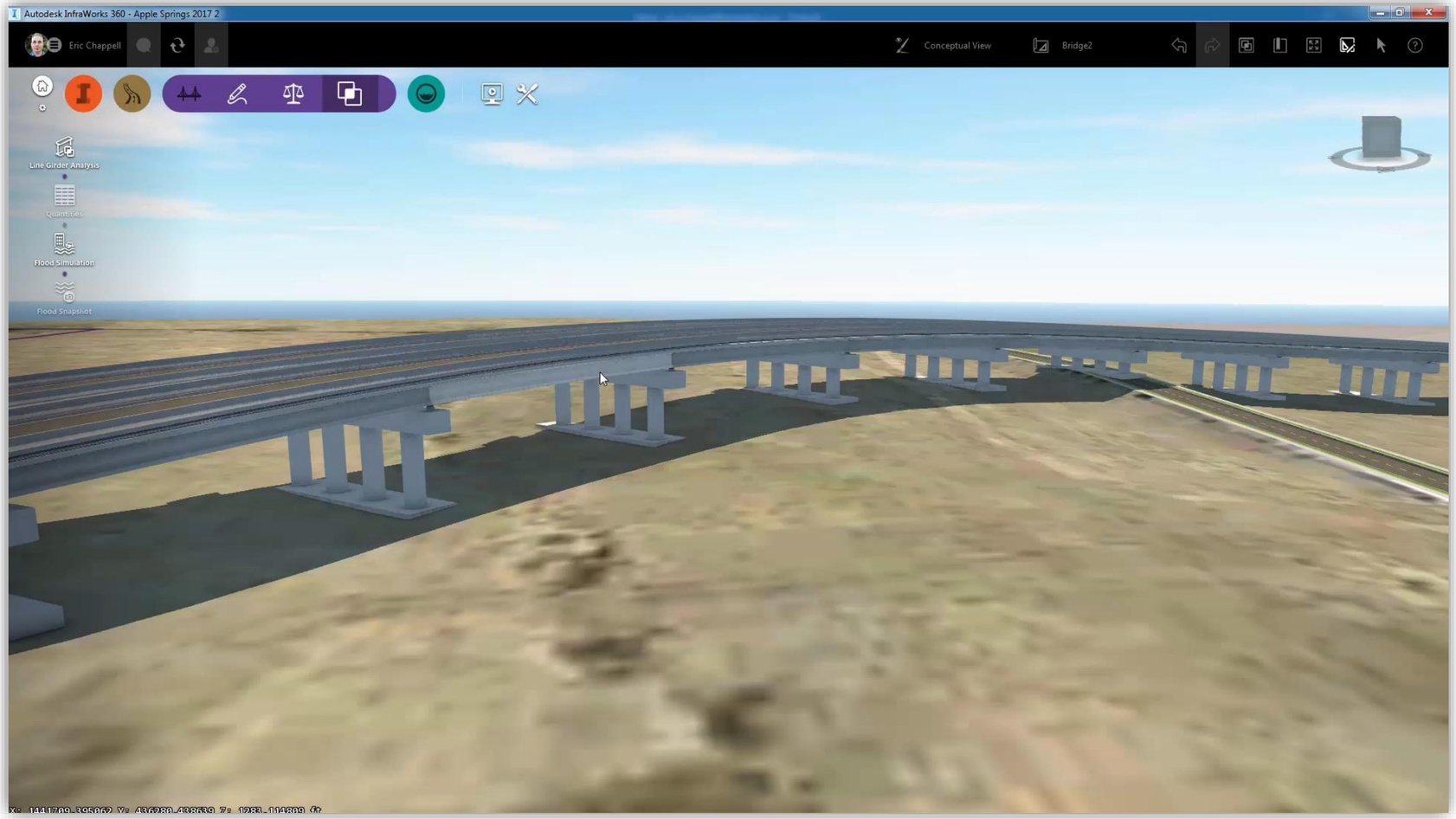
- Flip a switch to apply superelevation to your road design
- On screen graphics tell a clear story
- Based on design standards, but with the ability to make changes



More advanced capabilities to meet more project needs

Component-Based Bridges

- Understand and match complex cross sections
- Change the display of bridge components
- Detailed control of deck dimensions
- Variable cross sections of deck and girders



More detailed control of your design to meet more project needs

Line Girder Analysis

- Verify the structural strength of bridge girders
- Utilizes the power of cloud computing
- Get results on-screen or in report form
- Jump right into Structural Bridge Design

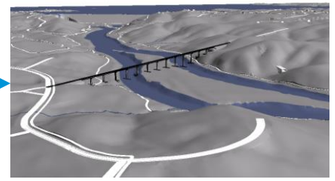
Go deeper into your bridge design so that you can get to detailed design faster

Civil Infrastructure Workflows

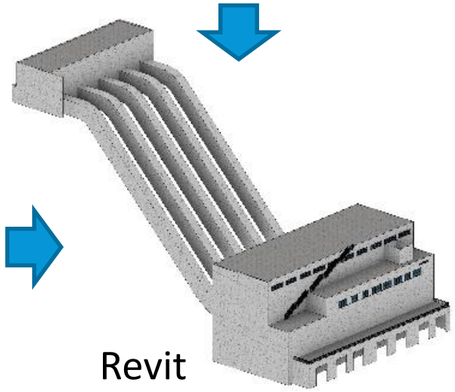
Reality Capture
Point Cloud

InfraWorks
Conceptual Design

Civil 3D
Terrain



Navisworks: Timeline Simulation,
Clash Detection & Quantification

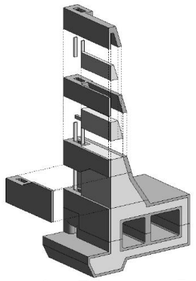


Revit
Hydro Power Plant

BIM 360 Glue
Coordination

AUTODESK® BIM 360™
Project Mgmt.
BIM 360 Field

FM
COBie

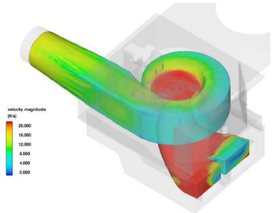


Revit Parts for
Hydro Power Plant

Inventor Parts
for Dams

Inventor Parts
for Infrastructure

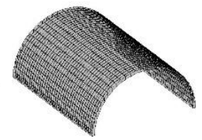
Vehicle Tracking



CFD
Analysis

Dynamo

Free-Form
Concrete Rebar
Design



Robot
Structural Analysis


Connected
Delivery
Construct New bridge

AUTODESK®

Make anything™