

*Presented at the FIG Working Week 2016,
May 2-6, 2016 in Christchurch, New Zealand*

3D Data Fusion for 3D Modeling Applications for the Energy Sector

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Recovery

from disaster

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Why should surveyors focus on the Energy Sector?

- an extremely **wide range** of applications
- utilization of **all kinds** of data capture and modeling methods
- 3D and **BIM** models required for all engineering disciplines
- **Surveying engineers** can contribute throughout the entire life cycle of any project
 - initial documentation
 - progress monitoring
 - project handover



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3D Data Acquisition



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Data Processing – Project deliverables

- 3D CAD Models
- 3D BIM Models
- Elevation Views, Sections , Plan Views - Relational Drawings
- Terrain Modelling
- 3D collaboration models
- 3D visualizations
- Bills of quantities



Engineering applications

- As-built documentation
- BIM
- Facility Management
- Finite Element Analysis
- Computational Fluid Dynamics
- 3D Comparison
- 3D monitoring
- 3D Collision check
- 3D Fabrication
- 3D Prototyping
- 3D Printing
- Volumetric Surveys

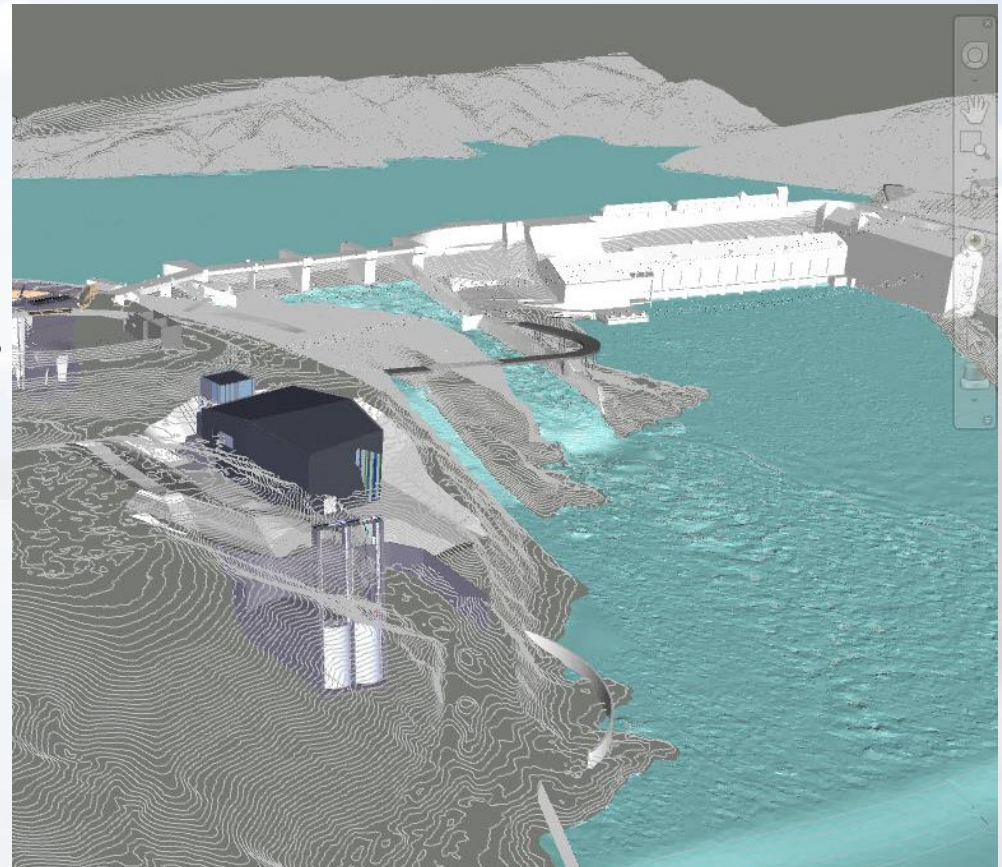




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Our Team



Anders Nesse,
Photogrammetry



Ulf Hägnefelt,
3D Scanning



Artemis Valanis,
BIM modelling,
photogrammetry



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- 2900 employees
- 80 offices in 11 countries
- NOK 3,8 billions in revenue *

* Pr. 01.01.2015

100%

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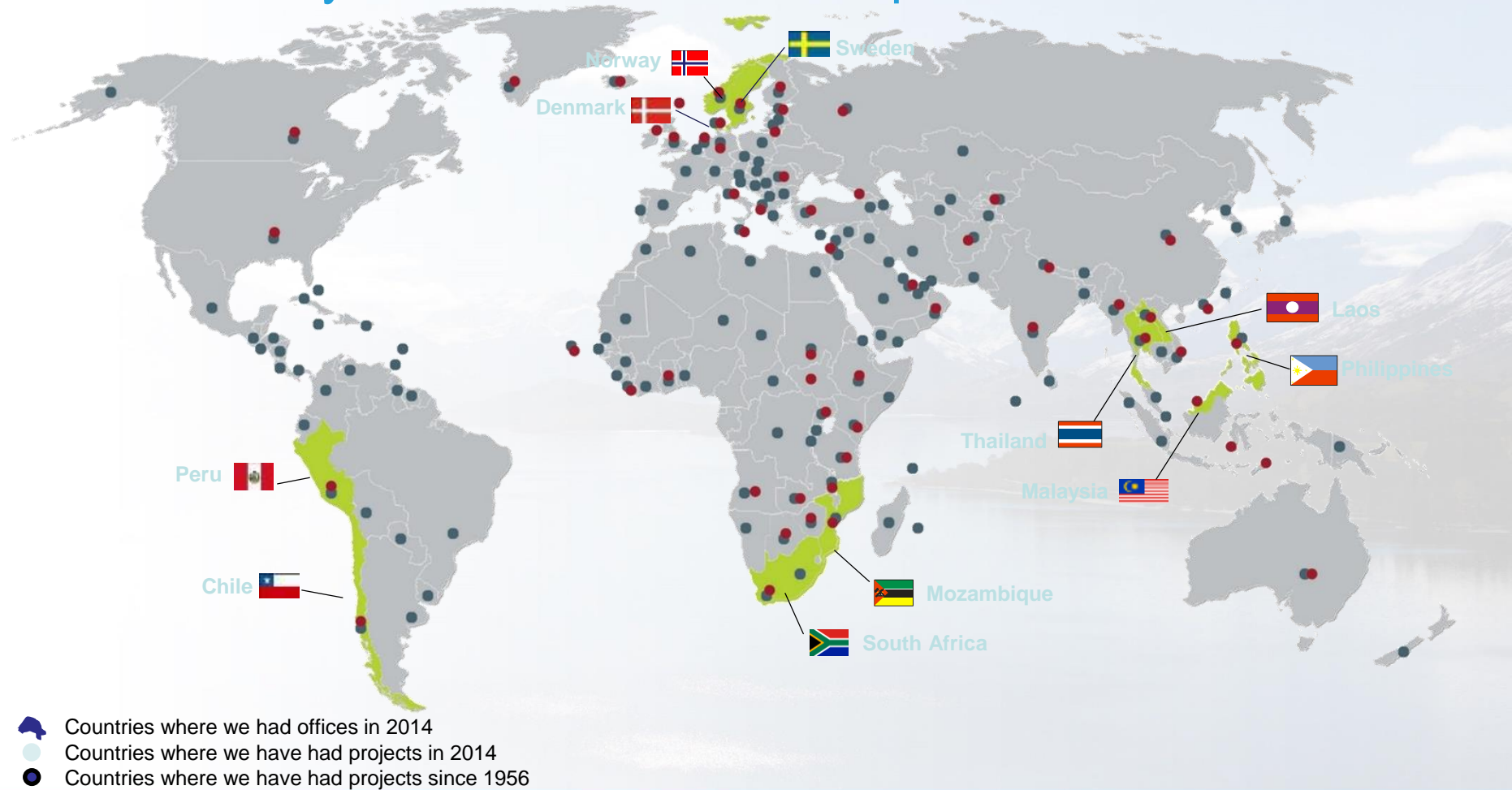
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More than 50 years of international experience



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3 projects case studies

- A Project on New Construction Design
- A Rehabilitation Project
- A 3D Documentation Project

Example projects 1/3

New Construction Design



Project description:

- New hydropower plant
- The biggest of its kind
- Entirely designed in 3D as a BIM model
- A Completely Paperless Project
- 1 sq Km Project Area
- Aerial and terrestrial Laser Scanning, Aerial and Ground image data, GIS data, Geodetic surveys



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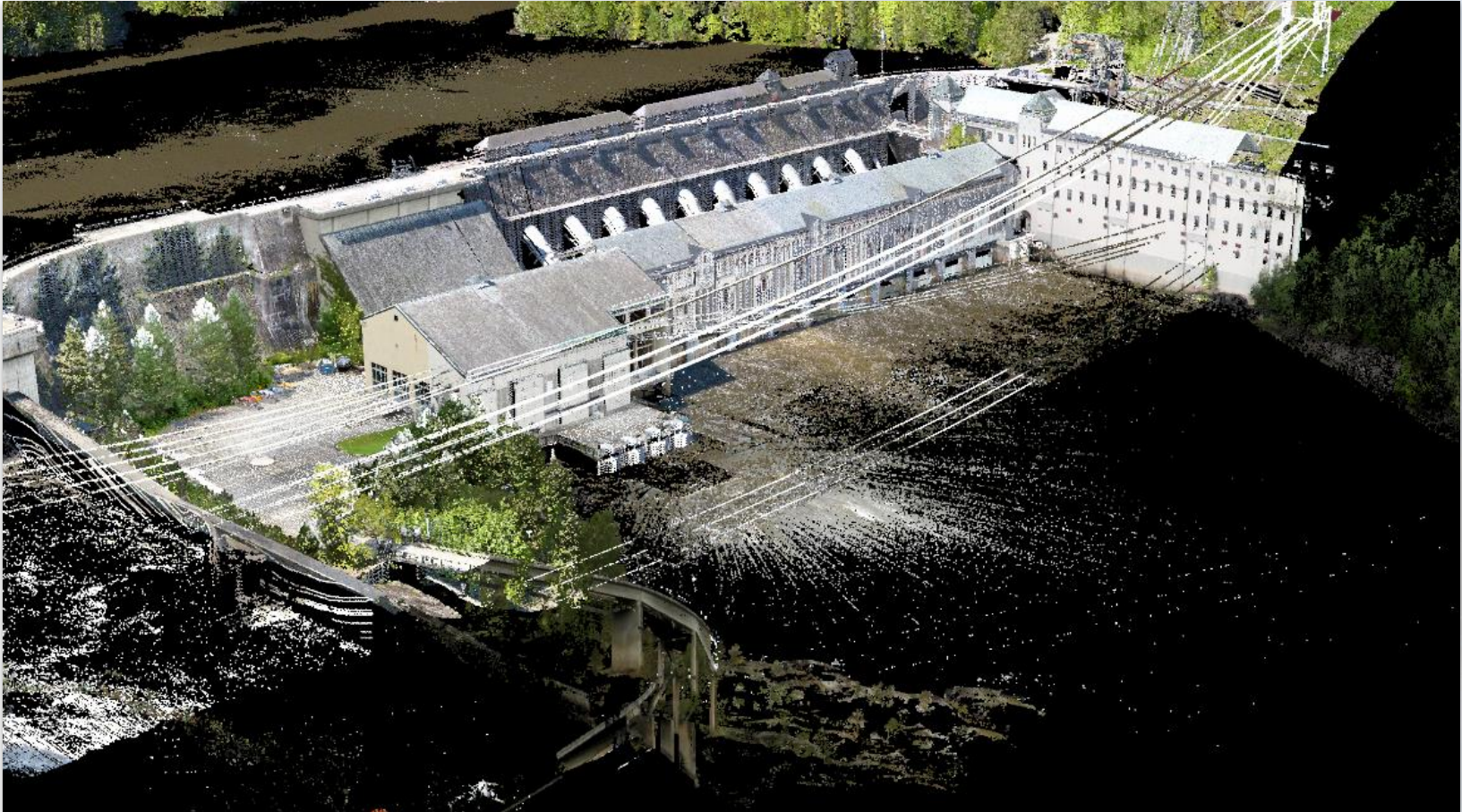


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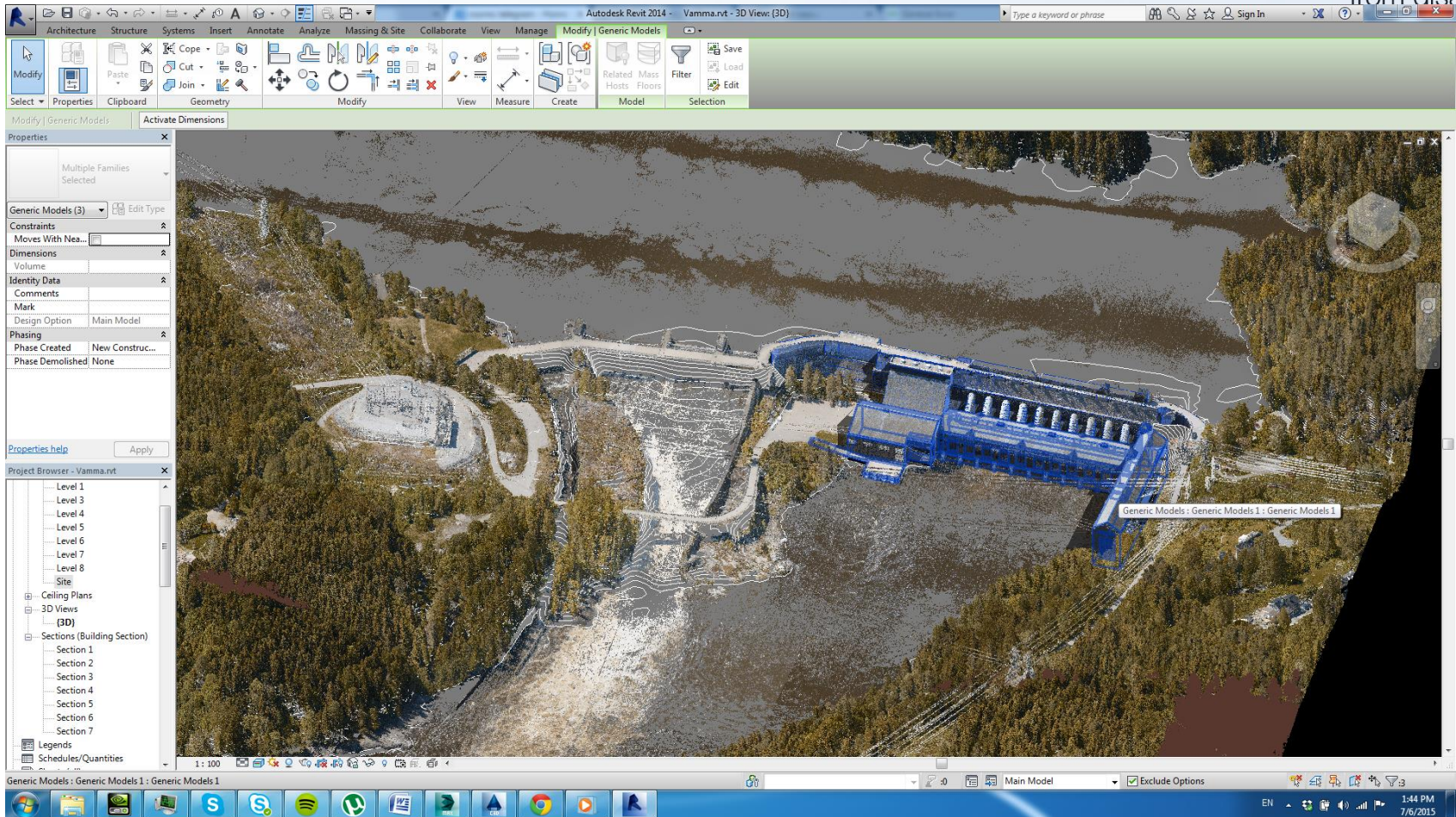


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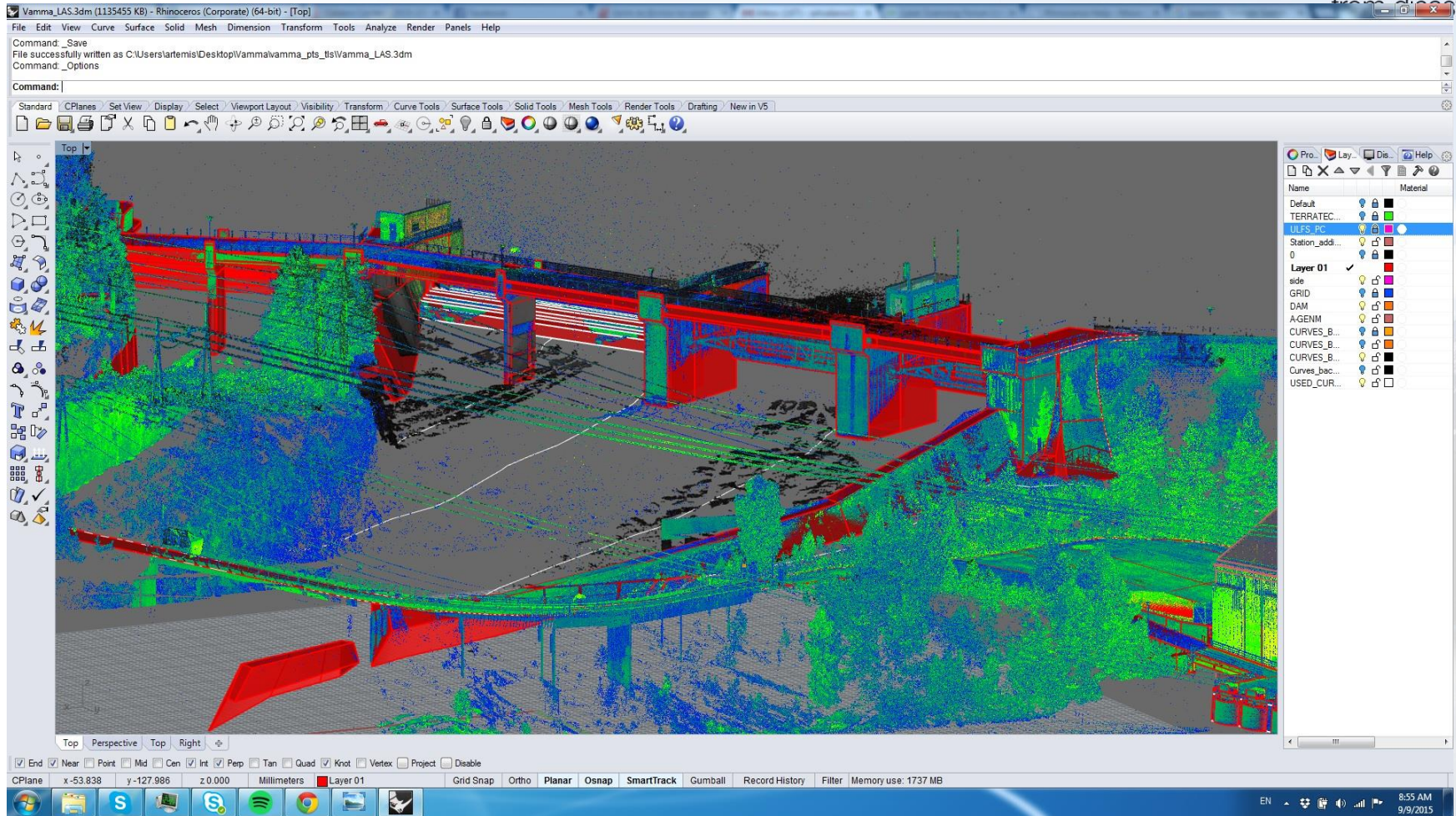


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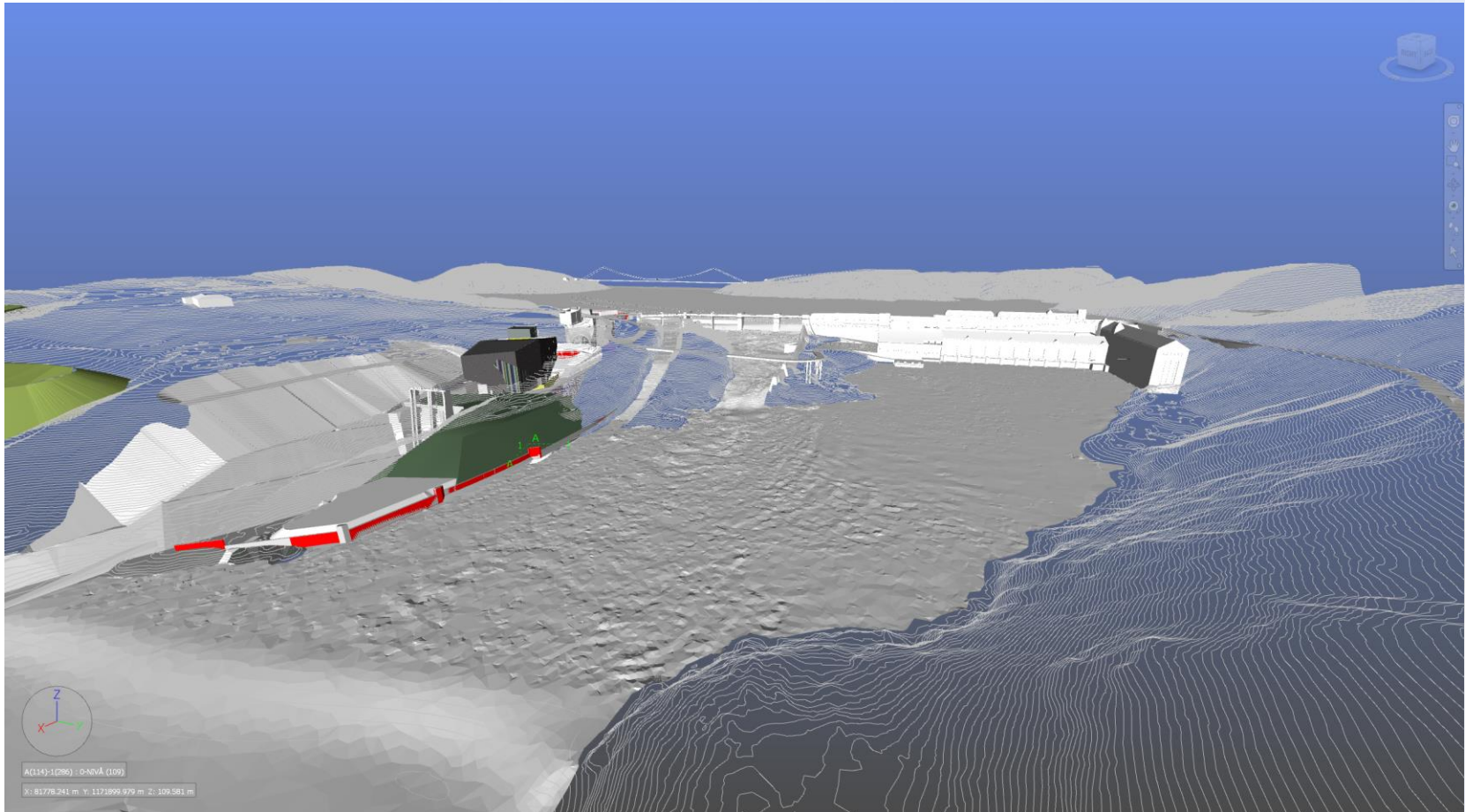


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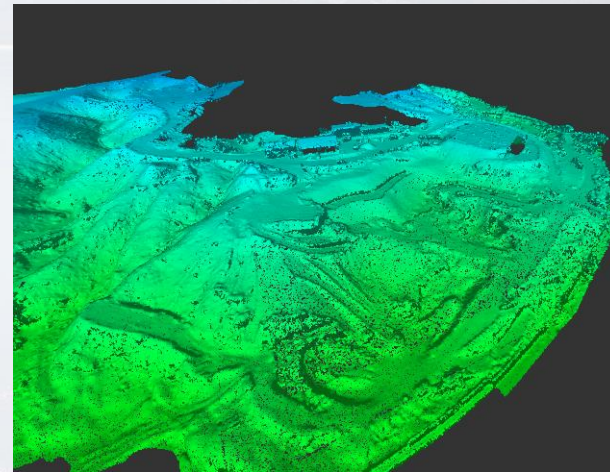
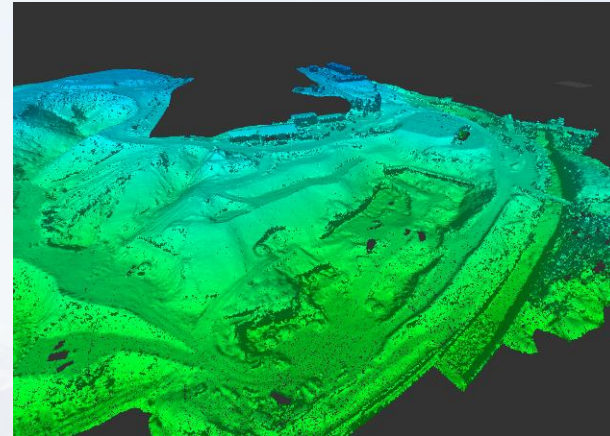
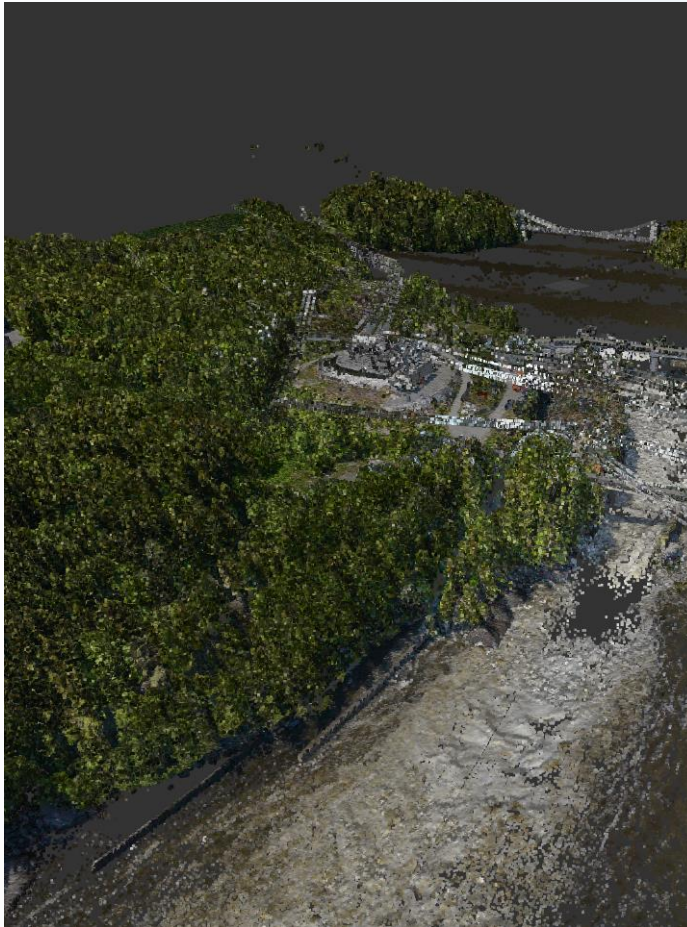


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Example projects 2/3

A Rehabilitation Project



Project description:

- Large project for rehabilitation and upgrade of a number of plants
- 3D documentation and modeling of a hydropower station including the existing waterways
- Terrestrial Laser Scanning and use of ROV for scanning the waterways



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Existing Data

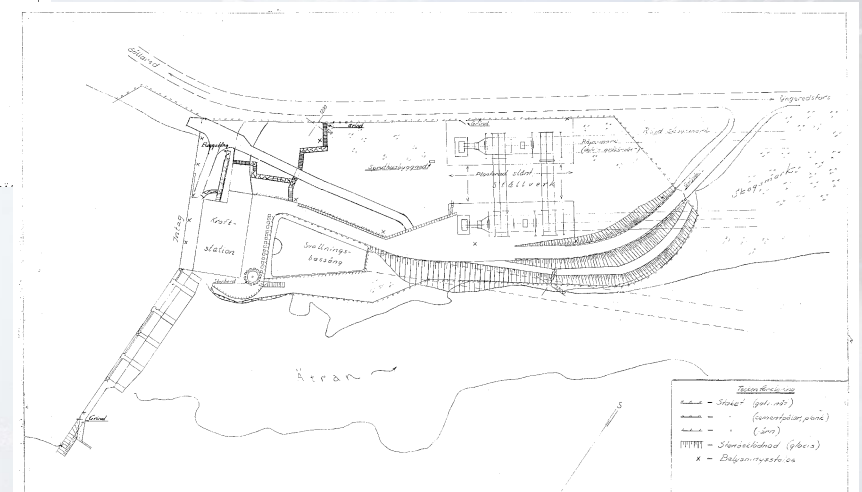
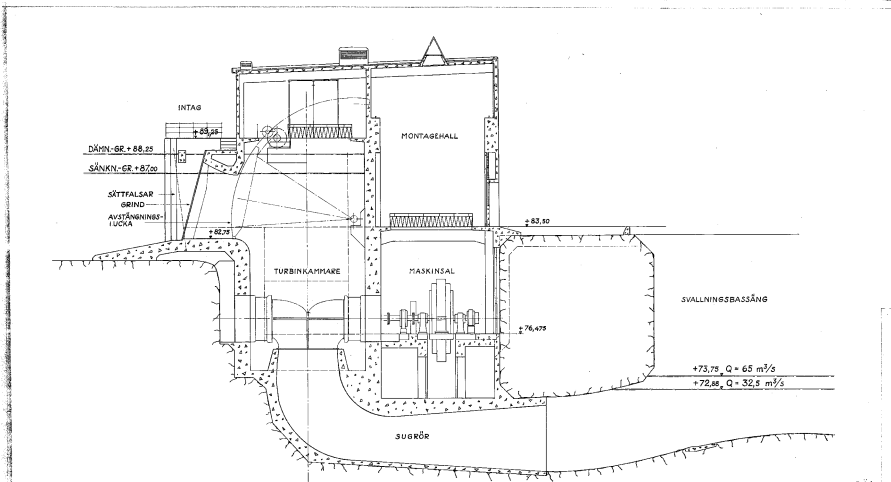




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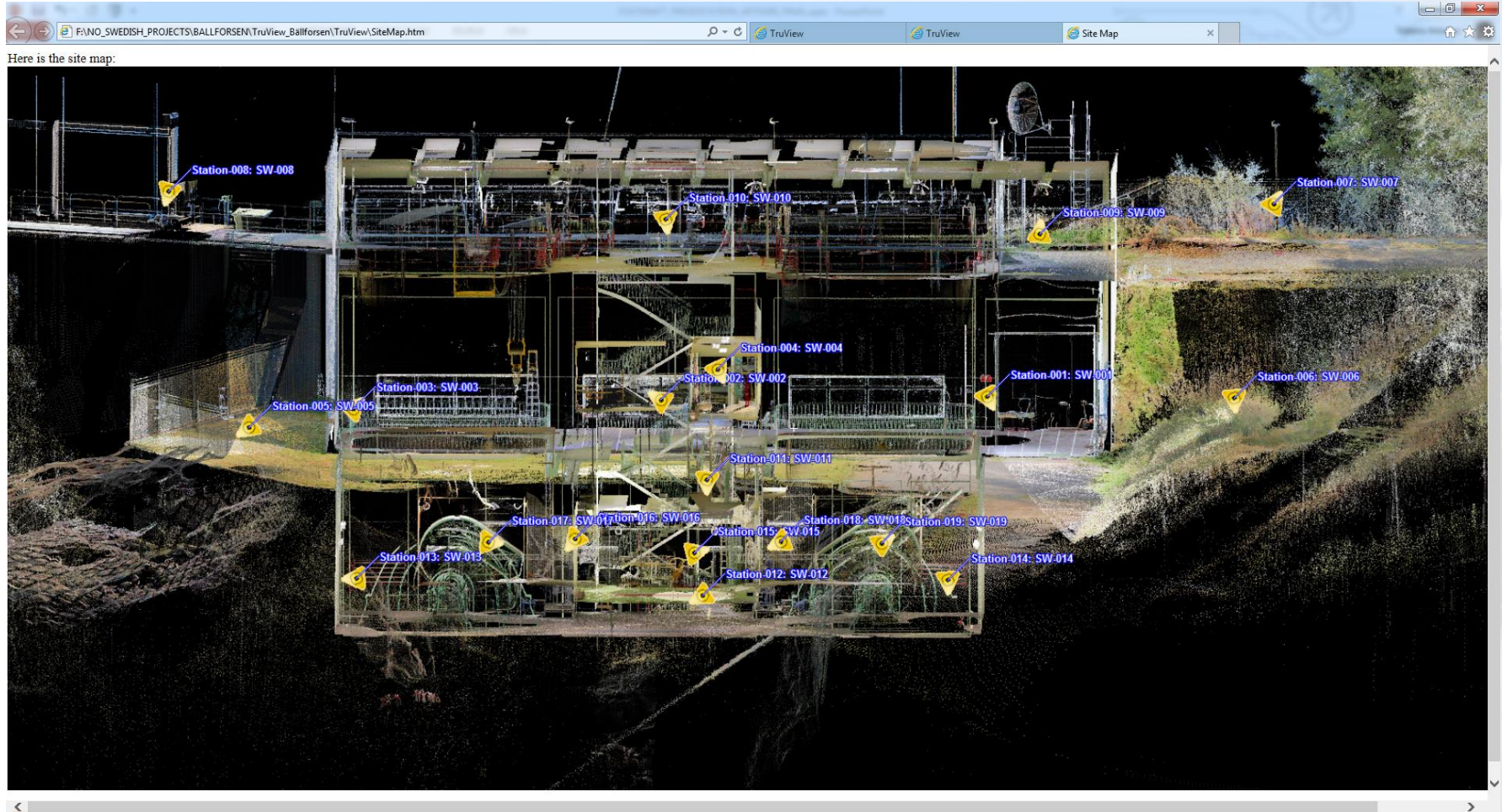


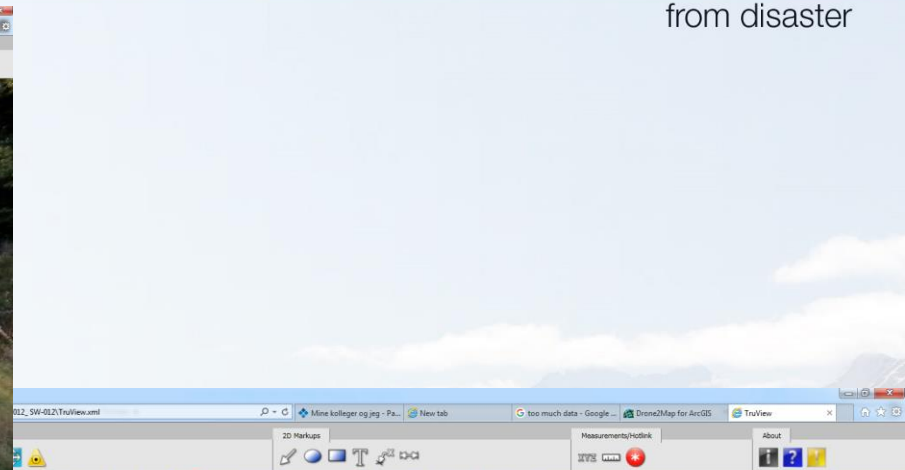
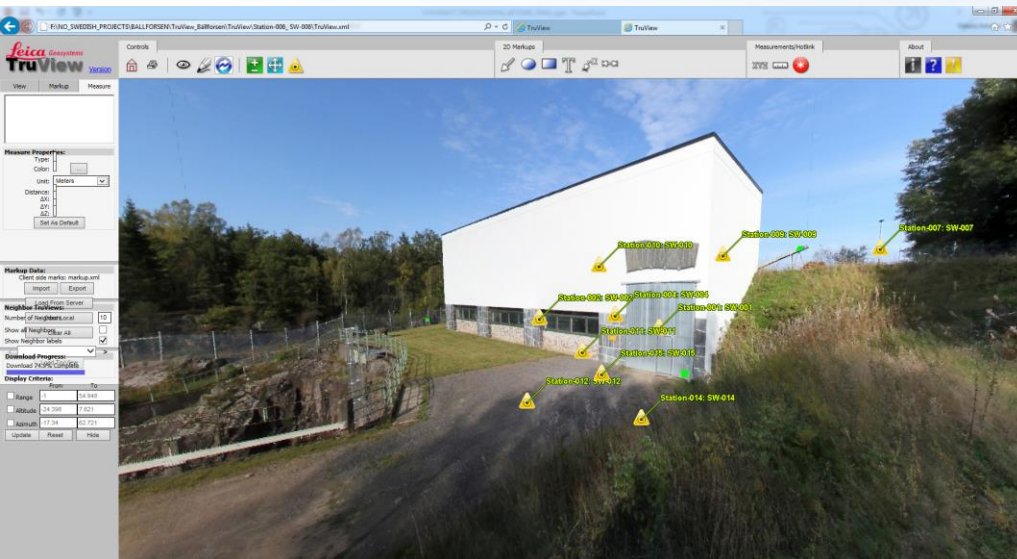


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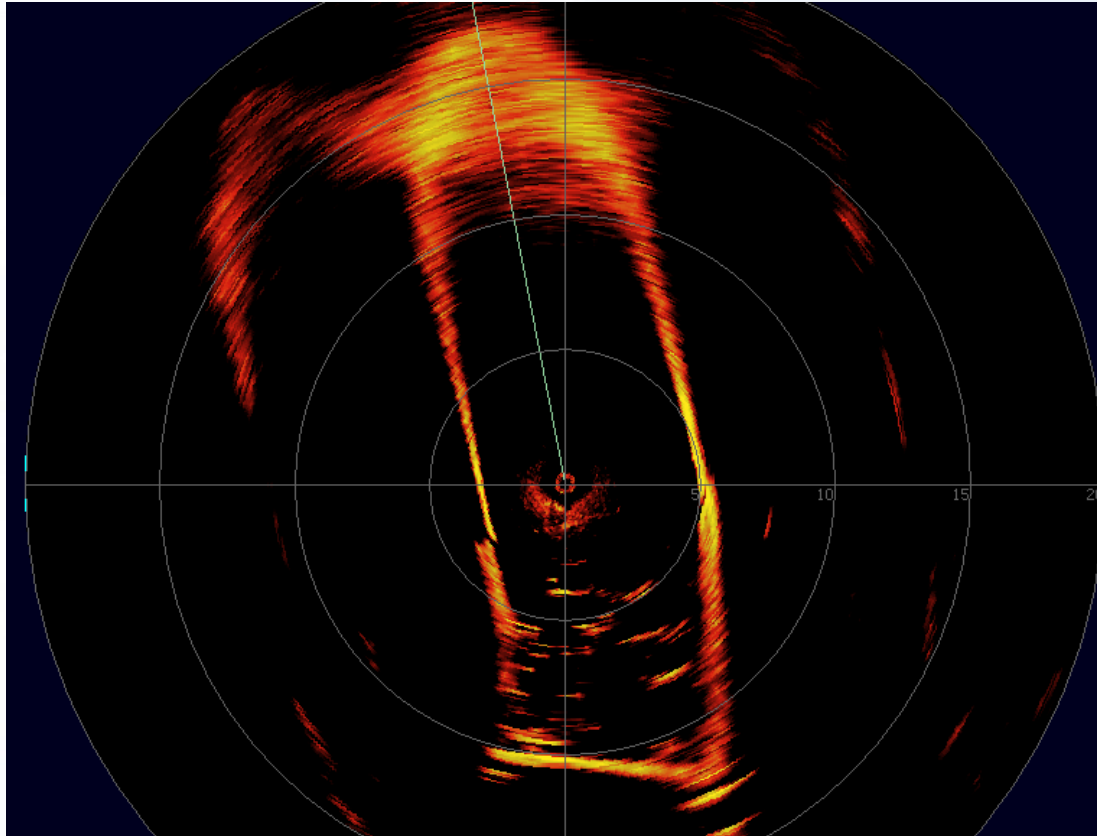




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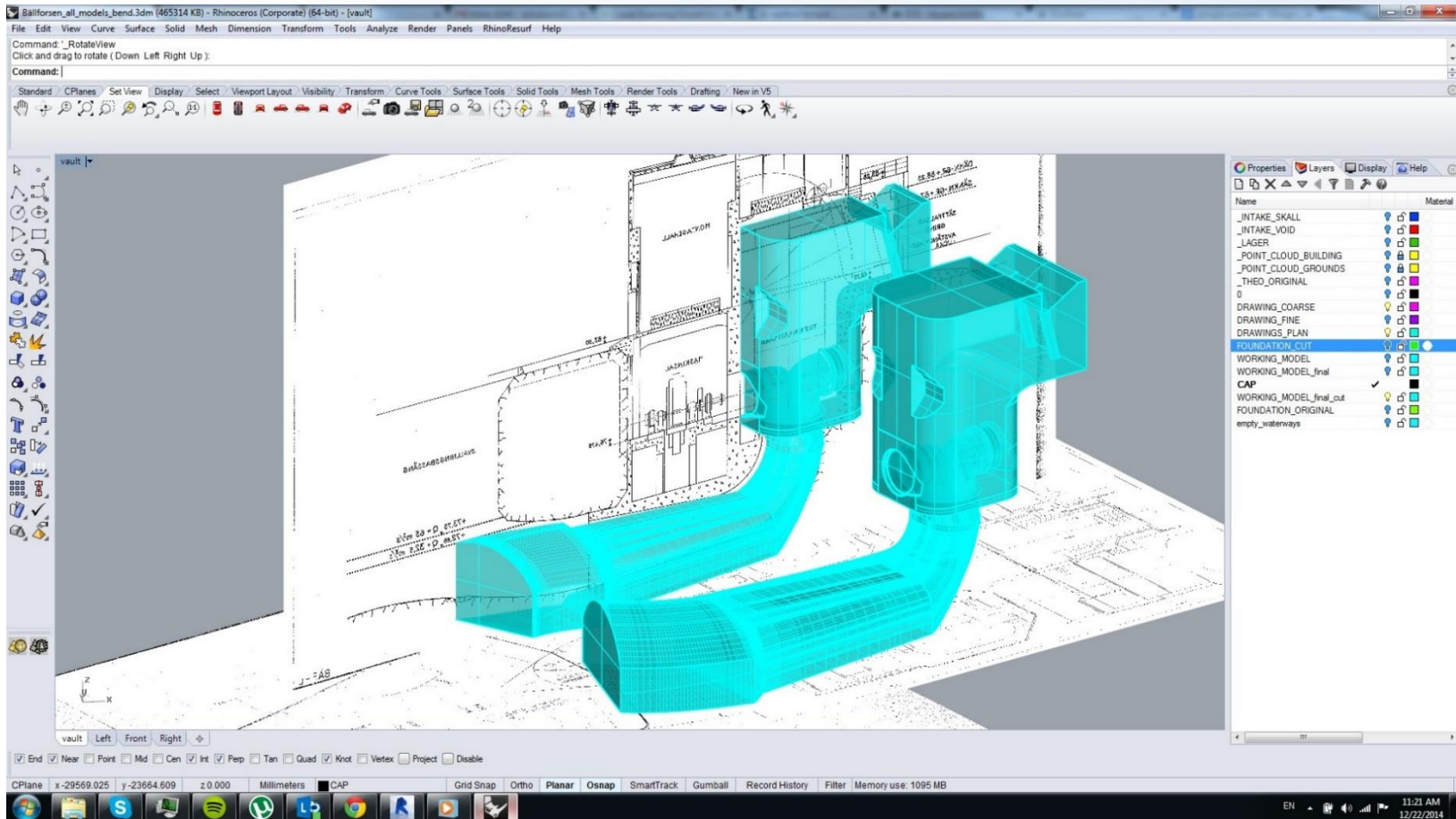


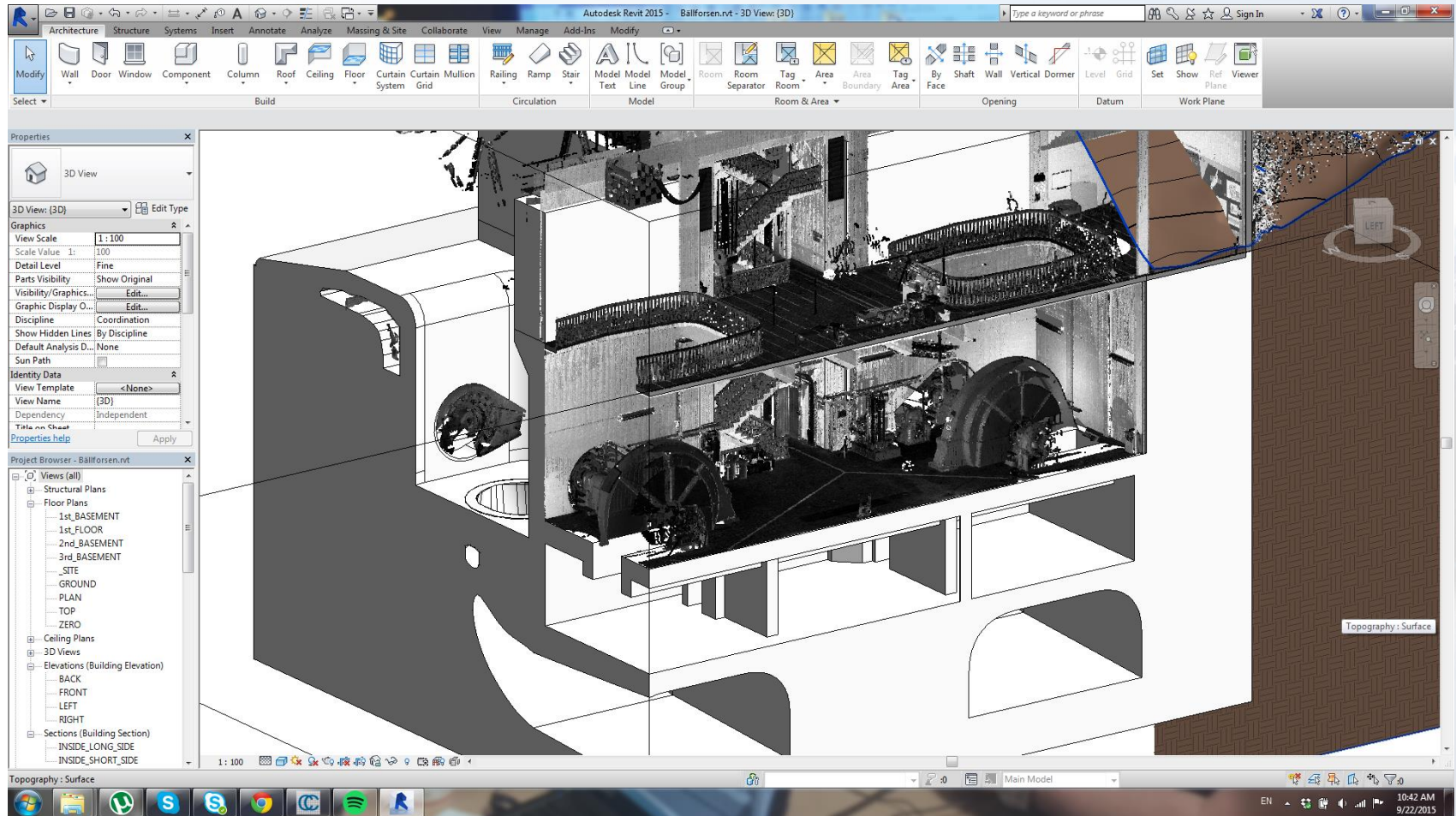


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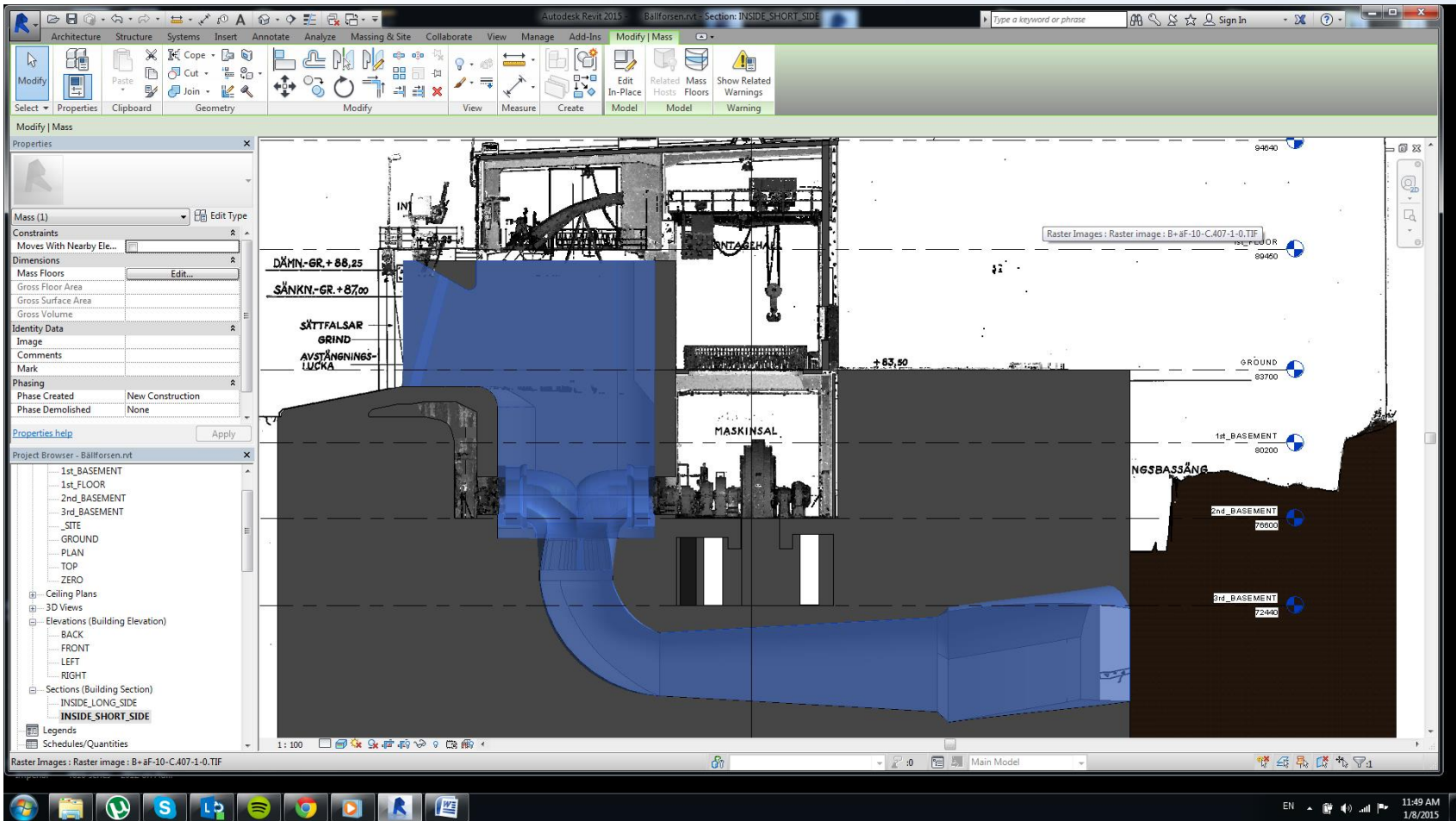


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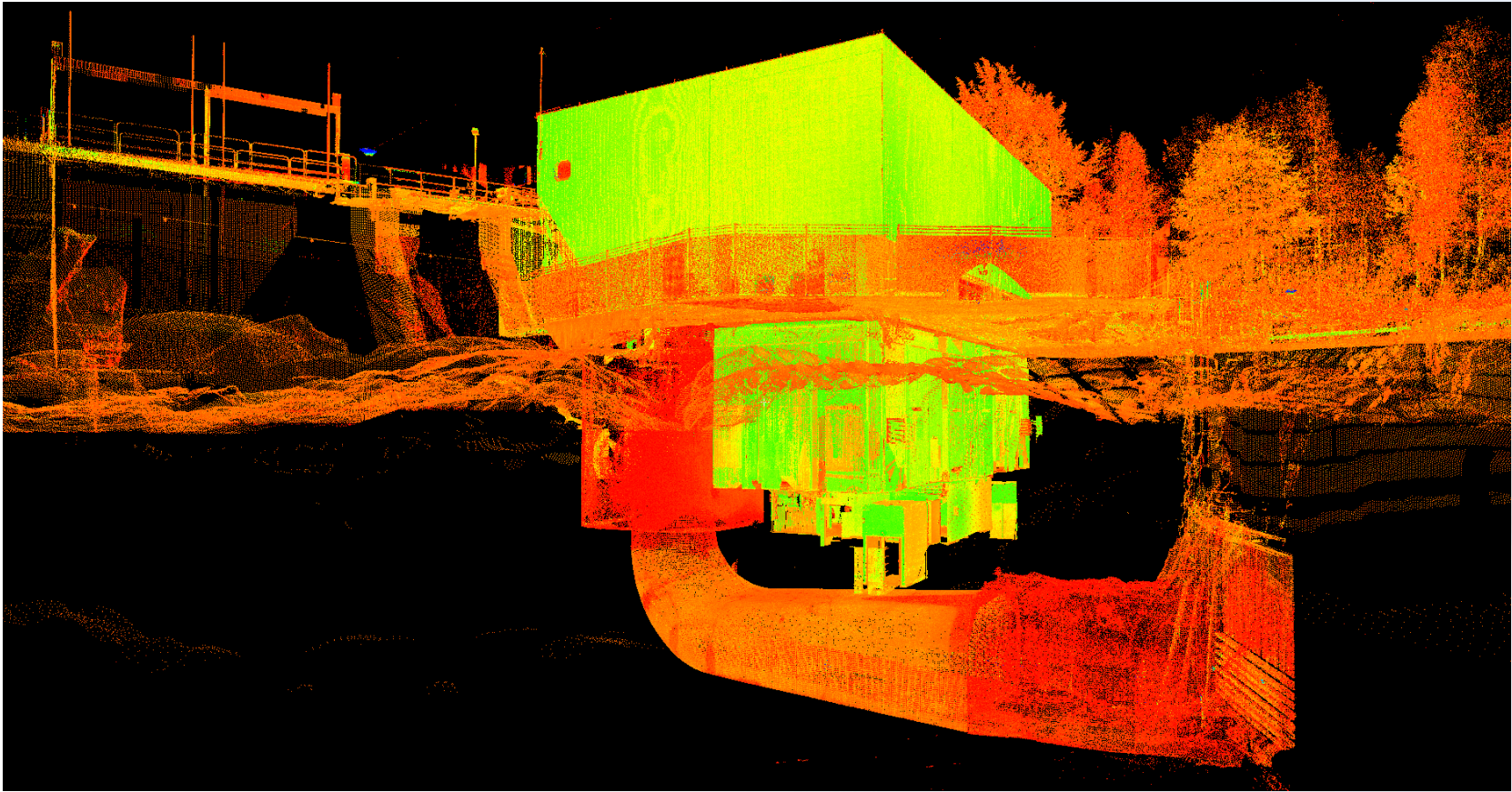


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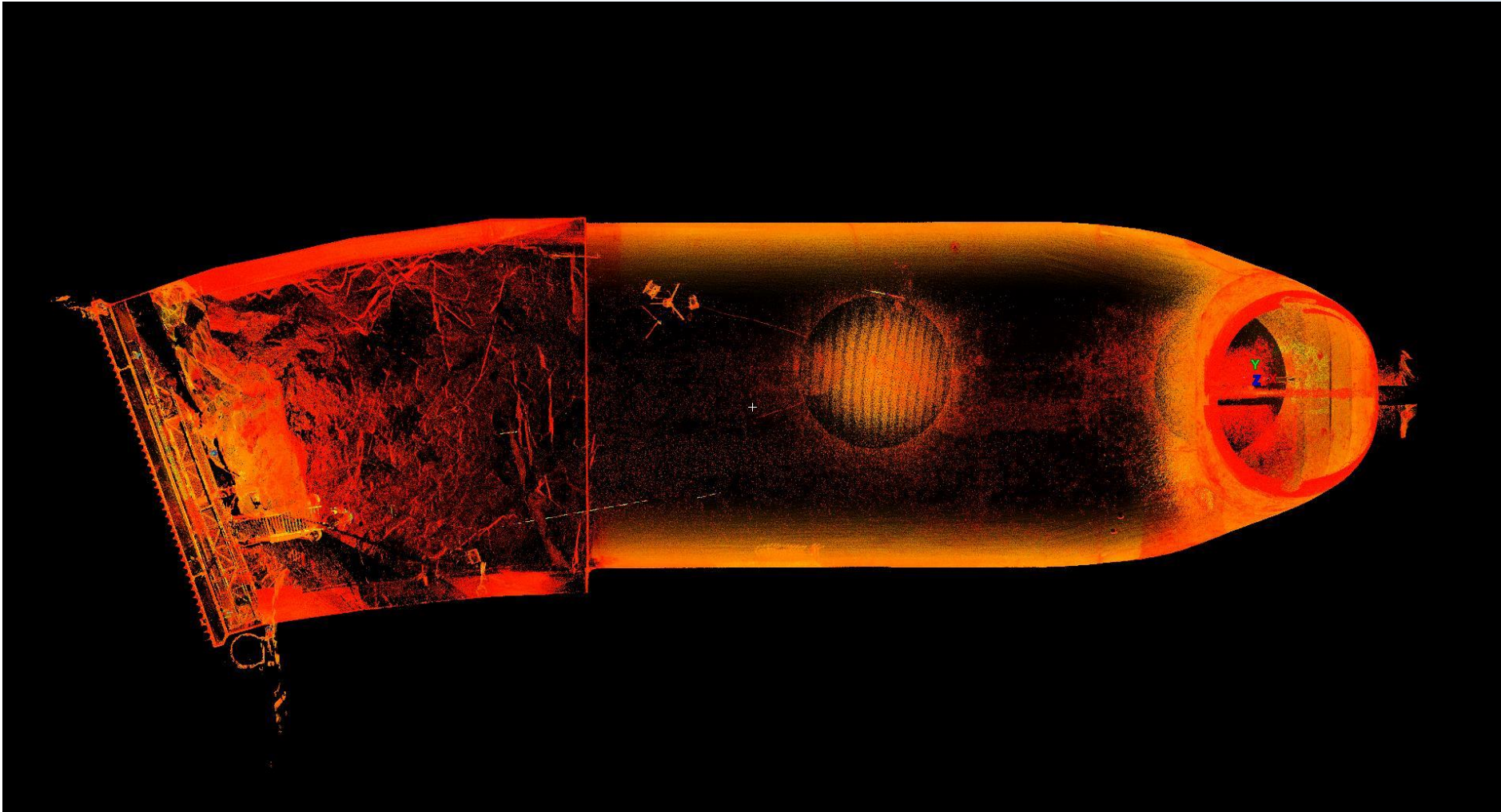


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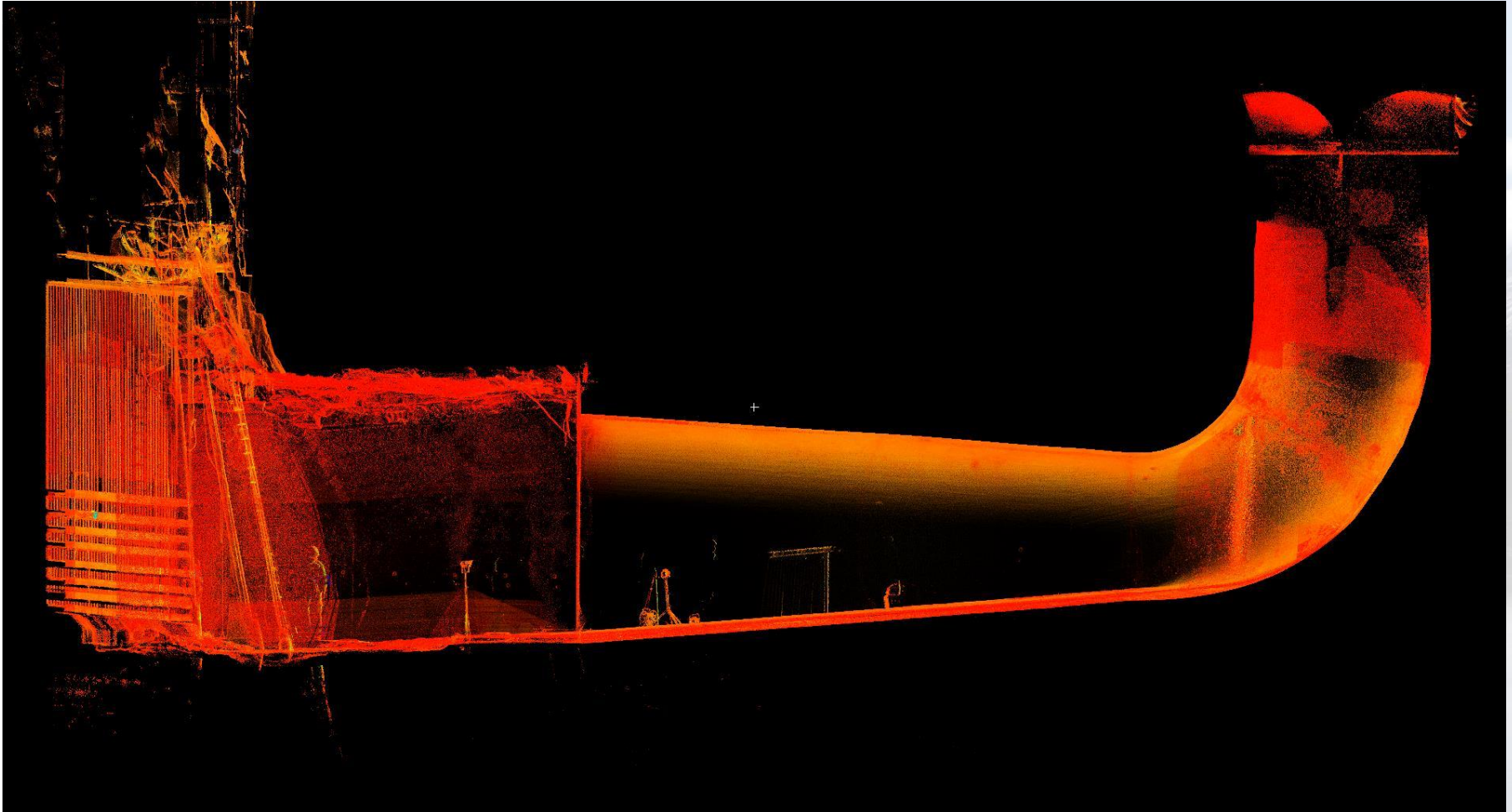


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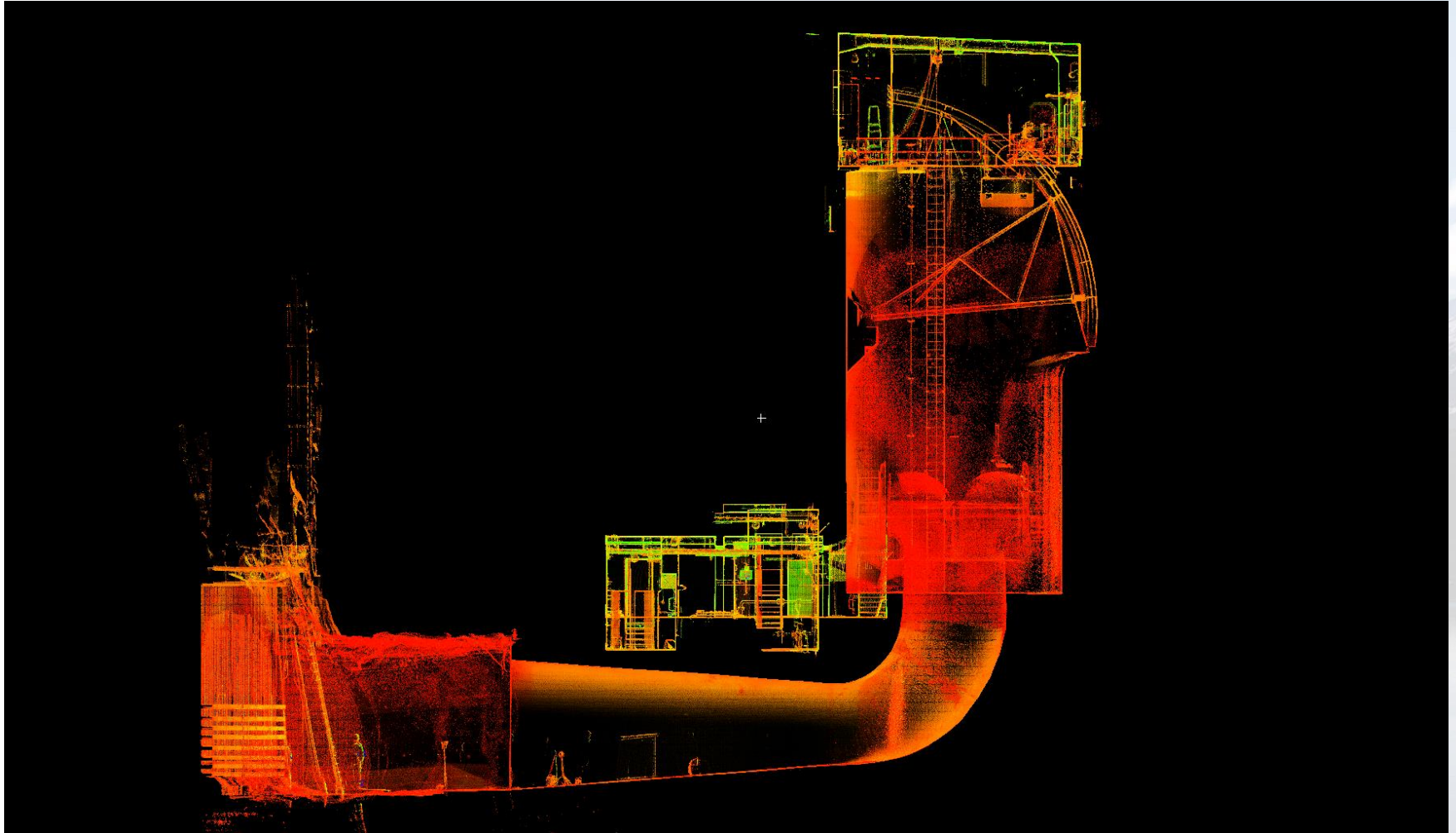


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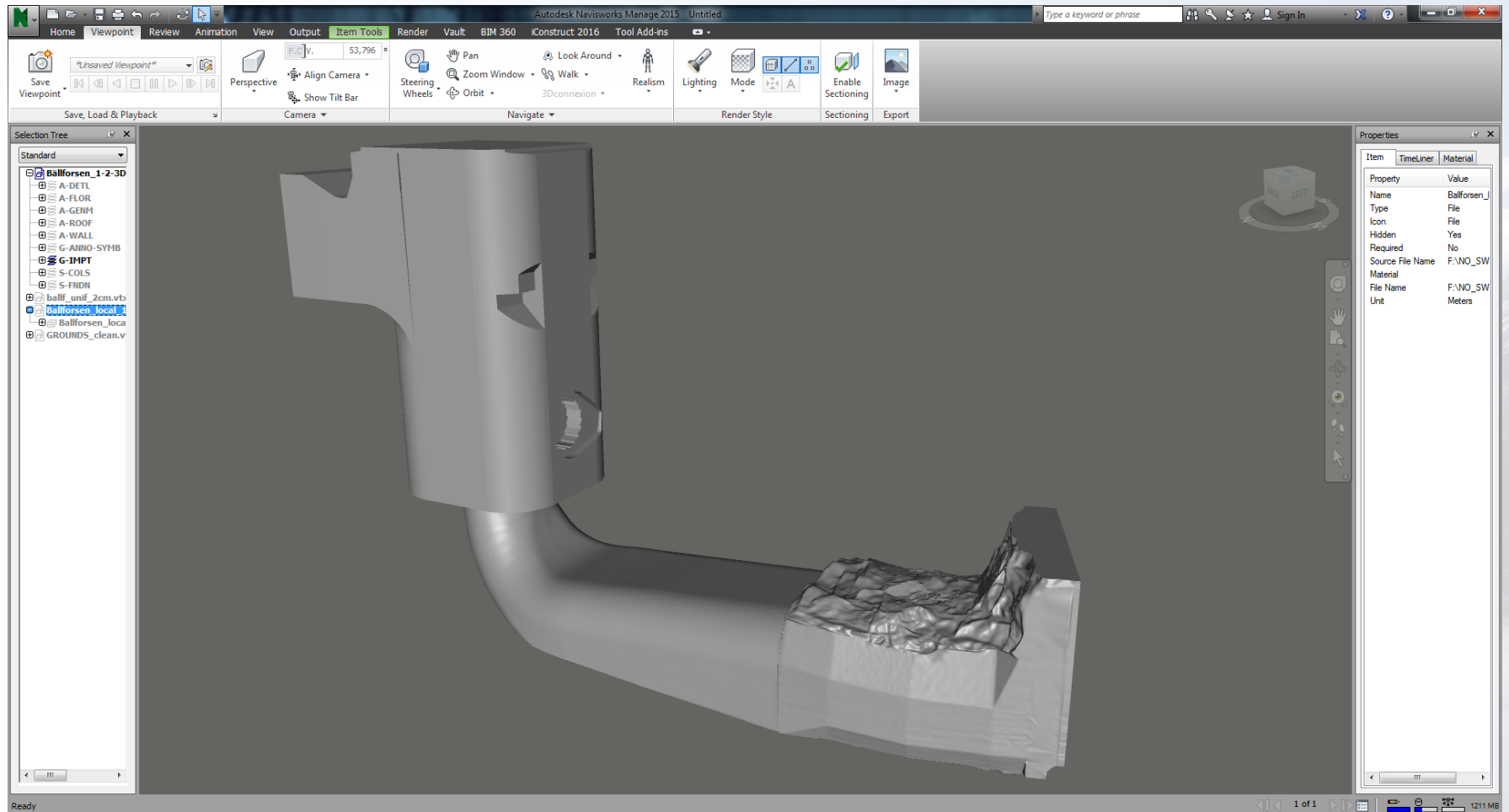


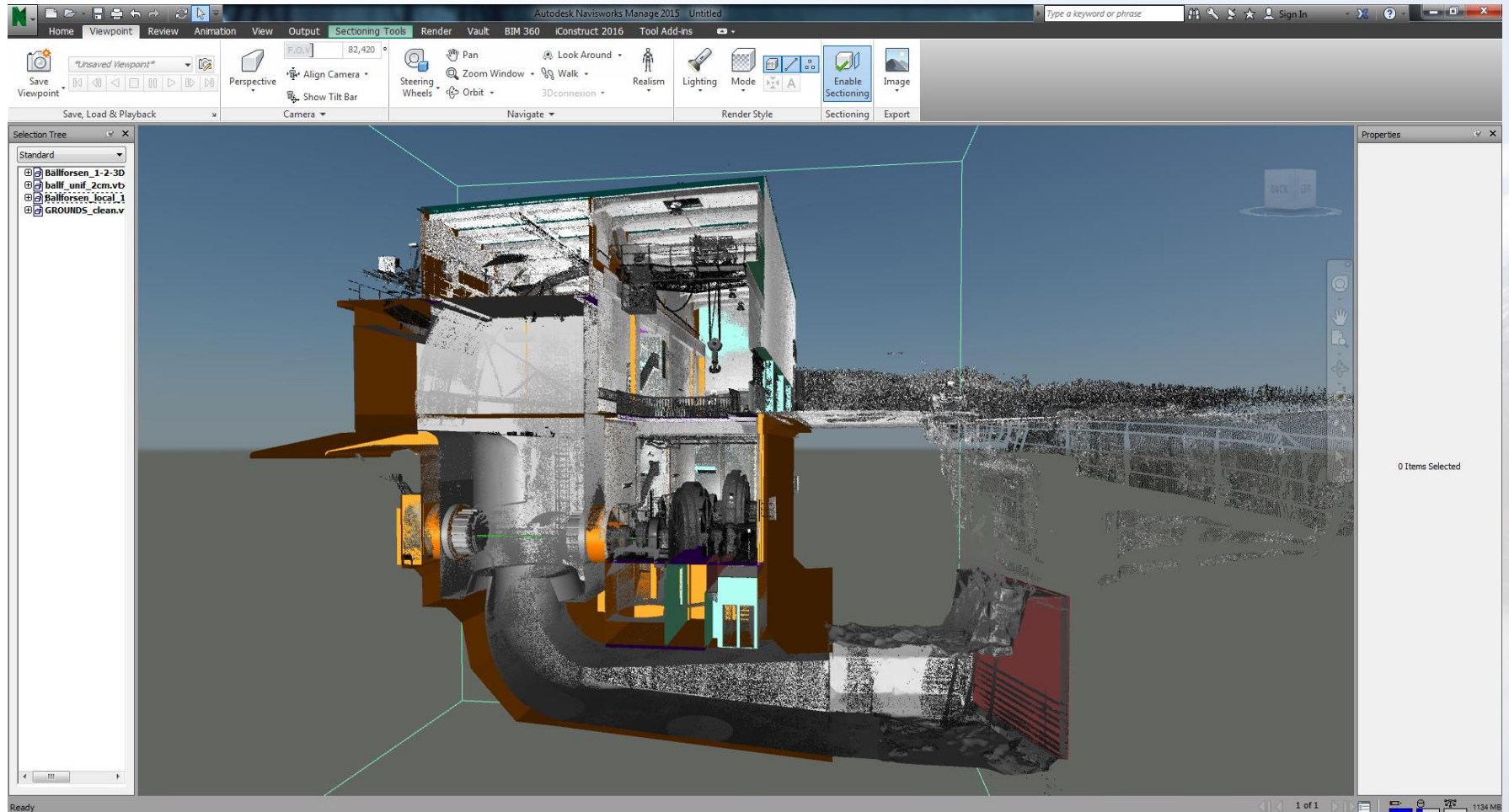


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Example projects 3/3

A 3D Documentation Project



Project description:

- part of a bigger project
- documentation, rehabilitation and upgrade of several power stations, including distribution power lines
- DEM data, orthophotos, GIS data and laser scanning for a number of stations
- Combination and processing of data into AutoCAD, Revit and Infraworks
- Focus on 3D documentation and modeling of an electric substation

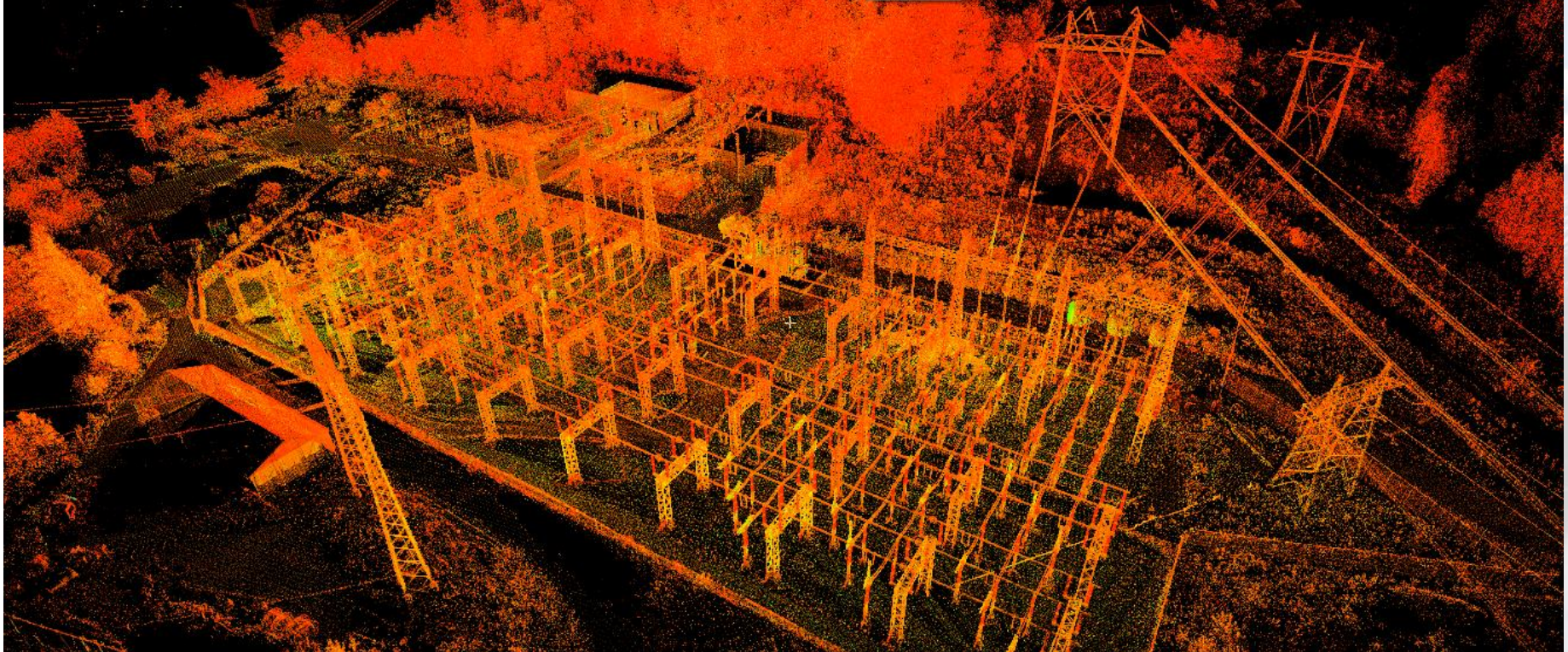


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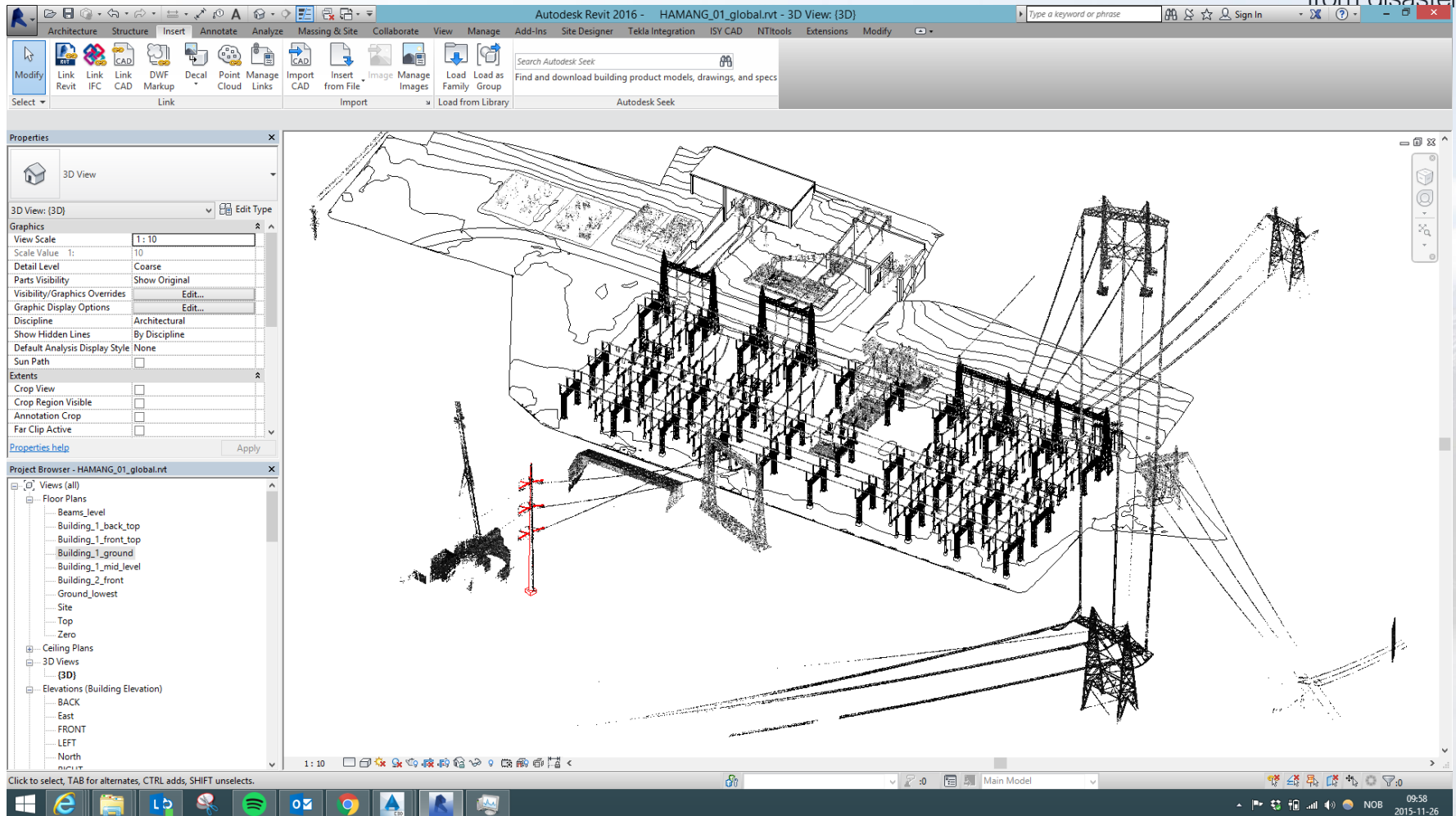


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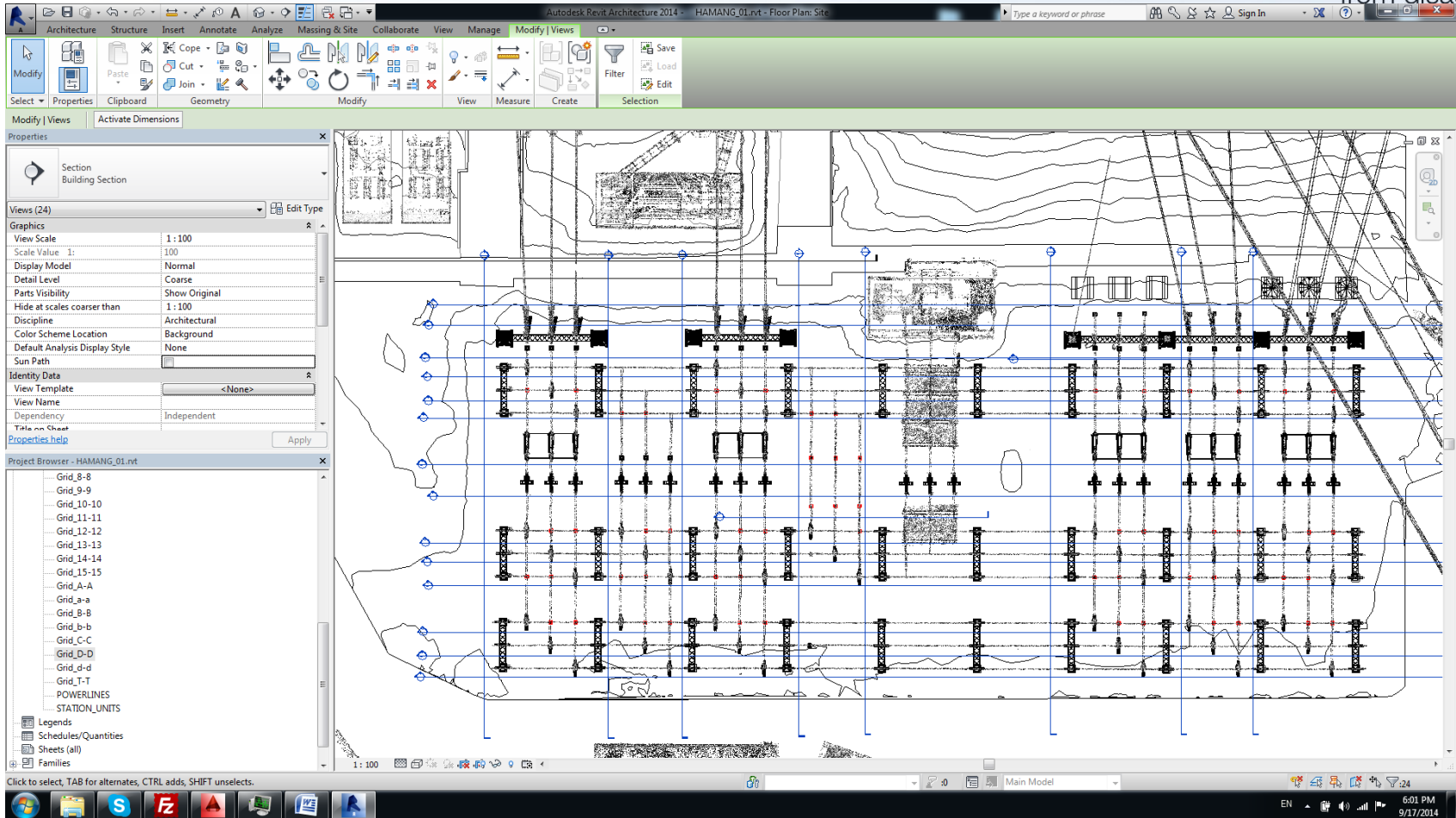


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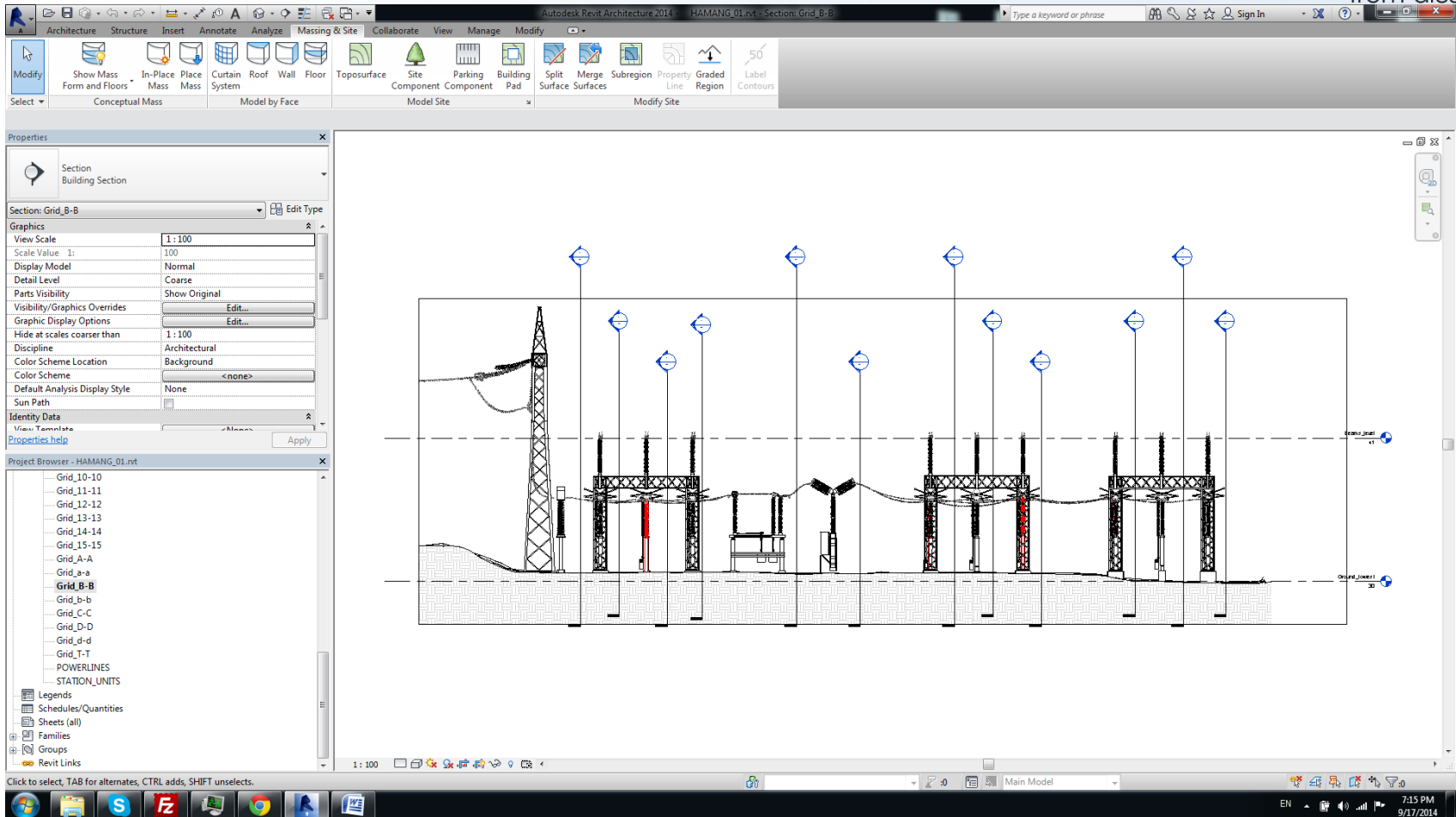


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Conclusions

3D Data Acquisition and Modeling for the Energy Sector

- An exciting and challenging area for surveyors
- A very wide range of applications and possibilities
- Constant requirement for high quality data, new workflows, data fusion and integration of processes

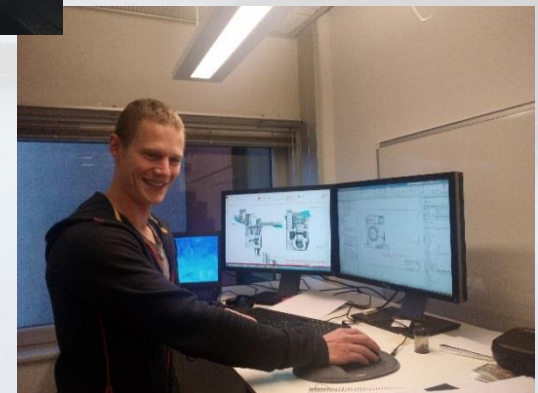
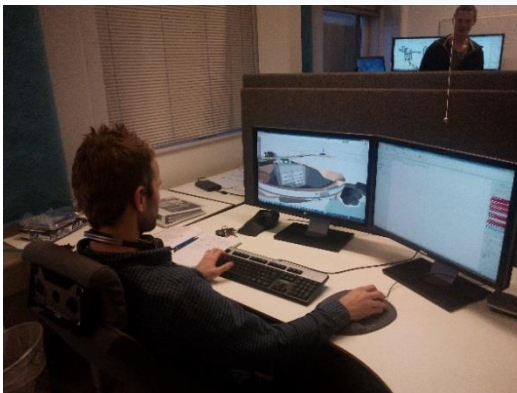


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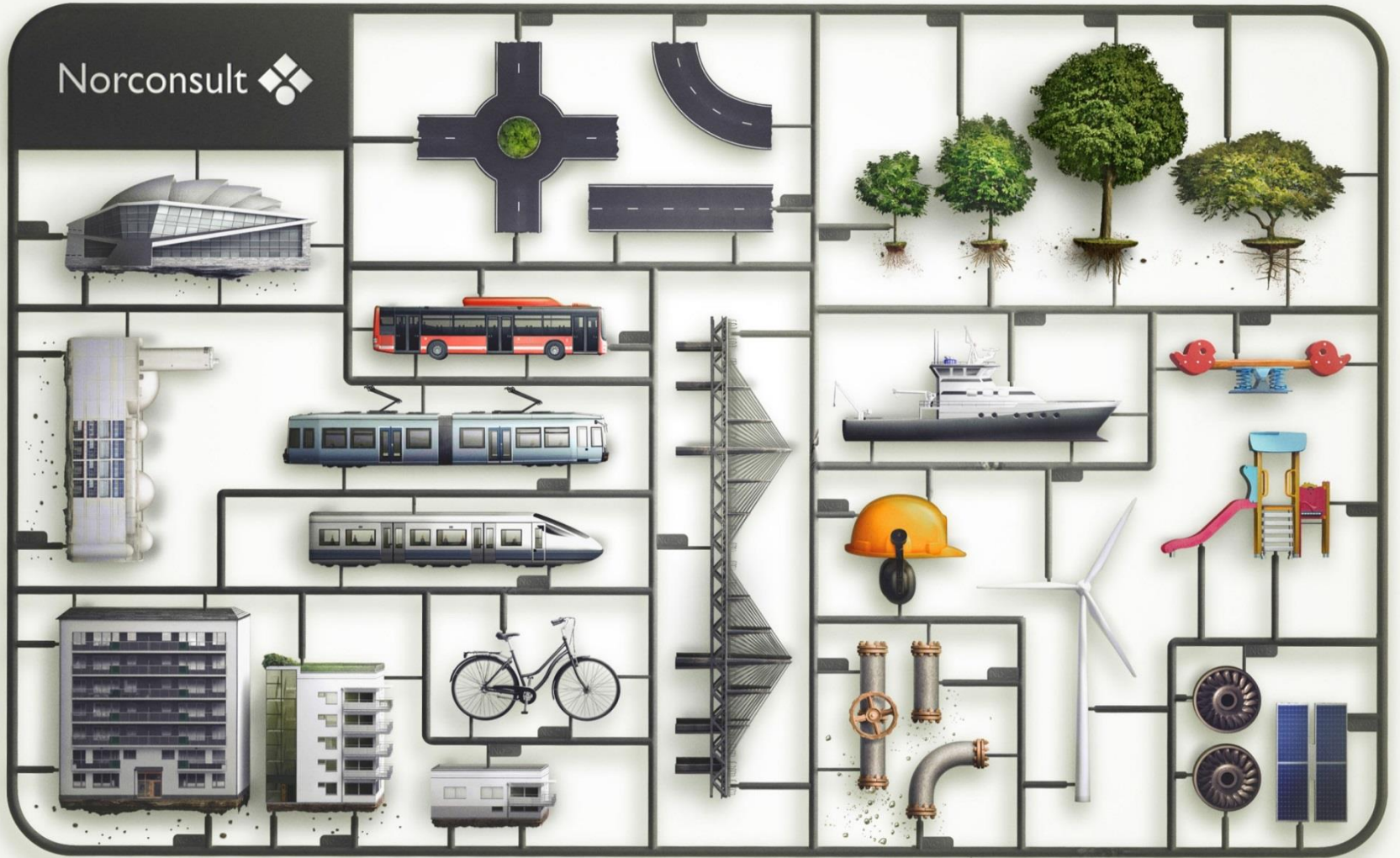
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