



## Point Clouds for Projects

Michael “Zee” Zeeveld – Applied Software

### AB5983

This lecture will focus on the workflow associated with collecting point cloud data and bringing it into Revit software and 3ds Max Design software for project interaction and improvement of projects' accuracy and quality. In addition, we will explore the timesaving features of using digitally collected data for integration in 3D modeling software. Attendees will bring point cloud data into Revit software and 3ds Max software to create a project. They will learn the workflow and be able to describe the process of merging and using the data.

### Learning Objectives

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

- Learn the workflow for digital data in design software
  - Learn how to create a project in Revit software with point cloud data
  - Learn how to create a project in 3ds Max software with point cloud data
- Understand the components for point cloud data creation, capture, and project uses

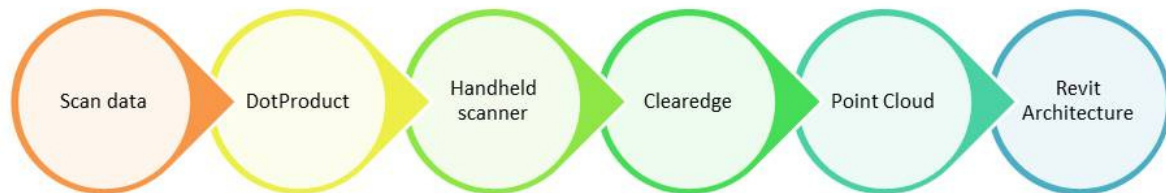
### About the Speaker

*Michael Zeeveld, a senior application specialist at Applied Software Technology Inc., has more than 19 years of experience in CAD management, commercial and architectural drafting, 3D modeling, visualization, 3D laser scanning, and 3D printing. He had the distinct honor of presenting and teaching at Autodesk University (2006, 2010, 2012, 2013, and 2014) as well as serving as a presenter at multiple AUGI CAD Camps and the RTC-Revit Technical Conference 2012. Michael is an associate member of the American Institute of Architects, and he is an Autodesk Certified Instructor, an Autodesk Consulting specialist, and an Autodesk Professional. Prior to joining Applied Software, Michael owned and operated both Focus CAD and Zinc Visualization, 2 CAD consulting companies specializing in creating animations; high-end, photorealistic renderings; and construction documents for architects and engineers. He has taught college courses and served as a member of the Technical Community College Advisory Board in Raleigh, North Carolina.*

*mzeeveld@asti.com*

Note: This is an outline of slides for reference a typical workflow of over 100 pages. I suggest not printing it, but use it as a future reference.

# Workflow



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# Scan data, Point Cloud, Conversion?

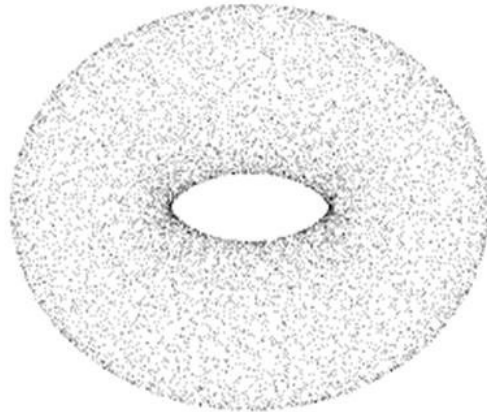


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## Scan data, Point Cloud, Conversion?

- A **point cloud** is a set of data points in some coordinate system.
- In a three-dimensional coordinate system, these points are usually defined by X, Y, and Z coordinates and often are intended to represent the external surface of an object.



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- 2mm accuracy at close range
- 12 to 13.5 ft scanning range @ 4mm accuracy



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- Accuracy

Range	Typical Accuracy (RMS)	Minimum Accuracy
< 1 m (3.3 ft.)	0.2%	0.4%
1 m to 2 m (6.6 ft.)	0.5%	0.8%
2 m to 3.3 m (11 ft.)	0.8%	1.2%
> 3.3 m ( 11 ft.)	Not specified	Not specified



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- Info...

## DPI-7 Product Specifications - General

Imager type	Compact, near infrared structured light and rgb 3D imaging system
User Interface	Android 4.4/Android 4.2 operating system
Data Storage	Onboard 16 GB or 32 GB flash drive
Data Transfer	USB 2.0/3.0, microUSB connector

## DPI-7 Product Specifications - Physical

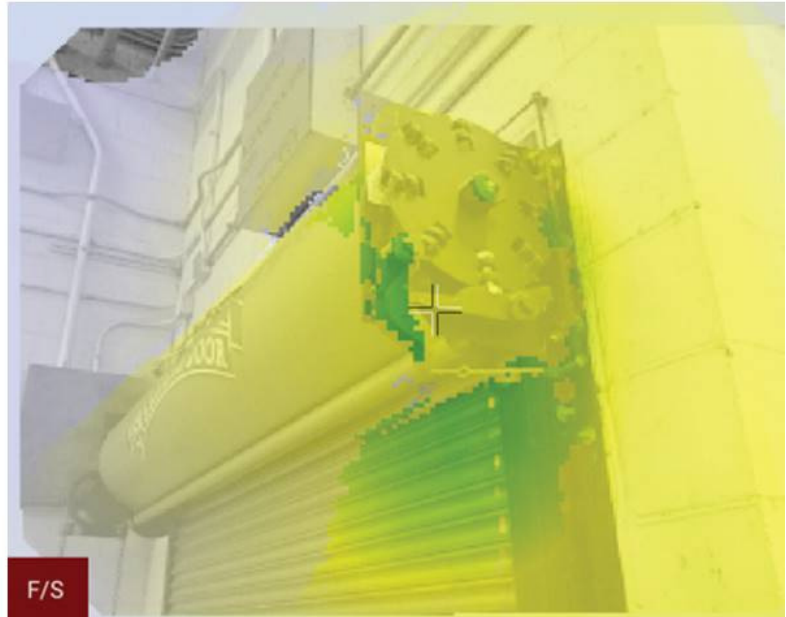
Mass	< 1kg (2.2 lbs.)
Dimensions	20 cm x 24 cm x 6 cm (8 in x 9.5in. x 2.4 in.)
Temperature	Tested operating range: 15 °C to 32 °C (60°F to 85°F)
Lighting	Not operational in direct sunlight
Humidity	Non-condensing



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- Real-time color coding of data quality



## DOT PRODUCT

- Real-time color coding of data quality



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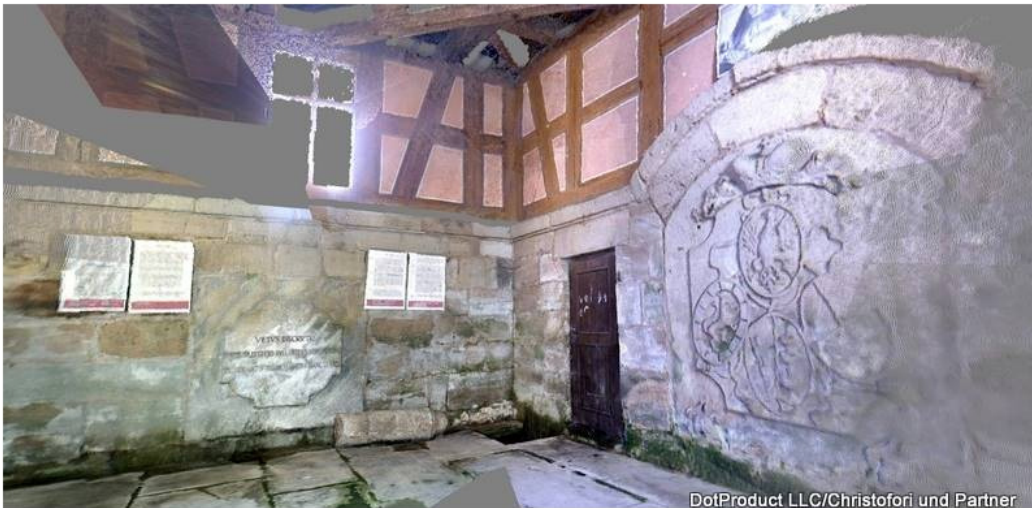
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- Register Point Clouds on the fly



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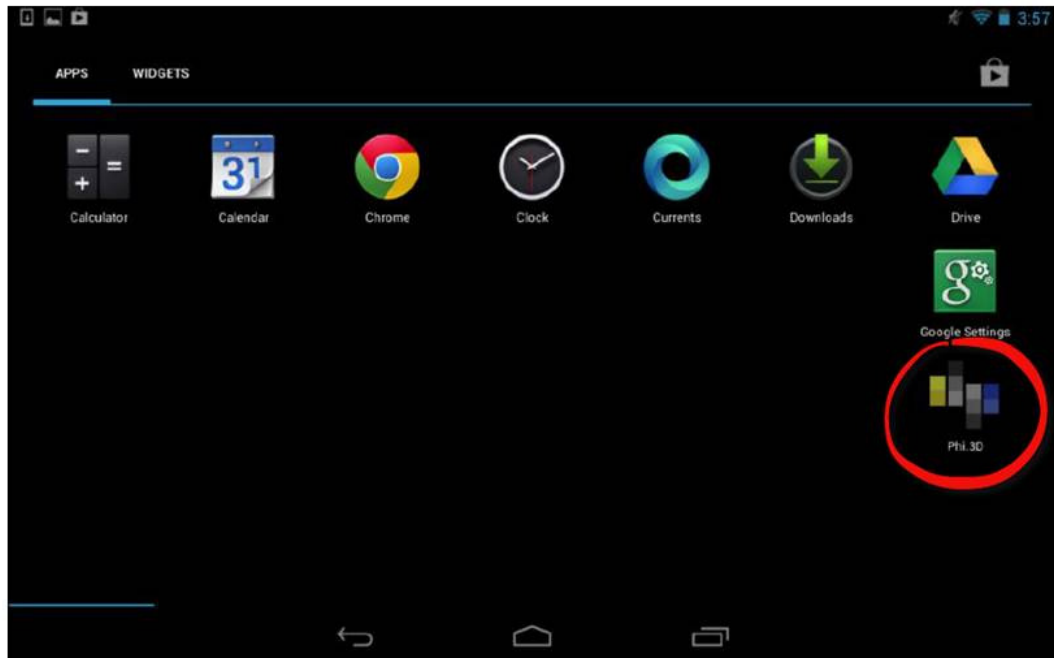
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- Extension Pole
- Extends up to 15 feet

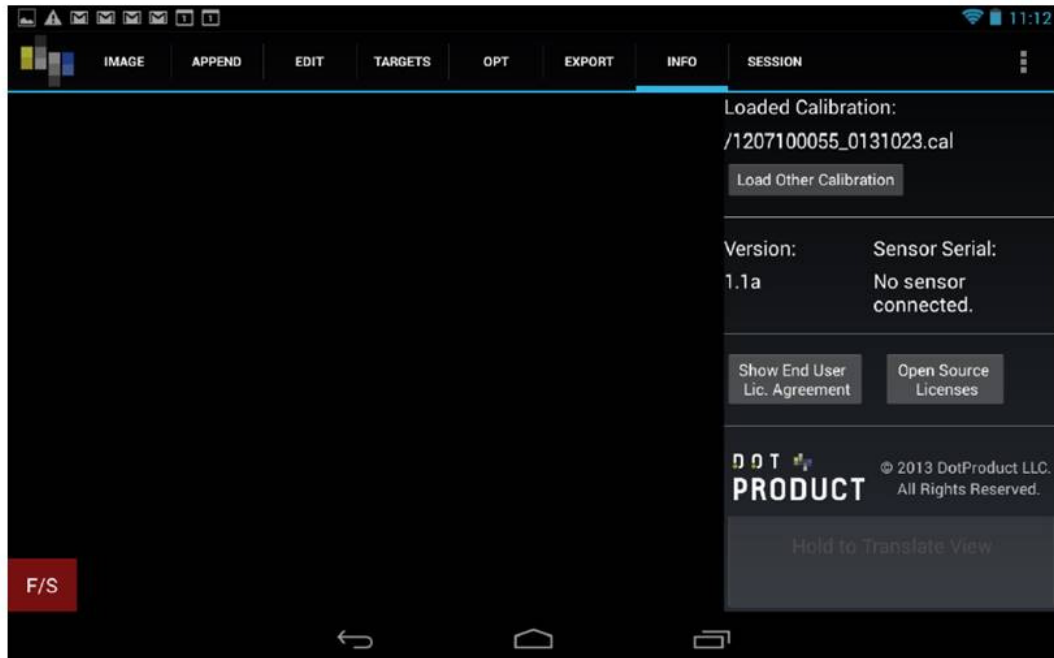




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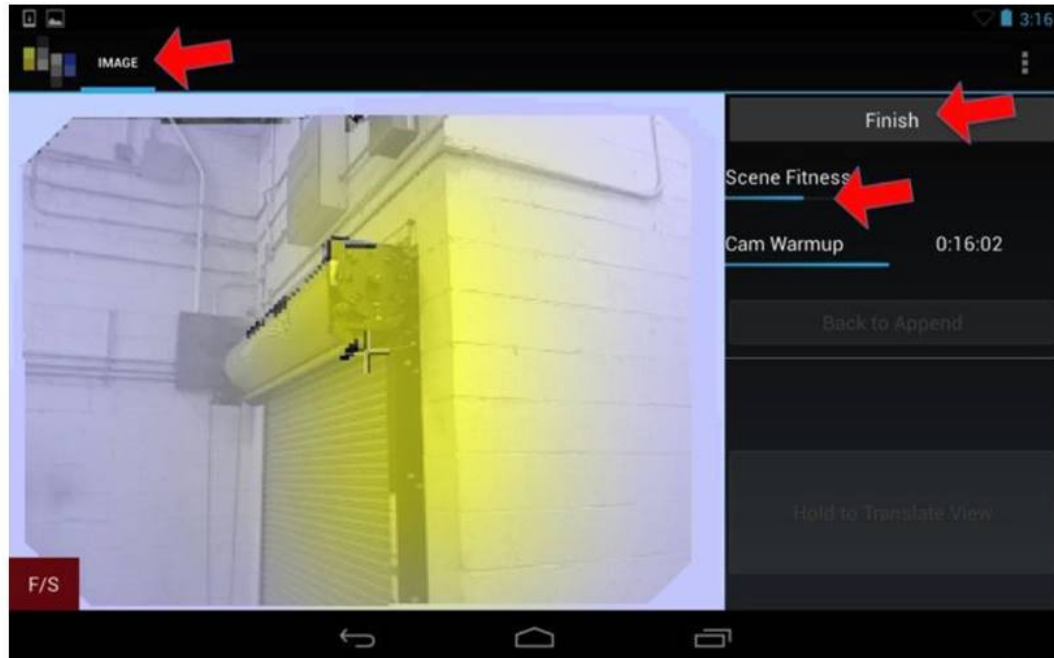
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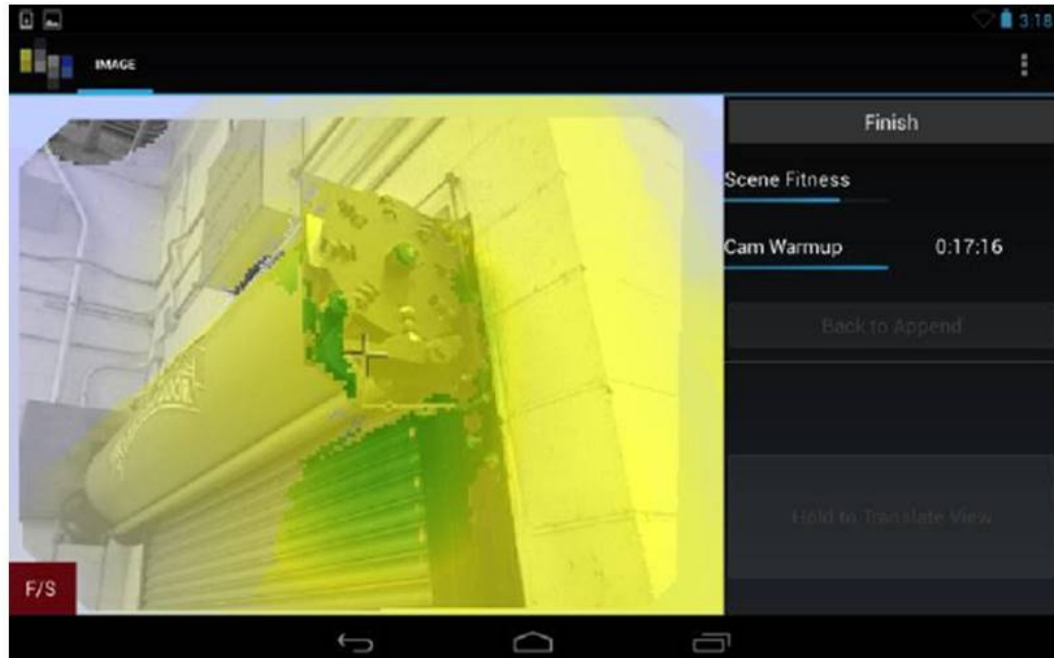


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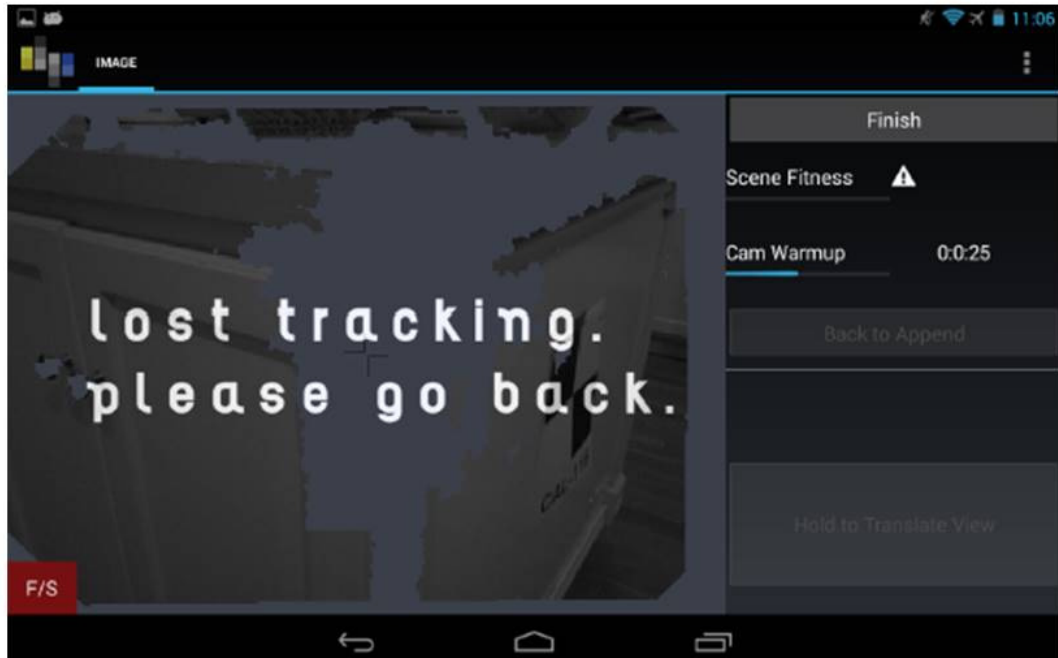
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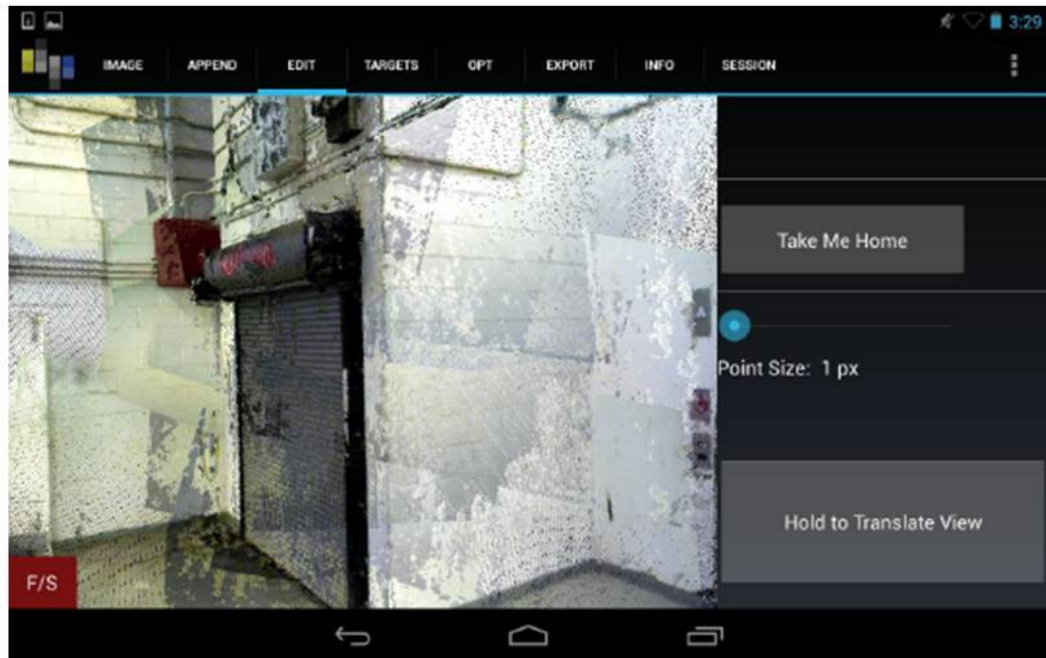
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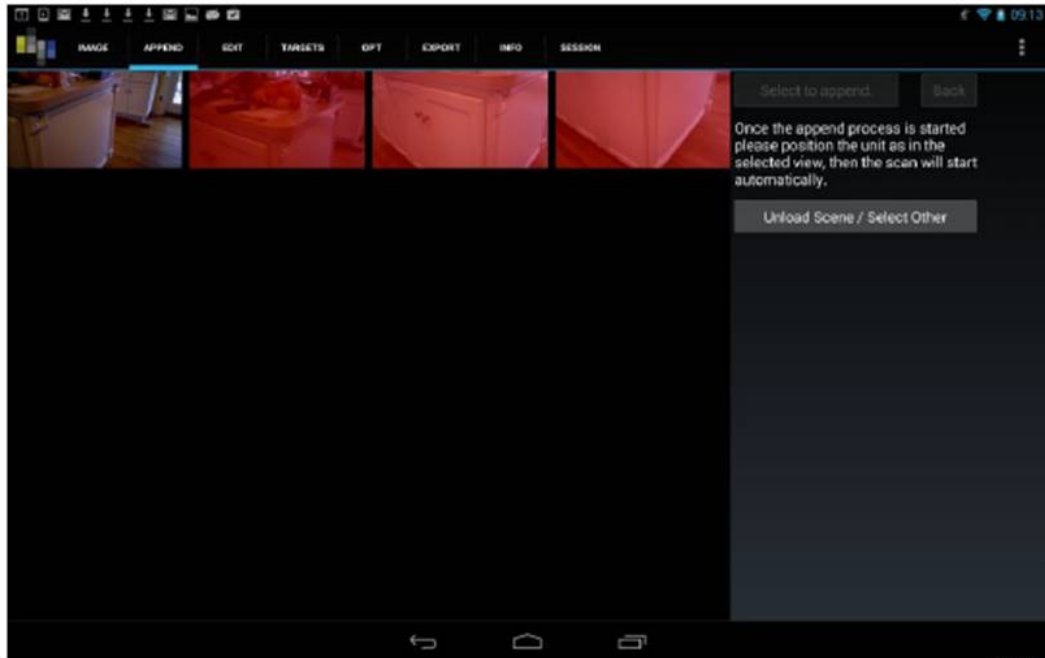
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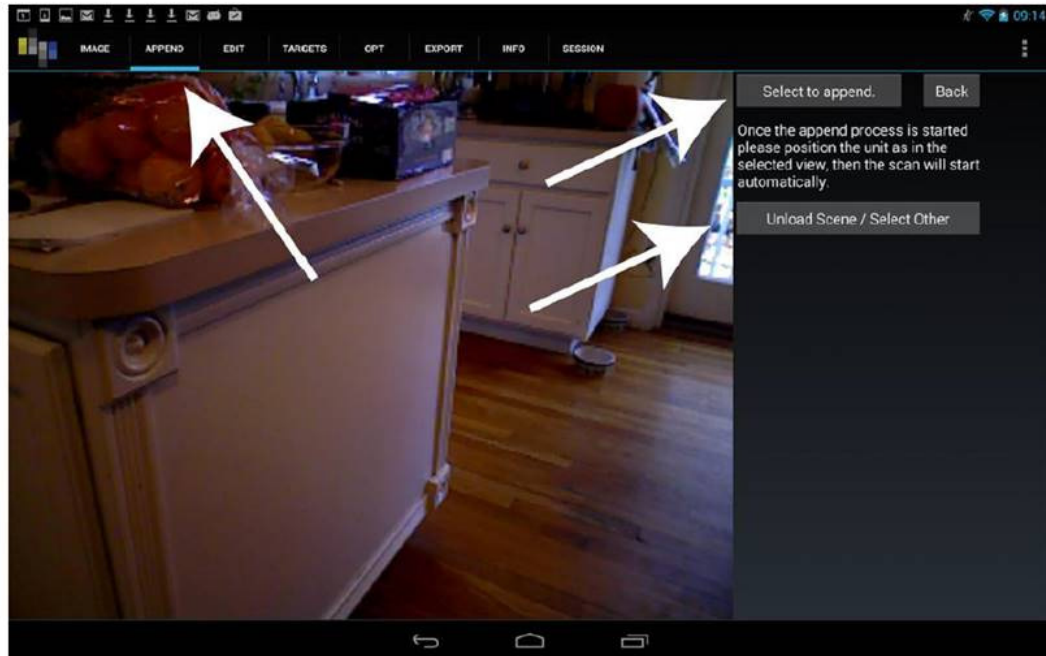
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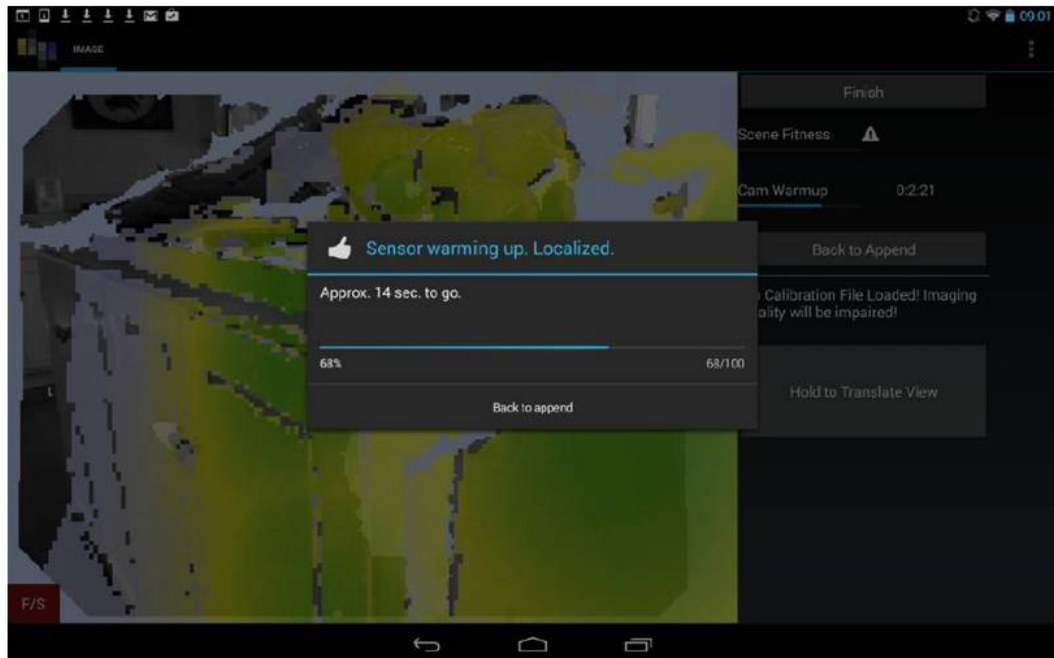
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“Optional”

- Target
- Registration Points



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IMAGE

APPEND

EDIT


TARGETS

OPT

EXPORT

INFO

SESSION



Load Targets File

(Back)

Targets File: ☒ Left-Handed System

None

Unit: Meters (m)

Set Target ID

Clear

Target:

Fit All Targets

Clear Target Fit

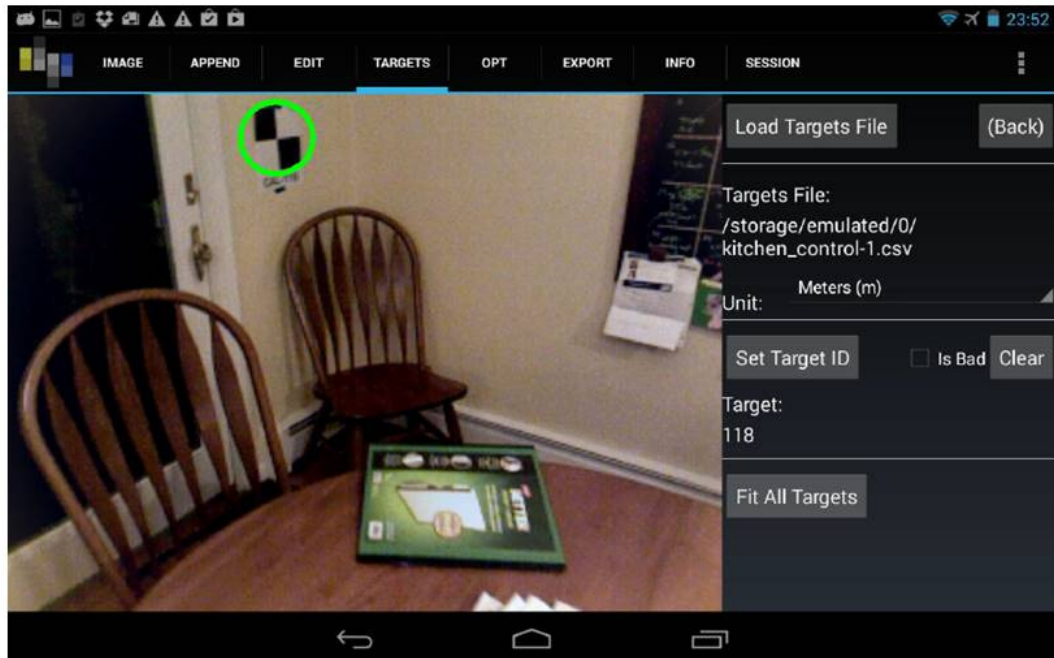
3 targets to go..

See Fit Report

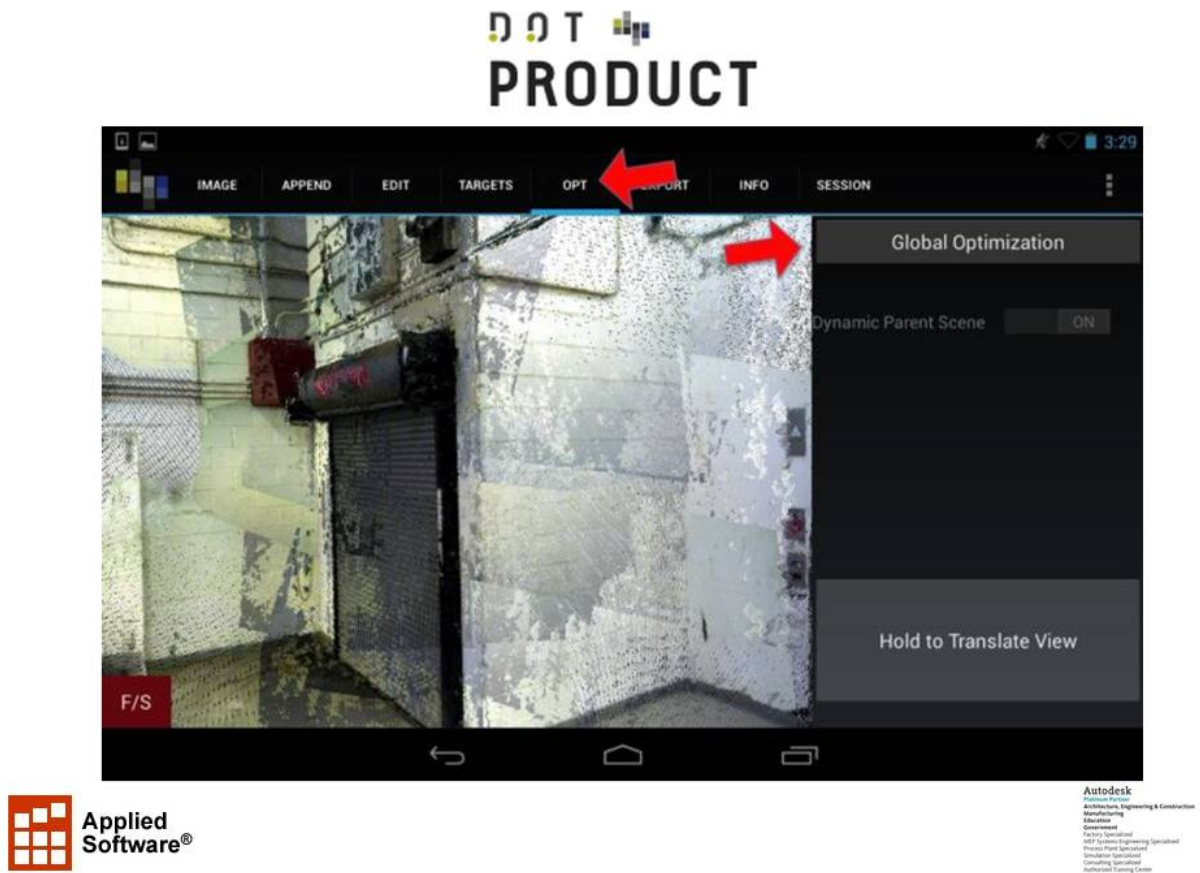


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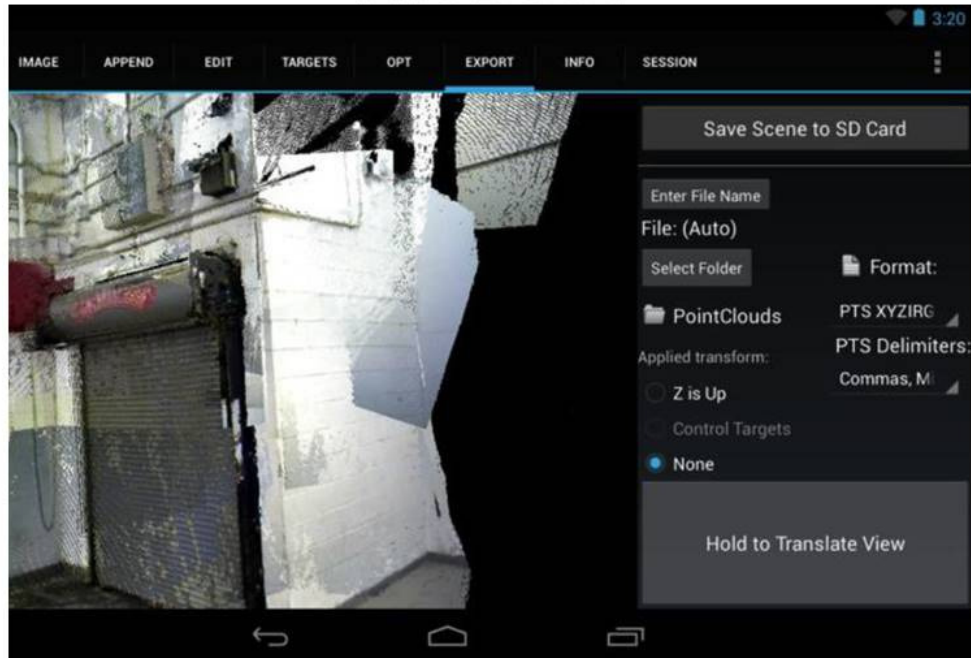


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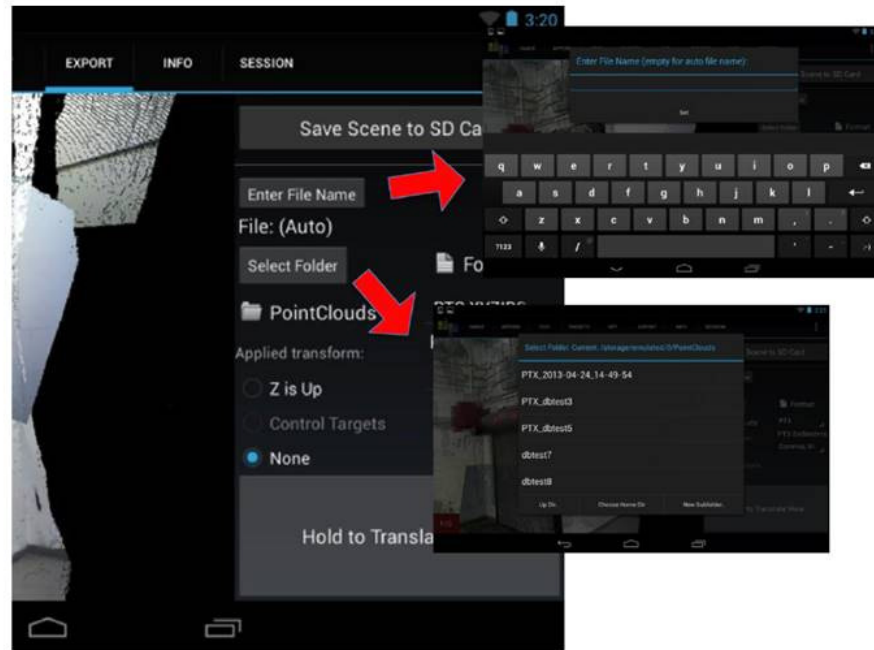


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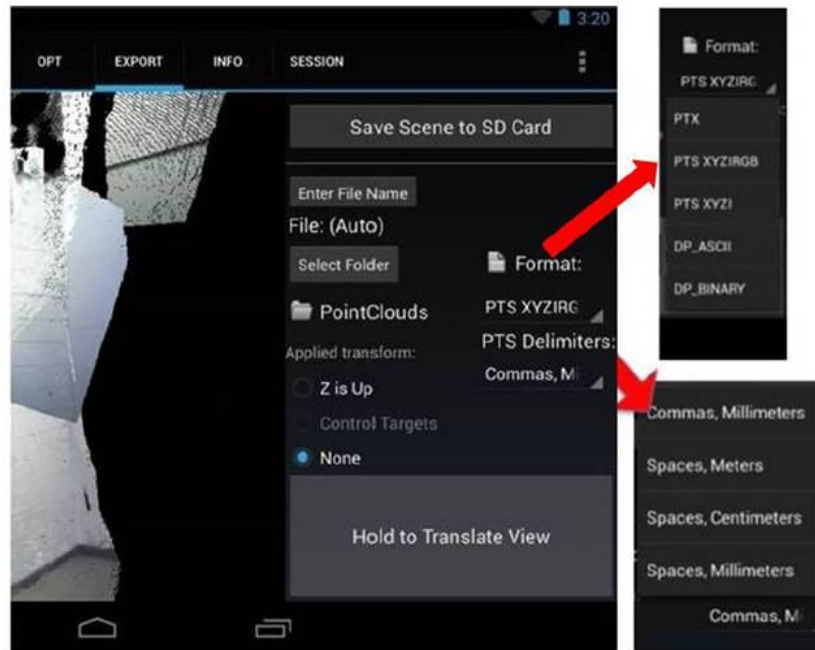
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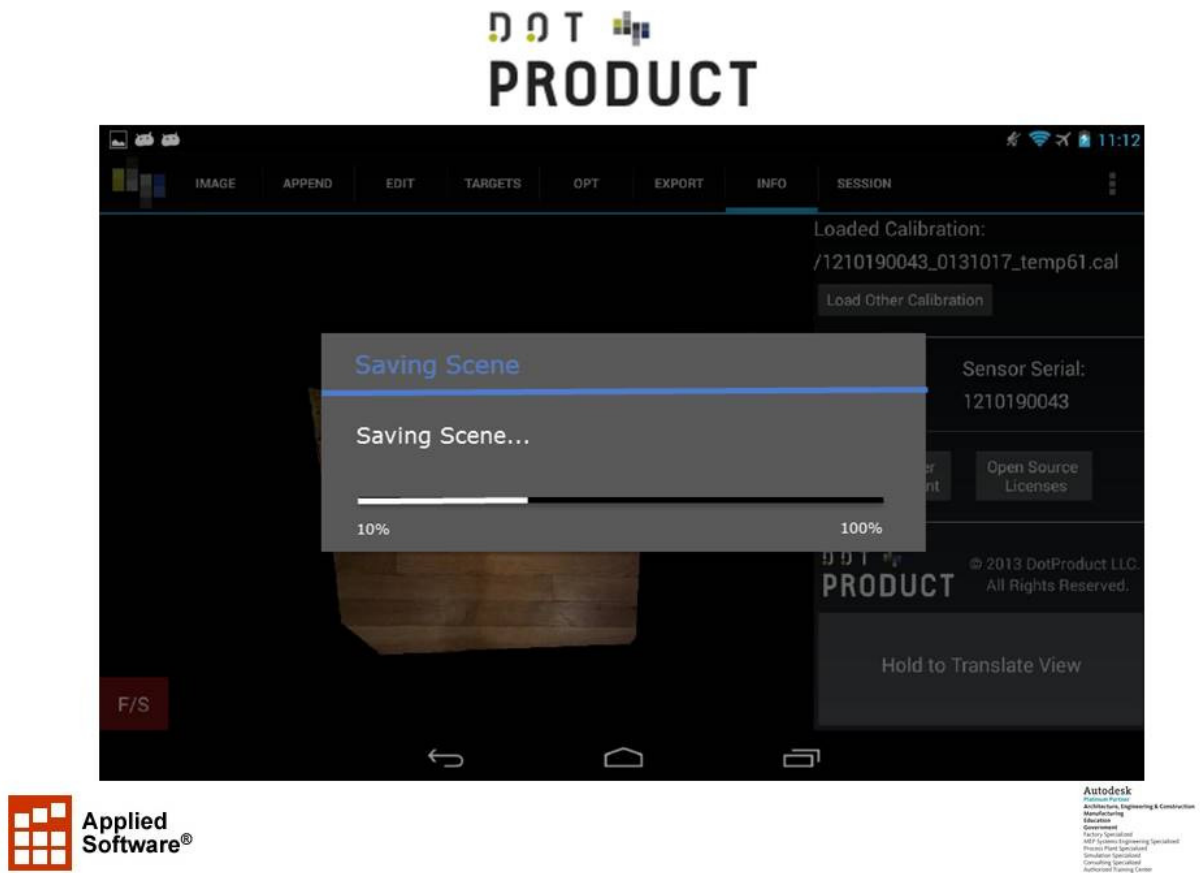


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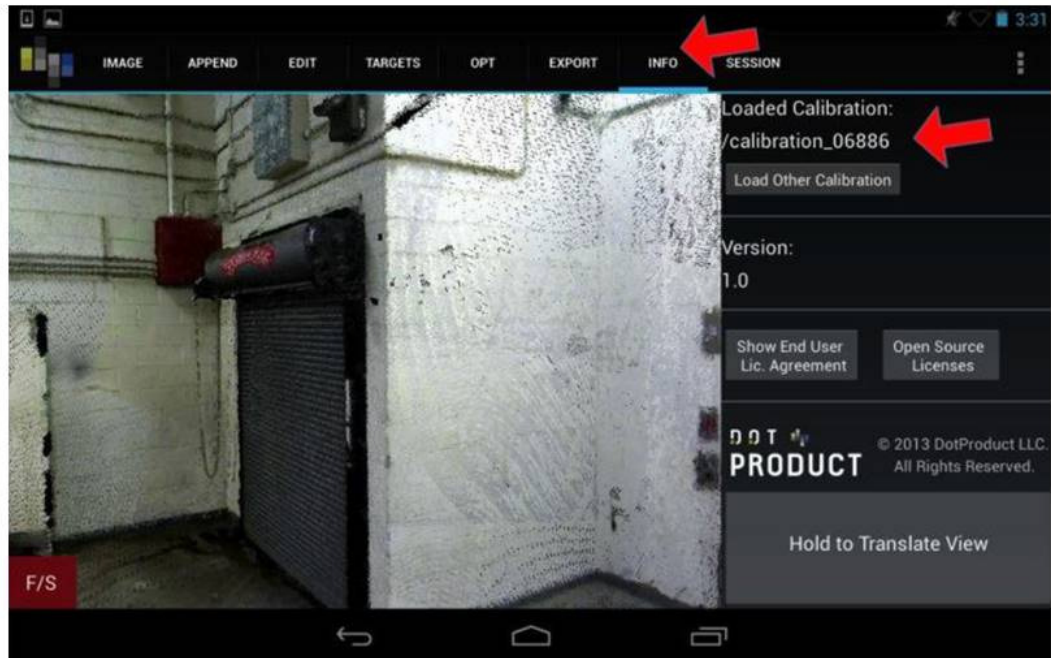
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- Copy PTX file(s) to computer



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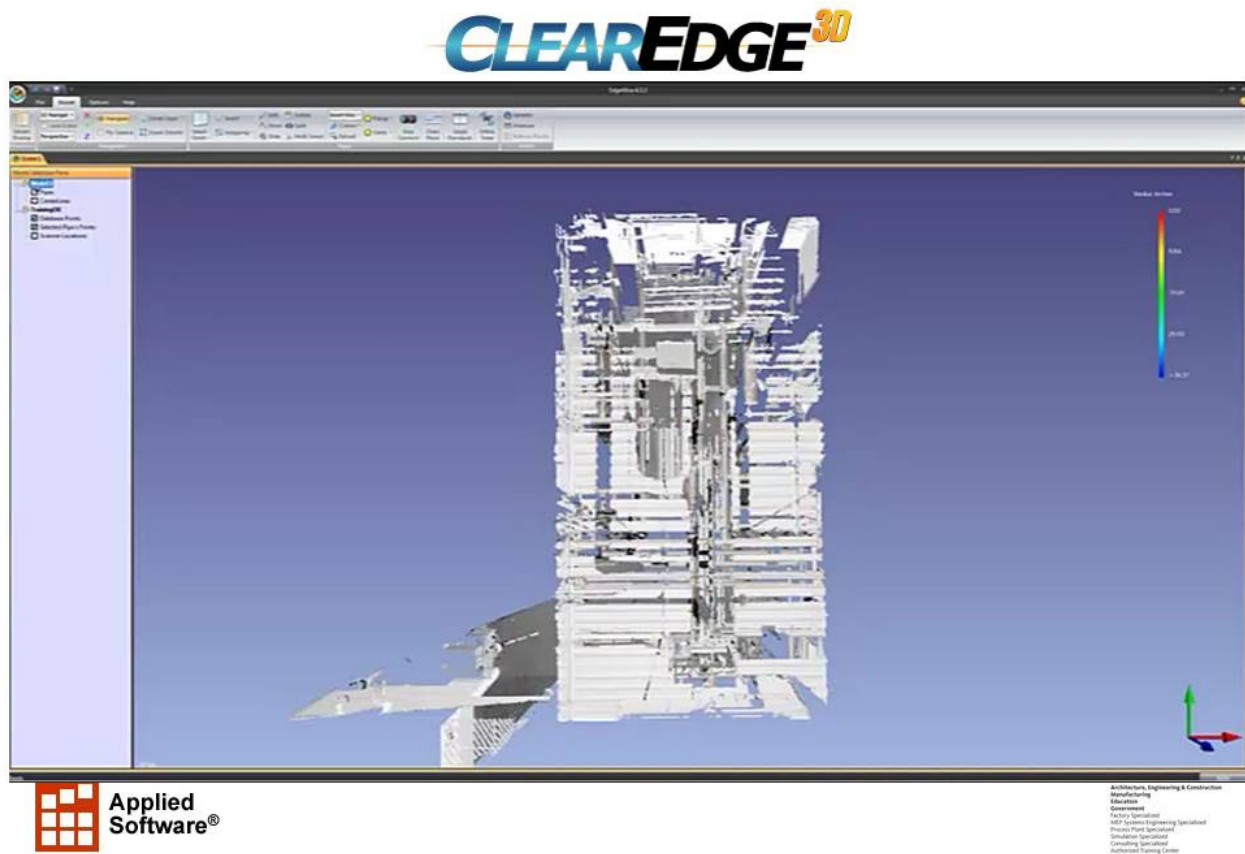


**The DotProduct DPI-7 Handheld 3D Imager Kit contains:**

1	Android Tablet computer with 16GB of storage (DotProduct reserves the right to provide greater than 16GB depending on availability).
1	License of DotProduct Phi.3D software which may be downloaded directly to the tablet and licensed to that tablet computer and PrimeSense Carmine 1.08 camera, once the tablet has been activated with Google and registered with DotProduct. One year of support and upgrades is included.
1	PrimeSense Carmine 1.08 red, green, blue and depth sensor. Performance specifications are available at <a href="http://www.dotproduct3d.com/rd1_08_specifications">http://www.dotproduct3d.com/rd1_08_specifications</a>
1	7" tablet bracket with handle attachment
3	USB to micro USB connectors for connecting camera to tablet
1	Carrying case
1	Tablet charger

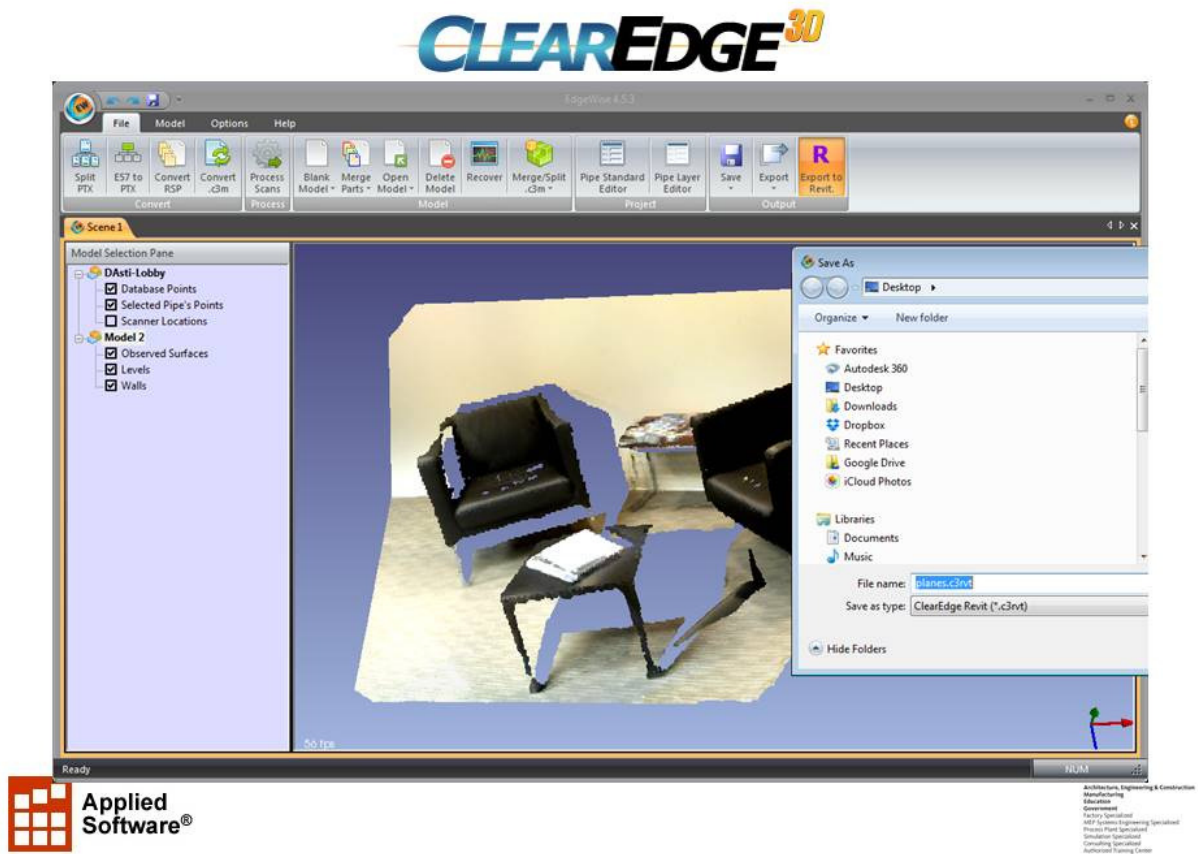


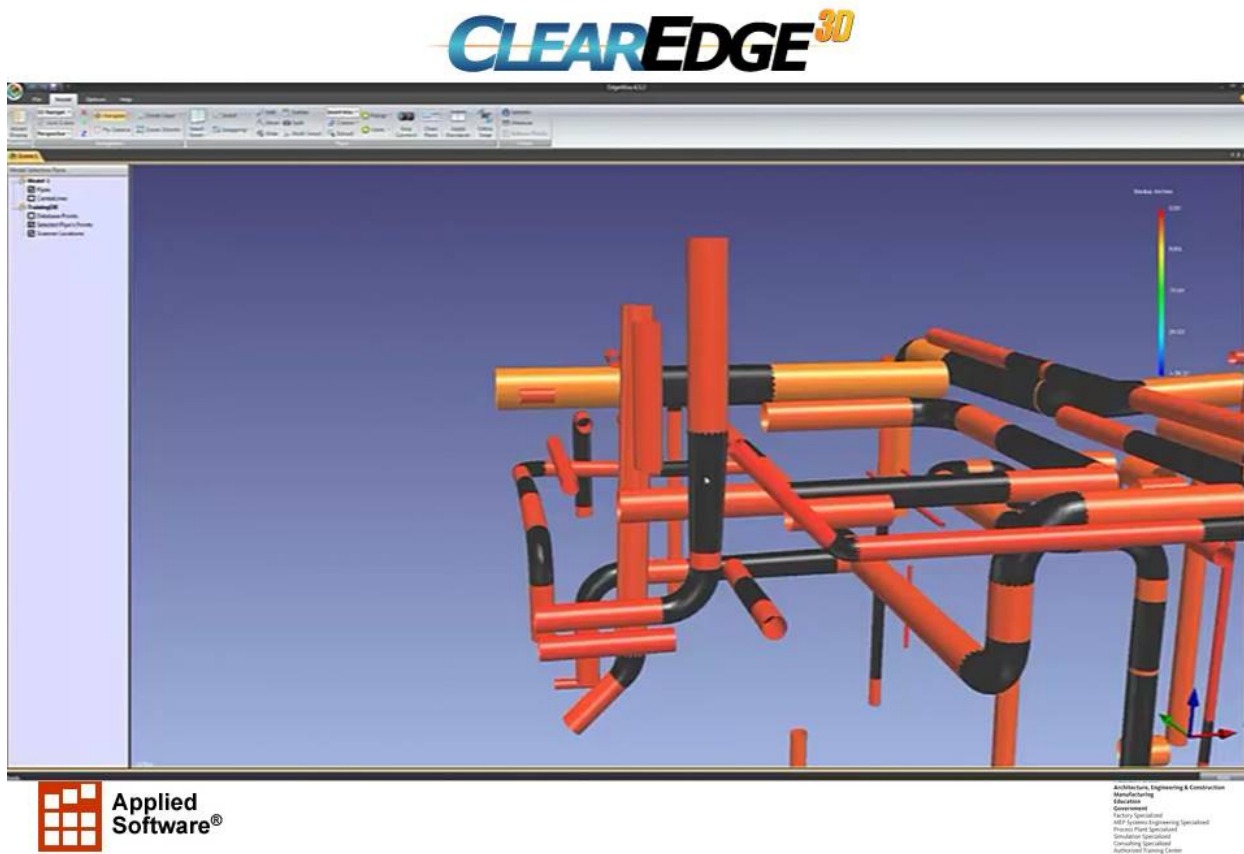
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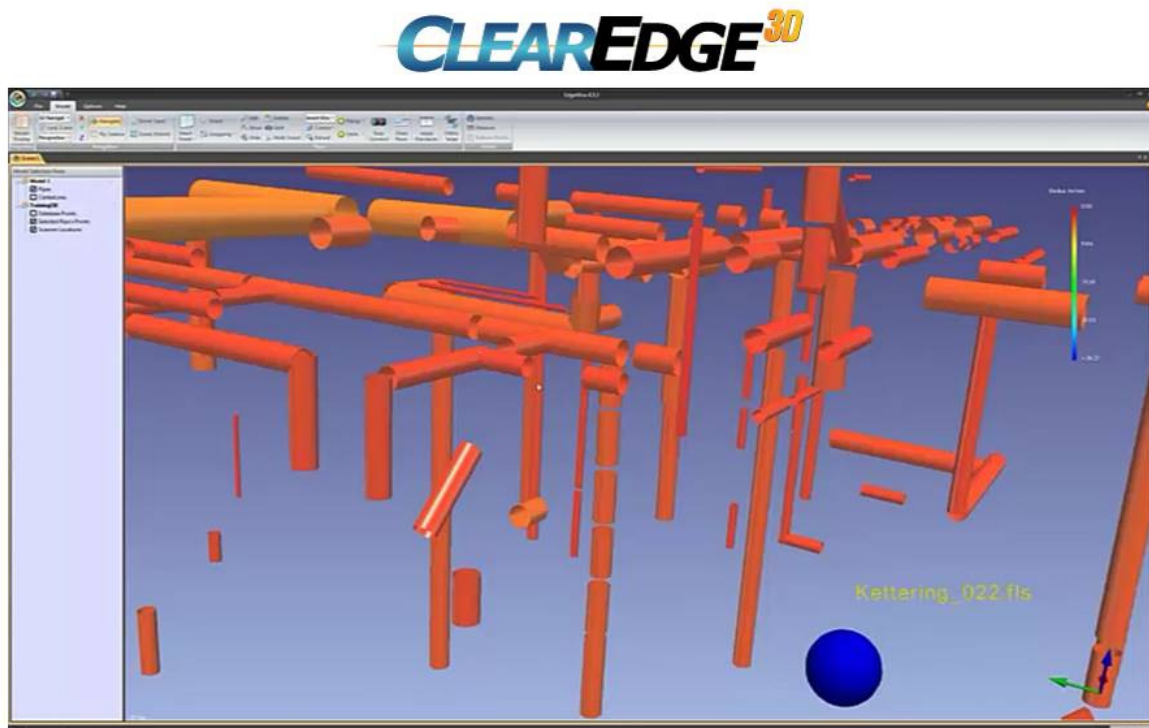










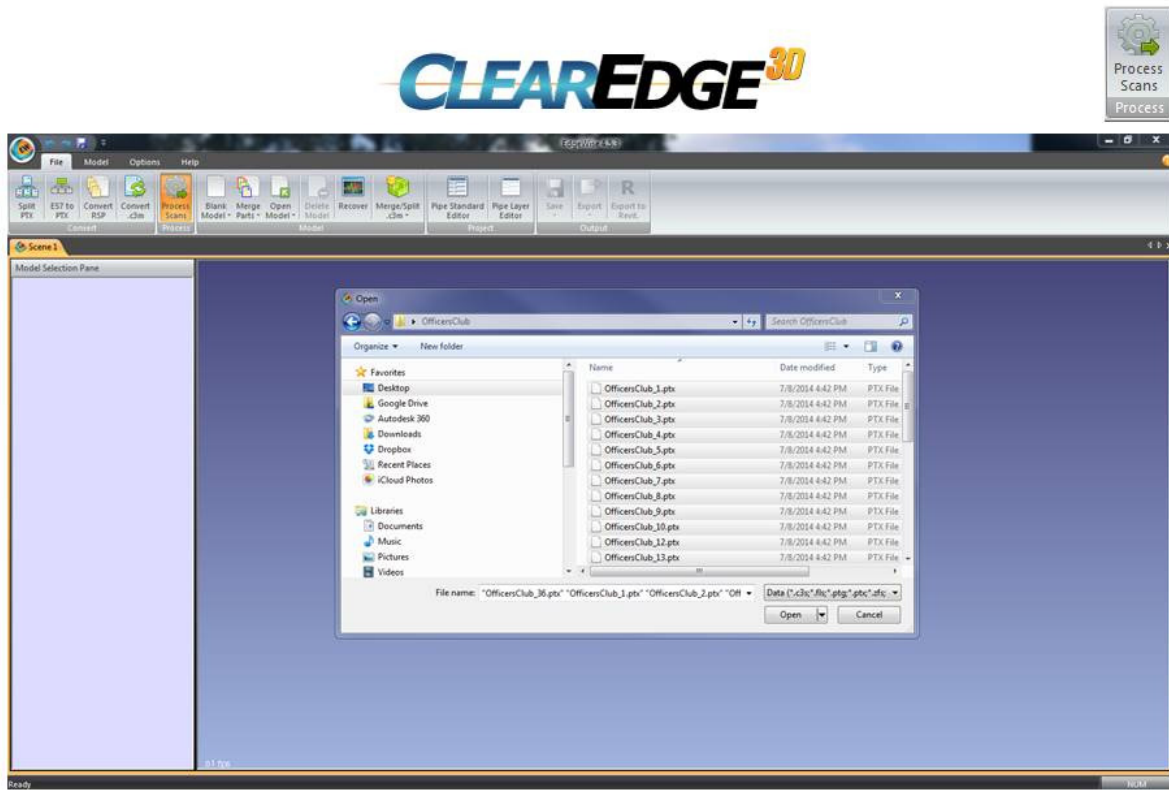


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## CLEAREDGE<sup>3D</sup>

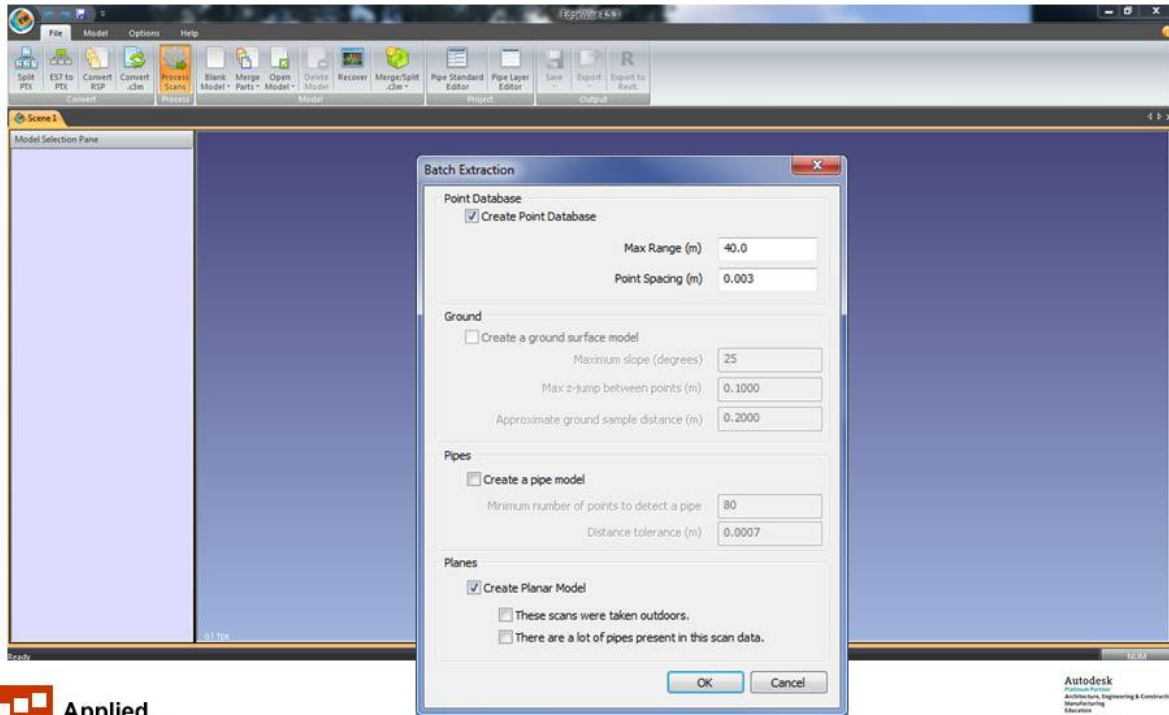


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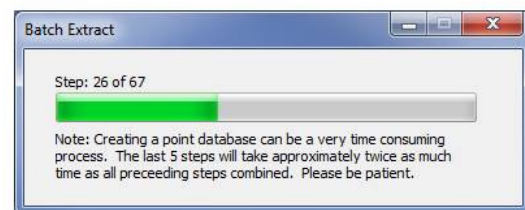
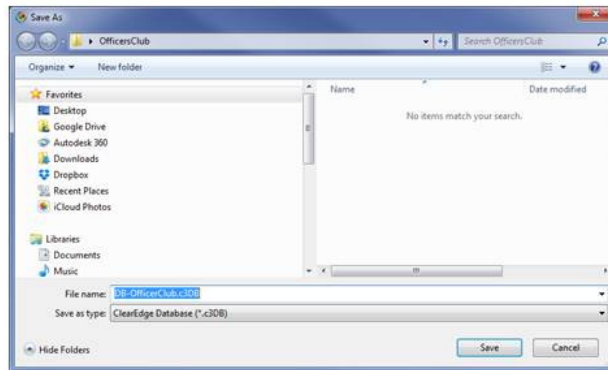
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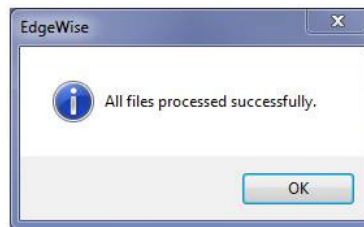
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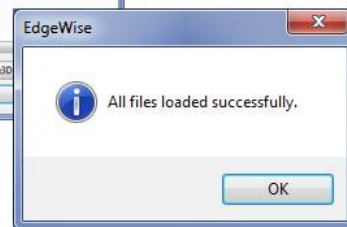
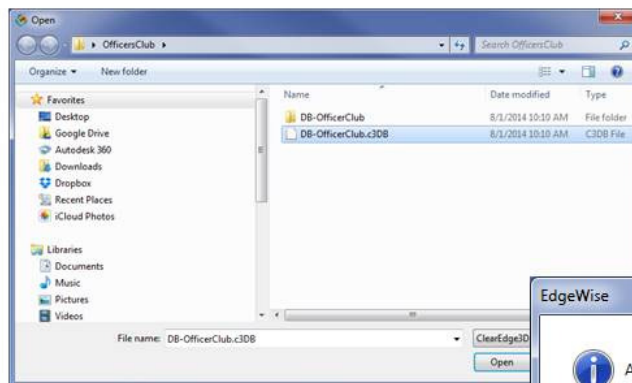
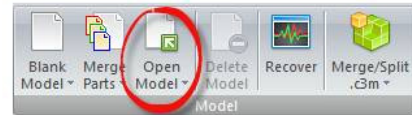




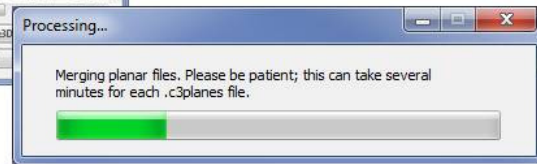
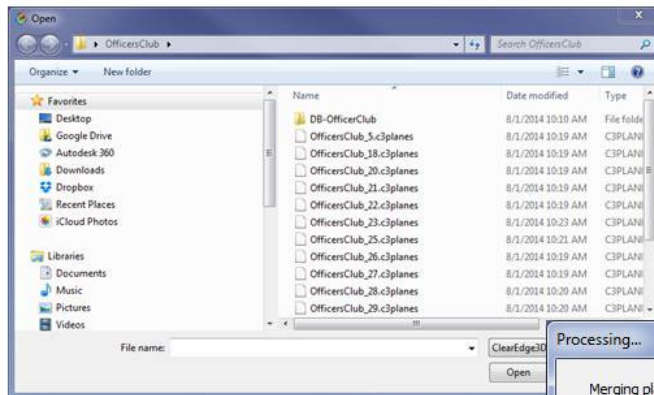
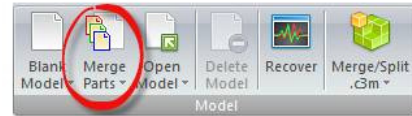
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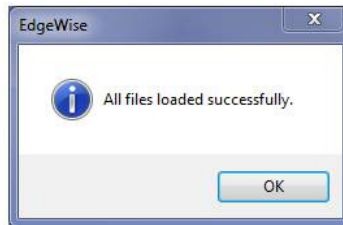


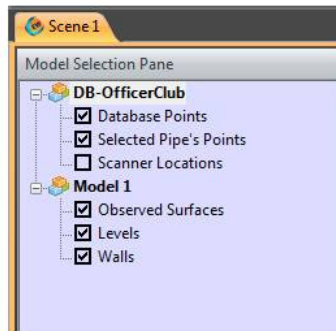
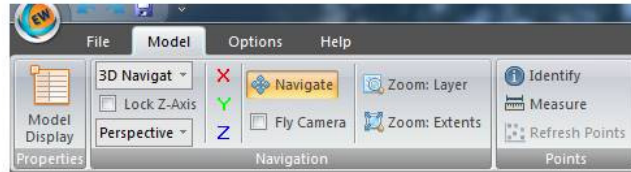


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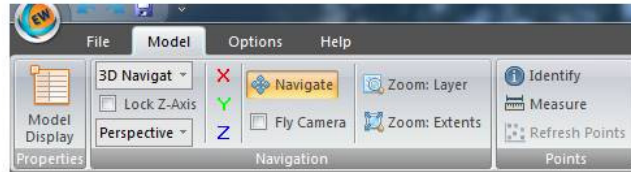


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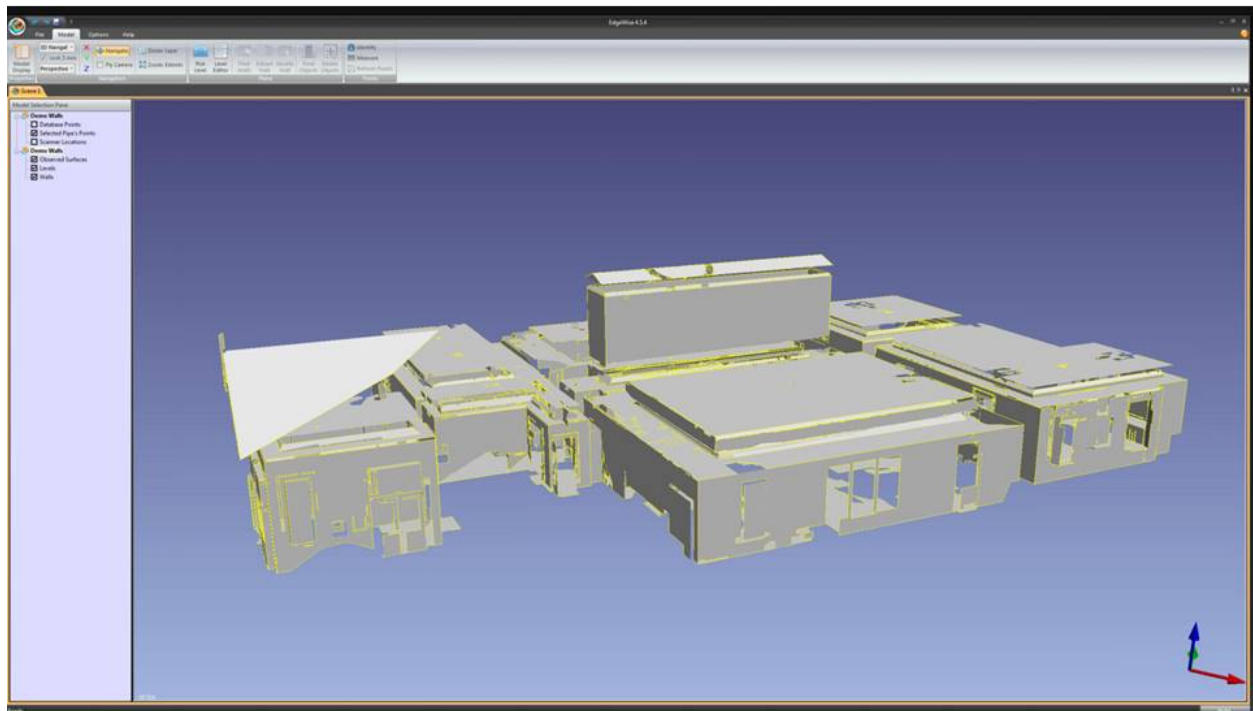


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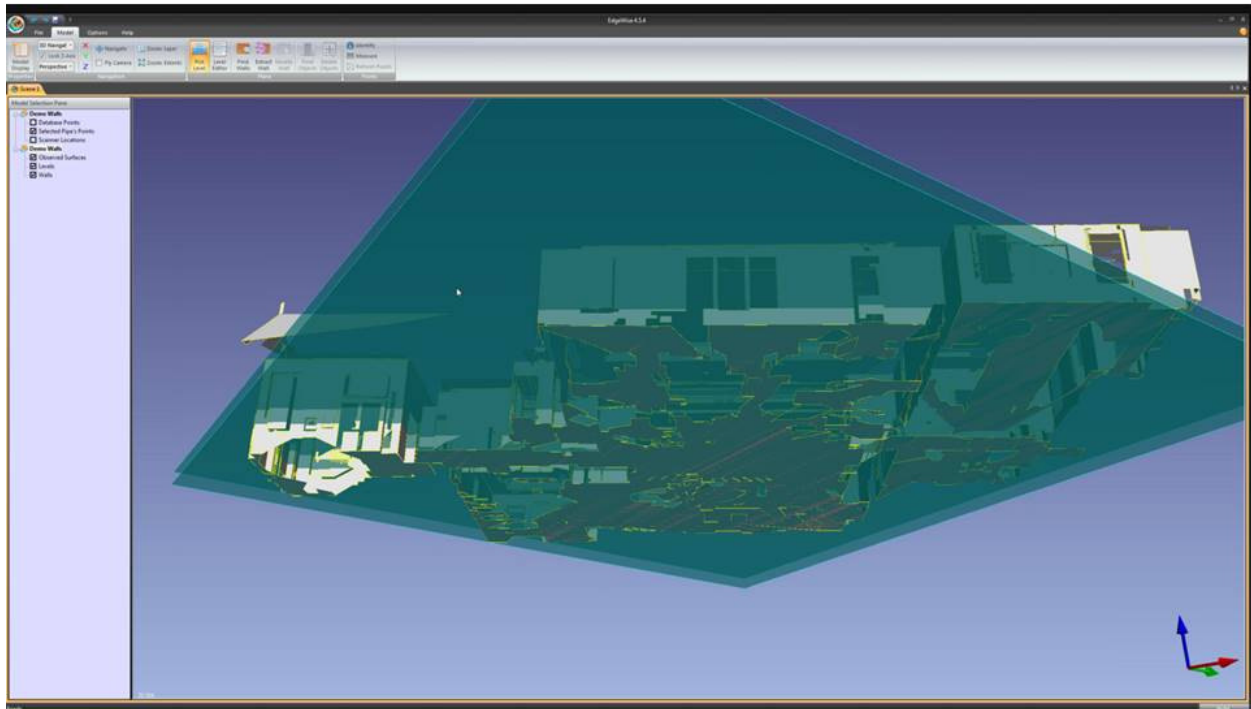


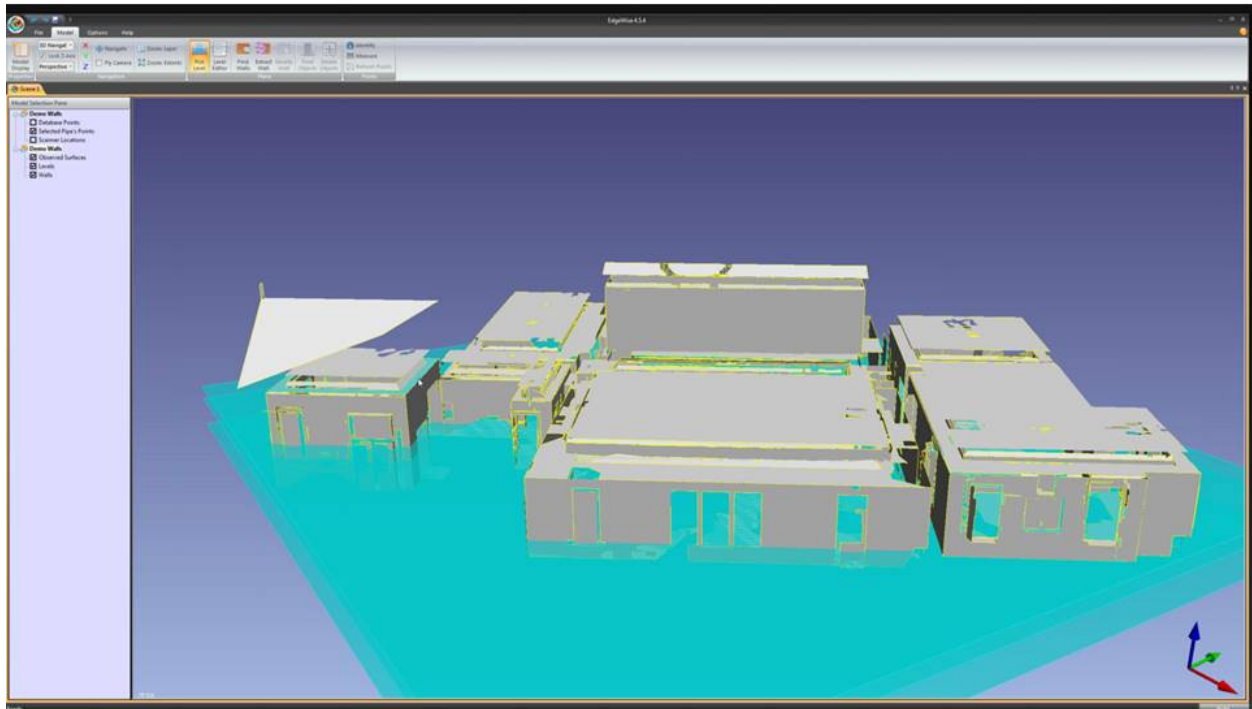
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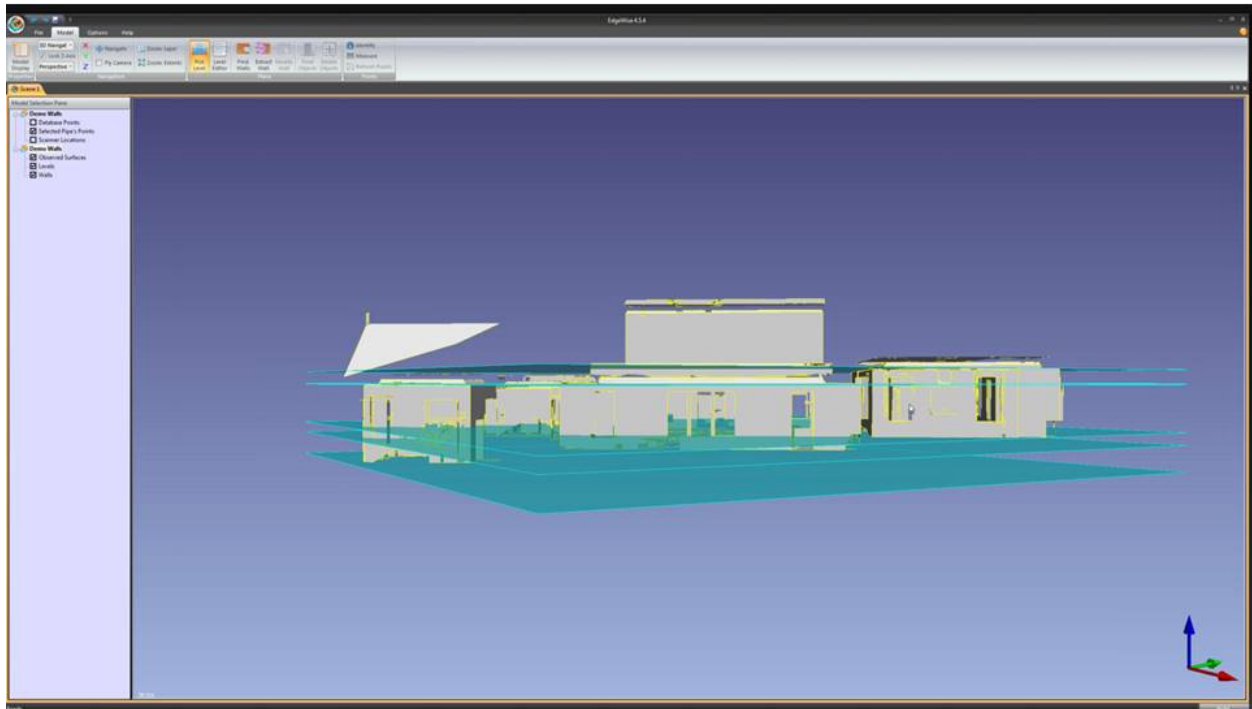


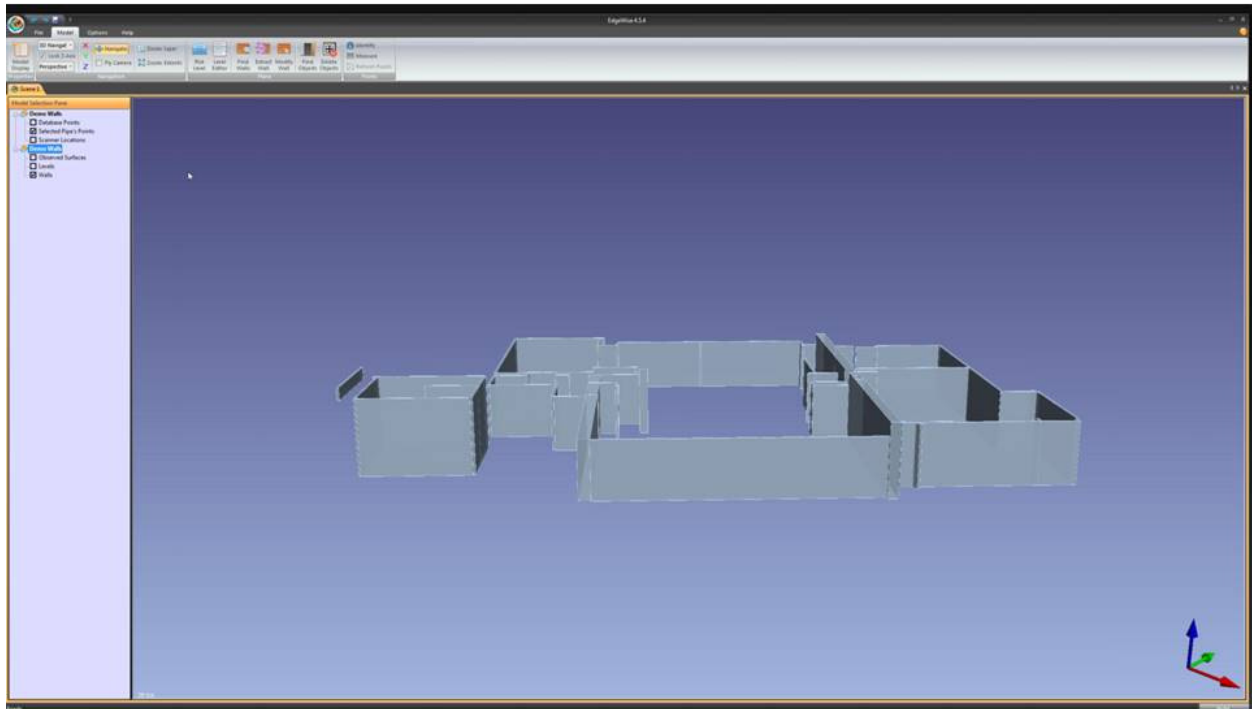


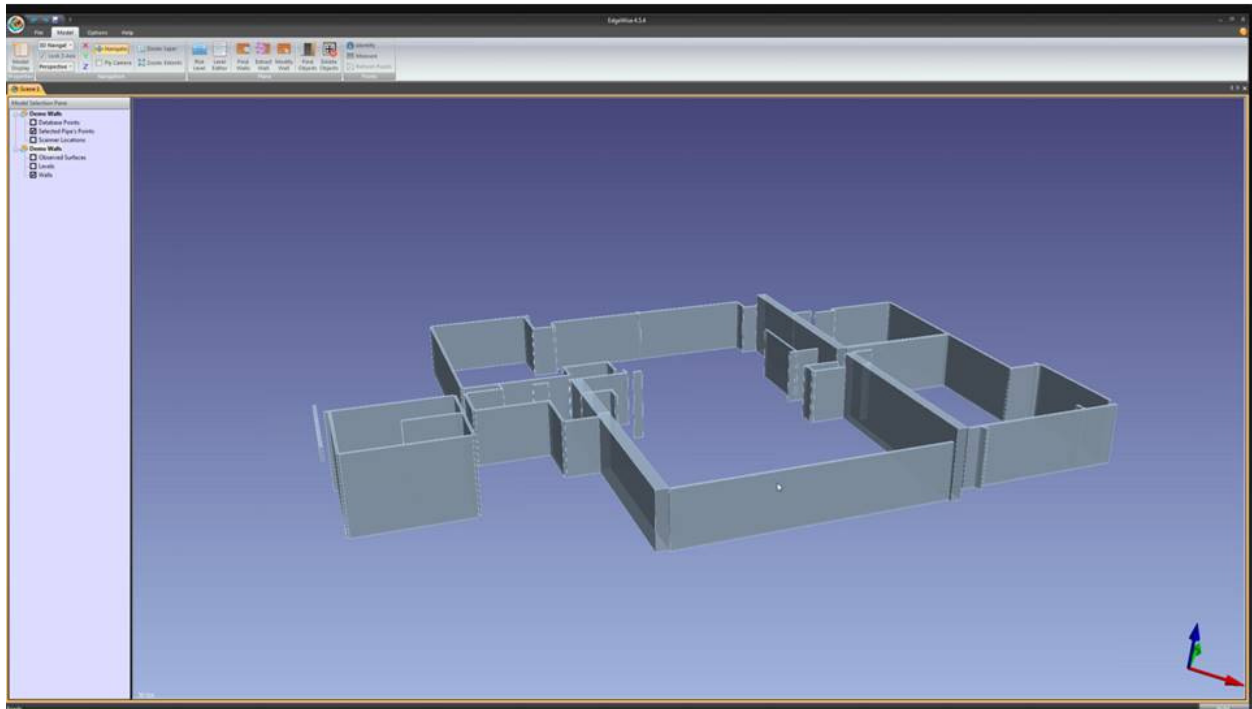


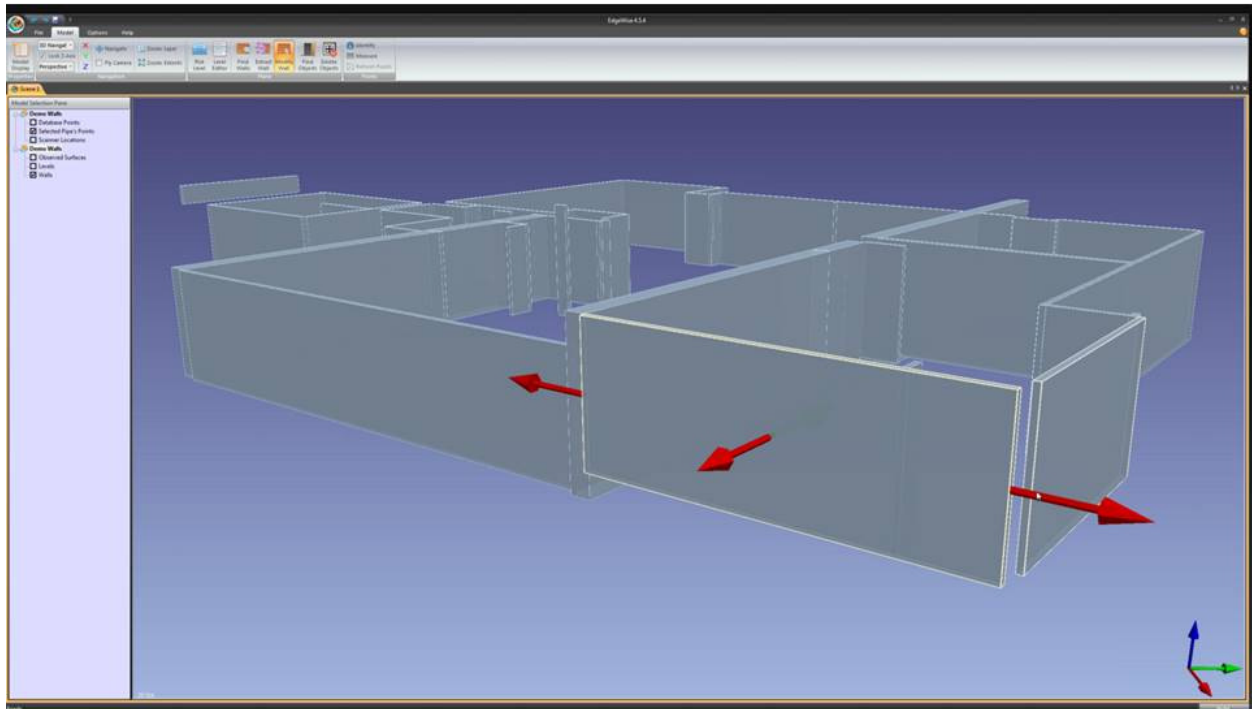


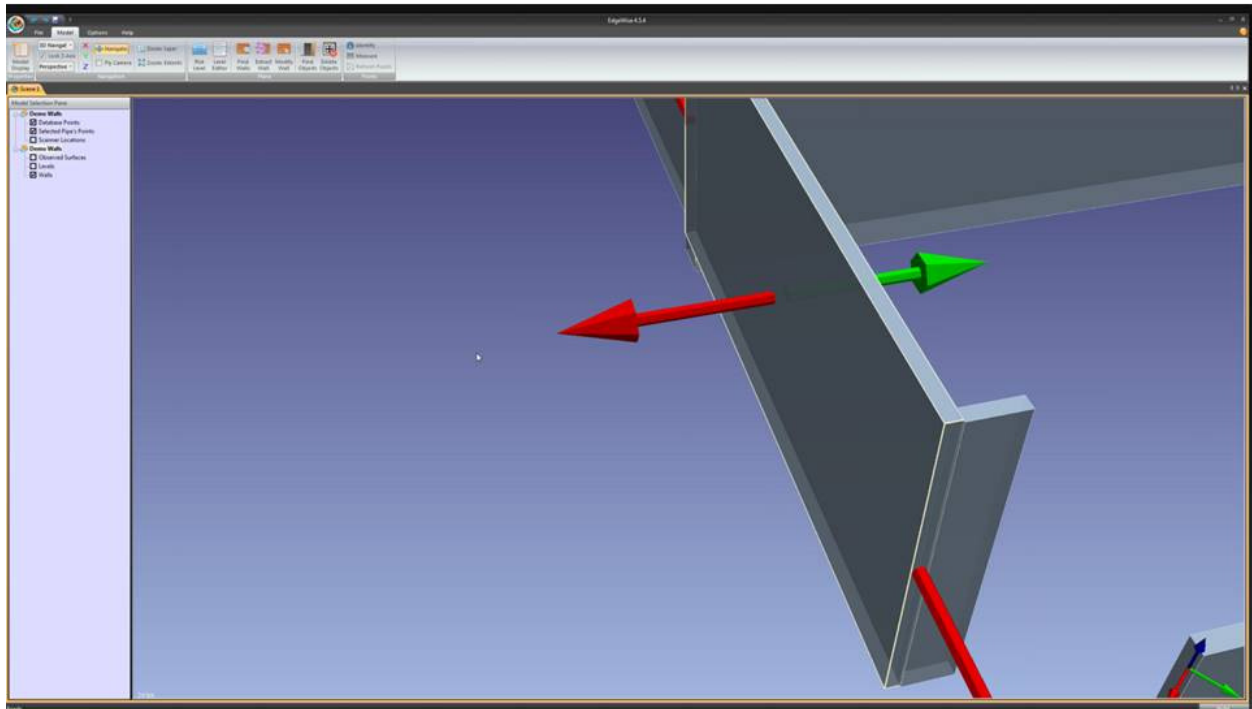


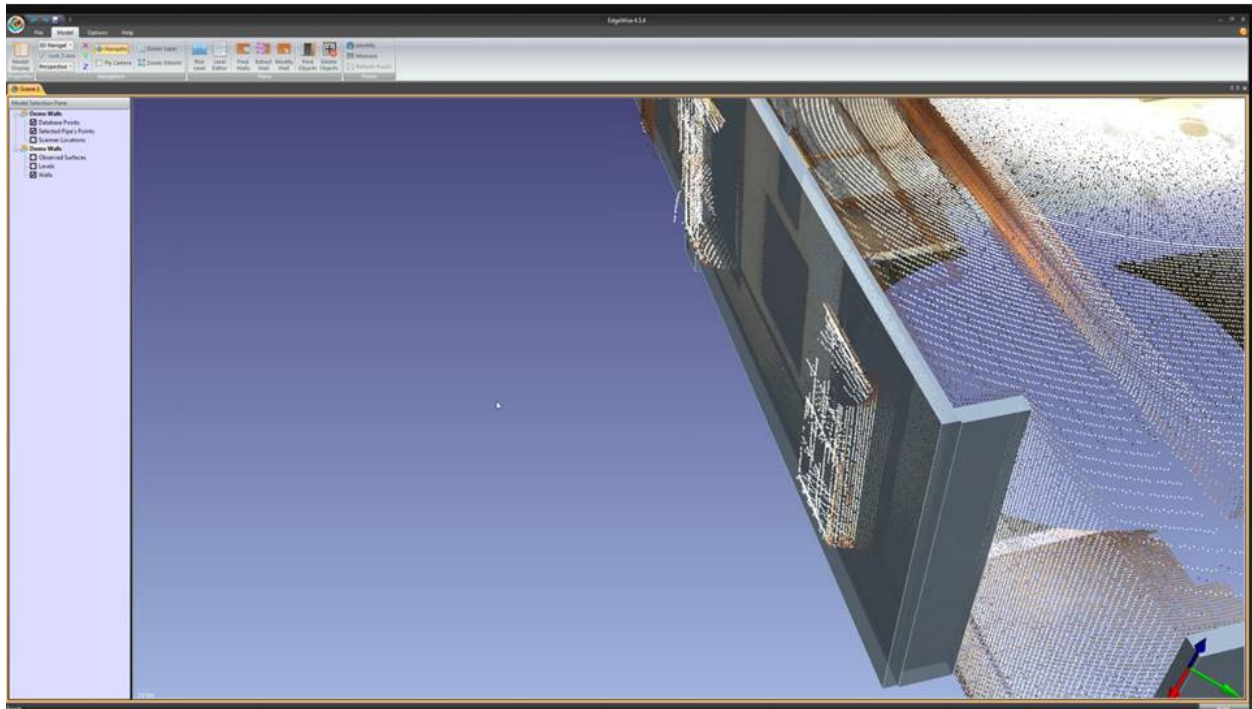




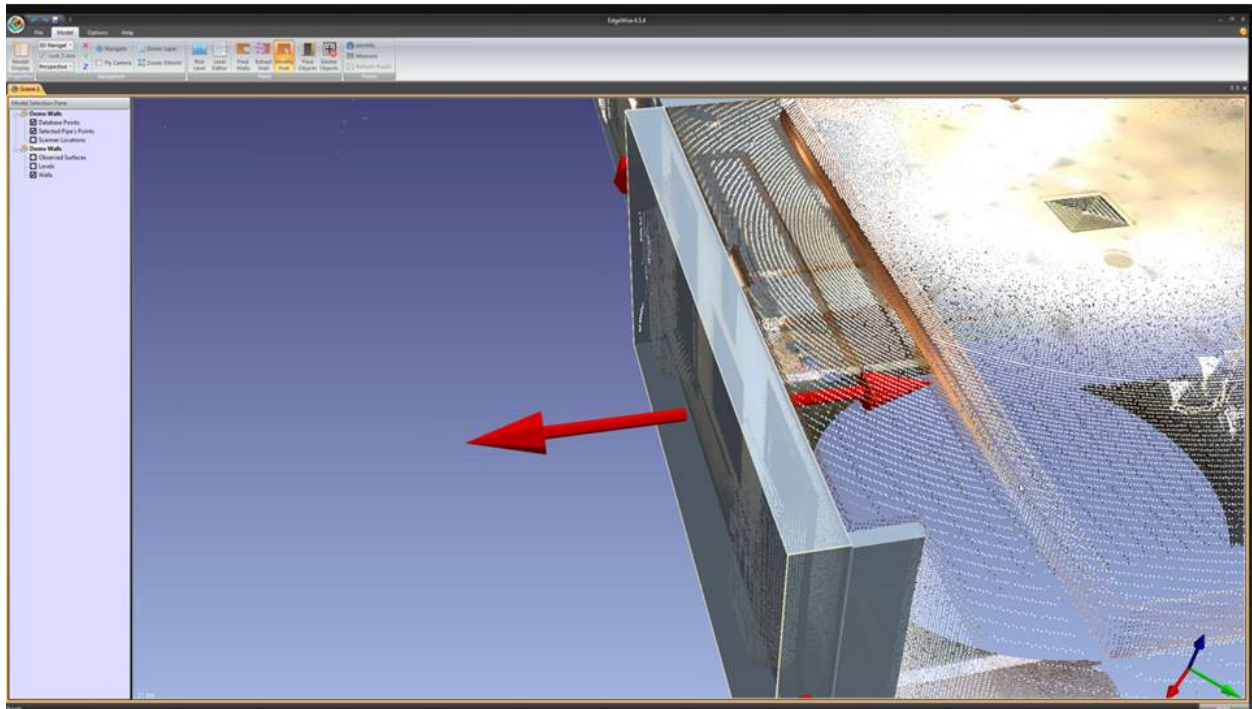


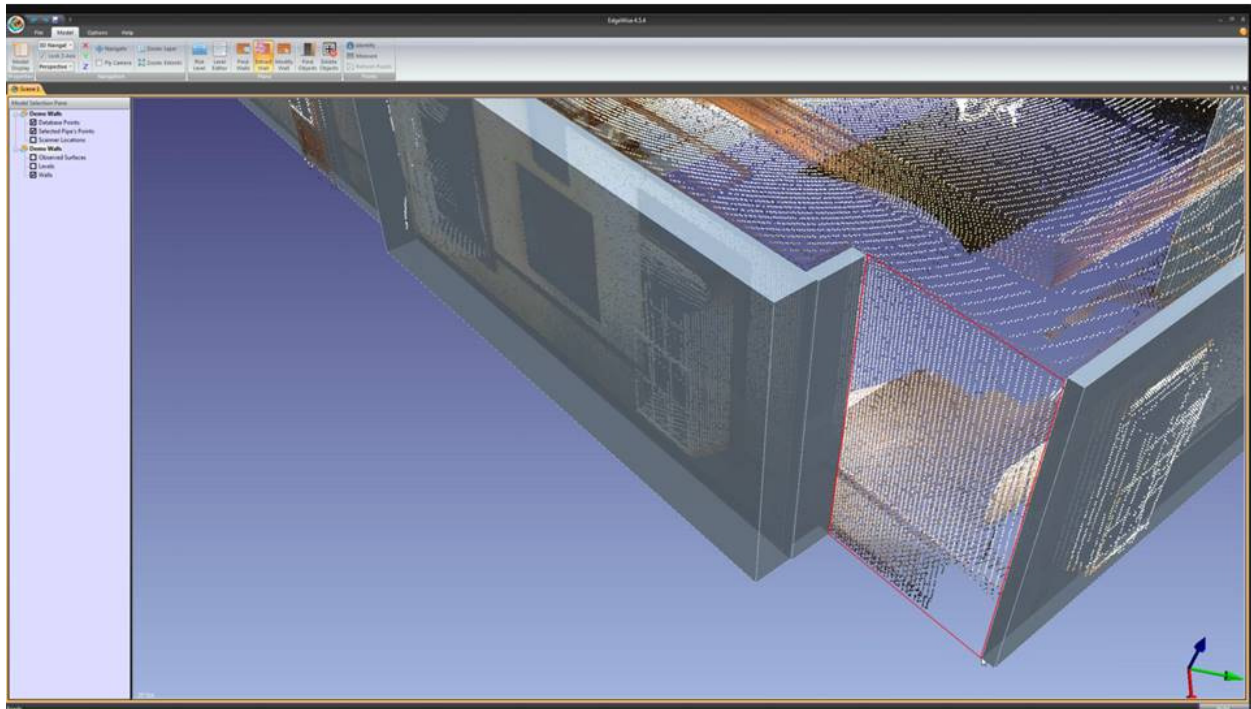


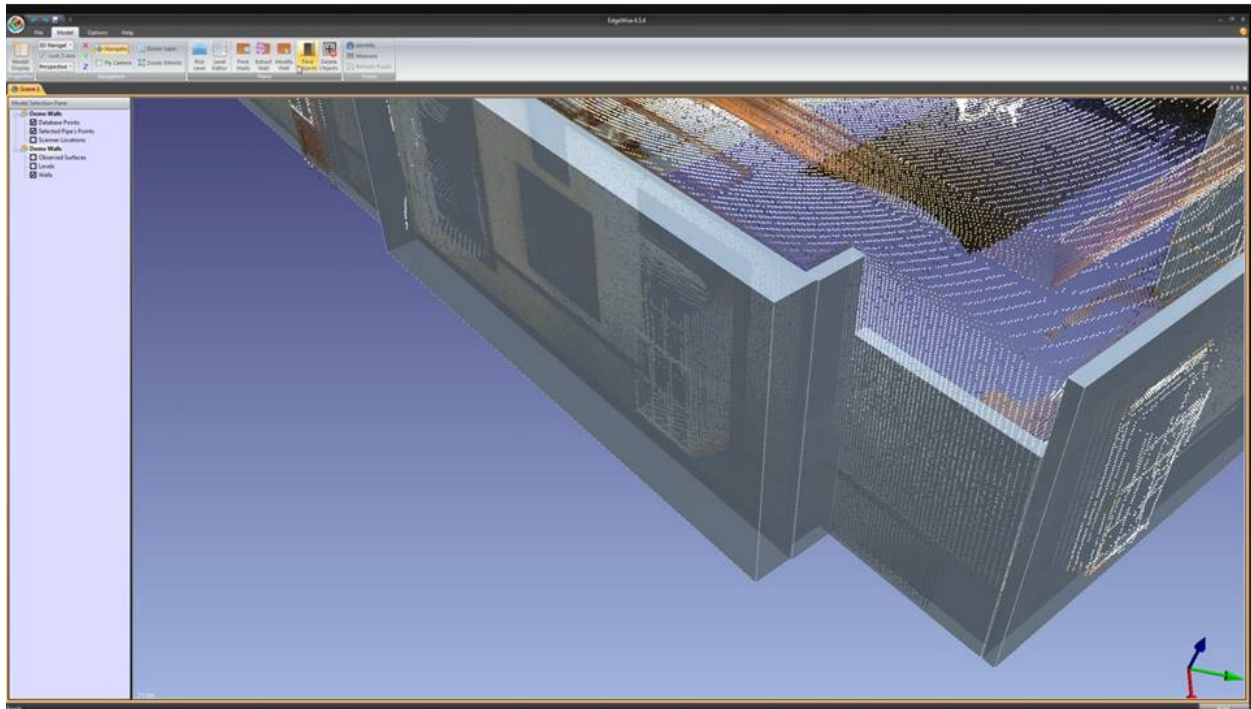


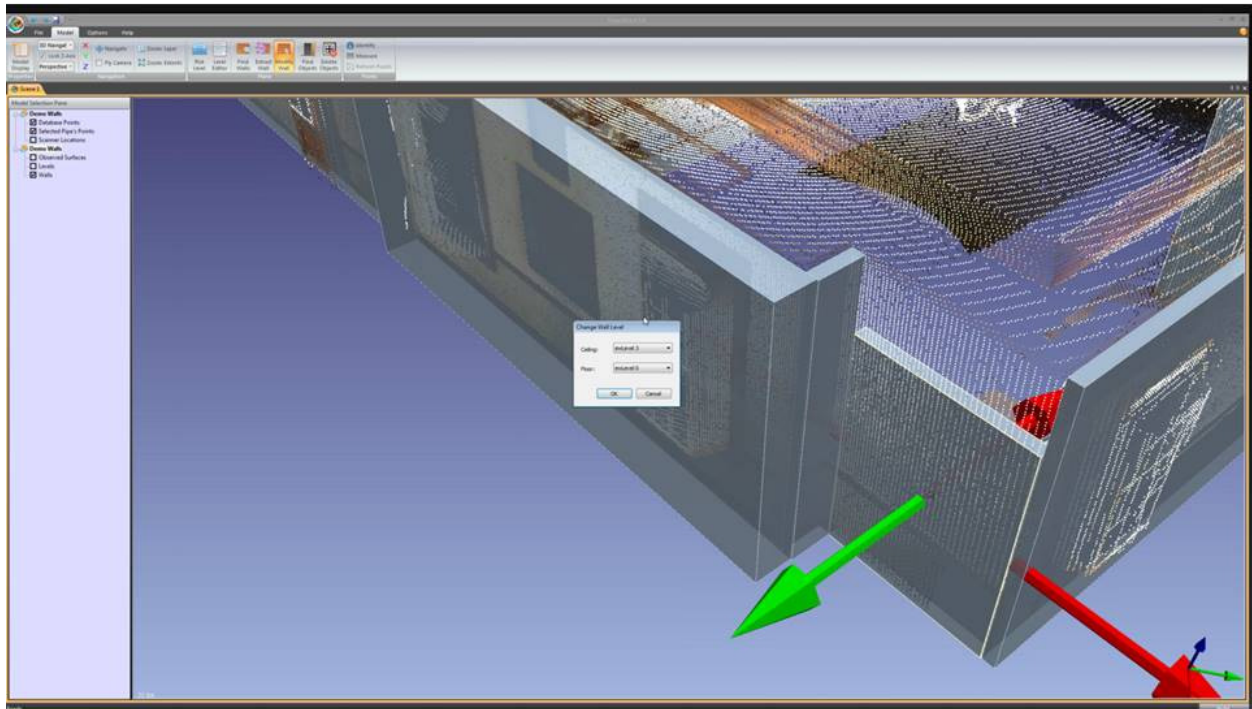


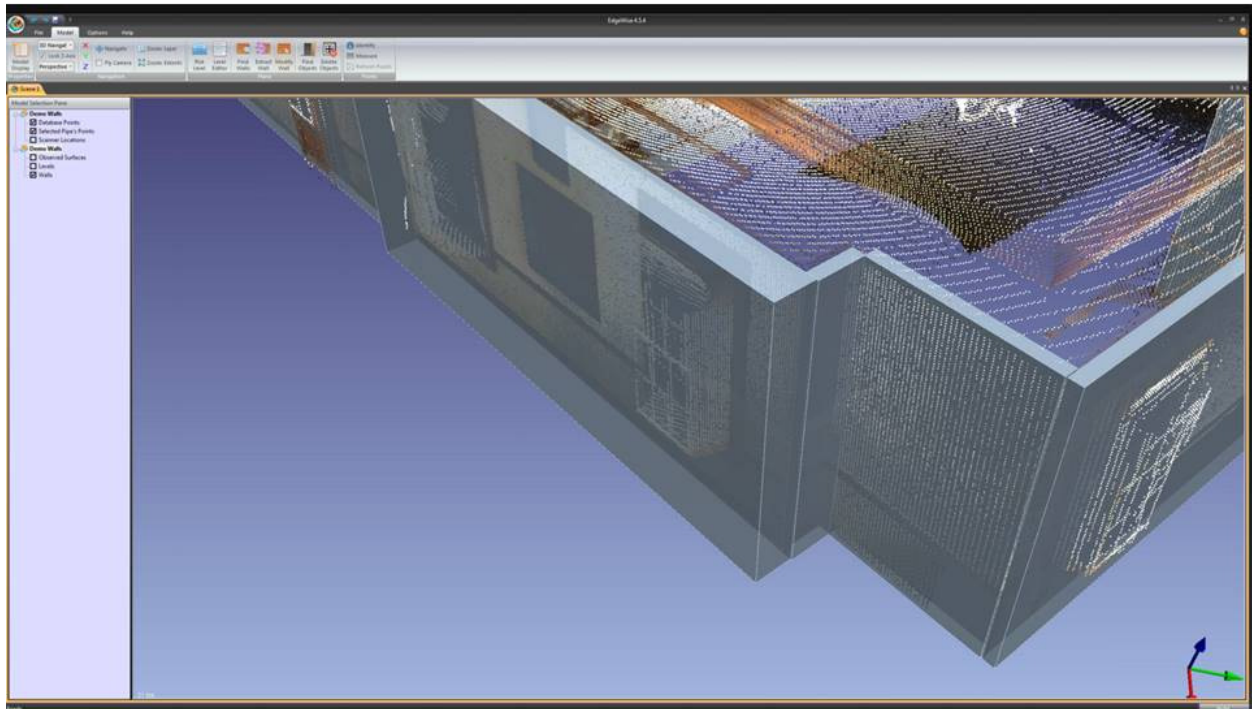




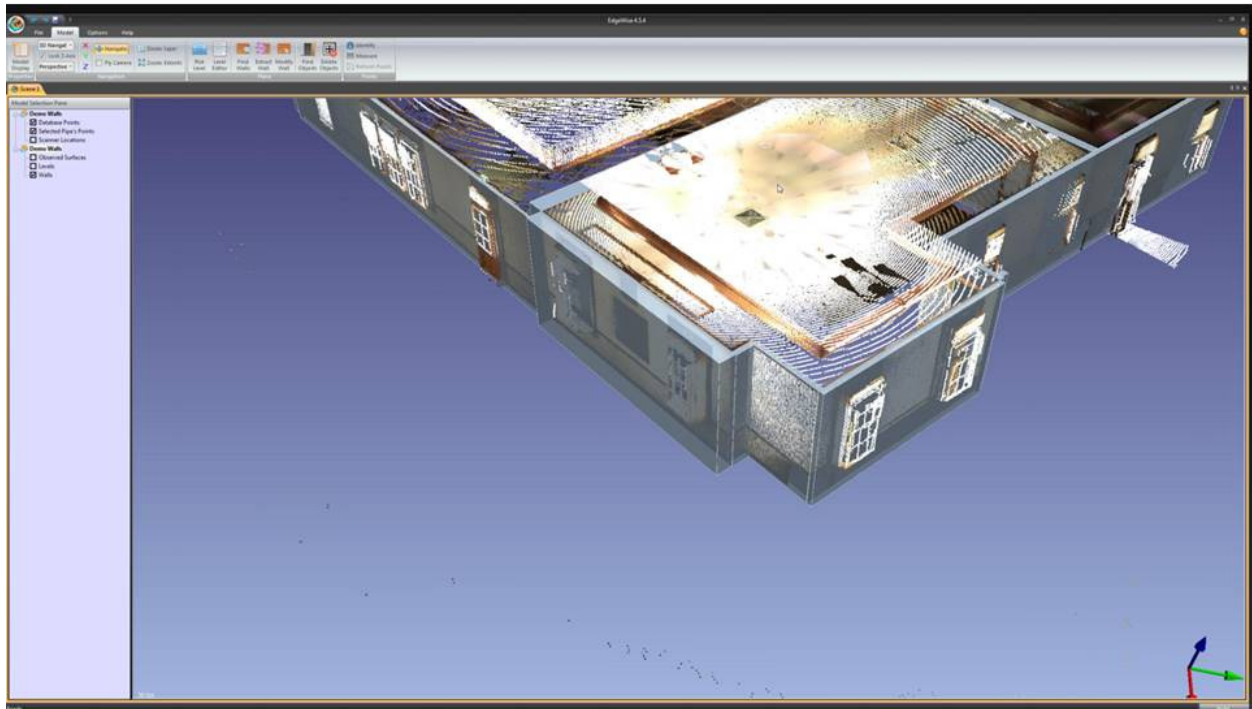


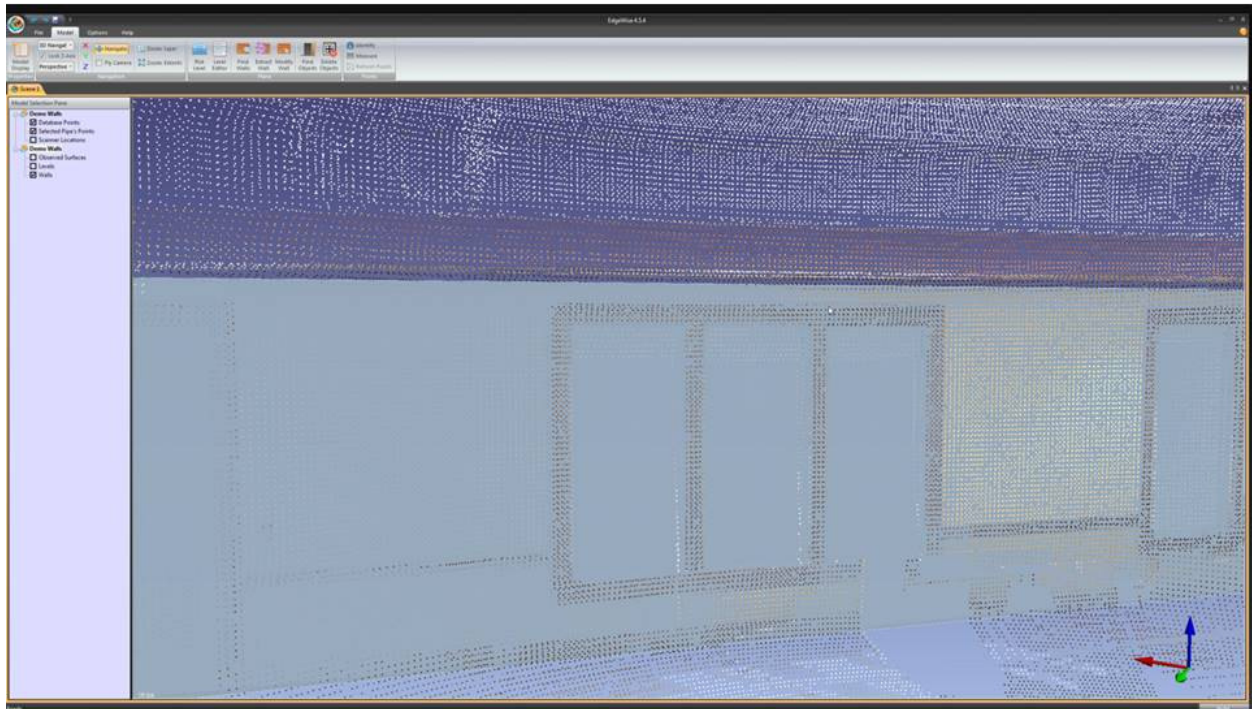


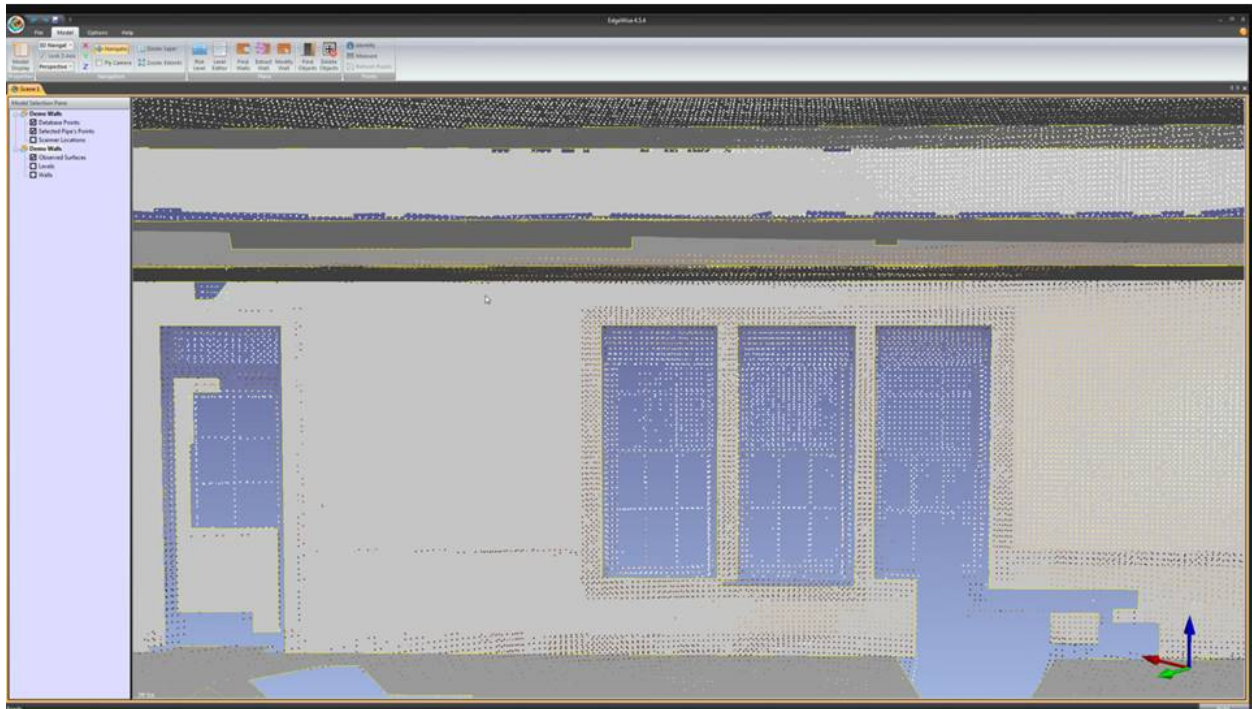




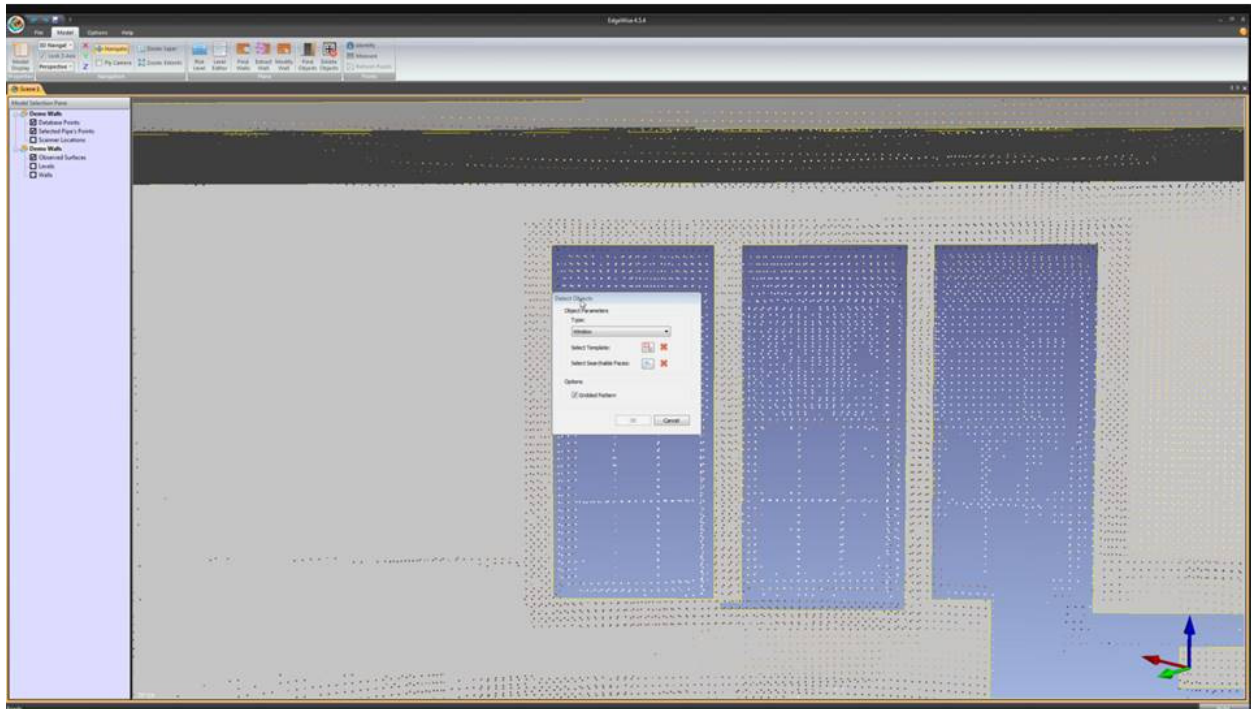


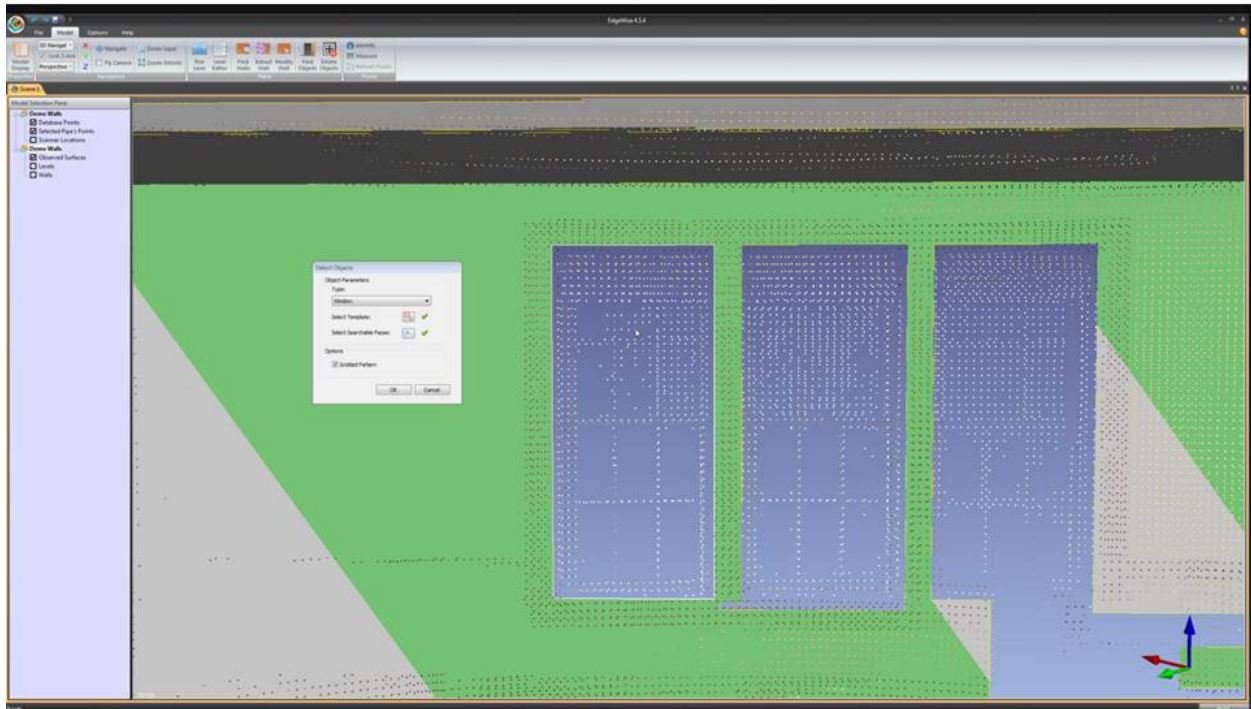


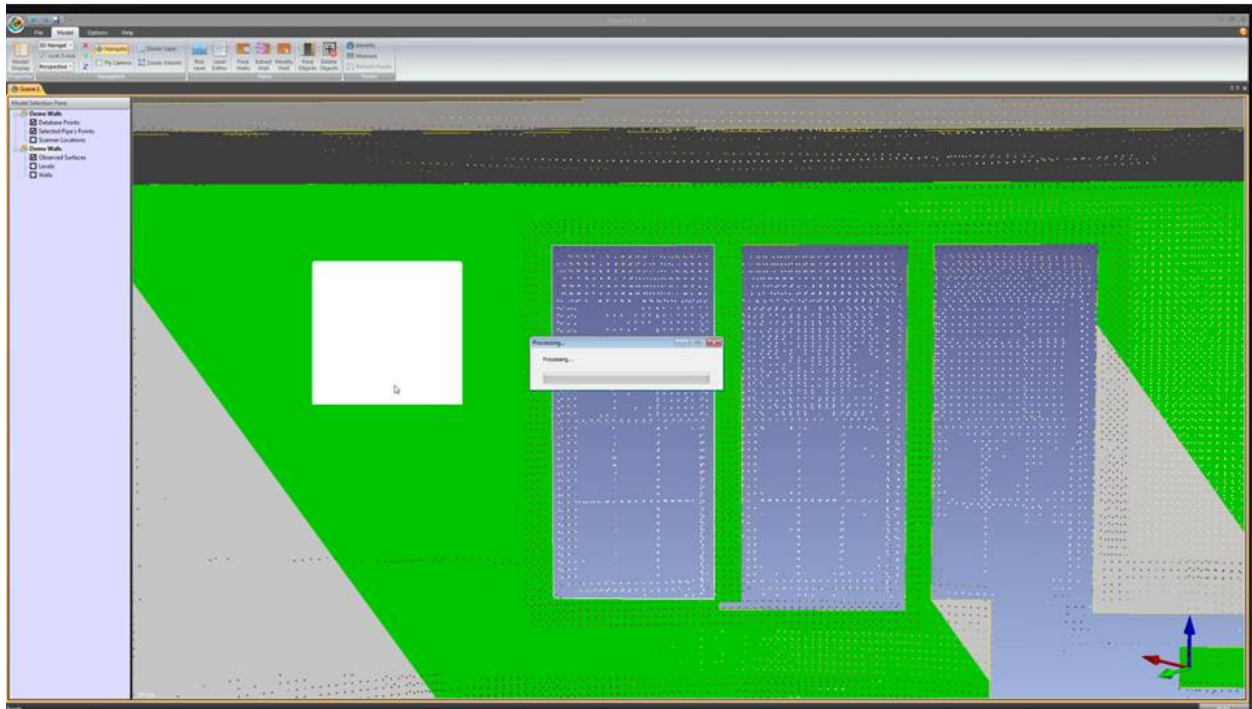


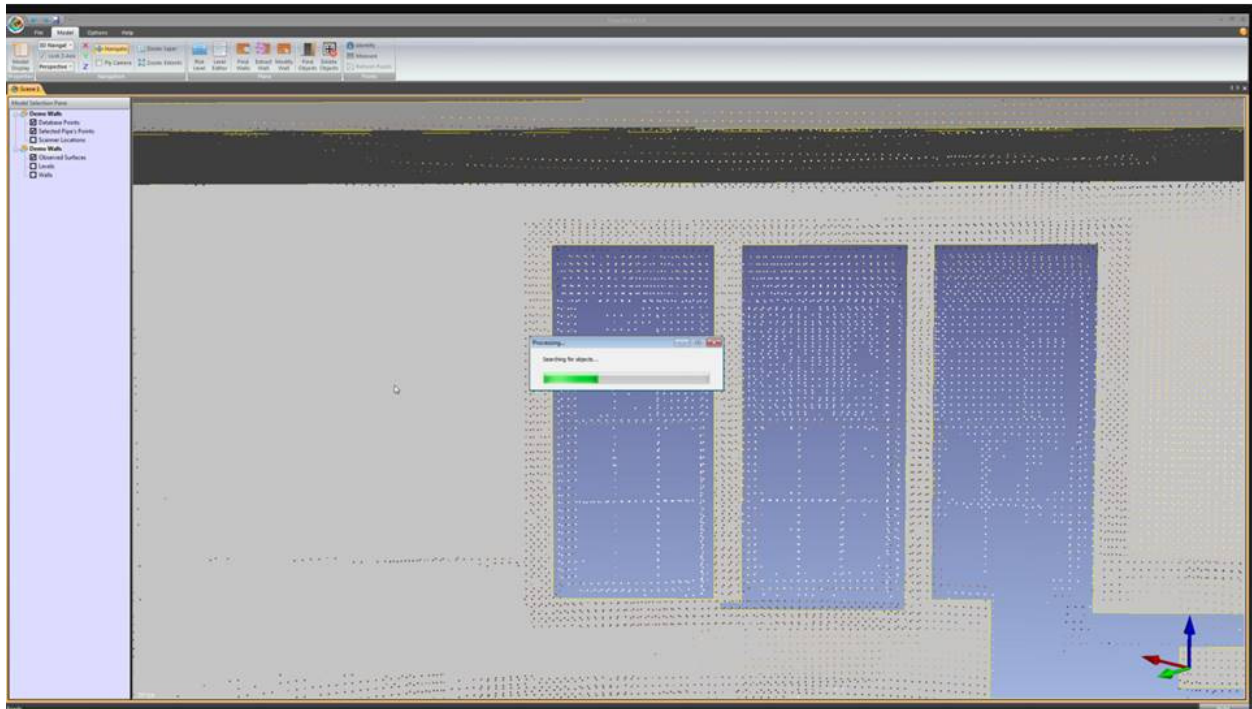


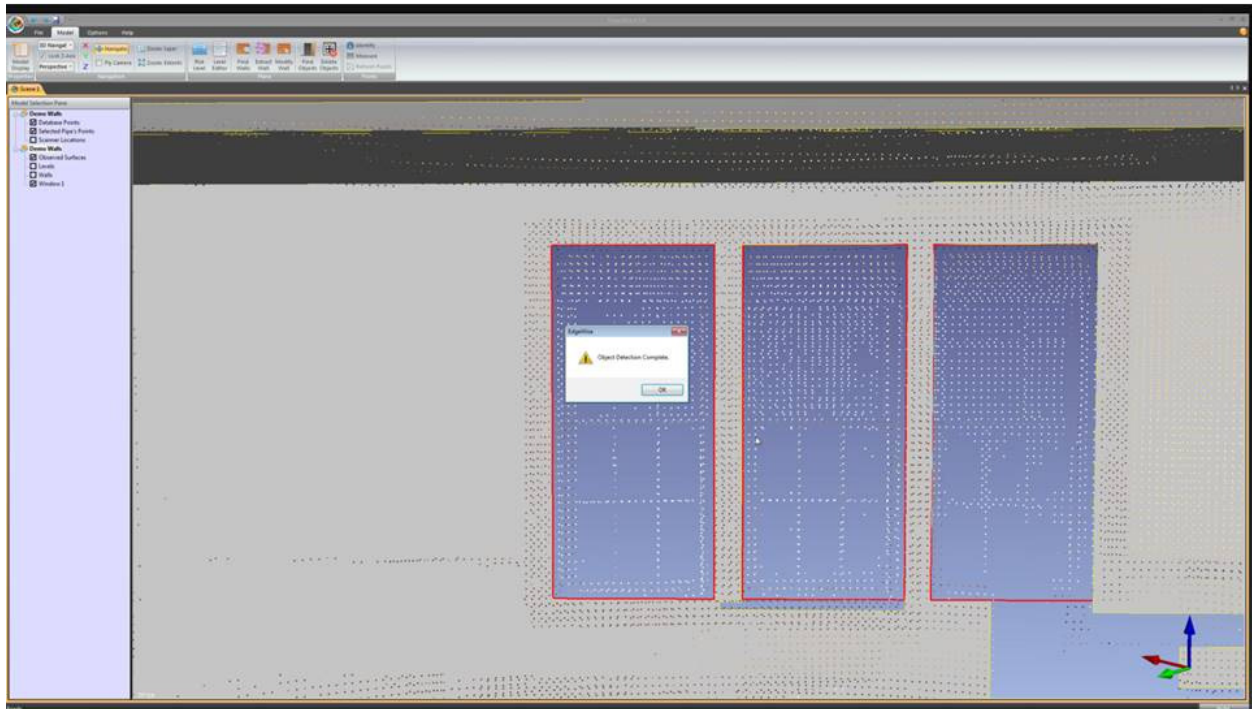




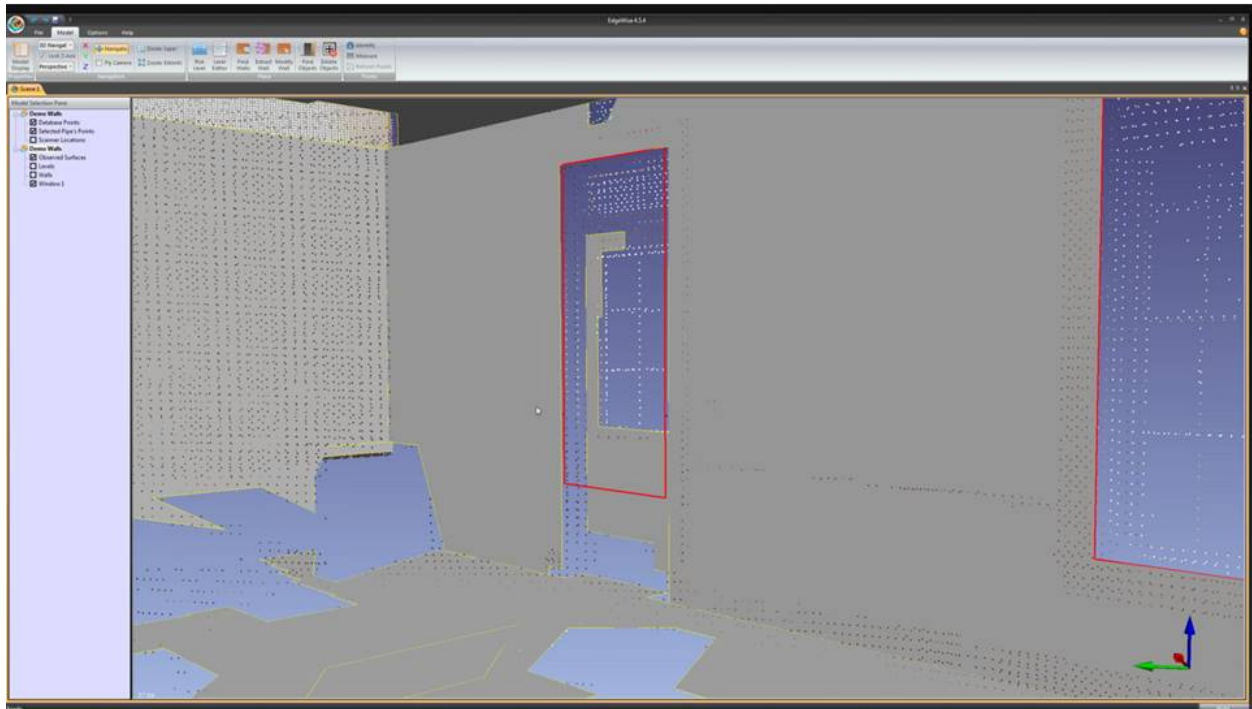


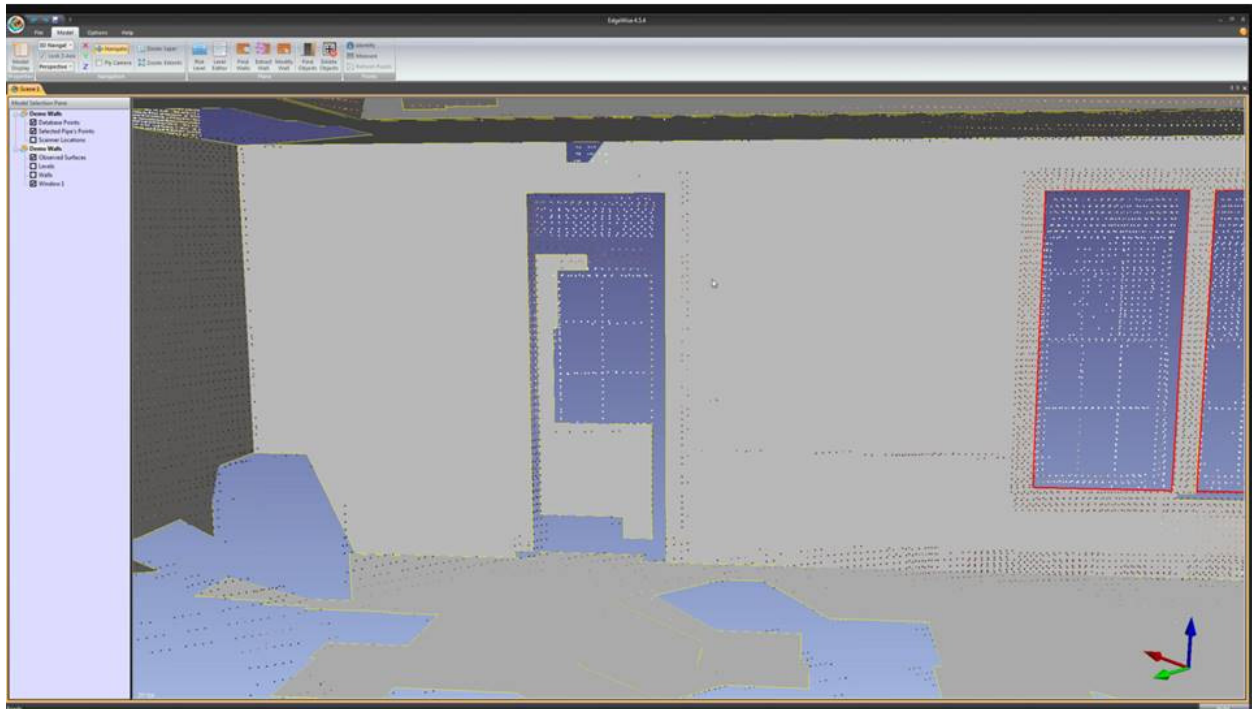


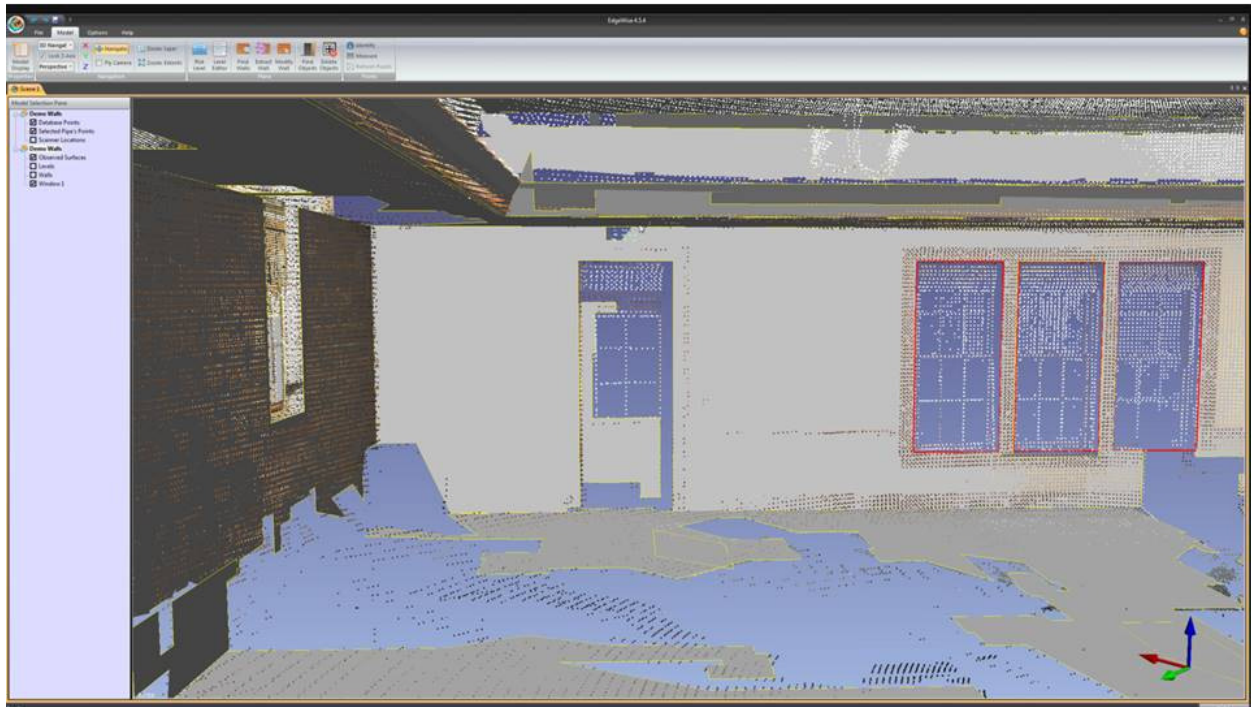




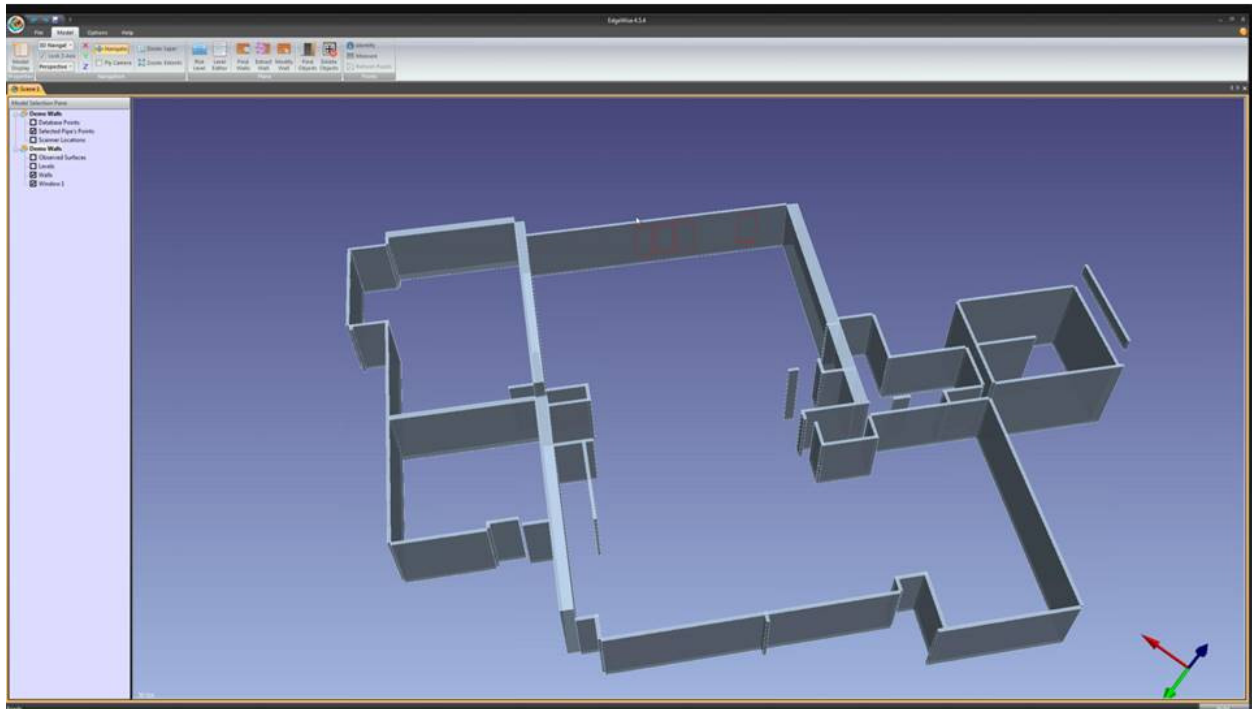


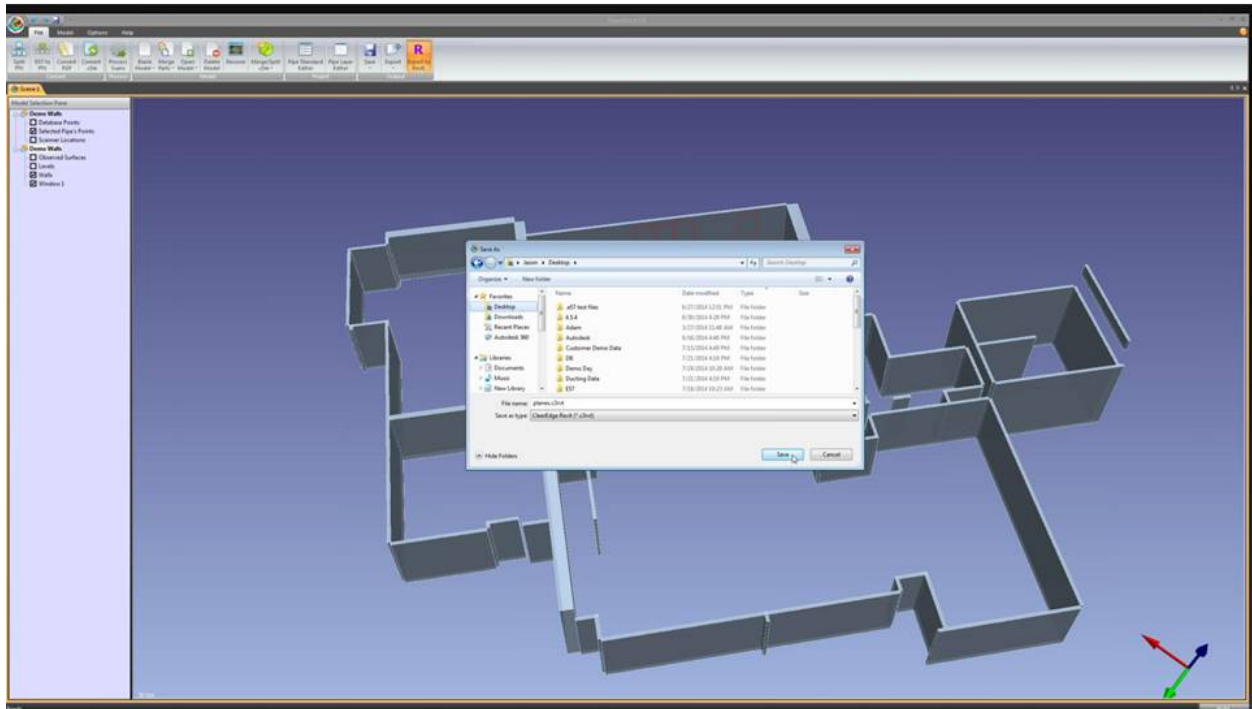


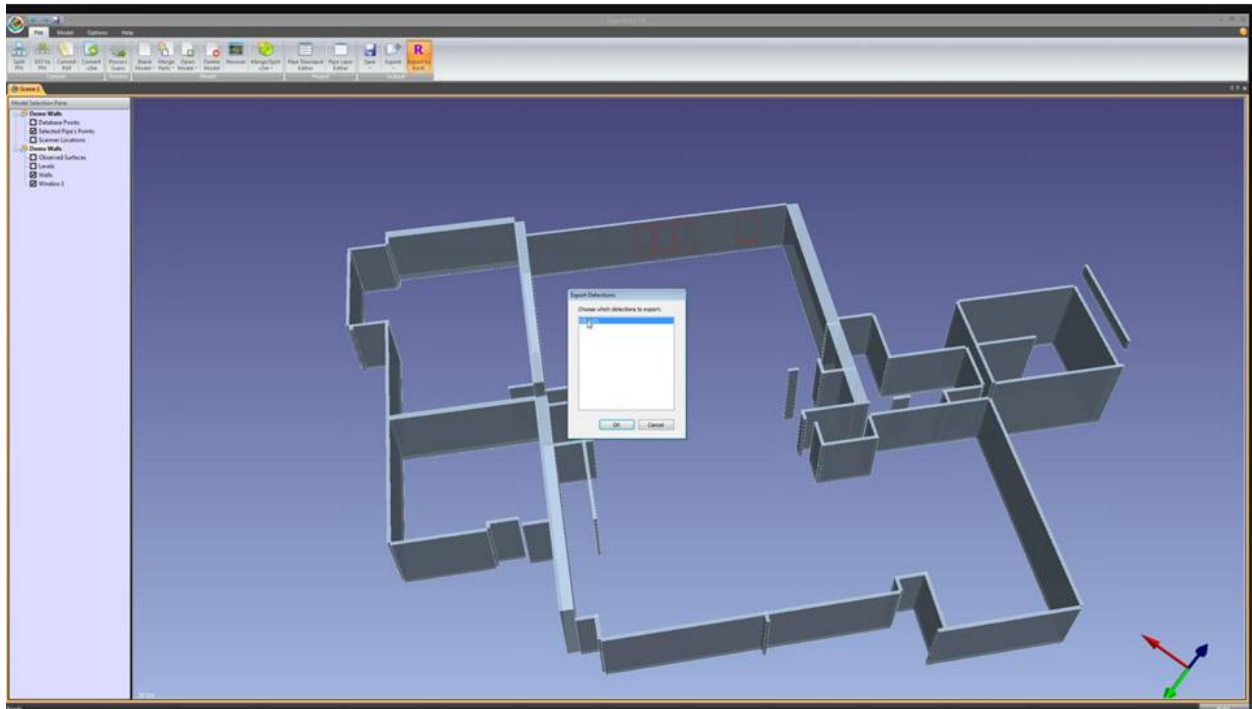


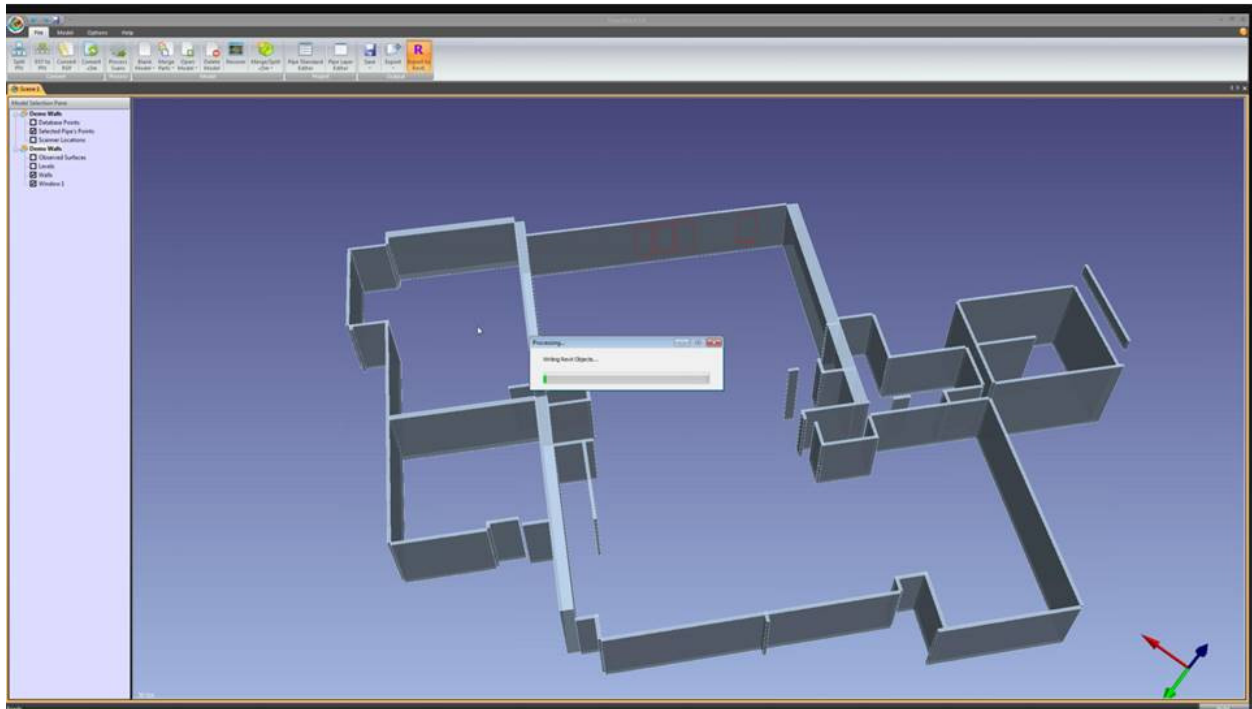










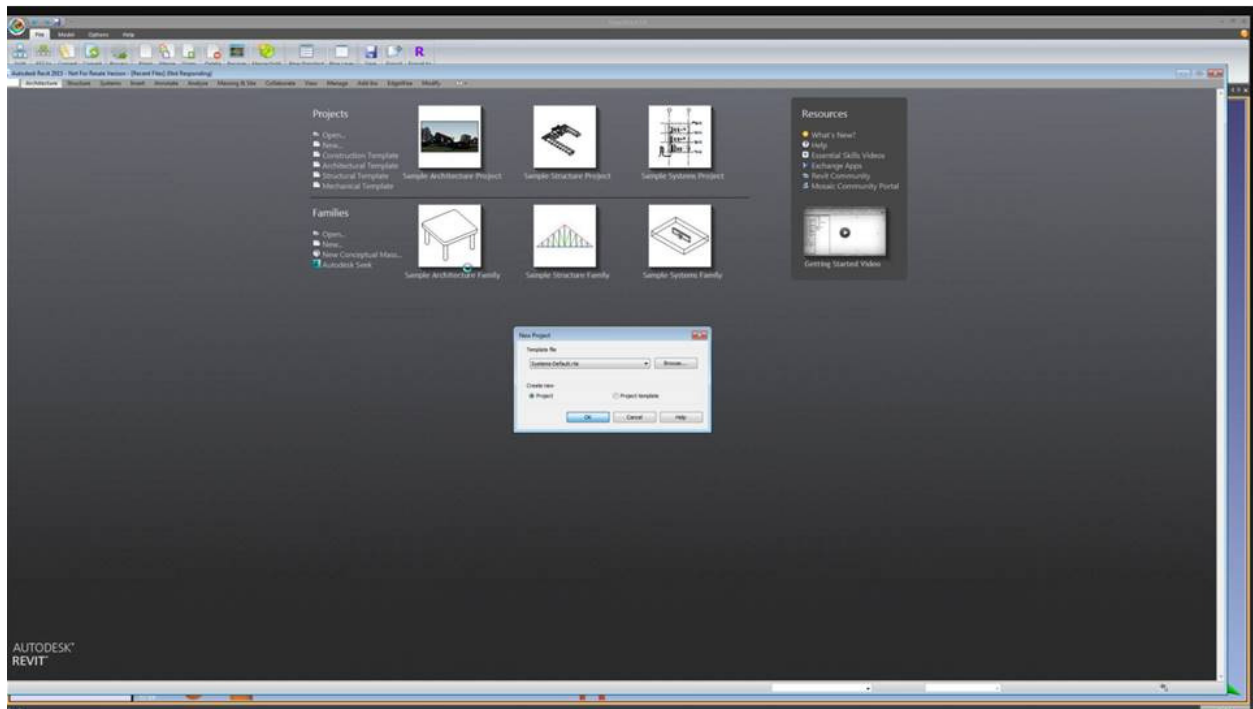


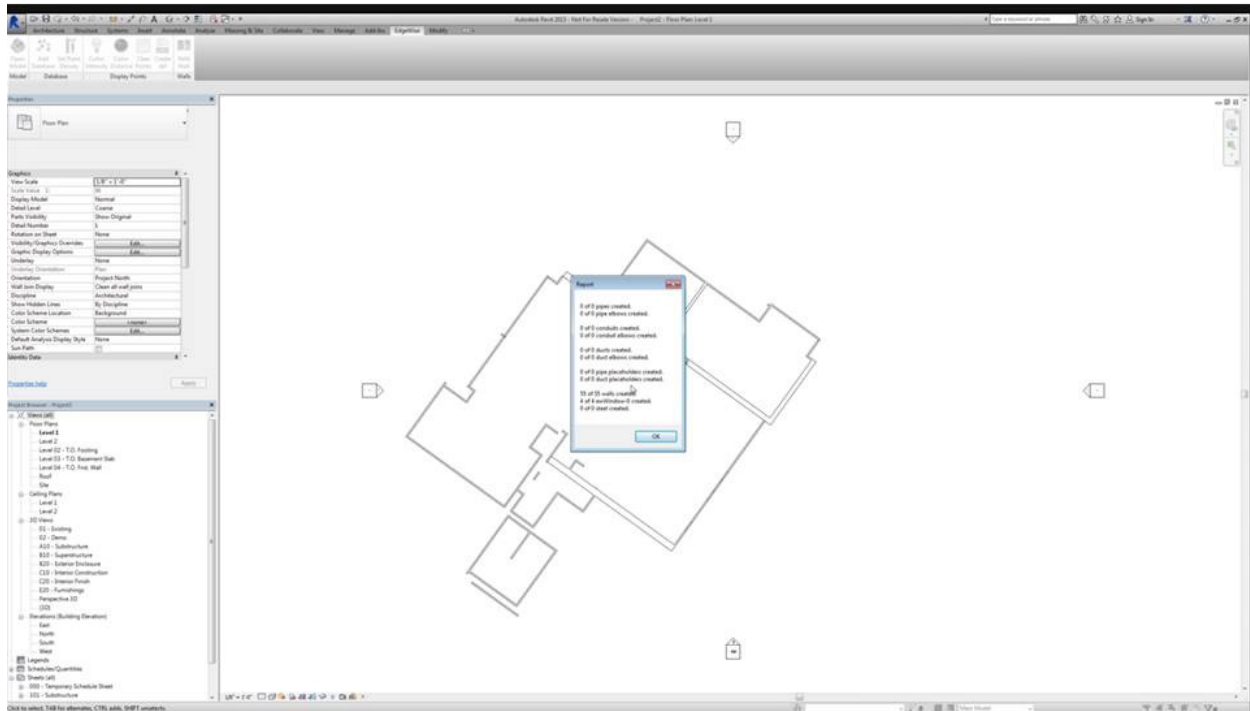
# Revit Architecture

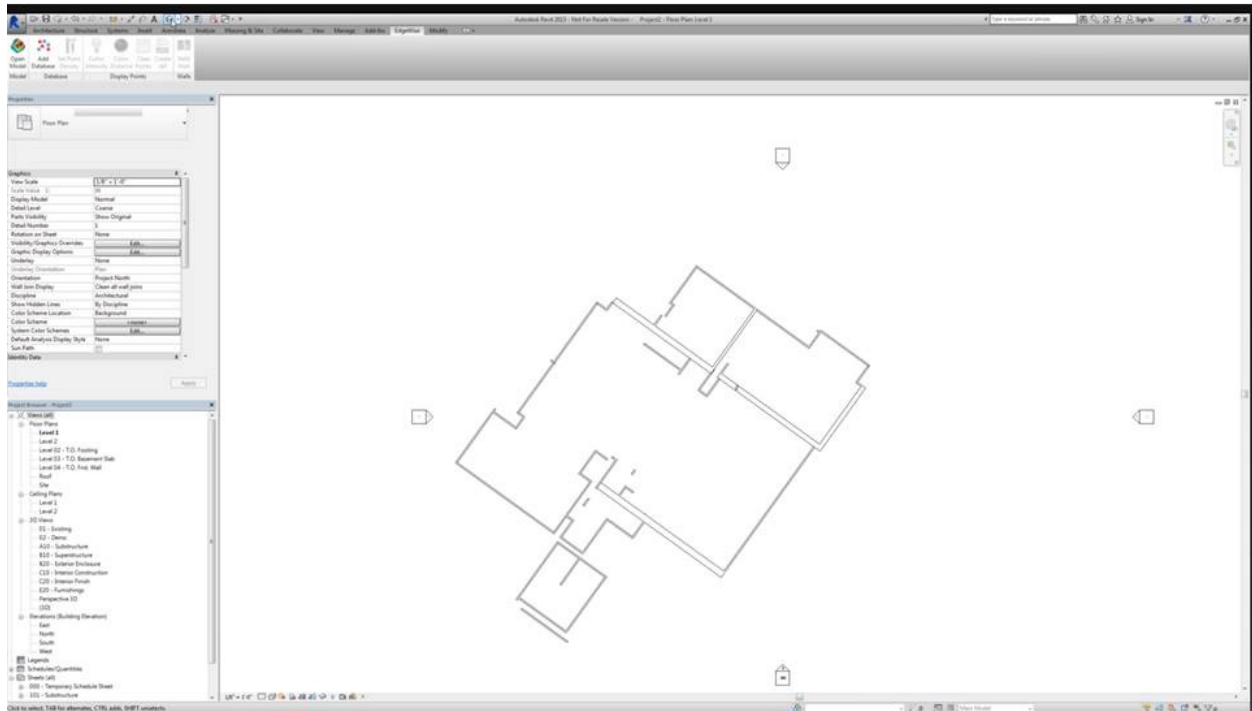
- Revit Architecture



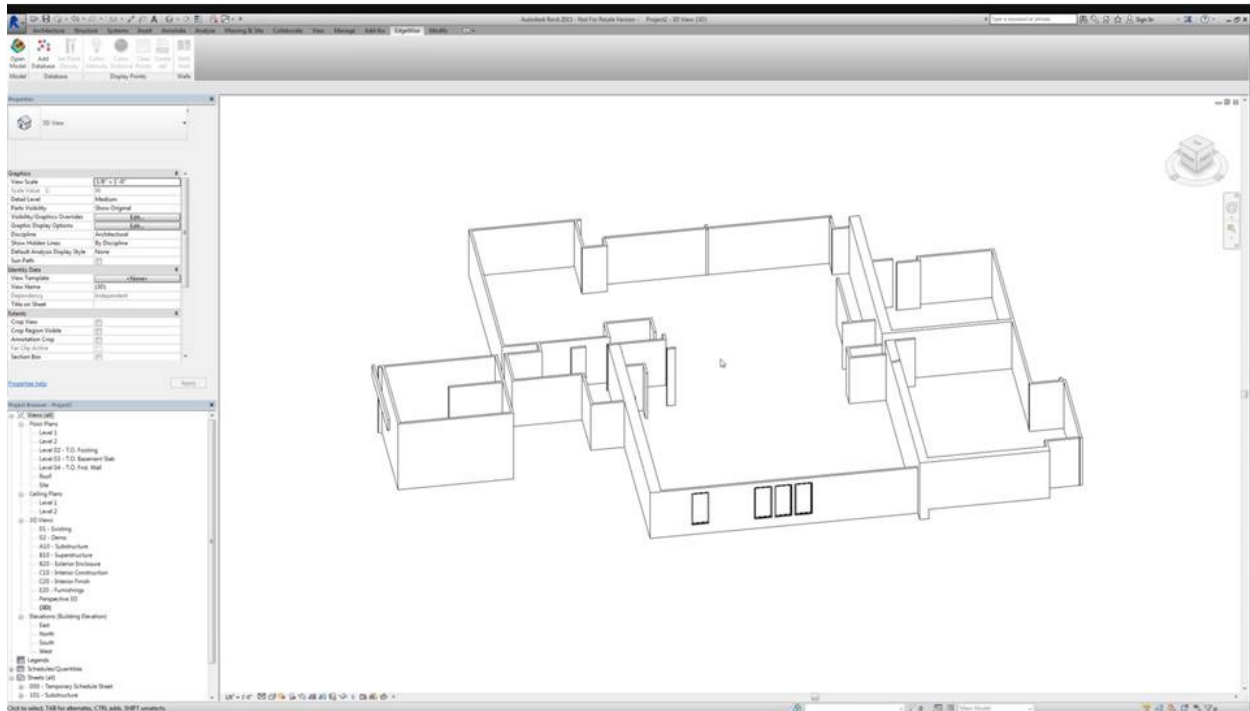
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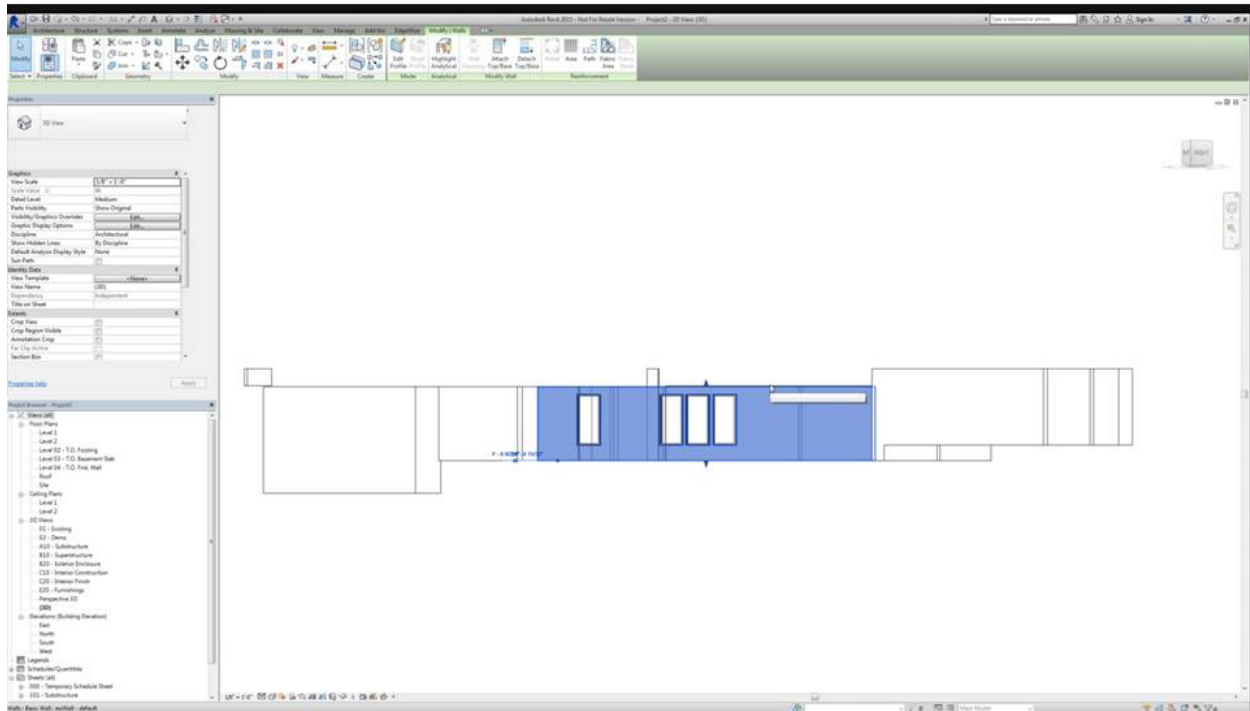


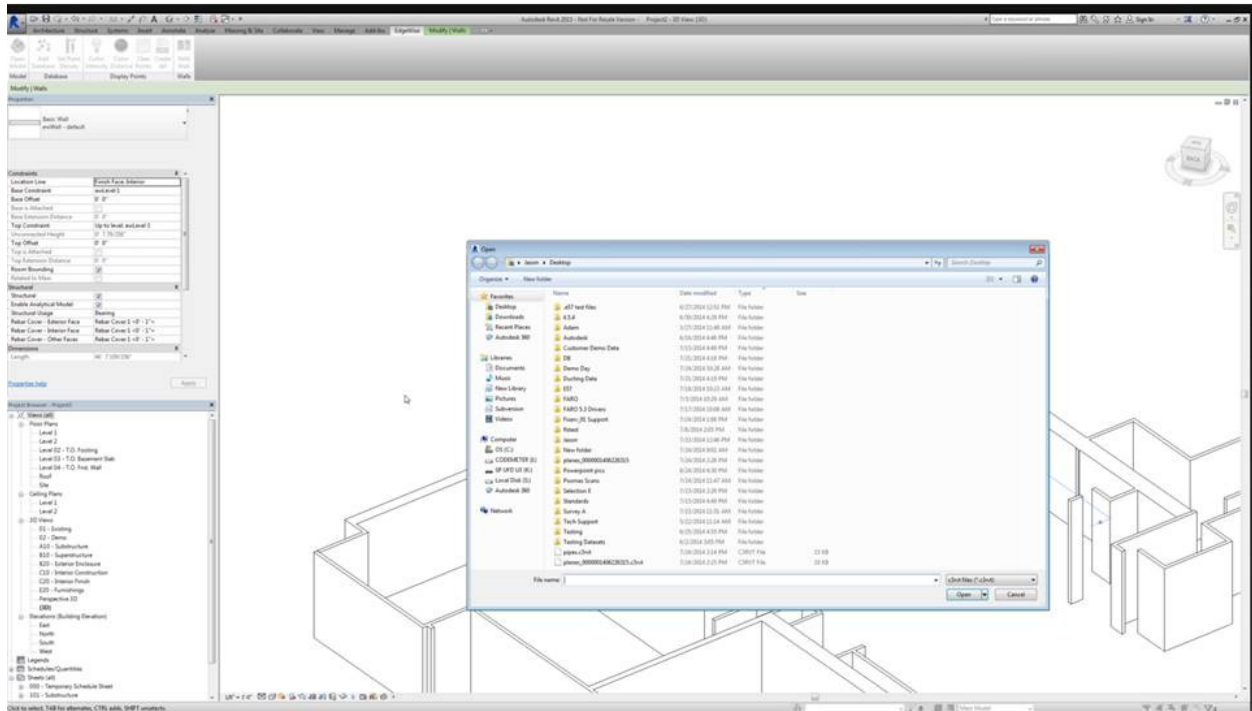


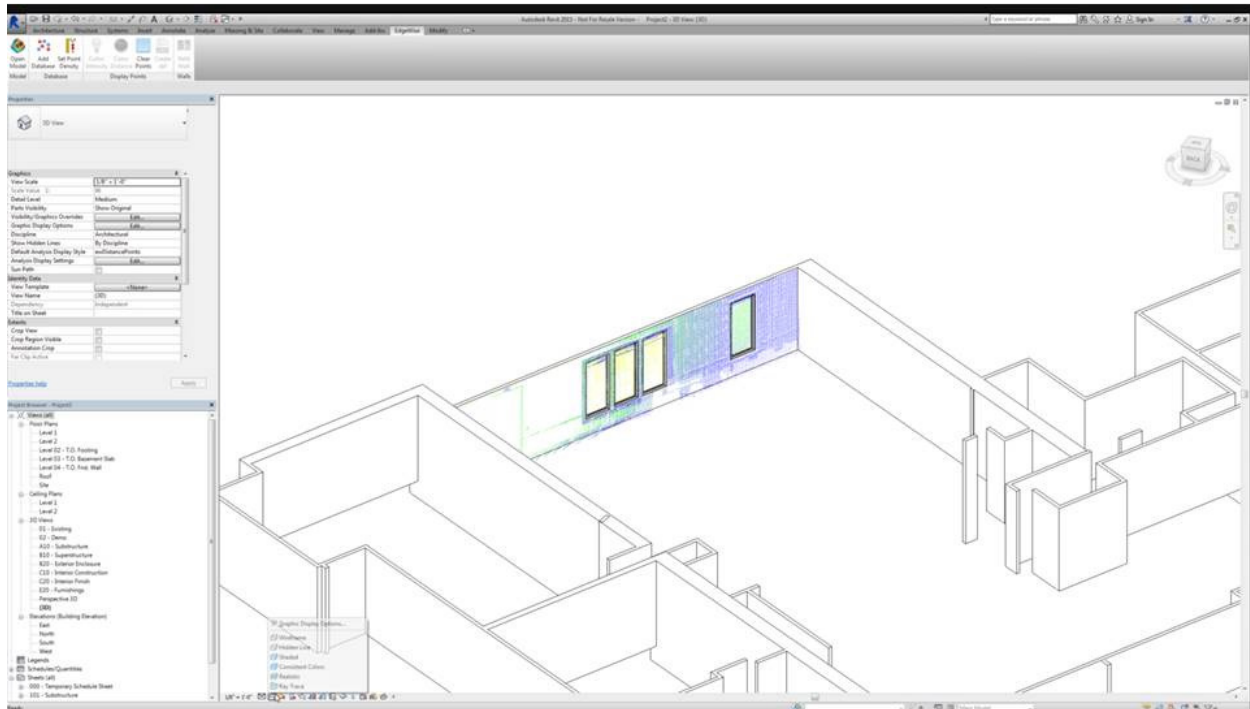


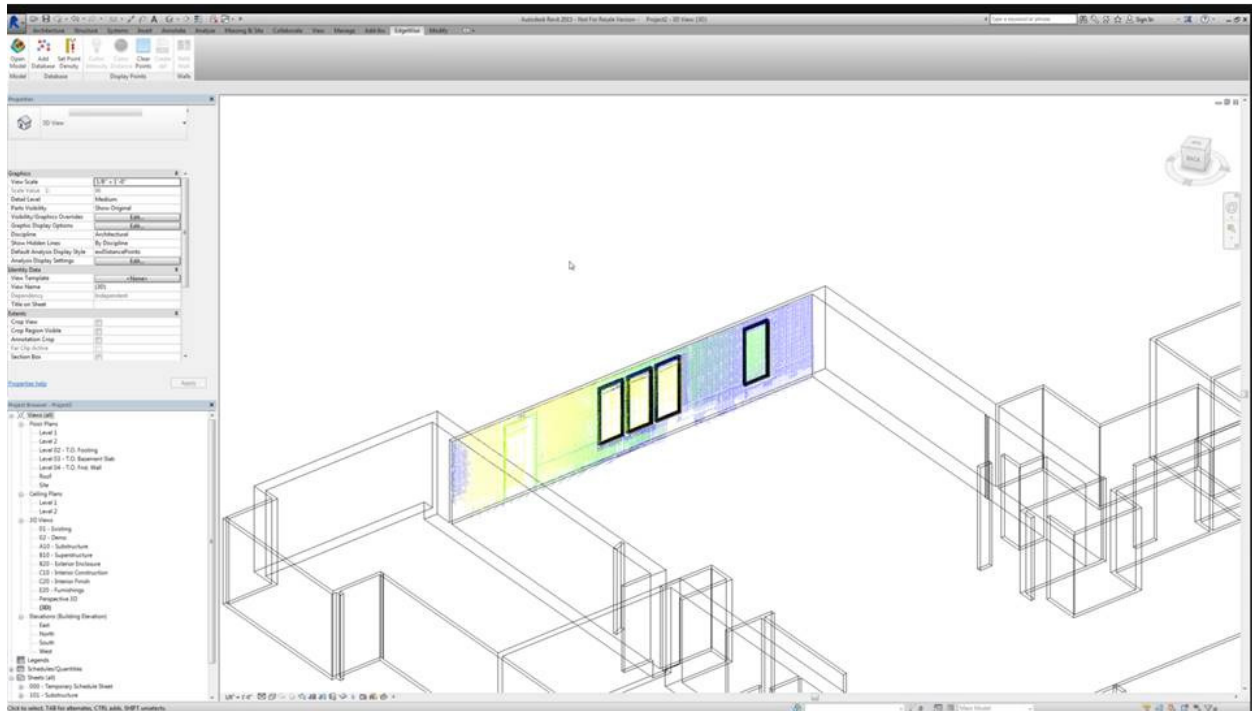


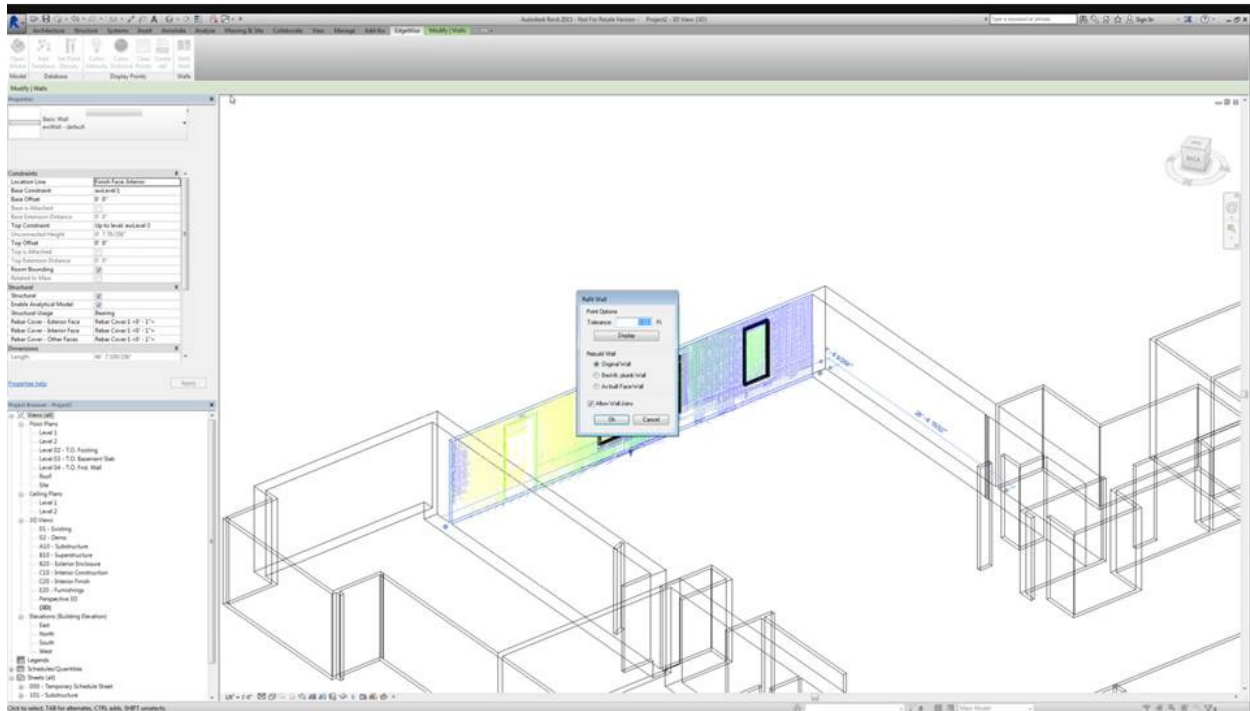


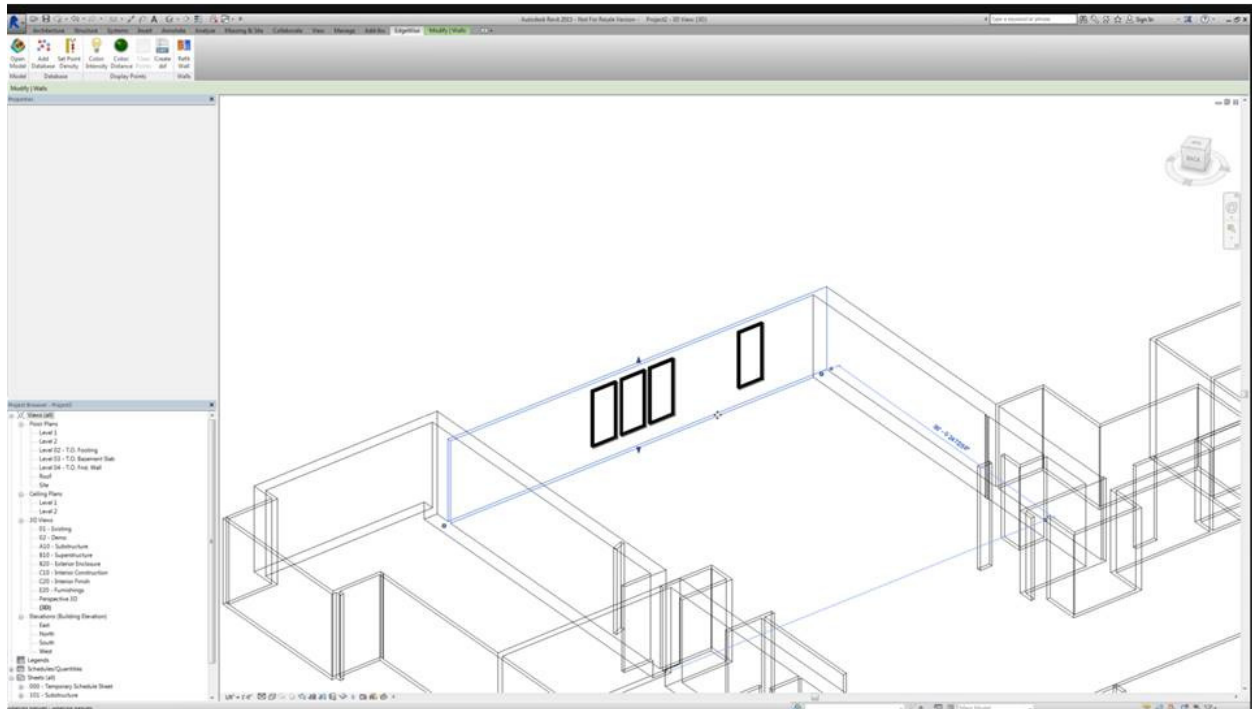


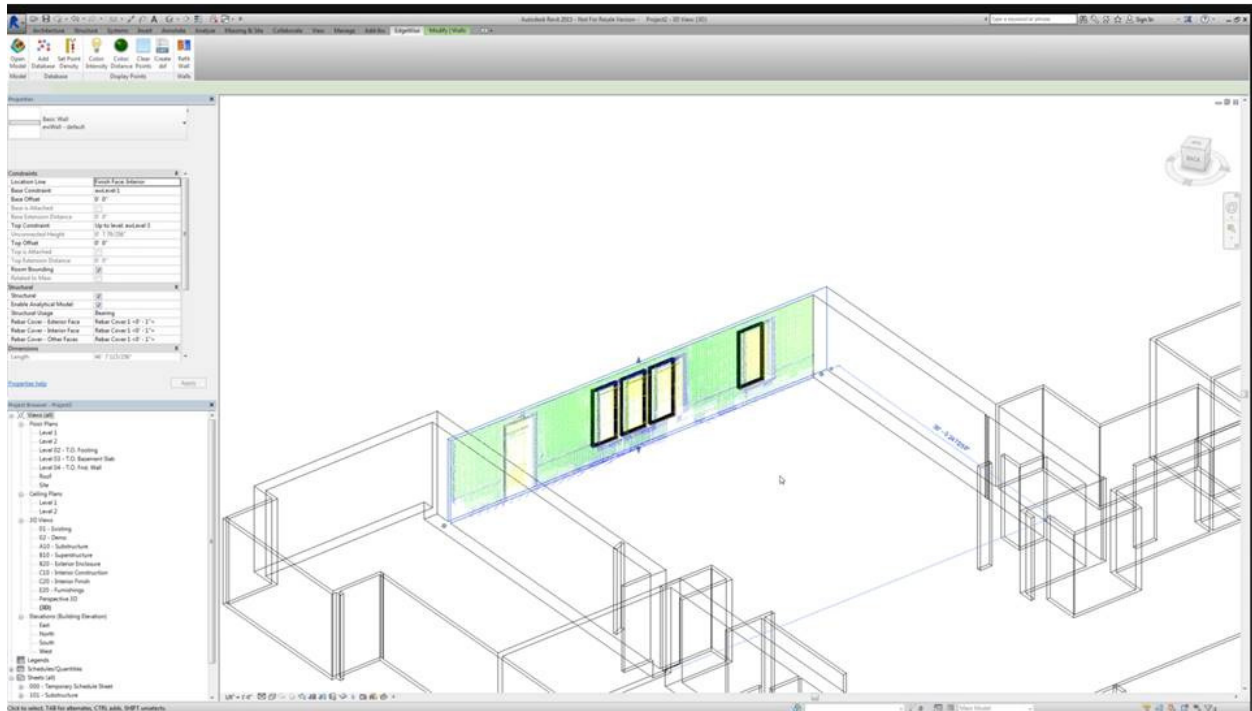




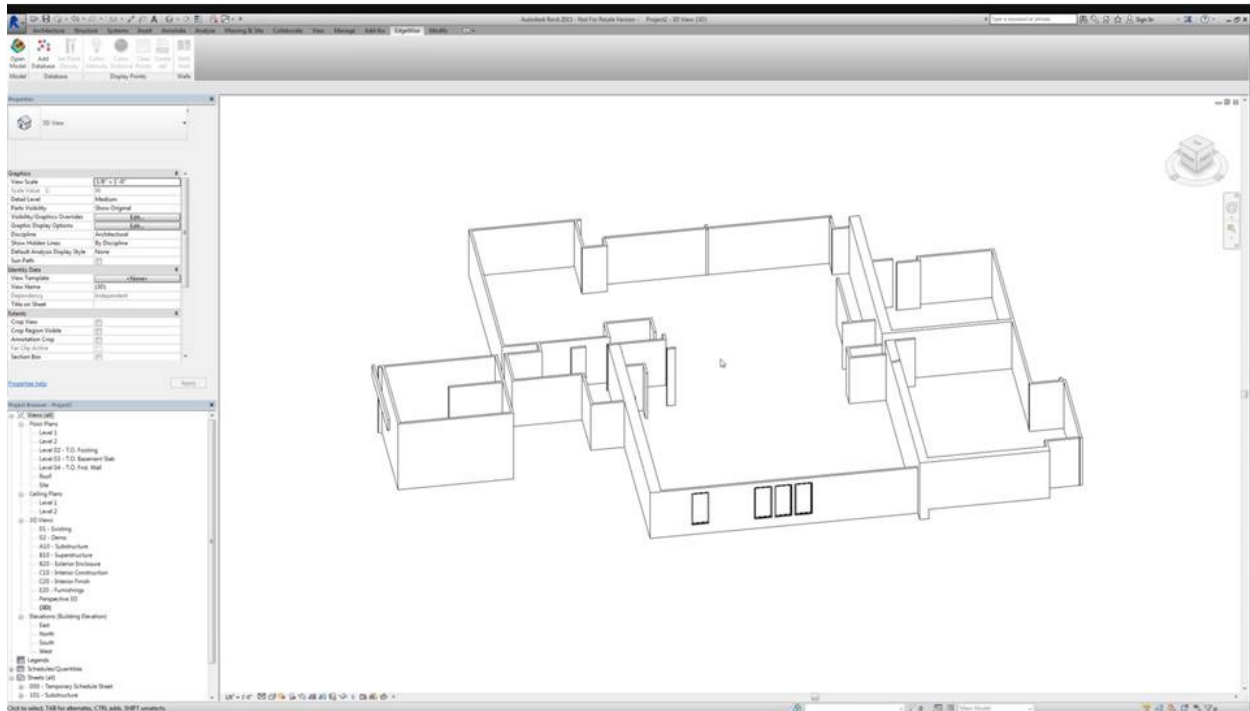












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