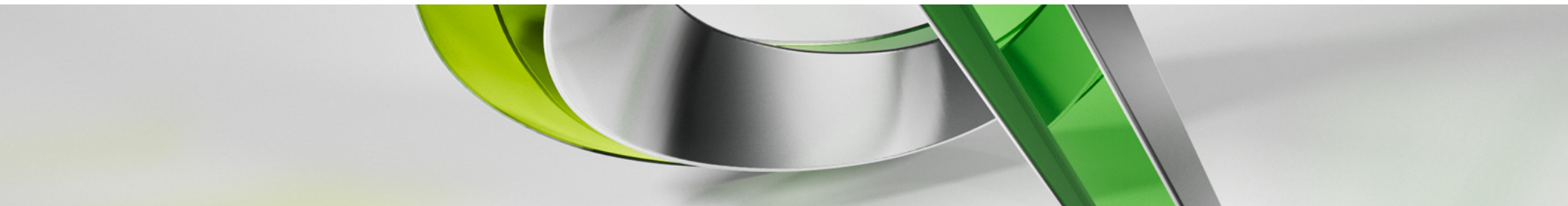




Point Cloud for Projects

AB5983

Michael “Zee” Zeeveld, Assoc. AIA, ACI
AEC/BIM Senior Application Specialist
mbzeeveld





Welcome!

Glad you're a part of the presentation



Purpose

- This lecture focuses on the workflow associated with Point Cloud data being collected and brought into Revit and 3ds Max Design for project interaction and to improve the accuracy and quality for projects. In addition the time-saving features of using digitally collected data for integration in 3d modeling software. Attendees will bring Point Cloud data into Revit and 3ds Max to create a project. They will learn the workflow and be able to describe the process of merging and using the data.



Objectives

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

- Learn the workflow for Digital data in design software
- Create a project in Revit with Point Cloud data
- *Create a Project in 3ds Max with Point Cloud data*
- Be able to describe the components for Point Cloud data creation, capture and project uses

Topics

- Workflow
- DotProduct
- Clearedge
- Revit



Timeline

- 90 minute presentation



About Me

“Zee”

Michael “Zee” Zeeveld, Assoc. AIA, ACI

- AEC/BIM Senior Application Specialist / Project Manager
- Training, Consulting and Implementation
- 20 years in the AEC industry and using software
- 10 years with Revit (Architecture and Architecture)
- 12 years using 3ds Max
- Started in AutoCAD DOS R11 using a tablet & puck
- Five time Autodesk University Presenter
- AUGI CAD Camp Presenter – multiple events
- Autodesk Training Center Instructor ID 26475
- Certified Autodesk Associate and Professional
- Certified Autodesk Consulting Specialist
- Certified Autodesk Fabrication Specialist
- Autodesk Certified Instructor - ACI



Autodesk®
Certified Instructor

Hello!

HELLO!

My name is

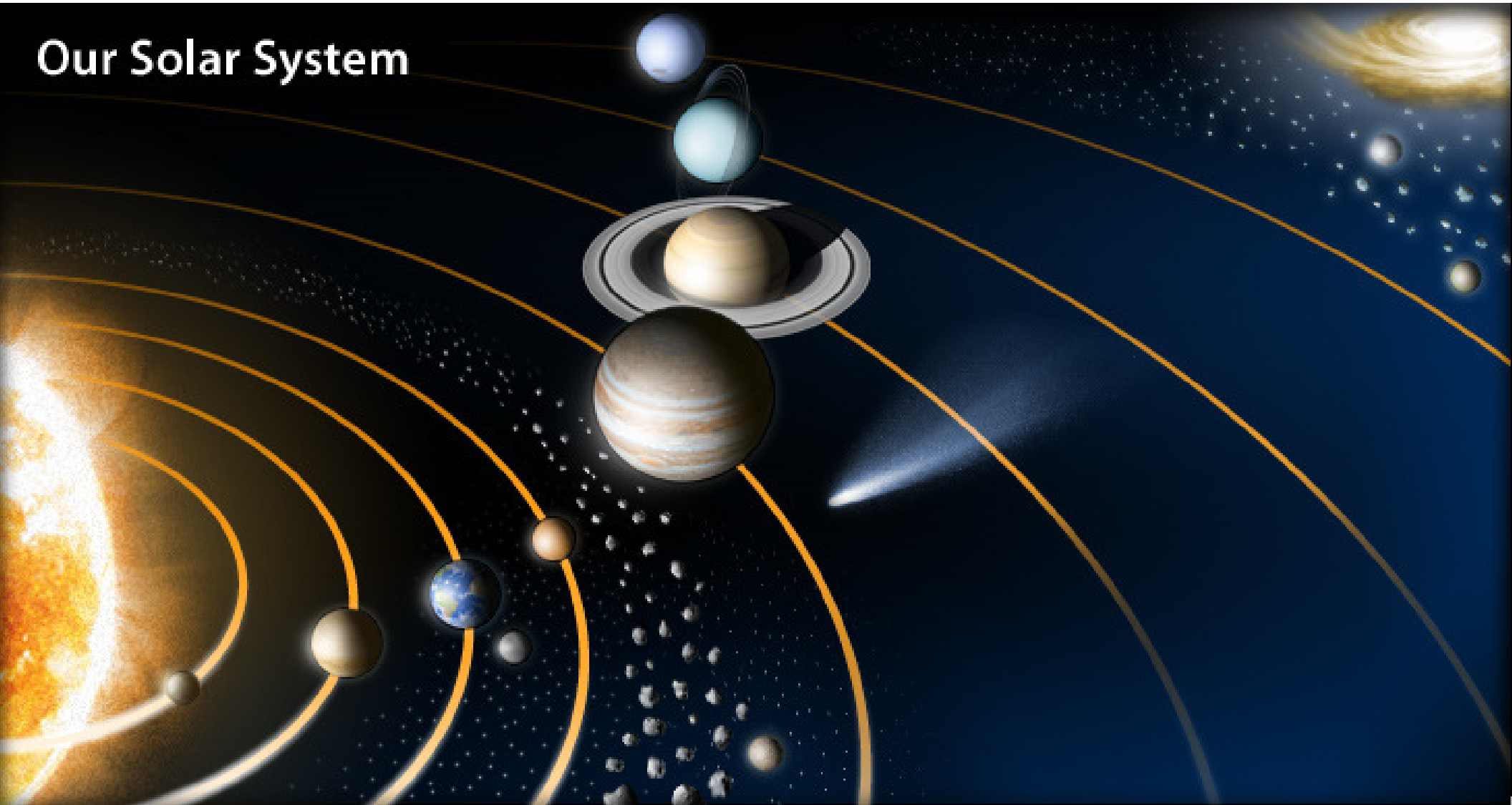
"Zee"

Housekeeping

- Who is in the audience?
- Are you doing Scanning currently?
- Are you using Revit?
 - What version?

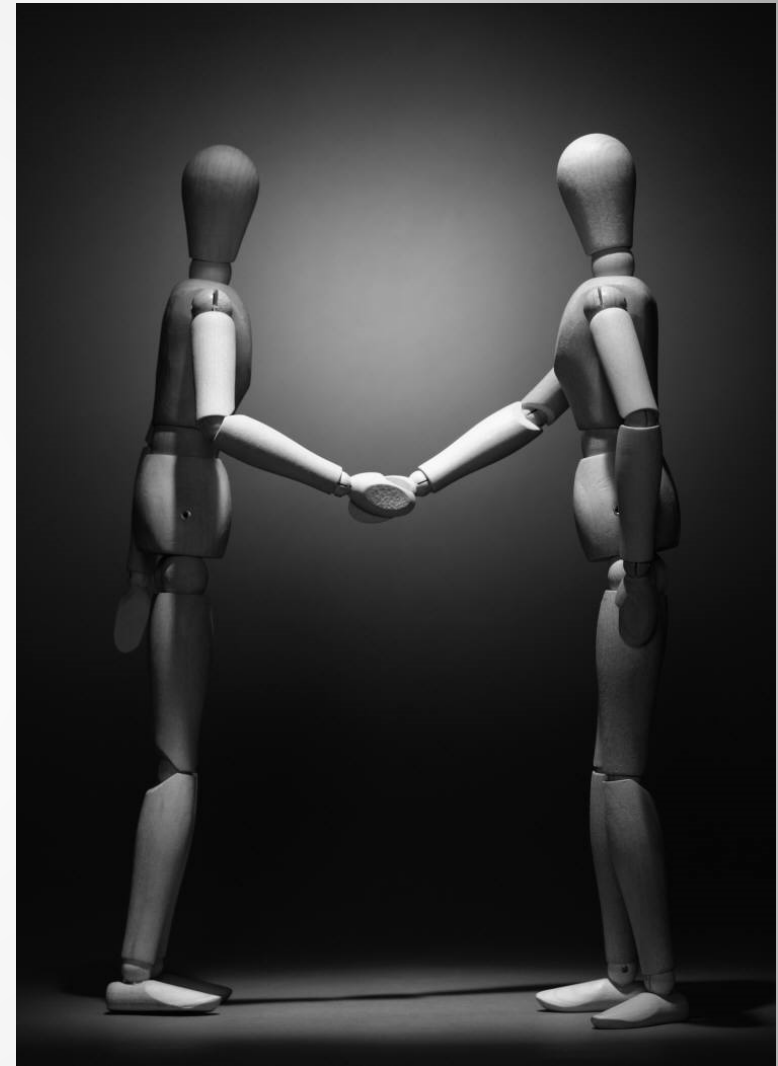


Our Solar System



Say Hello

- Meet your neighbor



General Information

- Turn off or silence any...
 - Cell phones
 - Flip-phones
 - Walkie-talkies
 - Pagers
 - Beepers
 - Short-wave radios
 - CB radios
 - Handheld devices
 - Or other electronic devices



General Information

- No video recording



Scan2BIM



Welcome!

Glad you're a part of the presentation!



Purpose of the presentation

- Introduce the workflow from Scan data / Point Clouds to BIM
- Using DotProduct, Clearedge 3D, and Revit



Timeline

- Intro
- Presentation
- Summary
- Q&A



Topics/Agenda

Workflow

- DotProduct
- Clearedge
- Revit Architecture



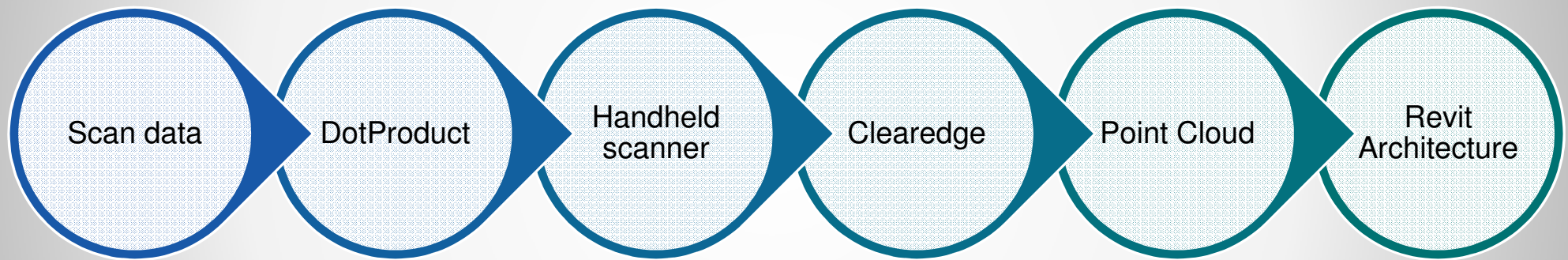


Agenda

Workflow

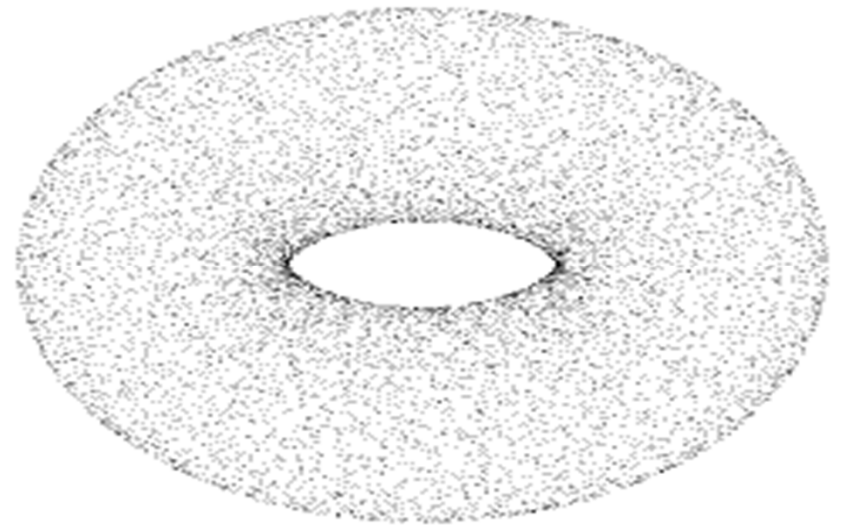
- DotProduct
- Clearedge
- Revit Architecture

Workflow



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.





Agenda

Workflow

- DotProduct
- Clearedge
- Revit Architecture

- DotProduct



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



■ 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 |

■ Info...

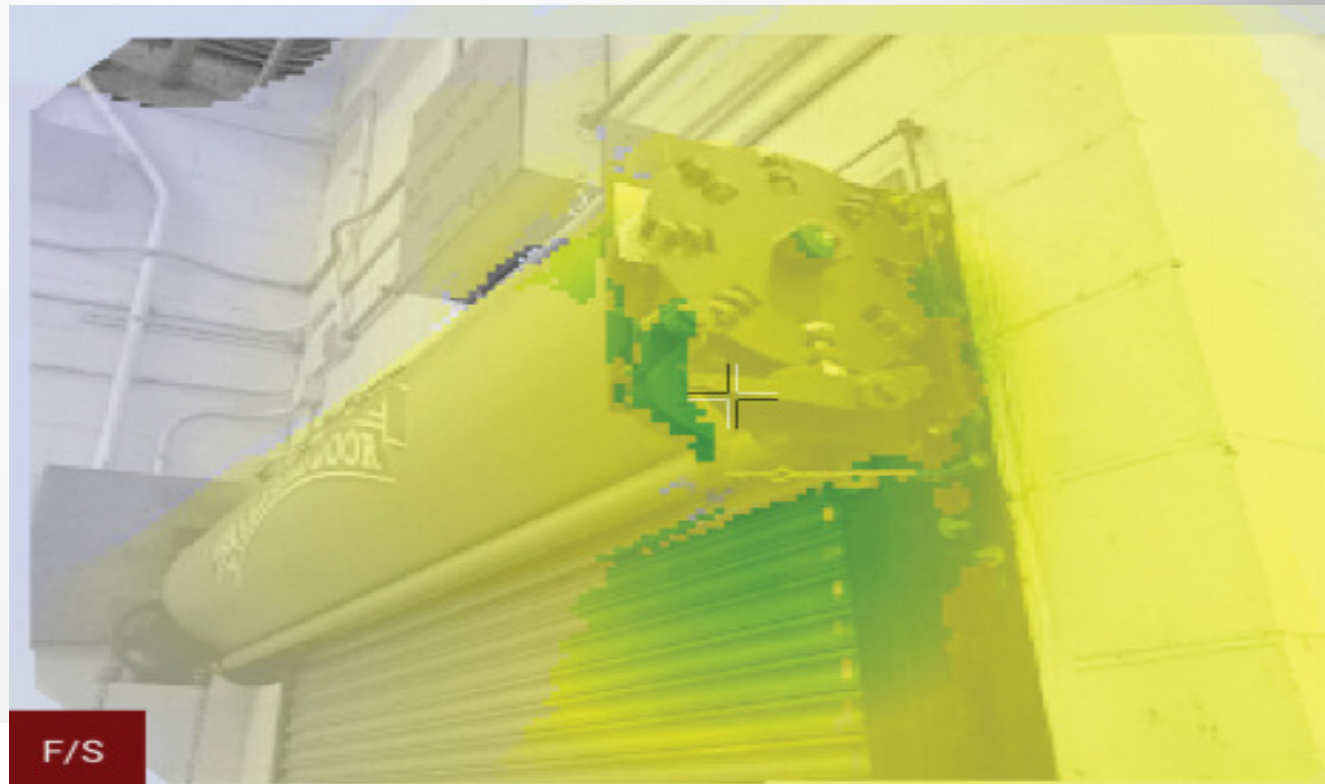
DPI-7 Product Specifications - General

| | |
|----------------|---|
| 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

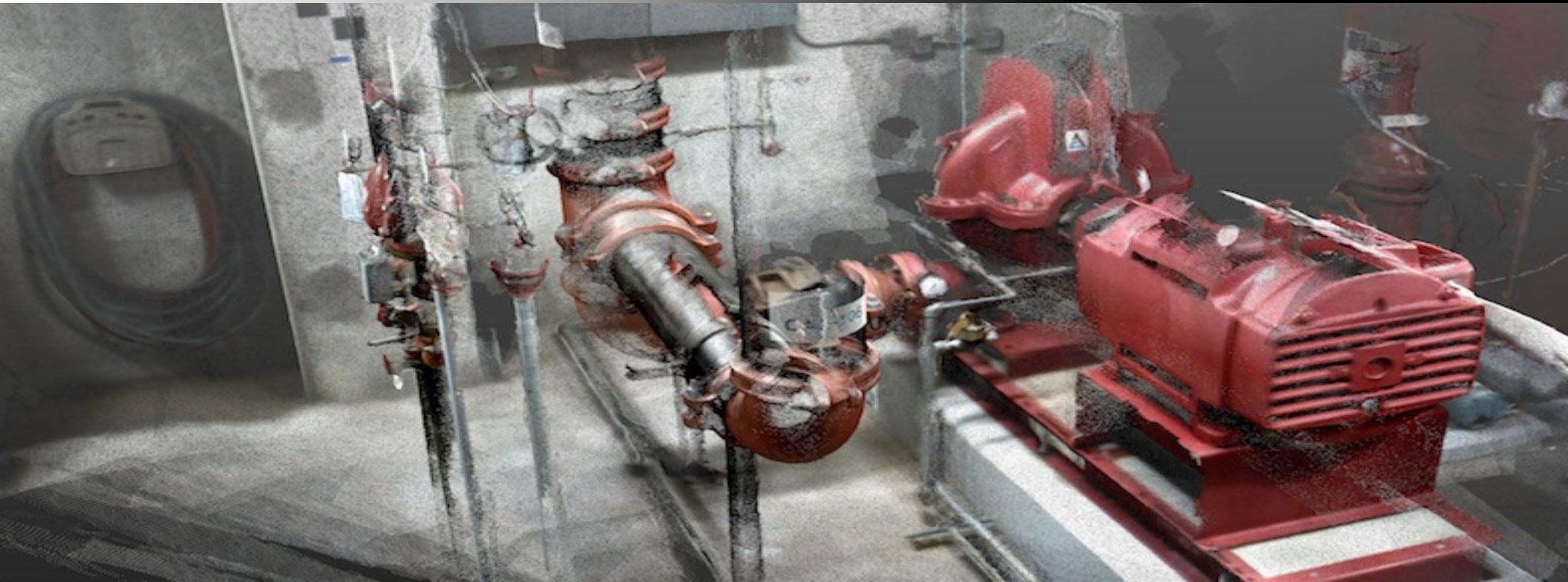
| | |
|-------------|---|
| Mass | < 1kg (2.2 lbs.) |
| Dimensions | 20 cm x 24 cm x 6 cm (8 in x 9.5in. x 2.4 in.) |
| Temperature | Tested operating range: 15 °C to 32 °C (60°F to 85°F) |
| Lighting | Not operational in direct sunlight |
| Humidity | Non-condensing |

- Real-time color coding of data quality



- Real-time color coding of data quality







DotProduct LLC/Christofori und Partner

- Register Point Clouds on the fly









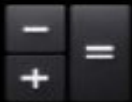


- Extension Pole
- Extends up to 15 feet



APPS

WIDGETS



Calculator



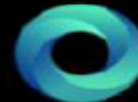
Calendar



Chrome



Clock



Currents



Downloads



Drive



Google Settings



Phi.3D



Real Time • Mobile • 3D

11:12

IMAGE

APPEND

EDIT

TARGETS

OPT

EXPORT

INFO

SESSION

Loaded Calibration:

/1207100055_0131023.cal

Load Other Calibration

Version:

1.1a

Sensor Serial:

No sensor
connected.

Show End User
Lic. Agreement

Open Source
Licenses

DOT
PRODUCT

© 2013 DotProduct LLC.
All Rights Reserved.

Hold to Translate View

F/S





IMAGE

APPEND

EDIT

TARGETS

OPT

EXPORT

INFO

SESSION



Start

Scene Fitness

Cam Warmup

0:15:44

Back to Append

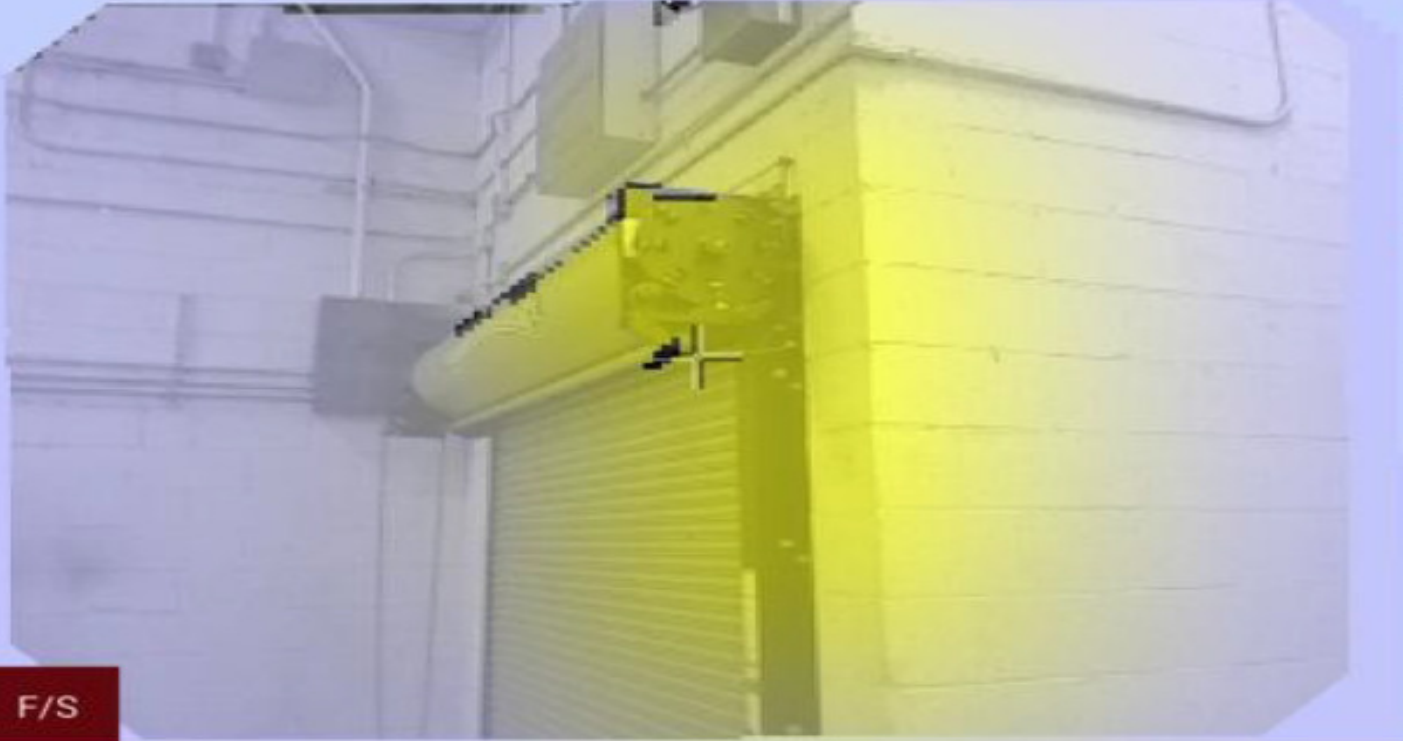
Hold to Translate View



3:16



IMAGE



Finish

Scene Fitness

Cam Warmup

0:16:02

Back to Append

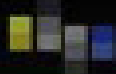
Hold to Translate View



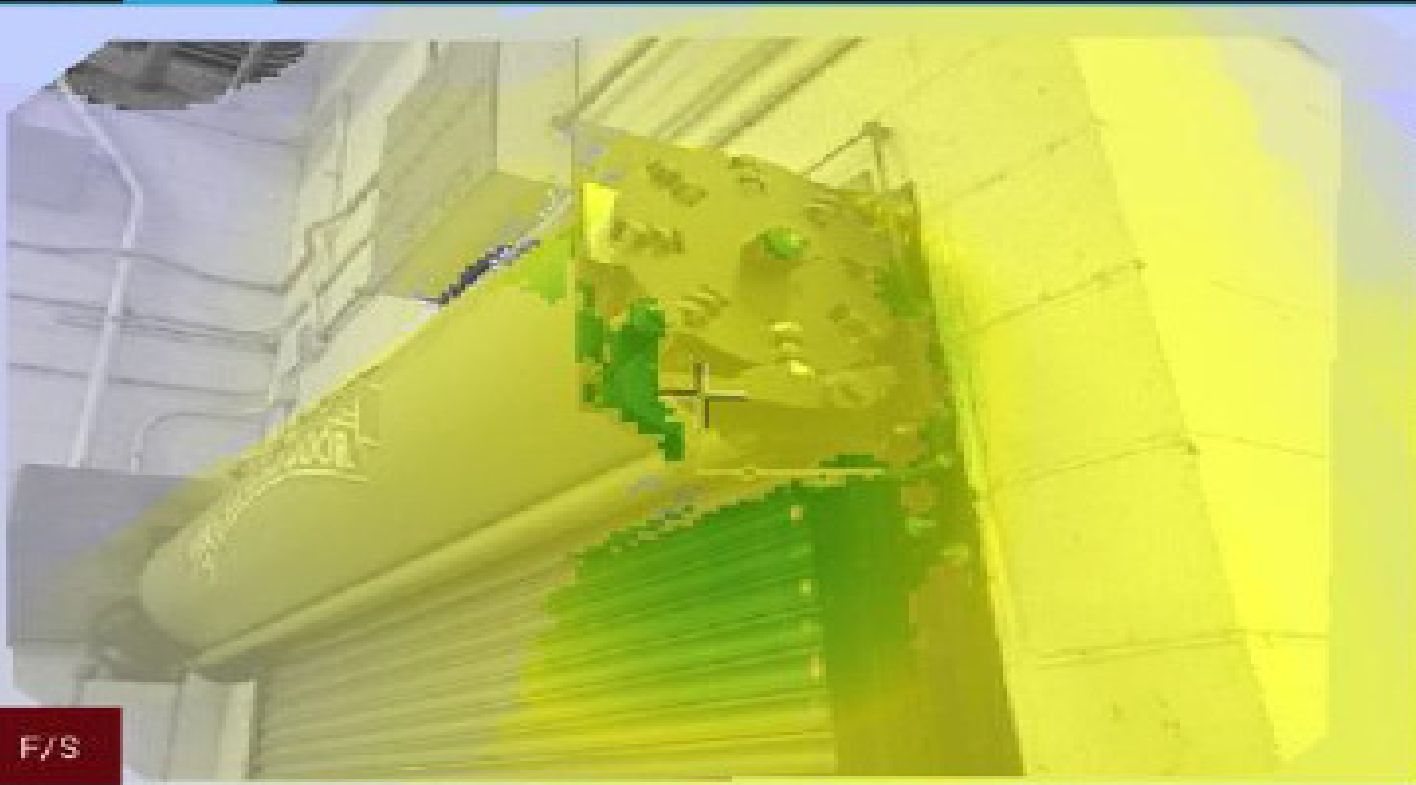
Real Time • Mobile • 3D



3:18



IMAGE



F/S

Finish

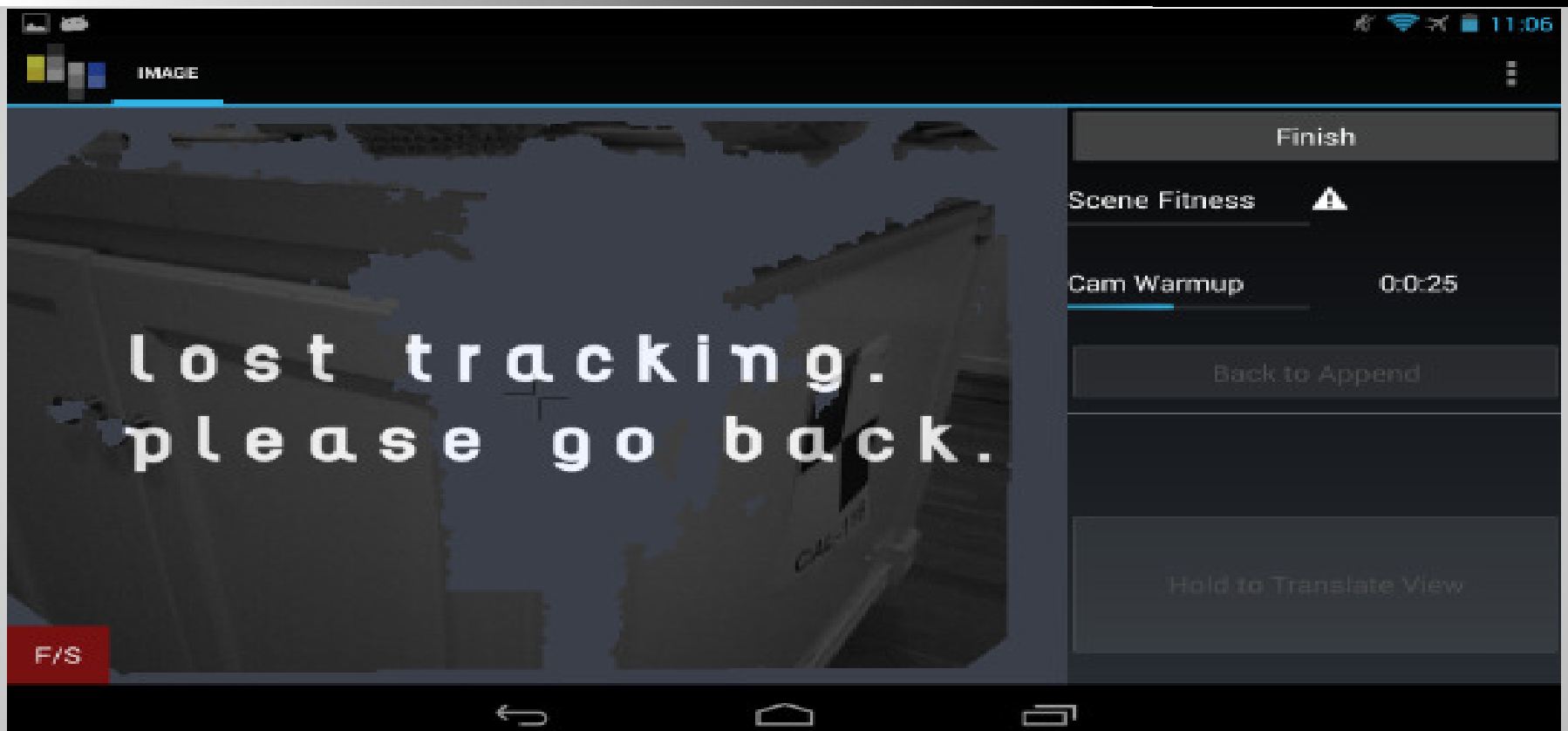
Scene Fitness

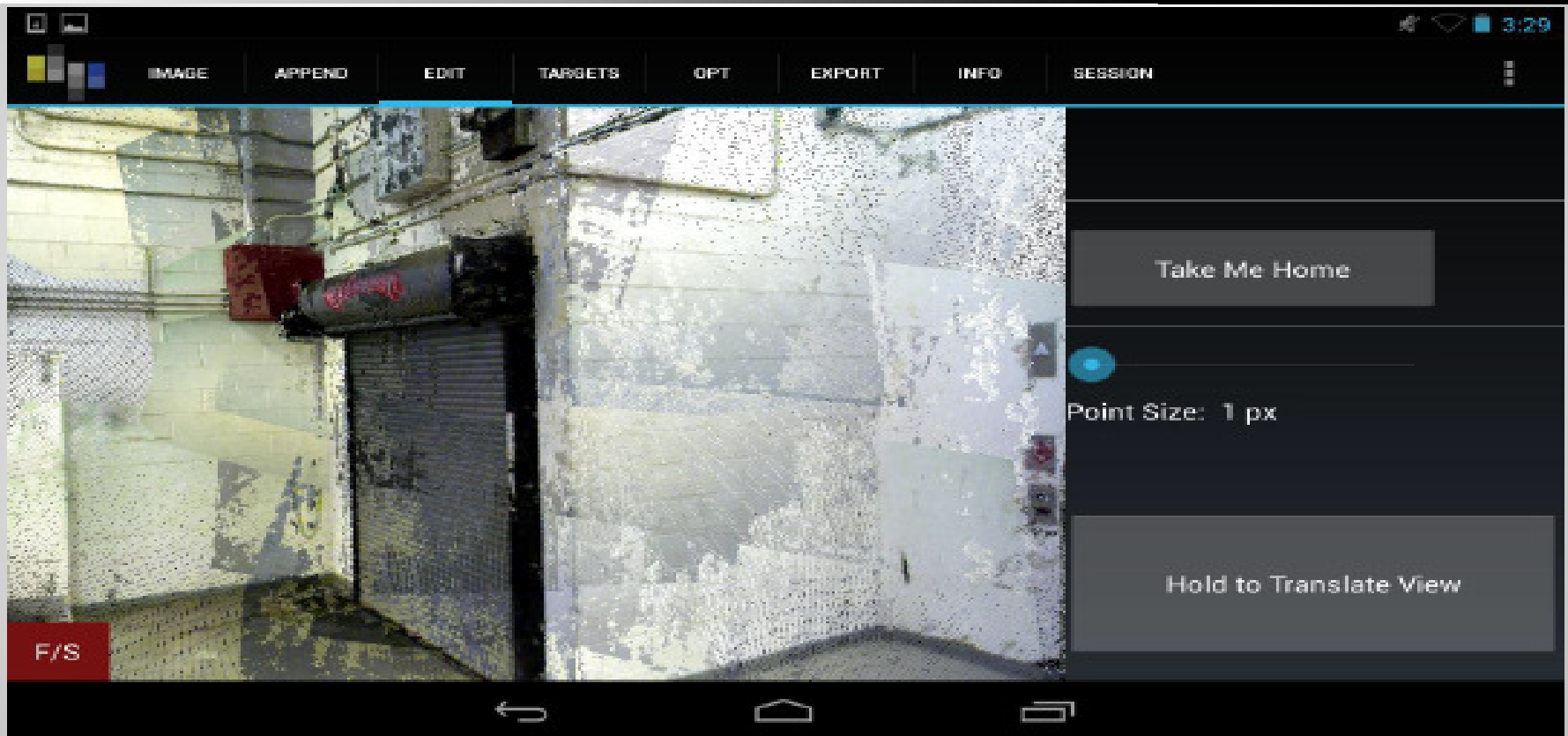
Cam Warmup

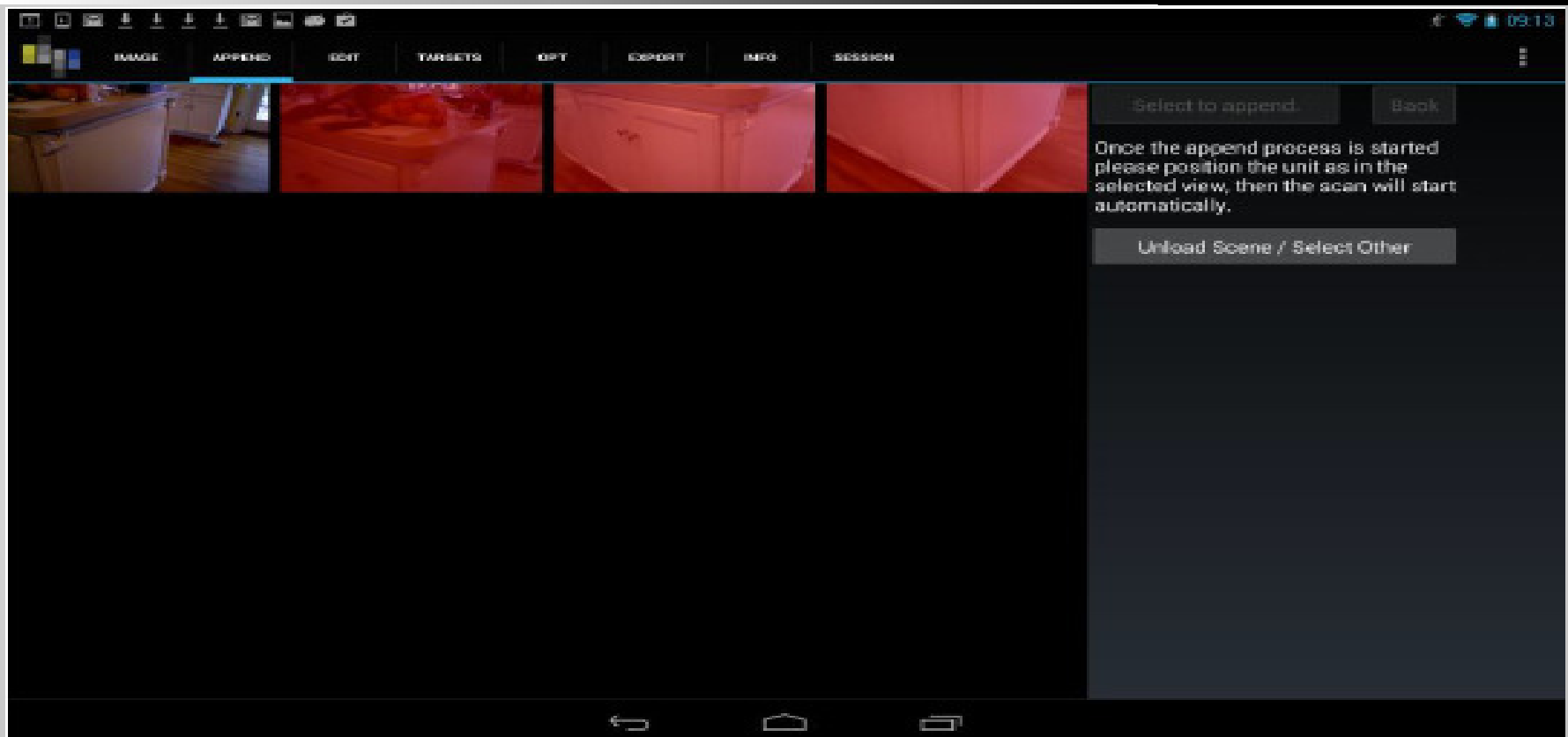
0:17:16

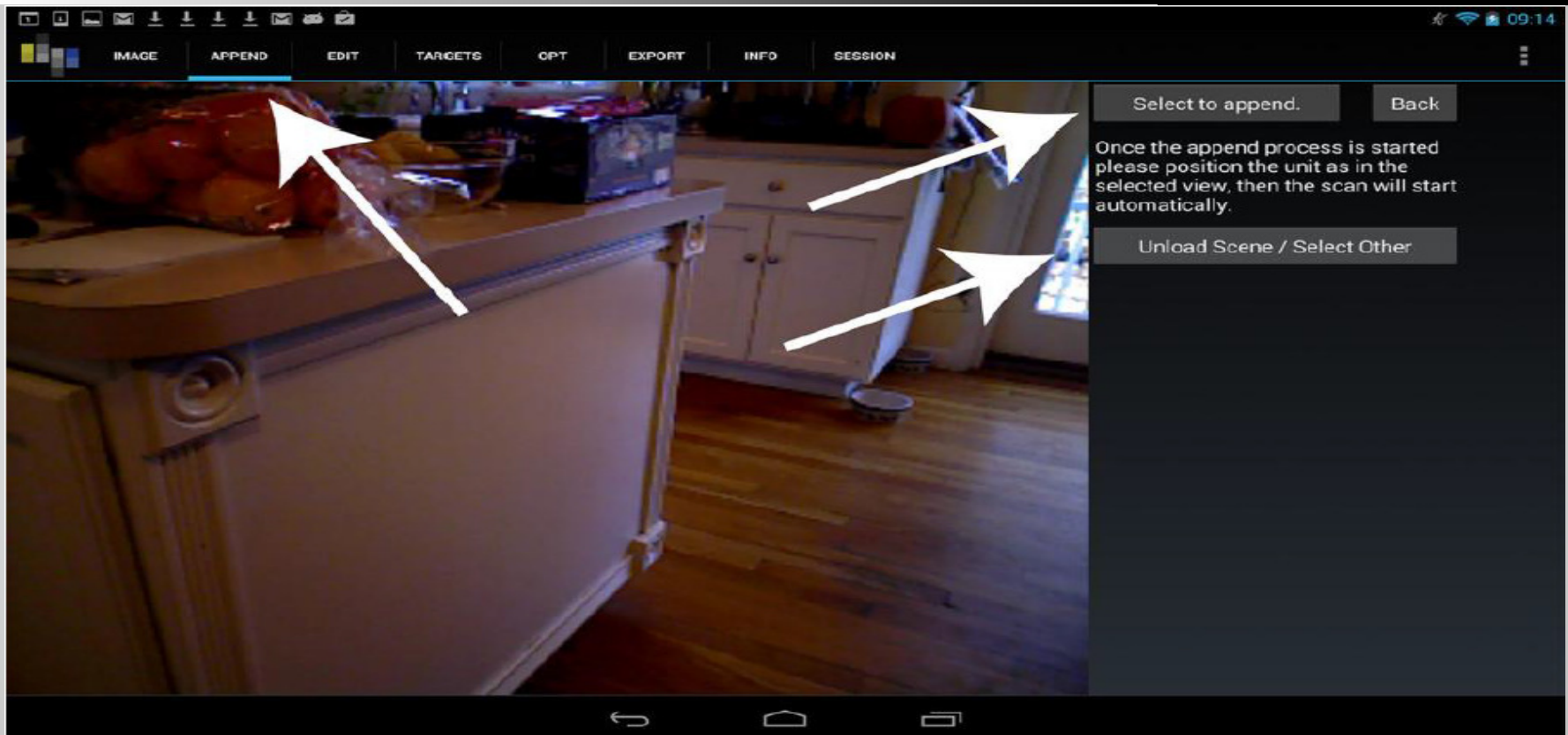
Back to Append

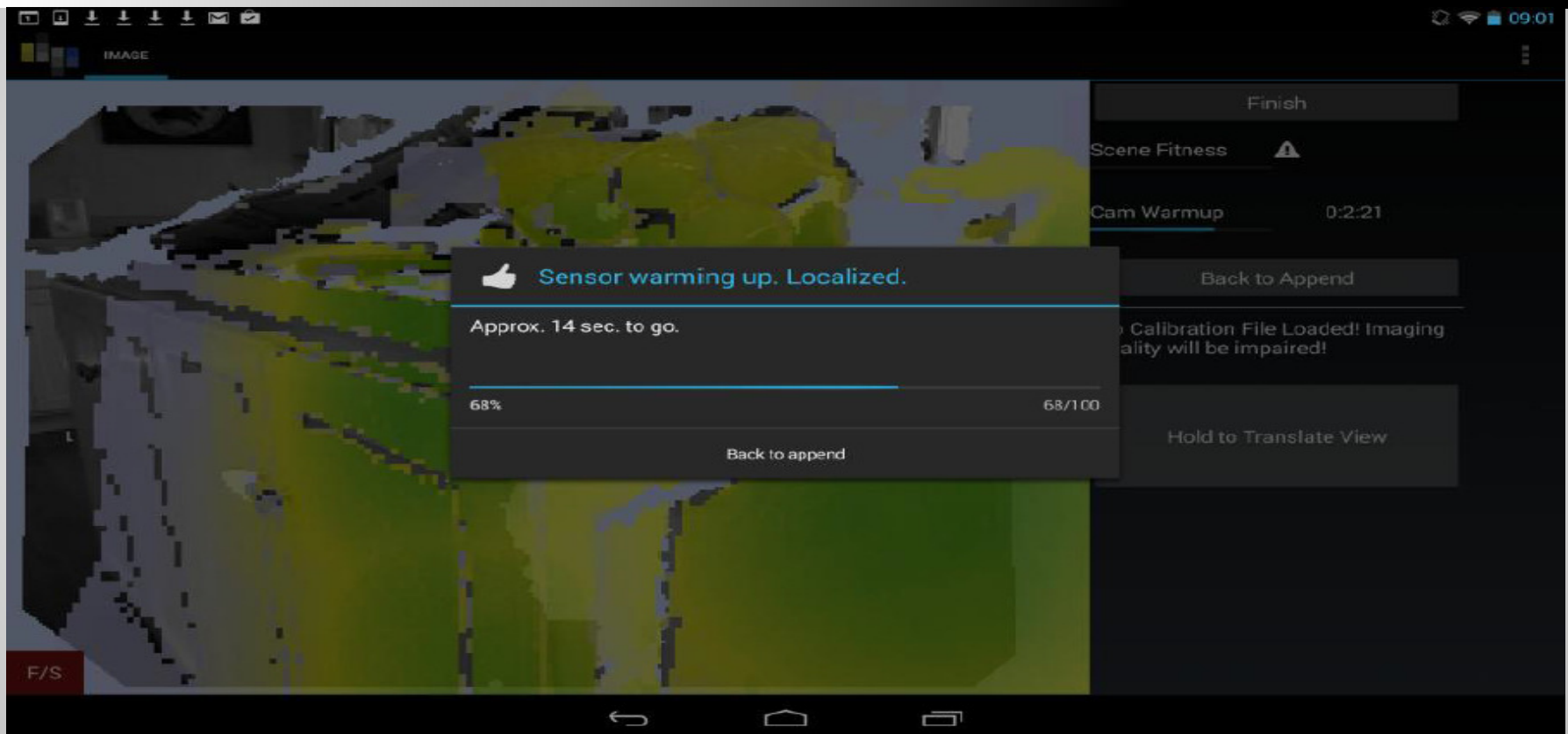
Hold to Translate View













**DOT
PRODUCT**

Real Time • Mobile • 3D

“Optional”

- Target
- Registration Points

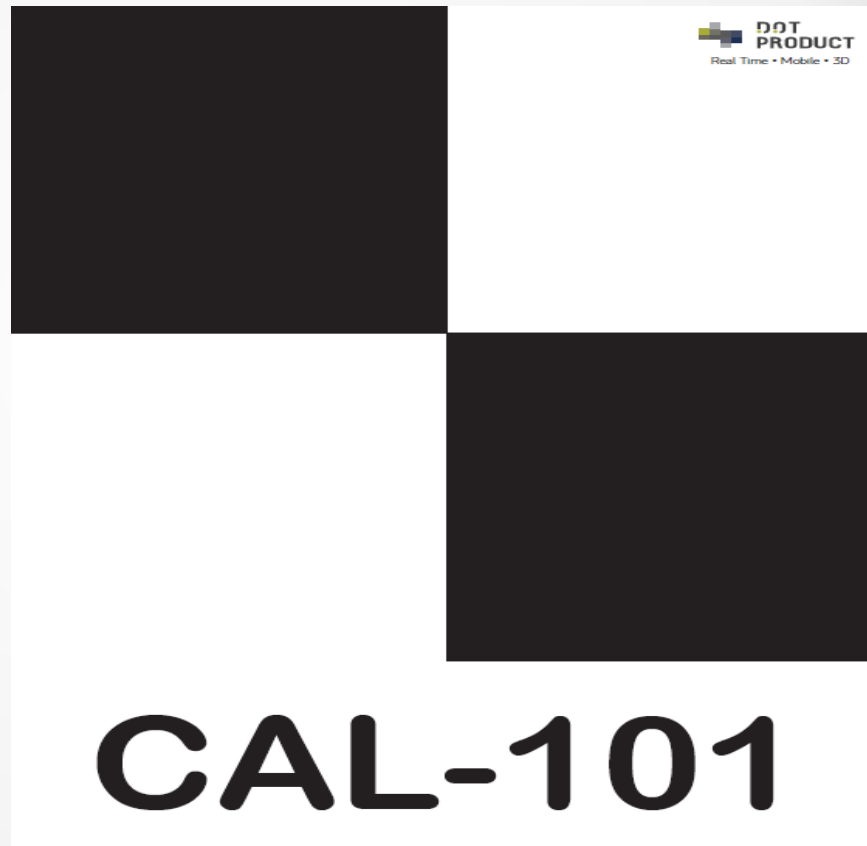




IMAGE APPEND EDIT **TARGETS** OPT EXPORT INFO SESSION

Load Targets File (Back)

Targets File: ☒ Left-Handed System

Unit: Meters (m)

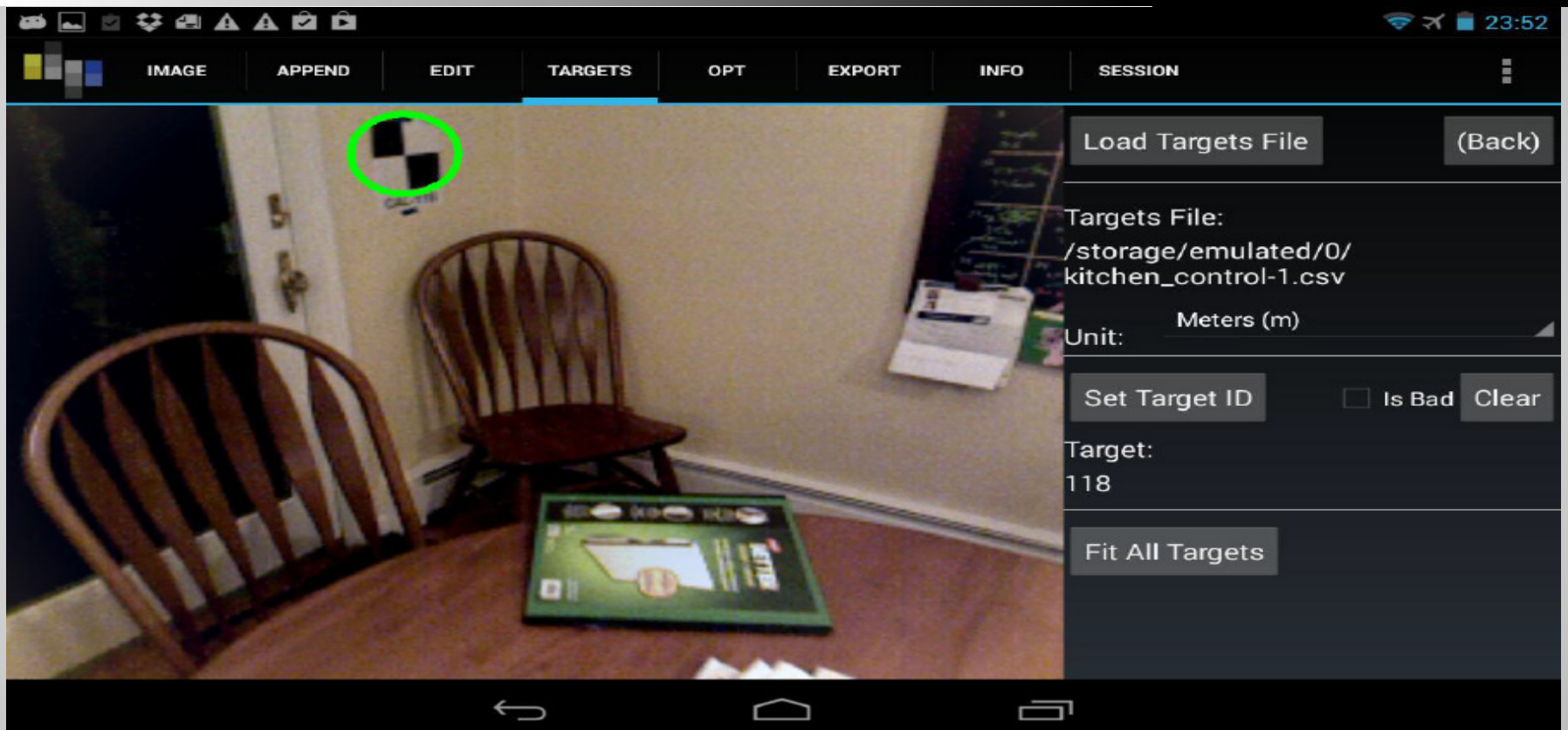
Set Target ID Clear

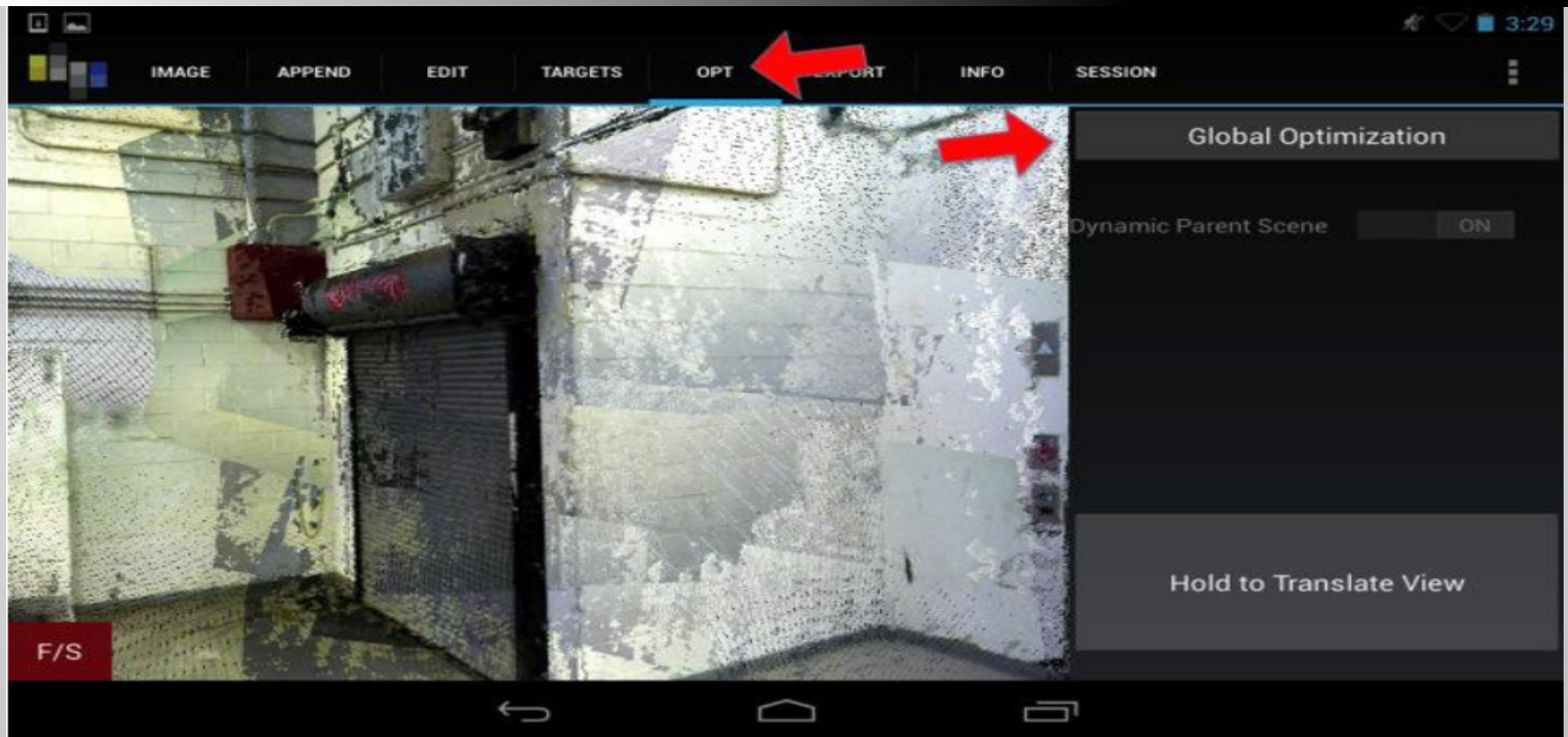
Target:

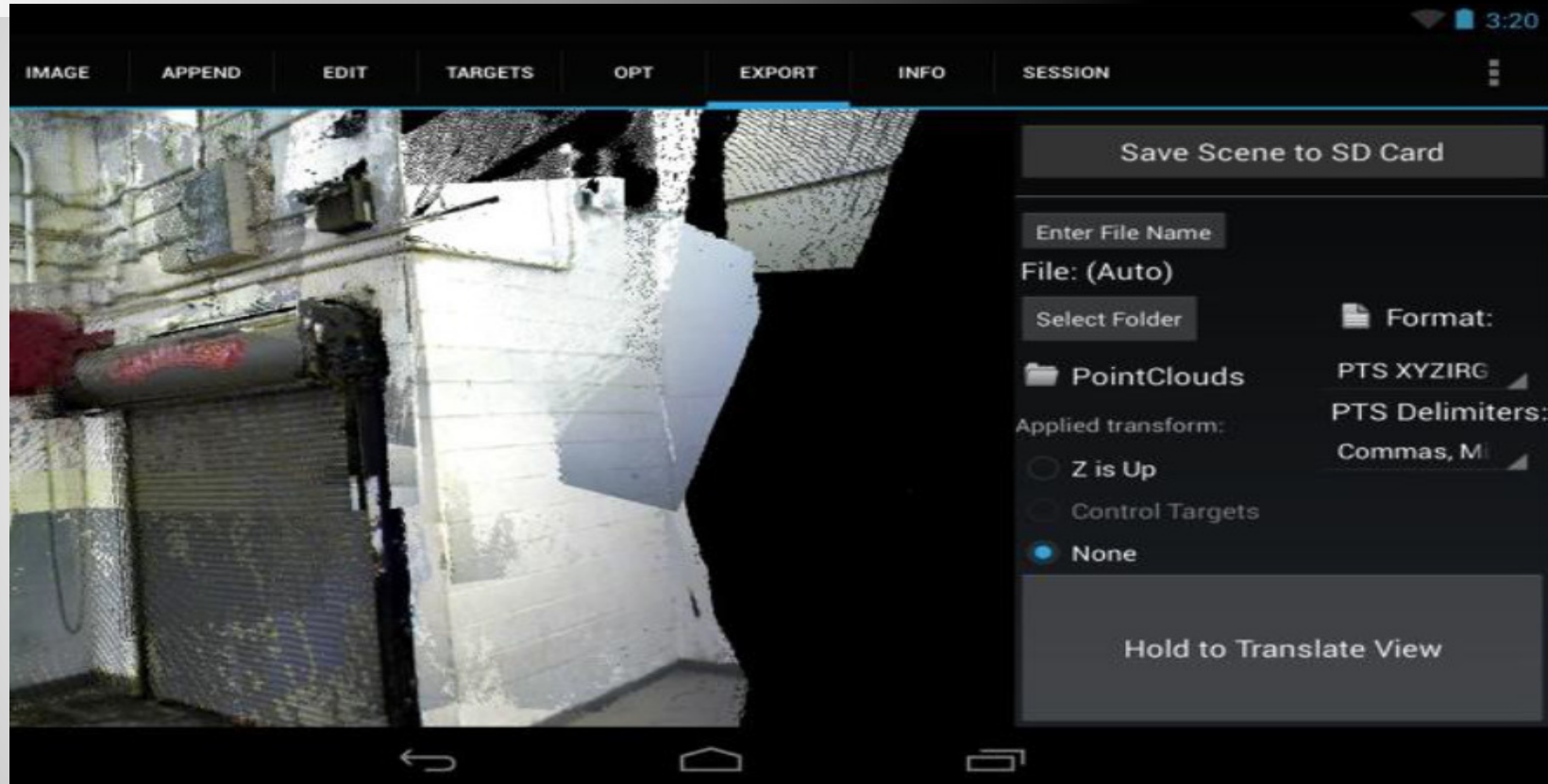
Fit All Targets Clear Target Fit

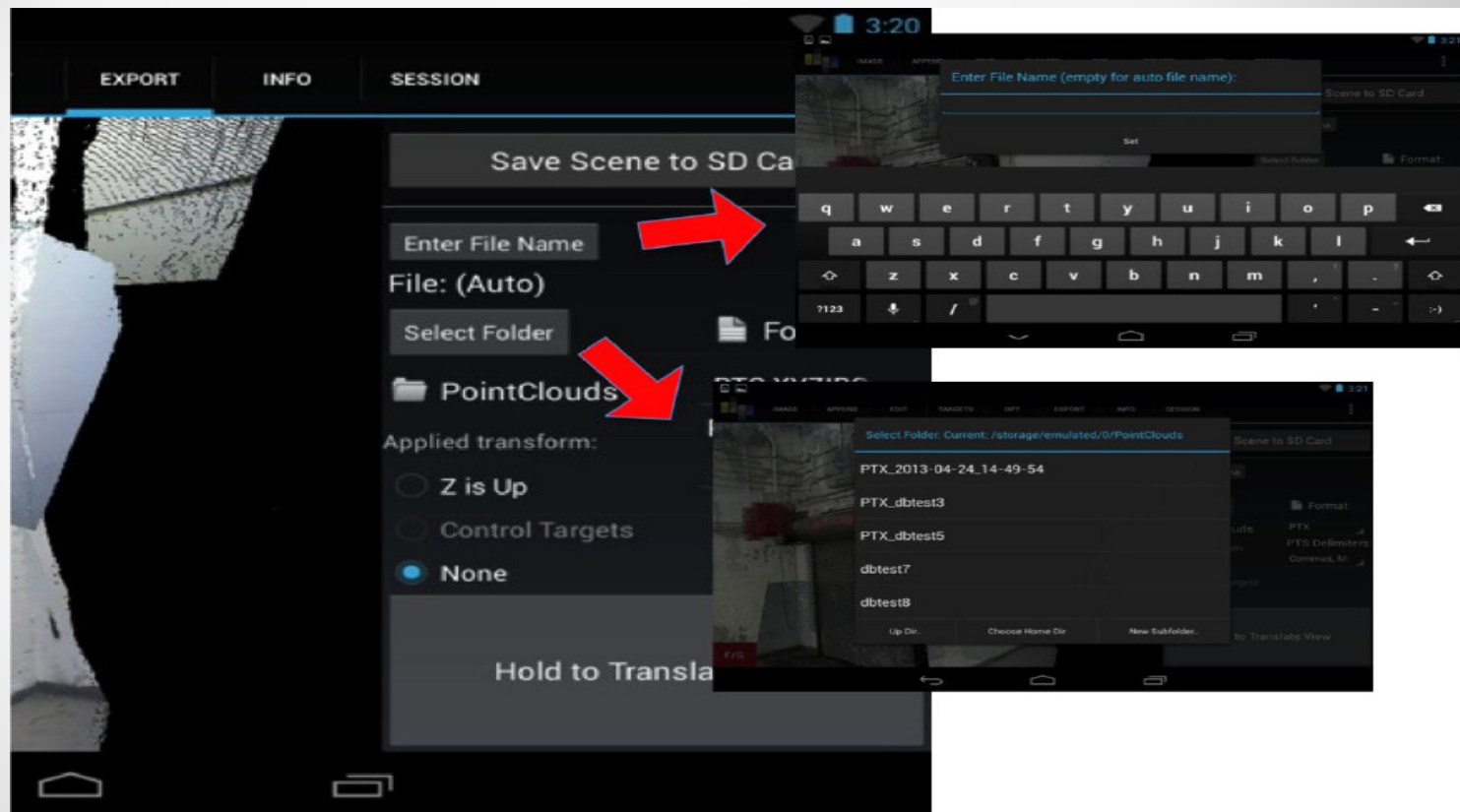
3 targets to go..

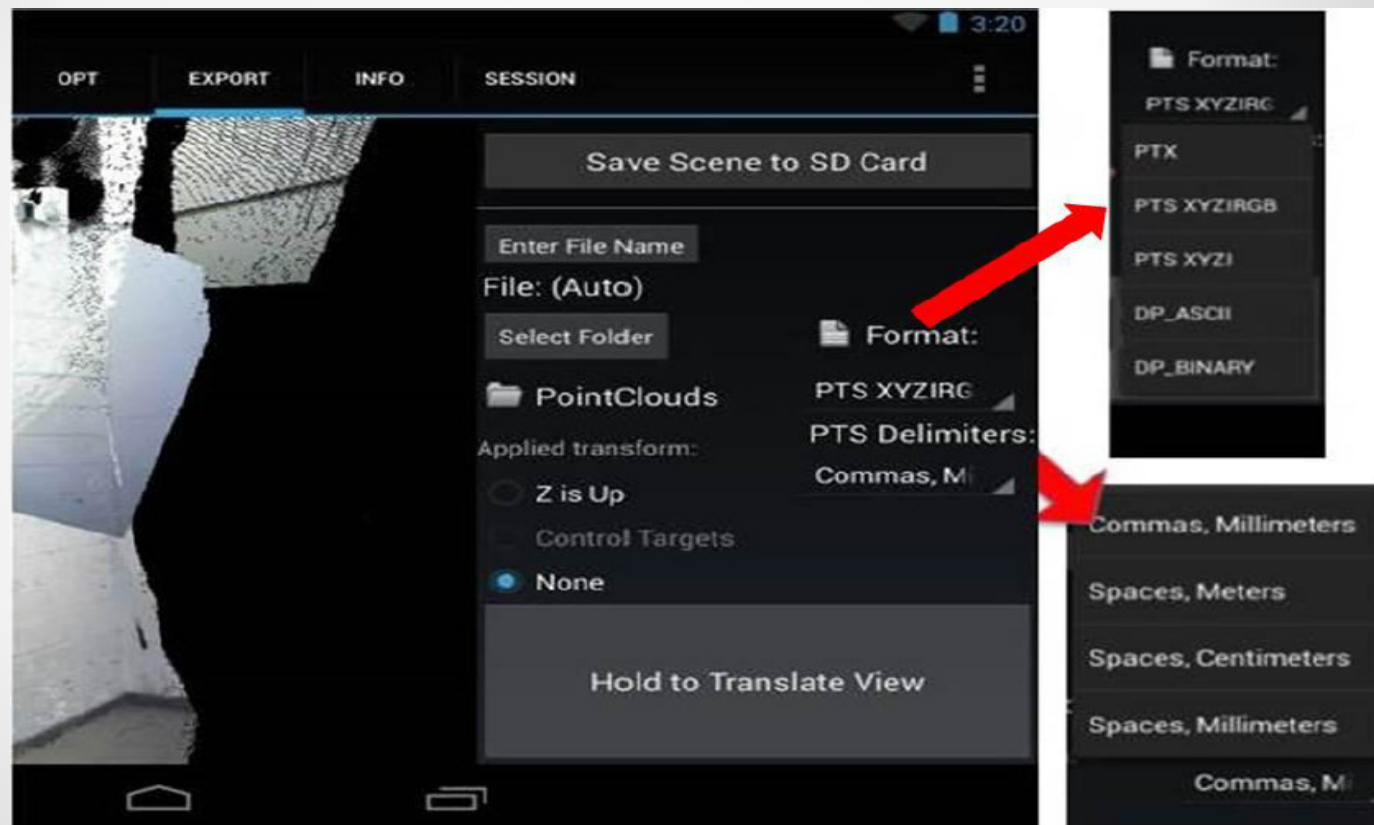
See Fit Report

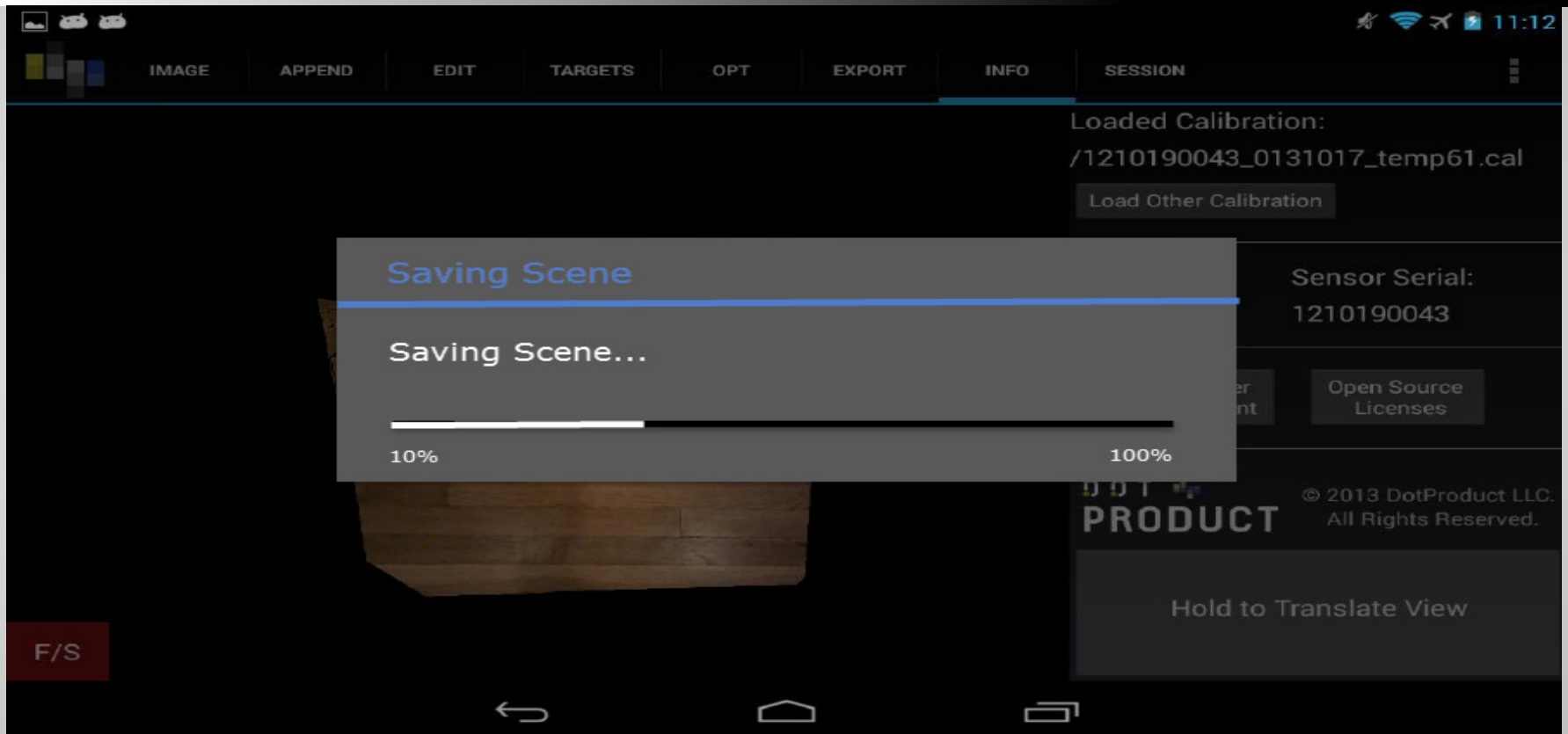












- Copy PTX file(s) to computer





Real Time • Mobile • 3D

3:31

IMAGE

APPEND

EDIT

TARGETS

OPT

EXPORT

INFO

SESSION

Loaded Calibration:
/calibration_06886

Load Other Calibration

Version:
1.0

Show End User
Lic. Agreement

Open Source
Licenses

DOT
PRODUCT

© 2013 DotProduct LLC.
All Rights Reserved.

Hold to Translate View

F/S

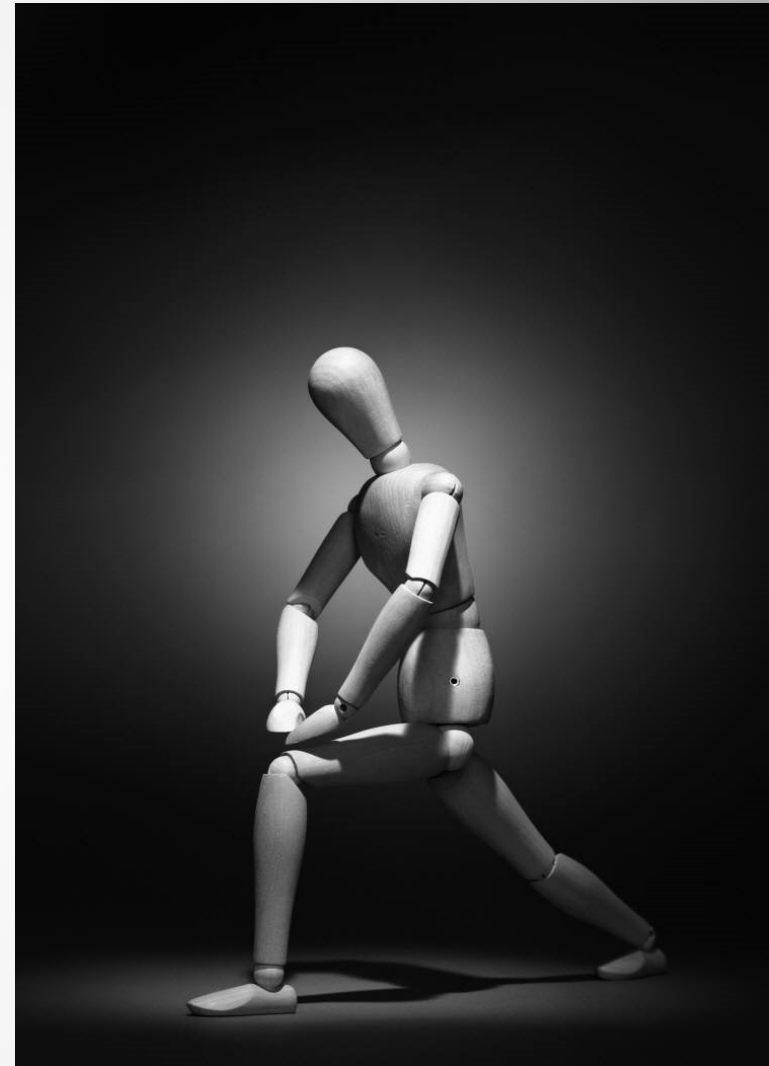
The DotProduct DPI-7 Handheld 3D Imager Kit contains:

| | |
|---|--|
| 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 http://www.dotproduct3d.com/rd1_08_specifications |
| 1 | 7" tablet bracket with handle attachment |
| 3 | USB to micro USB connectors for connecting camera to tablet |
| 1 | Carrying case |
| 1 | Tablet charger |



Stretch

- Get up and stretch out!



Agenda

Workflow

- DotProduct
- **Clearedge**
- Revit Architecture



- Edgewise
- www.clearedge3d.com

ClearEdge & EdgeWise

1. Maker of EdgeWise software – the automated feature extraction
2. Complete better than 50% of model with zero man-hours
3. Automated extraction: up to 85% of objects in your project
4. Reducing modeling man-hours: 75% on average
5. As-Built Documentation: create accurate “as-built” projects
6. Direct integration: Revit, CADWorx, Plant3D (Aug/Sept.) , PDMS, & other CAD
7. Pushing the boundaries: Object recognition technology

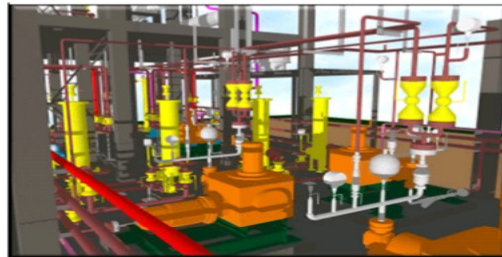


Copyri

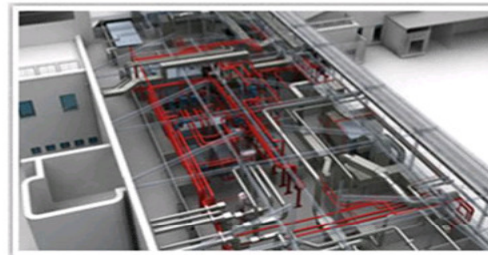
Slide 3

Product Portfolio

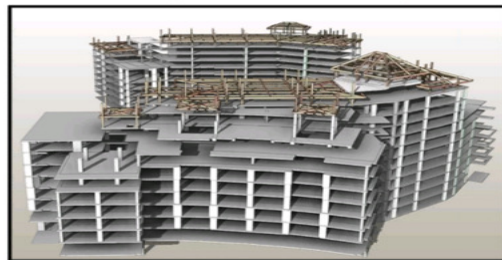
EdgeWise Plant



EdgeWise MEP



EdgeWise Building



EdgeWise Structure



Product Portfolio

The BIM Suite



EdgeWise **MEP**™

EdgeWise **Building**™

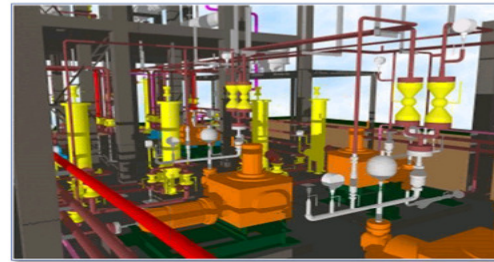
EdgeWise **Structure**™

Revit **Plug-in**

Copyright 2014 ClearEdge3D

Confidential

The Plant Suite



EdgeWise **Plant**™

EdgeWise **Structure**™

PCF Plug-in

PDMS **Plugin (Add-on)**

Slide 9



New Releases



EdgeWise MEP™ (Upgrade) COMING Q3 2014

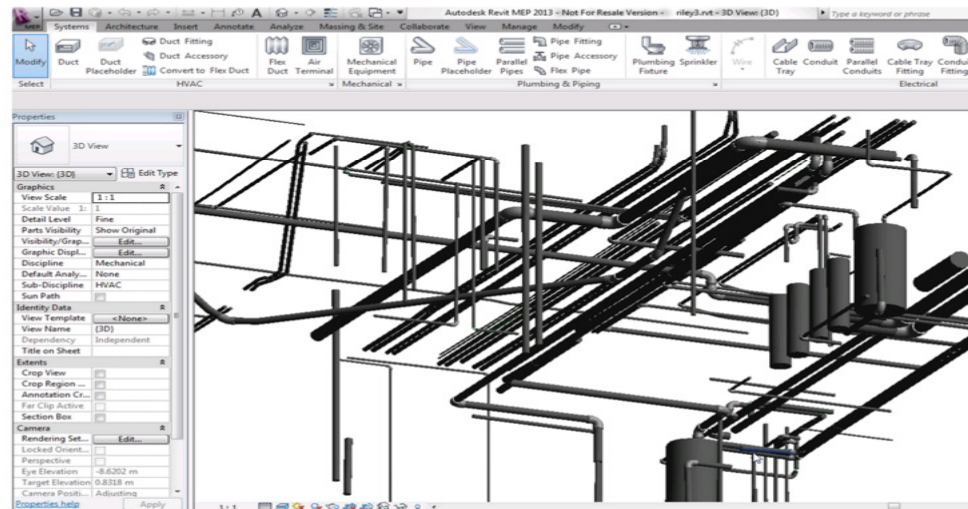
Square Ducting

Cable Trays

Primitives

Improved Clipping
Box

Improved
Performance



Copyright 2014 ClearEdge3D

Confidential

Slide 11



AUTODESK UNIVERSITY 2013





New Releases



EdgeWise Structure™

UPGRADE SUMMER 2014

Structural Steel

Angle Iron

Round Steel

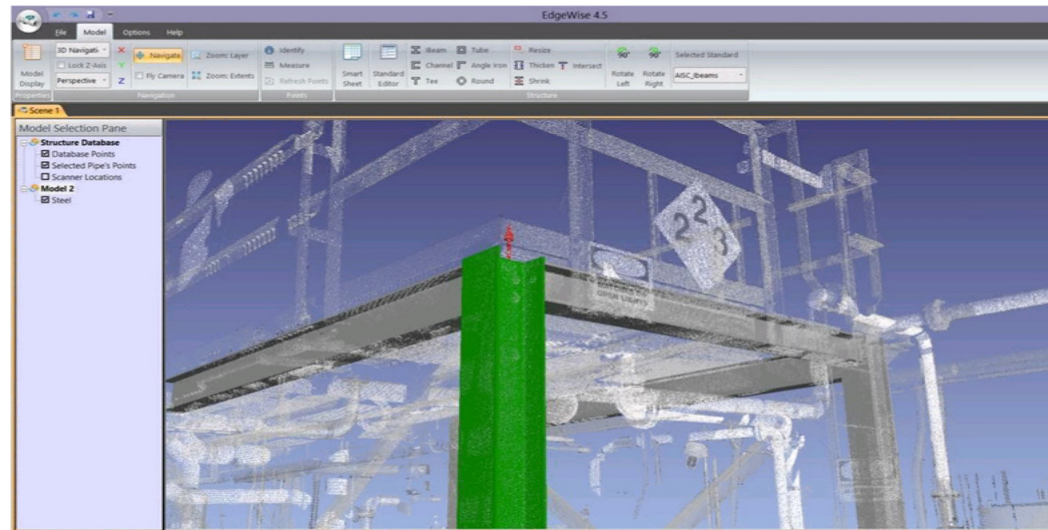
Beams (S-sections)

Up to 5X faster

Integration:

- Revit / AutoCAD
- Plant3D (coming)
- CADWorx
- AutoPlant
- PDMS

Copyright 2014 ClearEdge3D



New Releases

EdgeWise Building™ (Upgrade)

COMING OCTOBER 2014

Floors / Ceilings

Pitched Roofs

Photo-texturing

Object Recognition
of Doors

QA Reporting

Improved
Performance



Copyright 2014 ClearEdge3D

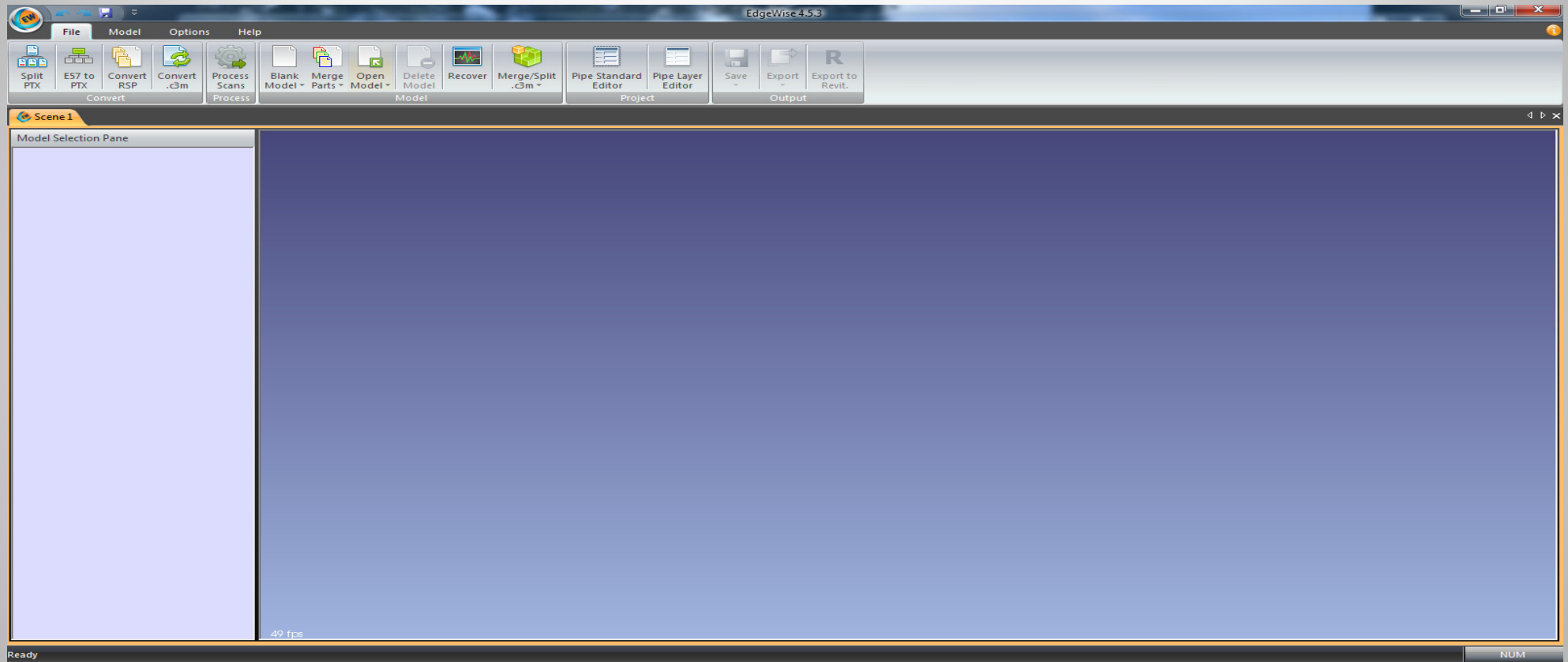
Slide 12

CLEAREDGE^{3D}

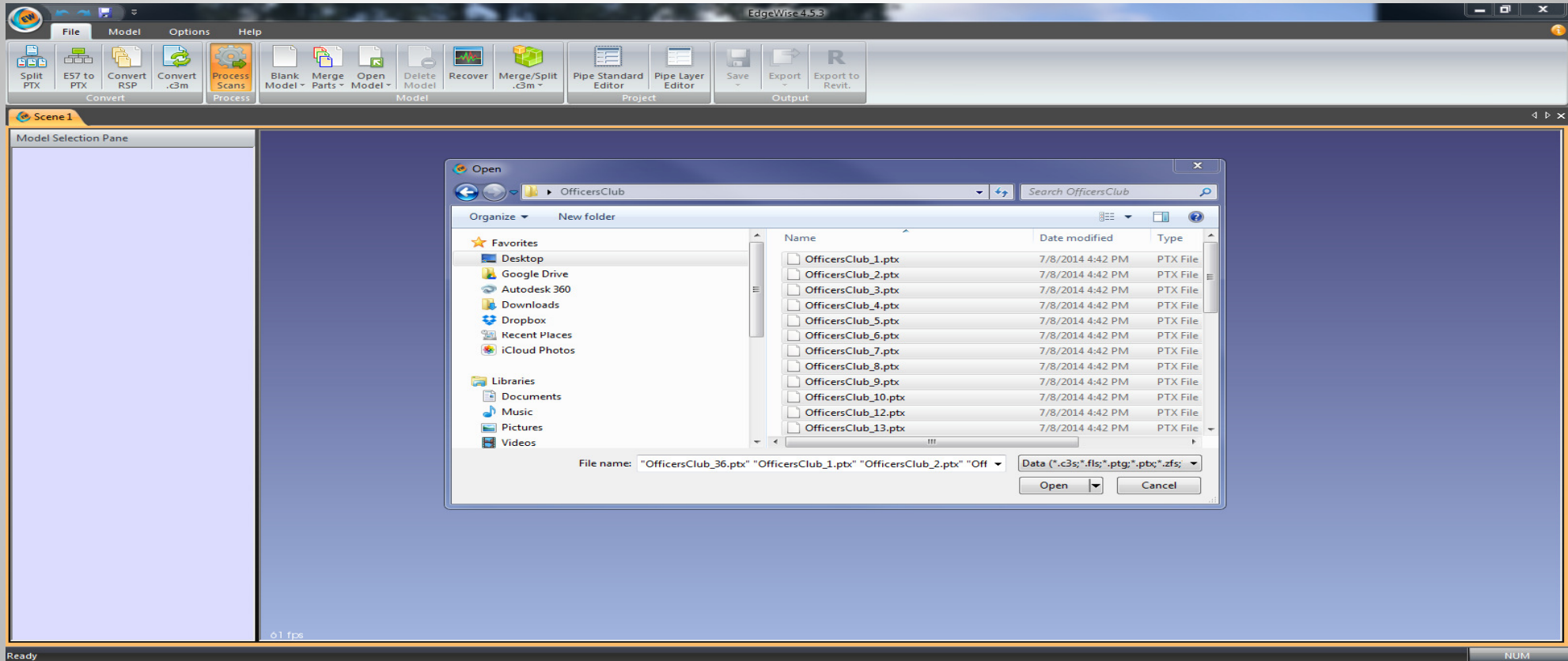
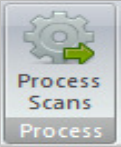


EdgeWise™

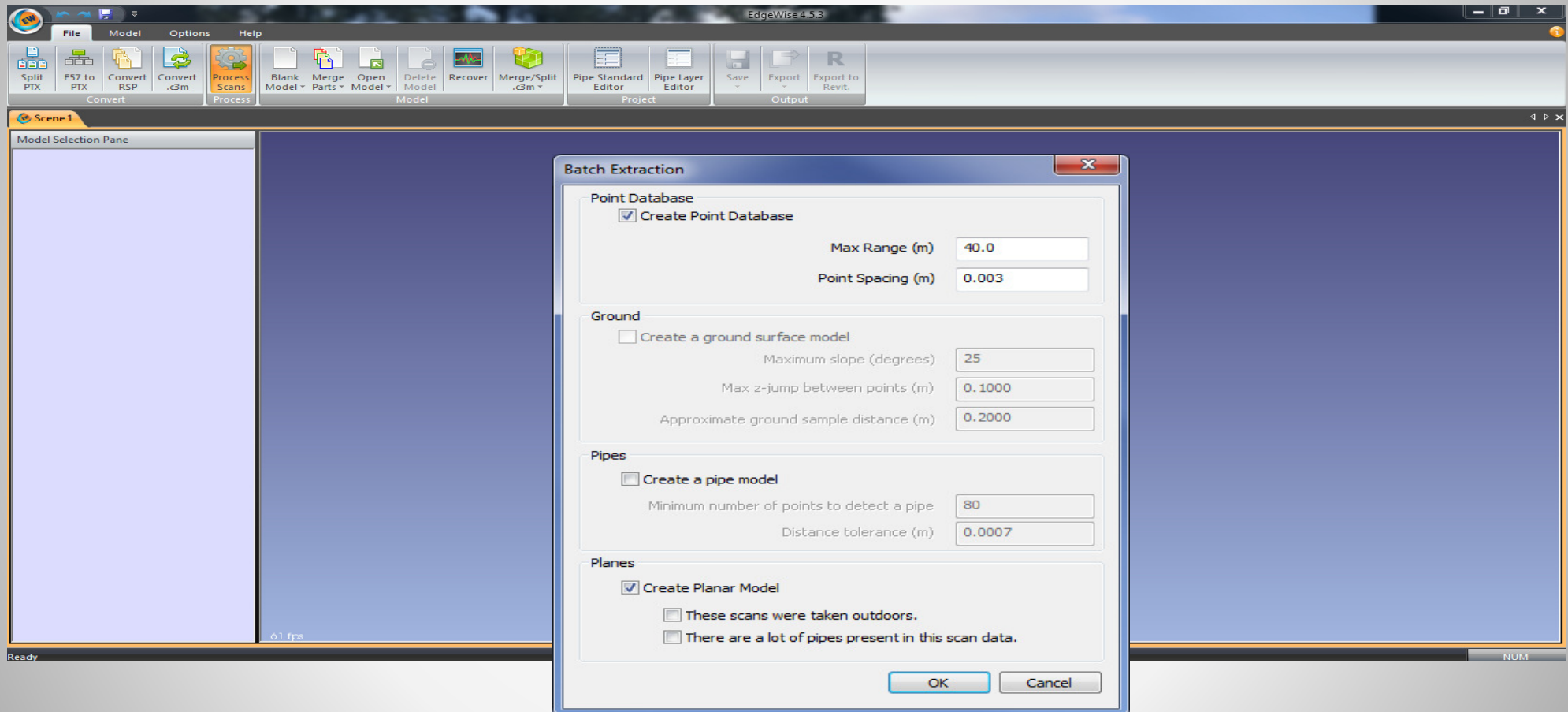
Copyright © 2009-2014 ClearEdge3D, Inc. All rights reserved.



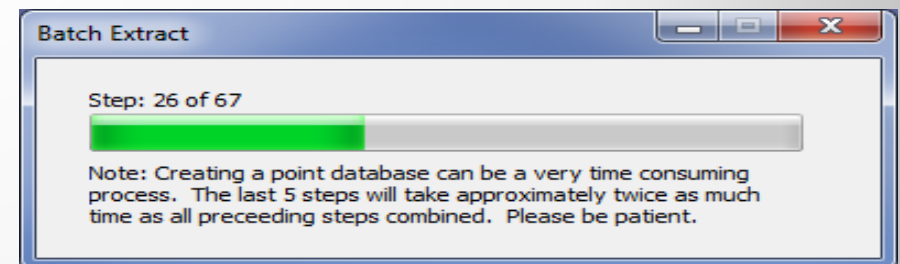
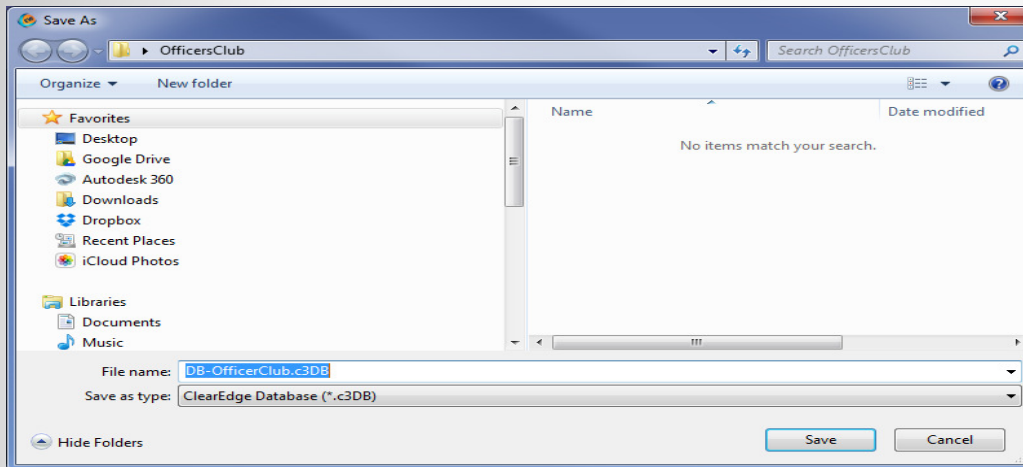
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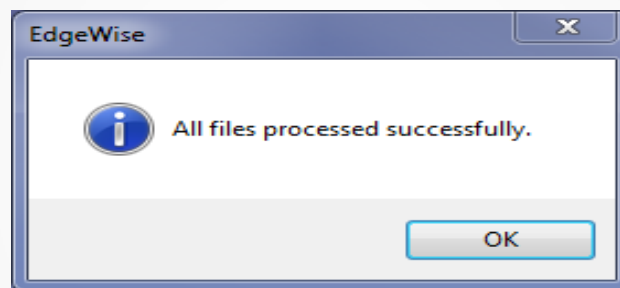


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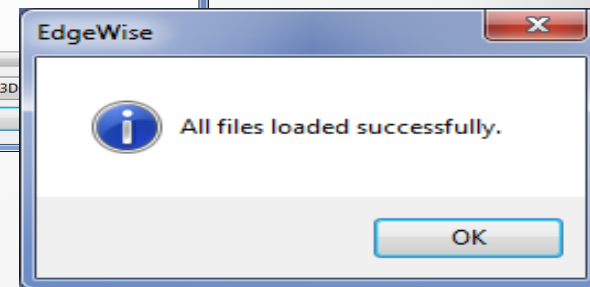
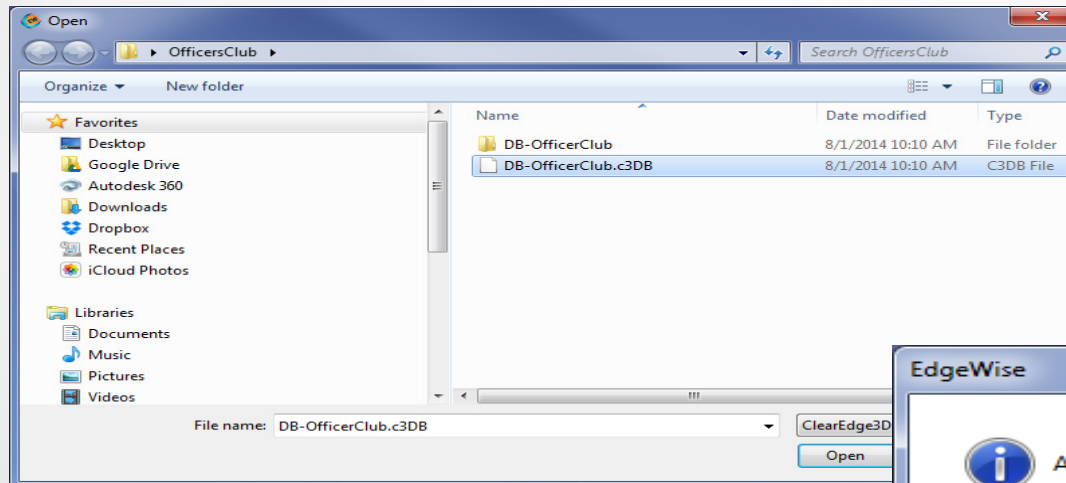
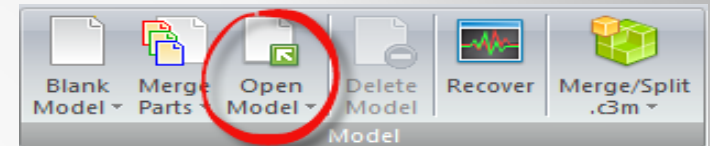


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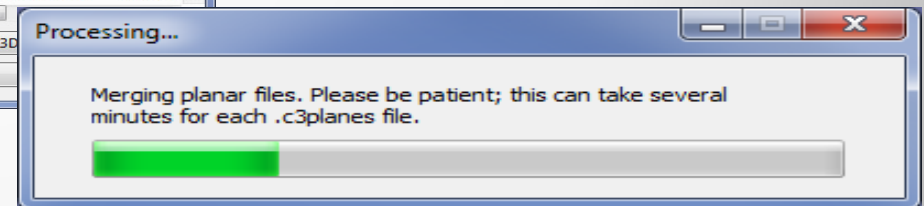
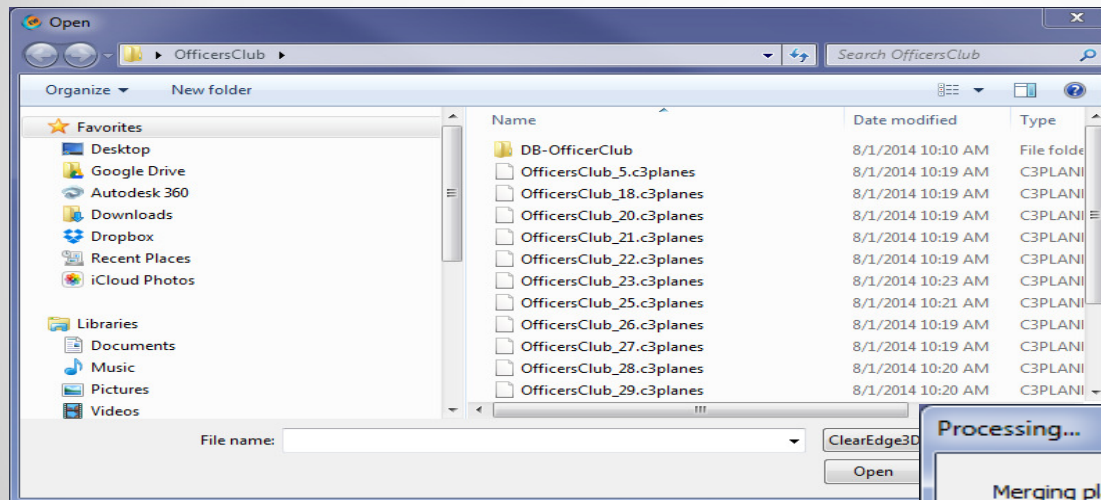
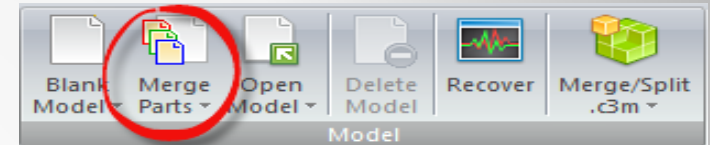




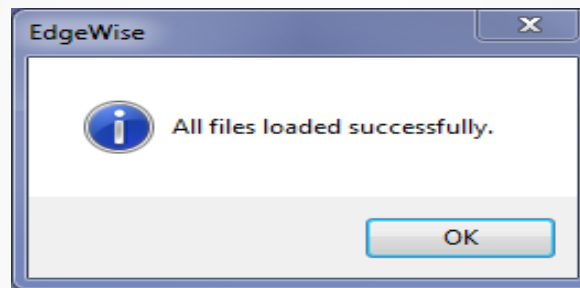
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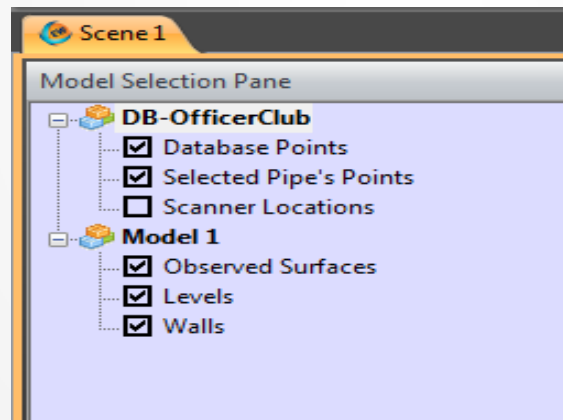
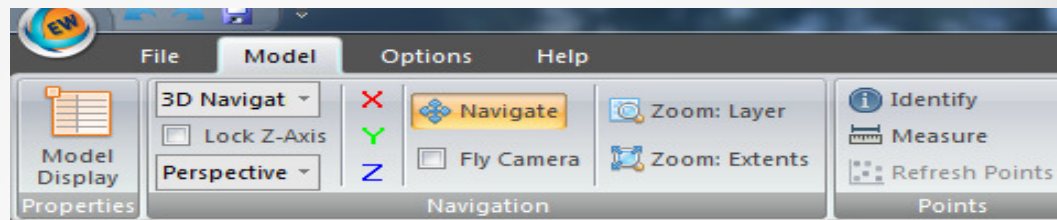
CLEAREDGE^{3D}



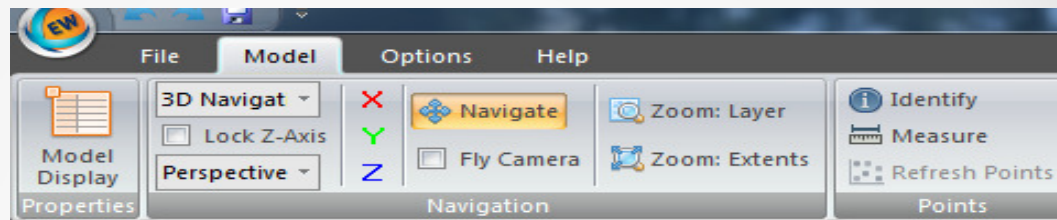
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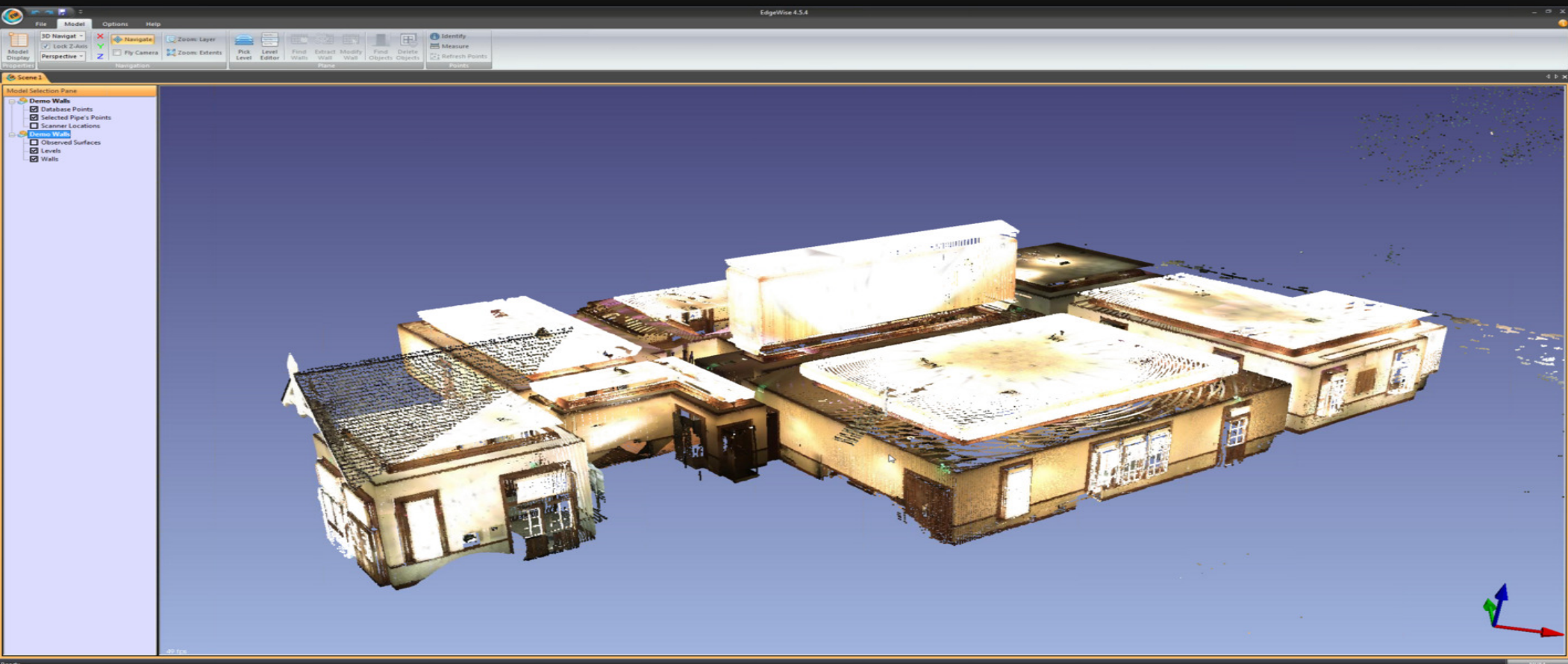
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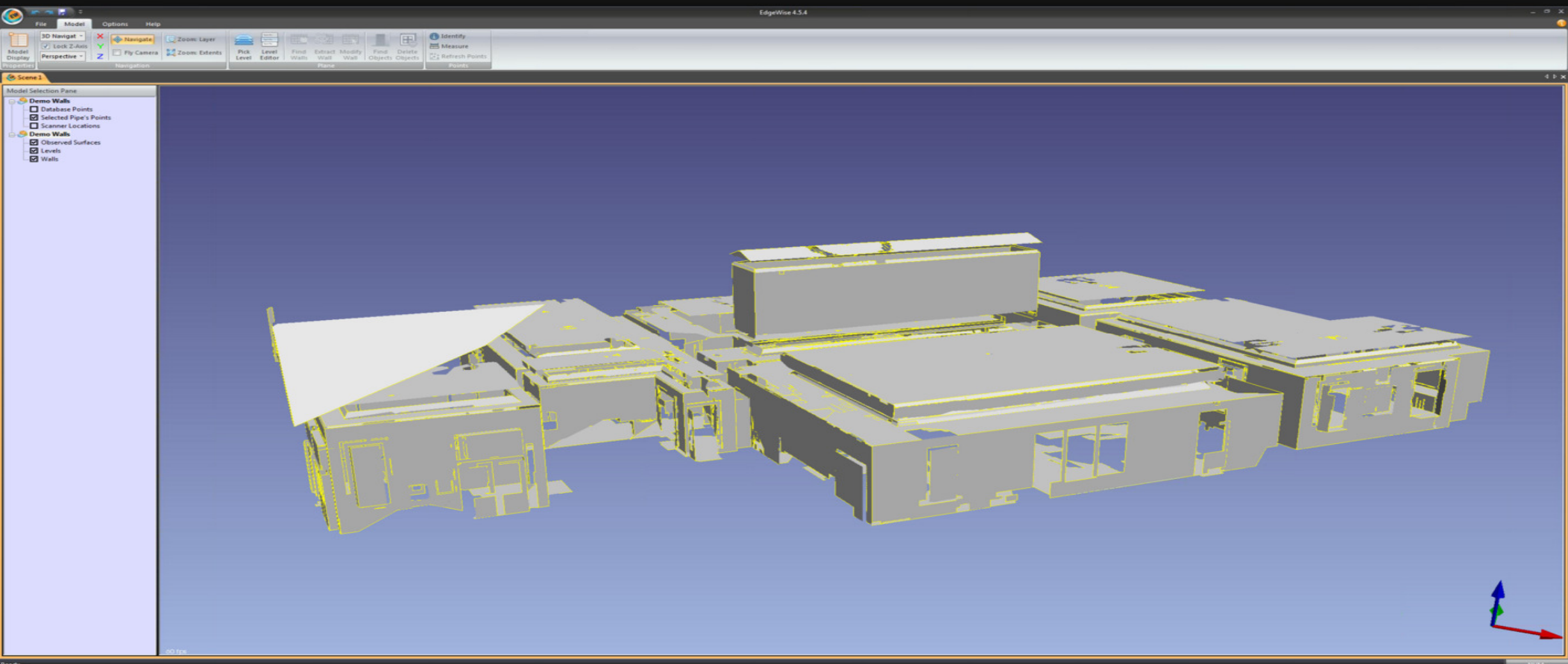
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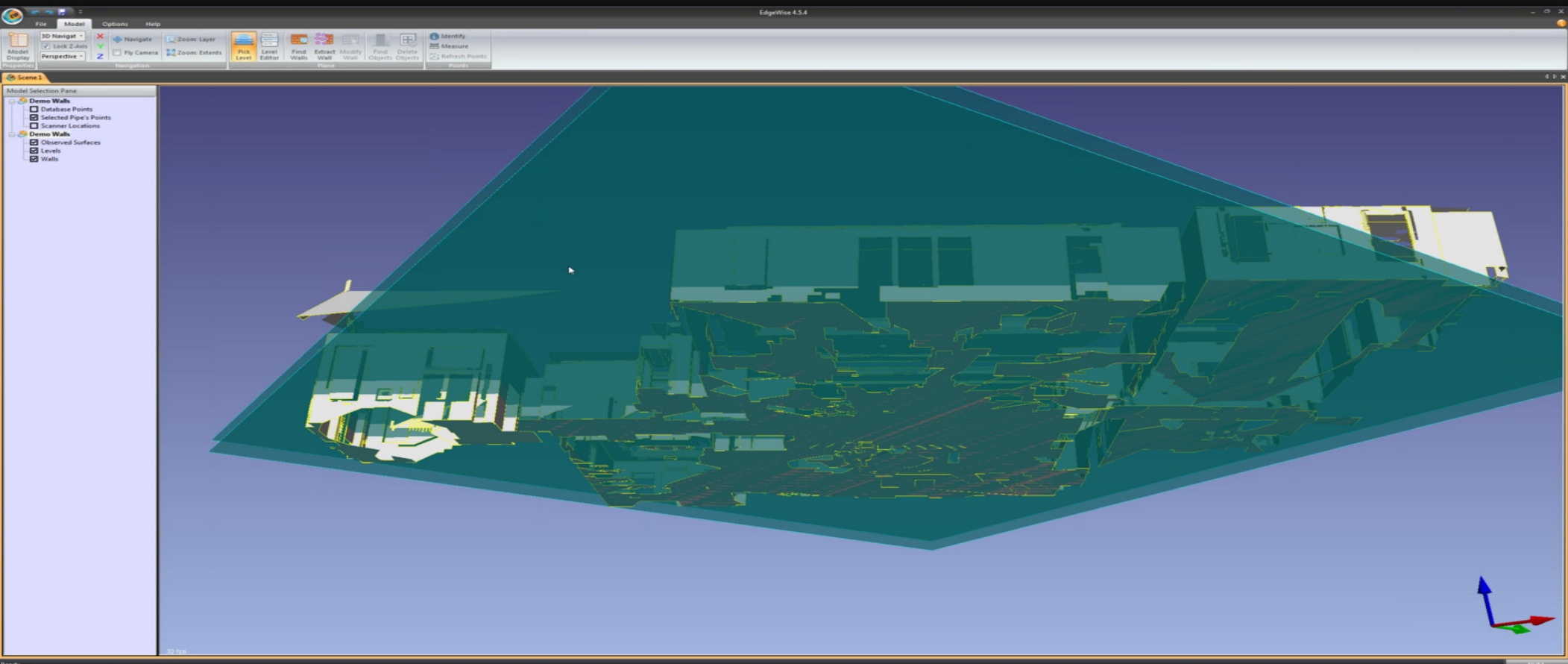
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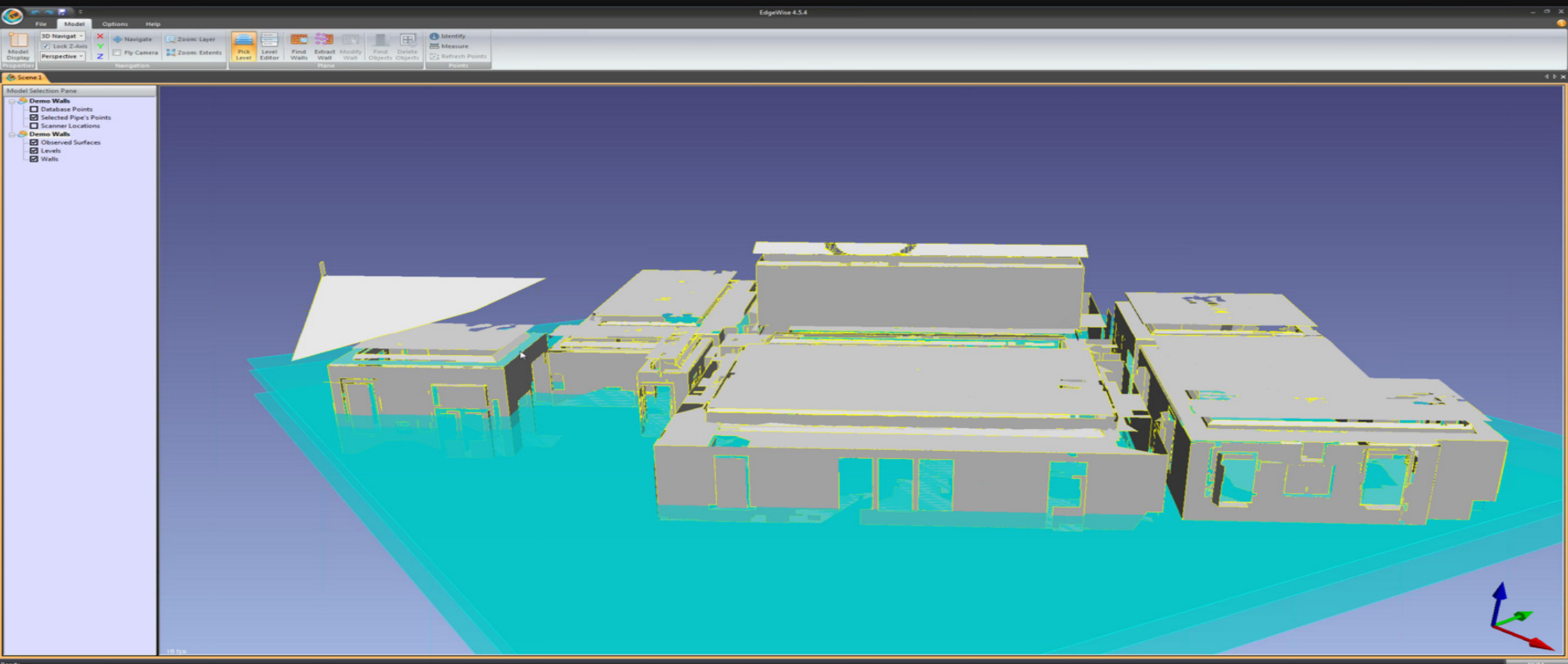
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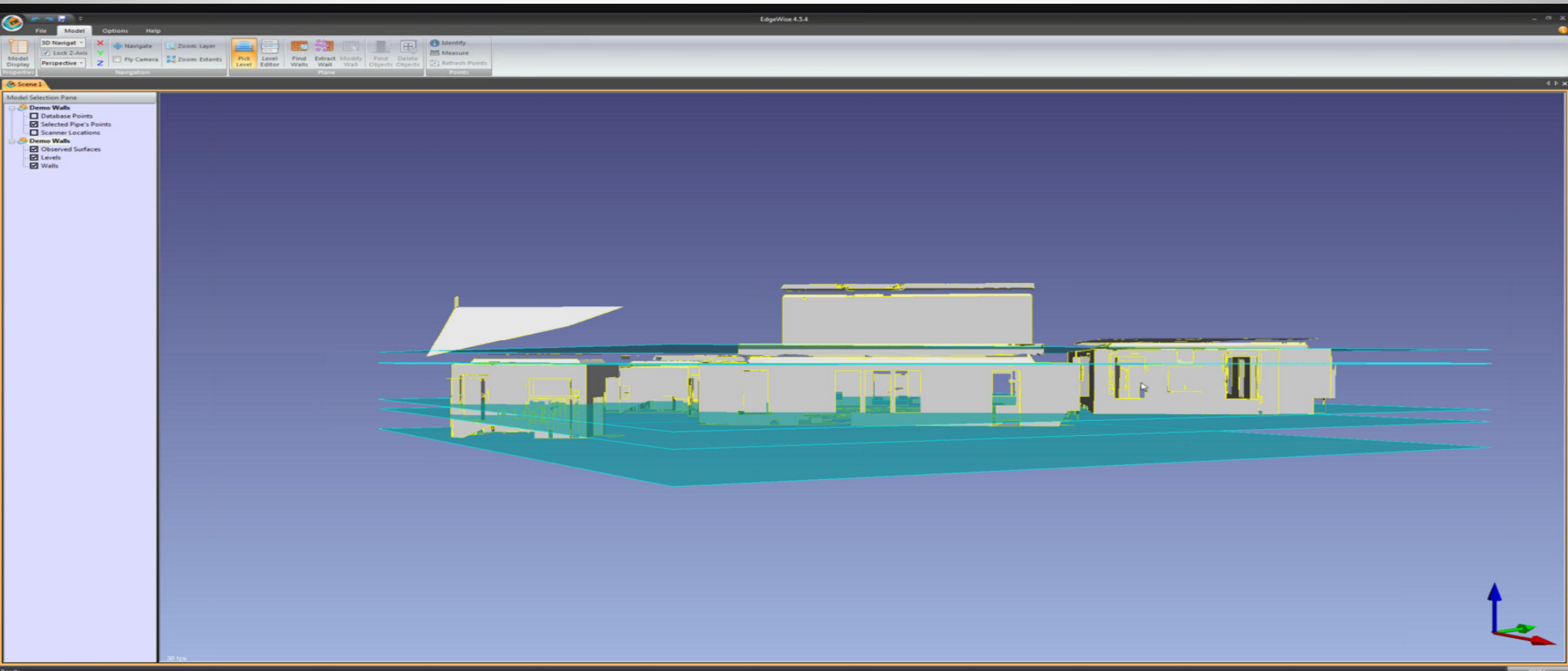
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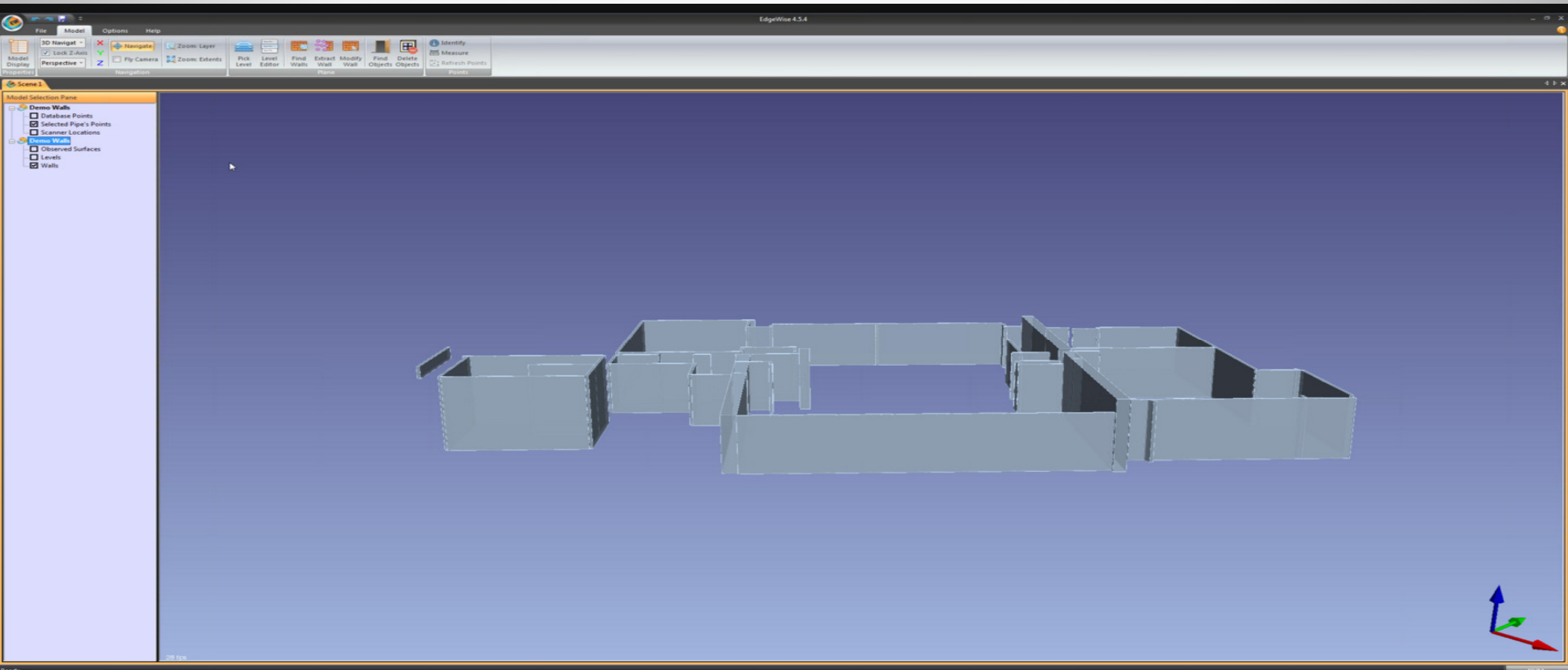
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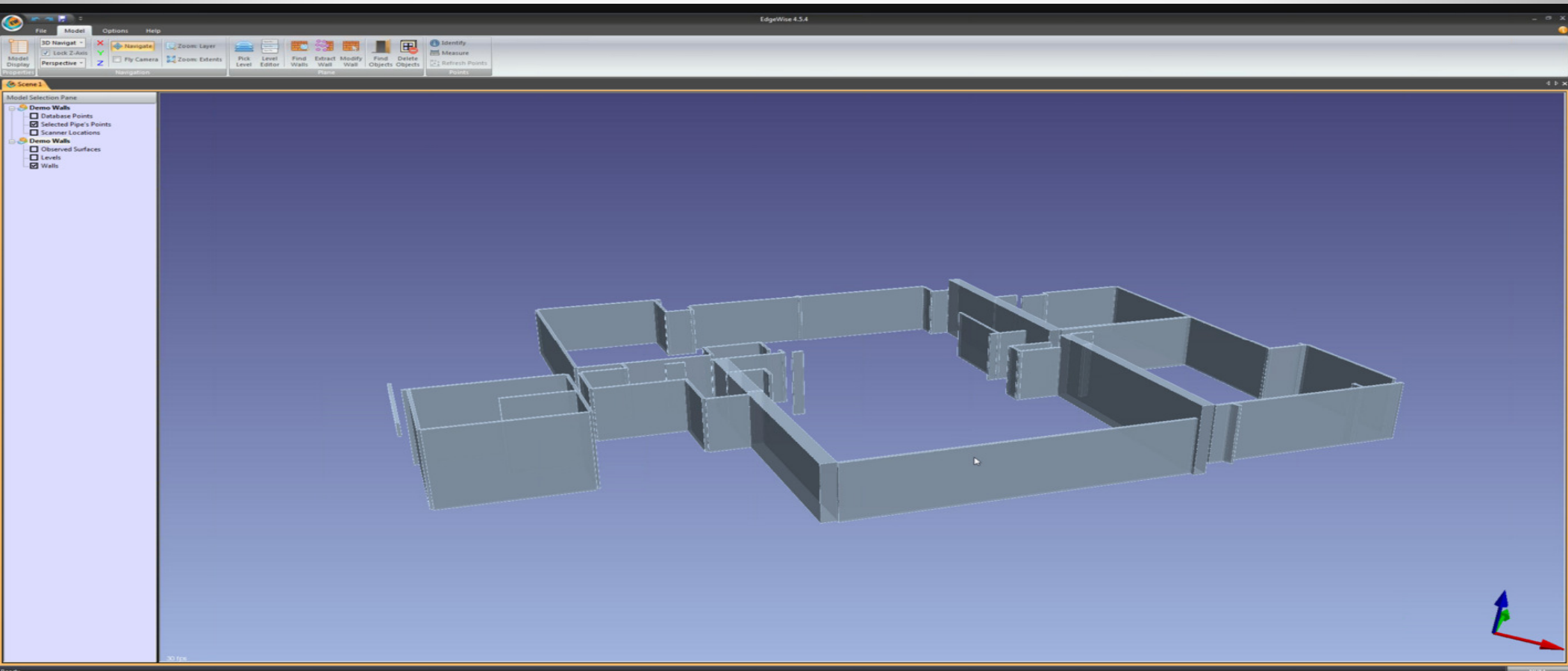
CLEAREDGE^{3D}



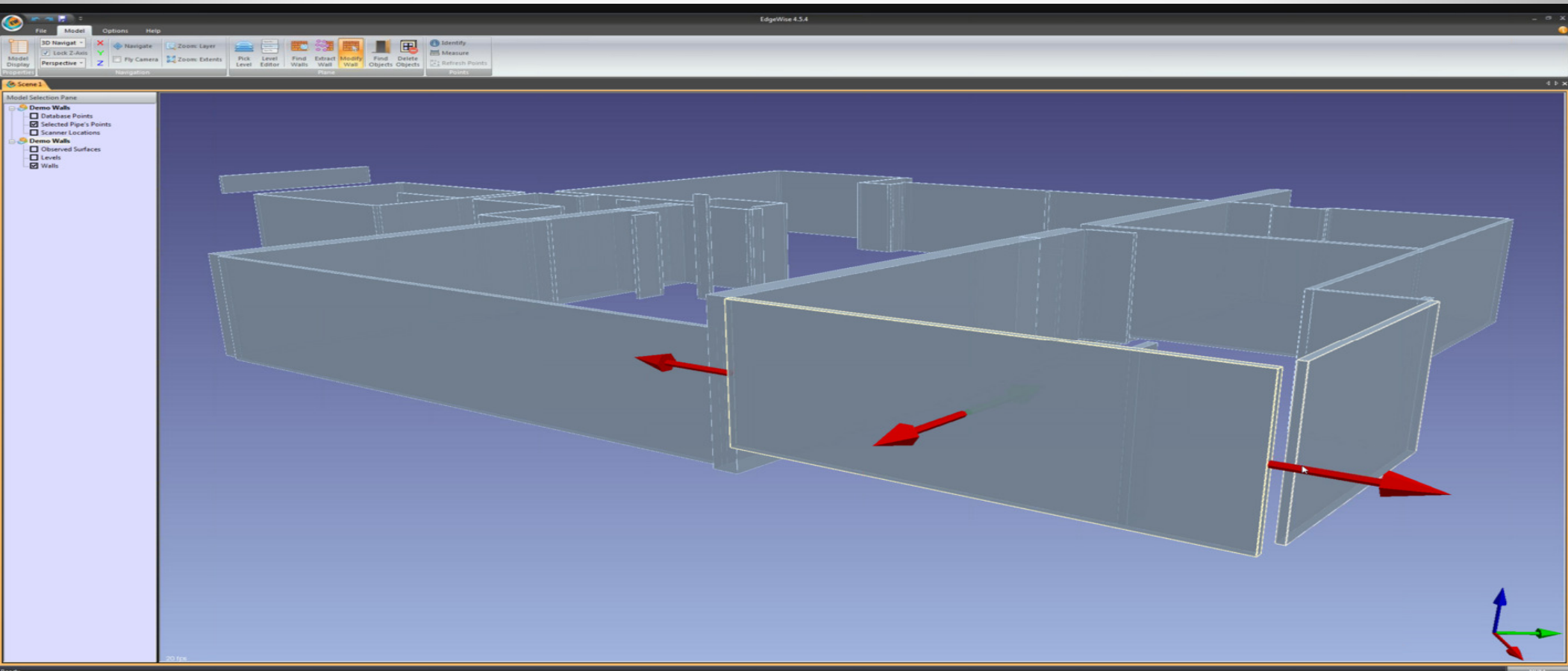
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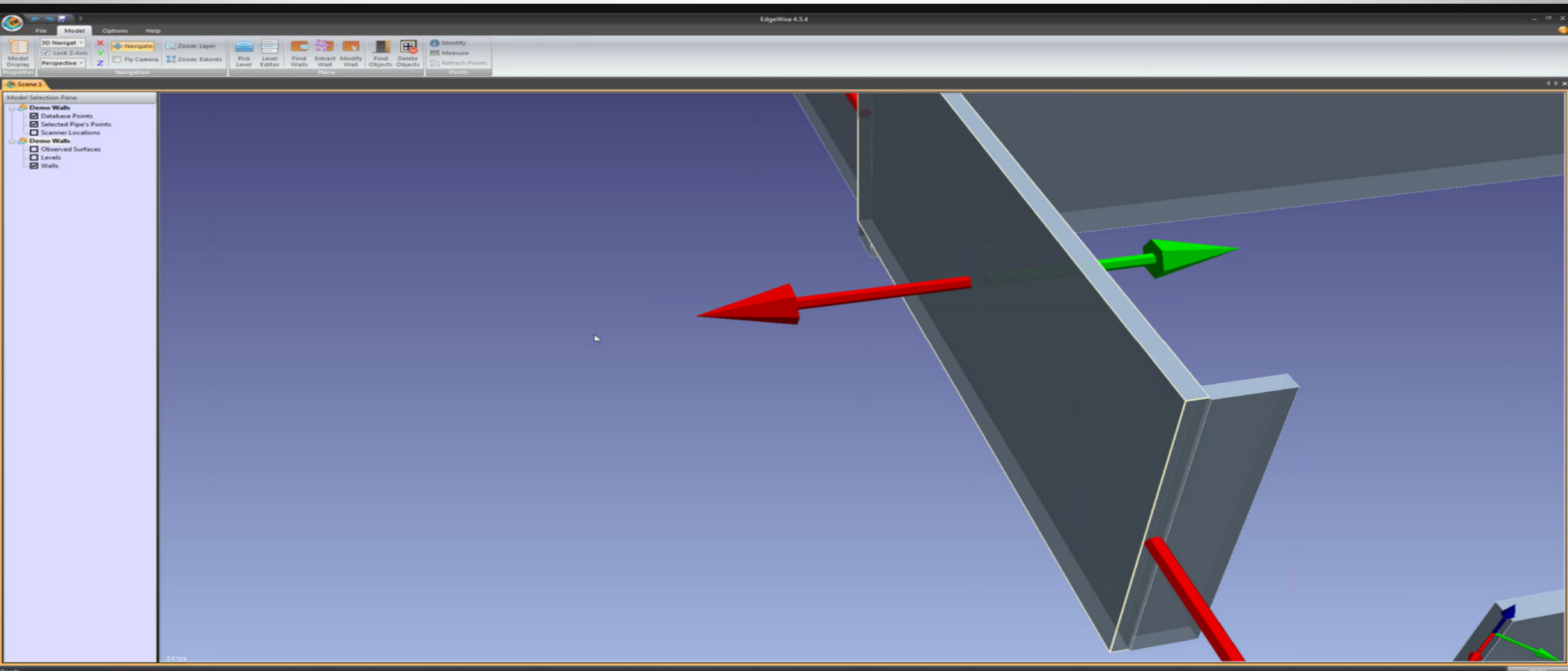
CLEAREDGE^{3D}



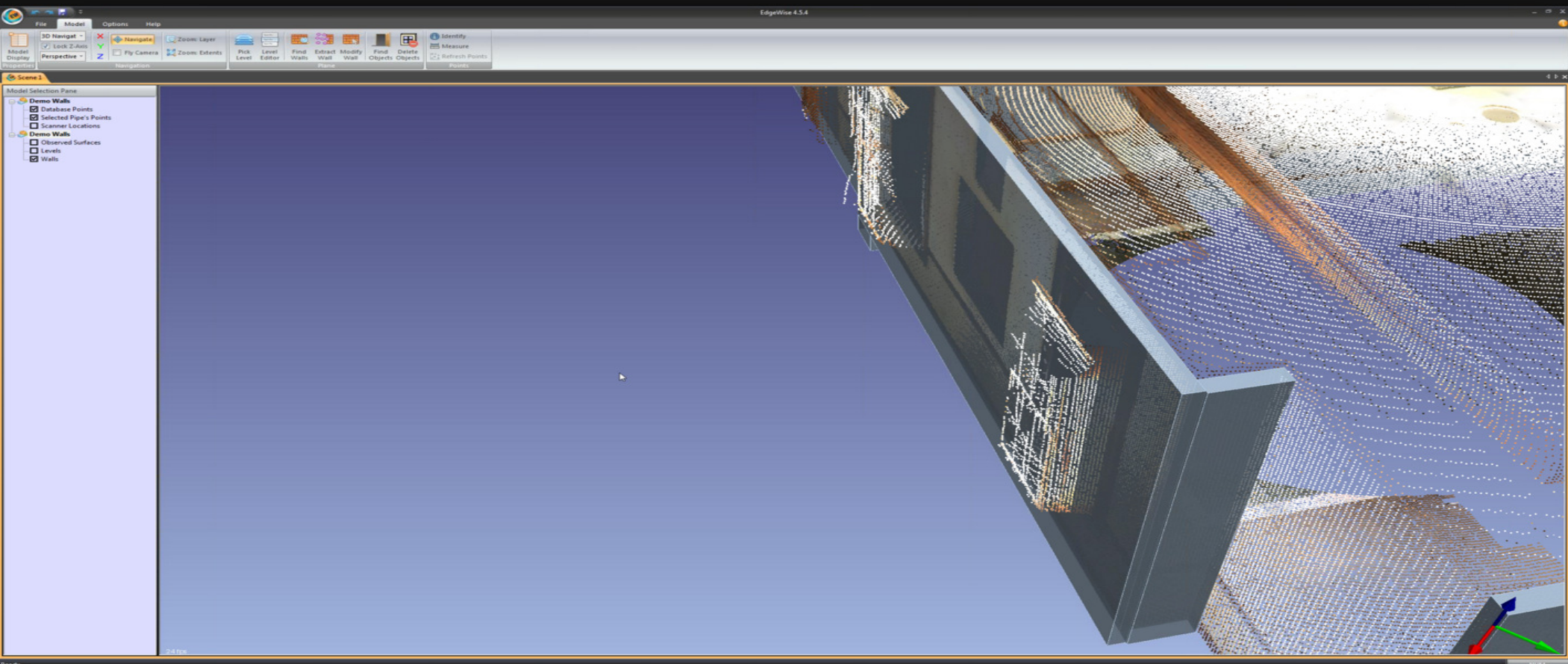
CLEAREDGE^{3D}



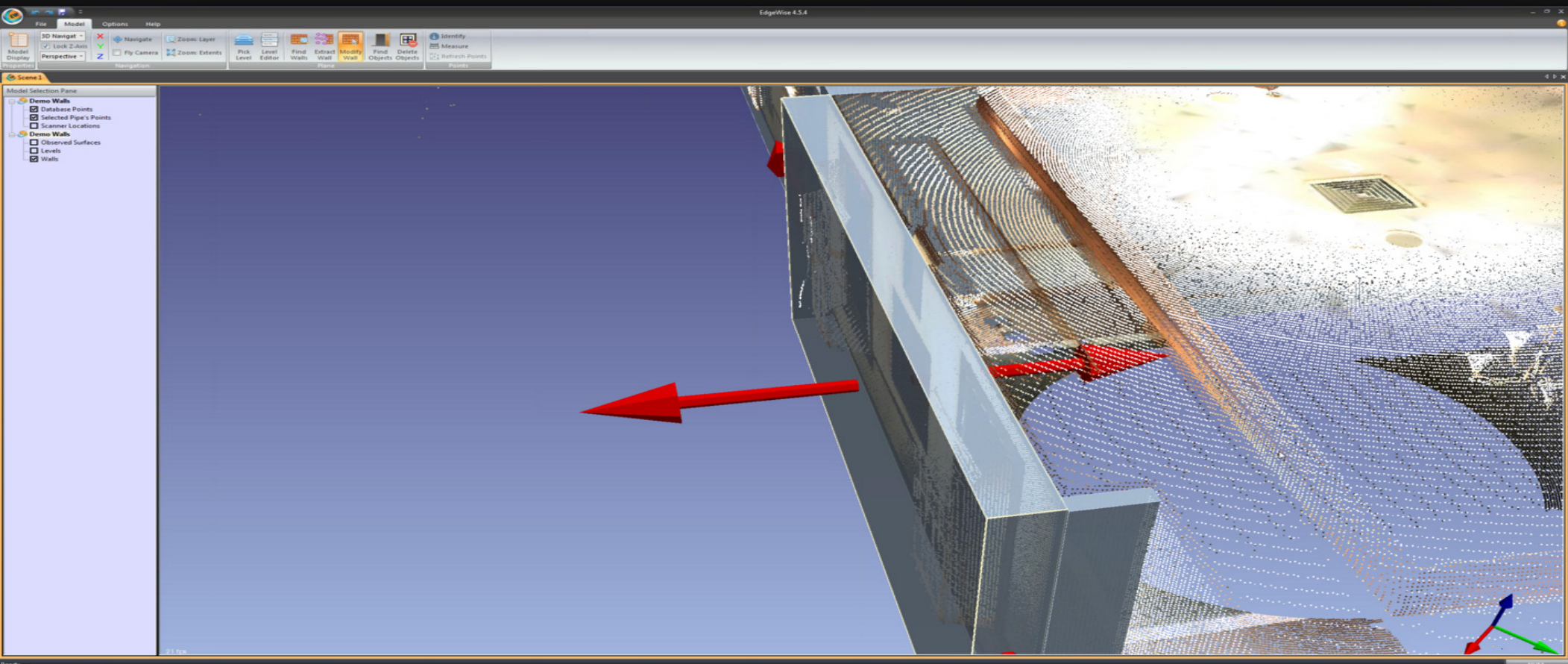
CLEAREDGE^{3D}



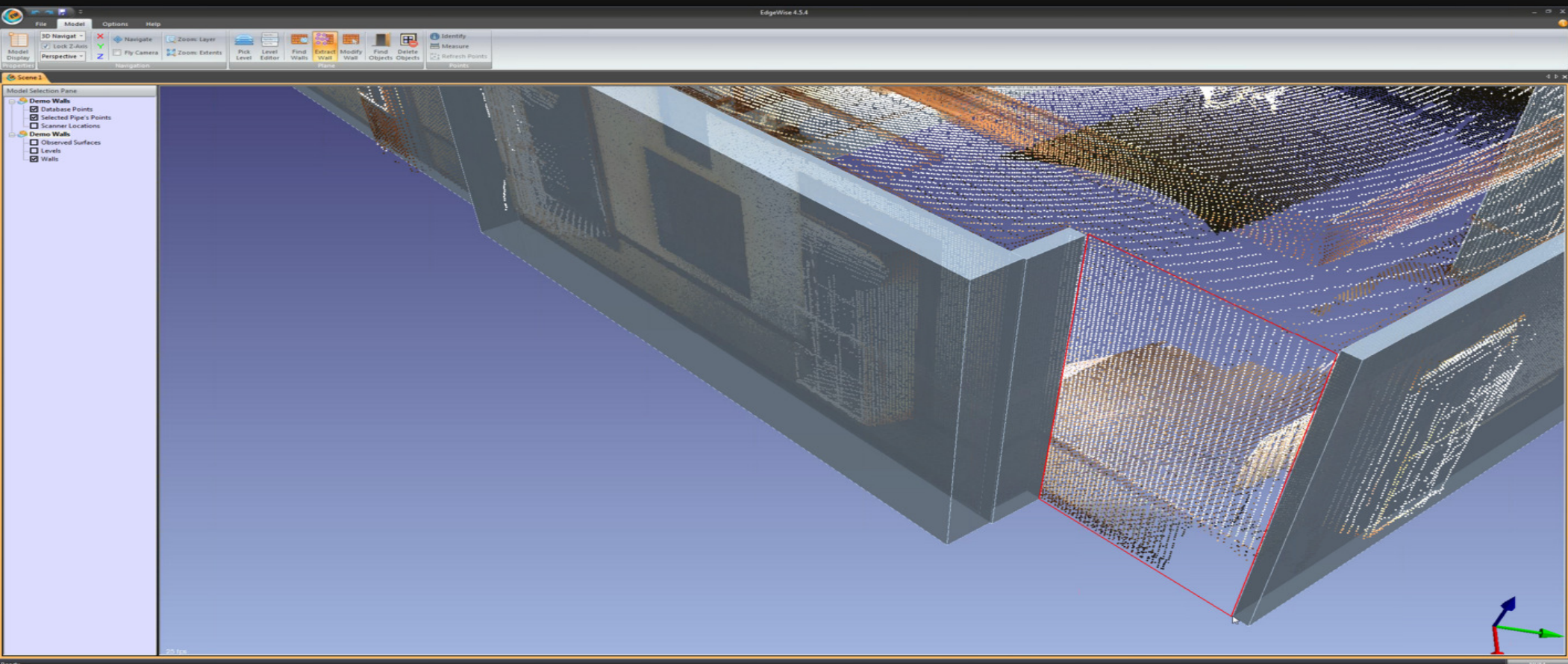
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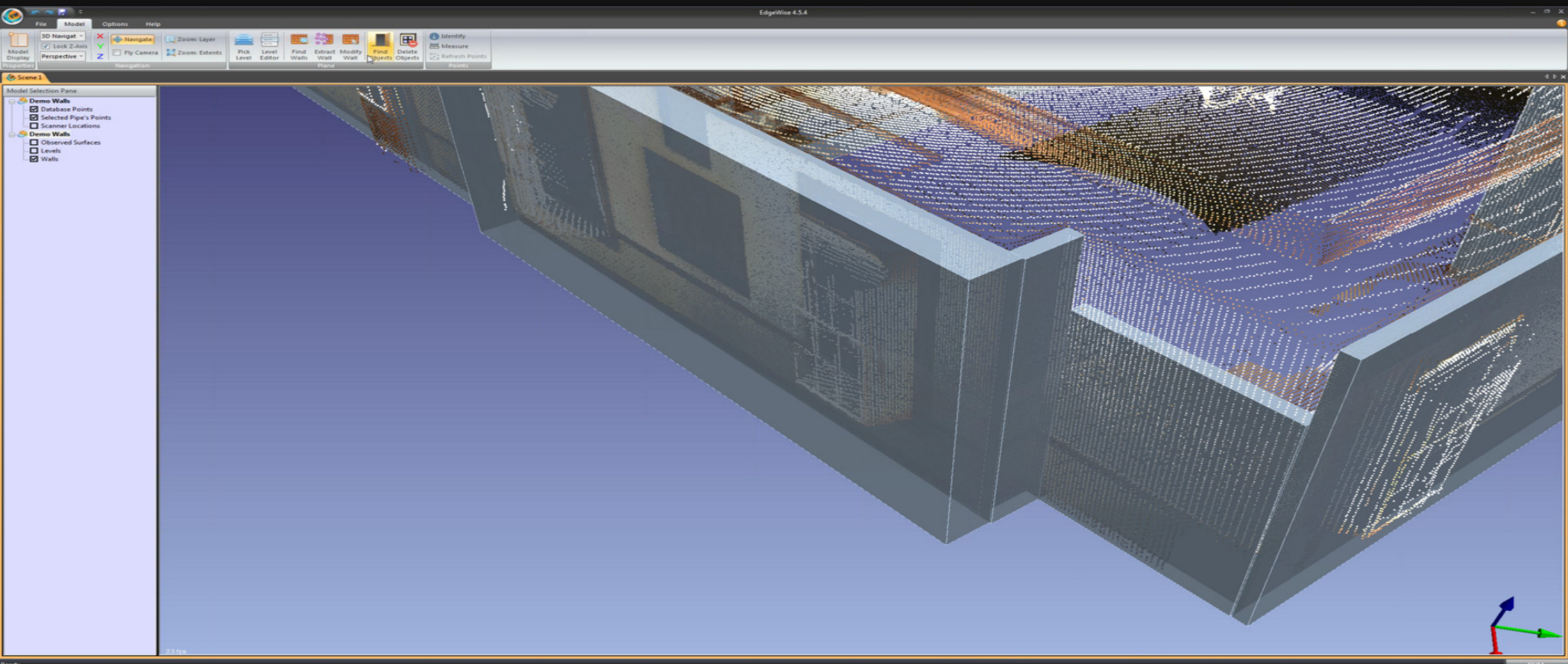
CLEAREDGE^{3D}



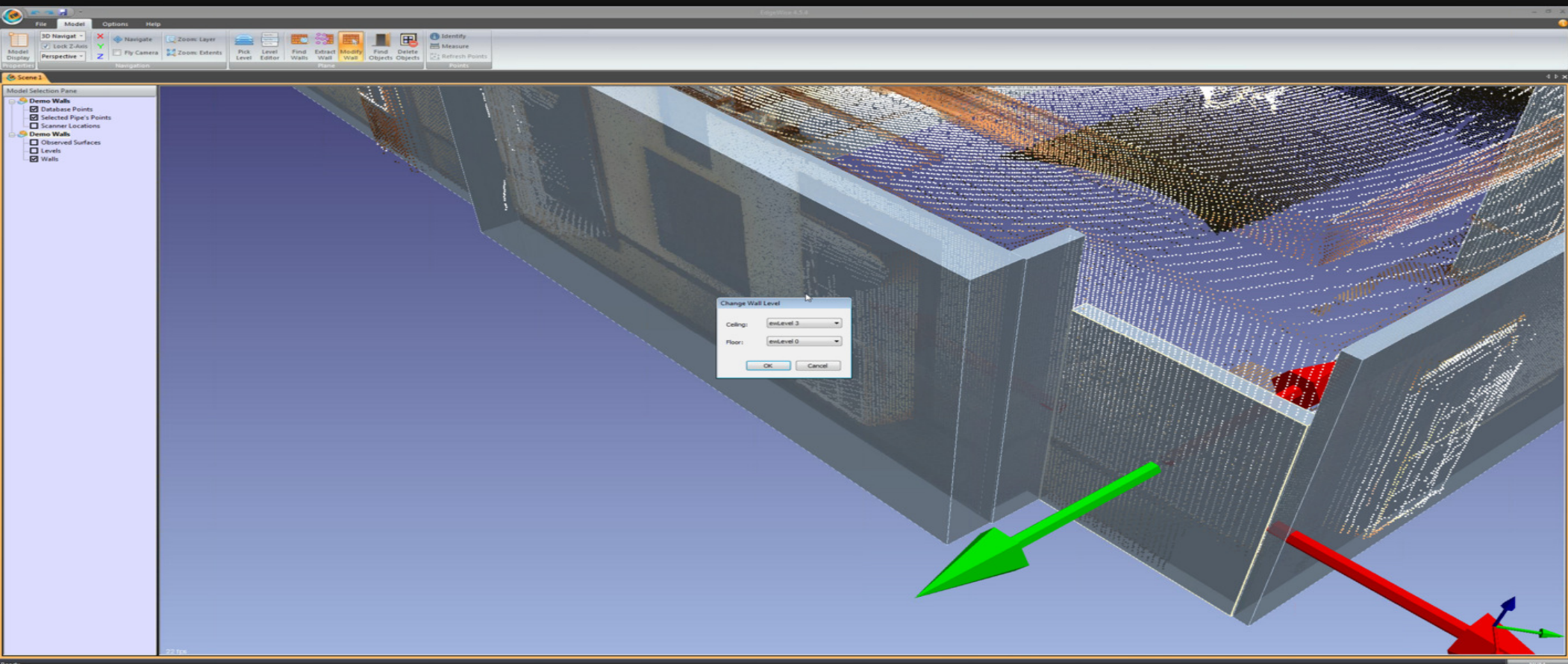
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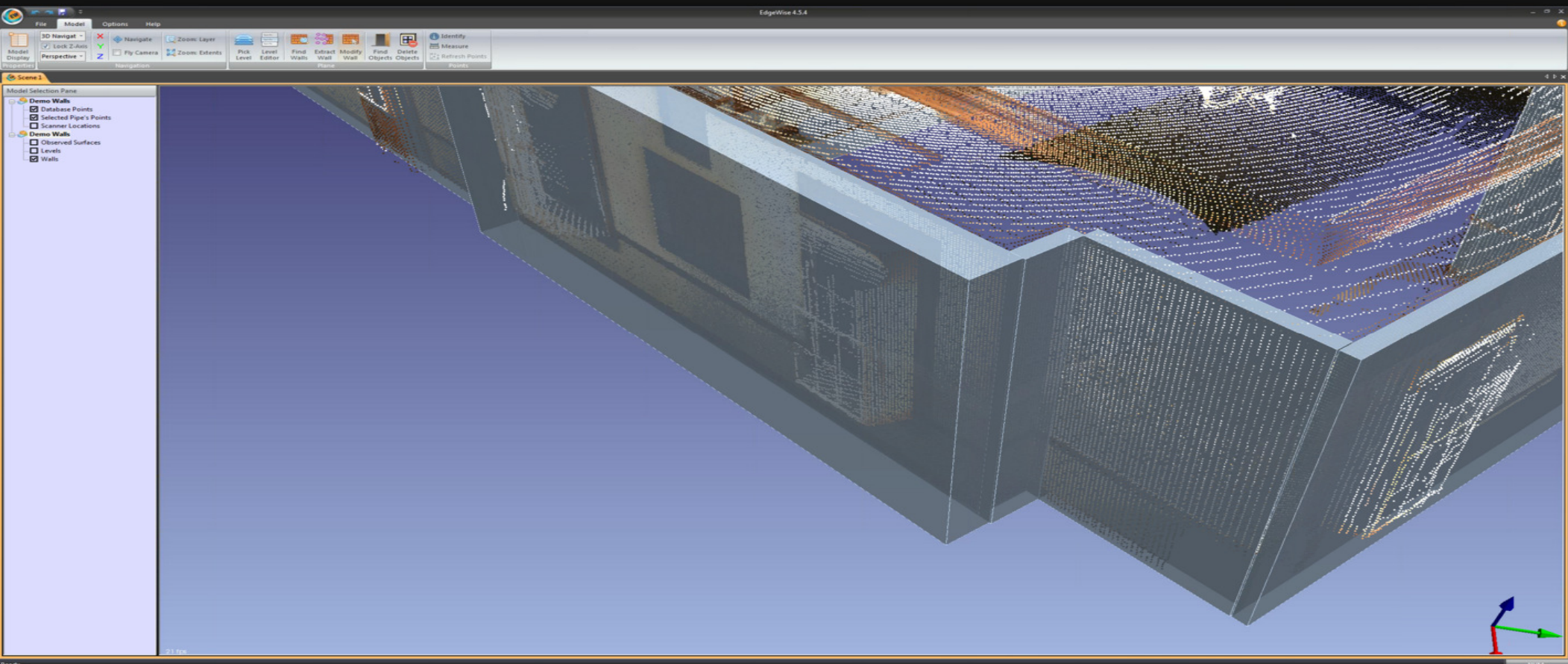
CLEAREDGE^{3D}



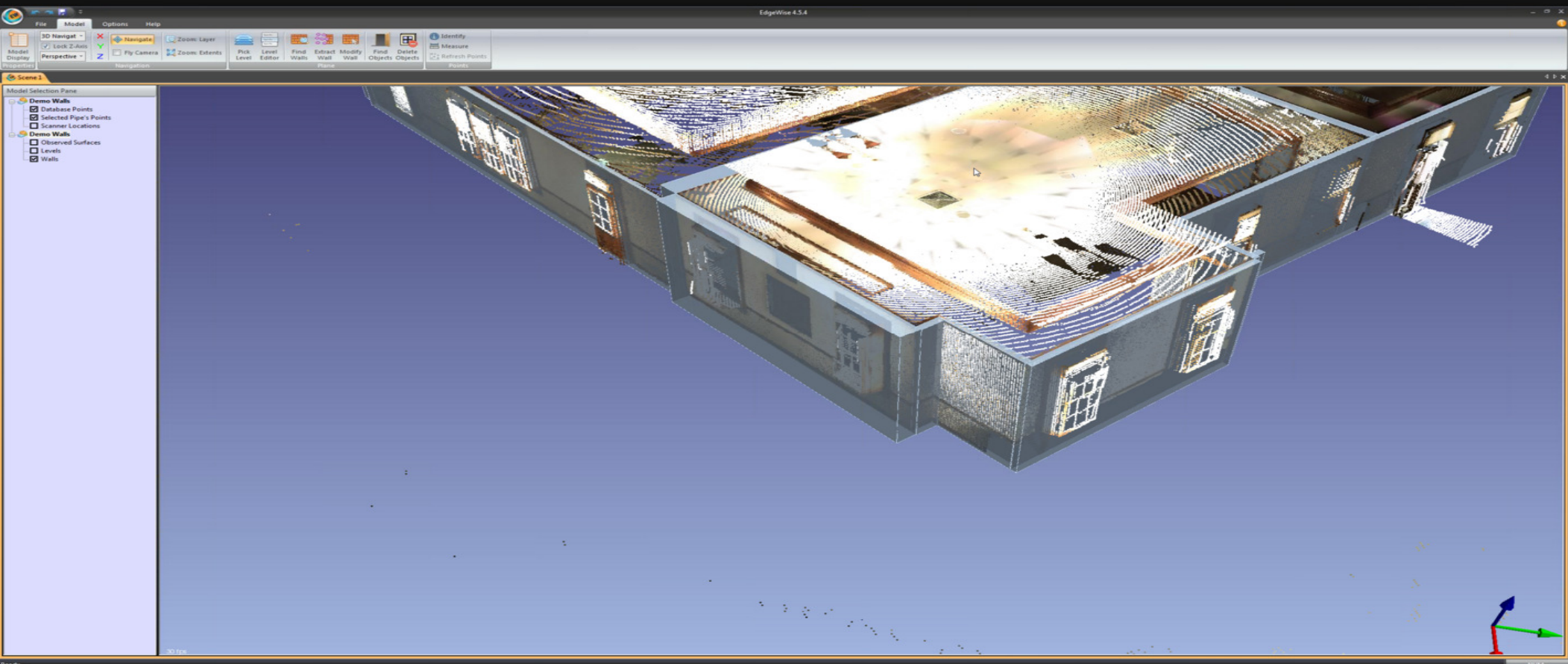
CLEAREDGE^{3D}



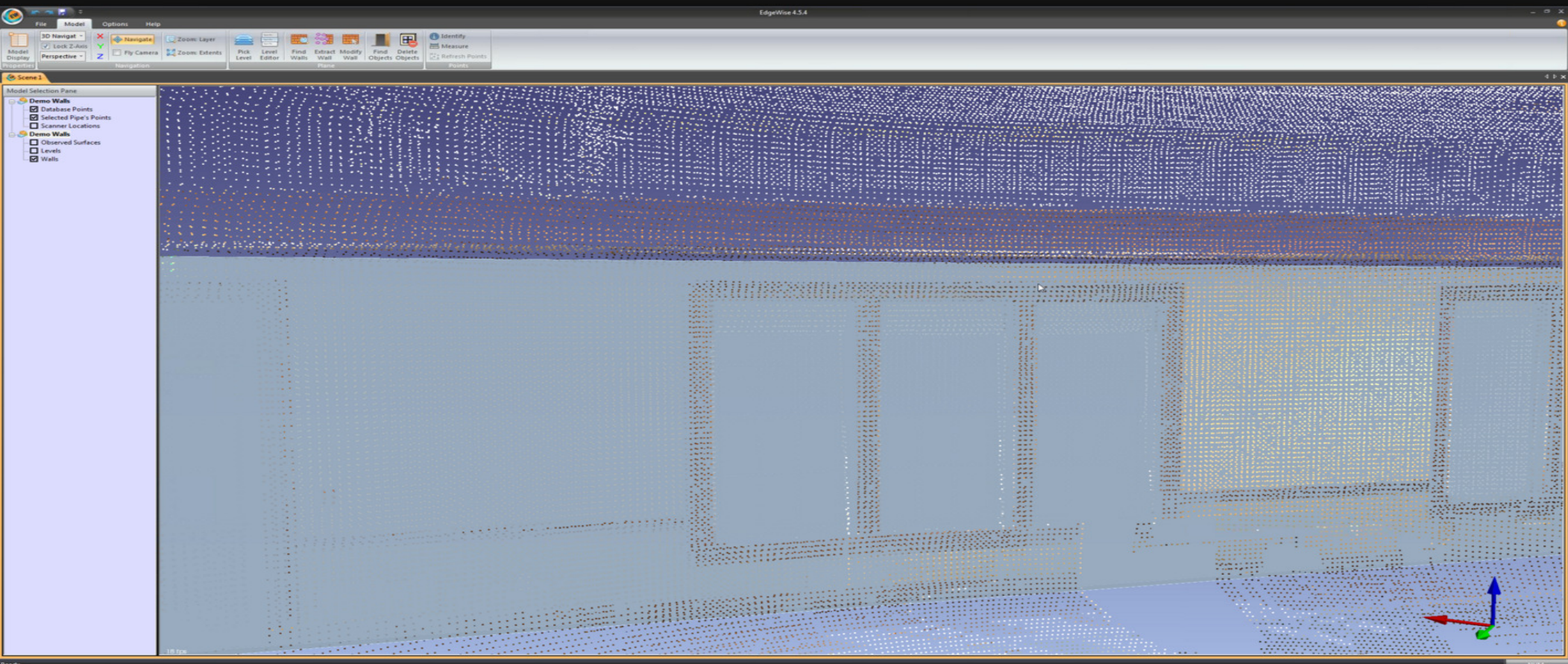
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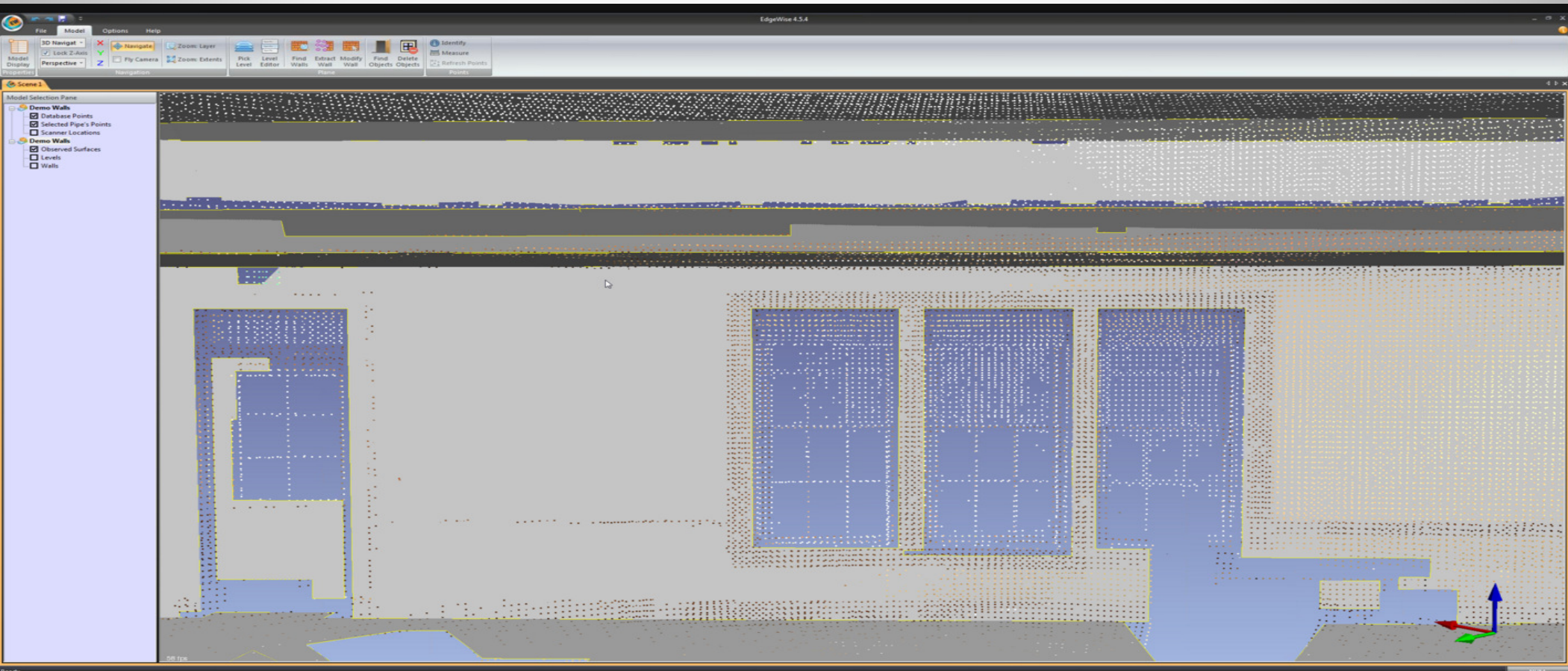
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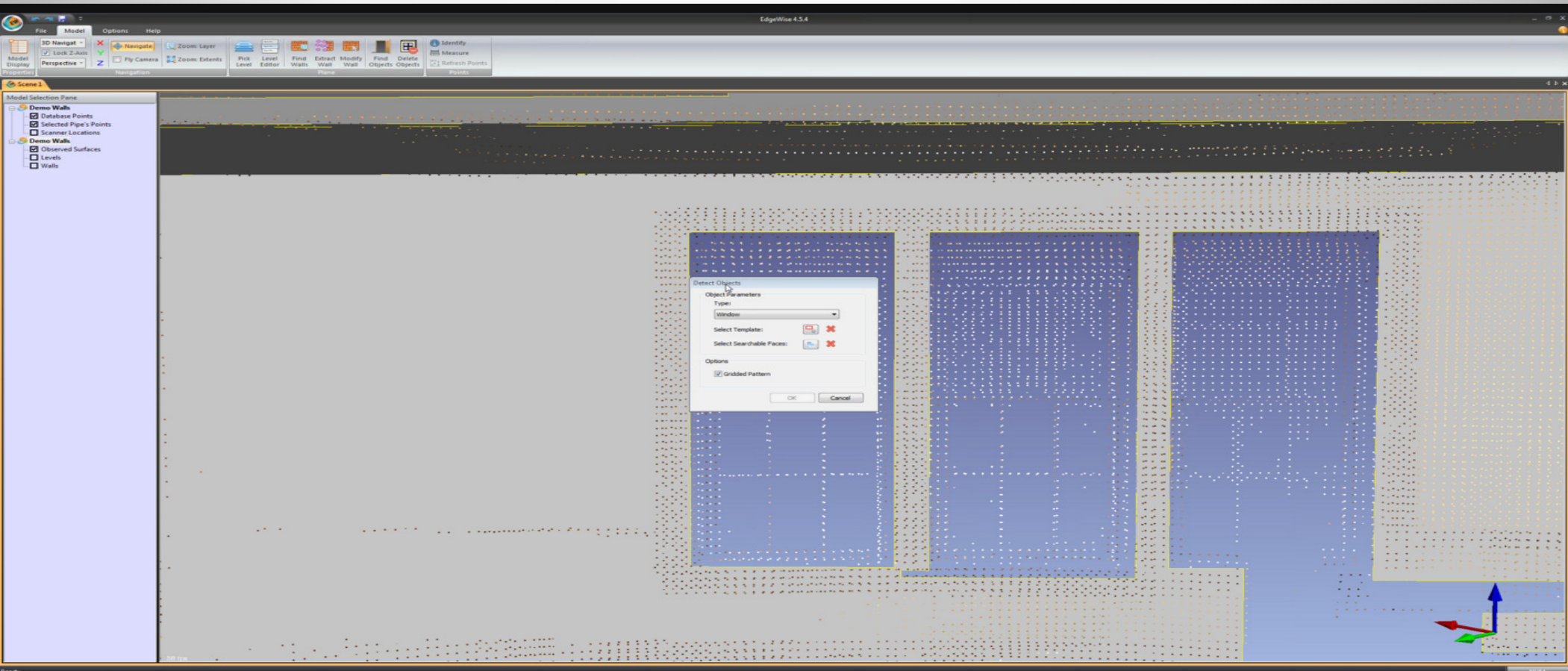
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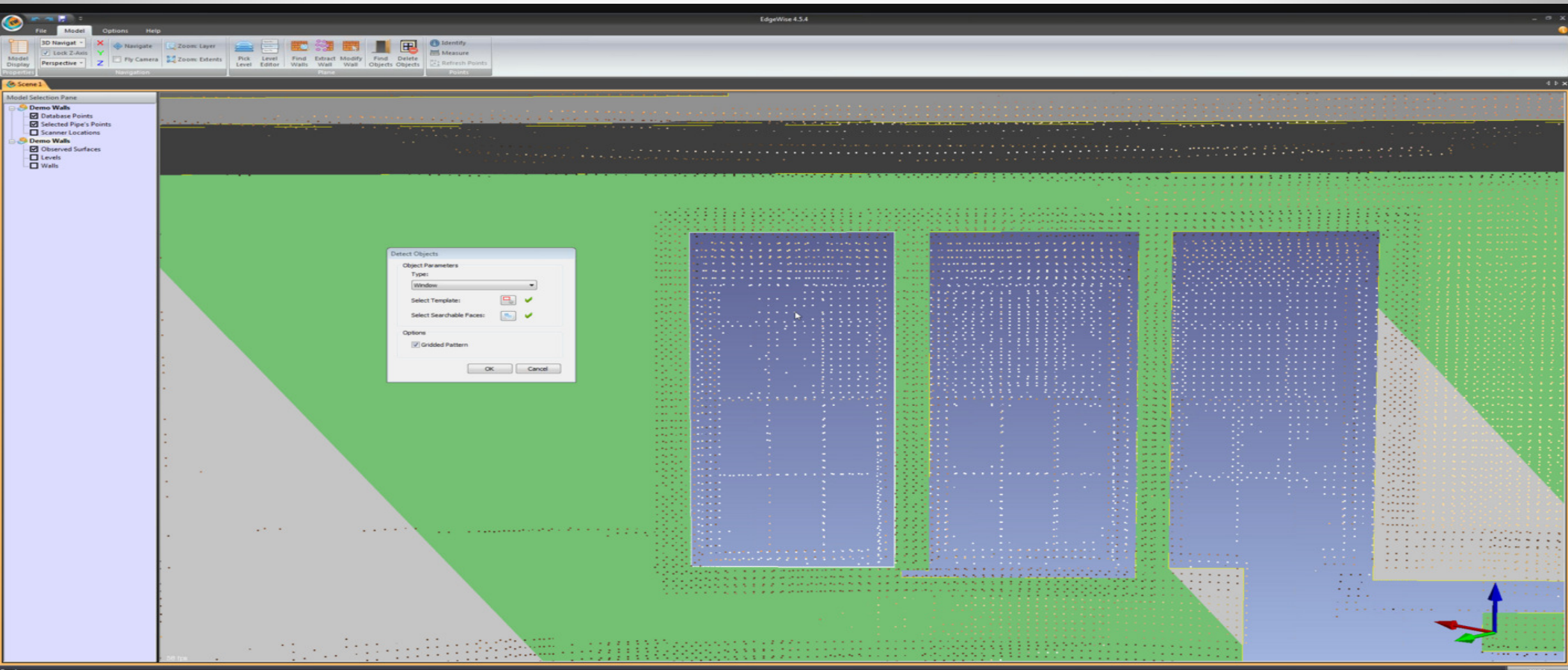
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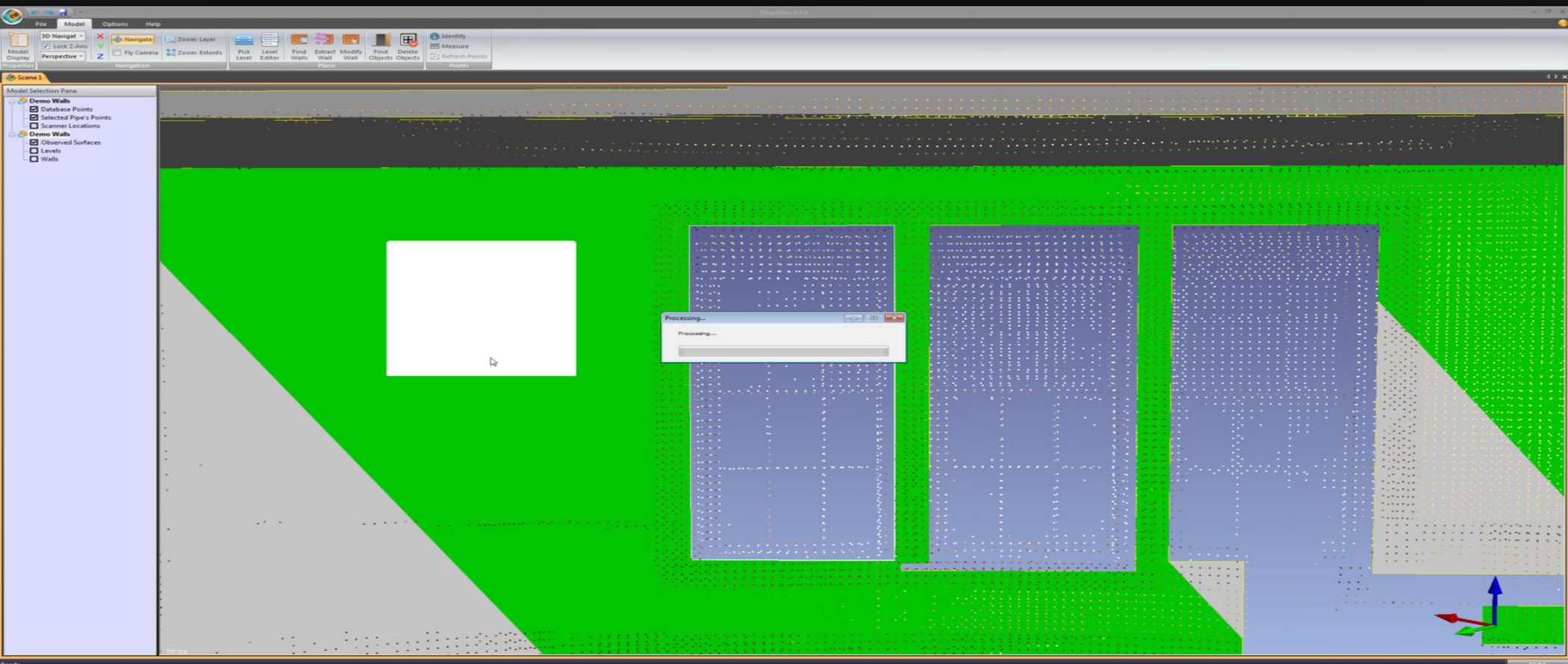
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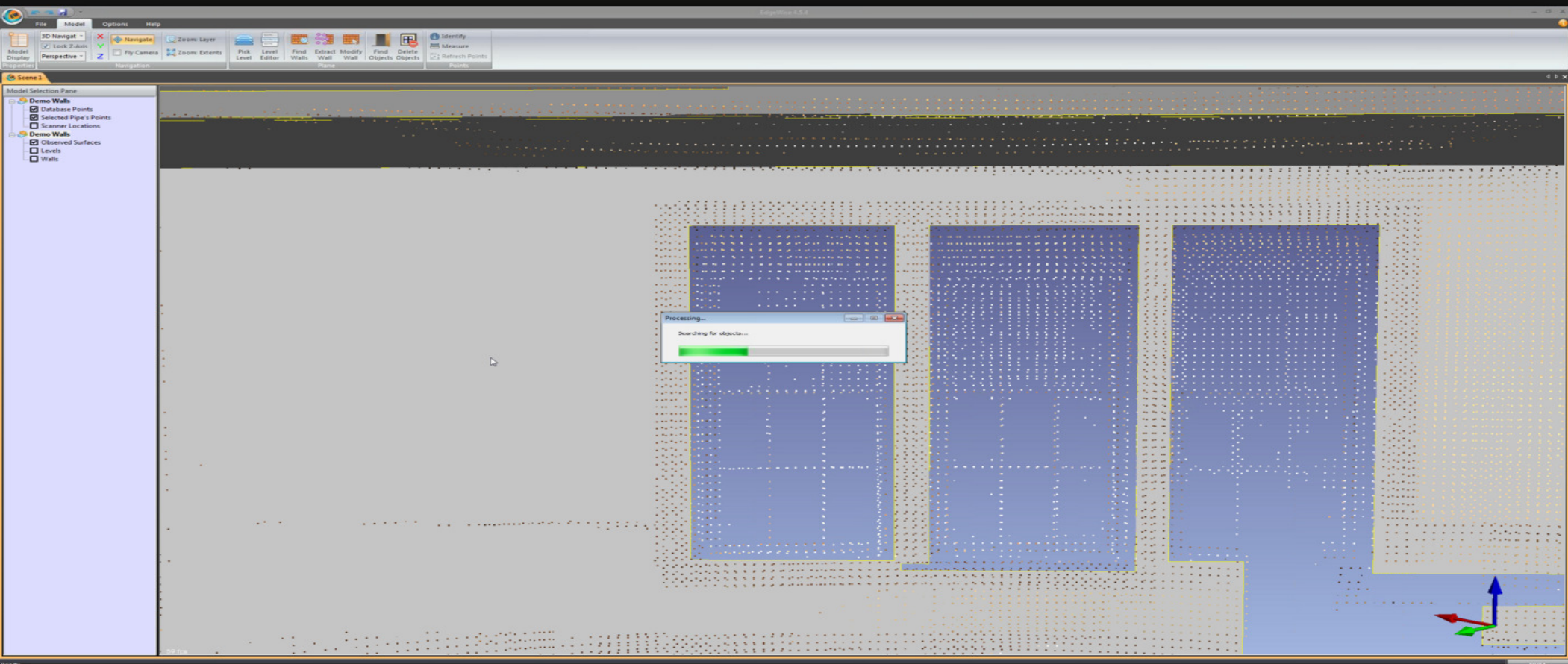
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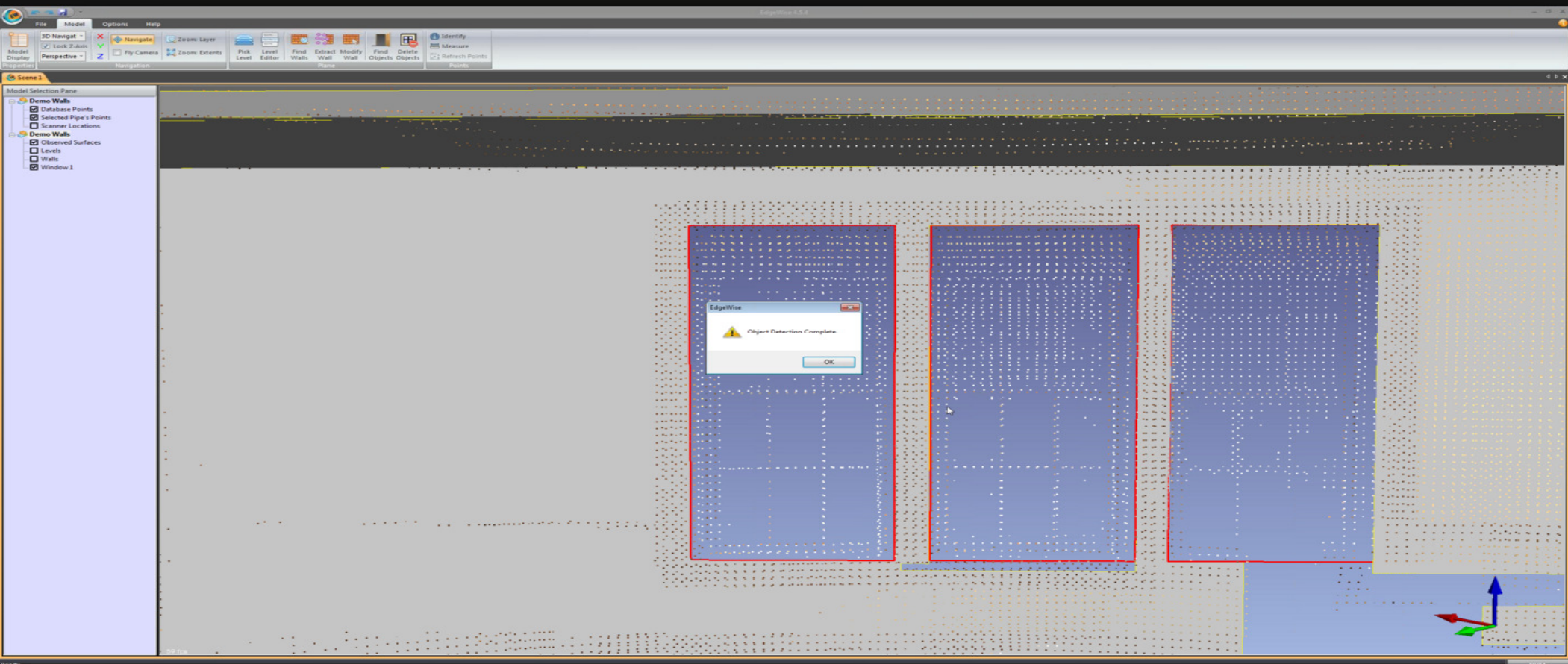
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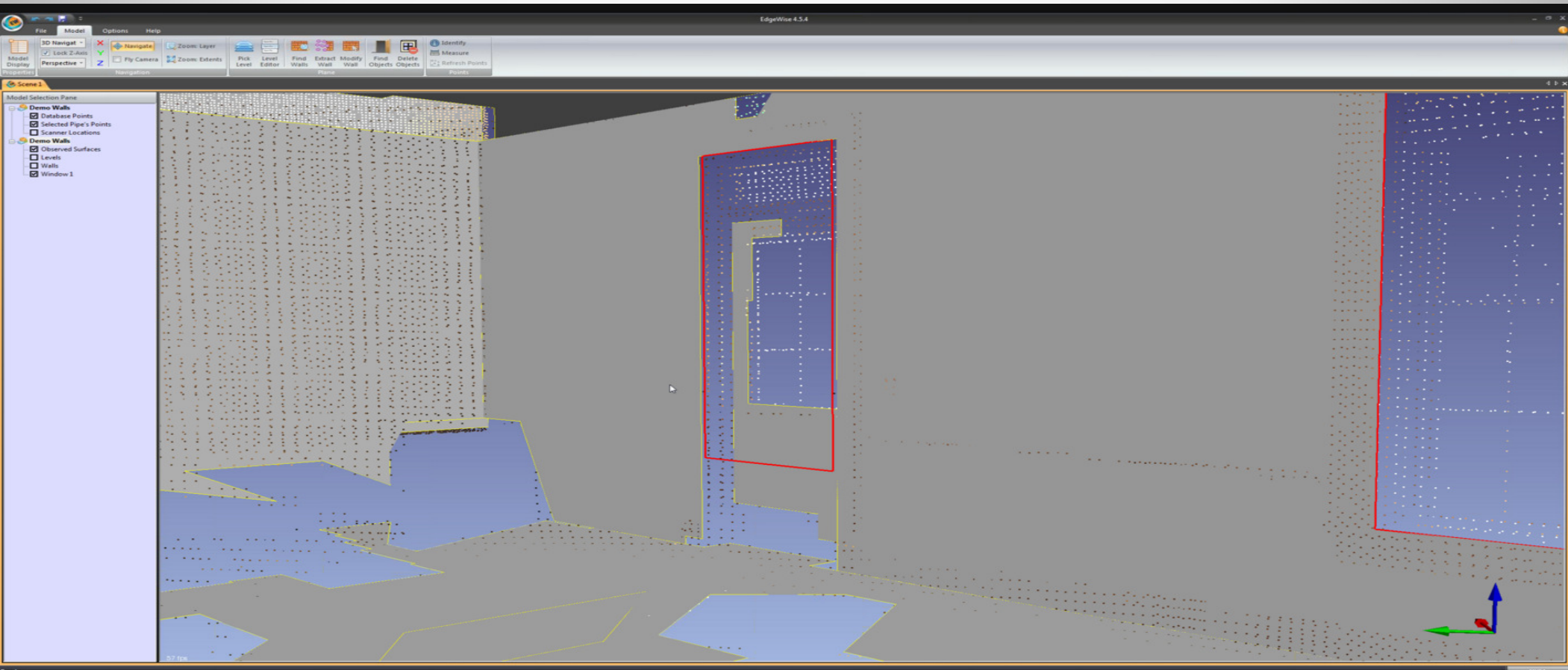
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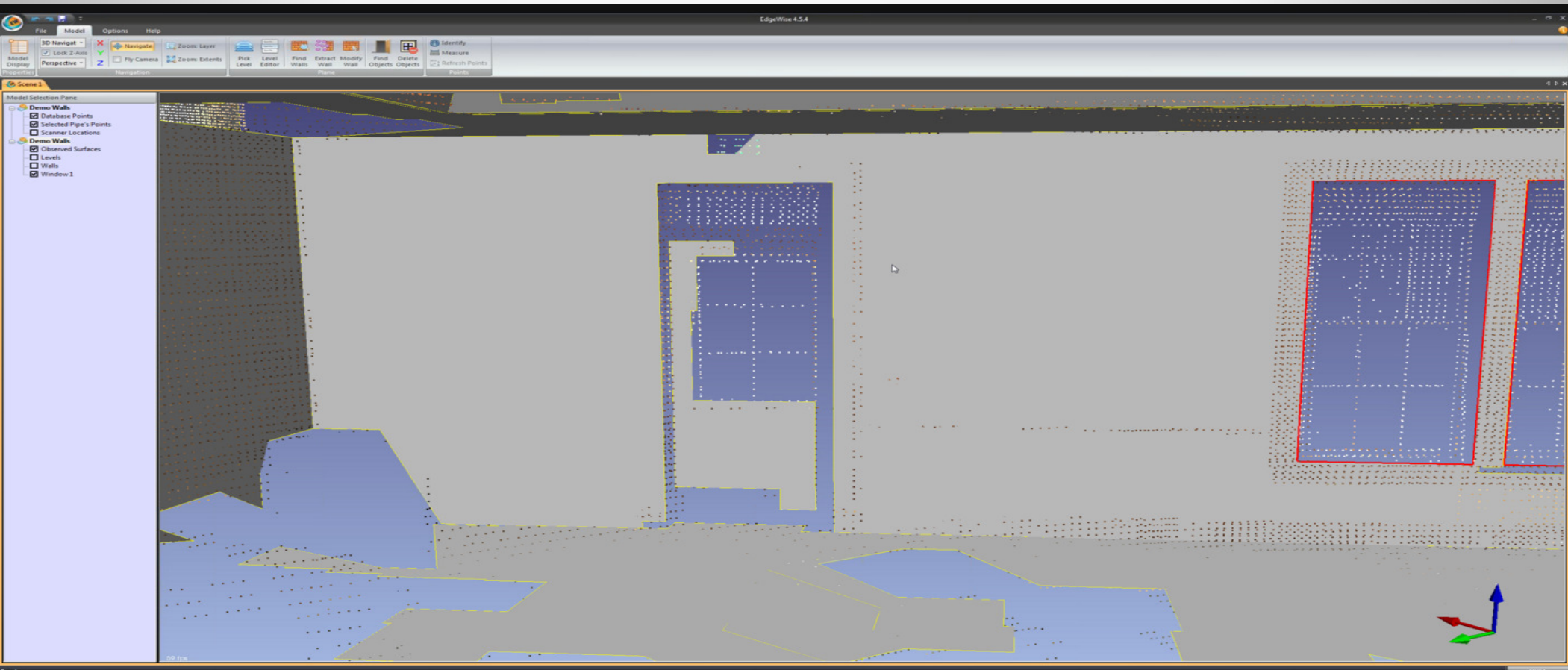
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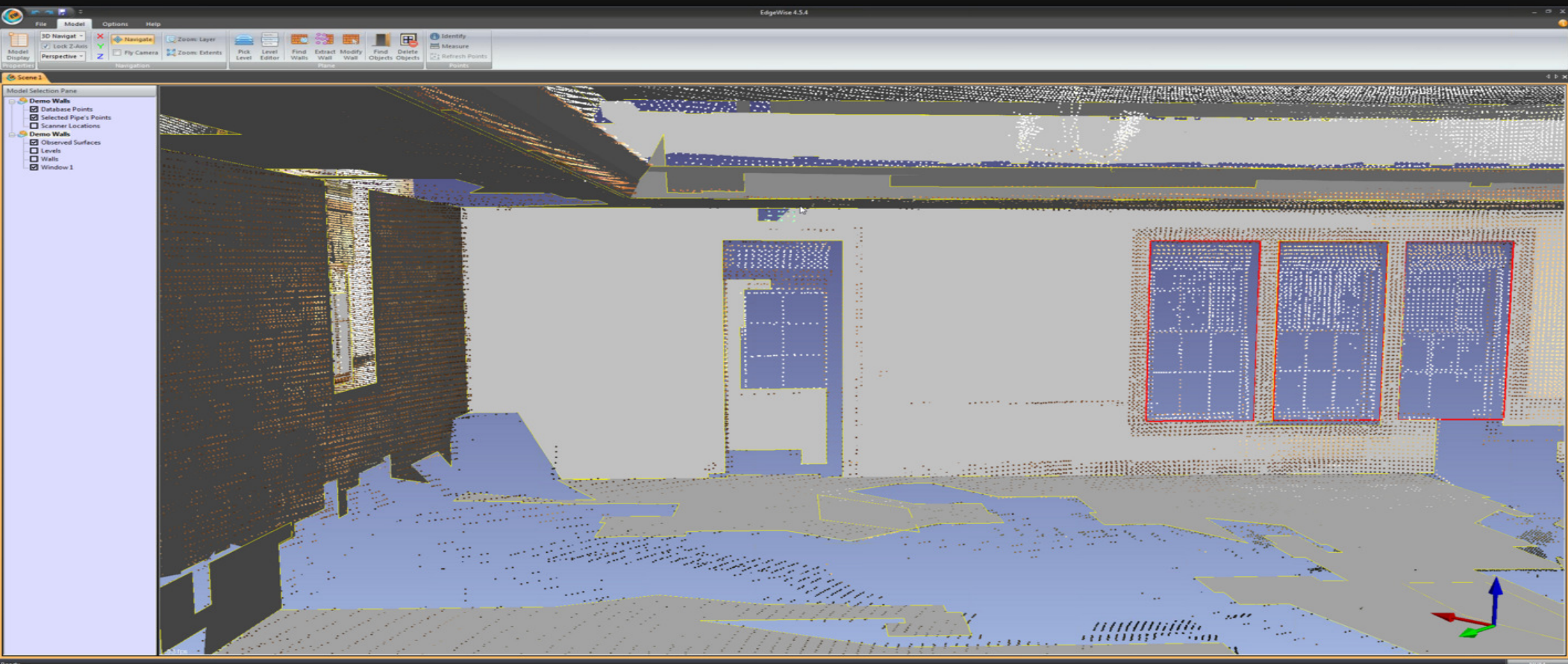
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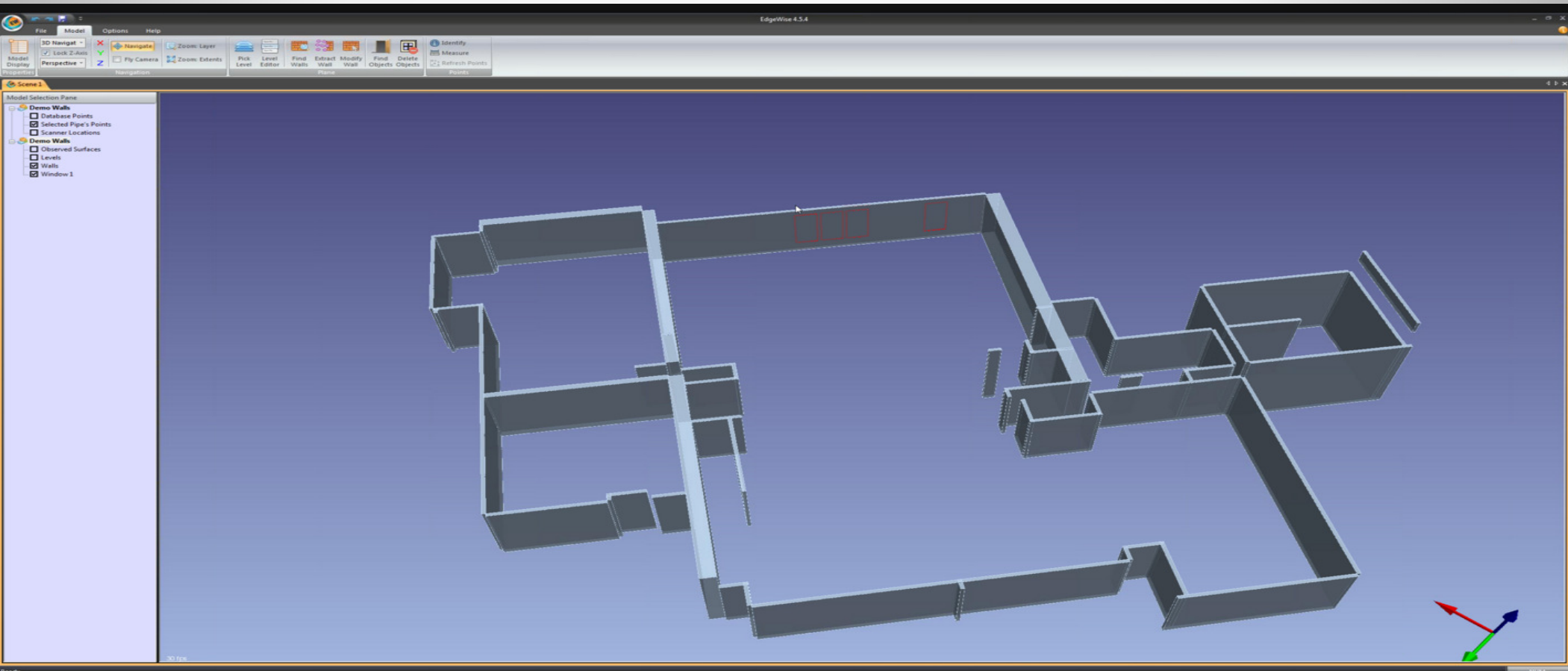
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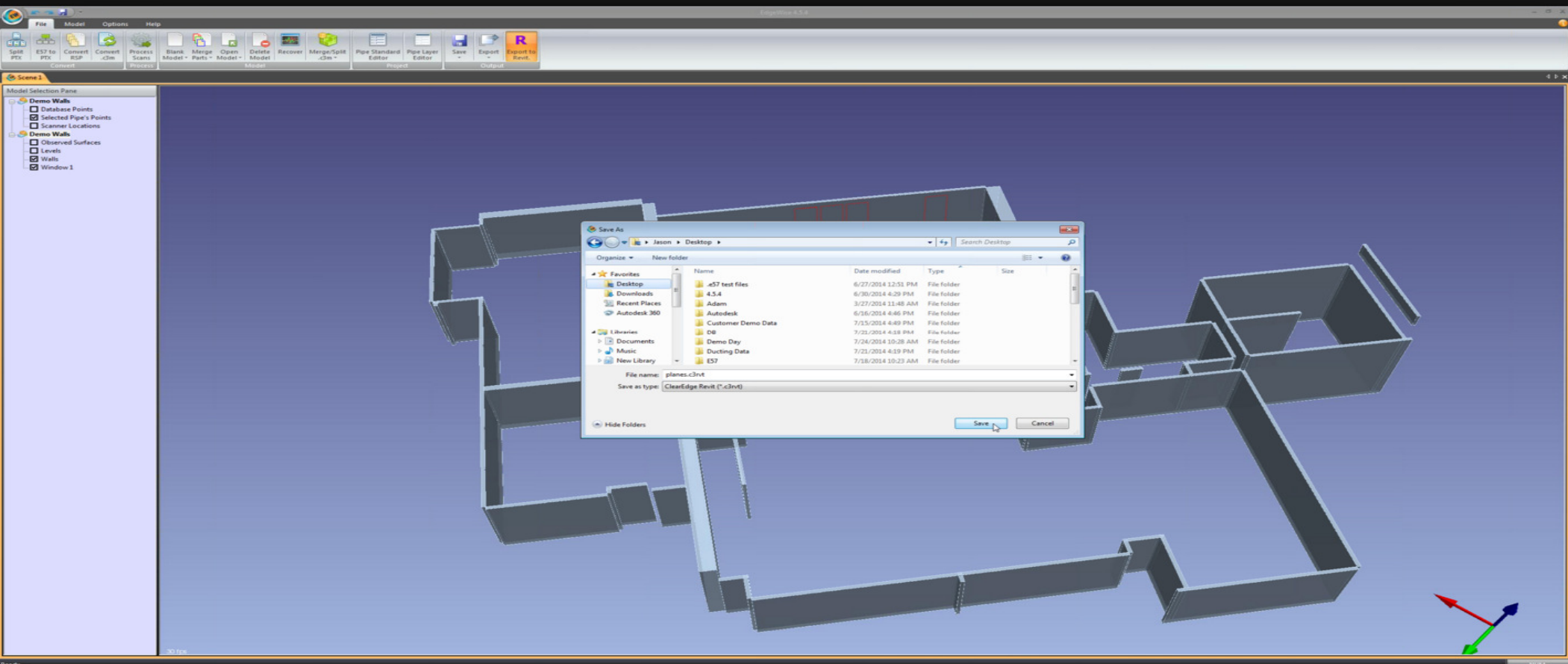
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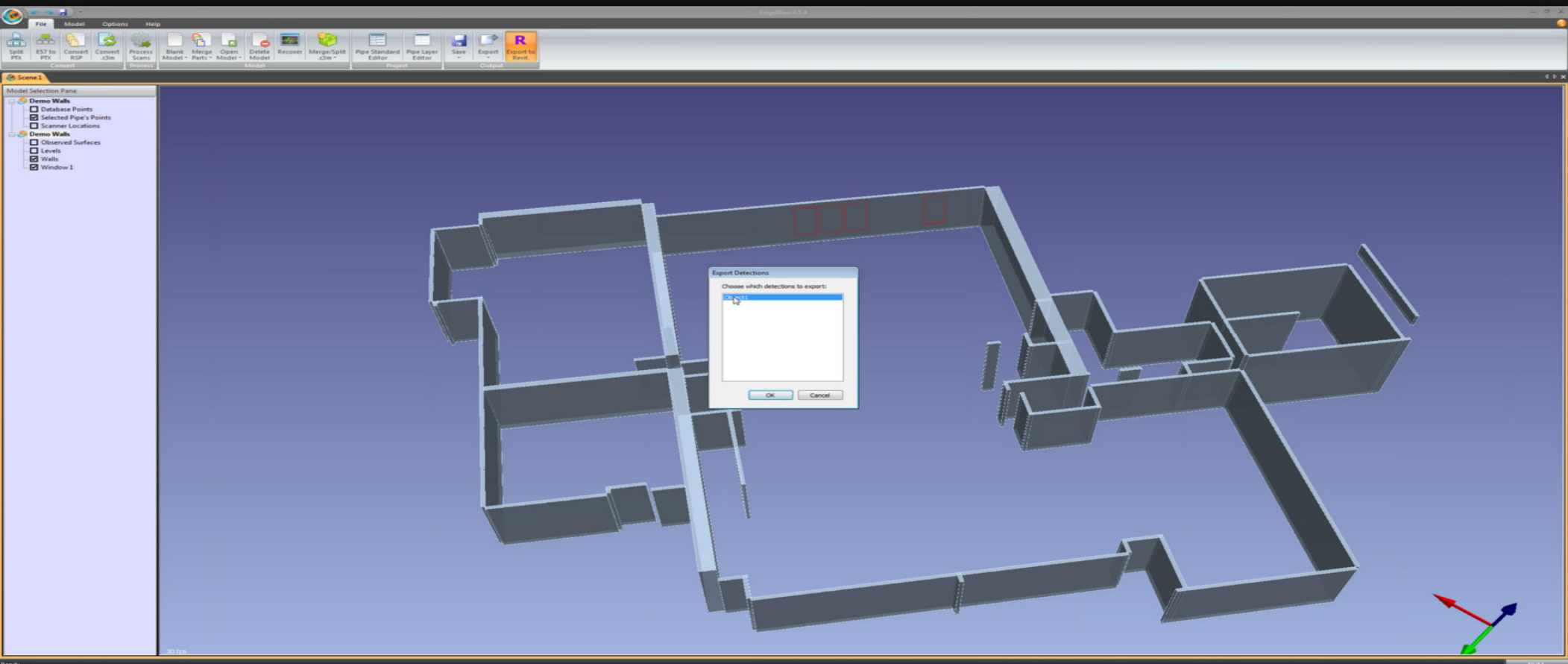
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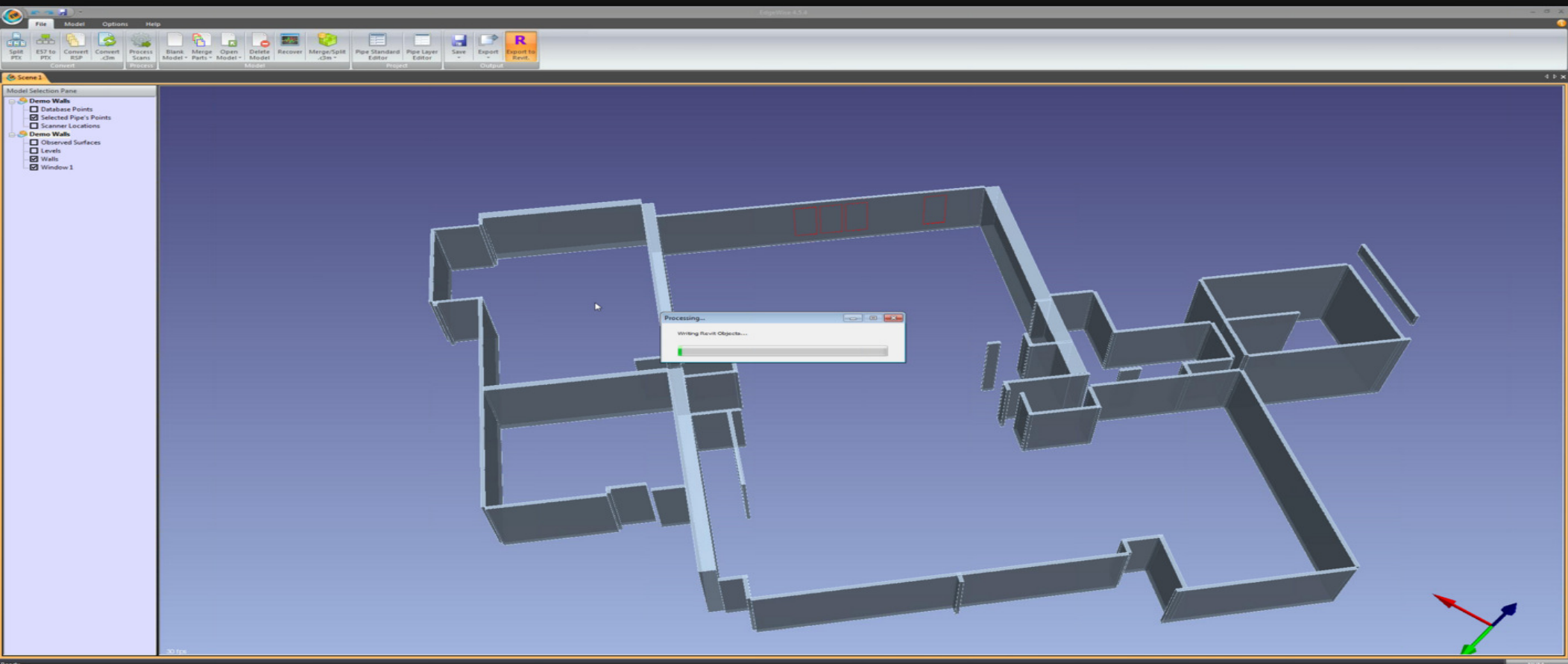
CLEAREDGE^{3D}



CLEAREDGE^{3D}



CLEAREDGE^{3D}



Agenda

Workflow

- DotProduct
- Clearedge
- Revit Architecture



Revit Architecture

- Revit Architecture



Revit Architecture

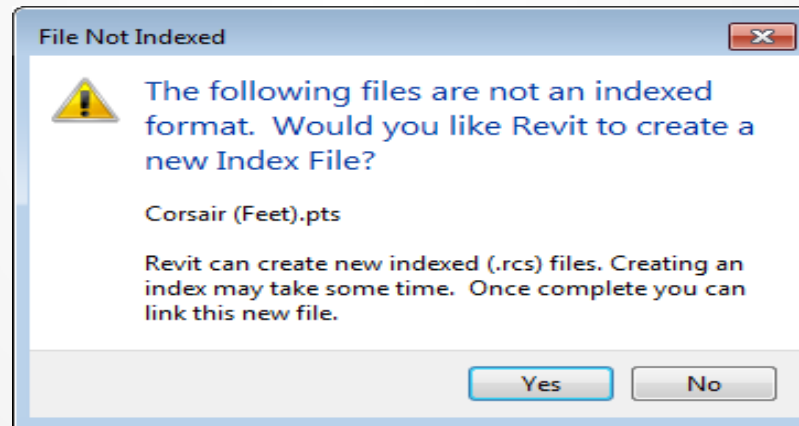


- Point Cloud Projects – rcp
- Raw formats

Files of type: Raw formats (*.3dd, *.asc, *.d3, *.dr, *.e57, *.fls, *.fws, *.ixf, *.las, *.las, *.s84, *.mpc, *.obj, *.pcg, *.ptg, *.pts, *.ptx, *.rds, *.rep, *.rxp, *.txt, *.zfprj, *.zfs)

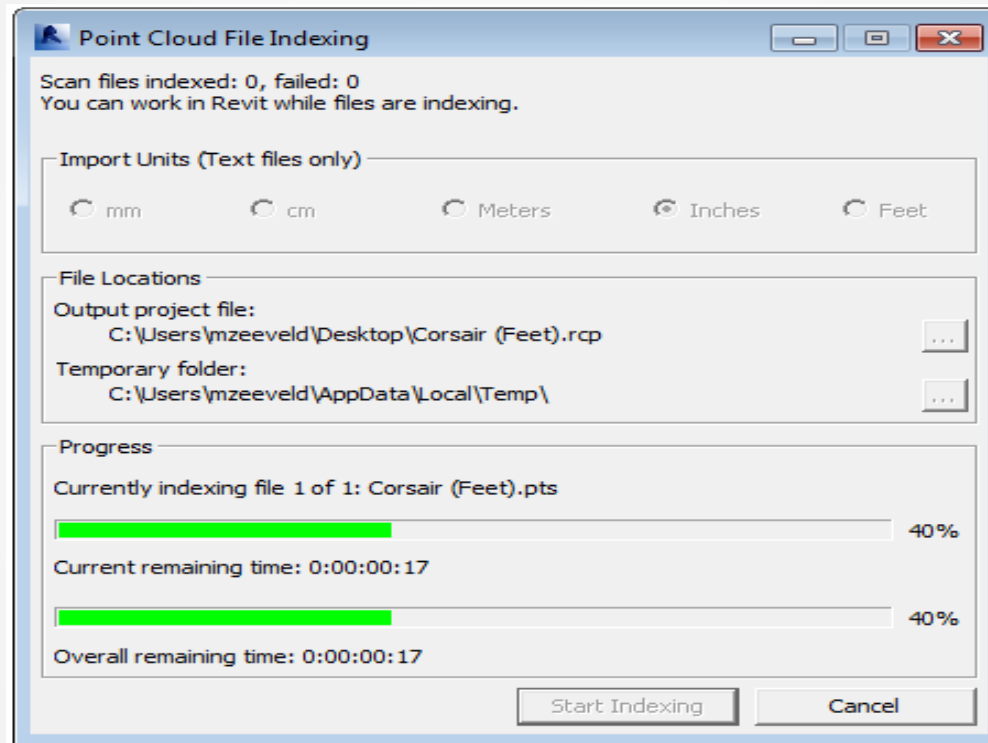
Revit Architecture

- Index

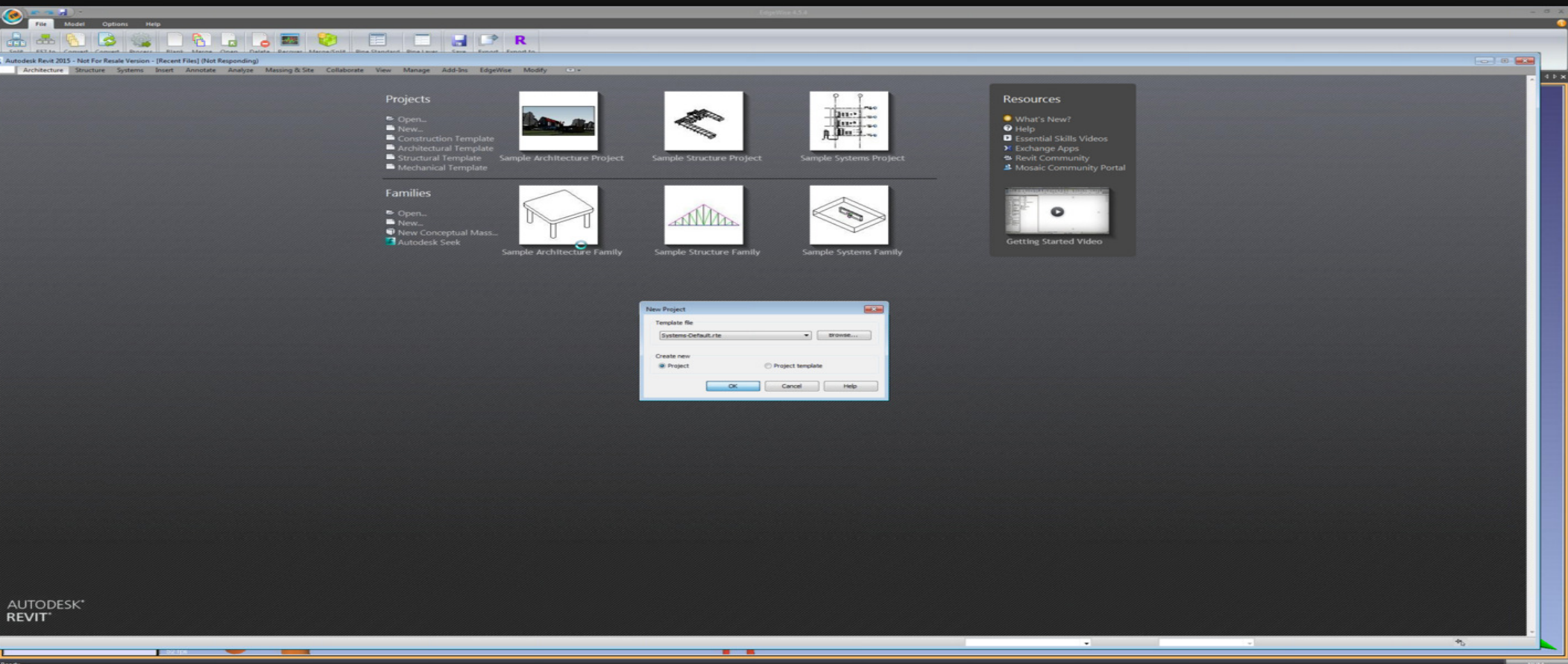


Revit Architecture

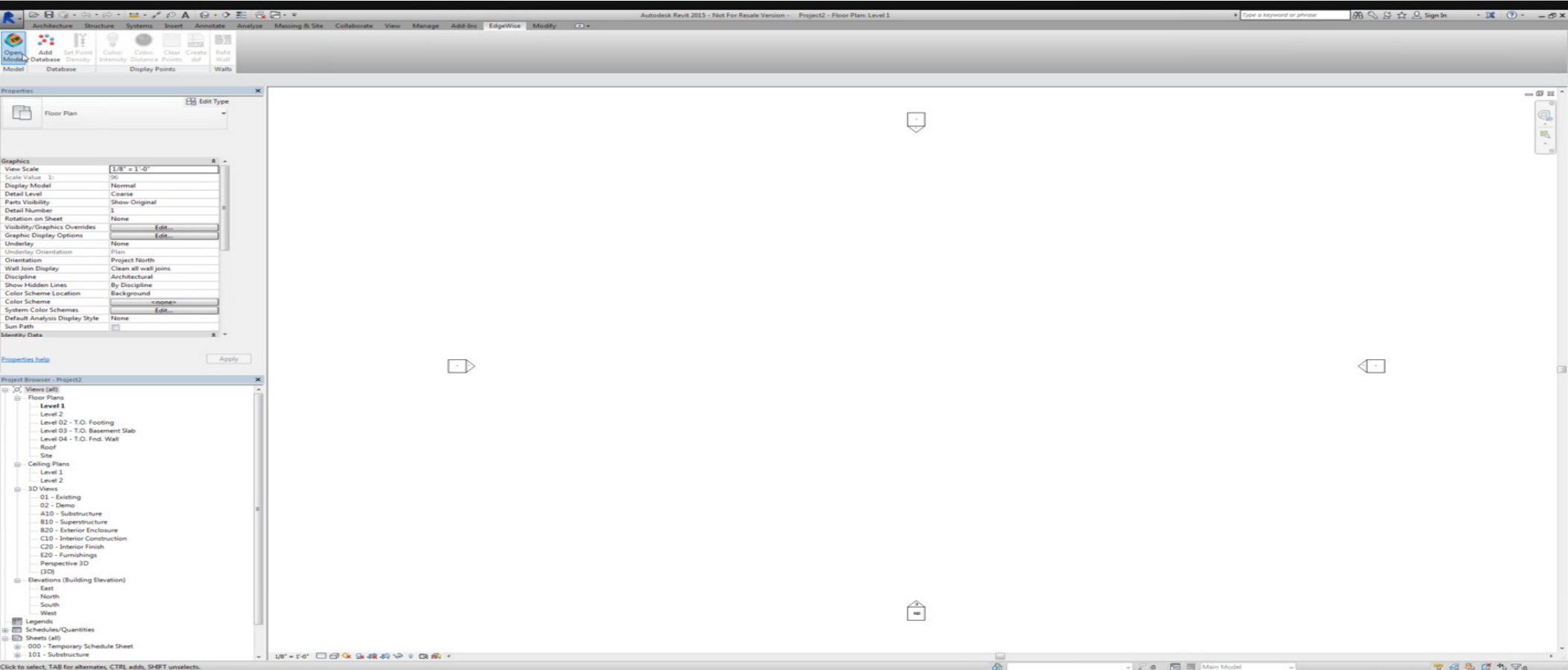
■ Indexing



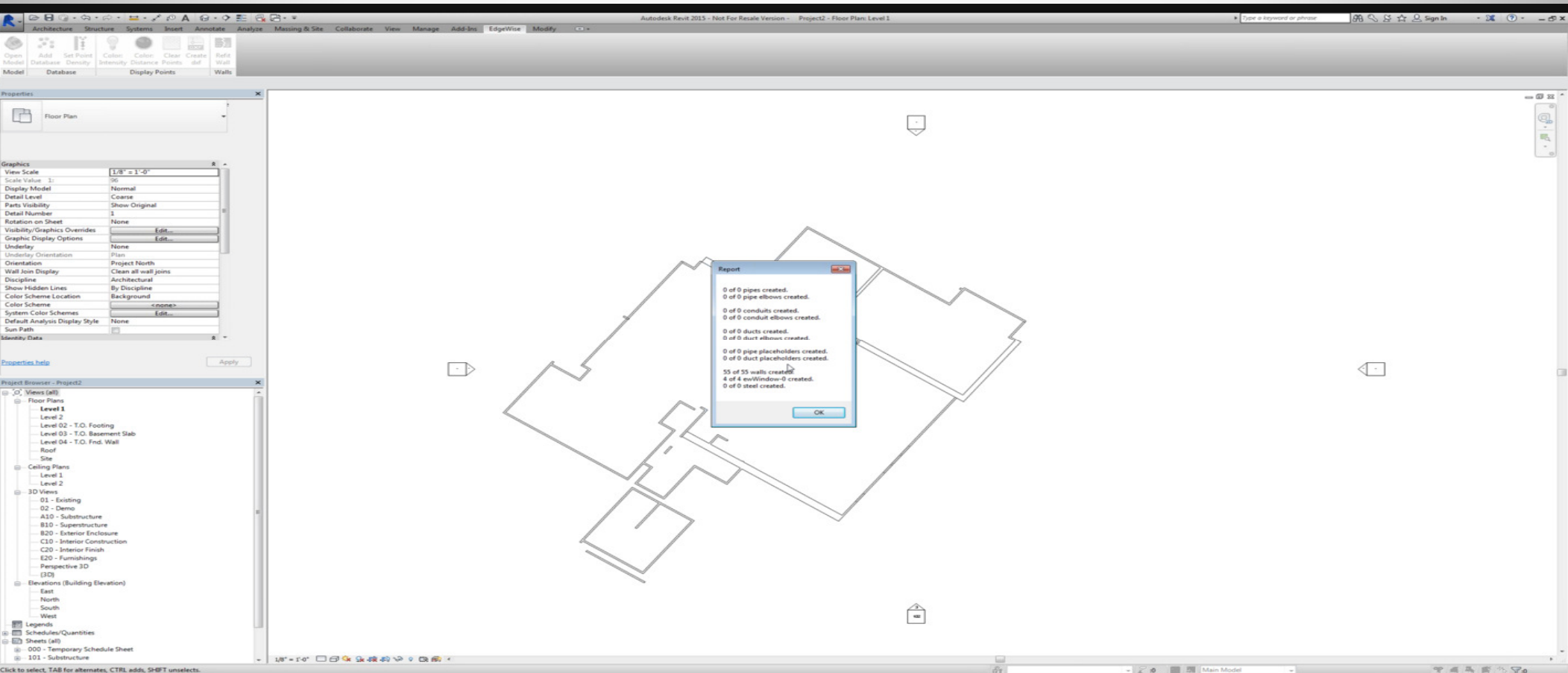
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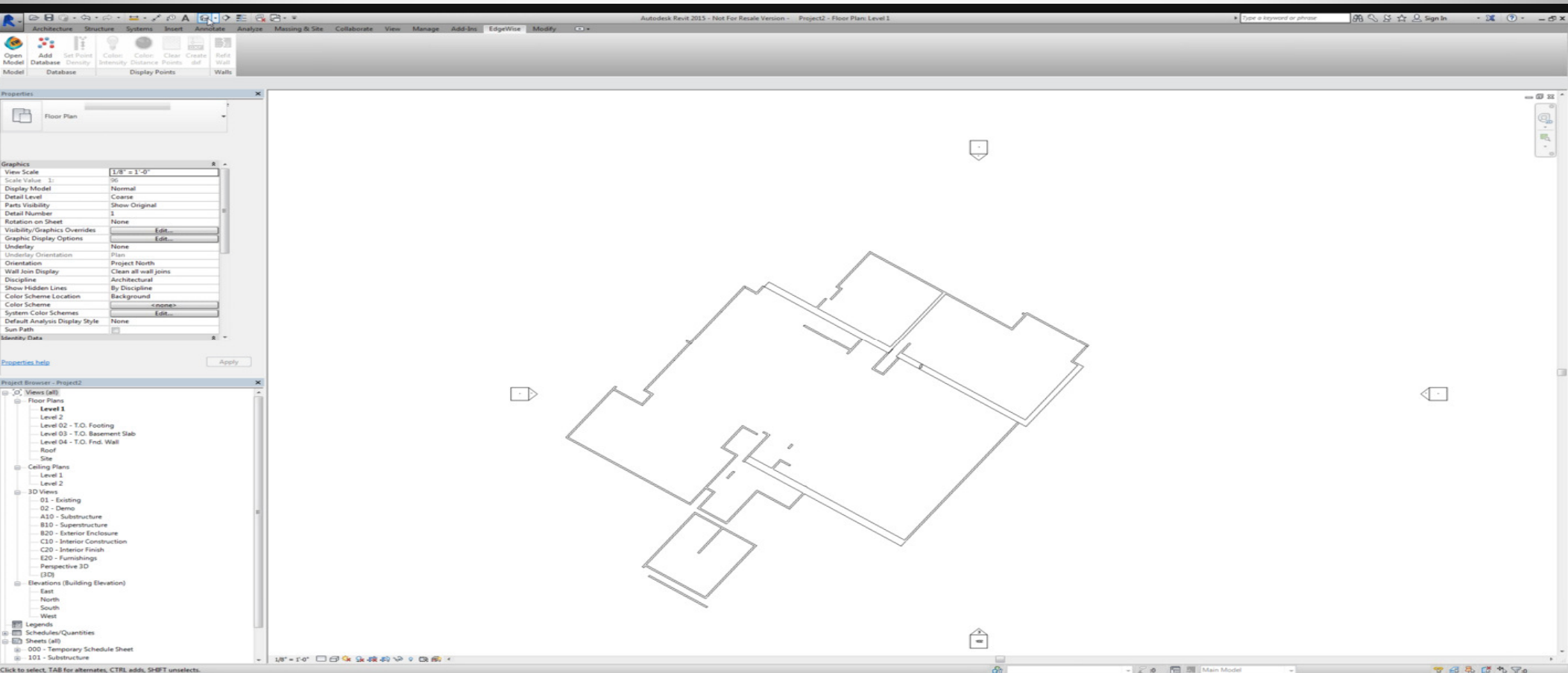
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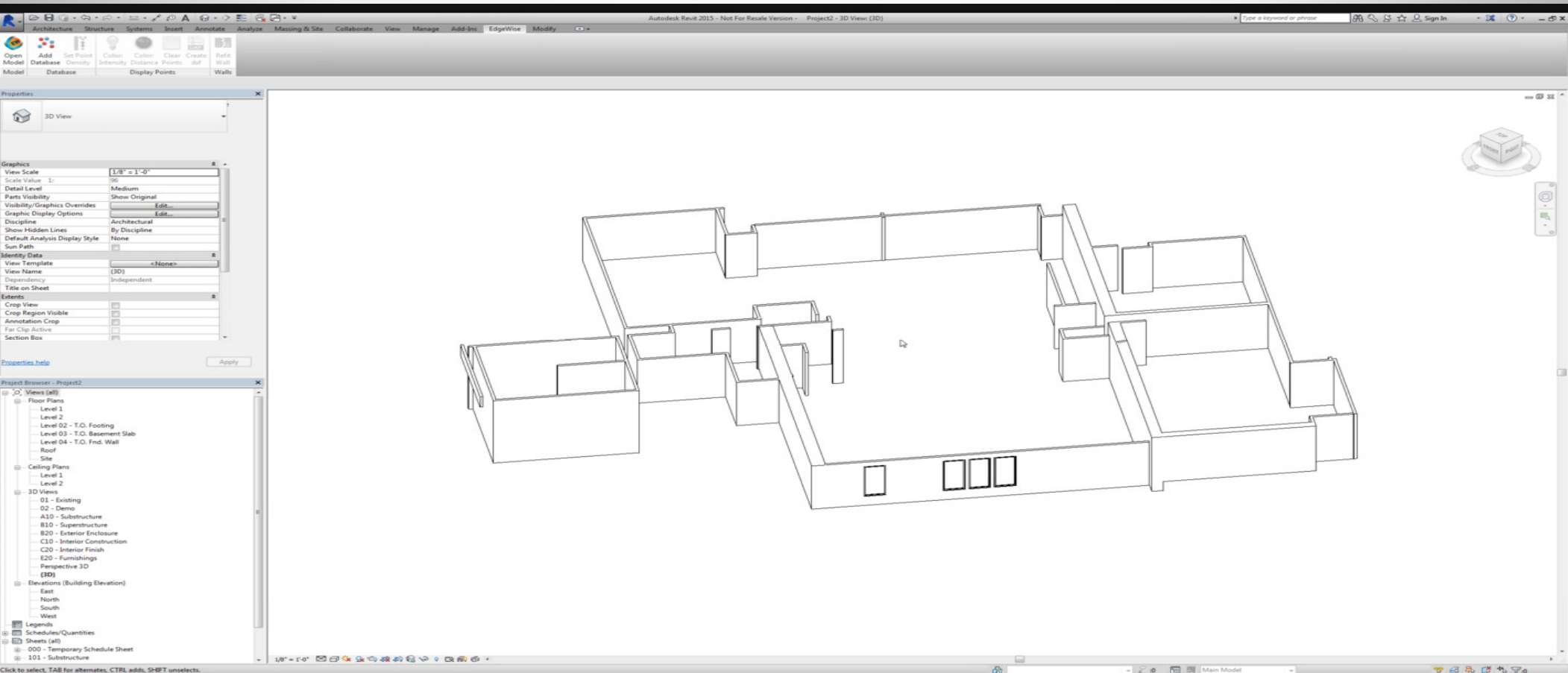
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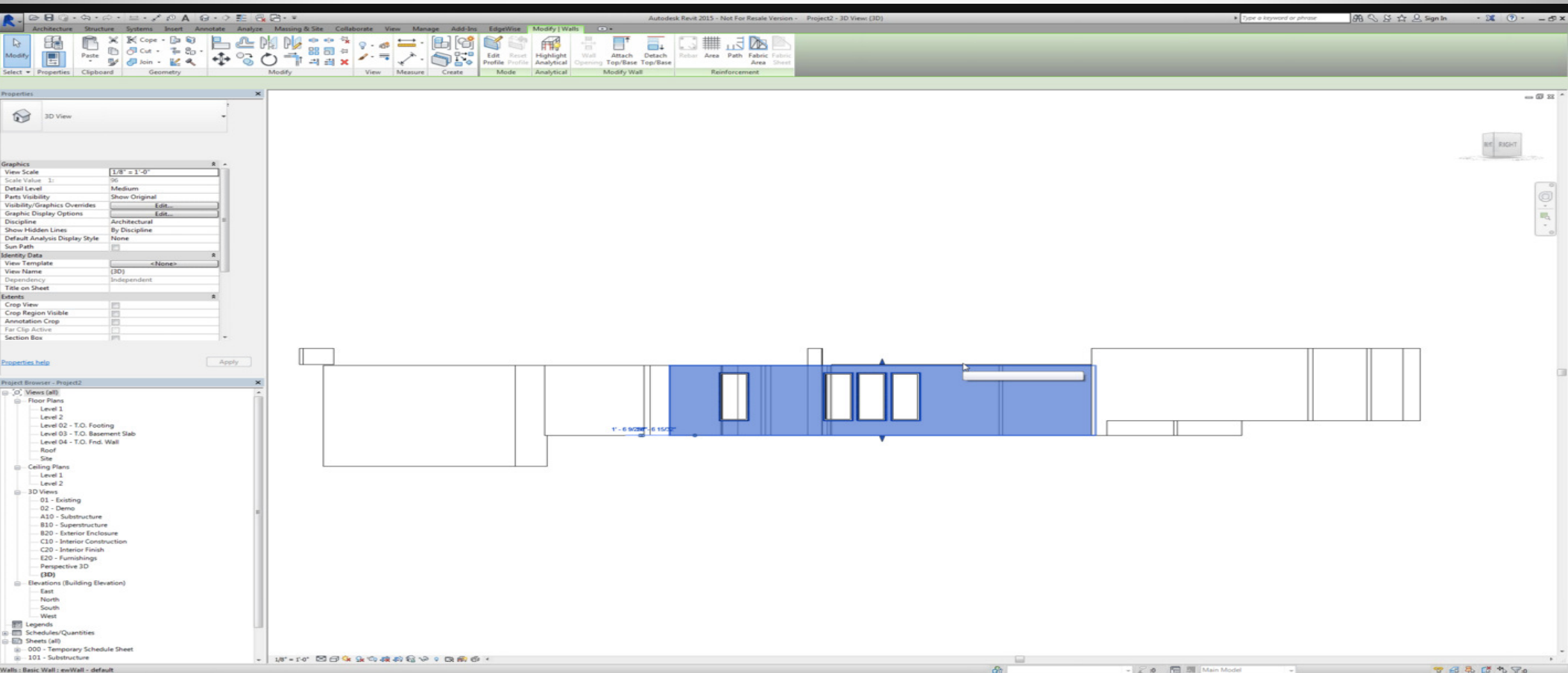
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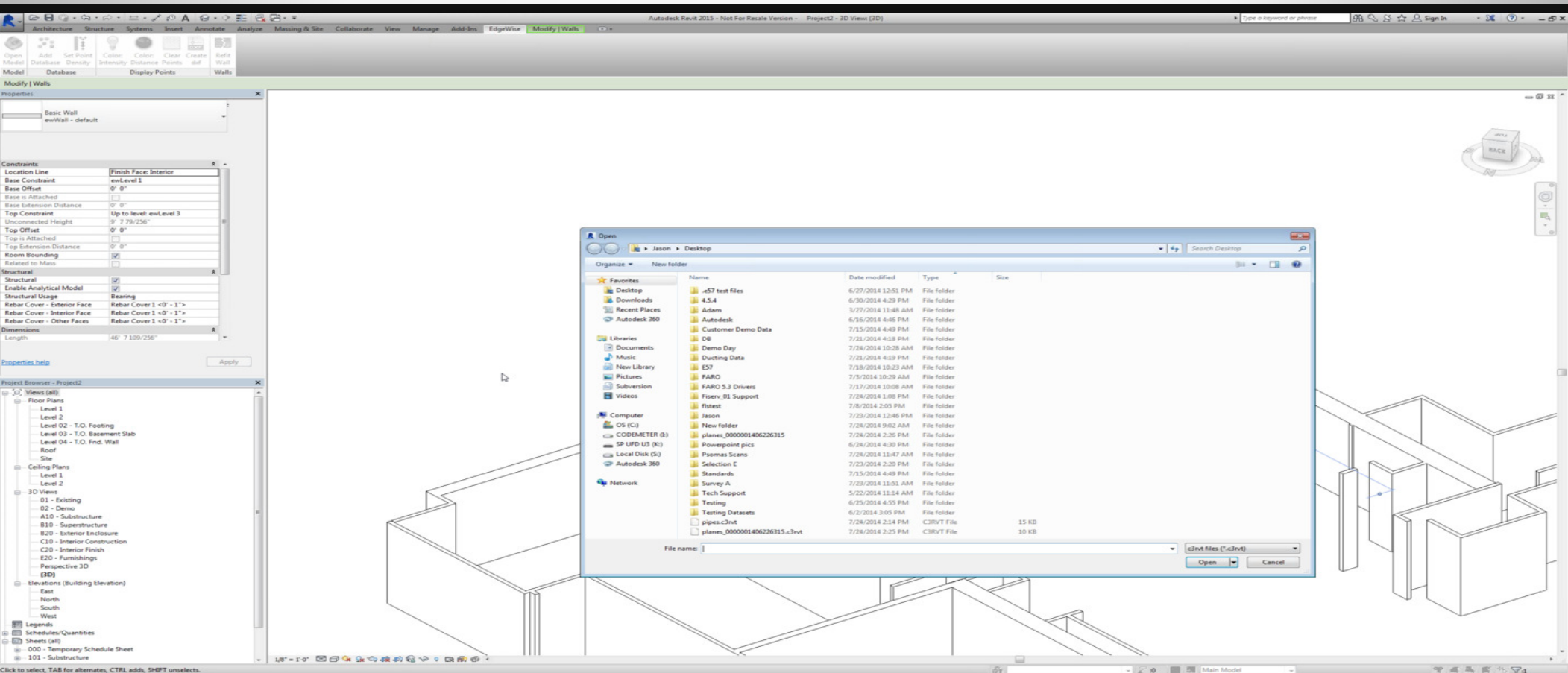
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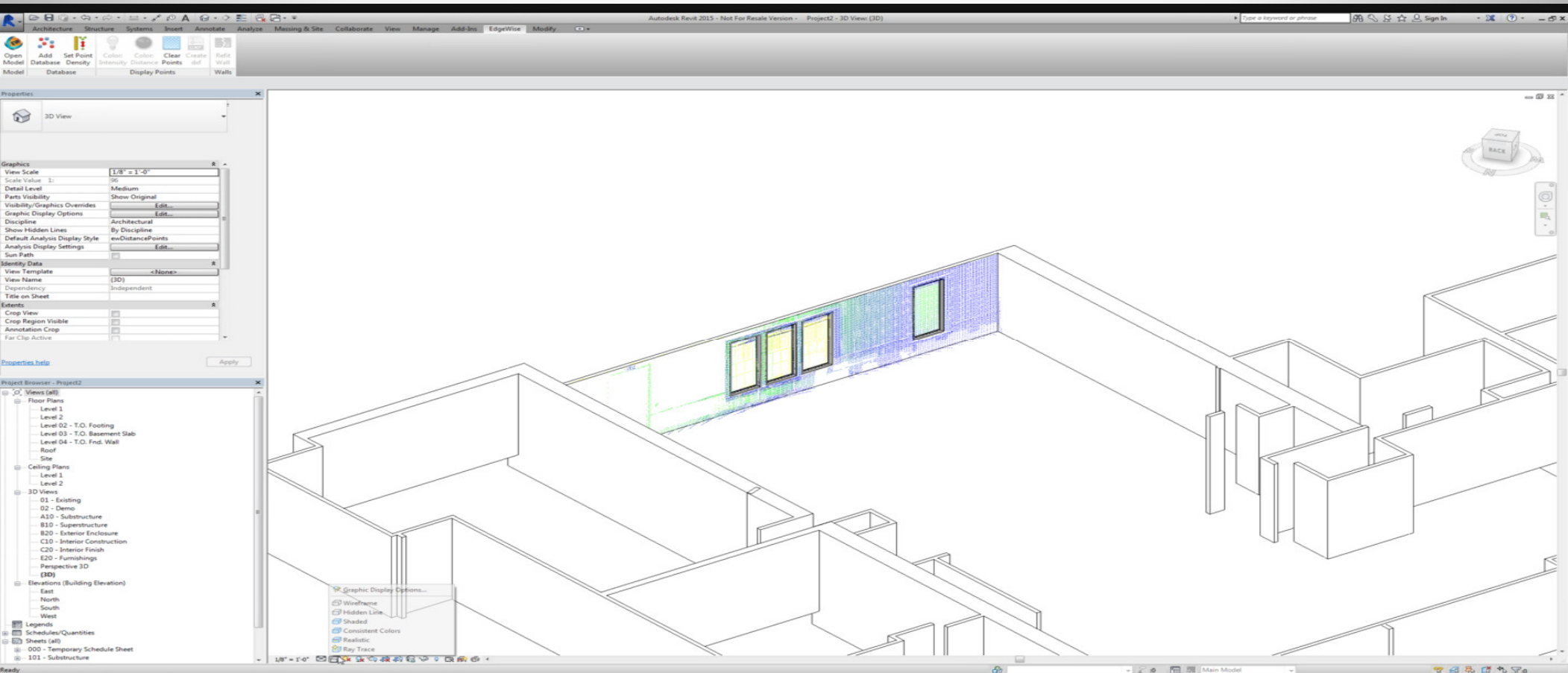
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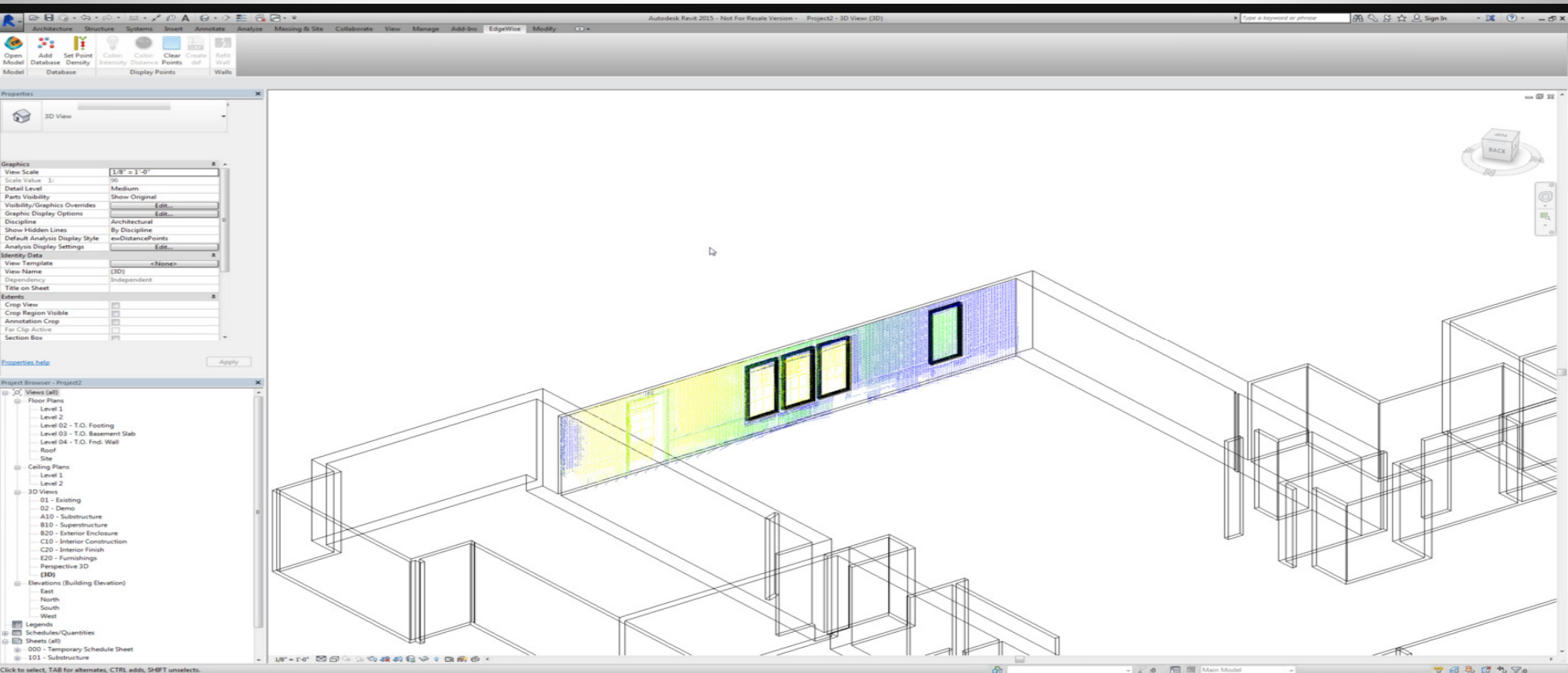
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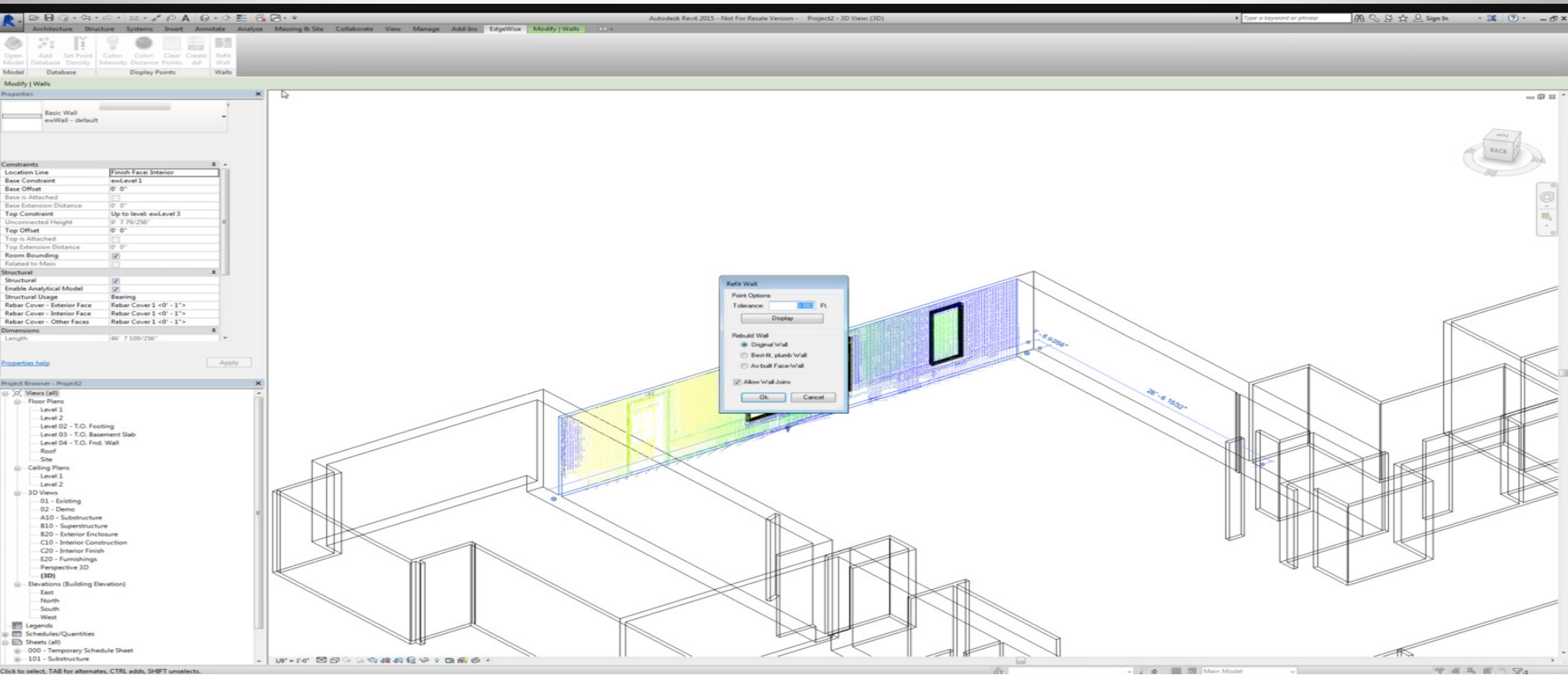
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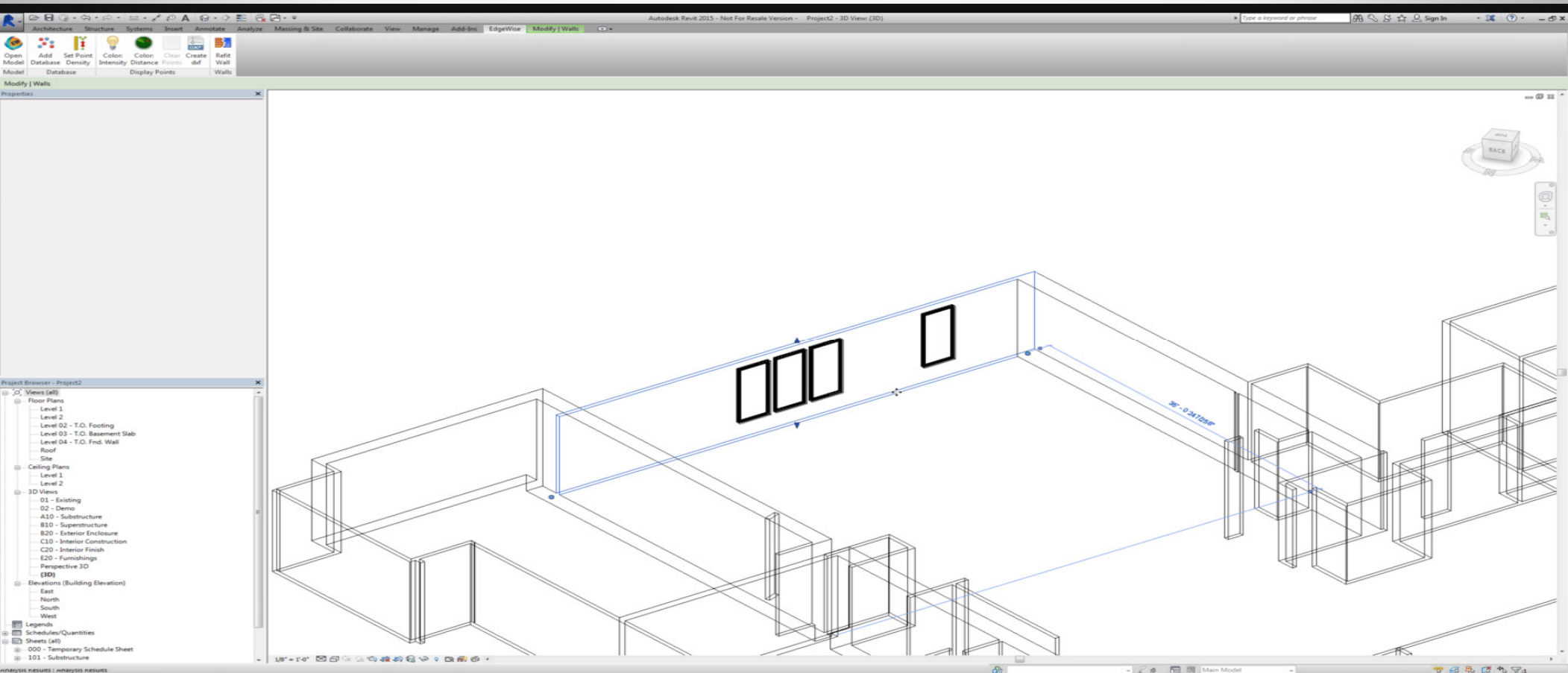
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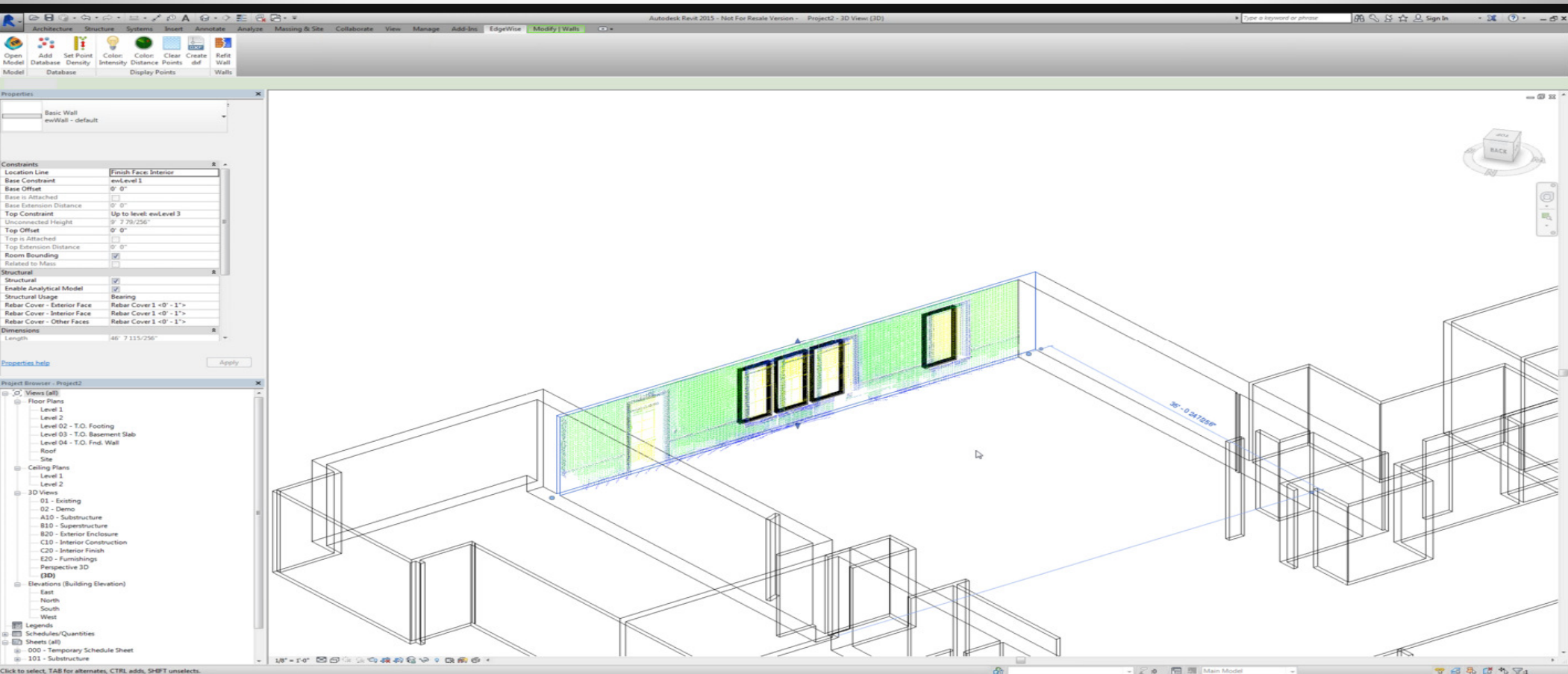
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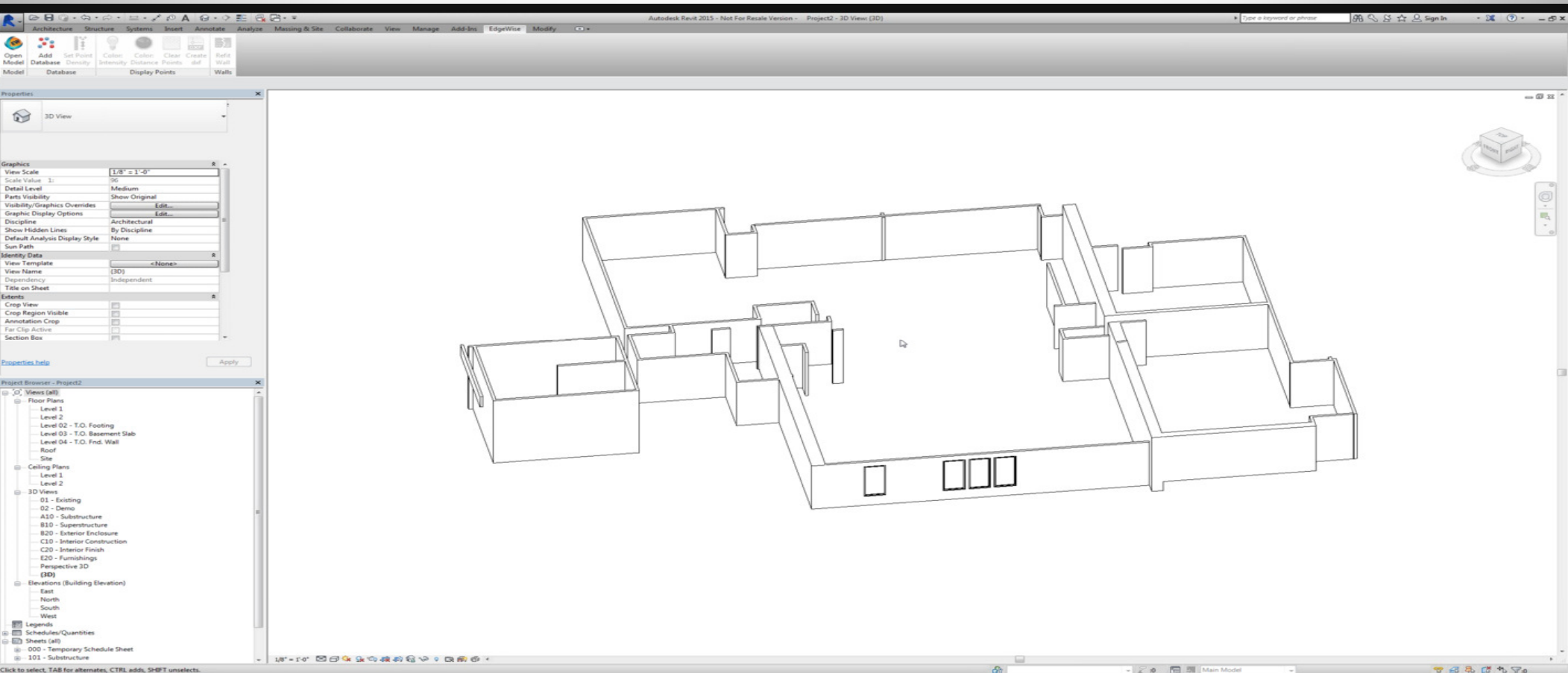
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Questions?



Summary

- We learned about the exciting new features in Autodesk Revit Architecture 2015 software. Introduced to new concepts of Building Information Modeling (BIM) and efficient, easy-to-use tools for parametric design and documentation.

Obtained Objectives

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

- Learn the workflow for Digital data in design software
- Create a project in Revit with Point Cloud data
- *Create a Project in 3ds Max with Point Cloud data*
- Be able to describe the components for Point Cloud data creation, capture and project uses

Contact

- mzeeveld@asti.com



Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2014 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time



Surveys

- Don't forget to fill out your surveys



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Happy Reviting!



Thank you!



