

CI124259

# Survey Scanner Point Cloud Processing Workflow: InfraWorks to AutoCAD Civil 3D

**Eric Vallejo, LSI**  
IMEG Corporation

**Ramesh Sridharan**  
Autodesk

## Learning Objectives

- InfraWorks project setup and files needed to import point cloud data
- Process Point Cloud data within InfraWorks
- Extract surface and linear features within InfraWorks to be used to supplement a traditional topographic survey within Civil 3D
- Import extracted data into Civil 3D and create a topographic survey surface model

## Description

This class is designed to articulate the workflow of creating a topographic survey model within AutoCAD Civil 3D software by using scanner-generated point clouds (Trimble SX10) processed within InfraWorks software. Initially, we will import our point cloud into InfraWorks where it will be analyzed, processed, and filtered. We will then export data from InfraWorks and import it within AutoCAD Civil 3D for additional processing. Once in AutoCAD Civil 3D, we will utilize extracted data to create a topographic survey model. The project example used in the presentation:

**Retaining wall assessment (75 feet long x 20 feet high) to determine if replacement is needed.** In this instance, our team decided to supplement a traditional topographic survey with scanner-generated point clouds to save on field time, and promote the safety of our survey crew.

## Speakers

### **Eric Vallejo**

Eric has been working within the Civil Engineering and Land Surveying industry since 1999 and is currently employed at IMEG Corporation. Duties include Civil design, conceptual exhibit creation, Survey data processing, plan review, construction staking setup and coordination. Eric is also responsible for the creation and implementation of the firm's Civil 3D and AutoCAD "Plan and Drafting Standards" along with the development of digital data management procedures and project workflow. Eric also administers Civil 3D/AutoCAD training as well as provide peer support.

[Eric.L.Vallejo@imegcorp.com](mailto:Eric.L.Vallejo@imegcorp.com)

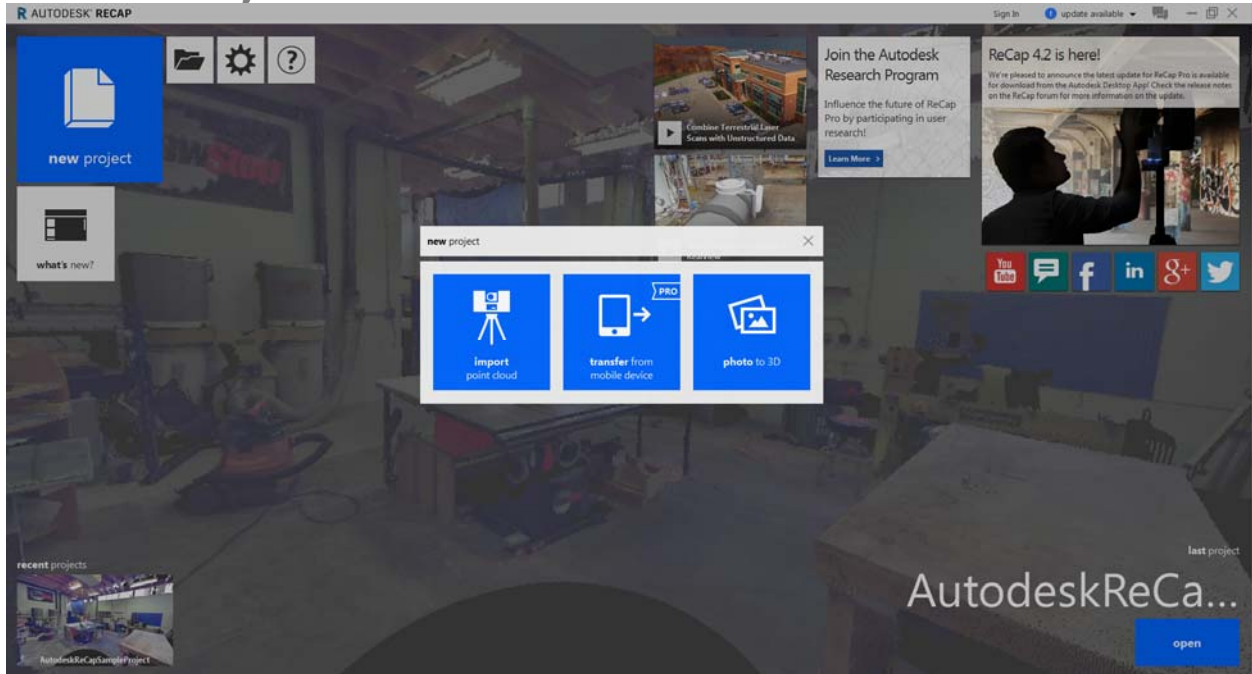
### **Ramesh Sridharan**

Ramesh has been working with reality capture point clouds, image processing, and machine learning based software development since 2001. With over 15 years of experience, he has successfully driven programs in research and development, technical sales, partner marketing, and customer analysis He is a pioneer in the field of reality capture point cloud product development that can handle and extract information from a large number of 3D datasets. As a Principal Product Owner in the Product Development Group (PDG) since he joined Autodesk in 2014, Ramesh is responsible for information extraction from Reality Capture for AEC applications.

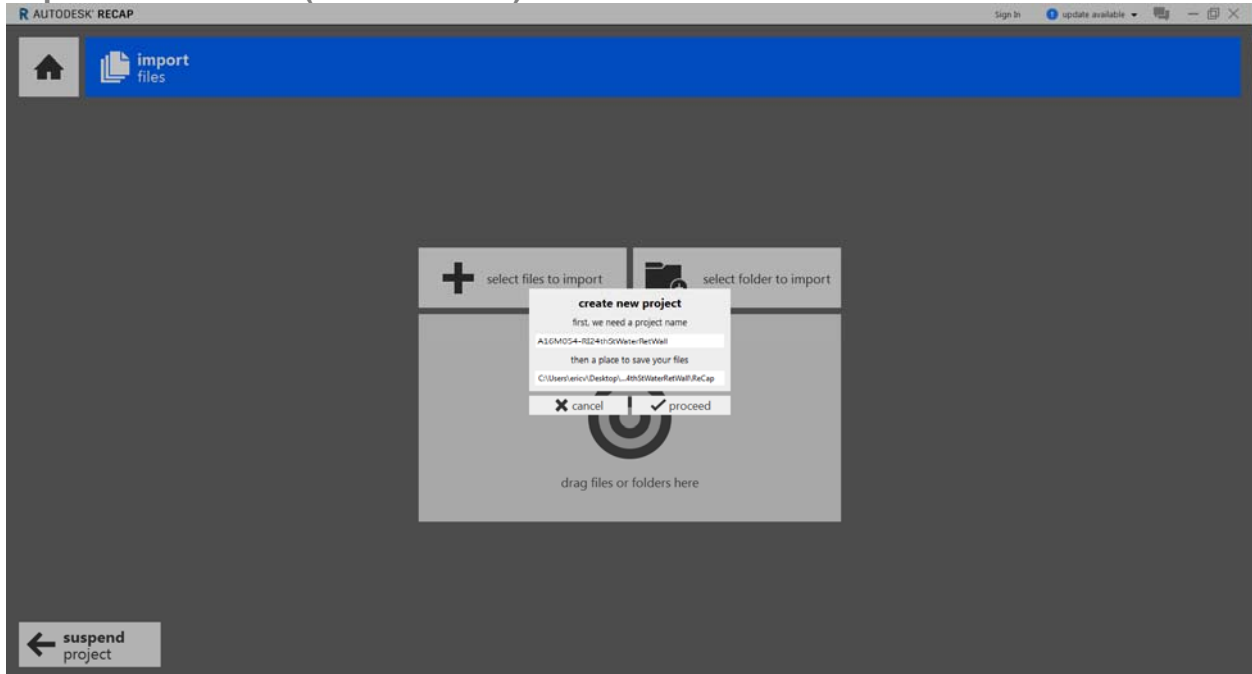
[Ramesh.Sridharan@AutoDesk.com](mailto:Ramesh.Sridharan@AutoDesk.com)

## Step 1: Convert Point Cloud Data within ReCAP

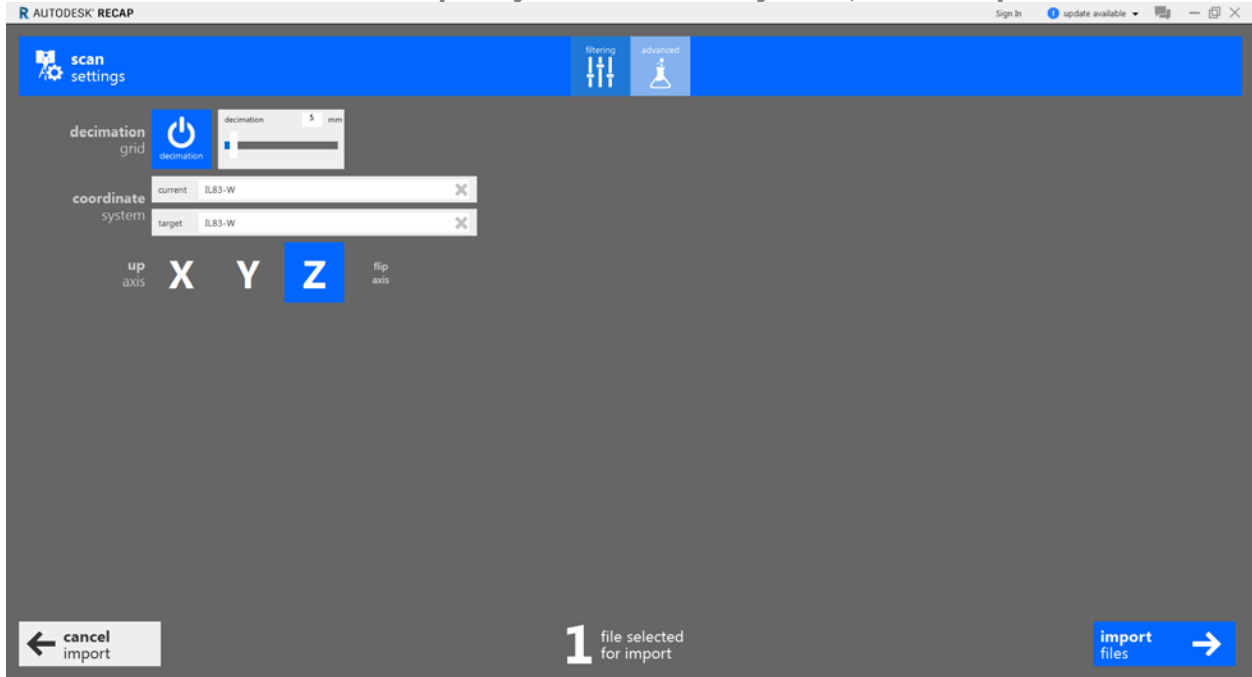
### Create New Project



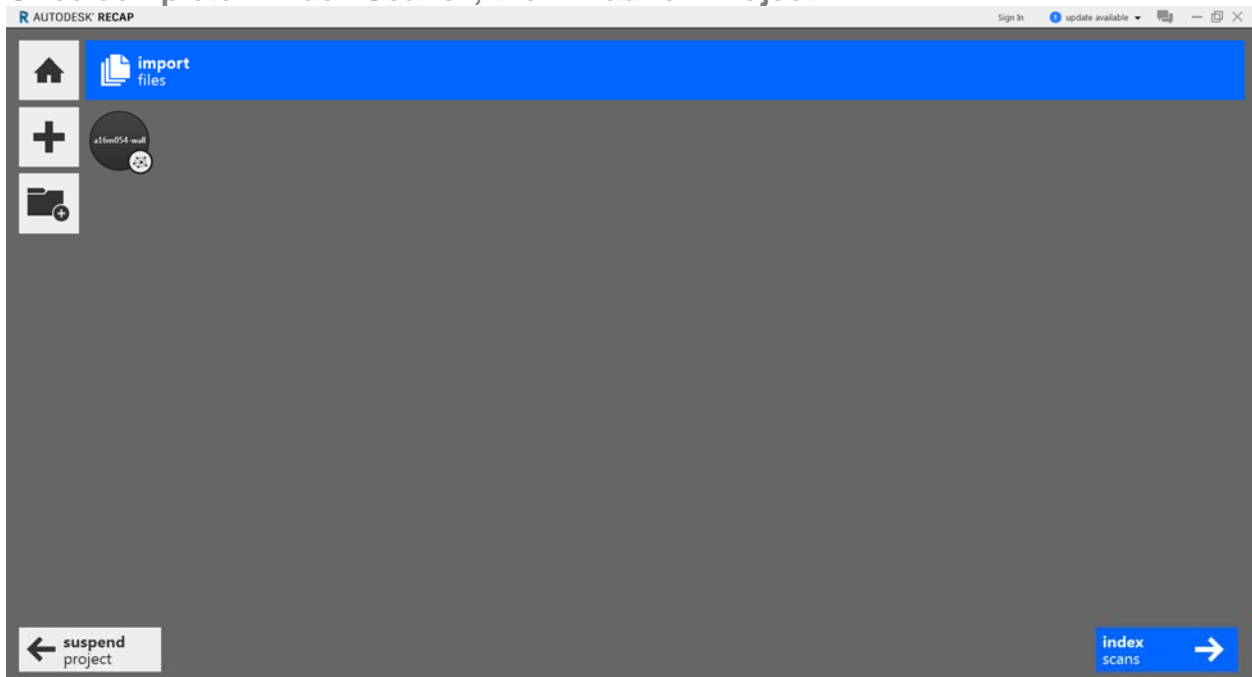
### Import Point Cloud (Trimble: LAS)



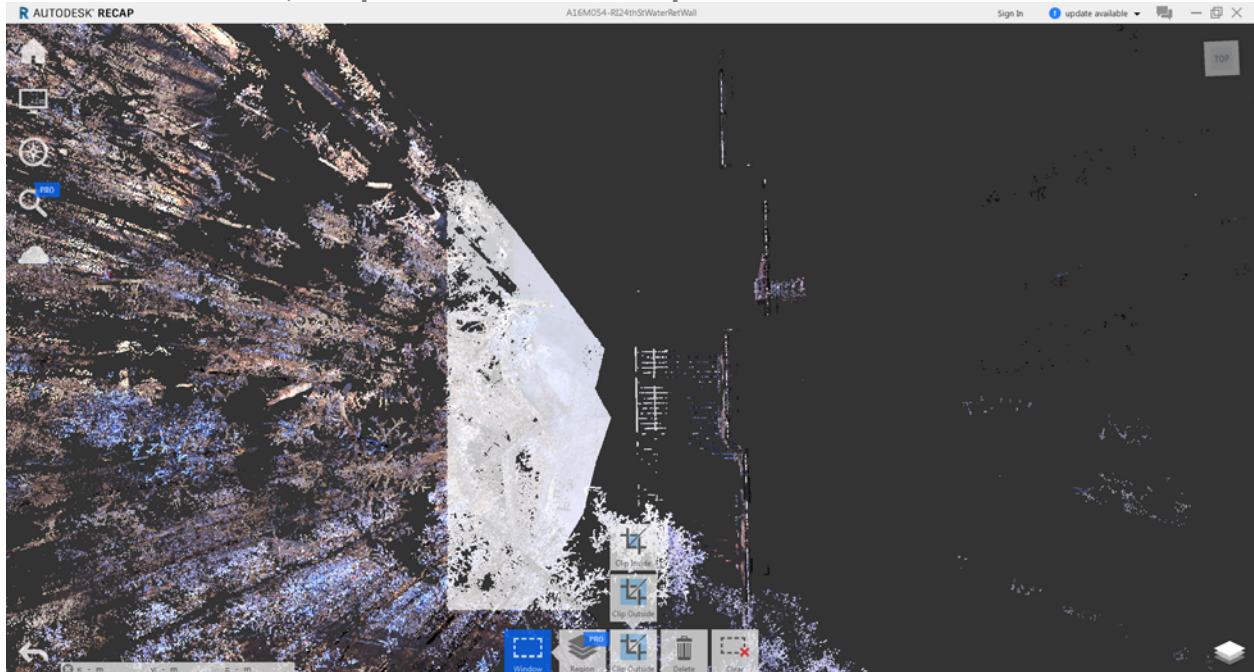
Use the “Advanced” tab to specify a coordinate system, then “Import Files”



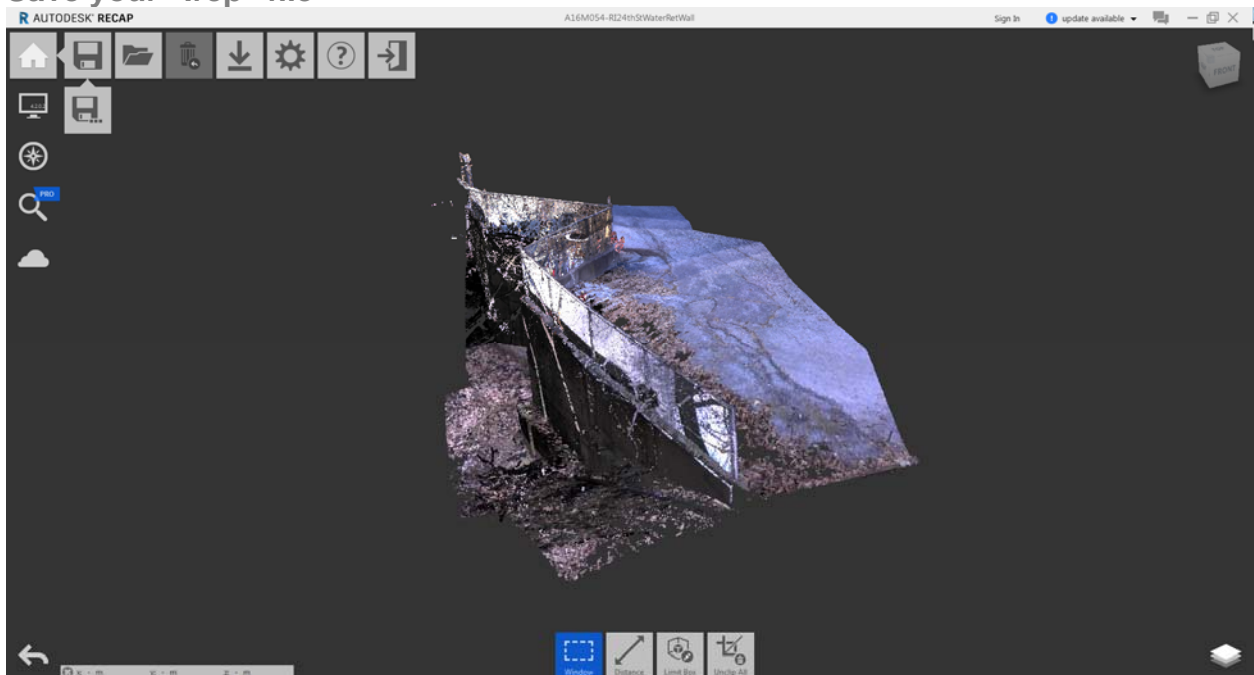
Once complete: “Index Scans”, then “Launch Project”



## Use the “Window”, “Clip” buttons to cleanup

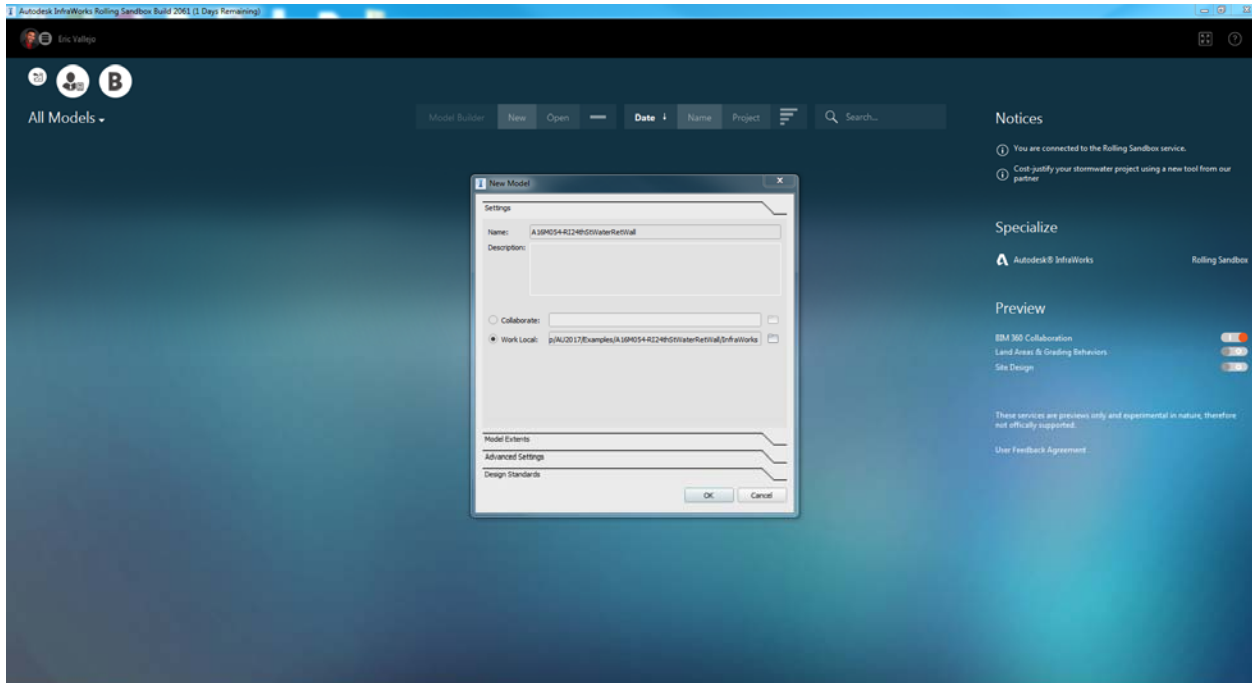


## Save your “.rcp” file

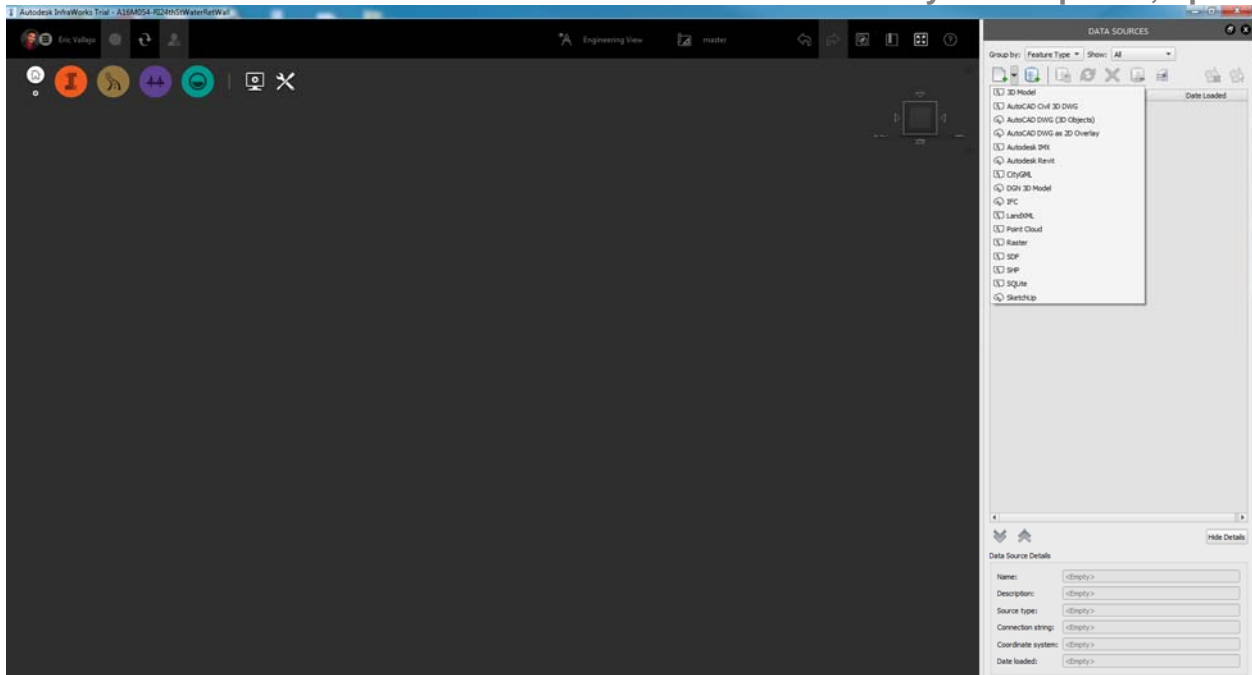


## Step 2: Process and Extract Data Within InfraWorks

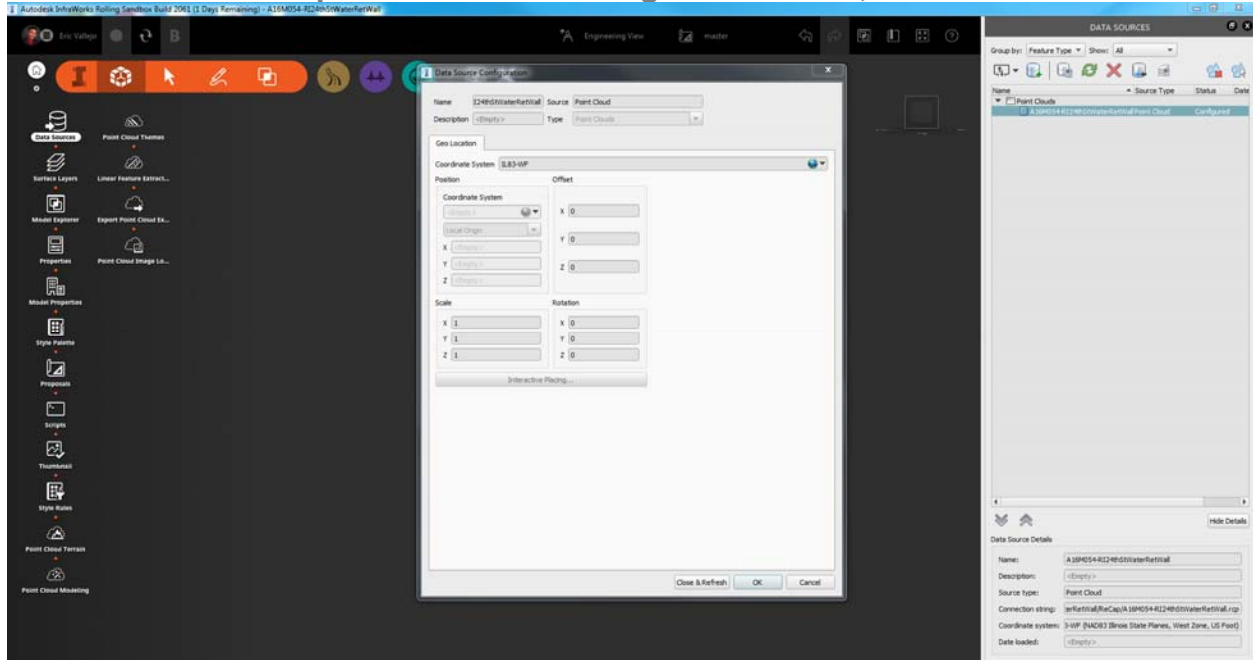
### Create a “New Model”



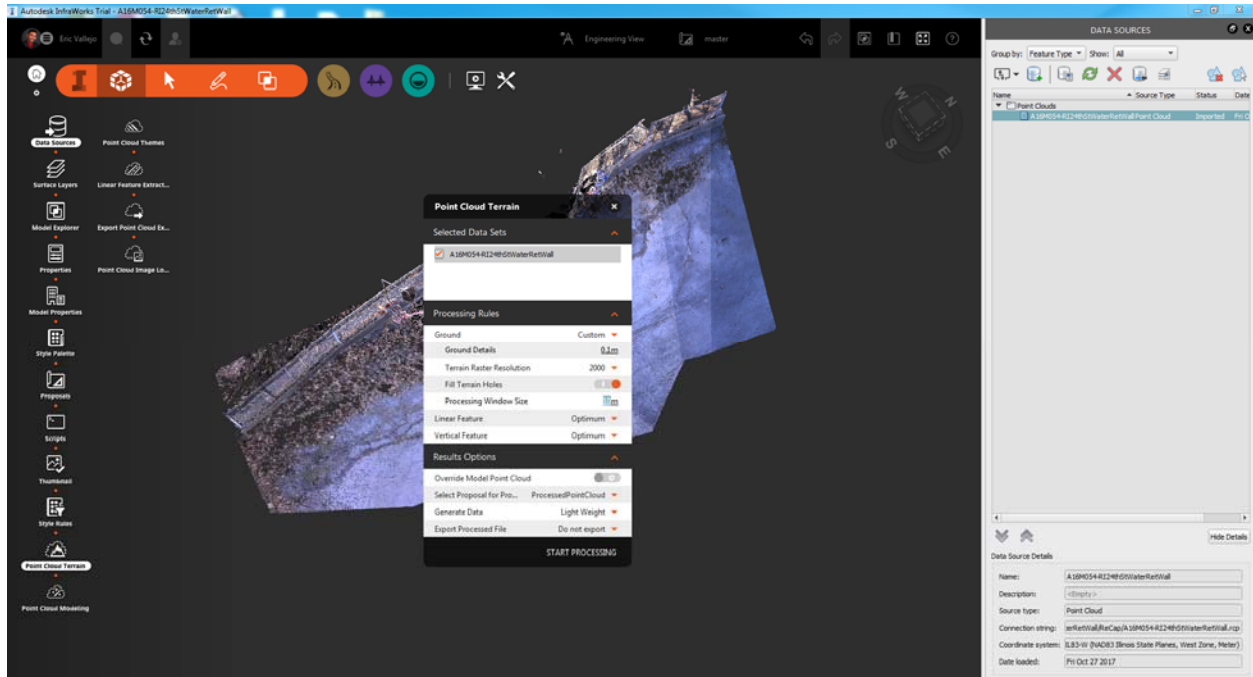
Within “Data Sources” choose “Point Cloud” and browse to your “.rcp” file; open



## Double-Click on the point cloud and configure if needed; Close and Refresh

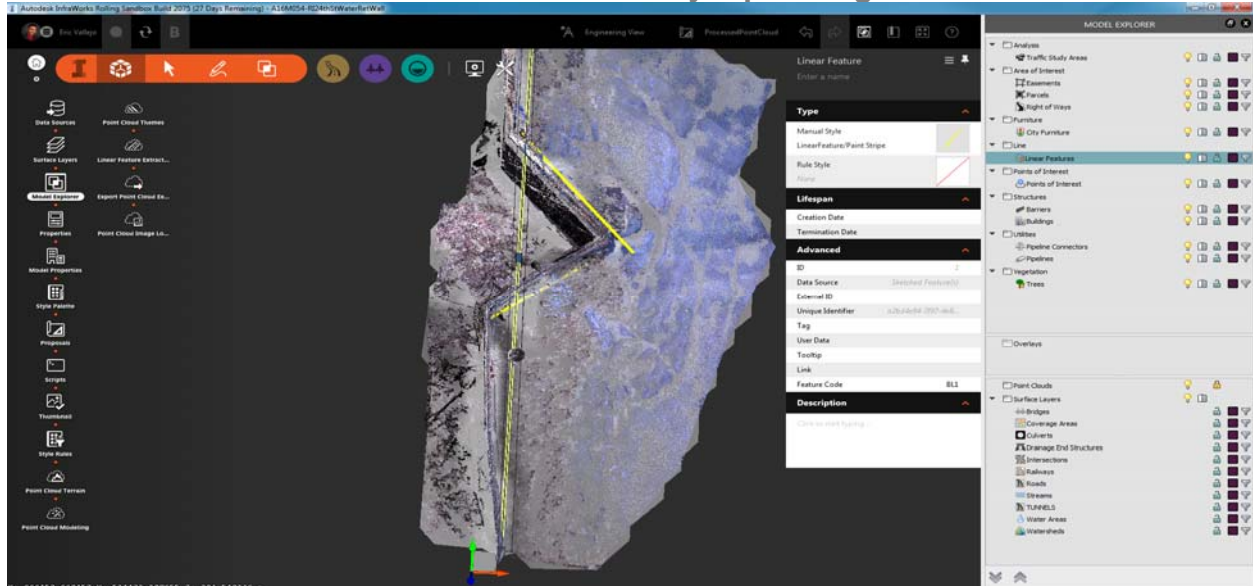


## Use "Point Cloud Terrain" to Process Data



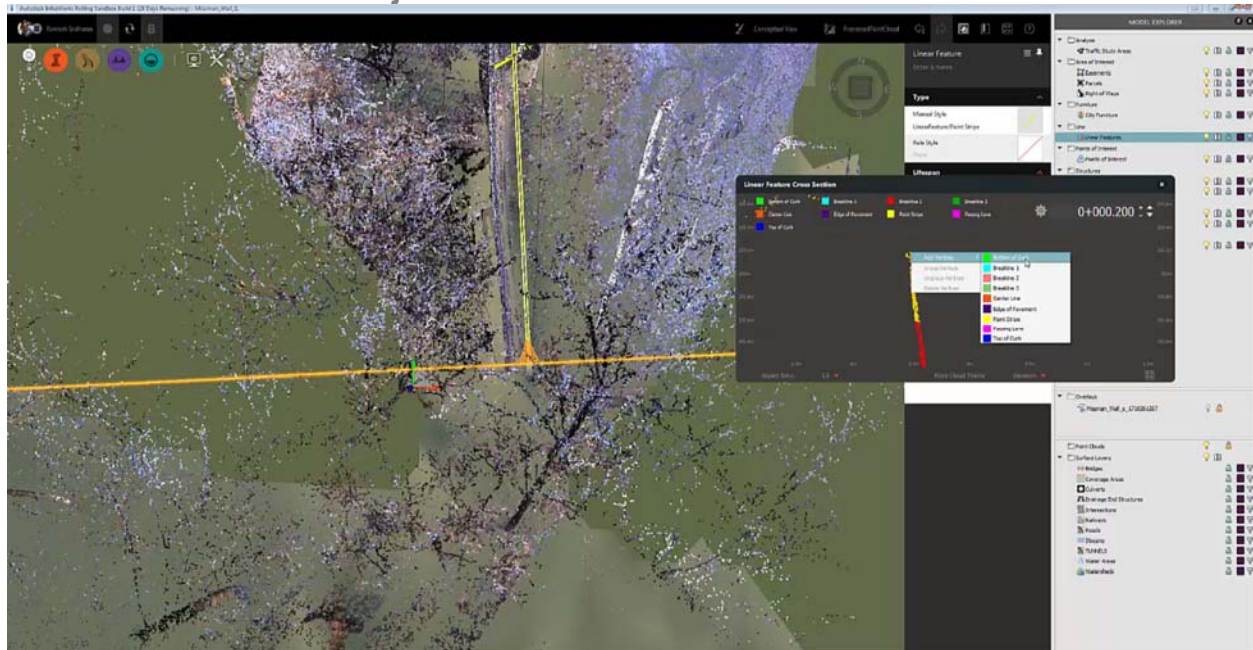
1. Select Data Set(s) you wish to process
2. Specify “Processing Rules” for the level of detail; optimum is the default
  - a. Ground: Classify ground Surface Points; less detail=smoother
  - b. Linear Feature: Classify points representing curb, fence, wall, etc.
  - c. Vertical Feature: Classify points representing trees, signage, poles, etc.
3. Specify “Results Options”
  - a. Override Model Point Cloud: Do not select this option if you want to retain the ability to reprocess the original point cloud data later. If you deselect the option, the processed data is added to the “Processed Point Cloud” proposal, which may increase model file size.
  - b. Select Proposal for Processed Data: Accept the default or choose another proposal to save the processed data. This option is available if you did not select “Override Model Point Cloud.”
  - c. Generate Data: Select the level of detail for the data. Selecting “Lightweight” or “Key Points” only may improve performance, but may also result in fewer ground points.
  - d. Export Processed File: You can export the processed data as an RCS file for use in other applications. If you select to export the data, you also need to specify where to save the file.
4. Click Start Processing

Use “Linear Feature Extraction” and manually input rough linework

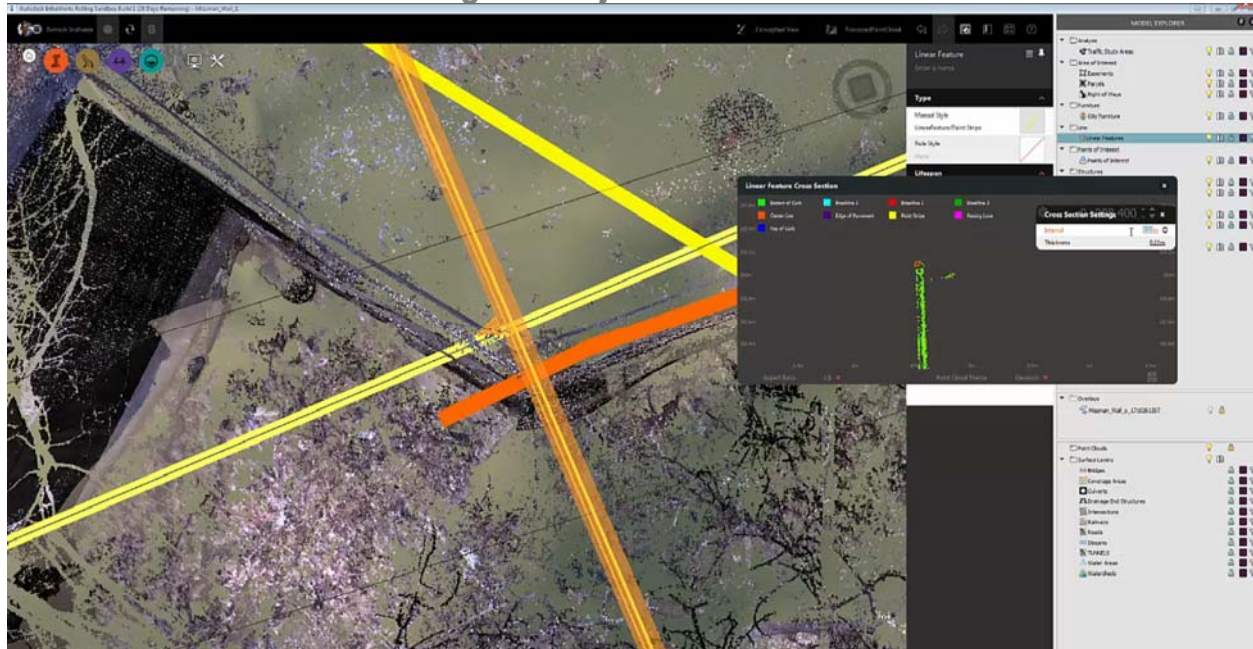




Right Click on the “Linear Feature” to delineate linework, add vertices at specific intervals and make 3D adjustments as needed



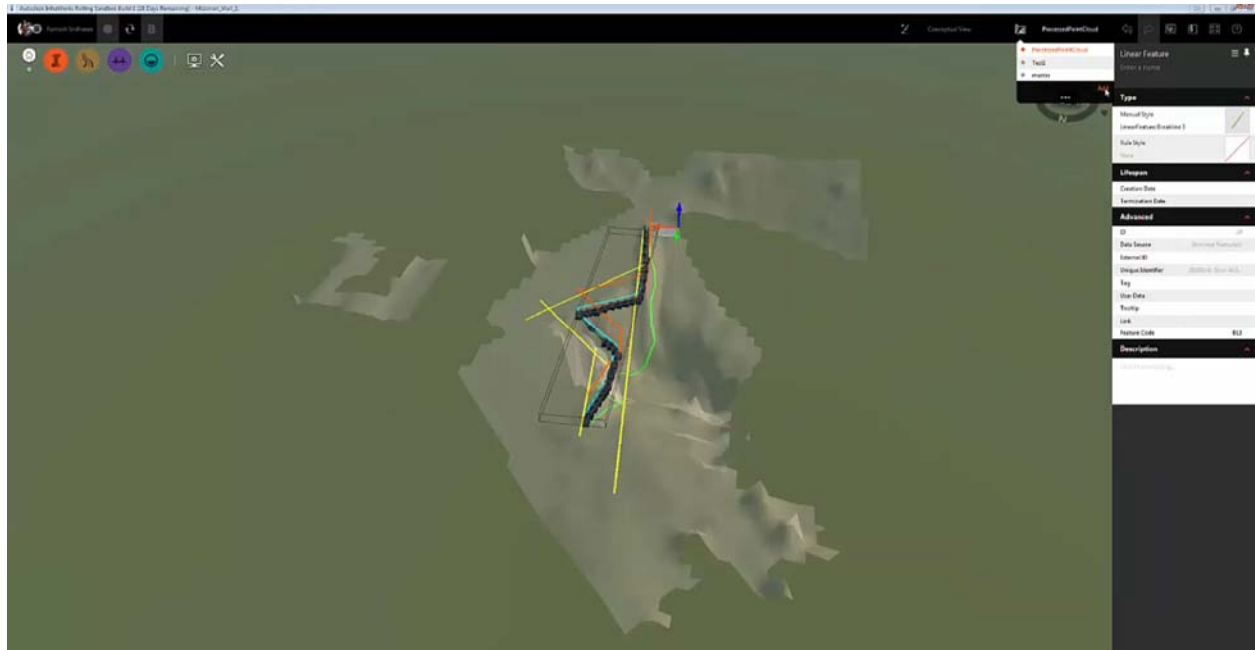
Use the “Cross Section Settings” to adjust intervals for more detail



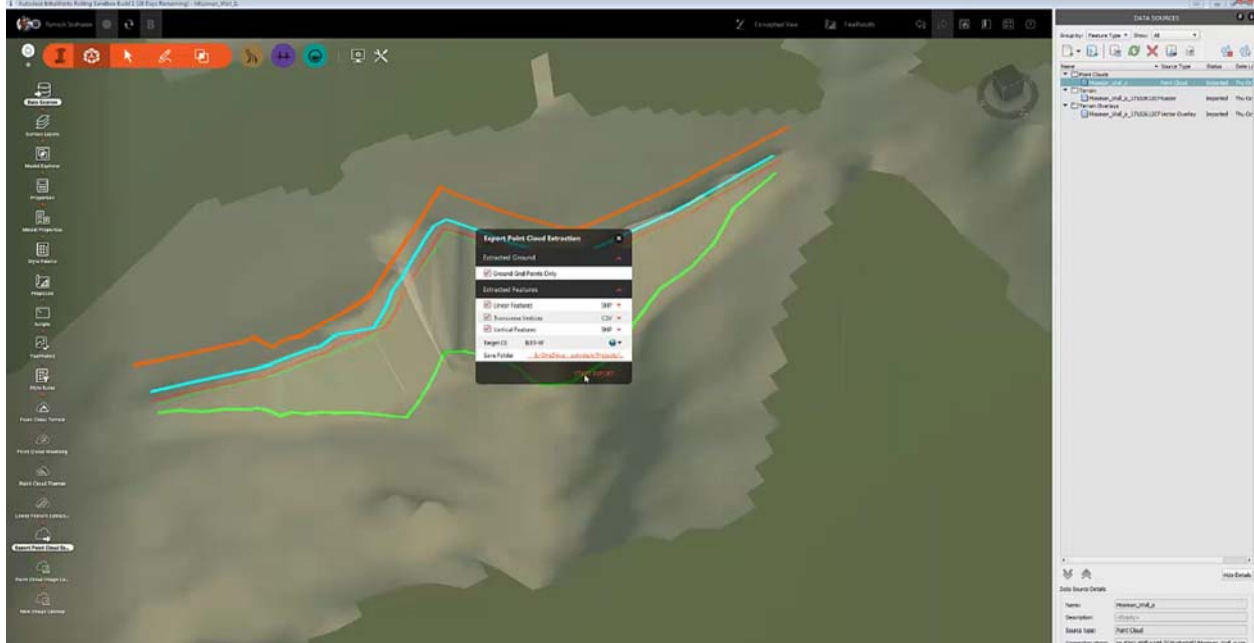
## Use “grips” join Linear Features or remove vertices



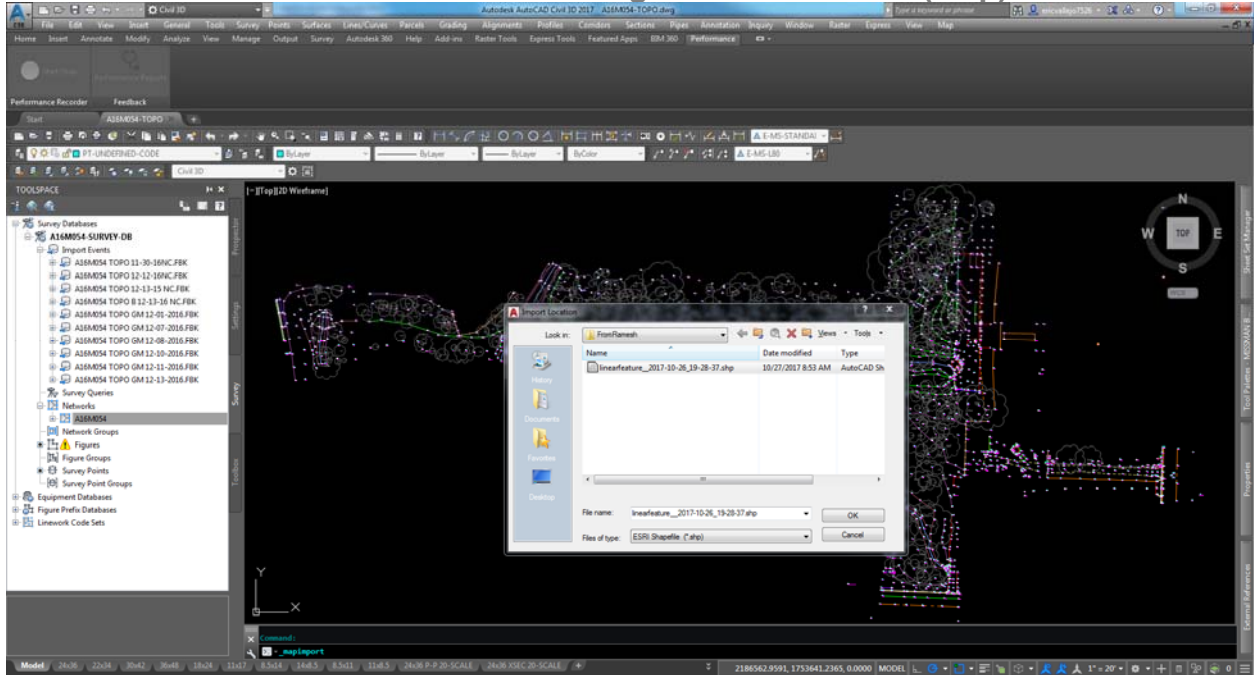
## “Add” a new Processed Point Cloud



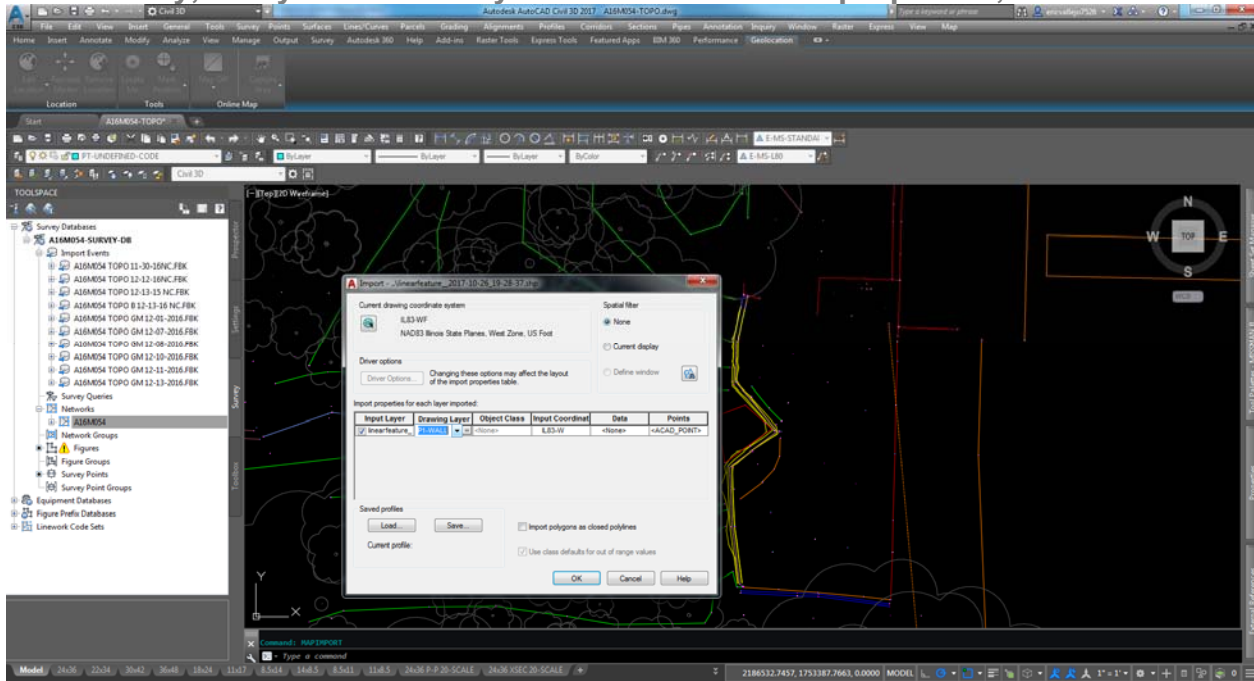
## “Export Point Cloud Data Extraction”



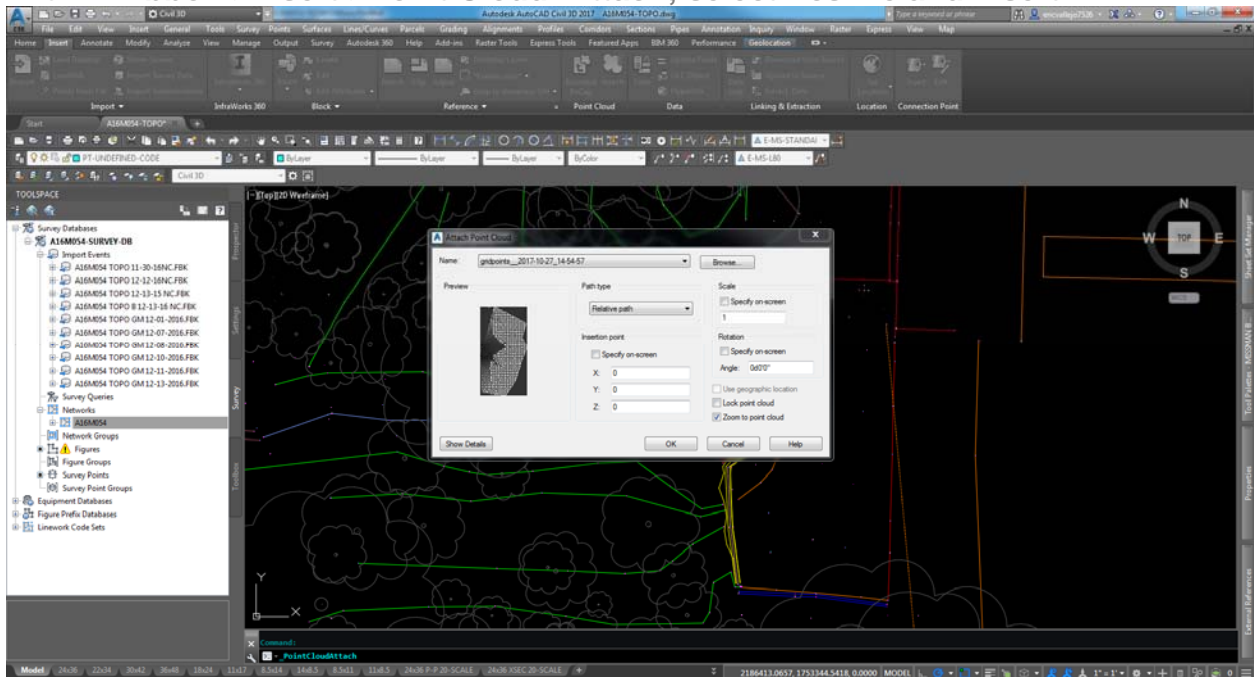
## Use the command: "MAPIMPORT" to bring in linear features (.shp)



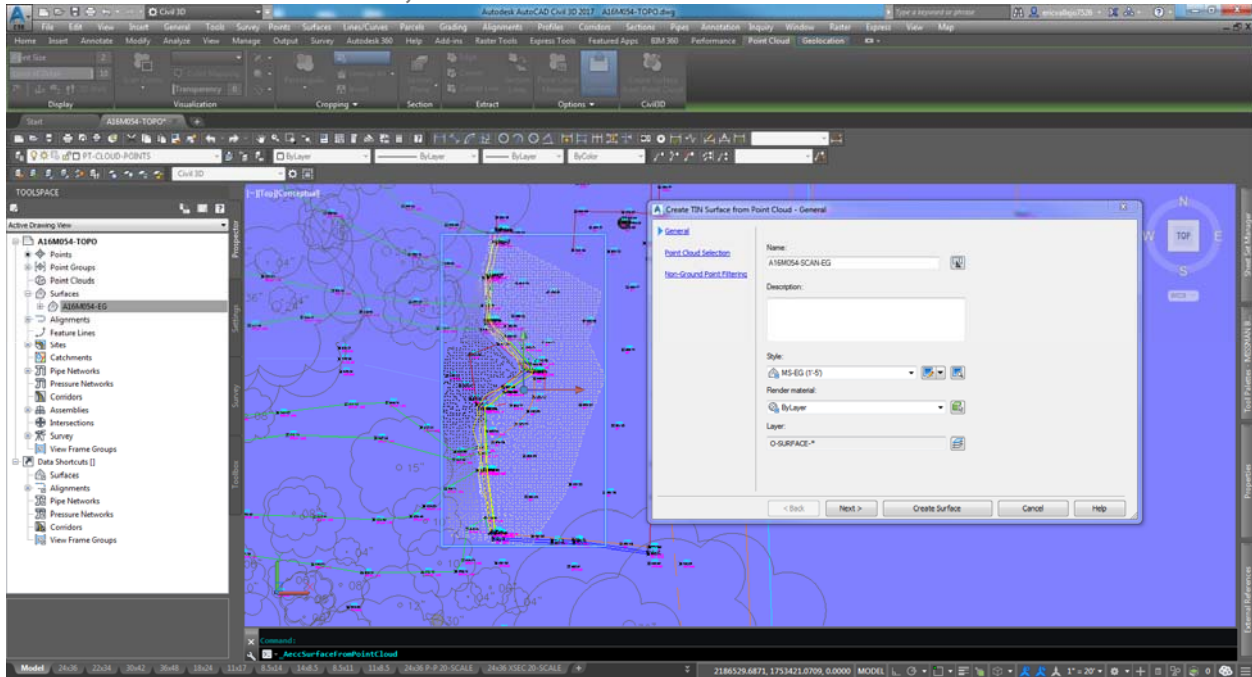
If necessary, verify coordinate system and set desired properties; click OK



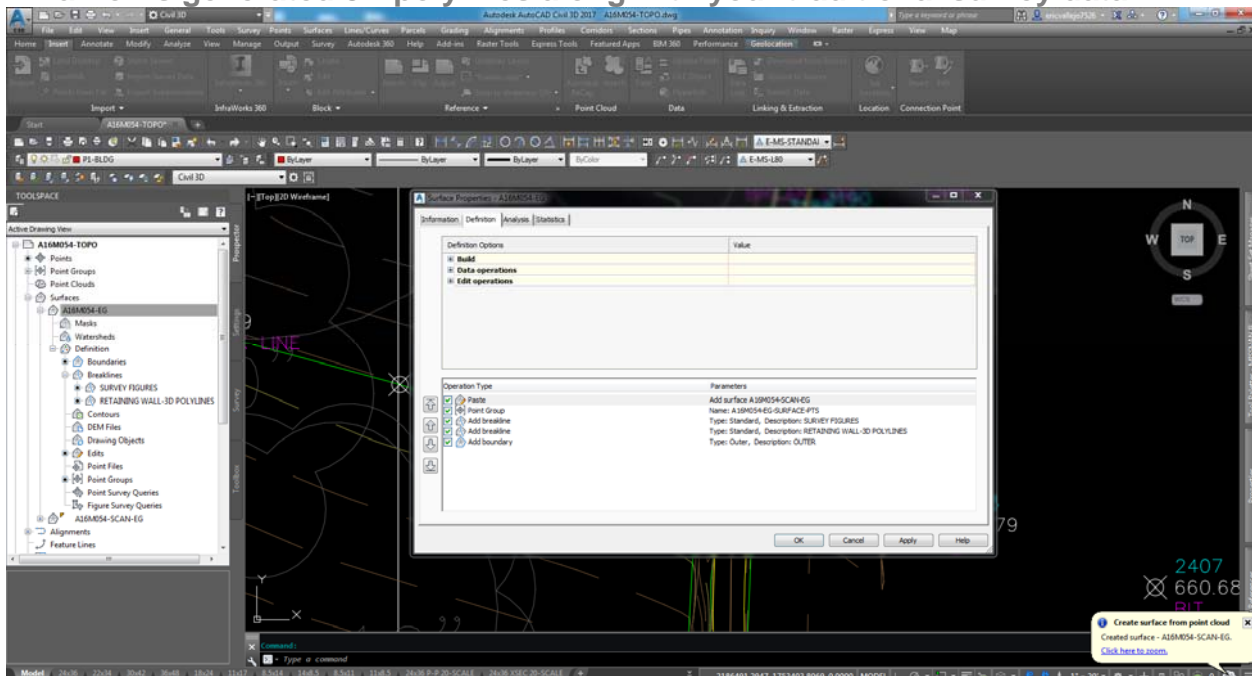
Within Ribbon->Insert->Point Cloud: Attach; select .rcs file and insert



## With Point Cloud Selected, use Ribbon to “Create Surface from Point Cloud”



## Create a new existing surface: Paste the “Scan-EG” Surface and add the InfraWorks generated 3D polylines along with your traditional survey data



Make any necessary edits and verify surface using “3D Orbit”

