

# Walk-in Slide: AU 2014 Social Media Feed

1. Click on the link below, this will open your web browser

<http://aucache.autodesk.com/social/visualization.html>

2. Use “Extended Display” to project the website on screen if you plan to work on your computer. Use “Duplicate” to display same image on screen and computer.

# Modeling and Visualizing Geology Subsurfaces with AutoCAD Civil 3D Ready for BIM

Gary Morin

Technical Director

Linkedin: [uk.linkedin.com/in/garymorin63](http://uk.linkedin.com/in/garymorin63)

# Class summary

Create and model geological data with the Geotechnical Module in AutoCAD Civil 3D software

# Key learning objectives

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

- Import and create boring holes and surfaces
- Understand the principles of modeling geology surfaces
- Comprehend the use and role of Feature Lines and Break Lines in modeling geology
- Convert the subsurface data in AutoCAD Civil 3D solids ready for export

# Import and Create Boring Holes and Surfaces

# CSV Import

- File format rules:
  - Delimiters supported:
    - Comma (,)
    - Semicolon (;)
    - Colon (:)
    - Vertical Bar (|)
    - Tab
  - Decimal point
    - Must match the character used on the computer

# Two Files

- Boring Locations
  - Location of each of the boring
- Boring Strata
  - Strata readings per individual borings



# Boring Locations

Column Heading	Description	Mandatory	Example
LocationID	Location unique ID	Yes	BH0001
LocationType	Type of activity at location	Yes	RC
Easting	Easting or longitude of the location of hole	Yes	123456.4
Northing	Northing or latitude of the location	Yes	232467.3
GroundLevel	Ground level relative to datum of location or start of traverse	Yes	35.43
FinalDepth	Final Depth		8.37
Orientation	Orientation of hole (degrees Clockwise from north)		87
Inclination	Inclination of hole (measured positively down from horizontal in deg)		56.3



# Example location file

```
LocationID,LocationType,Easting,Northing,Ground Level,FinalDepth,Orientation,Inclination
BH13,RC,348810.69,312280.95,57.33,,,
BH9,RC,348801.13,312224.73,51.98,,,
BH8,RC,348776.3,312250.22,53.06,,,
BH11,RC,348749.43,312520.97,62.99,,,
BH1,RC,348743.68,312482.79,61.64,,,
BH19,RC,348740.94,312224.17,50.68,,,
BH3,RC,348731.53,312327.8,57.33,,,
```

# Boring Strata

Column Heading	Description	Mandatory	Example
LocationID	Location identifier	Yes	BH001
DepthTop	Depth to the TOP of stratum	Yes	7.43
DepthBase	Depth to the BASE of description	Yes	8.12
GeologyCode	Geology code	At least one of these fields must exist	LC
GeologyCode2	Second geology code		SAND
LegCode	Legend code		102

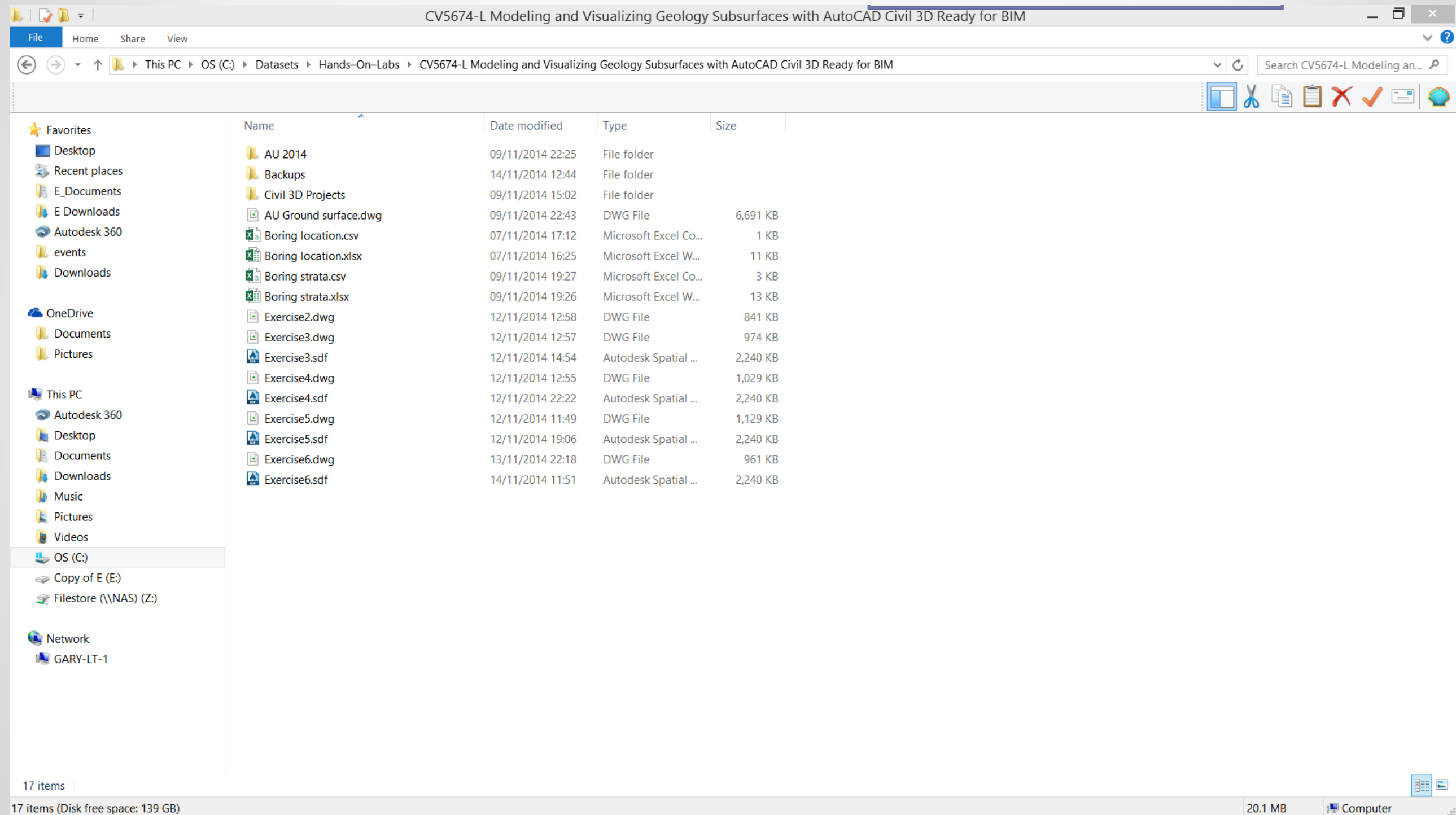
# Example Strata file

```
LocationID,DepthTop,DepthBase,LegCode,GeologyCode,GeologyCode2
BH1,0,0.5,101,TOPSOIL,
BH1,0.5,1.5,102,MADE,
BH1,1.5,3,803,SANDSTONE,
BH1,3,4.5,801,SANDSTONE,
BH1,4.5,8,803,SANDSTONE,
BH1,8,12,803,SANDSTONE,
BH10,0,0.6,101,TOPSOIL,
BH10,0.6,1.4,102,MADE,
BH10,1.4,3.1,201,CLAY,
BH10,3.1,5.8,501,GRAVEL,
BH10,5.8,8.6,803,SANDSTONE,
```

## *Data entry rules for strata*

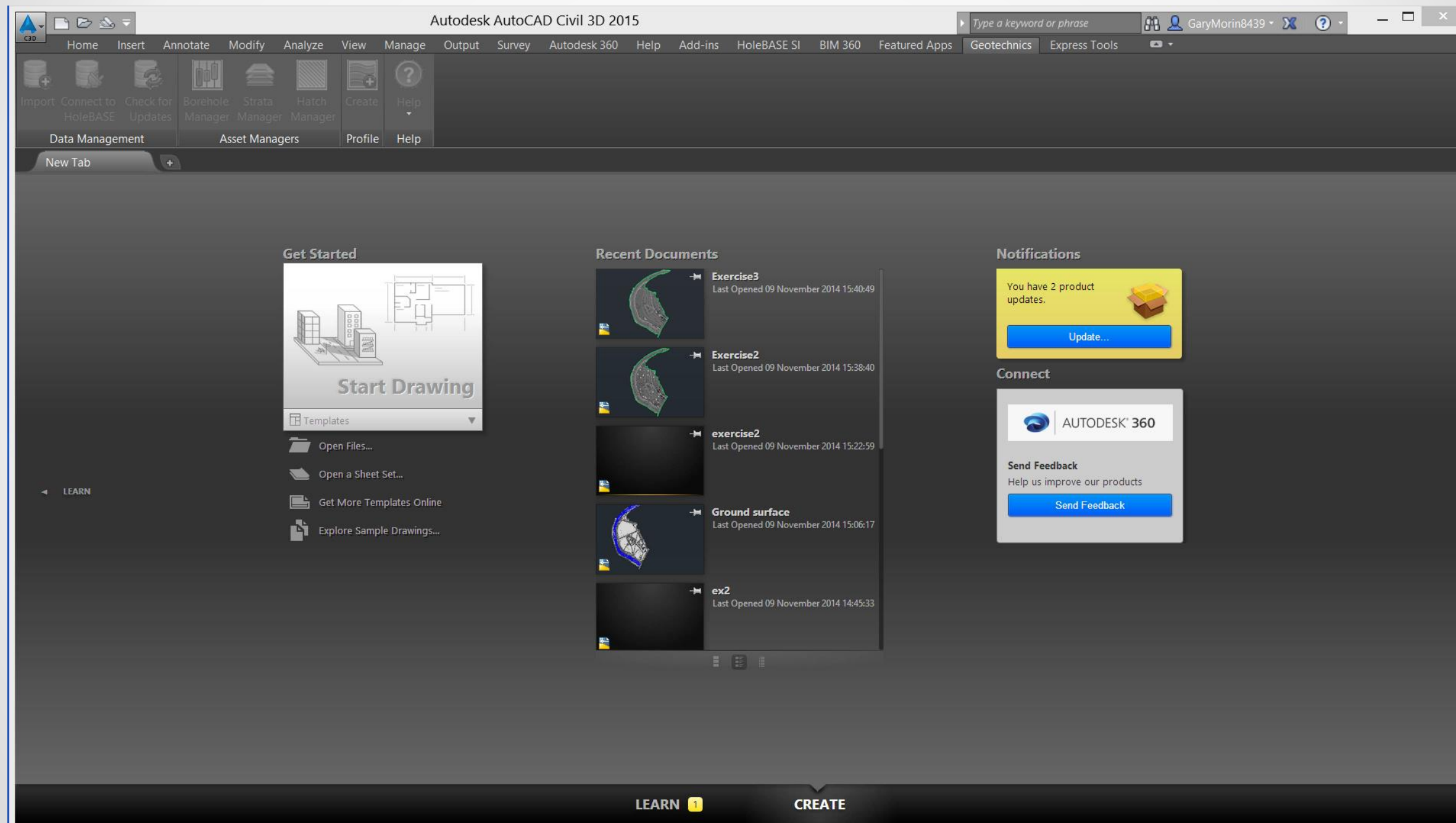
1. Each record must contain a valid location ID
2. Depth top and depth base must be specified for each record.
3. The strata bands should not overlap down an individual hole
4. Use consistent stratum names.

# Exercise 1: Creating and validating the CSV files



# Exercise 2:

## Importing CSV files into the Geotechnical Module



# Understand the Principles of Modelling Geology Surfaces



# Take Time to Understand the Data

- Take time to review the geology in the data.
  - Look for where the geology appear and don't appear
  - Look for the extents of a particular stratum
  - Look for anomalies in the data
- Use the 3D Boreholes to look at where the different geology appears around the site.
- Use the Plan log strips as an aid to the extents of geology when working in plan.
- Use profiles to highlight problems and discrepancies in the model.

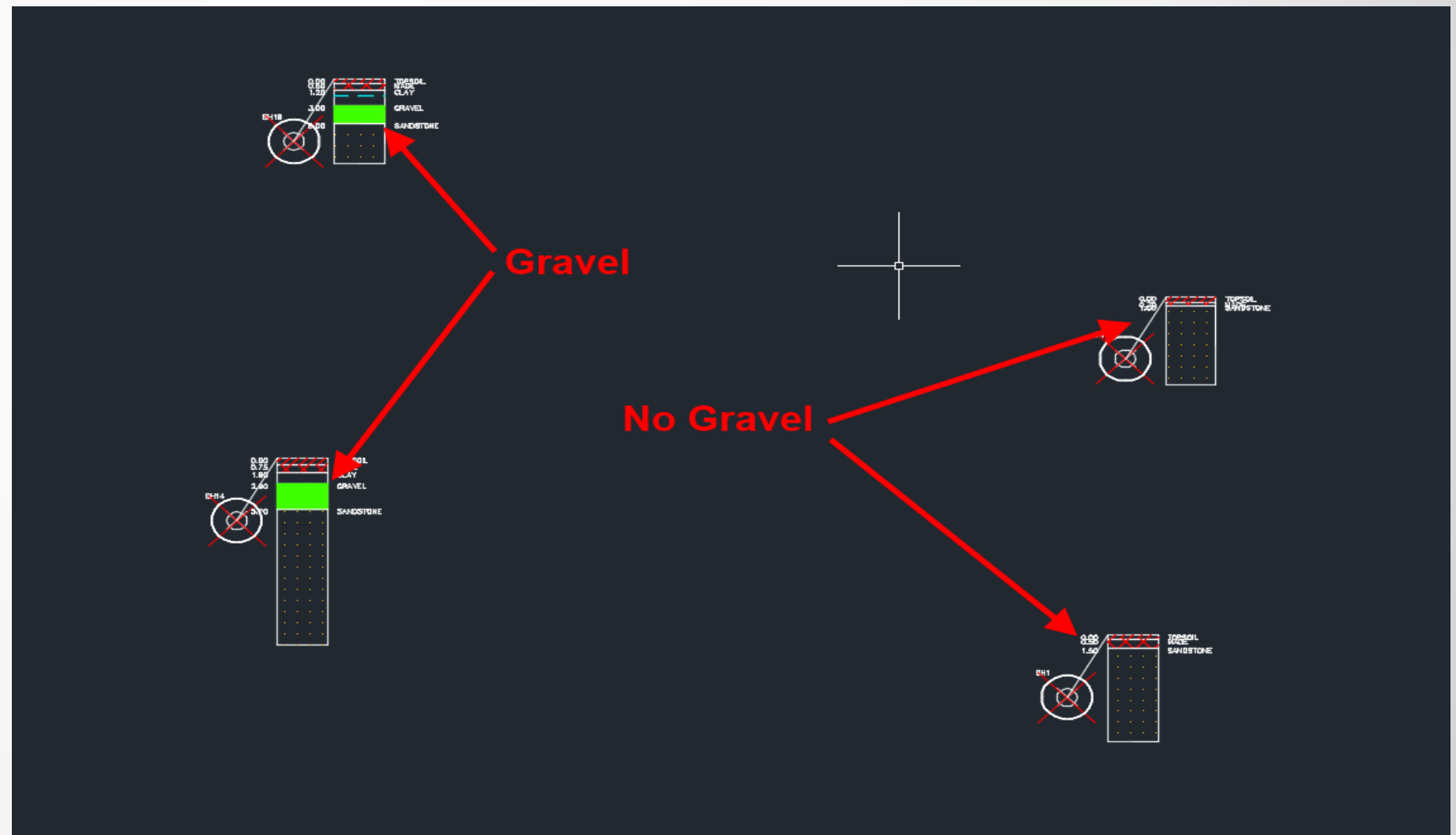
# Take Time to Understand the Data

- Use the 3D Boreholes



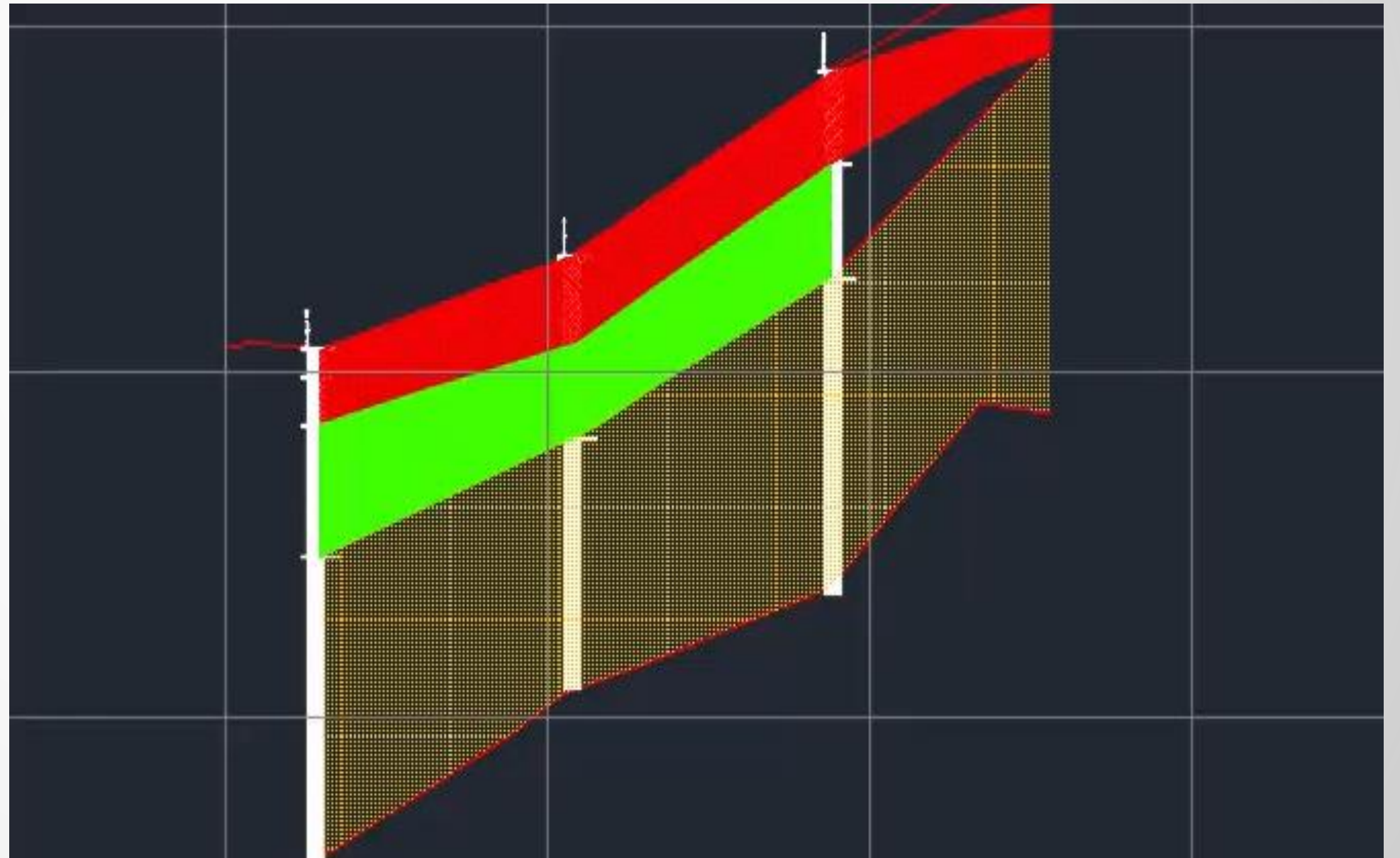
# Take Time to Understand the Data

- Use the Plan log strips as an aid to the extents of geology when working in plan.



# Take Time to Understand the Data

- Use Profiles to highlight problems and discrepancies in the model



# Rule

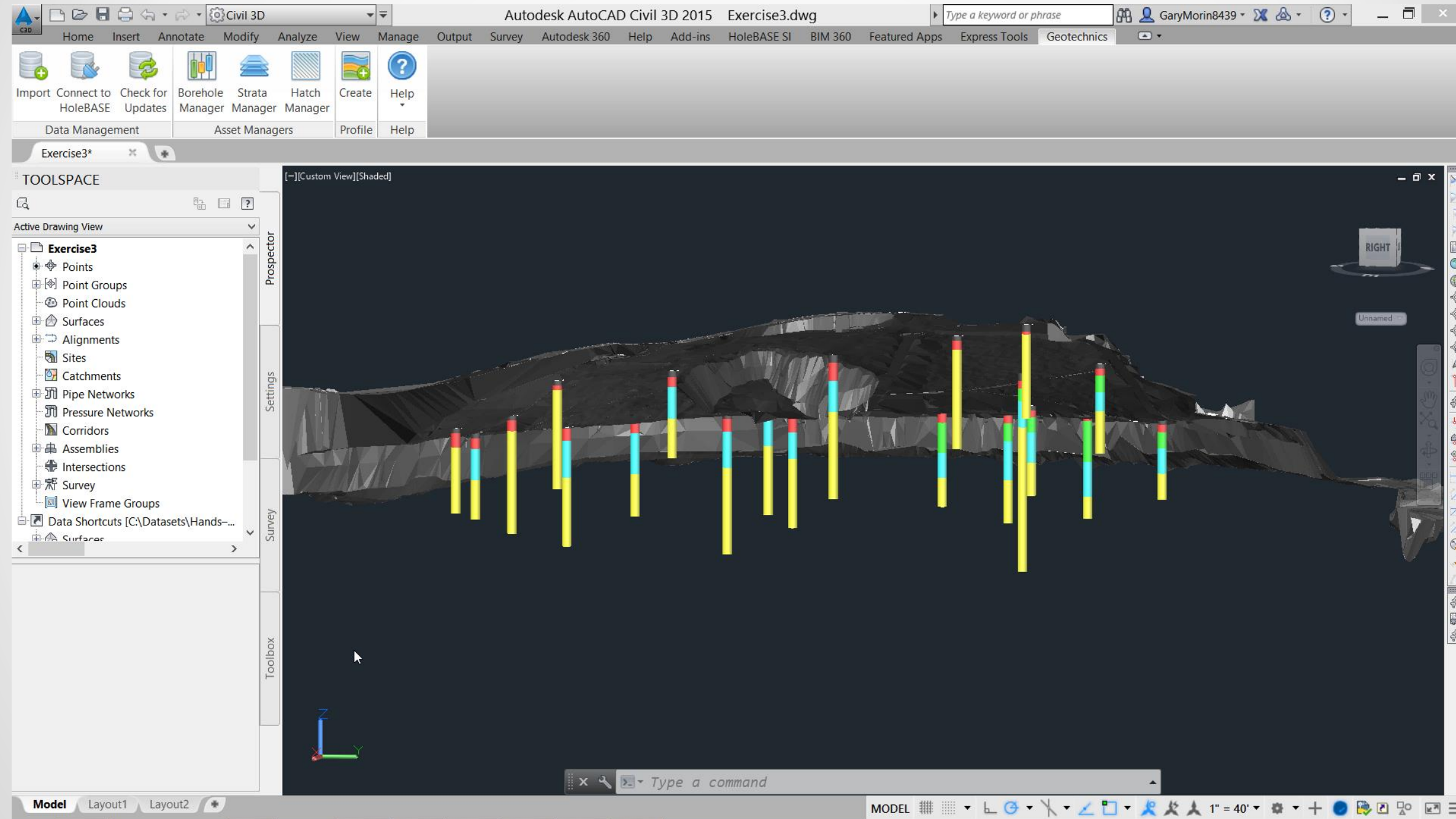
Always open drawings from **within** AutoCAD Civil 3D.

**DO NOT** open drawings from File Explorer, as the Geotechnical Module will not start up correctly.



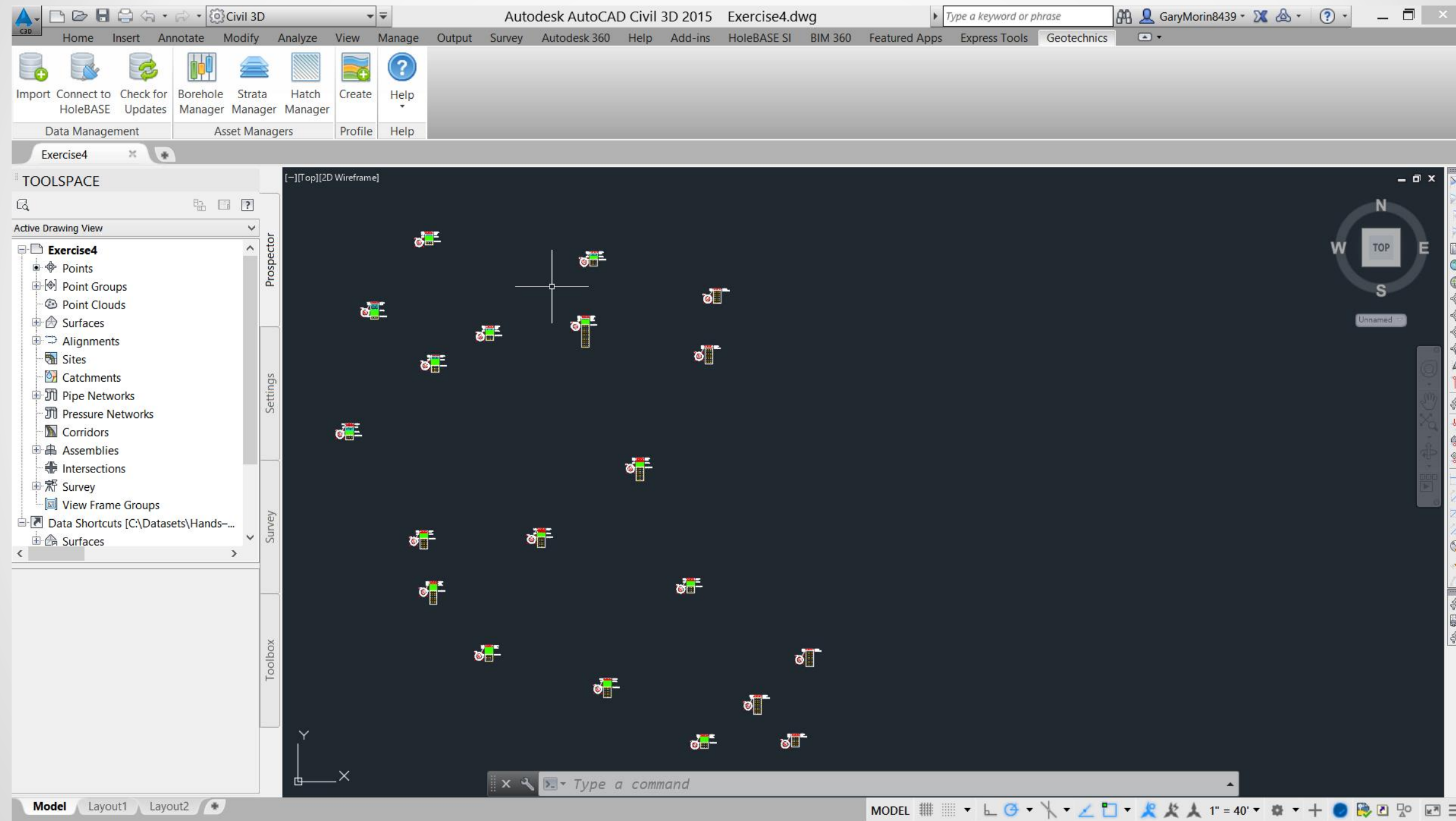
# Exercise 3:

## Using 3D Boreholes and Plan Log Strips



# Exercise 4:

## Using Geotechnical Profiles to Check Data

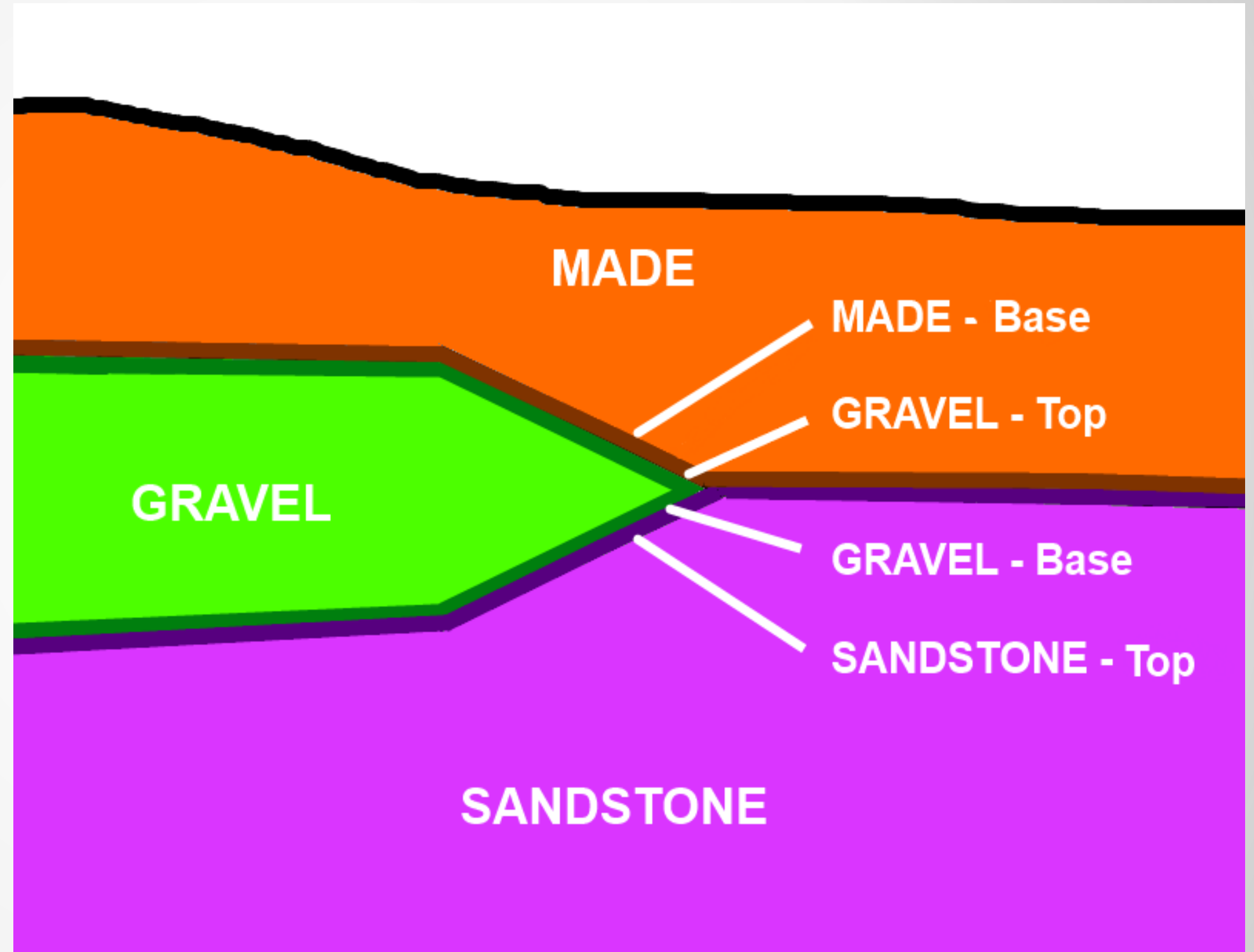




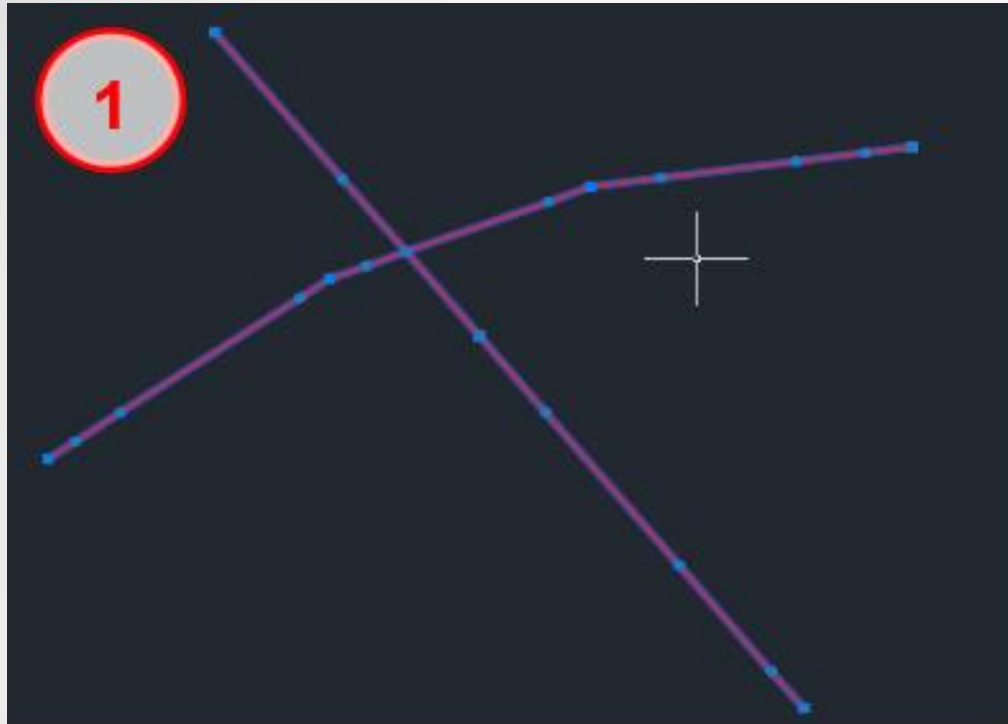
# Comprehend the Use and Role of Feature Lines and Break Lines in Modelling Geology

# Multiple Surfaces

- 4 Surfaces to Model extents of outcrop



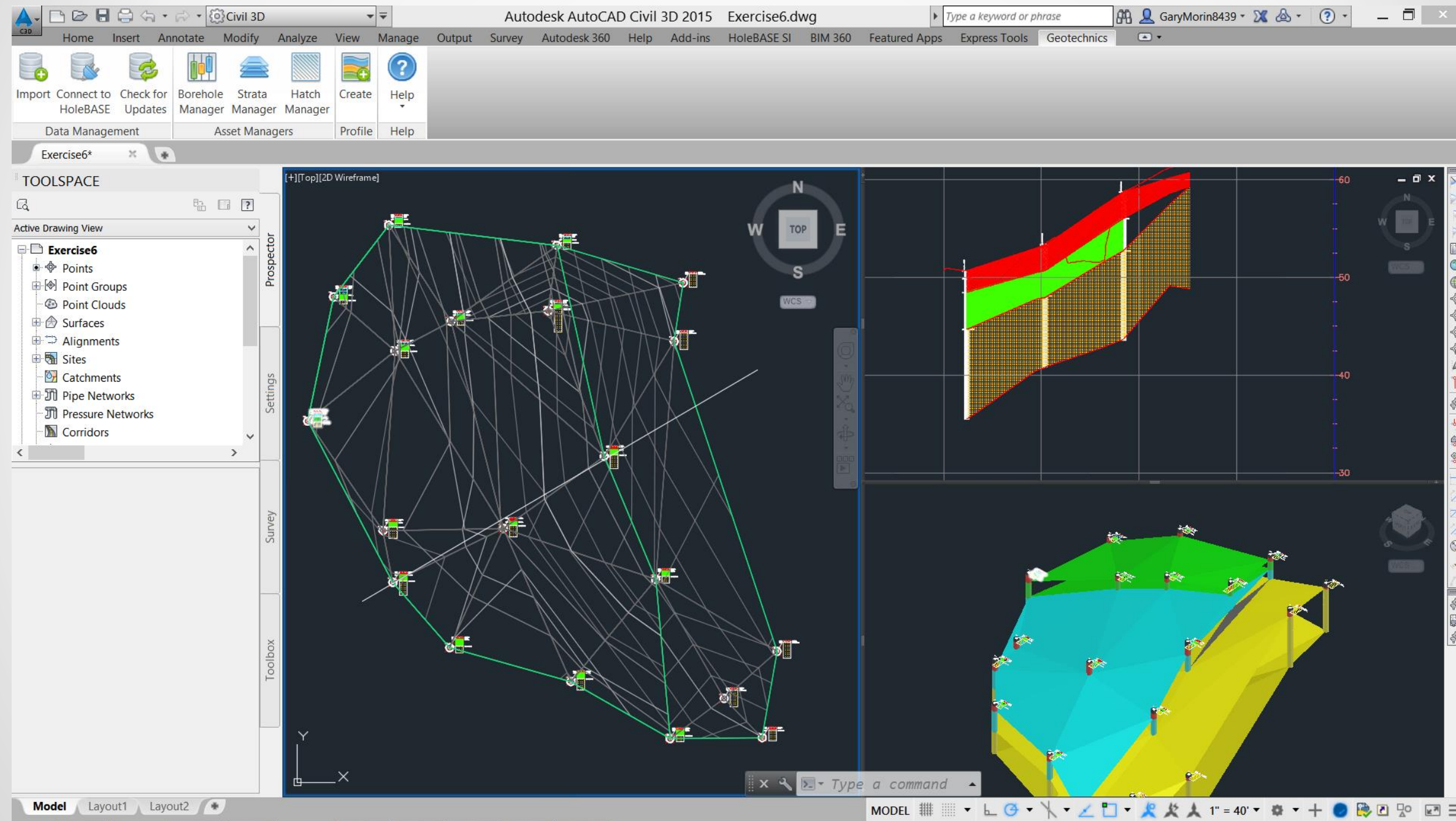
# Use Feature lines with Unique Sites



## Outline steps are:

- Draw a polyline representing the extents of the gravel.
- Convert the polyline into a feature line using the Sandstone - top as the elevation
- Add the feature line as break lines to the four surfaces
  - Sandstone - Top
  - Gravel – Base
  - Gravel – Top
  - Made – Base

# Exercise 5: Using Feature Lines and Break Lines to Model Geology







**Learn how to convert the subsurface  
data in AutoCAD software 3D solids  
ready for export**

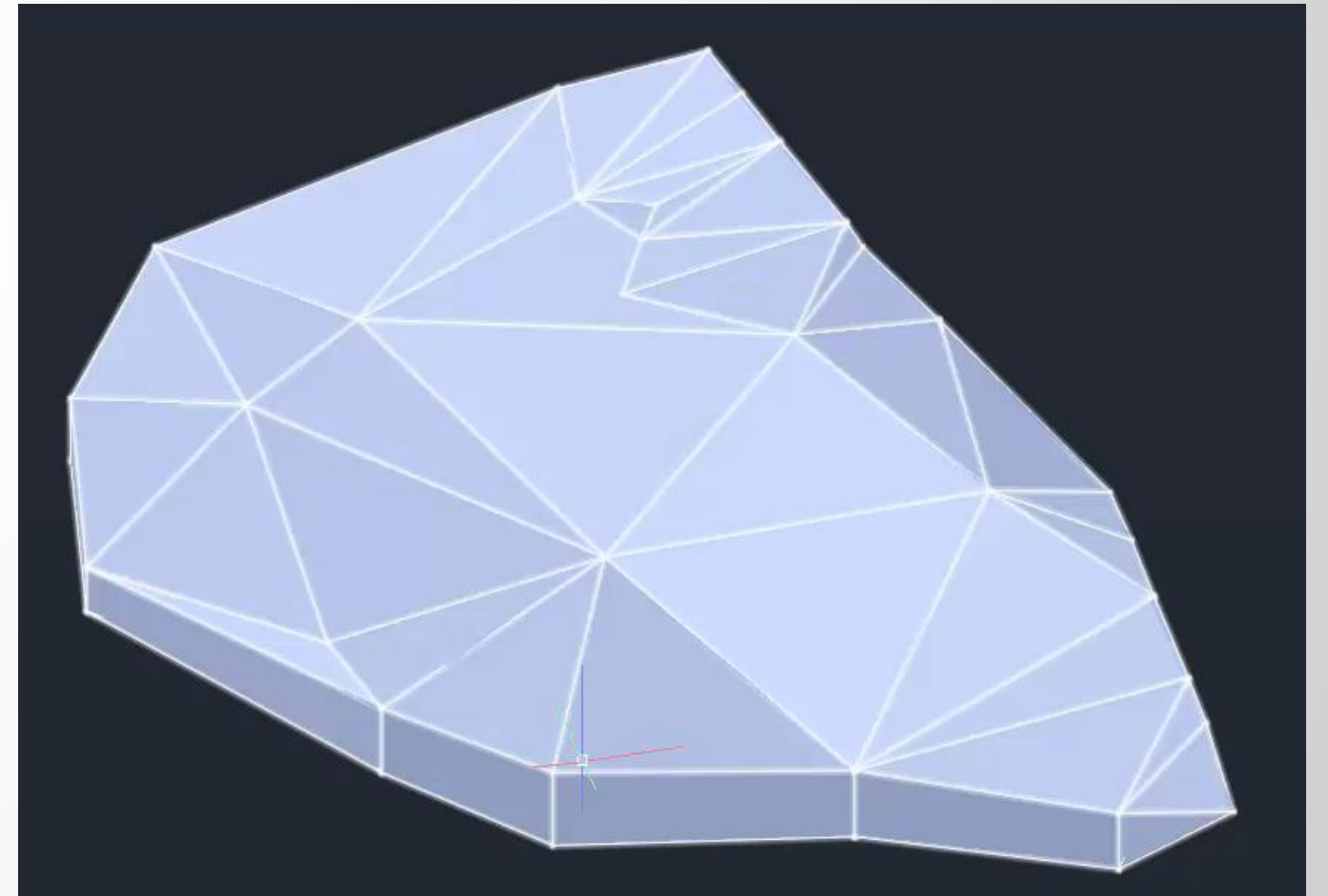


# Turn off Solid History

At Command Prompt>

SOLIDHIST

Type 1 press <Enter>

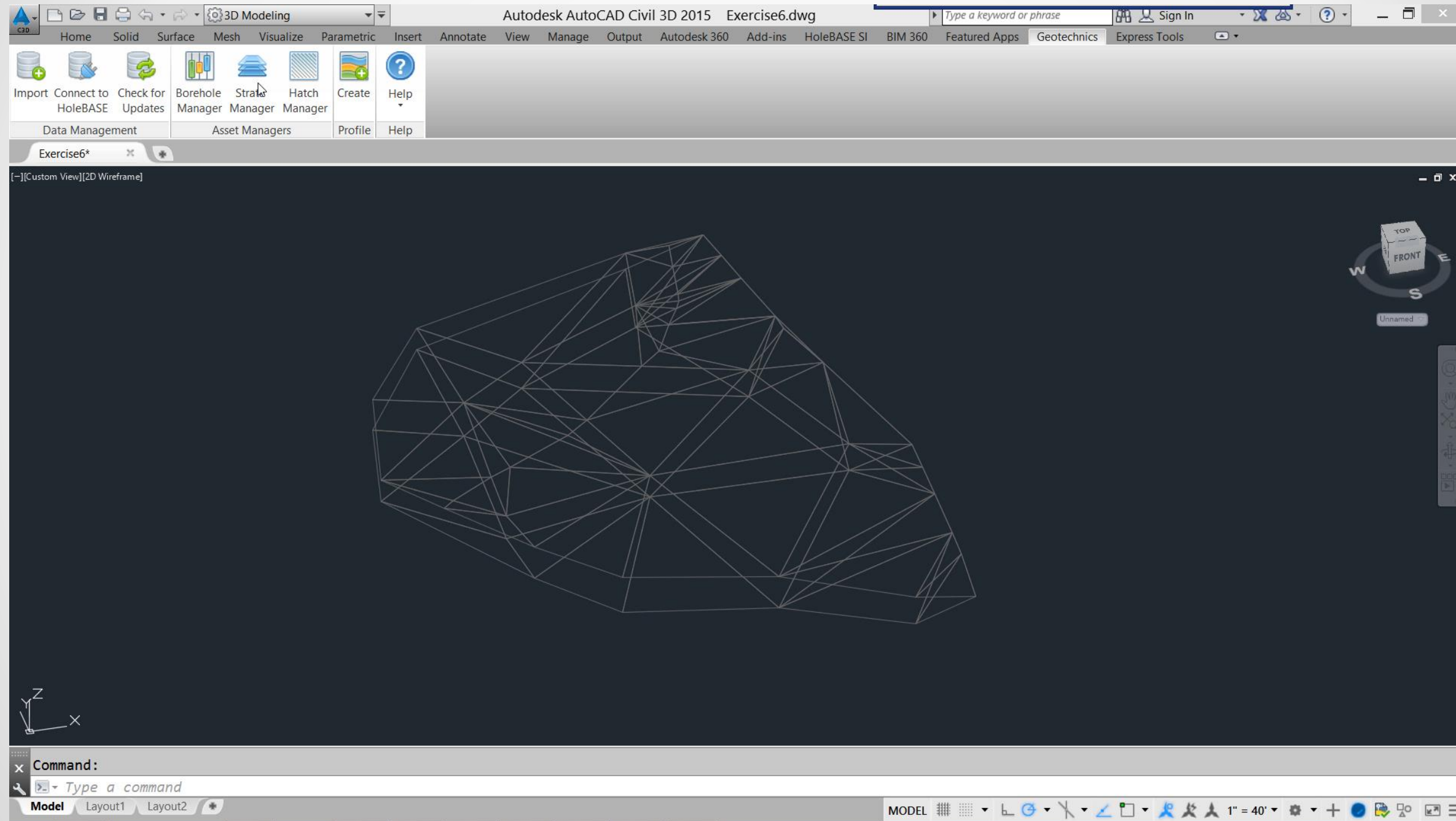


# Outline Steps

1. Extract triangles from top surface.
2. Extruded all triangles in the same direction.
3. Union all newly created solids into one single solid.
4. Repeat the above three steps for the base surface, triangles must be extruded in the same direction as above.
5. Use the subtraction command and subtract the base solid from the top solid.
6. The result is an AutoCAD solid representing the stratum.

# Exercise 6

## Creating a AutoCAD solid



# New Solid Creation tool

- In Productivity Pack 2

**For more information on Geotechnical BIM and free a gift (first come first served) visit:**

**Gary Morin**

**Keynetix Ltd**  
**Booth 109**

# 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











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