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.

CV6296

How Big is Big? Maximize AutoCAD Civil 3D Performance without Sacrifice

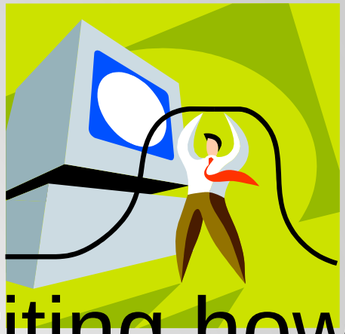
Lucy Kuhns

Autodesk Premium Support

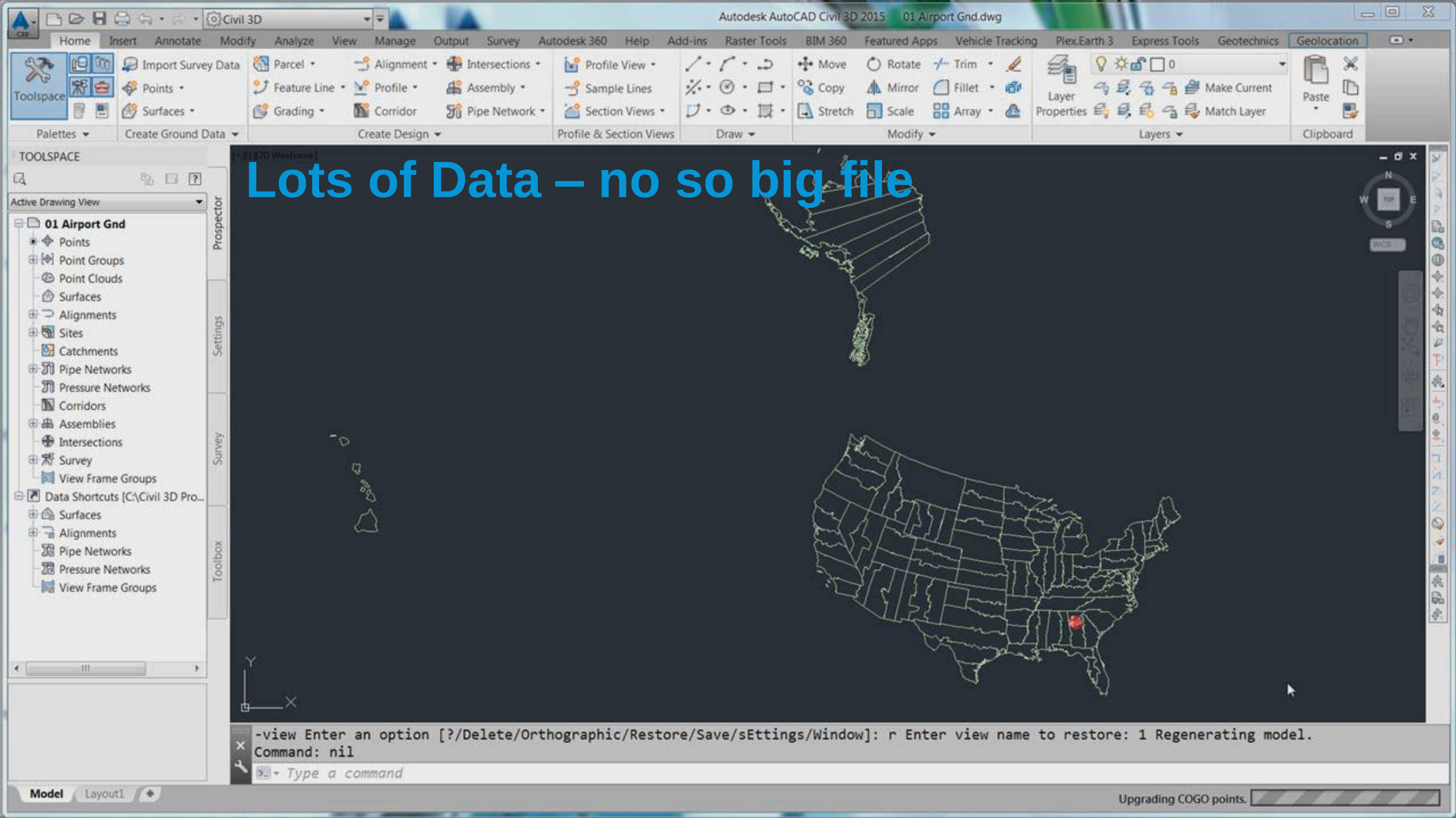
Nate Moore

Autodesk Premium Support

Technology, Tools, and Talented People



- Infrastructure projects all over the world are re-writing how we work successfully with Civil 3D.
- In Premium Support we see some of the successes and barriers to efficiency of Civil 3D
- There are re-occurring themes that we find our customers struggling with.
- One can greatly improve – or destroy - the power of Civil 3D by understanding how to avoid these themes…


Civil 3D
Autodesk AutoCAD Civil 3D 2015 01 Airport Gnd.dwg
Home Insert Annotate Modify Analyze View Manage Output Survey Autodesk 360 Help Add-ins Raster Tools BIM 360 Featured Apps Vehicle Tracking Plex.Earth 3 Express Tools Geotechnics Geolocation
Toolspace
Import Survey Data
Points
Surfaces
Parcel
Feature Line
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Corridor
Intersections
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Pipe Network
Profile View
Sample Lines
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Catchments
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Intersections
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View Frame Groups
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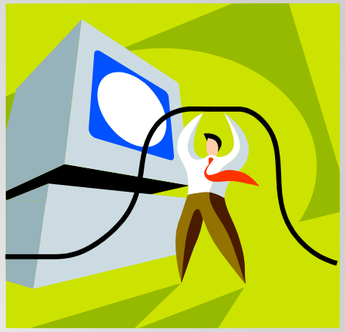
Surfaces
Alignments
Pipe Networks
Pressure Networks
View Frame Groups
Prospector
Settings
Survey
Toolbox
Lots of Data – no so big file
-view Enter an option [?/Delete/Orthographic/Restore/Save/sEttings/Window]: r Enter view name to restore: 1 Regenerating model.
Command: nil
Type a command
Model
Layout1
Upgrading COGO points.

What did we see



- Technology – GIS creates rich content
- Tools – XREF data management
- Talented People – know how to use NCOPY and EXPORTKML
- Technology – Geospatial awareness gives real world context

Why does this map look unusual?

- It is showing the State Planes Coordinate Zones

How Big is Big? - *What do you consider big*

- Surfaces - over 2 million surface points

  Because mms files start to hold overflow data

MEMORY MAP SURFACE

- Pipe Networks – over 500 pieces

  Need to break down large networks and use data shortcuts – also use Catalog Manager

- Alignments – over 30 miles 50km

  But why alignments??

Alignments

- Long lengths can be distorted by grid to ground and curvature of the earth
- Corridors that are built using complicated assemblies will choke down on long runs
- Sample lines must be in the same drawing as the cross-sections

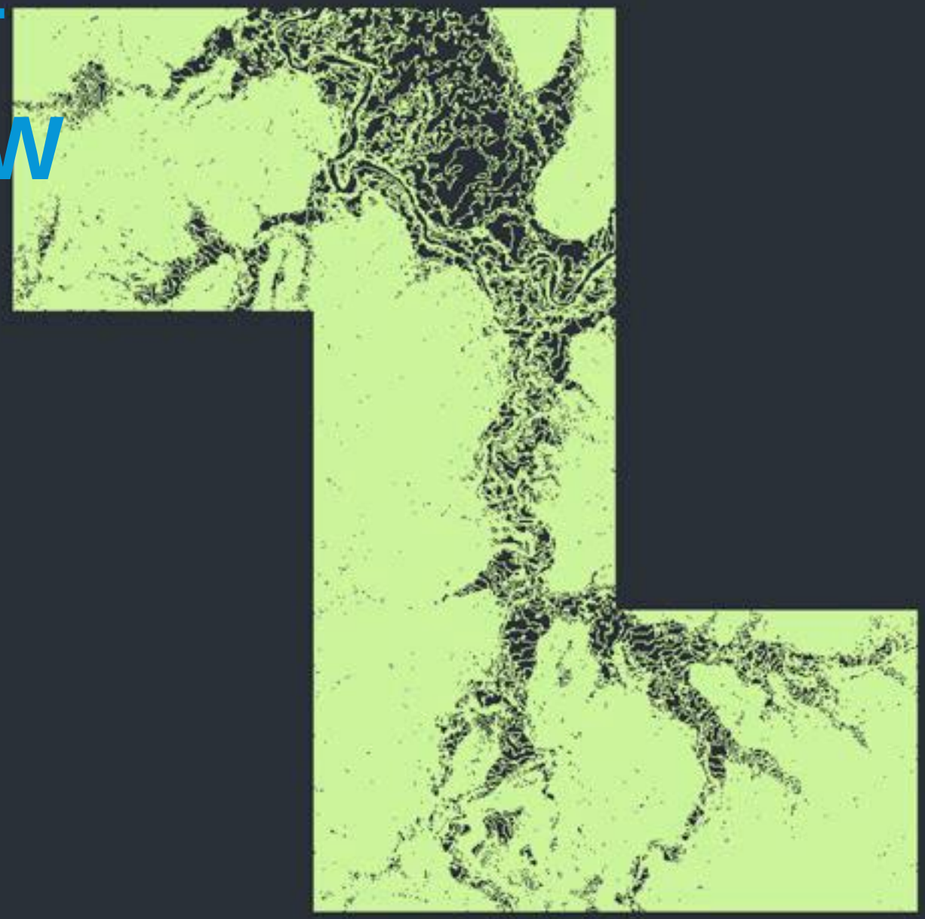
And - *what do you consider big?*

- Points
- Corridors
- Cross-sections
- Layouts
- Grading Objects

Lets Look at Surfaces – generated from contours

- Original Data from CAD line or pline entities that have elevation
- Contours generated from points

PROJECT OVERVIEW



Autodesk AutoCAD Civil 3D 2015 01 Original Contours Dwg.dwg

Civil 3D

Home Insert Annotate Modify Analyze View Manage Output Survey Autodesk 360 Help Add-ins Raster Tools BIM 360 Featured Apps Vehicle Tracking Plex.Earth 3 Express Tools Geotechnics

Toolspace | Import Survey Data | Points | Surfaces | Parcel | Feature Line | Grading | Alignment | Profile | Corridor | Intersections | Assembly | Pipe Network | Profile View | Sample Lines | Section Views | Move | Copy | Stretch | Rotate | Mirror | Scale | Trim | Fillet | Array | Layer Properties | A_Original Contour | Make Current | Match Layer | Paste

Palettes | Create Ground Data | Create Design | Profile & Section Views | Draw | Modify | Layers | Clipboard

TOOLSPACE

Active Drawing View

- 01 Original Contours Dwg
  - Points
  - Point Groups
  - Point Clouds
  - Surfaces
  - Alignments
  - Sites
  - Catchments
  - Pipe Networks
  - Pressure Networks
  - Corridors
  - Assemblies
  - Intersections
  - Survey
  - View Frame Groups
- Data Shortcuts [C:\Civil 3D Pro...
  - Surfaces
  - Alignments
  - Pipe Networks
  - Pressure Networks
  - View Frame Groups

Prospector | Settings | Survey | Toolbox

Command: *Cancel*
Command: *Cancel*
Type a command

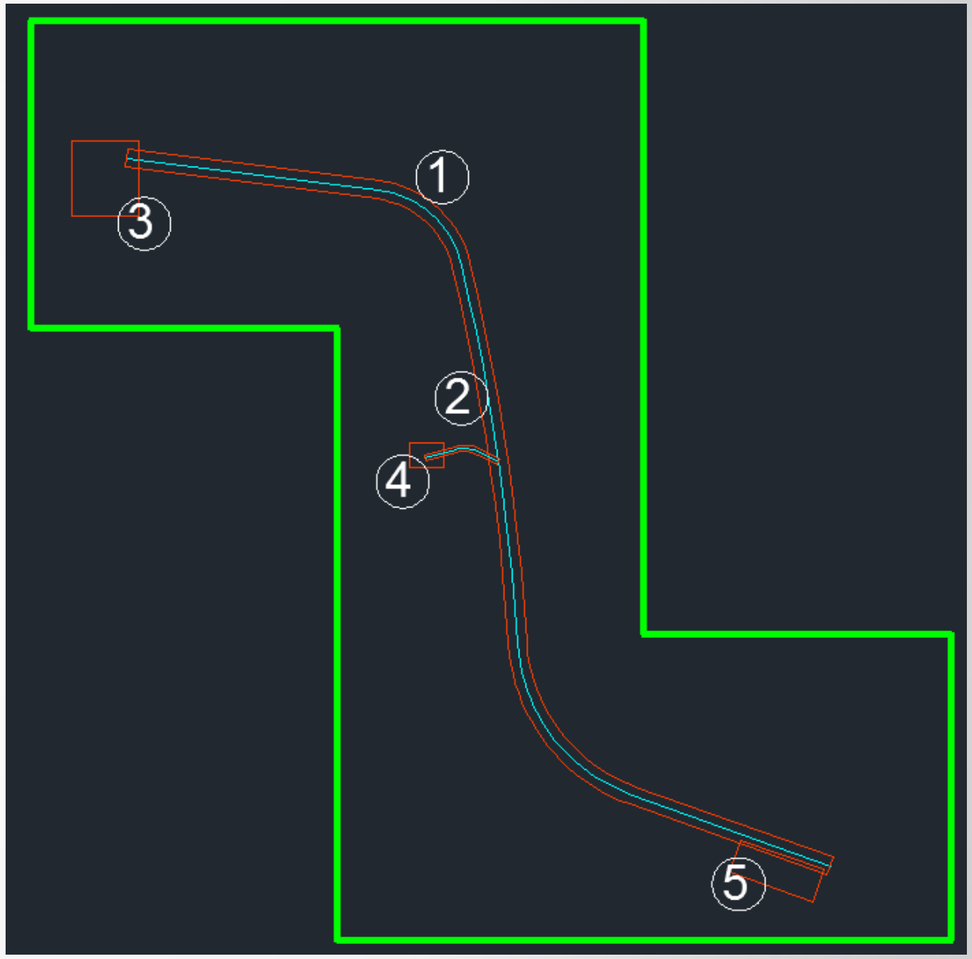
Model | Layout1 | Layout2

LK C3D 2015 286393.4134, 693936.9879, 0.0000 MODEL 1:1_1 / 100%

Slide 7 of 35 "AU 2014 Presentation Template Additional Slides" English (U.S.) 64%

Define High and Low Detail Areas

- Define areas of high detail and low detail
- Additional Work Orders may be needed for difficult terrain or where more finesse is needed

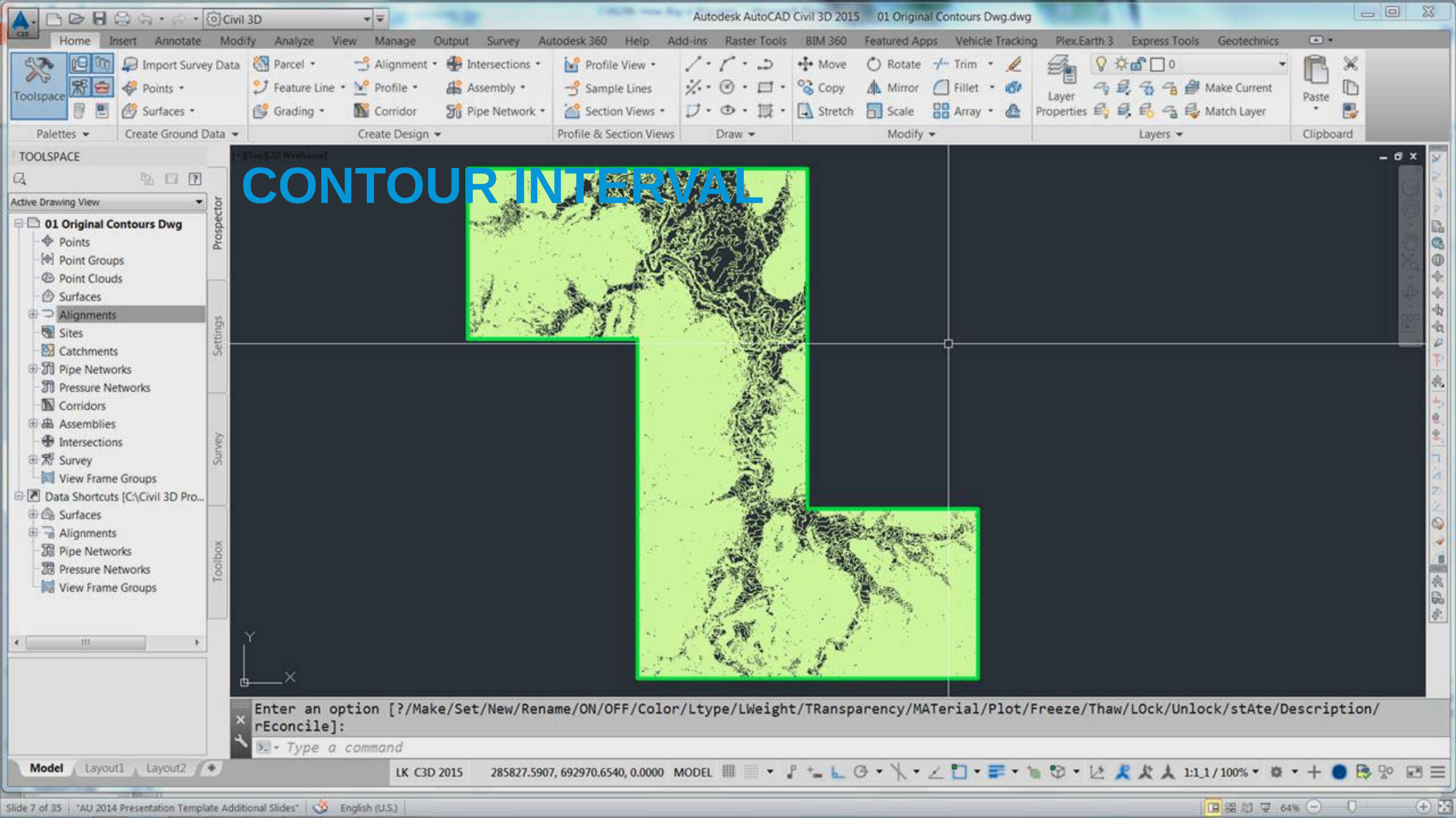


Workflow to Use Contours to Simplify Surface

- Original data is contours and break lines
- Contours must have elevation values

- Remember you cannot create data that is not there

- Don’t be misled - if original data is 2m intervals – why create 1m surface!


Civil 3D
Autodesk AutoCAD Civil 3D 2015 01 Original Contours Dwg.dwg
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Alignments
Pipe Networks
Pressure Networks
View Frame Groups
Prospector
Settings
Survey
Toolbox
CONTOUR INTERVAL
Enter an option [?/Make/Set/New/Rename/ON/OFF/Color/Ltype/LWeight/TRansparency/MATerial/Plot/Freeze/Thaw/LOck/Unlock/stAte/Description/
rEconcile]:
Type a command
Model Layout1 Layout2
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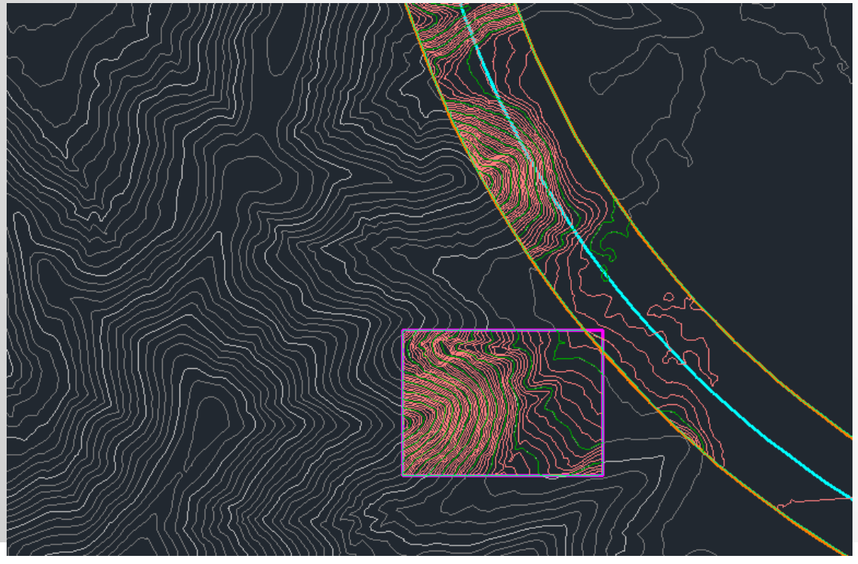
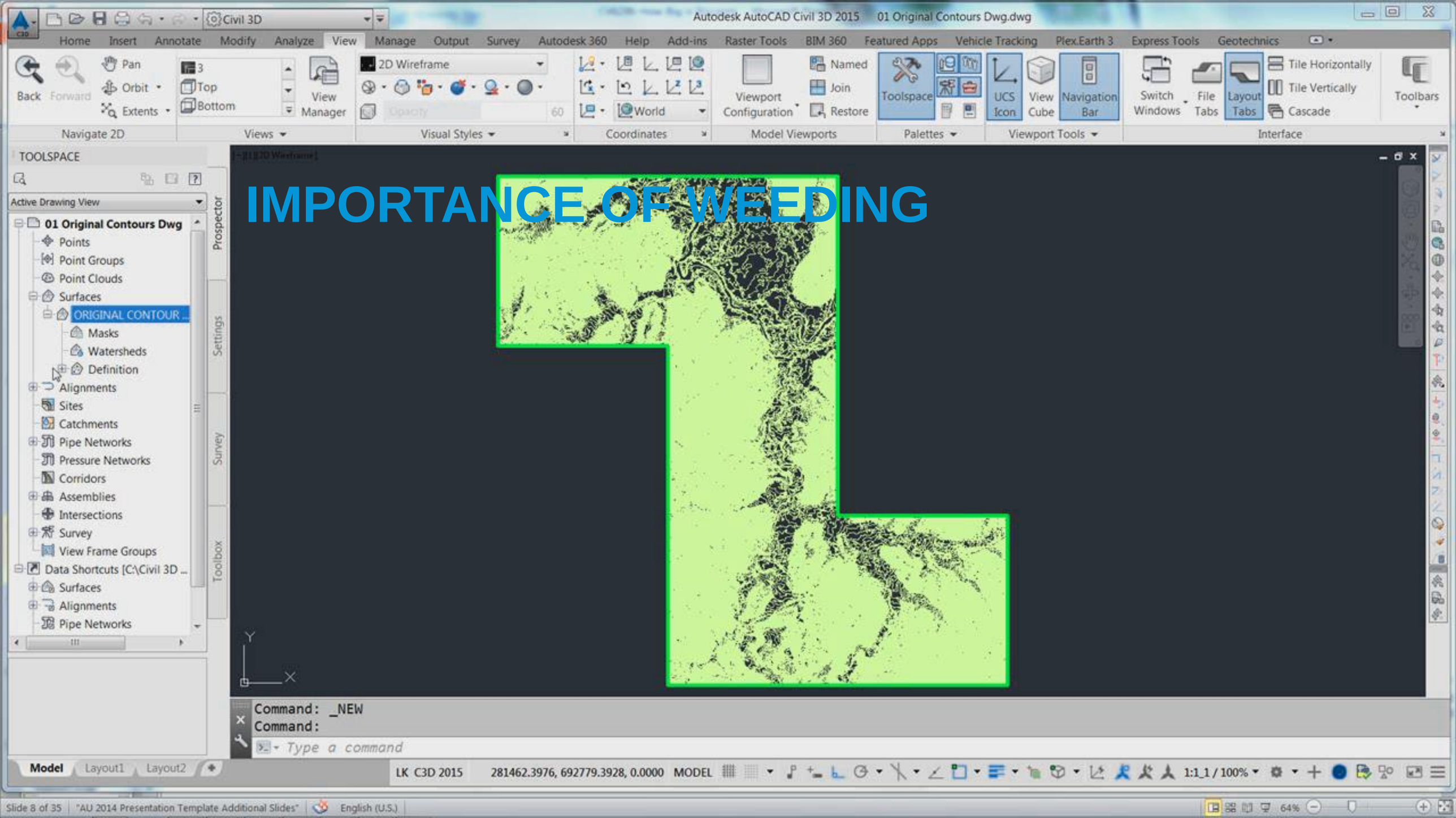
Slide 7 of 35 "AU 2014 Presentation Template Additional Slides" English (U.S.) 64%

Investigate the Original Data

- Contour Intervals = 0.5 m
- Data points ~ 0.5m
- Determine limits of coarse and detail surfaces




Civil 3D
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Back Forward Pan Orbit Extents Top Bottom View Manager
2D Wireframe World
Viewport Configuration Named Join Restore
Toolspace UCS Icon View Cube Navigation Bar
Switch Windows File Tabs Layout Tabs Tile Horizontally Tile Vertically Cascade Toolbars
Navigate 2D Views Visual Styles Coordinates Model Viewports Palettes Viewport Tools Interface
TOOLSPACE
Active Drawing View
01 Original Contours Dwg
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Point Clouds
Surfaces
ORIGINAL CONTOUR ...
Masks
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Catchments
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Pressure Networks
Corridors
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Intersections
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Pipe Networks
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IMPORTANCE OF WEEDING
Command: _NEW
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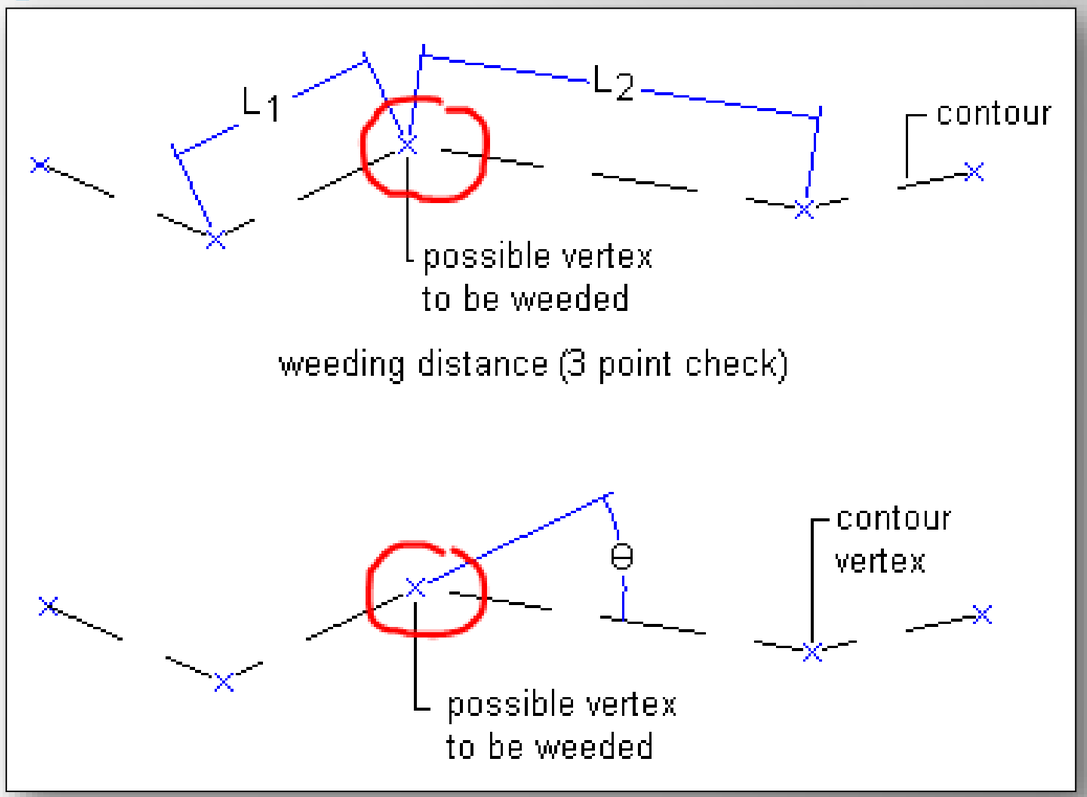
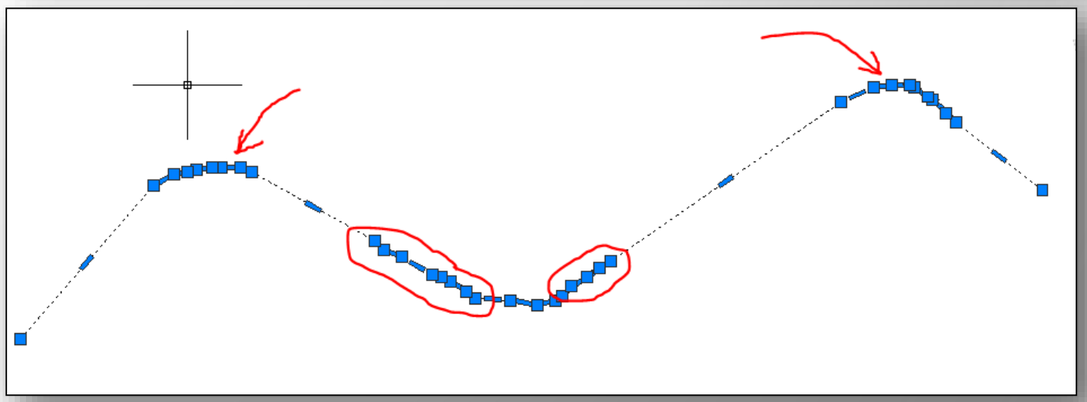
Slide 8 of 35 "AU 2014 Presentation Template Additional Slides" English (U.S.) 64%

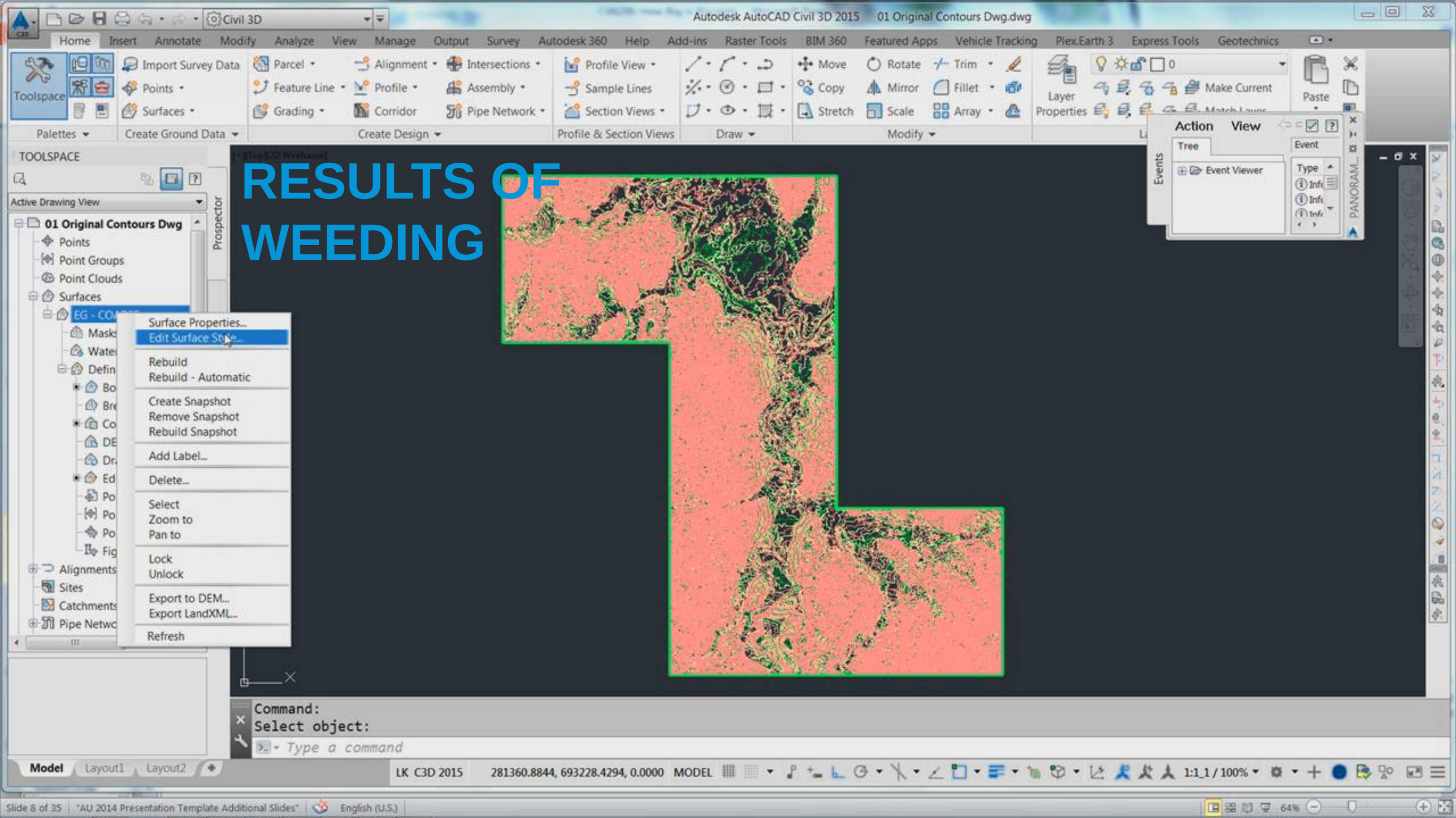
Contour Weeding – What is it?

- Weeding – eliminates points based on distance and angle criteria



Smoothing – adds points




RESULTS OF WEEDING
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Create Snapshot
Remove Snapshot
Rebuild Snapshot
Add Label...
Delete...
Select
Zoom to
Pan to
Lock
Unlock
Export to DEM...
Export LandXML...
Refresh
Action
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Event
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Type
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Type a command
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Slide 8 of 35
"AU 2014 Presentation Template Additional Slides"
English (U.S.)
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IDEA - Try same procedure with 2m Interval

- Repeat process
- Change the surface display to a coarse value – 2m intervals
- Extract the 2m contours

- Build a coarse surface using the 2m contours

  - Compare surface sizes
  - Surface size reduced to ~ 30% of original

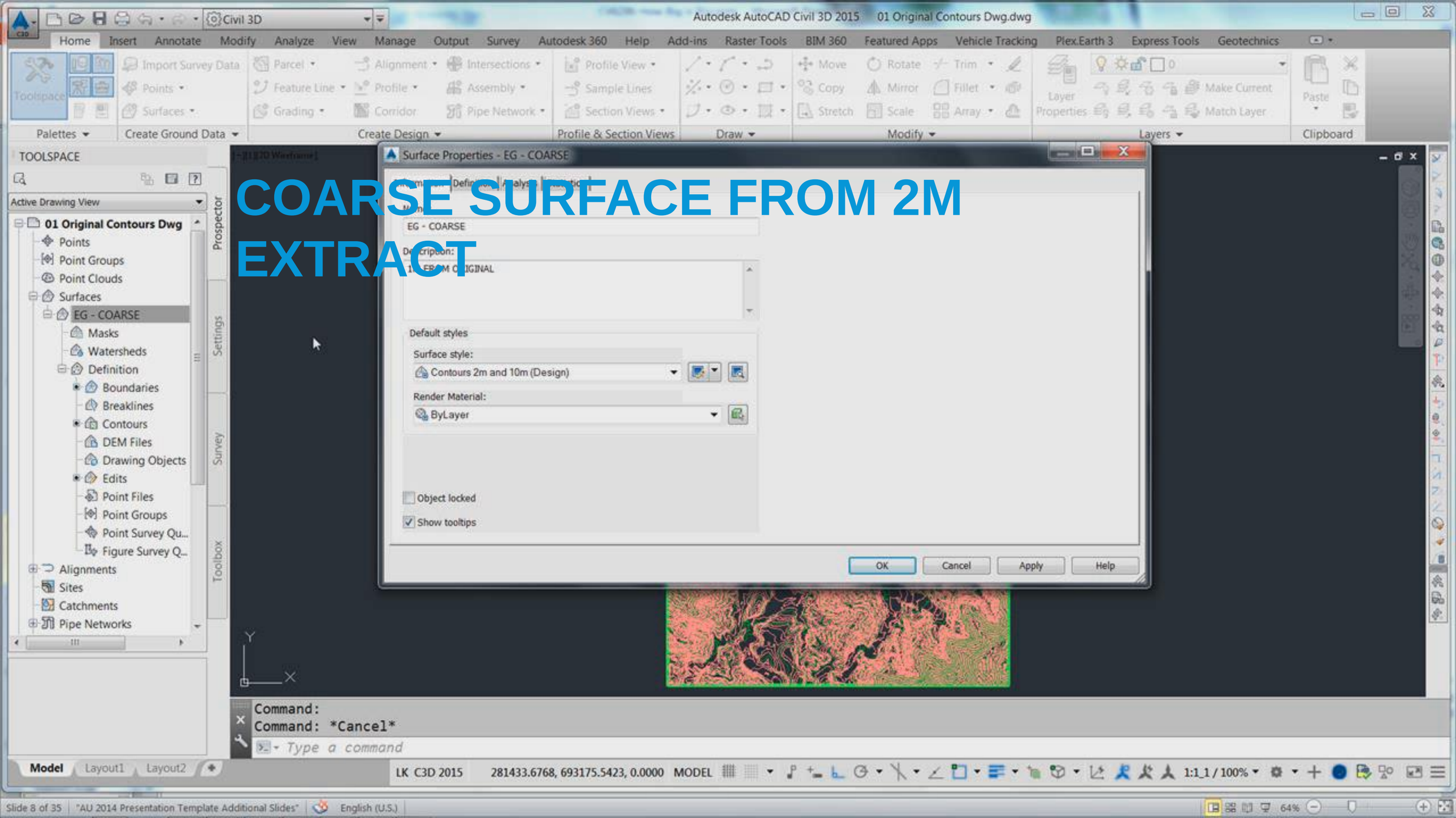
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Figure Survey Q...
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Sites
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Prospector
Settings
Survey
Toolbox
Surface Properties - EG - COARSE
EG - COARSE
Description:
Default styles
Surface style:
Contours 2m and 10m (Design)
Render Material:
ByLayer
Object locked
Show tooltips
OK
Cancel
Apply
Help
COARSE SURFACE FROM 2M EXTRACT
Command:
Command: *Cancel*
Type a command
Model
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Slide 8 of 35
"AU 2014 Presentation Template Additional Slides"
English (U.S.)
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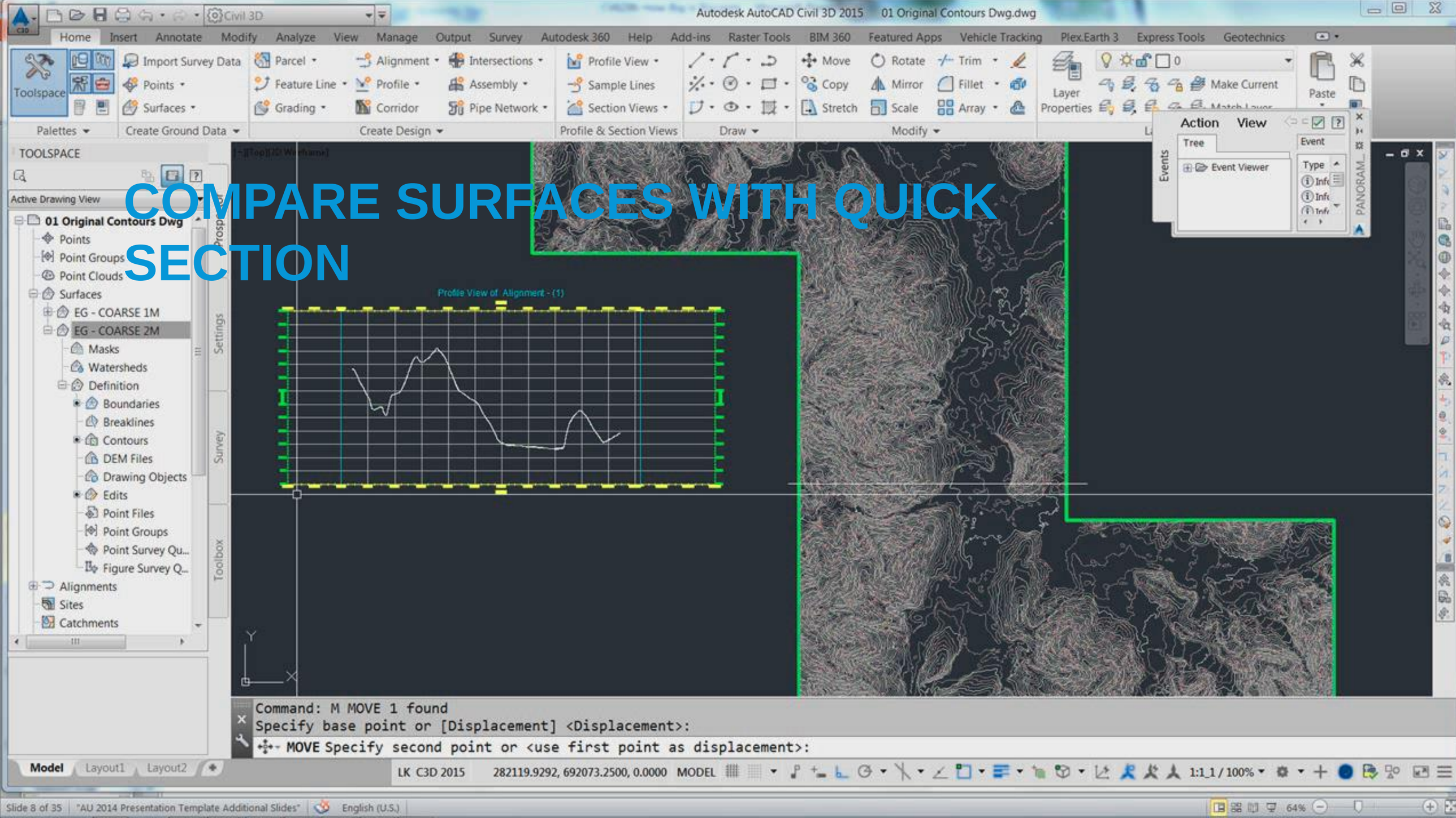
RESULTS OF 2M COARSE EG SURFACE

- Surface now 1/5 the size of original
  - From more than 1 million to 200,000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Plex.Earth 3
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COMPARE SURFACES WITH QUICK SECTION
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Event
Event Viewer
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Events
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Specify base point or [Displacement] <Displacement>:
MOVE Specify second point or <use first point as displacement>:
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Slide 8 of 35
"AU 2014 Presentation Template Additional Slides"
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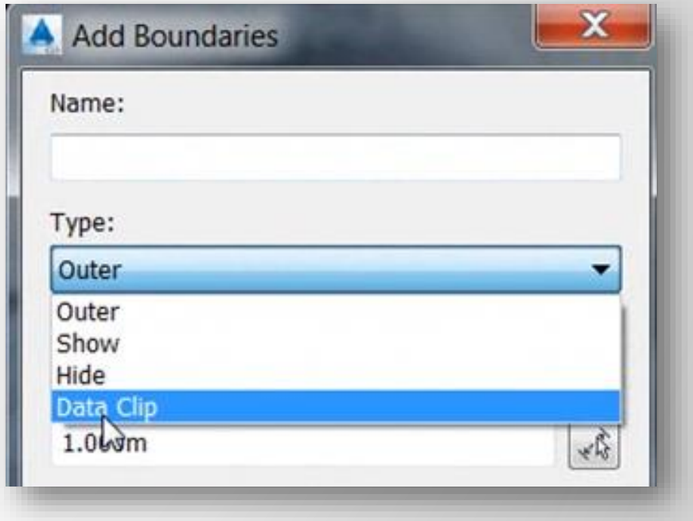
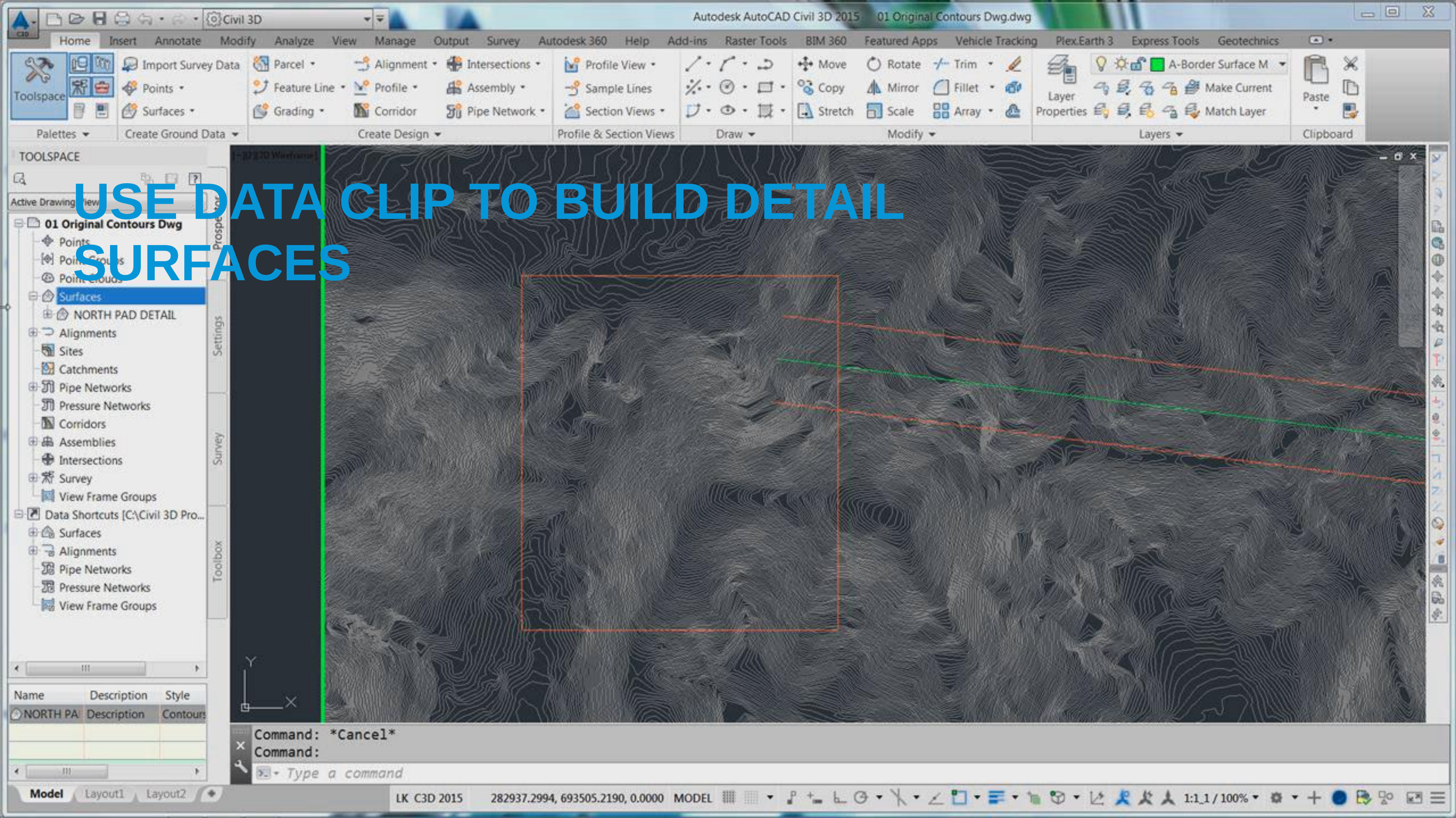
NOW BUILD THE DETAIL SURFACES

- Use the original contour entities

- Apply weeding as it does not loose fidelity

- Use Data Clip boundary

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Style
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Description
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Command: *Cancel*
Command:
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Layout1
Layout2
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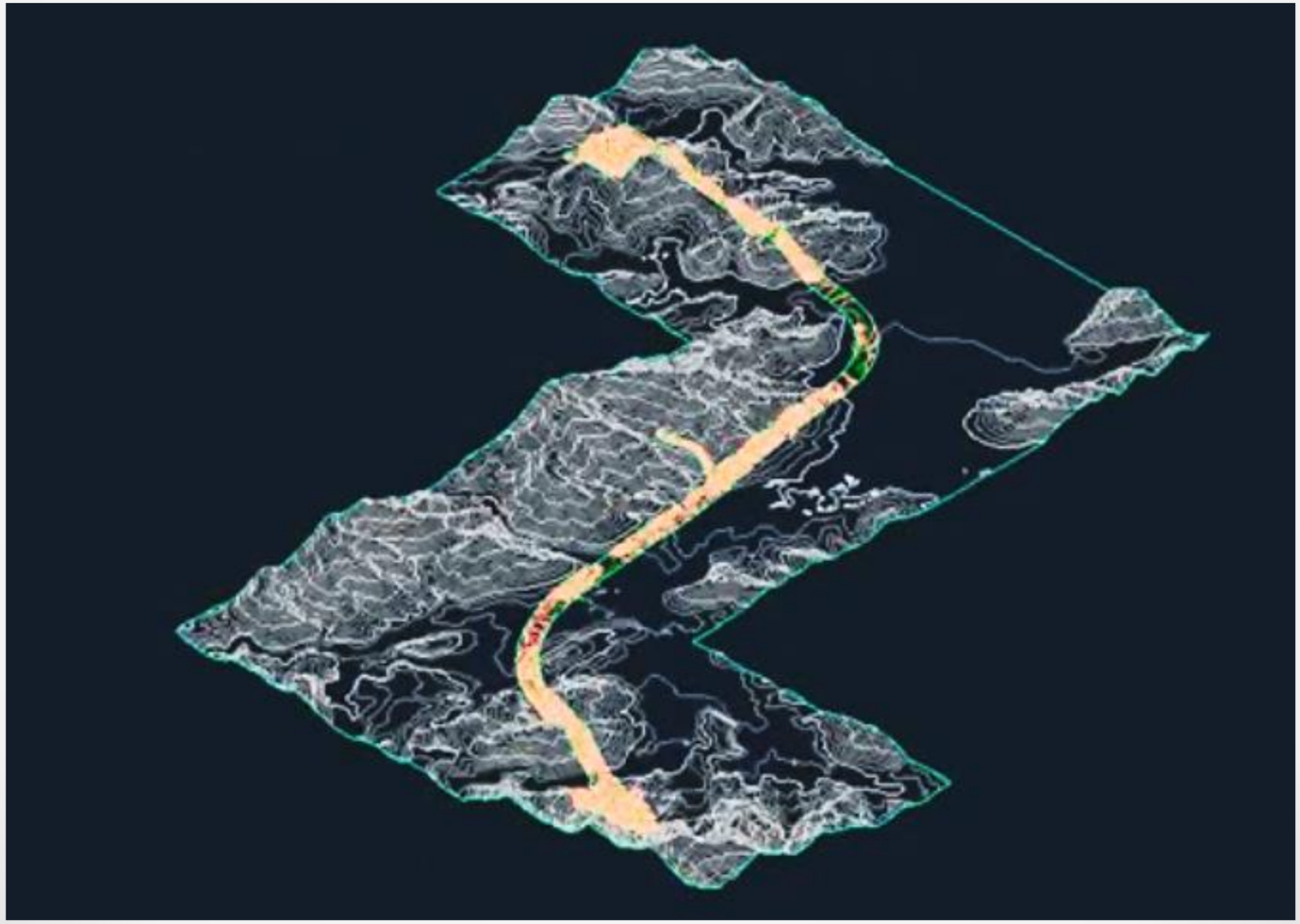
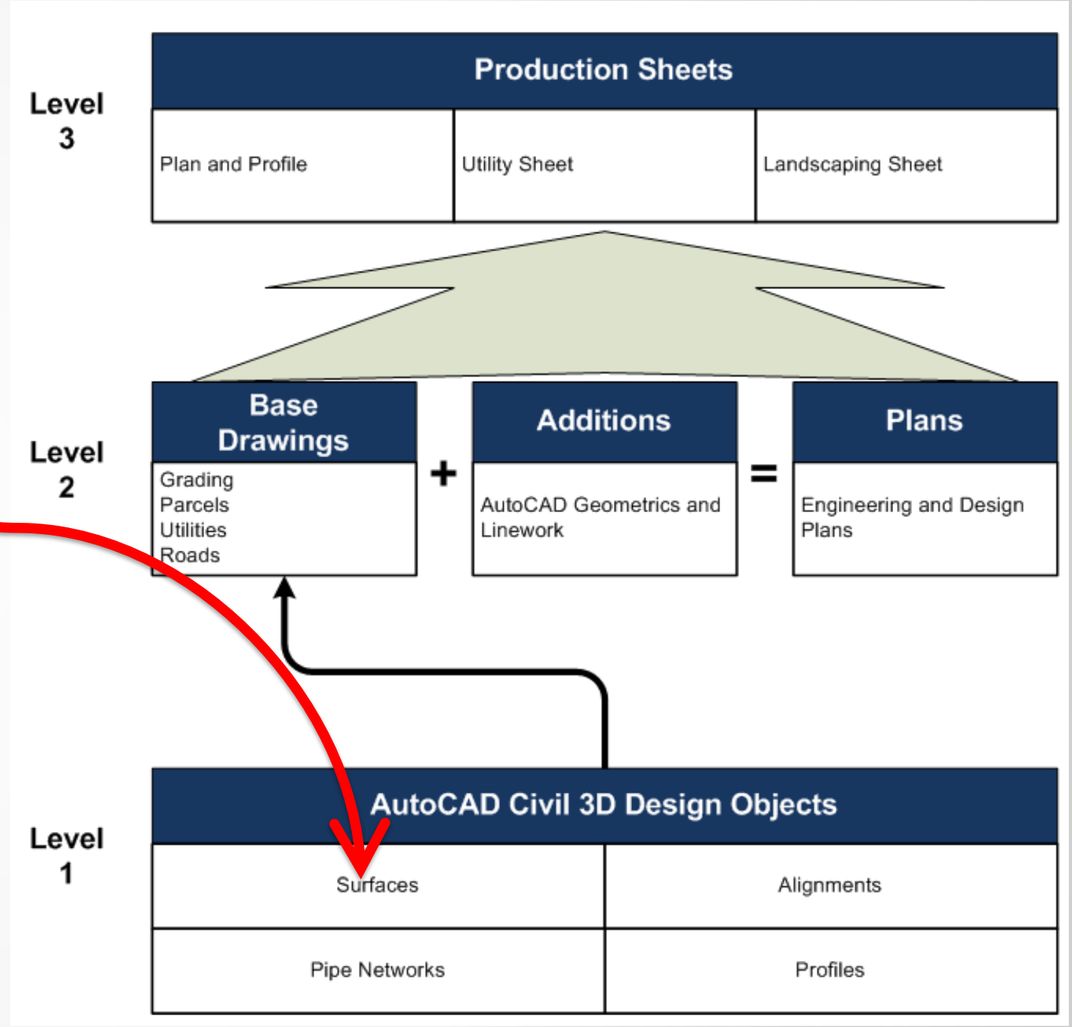
How the Project Looks – *Coarse Surrounds with Detail Areas*



BUILD THE SURFACE MASTER DWGs

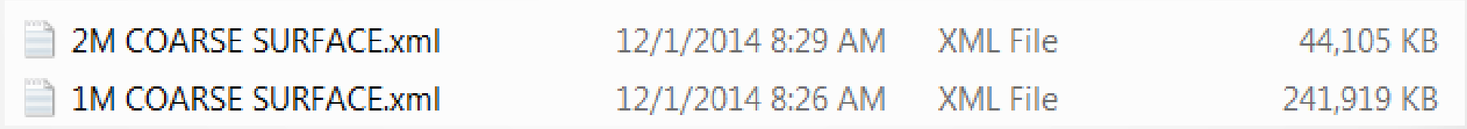
- Drawings that will be first principal data – Level 1
- Have an “owner”
- Managed via Data Shortcuts or Vault
- XML is the one data source referencing back to original entities

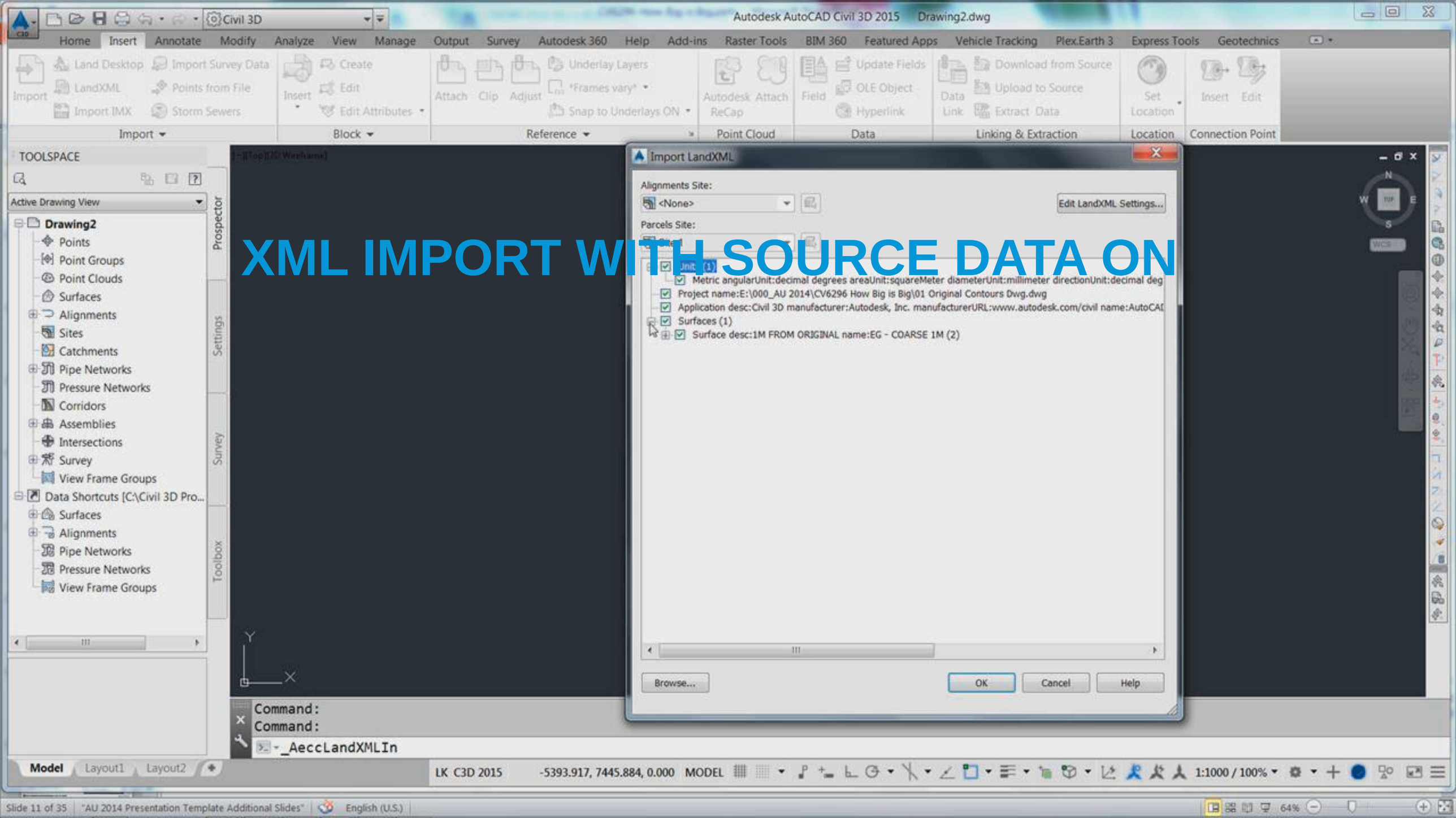


Remove the Underlying Contour Data

- The XML surface export also includes the original “CAD” polyline definitions that the surface was built from

- The surface import does not need these – make sure to toggle them off!

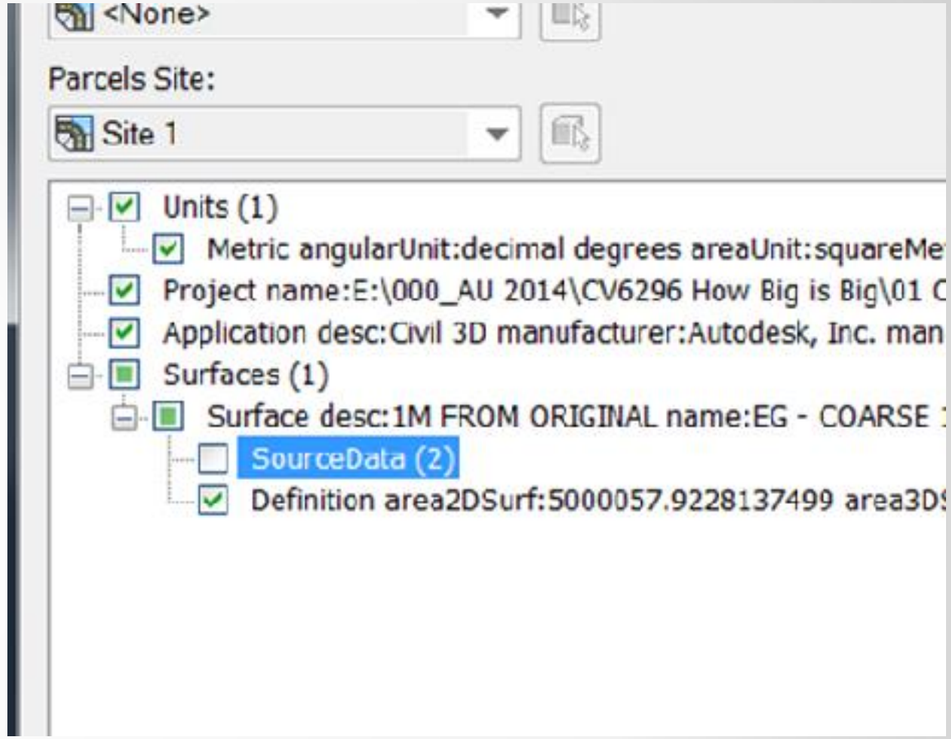




XML IMPORT WITH SOURCE DATA ON

1.6 MILLION ADDED ENTITIES

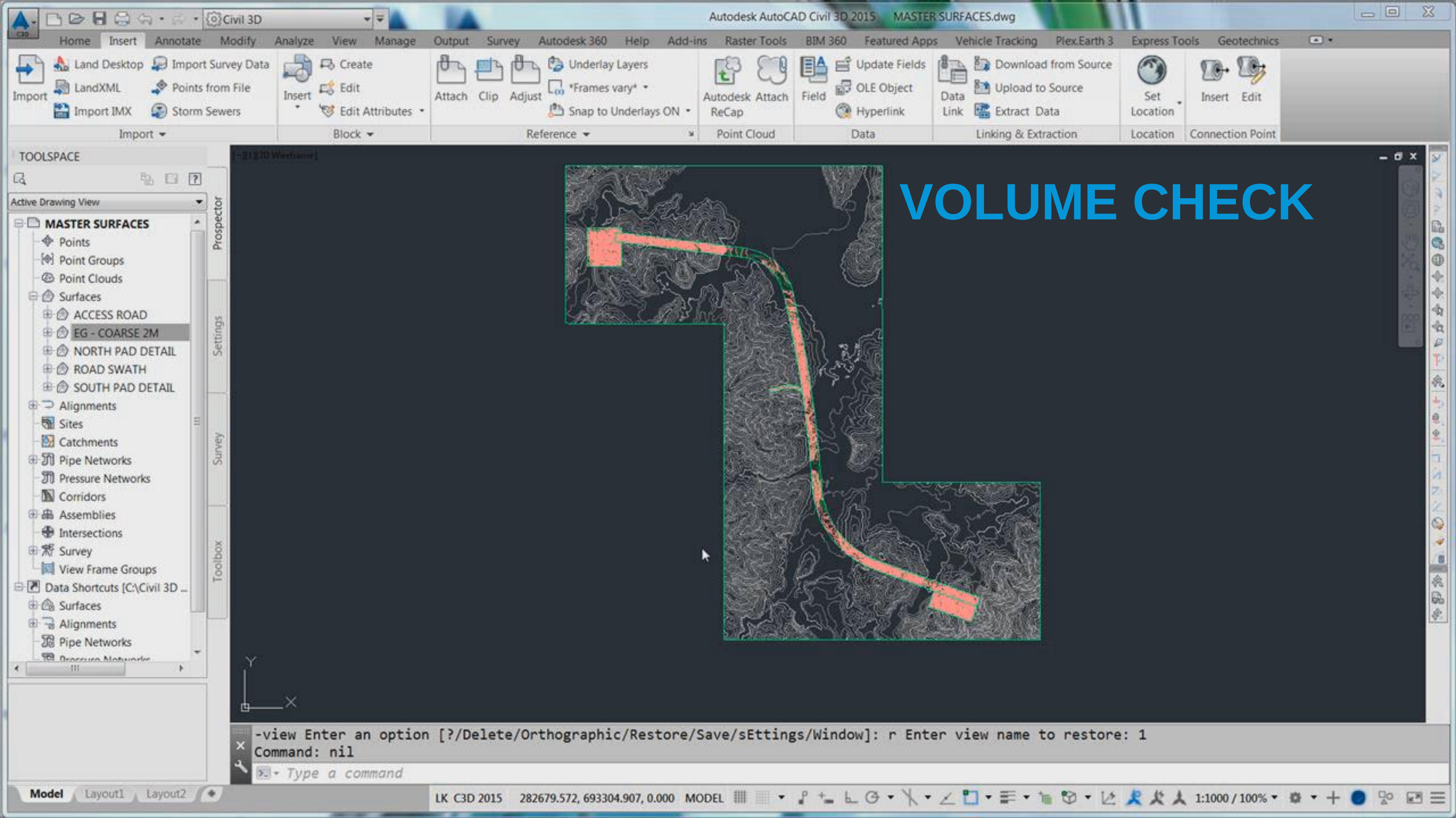
- Remember this toggle!



DO YOU TRUST THE RESULTS

- Success at reducing the size of surface objects

- But what is sacrificed???


Civil 3D
Autodesk AutoCAD Civil 3D 2015 MASTER SURFACES.dwg
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Land Desktop
LandXML
Import IMX
Import Survey Data
Points from File
Storm Sewers
Insert
Create
Edit
Edit Attributes
Attach
Clip
Adjust
Underlay Layers
Frames vary
Snap to Underlays ON
Autodesk ReCap
Attach
Field
Update Fields
OLE Object
Hyperlink
Data Link
Download from Source
Upload to Source
Extract Data
Set Location
Insert
Edit
Import
Block
Reference
Point Cloud
Data
Linking & Extraction
Location
Connection Point
TOOLSPACE
Active Drawing View
MASTER SURFACES
Points
Point Groups
Point Clouds
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ACCESS ROAD
EG - COARSE 2M
NORTH PAD DETAIL
ROAD SWATH
SOUTH PAD DETAIL
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Catchments
Pipe Networks
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Survey
View Frame Groups
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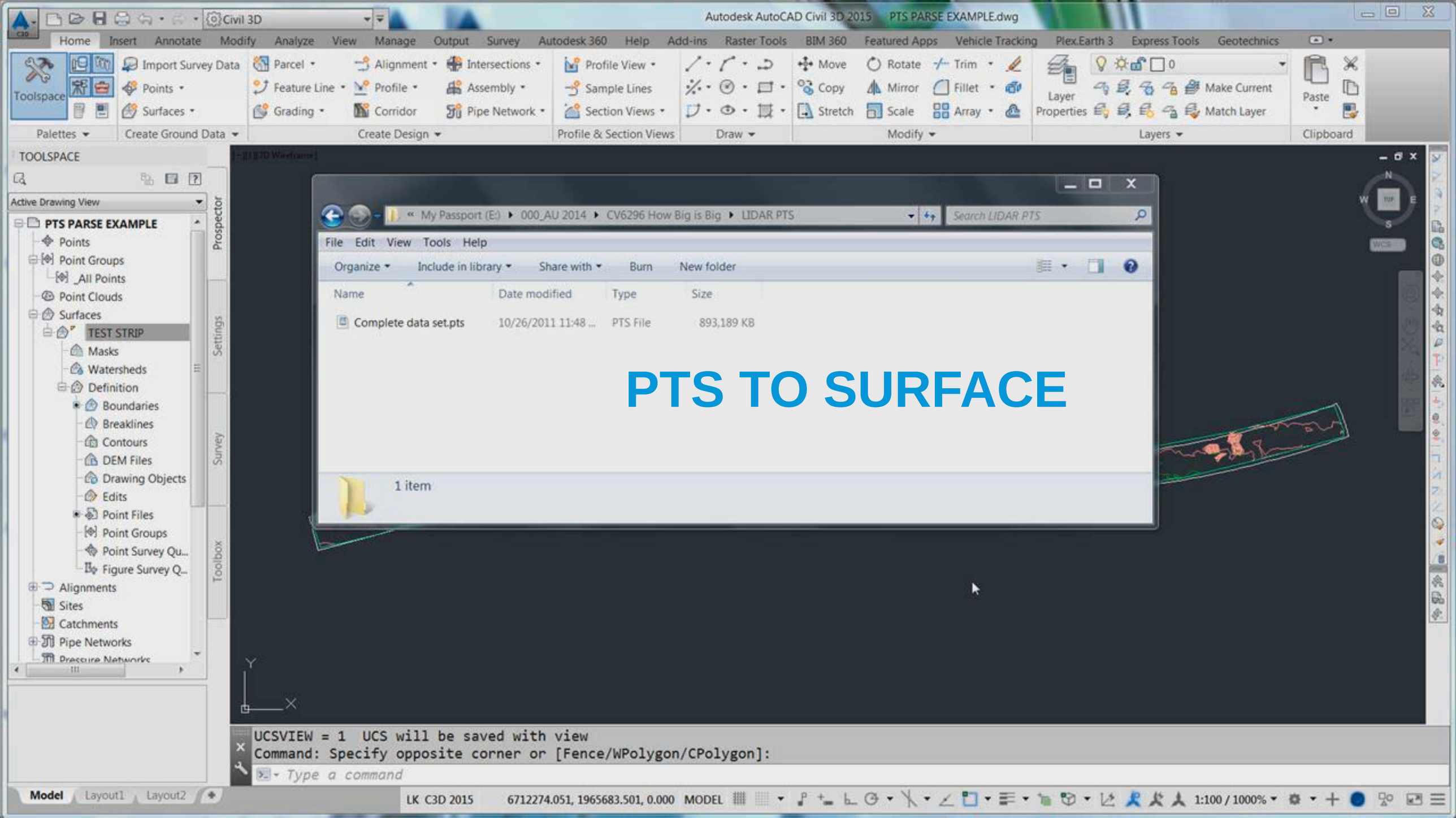
VOLUME CHECK
-view Enter an option [?/Delete/Orthographic/Restore/Save/sEttings/Window]: r Enter view name to restore: 1
Command: nil
Type a command
Model
Layout1
Layout2
LK C3D 2015
282679.572, 693304.907, 0.000
MODEL
1:1000 / 100%

THAT'S CONTOUR SURFACES … *WHAT ABOUT POINT DATA?*

- TECHNOLOGY – scanning devices are becoming commonplace!

PARSE AND DATA CLIP LIDAR POINTS

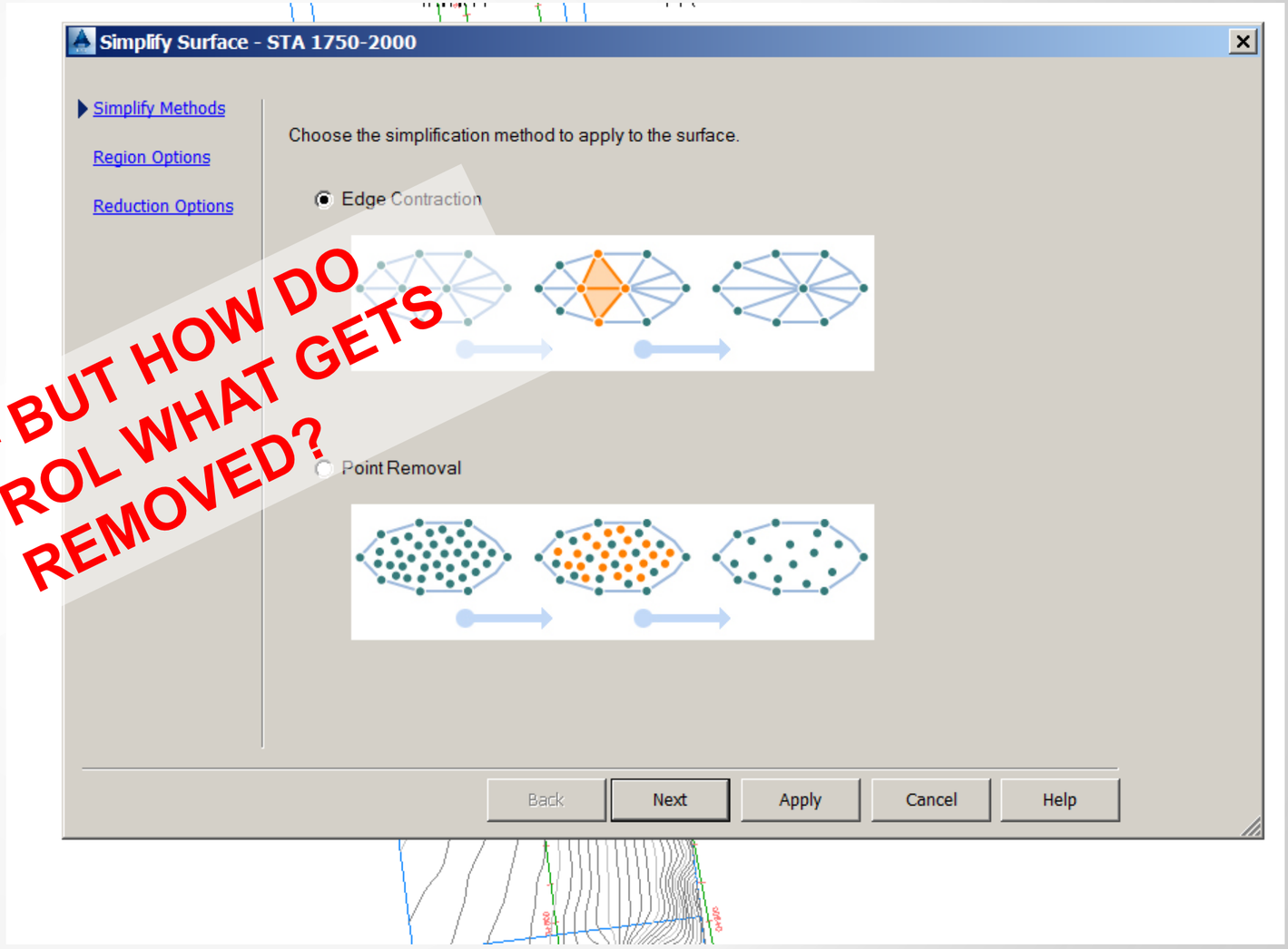
- Custom Point File Import
- Data Clip Boundary
- Generate Contours
- Create Useable surface from CONTOURS


Civil 3D
Autodesk AutoCAD Civil 3D 2015 PTS PARSE EXAMPLE.dwg
Home Insert Annotate Modify Analyze View Manage Output Survey Autodesk 360 Help Add-ins Raster Tools BIM 360 Featured Apps Vehicle Tracking Plex.Earth 3 Express Tools Geotechnics
Toolspace
Import Survey Data
Points
Surfaces
Parcel
Feature Line
Grading
Alignment
Profile
Corridor
Intersections
Assembly
Pipe Network
Profile View
Sample Lines
Section Views
Move
Copy
Stretch
Rotate
Mirror
Scale
Trim
Fillet
Array
Layer Properties
Make Current
Match Layer
Paste
Palettes
Create Ground Data
Create Design
Profile & Section Views
Draw
Modify
Layers
Clipboard
TOOLSPACE
Active Drawing View
PTS PARSE EXAMPLE
Points
Point Groups
_All Points
Point Clouds
Surfaces
TEST STRIP
Masks
Watersheds
Definition
Boundaries
Breaklines
Contours
DEM Files
Drawing Objects
Edits
Point Files
Point Groups
Point Survey Qu...
Figure Survey Q...
Alignments
Sites
Catchments
Pipe Networks
Prospector
Settings
Survey
Toolbox
My Passport (E:) ▸ 000_AU 2014 ▸ CV6296 How Big is Big ▸ LIDAR PTS
Search LIDAR PTS
File Edit View Tools Help
Organize Include in library Share with Burn New folder
Name Date modified Type Size
Complete data set.pts 10/26/2011 11:48 ... PTS File 893,189 KB
1 item
PTS TO SURFACE
UCSVIEW = 1 UCS will be saved with view
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Type a command
Model Layout1 Layout2
LK C3D 2015 6712274.051, 1965683.501, 0.000 MODEL 1:100 / 1000%

But What about the built in Surface Simplify Tools?

Edge Contraction
Contracts triangle edges to single points. Each edge contraction results in the removal of one point.

Point Removal
Selects and removes surface points. More points are removed from the denser areas of the surface.



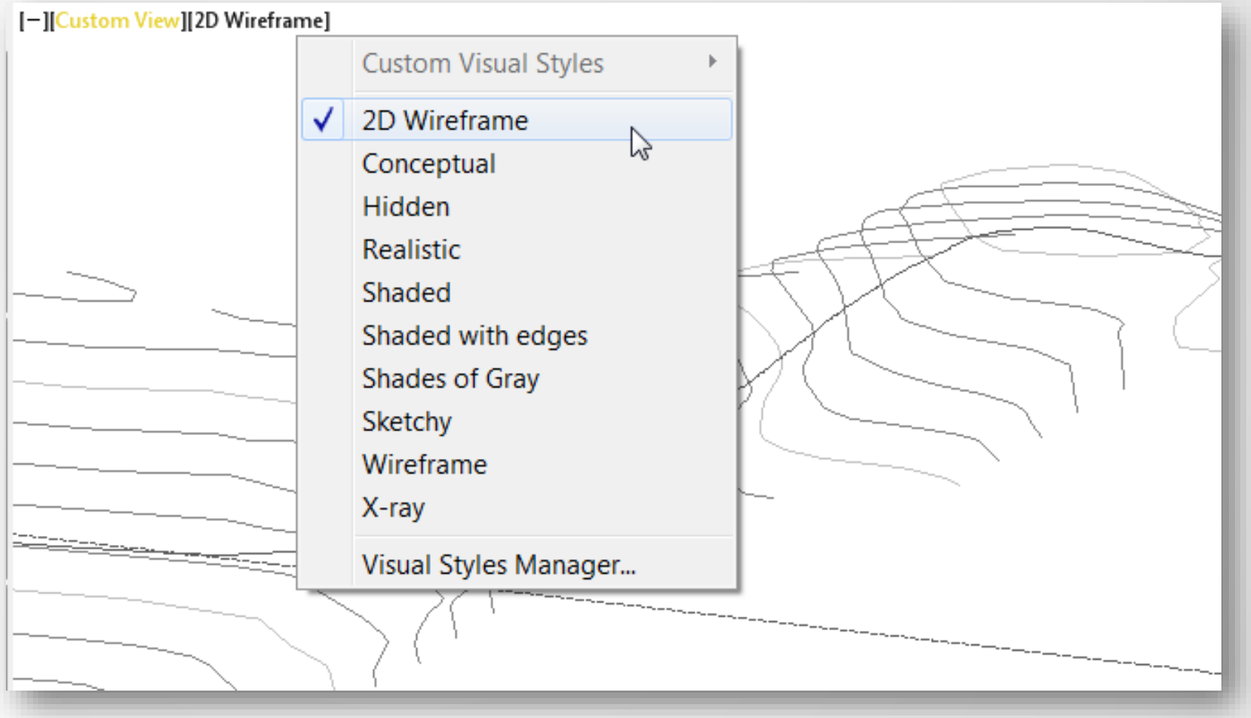
OK – BUT HOW DO CONTROL WHAT GETS REMOVED?

Sometimes it is just the little things…

- PURGE and WBLOCK
- Unregistered Applications – KILLZOMBIES
- Associative Hatches
- Entities in outer space - STATUS
- Service Packs and Hot Fixes – remember the scalelist issue!

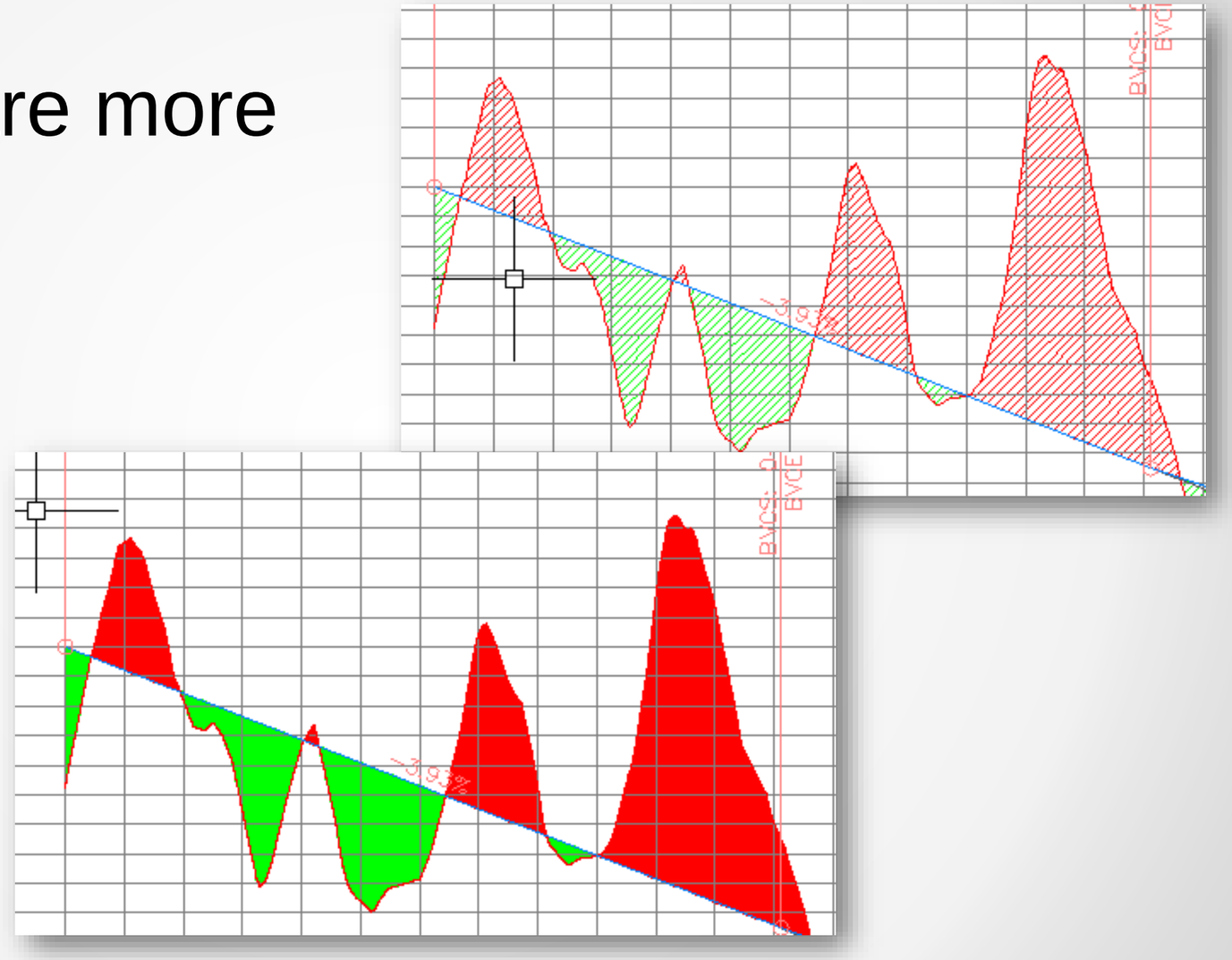
Sometimes it is just the little things…

- Visual Styles



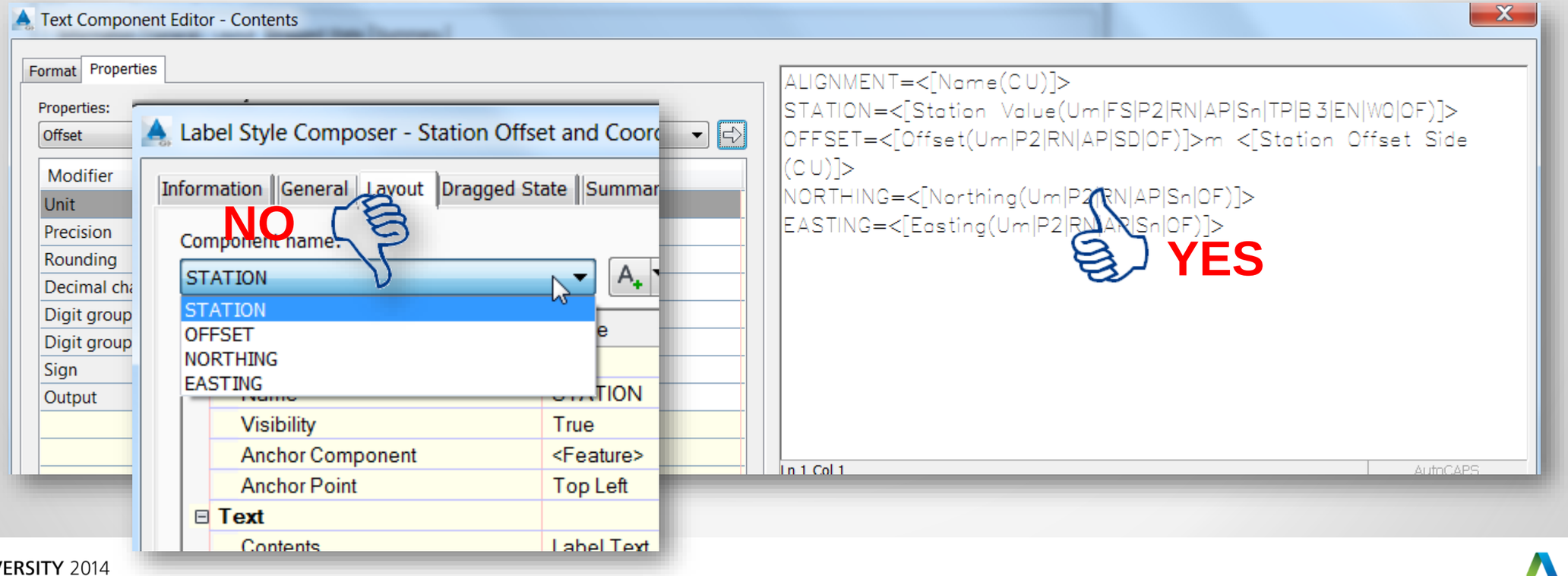
Sometimes it is just the little things…

- Solid Hatches are more efficient



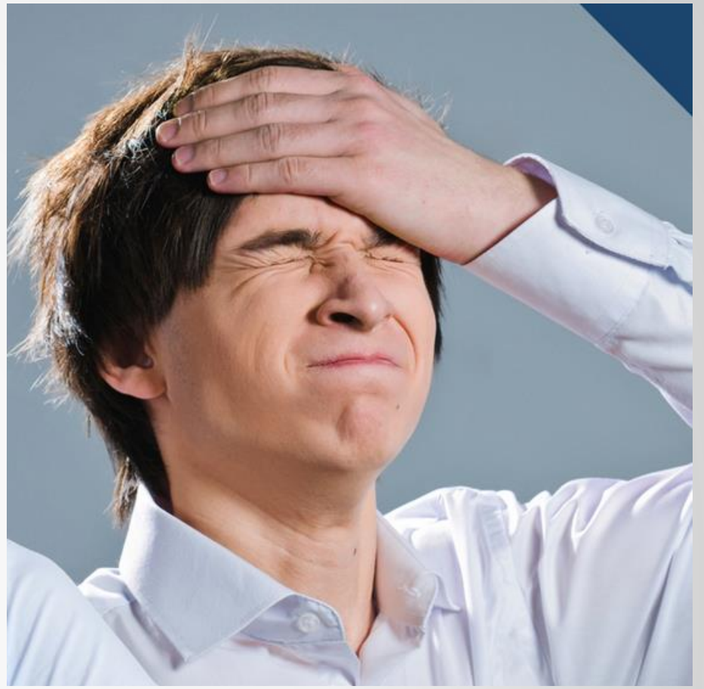
Sometimes it is just the little things…

- Labels Styles - Multiple property values are more efficient than multiple components



Sometimes it is just the little things…

- Forgetting to check your drawing back into Vault



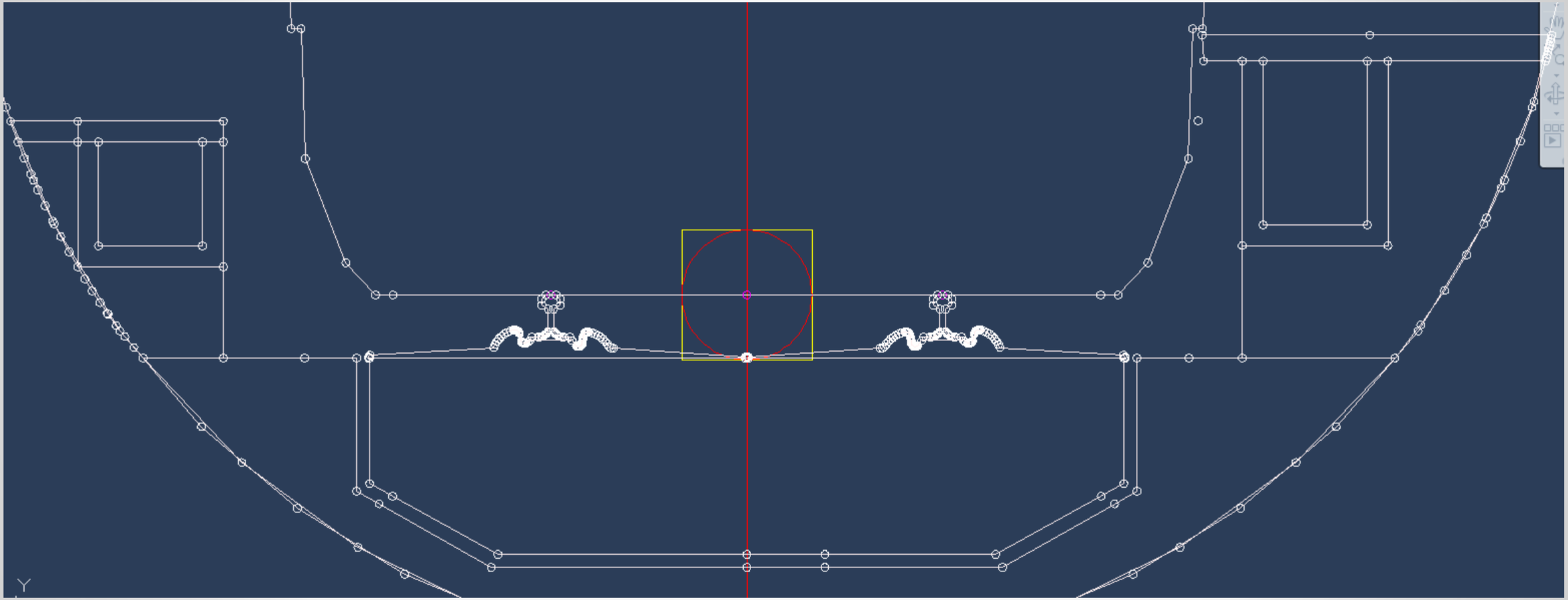
And Sometimes it is just your computer …

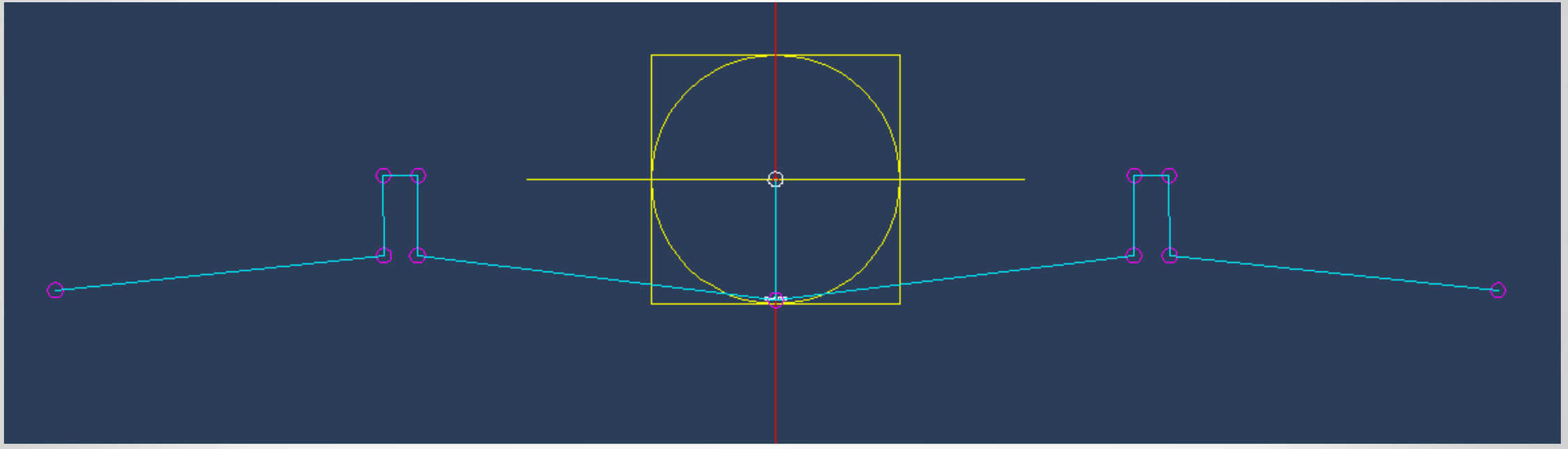
- **System Requirements – 64 bit - Multi-core ???**
  - Minimum vs. 3D modeling vs. Reality requirements
- **RAM**
  - 8GB (high density points or high res imagery 12-24GB)
- **Hard Drive**
  - 7200-10000RPM SATA drive
  - Solid State ???
- **Graphics Adaptor** – Autodesk Certified Hardware Page

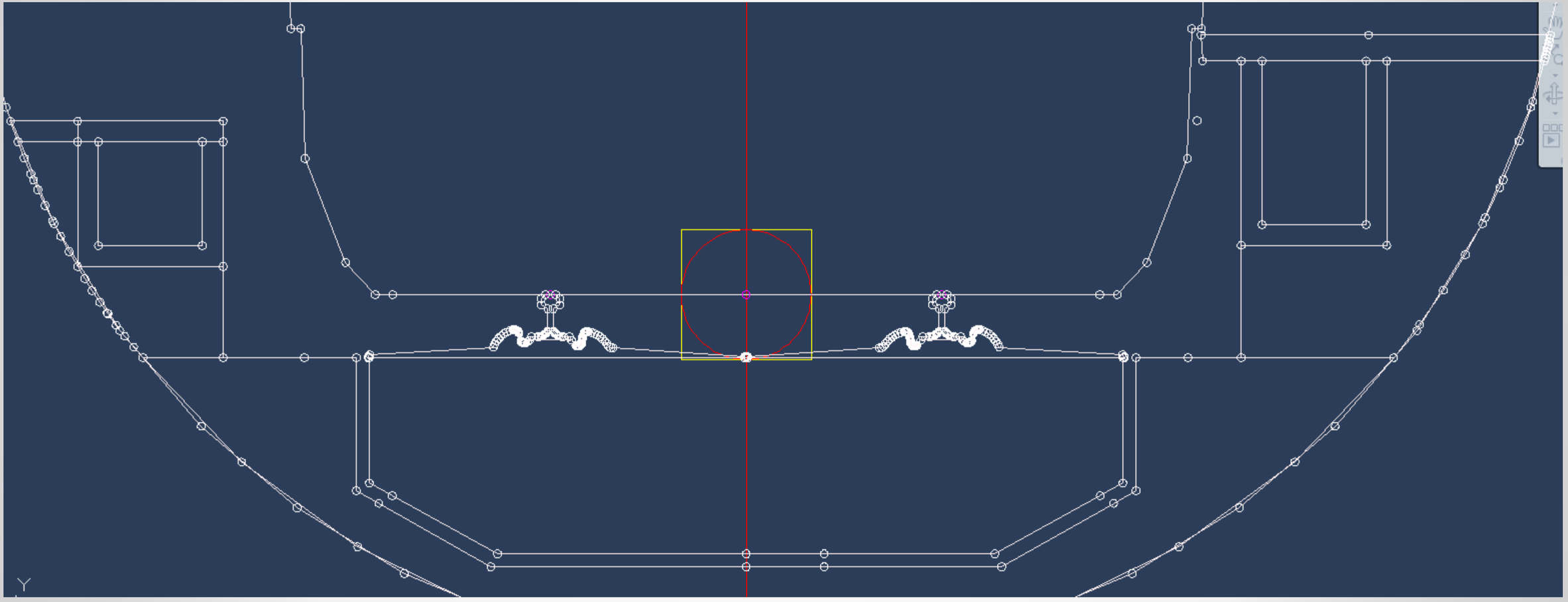
And Sometimes it is the REALLY BIG THINGS…

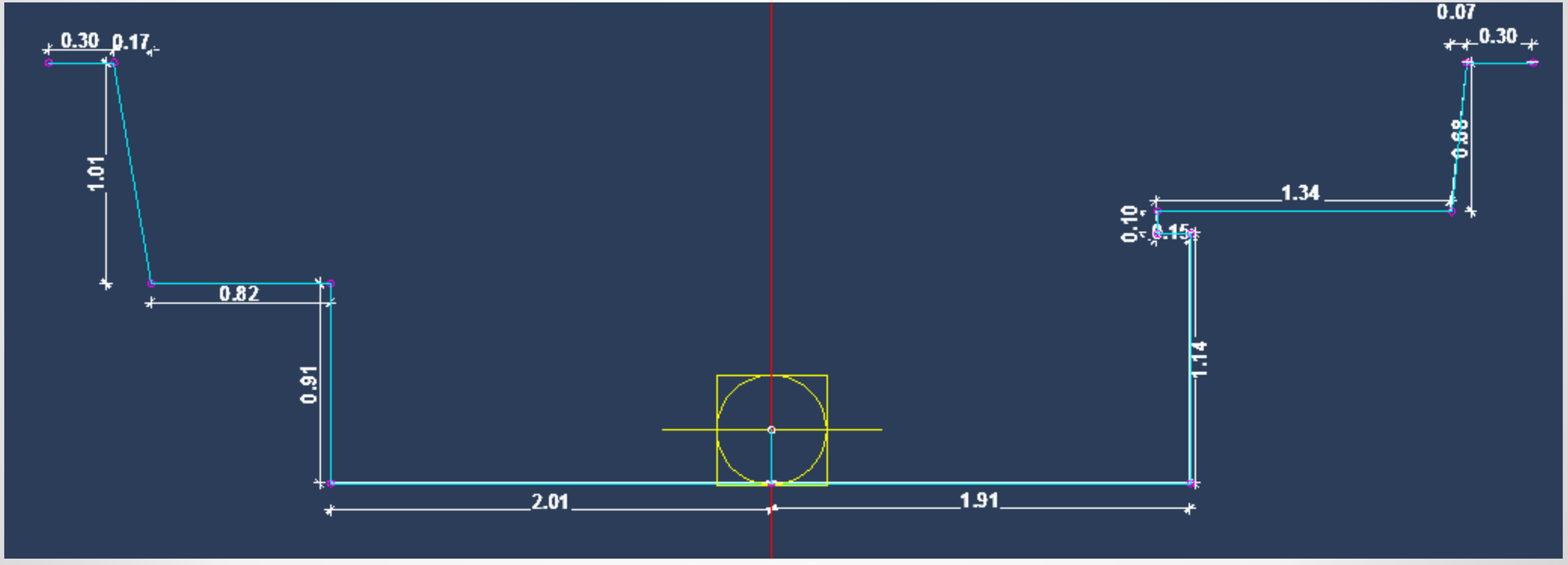
- LOD LOD LOD – understand the intent and deliverable
- Surface Management
- Logical Naming

And Sometimes it is the REALLY BIG THINGS…








0.30
0.17
1.01
0.82
0.91
2.01
1.91
0.07
0.30
0.68
1.34
0.10
0.15
1.14

What did we just see – *TECHNOLOGY TOOLS AND TALENT*

- Technology - Presents more challenges and data overload
- Talent – Understand Level Of Detail and Logical Naming
- Tools - Surface Management – is best done using contour data and XML source references

Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time

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