



AUTODESK UNIVERSITY 2015

CI10424

Civil Engineering and Surveying Processes: Autodesk® tools to help you accomplish more

Dino Lustri, P.E., P.S., ACI
D.L. Engineering & Surveying

Learning Objectives

- Learn how others start their base maps from scratch.
- Learn how others handle AutoCAD Civil 3D layering versus custom layers.
- Learn how others handle grading efforts.
- Learn how others bring together data from various sources to generate improvement plans.

Description

Attendees of this discussion will learn how others perform similar tasks during the day-to-day operations of consulting engineering and surveying companies. There is always another way, and perhaps the way someone else is doing it is better or more efficient than your way. The outline of this discussion will range from using Infrastructure Design Suite software for conceptual planning efforts to organizing your layers and detailed design efforts. Topics will include how we create our base maps from scratch, how we separate our manual linework from AutoCAD Civil 3D software-generated linework, how we handle grading efforts, and how we bring it all together for plan production.

Your AU Expert

Dino Lustri, PE, PS, is a consulting water resources engineer and surveyor (licensed in Ohio and Florida). He is also an Autodesk Certified Instructor. Dino first began using AutoCAD software in 1987 and has experienced each progression relating to civil engineering and surveying, from DCA and Softdesk software to Land Desktop software and AutoCAD Civil 3D software. His professional experience includes hydrologic and hydraulic modeling (HEC-2, HEC-RAS, TR-55, TR-20, and so on), as well as contracts in construction. He has acted in the capacity of city engineer for a number of municipalities, and he has provided expert testimony in legal cases. Dino has provided training for federal, county, municipal, and environmental agencies. He also has guided major utility companies, private firms, and individuals. Dino has authored a variety of training materials and best practices for numerous civil engineering and surveying workflows. Dino is a past president of the Professional Land Surveyors of Ohio, Cleveland Chapter. His latest passion is laser scanning.

Starting a base map from scratch. Base mapping: The beginning of everything.

Bringing in record map data using MAPIMPORT in Civil 3D.

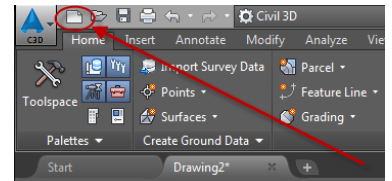
There are a number of file types that aren't native to Autodesk products that we might want to utilize in our drawings. Some of these file types include...

*.TXT, *.CSV, *.ASC, *.NEZ, *.SDF, *.E00, *.SHP, *.GML, *.XML, *.GZ, *.MIF, *.TAB, *.DGN, *.CATD.DDF, *.SQLITE, *.FT

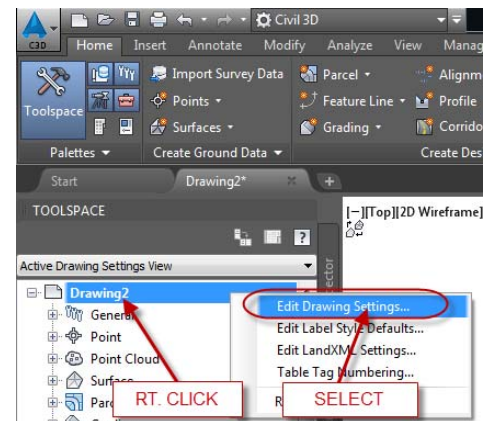
For this example we will bring in a DGN file used by a County to store tax map geometry information. In this example, the data is stored in a different coordinate system than our working drawing. This example will show you how to import the data, while simultaneously doing a coordinate conversion and assigning unique layers to the levels established in the original file.

- 1) Launch a new drawing based on your template or a Civil 3D template.
 - a. Click on the **QNEW** button.

Or start by opening **CI10424-R Dino Lustrì 00.dwg**

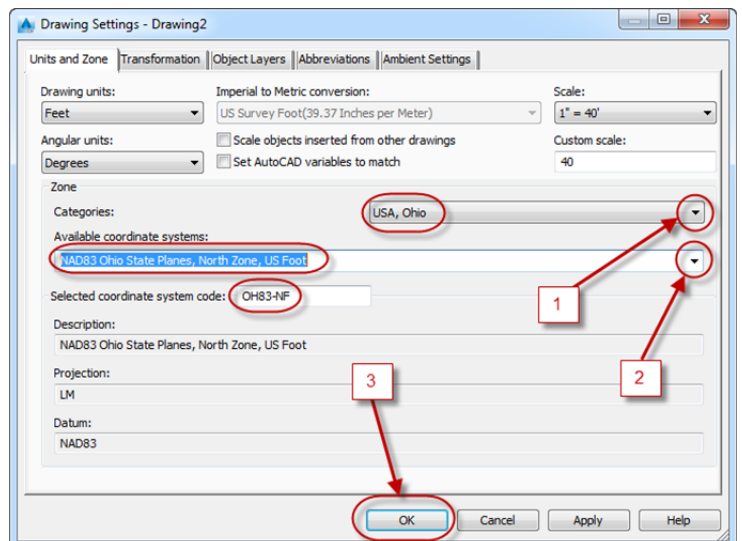


- b. On the *Settings* tab of the toolspace, right click the drawing name and then select **Edit Drawing Settings...**



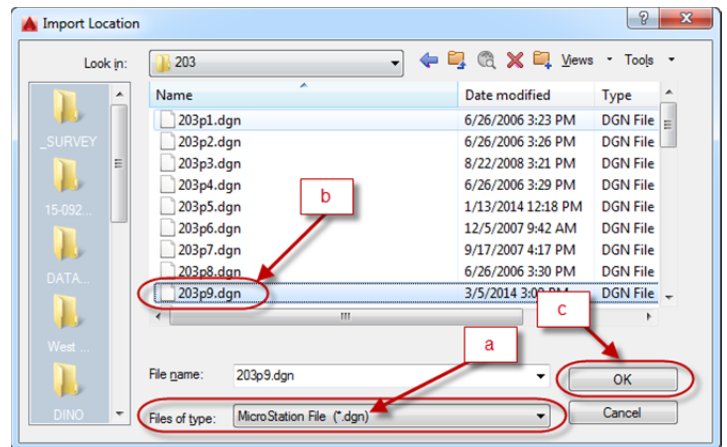
- c. Assign the Zone category as **USA, Ohio**, **Ohio** and set the Available coordinate System as **NAD83 Ohio State Planes, North Zone, US Foot (OH83-NF)**.

Click **OK** when finished.

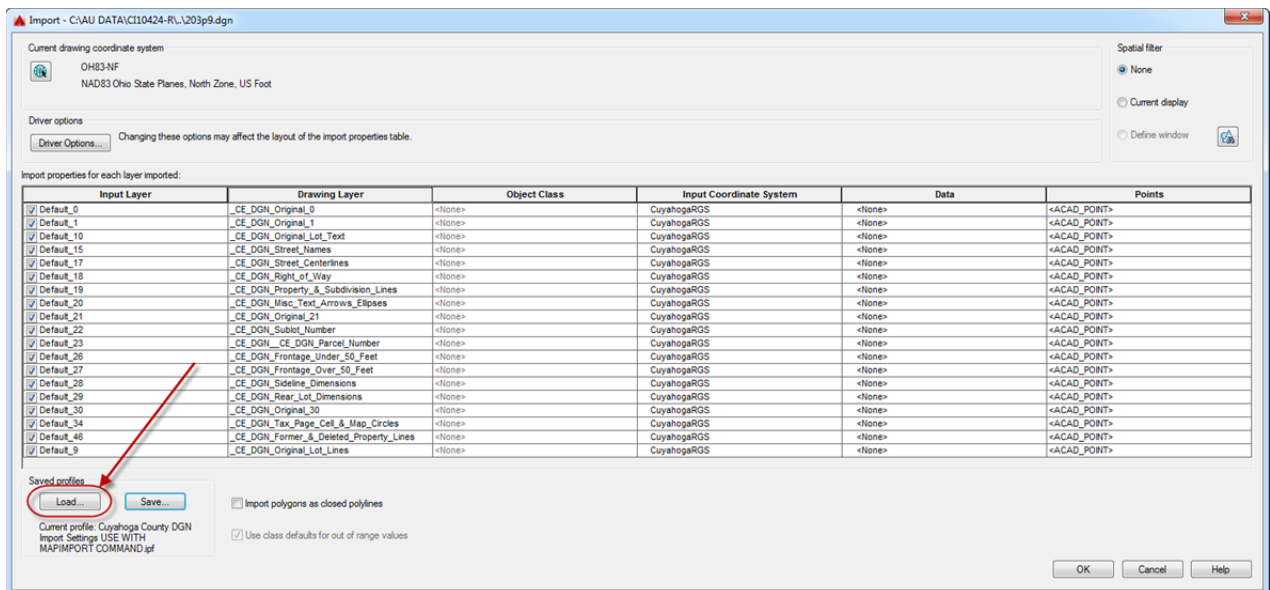


In lieu of the previous steps, start by opening **CI10424-R Dino Lustri 01.dwg**

- 2) Type **MAPIMPORT** in the command line.
 - a. Set the Files of Type to **MicroStation File (*.dgn)**.
 - b. Browse to the data files folder and select **203p9.dgn**.
 - c. Click **OK**.



- 3) In the resulting Import dialogue box, select **Load** under saved profiles and browse to the data files folder and select **Cuyahoga County DGN Import Settings USE WITH MAPIMPORT COMMAND.IPF**.



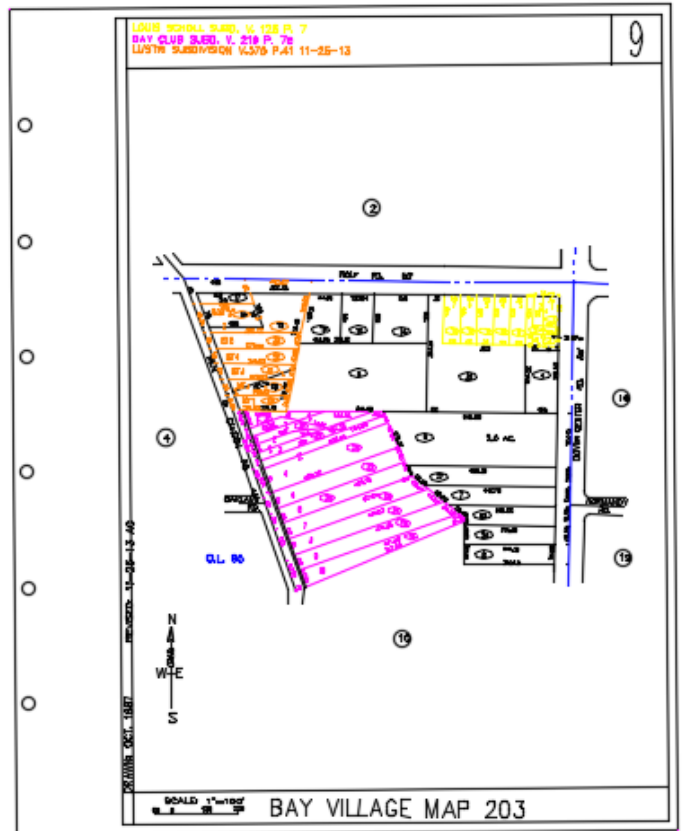
The benefits of loading this preconfigured file is the second column (Drawing Layer) and fourth column (Input Coordinate System). In the drawing layer column, you can assign whatever layer you want to use and import the source drawing layers into. And the *Input Coordinate System* column represents the original coordinate system of the file you are importing (i.e. dgn). You will have to know what coordinate system the source files are in order to populate this column with that information. In this case Cuyahoga Regional Geodetic Survey (CRGS) is a local proprietary coordinate system developed by the County before State Plane systems were commonplace.

- a. After reviewing the dialogue and replacing any missing settings in the aforementioned columns, click **OK** to import the data.



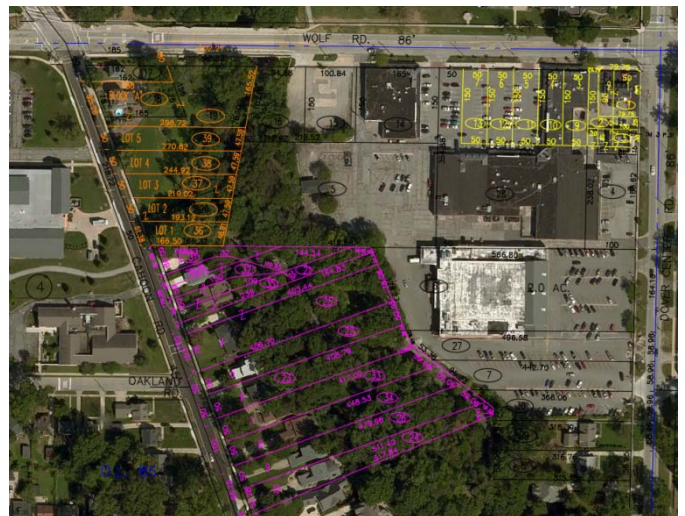
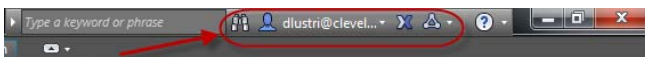
In lieu of the previous steps, start by opening **CI10424-R Dino Lustri 02.dwg**

- 4) Zoom extents to see the imported data.



- 5) The data is geospatially rectified, so if you wish to take advantage of the GEOMAP command and place aerial imagery in the background, you can. Type **GEOMAP** in the command line and select **A** for Aerial.

Please note that this command will only work if you are logged on to Autodesk Cloud Services.



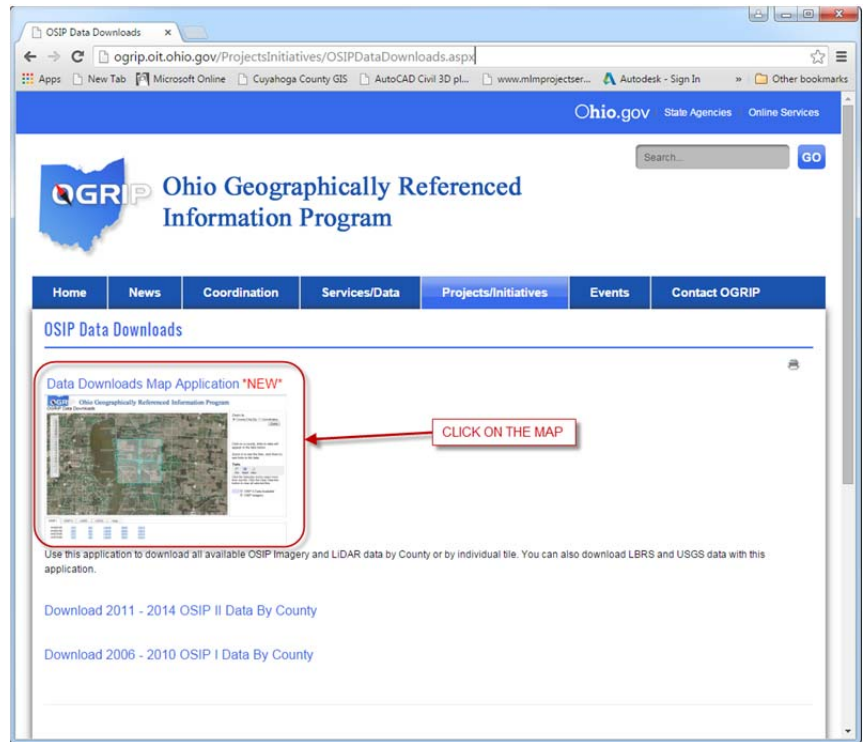
Q.E.D.

The final drawing in this example can be viewed by opening **CI10424-R Dino Lustri 03.dwg**

Generating Civil 3D Surfaces from LIDAR utilizing point cloud objects.

A large variety of resources can provide you with LIDAR data. For this example, we will use data obtained from the Ohio Geographically Referenced Information Program (OGRIP). The link for this site is below.... <http://ogrip.oit.ohio.gov/ProjectsInitiatives/OSIPDataDownloads.aspx>

On this website, you can click the data downloads map application, see the screen capture.

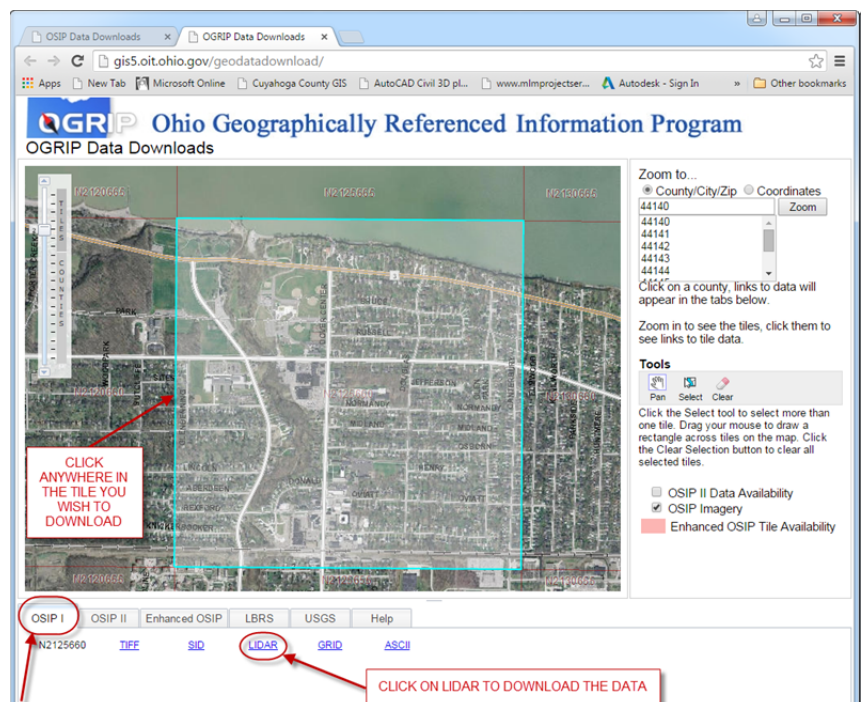


In the Map Application, use the zoom to function or pick on the map in order to navigate to the area of interest.

Click anywhere in the tile you wish to download.

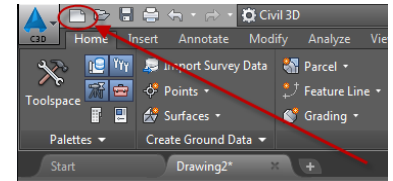
At the bottom of the dialogue, make sure you are on the OSIP I tab and then click on the LIDAR link in order to start the download of your data.

A ZIP archive will be downloaded. Unzip the contents to a location you can retrieve in the next steps.

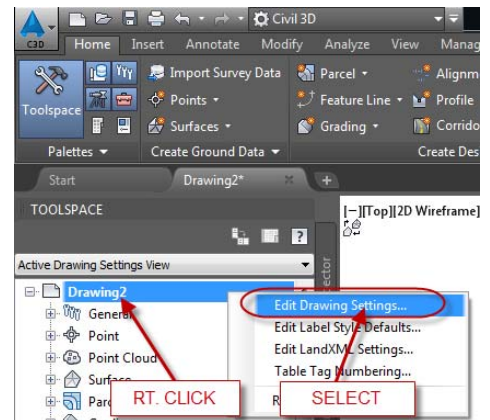


**CI10424-R Civil Engineering and Surveying Processes:
Autodesk® tools to help you accomplish more**

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 - a. Click on the **QNEW** button.Or start by opening **CI10424-R Dino Lustrì 00.dwg**

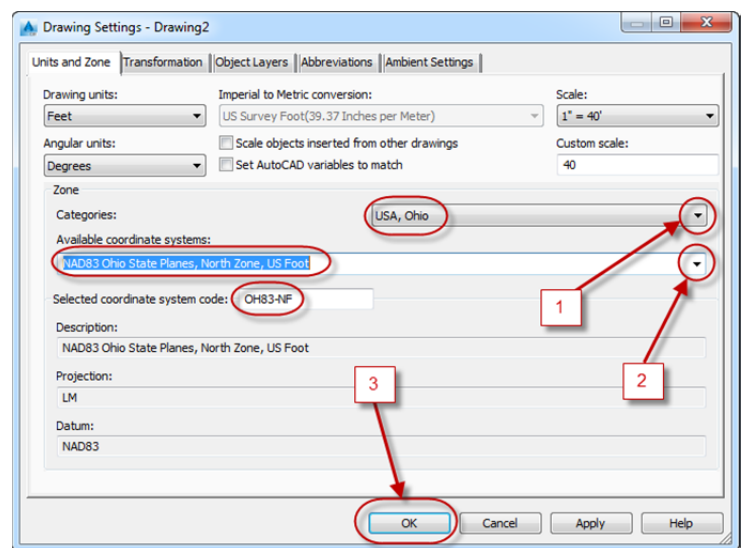


- b. On the *Settings* tab of the toolspace, right click the drawing name and then select **Edit Drawing Settings...**



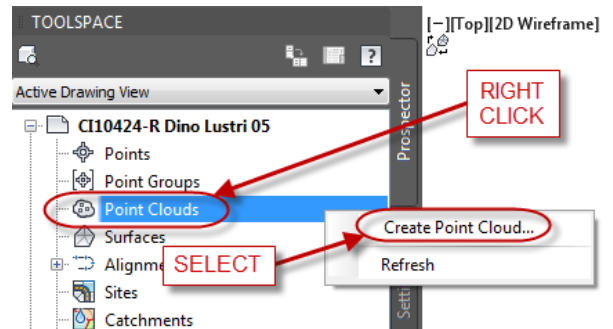
- c. Assign the Zone category as **USA, Ohio** and set the Available coordinate System as **NAD83 Ohio State Planes, North Zone, US Foot (OH83-NF)**.

Click **OK** when finished.



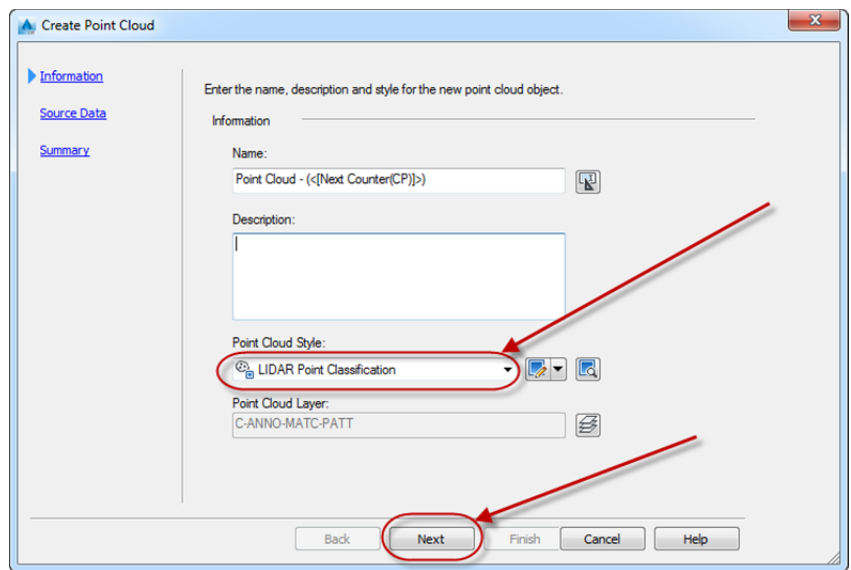
In lieu of the previous steps, start by opening **CI10424-R Dino Lustrì 04.dwg**

- 2) On the *Prospector*, right-click *Point Clouds* and select **Create Point Clouds...**



- 3) Change the Point Cloud Style to **LIDAR Point Classification**.

Click **Next** to continue.



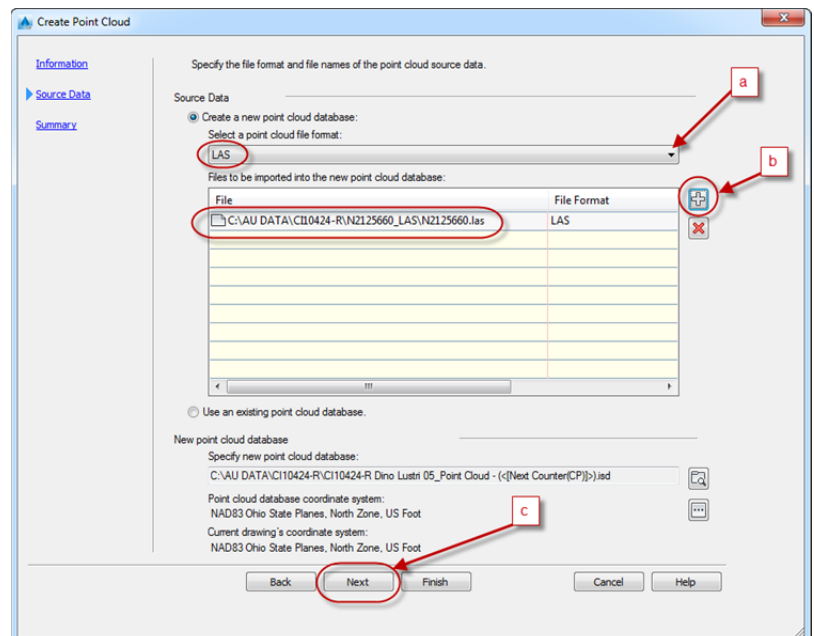
- 4) On the Source Data dialogue, perform the following steps...

- a. Set the Point Cloud File Format to **LAS**.

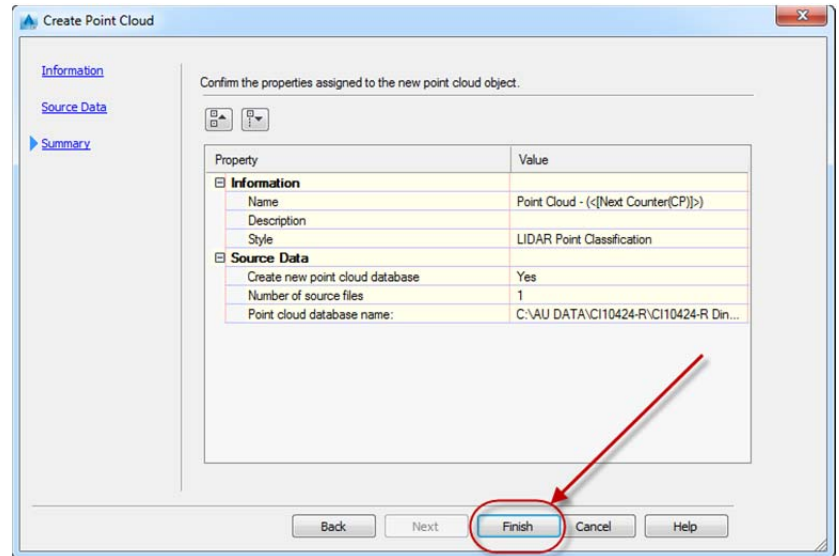
- b. Browse to your data folder and select **N2125660.LAS**.

(If you have not previously unzipped the downloaded file, do so in windows explorer before this step.)

- c. Click **Next** to continue.

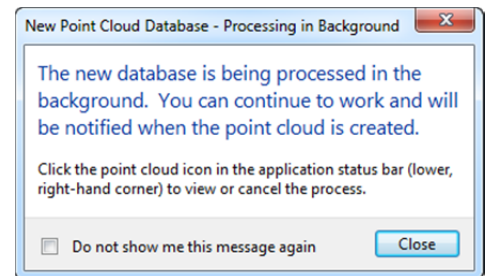


5) Select **Finish** on order to process the point cloud.

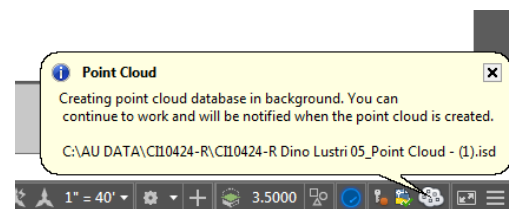


6) While the data is being processed you will see a number of alerts letting you know the status...

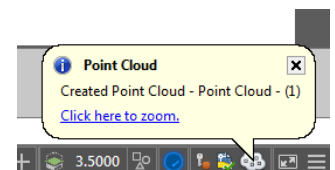
a. The initial dialogue alerting you to the fact that you can continue working while the data is being processed.



b. In the lower right corner of the screen, on the status bar you will notice a cloud icon. A cloud popup will appear initially to make you aware of this icon.

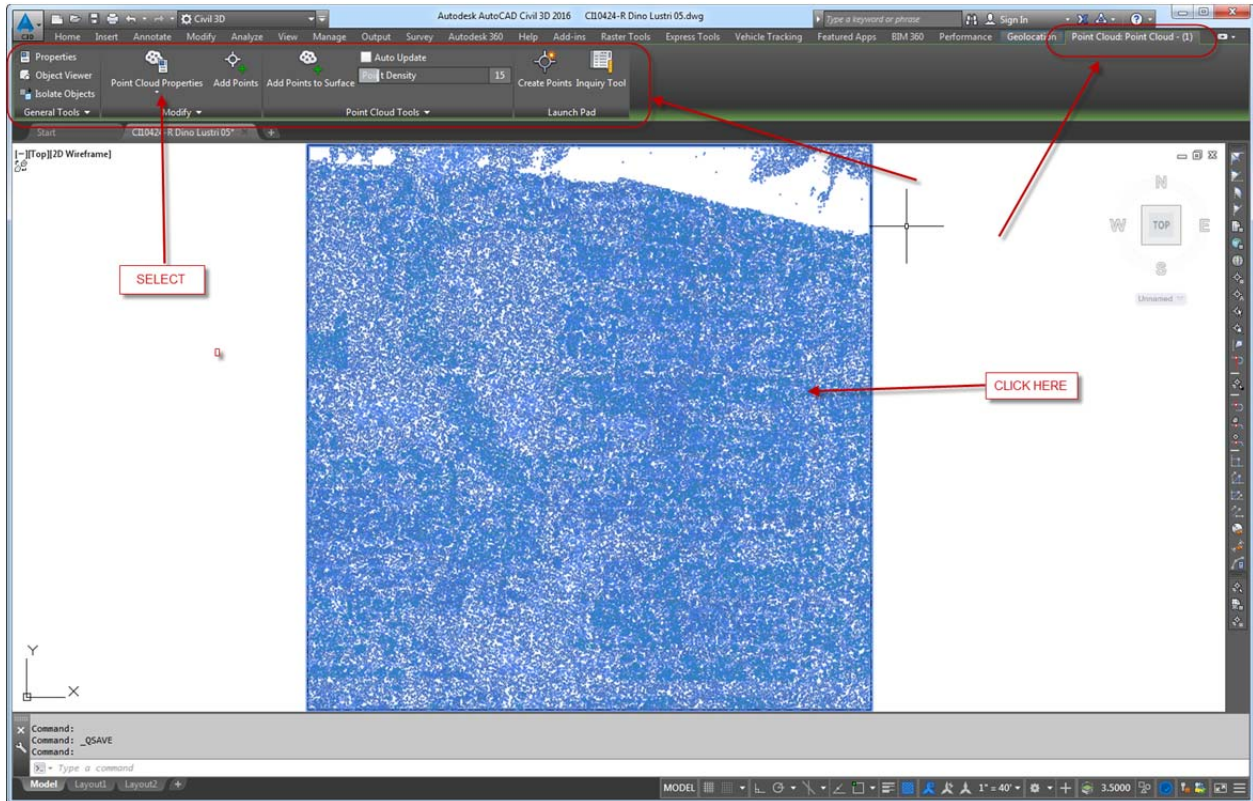


c. When the processing is complete a link will appear in the cloud popup and by clicking on the link you will be zoomed to the extents of the processed point cloud.

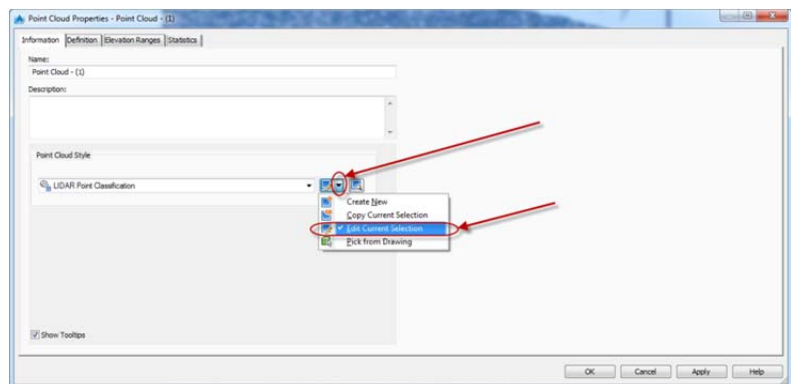


In lieu of the previous steps, start by opening **CI10424-R Dino Lustri 05.dwg**

- 7) By clicking on the point cloud object, a contextual ribbon will appear. On the ribbon select the **Point Cloud Properties** button.

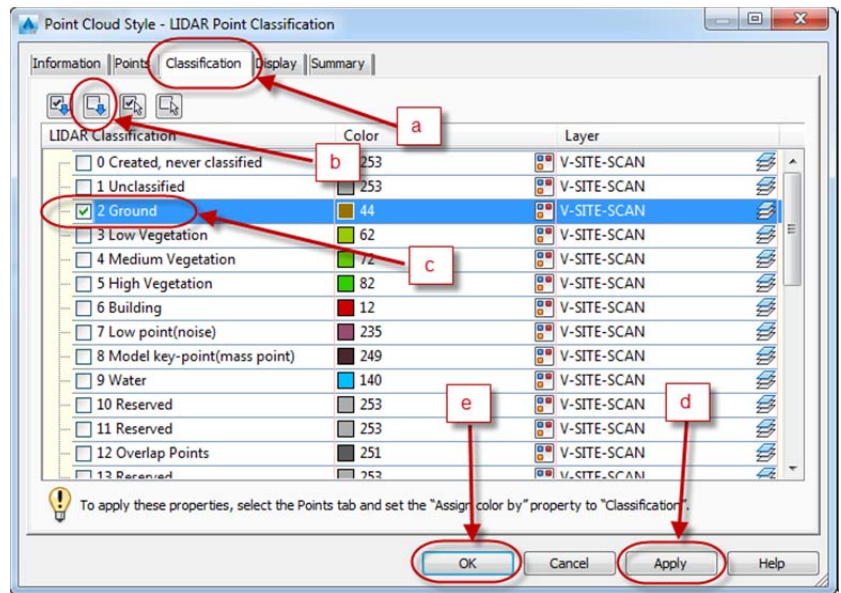


- 8) In the *Point Cloud Properties* dialogue, *Information* tab, expand the drop down next to the *Point Cloud Style* **LIDAR Point Classification**. Choose **Edit Current Selection**.



9) In the *Point Cloud Style* dialogue, perform the following:

- a. Select the **Classification** tab.
- b. Click the **'Uncheck all'** button.
- c. Select the **Ground** classification.
- d. Click **Apply**.
- e. Click **OK**.

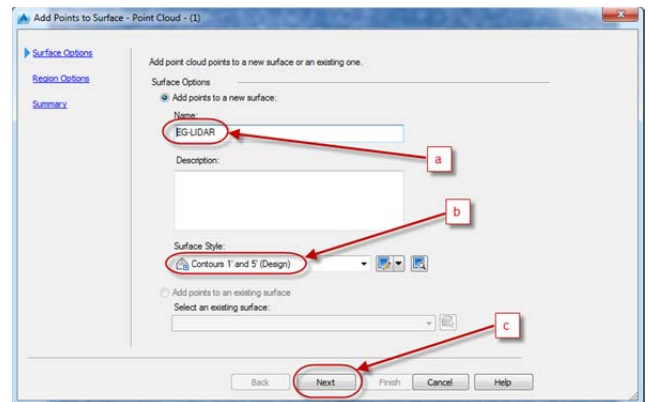


10) Click OK to exit the Point Cloud Properties Dialogue.

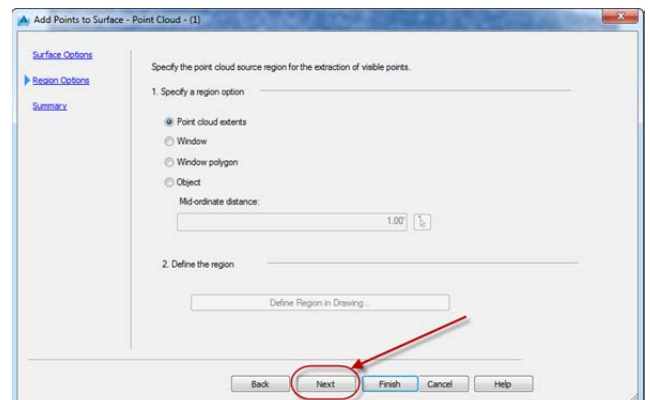
11) By clicking on the point cloud object again, the contextual ribbon will re-appear. On the ribbon select the **Add Points to Surface** button.

12) In the resulting dialogue, perform the following...

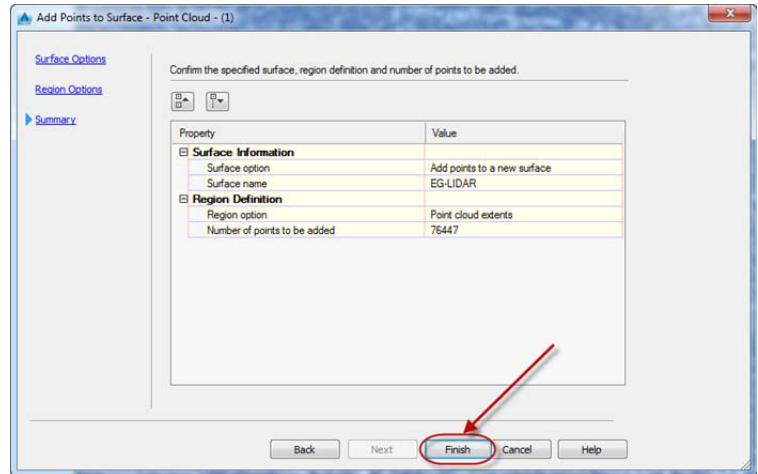
- a. Provide a name for the new surface. E.g. **EG-LIDAR**
- b. Assign a surface style. E.g. **Contours 1' and 5' (Design)**
- c. Click **Next** to continue.



13) Click **Next** in the *Region Options* dialogue.



14) Finally click **Finish**.



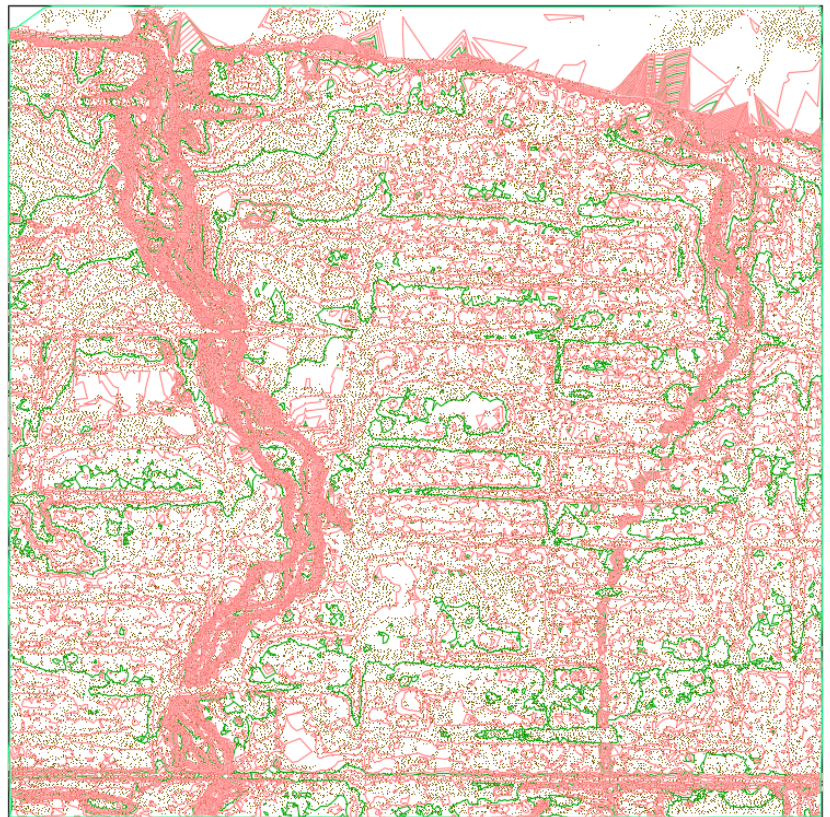
15) The surface will appear but you may need to press Escape to deselect the point cloud object.

16) By default the **LEVELOFDETAIL** system variable will be set to on. This means that in a zoomed out state, you will only see a reduced amount of contours on the screen. As you zoom in, more contours will appear. You can toggle this variable off by typing **LEVELOFDETAILOFF** at the command line. Be warned that your computer needs sufficient power to show all contours in some scenarios.

NOTE: This data set borders Lake Erie. Typically point clouds do not show returns on water. In this case it did, possibly due to debris or rough waves. Using standard Civil 3D surface editing skills, creating a boundary or removing triangles in these areas will clean this up.

17) A new Point Cloud Style can be generated to 'turn off' the point cloud. Or the layer assigned to that data can be turned off or frozen. Be aware that the data must be present for the surface to generate. If you freeze the data or remove it, the surface may revert to out of date and not be displayed properly.

Q.E.D.



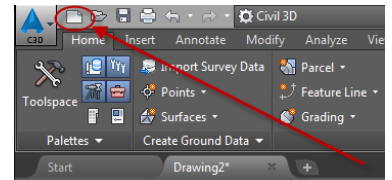
The final results can be obtained by opening **CI10424-R Dino Lustrì 06.dwg**

Importing Contour Data with Elevations.

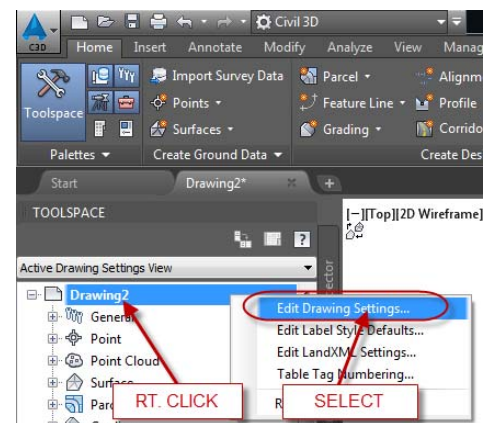
Many agencies provide contour data in a SHP file format. Many users of AutoCAD based products simply import the linework because they are unaware of the methodology to assign elevations to the linework during import.

The following example will take a large contour data set in SHP file format, connect to it by an FDO connection, and then import a smaller area while assigning elevation data to the imported lines.

- 1) Launch a new drawing based on your template or a Civil 3D template.
 - a. Click on the **QNEW** button.Or start by opening **CI10424-R Dino Lustrri 00.dwg**

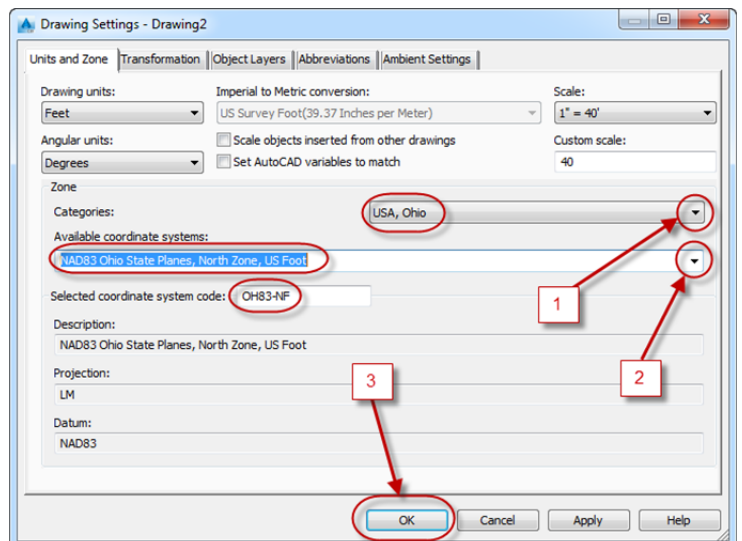


- b. On the *Settings* tab of the toolspace, right click the drawing name and then select **Edit Drawing Settings...**



- c. Assign the Zone category as **USA, Ohio** and set the Available coordinate System as **NAD83 Ohio State Planes, North Zone, US Foot (OH83-NF)**.

Click **OK** when finished.

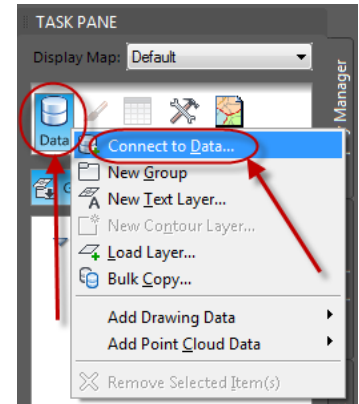


In lieu of the previous steps, start by opening **CI10424-R Dino Lustri 01.dwg**


- 2) Turn on the *Map Task Pane* by typing **MAPSPACE** at the command line, choose **ON**.

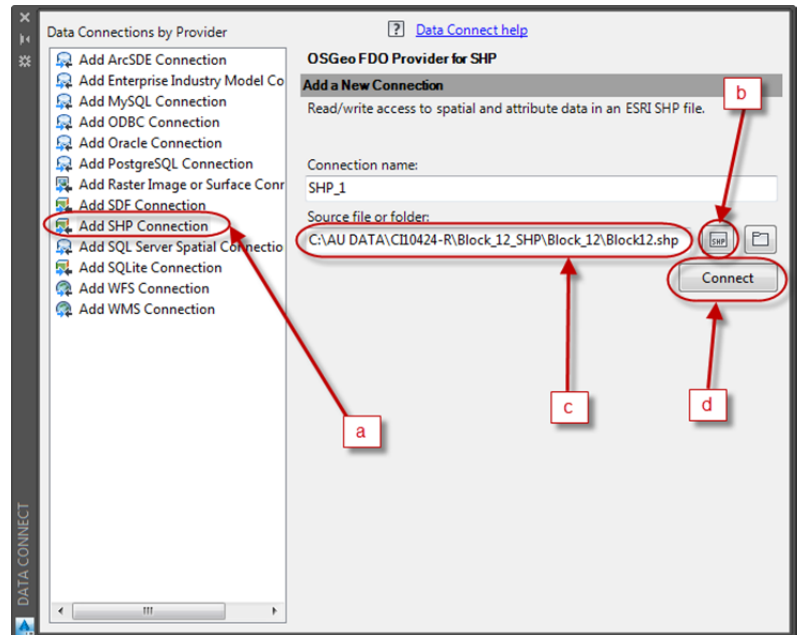


- 3) In the Task Pane, select the Data icon and then **Connect to Data** in order to launch the FDO connection dialogue.

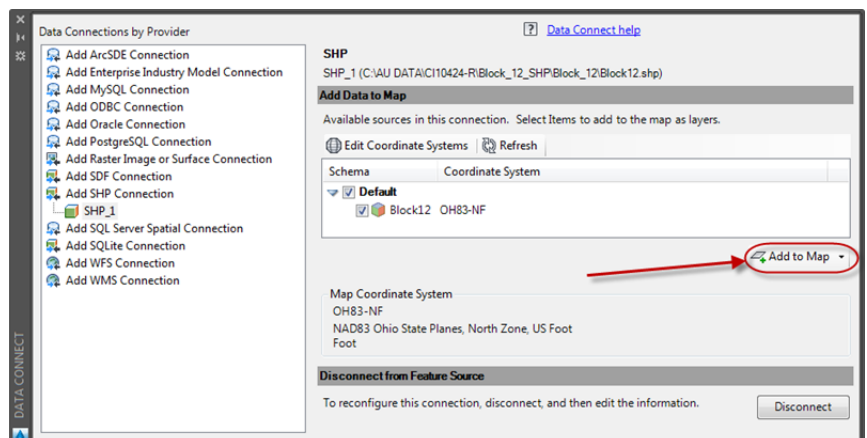


- 4) On the **Data Connect** dialogue perform the following steps:

- a. Select **Add SHP Connection**.
- b. Click the SHP file browse icon. 
- c. Browse to the data folder and select **Block12.SHP**.
- d. Click **Connect**.



- 5) Back on the Data Connect dialogue, select **Add to Map**.

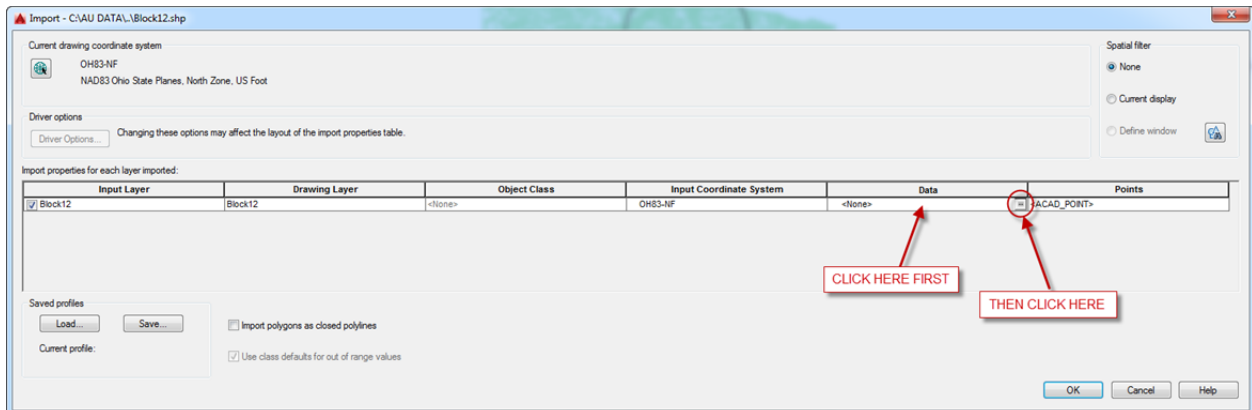


In lieu of the previous steps, start by opening **CI10424-R Dino Lustrì 08.dwg**

- 6) The purpose of doing this rapid connect is to establish a basis for which we will pick a smaller area of interest. Draw a circle or polyline around a portion of the data set that represents the area of interest.

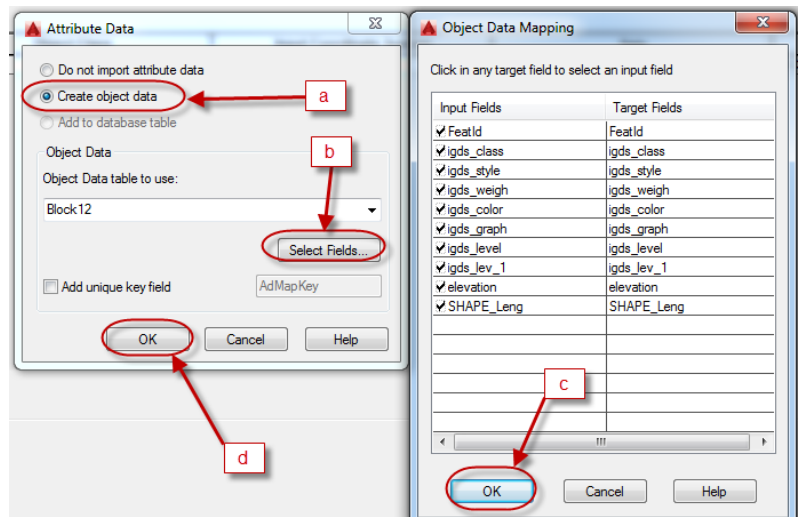



- 7) Type **MAPIIMPORT** at the command line.
- 8) Change the *Files of type* to **ESRI Shapefile (*.shp)**. Browse to the data folder and select **Block12.shp**. Click **OK** to continue.
- 9) In the Import dialogue, click under the Data column heading and then click the ellipsis.



- 10) Perform the following steps on the Attribute Data and Object Data Mapping dialogues:

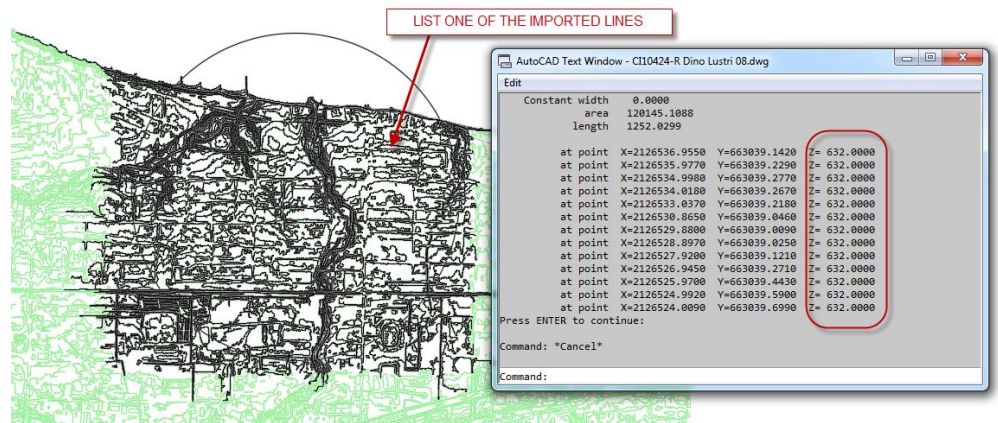
- a. Select the **Create Object Data** radio button.
- b. Click **Select Fields**.
- c. Note that Elevation is checked and click **OK**.
- d. Click **OK**.



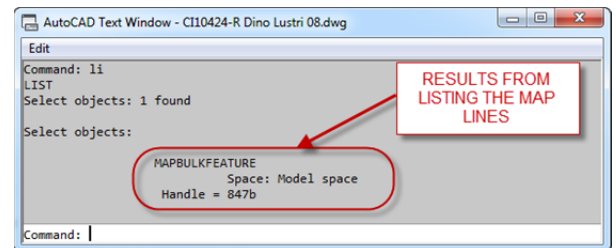
11) Back on the Import dialogue, select the Define Window button  under Spatial Filter. Then window the area you delineated with a circle or polyline.

12) Back on the Import dialogue, click OK to begin the import process.

13) You will see the results overlaid on the referenced data. If you **LIST** any of the new lines, you will see the elevation assigned to the polyline.



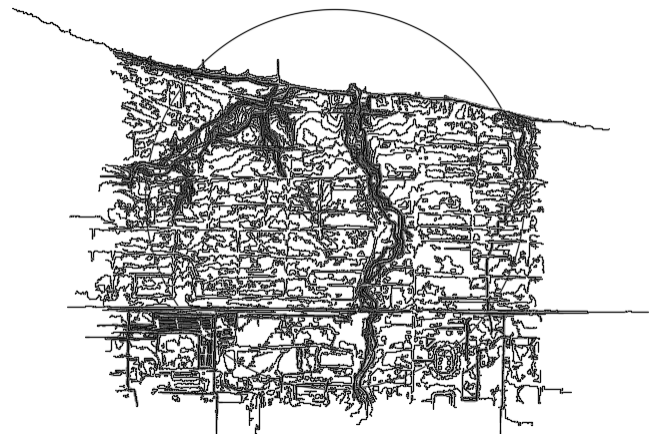
14) At this point you can disconnect the data through the Task Pane as you no longer need it. The data was imported into your drawing and as a result your drawing size will increase.



After creating a Civil 3D Surface from the resulting import, you may want to data shortcut the surface into a separate working drawing in order to reduce the file size of your active working drawing.

The completed drawing can be attained by opening
CI10424-R Dino Lustrì 09.dwg

Q.E.D.

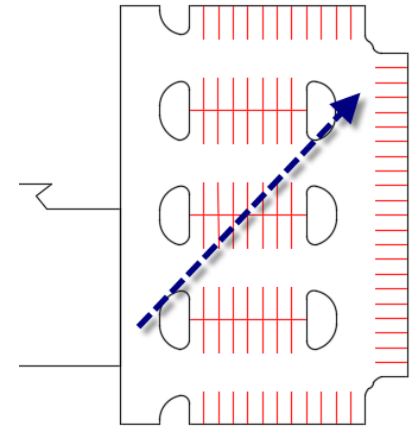


Performing grading tasks. Using Feature lines to assign elevations.

Creating a faux surface and using it to assign grades to complex geometry.

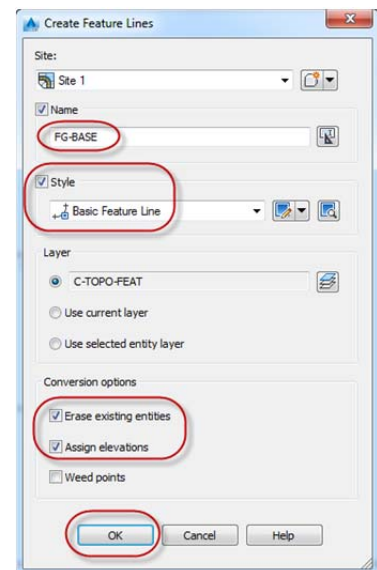
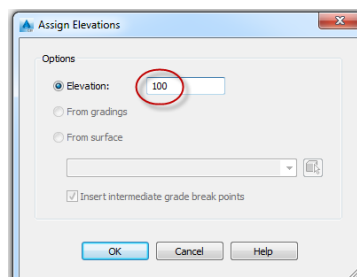
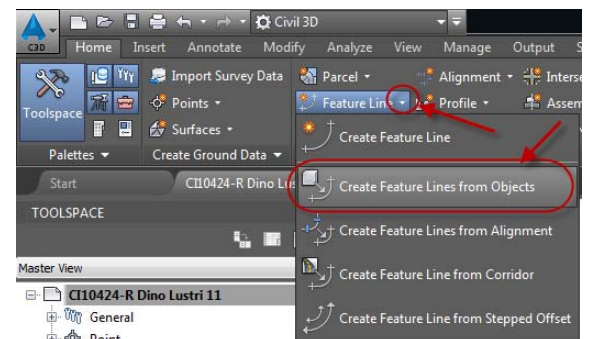
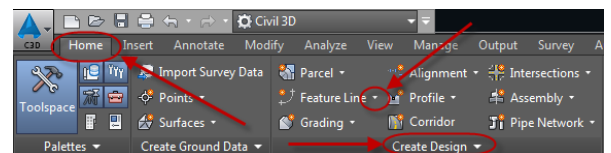
In this example, we are given a footprint for a parking lot and need to grade it out.

- 1) Start by opening the drawing named **C110424-R Dino Lustrì 10.dwg**. There is a building footprint with a proposed parking lot adjacent to it.
- 2) We are considering grading the lot so runoff goes in the direction of the arrow.
- 3) Draw a rectangle around the entire area. There is no need to match the edges of pavement, just make sure that all the pavement edges are within the rectangle.
- 4) Convert the rectangle to a feature line by the following steps:



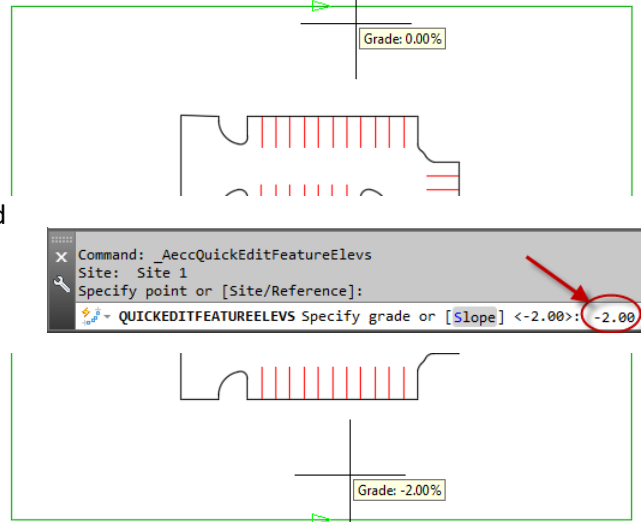
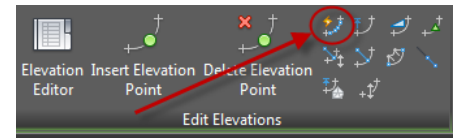
- a. On the *Home* tab of the ribbon, *Create Design* panel, click *Feature Line*.
- b. Then select **Create Feature Lines from Objects**.
- c. Select the rectangle you just made and fill out the dialogue according to the following:
 - i. Name: FG-BASE
 - ii. Style: Basic Feature Line
 - iii. Check Erase existing entities
 - iv. Check Assign Elevations
 - v. Click **OK**

On the *Assign Elevations* dialogue, enter **100**.

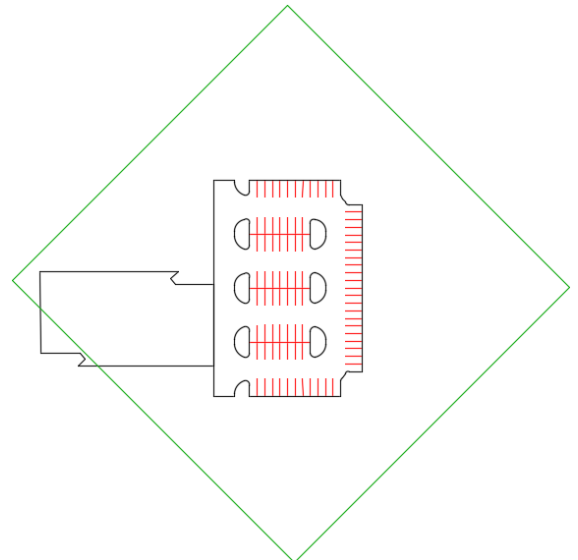


5) Click on the Feature Line you just created and on the contextual ribbon that appears do the following:

- On the *Edit Elevations* panel, select **Quick Elevation Edit**.
- Move your cursor close to the feature line and you will see a tooltip appear telling you the current grade of the line and its direction.
- Make sure the grade arrow is pointing in the direction you want, and then click on the screen. In the command line specify the grade, **-2.00**. (*Be sure to include the negative*)
- Do the exact same for the bottom feature line.
- Press ESC to exit the command.



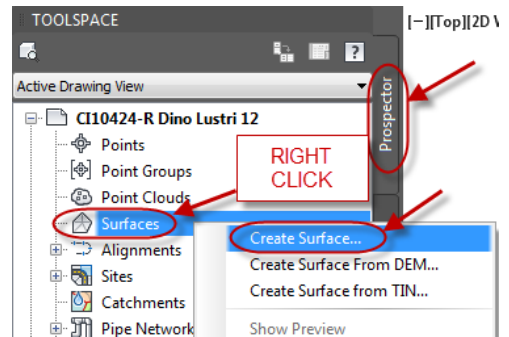
6) Rotate the feature line you just created 45 degrees counter-clockwise. Move the rectangle if necessary so that the entire parking lot edge of pavement fits within the rectangle.



In lieu of the previous steps, start by opening **CI10424-R Dino Lustrini.dwg**

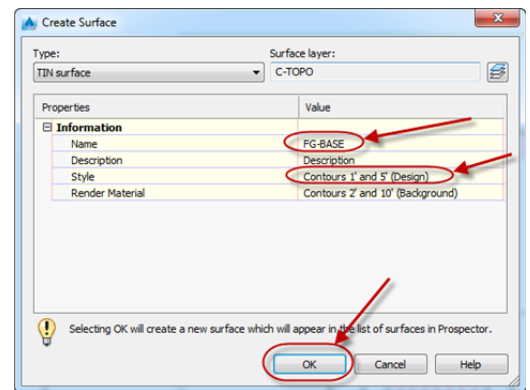
7) Create a new Surface by following these steps:

a. On the *Toolspace, Prospector* tab, right click *Surfaces* and select **Create Surface...**



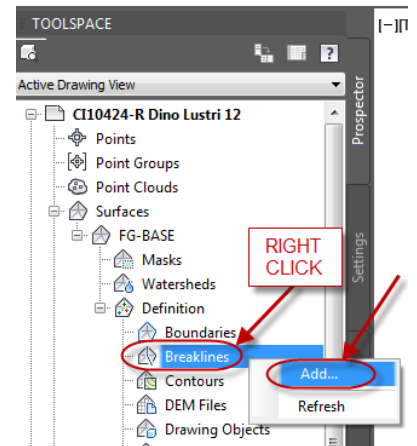
b. Enter the following information in the *Create Surface* dialogue:

- i. Name: **FG-BASE**
- ii. Style: **Contours 1' and 5' (Design)**
- iii. Click **OK**.



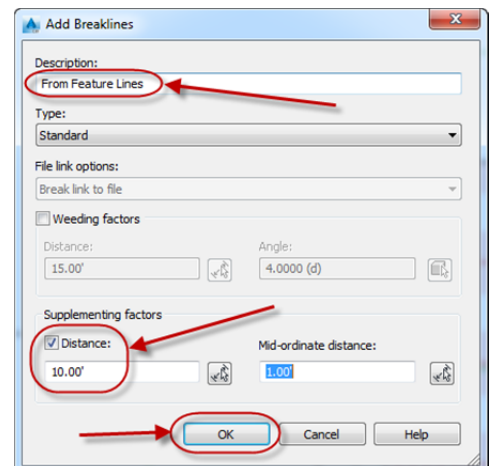
c. Expand *Surfaces* in the Prospector, expand the **FG-BASE** surface just created, and expand *Definition*.

d. Right click *Breaklines* and select **Add**.



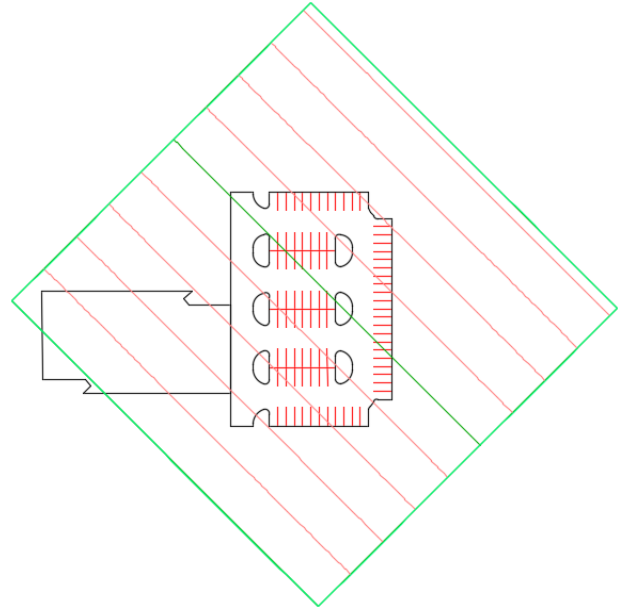
e. In the *Add Breaklines* Dialogue, set the following:

- i. Description: **From Feature Lines**
- ii. Under *Supplementing factors*, check *Distance* and enter **10.00'**
- iii. Click **OK**.



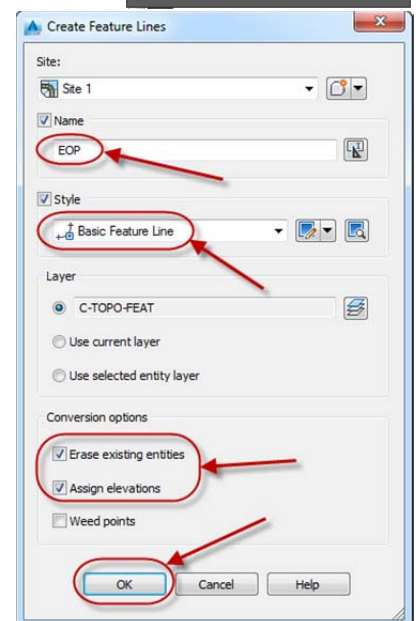
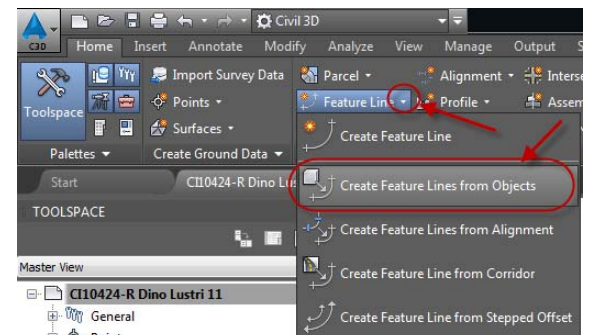
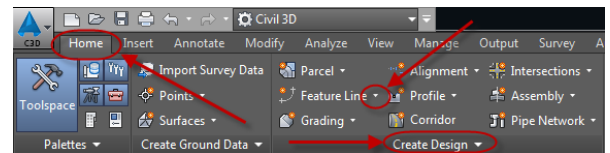
The reason for entering the supplementing factor is to give the resulting TIN more calculation points. This will give better results when applying this methodology to intricate geometry.

- f. Select the feature line in the drawing and press enter. The surface should regenerate.

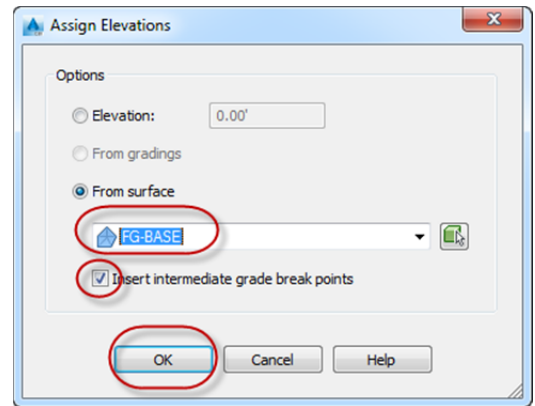


In lieu of the previous steps, start by opening **CI10424-R Dino Lustrì 12.dwg**

- 8) We will now grade out the parking lot edge by the following steps:
- Before proceeding, make sure the parking lot edge is a contiguous polyline by using the **JOIN** command.
 - On the *Home* tab of the ribbon, *Create Design* panel, click *Feature Line*.
 - Then select **Create Feature Lines from Objects**.
 - Select the parking lot edge line.
 - In the Create Feature Lines dialogue, enter the following:
 - Name: EOP
 - Style: Basic Feature Line
 - Check Erase existing entities
 - Check Assign elevations
 - Click OK.



- f. On the *Assign Elevations* dialogue, assign the FG-BASE surface and check *Insert Intermediate Grade Break Points*. Then click **OK**.

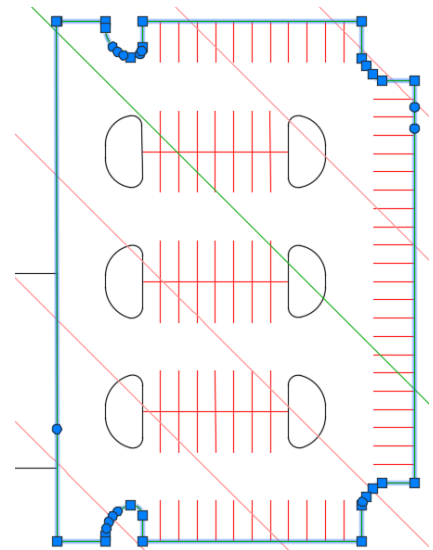


- 9) Click on the EOP feature line and see the number of vertices that highlight.

Note: Only the outer edge of this parking lot has been graded, the middle area needs better definition. Repeating the above steps, to add the islands, will improve the effort.

This is a static effort. This means that if you decide to rotate the original rectangle, in order for the EOP feature line to update, you will have to select it and re-assign elevations from the FG-BASE surface.

The following example will illustrate how a dynamic solution can be achieved.

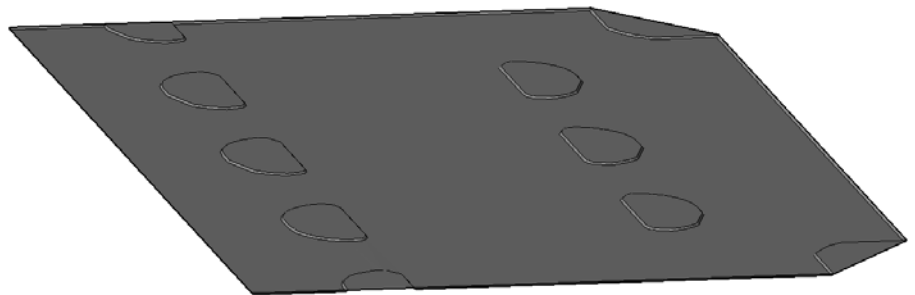
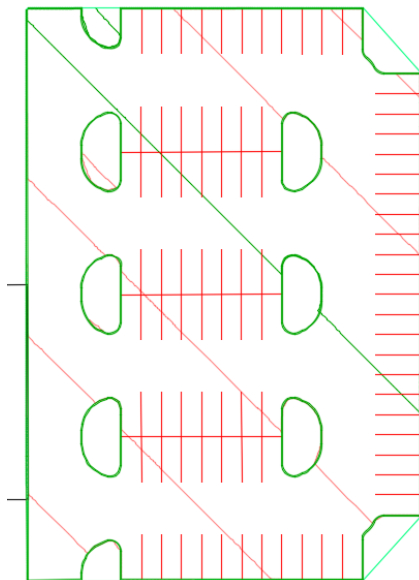


In lieu of the previous steps, start by opening **CI10424-R Dino Lustrì 13.dwg**

The final grading is accomplished by adding all the islands in the same way that the edge of pavement (EOP) was added.

- 1) Create a new surface called FG.
- 2) Add the EOP figure line generated above as a breakline to the new surface. Use supplementing at 2.0'.
- 3) Create *Figures from Objects* for all of the islands following the same steps as above.
- 4) Create EOP & island curbing by using the *Stepped Offset* command on the *Edit Geometry* panel of the contextual ribbon.
- 5) Add the figures to the FG surface as *breaklines* by setting the supplementing factor to 1.0'.
Note: Whenever you have sharp curves, e.g. island curbing, you need to model the curves better by lowering the distance between vertices.
- 6) There may be some minor Edge Swapping needed to refine the TIN.

Once the islands and grade break line are added to a new FG surface, the final graded lot will look something like the following:



In lieu of the previous steps, start by opening **CI10424-R Dino Lustri 14.dwg**

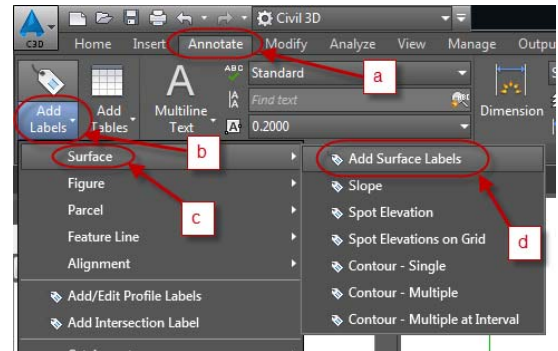
Creating Gutter/Top of Curb Surface Label Styles with expressions.

If your curbing is typical throughout your design, why spend the time labeling both top and bottom when one will do both?

The following steps will illustrate how to create a surface label that will show both gutter elevation and top of curb elevation based on a your design preference.

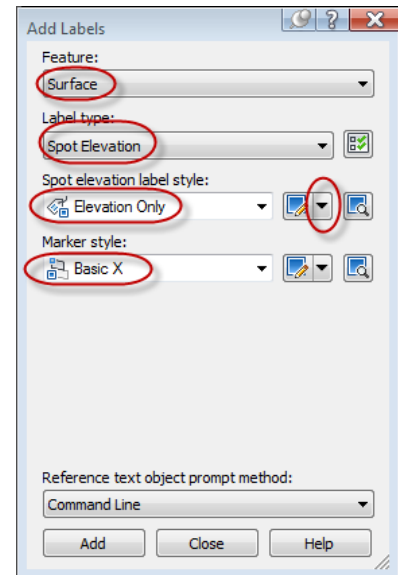
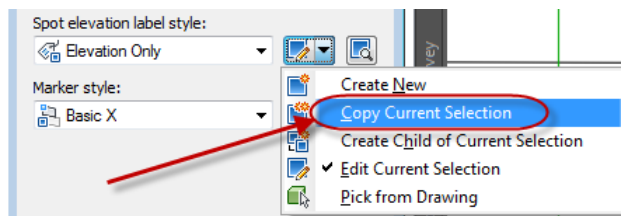
- 1) Launch the surface labeling tools by the following steps:

- a. Click on the *Annotate* tab of the ribbon.
- b. On the *Labels & Tables* panel, click the bottom of the *Add Labels* button.
- c. Click *Surface*.
- d. Select **Add Surface Labels**.



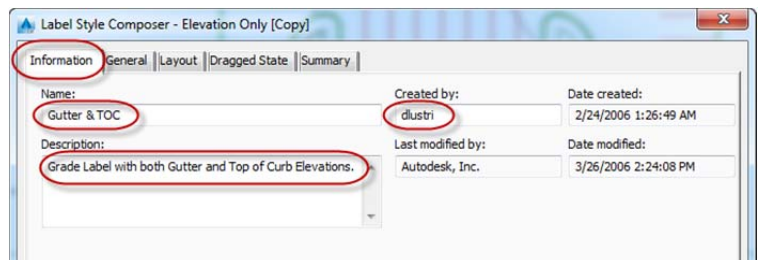
- 2) Set the following choices on the Add Labels dialogue:

- a. Feature: *Surface*
- b. Label type: *Spot Elevation*
- c. Spot elevation label style: *Elevation Only*
- d. Marker style: *Basic X*
- e. Click the drop down next to the *Elevation Only* label style and choose **Copy Current Selection**.

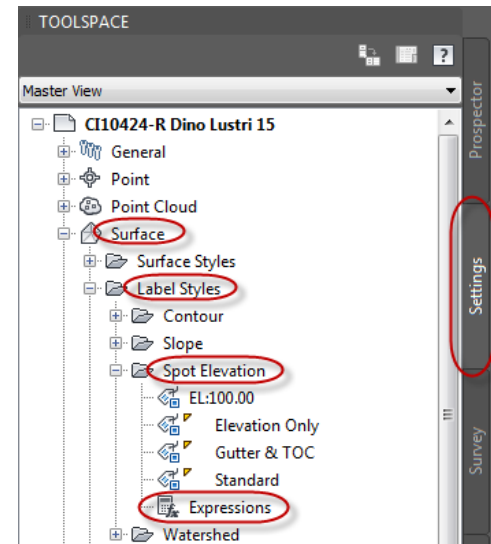



- 3) On the Label Style Composer dialogue, Information tab, provide the following:

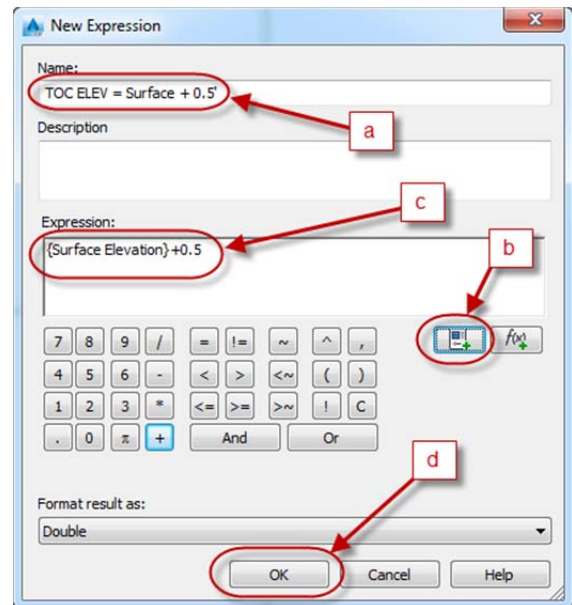
- a. Name: **Gutter & TOC**
- b. Created by: <your name>
- c. Description: **Grade Label with both Gutter and Top of Curb Elevations.**
- d. Click **OK**.



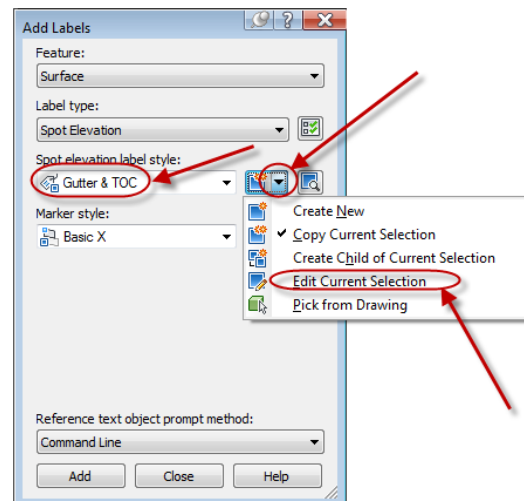
- 4) Go to the following on the *Toolspace Settings* tab:
 - a. *Surface > Label Styles > Spot Elevation > Expressions*
 - b. Right click Expressions and select **New**.



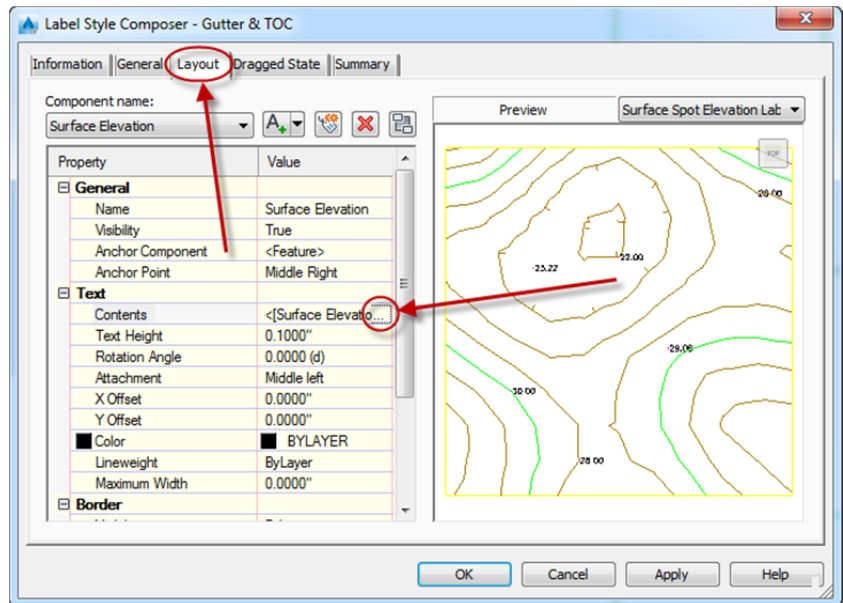
- 5) On the *New Expression* dialogue, perform the following steps:
 - a. Name: **TOC ELEV = Surface + 0.5'**
 - b. Under Expression click the Surface data button  in order to add *Surface Elevation* to the expression.
 - c. Then add a plus sign (+) and **0.5**.
 - d. Click **OK**.



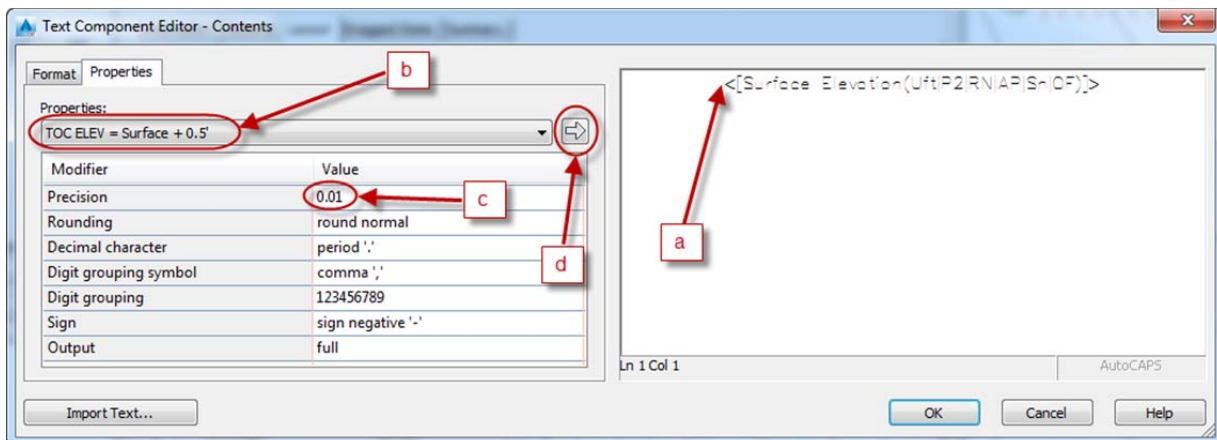
- 6) Back on the *Add Labels* dialogue click the *Edit Current Selection* button next to *Gutter & TOC*.



- 7) On the *Label Style Composer* dialogue for Gutter & TOC, click on the *Layout* tab, then choose the Contents value ellipsis.



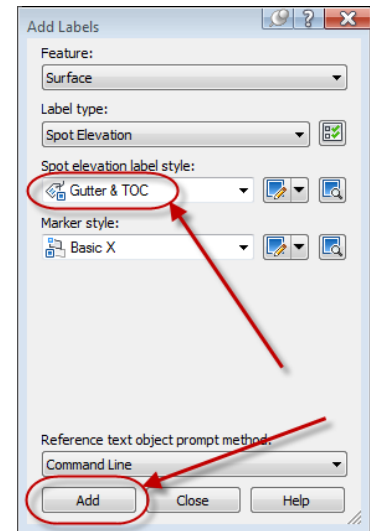
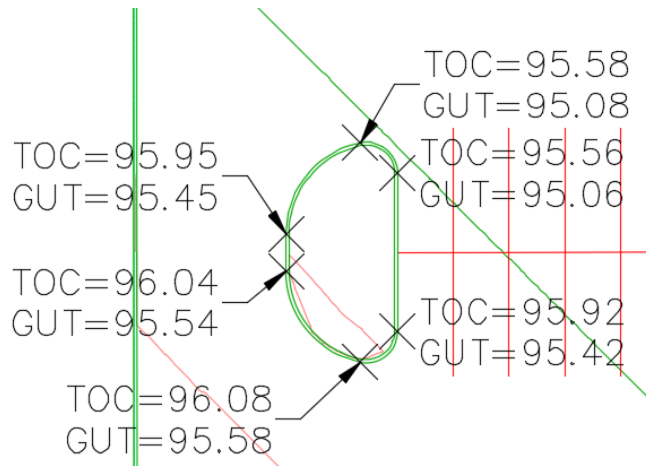
- 8) In the Text Component Editor, perform the following:
- Click in front of the existing surface elevation dynamic text.
 - Change the properties to the expression created above, i.e. TOC ELEV = Surface + 0.5'.
 - Set the precision to two decimal places, i.e. 0.01.
 - Push the expression into the label editor.



- 9) Add the following text to the label around the dynamic text:

- TOC=
- GUT= TOC=<[TOC ELEV = Surface + 0.5'(P2|RN|AP|GC|UN|Sn|OF)]>
GUT=<[Surface Elevation(Uft|P2|RN|AP|Sn|OF)]>
- Click **OK**.

- 10) On the *Add Labels* dialogue, press the **Add** button to add labels to your drawing.
- Select any part of the showing surface. If it isn't displayed, press the Enter key in order to choose your surface from a list. (Select FG)
 - Add labels around an island by using snaps or just picking.



NOTE: The label style can be customized to include an arrow with the TOC above and Gutter below.

Q.E.D.

The completed exercise can be obtained by opening **CI10424-R Dino Lustri 15.dwg**

For the following exercise, start by opening **CI10424-R Dino Lustrì 16.dwg**

Create a 'floating' island that will dynamically regenerate if you change the design by use of corridor modeling.

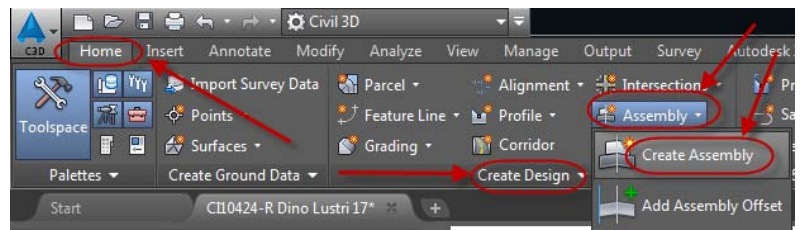
When grading out a parking lot with islands, it is typically the islands that give us the most grief once the perimeter is established. Islands are easy the first go through, but then if you need to make an adjustment, the effort of regrading all the PC's and PT's or grade breaks becomes a challenge.

The following steps will illustrate how to create an island that will change whenever you change the underlying surface.

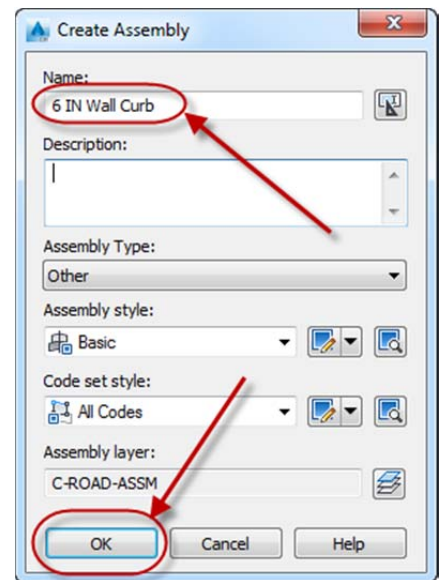
- 1) We need to create an assembly for a standard 6" x 18" wall curb.

Perform the following:

- a. On the *Home* tab of the ribbon, *Create Design* panel, select the *Assembly* pull down and choose **Create Assembly**.




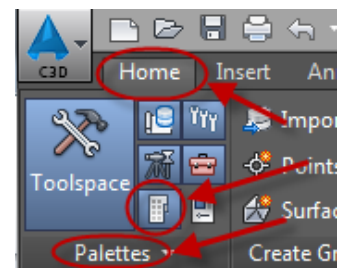
- b. Provide a name for this new assembly; **6 IN Wall Curb**.
- c. Click **Ok**.



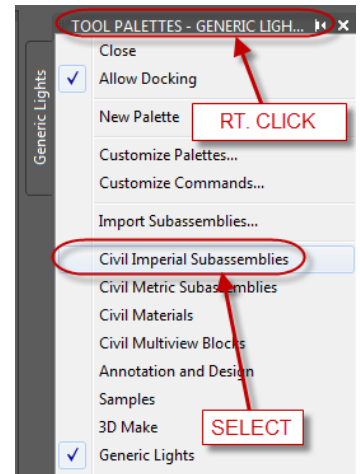
- d. An assembly marker will appear on your screen.



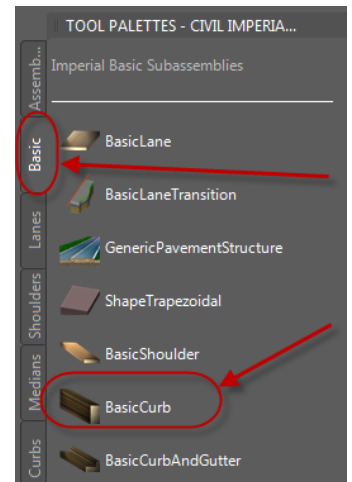
- 2) Turn on your *Tool Palette* by either clicking the  icon on the *Home* tab of the ribbon, *Palettes* panel, or by typing **CTRL-3**.



- 3) In case the tool palette is set to a different collection, set the *Civil Imperial Subassemblies* by performing the following steps:
 - a. **Right mouse click** the tool palette mast or top bar depending on if the dialogue is docked or not.
 - b. Select *Civil Imperial Subassemblies*.

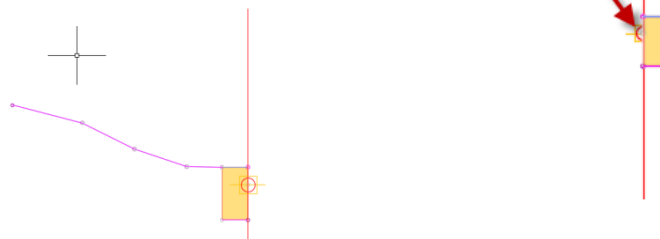


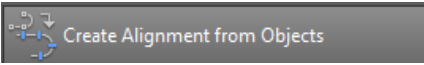
- 4) Click on the **Basic** tab for a list of basic subassemblies.



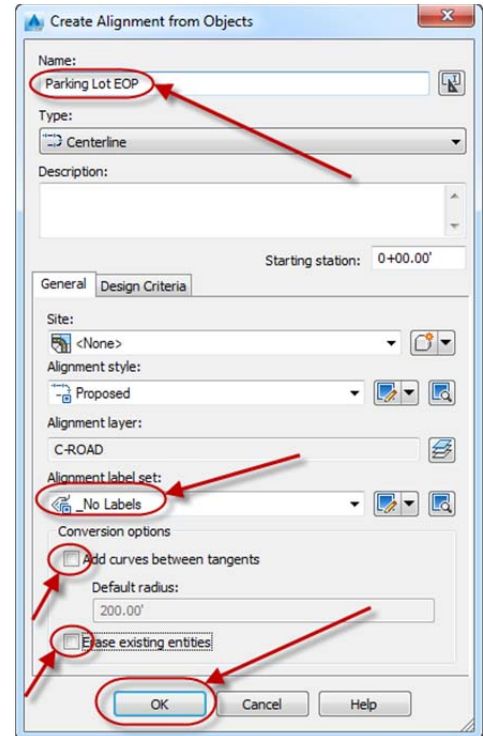
- 5) Choose the **BasicCurb** subassembly and **click** the *assembly marker* in the drawing area of your screen. You will see the BasicCurb appear attached to the assembly marker.

NOTE: You can add some **LinkWidthAndSlope** subassemblies to help in the appearance of landscape mounding.

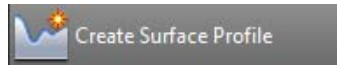


- 6) Create an alignment from the perimeter edge of pavement by performing the following steps”
 - a. On the *Home* tab of the ribbon, *Create Design* panel, click the pull down for *Alignment*.
 - b. Choose **Create Alignment from Objects**. 
 - c. **Select** the perimeter polyline. (Before performing this step, make sure the perimeter edge of pavement line is joined to be a single contiguous polyline.)
 - d. Press **Enter** to accept the alignment direction.

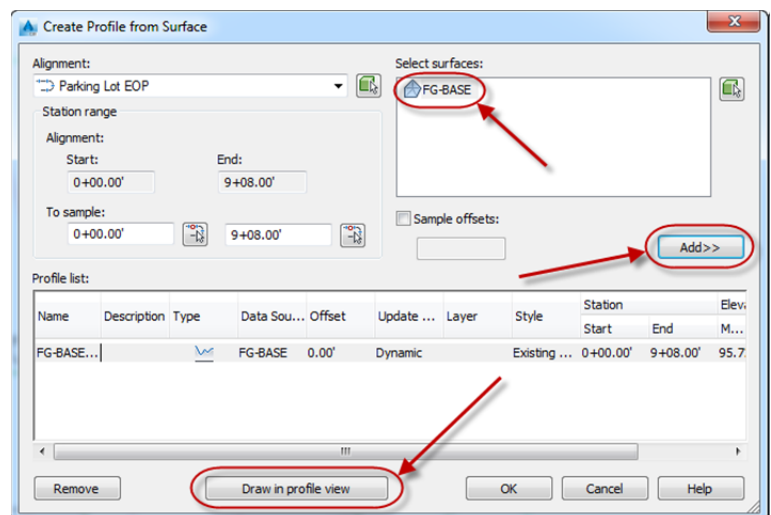
- 7) Assign the following to the *Create Alignment from Objects* dialogue box:
- Name: **Parking Lot EOP**
 - Alignment Label Set: **_No Labels**
 - Uncheck** *Add curves between tangents*
 - Uncheck** *Erase existing entities*
 - Click **OK**.



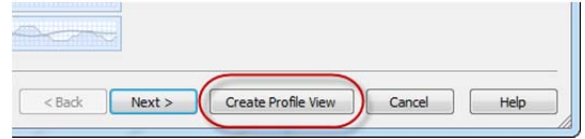
- 8) Create a profile of the alignment Parking Lot EOP by performing the following steps:
- Home* tab of the ribbon, *Create Design* panel, select the **Profile** pull-down.
 - Choose **Create Surface Profile**.



- 9) In the *Create Profile from Surface* dialog perform the following:
- Click on the **FG-BASE** surface.
 - Click **Add >>**
 - Click **Draw in profile view**.

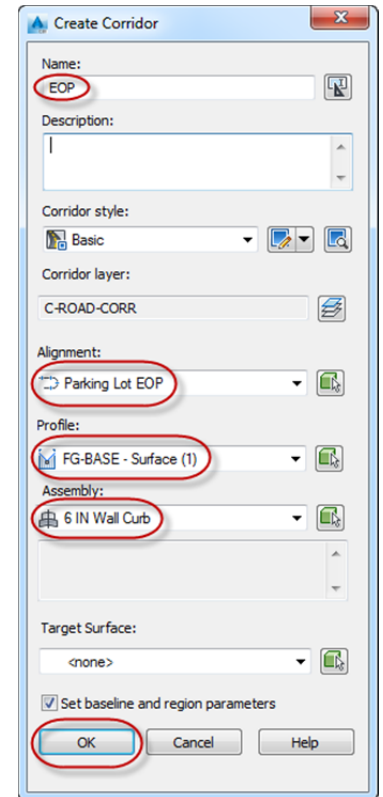


10) In the resulting *Create Profile View* dialogue, simply click **Create Profile View** and bypass the individual setups along the left side. (A different style can always be assigned later.)



11) Create a corridor model of the perimeter curbing by performing the following steps:

- a. *Home* tab of the ribbon, *Create Design* panel, select **Corridor** and perform the following:
- b. Name: **EOP**
- c. Alignment: **Parking Lot EOP**
- d. Profile: **FG-BASE-Surface (1)**
- e. Assembly: **6 IN Wall Curb**
- f. Click **OK**.



12) In the resulting *Baseline and Region Parameters* dialogue, click **OK**. A warning may pop up, simply click **Rebuild the corridor** to continue.

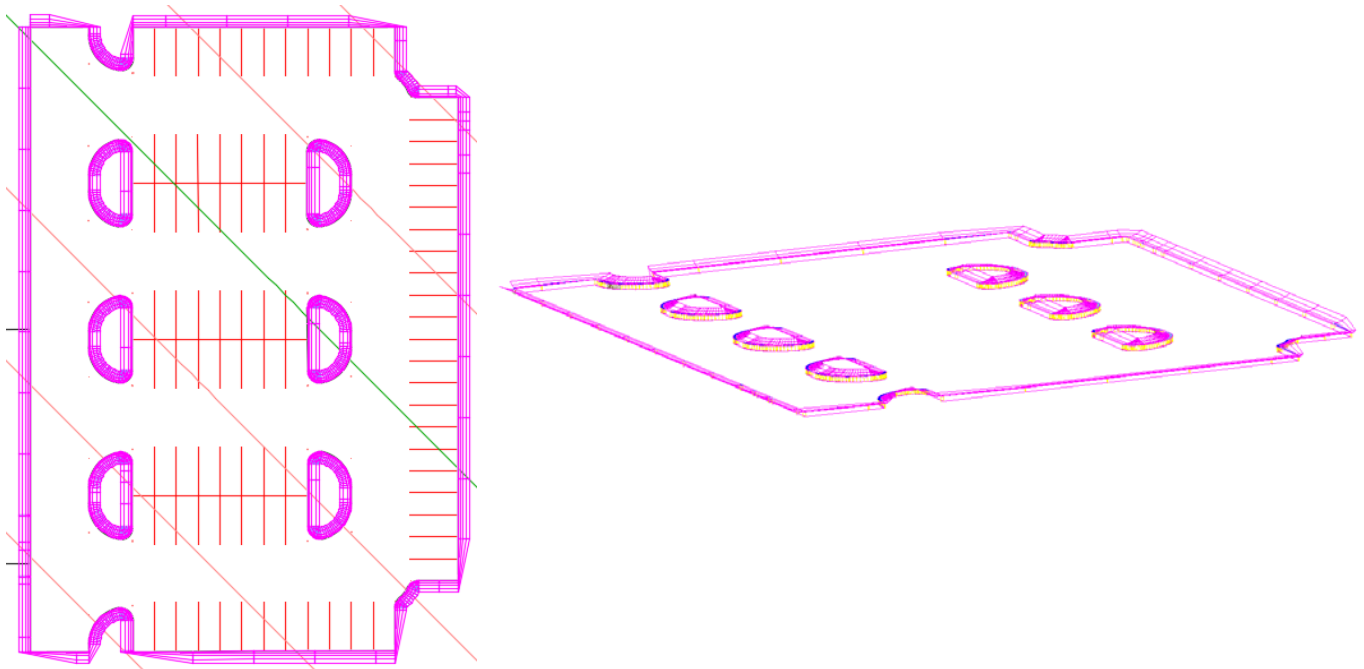


In lieu of the previous steps, start by opening **CI10424-R Dino Lustrì 17.dwg**

- 13) Following the same steps for the perimeter EOP, create alignments, profiles and corridor models for each of the islands.

NOTE: If the curbing appears on the 'outside' of the original curb line, thus making the parking space less than the minimum width required, simply reverse the island's alignment and rebuild the corridor. The curb model will reappear in the 'inside' of the island footprint. (Or you can mirror the assembly to the other side. Beware that if you already used the assembly elsewhere, it will change your previous work).

NOTE: If your corridor model does not regenerate the stations properly, simply eliminate the corridor model and recreate it after reversing the alignment.



Q.E.D.

The results of the previous steps can be obtained by opening **CI10424-R Dino Lustrì 18.dwg**

Once corridor surfaces are generated, they can be pasted into a single composite surface representing all the parts. The benefit of this methodology is that you can make changes to the underlying surface, i.e. you can change the slope, make numerous grade changes and the resulting islands will regenerate creating a functional final design. Labels will automatically update as well.