



Bentleyuser.dk Årsmøde 2010

Nordic Civil 2010

8.-10. November 2010, Munkebjerg Hotel, Vejle

Workshop - X7

Working with Site Modeler

Presenter: Lisa Whitson, Bentley Systems USA

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CE3WK6 Advanced Site Modeler (InRoads focus)

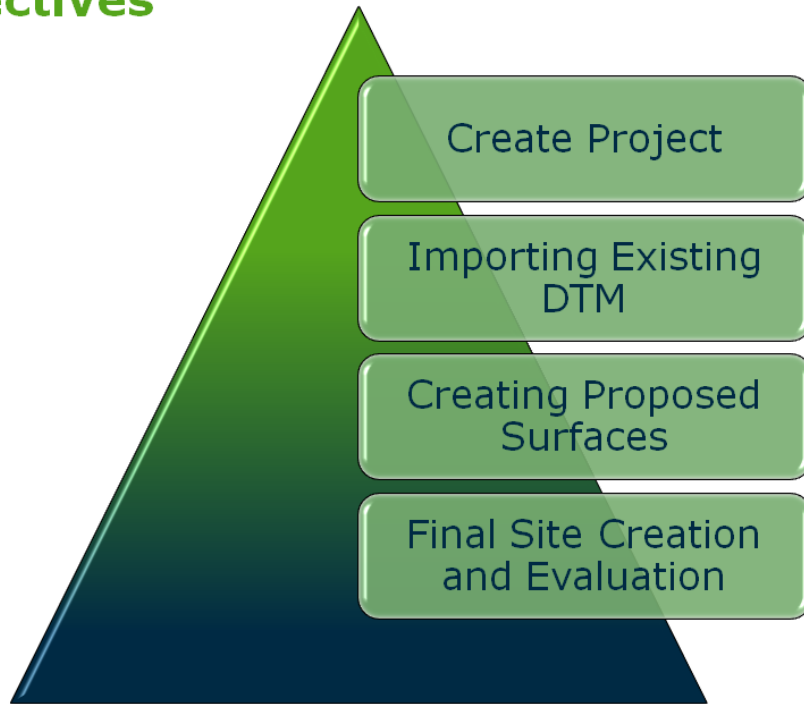
Corey Johnson – Bentley Systems

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THE BE COMMUNITIES LIVE CONFERENCE
PHILADELPHIA, PENNSYLVANIA, USA
MAY 17-21 2010

This advanced-level class introduces civil engineering designers to using Bentley InRoads based software for advanced grading projects. This hands-on training walks you through several techniques including how to model/design site features, including buildings, roadways, retaining walls and ponds. The following list details the content of each lab.

- Create Horizontal and Vertical Alignment
- Create a Site Modeler Project
- Create and modify a Roadway
- Create a Building
- Create a Parking Lot
- Create a retaining wall
- Create a Pond

Objectives



Lesson Name: Create a Site Modeler Project

LESSON OBJECTIVE:

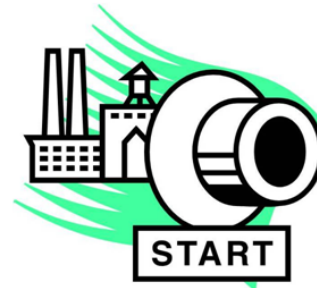
The Modeler enables fast, dynamic development of site models and easy management of the many changes that occur on site projects. It captures design intent as users work and provides immediate visual feedback. The software allows users to perform engineering modeling within a Digital Terrain Model (DTM)—without merging or extracting graphics into the DTM. Many traditionally cumbersome processes are reduced to one step: for example, you can dynamically move a building pad in a single drag and drop step—without measurement, clipping, merging, and placement steps.

The Site Modeler offers unprecedented flexibility in interactively working with site designs without the limitations of traditional iterative steps. No cumbersome triangle or point editing is necessary. The software maintains existing ground and provides full control over defining elevations and side slopes and balancing cut-and-fill. Analytical tools are included to afford powerful evaluation of site designs.

Modeler integrates digital terrain modeling with interactive 3D site design. The software allows you to incorporate design features in the model while maintaining existing ground. Move building pads. Change pond elevations. Extend retaining walls. Trim curbs. Resize berms. The Site Modeler automatically regenerates the DTM, yet retains full integrity of the models and the original DTM. There is no need for merging or extracting graphics into the terrain model. Easy, on-the-fly functions let you change elevations and side slopes and balance cut-and-fill. You can add features such as contours to the model as needed to define your design. Tools are supported for evaluating the site design and producing drawings and site models.

Starting Site Modeler for InRoads

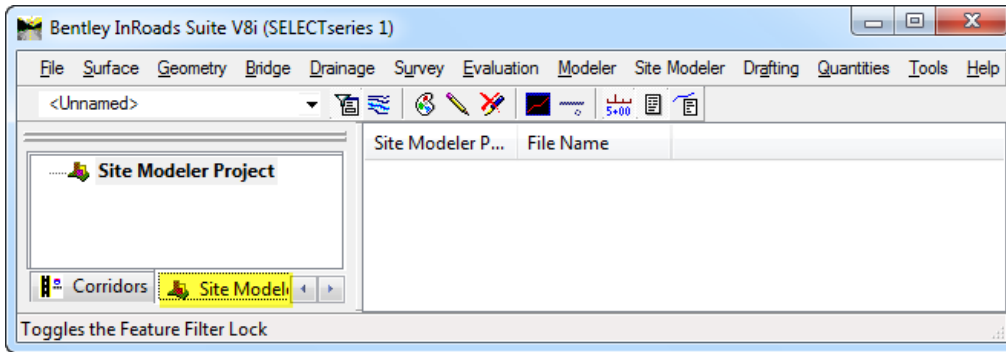
- Start Site Modeler for InRoads
- Load the files for this Lesson



EXERCISE: CREATING A SITE MODELER PROJECT

This exercise will guide you through the steps to get started

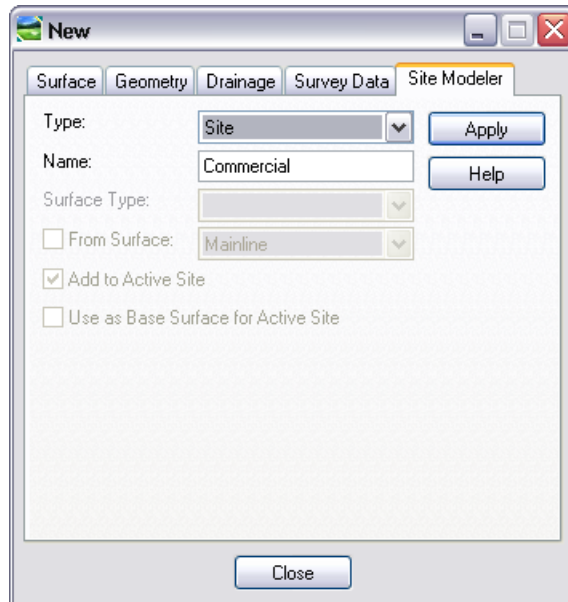
1. Double-click the InRoads or InRoads Suite icon
The MicroStation Manager appears
If there is no icon, then an alternate path for launching InRoads is
Start > Programs > Bentley > InRoads Group V8i (SELECTseries 1) > InRoads
2. The instructor will provide the appropriate path location for this project. Open the CAD file **Siteplan3D.dgn** located in the training folder for this workshop
3. Once InRoads has started, open the file **Project.rwk** located in the same folder as the design file.
4. In the Workspace Bar located, tab over to **Site Modeler**.



5. Right Click on **Site Modeler Project** and hit **New**.
6. For Type: select **Site Project** and for Name: input **Grading**.

EXERCISE: CREATING A SITE

1. Right Click on the Site Project called **Grading** and hit **New**.
2. For Type: select **Site** and for Name: input **Commercial**.



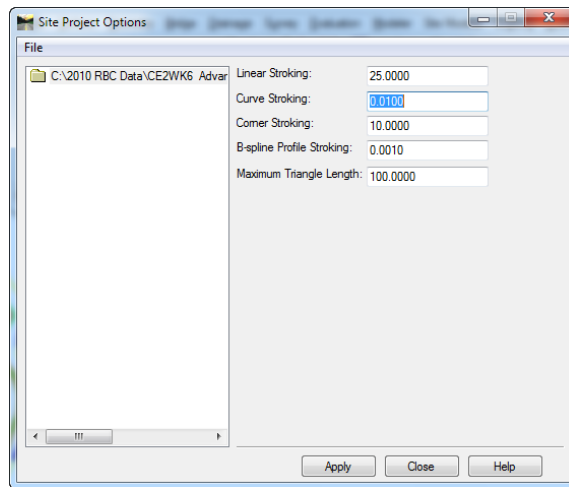
Lesson Name: Project Preferences

LESSON OBJECTIVE:

Modeler supports a wide array of user defined preferences which enables the designer to set project specific options, or a larger organization to set parameters to maintain standards. Each Modeler project contains a set of Preferences and they remain with the project.

Hint Hint: For efficient workflow, you can set the Preferences for a project, client, or your organization, then save them using the File > Save option. The default file extension is *.spf. The file can be opened in subsequent projects (File > Load), saving the time of redundant entry. The files can be placed on a server for multiple users.

The options are displayed in a list box in the left side of the dialog, while the right side displays parameters for the highlighted option. As different options are highlighted, the right side changes dynamically to reflect the selection. **OK** and **Cancel** close the dialog and storing the preferences, if required. Preferences can be

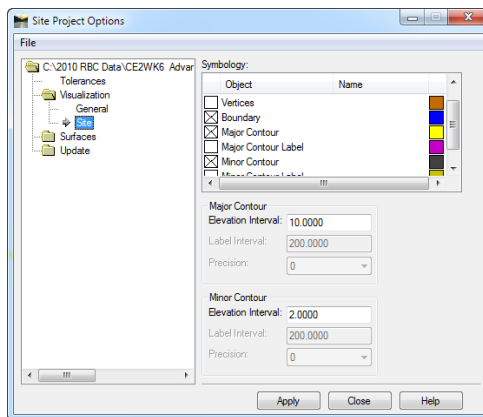


PREFERENCE OPTION	DESCRIPTION
Tolerances	Tolerance and stroking options used in the creation of Site Elements.
Visualization	Variety of element symbology and display options.
Surfaces	Standard List of Surface Types and default values for Surface parameters. The information includes the Surface Type and Naming Prefix, visualization settings and default side slopes for that Surface type.
Update	Toggle for automatic updating and setting a Working Boundary

EXERCISE: DEFINING THE PROJECT PREFERENCES

1. Select **Site Modeler > Tools > Options** then Select **File > Open > Site Options.spf**
2. Select **Surfaces > Existing Ground**.

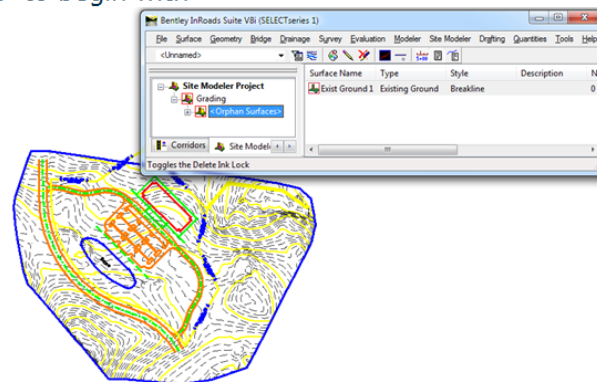
In the Surface Details, note the Visualization is toggled on, so the surface will be drawn. Triangles are turned off; however, Major and Minor Contours are turned on. No labels are placed, as their toggles are off.



3. Click **OK** and close dialog.

Creating a Project

- Start with the basics steps
 - Create plan design file of proposed layout
 - Have an "existing surface" available
 - Create Site Modeler Project
 - Load in "existing surface" to begin with
 - Save Project



EXERCISE: IMPORTING THE EXISTING DTM INTO THE PROJECT

While existing ground can be imported into a project at any time, it is best to do this first.

1. Select **File > New > Site Modeler**.

Hint: An alternate way to create a new surface is by Right Clicking on the Site Modeler Project and Selecting New as previously done in the exercise.

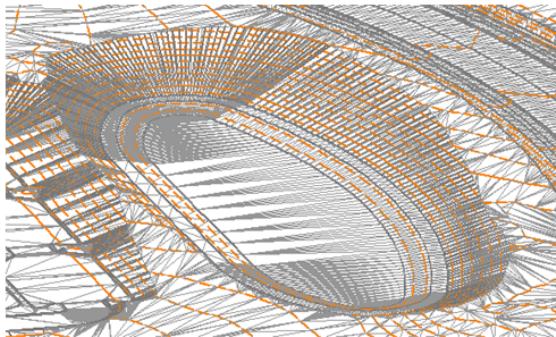
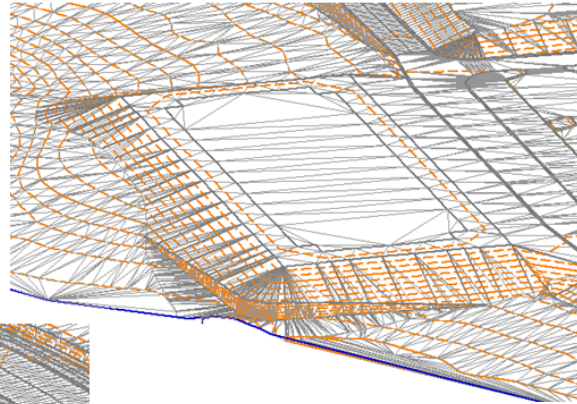
2. For Type: select **Surface**
 Surface Type: select **Existing Ground**
 Name: input **Existing Ground**.
 Toggle from Surface: **Existing_Ground**
 Toggle **Off** Add to Active Site
 Toggle **On** Use Base Surface for Active Site.
 Hit **Apply**

3. Save the site project. **File > Save > Site Modeler Project.**

Note When working on a project, frequent use of the File > Save pull down is important. Any changes made in the project are not recorded in the Modeler File (GSF) file unless a File > Save or File > Save As operation is executed. Hence, any power interruption or other malfunction will result in loss of data that can be avoided through the judicious use of the File > Save tool.

Create Design Surfaces

- Building Design
- Parking Lot Design



- Pond Design
- Roadway Design
- Retaining Walls

Lesson Name: Creating a Building Surface with Pad Design

LESSON OBJECTIVE:

This exercise will teach the student how to create a simple building pad and gentle sloping grassy area around the building pad.

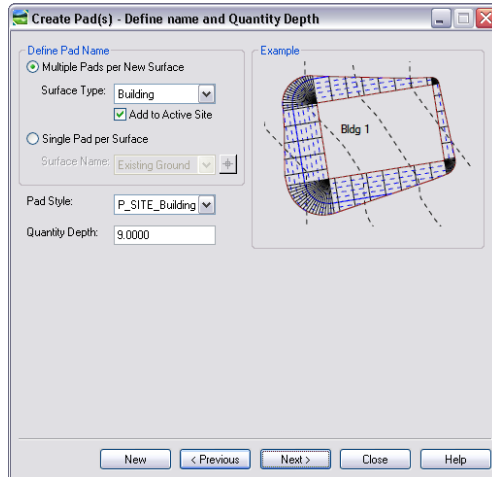
The conventional design process may typically start by creating the various access roads first. However, for the purpose of this training session, we will start by creating a building.

We are now going to create a building pad and add the building pad to our Model. We have a previously placed graphic shape that represents the footprint of our building. We will assign an elevation to this element based on the current existing ground conditions; place the element in a building surface that, in turn, will be placed into our Site.

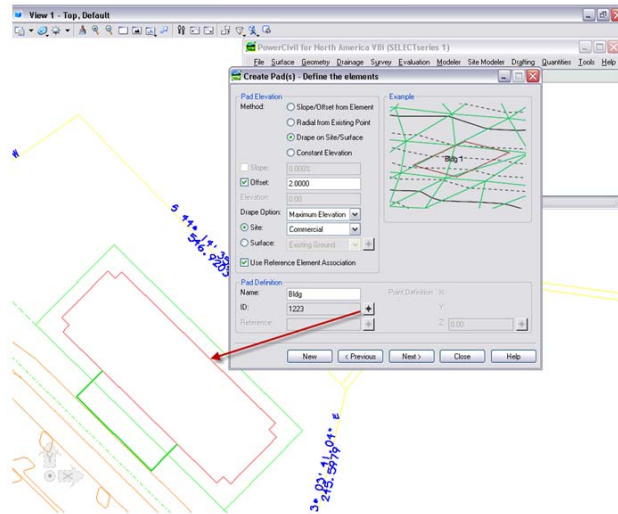
EXERCISE: CREATE BLDG1

1. Select **Site Modeler > Surface > Pad Design**

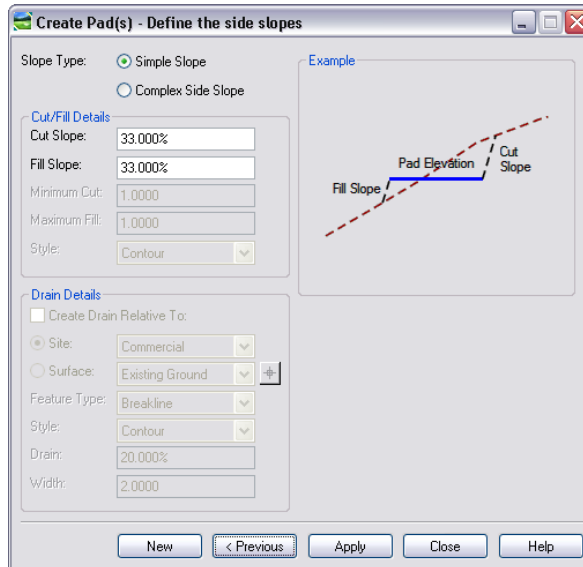
2. Review steps in Overview, Select **Next**.
3. Select *Multiple Pads per New Surface*, Surface Type: **Building**.
Toggle **On** Add to Active Site.
Pad Style: Select **P_Site_BuildingPad**.
Quantity Depth **9.0**.



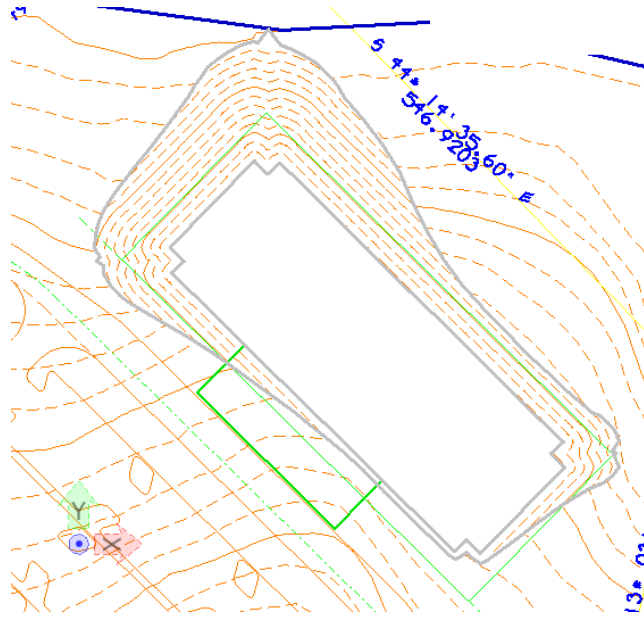
4. Select **Next**.
5. Select *Drape on Site/Surface*,
Toggle Offset **On** input **2.0**.
Drape Option: Select Maximum Elevation
Toggle Site: **Commercial**
Toggle **On** Use Reference Element Association
Name: Bldg
For ID: Use Pick Box and Select building graphic (Element id #1223) .



6. Click **Next**.
7. Select Simple Slope, input **1:3** or **33.00%** for Cut and Fill Slope.



8. Click **Apply**.
Building Pad is successfully added to Site called Commercial and contours are drawn.



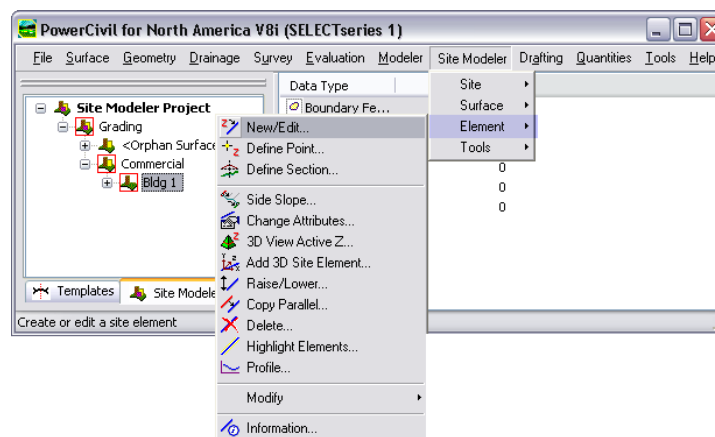
EXERCISE: ASSOCIATING A PLANTING AREA AROUND THE BUILDING

We will now add a grassy area around the building pad element. This grass area will have a -2% slope away from the building to ensure proper drainage. It should be noted that an element representing the outer boundary of this grassy area has been drawn into the file.

1. Select the 4 elements that comprise the outline of the grass area.

Hint The elements are the 4 solid green lines around the building outline. If you are having trouble identifying them, turn off the Display View by Right Clicking on Grading > Display Off.

2. Select **Site Modeler > Element > New/Edit**



3. Add to Surface **Bldg 1**

Do Not Select any items with the Element ID Pick Box, (these items were already selected before we ran the command)

Name: **Bldg**

Style: **P_Topo_Breakline**

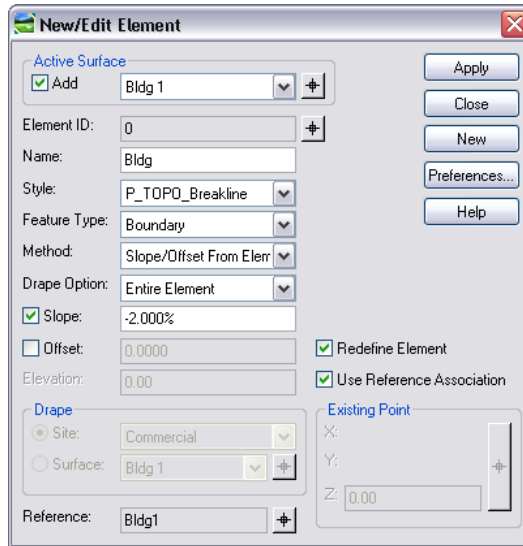
Feature Type: **Boundary**

Method: **Slope/Offset From Element**

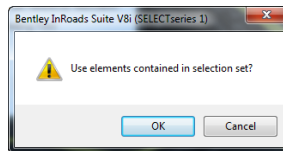
Drape Option: **Entire Element**

Toggle **On** Slope: **-2.0%**

Toggle **On** Redefine Element and Use Reference Association

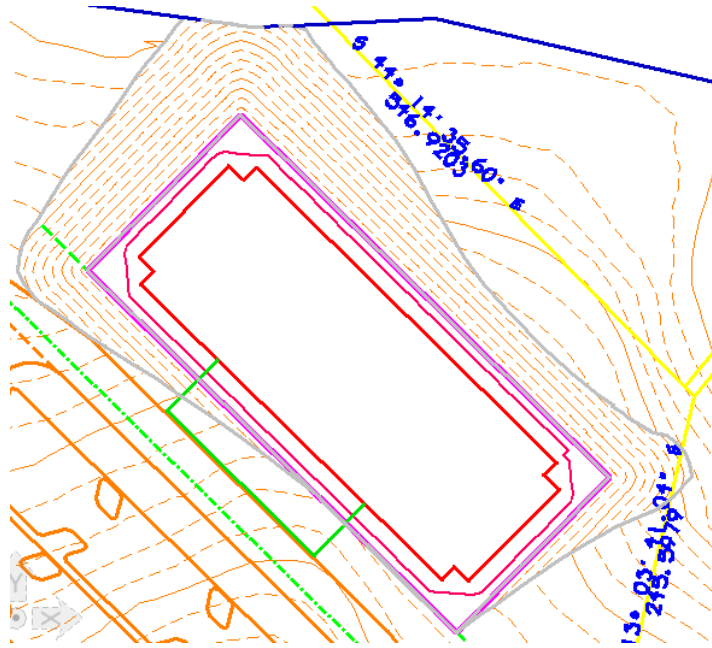


4. Select the Reference Pick Box and Select the Building graphic from the previous step.
5. Click **Apply**.



6. Click **OK** on Selection Set Dialog Alert.

The grass area elements are added to the BLDG 1 Surface. If you turned off the Display View in an earlier step, turn it back on now to see the element and associated contours.



This completes our Bldg 1 Surface for now. We may come back later and change it in some way, possibly raising or lowering it.

Lesson Name: Creating a Parking Lot

LESSON OBJECTIVE:

In this section, we will design and grade the parking lot. The desired slope across the parking lot is 2%. The parking lot will slope away from the building and entrance road. In order to create this design, we will create a temporary surface.

This surface is based off of the building elevation, and slope at 2% away from the building. This temporary surface will encompass the total area of the parking lot layout. Once this temporary surface is created we will proceed to drape all the elements representing the various Parking Lot edges of pavement onto the temporary surface. This will create a simple 2% grade across the parking area.

We can then proceed to place curb and gutter where appropriate.

EXERCISE: CREATING TEMPORARY SURFACE

1. Select **File > New > Site Modeler**.

Hint An alternate way to create a new surface is by Right Clicking on the Site Modeler Project and Selecting New as previously done in the exercise.

2. For Type: select **Surface**
Name: **Temp Grading 1**
Surface Type: select **Temporary Grading**
Toggle **Off** From Surface
Toggle **Off** Add to Active Site
Toggle **Off** Use Base Surface for Active Site.
3. Click **Apply**
4. Select **Site Modeler > Element > New/Edit**
5. Add to Surface **Temp Grading 1**

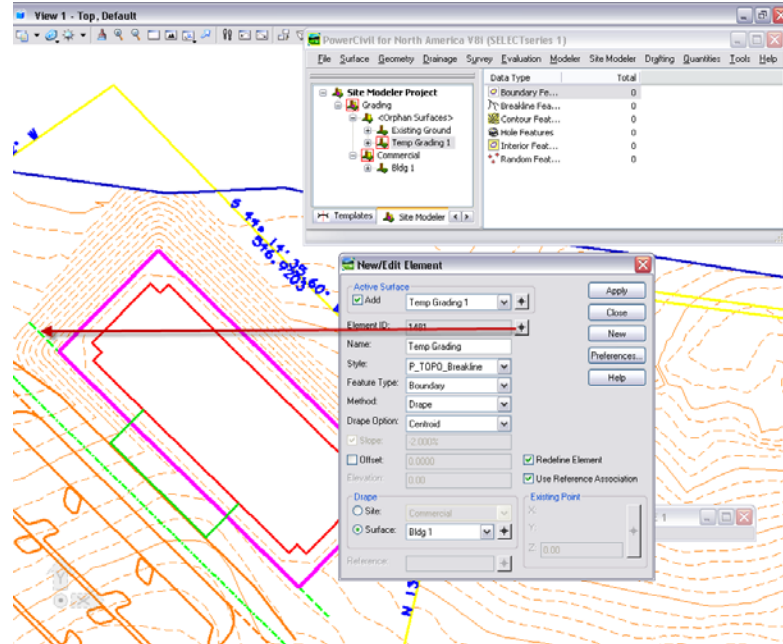
Element ID: Using Element ID Pick Box, Select the long dashed green line next to Bldg 1

Hint The element is a dashed green line extending past the building outline. If you are having trouble identifying it, turn off the Display View by Right Clicking on Grading > Display Off.

Name: **Temp Grading**
Style: **P_Topo_Breakline**
Feature Type: **Boundary**
Method: **Drape**
Drape Option: **Centroid**

Toggle **On** Redefine Element and Use Reference Association

Drape on Surface **Bldg 1**.



6. Click **Apply**.

7. Select **Site Modeler > Element > New/Edit**

8. Add to Surface **Temp Grading 1**

Element ID: Using Element ID Pick Box, Select dashed green line at opposite end of parking lot

Name: **Temp Grading**

Style: **P_Topo_Breakline**

Feature Type: **Boundary**

Method: **Slope/Offset From Element**

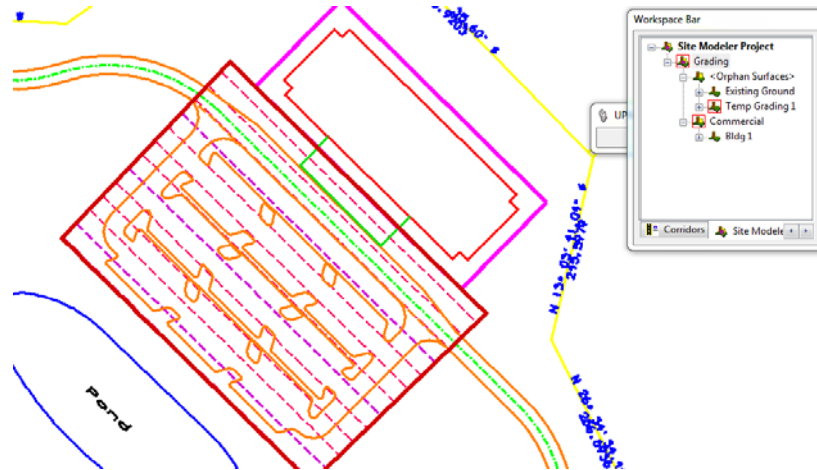
Drape Option: **Entire Element**

Toggle **On** Slope: **-2.0%**

Toggle **On** Redefine Element and Use Reference Association.

Using **Reference** Pick Box, Select dashed green line near building. (previous item selected)

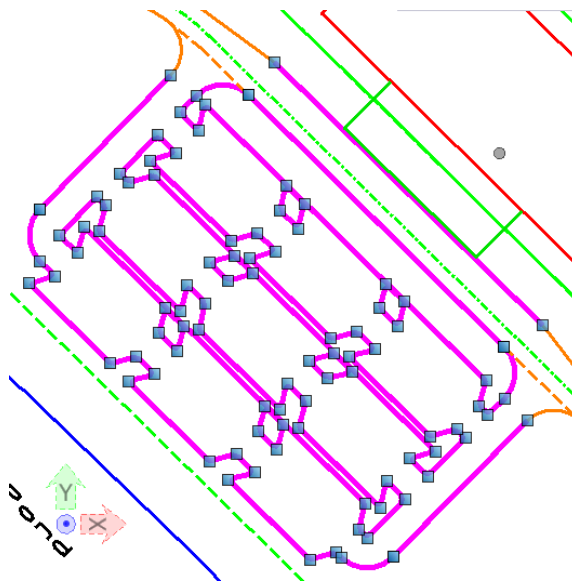
9. Click **Apply**.



EXERCISE: CREATING THE PARKING LOT

We now have a 2% sloped area (Surface - Temp 1) which encompasses the entire area of the proposed parking lot. At this point, we can simply select all the parking lot edges of pavement and drape them down onto this temporary surface. Thereby effectively and efficiently creating a nice 2% slope from element to element throughout the entire parking lot.

1. Select the graphical elements defining the parking lot, do not select the returns tying it to the entrance road.



2. Select **File > New > Site Modeler**.
For Type: select **Surface**
Surface Type: select **Parking**

Name: **PL 1**

Toggle **Off** from Surface

Toggle **On** Add to Active Site

Toggle **Off** Use Base Surface for Active Site

3. Click **Apply** and **Close**.
4. Select **Site Modeler > Element > New/Edit**
5. Add to Surface **PL 1**

Element ID: **Do Not** Select any items with the Element ID Pick Box
(those items were already selected before we ran the command)

Name: **PL**

Style: **P_Road_EdgeofPavement**

Feature Type: **Breakline**

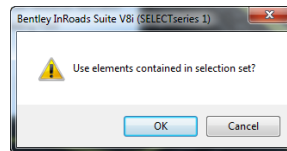
Method: **Drape**

Drape Option: **Entire Element**

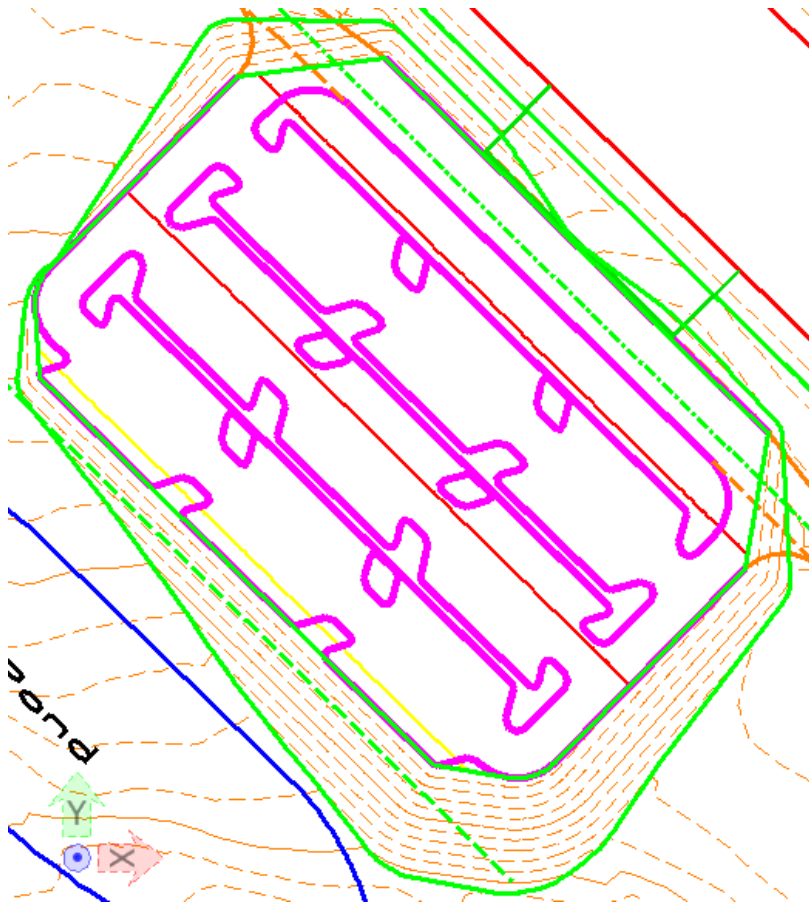
Toggle **On** Redefine Element and Use Reference Association.

Drape on Surface **Temp Grading 1**.

6. Click **Apply**.



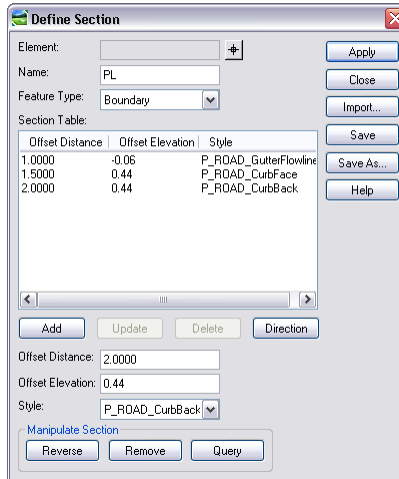
7. Click **OK** on Selection Set Dialog Alert.
8. Your Results should be similar to below. If you do not see any contours, did you Turn Off Display for Commercial Site???? Right Click on Commercial Site and Turn On Display.



EXERCISE: CREATING THE PARKING LOT ELEMENTS – ADDING CURB AND GUTTER

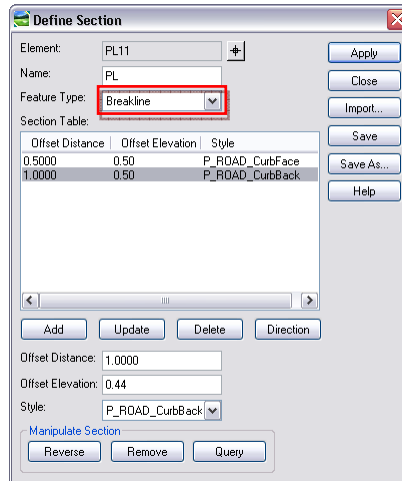
We will now add the appropriate curb & gutter at the edges of pavement throughout the parking lot. Around the exterior of the lot we will place the same 6” curb & gutter we will be using on the entrance road. In the interior islands we will place a simple 6” curb with no gutter.

1. Select the 3 outer graphical elements defining the parking lot, do not select the internal islands.
2. Select Site **Modeler > Element > Define Section.**
3. Name: **PL**, Feature Type: **Boundary.**
4. Offset Distance: **1.0**, Offset Elevation: **-.06**, Style: **P_ROAD_GutterFlowline.**
5. Click Add, adds data to Section Table above.
6. Repeat steps to match Dialog below.

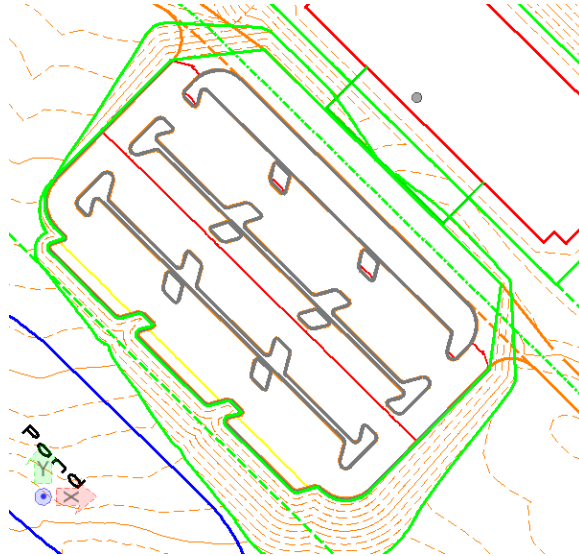


7. Select SaveAs... name curb.txt
8. Select Direction Button, move cursor so **Direction of Section** is facing outside of the parking lot.
9. Repeat the same steps for the internal islands using the settings below.

Hint For closed shapes, you will need to select each shape one at a time and set direction internal to the island. If you use several different types of sections, you can import a saved version.



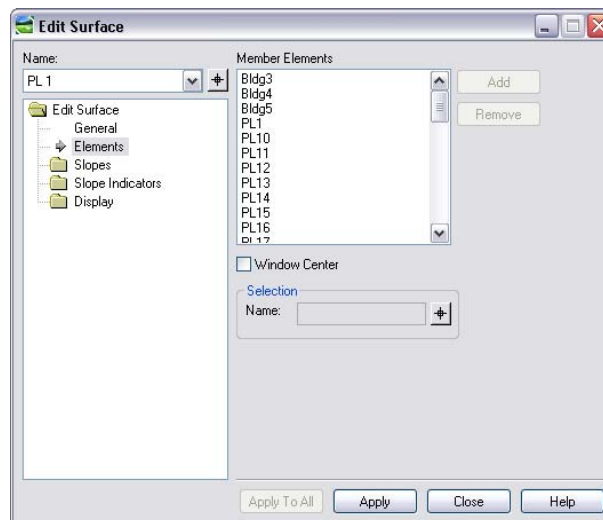
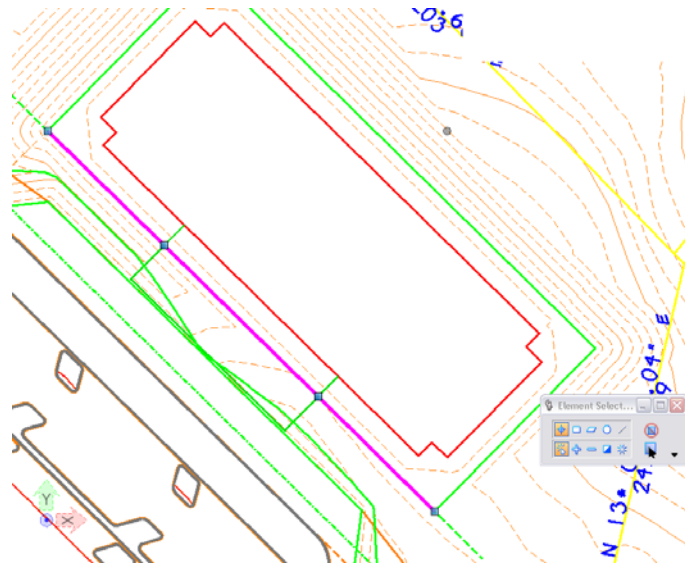
10. Review your design, should be similar as shown below.



EXERCISE: CREATING THE PARKING LOT ELEMENTS – SHARING BUILDING ELEMENTS

Several building elements that are adjacent to the parking lot object need to be shared with the parking lot to ensure a direct transition between the two objects.

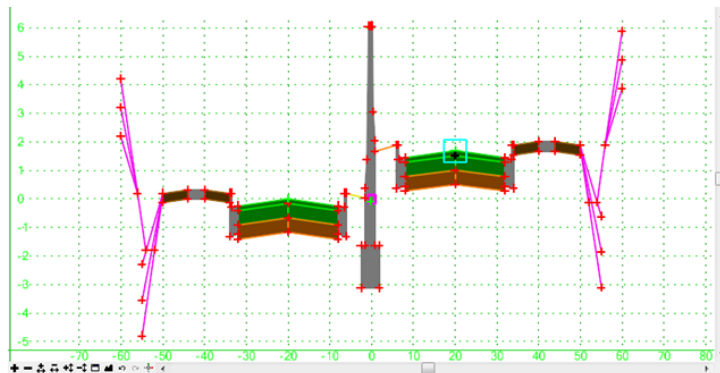
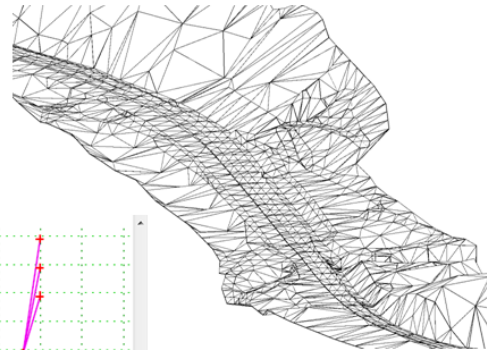
1. Select Site **Modeler > Surface > Edit > Elements**.
2. Name: **PL 1**
3. Using Selection Pick Box, Select each graphic one at a time, then **Add** them to Member Elements dialog.



4. Click **Apply > Close**.
5. We have successfully tied the parking lot and building together. Let's raise and lower the elevations and test the connectivity.
6. Select **Site Modeler > Surface > Raise/Lower...**
7. Using the Pick Box, Select the Building graphic. Raise it 5 feet, what happens? Lower it 5 feet.

Express Modeler / Roadway Designer

- Dynamic Templates
- Quick Roadway Creation



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Roads and Bridges



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Lesson Name: Creating the Mainline Roadway using Templates

LESSON OBJECTIVE:

Now we will design the mainline road. The layout of the horizontal and vertical alignment is complete. We will look at the Express Modeler vs. Roadway Designer. If you are using PowerCivil for North America, you will not have access to Roadway Designer, but can still benefit from the Templates and their flexibility with Express Modeler. These tools will aid us in creating all the roadway elements in one step.

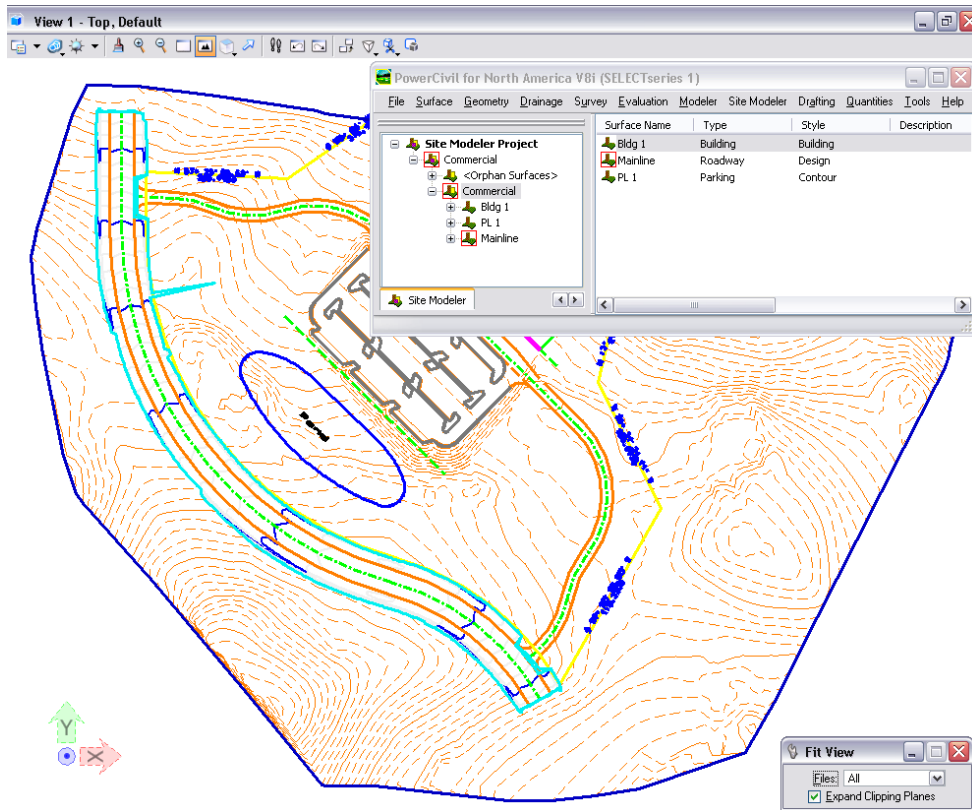
EXERCISE: REVIEWING THE TEMPLATE

1. Select **Modeler > Create Template**.
2. Double click in **Urban 4 Lane**.
3. Click on **Test** and place **P_ROAD_LaneLine-Style** as a target to the left, then right.
4. Review what is happening. Place **Active Surface** target and test End Conditions available within Templates.

Hint By using Parent/Child relationships and targeting styles increases the flexibility of Express Modeler. Notice the End Condition set to "Not Construct" targeting a style.

EXERCISE: RUNNING EXPRESS MODELER (POWERCIVIL FOR NORTH AMERICA)

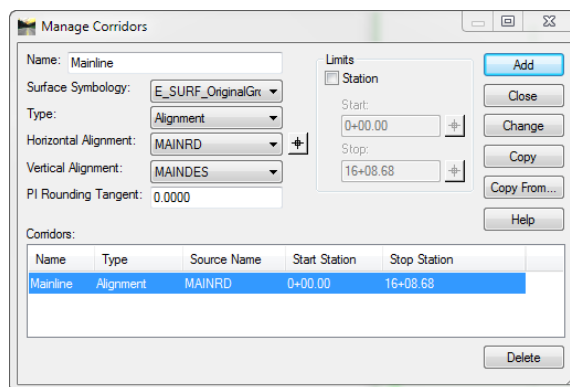
1. Select **Modeler > Express Modeler**.
2. Select Horizontal Alignment: **MAINRD**
Vertical Alignment: **MAINDES**
Interval: **5.0**.
3. Select **Templates > Urban 4 Lane**
4. Active Surface: **Existing_Ground**
Design Surface Name: **Mainline**
Default Preference: **Proposed**
Toggle **On** Add Exterior Boundary
Style: **P_TOPO_Exterior**
Toggle **On** Triangulate Surface
5. Hit **Apply**. Review Surface in Workspace Bar.
6. Select **File > New > Site Modeler**
7. For Type: select **Surface**
Surface Type: select **Roadway**
Name: **Mainline**
Toggle **On** from Surface: **Mainline**
Toggle **On** Add to Active Site
Toggle **Off** Use Base Surface for Active Site



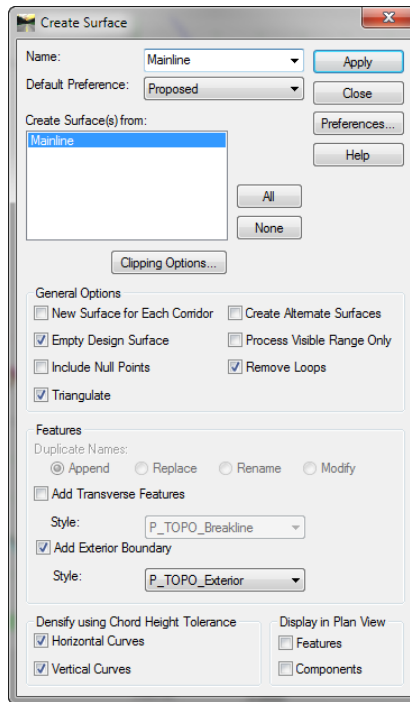
8. Review Site Project
9. Save Site Modeler Project

EXERCISE: RUNNING ROADWAY DESIGNER

1. Select **Modeler > Roadway Designer**
2. **Corridor > Corridor Management** from the menu on **Roadway Designer**
3. Name: **Mainline**
4. Surface Symbology: **E_SURF_OriginalGround**
5. Type: **Alignment**
6. Horizontal Alignment: **MAINRD**
7. Vertical Alignment: **MAINDES**



8. **Close** the **Corridor Management** dialog
9. On the **Roadway Designer** dialog click the **Fit** on the profile pane. You should now see the plan view of the alignment and the profile view of it
10. To apply templates to the corridor go to **Corridor > Template Drops**
11. Ensure that **12+34** is set for the **Station**
12. Set the Interval to **5.0**
13. Expand the **Library Templates** tree and highlight the **Urban 4 Lane** template.
14. Click **Add**
15. **Close** the **Template Drops** dialog.
16. Review your sections in **RD** and notice the areas around the **Entrance Roads**, what is happening?
17. Click **Create Surfaces**
18. Save Surface as **Mainline**



19. In the Roadway Designer dialog select **File > Save** to save the Roadway Designer project file. Name the file **Commercial.ird**.

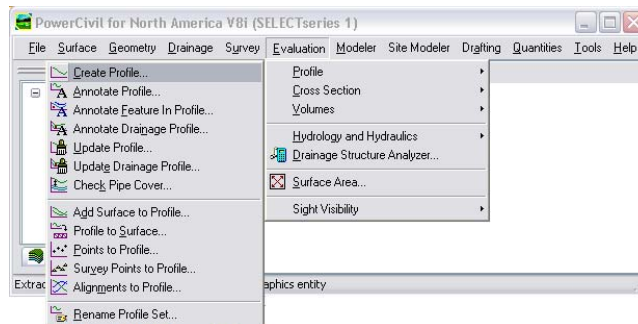
Lesson Name: Creating the Entrance Roadways

LESSON OBJECTIVE:

Now we will design the entrance roads. The layout of the horizontal alignment is complete, but we need to create the profile to connect to our designed elevations. Using the Evaluation Tools we will create a proposed profile and run the Express Modeler along our designed profile.

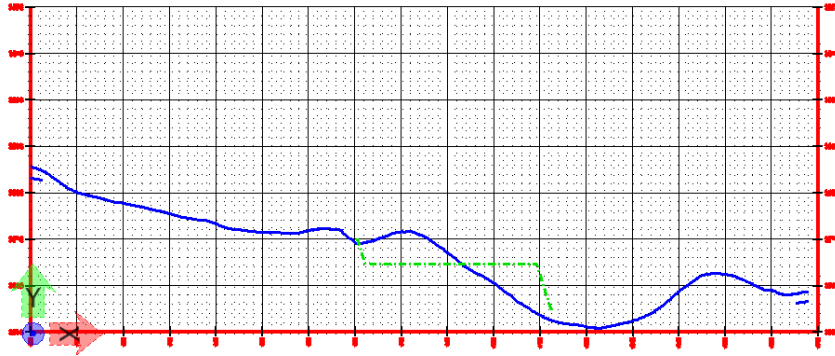
EXERCISE: EVALUATING THE PROFILE ALONG THE ALIGNMENT

1. Select **File > New > Geometry > Vertical Alignment**.
2. Name: **Entrance**
Description: **Proposed Vertical**
Style: **P_Cogo_Vertical**
Curve Definition: **Parabolic**
3. Click **Apply** the **Close**.
4. **Pan** design graphics off the screen to place profile.
5. Select **Evaluation > Profile > Create Profile**



6. Select **General**, Toggle **On** the following Surfaces: **Existing_Ground, Mainline, PL 1**
7. Select **Source**, Toggle Alignment: **Entry**
8. Click **Apply** and Accept DP on screen.
9. Click **Close** on Create Profile Dialog.

Hint Follow prompts in the lower left portion of the MicroStation window if unsure what to do next.

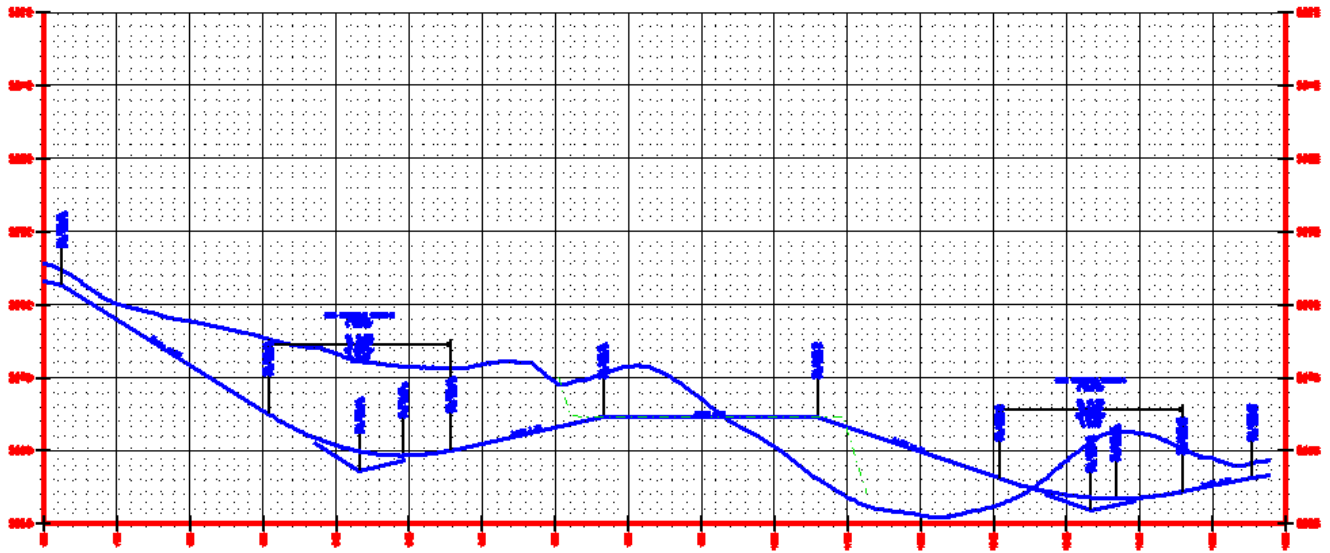


EXERCISE: CREATING THE PROFILE

1. Select **Geometry > Vertical Curve Set > Add Pl...**
2. Name: **Entrance**
3. Description: **Proposed Vertical.**

Hint Follow prompts in the lower left portion of the MicroStation window.

4. Start Profile on the left, target the edge of the **Mainline** surface showing in profile.
5. Open Key-In window from MicroStation.
6. **Key-in se=425.00,5257.25** for second point.
7. Dynamic snap to **PL 1** surface at approximate station value **7+65**.
8. Snap across the **PL 1** surface again at approximate station value **10+59**.
9. **Key-in se=1435.00,5251.90**
10. Dynamic snap to edge of **Mainline** surface.
11. Select **Geometry > Vertical Curve Set > Define Curve...**
12. Set **2** Vertical Curves with length for **250** feet to achieve a profile similar to below.



Hint Notice the Automatic Annotation!

13. Save Geometry Project.

EXERCISE: RUNNING EXPRESS MODELER OR ROADWAY DESIGNER ALONG NORTH AND SOUTH ENTRANCE

1. If using **Roadway Designer**, follow steps from above and use **stations** listed below and surface names
2. Select **Modeler > Express Modeler**.
3. Select Horizontal Alignment: **ENTRY**
Vertical Alignment: **Entrance**
Interval: **5.0**
Select **Templates > Entrance**
Active Surface: **Existing_Ground**
Design Surface Name: **South**
Default Preference: **Proposed**
Toggle **On** Add Exterior Boundary
Style: **P_TOPO_Exterior**
Toggle **On** Triangulate Surface
Toggle **On** Station under Limits
Start: **0+50.56**, Stop: **6+88.23**
4. Hit **Apply**. Review Surface in Workspace Bar.
5. Repeat steps 2 through 7 for North End
Design surface Name: **North**
Start: **11+60.13**, Stop: **16+21.82**
6. Hit **Apply**. Review Surface in Workspace Bar.
7. Select **File > New > Site Modeler**
8. For Type: select **Surface**
Surface Type: select **Roadway**
Name: **South**
Toggle **On** from Surface: **South**
Toggle **On** Add to Active Site
Toggle **Off** Use Base Surface for Active Site
9. Repeat for **North Entrance**
10. For Type: select **Surface**
Surface Type: select **Roadway**
Name: **North**
Toggle **On** from Surface: **North**

Toggle **On** Add to Active Site

Toggle **Off** Use Base Surface for Active Site.

These 2 Entrances should now have been added to the Site Modeler Project.

EXERCISE: TYING ENTRANCE ROADS TO PARKING LOT

1. In the **Workspace Bar**, Navigate to **PL 1** and right click to make **Active**.
2. Select **Site Modeler > Element > New/Edit**
3. Add to Surface **PL 1**

Name: **PL**

Style: **P_Road_EdgeofPavement**

Feature Type: **Breakline**

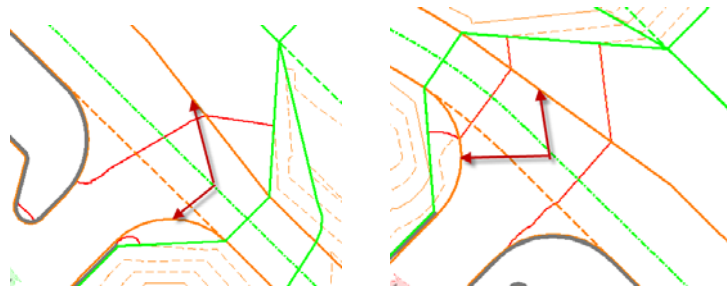
Method: **Drape**

Drape Option: **End Points**

Site: **Commercial**

Toggle **On** Redefine Element and Use Reference Association

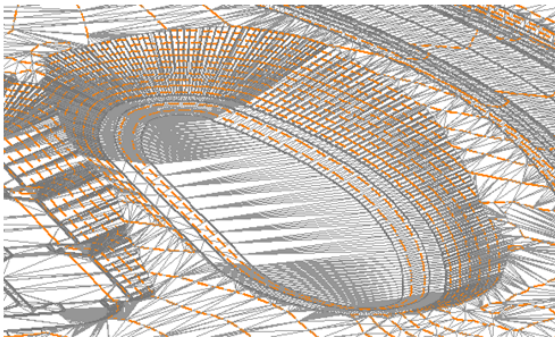
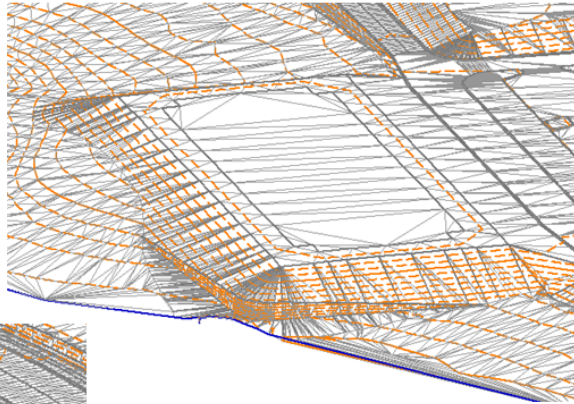
4. Select the Following graphics.



5. Repeat the steps for the other side of the Parking Lot as shown above.
6. Now Apply the Curb and Gutter Section we saved earlier as a **Boundary** to point the direction to the outside.

Create Design Surfaces

- Building Design
- Parking Lot Design



- Pond Design
- Roadway Design
- Retaining Walls

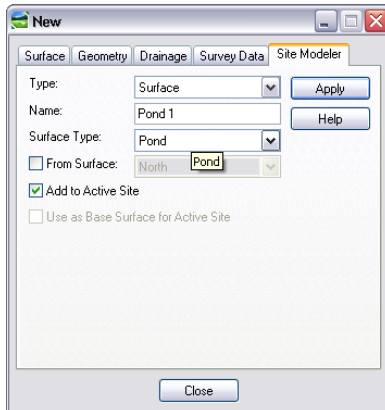
Lesson Name: Creating a Detention Pond

LESSON OBJECTIVE:

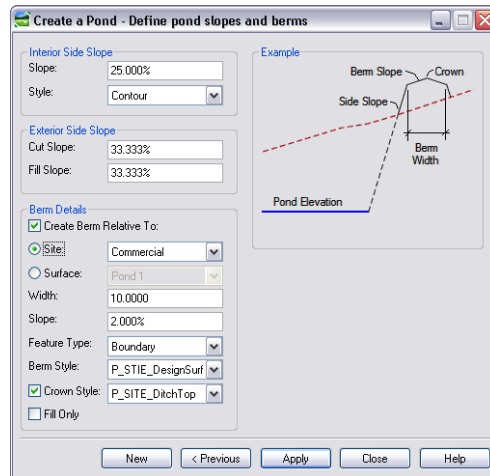
In this section we will create a pond object between the roadway and the parking lot. The MicroStation element that represents the pond shape has already been created and we will assign the desired elevation. There are many different ways to create the pond surface, we are going to focus on using the Pond Design tool for this workshop. After the pond is created we will use a few analysis tools to analyze pond volume.

EXERCISE: CREATING A POND WITH THE POND DESIGN TOOL.

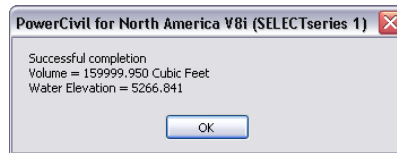
1. Select **Site Modeler > Surface > Pond Design**.
2. Review the Steps Outlines in the Overview. Click **Next**.
3. Click **New** at the bottom of the dialog to create a new surface. Match dialog settings below.



4. Style: **P_SITE_RetentionPond**
 Toggle **On** Top-Down Design
 To Volume: **160,000**
5. Click **Next**
6. Toggle Drape on **Site/Surface**
 Drape Option: **Minimum Elevation**
 Site: **Commercial**
 Using the ID Pick Box, select the blue pond graphic
7. Click **Next**
8. Interior Side Slope: **1:4 or 25%**
 Exterior Cut and Fill Slopes: **1:3 or 33.33%**
 Toggle **On** Create Berm Relative To:, Site: **Commercial**
 Width: **10.0**
 Slope: **2.0%**
 Feature Type: **Boundary**
 Berm Style: **P_Site_DesignSurface**
 Crown Style: **P_Site_DitchTop**
 Toggle **Off** Fill Only



9. Click **Apply**



10. Click **OK** on the verification box.

11. Using the **Surface Move** Tool, grab the **Pond** and move around.

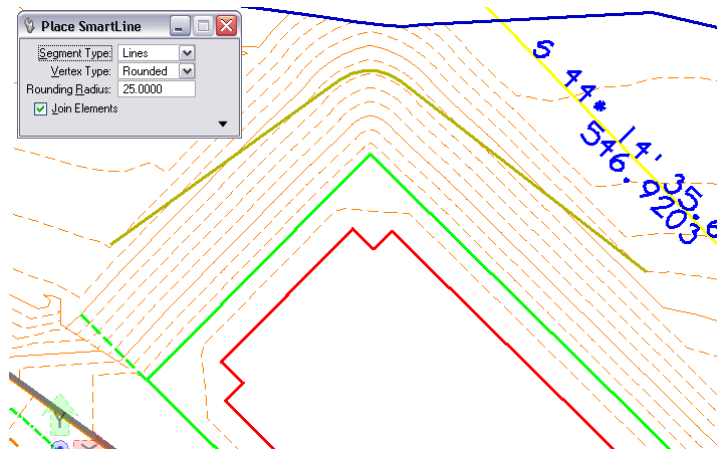
Lesson Name: Creating a Simple, Dynamic Retaining Wall

LESSON OBJECTIVE:

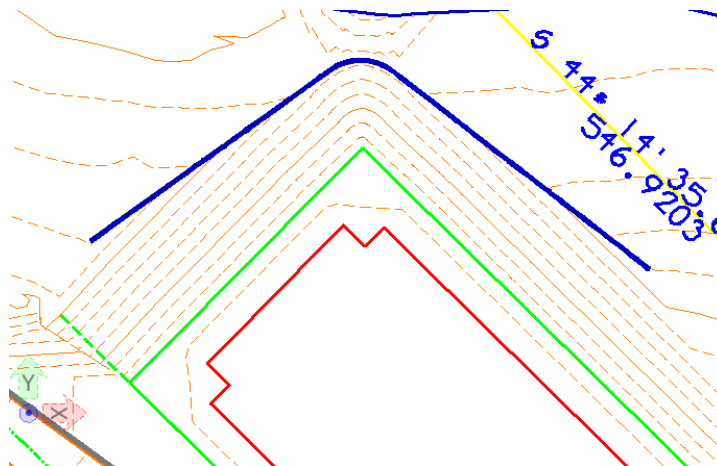
In this section we will create a simple retaining wall to limit the grading around the building. There are many different ways to create a retaining wall, we are going to focus on using simple graphics for this workshop.

EXERCISE: CREATING A RETAINING WALL GRADING SURFACE.

1. Around the north edge of the building, using the **Place SmartLine** command, create a retaining wall location several feet away from the building and planting area, place a **25'** radius at the corner.

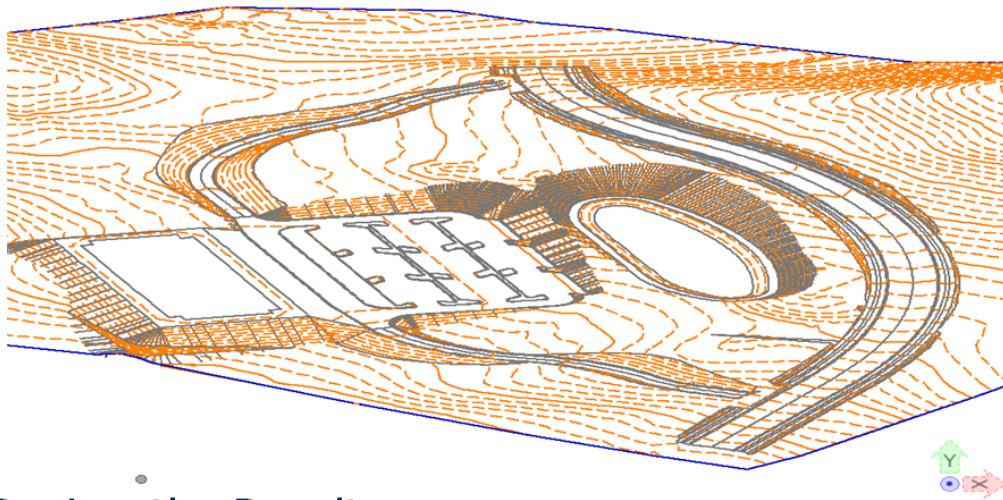


2. Now offset that line **1'** to the **North**
3. Create a **New Surface** using **Retaining Wall** Type called **Wall 1** and **Add to Active Site**
4. **Drape** first element on **Site: Commercial** using **entire element** drape as a **boundary**
5. **Drape** second element on **Surface: Existing Ground** using **entire element** as a **boundary**



Create the Finished Surface

- Create One Site from Multiple Surfaces



- Review the Results

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Roads and Bridges



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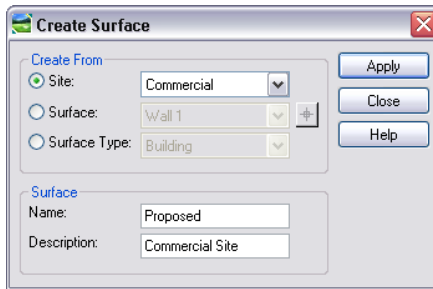
Lesson Name: Site Modeler Tools

LESSON OBJECTIVE:

In this section we will explore the features located under the Tools Pulldown. Create Surface will take our dynamic design surface and create a DTM for use in creating machine control surfaces and combining with Roadway Corridors. Export Visualization will export our dynamic visualization for use in plans production. Site Volume will give you interactive volumes within Site Modeler. Site Tracking will allow you to check elevations and slopes anywhere on you Site or Surfaces you created on the fly. Synchronize with Graphics will reapply the proper Site Modeler associations to CAD graphics if a graphic is modified outside of Site Modeler. Options controls the preferences for our surfaces, we covered in the first lesson.

EXERCISE: CREATE SURFACE.

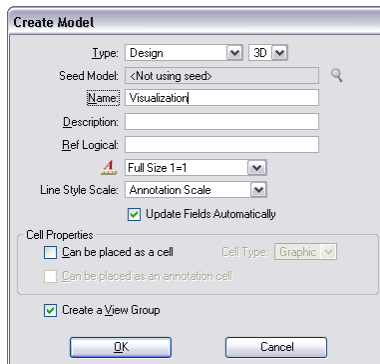
1. Select **Site Modeler > Tools > Create Surface**.
2. Select Site: **Commercial**, under Surface for Name: **Proposed**, Description: **Commercial Site**.
3. Click **Apply** then **Close**.



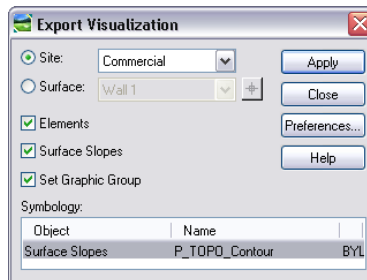
Hint This creates a Proposed.DTM for use in plans production and for use in the remainder InRoads program.

EXERCISE: EXPORT VISUALIZATION.

1. Save your current **Site Modeler Project**. Within **MicroStation**, create a new 3D Model called **Visualization**



2. Select **Site Modeler > Tools > Export Visualization**.
3. Select Site: **Commercial**
Toggle **On** Elements, Surface Slopes, Set Graphic Group
Symbology: **P_TOPO_Contour**
4. Click **Apply**
5. Then **Close**



Hint This will create a 3D/2D presentation of the surface and elements that created the surface based on the Preferences .SPF file. **Alternatively**, you can display the information from the DTM surface we created previously.

EXERCISE: SITE VOLUME.

4. Select **Site Modeler > Tools > Site Volume**
5. Select **General**
Toggle **On** Prismoidal
Cut Factors, Cut:**1.0**, Fill:**1.3**
6. Select **Calculation Options**
Select Surface to Site
From:**Existing Ground**, To:**Commercial**
Toggle **Off** Use Quantity Depth, By FIFO, and Use Range
7. Click **Apply**
8. Reselect **General** tab to see results.

Hint This will compare our Existing Ground surface to our completed Site called Commercial. Review your results.

6. Reselect **Calculation Options**
Toggle **On** Use Quantity Depth
7. Click **Apply**
8. Reselect **General** tab to compare results.

Hint Why did the results change? Remember we applied **9.0** foot **Quantity Depth** on our Bldg 1.

EXERCISE: SITE TRACKING.

1. Select **Site Modeler > Tools > Site Tracking.**
2. Select Site: **Commercial**
Toggle **On** Elevation
Click **Activation** and move cursor around on your screen
3. Toggle **On** Slope
Slope Between Points
Click **Activate**. Select **2** points on the Site
4. To Adjust the Visualization of the Arrow, Contour and Elevation Text, Click **Settings**

Hint This can be used at any stage of the design process. It is a very powerful tool to evaluate your design as you create it.