



# Lesson 10: Analyzing The Model

## WELCOME!

In this lesson we will look at a variety of tools to analyze the current state of the site model. There are tools to compute volumes between objects and models, display cut/fill depths between objects and models, display the surface of models and objects with different themes as well as many other tools. These tools can be invoked at any point in the design process to check a desired result.

## LESSON OBJECTIVES

In this lesson, the topics covered include:

- Height/Slope Analysis Tool
- Profile Analysis Tool
- Volumes Analysis Tool
- Elevation Differences Analysis Tool
- Themes Analysis Tool

Be sure to have a look at the context sensitive help for PowerCivil. Either while using the tutorial or in general practice with the software, you will find the help system not only includes program documentation but it also is equipped with links to online video clips (internet connection is required). Access the help from the menu bar under *Help>Civil Help*.

## INTRODUCTION

We have a completed grading design. This lesson will show you how to use the available analysis tools to evaluate the design. We will check the cut/fill volumes, evaluate the surface drainage, check slopes, elevations, etc. Some of the tools have been looked at in previous lessons. This demonstrates the fact that these tools can be invoked at any point in the design process to check and evaluate your work.

## SITE MODELER ANALYSIS TOOLS

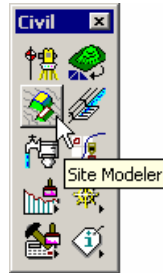
With the GSF model created, the Analysis Tools provide you with many ways to evaluate your grading design.

From the desktop, launch PowerCivil from the program icon, navigate to the folder for Lesson 10 and then open the file “LAYOUT.DGN” Once in the file, you will want to follow these steps:

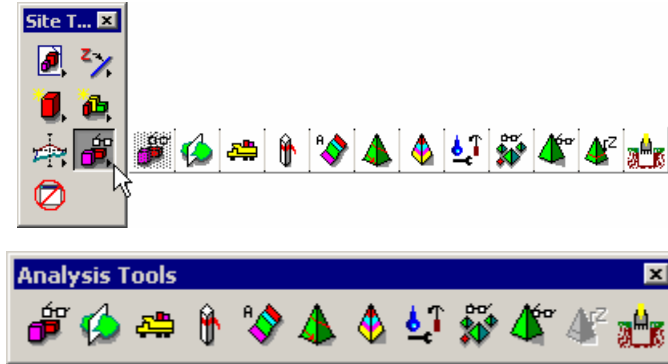
1. Open the Civil Tools. (*Civil>Civil Tools*)



2. Invoke the “Site Modeler” tool and select the “GSF” file from the Lesson 10 folder “LAYOUT.GSF”



3. Tear off the “Analysis” tool palate from the “Site” tool frame.

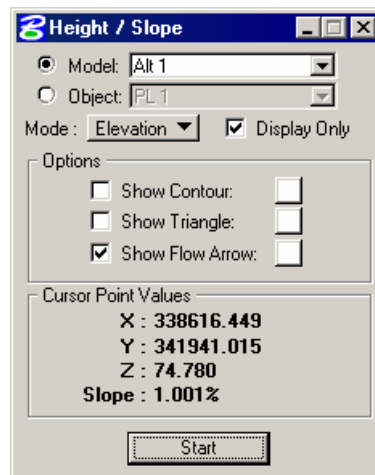


### HEIGHT/SLOPE TOOL

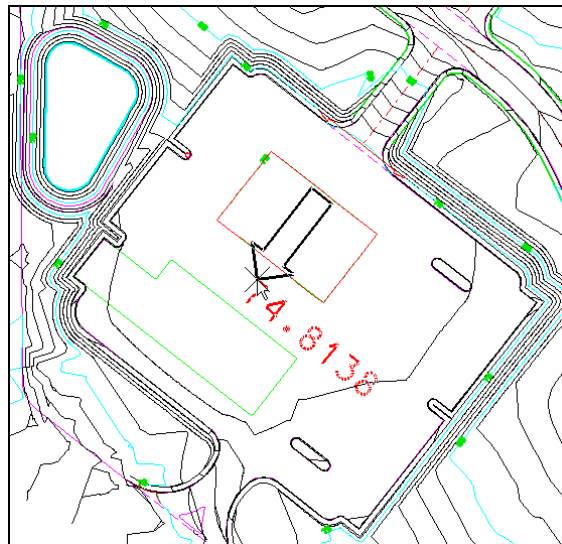
To view this portion of the lesson, press the play button.



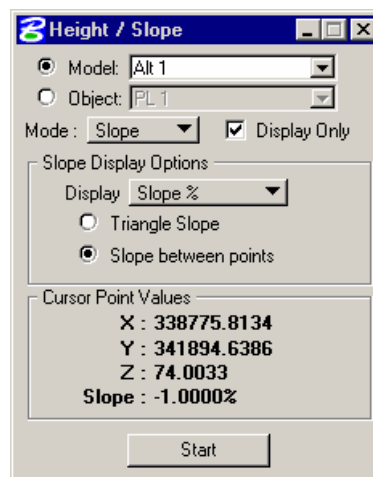
1. Select the Height/Slope tool (*1<sup>st</sup> icon, Analysis Tool Frame*)  
Set the Model to “Alt 1” and enable the Flow Arrow option.  
Click “Start”.



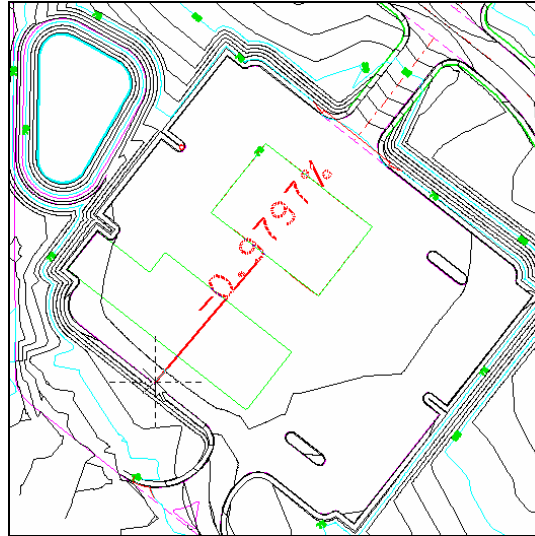
2. Move your cursor around the site and review the surface and flow direction.



3. Return focus to the "Height/Slope" dialog. Change the "Mode" to "Slope". Set the "Slope Display Option" to "Slope between points".



- Strike two data points at various points on the model surface for review.



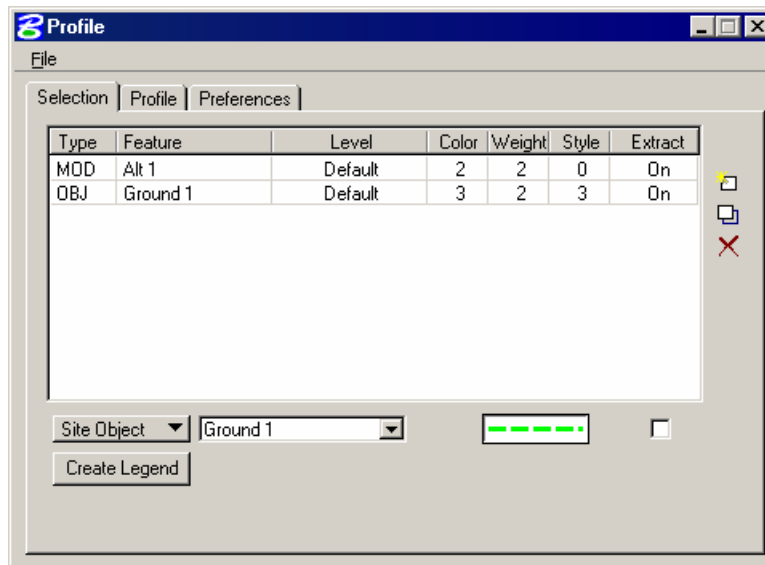
**PROFILE TOOL**

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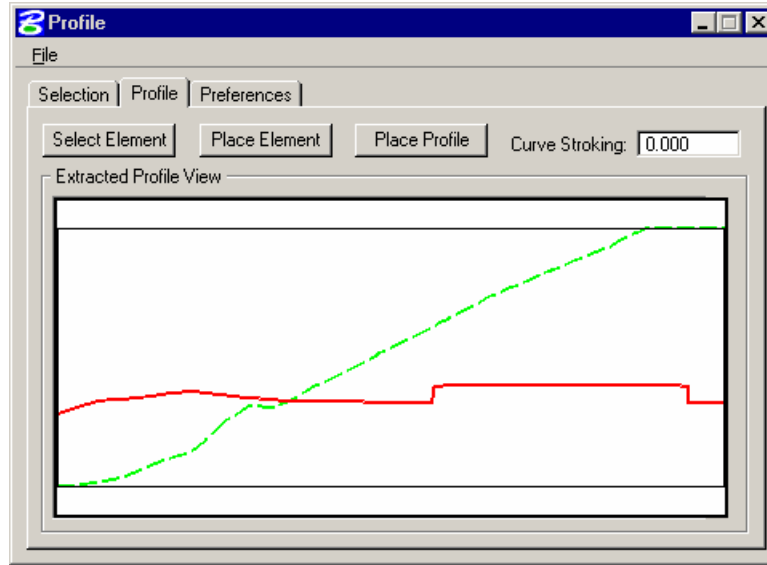


- Select “Create Profile” tool. (*2<sup>nd</sup> Icon, Analysis Tool Frame*)

The Model and Ground surface will already be in the list because we use the profile tool in Chapter 9 - Channel Wizard. If these features are not present, go ahead and add the two surfaces as shown.



2. Add the Pond 1 Object to the surface list.
3. Select the “Profile” tab and strike two points across the model surface. Right mouse click when finished. Continue to strike points at various locations and review the profiles.



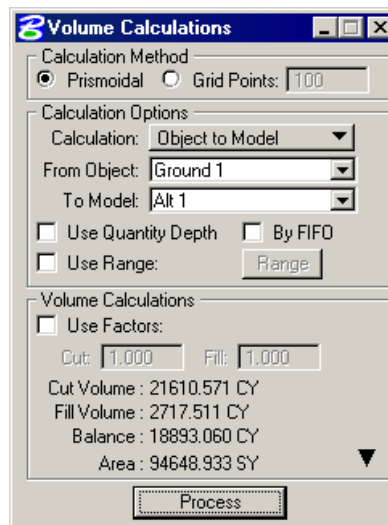
### VOLUMES TOOL

The Volumes Tool computes volumes between two surfaces or between a plane and a surface. The quantities are displayed in the dialog, and can be optionally written into an ASCII file.

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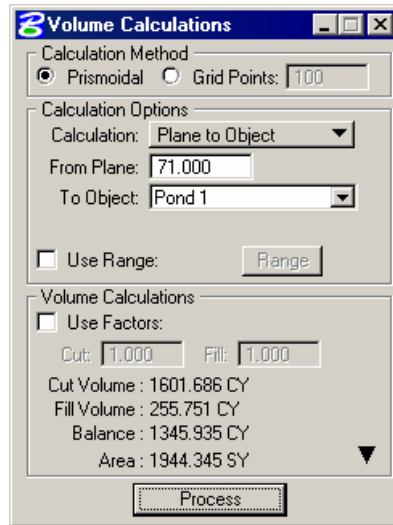


1. Select the Volumes Tool. (*3<sup>rd</sup> Icon, Analysis Tool Frame*)
2. Set the “Calculation” option as shown (Object to Model) and click the “Process” button.

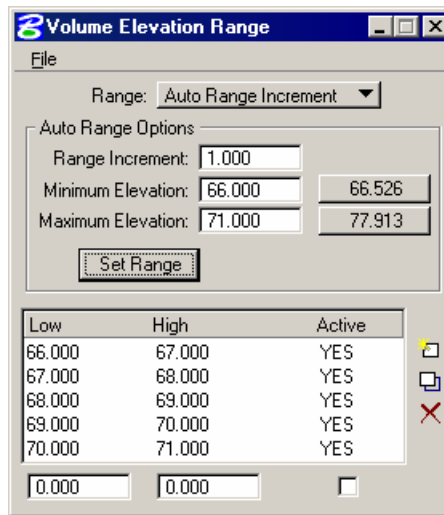


**Note** Review the results.

- Switch the “Calculation” option to “Plane to Object”. Set the “Plane Elevation” to 71.0 and the “Object” to “Pond 1”. Click the “Process” button.



- Now toggle “ON” the “Use Range” option, click the “Range” button and set up the following ranges. In the “Auto Range Options” group box, fill out as shown and click the “Set Range” button.



- Return focus to the “Volume Calculation” dialog click “Process” and review the results.

Low	High	Cut	Fill
66.000	67.000	81.010	0.000
67.000	68.000	291.334	0.000
68.000	69.000	346.171	0.000
69.000	70.000	407.908	0.000
70.000	71.000	475.262	0.000

6. Close the “Volume”, “Elevation Summary”, and “Elevation Range” dialogs.

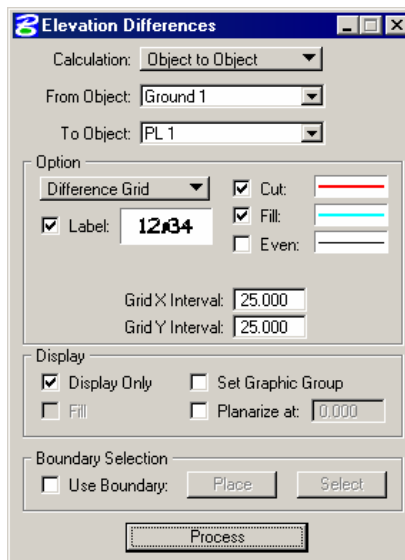
**ELEVATION DIFFERENCES TOOL**

The Elevation Difference tool supports a variety of grid generation, Isopach contour drawing, and cut/fill latticing.

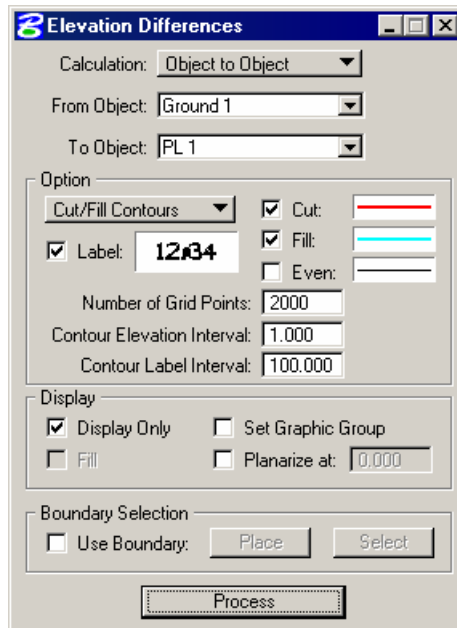
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1. Select the “Elevation Difference” Tool (*4<sup>th</sup> Icon, Analysis Tool Frame*)
2. Set the dialog “Option” to “Difference Grid”. The “Difference Grid” option draws a textual grid of cut / fill elevations, i.e., the cut or fill depth between the two specified surfaces at each grid point. Set the “Label Text” by double clicking on the sample in the dialog. Set the text height to 3.0 or 4.0. Set the other symbology options to anything you like. Click “Process” when finished.



- Return focus to the “Elevation Difference” dialog change the option from “Difference Grid” to “Cut/Fill Contours”. “Cut / Fill Contours” (Isopach) are simply contours of the cut and fill depths. Click “Process”.



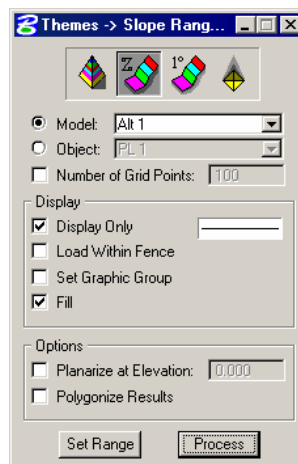
### THEMES TOOL

Thematic maps of elevations, slopes or aspects can be generated from triangulated models and objects.

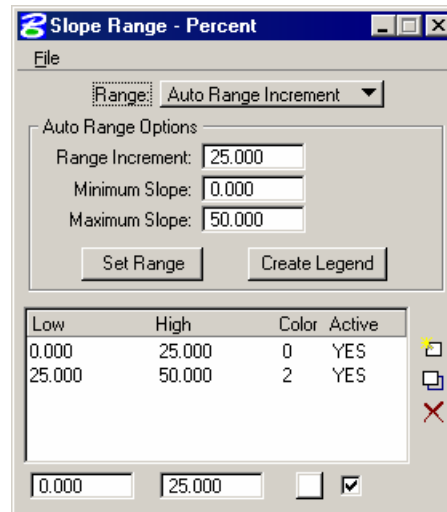
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- Select the “Themes” tool. (*7<sup>th</sup> Icon, Analysis Tool Frame*)
- We will be using the “Slope” theme to see which areas of our surface are steeper than a 4:1 slope. Select the “Slope Range Percent” (*2<sup>nd</sup> Icon, Themes dialog*) option. Set the dialog as follows:



3. Click the “Set Range” button and set up two ranges from 0 to 25 percent and 25 to 50 percent. Fill out the top portion of the dialog and click the “Set Range” button to fill out the bottom.



4. Return focus to the “Themes” dialog, click the “Process” button.

## SUMMARY

The main point to remember is:

- The analysis tools are used to evaluate the design and can be used at any point in the modeling process.

For more video instruction please visit the following web page...

<http://65.217.17.142/downloads/sitemodeler/GEOPAK%20Site%20Modeler%20Training%20Videos.htm>