



Lesson 8: Grading a Pond

WELCOME!

This lesson is about grading a pond. Now that you have designed the roadways, PowerCivil has a multitude of tools that allow you to automatically grade ponds. In this lesson you will learn how to grade and contour the pond and how to analyze different aspects of the pond.

LESSON OBJECTIVES

In this lesson, the topics covered include:

- Topic 1 PowerCivil Pond Tool – create the pond contours
- Topic 2 PowerCivil DTM Analysis – analyze the pond volume and themes

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

This Lesson will show you how to grade the pond with the PowerCivil Pond tools. With the Pond tools you automatically design ponds based on various design constraints, you can design to achieve selected volumes, water surface elevations, and much more. You will also learn how to use the Volume tool as well as numerous Analysis tools to assist with interrogation of the pond design.

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



POND TOOL

With the GSF model created, the Pond Tool options provide you with many ways to design and automatically grade the ponds.

From the Windows Explorer, open the folder for Lesson 8 and then open the file “LAYOUT.DGN”.

The “LAYOUT.DGN” file contains the base planimetrics required for pond design initiation.

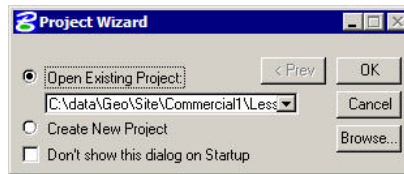
Once in the file, you will want to follow these steps:



1. Open the Civil Tools (*Civil>Civil Tools*).
2. Invoke the Site Modeler Tool (*Civil>Modeler*).



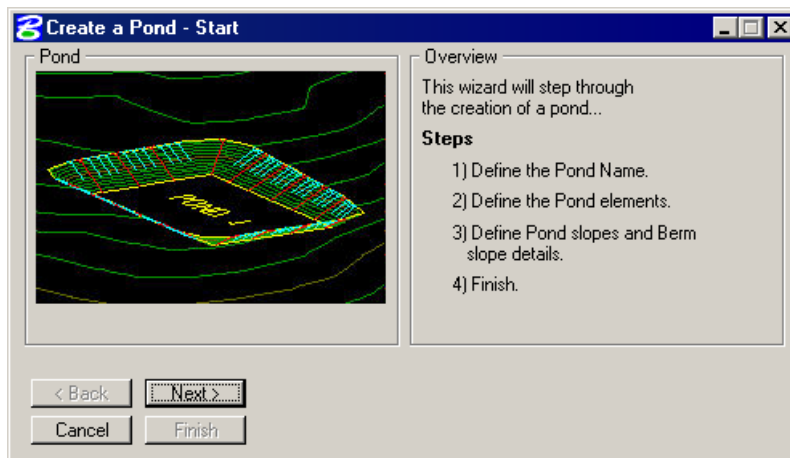
3. Select the GSF File from the Lesson 8 folder "LAYOUT.GSF". At the Project wizard window, click "Browse" and select the project file "LAYOUT.GSF" from the lesson 8 folder.



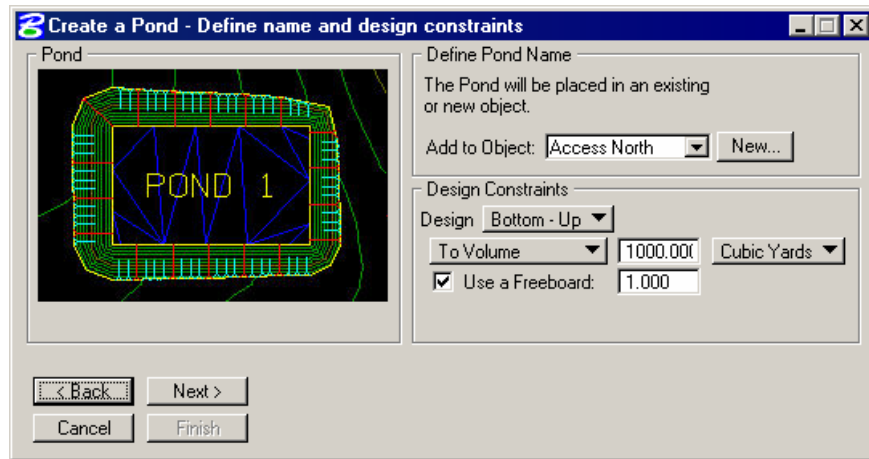
4. Select the Pond Design tool (*Tools >Pond Design*) from the main toolbox:



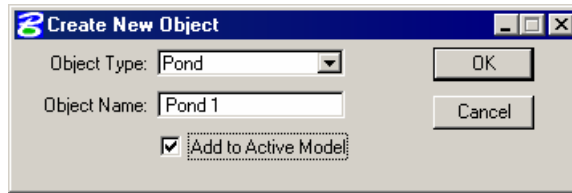
The Pond Design Tool opens as shown below:



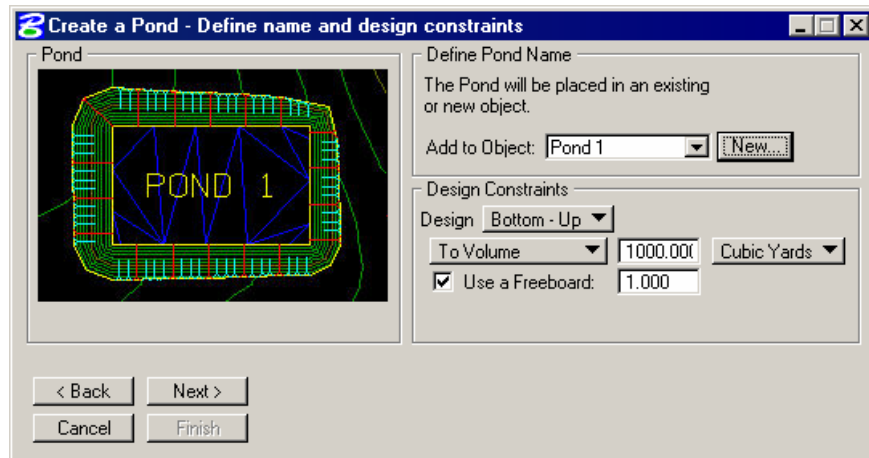
5. Select “Next” and define the Pond Name:



6. Click "New" from the "Define Pond Name" group box to create a new Object.
7. Add “Pond 1” : Select the Object type "Pond" and Click OK to accept the new Object name "Pond 1".



8. Return to the Pond Tool to set the Design Constraints, and click “Next” to access the next step in the Pond Tool.

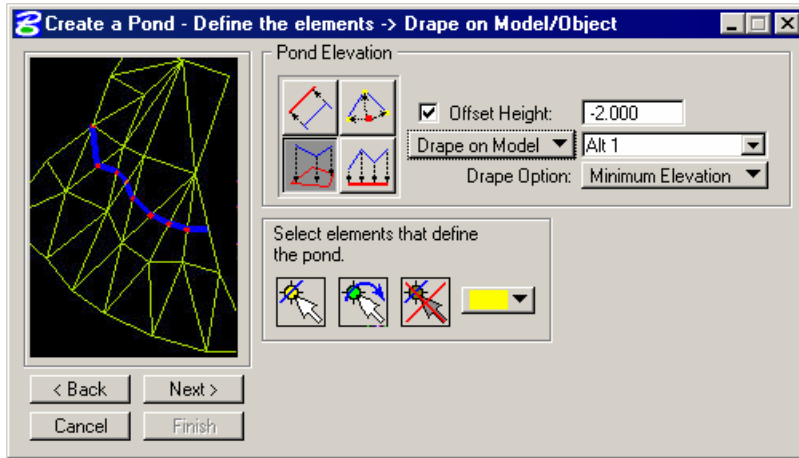


Set the dialog as shown above.

Design	Bottom-Up
To Volume	1,000 cubic yards
Use Freeboard	1 foot

9. Click “Next”

Define the Pond Elements:



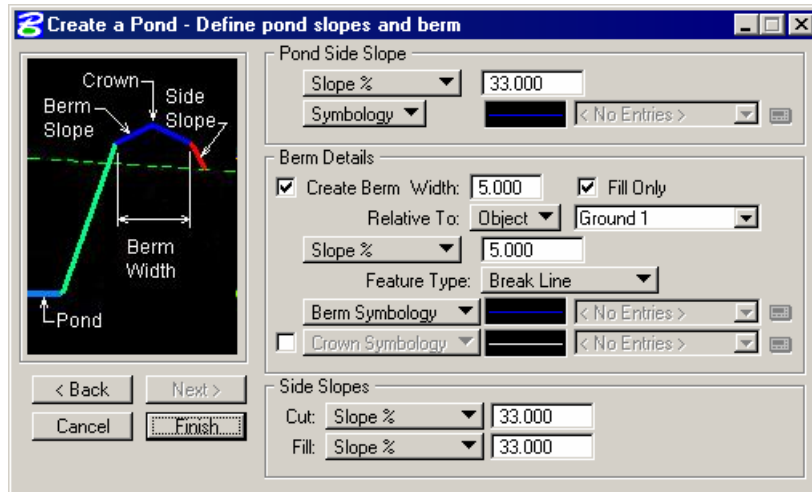
Set the dialog as shown above.

Offset Height:	-2.0 ft
Drape On Model:	Minimum Elevation

10. Click “Select Elements” and select the pond bottom.

11. Click “Next”

Define pond slopes and berm:



Set the dialog as shown above.

Pond Side Slope:	
Slope:	33%
Berm Details:	
Create Berm Width:	5 feet, Fill Only
Relative to: Object:	Ground 1
Slope:	5%
Side Slopes:	
Cut:	33%
Fill:	33%

12. Click "Finish"

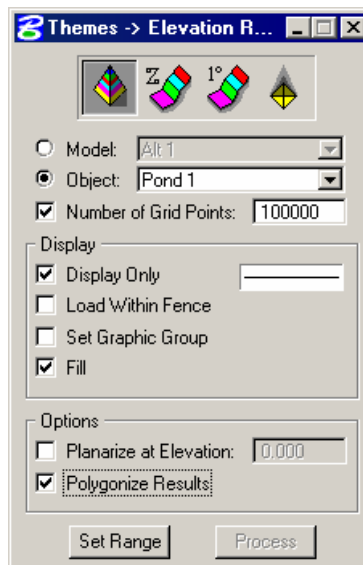
DTM ANALYSIS

POND ANALYSIS, ELEVATION RANGE:

1. Lets view the range of elevations within the pond in order to determine the pond's minimum and maximum elevation; Select the Elevation Range tool (*Modeler>Analysis>Themes*)



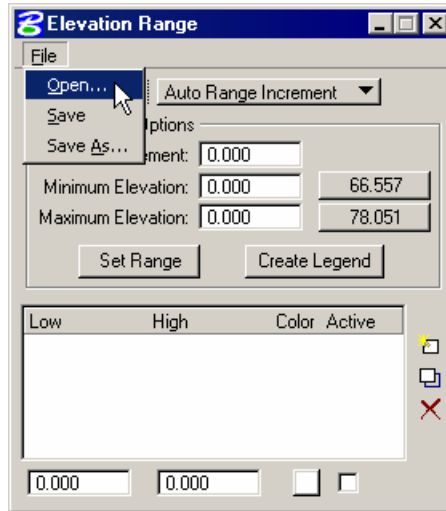
2. Determine the Elevation Range of Object: Pond 1. Set the dialog as shown below:



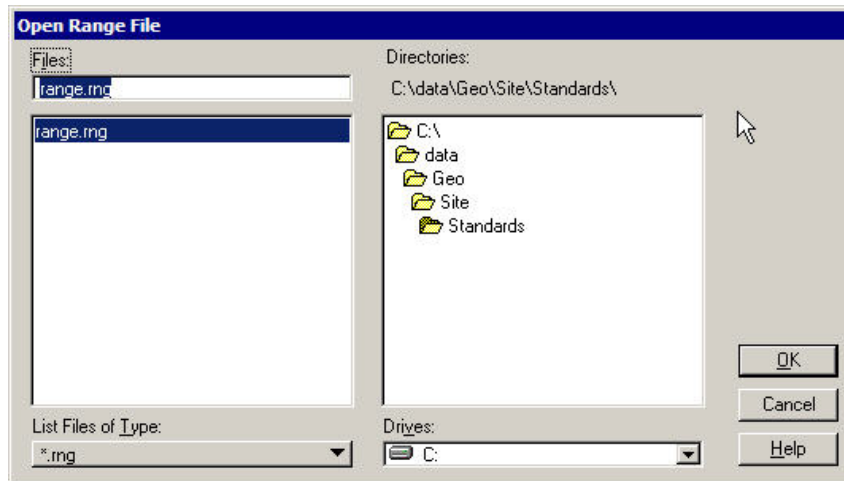
Number of Grid Points	100,000
Display Only	ON
Fill	ON
Polygonize Results	ON

3. Click “Set Range”:

The Elevation Range dialog opens as shown below:



4. Click the “Minimum Elevation” & “Maximum Elevation” buttons to extrapolate the elevations automatically.
5. Select *File > Open* and open the file from the “Standards” directory:



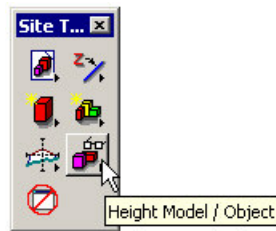
- Click “Process” to process the Elevation Range:



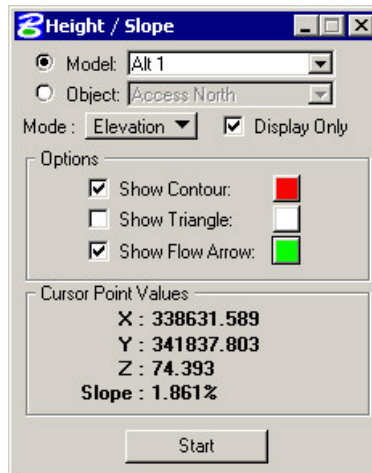
- Save the Model.

POND ANALYSIS, HEIGHT TOOL:

- Let’s interrogate the contours to determine direction of drainage flow and slope characteristics of the proposed design; Select the “Height Model/Object” tool (*Modeler>Analysis > Height*).

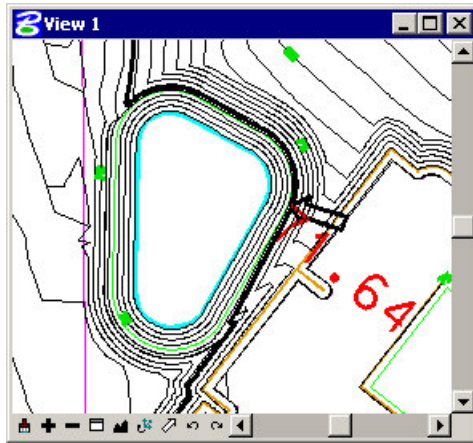


- Set the tool to the Model “Alt1”. Set the dialog as shown below:



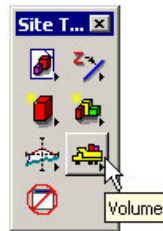
Mode	Elevation
Display Only	Toggle ON
Show Contour	Toggle ON
Show Flow Arrow	Toggle ON

- Click the “Start” button to initiate display of the contours and flow arrow, then scroll the cursor over the proposed design to view the display:

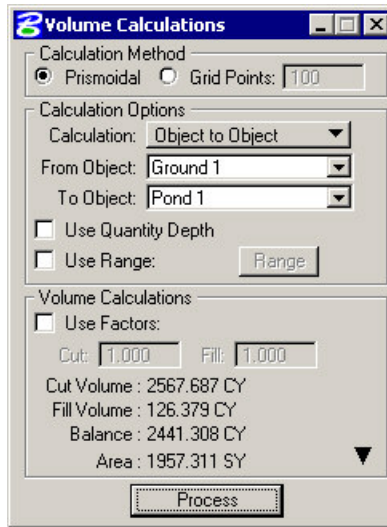


POND ANALYSIS, VOLUME:

- Lets compute the volume within the pond; Select the “Volume Analysis” tool (*Modeler>Analysis>Volumes*)



2. Compute the volume between the existing ground object and the pond object.
Set the dialog as shown below:

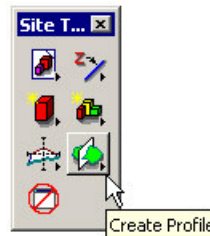


Calculation Method	Prismoidal
From Object	Ground 1
To Object	Pond 1

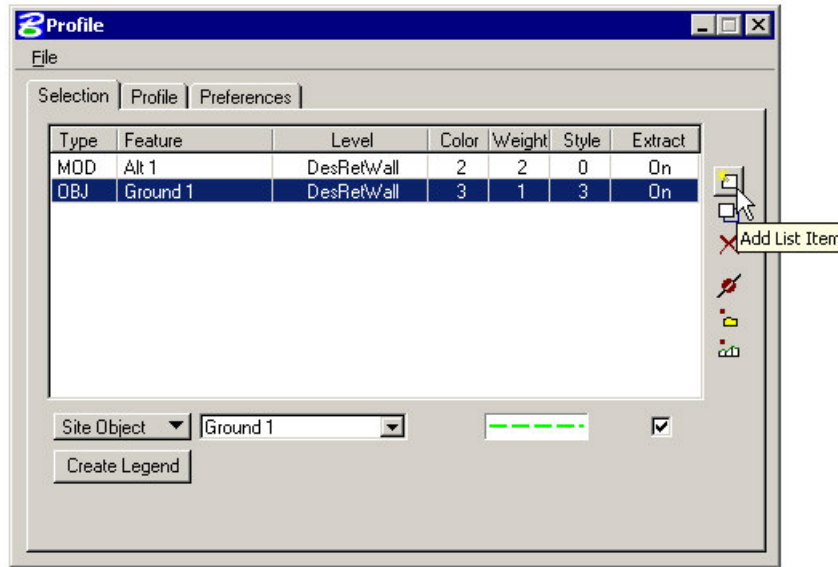
3. Click the “Process” button to initiate the calculations, which are displayed in the Volume Calculations groupbox and may also be output to an ASCII text file.

POND ANALYSIS, PROFILES:

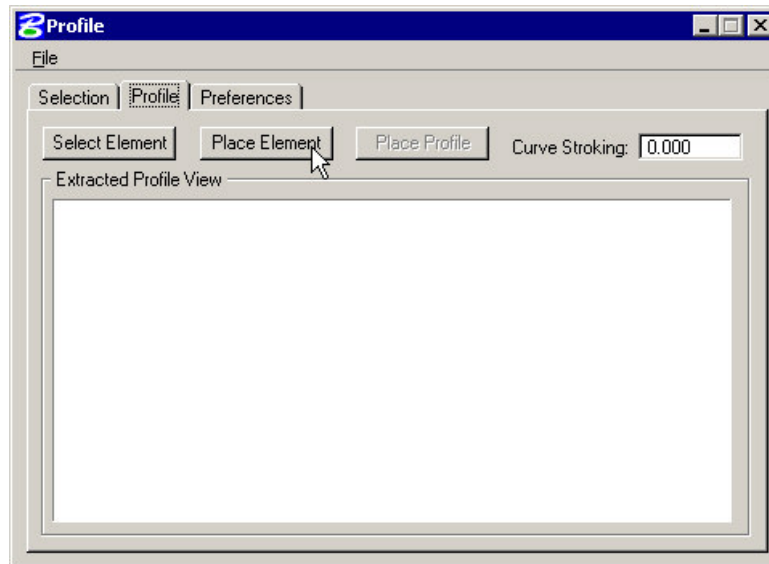
1. Lets cut a profile view through the pond; Select the “Create Profiles” tool.
(Modeler>Analysis>Create Profiles)



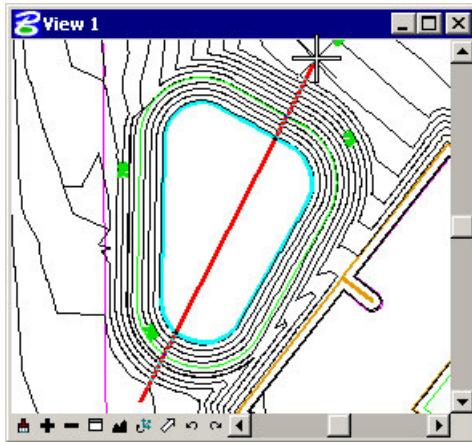
2. Add the Model "Alt1" and Object "Ground1" to the Selection list using the "Add List Item" button:



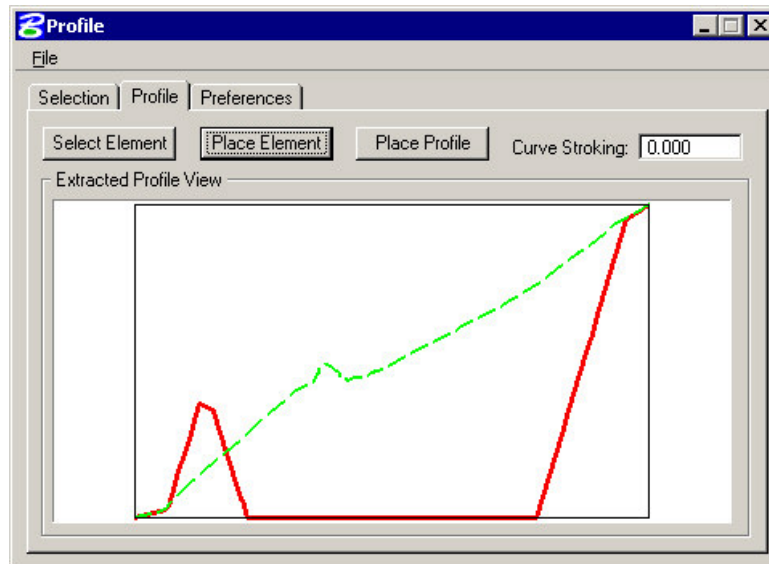
3. Select the "Profile" Tab and click the "Place Element" button:



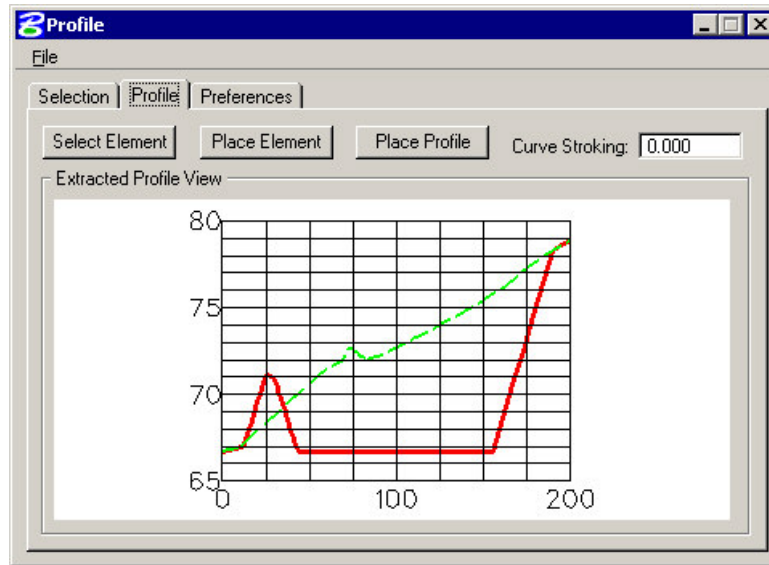
4. Data point twice through the pond in the region of the profile cut:



5. The cut profile should now appear in the Profile Tab:



6. Select the “Preferences” Tab and set the Grid and Labels preferences as required, then return to the “Profile” Tab so that the completed profile may be placed in the design plane using the “Place Profile” button:



SUMMARY

The main points to remember are:

- PowerCivil allows you to interactively design ponds using the Pond Tool. You can edit and revise the grading with a variety of tools.
- Surface interrogation is achieved using the DTM Analysis tools.
- You can create profiles, thematic maps, site line analysis and analyze drainage features with this flexible set of tools.

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

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