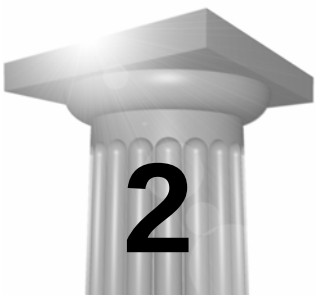


# 2 Lesson 2: The CAD Environment

## WELCOME!

This lesson is all about the CAD environment within PowerCivil. As discussed in the previous chapter, PowerCivil is an integrated environment of powerful civil design tools along with a very comprehensive CAD engine. In this lesson you will learn how to navigate within the CAD environment as well as how to manage the data that is being created during the design and production process. The use of some of the basic drawing tools will be investigated as we prepare to begin the modeling process in the next lesson.

## LESSON OBJECTIVES

In this lesson, the topics covered include:

- Topic 1 PowerCivil User Interface – menu bars and dialog boxes
- Topic 2 Managing Data Files – managing the various data types in the project
- Topic 3 Attaching a DWG Reference – how to attach a DWG as a reference to the layout
- Topic 4 PowerCivil Drawing Tools – using basic tools to complete the layout

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 the interface of PowerCivil is laid out, helping you to understand where tools can be found and how to navigate the application. Additionally, you will learn about the key data components for your design and production work. It is essential that you understand where items are stored and how changes to your design should be committed to hard memory for later recall. Finally, you will complete the geometric layout for this tutorial using some of the basic drawing tools provided with PowerCivil.

## USER INTERFACE

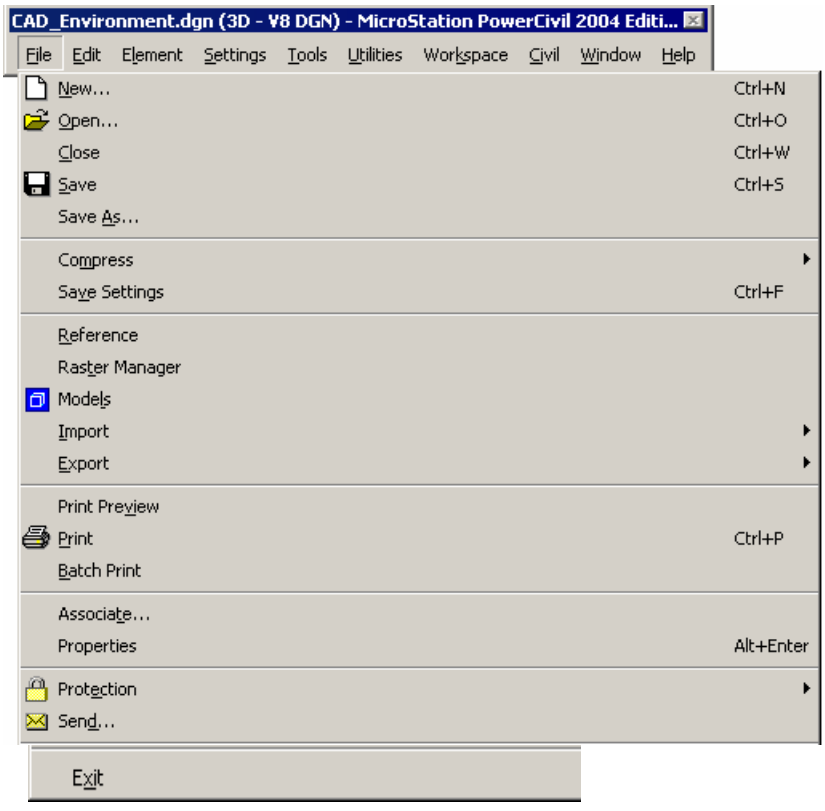
The PowerCivil user interface allows the user to choose a command either through the menu bar or by selecting an icon from one of the various tool palettes.

From the desktop launch PowerCivil using the program icon  , navigate to the folder for Lesson 2 and open the file “CAD_ENVIRONMENT.dgn”. Once the file is open, you will want to explore the interface using the following:

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

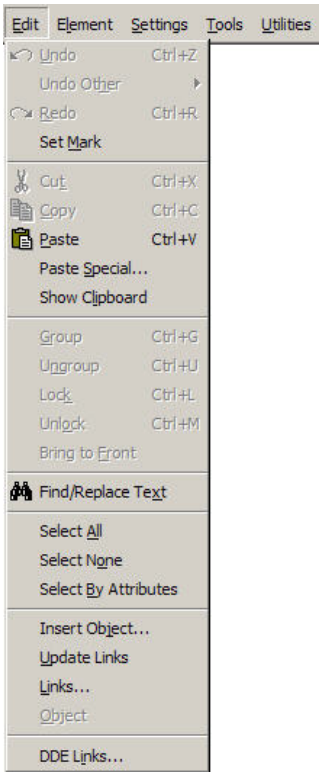

Let’s take a look at the menu bar, where you will find many of the common Windows-like selections as well as other menu options that are specific to PowerCivil.


From the ***File*** menu, you can select from the typical Windows file operations as well as others specific to PowerCivil.

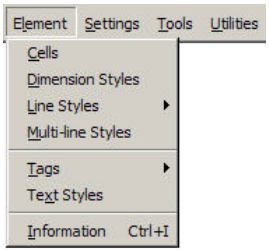


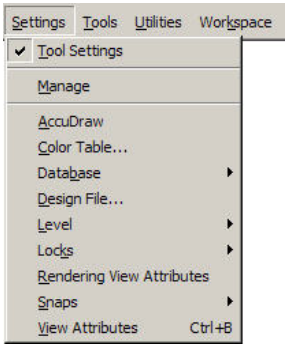
The ***Edit*** menu also provides some typical Windows functions as well as those specific to PowerCivil.




The ***Element*** menu is specific to PowerCivil and provides access to drafting element dialogs for cell (*block*) placement, dimensioning, custom line styles, element tags, text styles and element information.

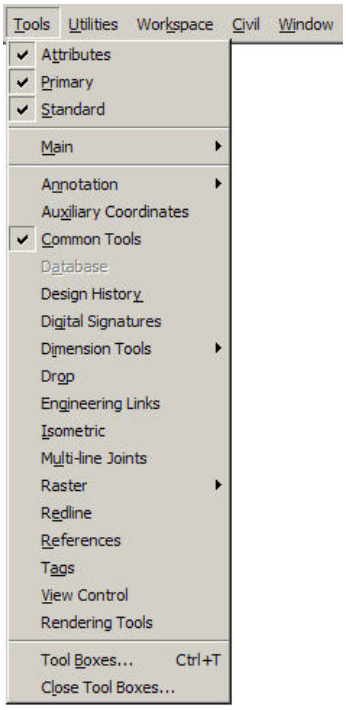



The ***Settings*** menu is also specific to PowerCivil and provides access to program settings that control the behavior of the application. Key items are *AccuDraw, Snaps, View Attribute and the Level tools.*

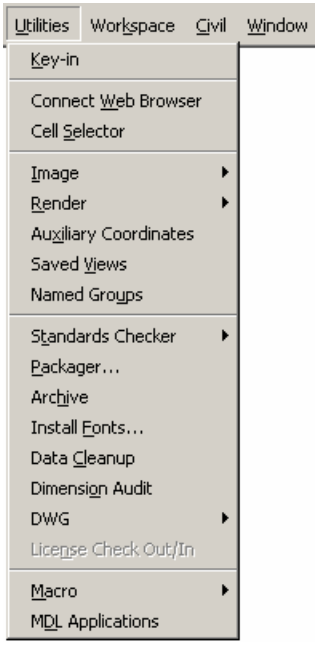


The ***Tools*** menu provides access to PowerCivil tool palettes that can be docked into the interface for quicker access to often used drafting tools. Key items to dock are *Attributes*, *Primary*, *Standard*, *Main* and *Common Tools.*

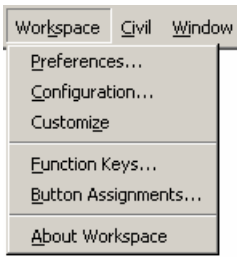



The ***Utilities*** menu provides access to other functions of PowerCivil that may not be used as much but can still provide significant value to the user. Key functions to consider are *Key-in, Saved Views, Standards Checker* and *Data Cleanup*.

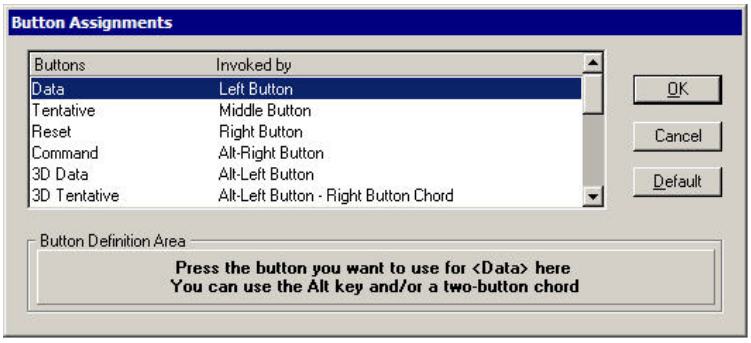


The ***Workspace*** menu provides access to operational settings within PowerCivil. These settings control much of the environment that the user experiences while working. In this tutorial we will adjust the *Workspace Configuration* so that the resources supplied with the data set are found by the program automatically reducing the time spent browsing the folder structure.

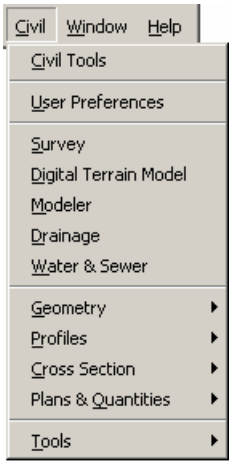



In addition, you may want to adjust the *Button Assignments* depending on the type of mouse that you are using. Typically, the primary buttons on the mouse are assigned as follows…

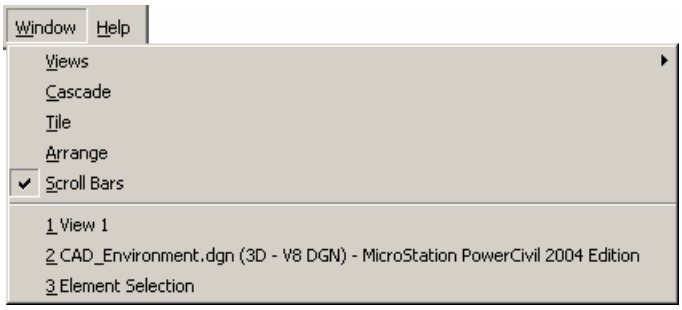



If you do not have a center button or mouse wheel, the *Tentative* button is invoked by a *Left-Right Button Chord.* It is not necessary to configure any buttons beyond "Data", "Tentative" and "Reset".

The ***Civil*** menu is primarily used to access the civil design capabilities which will be discussed later in the tutorial.



The ***Window*** menu provides access to the 8 views of PowerCivil. These views can be oriented in many ways to make it easier to navigate the data in the file.




The ***Help*** menu provides access to the HTML based online help system that, in addition to this tutorial, can also assist you as you work with PowerCivil.

The "Common Tools" palette *(Tools>Common Tools)* provides many of the drawing and manipulation tools that will be used to create and edit the site layout. Experiment with some of these tools to get familiar with them as they will be used extensively in the ensuing lessons.

The "View Controls" located at the bottom left of each PowerCivil View allow you to control the view aspects. With these controls you can zoom, pan, window an area, fit the design and more. Experiment with the "View Controls" to get familiar with them as they too will be used extensively in the ensuing lessons.

## MANAGING DATA FILES

The management of design data while working with PowerCivil requires a bit of forethought.

When dealing with the Site Modeler portion of the product, there are two primary data types to consider, first there is the DGN/DWG design file which stores the CAD data. Second, there is the PowerCivil Modeler project data which is saved as a file with the file extension of GSF. These two files are very much interrelated and changes to either one will have an impact on the other.

To keep order when dealing with Modeler design data, it is recommended that you name the GSF file the same as the DGN file. This will help to ensure that the project data does not get out of sync with the design file data. You will want to be in the correct DGN file when the Site Modeler is invoked and a GSF file opened. Naming the two files the same is the best way to ensure synchronization.

In addition, there are other data files that will be created as the project progresses. The following is a list of data files that will be created during this tutorial…

| File Type | Description |
|---|---|
| DGN | Design file containing geometric layout, text and general information used to produce plans |
| GSF | PowerCivil Site Project file containing all components of the grading model This file must remain synchronized with the corresponding DGN file |
| GPK | PowerCivil Coordinate Geometry file containing all geometry related to horizontal & vertical alignments as well as stake out information |
| GDF | PowerCivil Drainage Project file containing all components of the drainage design |
| GWS | PowerCivil Water and Sewer project file containing all components of the water and sewer design |

## ATTACHING A DWG REFERENCE

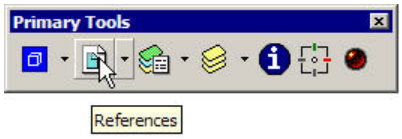
In order to accurately design the drives and parking area for the commercial site, we will need to reference in the surveyed topographical data for the project. In this case, we are going to assume that survey was done by a firm that uses a product different than PowerCivil and the firm has provided a file that is in DWG format.

As stated in the introduction, this format difference does not present a problem. PowerCivil can easily reference the DWG file “BASE.DWG” to the master file “LAYOUT.DGN”.

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


Follow these steps to make the reference attachment:

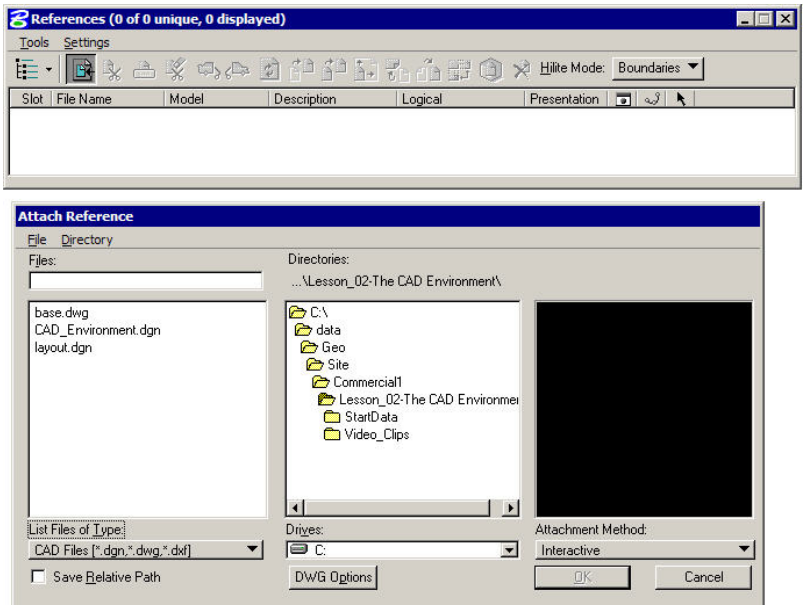
1. Use *File>Open* to open the file “LAYOUT.DGN” from the lesson 2 folder.
2. Once in the “LAYOUT.DGN” file, access the “References” dialog *(File>References)* or use the Primary Tool bar icon.



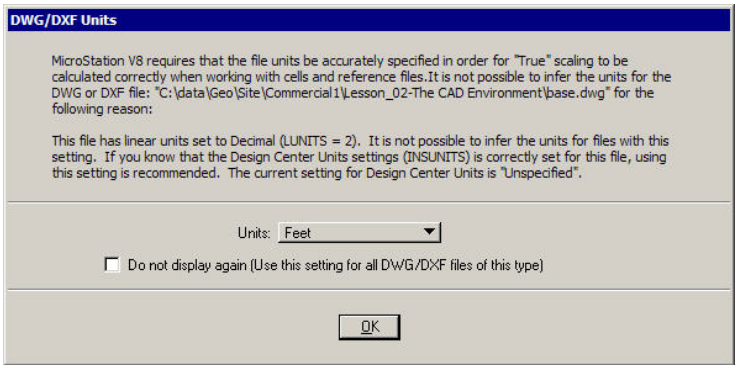

  

3. At the “References” dialog use the “Attach Reference” icon *(Tools>Attach)* to open the “Attach Reference” dialog. Change the “List Files of Type” option to “CAD Files” and navigate to the Lesson 2 folder and select “BASE.DWG” and press the “OK” button.

***Hint*** On the Attach Reference dialog, select Directory>Current Work Directory to set the folder to the same folder as the current design file resides in. This negates the need to navigate to the folder when the files are in the same folder.

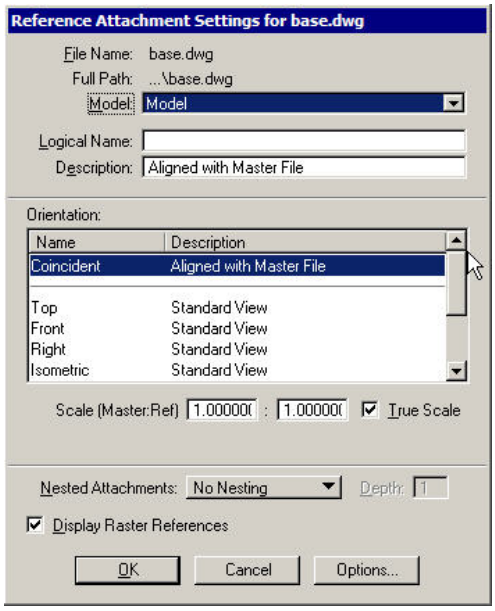



4. In the “DWG/DXF Units” dialog, set the “Units” to “Feet” and press the “OK” button.



5. Accept the default settings on the “Reference Attachment Settings” by pressing the “OK” button. The DWG base file will now be referenced (attached) to the “LAYOUT.DGN” file.




With the survey information attached, we can now see how the design layout corresponds to existing conditions; we will use the drawing and modification tools to complete the design. We can control the view of the DWG reference and finish the design edge of pavement, making the design ready for modeling.

## DRAWING TOOLS

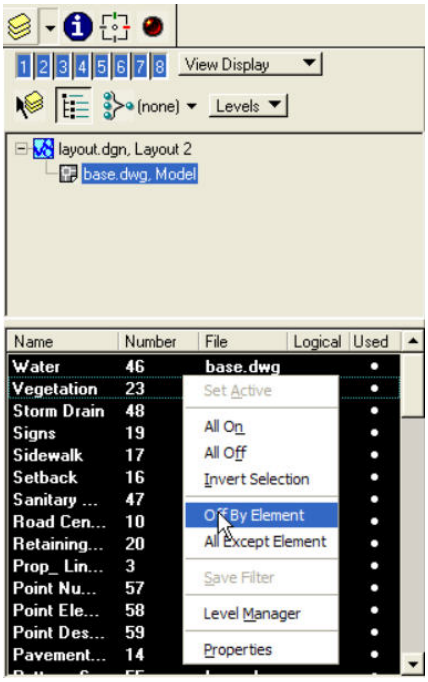
One of the really nice things about PowerCivil is that the design features like grading and drainage features are controlled by drawing elements. This may not seem like a big deal on the surface, but the power to change design features by moving or modifying drawing elements is truly awesome.

Since the grading will depend on the elements used to layout the commercial design, it might be a good idea to get comfortable with some of the drawing and modification tools.

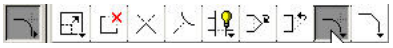
To view this portion of the lesson, press the play button.

Follow the steps to complete the layout:

1. Continuing in the “LAYOUT.DGN” file, use the “Level Display” dialog *(Tools>Level>Display)* from the “Primary Tool” bar to turn “OFF” most of the levels in the “BASE.DWG” reference. Right-click in the dialog and choose “Off By Element” then click on the elements in the view which you do not wish to see.




2. Choose the level “DesEofP” from the “Attribute” tool box and begin to construct the driveway returns in the layout. Choose the “Construct Circular Fillet” tool to add the returns to the road intersection.



3. Continue to construct the layout by extending the driveway intersection. Use the key-in *(Utilities>Keyin)* command “Extend Line” and the “Construct Circular Fillet” tool to complete these tasks.

## SUMMARY

The main points to remember are:

- The user interface can be controlled and modified in various ways. You can access commands through the menu bar or from tool palettes.
- Managing data files is important – remember to keep naming conventions in order to ensure synchronization between CAD and model data.
- Referencing DWG data is a snap.
- Drafting tools are available to produce layout graphics.

For more video instruction please visit the following web page…
http://65.217.17.142/downloads/sitemodeler/GEOPAK%20Site%20Modeler%20Training%20Videos.htm