



GEN10807

## Plotting Survival Guide: Tips for Headache-Free AutoCAD Plotting

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### Learning Objectives

- Learn how to manage multidisciplinary plotting with plot style tables
- Learn how to manage multidisciplinary plotting with plot style tables
- Learn how to standardize the setup of layouts using drawing templates and named page setups

Discover tips to simplify plotting for end users

### Description

Learn to apply several proven techniques into your AutoCAD software environment that will negate the need for painkillers by removing the headaches from your plotting process. In this class you'll get tips, tricks, and best practices for achieving consistent plotting, regardless of the selected device or which office a user is in. We will complement advanced topics such as configuring plotter configuration files (PC3) by several easy-to-apply topics like named page setups and drawing templates. You'll walk away with a blend of thought-provoking ways to standardize plotting within medium and large firms, ensuring your plans look as professional as the designs you create.

### Your AU Experts

*Donnie Gladfelter is a highly visible and respected thought leader in the CAD community. He is well known for the CAD Geek blog ([www.thecadgeek.com](http://www.thecadgeek.com)), and he has written many articles for the popular AUGIWorld magazine and is a popular speaker at Autodesk University and other industry events. He has worked with the Development Team at Autodesk, Inc., to help shape future versions of AutoCAD software, and the company has featured him on many occasions, including in numerous video interviews. Donnie also helps to empower CAD professionals locally and across the world as a technical product and online manager for CADD Microsystems (an Autodesk Platinum Partner) and as a former member of the Autodesk User Group International (AUGI) Board of directors.*

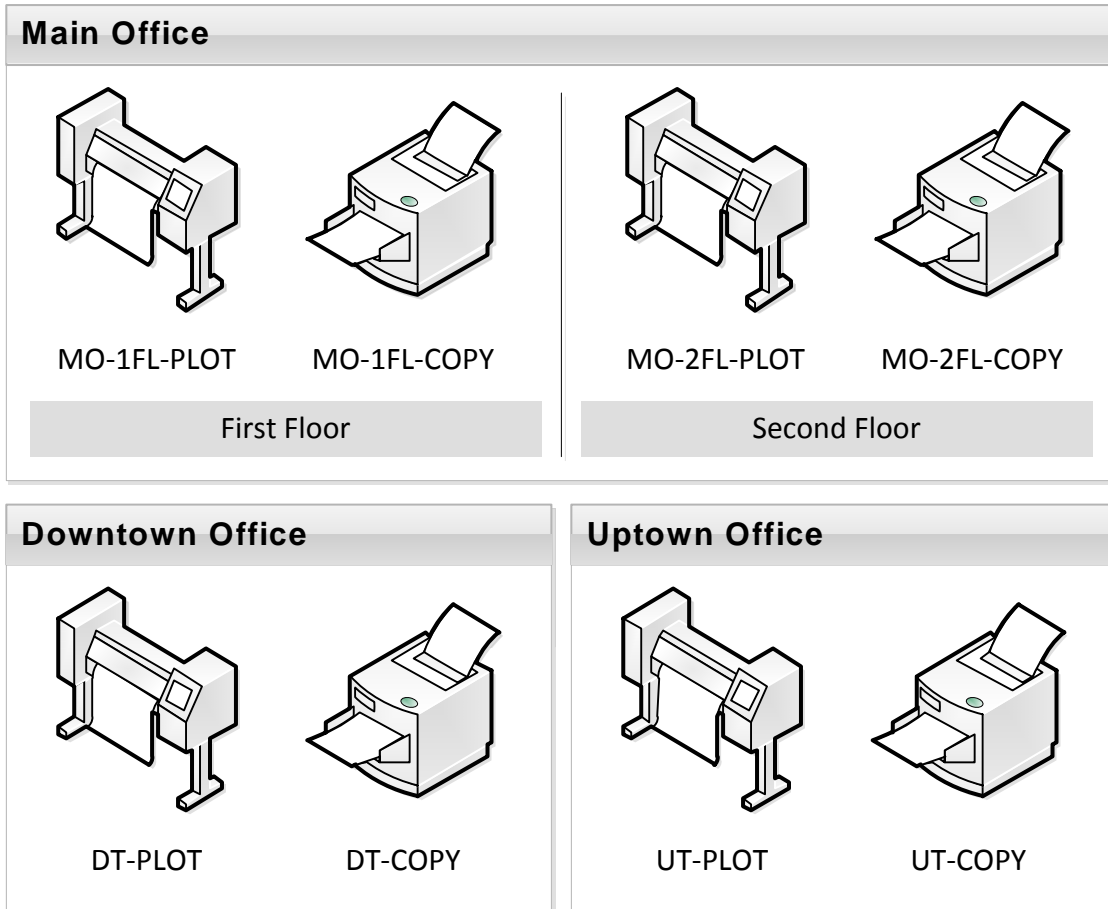


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**Abstract**



This session will examine plotting for a fictitious civil engineering / survey firm that operates a total of three offices; two branch offices plus their corporate headquarters. Each office is equipped with both a small format copier (for plots smaller than 11x17), and a large format plotter for everything else. This setup is doubled for the corporate headquarters location which spans two floors.

A typical job starts in the survey group establishing existing conditions; conducting a topographic and boundary survey. Once complete, this information is passed to the engineering group who uses this information as the basis of their proposed design. The nature of each groups work from the perspective of plan sheets is opposite; existing conditions are the primary element of plans created by survey, whereas existing conditions are secondary features in the plans created by engineering. Consequently there's a need to minimize the amount of time spent "fixing" drawing as their exchanged between departments.

## Identifying Standardization Objectives and Components

To begin, let's identify some of the issues currently facing both survey and engineering teams as they exchange drawings from department to department, and even office to office.

### **Hours are spent “fixing” layer properties within drawings when exchanged between departments.**

A line that needs to plot bold and continuous in survey, but as a secondary feature to the proposed design engineering is creating that same line should be light (screened) and dashed in their plan set.

### **Plotting Hardware Differences**

While each office has its own plotter, the model and/or brand differ from device to device. Although each plotter is capable of plotting a 24 x 36 drawing sheet, internal margins along with several other settings controlling how drawings are positioned on plotted drawing sheets. Consequently, plots vary from plotter to plotter requiring users to tweak page setups to get drawings to plot achieve consistent results.

### **Device Configuration Differences**

Plots are oftentimes inconsistent between drawings sent to the same plotter since device configurations may vary between drawings and or workstations.

### **Device Not Found Errors**

Since device names vary between offices, AutoCAD cannot find the plotter from the originating office and displays an error.

### **Each drawing plots in a slightly different location than the one before it.**

Plot dialog preferences are setup for each layout tab individually translating to differences when drawings are sent to the plotter.



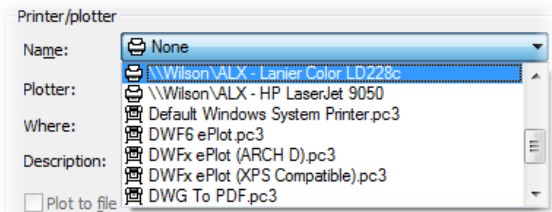
## Basic Printer Setup and Configuration

Printers may be configured for AutoCAD in one of two fundamental ways; using the Windows system printer directly, or by way of an AutoCAD plotter configuration (.pc3) file. For the purpose of this discussion, a system printer is a device managed by Windows and made available to all installed applications; Internet Explorer, Word, Adobe Acrobat, etc. By contrast an AutoCAD plotter configuration (.pc3) can only be used by AutoCAD and can, but doesn't have to connect to a system printer.

Oftentimes the default configuration of a printer is not adequate for plotting AutoCAD drawings. Specific settings must be made to achieve the desired result. Making these changes on an individual basis frequently translates to inconsistencies in the way settings are applied to drawings, thus leading to inconsistent plots. Capturing these settings using an AutoCAD printer configuration (.pc3) file will allow these settings to be applied to any number of drawings in a consistent manner.

### Create Printer Configuration Files

AutoCAD printer configuration (.pc3) files appear alongside system printers in the Printer/Plotter Name drop-down list within the Plot dialog. Sending plots to them is largely the same as sending plots to system printers, however with PC3 devices several device configuration options will be applied without the need for user intervention.



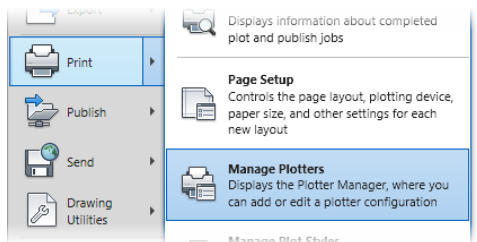
Included with AutoCAD is a wizard for creating printer configuration for both system and non-system devices. This wizard is accessed from the AutoCAD Application Menu.

*Non-System Device: These can range from physical devices connected using special AutoCAD drivers to virtual devices such as the DWF ePlot and DWG to PDF devices that ship with AutoCAD.*

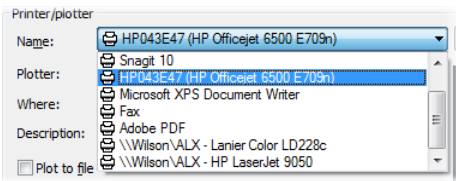
### Procedure: Creating a PC3 Plotter Configuration File

To create a new .pc3 Plotter Configuration file:

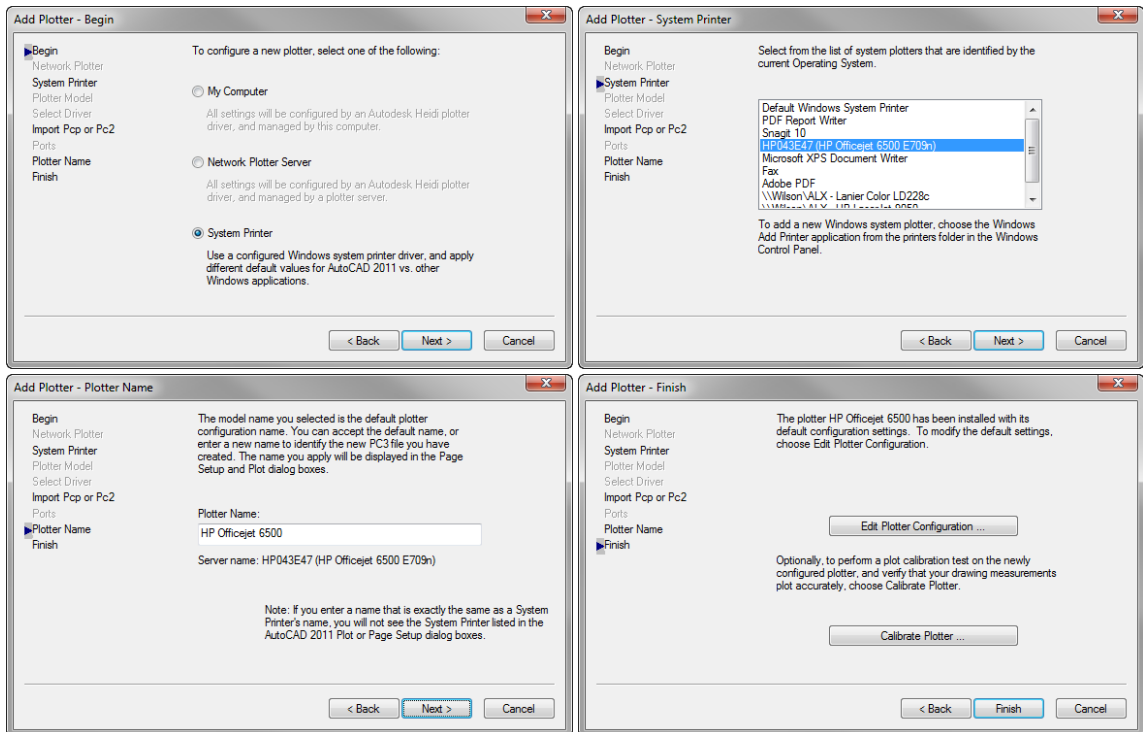
1. Click Print → Manage Printers from the AutoCAD Application Menu.



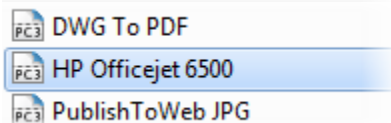
2. Double-click Add-A-Plotter Wizard to start the Add Plotter Wizard.



3. Follow the prompts inside the All Plotter Wizard.



4. Finishing the Add Plotter wizard creates a new .pc3 plotter configuration file that is connected to the device selected within the wizard.

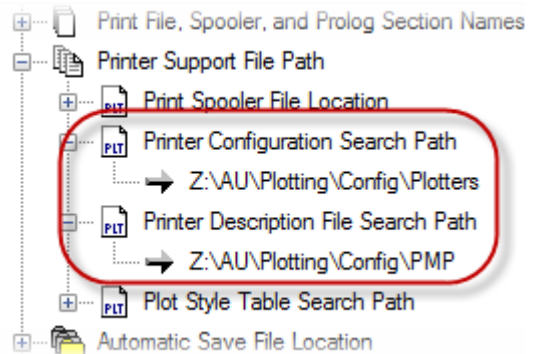


*TIP: Although only one system printer may exist for each device, multiple .pc3 plotter configuration files can represent a single device. This flexibility may be used to setup a single plotter to function differently for black & white plots verses color plots, or to adjust for any number of necessary configuration differences.*

## Sharing Plotter Configurations

Printer configurations are really only helpful if several users have access to the same configuration files. Locating printer configurations (.pc3) in a common network location will achieve this goal. Since PC3 files are connected to either a system or non-system device, not the computer itself, these files are easily moved to any location on the network using Windows Explorer.

Although not yet discussed, it's possible to further customize Printer Configuration (.pc3) files with Plotter Model Parameters (.pmp) files. For this reason it's important to configure a directory for both Printer Configuration and Plotter Model Parameter files when standardizing plotting for network use.

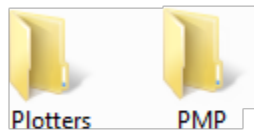


*TIP: Place PC3 and PMP files in a read-only directory on the server to prevent users from accidentally making unwanted modifications.*

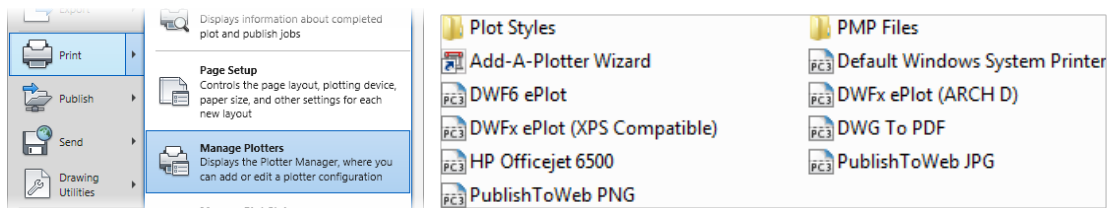
### Procedure: Standardizing Network Plotter Paths

**Centralize PC3 and PMP files into their respective directories on the network:**

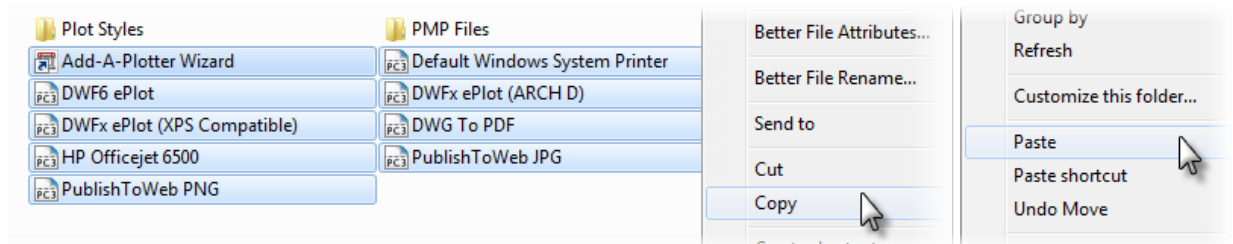
- Using Windows Explorer create a new network directory for both the PC3 and PMP files.



- Open the existing Printer Configuration Search path from the AutoCAD Application Menu → Print → Manage Plotters.



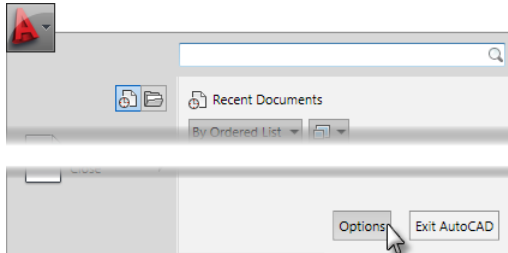
- Copy existing PC3 files to the newly created network location.



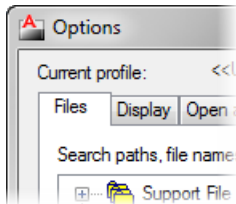
**Update Printer Support paths to reflect network location:**

The following procedure will must be applied to each users machine. Each user will use centralized printer configuration after these changes are made.

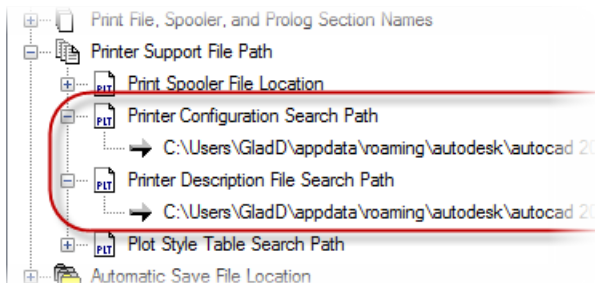
1. Open the Options dialog by selecting the AutoCAD Application Menu → Options.



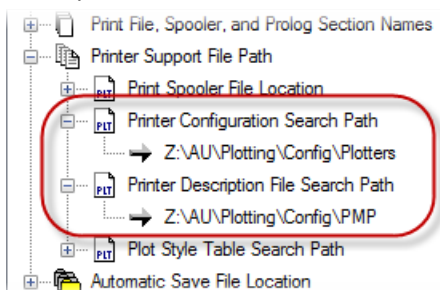
2. Switch to the Files tab it's not already current.



3. Expand the Printer Support File Path → Printer Configuration Search Path and Printer Description File Search Path nodes.



4. Change the Printer Configuration Search Path to the directory with your PC3 files and the Printer Description Search Path to the directory with your PMP files.



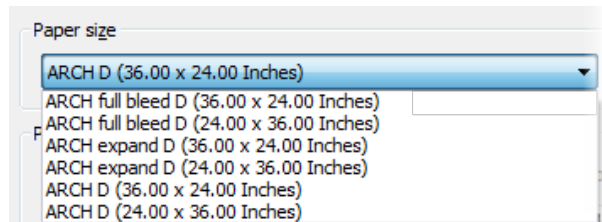
5. Click OK to exit the Options dialog.

## Paper Sizes

Unfortunately, all ARCH D 24 x 36 pieces of paper are not created equal in the eyes of AutoCAD. Unless they happen to be the same make and model, seldom will two plotters offer the “same” ARCH D 24 x 36 paper sizes. In fact, several plotters will even offer multiple variations of the “same” paper size for users to choose from. This vast landscape of paper sizes helps ensure at least one will accommodate your needs; however it also means users are more likely to pick the incorrect paper size than the correct one. While there isn’t one cure-all fix for this, several steps can be taken to minimize if not eliminate the disconnect.

### Filtering Non-Essential Paper Sizes

As an example, the DWF ePlot device included with AutoCAD provides three variations of the ARCH D paper size; ARCH D, ARCH expanded D, and ARCH full bleed D. Each of these is then offered in both portrait and landscape orientations bringing the total number of variations to six.

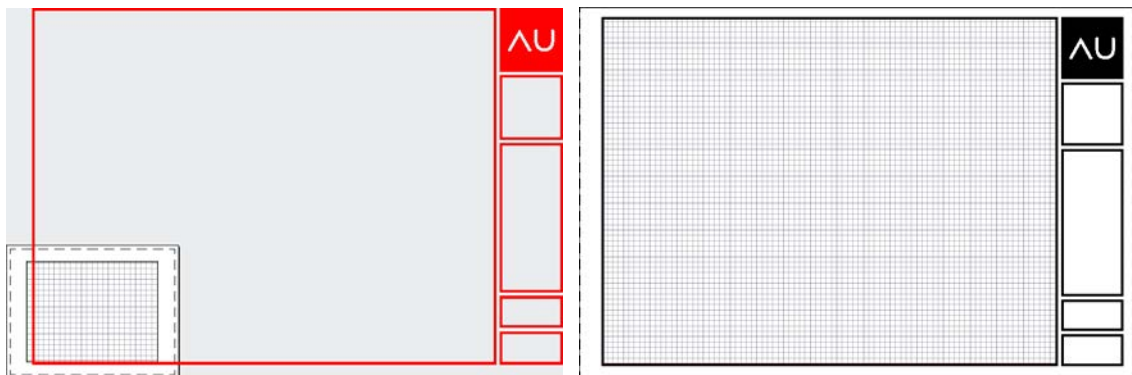


Using AutoCAD Plotter Configuration (.pc3) files, the list of available sheet sizes may be reduced to only include the handful used by your firm. When determining the correct paper sizes for your firm, it’s best to create a “dummy drawing sheet” for each of the paper sizes your firm uses. This dummy drawing sheet can then be used to test each of the available paper sizes before finding the one that works best for your firm.

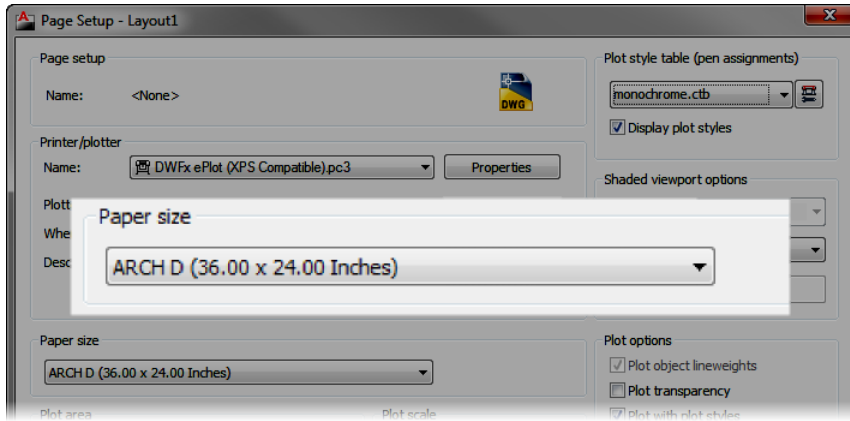
### Procedure: Testing Paper Sizes

The following procedure will walk you through the process of building and then testing a dummy drawing sheet to each of the available paper sizes of a plotter (DWF ePlot in this case):

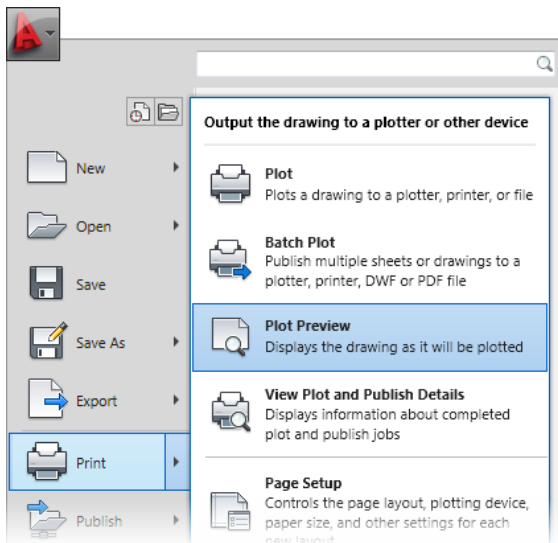
1. Build a dummy drawing sheet the same way you would build a typical drawing sheet; i.e. reference/insert drawing border.



2. Right-click the current Layout tab to open the Page Setup Manager. Modify the current layouts page setup.

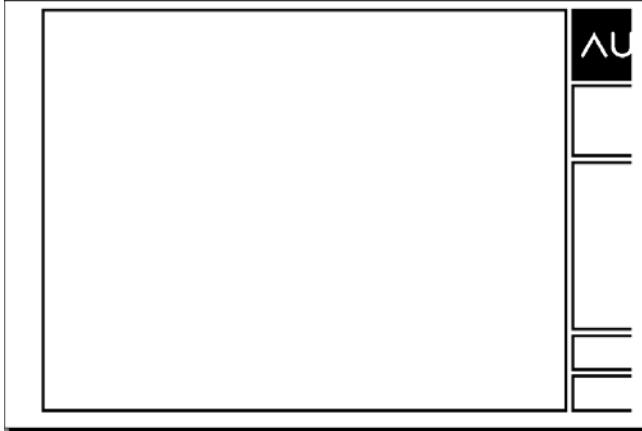


3. On the AutoCAD Application Menu, click Print → Plot Preview to generate a preview of your dummy drawing sheet.

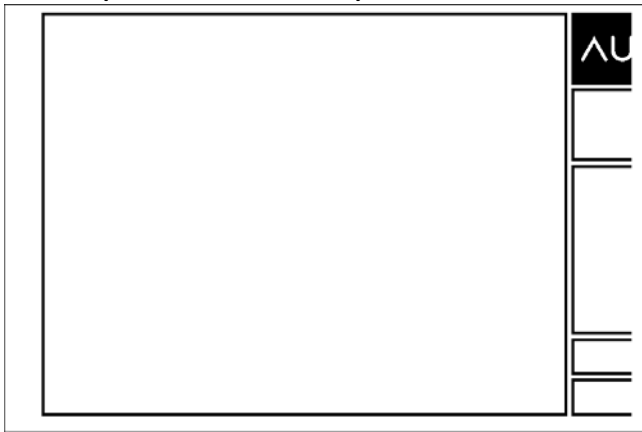


- Repeat steps 2 – 3 until each paper size is tested.

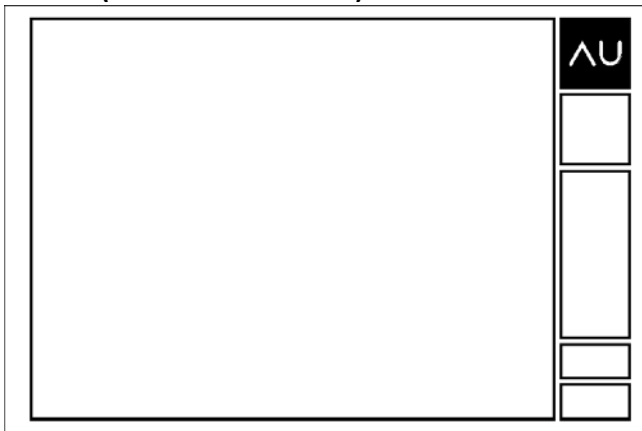
From the samples below, the ARCH full bleed D (24.00 x 36.00 Inches) paper size appears to be the best choice for our title block.



**ARCH D (24.00 x 36.00 Inches)**



**ARCH D (24.00 x 36.00 Inches)**

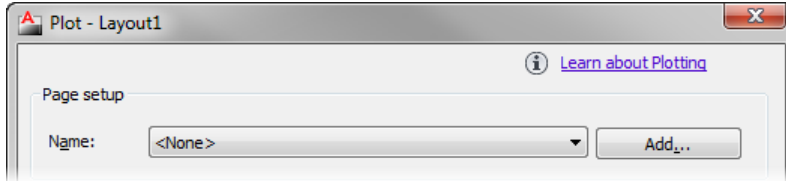


**ARCH full bleed D (24.00 x 36.00 Inches)**

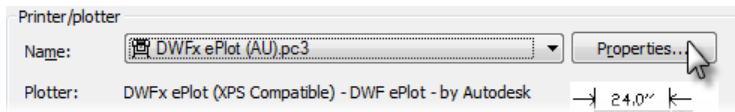
**Procedure: Filter Non-Essential Paper Sizes**

The non-essential paper sizes may be filtered out after determining the best paper sizes for your application.

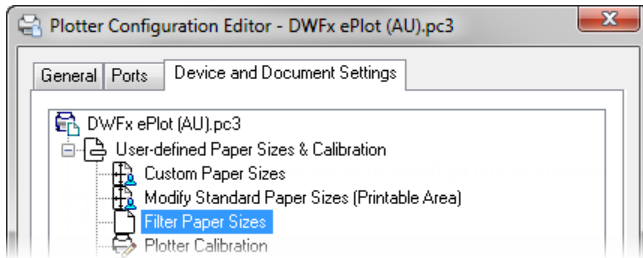
1. Open the Plot dialog; Application Menu → Print, PLOT command, etc.



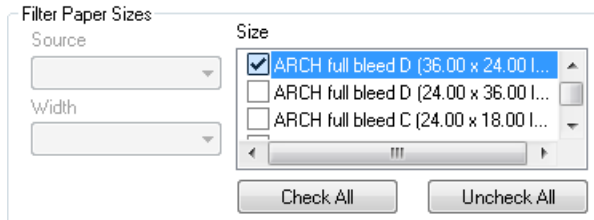
2. Select the plotter whose paper sizes should be customized and click Properties.



3. From the Device and Document Settings tab of the Plotter Configuration Editor dialog; expand User-defined Paper Sizes & Calibration → Filter Paper Sizes.

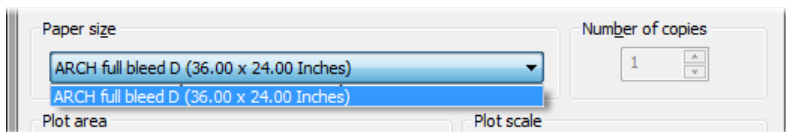


4. Each available paper size for the selected plotter is listed within the Filter Paper Sizes group of the Plotter Configuration Editor dialog. Uncheck all but the paper sizes that are compatible with your company standard.



*TIP: Use the Uncheck All button to clear all checkboxes, and then proceed to check the needed paper sizes.*

5. Click OK to save changes and exit the Plotter Configuration Editor dialog. With the device still selected from the Plot dialog, expand the list of available paper sizes.



## Coordinating Devices

After establishing the best paper size for each device in a firm, the next step is to coordinate the subtle differences between plotters. Although a specific paper size was the best choice independent of all other plotters, some changes to page setup and even your title block may be required to ensure consistent plots between all plotters in your firm. The exacting nature of this exercise is very much an exercise of trial and error.

The basic procedure to coordinate devices is deceptively short, and can be summarized in these steps:

1. Create a “dummy drawing sheet” for Device A and Device B.
2. Plot dummy drawing sheets from each device.
3. Compare plots using either a light table or window with plenty of sunlight. Look for any differences between the two drawing sheets; titleblock positioned at slightly different locations, etc.
4. Modify the PC3 for the device and repeat steps 2-3.

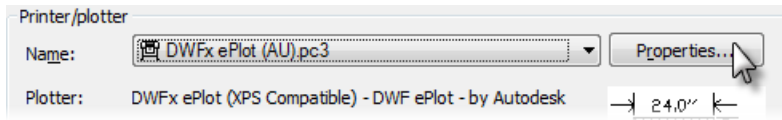
Naturally each device will be slightly different than the next, and consequently require a different level of customization/coordination. Although other actions may be necessary for certain devices, some common “tricks of the trade” include:

- AutoCAD MOVE command: Use to modify the location of your title block in relation to the origin (0,0,0) point.
- Tick Marks: Some plotters may place your title block along the left margin regardless of where the title block is inserted within the layout tab. Placing a small tick mark in the lower left corner can oftentimes be used to hone the placement of a title block.
- Modify the Printable Area (Internal Margins): Adjusting the internal margins or printable area as it's known inside AutoCAD will effectively redefine the origin point of your layout tab. Note the printable area is represented inside your Layout by a dashed line.
- Device Settings: Some system devices (printers available to any program on your computer) have additional configuration options. These will obviously vary from printer brand to printer brand, and sometimes even printer model to printer model, so it's a good idea to check these out and see what's available to you.

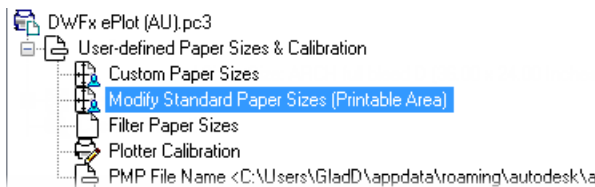


**Procedure: Modifying Paper Size Margins**

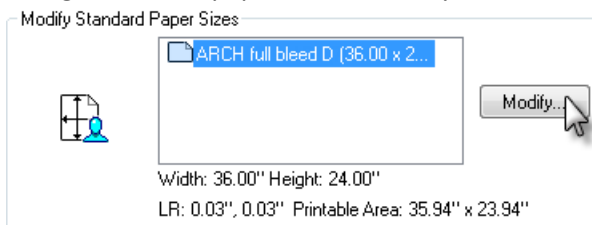
1. With the PC3 of the device to modify selected in the Plot Dialog, click Properties.



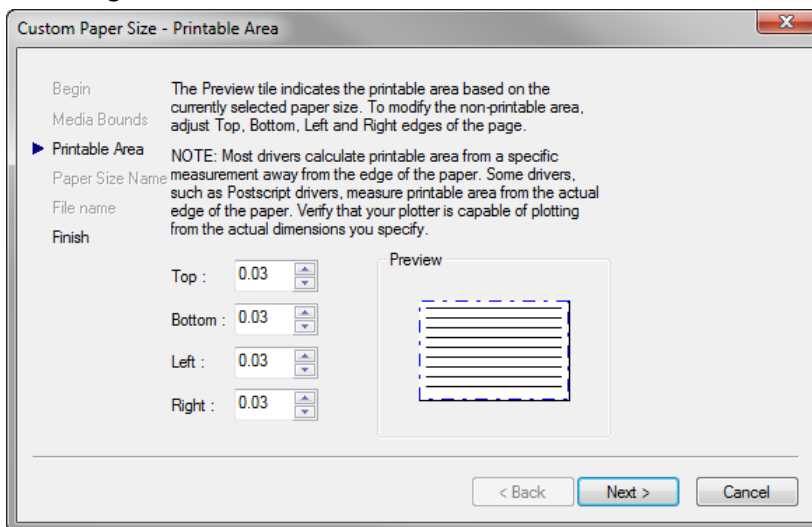
2. Switch to the Device and Document Settings tab within the Plotter Configuration Editor dialog; expand User-Defined Paper Sizes & Calibration → Modify Standard Paper Sizes (Printable Area).



3. Within the Modify Standard Paper Sizes group at the bottom of the Plotter Configuration Editor dialog; select the paper size to modify, and click Modify....



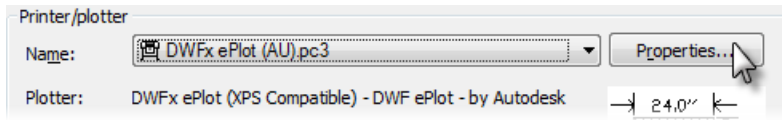
4. Make the necessary adjustments to the printable area of the selected paper size from the Custom Paper Size – Printable Area dialog. Click Next and then Finish to save changes and exit the dialog.



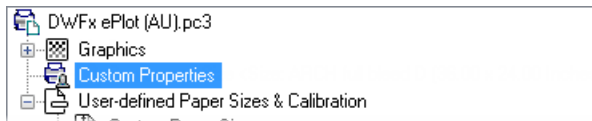
5. Click OK to save changes and exit the Plotter Configuration Editor dialog.

**Procedure: Accessing Device Driver-Specific Settings**

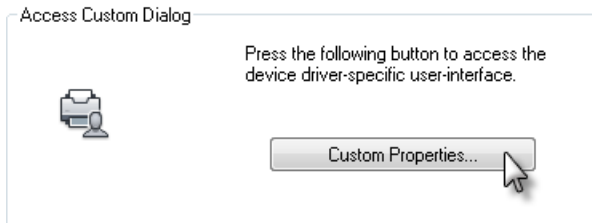
1. With the PC3 of the device to modify selected in the Plot Dialog, click Properties.



2. Switch to the Device and Document Settings tab within the Plotter Configuration Editor dialog; expand Graphics → Custom Properties.



3. Click Custom Properties within the Access Custom Dialog group at the bottom of the Plotter Configuration Editor dialog.



4. The custom properties dialog will be specific to the current device. Click OK to save any changes, and return to the Plotter Configuration Editor Dialog.
5. Click OK to save changes and exit the Plotter Configuration Editor.

## Inter-Office Sharing and Sheet Setup

With paper sizes selected and properly coordinated it's now possible to simply drawing sheet setup to a single process. This section will focus on building a way for users to simply create a new sheet without worrying about where the title block should be inserted or how to configure the Plot dialog. By investing the time to calibrate each plotter a user may send a plot to, it's now possible to create a single way for setting up drawing sheets for the entire firm. That's to say users in the Main Office will set their sheets up exactly the same way as users in the Downtown Office; even if the make and model of the plotters in those offices differ.

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*WARNING: The process outlined in this section may NOT work as described unless the output of each device in your firm has been calibrated. Before proceeding, the output and placement of drawing sheets between plotters should be verified.*

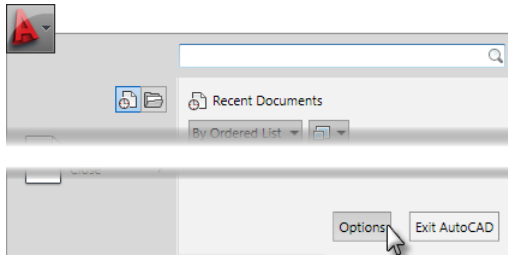
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### Filter Available Plotters

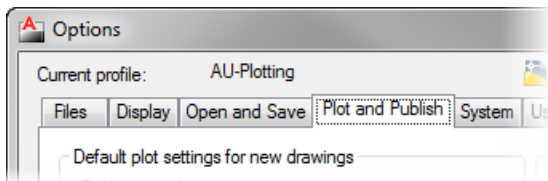
Despite the time invested in configuring PC3 files that are customized to the drawings your firm creates, users can still circumvent these efforts and plot directly to the system device. The list of available plotters can either include both system printers and non-system (PC3) printers, or ONLY non-system (PC3) printers. By hiding system printers, users will only be able to select the pre-configured plotters you customized to work with your firms standards.

#### Process: Hiding System Printers

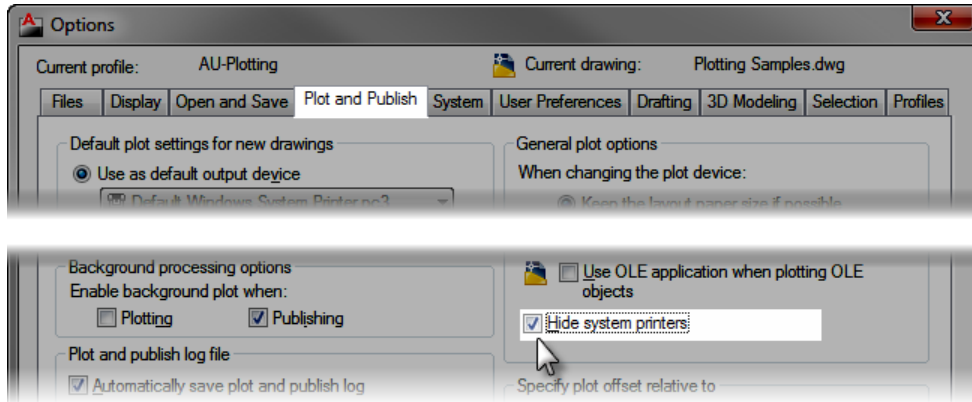
1. Open the Options dialog by selecting the AutoCAD Application Menu → Options.



2. Switch to the Plot and Publish tab.



3. Within the General Plot Options group of the Plot and Publish tab, check the Hide System Printers checkbox.

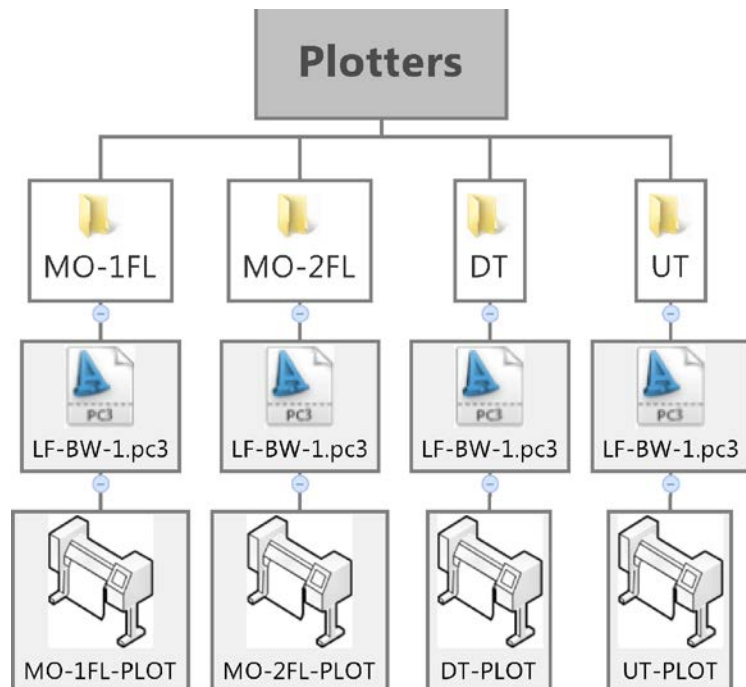


4. Click OK to save changes and exit the Options dialog.
5. Start the PLOT command, and note the list of available plotters.

### Standardize Plotter Names

When switching printers in the Plot dialog, AutoCAD will automatically select the settings (paper size) that best match the previously selected printer. The same is true if the device previously selected in the Plot dialog changes to a different device of the same name. Let me explain this idea in a little more detail.

Users working on the first floor of the Main Office will most likely plot to MO-1FL-PLOT. Similarly users working from the Downtown Office will most likely plot to DT-PLOT. If the PC3 files for these devices were named MO-1FL-PLOT and DT-PLOT respectively, users would get an error stating the device originally assigned to a drawing sheet cannot be found when drawings are exchanged between offices.



Since AutoCAD will automatically choose the settings that best match the settings from the original device, the primary plotter for each office can be standardized. Consequently, standardizing plotter names will eliminate both the device not found error and the need to choose a different device when drawings are shared between offices. Facilitating this configuration does require some planning. As such, the setup for our fictitious office may look like the graphic to the right.

Notice how the name of the PC3 remains the same (LF-BW-1), while the device each PC3 is connected to changes based on the floor/office location. Since the plotter name device (PC3) name is used throughout the firm, drawings will automatically plot to the device closest to my current location throughout the firm. This is achieved because of two very important components.

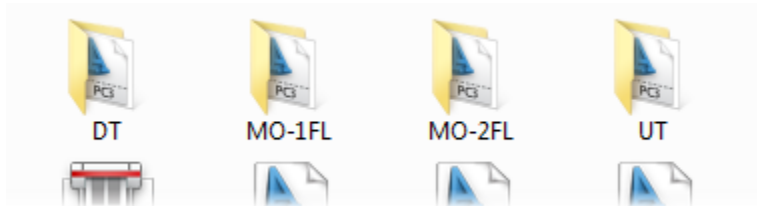
First, each device was calibrated to plot exactly the same as every other device in the firm. Although the physical device may be different, the configurations of those devices match making it easy for AutoCAD to switch between each device.

Secondly, since two files of the same name cannot exist in the same directory, separate Printer Configuration Search Paths are used for each floor/office location. See the *Standardizing Network Plotter Paths* procedure for more information on how change this path.

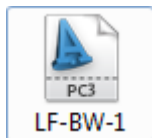
**Procedure: Configure Multiple Printer Configuration Search Paths**

Segregating plotters specific to each office/floor is great, but what about managing each of the standard plotters that ship with AutoCAD. You probably won't want to copy the out-of-the-box plotters like DWG to PDF, and the various DWF devices. The following procedure outlines how to create what in essence is multiple Printer Configuration Search Paths.

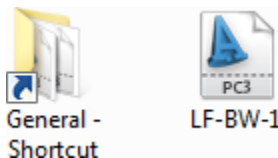
1. Create office specific Printer Configuration Search Paths



2. Create the office specific devices inside each office Printer Configuration Search Path; DT, MO-1FL, MO-2FL, UT in this example.



3. Create a shortcut to the "General" Printer Configuration Search Path; the directory containing each of the out-of-the-box printers such as DWG to PDF, and DWF ePlot.



4. Set the Printer Configuration Search Path to the directory with the office/floor specific PC3 files. AutoCAD will read the Windows shortcut and include the devices within the shortcut directory

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*NOTE: The office-specific Printer Configuration Search Path should not be a subdirectory of the General Printer Configuration Search Path.*

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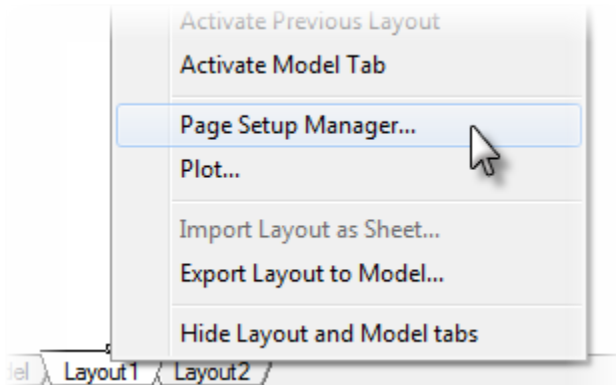
## Standardize Layout Tab Setup with Page Setups

Named Page Setups provide an easy way to capture the settings contained within the Plot dialog and reuse them on other Layouts. Including these Page Setups within a company drawing template (.dwt) means standard plot configurations are automatically at user's fingertips. By combining everything into a single template (.dwt) file, new layouts can then be created from a library of pre-configured (aka guaranteed to work) Layouts.

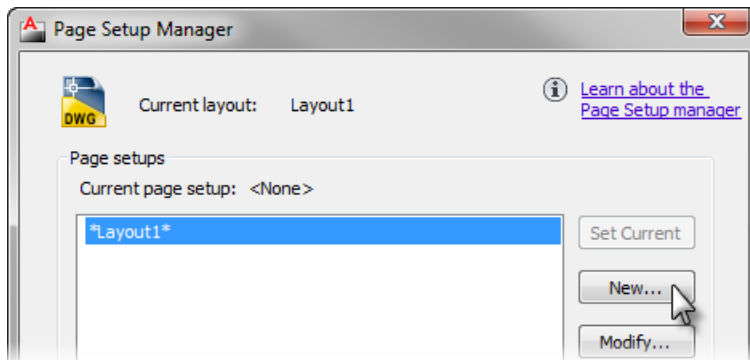
### Procedure: Creating Named Page Setups

Creating Named Page Setups is almost as easy as using the Plot dialog itself. However an intermediary step will allow you to name the Plot dialog configuration as a Page Setup before AutoCAD opens a dialog that's nearly identical to the Plot dialog.

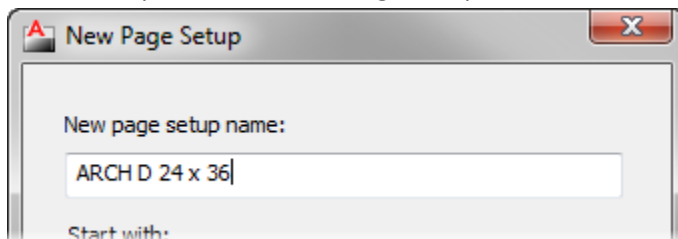
1. Right-click on the current Layout tab and select Page Setup Manager...



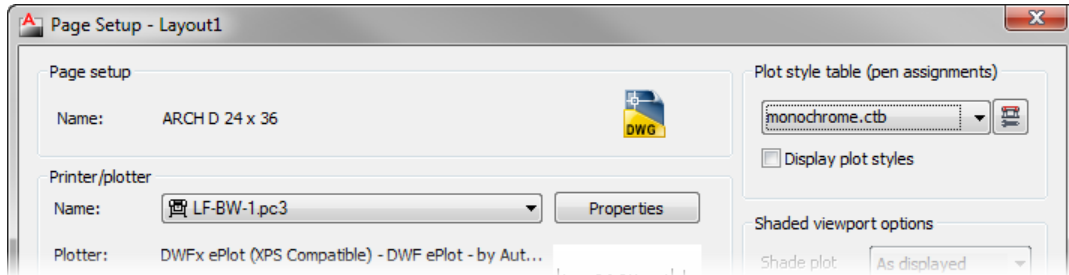
2. From the Page Setup Manager dialog; click New.



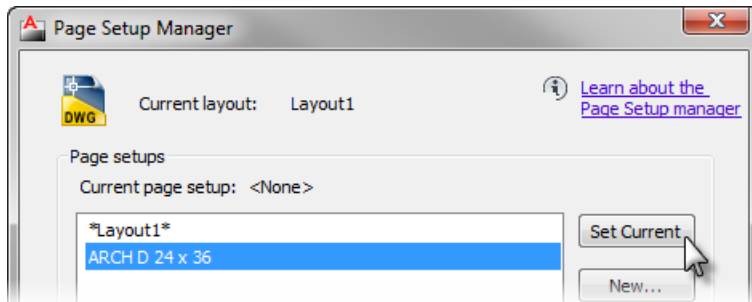
3. Enter a unique name for the Page Setup within the New Page Setup dialog.



- The Page Setup dialog (that closely resembles the standard Plot dialog) opens. Configure this dialog as you would the Plot dialog and click OK.



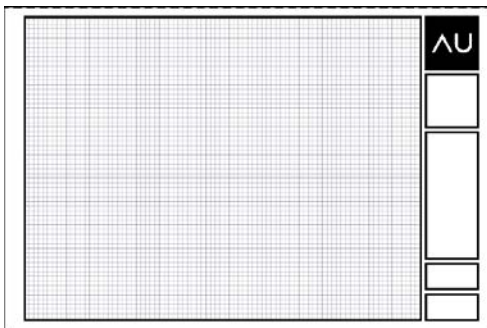
- Back at the Page Setup Manager dialog, select the newly created Page Setup and click Set Current.



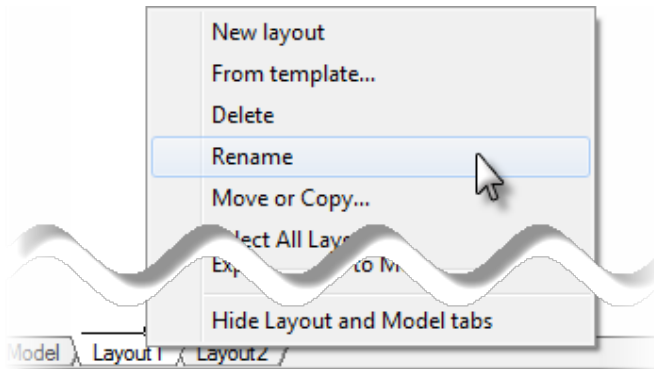
**Procedure: Creating a Layout Template Drawing**

Each of the Page Setups you create may be combined with a standard Layout that future Layouts can be created from. Each of these standard layouts will be stored in an AutoCAD Drawing Template (.dwt) file.

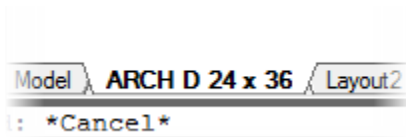
- If it's not already, insert/reference your title block, and insert any necessary block attributes.



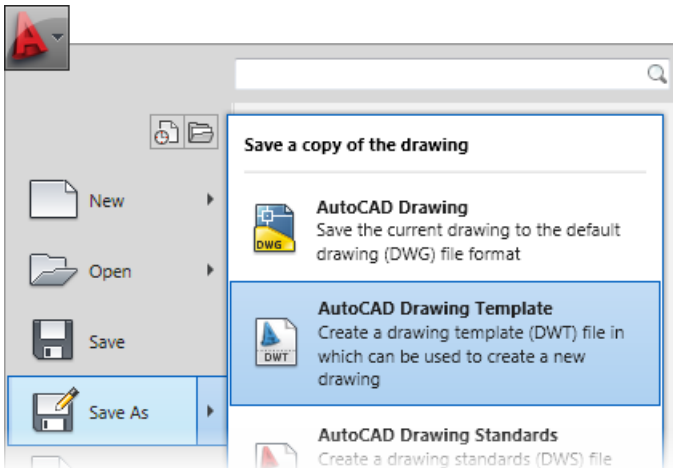
2. Right-click on the Layout tab and select Rename.



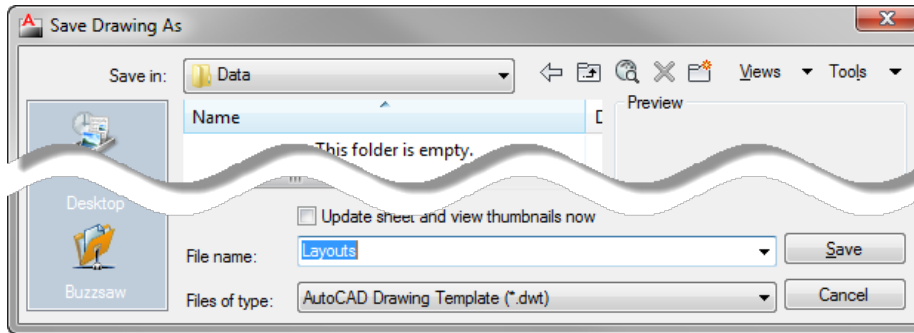
3. Enter a descriptive name for your layout tab.



4. Save the current drawing as an AutoCAD Drawing Template; Application Menu → Save As → AutoCAD Drawing Template.



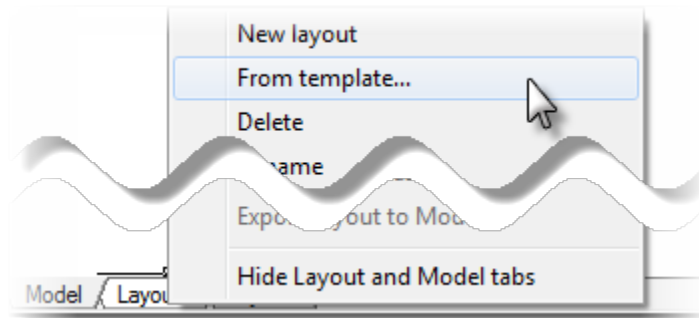
5. Save the drawing template in a common location on the network where other users will have access to it.



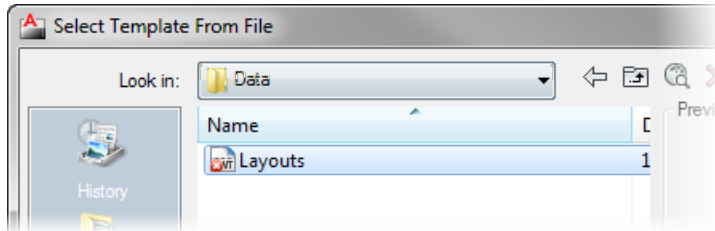
### Process: Creating Layouts from a Template

To create layouts from a layout template (.dwt) drawing:

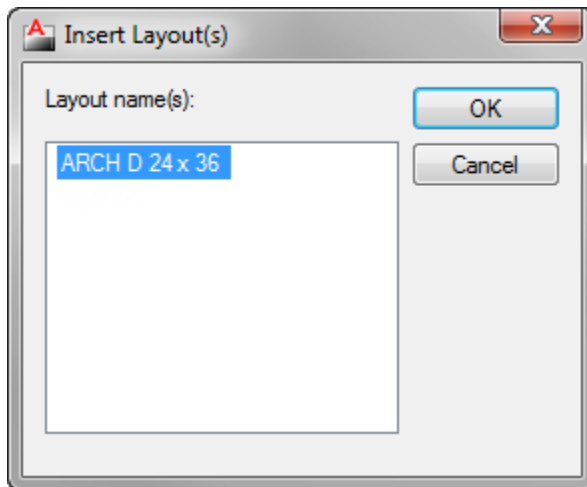
1. Within any AutoCAD drawing, right-click on a layout tab and select From Template.



2. Browse to and select the Layout template (.dwt) drawing containing the desired paper size.



3. Select a layout from the selected template to insert into the current drawing as a new layout.



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*NOTE: It's typically considered a best practice to store all Layout templates in a single drawing so they are easily located when creating new layouts.*

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## Multi-Disciplinary Plotting

Standardizing plotting for one discipline is hard enough, multiplying that by any number of different, yet related disciplines only multiplies the problem. AutoCAD translates what is shown on the screen to what we see on paper using what's known as a Plot Style Table. The original and arguably most popular type of Plot Style Table is color-based, and designated by the .ctb file extension. A lesser known, yet arguably more versatile Plot Style Table is known as a Named Plot Style Table and is designated by the .stb file extension.

Color-dependent plot style tables map each of the 255 standard AutoCAD colors to a specific configuration including properties such as the color of the plotted line, screening, and lineweight to name a few. This method is a loose interpretation from the old pen plotters; a plotter may have 8 pens of varying thicknesses. A throwback of this system, many firms use what's oftentimes called a 6, 8, or 10-pen rotation when configuring their plot style table. This basically means every 6, 8, or 10 of the standard AutoCAD colors will share the same properties up through 255.

This basic approach has served the AutoCAD community very well over the years. Since one is effectively limited to 255 colors, the versatility for multi-disciplinary collaboration is quite limited. Due to this limitation, referencing drawings from a different discipline oftentimes requires investing some amount of time to make it plot correctly within your drawing set.

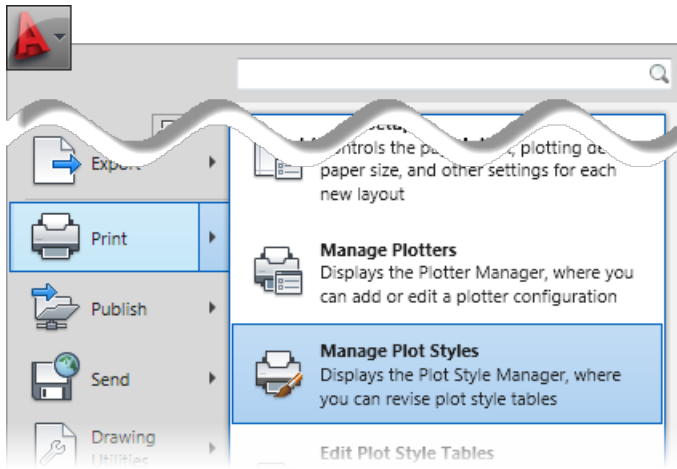
Named plot styles are a newer alternative to color-dependent plot styles, and provide the versatility necessary to facilitate multi-disciplinary collaboration. Using named plot styles, color no longer has any bearing on how your drawing plots (lineweight, screening, etc). Instead users will assign a named plot style that you create. This named plot style is defined much like a color-dependent plot style, except that you provide its name.

With the ability to specify your own names, each discipline could then have their own series of plot styles. Using our fictitious civil/survey firm as an example; my plot style table may have a series of plot styles with a C- prefix and another series with a V- prefix (tying into the discipline codes from the National CAD Standards). Items that should be screened in Survey drawings but not Engineering drawings could be assigned a C- plot style, and vice versa for survey items in engineering drawings.

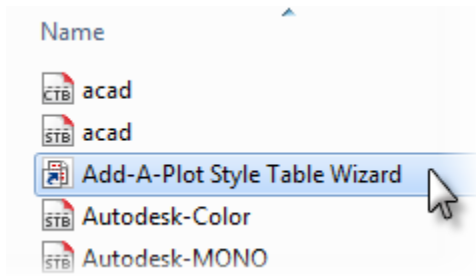
### Procedure: Creating a Named Plot Style Table

1. From the Application Menu → Print select Manage Plot Styles.

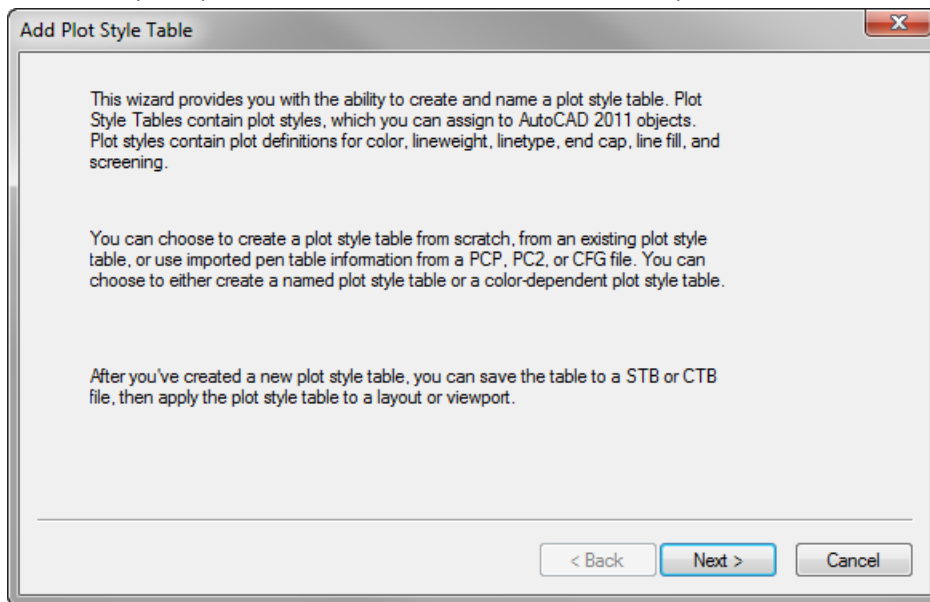




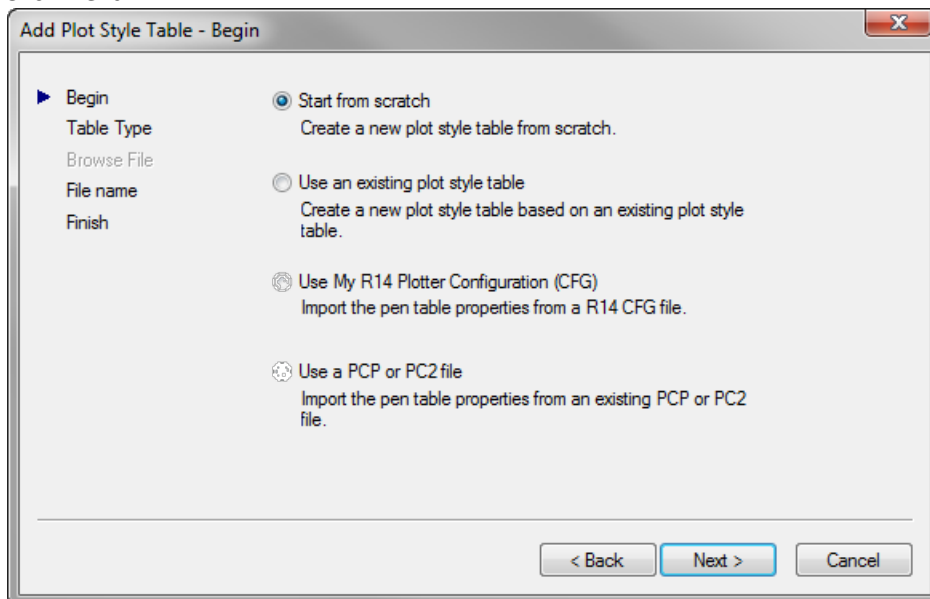
2. Click Add-A-Plot Style Table Wizard.



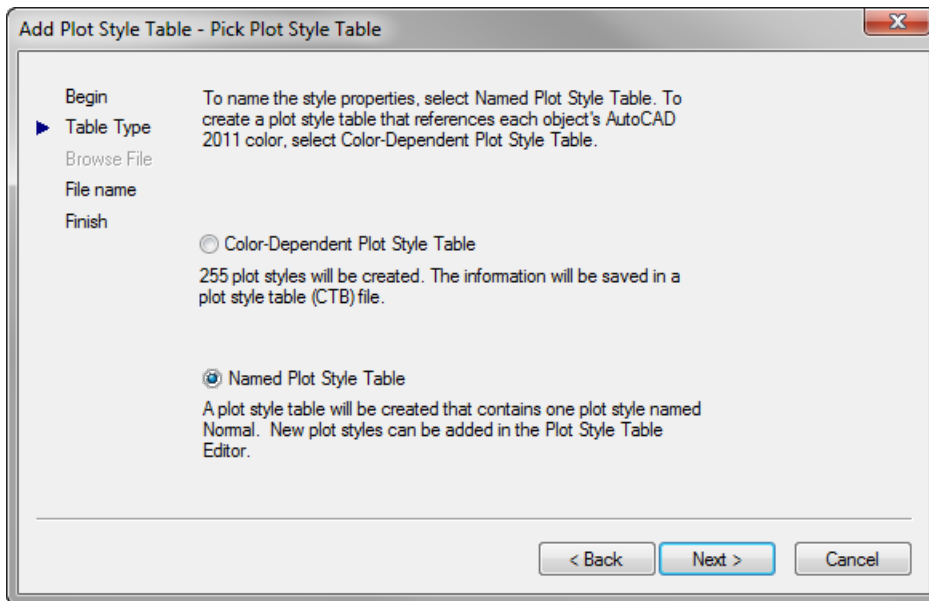
3. Follow the prompts in the wizard to create a new Plot Style Table:



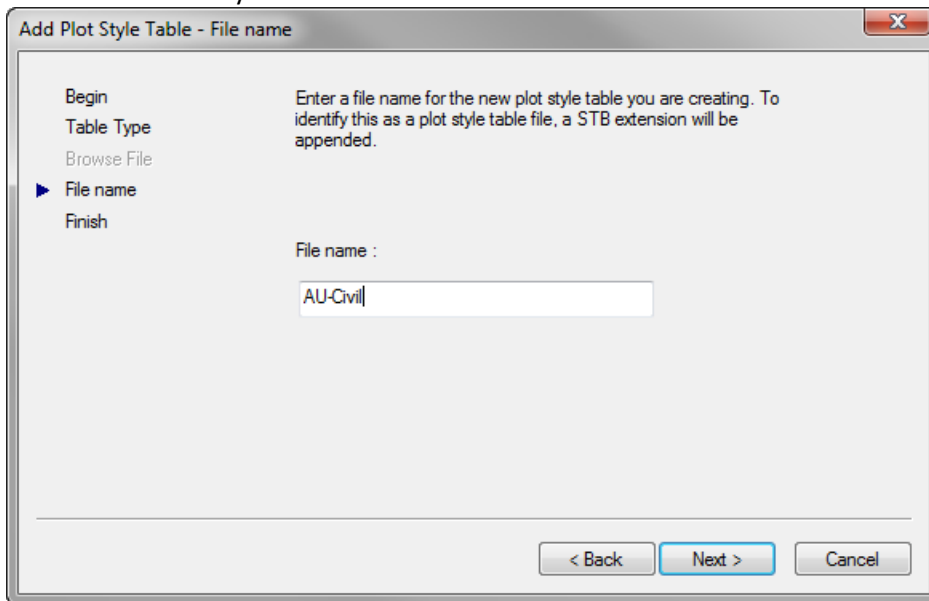
Click Next



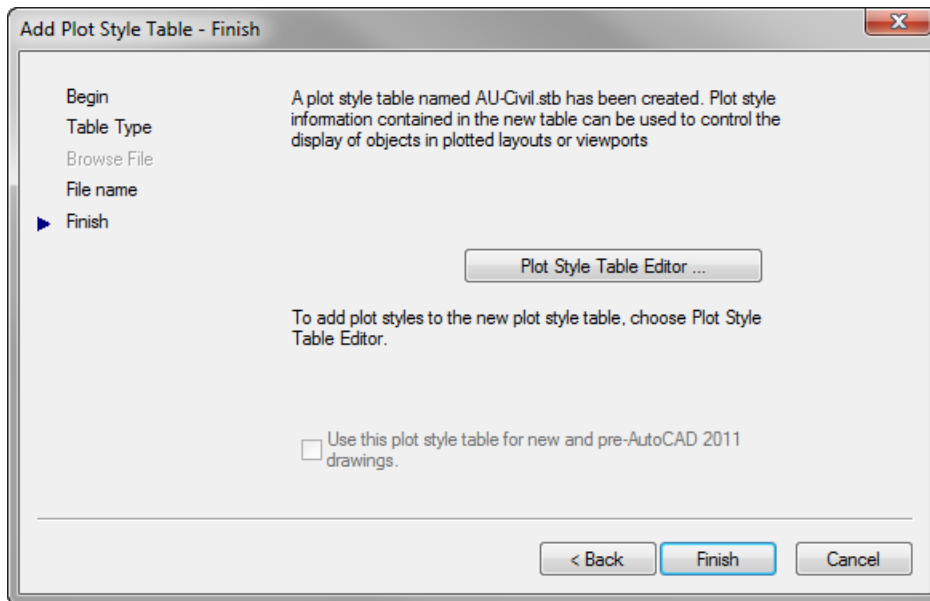
Click Start From Scratch



Click Named Plot Style Table

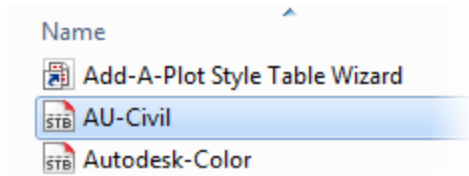


Enter a name for the Plot Style Table.

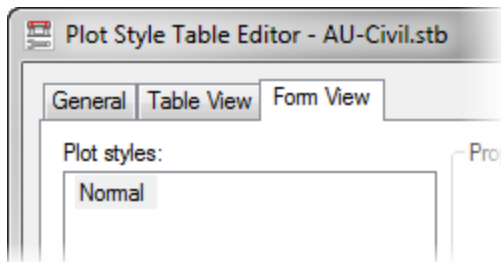


Click Finish.

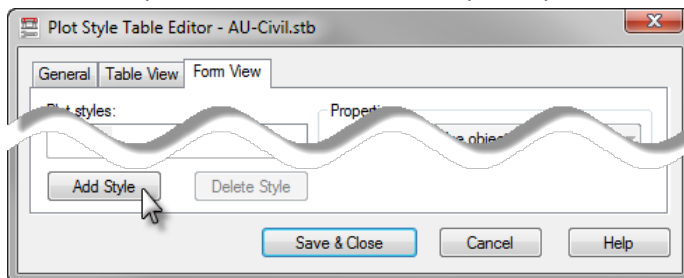
4. Double-click the Plot Style Table to open it.



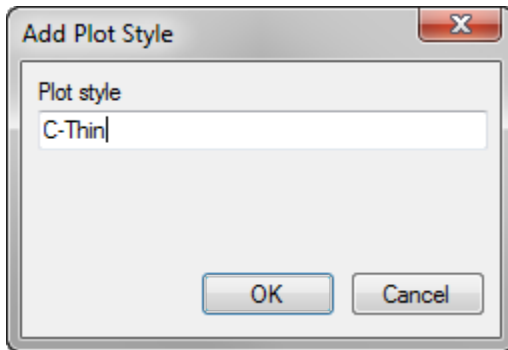
5. Switch to the Form View Tab within the Plot Style Table Editor dialog.



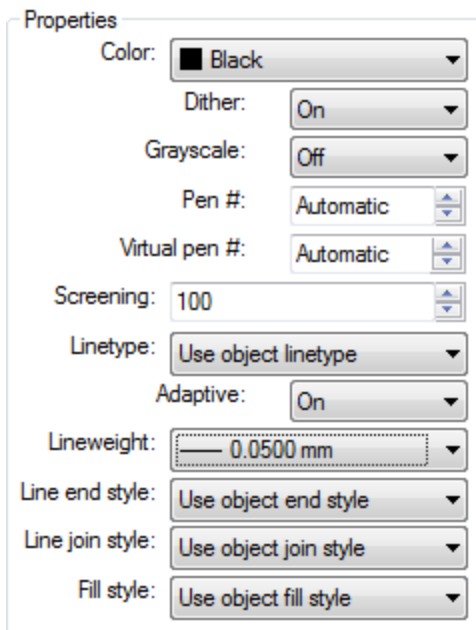
6. Click Add Style to create a new named plot style.



7. Enter a unique name for the plot style. Click OK.



8. Configure the Properties (color, lineweight, screening, etc) for the newly created plot style.



9. Repeat steps 6-8 to create additional plot styles.

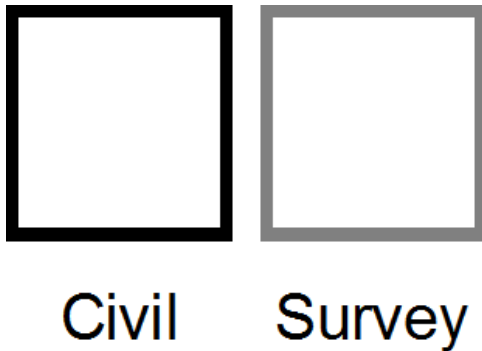
Ultimately two Plot Style Tables containing the exact same styles would be created. The basic Plot Style Table might look like this:

Engineering Style	Survey Style	Lineweight
C-Thin	V-Thin	0.005 in.
C-Normal	V-Normal	0.010 in.
C-Medium	V-Medium	0.015 in.
C-Bold	V-Bold	0.020 in.

The Civil.stb Plot Style Table would plot each of the C- plot styles 100% black, whereas the V- plot styles would be screened 50%. The Survey.stb would do the exact opposite with the V- plot styles plotting 100% black and the C- plot styles plotting 50% screened.

As an example here's a sample drawing. The square on the left has a C- plot style assigned to it, and the square on the right has a V- plot style assigned to it.

When plotted using the Civil.stb the civil engineering objects plot 100% black, and the survey components plot 50% screened.



The reverse happens when that same drawing is plotted using the Survey.stb Plot Style Table instead. The civil engineering objects plot 50% screened and the survey objects plot 100% black.

