Neo Plot Enhancements

Feature Specification

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1 Introduction: Problem and Opportunities

The Neo (AutoCAD 2004) Publish cluster is composed of a number of related features aimed at improving the plotting / publishing user experience. While users were appreciative of the added plotting functionality introduced in the AutoCAD 2000 release, they found that the UI was confusing and interaction with the feature unpredictable. Neo exposes evolutionary enhancements addressing key usability issues to the legacy plot UI, while also introducing a revolutionary and simplified new publishing paradigm more closely aligned with users' real-world conceptualization of aggregations of physical "sheet sets".

1.1 Feature Description

The release of AutoCAD 2000 contained a dramatically different user experience and interface for creating printed output. The new design exposed a great deal of added power and flexibility to our customers, but the enhancements came at the price of a steep learning curve. Customers were initially unhappy by the dramatic paradigm shift, and what was initially considered internally as a selling point of the new release was perceived by customers as a liability and barrier to upgrade.

Over time many of our customers came to appreciate the new plotting paradigm, but it continues to be intimidating to new users of the product, or those who plot on an infrequent basis. The Plot Enhancements feature targets these users by providing a streamlined plotting interface that initially presents a subset of the full range of options available in the Red Deer (AutoCAD 2004) plotting interface. The initial streamlined dialog box is expandable, showing all available options for power users who need ready access to all plot functionality.

2 Goals, Requirements and Use Cases

The following sections detail the goals, requirements, and use cases for Neo Plot Enhancements.

2.1 Usability Goals

1. Provide a streamlined, intuitive interface that allows users to quickly generate plots of the current sheet or display.
2. Allow novice users, or those who plot from AutoCAD infrequently, to quickly and accurately generate printed output scaled-to-fit on a printed sheet.
3. Allow users to change various plot settings without modifying the underlying settings of a sheet or its associated page setup.
4. Allow power users to interact with a complete Plot interface that presents all the functionality available through the legacy Red Deer Plot UI.
5. Conduct extensive customer validation to ensure that any changes are not perceived as too radical.

2.2 Requirements

The following high-level requirements are identified for the Neo Plot feature[1]:

1. **Provide novice users with a streamlined, less intimidating Plot dialog box.** The reworked Plot dialog box should capture the essence of the "Quick Plot" functionality detailed in a separate CD document. The dialog box should be expandable so that power users have ready access to the full range of available plot options.
2. **Implement a "just-in-time" toolbar when in plot preview mode (similar to the Preview mechanism in Microsoft Word).** When in the new preview mode, all enhanced secondary windows are temporarily hidden, and the user's toolbars are temporarily replaced with a single Preview toolbar. The toolbar should expose the following buttons when previewing from within a plot context:
    a. Plot
    b. Pan
    c. Zoom
    d. Zoom Window
    e. Zoom Original
    f. Exit Preview

    Users exit out of preview mode by clicking the Exit Preview button; by invoking a command through a pull-down menu; or by pressing the ESC or ENTER keyboard

[1] Note: A formal requirements phase is not part of the Neo design cycle. In the place of a detailed requirements document, feature team clusters are reviewing and prioritizing use cases. The prioritized list of use cases for the entire Publish feature cluster is available in a spreadsheet (refer to the Related Documents section at the beginning of this Conceptual Design document).

keys. Upon exiting preview mode, the previous state of all user toolbars and enhanced secondary windows is restored.

3. **Make it more difficult for users to inadvertently save changes back to a layout when generating a one-off plot.** In legacy AutoCAD, there is a check box ("Save changes to layout") that many users are unaware of. If this checkbox is checked, any changes they make in the plot dialog box (e.g., changing the printer or paper size) get saved back to the layout. To make saving changes back to layouts a conscious user choice in Neo, the check box is cleared (unchecked) by default.
4. **Implement a standard Windows list control for the Plot Style Table and Pen Editor UI's.**

2.3 Use Cases

The following high-level use cases have been identified for Plot Enhancements:

Use Case	Use Case
UC_PL01	To change the current page setup for one-off plots without saving the changes back to the source layout
UC_PL02	To plot the current drawing to a different output device without permanently changing any page setup settings
UC_PL03	To plot the current sheet scaled-to-fit
UC_PL04	Design 1: To view a contracted version of the Plot dialog box that displays a sub-set of available settings ("Quick Plot")
UC_PL05	Design 1: To view an expanded version of the Plot dialog box that displays all available settings
UC_PL06	Design 2: To view basic ("Quick Plot") Plot settings
UC_PL07	Design 2: To view advanced Plot settings
UC_PL08	Design 3: To view basic ("Quick Plot") Plot settings
UC_PL09	Design 3: To view advanced Plot settings

3 Terminology

Term	Definition
Anchor Point	A point which anchors sheet geometry in place, making sheet geometry positioning independent of output device. When changing output devices causes a change in the available printable area for a sheet, offset values are automatically calculated to maintain the absolute positioning of sheet geometry. See also: *Printable area*.
Automatic Offset	New functionality exposed through the Plot dialog box that is enabled when creating a new layout in Neo. Automatic offset calculates an offset value to apply to sheet geometry in order to maintain consistent positioning of layout elements when switching between devices with different available printable area. Automatic Offset is always enabled in Neo.
DPI	Dots per inch. Neo introduces a new DPI property for sheets, making it possible to accurately convert from dimensionless to dimensional media.
Layout	A mechanism in legacy AutoCAD for defining an environment of content to print and representing it visually within the bounds of plottable area for a given output device at a given output size. In Neo, legacy layouts are enhanced with additional properties and become sheets. See also: *Sheet*.
Page Setup	A collection of settings from the plot dialog box that is saved in the drawing file. Page setups contain all the information that layouts store, including output device, layout scale, and so on. Once defined in a drawing file, a page setup can be used in any layout. Neo introduces a new mechanism for users to associate page setups at the sheet set level. See also*: Sheet*.
PC3 File	An Autodesk driver file that takes advantage of the full range of capabilities of a given printer or plotter. A PC3 file can be wrapped around a Windows system printer, or can configure a printer directly. See also: *System Printer*.
Preview Mode	A special mode in AutoCAD that shows a full preview of how the current plot settings will be applied when users issue the plot command. In Neo, a new "just-in-time" toolbar will be introduced. When in Neo preview mode, all enhanced secondary windows and user toolbars will temporarily be hidden, and a toolbar with buttons directly relevant to the preview operation will be displayed. Upon exiting out of the preview mode, the previous state of all enhanced secondary windows and user toolbars will be restored.
Printable Area	The area on a sheet of paper that a given plotter is capable of using when generating printed output. In previous releases of AutoCAD, layout geometry was positioned in the layout relative to the available printable area. Changing from one output device to another would cause geometry to shift within the layout if the two output devices had different printable areas. In Neo, an option is exposed to dissociate layout geometry from the available printable area, instead defining layout positioning as an offset value a particular distance from the lower left border of the physical sheet. To maintain compatibility with AutoCAD 2004, an automatic offset value is computed and maintained within the DWG. Users can also continue to position layout geometry according to the available printable area of the initial device originally associated with a given layout, in which case automatic offset values are calculated according to the printable area of this initial device.
Sheet	A new term in Neo for legacy layouts. Layouts are enhanced in Neo so that they are defined with a concept of their size. This size is wholly independent from the page size specified in a page setup.
Sheet Set	An ordered collection of sheets that share common properties, such as media size

Term	Definition
	and current page setup. Sheet sets roughly correspond to the physical set of bound sheets that are the primary communication medium on typical AutoCAD projects. Sheet sets are tailored for fast and efficient output of printed or electronic documents through the Publish command. *See also*: Sheet
Sheet Set Manager	A new interface in Neo that allows users to easily assemble sheets into a coherent, ordered drawing set. Page setups are associated at the sheet set level.
System Printer	A print or plot device that is configured at the system level through the Windows control panel. The Windows system printer only exposes a limited subset of the functionality required by most of our users for their plotting needs. Therefore, users frequently need to define an Autodesk PC3 file for configuring their plotting devices. See also: *PC3 File*.

4 Interaction Design

4.1 Plot Enhancements Overview

Plotting is a key user activity that is central to the success of AutoCAD as a product. Because of this, it is imperative that changes made to Plot user interaction and interface layout be extensively validated with our customers. The Publish feature team has conducted multiple rounds of customer validation, and based on these findings the Plot redesign has separated the options available in the legacy Plot dialog box into the following two categories:

- **Core ("Quick Plot") Options:** Those options that are core to the user plotting experience, and most likely to be changed by users on a regular basis.
- **Advanced Options:** Those options that users are less likely to regularly modify.

Research has also indicated that most plotting users fall into one of two types regarding the level of detail they'd like exposed in the Plot dialog box:

- **Minimalist UI:** This user type prefers a streamlined interface that only presents those options that are most frequently used. These users rarely modify many settings within the Plot dialog box and are overwhelmed by the range of available options. These users are typically novices or those that use the PLOT command infrequently.
- **Complete UI:** These users express a preference for a dialog box that displays the full range of available options. These are power users who are comfortable with the existing plotting paradigm. Their ideal UI provides access to all available settings in a single, non-tabbed interface.

The Plot Enhancement redesign focuses on providing a clean interface that provides novice users with a streamlined UI presenting just those controls they'll typically need, while balancing the needs of power users who need quick access to the full range of plotting functionality. The following section details some of the findings of the customer validation process.

4.1.1 Plot Enhancements Validation

To validate the new Plot design, four different versions of the Plot dialog box were previewed to several existing AutoCAD customers. All customers are current participants in the Beta program, and thus under non-disclosure agreements. A total of 21 user sites received the design mock-ups and reviewed them with 100 + AutoCAD users. Users expressed a clear preference for one of the four designs.

The preliminary customer review of the four designs resulted in the following high-level findings:

- Most sites reported that they found the design alternatives to be preferable to the existing 2004 Plot dialog box.
- The majority (87.5%) expressed a preference for the design presented in this specification.
- Most sites indicated that they found the reordering of controls to be logical.

Here is a sampling of representative customer quotes from this study:

"No one, not even novice, is particularly bothered by the existing tabbed dialog, but most prefer Design 1 to the existing." *Rusty Gesner, Group A*

"It was unanimous with all my CAD operators. We all liked #1. We'd leave it in the fully expanded format though, and I've been assured that the settings for this would be sticky." *Robert Grandmaison*

"Vote 21 to 1 for #1. Everyone, including myself would like to see all options in one dialog box, in lieu of additional buttons, tab etc. 1 voted for option #3." *Steven Papke, KBJ Architects, Inc.*

"Design 1 was strongly preferred by 5 users (including both novices) and a close second by the other 2 users. Design 2 was slightly preferred by 2 users." *Rusty Gesner, Group A*

"Nice layout, everything is right in front of you when expanded." *Ken Przybsz, City of Charlotte, Engineering and Property Management*

"I've looked at the 4 designs and my vote would be for the Design 1 if it remembered its state. I like this one because it is the only one that could be called up with everything showing (if it remembered the expanded state), all the others require a click on a tab or button to change options." *Rick Moore*

"I like the first option the best. The only thing I would change is the centering area with the scale. More users will need to specify a scale than will need to offset the plot distance." *Stephen Cupp*

"I and all my drafters seemed to prefer the expandable dialog to the current dialog." *Robert Grandmaison*

"I have to agree with the group so far. I like option 1 of all of them. I don't like 3 or 4 much because they require getting to plotting features through a whole new dialog. I guess I fall into the 'Complete UI' category. I like it all right there for me to change as necessary. I think that Option 1 is a good balance between the two options (the needs of novice users vs. advanced users)." *Brian Allen, McKeown Inc.*

"I looked at the mock ups and all are very nice designs. The one that I like the best would be the first one though. It just seems the cleanest and is a happy middle." *Lee Ambrosius, HyperPics*

"I ran the document by all my drafters. Without exception everyone preferred the first option where the 'expandable' dialog would contain all the options, or limited choices. No one liked the tabs or other button scenarios to get to the advanced options. And I agree with them. ☺" Robert *Grandmaison*

"I really like the looks of this - do you think this will be revised by means of an extension, or will we have to wait until the next AutoCAD?
On the other plot designs - ranking in my order of preference:
1: Design 1 (after talking with you I think this may really be the best one,
I just don't like the style of button for the expanding and contracting)
2. Design 2 - if #1 doesn't win, then #2 is the best compromise choice
3. Design 4 - this bears some resemblance to #1, but I think it's

confusing how you get to the expanded dialog
4. Design 3" Kevin *Terry*

Following this preliminary research, the design rated most favorably by users was subjected to a formal paper prototype usability test comparing the new UI to the existing legacy UI. The preferred design again rated extremely favorably during the usability test, with all users indicating they found it preferable to the existing Plot UI.

In the usability test, users were asked to perform two tasks using the existing legacy UI and the new UI. Users were also presented with a questionnaire that asked them to rate the two UI's. Users rated the software on a variety of measures, responding with a number ranging from 1 to 7. A low numerical rating indicated a negative impression on a given measure, while a high numerical rating indicated a positive impression.

Users were asked the following questions:

1. How would you rate the ease-of-use of the Plot dialog box? (1 = difficult, 7 = easy)
2. How would you rate your satisfaction with working with the Plot dialog box? (1 = frustrating, 7 = satisfying)
3. Do you feel that the Plot dialog box accommodates all levels of users? (1 = strongly disagree, 7 = strongly agree)
4. Do you feel the interface of the Plot dialog box is intuitive? (1 = strongly disagree, 7 = strongly agree)
5. Do you feel that the data grouping (layout of controls) is reasonable for easy learning? (1 = strongly disagree, 7 = strongly agree)

Responses are summarized in the following two tables.

Table 1: User Ratings of AutoCAD 2004 UI

	User Number							
Question	**1**	**2**	**3**	**4**	**5**	**High**	**Low**	**Average**
1. Ease of use	5	3	5	7	6	7	3	**5.2**
2. Satisfaction rating	4	3	6	6	7	7	3	**5.2**
3. Accommodates all levels of users	1	1	3	4	5	5	1	**2.8**
4. Intuitive interface	1	1	3	3	6	6	1	**2.8**
5. Grouping of options	3	1	4	6	7	7	1	**4.2**

Table 2: User Ratings of Neo UI

	User Number							
Question	**1**	**2**	**3**	**4**	**5**	**High**	**Low**	**Average**
1. Ease of use	6	5	6	7	6	7	5	**6**
2. Satisfaction rating	6	4	6	7	7	7	4	**6**
3. Accommodates all levels of users	7	5	6	7	6	7	5	**6.2**
4. Intuitive interface	7	4	6	6	6	7	4	**5.8**

Question	User Number					High	Low	Average
	1	2	3	4	5			
5. Grouping of options	7	5	6	7	7	7	5	**6.4**

4.2 Dialogs

The following sections detail changes to the various dialog boxes that comprise the Plot feature.

4.2.1 Plot Dialog Box

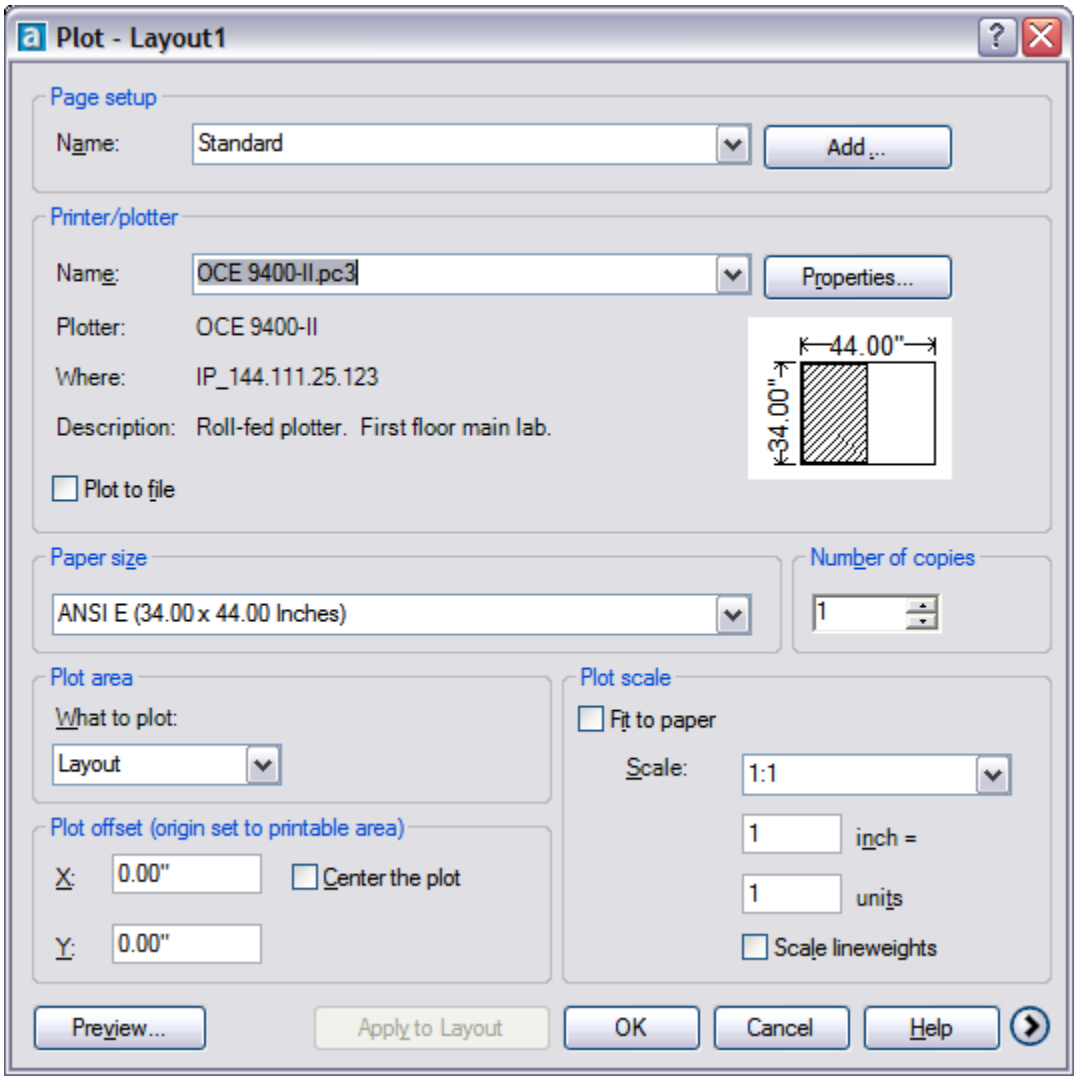
The new Plot design features a dialog box that expands and contracts, to reveal more or less plot information as desired. The dialog box and its various options behave largely as the AutoCAD 2004 version, with the majority of changes related to reordering of individual options and the removal of the former tabbed structure of the dialog. Dialog box persistence matches that of the 2004 plot dialog: the settings associated with the current layout are restored and used to populate the Plot dialog box when it is invoked. If a named page setup is listed in the Name region of the Page Setup frame, the item in the drop-down list is changed to "<Select page setup to apply>" if any changes are made to any of the options in the Plot dialog box. The sole exceptions to this rule are the following controls, which do not reset the name of the current named page setup:

- Number of copies
- Plot to file
- Save changes to layout

The Plot dialog is initially invoked in its contracted state. A button at the right of the interface expands the dialog box, revealing additional options. The dialog box persists its state (collapsed versus expanded) across AutoCAD sessions. The title bar of the dialog box indicates the current layout (e.g., "Plot – Layout1").

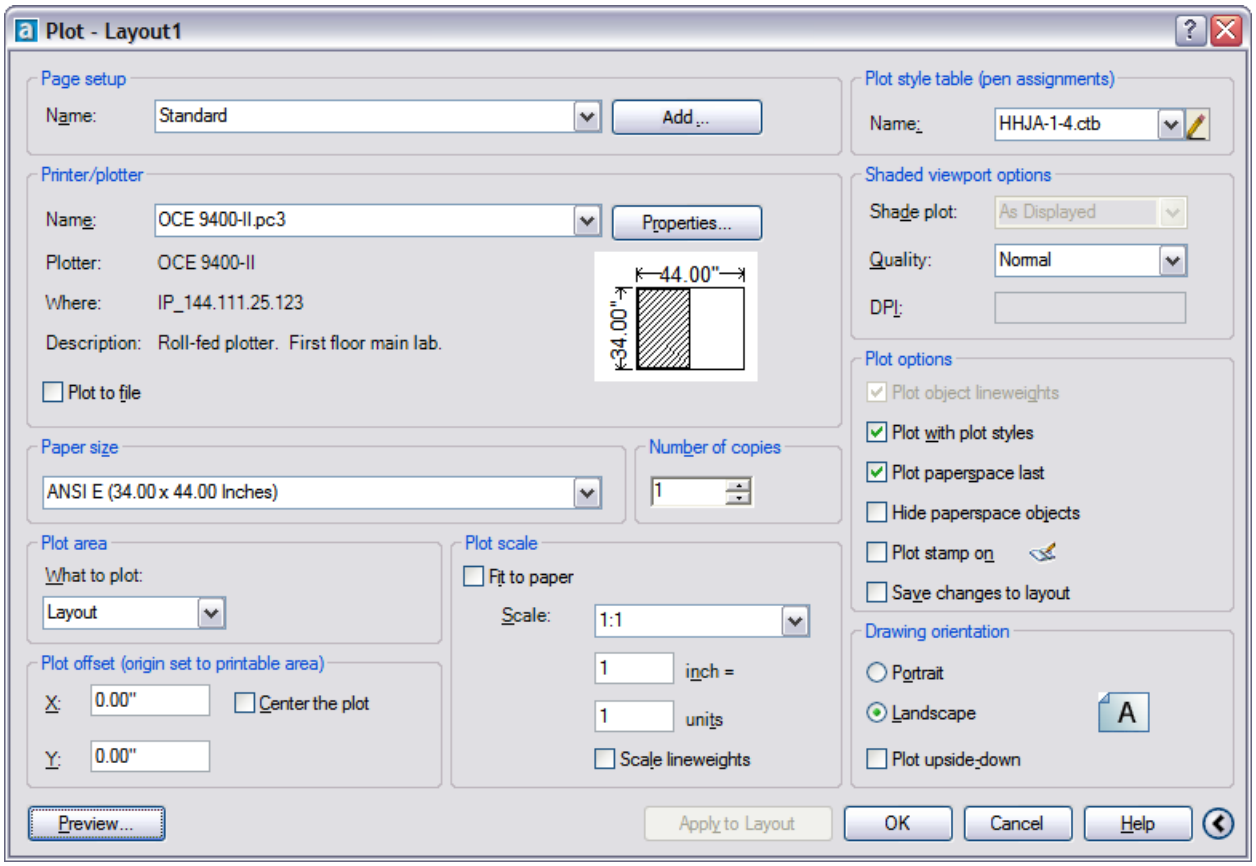
The following screenshot depicts the Plot dialog box in its collapsed state.

NOTE: The accelerators depicted in all Plot-related screenshots do not match the current SWD implementation. Please refer to the table later in this section for the definitive list of all Plot dialog accelerators.



The Plot dialog box is not resizable. However, tool-tips are available for various static text regions (for example, plotter description) should the string be too long to display properly within the dialog box.

If users wish to view the full range of available plot options, they can click the button centered along the right border of the dialog box to reveal the expanded version, depicted in the following screenshot:



The following table details the controls in the redesigned Plot dialog box. Controls are listed in their proper tab order for the expanded dialog[2]. Accelerators are indicated as underlined text[3]. Note that the accelerators for a number of controls have changed from their AutoCAD 2004 counterparts.

Note that some controls have duplicate keyboard accelerators. This is a necessity because of the large number of controls exposed through this dialog box, and the collapsing of the former tabbed dialog box approach into a unified, single-pane dialog.

Control	Description
Name: (*Page setup region*)	Drop-down list. The lone change to the AutoCAD 2004 behavior is that the default value changes from "<Select page setup to apply>" to "<Click Add to create page setup>".
Add... (*Accelerator: first period)*	Button. Invokes the new Add Page Setup dialog box.
Name: (*Plot style table region – accelerator: colon*)	Drop-down list. The lone change to the behavior of this control vs. 2004 is the addition of a "New..." option at the bottom of the list, which behaves identically to the New button present in 2004. When New is selected, the Add Named Plot Style Table wizard is displayed.
	Button. Tool-tip is Edit. This button behaves identically to the Edit button present in 2004.

[2] Note: when in its collapsed state, the tab order changes: any controls from the expanded region are omitted from the collapsed dialog tab order.

[3] Hard-to-read or obscure accelerators are further highlighted by a parenthetical reference that points out the accelerator – for example, "*accelerator: j*".

Control	Description
Name: (*Printer/plotter region)*	Drop-down list. No changes to the AutoCAD 2004 behavior.
Properties…	Button. No changes to the AutoCAD 2004 behavior.
Plotter:	Static text region. The lone change versus AutoCAD 2004 behavior is that a tool-tip is available when the user's mouse hovers over this string. This is useful in cases where the string is too long to display properly in the dialog box, resulting in truncated text.
Where:	Static text region. The lone change versus AutoCAD 2004 behavior is that a tool-tip is available when the user's mouse hovers over this string. This is useful in cases where the string is too long to display properly in the dialog box, resulting in truncated text.
Description:	Static text region. The lone change versus AutoCAD 2004 behavior is that a tool-tip is available when the user's mouse hovers over this string. This is useful in cases where the string is too long to display properly in the dialog box, resulting in truncated text.
Plot to file:	Check box. Specifies that the current plot should be sent to file output, rather than to a hardcopy device. There are a couple of changes to the behavior of this control versus its 2004 counterpart. The first change is related to the wording of the control. In 2004, if users checked this check box with a hardcopy device specified, the string dynamically updated to "Plot to file (this plot only):". The extra verbiage was to inform users that the setting of this control was not persistent. This approach is non-standard, and is not consistent with another non-persistent control in the dialog, Number of Copies. Given that, in Neo the label of this control always reads "Plot to file:". The other change relates to naming and specifying an output directory for the operation. In 2004, an edit field was available in the Plot dialog box that became enabled when users checked this check box. In Neo, this edit field has been removed. For a complete description of the new plot-to-file behavior, refer to section 4.2.1.2.
Partial preview region	Dynamic preview region. Replaces the partial preview functionality accessible through a dialog box in previous releases. For a complete description of the behavior of this control, refer to section 4.2.8. When the user's mouse hovers over this region, a multi-line tool-tip displays the current paper size and available printable area.
Shade plot:	Drop-down list. No changes to the AutoCAD 2004 behavior.
Quality:	Drop-down list. No changes to the AutoCAD 2004 behavior.
DPI:	Edit box. No changes to the AutoCAD 2004 behavior.
Paper size:	Drop-down list. The lone change to the behavior of this control vs. 2004 behavior is that the current paper size units setting (ANSI [inches] vs. ISO [mm]) now controls the display of units in various elements of the dialog box (e.g., partial preview region, inches/mm edit box, etc.). This is due to the removal of the inches and mm radio button toggles that were present in 2004.
Number of copies	Spinner. The lone change to this control versus the AutoCAD 2004 behavior is that the maximum number of copies is now set to 99.
Plot in background	Check box. Toggles whether plot operations take place in background or foreground mode. Changing this option also changes the analogous option exposed through the Options dialog box.
Plot object lineweights (*accelerator: g*)	Check box. No changes to the AutoCAD 2004 behavior.
Plot with plot styles	Check box. No changes to the AutoCAD 2004 behavior.
Plot paperspace last	Check box. No changes to the AutoCAD 2004 behavior.
Hide paperspace objects (*accelerator: j*)	Check box. No changes to the AutoCAD 2004 behavior.
Plot stamp on	Check box. Renamed version of the On checkbox present in AutoCAD 2004. No changes to the AutoCAD 2004 behavior.
	Button. Tool-tip is "Plot Stamp Settings…". Launches the Plot Stamp Settings dialog box.
Save changes to layout	Check box. The lone change versus 2004 behavior is that this check box is cleared by default.

Control	Description
What to plot:	Drop-down list. Replaces a number of radio button controls that were present in 2004. When working from the Model tab, the available options are Limits, Extents, Display, View, and Window. When working from a layout tab, the available options are Layout, Extents, Display, View, and Window. All options correspond to their 2004 counterparts. When View is selected, an additional drop-down list is added dynamically to the right of the Plot Area drop-down list once the user left-clicks in the list to select this option. The dynamically added list displays available views that are defined for the DWG. If no views are defined for the current drawing, this option is disabled. When the Window option is selected, a Window button is dynamically added. When this button is clicked, the Plot dialog box is temporarily hidden so that the user can select a windowed region in the drawing. A prompt (identical to the 2004 prompt) appears at the command line. For a complete description of the behavior of the new dynamic View and Window controls, refer to section 4.2.1.3.
Plot offset (origin set to printable area)/Plot offset (origin set to layout border)	Group box. Displays variable text depending on the current setting of Plot Offset Definition in the Options dialog box. If plot offset is set to display offset as a distance from the available printable area (legacy behavior), the string displayed in this group box is "Plot offset (origin set to printable area)". If plot offset is set to display offset as a distance from the layout border, the string displayed in this group box is "Plot offset (origin set to layout border)".
Center the plot	Check box. The lone change vs. 2004 is that when this option is checked, the X and Y offset fields are disabled.
X:	Edit box. Specifies an offset from either the available printable area for the current output device or from the layout border. When Center the Plot is checked, this edit region is disabled.
Y:	Edit box. Specifies an offset from either the available printable area for the current output device or from the layout border. When Center the Plot is checked, this edit region is disabled.
Fit to paper	Check box. This option corresponds to the Scaled to Fit option present in the Scale drop down list in 2004. When Plot Area is set to Layout, this option is disabled. When this check box is enabled, the Scale drop-down list is set to Custom, and the scale factor is recomputed and displayed in the scale edit fields. Additionally, the scale combo and edit box controls are disabled when this option is checked.
Scale:	Drop-down list. The lone change to the behavior of this control is the removal of the Scaled to Fit option present in AutoCAD 2004. Scale to fit is now handled through the "Fit to paper" check box. When "Fit to paper" is checked, Scale is set to Custom, and the custom scale factor is displayed in the Inch/units edit regions.
Inch =/ Inches = /mm =	Edit box. There are two notable changes to the behavior of this control vs. 2004. The first is that the units display toggles based on the currently selected paper size (ANSI vs. ISO). The second is that when in ANSI mode, the string displayed dynamically toggles based on the current setting. When set to 1, the string is "Inch". When set to a number greater than 1, the string is "Inches". When the "Fit to paper" check box is checked, this control is disabled.
units	Edit box. No changes to the AutoCAD 2004 behavior. When the "Fit to paper" check box is checked, this control is disabled.
Scale lineweights	Check box. Moved from the location in AutoCAD 2004 (previously located in the Plot Scale frame). No changes to the AutoCAD 2004 behavior.
Portrait	Radio button. No changes to the AutoCAD 2004 behavior.

Control	Description
Landscape	Radio button. No changes to the AutoCAD 2004 behavior.
Plot upside-down (*accelerator: -*)	Check box. No changes to the AutoCAD 2004 behavior..
	Bitmap. No changes to the AutoCAD 2004 behavior.
Preview…	Button. Reworded version of the Full Preview button present in 2004. No changes to the AutoCAD 2004 behavior.
Apply to Layout (*accelerator: y*)	Button. This button is initially disabled. Upon making any changes to the Plot dialog box, the Page Setup Name is reset to <Select page setup to apply>, and this button becomes enabled. Clicking it saves any changes to an un-named page setup that is saved with the current layout.
OK	Button. No changes to the AutoCAD 2004 behavior.
Cancel	Button. No changes to the AutoCAD 2004 behavior.
Help	No changes to the AutoCAD 2004 behavior.
More Options/Less Options	Button. Presents an expanded or collapsed version of the dialog box. The last state of the dialog box is persisted and remembered across sessions. When the following icon is used, the tool-tip is "More Options (Alt + >)":  The accelerator for this state is >. When the following icon is used, the tool-tip is "Less Options (Alt + <)":  The accelerator for this state is <.

4.2.1.1 Plot Dialog Box: Removed Functionality

As part of the Plot dialog box redesign, a number of elements that were present in AutoCAD 2004 were removed to free up space. Most of these elements were deemed redundant or no longer needed within the Plot UI. The following list details the removed components:

- **Layout Name** – The Layout Name frame displayed the name of the layout that was current at the time the Plot dialog box was invoked. If multiple layouts were selected, the string displayed updated to read "selected layouts". The Layout Name region is removed in Neo, and the name of the current layout is now displayed in the title bar. For example, if Layout 1 was active when the Plot dialog box was invoked, the title bar of the dialog box would read "Plot – Layout 1".
- **Hints** – The Hints button launched a Help file that contained driver-specific information related to the currently selected output device. This button was introduced in the AutoCAD 2000 release, and was deemed by the feature team to no longer be needed in the primary Plot UI. Tech Pubs should make a determination if

this material should be folded into the general Plot user documentation, or be maintained and accessible through other mechanism in the main Help system.

- **What to plot** – This was a framed region that allowed users to specify what would be plotted when the plot operation was invoked. The available choices were Current Tab, Selected Tabs, or All Layout Tabs. In Neo, the tabbed layout structure in AutoCAD may be going away. Additionally, the preferred mechanism for generating output of multiple layouts is now through the Publish command. Users initially indicated dissatisfaction with the decision to remove this functionality from the Plot dialog box. They indicated that Publish has performance issues, sometimes taking two to three times as long to complete an operation as it took to complete the analogous operation from the Plot dialog. SWD has indicated that these performance issues should disappear in Neo, as Plot and Publish will be sharing a common API. When users were asked if Publish would suffice for outputting multiple layouts if performance became a non-issue, they indicated that it would. A performance benchmark requirement has been added to the Publish specification, indicating that the performance of plot and publish for an analogous operation outputting multiple layouts must be within 10% of each other. If the performance of Publish does not meet this benchmark, the Plot dialog box must continue to support the plotting of multiple layouts.
- **File Name and Path** – This was a region that appeared in the Plot to File frame in AutoCAD 2004 that allowed users to specify a default file name and path to which plot files were generated. The Plot to File check box has been relocated in the Plot dialog box, while a modified version of the File Name and Path setting has been moved to the Options dialog box. Refer to the following section (section 4.2.1.2) for a complete description of the new plot-to-file behavior.
- **Partial Preview** – The Partial Preview button launched a secondary dialog box that displayed a rudimentary depiction of how plotted output would appear with the currently specified settings. Partial Preview was useful for helping users diagnose certain problems that might occur with their plotted output. In Neo, some of the functionality offered by the Partial Preview dialog box will be incorporated directly into the Plot dialog box, in a new, dynamic partial preview region.
- **Inches & MM radio buttons** – The Inches and MM radio buttons toggled the units display (inches vs. mm) that appeared in various places throughout the Plot dialog box (e.g., Plot Scale, Plot Offset, etc.). As users selected various paper sizes, the radio button would toggle to display the units specified by the currently selected paper size. However, if desired, users could click on the radio button to toggle the display to alternative units that did not match the current paper size. In Neo, it has been deemed sufficient to toggle units display in the dialog box based on the currently selected paper size. If there is customer pushback on this during the Neo Beta cycle, we can offer a system variable as a solution that allows users to override the default behavior of honoring the units of the current paper size.
- **Settings button** – The Settings button launches a dialog box that allows users to specify a number of settings related to plot stamp data. As the Publish dialog box is enhanced to include plot stamp information in Neo, this button has been moved to the Options dialog box, and plot stamp settings are applied to both plot and publish

operations. The check box for toggling on and off plot stamp data remains in the Plot dialog box, and an analogous control is introduced in the Publish dialog box.

4.2.1.2 Plot-to-file Behavior

Plot-to-file behavior is changed somewhat from previous releases. In AutoCAD 2004, users controlled plot-to-file settings through a framed region on the Plot Device tab of the Plot dialog. After checking the Plot-to-file check box, the text label of the check box dynamically updated to read "Plot to file (this plot only)", as a visual cue to users that this setting wouldn't be persisted across invocations of the dialog box. When the "Plot to file" check box was checked, the "File name and path" edit box became enabled, providing users a space for specifying an output directory for the file.

The behavior became somewhat non-intuitive in situations where a plot-to-file operation applied to multiple tabs. For example, if users selected a range of tabs and specified a file-output PC3 file (e.g., DWF 6), all files would be selected to the output directory specified in the "File name and path" edit box, but the name portion of this field was ignored for all tabs except for the first tab. All other tabs were plotted using the layout name as the physical file output name.

In Neo, the "File name and path" edit box is moved from the Plot dialog box to the Plot and Publish tab of the Options dialog box. The control is renamed to "Default output directory for plot-to-file operations". When plotting a single layout tab to file, users are presented with the Plot to File dialog box. This is a standard file navigation dialog box that allows users to specify a name and location for the plotted file. By default, the name used to populate the dialog is a combination of the drawing name and the name of the layout being plotted (for example, "Drawing1-Layout1.plt"). The default output directory used to populate this dialog box within a given editing session is taken from the "Default output folder (DWF and plot-to-file)" field from the Options dialog box. If users navigate to a different directory, this directory is persisted within the editing session until a new directory is specified. If users click Cancel from this dialog box, they are returned to the Plot dialog box.

The Plot dialog box no longer supports plotting multiple layouts in Neo.

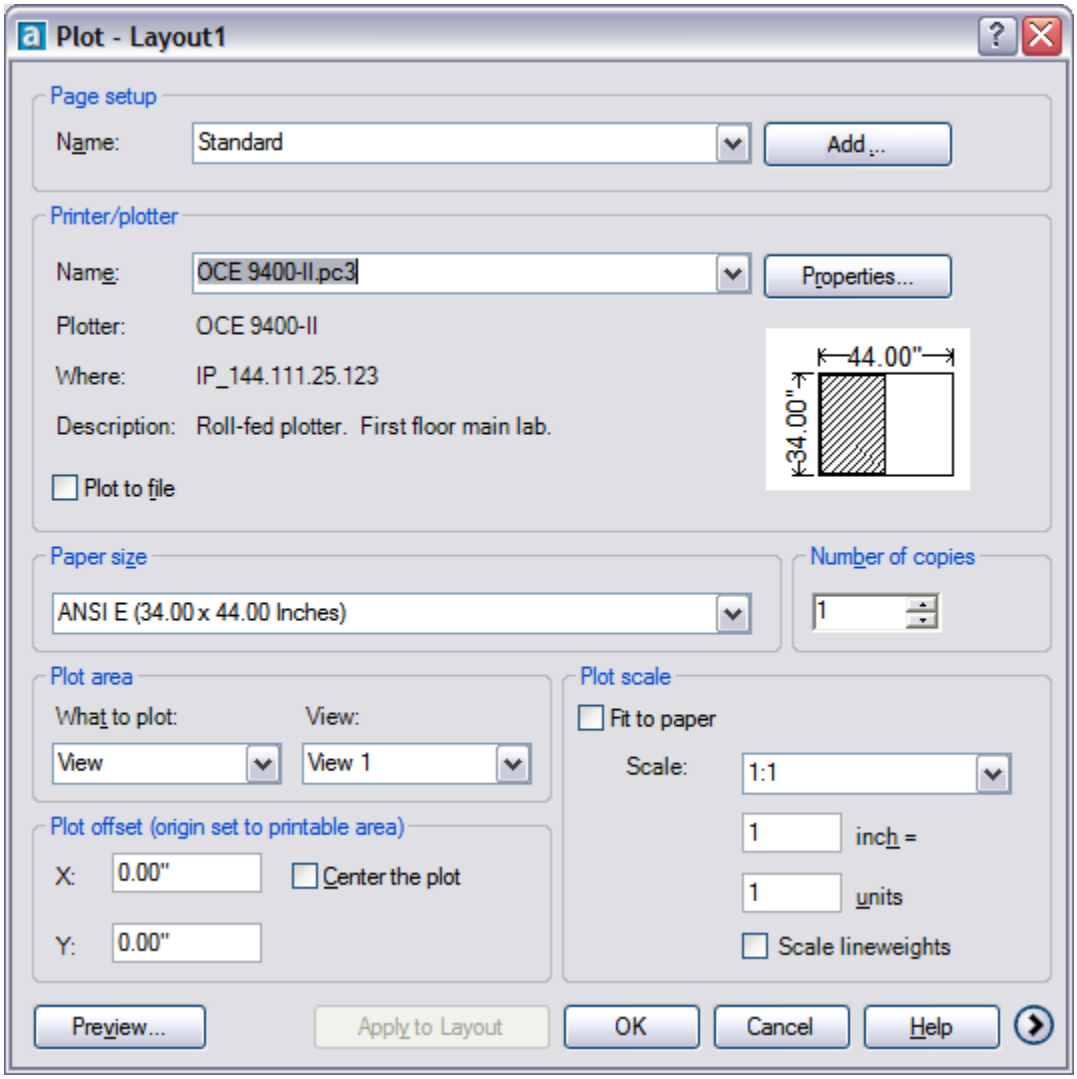
4.2.1.3 Behavior of the Plot Area Control

In AutoCAD 2004, the Plot Area control was a series of radio buttons that allowed users to select from the various available options (Layout, Extents, Display, etc.). In the interest of conserving space within the reworked dialog box, these radio button options have been replaced by a single drop-down list. The interaction with the drop-down list is straightforward when working with most of the options, but two options result in the Plot Area region dynamically changing when they are selected:

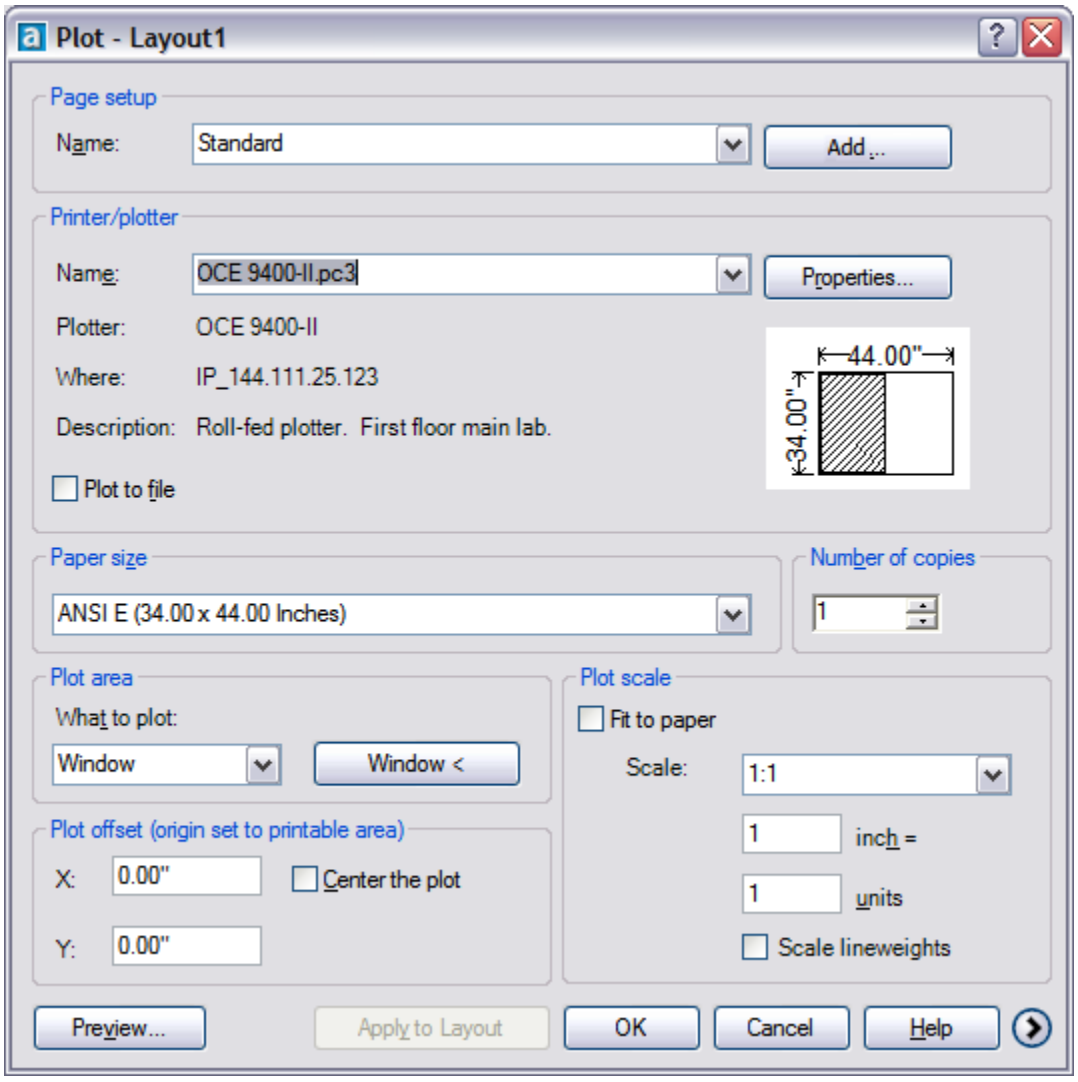
- **View** – When this option is selected, a second drop-down control is added to the Plot Area frame. This drop-down lists the named views defined for the current drawing. This option is disabled if no views are defined in the current drawing.

- **Window** – When this option is selected, the Plot dialog box is temporarily dismissed and users are prompted to specify a windowed region in the drawing editor. After having defined a windowed region, a button labeled Window is added to the right of the Plot Area drop-down. This button behaves identically to the analogous button present in 2004, allowing the user to redefine the windowed region.

The following screenshot depicts the Plot dialog box when the View option is selected.

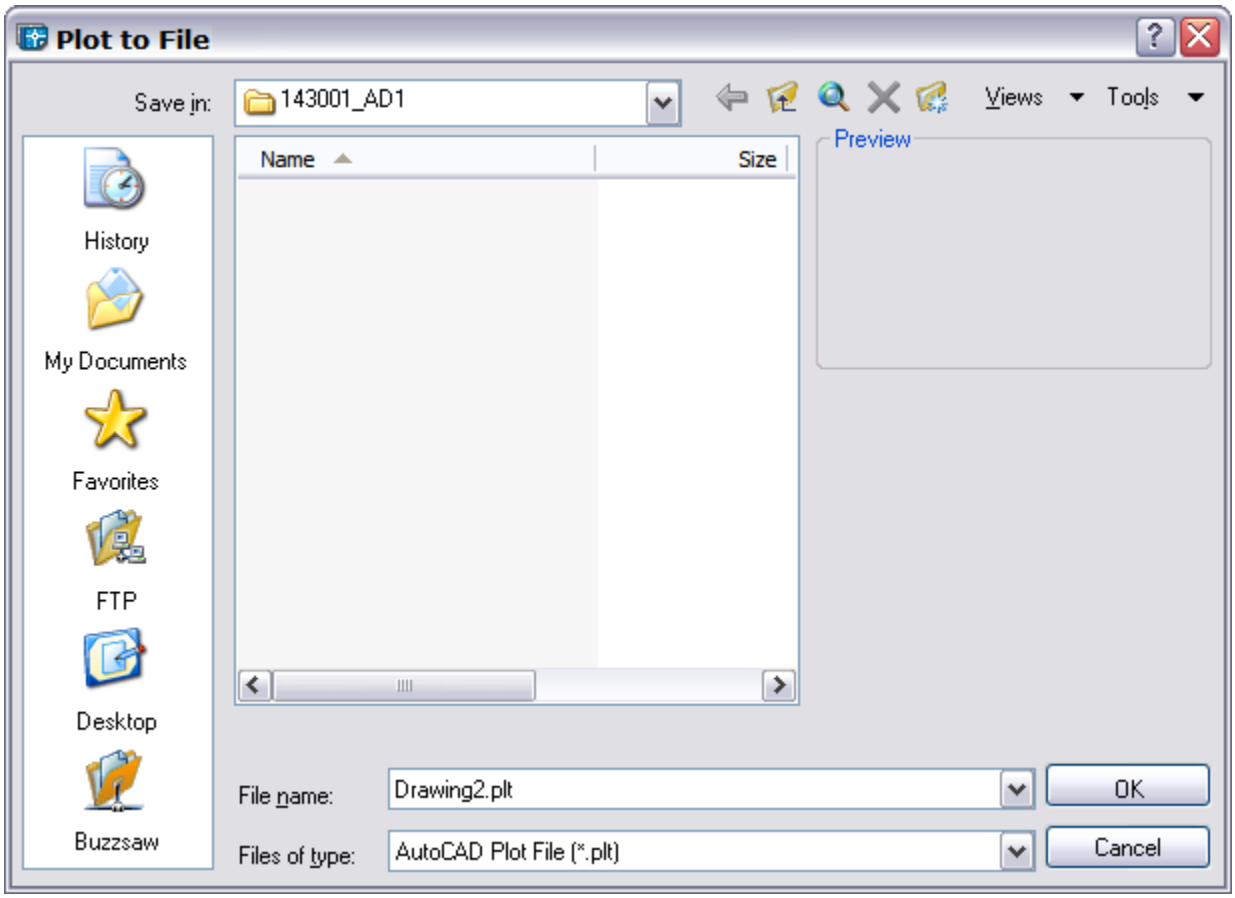


The following screenshot depicts the Plot dialog box when the Window option is selected.



4.2.2 Plot to File Dialog Box

Plot to File is a new dialog box that allows users to specify a name and location for plot-to-file operations invoked from the Plot dialog box. It is a standard file navigation dialog box, from which users can specify a name and location for a plot. The following screenshot illustrates this dialog box.



This dialog box is invoked after clicking OK in the Plot dialog box if the "Plot to file" check box is checked. By default, a combination of the name of the current drawing and layout is used to populate the "File name" field, and the "Save in" directory is determined by the "Default location for plot to file operations" control exposed from the Plot and Publish tab of the Options dialog box.

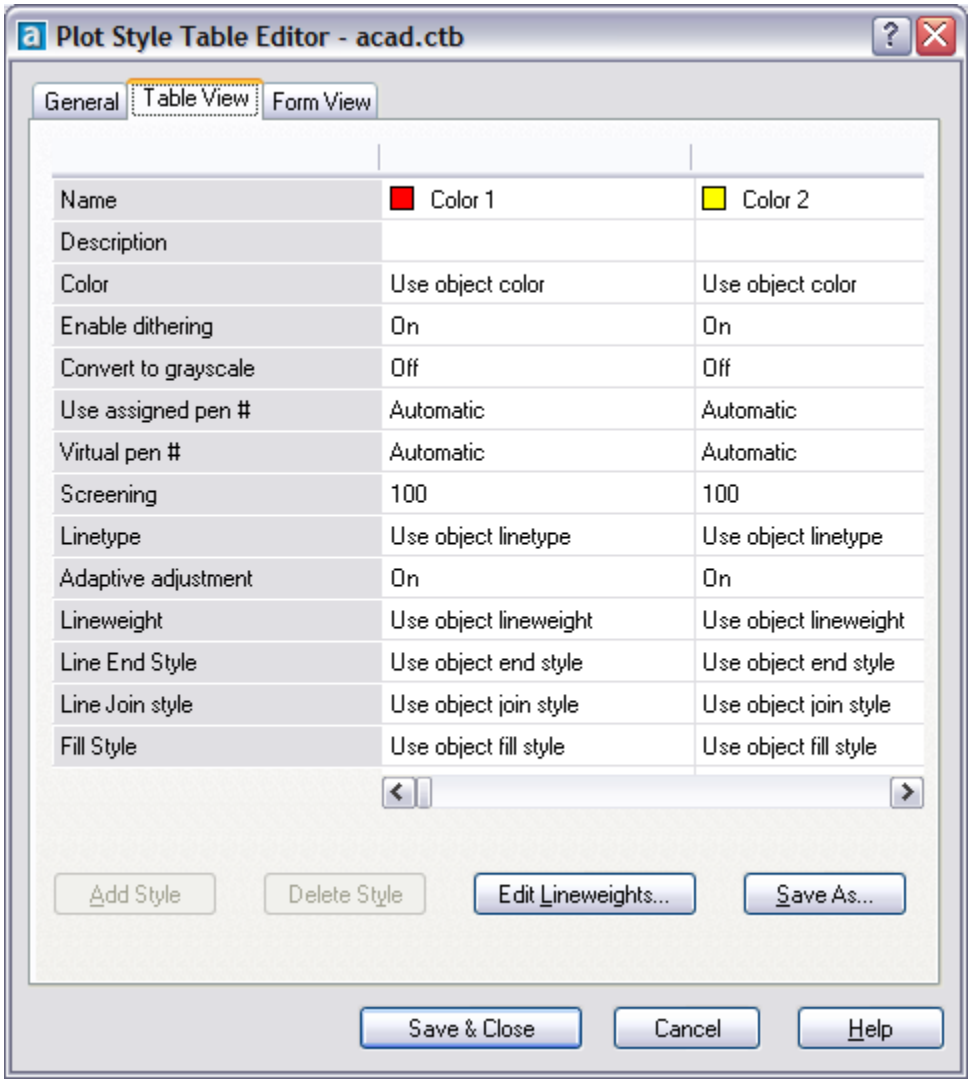
The following table describes the unique controls that are available from this dialog box. Accelerators (where applicable) are indicated as underlined text. Any controls not explicitly detailed behave as they do in other AutoCAD file navigation dialogs.

Control	Description
Save in:	Combo box. Displays the directory the plot file will be created in. By default, the directory location used to populate this control is obtained from the "Default location for plot to file operations" control exposed through the Plot and Publish tab of the Options dialog box. If desired, users can navigate to another directory where the plot file will be created.
Name	List control. Lists any plot files that are present in the "Save in" directory.
File name:	Combo box. Provides a space for users to enter a name for the current plot file. By default, a combination of the current drawing name and layout is used (for example, "Drawing1-Layout1"). If desired, users can enter another name. Any name typed in this control is displayed in the drop-down list if the combo box chevron is clicked. If the specified plot file name already exists in the target directory, the "Plot File Exists" alert is displayed.
Files of type:	Combo box. Lists the file type. The only available option is "AutoCAD Plot File (*.plt)".
OK	Button. Closes the dialog and generates the plot file. If no name is specified in the "File

Control	Description
	name" field, the "Missing Plot File Name" alert is displayed. If the file name contains invalid characters, the "Invalid Characters" alert is displayed.
Cancel	Button. Closes the dialog without applying any changes.

4.2.3 Plot Style Table Editor Dialog Box

In AutoCAD 2004, the Plot Style Table Editor made use of a proprietary (Stingray) grid control that provided more functionality than was needed and was the source of a number of bugs. In Neo, this control is replaced with a stock Microsoft Foundation Class (MFS) list control that provides all the needed functionality that was present in the proprietary control. The new list control is depicted in the following screenshot.

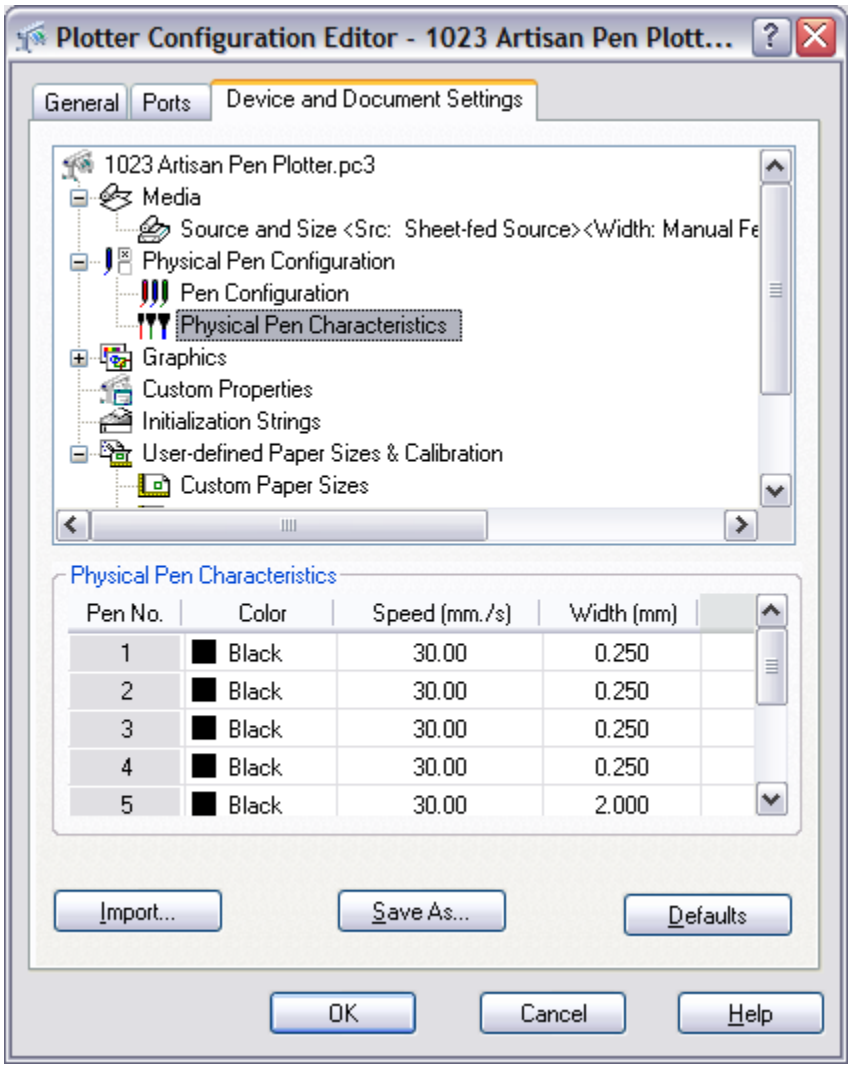


The following list details the most important changes that result from the implementation of the new list control:

- Columns and rows can no longer be reordered through drag-and drop operations (this was the cause of a number of legacy problems in the Stingray control)
- Style names are now ignored during copy and paste operations for STB files (only properties are copied, consistent with the previous behavior for CTB files)
- Row heights can no longer be resized
- Cell selection is now limited to individual cells, individual columns, or multiple columns (legacy control supported selecting ranges of cells across columns)
- The same bitmaps present in the Form View have been added to the Table View for the following controls:
    - Line End Style
        - Butt
        - Square
        - Round
        - Diamond
    - Line Join Style
        - Miter
        - Bevel
        - Round
        - Diamond
    - Fill Style
        - Solid
        - Checkerboard
        - Crosshatch
        - Diamonds
        - Horizontal Bars
        - Slant Left
        - Slant Right
        - Square Dots
        - Vertical Bars
- Consistent right-click menu behavior (same options available) when right-clicking column headers or individual cells

4.2.4 Plotter Configuration Editor Dialog Box

Similar to the Plot Style Table Editor, the Stingray grid control present in the Plotter Configuration Editor dialog box has been replaced by a stock MFC list control. This control can be accessed by creating or opening a PC3 file defining the configuration for a pen-based plotter, then navigating to the Device and Document Settings tab and clicking on Physical Pen Characteristics. The new list control is depicted in the following screenshot.



The following list details the most important changes that result from the implementation of the new list control:

- Row heights can no longer be resized
- The icon that appeared in the left border of the 2004 dialog has been removed to free up dialog real estate
- Techniques for changing units changed: In 2004, this was settable as a combo box available when the column headers were clicked. In Neo, this is now settable via shortcut menu options available after right clicking the column headers.

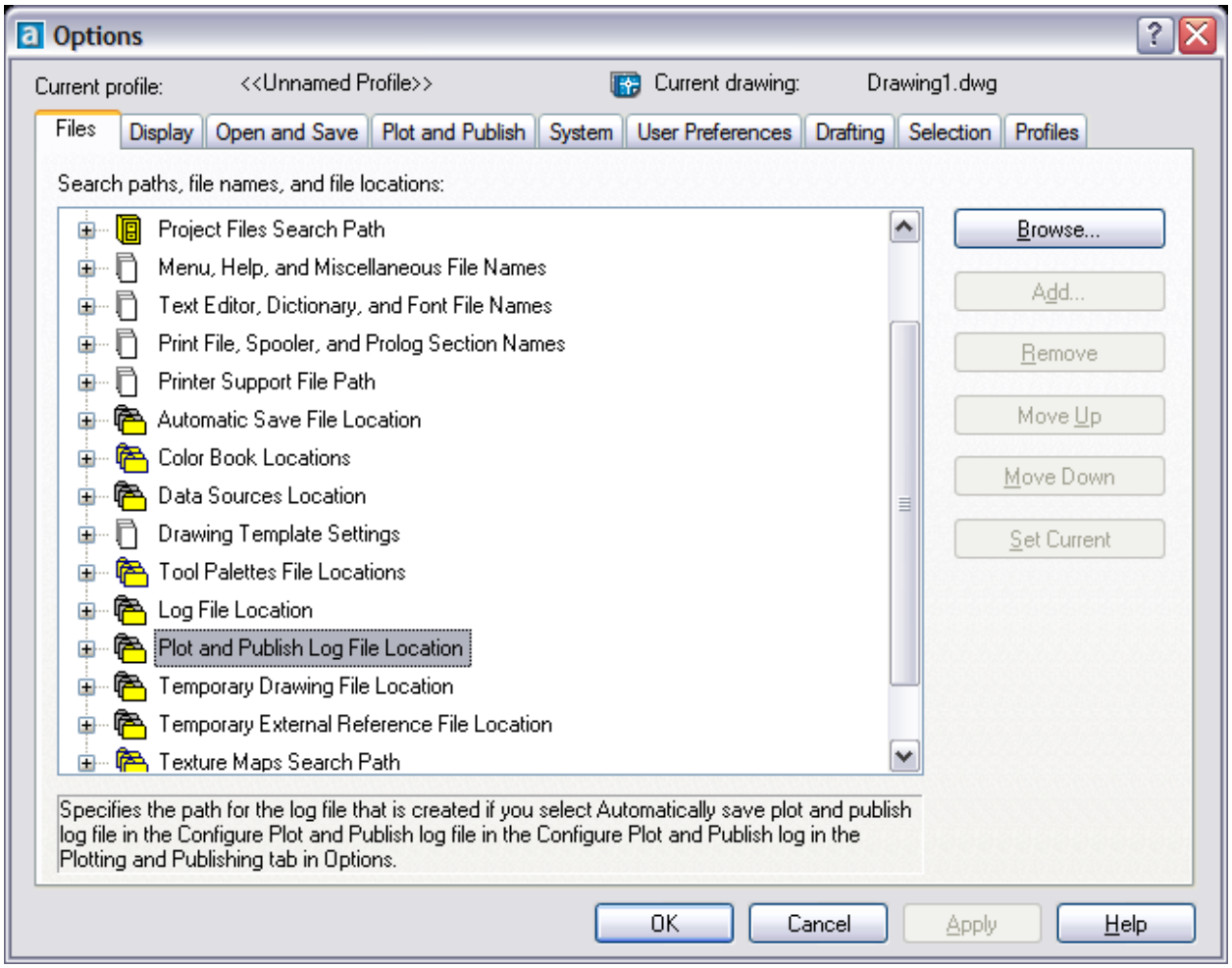
4.2.5 Options Dialog Box

A number of plot and publish related changes are made to the various tabs of the Options dialog box. For the Publish feature cluster, the following changes are required on the Files tab:

- Addition of a Plot and Publish Log File Location option

- Addition of a Default Template for Alternative Page Setups option to the Drawing Template Settings node

The following screenshot illustrates the reworked Files tab.



The following table describes new or changed options exposed through this tab. No new accelerators are exposed.

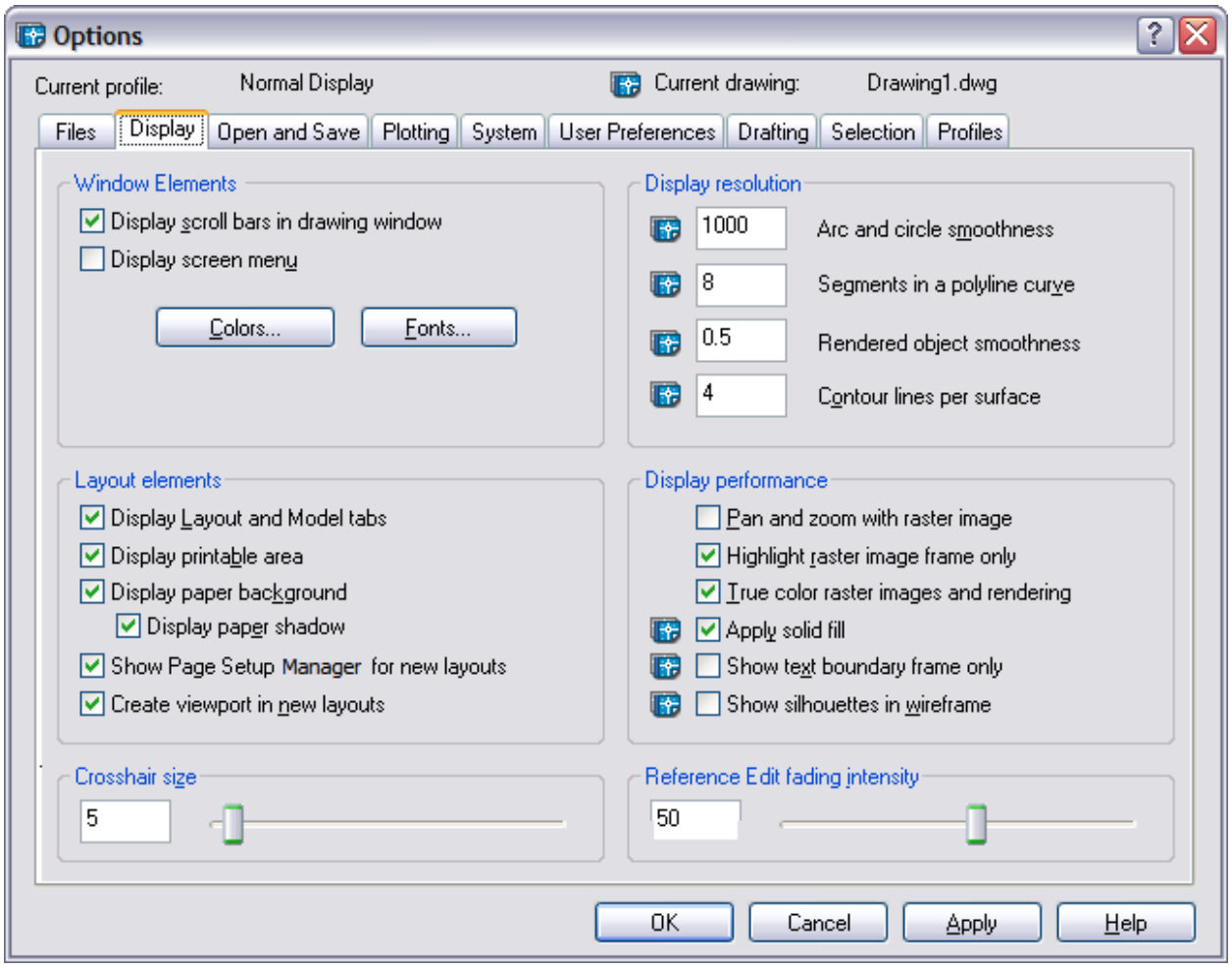
Control	Description
Plot and Publish Log File Location	Edit field. Specifies the path for the Plot and Publish log file. The default value for this option is <%USERPROFILE%>\<Local Settings>\<Application Data>\Autodesk\<APPNAME>\<VERNAME>\<LANG>\. The Help string that is displayed at the bottom of the tab when this option is selected reads as follows: "Specifies the path for the log file that is created if you select 'Automatically save plot and publish log file' from the Plot and Publish tab." This option is per-user data that is written to the Registry.
Default Template for Sheet Creation and Page Setup Overrides	Edit field. Specifies the DWT file used by default for sheet sets as a repository for page setups that can be applied as overrides from the SSM. The template specified is also used to populate the "File name" field of the Select Page Setup From File dialog box for

Control	Description
	import page setup operations. This option appears below the existing Default Template File Name for QNEW option in the tree. By default, this is set to <%USERPROFILE%>\Local Settings\Application Data\Autodesk\<APPNAME>\<VERNAME>\<LANG>\Template\Sheet Sets\Architectural Imperail.dwt. When this option is selected, the only available controls amongst the buttons to the right of the list are Browse and Remove. Choosing Browse launches a standard file navigation dialog box (the same one that appears when clicking Browse with the Default Template File Name for QNEW option selected in the list) in the current user's template directory (<%USERPROFILE%>\Local Settings\Application Data\Autodesk\<APPNAME>\<VERNAME>\<LANG>\Template). The Help string that is displayed at the bottom of the tab when this option is selected reads as follows: "Specifies the default template that is used to store alternative page setups that can be applied to Publish operations from the Sheet Set Manager." This option is per-user data that is written to the Registry.

The following Publish-related changes are required on the Display tab:

- Addition of a "Display printable area" option that replaces the erroneously labeled "Display margins" option

The following screenshot illustrates the reworked Display tab.



The following table describes new or changed options exposed through this tab. Accelerators are indicated as underlined text.

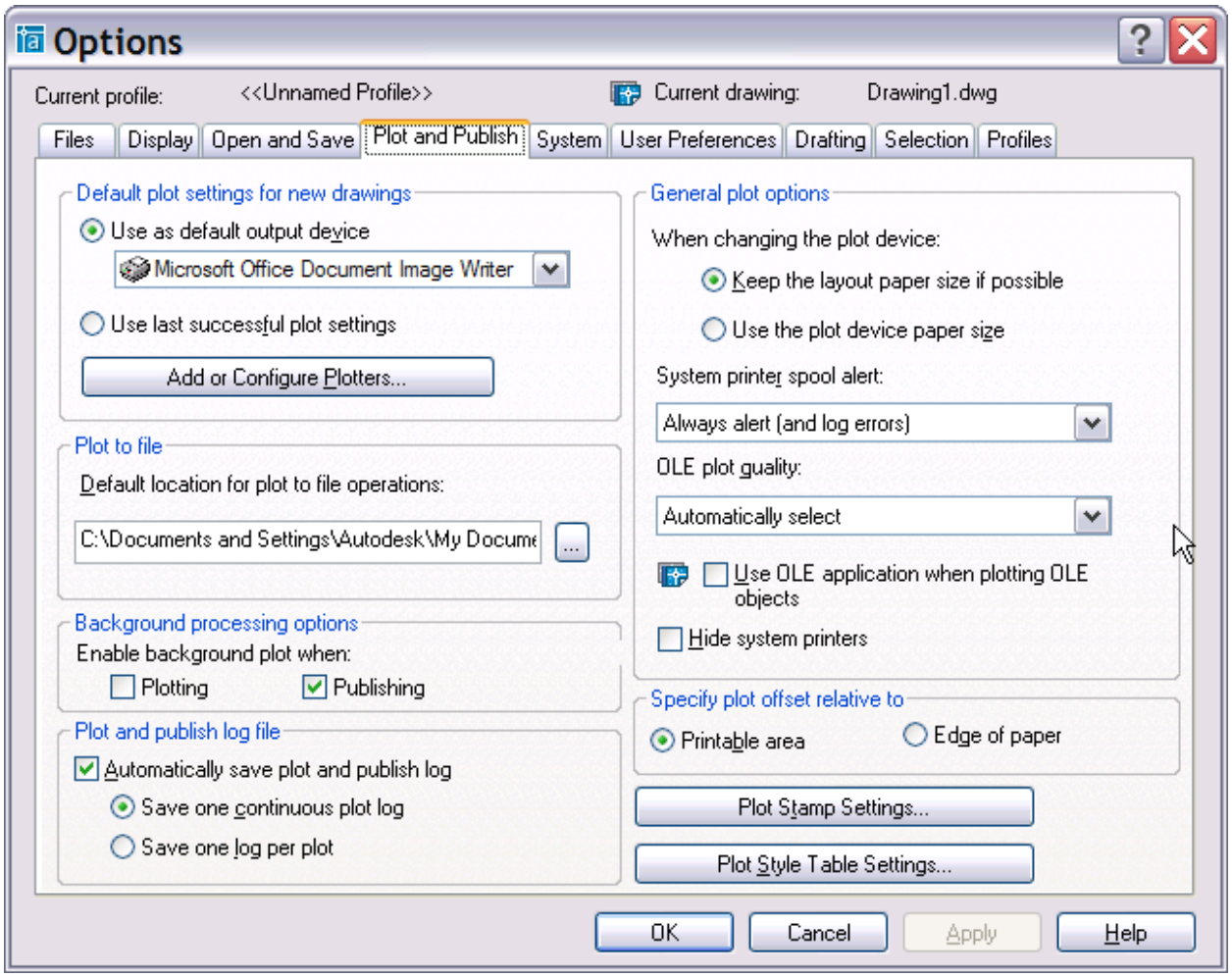
Control	Description
Display printable area	Check box. Renamed version of the "Display margins" option present in 2004.
Show Page Setup Manager for new layouts	Check box. Updated version of the "Show Page Setup dialog for new layouts" present in 2004. By default, this check box is unchecked. When checked, it calls the new Page Setup Manager dialog box, rather than the Page Setup dialog as in previous releases.
Show text boundary frame only	Check box. Only change from 2004 implementation is to the assigned accelerator.

The following Publish-related changes are required on the Plotting tab:

- Renaming the tab from "Plotting" to "Plot and Publish"
- Moving all options from the "Default plot style behavior for new drawings" frame to the Plot Style Table Settings dialog box
- Adding a Plot Style Table Settings button to access the new Plot Style Settings dialog
- Adding a Plot Stamp Settings button to access the Plot Stamp dialog box
- Addition of an "Enable background plot" option (described in the Background Plot specification)

- Addition of an Automatically save plot and publish log check box (described in the Background Plot specification)
- Addition of a "Save one continuous plot log" radio button (described in the Background Plot specification)
- Addition of a "Save one log file per plot" radio button (described in the Background Plot specification)
- Addition of a "Default output directory for plot-to-file operations" text box

The following screenshot illustrates the reworked Plot and Publish tab.



The following table describes new or changed options exposed through this tab. Accelerators (where applicable) are indicated as underlined text.

Control	Description
Default location for plot-to-file operations:	Edit box. Specifies a default location to use for all plot-to-file operations. This directory location will be used to populate a standard file navigation dialog box that is presented to users when plotting a single tab to file, rather than to a hardcopy device. By default, the directory specified in this edit box is the My Documents location of the current AutoCAD user.
...	Button. Launches a standard file navigation dialog box, from which users can navigate to a directory to use as the default location for all plot-to-file operations.

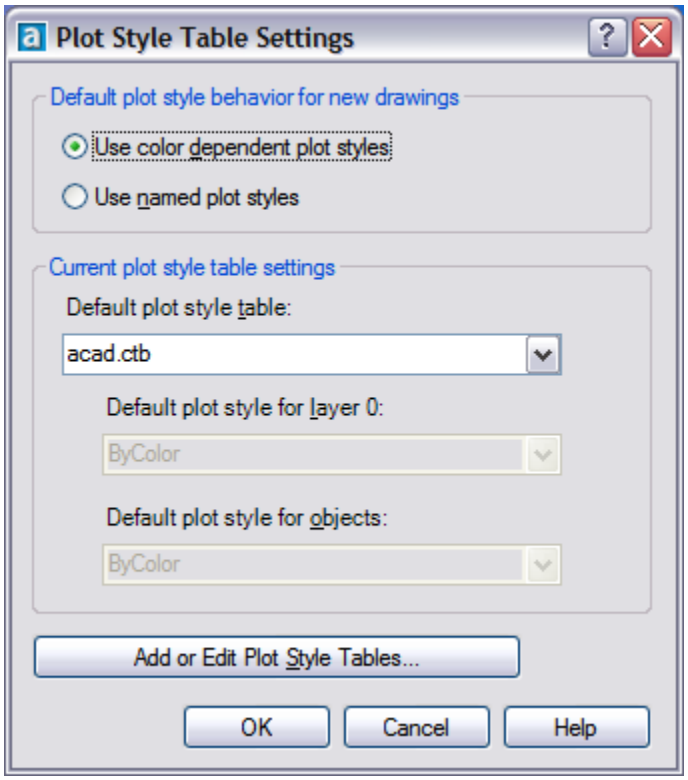
Control	Description
Automatically save plot and publish log	Check box. Indicates that a log should automatically be generated for plot and publish operations. This option is checked by default. For full details about this option, refer to the Background Plot specification.
Save one continuous plot log	Radio button. Indicates that plot and publish operations should be logged in a single, continuous log file. This option is selected by default. If the "Automatically save plot and publish log" check box is cleared (unchecked), this option is option is disabled. For full details about this option, refer to the Background Plot specification.
Save one log file per plot	Radio button. Indicates that plot and publish operations should be logged as individual files for each operation. If the "Automatically save plot and publish log" check box is cleared (unchecked), this option is disabled. For full details about this option, refer to the Background Plot specification.
Enable background plot	Check box. Specifies that plot operations should be run as a background process. For full details about this option, refer to the Background Plot specification.
Printable area	Radio button. Specifies that any offset values displayed in the Plot dialog box should be expressed with relation to the available printable area of the current output device. This option is enabled by default, and corresponds to a PLOTOFFSET system variable setting of 0.
Edge of paper	Radio button. Specifies that any offset values displayed in the Plot dialog box should be expressed with relation to the layout border. This option corresponds to a PLOTOFFSET system variable setting of 1.
Plot Style Table Settings…	Button. Opens the Plot Style Table Settings dialog box, from which users can specify a number of settings related to plot style tables. This dialog box replaces a number of controls that were accessible through the Plotting tab of the Options dialog box in AutoCAD 2004.
Plot Stamp Settings…	Button. Opens the Plot Stamp dialog box, from which users can specify a variety of plot stamp data. If plot stamp is enabled in either the plot or publish dialog box, this data is included in the printed output.

4.2.6 Plot Style Table Settings Dialog Box

Plot Style Table Settings is a new dialog box[4] that contains a number of controls that were previously exposed through the Plotting tab of the Options dialog box. Due to the inclusion of a number of new controls on this tab, some legacy controls had to be moved to a secondary dialog box to free up sufficient space. The controls present in the "Default plot style behavior for new drawings" frame were a logical grouping that could sensibly be removed as a coherent unit and presented to users through a secondary dialog box.

The following screenshot depicts this new dialog box.

[4] The Help ID for this dialog box is PlotStyleTableSettings.



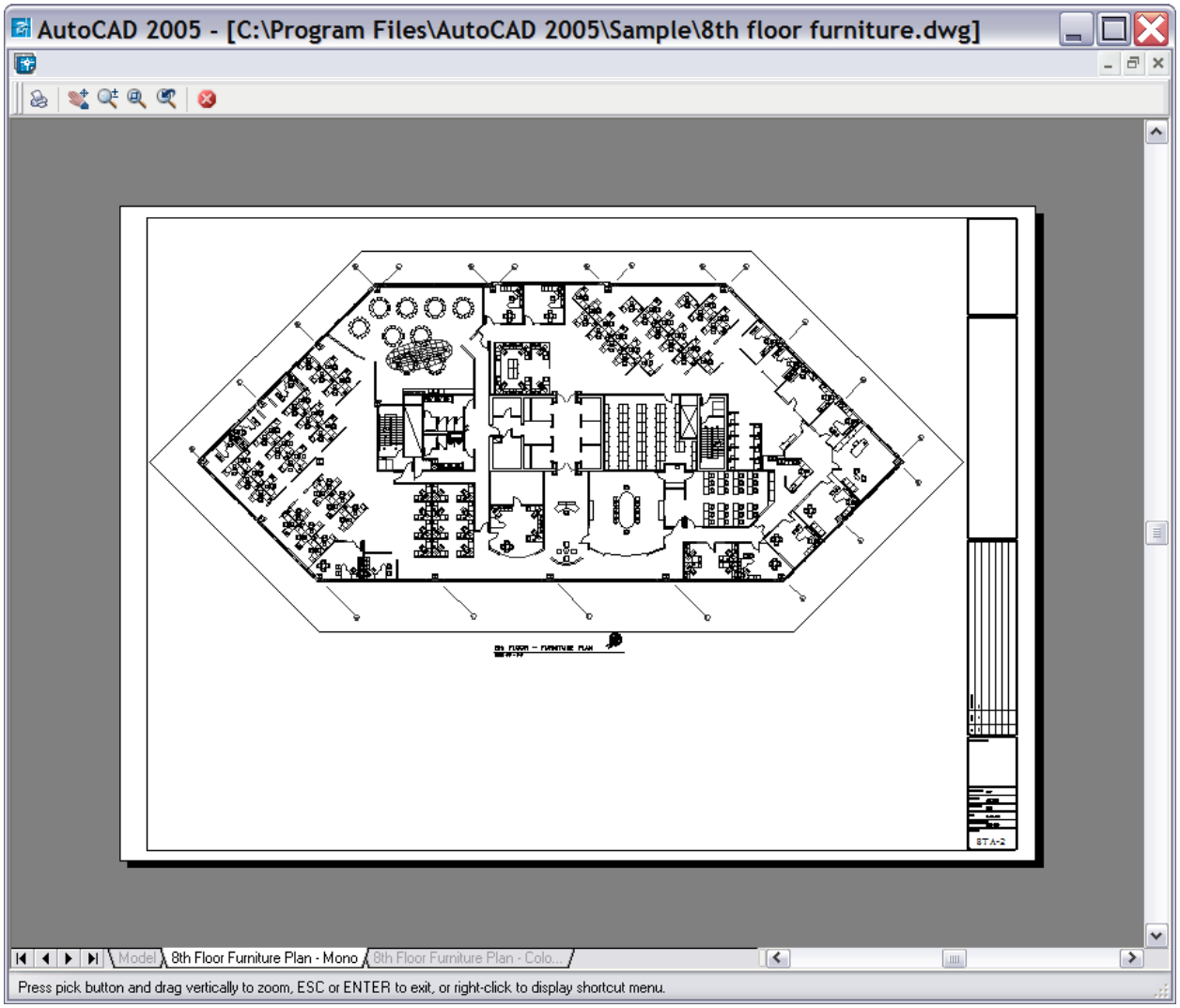
The following table details the controls in the Plot Style Table Settings dialog box. Controls are listed in their proper tab order. Accelerators (where applicable) are indicated as underlined text.

Control	Description
Use color dependent plot styles	Radio button. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.
Use named plot styles	Radio button. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.
Default plot style table:	Combo box. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.
Default plot style for layer 0:	Combo box. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.
Default plot style for objects:	Combo box. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.
Add or Edit Plot Style Tables…	Button. Displays the Plot Style Table Manager, from which users can create a new plot style table or edit an existing one. After dismissing the Plot Style Manager, users are returned to the Plot Style Table Settings dialog box.
OK	Button. Applies the current settings, closes the dialog, and returns the user to the Options dialog box.
Cancel	Button. Closes the dialog without applying settings and returns the user to the Options dialog box.
Help	Button. No changes versus the control that was exposed through the Options dialog box in AutoCAD 2004.

4.2.7 Plot Preview Window

The Preview window is displayed when users invoke the PREVIEW command. It provides an environment for users to visually review the expected output of generating a plot given the current settings of the Plot dialog box. The primary change from the AutoCAD 2004 implementation of the Preview window is the introduction of a just-in-time toolbar. When in Preview mode, all active AutoCAD toolbars, palettes, pull-down menus, and the Command line are temporarily hidden, replaced by a single Preview toolbar. Upon exiting out of the Preview mode, the user's previous toolbar and palette settings are restored.

The following screenshot illustrates the new Preview window with its just-in-time toolbar.



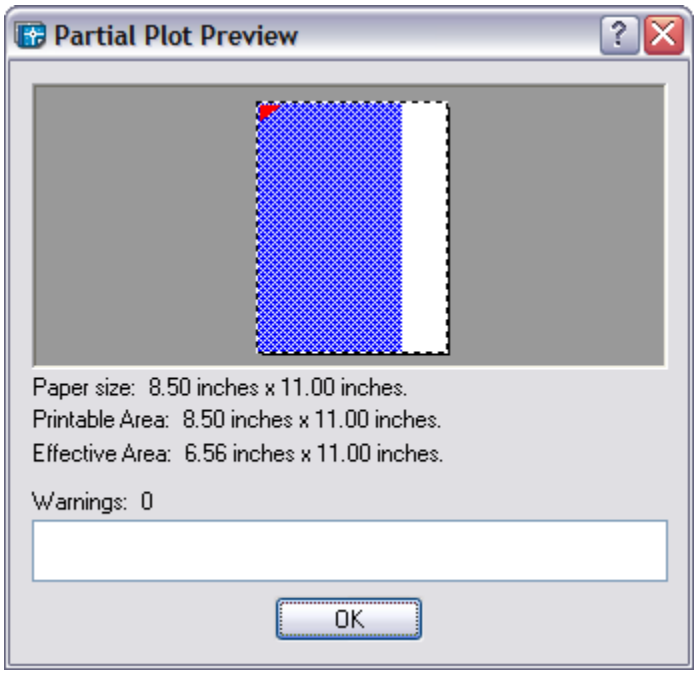
The following table details the controls that are available from the Preview toolbar.

Toolbar Option	Description
	Tool-tip is "Plot". Plots the current layout, closes the Preview window, and returns to the drawing editor (behavior is identical to right-clicking and choosing Plot in the 2004 Preview implementation).

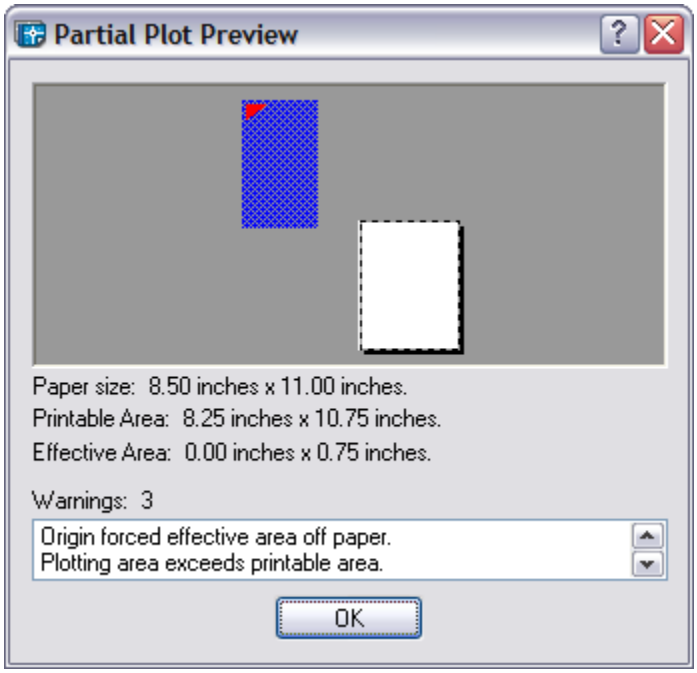
Toolbar Option	Description
	Tool-tip is "Pan". Places the Preview window in Pan mode (behavior is identical to right-clicking and choosing Pan in the 2004 Preview implementation).
	Tool-tip is "Zoom". Places the Preview window in dynamic zoom mode (behavior is identical to right-clicking and choosing Zoom in the 2004 Preview implementation).
	Tool-tip is "Zoom Window". Places the Preview window in zoom window mode (behavior is identical to right-clicking and choosing Zoom Window in the 2004 Preview implementation).
	Tool-tip is "Zoom Original". Returns the Preview window to its original, zoom factored state (behavior is identical to right-clicking and choosing Zoom Original in the 2004 Preview implementation).
	Tool-tip is "Close Preview Window". Closes the preview window and returns the user to the drawing editor (behavior is identical to right-clicking and choosing Exit in the 2004 Preview implementation).

4.2.8 Partial Preview

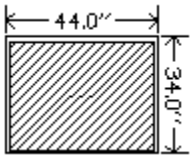
The Partial Preview dialog box present in AutoCAD 2004 has been deprecated. In Neo, a new preview region is introduced within the Plot dialog box itself, and maintains much of the functionality that the former dialog box provided. Whereas the former dialog box was a fully dynamic representation of how drawing geometry would be positioned relative to the current sheet, the new preview region is only dynamic to a certain extent. As an example, consider the following partial preview image from AutoCAD 2004. This image represents the Partial Preview dialog box when no problems will force one or more portions of the current plot job to exceed the available printable area for the specified output device.



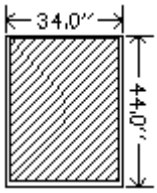
When problems are encountered and some or all of the objects to plot exceed the available printable area, the images update dynamically and to scale to represent the full extent of the mismatch as depicted in the following image.



In Neo, the preview image dynamically represents the currently specified paper size and how the geometry is positioned on the layout page when everything fits within the available printable area. For example, the following screenshot depicts the partial preview image for a 44 x 34 inch paper size:[5]

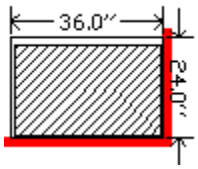


The following screenshot depicts the partial preview image for a 34 x 44 inch paper size:



When problems arise and model or layout objects exceed the printable area available for the current output device, the preview image updates with a red hatching pattern to show the directions in which the printable area is violated, as depicted in the following image.

[5] Note: the appearance of the background/foreground colors of the new preview region is dependent on the current AutoCAD system settings for background and foreground color for model and paper space exposed through the Options dialog box.



In the above example, the mismatch and the direction of the mismatch is indicated by the red region. Thus objects are exceeding the available printable area of the specified output device to the right and bottom regions of the layout.

The following list details the relevant positioning of various components (those components whose positioning remains constant even as the bitmap is scaled) of the preview region:

- **Positioning of dimension text** – 5 pixels to the left/above the page border
- **Problem region** – begins at the page border and is drawn 5 pixels thick

The Neo preview image contains the following elements:

- **Layout paper boundary** – represents the available space within the current layout tab.
- **Used printable area** – a hatched region depicting the used portion of available printable area based on the current layout settings. This region updates dynamically as various settings (for example, scale factors and orientation) are changed within the Plot dialog box.
- **Current paper size width** – dynamically updates as various paper sizes are selected in the Plot dialog box. The width is displayed between dimension lines that span the layout paper boundary.
- **Current paper size height** – dynamically updates as various paper sizes are selected. The height is displayed between dimension lines that span the layout paper boundary.

The Preview bitmap is dynamically drawn using AutoCAD's native hatch and dimensioning capabilities. The bitmap is optimized for a rectangle drawn to E-sized dimensions, indicating a paper size of 44" x 34". The settings listed below are for this optimized bitmap. The preview bitmap for different paper sizes should scale the settings below appropriately, so that the overall look, size, and spacing of objects in the preview bitmap remains constant.

The hatch pattern in the preview image is applied to a rectangle within the available printable area using the following hatch pattern settings:

- **Hatch pattern** – ANSI31
- **Angle** – 0
- **Scale** – 15

The dimensions applied to the preview rectangle use the following dimension settings (any values not explicitly specified should honor the Standard dimstyle settings):

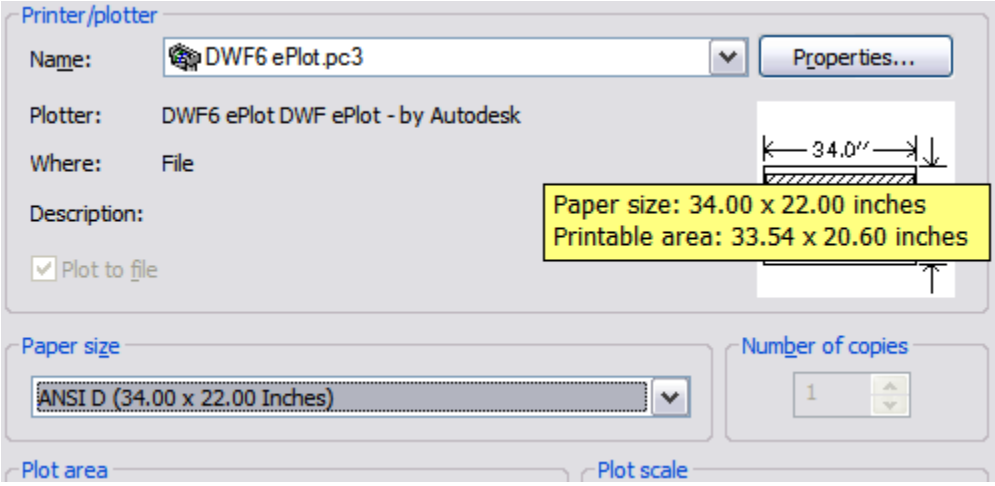
- **DIMEXE (Extend beyond dim lines) –** 2.0000
- **DIMEX0 (Offset from origin) –** 2.0000
- **DIMBLK1 (1st arrowhead) –** Right angle
- **DIMBLK2 (2nd arrowhead) –** Right angle
- **DIMASZ (Arrow size) –** 4.0000
- **DIMTXTSTY (Text style) –** default text style of the current dim style
- **DIMTXT (Text height) –** 6
- **DIMTAD (Vertical placement) -** Centered
- **DIMJUST (Horizontal placement) -** Centered
- **DIMGAP (Offset from dim line) –** 0.500
- **Text alignment –** Aligned with dimension line
- **Fit –** Either text or arrows, whichever fits best
- **Text placement –** Beside dimension line
- **DIMSCALE –** 1.0[6]
- **DIMLUNIT (Unit format) –** Decimal
- **DIMDEC (Precision) –** 0.00

The size of the partial preview control is 145 x 100 pixels. The preview image is centered within this control. The physical dimensions of the preview image (including drawn dimension lines, etc.) should never exceed either of the following dimensions (scaling of the image should scale the image to the largest size that will not exceed either of these values):

- **Width** – maximum 140 pixels
- **Height** – maximum 95 pixels

When the user's mouse hovers over the partial preview region, a multi-line tool-tip is displayed, as depicted in the following screenshot:

[6] The DIMSCALE setting updates according to the current paper size, with an E-size sheet always being scaled to 1.0. Plotting to a C-size sheet would scale to 0.5; plotting to an A-size sheet would scale to 0.25, etc.



The tool-tip text contents will be the same as the static text in AutoCAD 2004. The units (inches /mm/pixels) used in the dialog will function as they currently do in Neo, and simply display the correct abbreviation within the tool-tip.

The tool-tip displays both paper size and printable area, on separate lines. Paper size matches that shown in the paper size drop-down, but omits any additional string verbiage (e.g., ANSI D). The printable area dimensions for width by height mirror those of the paper size dimensions (e.g., paper size 34.00 x 22.00 inches corresponds to printable area 33.54 x 20.60 inches, while paper size 22.00 x 34.00 inches corresponds to printable area 20.60 x 33.54 inches).

4.3 Graphics

The Plot Enhancements feature contains a number of new icon graphics. These are depicted in the table below. Note that a number of these icons serve as placeholders until actual iconography can be developed by a graphics consultant later in the Neo cycle. These icons will be ECO'd into the specification at a later time.

Icon	Size	Location	Description
	16 x 16	Plot dialog box	Edit Plot Style Table icon.
	16 x 16	Plot dialog box	Plot Stamp Settings icon.
	16 x 16	Plot dialog box	More Options icon.
	16 x 16	Plot dialog box	Less Options icon.
	16 x 16	Plot Preview toolbar	Plot icon.
	16 x 16	Plot Preview toolbar	Pan icon.
	16 x 16	Plot Preview toolbar	Zoom icon.
	16 x 16	Plot Preview toolbar	Zoom Window icon.

Icon	Size	Location	Description
	16 x 16	Plot Preview toolbar	Zoom Original icon.
	16 x 16	Plot Preview toolbar	Close Preview Window icon.

4.4 Messages

4.4.1 Confirmation Messages

There are no new or modified confirmation messages for the Plot Enhancements feature.

4.4.2 Warning Messages

The following section details changes to the warning messages for Plot.

4.4.2.1 Plot File Exists

Plot File Exists is a renamed version of an alert present in AutoCAD 2004. It is presented when users specify a plot file name that already exists in the target directory. The lone change to this alert is changing the title bar text from "Warning" to "Plot File Exists".

4.4.3 Error Messages

The following section details changes to the error messages for Plot.

4.4.3.1 Invalid Plot File Name

The Invalid Plot File Name alert is presented when users click the OK button from the Plot to File dialog with an empty "File name" field. The alert has a single OK button, and the following message text: "You must specify a name for the plot file in the 'File name' field." Clicking OK returns the user to the Plot to File dialog with the "File name" field selected.

4.4.3.2 Invalid Characters

The Invalid Characters alert is presented when users specify illegal characters (e.g., "/", ".", etc.) in a plot file name from the Plot to File dialog box. The alert has a single OK button, and the following message text: "The file name you specified contains one or more invalid characters. Please enter a valid file name." Clicking OK returns the user to the Plot to File dialog with the "File name" field selected and highlighted.

The following characters are considered invalid and will trigger this alert:

" * , / : < = > ? \ ` | ;

5 Access

5.1 Application Menu

No changes are made to the application menu access for the command set that comprises the Plot Enhancements feature.

5.2 Toolbars

A new Plot Preview toolbar is introduced, as described in section 4.2.5. The toolbar contains the following components.

Toolbar Option	Description
	Tool-tip is "Plot". Plots the current layout, closes the Preview window, and returns to the drawing editor (behavior is identical to right-clicking and choosing Plot in the 2004 Preview implementation).
	Tool-tip is "Pan". Places the Preview window in Pan mode (behavior is identical to right-clicking and choosing Pan in the 2004 Preview implementation).
	Tool-tip is "Zoom". Places the Preview window in dynamic zoom mode (behavior is identical to right-clicking and choosing Zoom in the 2004 Preview implementation).
	Tool-tip is "Zoom Window". Places the Preview window in zoom window mode (behavior is identical to right-clicking and choosing Zoom Window in the 2004 Preview implementation).
	Tool-tip is "Zoom Original". Returns the Preview window to its original, zoom factored state (behavior is identical to right-clicking and choosing Zoom Original in the 2004 Preview implementation).
	Tool-tip is "Close Preview Window". Closes the preview window and returns the user to the drawing editor (behavior is identical to right-clicking and choosing Exit in the 2004 Preview implementation).

5.3 Shortcut Menus

The Sheet Set Manager team is considering removing the model and layout tabs from the bottom of the AutoCAD drawing editor. If this occurs, the plot-related shortcut menu options (Plot, Page Setup, etc.) currently accessible through these tabs will move to whatever new mechanism is exposed for navigating between layouts in the new environment. As the Sheet Set Manager feature team had not made a final determination regarding this prior to the Plot Enhancements specification complete milestone, refer to the specifications for the Sheet Set Manager feature cluster for details about the new layout behavior and shortcut menu access.

5.4 System Variables

The Plot Enhancements feature introduces a new system variable controlling plot offset behavior. This system variable corresponds to the new Plot Offset Definition radio buttons exposed through the Options dialog box.

PLOTOFFSET
Type: Integer
Saved in: Registry
Initial value: 0
Controls how plot offsets are displayed in the Plot and Page Setup dialog boxes.
0 = Offset expressed relative to printable area
1 = Offset express relative to layout border

5.5 Registry Settings

The Plot dialog box is now implemented as an expandable and collapsible dialog box. The last state (expanded vs. collapsed) of the dialog box is persisted, and should be stored as a per-user setting in the Registry. All other persisted dialog box settings behave as they did in AutoCAD 2004.

5.6 Status bar

Background and foreground Publish information is accessed and reported through the status tray region of the AutoCAD drawing editor. For specifics, refer to the Background Plot specification.

6 Additional Considerations

6.1.1 Default Metric Behaviors

AutoCAD 2004 provided a toggle in the Plot dialog box for users to specify whether values in the dialog should be indicated in inches or mm. This toggle goes away in Neo, and the current display is tied to the selected paper size. For details, refer to section 4.2.1.1.

6.2 Support Issues

One of the aims of the Plot Enhancements feature is to address key usability issues that have caused users problems in the past. Product Support may want to highlight some of the following changes in support materials or white papers:

- **Save changes to layout** – This is a check box in the Plot dialog box that, when checked, saves any changes users make to various settings in the dialog back to the source layout. In previous releases, this check box is checked by default. Many users are unaware of this check box and its functioning, and inadvertently save changes back to a layout when generating a one-off plot. Initial plans in Neo called for removing this check box, but some key customers indicated they would consider the removal of the check box a serious problem. In Neo the check box remains, but it has been moved to the expanded (Advanced) portion of the reworked dialog and is unchecked by default. Users who are familiar with this check box should be made aware of the change in its default state. Additionally, a new Apply to Layout button is added to the dialog box, so users can make changes to various plot settings and click on this button, rather than having to generate a plot (or begin a Plot operation and cancel it before it completed, as many users did as a workaround) to save the changes.
- **Anchor point** – Neo introduces a new anchor point concept, which specifies an absolute positioning for layout geometry and calculates an automatic offset to maintain this positioning. This anchor point serves as a first step towards a more robust margins implementation in a future release. Many users have traditionally mistakenly considered the dashed line representation of printable area in layouts as being indicative of margins. This erroneous conception was further bolstered by mistakes in the user documentation and in the AutoCAD UI (e.g., the Display tab of the Options dialog box), which referred to printable area as margins. Users should be made aware of this new feature, and its relationship to the concept of printable area. Also, all existing documentation that erroneously uses the term "margins" for "printable area" should be updated.
- **Removed functionality** – As part of the Plot dialog box redesign, customer validation was conducted to see if some components of the current Plot dialog box could safely be removed. A complete description of removed functionality is detailed in section 4.2.1.1.
- **Changes in plot-to-file functionality** – Plot-to-file behavior is changed somewhat – rather than specifying the name of the plot file directly in the Plot dialog box,

users are now presented with a standard file navigation dialog box to name and specify an output directory for the plot file. A complete description of the new behavior is detailed in section 4.2.1.2.

- **Background plotting** – Neo introduces a new background plot mode, where plot and publish operations run as a separate background process, allowing users to continue working in the drawing editor while plot activities take place. This new background plot mode is enabled by default, as long as the target system AutoCAD is being installed on meets the minimum system requirements.

7 Dependencies

7.1 Dependencies on Other Features

As part of the Sheet Set feature cluster, consideration is being given to doing away with the tabbed representation of layouts in the AutoCAD drawing editor. Shortcut menu access for plot-related functionality currently accessible through the layout tabs (e.g., Plot, Page Setup, etc.) will be documented in one of the specifications for the Sheet Set Manager feature cluster.

The following additional dependency is identified:

- Background plotting

7.2 Dependencies on This Feature

The Page Setup dialog box design is based heavily on the design of the Plot dialog box. Any changes made to the Plot dialog box over the course of the Neo cycle (during initial detailed design, or subsequently as a result of an ECO or SCO) need to be updated and reflected in the Page Setup dialog box.