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## Introducing AutoCAD 2005

Creating a single drawing as efficiently as possible is important. Delivering a coordinated set of drawings in a timely manner directly benefits your bottom line. With AutoCAD 2005 software you can do both. Everyday tools like the table object and tool palettes help you boost productivity, and the new Sheet Set Manager helps you control content across entire sets of related drawings, decreasing the risk of errors. Then, in a single view, you can compose and collate sheet sets and share them with your project team using plots, eTransmit, or DWF™ files.

With AutoCAD 2005 you can create drawings more efficiently. Day-to-day productivity boosters in AutoCAD 2005 include

- Enhanced tool palette functionality to customize tools for any AutoCAD command or utility
- New table objects that help you easily create and modify schedules, parts lists, revision history, and more
- New field functionality that enables you to reference data, such as the current date or drawing file name, and include it as text in tables, text objects, and block attribute definitions
- Background text mask and common drafting symbols available from the mtext editor
- Object linking and embedding (OLE) functionality that improves control over the size and plot quality of OLE objects
- Draw order functionality that provides easier access, greater control, and more predictable results

With AutoCAD 2005 you can view and manage entire sets of drawings with ease and efficiency. Using the new Sheet Set Manager, you can

- View and organize drawing sheets in the easy-to-understand tree structure
- Import layouts from existing drawings into a sheet set
- Add new sheets to your sheet set
- Open and edit sheets from a sheet set
- Lay out your drawing sheets using viewports in paper space
- Insert view labels and callouts that link across sheets
- Coordinate and update title block information, sheet numbering, sheet names, and detail labels across an entire sheet set
- Apply plot stamp information anywhere on a sheet, ensuring that the plot stamp data is updated for every plot
- Insert a sheet index on the title sheet, which automatically lists all the sheets in the set and creates hyperlinks
- Navigate through a sheet set using hyperlinks
- Archive an entire sheet set at the end of the project or at key points along the project lifecycle

AutoCAD 2005 makes it easy to share individual drawings or entire sheet sets. You can

- Select the entire sheet set or a specified set of sheets using named sheet selections
- Apply predefined plot settings using named page setups
- Plot an entire sheet set or a specified set of sheets in the background while you continue working
- Create an electronic transmittal set of an entire sheet set or a specified set of sheets
- Publish a sheet set to a DWF (Design Web Format™) file with hyperlinks that provide one-click navigation through the sheets

The following pages will describe in some detail the new features within AutoCAD 2005. The document is organized in the categories of Managing, Creating, and Sharing, beginning with the concept and functionality of the new Sheet Set Manager. Why do we introduce Sheet Set Manager at the outset? You will see that many of the new Creating features in AutoCAD 2005 provide immediate benefits to the user; however, some have even more impact and leverage when used within the Sheet Set Manager. We structured the document to illustrate the best possible utilization of the features in AutoCAD 2005. As an example, the Sheet Index can be created simply as a table, but when linked with the Sheet Set Manager, it has the power to work across the entire set of documents.

### What Is a Sheet Set?

A sheet set is usually a primary, legally binding deliverable item to communicate project information. In most cases, you present or deliver designs to clients and other stakeholders many times during a project. Your design presentations and deliverables are typically an organized set of bound drawing sheets that systematically specify a design.

Although you can organize a sheet set as a series of layouts in a DWG file, you might find that this method of organization prohibits members of your project team from simultaneously editing different layouts. You might also find that working with more than a handful of layouts is difficult because of the many layout tabs. For these reasons, you probably create your sheets as individual drawings and then organize them by grouping them into folders and assigning appropriate files names. If this describes the way you work, the Sheet Set Manager can help you more efficiently create, manage, and share sheet sets.

Sheet sets in AutoCAD 2005 comprise several elements that work together to help you produce your final design deliverable. The AutoCAD 2005 Sheet Set Manager helps you organize your drawing sheets into subsets that represent different types of drawings. The benefits of sheet set management include the ability to

- View, sort, delete, create, and manage your sheets all in one place
- Use simple right-click operations to reduce the steps to publish all drawing sheets
- Create layout views automatically
- Automate sheet number and detail labeling
- Link sheet set information into title blocks and plot stamps
- Perform tasks across a sheet set (for example, eTransmit, plotting, publish to DWF)

### Managing

Implementing the AutoCAD 2005 sheet set concept is simple using the Sheet Set Manager. As you begin, you can work the same way that you work in AutoCAD 2004 and then gradually take advantage of the sheet set functionality. You can use your current drawings and organizational structure to create an AutoCAD 2005 sheet set.

Using the Sheet Set Manager, you can manage sheets, views, and models in a sheet set. It displays all drawing sheets and sheet subsets to help you better organize, plot, and link information in your drawings. You can see who currently has drawings open for editing and which drawings are available.

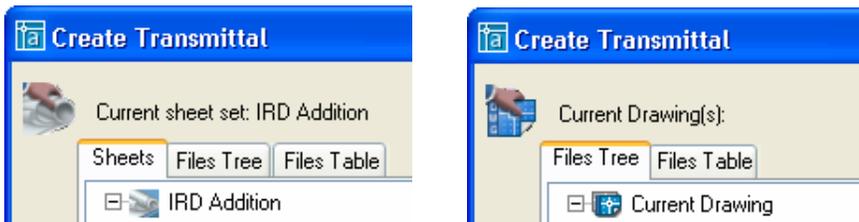
You can access the Sheet Set Manager using several methods, including typing SSM at the command line or choosing Open Sheet Set from the File menu.



**Figure 1. Open Sheet Set command on the File menu**

If you access a drawing when you have its sheet set open, AutoCAD 2005 offers functionality related to sheet sets that is not available if you access a drawing when its sheet set is not open. Some dialog boxes display icons indicating that the sheet set for the current drawing is open.

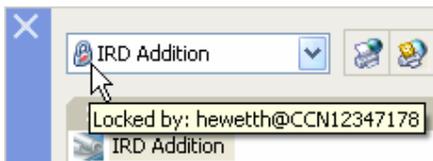
For example, if you access the Create Transmittal dialog box while you have a sheet set open, the dialog box displays the sheet set icon and status line. The Create Transmittal dialog box displays three tabs, including the Sheets tab. If you access the Create Transmittal dialog box without an active sheet set, the dialog box displays the drawing icon and label. The Sheets tab does not display in the dialog box while you are in drawing mode.



**Figure 2. Create Transmittal dialog box with and without a sheet set open**

## Accessing Sheet Sets

In the Sheet Set Manager, a drop-down list enables you to create a new sheet set or open an existing one. Multiple users can access a sheet set at the same time. If someone attempts to change the sheet set, such as adding a new sheet, the sheet set automatically locks to prevent anyone else from editing it. When a sheet set is locked, an icon in the upper-left corner of the Sheet Set Manager indicates the status and who locked it.

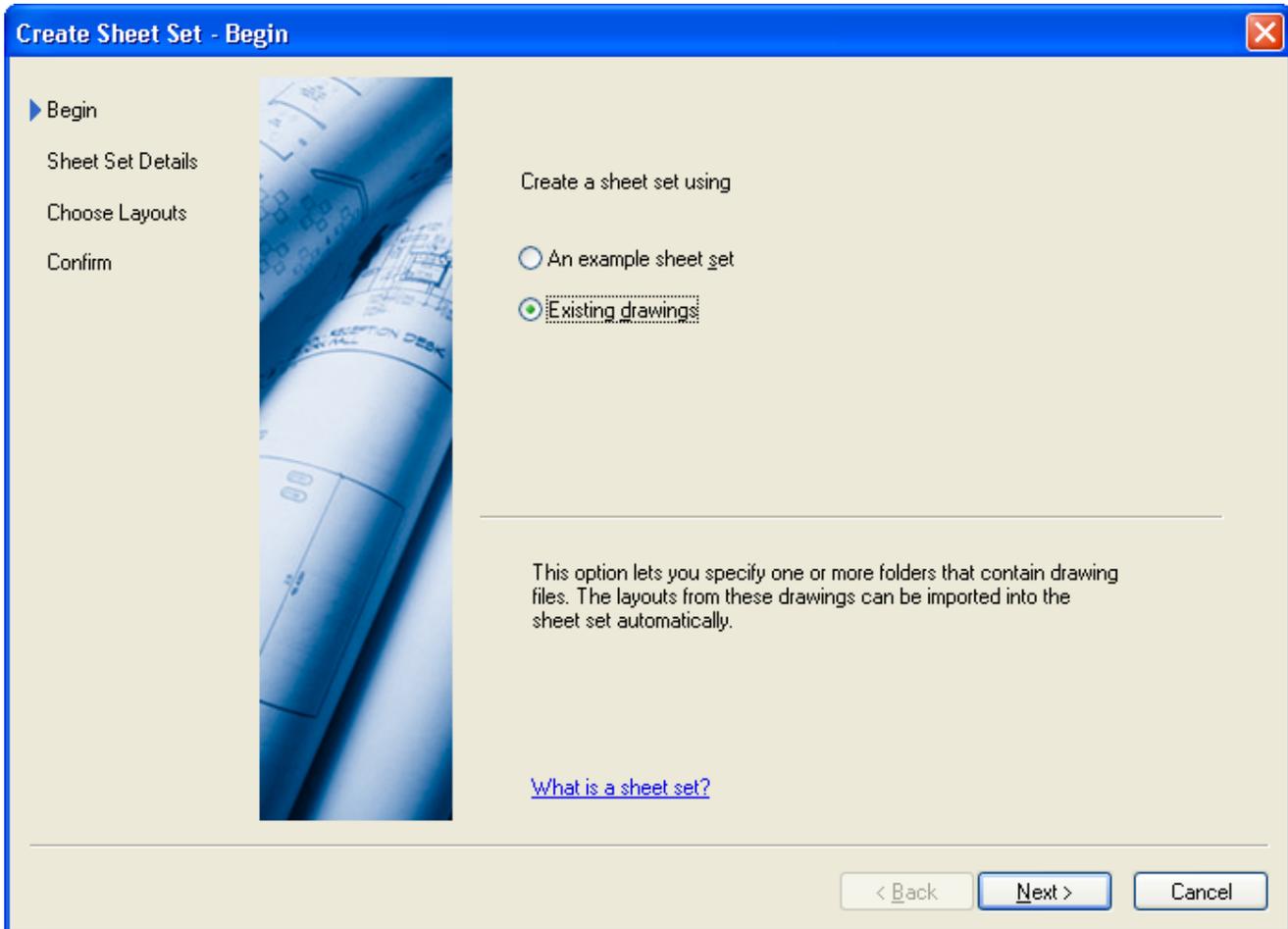


**Figure 3. Lock icon in the Sheet Set Manager**

Even if someone is editing the sheet set, you can view the contents of the sheet set, publish sheets, create transmittal sets, and even edit drawings that are referenced by the sheet set. After the person completes edits to the sheet set, AutoCAD 2005 automatically unlocks the sheet set to make it available for others to edit.

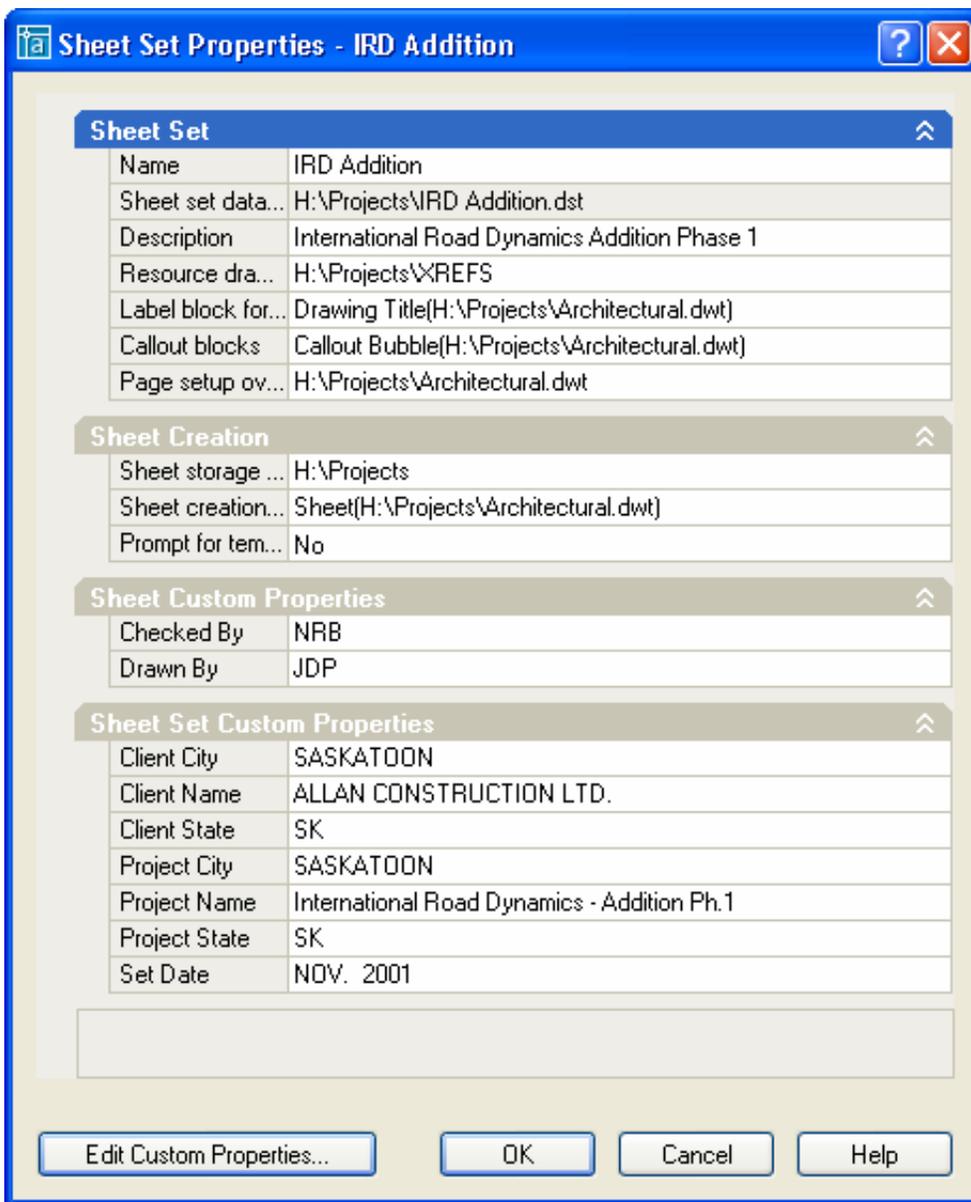
AutoCAD 2005 includes several sample sheet sets that make it easy to explore the powerful new sheet set functionality. The sample sheet sets are located in the *AutoCAD Sample* folder under *Sheet Sets*. When you are ready to create your own sheet set, you can use the Create Sheet Set wizard. The wizard offers you the flexibility to create a new sheet set by using an existing sheet set as an example or by importing layouts from existing drawings.

For example, you can begin taking advantage of sheet set functionality by importing existing layouts from one of your current projects. Using the Create a New Sheet Set Using Existing Layouts option, you simply select the folder of drawings from which you want to import layouts. The wizard displays all the drawings in the folder and all the layouts in those drawings. You select which layouts you want to import, and AutoCAD 2005 automatically adds them as sheets in your new sheet set.



**Figure 4. Create Sheet Set wizard**

Sheet sets can include a variety of properties such as default label and callout blocks, layouts, and page setups. You can access sheet set properties by right-clicking the sheet set name and choosing Properties.



**Figure 5. Sheet Set Properties dialog box**

In addition to the standard sheet set properties, you can create custom properties to meet your company or project standards.

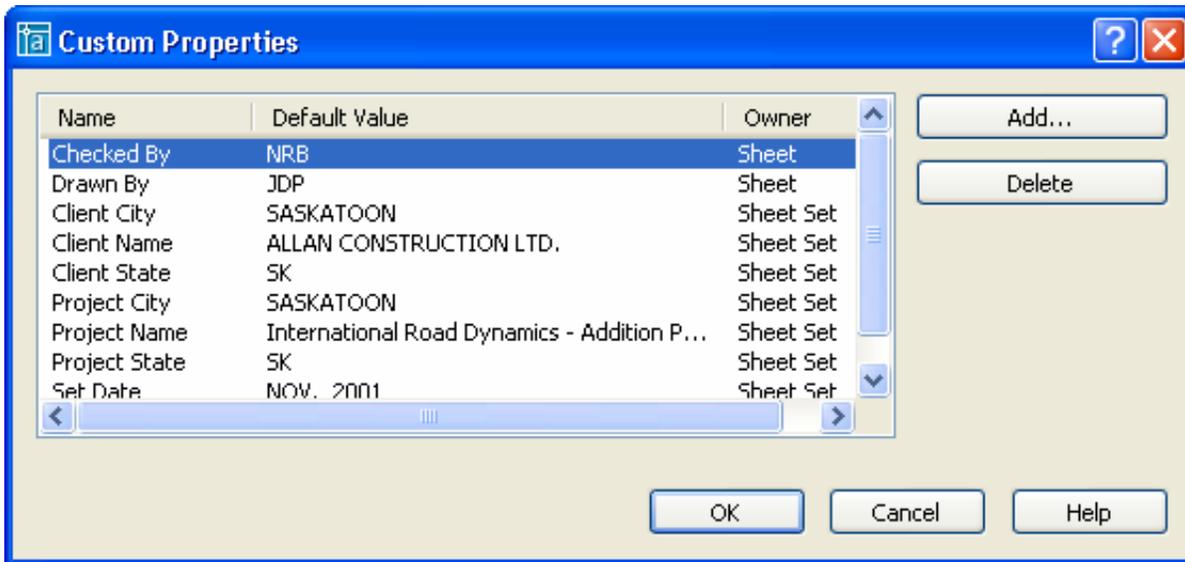


Figure 6. Custom Properties dialog box

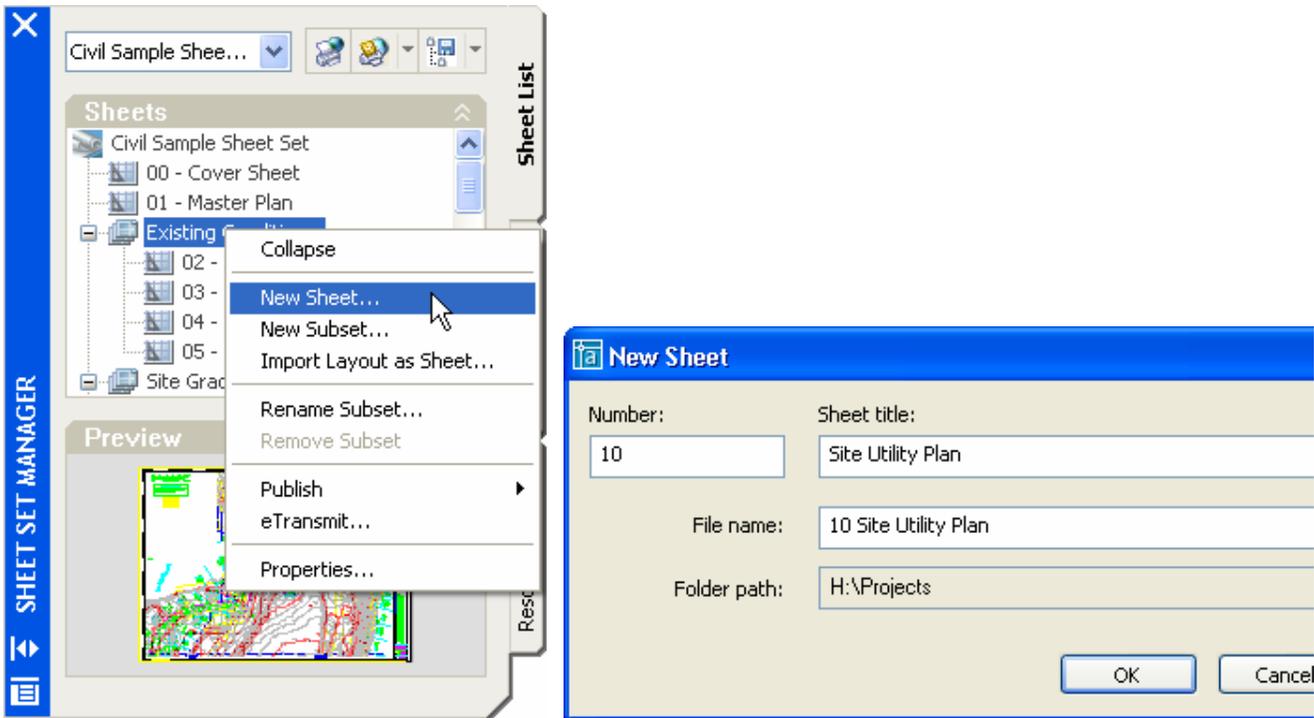
## Organizing Sheets

Sheets in the Sheet Set Manager represent an electronic version of the hard-copy plots that are part of your design deliverable. Each sheet in the sheet list is associated with a layout in a drawing (DWG) file. The associated layout can include multiple viewports, and the viewports can display model space geometry that is externally referenced from multiple DWG files.

On the Sheet List tab of the Sheet Set Manager, you can easily organize all sheets in your sheet set. You can add sheets, and you can even arrange some or all of the sheets into subsets and nested subsets. You can define named sheet selections and then recall a particular set of sheets at any time.

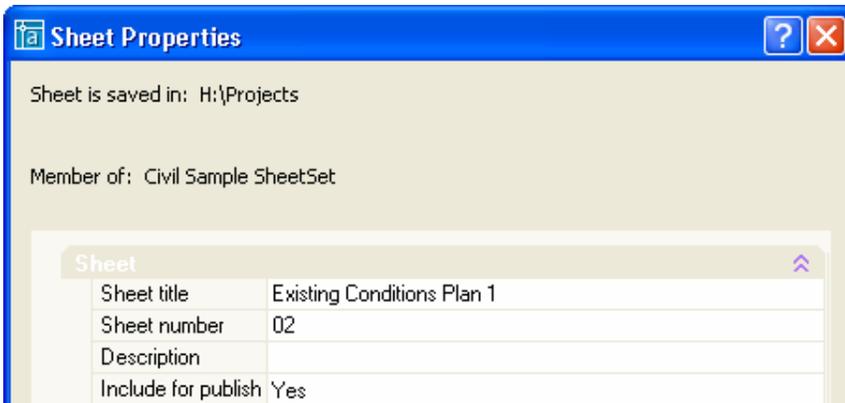
For example, suppose your firm is designing a building. You might create a sheet set for the entire project and then create subsets for architectural, electrical, and mechanical drawings. Within each of those subsets, you could create a subset for details. You might define named sheet selection sets for each subset (architectural, electrical, mechanical) and one for the entire project. If you need to produce a set of drawings for the electrical contractor, you simply restore the electrical sheet selection set. If you need to produce the entire set of drawings for the client, you restore the project sheet selection set.

The Sheet List tab of the Sheet Set Manager enables you to create new sheets by using a default layout from a template (DWT) file or by importing sheets from existing DWG or DWT files. You provide a sheet number and title for new sheets and you can reorder, rename, or remove sheets and subsets.



**Figure 7. Creating sheets in the Sheet Set Manager**

Although a sheet is associated with layout in a DWG file, it also contains additional properties. You can access the properties of any sheet in the sheet set by right-clicking the sheet name and choosing Properties.



**Figure 8. Sheet Properties dialog box**

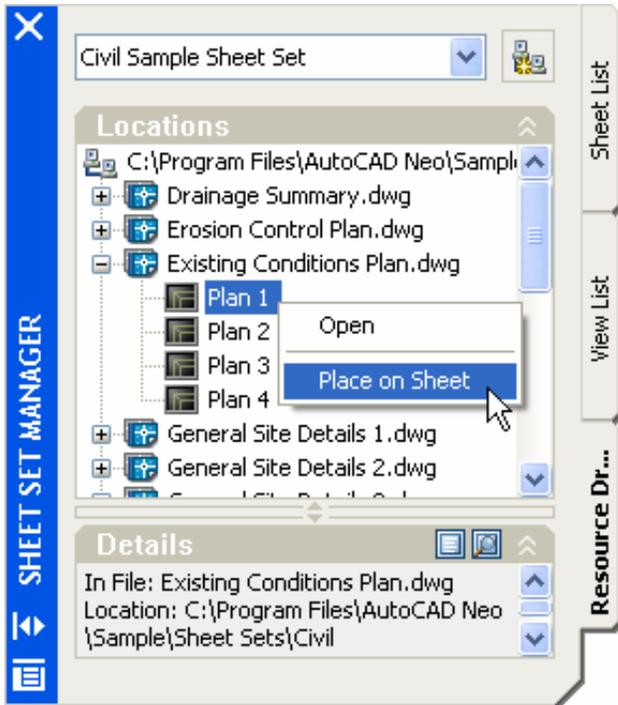
Using the Sheet Set Manager, you can easily locate and open referenced drawing files for editing in the AutoCAD drawing window.

### Accessing Model Space Views from Resource Drawings

AutoCAD 2005 automates the process of laying out your drawing on your drawing sheets. After you have created a new blank sheet in a sheet set, the next step is to lay out your viewports on the sheet. You can do this using model space views or an entire model space drawing.

Using a drawing from the Resource Drawings tab, you can automatically create a labeled, sized, and scaled viewport on your drawing sheet. You can access any number of resource drawings by

adding their folder locations to the Resource Drawings tab. The Resource Drawings tab displays all named model space views in a selected drawing. By right-clicking a model space view, you can automatically place it on your current sheet. If you want to view or edit the model space geometry before placing the view on your sheet, you can use the context-sensitive menu to quickly open the resource drawing with the selected model space view current.



**Figure 9. Accessing named views from the Resource Drawings tab**

When you create a viewport using a resource drawing, the new viewport automatically attaches the resource drawing as an xref and displays all the model space geometry from the selected viewport. You can modify the size, scale, and location of the new viewport using standard AutoCAD commands.

Creating a viewport using a resource drawing automatically adds an associated sheet view to the View List tab.

## Managing Sheet Views

Sheet views are named paper space views that are registered and tracked in the sheet set. You can view them, and to some degree manipulate them, using the View List tab of the Sheet Set Manager. The view list displays all the sheet views used in the sheet set. By right-clicking a view, you can quickly add a view label or callout block to a sheet.

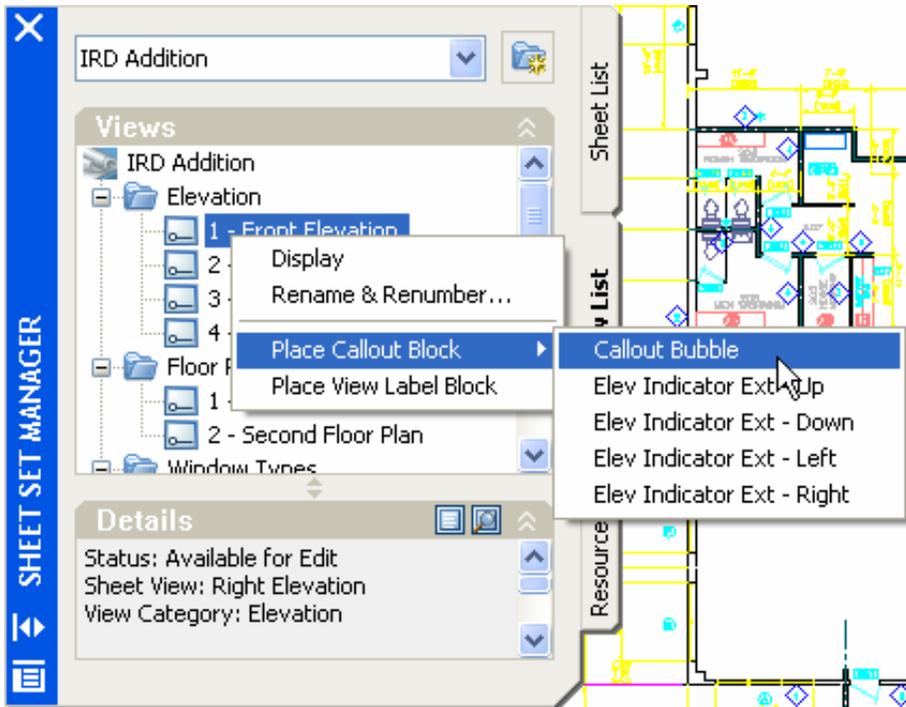


Figure 10. Adding a callout from the View List tab

You can organize the sheet views into view categories and assign different callout blocks to each view category.

For example, suppose you produce architectural drawings. You might want different callout blocks for different types of information. For section views, you want section bubbles, and for elevation views you want either interior or exterior elevation bubbles.

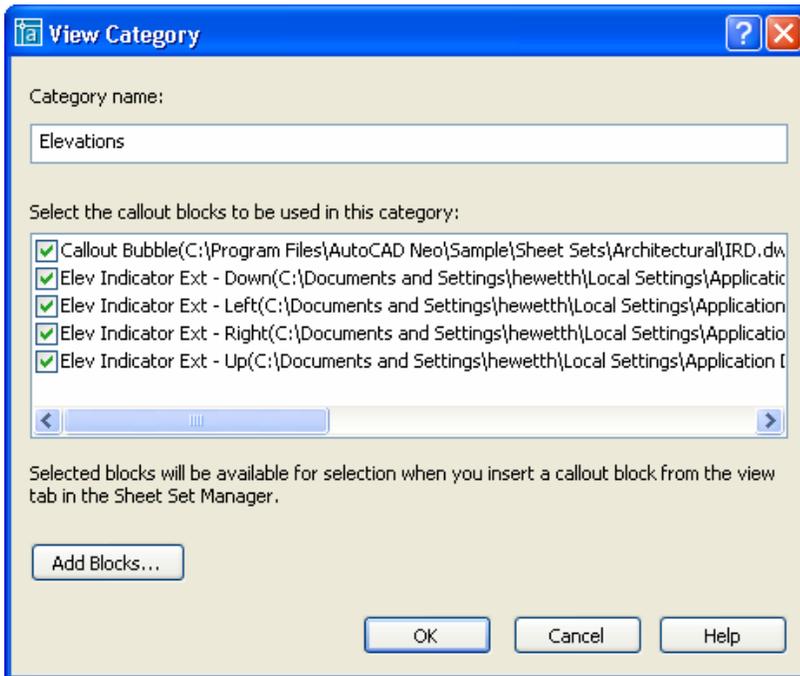
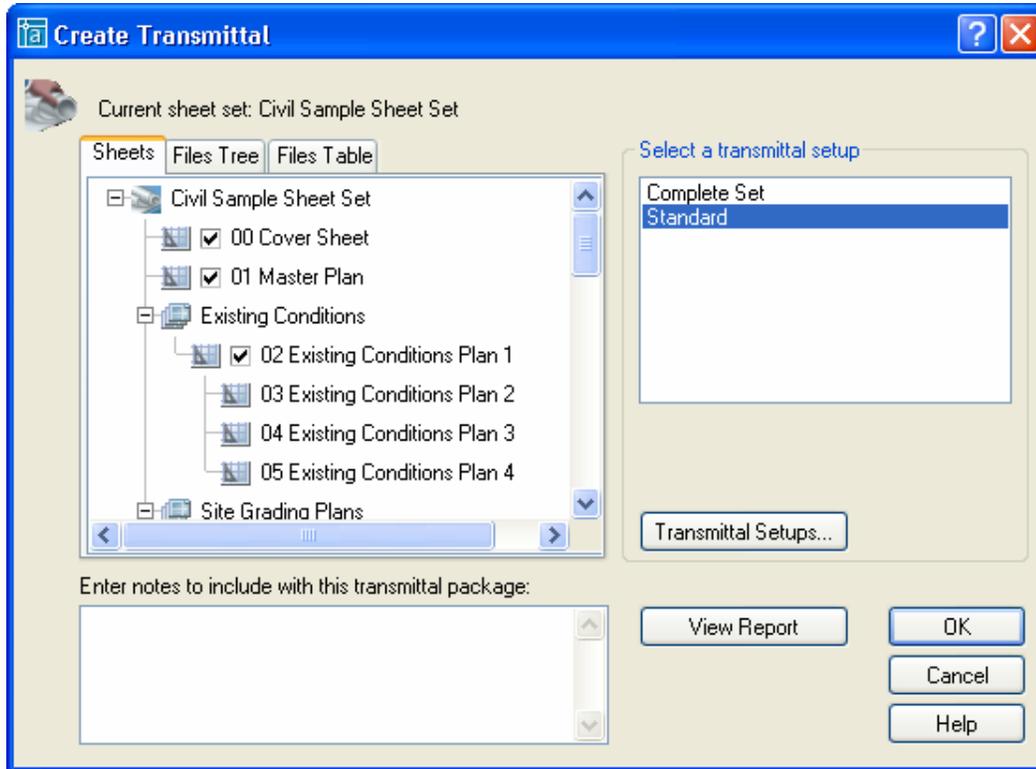


Figure 11. View Category dialog box

## Creating Transmittal Sets

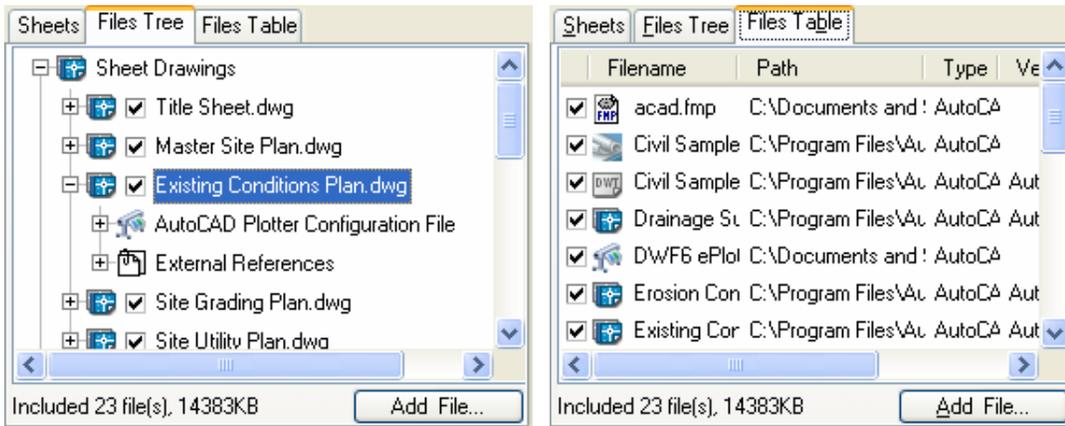
eTransmit functionality has been enhanced in AutoCAD 2005 to take advantage of sheet sets. A right-click on the sheet set name provides quick access to the Create Transmittal dialog box. Accessing the Create Transmittal dialog box from the Sheet Set Manager displays three tabs: Sheets, Files Tree, and Files Table.



**Figure 12. Create Transmittal dialog box**

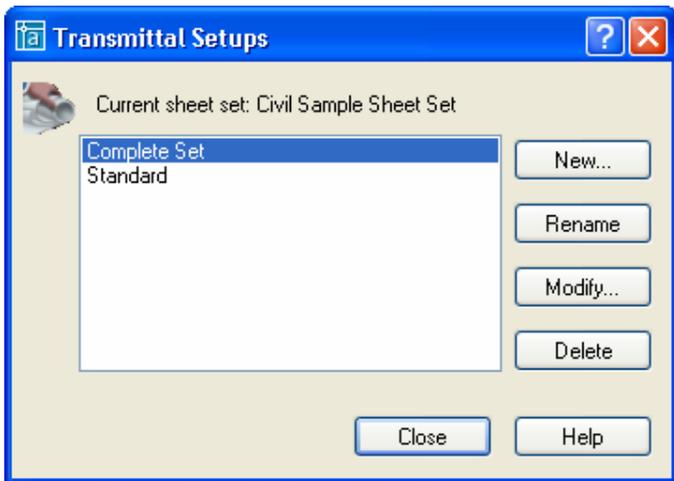
The Sheets tab displays only if you create a transmittal set when the sheet set is open. The Sheets tab shows a tree view of all sheets in the transmittal package, organized by the sheet set structure.

As in AutoCAD 2004, the Files Tree tab displays a hierarchical structure of the files in the sheet set. In AutoCAD 2005, when you add a DWG file to the transmittal set, all the drawing's reference files are automatically added as well. The Files Table tab displays a table format of all files in the transmittal set.



**Figure 13. Files Tree and Files Table tabs**

You can define and manage transmittal sets using the Transmittal Setups dialog box. The Transmittal Setups dialog box displays a list of all transmittal setups associated with a sheet set or drawing.



**Figure 14. Transmittal Setups dialog box**

A default transmittal setup, named “Standard,” is included with AutoCAD 2005. You can modify the properties of the Standard transmittal setup or create any number of additional transmittal setups. Transmittal setups are stored in either the sheet set or the user registry, depending on whether you access the Transmittal Setups dialog box while you have a sheet set open.

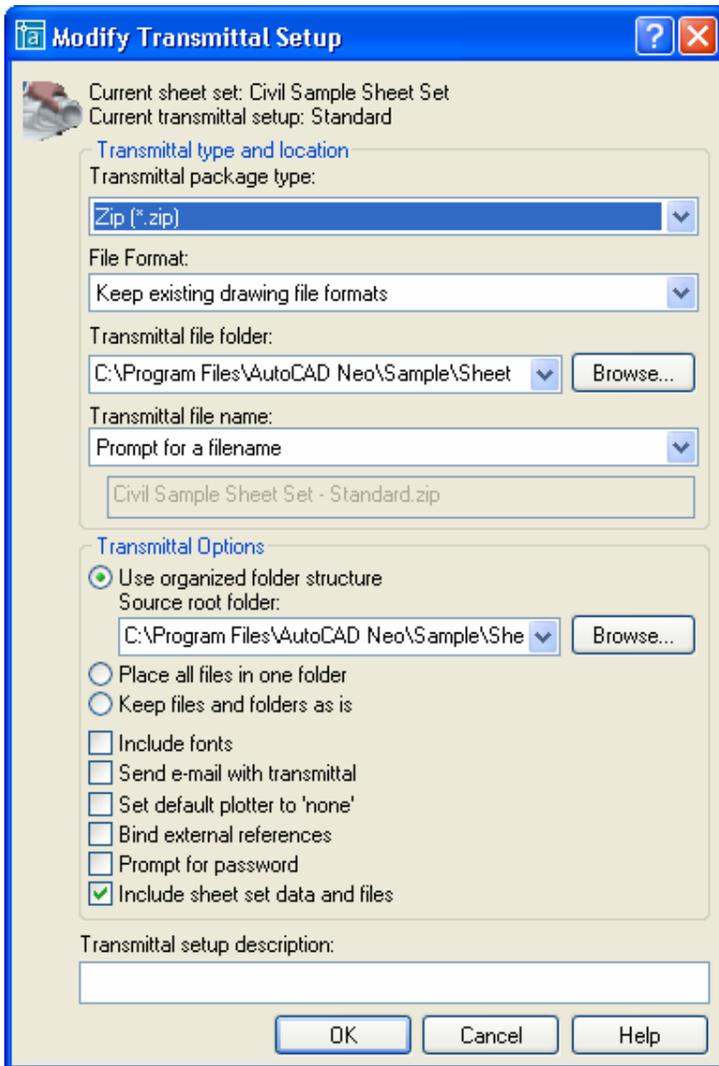
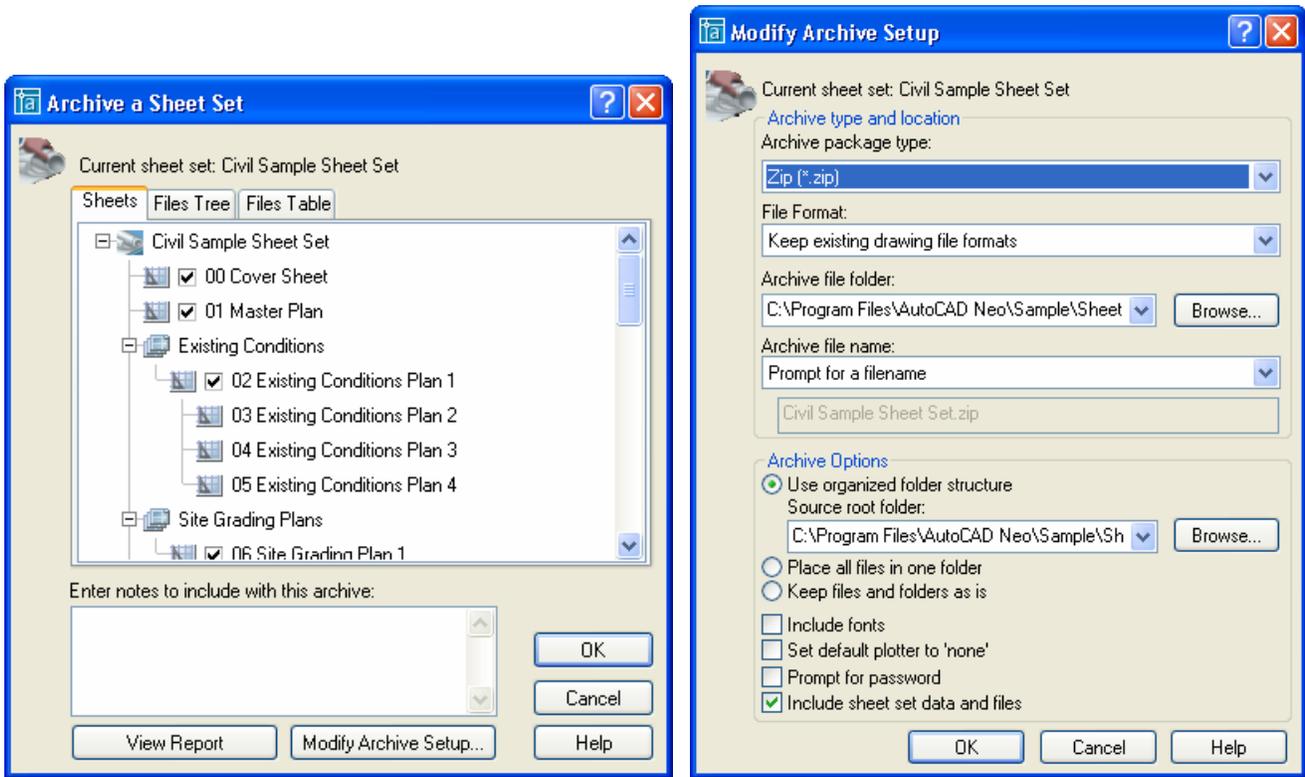


Figure 15. Modify eTransmit Setup dialog box

## Archiving Sheet Sets

Using new functionality in AutoCAD 2005, you can archive an entire sheet set using an interface similar to that used for creating a transmittal set. You can access the archive functionality from the context-sensitive menu in the Sheet Set Manager.



**Figure 16. Archive a Sheet Set and Modify Archive Setup dialog boxes**

The archive functionality enables you to save project data at crucial milestones throughout the life of a project as well as at the end. Archiving your project data, as opposed to copying it to another folder, minimizes costly mistakes caused by storing multiple versions of drawings.

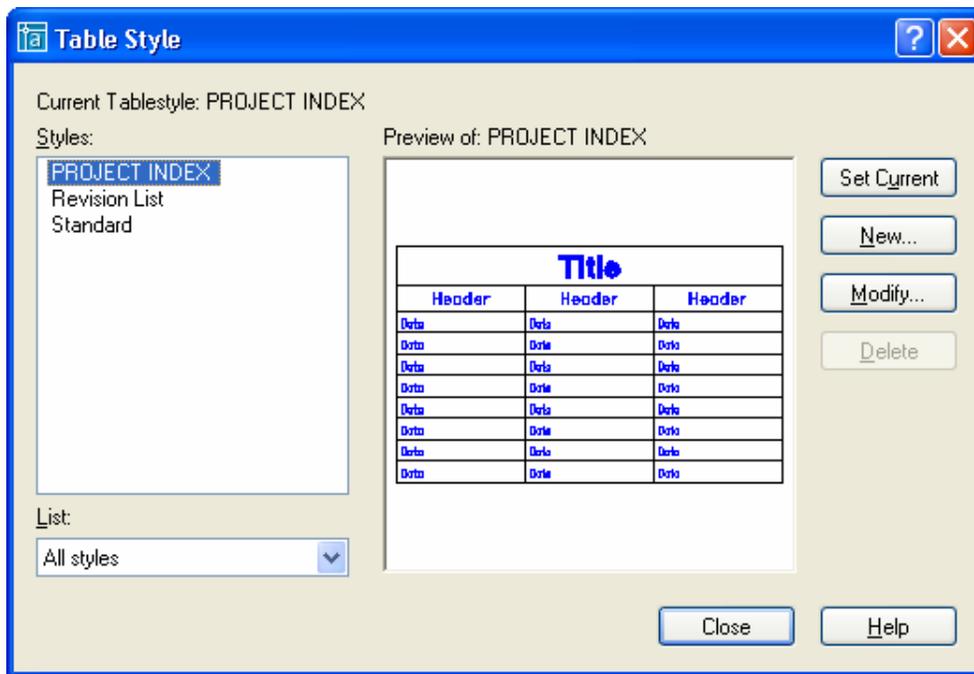
For example, suppose you submit a set of site plans and related drawings to the local planning board for review. If you want to continue working on the project drawings while you wait for approval from the planning board, you can quickly create an archive of the submitted sheet set before continuing with the design. If any problems or questions arise regarding your planning board submittal, you can always refer back to your archived set.

## Creating

You can compose drawing sheets using a variety of elements, including tables, fields, and views. You can use most of these elements in your drawing (DWG) files even if they are not part of a sheet set.

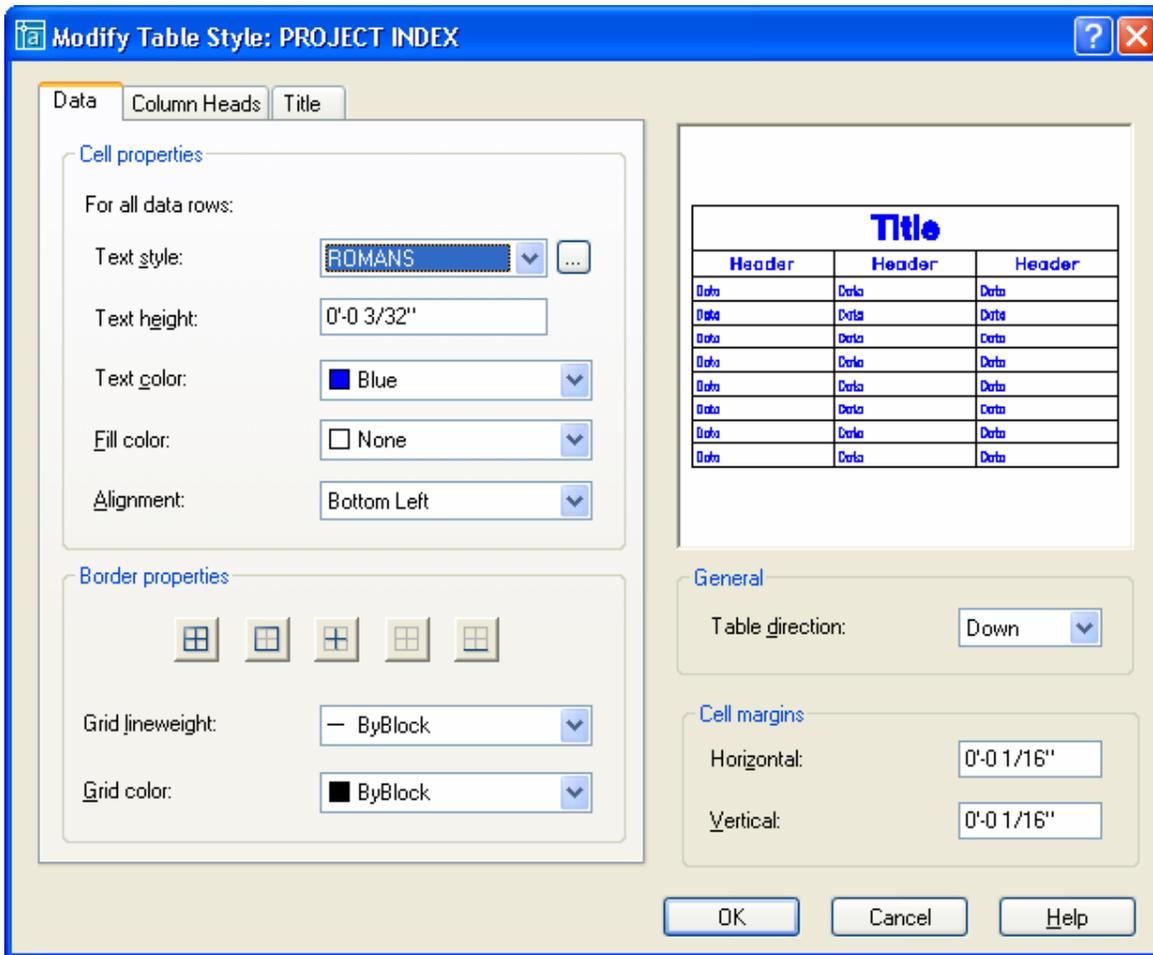
### Creating Tables

Tables are a fundamental part of any set of drawings, and with the new table functionality in AutoCAD 2005, you can increase your productivity by automating the tedious task of creating and maintaining tables. The new table objects in AutoCAD 2005 are flexible in their appearance. They are based on table styles similar to the way text and dimensions are based on text and dimension styles. With an interface that is similar to the Dimension Style dialog box, the Table Style dialog box enables you to set the current table style, create new table styles, and modify or delete existing table styles.



**Figure 17. Table Style dialog box**

You can define table styles that contain multiple columns and rows, including title and header rows. Tabs in the New and Modify Table Style dialog boxes enable you to apply different cell and border properties to data cells, column headings, and title headings. Border properties include grid visibility, lineweight, and color. Cell properties include text style, text height, text color, fill color, and alignment. You can specify the table direction, up or down, and you can specify horizontal or vertical table margins.



**Figure 18. The new Modify Table Style dialog box**

Defining and applying table styles helps ensure that you are using standard fonts, colors, text heights, and lineweights. You can define any number of table styles to create tables faster and with greater consistency.

For example, you might define one table style called Equipment Schedule, a second called Revision Notes, and a third called Sheet List. Each table style has properties that offer the best results for that particular type of table.



key to move down the cells. You simply double-click a table cell and enter text or insert blocks, hyperlinks, or fields (for more information, see "Creating Fields" later in this document).

Text Formatting			
Standard	simplex.shx	0.1250	B
ERAC-1-37	LIEBERT MMD20W	75	0.3

Figure 21. Adding content to a table cell

Using grip support, you can modify the table location, column width, and row height. You can edit the properties of individual cells using the Properties palette, and a context-sensitive menu enables you to insert and delete rows and columns as well as merge or unmerge adjacent cells.

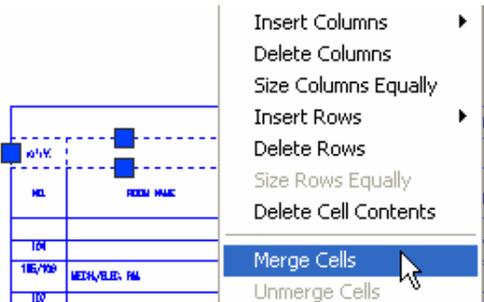


Figure 22. Modifying a table

The benefit of creating tables is not limited to AutoCAD software. You can copy table data from Microsoft® Excel and paste it into your drawings as AutoCAD entities. AutoCAD 2005 automatically converts it to an AutoCAD table object while maintaining formatting from the original spreadsheet. You can modify the table and even add more rows and columns just as if you created it directly in AutoCAD software.

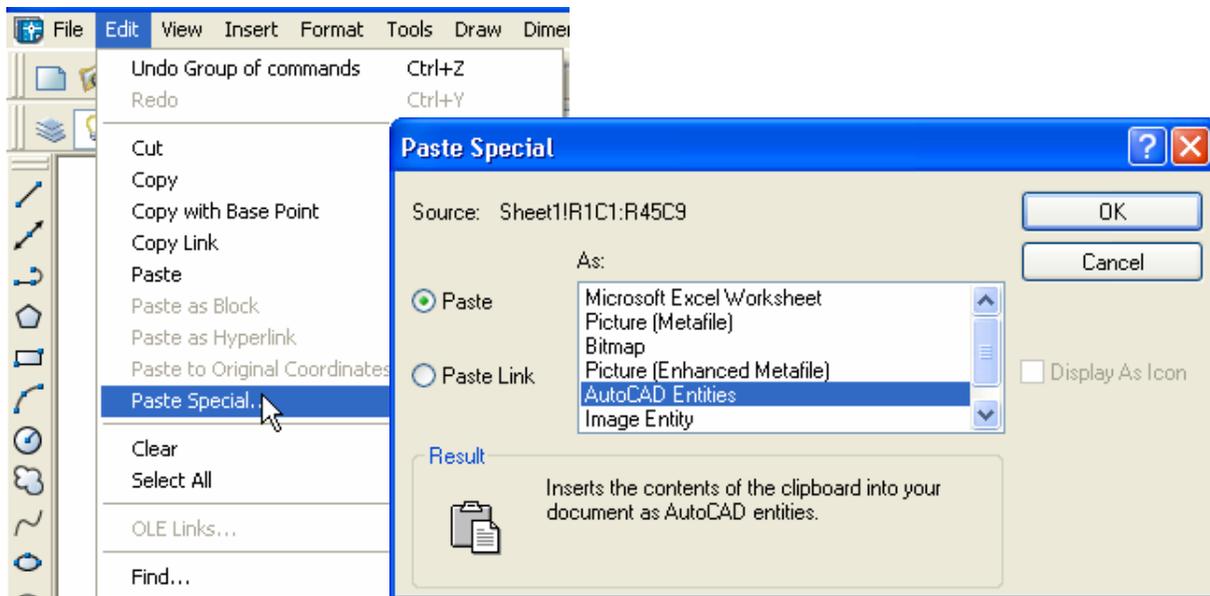
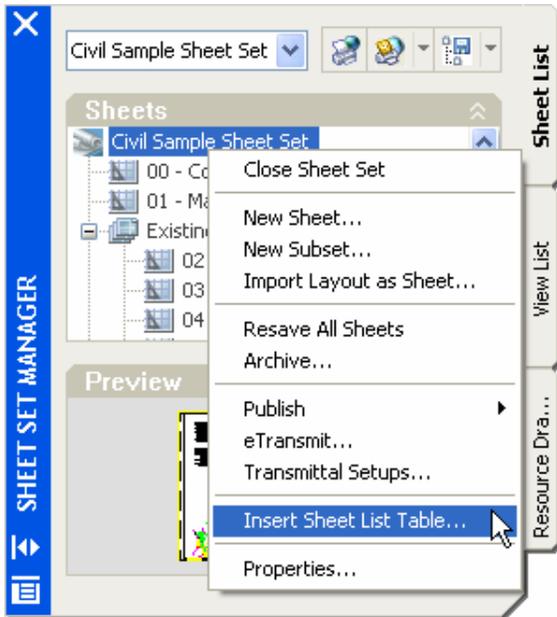


Figure 23. Pasting table data from Microsoft Excel

If you want to use the data from your AutoCAD tables in other applications, you can easily export the table data to a comma-separated value (CSV) file format. The export functionality is available by choosing Export from the context-sensitive menu when you have a table selected. You can import the CSV data into Microsoft Excel or other database spreadsheet applications.

## Creating a Sheet Index

In AutoCAD 2005, you can automatically create a sheet index on the title sheet. You simply right-click the title sheet and choose Insert Sheet List Table. After you specify a table style, AutoCAD 2005 automatically creates a table that references all the sheets in the set.



**Figure 24. Inserting a sheet list table**

Once the sheet list table has been created, a context-sensitive menu option enables you to automatically update the sheet list table, ensuring that it contains the most current data. You can quickly open any sheet listed in the sheet list table by clicking the hyperlinked sheet name.

<b>SHEET INDEX</b>	
Sheet Number	Sheet Title
T-01	Title sheet
AS-01	Architectural Site Plan
A-01	Main & Second Floor Plans
A-02	Exterior Elevations
A-03	Doors & Windows
A-04	Reflected Ceiling Plans
A-05	Sections and Details
S-07	Foundation Plan
S-08	Structural Sections and Details
S-09	Floor Framing Plan and Sections
S-10	Structural Sections

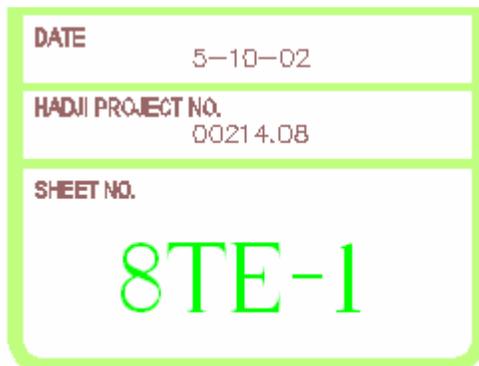
**Figure 25. Sample sheet list table**

When you publish your sheet set to DWF format, the sheet list table helps you navigate to any sheet in the sheet set.

### Creating Fields

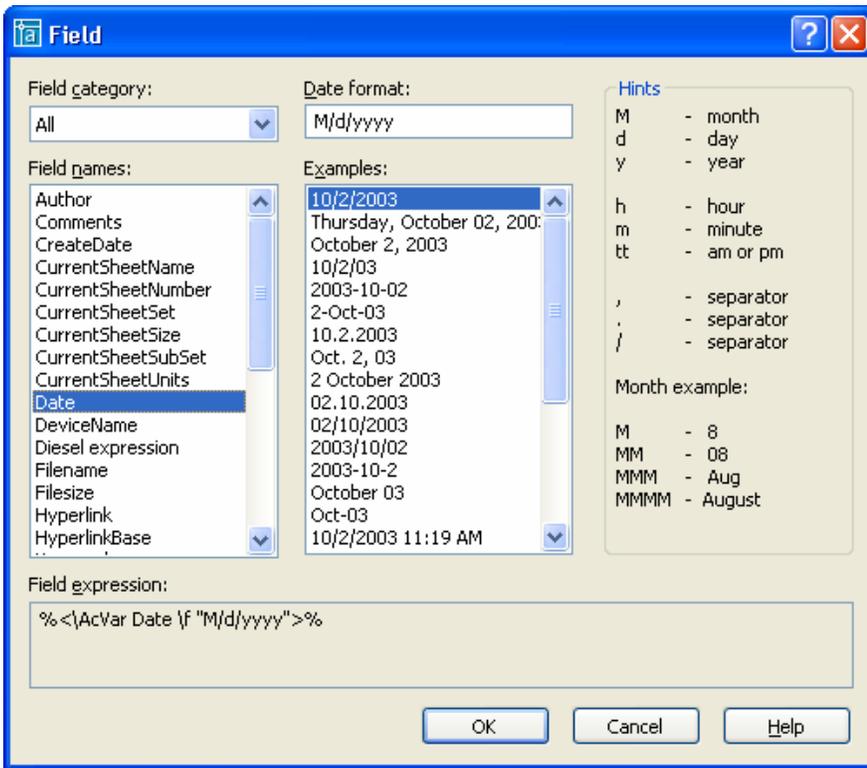
Fields are placeholders in text objects for data in a document that might change during the life of a drawing. Field data can include drawing properties, system variables, object properties, and even some operating system properties, such as time, current date, or file name.

For example, suppose you add fields to a drawing title block. The field data might include the creation date, project number, and sheet number.



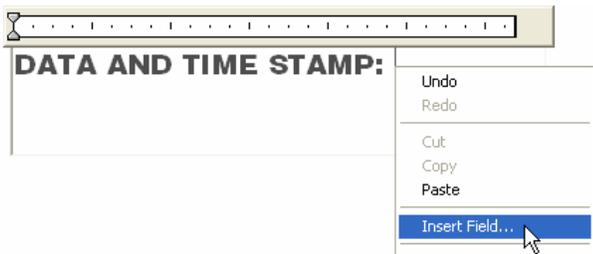
**Figure 26. Sample title block using field data**

In the Field dialog box, AutoCAD 2005 makes available a list of predefined fields. You can easily insert fields into existing multiline text objects, attributes, or table cells by accessing the fields functionality from a context-sensitive menu.



**Figure 27. Field dialog box**

For example, suppose you have text that refers to the current date and time. Rather than entering the date using standard multiline text and having to update it manually, you can insert a Date field that references the current date and time in the multiline text object.



**Figure 28. Adding a field to multiline text**

Once a field is in place, you can edit the contents or control how it is updated. If you right-click a field, you can select from field-specific options, including Edit Field, Update Field, and Convert Field to Text. By default, field values automatically update when you open, save, plot, eTransmit, or regenerate a drawing to ensure that you always have the current data. You can control the automatic evaluation of fields using the FIELDEVAL system variable.

If you open an AutoCAD 2005 drawing that contains field data in AutoCAD 2004, the drawing displays the last evaluated value. In this way, you can take advantage of the powerful AutoCAD 2005 field functionality when you work with AutoCAD 2004 users.

In addition to supporting fields in existing AutoCAD text objects, AutoCAD 2005 supports fields in the new table object as well as sheet set–related items, including

- Sheet set, subset, sheet name, sheet number

- View category, view name, view number
- Current sheet properties
- Plot-related fields for plot stamps

If you access the Field dialog box while the Sheet Set Manager is open, you can select the SheetSet field category to insert fields that reference data across sheets.

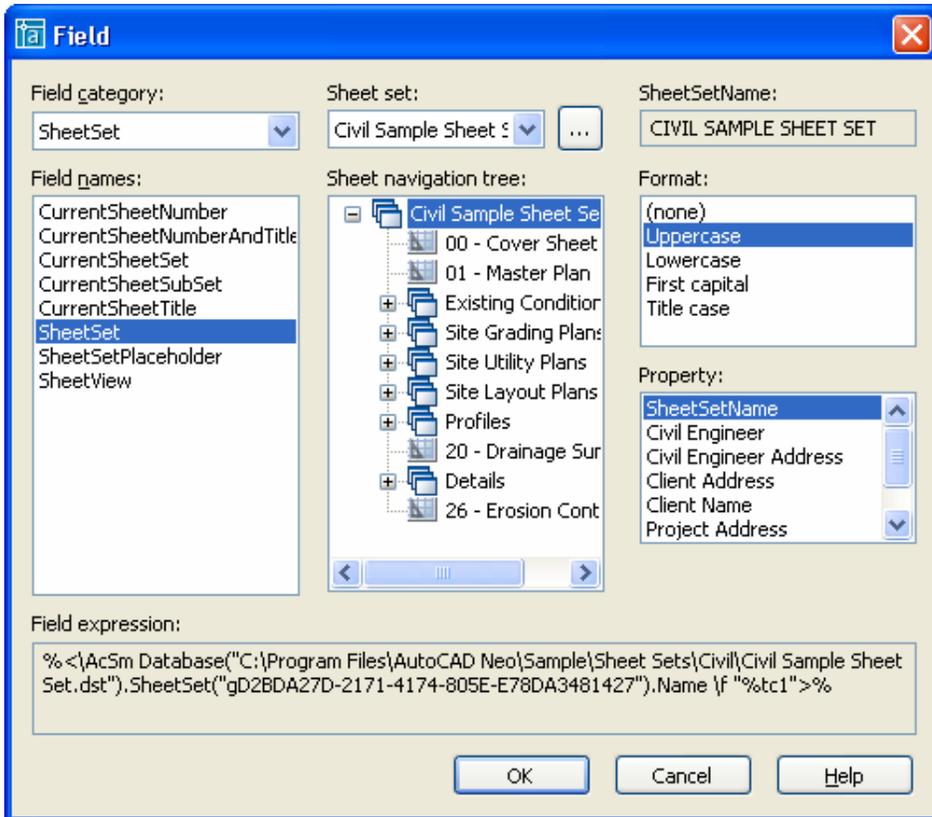
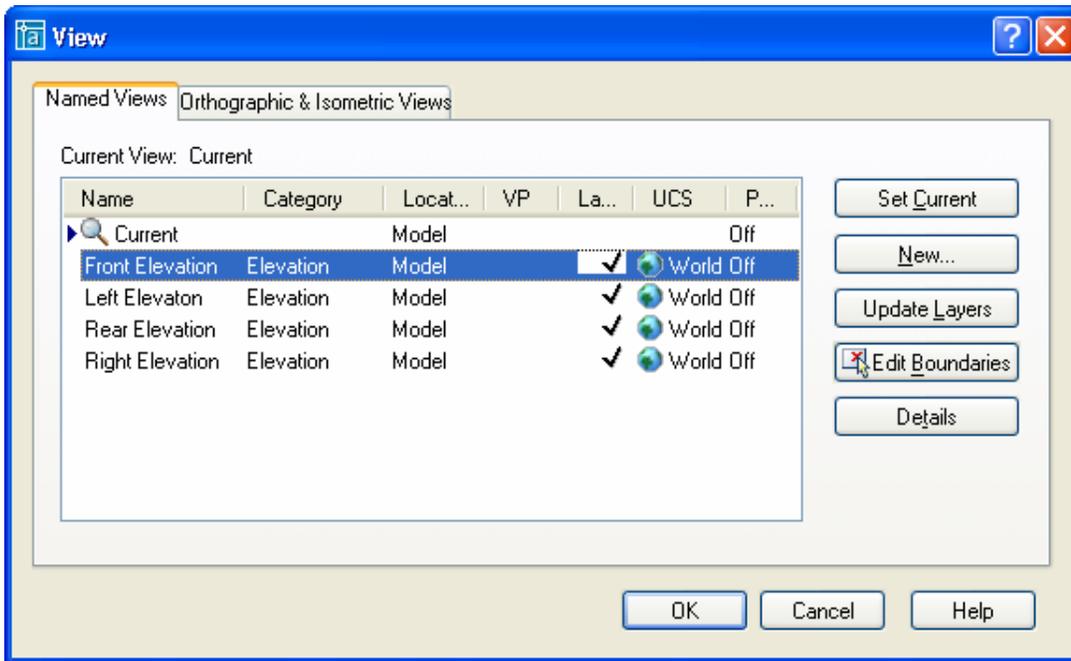


Figure 29. Sheet set fields

## Working with Named Views and Viewports

AutoCAD 2005 offers powerful enhancements to named view and viewport functionality. These enhancements make it possible to use views in a sheet set environment. Even before you begin implementing sheet sets, you can take advantage of many of the view and viewport enhancements.

The updated View dialog box gives you more control and flexibility for creating and managing named views. You can assign a view category, store layer settings with the view, and edit the view boundaries. Named views that you create from paper space are associated with a specific layout. Together, these enhancements make it easy to create named views that store all the information necessary to restore views.



**Figure 30. View dialog box**

Enhanced viewport functionality makes it easier to work between model space and paper space. In a paper space layout, you can automatically maximize a viewport to work on your model space drawing using the entire drawing area.

The VPMAX command is accessible at the command prompt or from the context-sensitive menu when you have a viewport selected. After making edits to the model space geometry, you can use the context-sensitive menu option or the VPMIN command to quickly return to your previous paper space view.



**Figure 31. Viewport context-sensitive menu**

For example, suppose you have a drawing layout that contains four viewports. While adding notes to the layout, you realize that the geometry in one of the viewports is incorrect. Rather than selecting the Model tab to edit the model space geometry, you simply select the viewport and choose Maximize Viewport from the context-sensitive menu. AutoCAD software automatically maximizes that viewport to fill the drawing area and makes it active for model space editing. After you make the necessary edits to the model geometry, right-click and choose Minimize Viewport. AutoCAD automatically returns you to the paper space layout with the same view that you had before maximizing the viewport.

## Working with Layers

AutoCAD 2005 includes many layer enhancements to help support the new sheet set functionality and to help you manage large groups of layers.

The space-saving design of the new Layer Properties Manager provides greater functionality in a more intuitive interface. You can provide a description for each layer, and you can immediately apply any layer changes without closing the Layer Properties Manager. If you right-click the column headings, you can quickly maximize columns based on content. Any changes you make to the display of columns remain the next time you access the Layer Properties Manager.

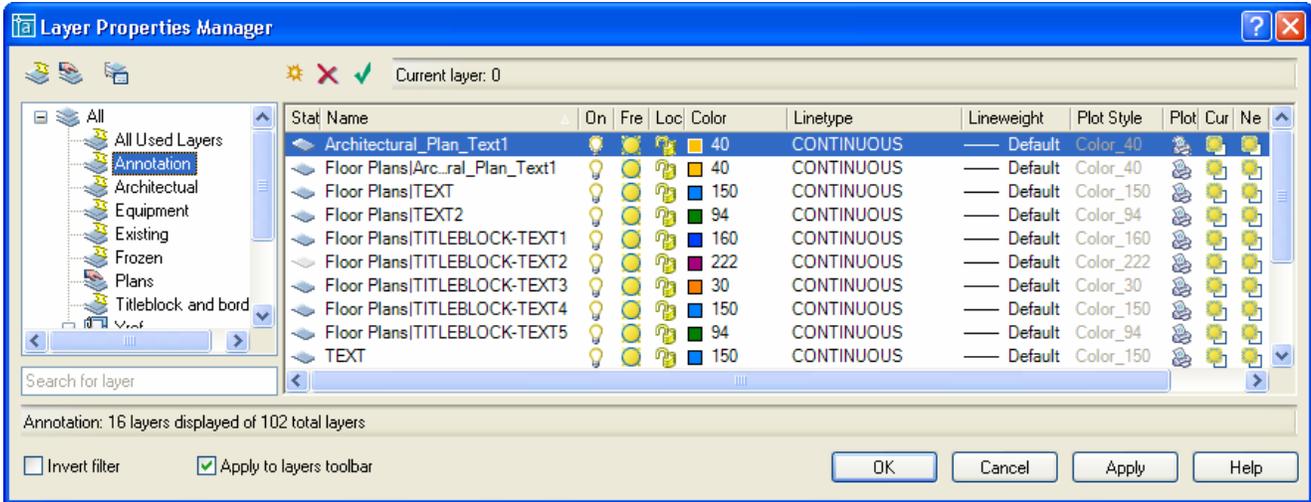


Figure 32. Layer Properties Manager

One of the most noticeable changes in the Layer Properties Manager is the new Filter tree view control. In AutoCAD 2005 you can group layers using filters. Filters for xref layers are automatically created and displayed in the tree view. Using layer filters, you can easily control layer visibility for all layers in a particular filter group.

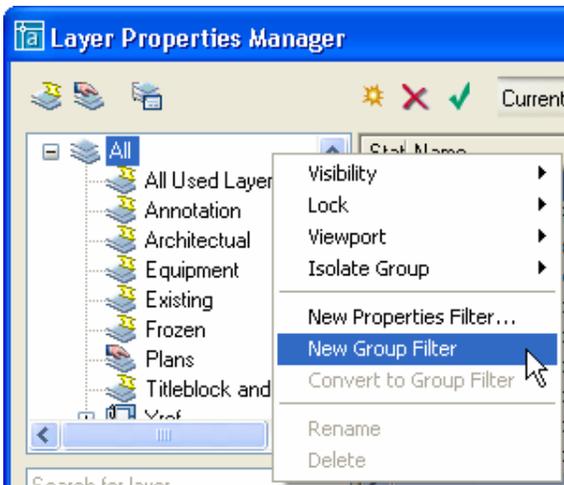


Figure 33. Filter tree view context-sensitive menu

A properties filter defines which set of layers are displayed in the Layer Properties Manager based on any combination of their layer properties, including name, state, color, linetype, lineweight, and plot style. You can preview the results of the properties filter using the new Layer Filter Properties dialog box. The preview updates immediately as you add properties to the filter definition.

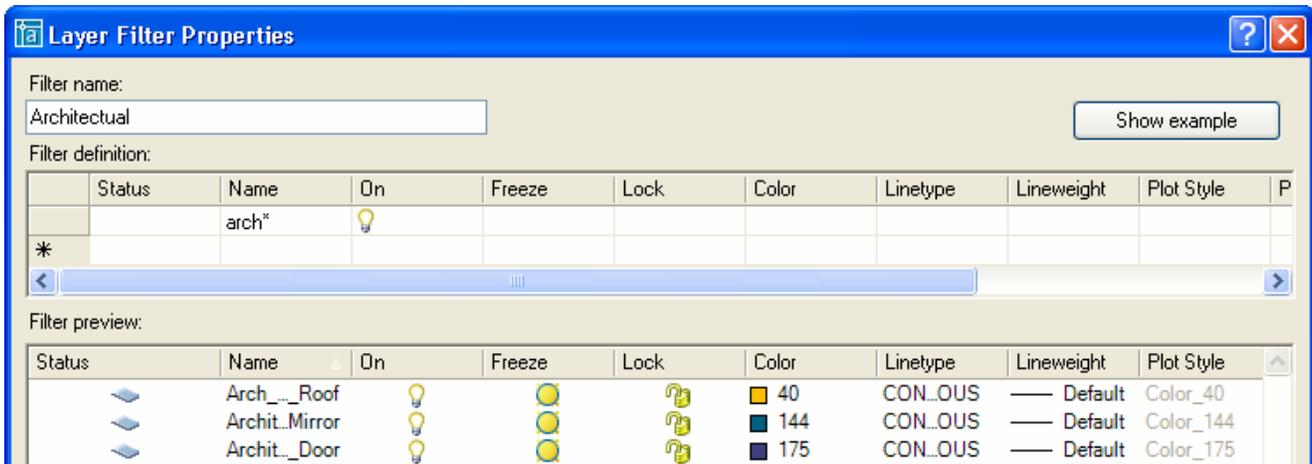


Figure 34. Layer Filter Properties dialog box

For example, suppose you have a drawing with electrical and mechanical layers whose layer names start with E and M, respectively. You want to see a list of all the visible electrical layers, but you are interested only in the visible mechanical layers that are color 71. You can define a properties filter that lists layer names beginning with “E” that are turned on and thawed as well as layer names beginning with “M” that are turned on, thawed, and color 71. You can save the properties filter to a specific name, such as Building Systems.

Similar to properties filters, group filters also control which layers display in the Layer Properties Manager. However, unlike properties filters, the content of a group filter does not change after you create the filter, even if the layer properties change. You can add any layer to a group filter, regardless of its properties, by dragging the layer name from the Layer Properties Manager onto the group name. You can even add or replace layers in a group filter by selecting an object from the drawing.

For example, suppose you have a drawing with various text layers. You can define a layer group, called Text, and then drag all relevant layers from the Layer Properties Manager into that group. If you are unsure of the layer names, you can choose Select Layers>Add from the context-sensitive menu and then select the text objects in the drawing. With the group filter created, you can view and manipulate just the layers related to text whenever necessary.

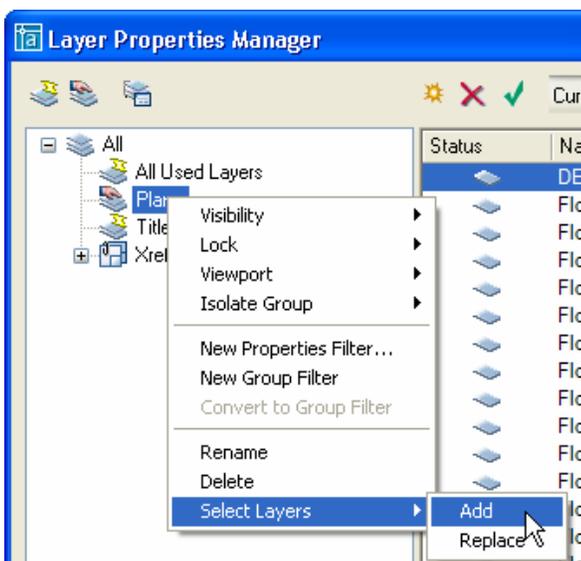


Figure 35. Adding layers to group filters by selecting objects

You can define any number of properties and group filters, and you can easily restore a defined filter simply by selecting it from the Filter tree view. Properties filters can be nested under properties or group filters, and group filters can be nested under other group filters. You can even convert a properties filter into a group filter.

In addition to the powerful new properties and group filters, AutoCAD 2005 offers significant enhancements to layer state functionality, including an updated user interface. Layer states can now store viewport layer information for the current viewport. Layer states also store the current layer, and you have the option to provide a layer state description.

### Accessing New Symbols

The addition of new symbols, available from the context-sensitive menu in the Multiline Text Editor, saves you time and reduces the risk of making mistakes. You can insert these commonly used symbols directly into your multiline text objects rather than inserting them as separate block objects and manually positioning them with related text. When you move or edit the multiline text object, the symbols relocate accordingly.

AutoCAD 2005 provides the following new text symbols:

Δ	Capital Delta	ℙ	Plate/Property Line
Φ	Electrical Phase	X <sup>2</sup>	Superscript 2
Ω	Ohm	X <sub>2</sub>	Subscript 2
⌒	Centerline	∠	Angle
⌚	Boundary Line	≈	Almost Equal To
ℱ	Flow Line	≠	Not Equal To
⌚	Monument Line	≡	Identical To

The new symbols are available in the following TrueType and compiled shape (SHX) fonts:

Simplex	Isocp	Isoct	Isocpeur
Romans	Isocp2	Isoct2	Isocpeur italic
	Isocp3	Isoct3	Isocteur
			Isocteur italic

### Applying the Mtext Background Property

Annotating drawings often requires that you create text on top of other objects. With the new multiline text background property, you can apply a fill around multiline text so that it obstructs any objects below it.

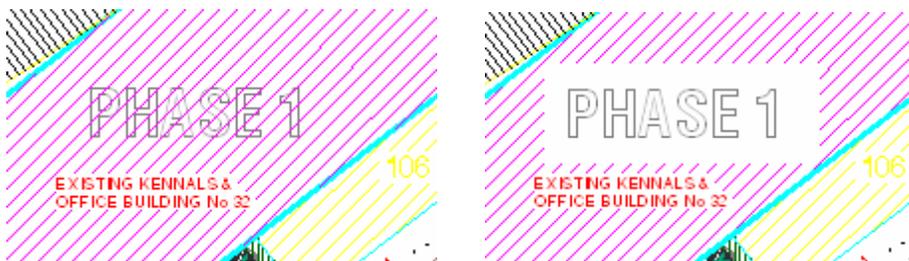


Figure 36. Multiline text before and after applying the background property

A context-sensitive menu option in the Multiline Text Editor provides access to the Background Mask dialog box, where you can specify a border offset factor that is the distance the background extends beyond the edge of the text. You can select a specific color to use as the background fill, or you can use the same color as the display background.

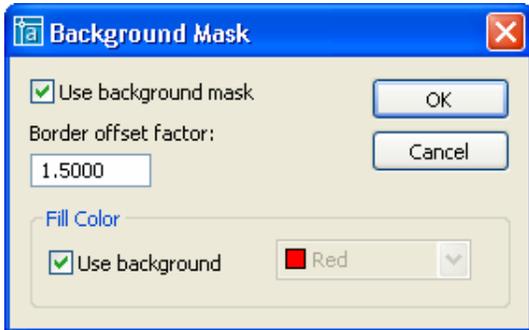


Figure 37. Background Mask dialog box

## Working with OLE Objects

AutoCAD 2005 offers improved support for OLE data from other applications such as Microsoft Word and Excel. Improved support for object scaling and manipulation makes it easier to place OLE objects accurately.

When you copy data from another application and paste it into an AutoCAD drawing, you place the new OLE object by specifying an insertion point. If the OLE object contains text, AutoCAD software automatically approximates the point size in the source document to an equivalent size in AutoCAD units. When you paste an OLE object into a layout, the scale is based on the layout's sheet size and units. When you paste an OLE object into model space, the scale is based on the paper unit property of the current page setup as well as the new MSCALE system variable.

In AutoCAD 2005, OLE objects are automatically drawn on the plane of the current user coordinate system, providing more flexibility and control for presenting OLE data. Manipulating OLE objects in AutoCAD is easier and more flexible because they behave like other AutoCAD objects. You can select OLE objects and add or remove them from selection sets just like other objects in AutoCAD. They respond to any of the standard selection options such as Window, Crossing, and All. When you select an OLE object, you can access standard AutoCAD grip functionality, including the grip context-sensitive menu. In addition to using grips to manipulate OLE objects, you can use standard AutoCAD editing commands such as Move, Copy, and Array, and you can manipulate some OLE object properties through the Properties palette.

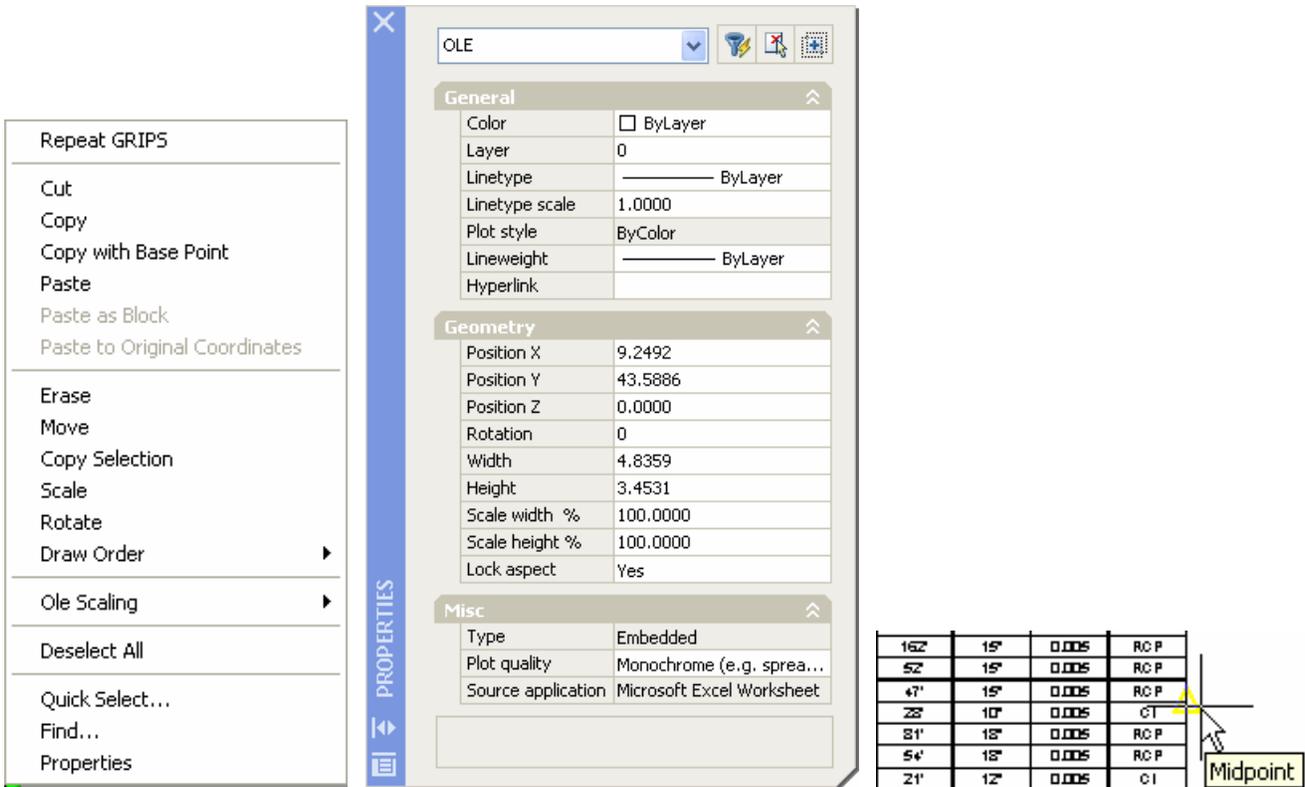


Figure 38. Manipulating OLE objects

With an OLE object selected, a context-sensitive menu provides access to the OLE Text Size dialog box. You can map a text font and size to an AutoCAD text height, overwriting the initial scale that AutoCAD determined automatically.

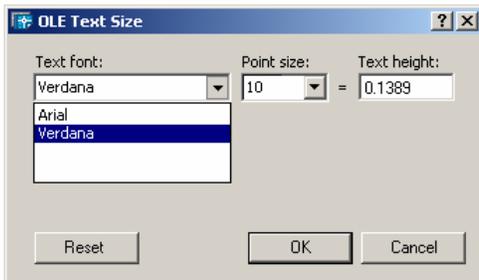
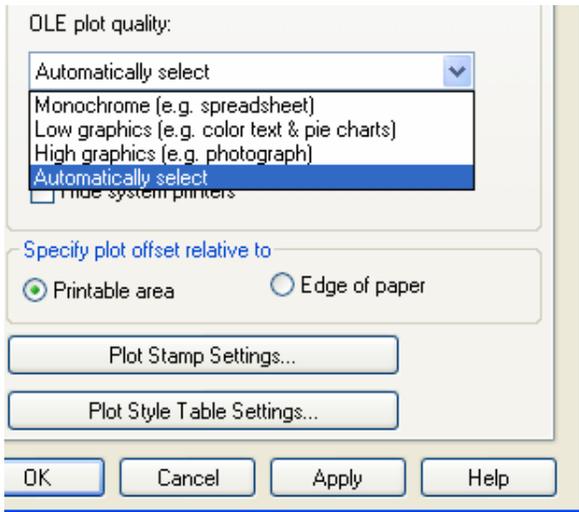


Figure 39. OLE Text Size dialog box

AutoCAD 2005 offers improved plot quality of OLE objects by enabling you to assign an appropriate plot quality based on the type of OLE object. OLE plot quality options are available on the Plot and Publish tab of the Options dialog box.

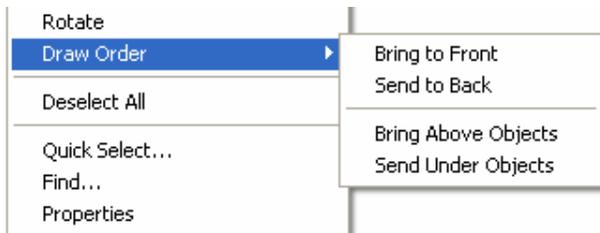


**Figure 40. OLE plot quality choices in Options dialog box**

The many OLE enhancements in AutoCAD 2005 help you easily produce high-quality drawings.

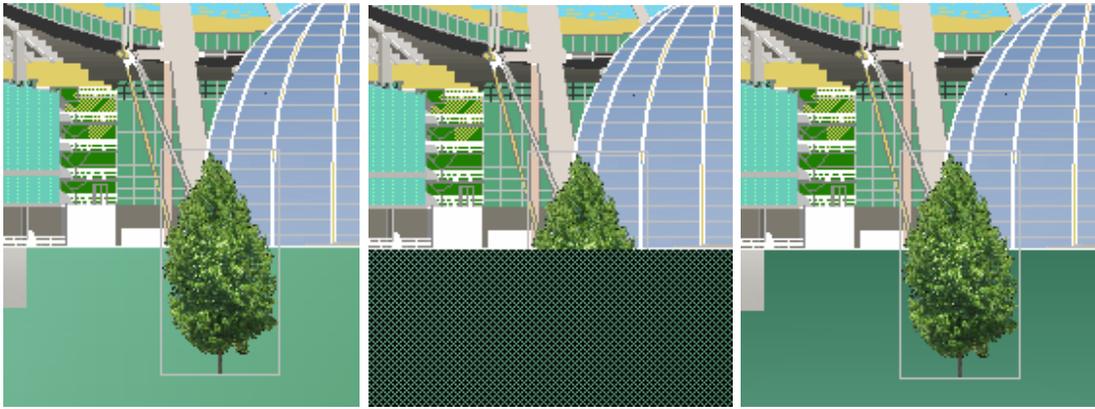
### Arranging Draw Order of Objects

If you ever create overlapping objects in AutoCAD software, you are probably familiar with the Draw Order feature. You use Draw Order in 2D views to control the order of objects in relation to each other. AutoCAD 2005 provides easier access to draw order functionality and eliminates the need to regenerate the drawing manually to see proper draw order results. Draw order tools are available as a context-sensitive menu option when you have objects selected in the drawing workspace.



**Figure 41. Draw Order menu option**

Updated Draw Order behavior provides a WYSIWYG (what you see is what you get) display of modified objects. When you edit an object that is behind another object, the edited object automatically returns to its assigned position as soon as the edit operation is completed. You no longer have to regenerate or plot the drawing to see the final draw order results. If you create a new object that is based on an existing object, the new object automatically inherits the draw order properties of the original object. This enhanced functionality applies to various operations, including copy, break, fillet, chamfer, block creations, wblock, and explode.



**Figure 42. Display sequence when editing objects**

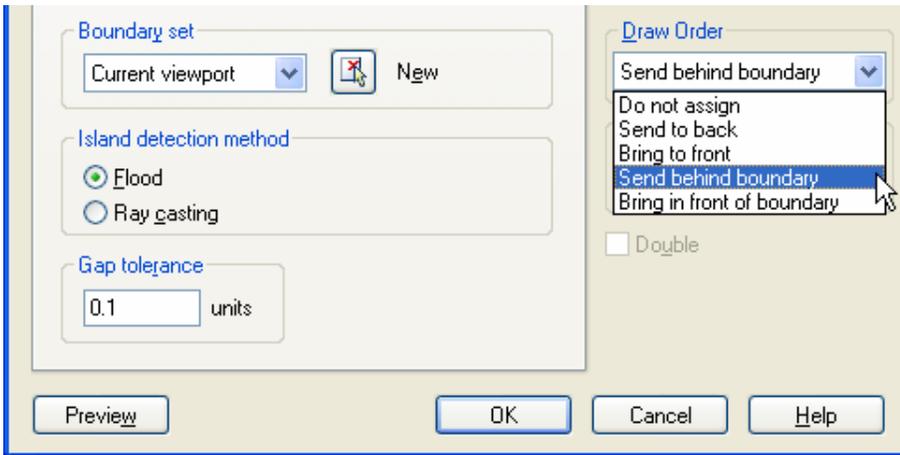
The new Draw Order behavior should not significantly affect performance. However, if you want to revert to previous behavior, the DRAWORDERCTL system variable is available.

Value	Behavior
0	Disables all new Draw Order behavior
1	Enables new Draw Order editing behavior
2	Enables new Draw Order inheritance behavior
3 (default)	Enables all new Draw Order behavior

Using draw order functionality minimizes the importance of controlling object-sorting methods; therefore, the Object Sorting Methods section on the User Preferences tab of the Options dialog box was removed to avoid confusion.

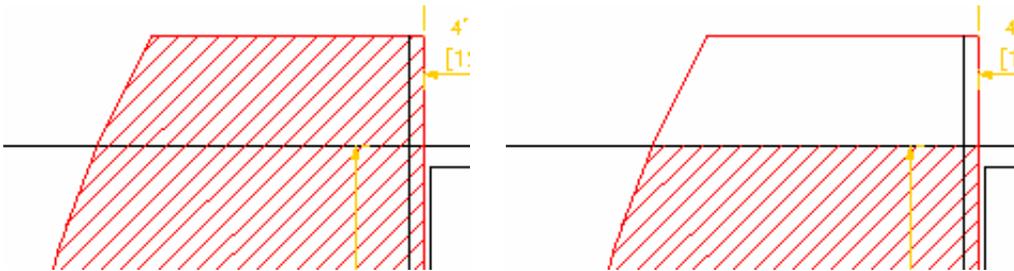
### Hatching Objects

Boundary hatching in the AutoCAD 2005 software application offers improved functionality. The Hatch Edit and Boundary Hatch and Fill dialog boxes offer two new controls. You can preassign drawing order to hatch objects to create hatches that automatically display behind their associated boundaries. When picking points to select hatch areas, you can use a new option for Gap tolerance to pick a point inside an area that is not completely closed. If the gaps are within the specified gap tolerance, you can choose to ignore the gaps and complete the hatch operation.



**Figure 43. Updates to the Hatch dialog box**

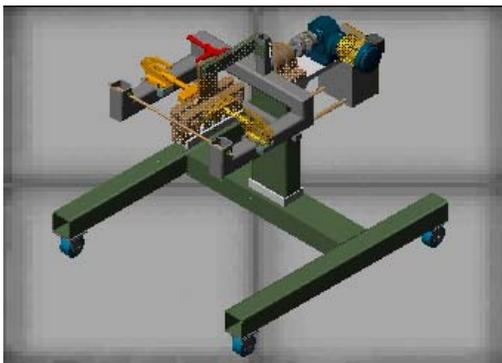
Additional improvements enable you to trim a hatch to a new boundary using the standard trim tool.



**Figure 44. Hatch object before and after trimming to a new boundary**

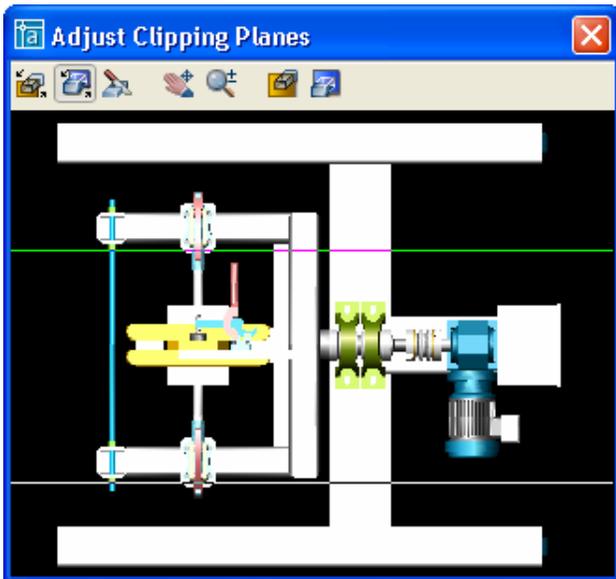
### Working in 3D

AutoCAD 2005 provides enhanced support for viewing objects in shaded 3D viewports. Whether you are working directly in a viewport or plotting one, raster images and object lineweights automatically display in any shaded viewport. You can easily apply a solid, gradient, or image background to your drawing using the Background command. If you enable backgrounds from the Options dialog box, Systems tab, or the Properties button, AutoCAD displays the background image in any shaded viewport, not just when you render. Raster images, object lineweights, and backgrounds continue to display in shaded viewports even while you manipulate the view using 3D Orbit.



**Figure 45. 3D viewport with an image background**

3D clipping has been enhanced to provide more viewing flexibility. You can resize the Adjust Clipping Planes window, and you can pan and zoom in the clipping window.



**Figure 46. Adjust Clipping Planes window**

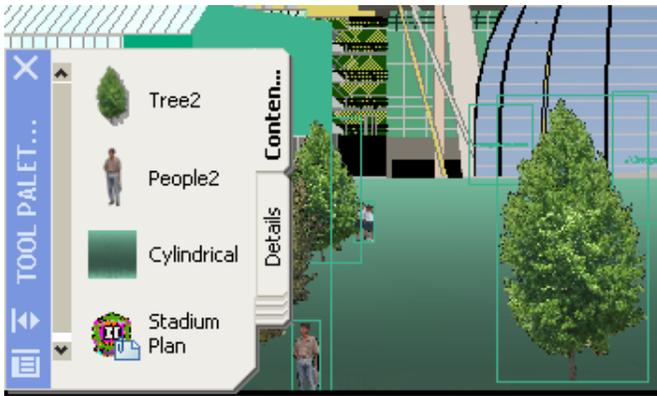
## Using Tool Palettes

Tool palettes—proven productivity boosters in the AutoCAD 2004–based software products—have been greatly enhanced in AutoCAD 2005. You can add commands to tool palettes for quicker access, minimizing the use of toolbars, and maximizing screen space. Save time by dragging multiple types of content from drawings onto tool palettes for convenient reuse. You can also group tool palettes by category for enhanced ease of use.

AutoCAD 2005 offers increased support for content tools. Using content tools, you can add predefined content to your drawings, including hatches, blocks, xrefs, images, and gradients. You can easily add content tools by dragging them onto a tool palette.

If you drag hatch patterns, blocks, xrefs, images, or gradient objects from the current drawing, AutoCAD 2005 creates content tools by example. AutoCAD software automatically references the definitions and applies the properties from existing objects to the new content tool, so that you can reuse your previous work. You save time by creating tools that are consistent with your current standards and maintain consistency between drawings.

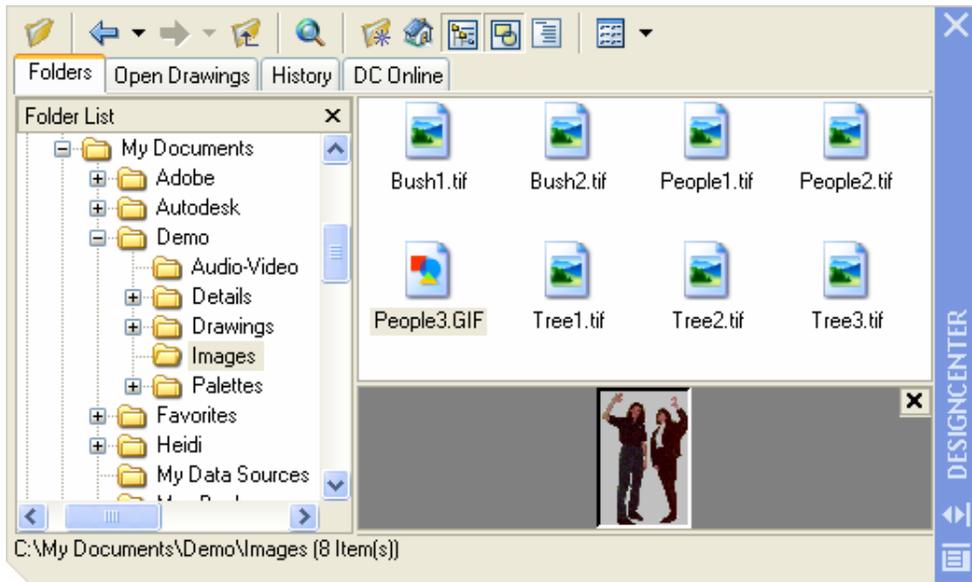
For example, suppose you have an elevation drawing that contains images of people and trees, as well as carefully created gradients. You can drag these objects onto a tool palette, automatically creating tools that reference the same geometry and have the same color, scale, and rotation properties. When you use these tools to create other elevations, not only do you have quick access to the appropriate tools but you save considerable time and effort in creating new elevations that are consistent with the original.



**Figure 47. Creating content tools by example**

If you drag existing drawing and image files using Microsoft® Windows® Explorer, you can easily create content tools referencing drawing and raster content that is located on your local or network drive. Dragging existing hatch, block, xref, and image content using the AutoCAD® DesignCenter™ feature enables you to access content that is located on your local and network drives as well as on the web. AutoCAD 2005 software applies default properties, such as scale and rotation, so you can insert geometry that corresponds to the original object definitions.

For example, suppose you have a folder containing standard images that you insert at different scales and rotation angles, depending on the scale of your drawing. You can use the DesignCenter function or Microsoft Windows Explorer to create a tool palette with your standard images and modify the scale and rotation of the images on an individual basis when you insert them.



**Figure 48. Creating content tools from DesignCenter feature**

In addition to content tools, AutoCAD 2005 enables you to easily create command tools. Using command tools, you can quickly access any AutoCAD commands. You can customize command tools with scripts, custom ARX commands, and AutoLISP® expressions. You can easily add command tools by dragging them onto the tool palette. If you drag any object other than a block, xref, image, hatch, or gradient from the current drawing, AutoCAD 2005 creates a command tool by example. AutoCAD automatically applies the properties of the existing object to the new command tool, so you can reuse your previous work and maintain consistency between drawings.

For example, suppose your drawing contains multiline text (mtext) objects that are located on the notes layer and that use the notes text style. If you drag one of the mtext objects onto your tool palette, AutoCAD 2005 software automatically creates an mtext command tool with default tool properties corresponding to the original mtext object. Each time you use your new mtext tool, AutoCAD automatically draws the text on the notes layer, using the notes text style.

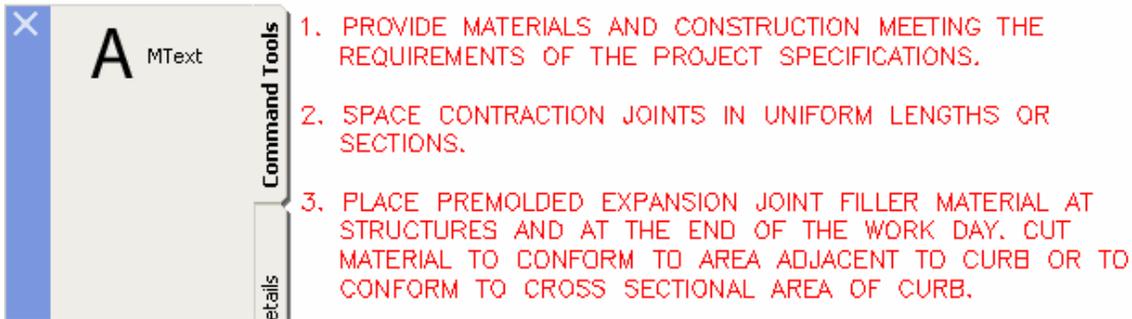


Figure 49. Creating command tools by example

If you drag buttons from existing toolbars while the Customize dialog box is open, you can create command tools that imitate your existing work environment. Creating command tools using this method helps you maintain consistency with your current work process while taking advantage of the powerful functionality and space-saving design of tool palettes. Since command tools also include application programming interface (API) support, this is the best method for converting your custom buttons to tool palettes.

For example, suppose you have a custom toolbar with buttons that contain macros and call custom ARX commands or AutoLISP expressions. If you open the Customize dialog box and then drag custom buttons from existing toolbars onto a tool palette, AutoCAD 2005 software automatically creates tool palette tools that behave exactly as your toolbar buttons do. You can take advantage of the tabbed tool palette interface, transparency, and autohide while working with powerful and familiar custom tools.

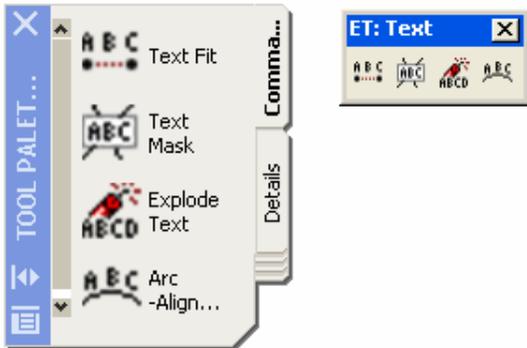
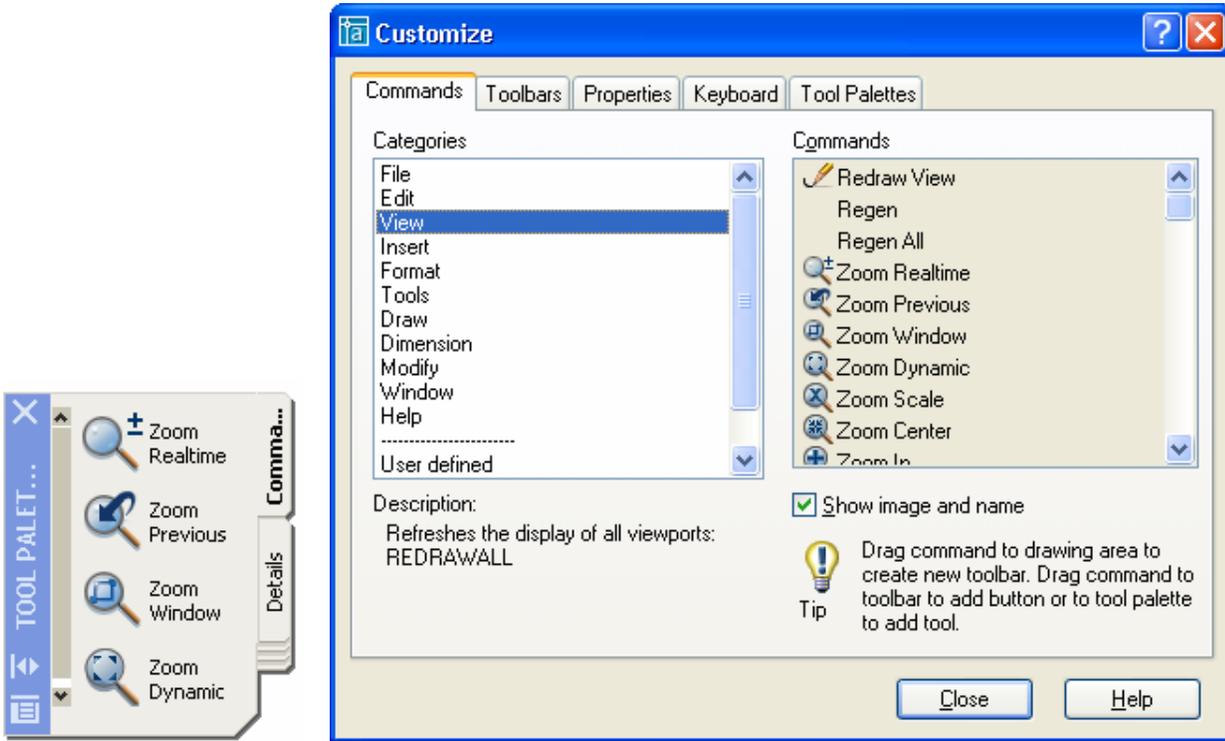


Figure 50. Creating command tools from toolbar buttons

If you drag commands from the Customize dialog box, you can create command tools for any AutoCAD software commands using their default properties. Creating command tools using this method helps you create simple tools that use core, default AutoCAD functionality.

For example, suppose you have never customized your toolbar buttons, or maybe your custom toolbar buttons are error prone because of missing or inaccurate code. Rather than propagating troublesome code that you must eventually revise, you can start fresh with simple but accurate tools.



**Figure 51. Creating command tools from the Customize dialog box**

Depending on the type of command tool that you create, the tool may be in the form of a flyout. AutoCAD 2005 software automatically creates tool flyouts for the most common drawing commands, including Line, Arc, Circle, Ellipse, Polyline, Ray, Spline, and Xline. It also creates tool flyouts for all dimensioning commands, including Aligned, Linear, Radius, Diameter, Angular, Ordinate, Quick Dimension, Baseline, Continuous, Quick Leader, and Geometric Tolerance. The command that you use to create the flyout is automatically set as the current tool, and you can remove any unwanted tools from the flyout by modifying the tool properties.

For example, if you create a line tool using any of the methods described in the previous section, the tool is in the form of a flyout, with the line tool being the current tool. If you open the flyout, you can choose from any of the eight command tools. The tool that you select automatically becomes current and launches the appropriate command.



**Figure 52. Flyouts for geometry and dimensioning command tools**

You can modify the properties of any tool by right-clicking the tool and choosing Properties. The tool properties depend on the type of tool. All tools have general properties such as color, layer, and linetype. Additional properties vary, depending on the type of tool. Block and xref tools include insertion information such as scale and rotation. Hatch and gradient tools include pattern information, and command tools include options for flyouts and command strings. You can apply an auxiliary scale to block and hatch tools so that they insert according to the dimscale or plotscale value of the current drawing.

For example, suppose you have two drawings, both of which have layout plot scales of 1:1. One of the drawings has a viewport scale of 1:10 and a corresponding dimscale of 10. The other drawing has a viewport scale of 1:20 and a corresponding dimscale of 20. (A similar example in architectural units would be one drawing with a viewport scale of 1/4 inch=1 foot and a dimscale of 48, and a second drawing with a viewport scale of 1/8 inch=1 foot and a dimscale of 96.) If you set the auxiliary scale of the block tool to use the dimscale value, the block inserts at the appropriate scale for either drawing.

You can overwrite the default scale and rotation values of blocks and xrefs upon insertion by selecting the appropriate option from the context-sensitive menu or command line.

For example, suppose you have a block with a default scale equal to 1 and a default auxiliary scale equal to the drawing's dimscale. If you want to insert a block at a different scale, when prompted to insert the block, right-click, choose Scale, and enter the appropriate scale factor.

Using the tool properties, you can convert between hatch and gradient tools, and you can convert between block and xref tools.

For example, suppose you create an xref tool for your title block and then decide that you would prefer to insert the title block as a block rather than an xref. Using the tool properties, you can change the Insert As field to Block instead of Xref.

AutoCAD 2005 provides powerful functionality not only to create tool palettes, but also to manage them. You can easily organize your tool palettes into logical sets and quickly restore them at any time using palette groups. With palette groups, you have quick access to all your tools without sacrificing screen space. You create palette groups using the Customize dialog box, and you can easily switch between palette groups from the Customize dialog box or from the tool palette itself.

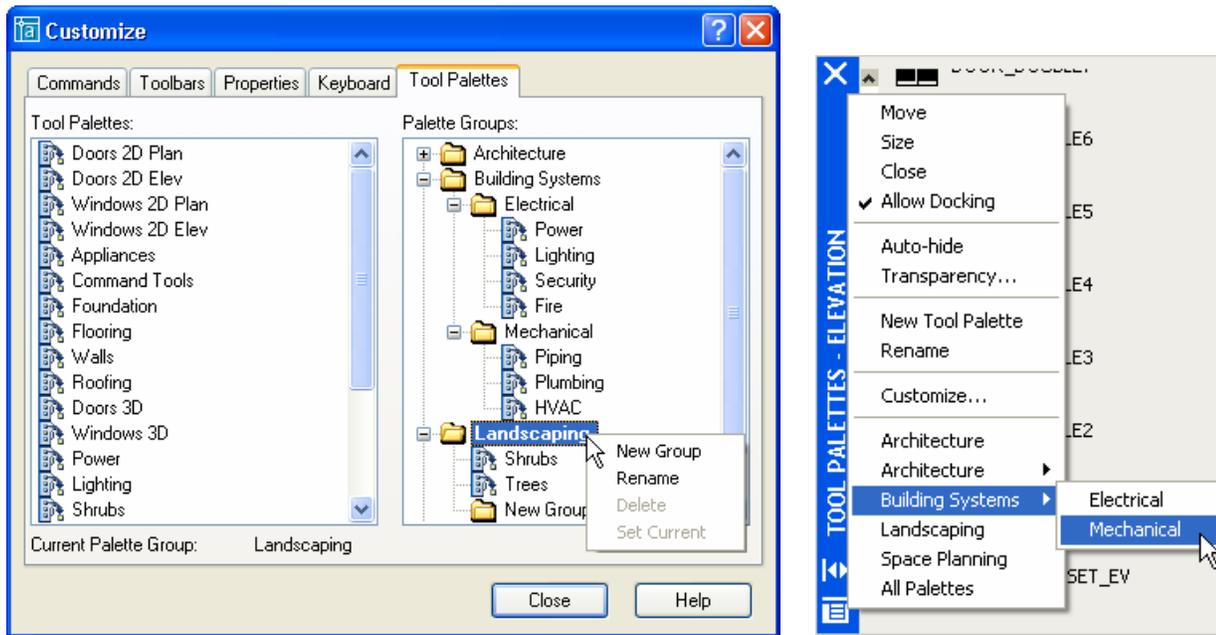


Figure 53. Creating and accessing tool palette groups

You can easily switch between tool palette groups using a context-sensitive menu accessible from the Customize dialog box or the Tool Palettes title bar.

With the powerful functionality available with AutoCAD 2005 tool palettes, you can create, reuse, and organize your frequently used tools. You can dramatically increase your productivity while maximizing the amount of screen space in which you can work.

## Reviewing Font Enhancements

New and updated fonts offer better support of Japanese characters. The following Japanese fonts are installed with all versions of AutoCAD software:

- EXTFONT2.SHX*: Revised version of current Japanese *EXTFONT.SHX*
- @EXTFONT2.SHX*: Vertical version of *EXTFONT2.SHX*
- EXTSLIM2.SHX*: ASCII font for use with Japanese font, 2/3 width of Japanese character
- EXTHALF2.SHX*: ASCII font for use with Japanese font, 1/2 width of Japanese character

## Sharing

Design deliverables typically include some form of plotted output, either electronic (DWF) or paper. New and enhanced functionality in AutoCAD 2005 makes it easier for you to plot design documents, whether you are working with individual drawings or a sheet set. The new Plot and Page Setup dialog boxes offer a simplified user interface. Enhanced publish functionality offers support options for multiple document printing, and with background plotting you can continue working while you are plotting.

## Using Named Page Setups

Named page setups enable you to save different page configurations that you can quickly restore at any time. AutoCAD 2005 provides enhancements to page setup functionality, making named page setups easy to use with both sheet sets and individual drawings. You can create, modify, and import named page setups using the new Page Setup Manager.

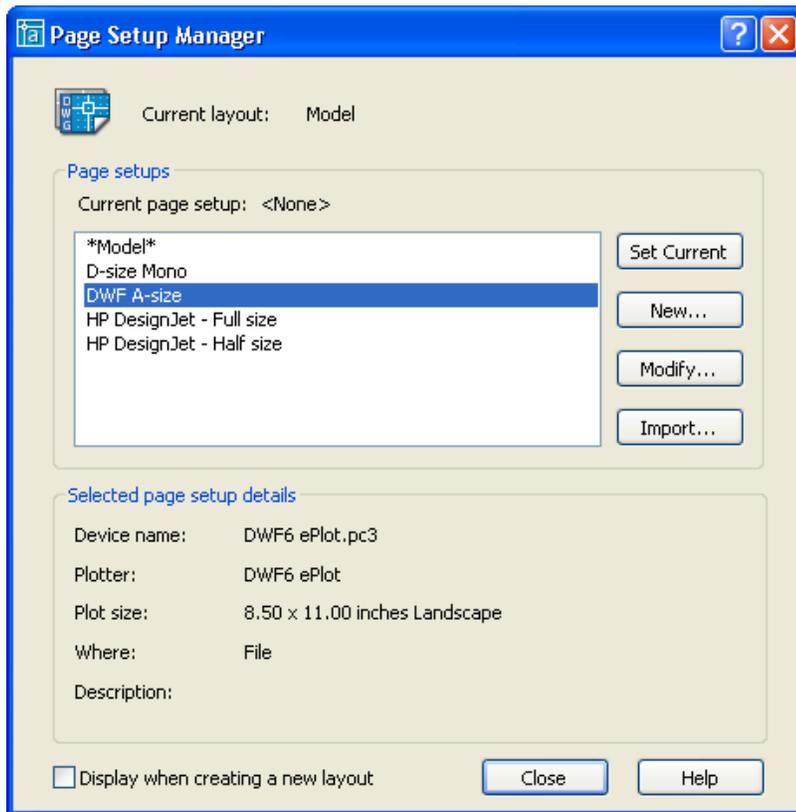


Figure 54. Page Setup Manager

From the Page Setup Manager, you can access the redesigned Page Setup dialog box. The Page Setup dialog box provides all page setup controls in one location with the most commonly used controls on the left side. The Preview option in the lower-left corner provides a full preview of how the current plot settings are used when you plot the drawing.

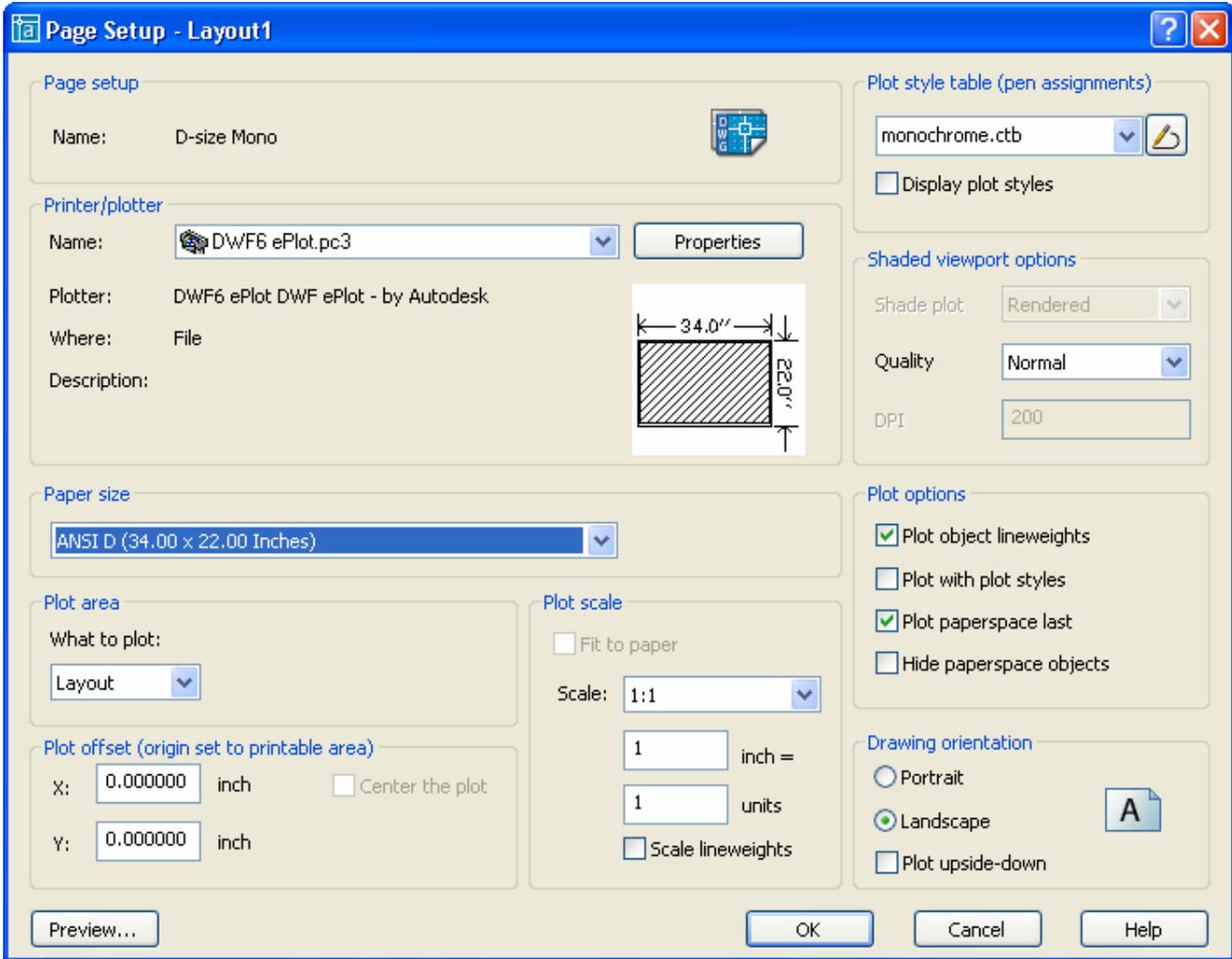


Figure 55. Page Setup dialog box

When you are working with sheet sets, page setups that are saved in the associated drawings automatically become accessible to the sheet set. In addition, you can access named page setups from any other drawing (DWG) or template (DWT) file. You can assign a default page setup to the sheet set while having the flexibility to choose from several alternative page setups.

### Using the New Plot Dialog Box

AutoCAD 2005 offers a simplified Plot dialog box similar to the new Page Setup dialog box. You can display the Plot dialog box in collapsed mode for easy access to the most frequently used plot controls.

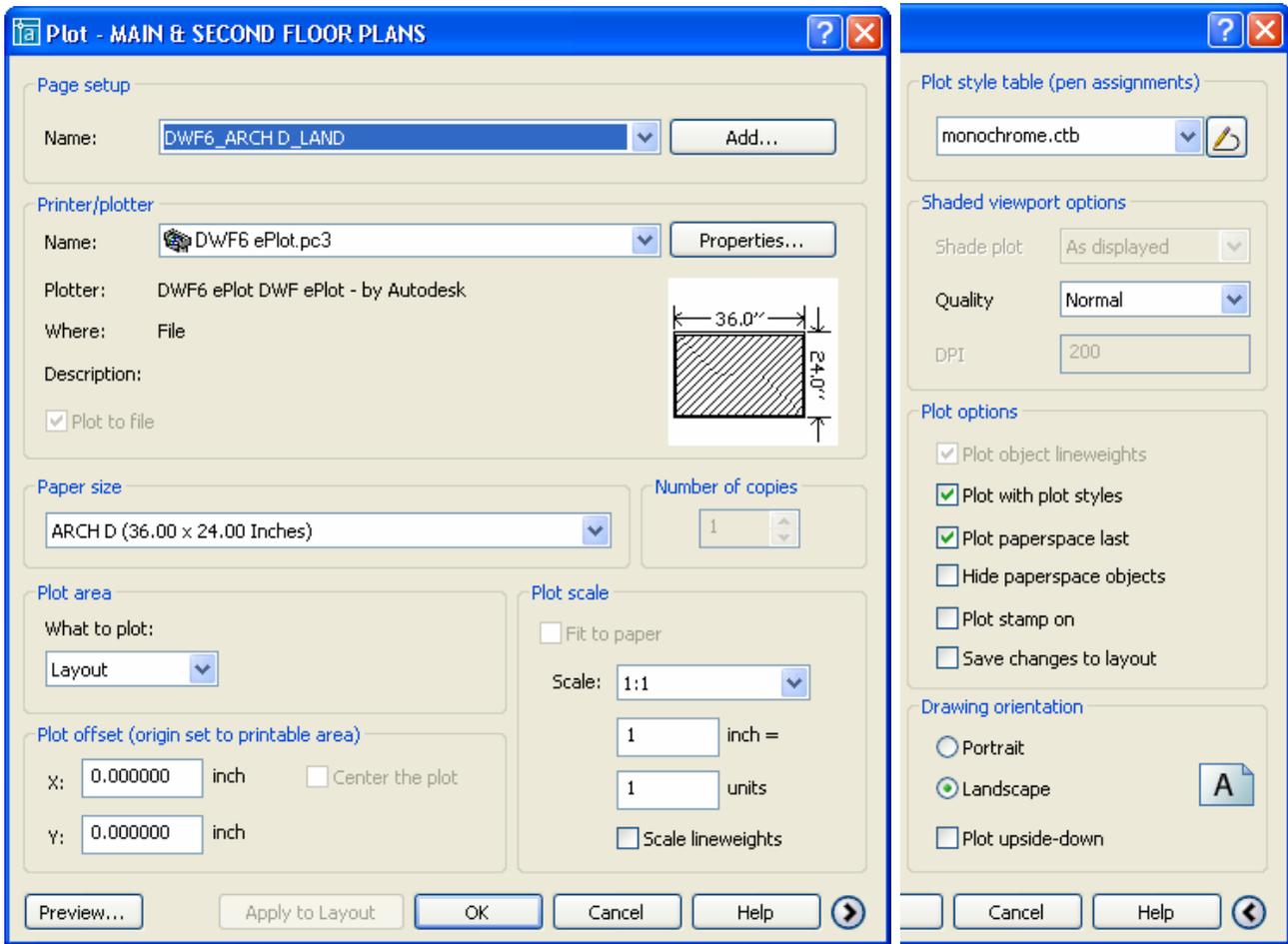


Figure 56. Expanded Plot dialog box

### Publishing to DWF

A Design Web Format (DWF) file is the electronic equivalent of a printed document in the sense that it cannot be changed or edited. In AutoCAD 2005, you can publish an entire sheet set with a single click. When you are working with sheet sets, the publish functionality takes advantage of the sheet and setup information stored with the sheet set. All the publish information that AutoCAD requires is already there, eliminating the need to access the Publish dialog box.

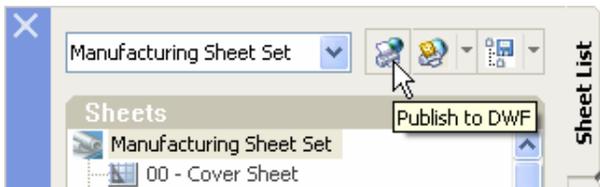
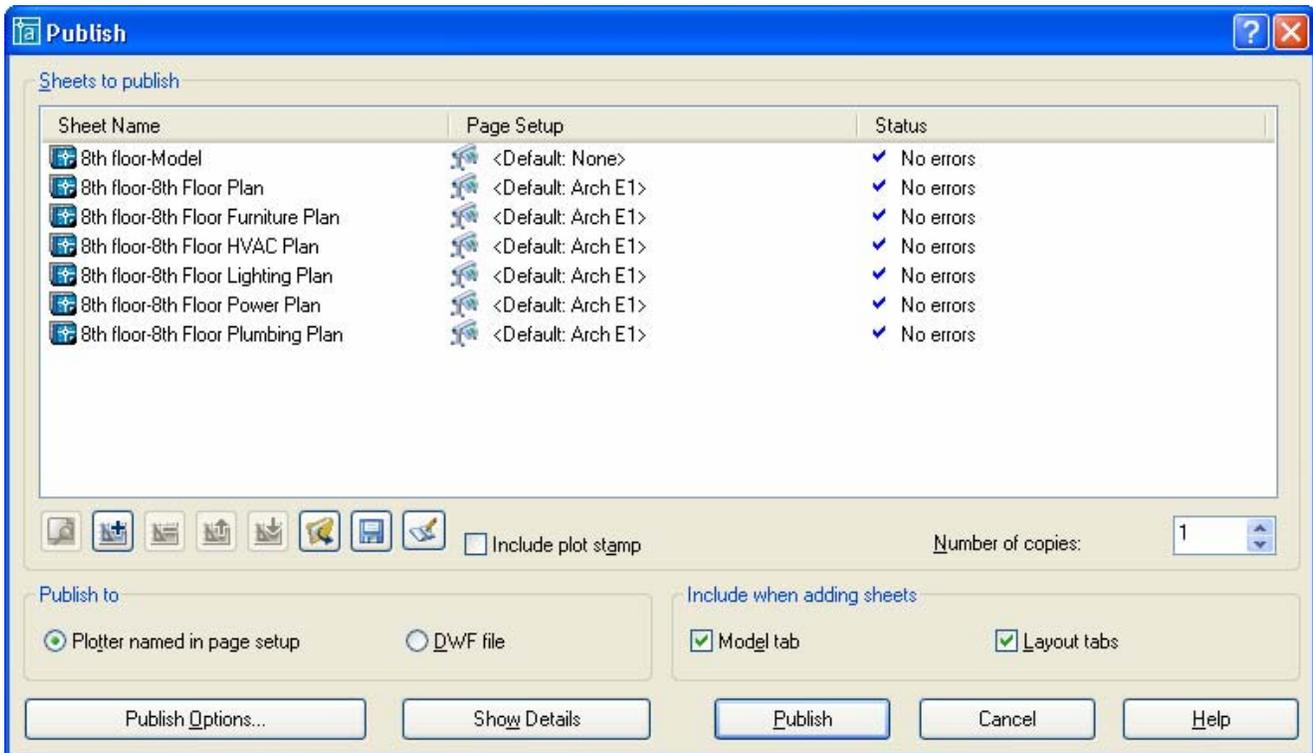


Figure 57. One-click publish from the Sheet Set Manager

If you want to publish an individual drawing without using sheet set functionality, the Publish dialog box offers significant enhancements to simplify the publishing process. You can access the Publish dialog box and publish sheets in their current state without first having to save the drawings. The Publish dialog box now enables you to include a plot stamp, specify the number of copies, and preview your electronic plot before starting the publish process.



**Figure 58. Publish dialog box**

The Publish dialog box offers direct access to DWF publish options. You can choose between multisheet DWF files or multiple single-sheet DWF files. You can apply password protection and specify whether to include layer information. With easy access to the DWF PC3 properties, you no longer have to search for the Plotter Configuration Editor.

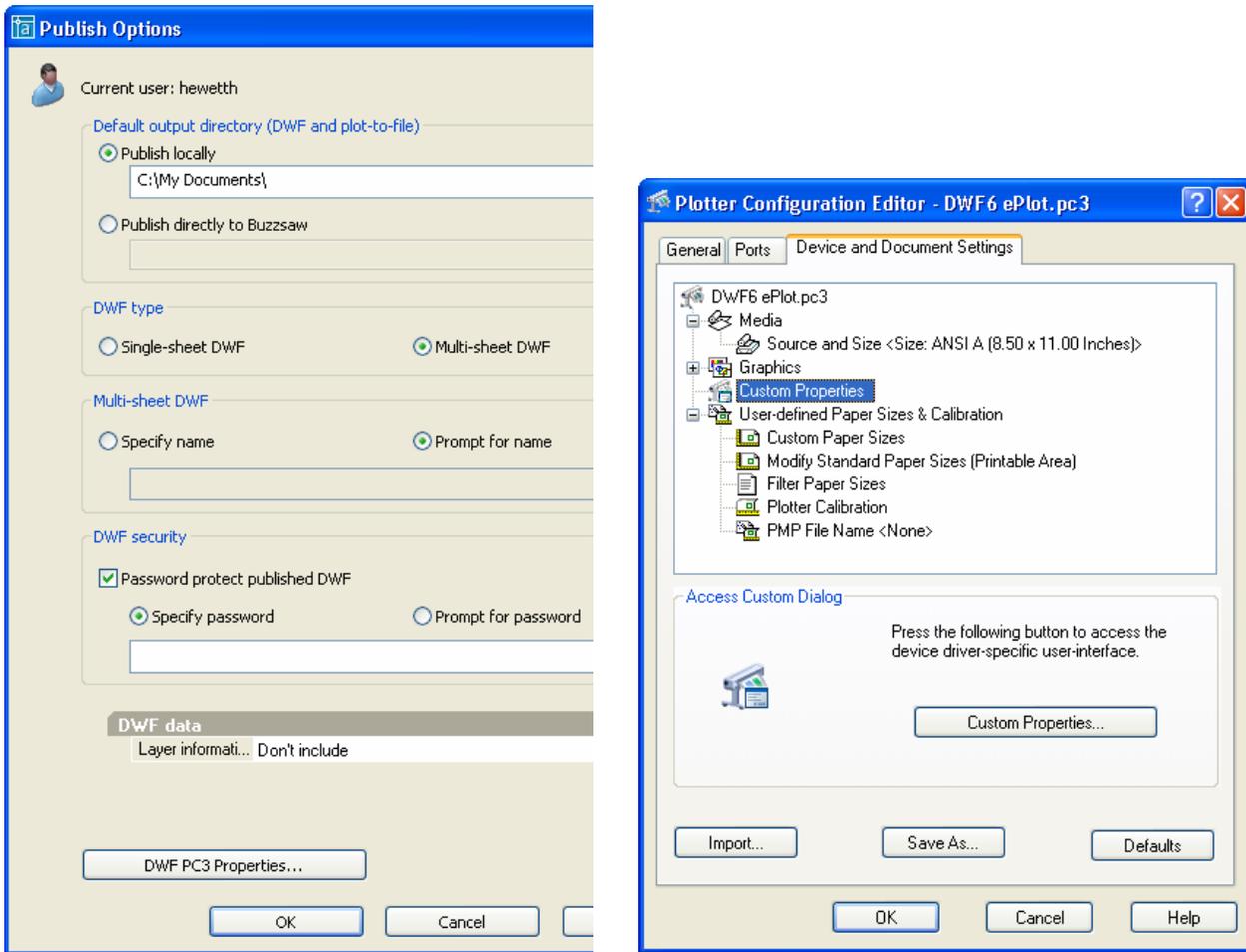


Figure 59. Publish Options and the Plotter Configuration Editor

### Plotting and Publishing in the Background

Whether you publish your designs to DWF format or to paper, with AutoCAD 2005 you can continue working in the drawing editor while AutoCAD plots in the background. You can control background plotting, which is enabled by default, from the redesigned Plot and Publish tab of the Options dialog box. To ensure that your plots were successfully completed, AutoCAD 2005 can automatically create a log file listing comprehensive plot details, including start time and date, completion time and date, and final status. The log file stores cumulative plot information from multiple plot sessions. You can specify the location of the log file using the Files tab of the Options dialog box.

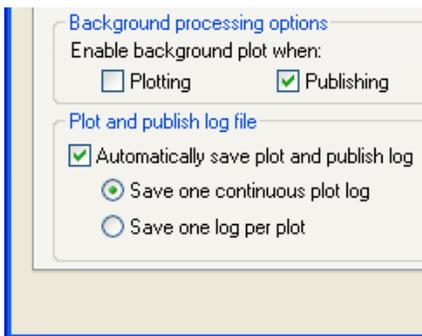
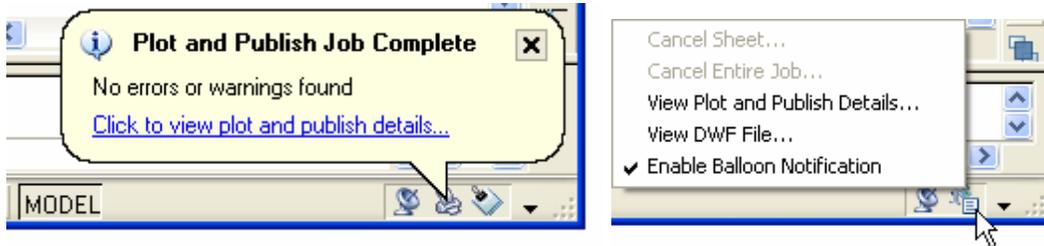


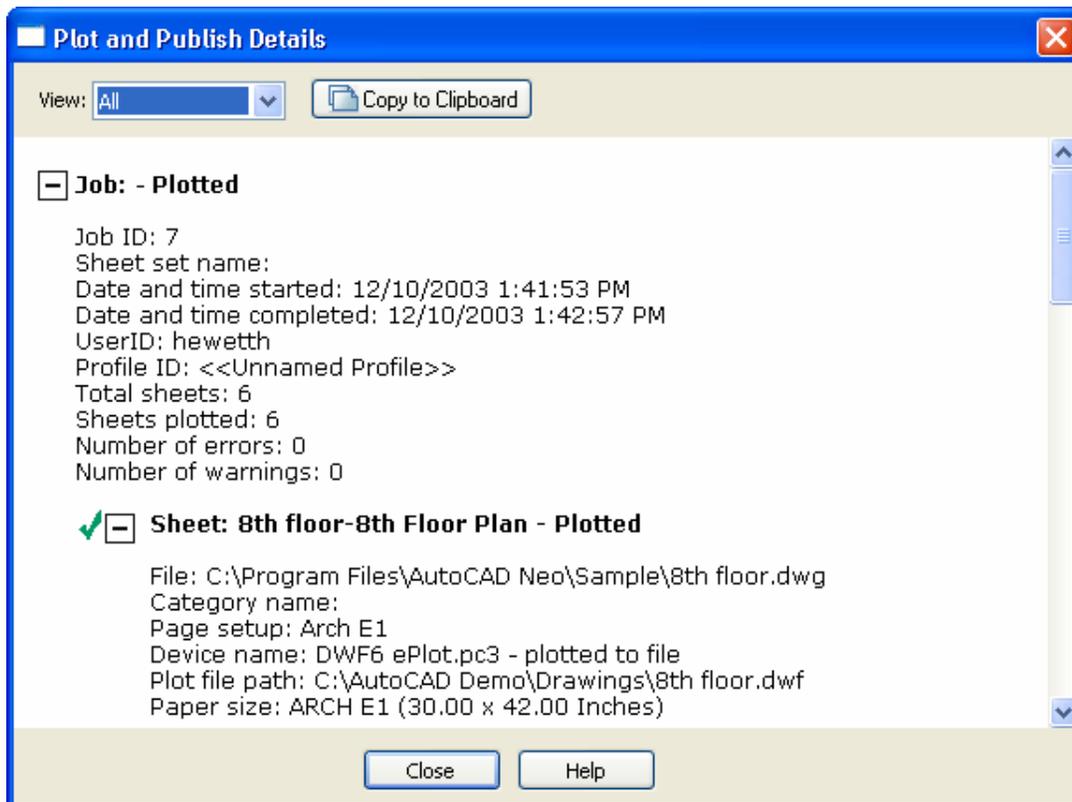
Figure 60. Background processing options in the Options dialog box

A new plot icon is displayed in the status tray, providing you quick access to your plot job. A context-sensitive menu offers various plot-related options, including the ability to cancel the entire job. When the plot job is completed, you receive an unobtrusive bubble notification. You can follow the link to view the plot and publish details in the new Plot and Publish Details dialog box.



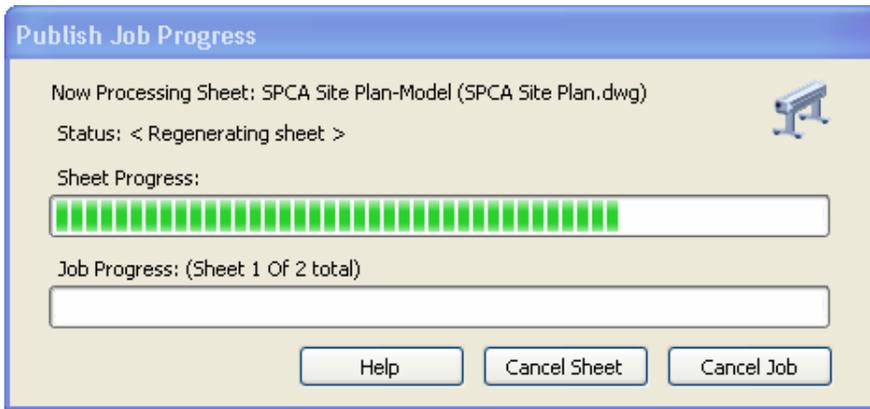
**Figure 61. Plot and Publish Job Complete bubble notification**

The Plot and Publish Details dialog box, also accessible by clicking the plot icon after a plot job has completed, displays plot and publish information for the current session.



**Figure 62. Plot and Publish Details dialog box**

If you disable background plotting, you can monitor the progress of your current plot job on screen. The new progress dialog box displays progress meters for the current sheet as well as the entire job. A job progress dialog box is displayed for both plotting and publishing.



**Figure 63. Plot Job Progress dialog box**

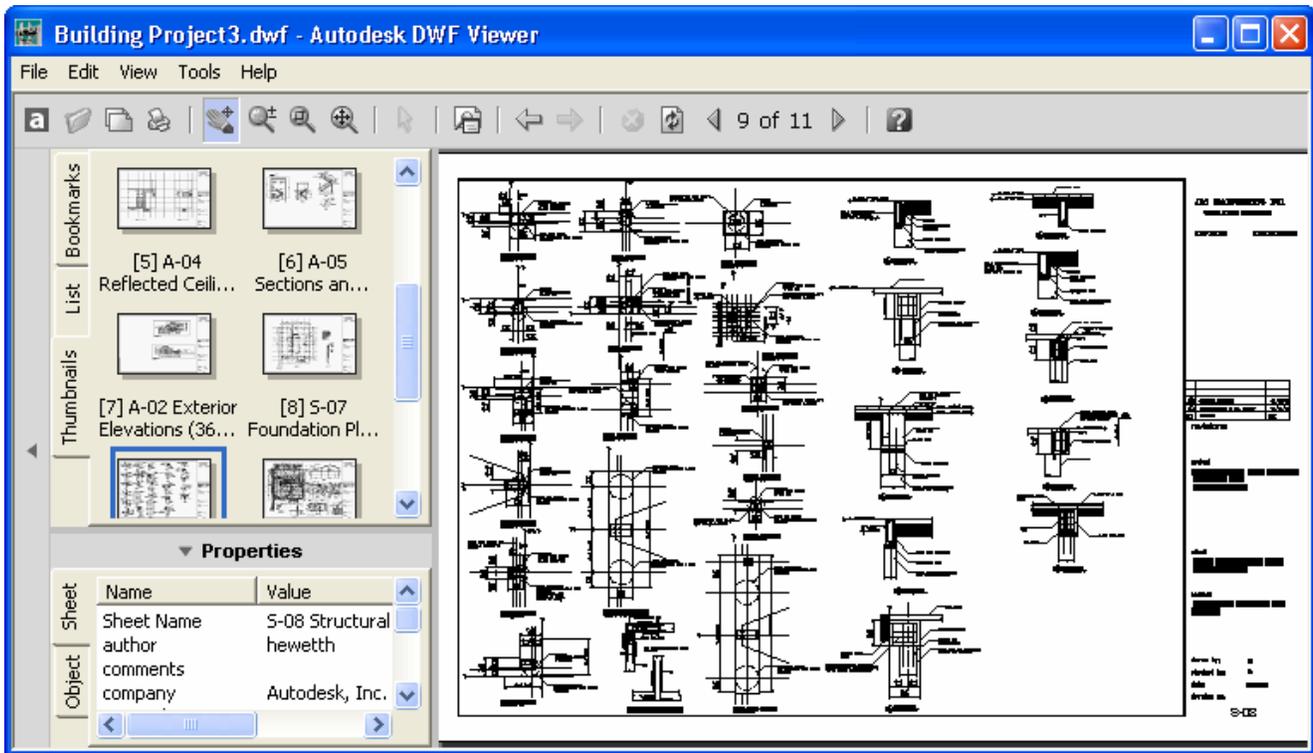
## Using Electronic Sheet Sets

The DWF file format is ideal for sharing data-rich drawings, maps, and models between engineering design professionals and their project teams. It is the fastest, easiest way for you to communicate design information while ensuring secure and efficient collaboration at any stage of the project or product lifecycle. You may receive DWF files from team members who use a variety of software products. They can publish DWF files directly from the AutoCAD 2004 and 2005 family of products, or they can install the free DWFwriter™ printer driver as a Microsoft Windows system printer and print to a DWF file from any application that has printing capability. Any specialized information required to view the drawing, such as xrefs, pen tables, or fonts, is included with the DWF file. The publisher can be sure that you see the drawing exactly as it was intended. Once a document is published to DWF, anyone with a DWF viewer, such as Autodesk® DWF™ Viewer (formerly Autodesk® Express Viewer) or Autodesk® DWF™ Composer, can view it.

Autodesk DWF Viewer is a free\*, lightweight, high-performance application for viewing and printing DWF files. It enables you to view DWF files that preserve the intent of the designer, without requiring the original design application. DWF Viewer presents all the intelligent data preserved with accuracy in the DWF file, including drawing scale, coordinates, assorted views, hyperlinks, sheet or object properties, and the file creator. Autodesk DWF Viewer has a flexible printing system that enables you to print to scale, fit to page, tile, or selectively print a variety of sheets from a DWF sheet set.

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\* This product is subject to the terms and conditions of the end-user license agreement that accompanies download of this software.



**Figure 64. Autodesk DWF Viewer**

Autodesk DWF Composer is the next-generation viewing tool from Autodesk Collaboration Services. The software enables your team to easily coordinate projects throughout the entire design review process, communicating digital design information with published DWF data. With Autodesk DWF Composer, project team members can work with computer-generated drawings and images even if they do not own or know how to use graphics software. It supports the electronic exchange of drawings among participants with different job responsibilities and in multiple locations. Because DWF Composer allows anyone to join in a project, it supports the management of drawings across a project's lifecycle, including concept, design, bidding, building/production, and ongoing management and maintenance. With DWF Composer, team members can transmit drawings and markups instantly and facilitate review, coordination, and revision throughout a project lifecycle.

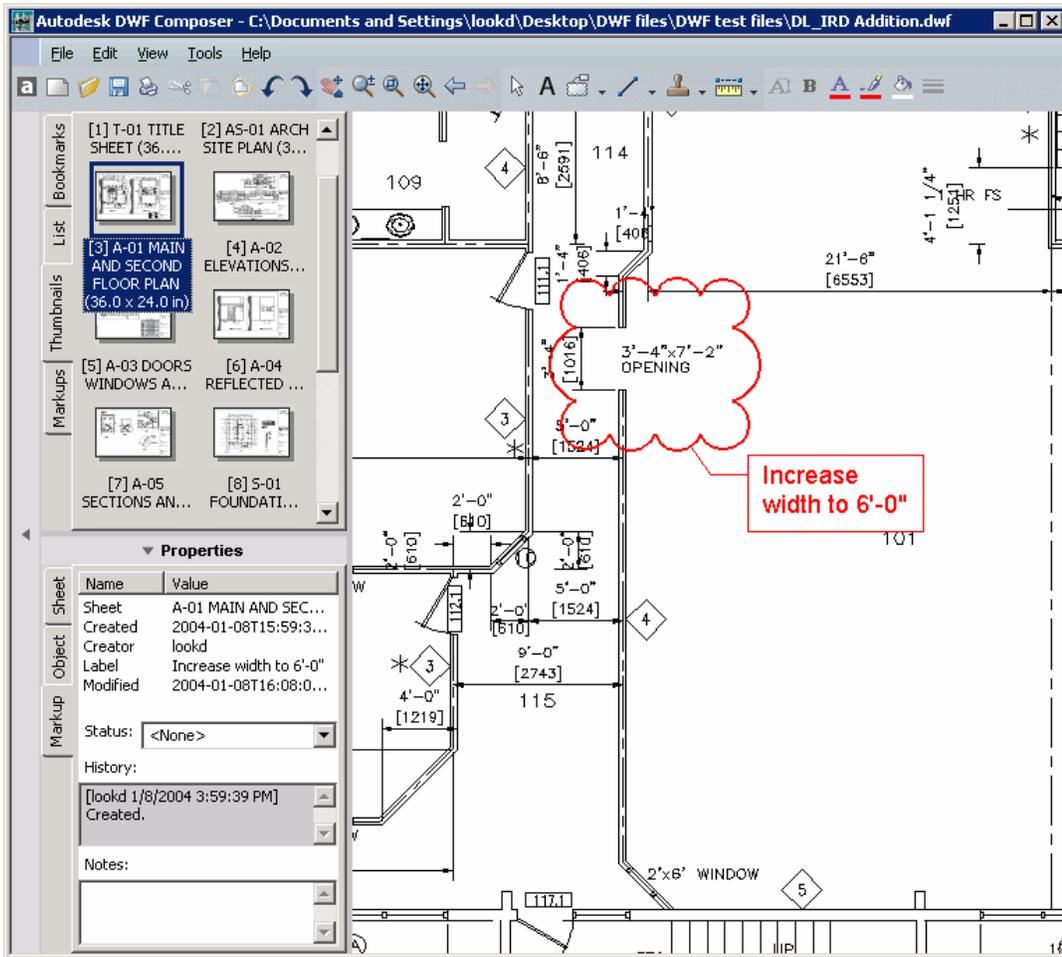
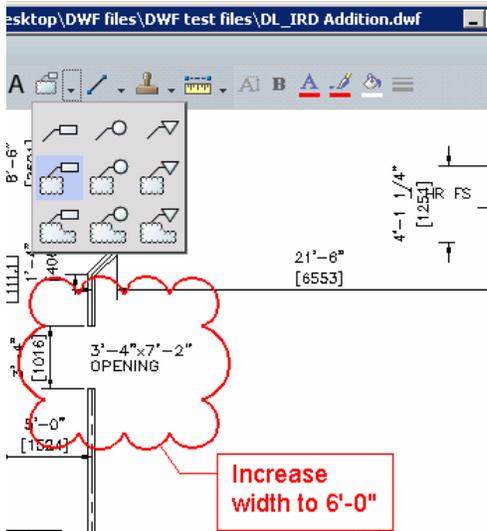


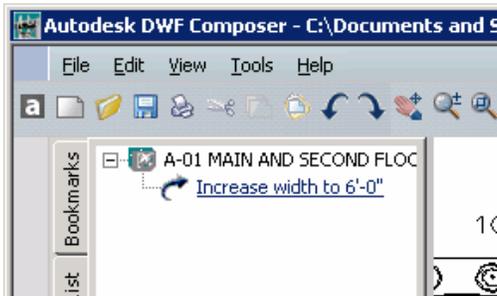
Figure 65. Autodesk DWF Composer

Using Autodesk DWF Composer, you can navigate to various sheets in a multisheet DWF file. You can measure distances and areas in a drawing, follow hyperlinks within a sheet set, turn layers on or off, navigate to various markups, and keep track of the author, time of creation, and status. DWF Composer provides markup and redlining functionality that replaces the paper process. You can mark up drawings with comments, sketches, dimensions, text, and stamps.



**Figure 66. Markup tools in Autodesk DWF Composer**

Autodesk DWF Composer helps you manage workflow by tracking redline and markup information. You can view the status of comments and markups throughout the revision process. DWF Composer automatically maintains a list of markups created using the markup tools including time stamp modifications made to the markup objects. You can reorganize and recombine different sheets into a sheet set, print sheets with their markups, and republish the sheet set with markups.



**Figure 67. Markup browser with hyperlinks**

## Working with Markups

AutoCAD 2005 and Autodesk DWF Composer provide an integrated solution for creating and viewing markups. The workflow begins in AutoCAD software, when a drafter publishes a DWF file containing one or more drawing sheets. A reviewer then opens the DWF file in Autodesk DWF Composer. The reviewer can verify accuracy and indicate corrections or changes as markups in the DWF file. The reviewer saves these markups, sends the DWF file back to the originator, who then reviews and responds to the markups in the AutoCAD environment. After addressing each markup, the reviewer republishes and resubmits the DWF file to the reviewer. This process generates additional markups with each iteration until all markups have been reviewed and addressed.

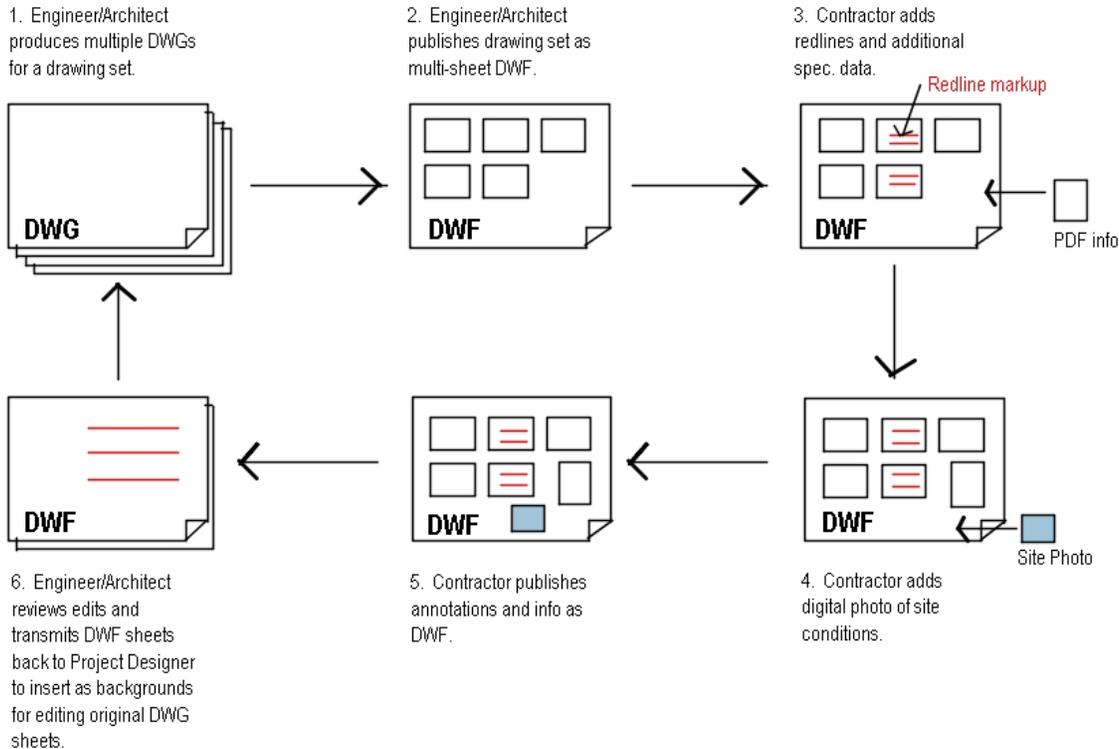


Figure 68. Typical markup workflow

With AutoCAD 2005 you can load markup sets into the AutoCAD drawing editor. A markup set is a collection of individual markups, contained in a single DWF file. Markup sets begin as ordinary DWF files that were published from AutoCAD and then marked up in Autodesk DWF Composer.

You can view a markup set directly in AutoCAD using the Markup Set Manager, accessible from the Markup command or the Open Markup DWF dialog box. The Markup Set Manager displays the list of markups in the current markup set. The markups are shown in a tree view, organized by sheets. Only those sheets in the DWF file that contain markups are shown in the tree view. From the Markups tree view, you can republish marked up DWF files, open sheets with associated markups, change the markup status, and more.

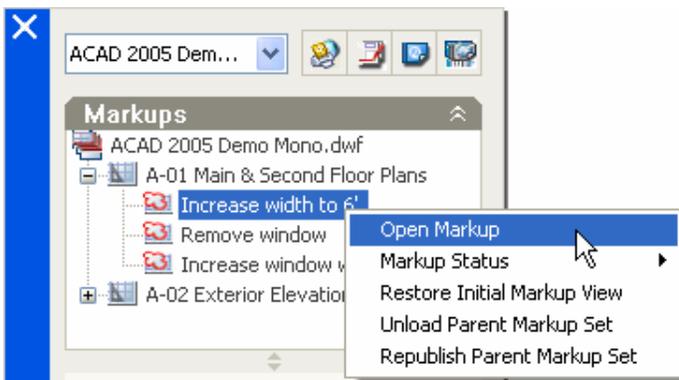
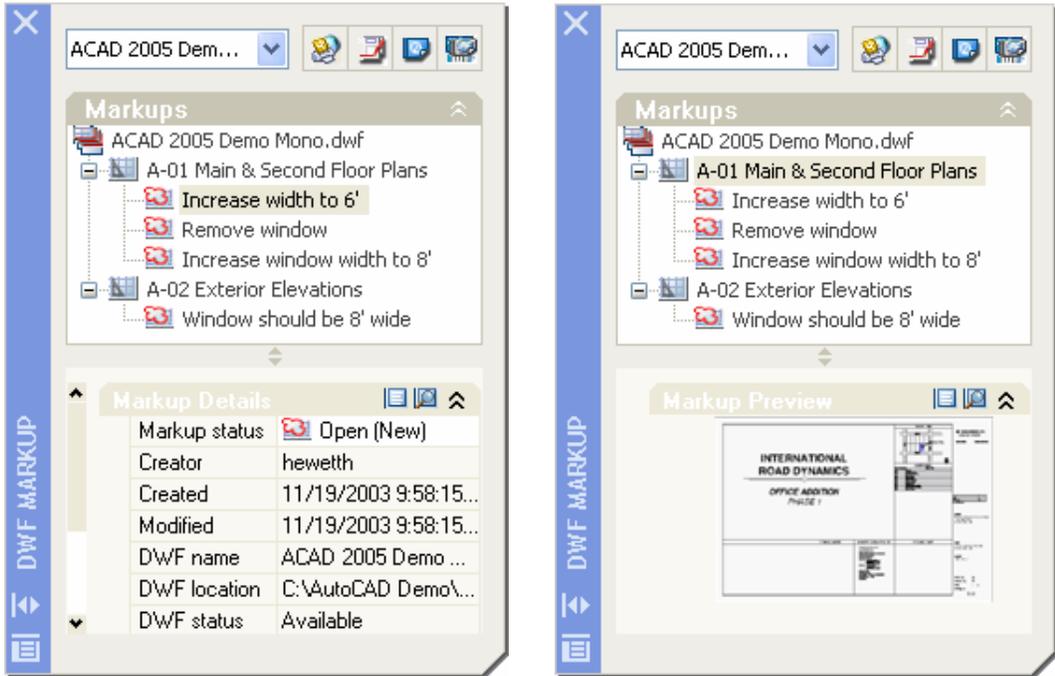


Figure 69. Markups tree view

You can use the Markup Set Manager to view details about a particular sheet or markup, and you can switch between a details view and an actual preview of the markup. The type of information

displayed in the details pane varies, depending on whether you selected a markup set (DWF), sheet, or specific markup.



**Figure 70. Markup Set Manager with details and preview pane**

Using the markup functionality in AutoCAD 2005, you can view markup information contained in a DWF file, and you can click a particular markup to access the corresponding location in the associated drawing. AutoCAD automatically opens the associated drawing (DWG) and zooms to the area in need of revision. You can make the appropriate edits, change the markup status, and republish the DWF all from the AutoCAD software application.

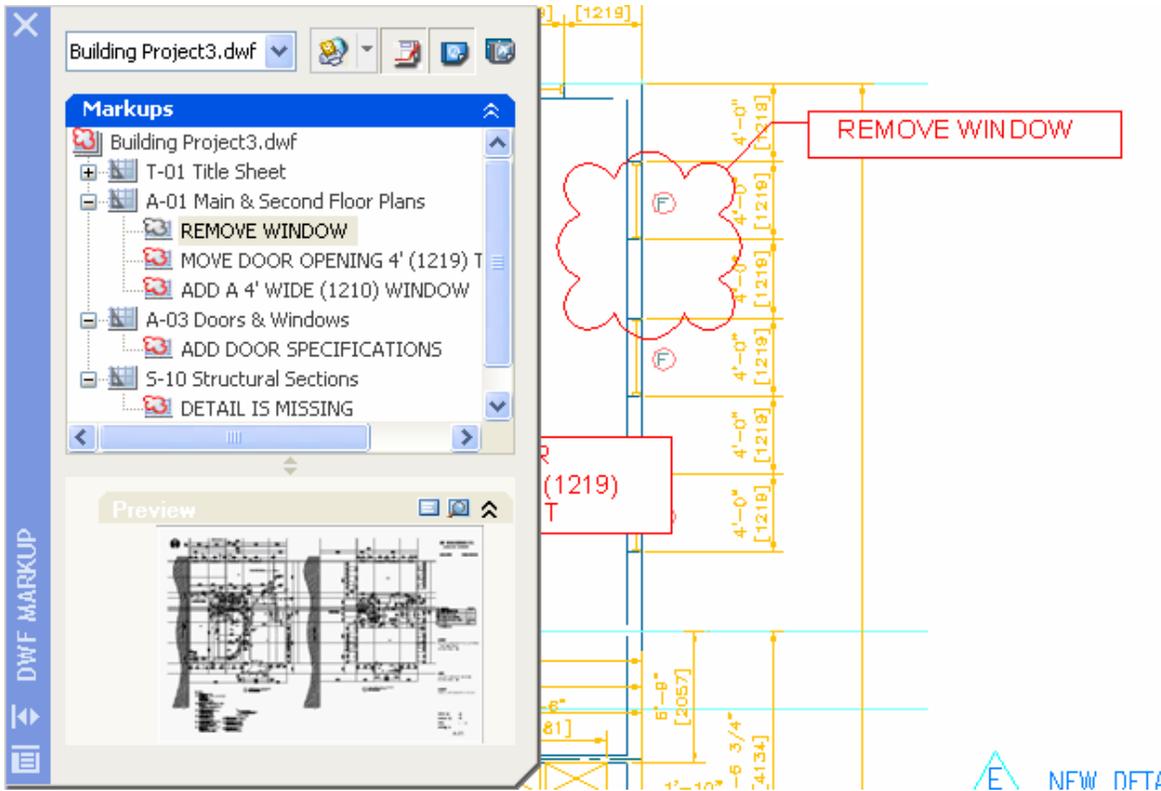


Figure 71. Markup overlaid on a drawing (DWG)

The markup functionality in AutoCAD 2005 automates the iterative process of drawing review, markup, and revision, streamlining workflow and helping to increase productivity.

## Learn More About AutoCAD 2005

You can learn more about AutoCAD 2005 by contacting your local Autodesk reseller or visiting the Autodesk website at [www.autodesk.com/autocad](http://www.autodesk.com/autocad). If you have already installed AutoCAD 2005, check out the New Features Workshop. The New Features Workshop contains a series of animated demonstrations, tutorials, and feature overviews designed to help you learn the new features. You can view the New Features Workshop the first time you launch AutoCAD 2005 or access it at any time from the Help menu.

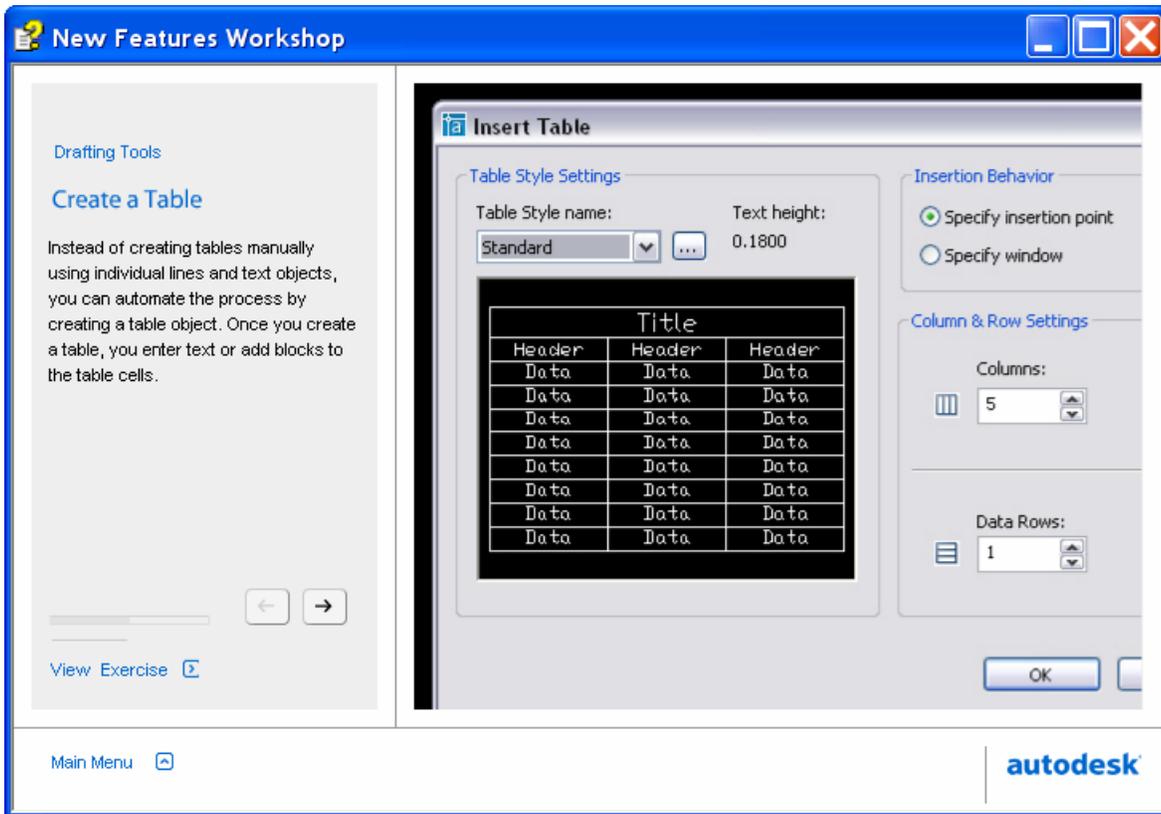


Figure 72. New Features Workshop

## Conclusion

As you have seen, AutoCAD 2005 provides features to help you create a single drawing efficiently as well as manage an entire set of coordinated drawings. Productivity features like the table object and enhanced tool palettes simplify drafting tasks, while features like the new Sheet Set Manager help you create, manage, and share entire sets of drawings with maximum efficiency.

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