Drawing Creation Tutorial

Composed Drawing Workflow

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SESSION 2

Composed Drawing Workflow

Objective

By the end of this session, you will be able to:

- Place volume by two points using 3D pin point
- Create a new composed drawing
- Place a view
- Associate view to volume with and without filter
- Update view
- Exclude objects from the drawing

Overview

Drawings and Reports tasks are performed so designers can provide their organization with detailed drawings of a plant design quickly and accurately. Drawings can be of the entire plant or zoomed to a specific area. These documents are referred to as composed drawings.

A composed drawing is an orthographic drawing that you create by defining one or more drawing views of selected volumes in a 3D task. A drawing view processes all objects in the model that are in its associated volume, and not just the objects displayed in the current workspace. You can then use filters to specify which objects you want to show in the drawing view. You can use any method in the Space Management task to create the volumes.

You access the Drawings and Reports task by going to **Tasks > Drawings and Reports**. This series will cover the procedures pertaining to the Drawings & Reports task in Smart 3D.

The first topic demonstrates the steps for creating a new composed drawing. The look of a drawing is configured by view layout templates and border templates. Your administrator primarily defines these aspects of the workflow, but they are important for you as a designer to understand.

Layout templates define standard single and multiple view drawing layouts, and default values for all view properties such as view direction, view style, and scale. Border templates define standard drawing sizes and standard title block properties. When you create a new drawing, the view layout you select is scaled to fit your selected border and added to the drawing so that you don't have to place all your views manually. You can add more views or edit the existing views as needed.

Each individual composed drawing must be placed within a composed drawing folder in the drawings hierarchy. It is possible to create any number of composed drawing folders under a generic drawing folder. You can also create a composed drawing folder when you create a composed drawing. It is likely your administrator will have already predefined your drawing folder hierarchy to facilitate efficient browsing to the specific drawings of interest. But you should be aware of how the system is configured, in any case.

Individual designers create volumes as needed for their composed drawing views. These drawing volumes should be organized in the Space Management hierarchy according to the management plan of your administrator. For example, the administrator will have created a space folder for each design application area. You can then locate volumes saved within by selecting a drawing view. This task will be demonstrated later.

Create the volumes for your drawing views in the Space Management environment is performed using several unique methods. You can place a volume by two points, place a volume by selection, along a path, or place volumes by plane and offset. Whichever you choose, you will assign the created volumes to a Space Management folder so they remain organized.

A single volume can be referenced by multiple drawing views in multiple drawings. Editing the volume impacts all drawing views that reference the volume. You can create volumes for the drawing views at any time before the step of associating a drawing view to a volume.

The workflow for creating a new drawing generally regards the following steps:

1. Define your workspace to display a segment of your plant.
2. Select "New Composed Drawing" from the Drawing Console.
3. Configure the save location and titles for your new drawing.
4. Create a new or edit an existing drawing view. It is now possible to copy/paste views and edit view properties such as view style, scale, look direction, view direction, and annotation coordinate systems.
5. Associate the drawing view to a volume by selecting "Associate Objects to a View". Upon selecting this command, a ribbon is displayed, allowing to you define a filter to specify which items in the volume display in the drawing views. If a drawing view is already associated to a volume, the associated volume is highlighted. You can select a different volume or pick a different drawing view to associate from the select list. If you do not select a filter, then all objects in the model database in the associated volume and are included by the view style associated with the view are displayed in the drawing view.
6. Update the view.
7. Update the drawing interactively or, if you administrator has set up a batch server, by batch.

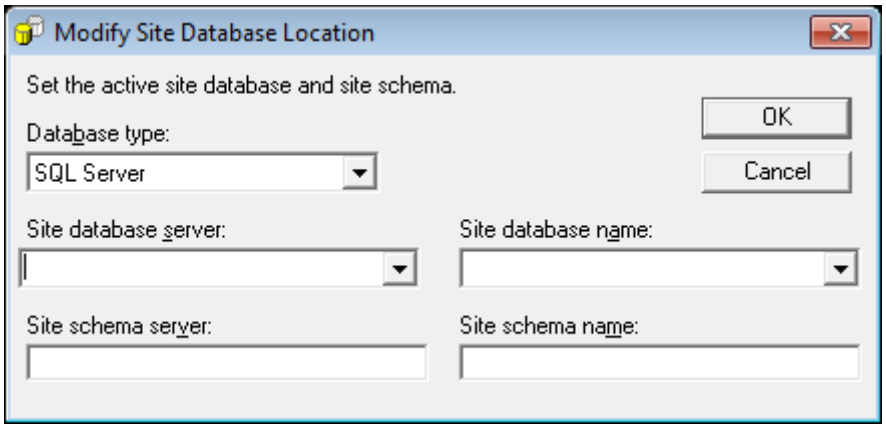
You can update multiple composed drawings at once, and you can update folders that contain composed drawings. To update drawings on a batch server, select one or more drawings or folders and select the **Batch…** menu. You can then select actions such as update and print to queue and schedule the batch job.

Now we will proceed to the next session where we will perform the tasks involved in creating a new composed drawing in Smart 3D.

Define Workspace

1. From the **Windows Start** menu, click **All Programs > Intergraph Smart 3D > Database Tools > Modify Database and Schema Location.**

*The **Modify Site Database Location** dialog box displays so that you can confirm that you are connected to a site database.*



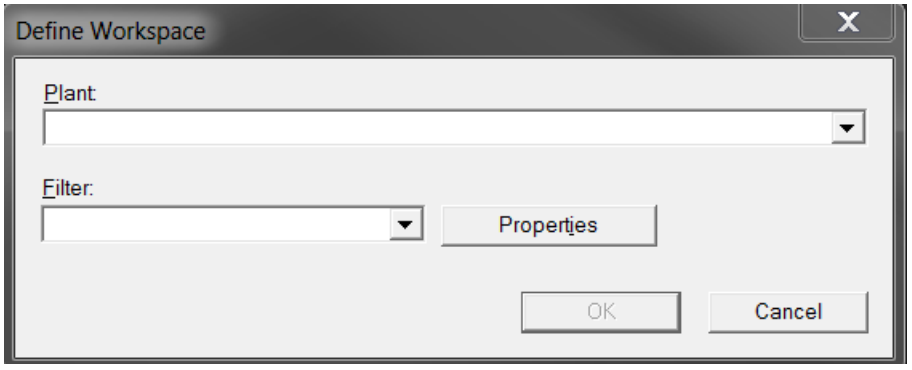
2. Click **OK** on the **Modify Site Database Location** dialog box.
3. From the **Windows Start** menu, select **All Programs > Intergraph Smart 3D > Smart 3D.**

   *The **New** dialog box displays.*
4. Click **EnglishUnits** on the **New** dialog box, and then click **OK**.

   TIP The selections are session templates that set the workspace environment. New session templates can be created and saved in *[Product Folder]*\CommonApp\SessionTemplates\General. The software adds these session templates to this dialog box automatically.
5. Maximize the graphic window that appears.

6. Click **File > Define Workspace.**

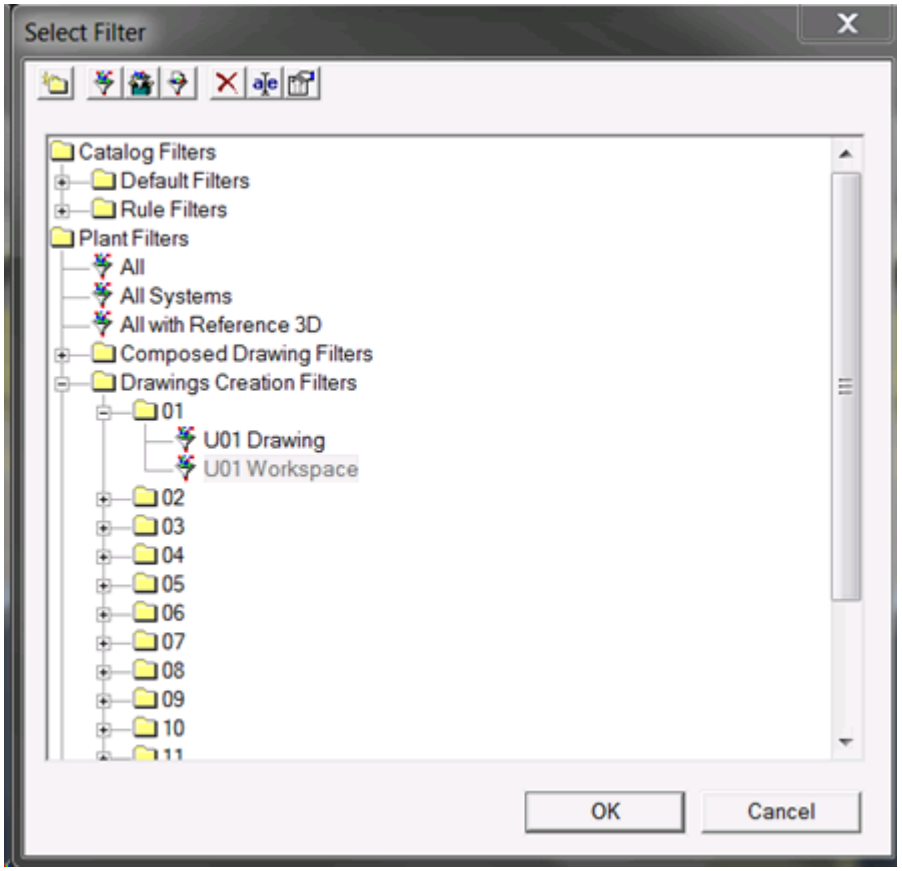
   *The **Define Workspace** dialog box displays.*



   TIP It is necessary to define a workspace before using the product.
7. Select *[TBD]* from the **Plant** list on the **Define Workspace** dialog box
8. Select **More** from the **Filter** list on the **Define Workspace** dialog box.

*The **Select Filter** dialog box displays.*

9. Select **Plant Filters\Drawings Creation Filters\01\U01 Workspace** on the **Select Filter** dialog box.



TIP The **U01 Workspace** filter includes objects on the **System** tab of the **Workspace Explorer** and the appropriate space folder for this lab.

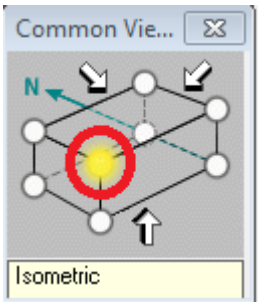
10. Click **OK** on the **Select Filter** dialog box.
11. Click **OK** on the **Define Workspace** dialog box.

    The workspace populates with modeled objects.

12. When the workspace query completes, click **Common Views** on the **Common** toolbar.

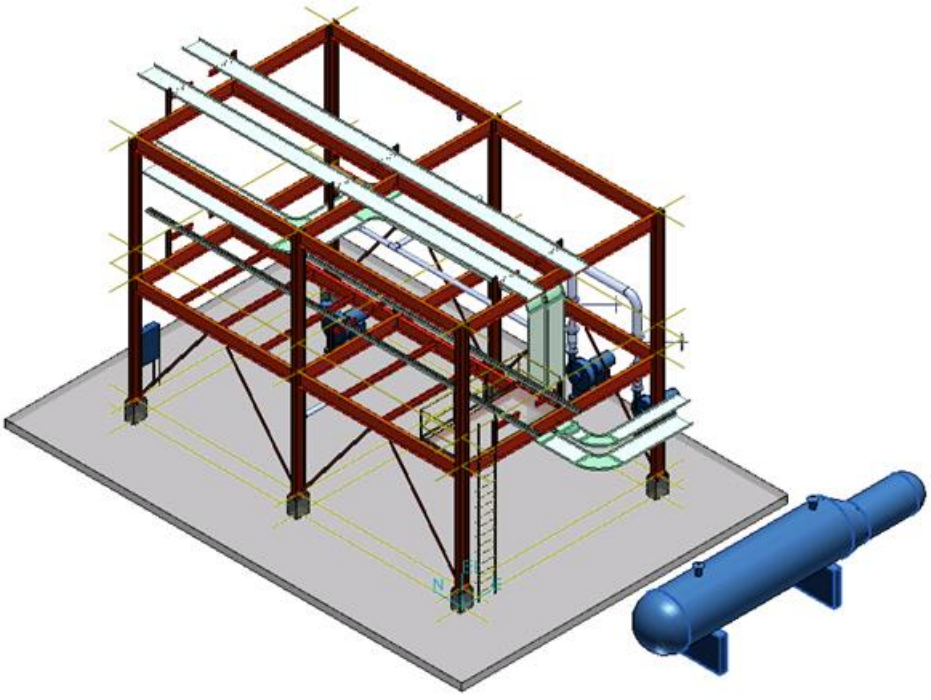
    *The **Common Views** dialog box displays.*

13. On the **Common Views** dialog box, select the node that changes the look direction to **Looking NE and Down**.

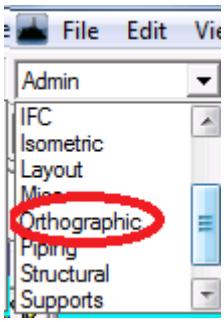


14. Click **Fit** .

All the objects fit into the graphic window.



15. Select **Orthographic** from the **Active Permission Group** list.



TIP The **Active Permission Group** list is located in the upper-left corner of the **Smart 3D** application.

Objects added to the model during class, including drawings and views, are in this permission group.

Place Volume by Two Points

1. Click **Tasks > Space Management** to enter the task to place the volume to be used by the drawing.
2. Click **PinPoint** on one of the horizontal toolbars at the top of the window.

   *The **PinPoint** ribbon displays.*

3. Ensure that the **Coordinate System** field is set to **Global.**
4. Click **Set Target to Origin** to ensure that the points are measured from the Global origin.

   TIP The coordinate system also determines the *alignment* of the volume for most of the volume placement commands. In this case, the faces of the two-point volume are parallel with the one of the planes of the Global coordinate system.
5. Click **Place Volume by Two Points** on the vertical toolbar.

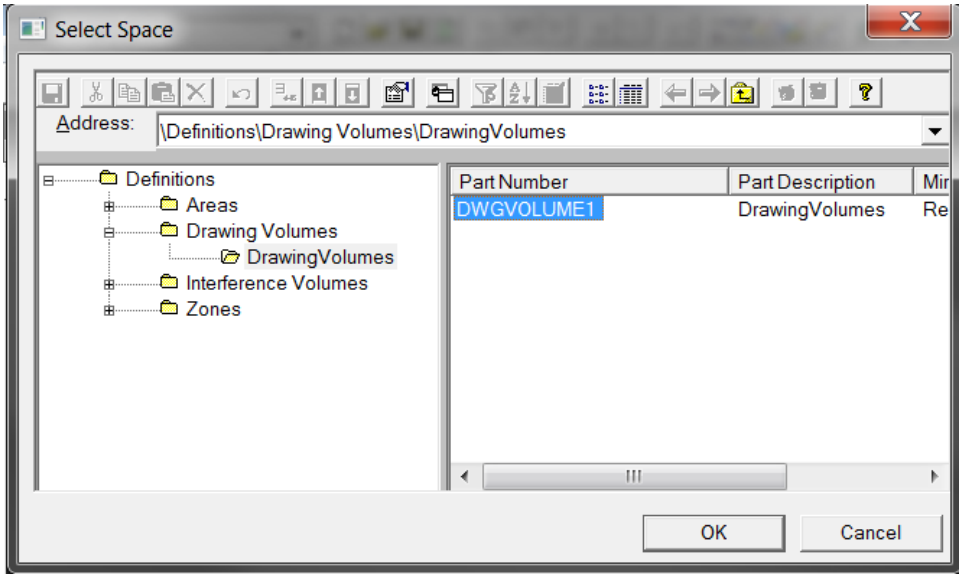
   *The **Place Volume by Two Points** ribbon displays.*

   TIP The green-colored buttons at the bottom of the vertical toolbar in the Space Management task are for the placement of volumes for use with the Volume component. These commands are not to be used in this lab. The volume placement command to be used for this step is the one near the top of the vertical toolbar.

   With the **Place Volume by Two Points** command, volumes are placed by specifying the location of two diagonal points forming a rectangular prism.
6. Type **U01 2 Points** in the **Name** field on the **Place Volume by Two Points** ribbon.
7. Select **More** from the **Type** list on the **Place Volume by Two Points** ribbon.

   *The **Select Space** dialog box displays.*

8. Select **Definitions\Drawing Volumes\DrawingVolumes\DWGVOLUME1**.



9. Click **OK** on the **Select Space** dialog box.
10. Select **More** from the **Space** folder list.

    *The **Select System** dialog box displays.*
11. Click **Database** to display the space folder hierarchy of the model.
12. Select the **Drawings Creation Labs\01** space folder.
13. Click **OK** on the **Select System** dialog box.
14. Click **Disable Assoc Point Creation** so that the volume points are not locked to their initial position.
15. Type **72** in the **E** field on the **PinPoint** ribbon. Press TAB.

    *The field displays **72 ft 0.00 in** and is locked.*
16. Type **2** in the **N** field on the **PinPoint** ribbon. Press TAB.

    *The field displays **2 ft 0.00 in** and is locked.*
17. Type **-2** In the **El** field on the **PinPoint** ribbon. Press TAB.

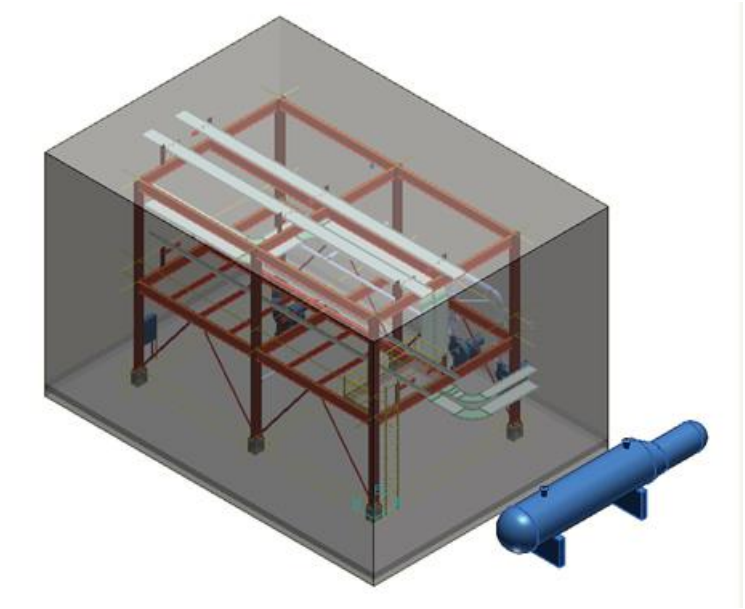
    *The field displays **-2 ft 0.00 in** and is locked.*
18. Click anywhere in the graphic view to complete placement of the first point of the volume.
19. Type **112** in the **E** field on the **PinPoint** ribbon. Press TAB.

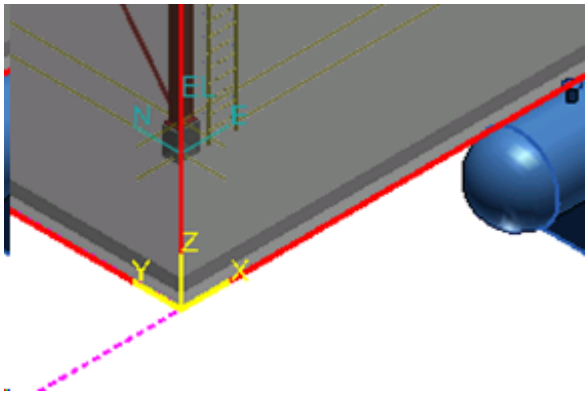
    *The field displays **112 ft 0.00 in** and is locked.*
20. Type **58** in the **N** field on the **PinPoint** ribbon. Press TAB.

    *The field displays **58 ft 0.00 in** and is locked.*
21. Type **34** in the **El** field on the **PinPoint** ribbon. Press TAB.

    *The field displays **34 ft 0.00 in** and is locked.*
22. Click anywhere in the graphic view to complete placement of the two-point volume.

23. Press ESC to exit **Place Volume by Two Points**.



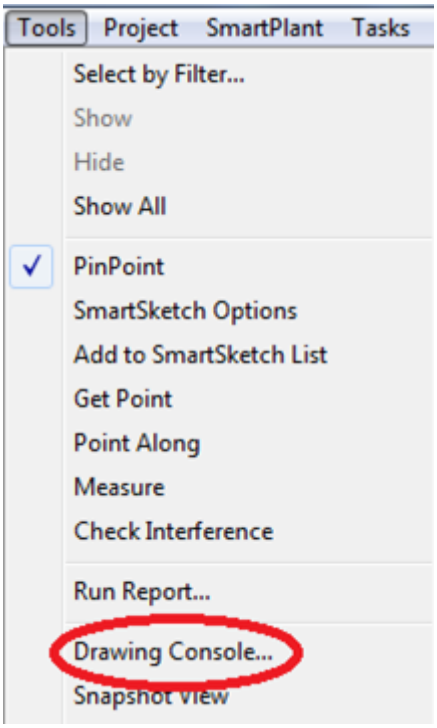


TIP If you select a volume while in the **Space Management** task, a local coordinate system triad displays at one corner of the volume. In the case of a two-point volume, the triad displays at the location of the first point.

The orientation of the local coordinate system is important for drawings, as you will see later in this lab.

Create New Drawing

1. Click **Tools > Drawing Console.**



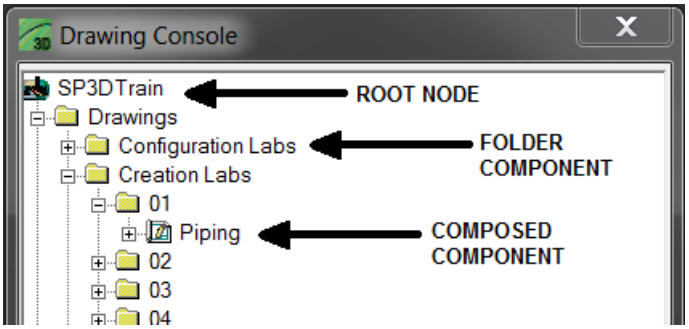
*The **Drawing Console** window displays.*

TIP Drawings can be managed from the **Drawing Console** or within the Drawings and Reports task.

The **Drawing Console** remains open until the you enter any one of the following *non-modeling* tasks:

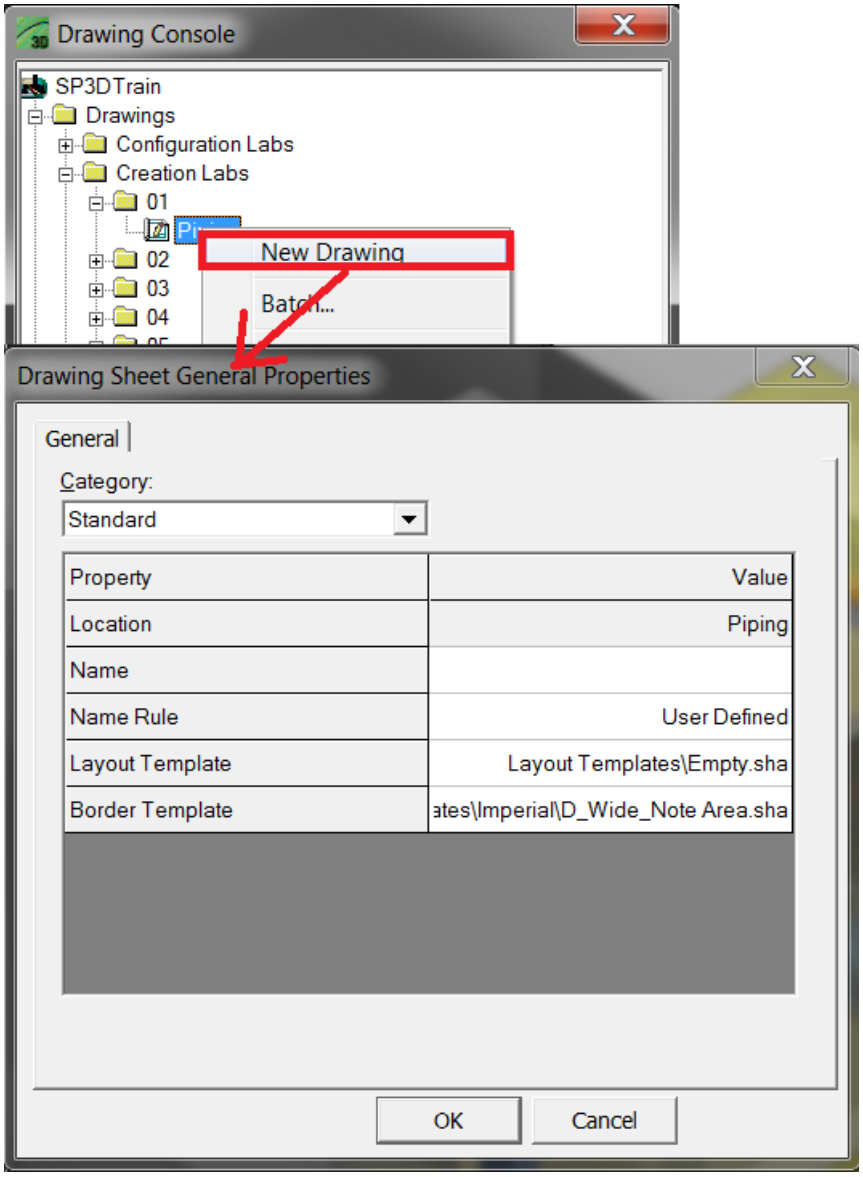
- **Drawings and Reports**
- **Catalog**
- **Systems and Specifications**

2. In the **Drawing Console** window, expand the **Drawings\Creation Labs\01** folders.



3. Right-click **Piping,** and select **New Drawing**.

   *The **Drawing Sheet General Properties** dialog box displays.*



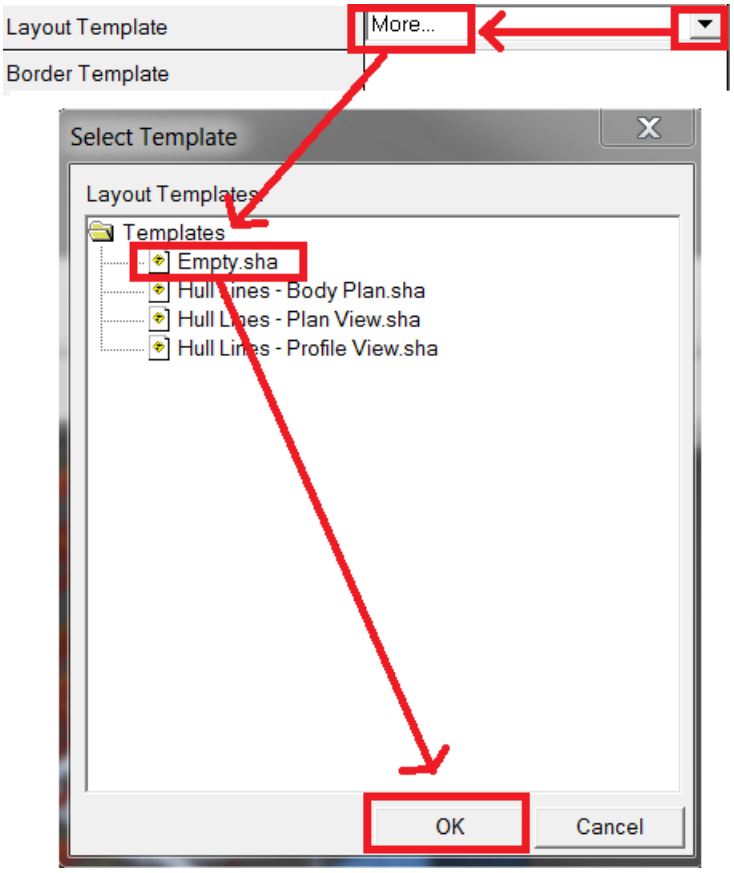
TIP The commands seen on the pop up menu depend on the component that is accessed. The appearance of some commands is further restricted by the environment. For example, **New Drawing** is only available on the shortcut menu of a Composed component in the **Drawing Console**. The command does not display on the shortcut menu of a Composed component in the **Drawings and Reports** task.

4. Type **Piping Plan01** in the **Name** field on the **Drawing Sheet General Properties** dialog box.

5. Select **More** from the **Layout Template** list on the **Drawing Sheet General Properties** dialog box.

*The **Select Template** dialog box displays.*

6. Select **Empty.sha** on the **Select Template** dialog box.
7. Click **OK** on the **Select Template** dialog box.



TIP Layout templates can have a set of views already predefined and prearranged for producing standardized drawings.

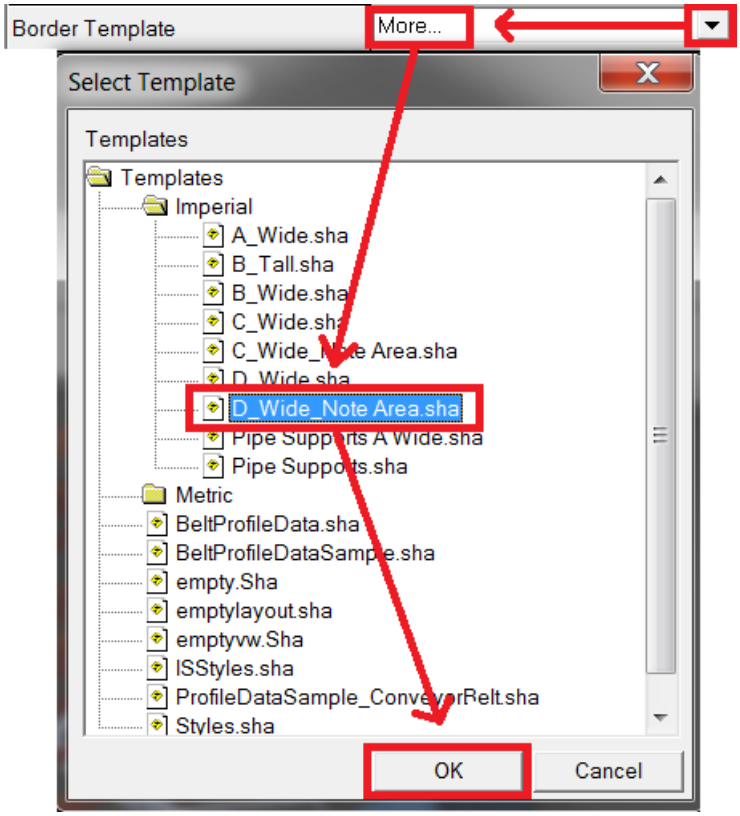
The delivered *Empty.sha* template has no views saved in it.

8. Select **More** from the **Border Template** list.

   *The **Select Template** dialog box displays.*

9. Double-click the **Imperial** folder on the **Select Template** dialog box to expand it, and select **D_Wide_Note Area.sha**.

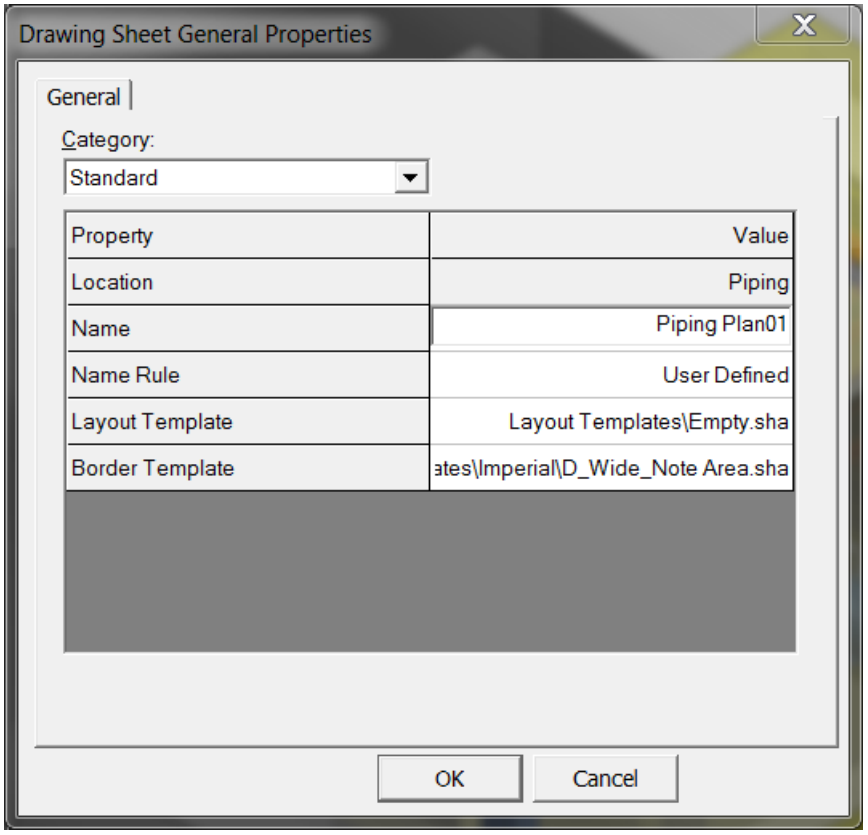
10. Click **OK** on the **Select Template** dialog box.



TIP The delivered border templates already contain predefined border graphics and border labels.

11. Click **OK** on the **Drawing Sheet General Properties** dialog box.

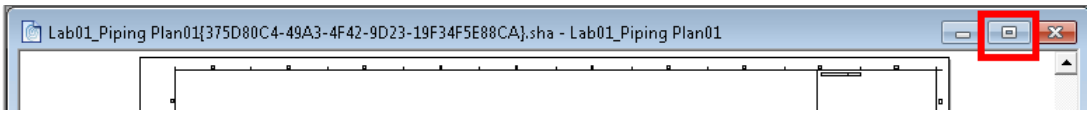
*The software opens the new drawing in a **SmartSketch Drawing Editor** window.*



TIP The values entered into the **Layout Template** and **Border Template** fields are remembered while in the same session. They are also remembered in the session template.

Place a View

1. Maximize the drawing window in **SmartSketch Drawing Editor**.



2. Click **Fit** .
3. Click **Place View** .

   TIP The toolbar is officially called **SP3D Drawings Compose Toolbar**. The buttons on this command are added by Smart 3D to perform specialized drawings operations. This toolbar is not available if **SmartSketch Drawing Editor** is used outside of Smart 3D.

   Views placed with this command are rectangular in shape and defined by two diagonal points.

   Views can be placed with **Place View** by two methods:

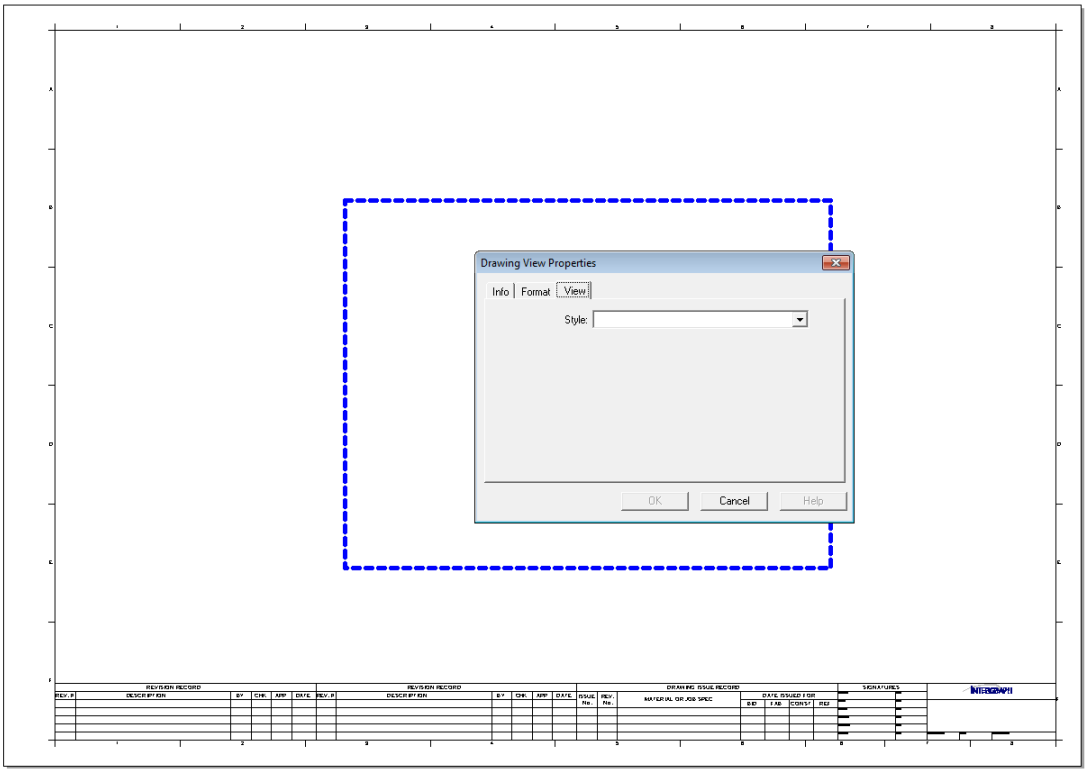
a. Position the cursor in the window and click to place the first point; move the cursor to a different position in the window and click again to place the second point.

b. Position the cursor in the graphic window and mouse down; drag the cursor to the second point in the window and mouse up.

Views are based on the SmartFrame element. However, views have additional attributes which give them behaviors not available to a SmartFrame. These additional behaviors are only available when editing the drawing within Smart 3D.

4. Place a two-point rectangle of any size approximately centered within the border area.

*The **Drawing View Properties** dialog box appears when placement is complete.*

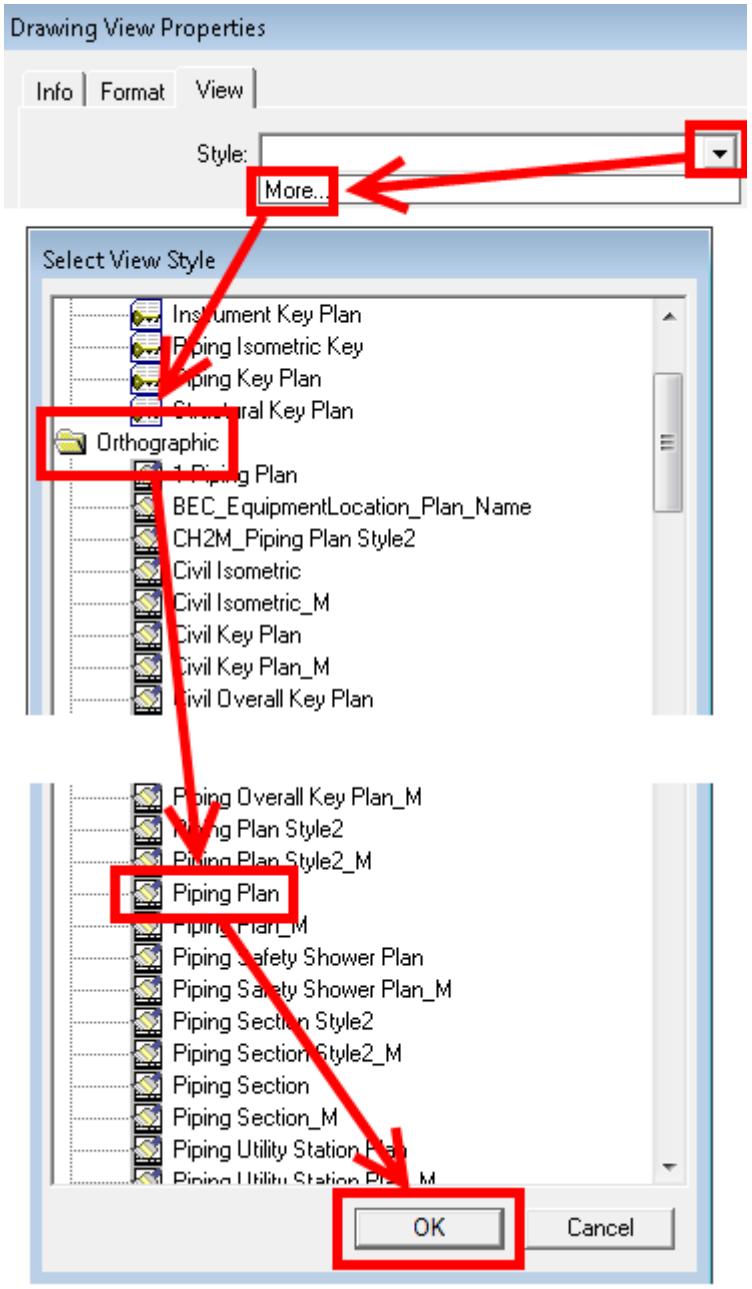


5. Select **More** from the **Style** list on the **Drawing View Properties** dialog box.

*The **Select View Style** dialog box displays.*

6. Select **Orthographic\Piping Plan**.

7. Click **OK** on the **Select View Style** dialog box.

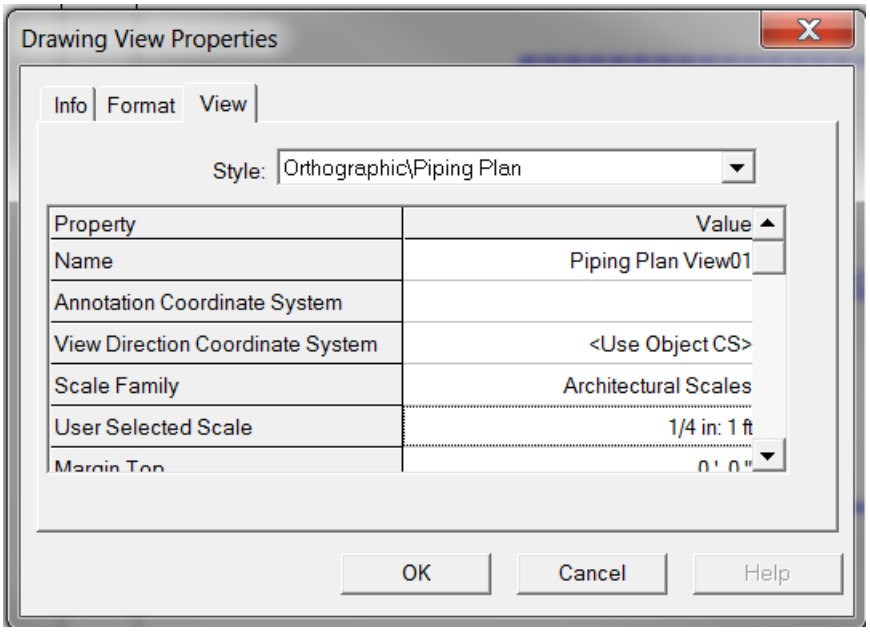


TIP The purpose of a view style is to determine what and how objects display in the drawing. The delivered Piping Plan view style includes several objects in its definition: piping parts, equipment, and structure, to name a few.

The naming convention of this view style does not mean it is limited for use only in the plan direction. It can be used in views of other look directions but it was designed to work best in the plan direction.

*After selecting a view style, additional fields display on the **Drawing View Properties** dialog box.*

8. Type **Piping Plan View01** in the **Name** box.
9. Select **Architectural Scales** from the **Scale Family** list.
10. Select **1/4 in: 1 ft** from the **User Selected Scale** list.
11. Click **OK** on the **Drawing View Properties** dialog box to complete the view definition.



TIPS

- Additional values in the **User Selected Scale** field can be bulkloaded into the catalog database.

  At a minimum, the following fields must be edited when creating a *normal* graphic view; other fields already have default values:

  - **Name**
  - **Scale Family**
  - **User Selected Scale** (if Scale Family is not **Fit To Scale**)
- After clicking **OK** on the **Drawing View Properties** dialog box, the software performs an *auto save* of the drawing.
- Notice that the **View Direction Coordinate System** field displays **<Use Object CS>**. This means that the view's look direction is relative to the local coordinate system of the associated volume.

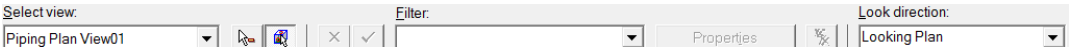
Associate View to Volume

1. Click the view just placed. Then, click **Associate Objects to View** .

   TIP One purpose of the **Associate Objects to View** command is to establish a relationship between a graphic view and a volume in the model. The relationship is established by selecting a volume in the **Workspace Explorer** or in a graphic modeling window. Therefore, the volume must be in the workspace to complete this command.

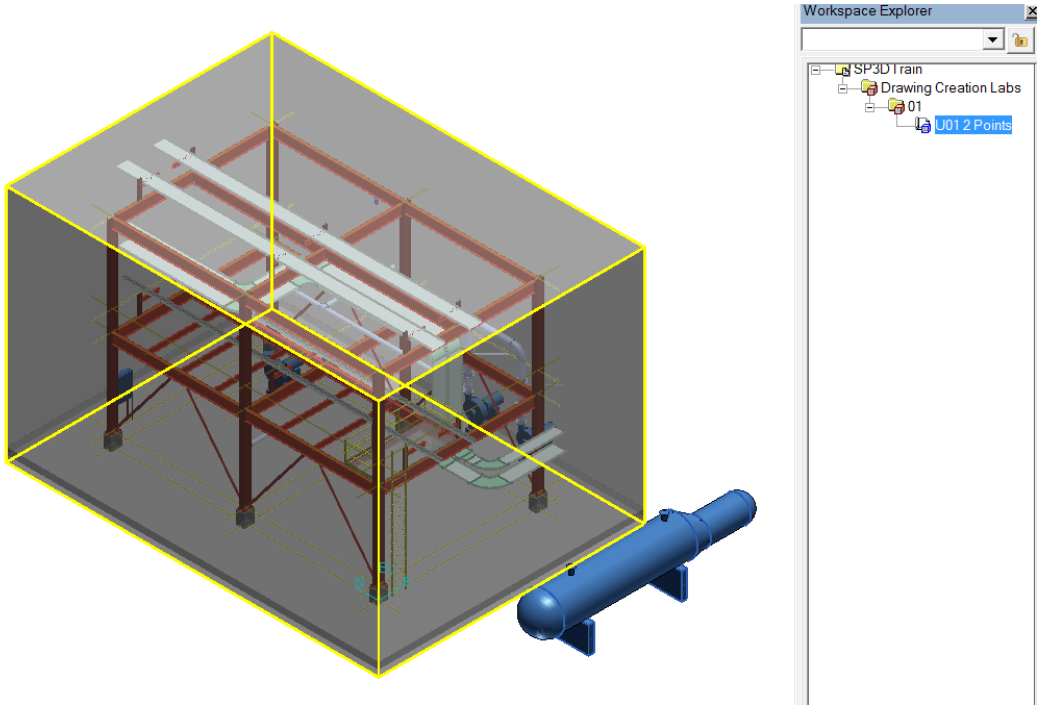
2. Switch to the **Smart 3D** window.

   *The **Associate Objects to View** ribbon displays in the modeling environment.*



3. Click the **Space** tab in the **Workspace Explorer**.
4. Click the volume **U01 2 Points** in the **Workspace Explorer**.

   The volume in the model is outlined with heavy yellow edges. This is a visual indication showing that a relationship to the view has been established.



The objects in the volume are *candidate* objects to appear in the drawing. The candidate objects are passed to the view style where they might be further restricted.

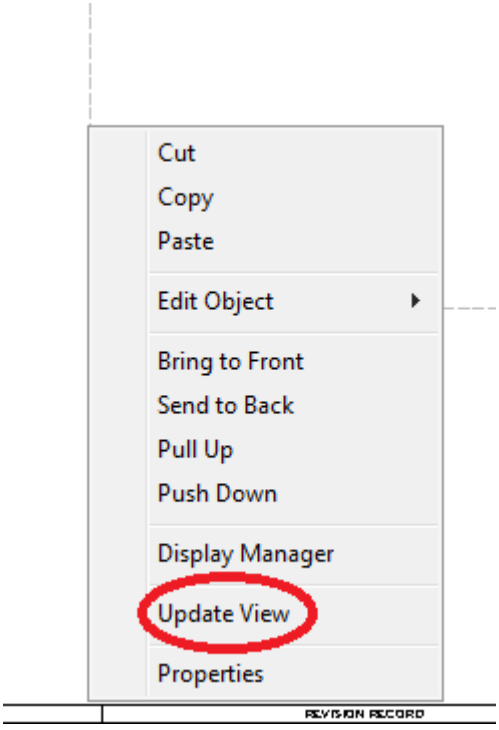
Update View

1. Switch to the **SmartSketch Drawing Editor** window.

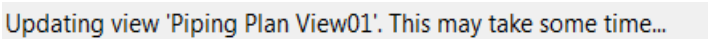
   The view is still centered in the same position but has resized to match the scaled dimensions of the associated volume.

   TIP By design, composed views that are **not** *Fit to Scale* always match the scaled size of the associated volume. This is not true for Volume and Drawing by Query type drawings, where the view size is not in sync with the size of the volume.

2. Right-click the view boundary once to exit the **Associate Objects to View** command.
3. Right-click the view boundary again to display the shortcut menu for the view.
4. Select **Update View**.

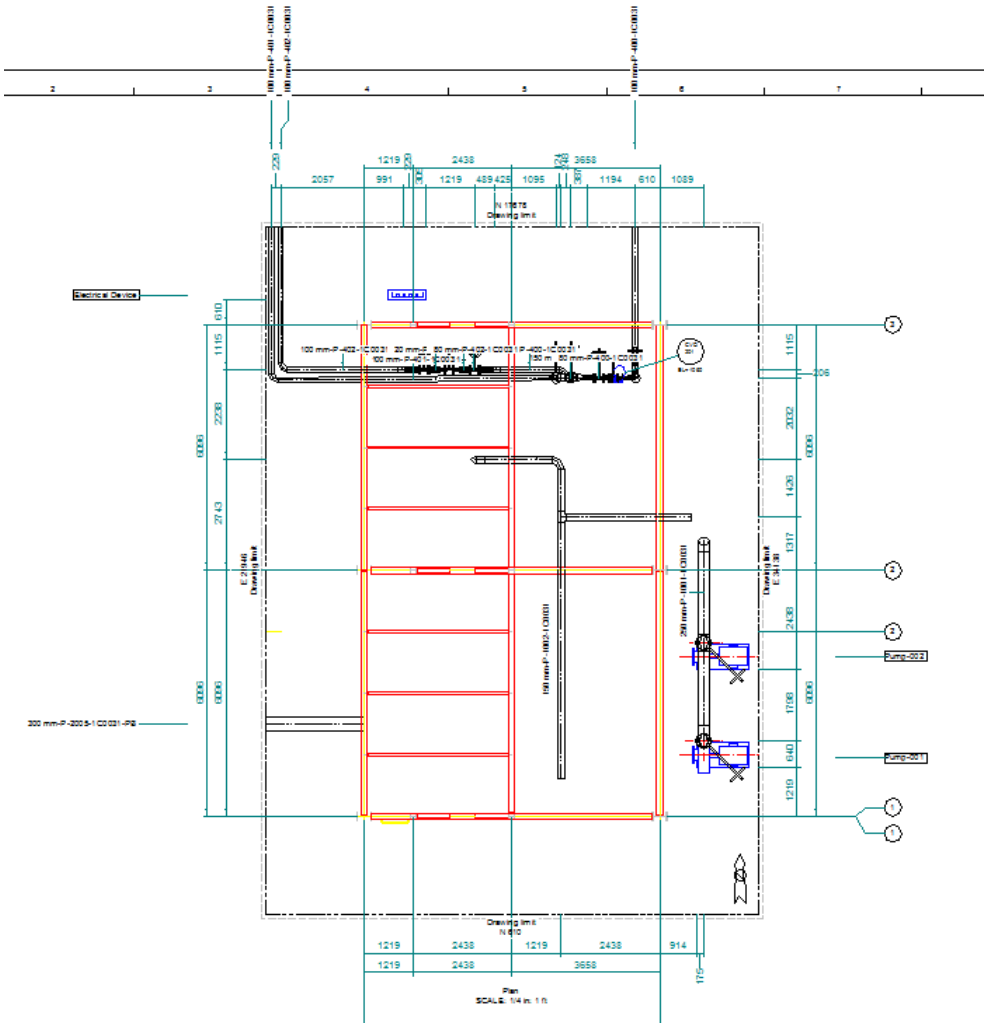


TIP The **Update View** command renders the graphics from the model and place dimensions and labels if they are specified in the view style.



TIP Notice that the **Status Bar** in the lower left corner of the **Drawing Editor** window indicates that a view update is in progress. When the view update completes, the software automatically saves the drawing.

The updated view contents should appear similar to the picture below:



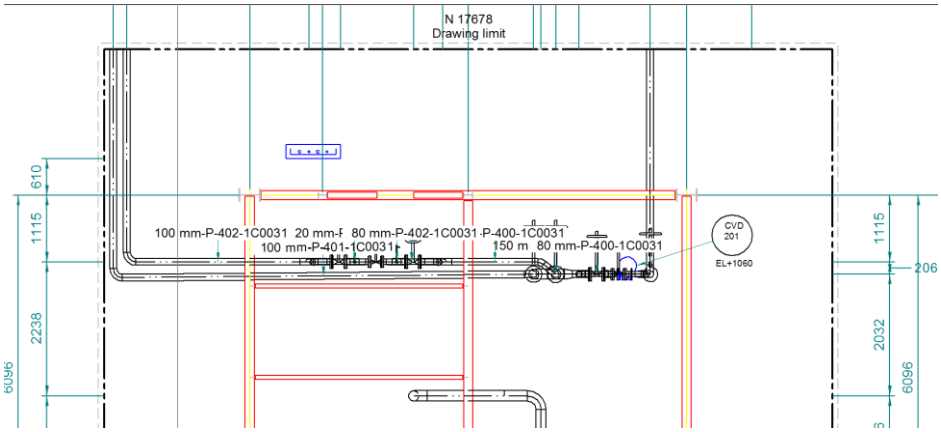
5. Click **2D/3D Selection** on the horizontal toolbar.

   TIP By clicking on a drawing object while the **2D/3D Selection** command is enabled, the corresponding object in the model is selected. The selected object in the model can be edited if needed.

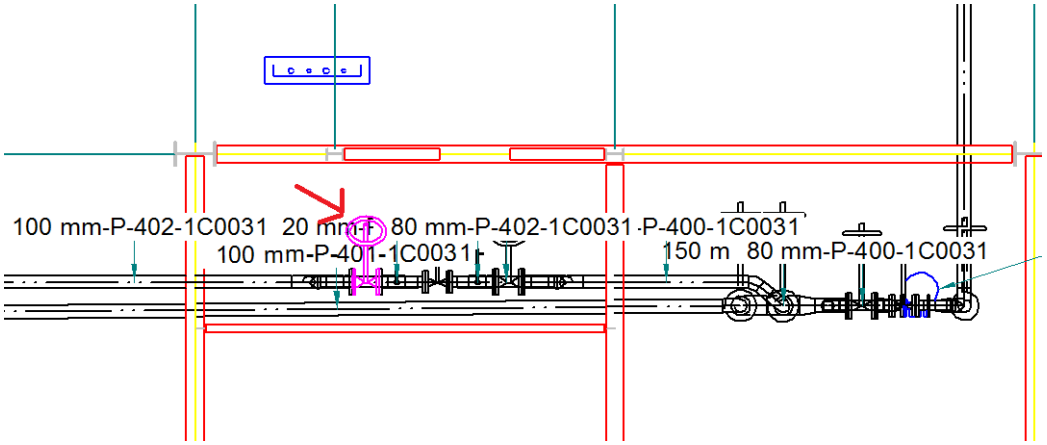
   Selecting a drawing label while the command is enabled also selects the associated object in the model.

6. Click **Zoom Area**.

7. Drag a rectangle around the top half of the view to get a closer look at the contents.

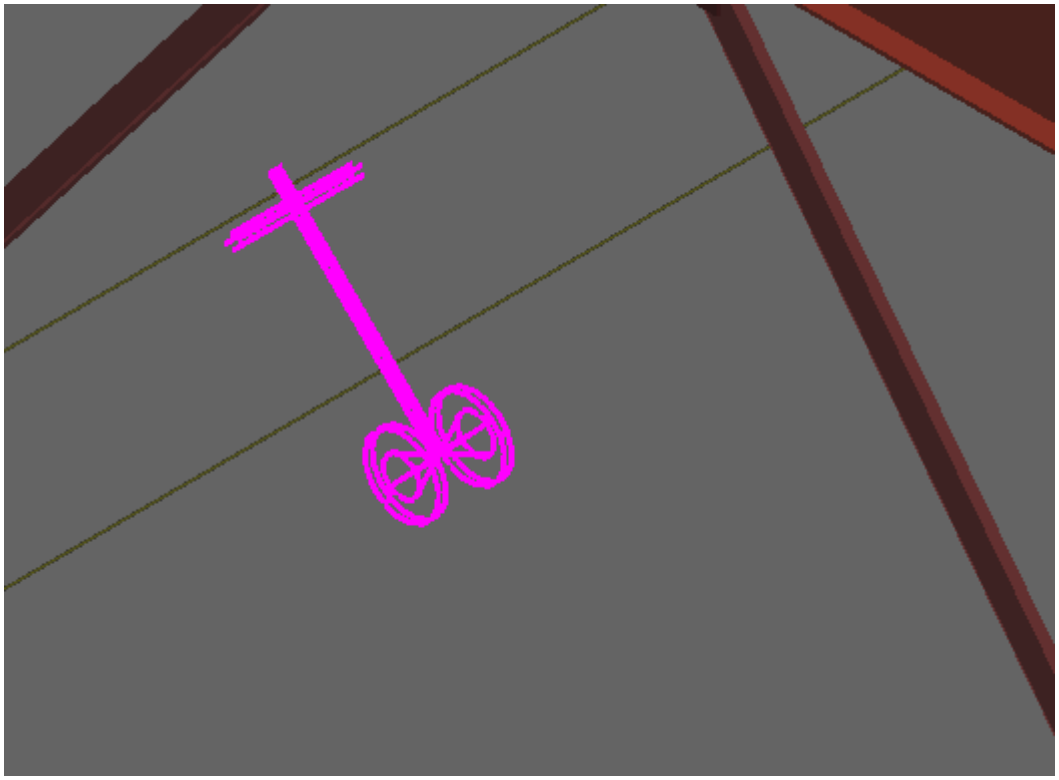


8. Right-click to exit **Zoom Area**.
9. Click on the pipe valve indicated in the picture below:



10. Switch to the **Smart 3D** window, and notice that the corresponding model object is selected.
11. Click **Fit** .

The software fits the selected pipe valve in the graphic window.



TIP Notice that this valve is not part of the workspace but still appears in the drawing view because it is within the volume boundaries and passes the tests in the view style.

The next section in this lab associates the view to a filter that further restricts what objects in the volume are passed to the view style.

12. Switch to the **SmartSketch Drawing Editor** window.
13. Click **2D/3D Selection** to stop the command.
14. Press ESC to clear the selection from the pipe valve in the drawing.

Associate View to Filter

1. Click the view boundary. Then, click **Associate Objects to View**.

   TIP Notice that if any object embedded within the view is clicked, like the valve selected above, the view is selected. Notice also that the view shortcut menu appears if any embedded object is right-clicked. This is useful to know when zoomed in so tightly that the view boundary is not present in the window – simply right-click an object in the view to update the view or click an object in the view to select the view for the **Associate Objects to View** command.

2. Switch to the **Smart 3D** window.

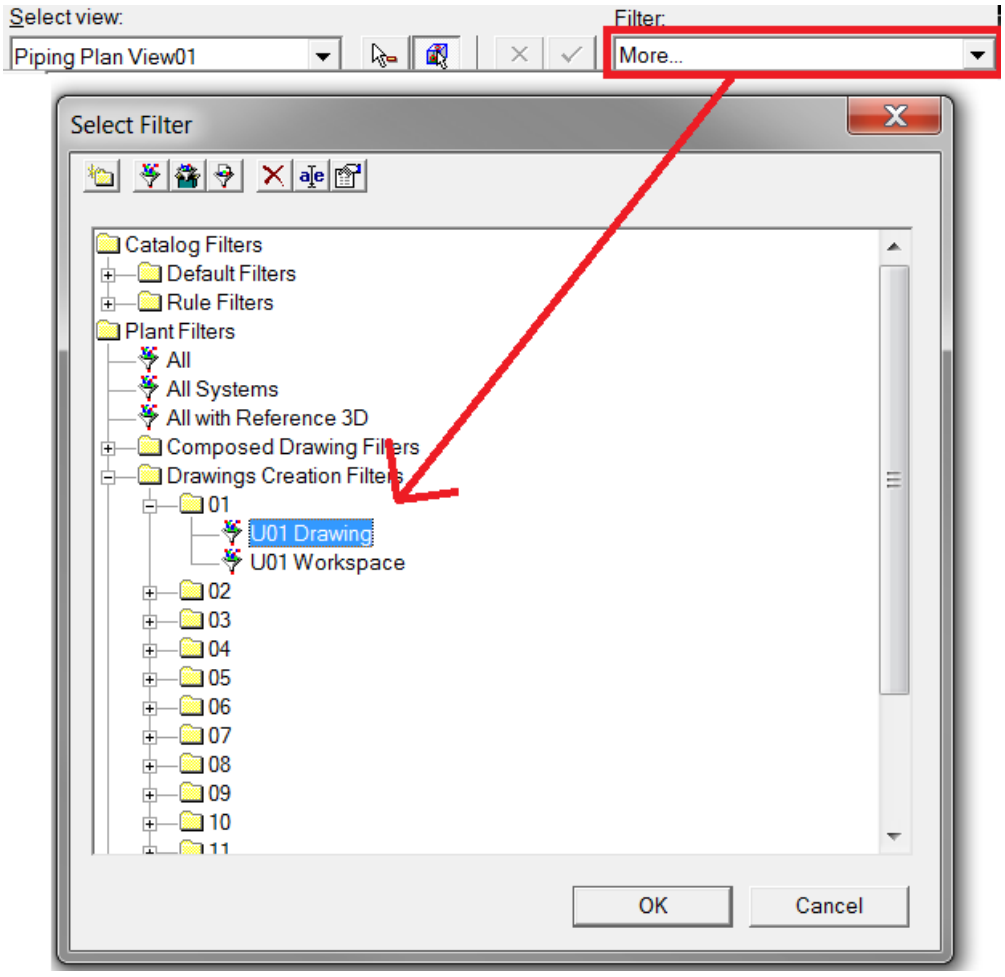
   *The **Associate Objects to View** ribbon displays in the modeling environment.*

3. Select **More** from the **Filter** list on the **Associate Objects to View** ribbon.

*The **Select Filter** dialog box displays.*

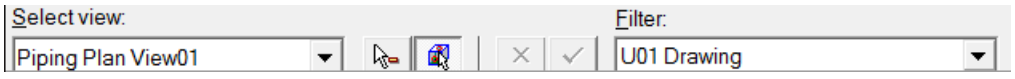
TIP You will create the filter to use on the **Associate Objects to View** ribbon in the next several steps.

4. Expand the **Drawings Creation Filters** folder and the **01** folder under the **Plant Filters** node on the **Select Filter** dialog box.
5. Select the **U01 Drawing** filter.



6. Click **Properties** to view the restrictions placed on the drawing by this filter.
7. Click **OK** on the **Select Filter** dialog box.

*The software populates the **Filter** field on the **Associate Objects to View** ribbon.*

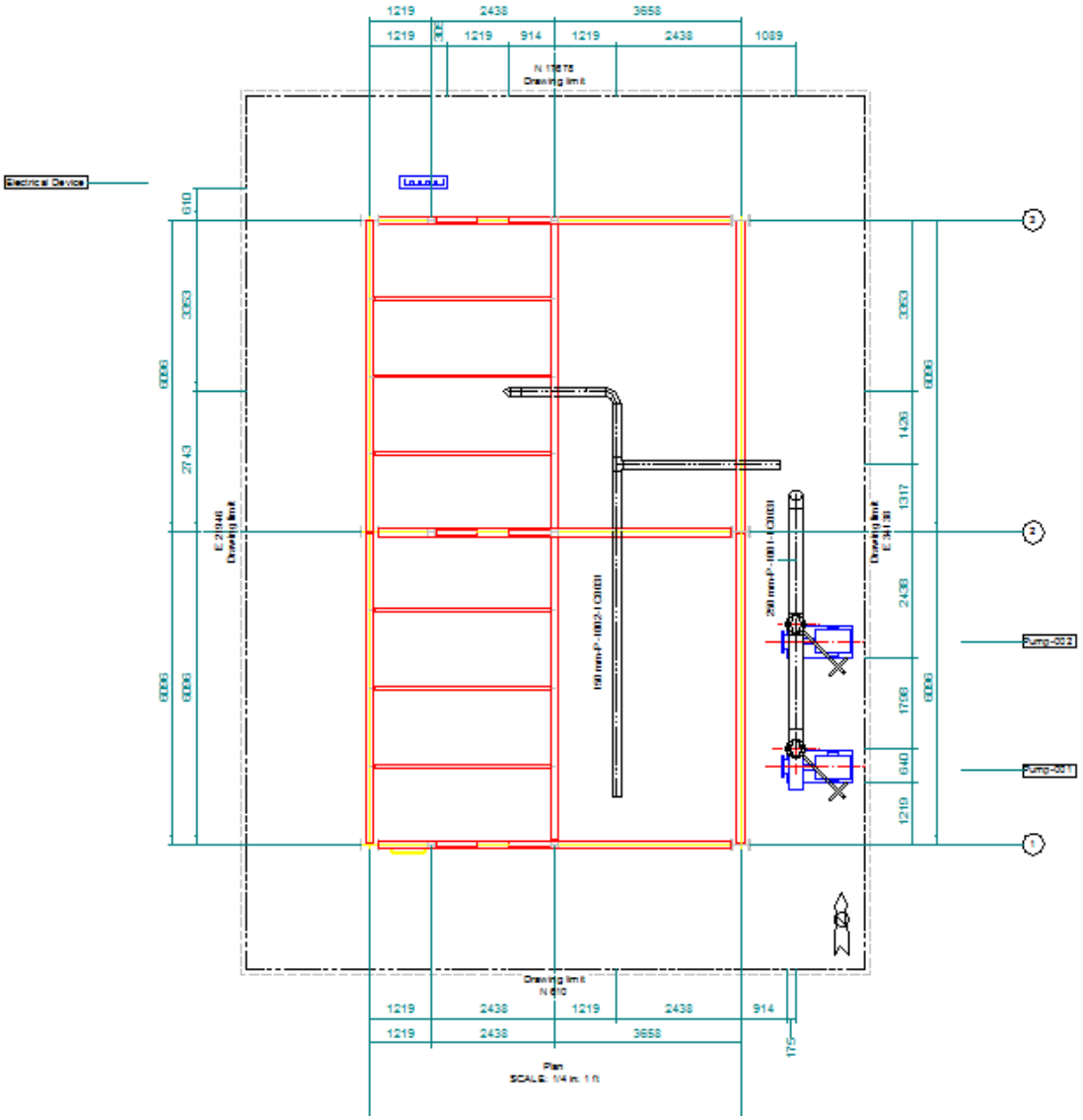


TIP The purpose of the **Filter** field on the **Associate Objects to View** ribbon is to further restrict the objects being passed to the view style. In this case, the candidate objects passed to the view style are those in the volume AND within the U01 system.

8. Switch back to the **SmartSketch Drawing Editor** window.

9. Right-click the view boundary once to exit the **Associate Objects to View** command.
10. Right-click the view boundary again to display the shortcut menu for the view.
11. Select **Update View**.
12. When the update completes, click **Fit** .

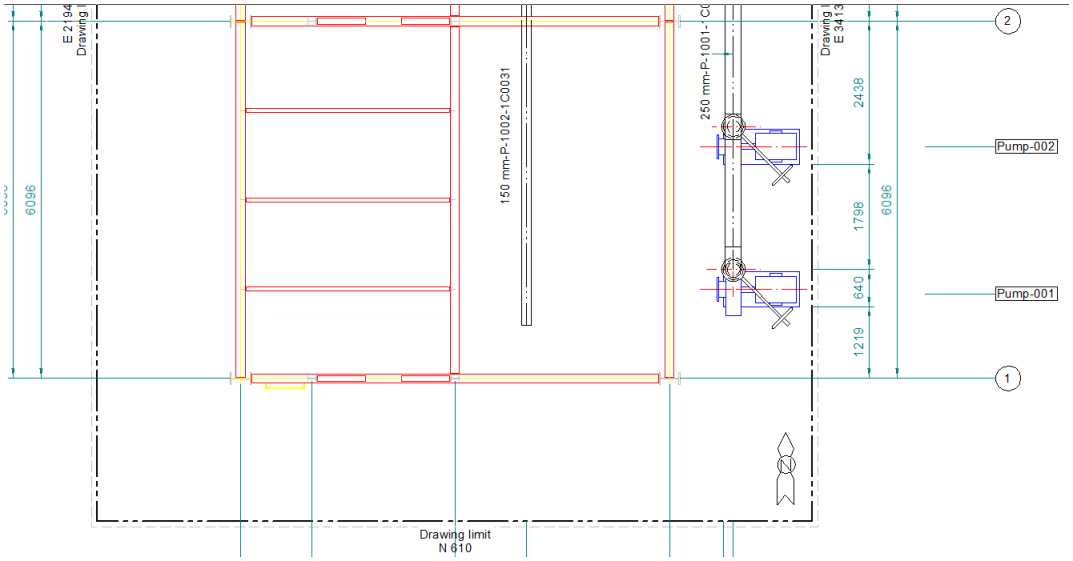
    The updated view contents should appear similar to the picture below:



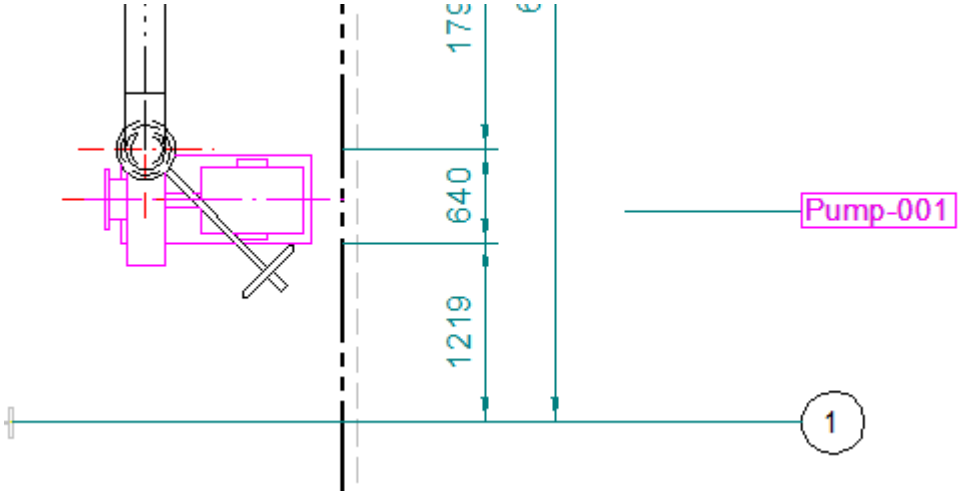
TIP Notice the reduced number of objects in the drawing. Notice that the pipe valve that was selected earlier with **2D/3D Select** is no longer displaying in the drawing. This is because that object is not included in the U01 restrict filter.

Exclude Objects

1. Click **2D/3D Selection** on the horizontal toolbar.
2. Click **Zoom Area**.
3. Drag a rectangle around the bottom half of the view to get a closer look at the contents.



4. Right-click to exit **Zoom Area**.
5. Click on the label that displays **Pump-001**.



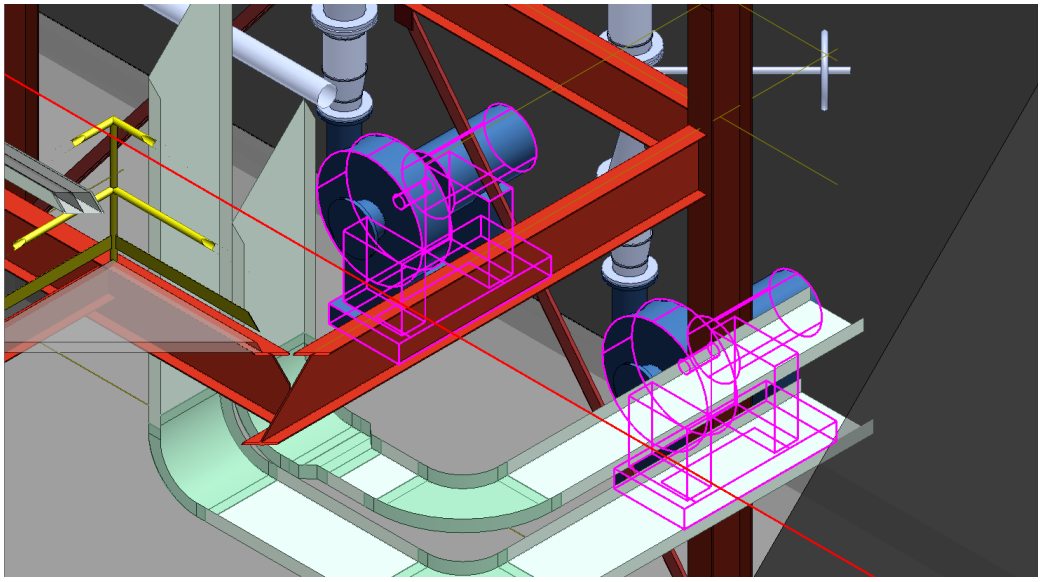
TIP Notice that selecting the label while in the **2D/3D Select** command also selects the associated object.

6. Press CTRL, and click on the label that displays **Pump-002.**

   Both pumps are selected in the drawing.

7. Switch to the **Smart 3D** window, and click **Fit**.

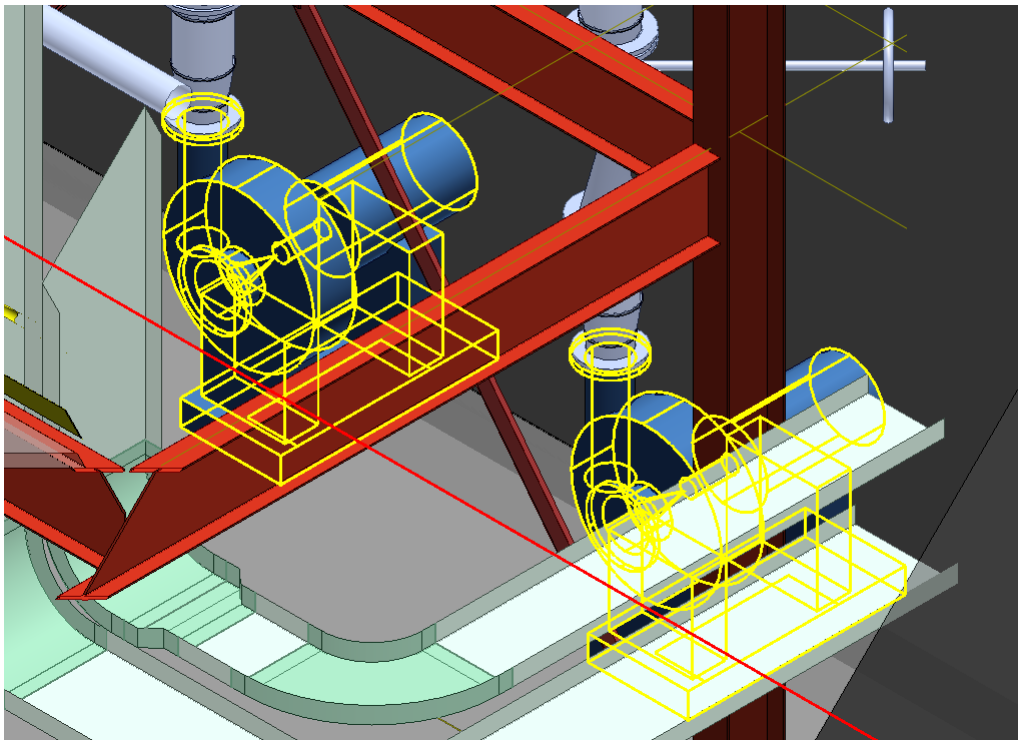
The software fits the selected pumps in the graphic window.



8. Switch to the **SmartSketch Drawing Editor** window.
9. Click **2D/3D Selection** to turn off the command.
10. Press ESC to clear the selection from the objects.
11. Select the view, and click **Associate Objects to View**.
12. Switch to the **Smart 3D** window.

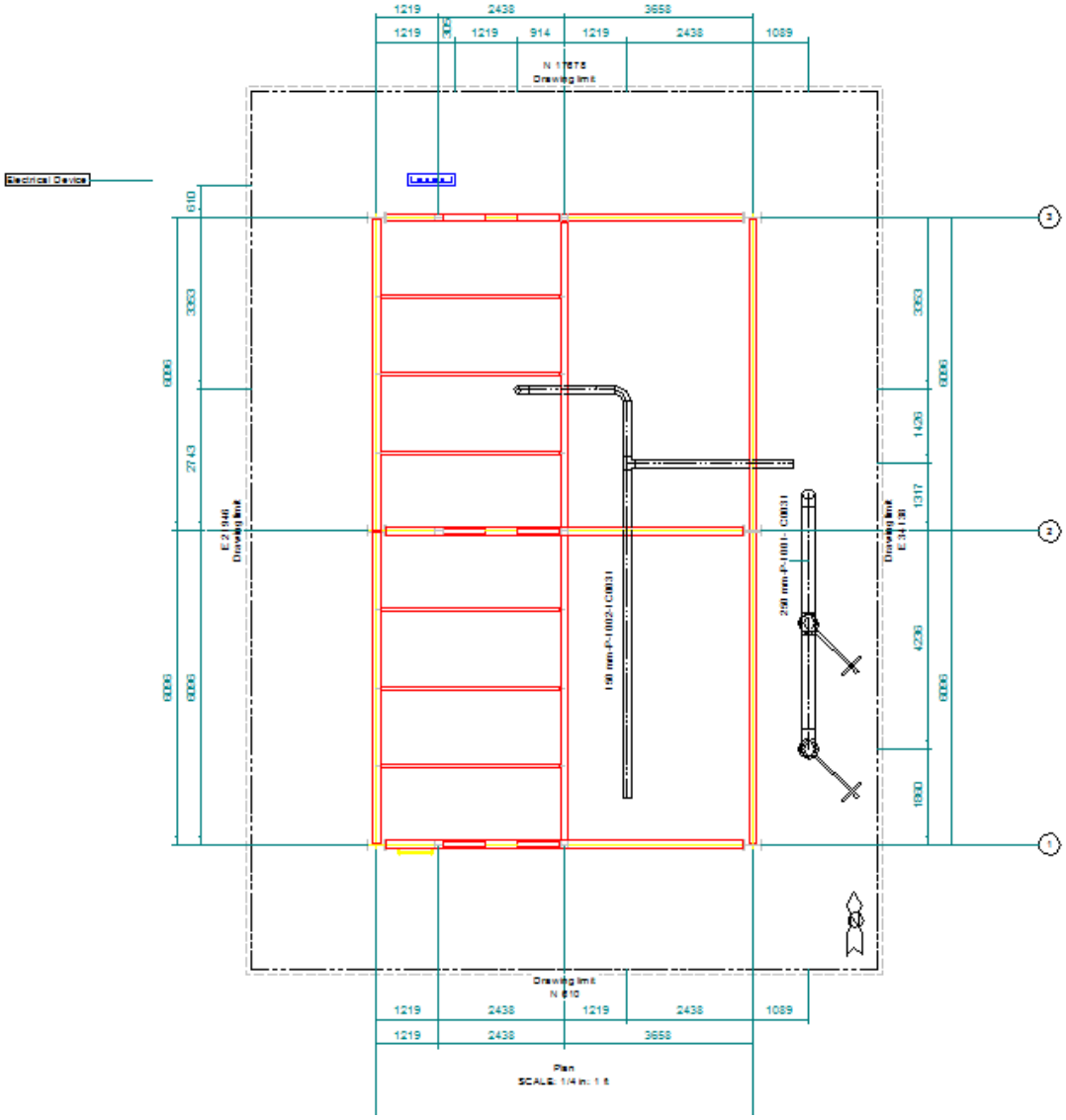
    *The **Associate Objects to View** ribbon displays in the modeling environment.*
13. Click **Exclude Objects** on the **Associate Objects to View** ribbon.

14. Click both pumps that were selected previously with the **2D/3D Select** command so that they are displayed with a yellow outline.



15. Click **Accept** on the **Associate Objects to View** ribbon to add the pumps to the exclude list for that view.
16. Switch to the **SmartSketch Drawing Editor** window.
17. Right-click the view boundary once to exit the **Associate Objects to View** command.
18. Right-click the view boundary again to display the shortcut menu for the view.
19. Select **Update View**.
20. When the update completes, click **Fit** .

The updated view contents should appear similar to the picture below:



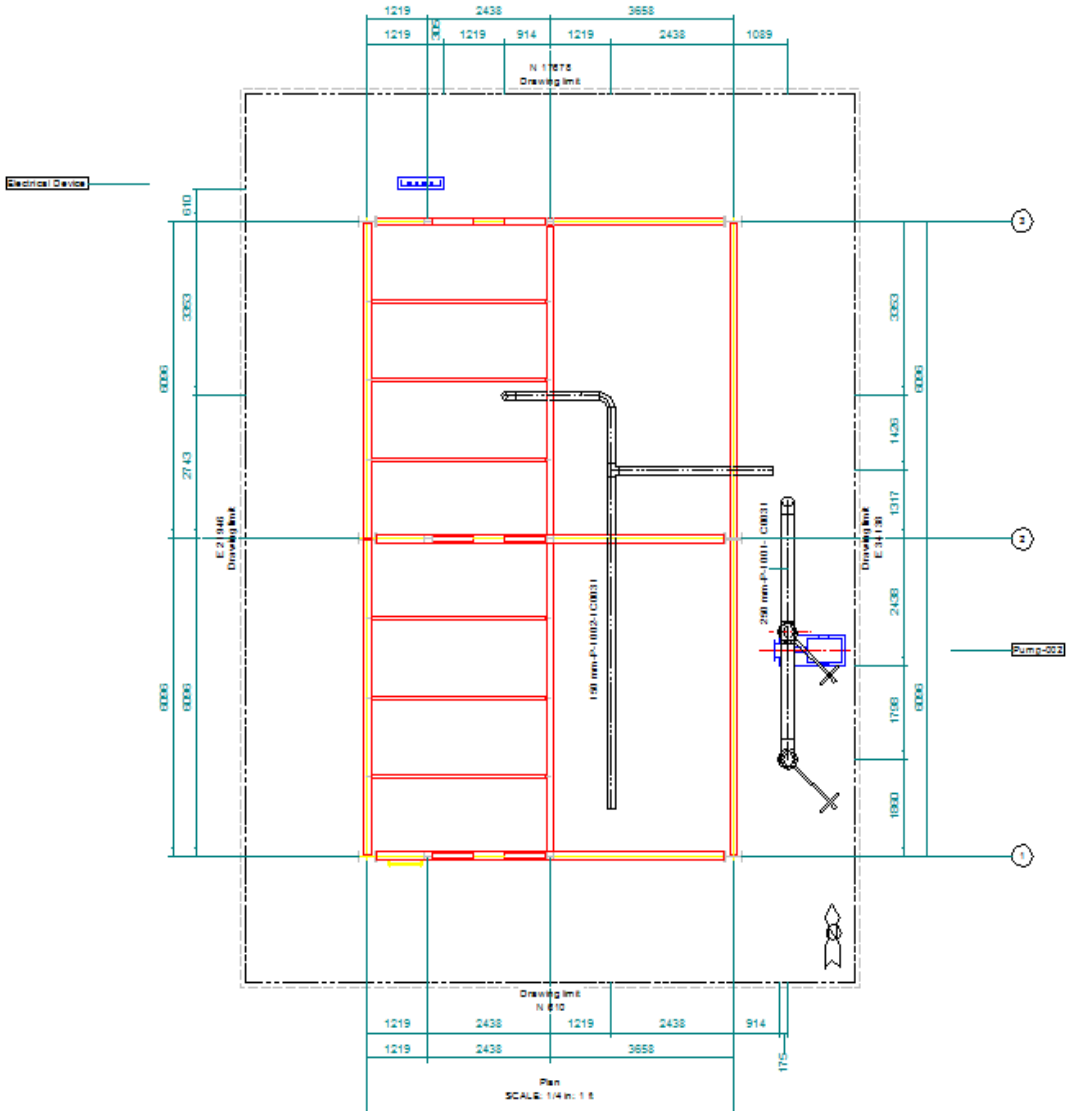
TIP Notice the excluded pumps are no longer in the view. Notice also that the each pumps' labels and dimensions do not appear.

Include Objects

1. Select the view, and click **Associate Objects to View** .
2. Switch to the **Smart 3D** window.

   *The **Associate Objects to View** ribbon displays in the modeling environment.*
3. Click **Exclude Objects** on the **Associate Objects to View** ribbon to display the excluded set of objects with a yellow outline.
4. In the graphic view, select **Pump-002** so that it no longer has the yellow outline.
5. Click **Accept** on the **Associate Objects to View** ribbon to remove the pump from the exclude list.
6. Switch to the **SmartSketch Drawing Editor** window.
7. Right-click the view boundary once to exit the **Associate Objects to View** command.
8. Right-click the view boundary again to display the shortcut menu for the view.
9. Select **Update View**.

The updated view contents should appear similar to the picture below:



TIP Notice that Pump-002 appears in the drawing after it was removed from the exclude list. Notice also that its associated labels and dimensions also appear.

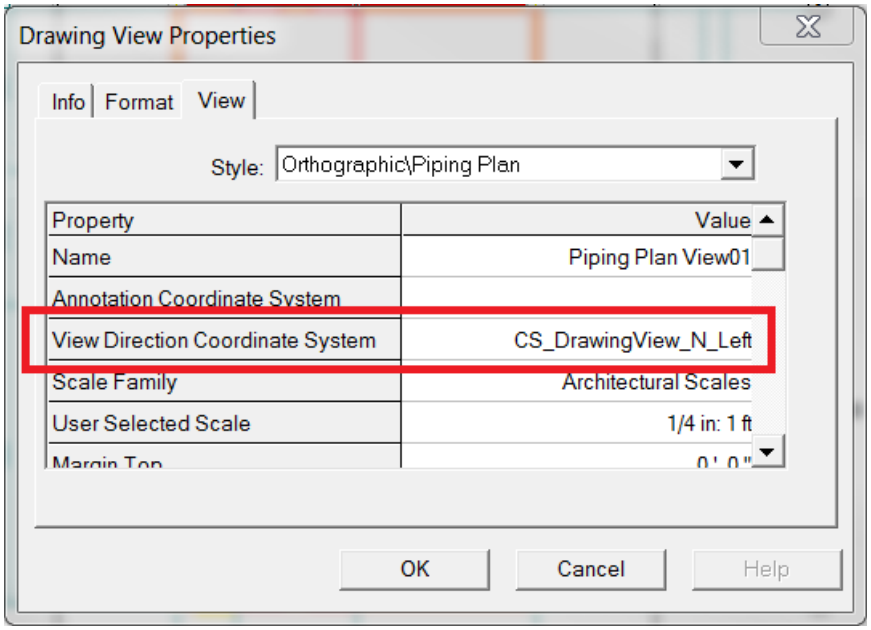
Rotate View using View Direction Coordinate System

1. Right-click the view boundary, and select **Properties**.

   *The **Drawing View Properties** dialog box displays.*

2. Select **CS_DrawingView_N_Left** from the **View Direction Coordinate System** list on the **Drawing View Properties** dialog box.

3. Click **OK** on the **Drawing View Properties** dialog box.



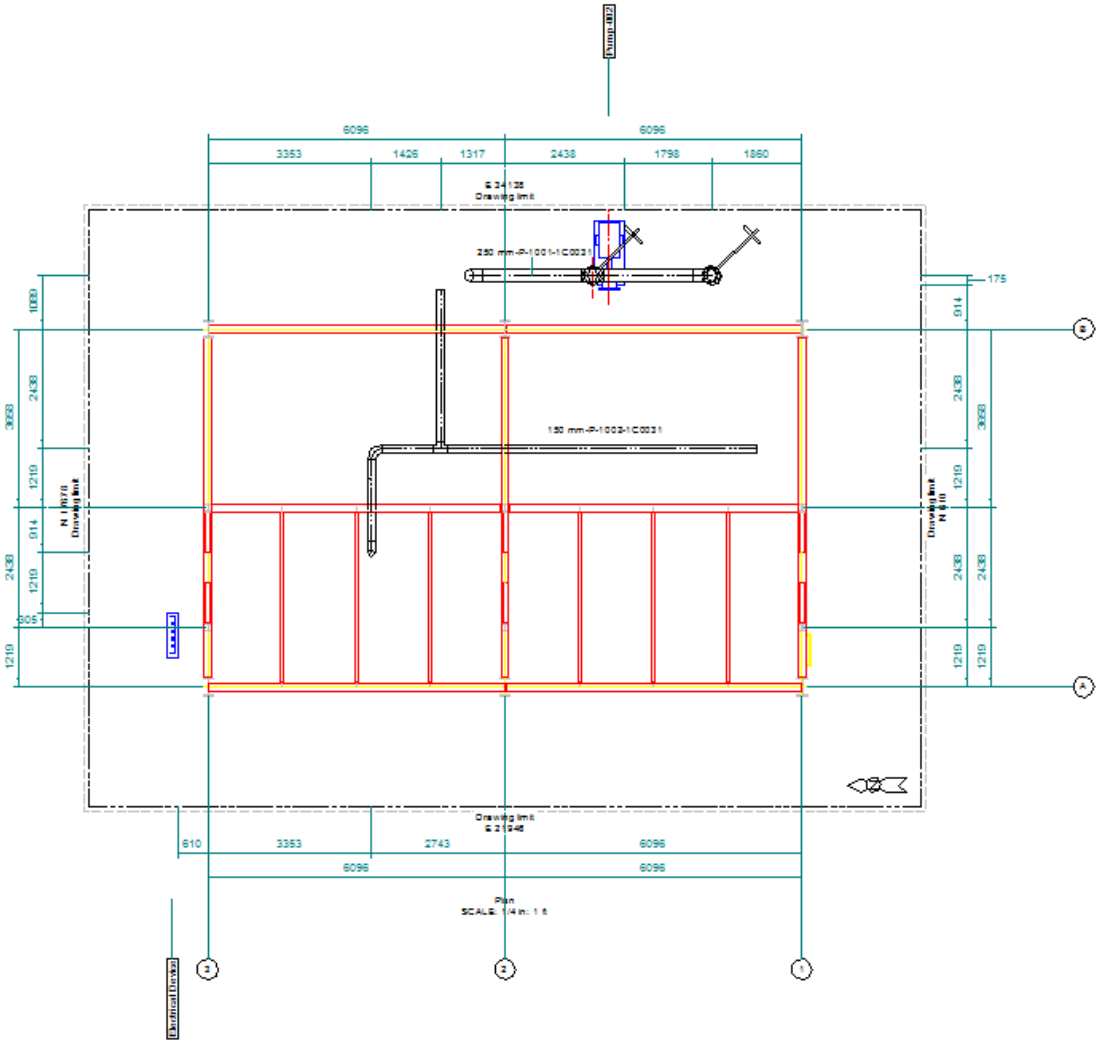
TIP Instead of using the associated volume's local coordinate system, the view's look direction is now relative to the selected coordinate system. In this case, **CS_DrawingView_N_Left** is rotated such that the local North axis is at an angle of 90 degrees East of Global North.

The view resizes to match the new range of the contents.

4. Right-click the view boundary again to display the shortcut menu for the view.

5. Select **Update View**.

The updated view contents should appear similar to the picture below:



TIP Notice that the North arrow is now pointing toward the left instead of toward the top of the page. In a plan looking direction, the software is designed to orient the view such that the North axis of the **View Direction Coordinate System** is pointing toward the top of the page. The North arrow label is designed to point in the direction of Global North.

6. Select **File > Exit** to exit **SmartSketch Drawing Editor**. You do not need to save the drawing because the software automatically saved during the update of the view.