



Session 25

Revit MEP Tips and Tricks

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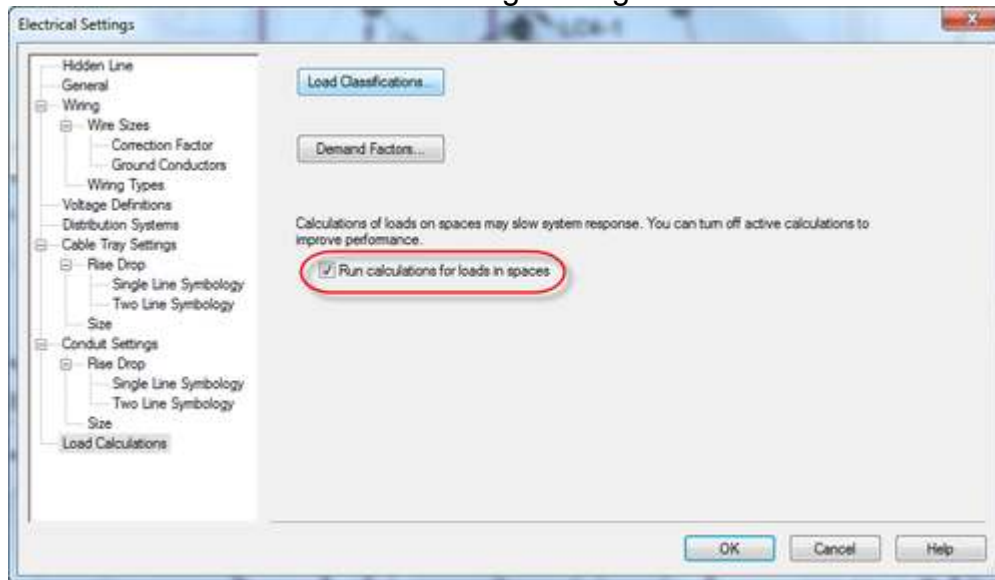
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Sometimes it's the little things which make all the difference. I thought I would share some nifty tricks that can help make Revit MEP go down a little easier.

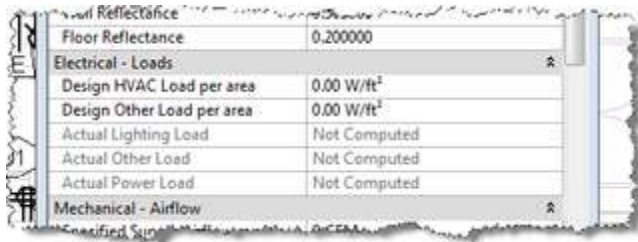
1. Use the space bar to inherit duct and pipe sizes from objects you have connected to instead of uses the last used size. Hit the space bar again to cycle back to the last used size.
2. Tap the space bar to rotate Light fixtures 90 degrees before you insert them. Hold your cursor over an angle wall and tap the space bar to have you light fixture or diffuser align to that wall or go perpendicular to it..
3. Tabbing while hovering over a duct or pipe will highlight portions or the entire run (system).
4. Use your keyboard's arrow keys to nudge selected objects left, right, up and down small distances.
5. Type **CM** to add every single available object type to the type selector. I use this when I can't remember the family type. **CM** loads them all.

A New Setting to Increase Performance

As we all know, performance is one of the key concerns when working with Revit MEP. Any method to increase the performance is invaluable, no matter how insignificant it may seem. With the release of Revit MEP 2011, another such method has been added. This is found in the Electrical Settings dialog.



Included in the new Load Calculations panel of the dialog is a control that allows you to turn off load calculations for spaces. Unchecking the “Run calculations for loads in spaces” checkbox will keep Revit from constantly updating these calculations and show the loads as “Not Computed” in the Properties dialog. As soon as the box is rechecked, the values will be calculated again.



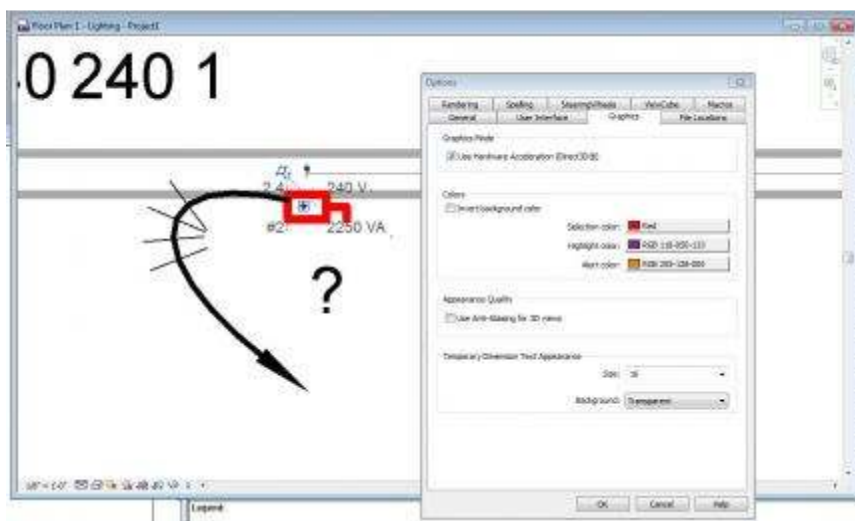
When you upgrade a project to the 2011 version, this setting will be enabled*, so load calculation will be running. You should find an improvement after turning this off.

*Note that the setting will be disabled if you start a new project using a template that shipped with the 2011 release.

Revit MEP Temporary Dimensions

Temporary Dimensions play an important role in Revit Architecture, Structure and MEP. In Revit MEP the term “temporary dimension” is a little misleading. MEP’s temporary dimensions are less about length and more about displaying key design information. I have found on a number of machines that the out of the box Revit MEP temporary dimensions are much too small to be legible. Users try to zoom in on them to read the information but they are still illegible because they stay the same size no matter how far one zooms in on them.

To fix this click on the Revit “R” in the upper left of the screen and go to Options. Then click on the Graphics tab. There you will find the dialog box to increase the “temporary dimensions text appearance” size. Adjust this value to a usable size and you will be much more able to get your design information on the fly.



Of course this is also the same place to set Revit Architecture and Structure.

Turn off MEP System Calculations

In Revit 2012, there is a new Calculations parameter in the System type properties. You can use it to limit or turn off system calculations. The Calculations parameter has three options: All, Flow Only, and None, depending on the system type.

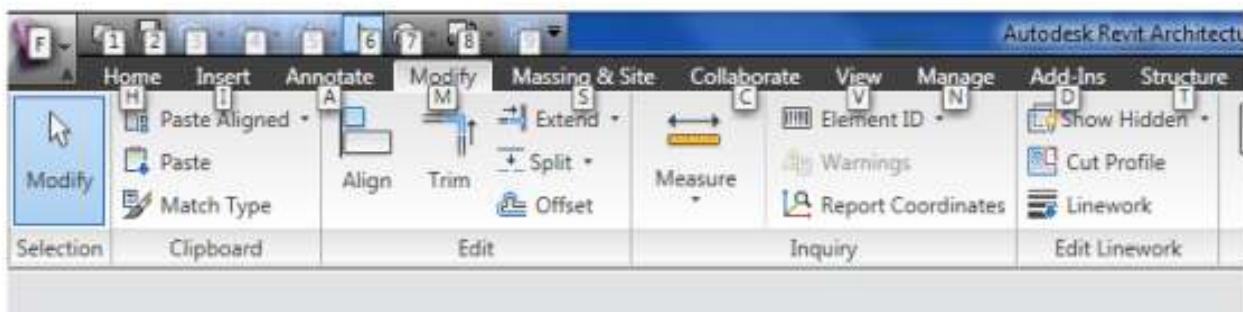
Depending on the option, the affected parameters may not be calculated, and their values are displayed as “Not Computed”. The affected parameters include flow, fixture units, velocity, velocity pressure, friction, friction factor, pressure drop, static pressure, and others.

For example:

1. Select a Supply Air system in the model. Then in the System Type Properties dialog, set the Calculations parameter to None.
2. In the System Properties palette, values for “Flow” and “Static Pressure” show “Not Computed”.
3. Select the duct in this system. In the Duct Properties palette, values for velocity, velocity pressure, pressure drop, and others show “Not Computed”.

Getting Hold of the Keys to Revit

After working with other software that used keyboard shortcuts many still may not have learned all the Revit shortcuts. The easiest way to learn the shortcuts would be to have them show up when there might be an opportunity to use them. Using the “Alt” key will bring up some letters designating the various parts of the ribbon menu. Once these are learned it is easy to get to the various menus to learn their shortcuts. By using the “ALT” key plus the letter or number associated with the different areas the menus will change to that tab or section and the shortcuts will be displayed. So, by using “Alt+M” the Modify tab would be displayed and all the two letter keyboard shortcuts will show up for the Revit tools.



Keyboard Shortcuts in Revit

When multiple keyboard shortcuts start with the same letter, it can be challenging to remember the shortcut for the desired tool. Use the status bar at the bottom left of the Revit screen and arrow keys to choose the right one.

For example, you may define "MI" for Mirror and "MM" for Modify. When you type the first "M" on the keyboard, you will see that Mirror is the current command in the status bar ready to be activated. To activate this keyboard shortcut, simply press the Space Bar or Enter key.

If you don't want the Mirror tool, you can type the next character in the shortcut if you know it. Or you can circulate the status bar to show all available keyboard shortcuts that start with "M" by using the arrow keys, and then press the Space Bar or Enter to activate.

If a two-character keyboard shortcut is entered, and no three-character shortcuts exist with the same first two characters, the command starts immediately with no press of the Space Bar or Enter keys.

Revit 2012 Update: New to Revit 2012 (Architecture, MEP, and Structure) Single-key keyboard shortcuts now have priority on the Status Bar. If a character is used as a single-key shortcut, *and* that character is **not** used as a first character in any other shortcut, then pressing that character immediately activates the command with no additional keystrokes. If a character is used as a single-key shortcut, and is also used as the first character in other multi-key shortcuts, when the character is pressed the command assigned the single key appears on the Status Bar (new priority for Revit 2012) and can be activated by pressing the Space or Enter Key. Additional commands that use the same first character can then be accessed by either: pressing the next character in the shortcut if it is known, or by circulating through available commands using the Arrow keys.

Making Custom Keys

Going to the Options dialog box in the latest build will display a button to get to the new customize keyboard short cuts dialog box.

In the Keyboard Shortcuts dialog box just select the Command then in the "Press new keys:" input shortcuts for the command. "Shift" and "Ctrl" keys can be used as well. This can also contain up to 5 characters. To remove a shortcut highlight it and select the "Remove" button in that same dialog box. Use the pulldown to help limit the search for the commands. The pulldown allows for various filters including searching by tabs.



Updating the Project Template

About once a year it is good to have a discussion with the Revit team in the office and review what might be changed about the company template. Some points to go over are:

- What has worked well?
- What has not worked well?
- Is there anything that has to be done for every project that could be set up in the template?
- What families need to be added?
- What families can be removed?
- What annotation families need to be updated or added?
- Are the schedules up to date?
- Can some schedules from finished projects be imported?
- Do the borders look the way they need to?
- Are there any Shared Parameters that need to be created?
- Review all the items under the “Settings” menu.
- Check into the annotation categories carefully.
- Dig down into each fly-out menu for more information.
- Create an “Open and Close with me” drafting view to help speed opening and closing of files.

When getting ready to go to a new update it is recommended to start with the new version default. Purging it is not uncommon for some to start with the cleanest file possible. Use the list above to start. Open up everything in the new version to update it then transfer it over to the new version template.

Broken Mirror

Sometimes the “Mirror” command just won’t work. Use the “Rotate” with the “Copy” option to get the objects across. This procedure requires that a line be drawn to locate the midpoint between where the original objects are and the desired location. Move the rotation pivot point half-way between where the original object was and the “mirrored” item is to be. Rotate the object 180 degrees but make sure to check the “Copy” box on the “Options bar.”

Changing the Display Properties of Ductwork Systems

When using standard AutoCAD, objects are controlled by layers. This will give the objects the ability to have assigned colours, line-types, and line-weights. Within Autodesk Building Systems objects will have standard layers, but they will also have sub layers. For example; ductwork is assigned to a layer called ‘H-Supply-G’, held within this layer there are a number of additional layers, these will include insulation, lining, centre lines etc.

In this example I will attempt to show you how to access these sub layers and assign specific colours, line-types etc to them.

When using the sub layer, there are two ways of controlling them. The first is to access them through the ‘Style Manager’. If they are amended here, they will use the revised colours etc on every piece of ductwork created thereafter. If however they are revised by selecting the object and right-clicking, then this will only change ductwork of that actual size, and any ductwork that is created with that actual size.

It is advisable to revise these in your template file, as this will then hold the information for every new drawing that is created. If the revisions are made on a single file then that information will only be held on that drawing.

1. Before adding any ductwork to your drawing, select Style Manager (under the Format pull-down menu).
2. Expand HVAC Objects, and then expand Duct System Definitions.
3. Select the system that you want to revise, right click and select Edit.

This will bring you into the desired Ductwork style manager; inside this you will find various tabs that will control the attributes of the ductwork. For example; there is a tab called Design Rules, this is where the main layer assignment is made to the object. There is a tab called Design Parameters, this is where the design values are added for that style of ductwork.

The tab we require is the Display Properties tab. Within this tab there are various different display representations (something I will cover another day!). The Display Representations that we are interested in is the ones in bold. There should be two highlighted, one called 'Flanges' and one called 'Haloed Lines'. The Flanges display rep controls only the actual flange shown at either end of the ductwork; this is still highlighted in the list even if you aren't using a flange style duct (i.e. Slip Joint).

4. Select the box to the right of Haloed Lines

As you see there is a list of predefined layers for the sub information of the ductwork. This is very similar to AutoCAD's standard Layer Manager. All colours, line-types, line-weights etc can be controlled from here. There is one thing to be aware of - Now that you have accessed this sub layer system, ABS will turn on centre-lines by default so if you don't want these, then you will need to select the light bulb next to each one to turn them off.

There are a couple of layers that have 'haloed lines' at the end of them. These represent the line when it passed under another piece of ductwork. The image below will show this better. This will allow you to have lining and insulation in a dotted line, but when they pass under another duct they will disappear completely. It will also allow you to have different colours and line-types for the actual duct when passing under another.

Maximizing Your Template

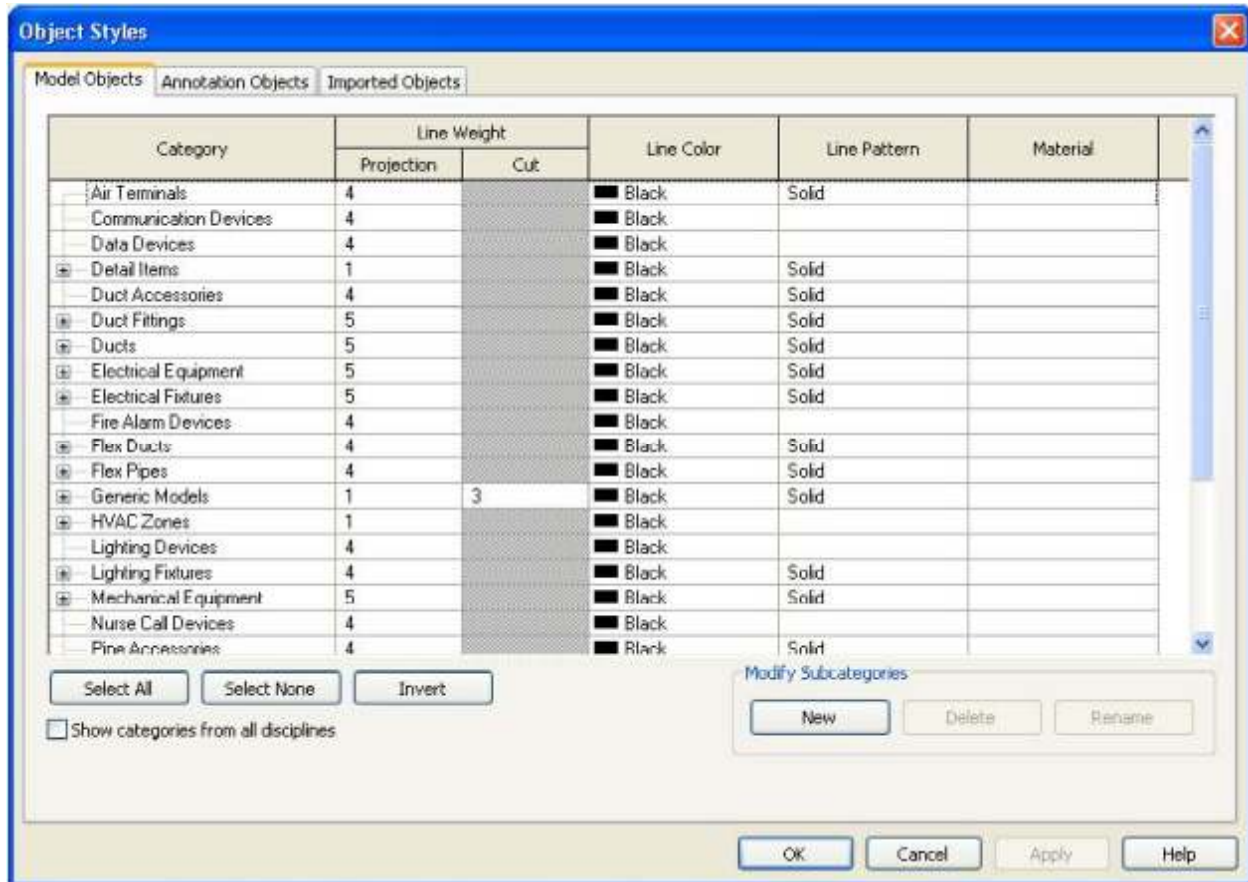
The template file is the foundation for success for using Revit MEP. Throughout this session, we'll work in several areas where items can be adjusted in the template, and have a wide-ranging impact on a project. By starting with the template used to create projects, you can make several changes that will reduce production related tasks throughout the course on the project. Too often, users don't spend the time making these adjustments, which creates additional work for the user.

A well-defined template (or groups of templates) dramatically reduces the amount of time used to setup and run a project. Autodesk includes several templates with the package, but the one to start from for MEP consultants is the *Systems-Default.rte* file. This template already starts with electrical and mechanical views, but may not necessarily be set up to match exactly the way you want. There is a process you can follow when editing templates, so we'll review the steps to make sure these changes are made as quickly as possible and in a uniform fashion.

Object Styles

Before you get started setting up views, it's a good point to make sure you know what the default settings are for lineweights and linetypes for the elements that are placed in a project. These settings are controlled by the element itself, rather than "bylayer" as AutoCAD does. The template includes a few settings you need to check prior to editing element and view properties.

To see what the default lineweights are for our elements in all views, select *Manage > Project Settings > Settings > Object Styles*:



From this dialog, you can select what penweight you want an element to be – when it isn't overridden in a view. Filters in a view template can also override these settings, so you can have objects set to use their defaults in some views, while having other objects set to lighter or screened weights for coordination purposes.

Here's the TIP – Add subcategories to object styles to allow more control over the visibility of objects. For example, electrical equipment could include a clearance object subcategory that represents the clear around and in front of a panel. The same category needs to be added to the panel family (with a solid object created and assigned to the category for visibility control).

Since object styles control lineweights, you need to understand how Revit MEP treats lineweights. Since layers, PC3's and CTB/STB's aren't used with Revit, the lineweight is usually controlled by the object. Revit's template start by providing a range of penweights that are also adjustable by scale, but in most cases these need to be edited to allow for more detail.

To edit the lineweights used by the object styles, select *Manage > Project Settings > Settings > Lineweights*:

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weights

Model line weights control line widths for objects like walls and windows in orthographic views. They depend on view scale.

There are 16 model line weights. Each can be given a size for each view scale. Click on a cell to change line width.

	1" = 1'-0"	1/2" = 1'-0"	1/4" = 1'-0"	1/8" = 1'-0"	1/16" = 1'-0"	1/32" = 1'-0"
1	0.0030"	0.0030"	0.0030"	0.0030"	0.0030"	0.0030"
2	0.0070"	0.0070"	0.0070"	0.0050"	0.0030"	0.0030"
3	0.0120"	0.0120"	0.0110"	0.0080"	0.0040"	0.0030"
4	0.0180"	0.0180"	0.0160"	0.0120"	0.0060"	0.0040"
5	0.0250"	0.0250"	0.0220"	0.0180"	0.0090"	0.0060"
6	0.0350"	0.0350"	0.0300"	0.0250"	0.0130"	0.0090"
7	0.0500"	0.0500"	0.0420"	0.0350"	0.0180"	0.0130"
8	0.0750"	0.0750"	0.0600"	0.0500"	0.0250"	0.0180"
9	0.1000"	0.1000"	0.0900"	0.0750"	0.0350"	0.0250"
10	0.1350"	0.1350"	0.1200"	0.1000"	0.0500"	0.0350"
11	0.1750"	0.1750"	0.1550"	0.1350"	0.0650"	0.0500"
12	0.2250"	0.2250"	0.2000"	0.1750"	0.0850"	0.0650"
13	0.3000"	0.3000"	0.2500"	0.2250"	0.1100"	0.0850"
14	0.3000"	0.3000"	0.3000"	0.3000"	0.1500"	0.1100"
15	0.4000"	0.4000"	0.4000"	0.4000"	0.2000"	0.1500"
16	0.5000"	0.5000"	0.5000"	0.5000"	0.2500"	0.2000"

Add... Delete

OK Cancel Apply Help

Note how the out of the box settings are defined for model elements – the heavier the weight, the wider the variation between weights in a view, based on scale. The list also leans more towards heavier pen widths, so you can change whole rows at

Hold down the left mouse button and drag it across the entire row:

	1" = 1'-0"	1/2" = 1'-0"	1/4" = 1'-0"	1/8" = 1'-0"	1/16" = 1'-0"	1/32" = 1'-0"	
1	0.0030"	0.0030"	0.0030"	0.0030"	0.0030"	0.0030"	Add...
2	0.0070"	0.0070"	0.0070"	0.0050"	0.0030"	0.0030"	Delete
3	0.0120"	0.0120"	0.0110"	0.0080"	0.0040"	0.0030"	
4	0.0180"	0.0180"	0.0160"	0.0120"	0.0060"	0.0040"	
5	0.0250"	0.0250"	0.0220"	0.0180"	0.0090"	0.0060"	

Now all cells are highlighted in the row – you can now edit each one of the cells values without having to pick each item one at a time. Once you reach the last row you want to edit, hit enter and the choices will be saved. Choose *OK* to close the dialog. This method will allow you to scale down the lineweights with slight variations without having to edit individual element object style settings.

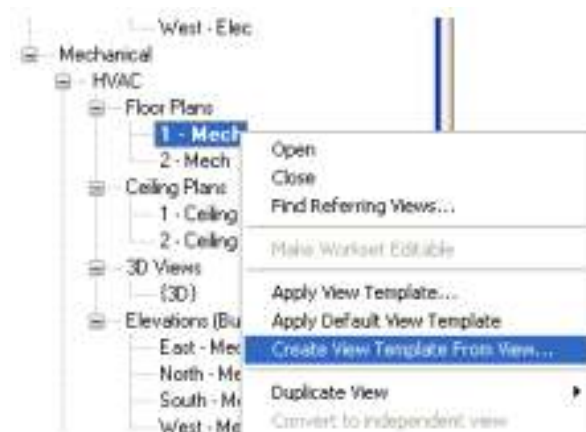
Here's the TIP: Strip out the extra scales if you want the line weights to be the same regardless of the scale of the drawing – and make sure that when you edit the weights, you go back and edit the object styles, view templates and any other location where the lineweights may be overridden.

View Templates

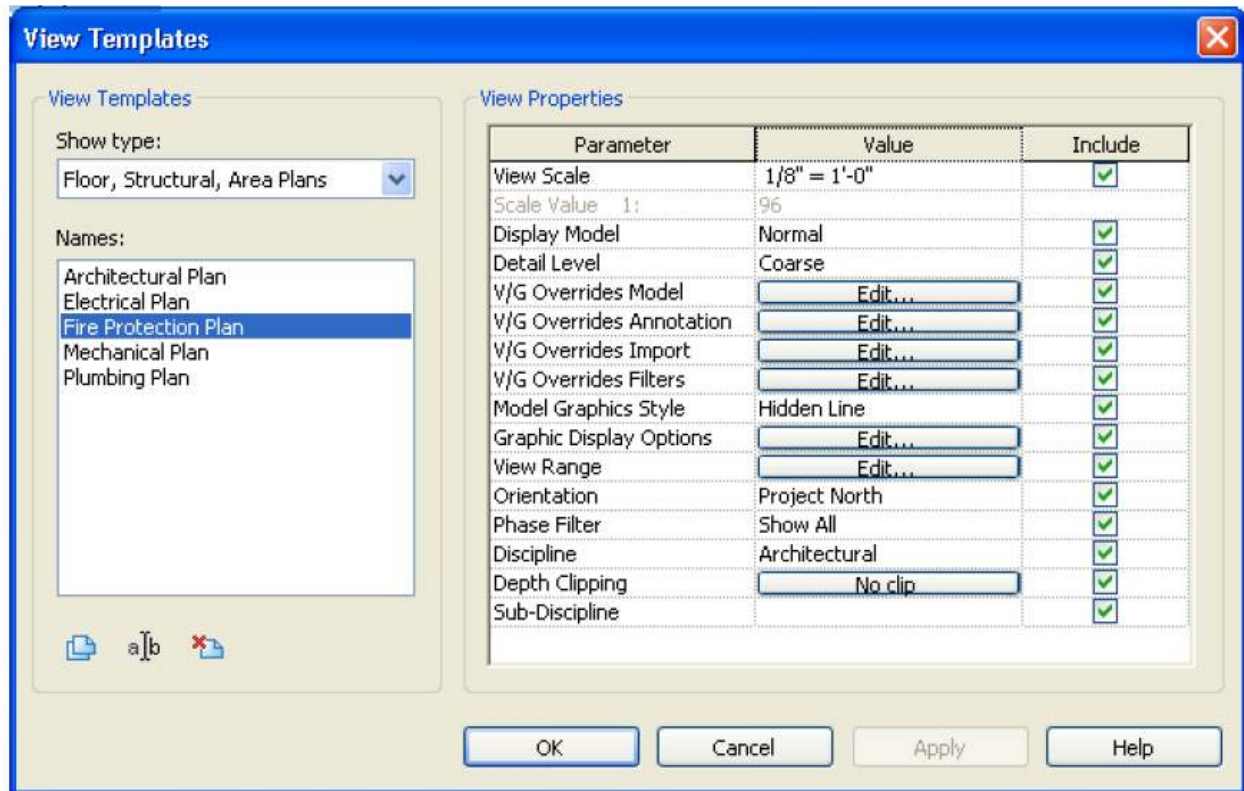
This is one of the most powerful tools for project setup in Revit – the more defined and refined your view settings, the less work a user has to do when working in a project. A CAD manager can make a big impact on a project by having predefined view templates in their project to address all types of plan views – for example, I use view templates to separate electrical lighting from electrical power, including not only the visibility graphics, but also the detail level, the scale, and the sub-discipline – the view template can control all of this.

So, it's a good idea for the CAD manager or user to pre-define how specific views control the visibility of elements. The simplest way to do this is duplicate one of the existing views, and then edit the duplicate.

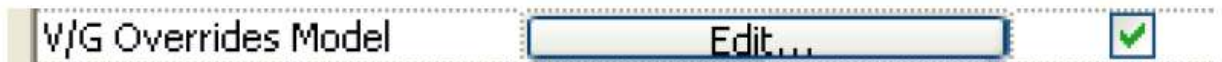
Right click on the default *1-Mech* view, and then select *Create View Template from View*:



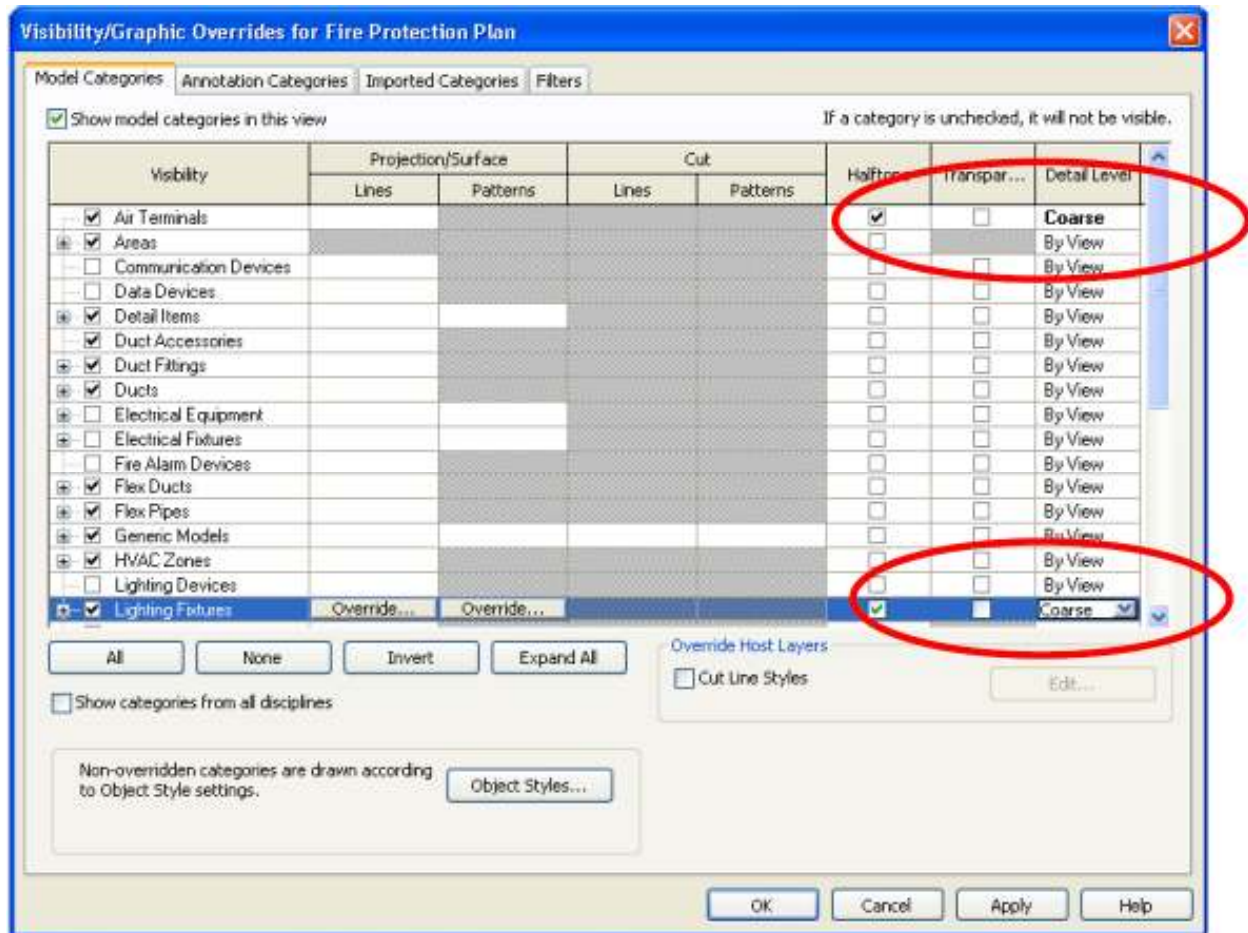
For the name, type in **Fire Protection Plan**. Select **OK** to continue, and the *View Templates* dialog will appear:



From the View Template dialog, choose the *Edit* button for *V/G Graphics Overrides Model* settings:



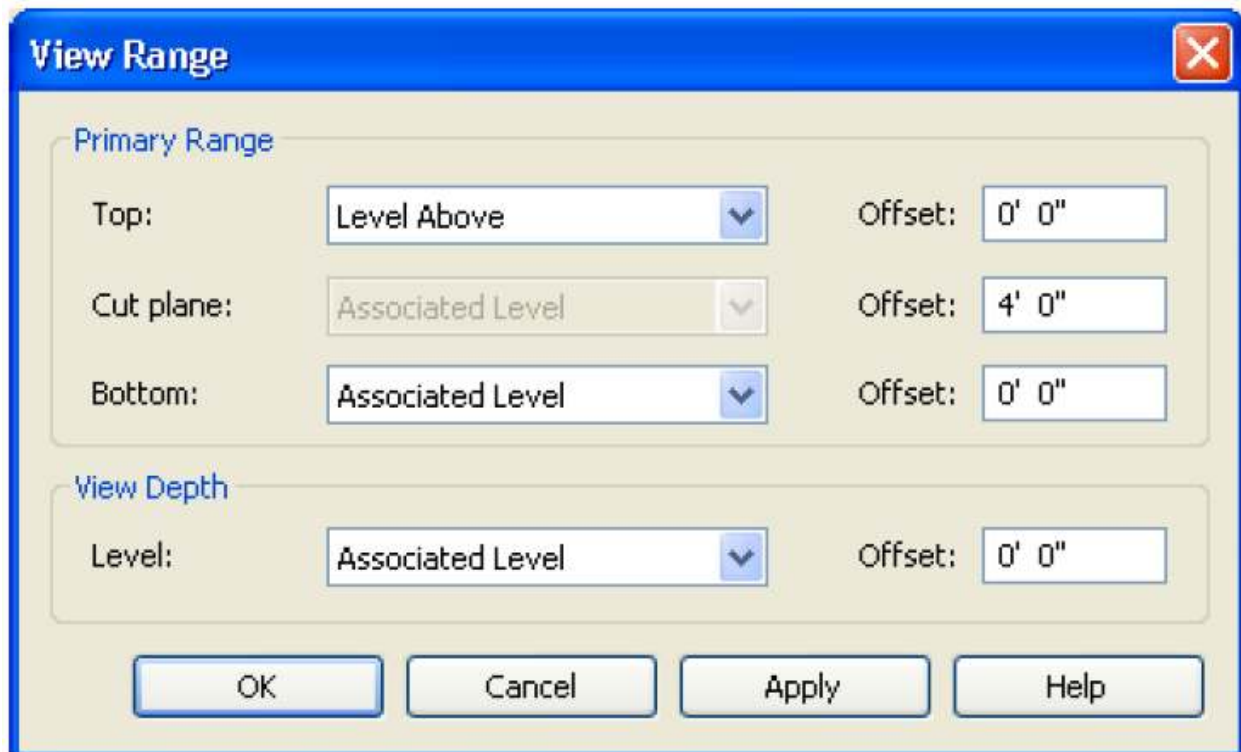
For coordination purposes, leave the Air Terminals and Lighting Fixtures checked – and check the halftone option for each. This will allow you to see these items but screen them, so you can work around these items as needed – and if you want to print this view, they'll appear lightened in the background. You can also set the detail level to coarse to show less detail. Turn off all other items you don't want to see in the plan. Choose **OK** to close this dialog when you're finished:



Another item I like to make sure I've checked is the range of what's displayed in the view. From the dialog, check the edit button for the View Range tool:



The default 1 - Mech view is actually restricted to only show you items that appear on the first floor, up to 10' above the finished floor. With MEP items, in most cases you really want to see what's placed from floor level to floor level, so we'll edit this for the top of the view to go to the *Level Above*, and set the offset to 0" – this will now display all of the MEP items between both levels. Choose OK to close the dialog when you're finished.



View Range

Primary Range

Top: Level Above ▼ Offset: 0' 0"

Cut plane: Associated Level ▼ Offset: 4' 0"

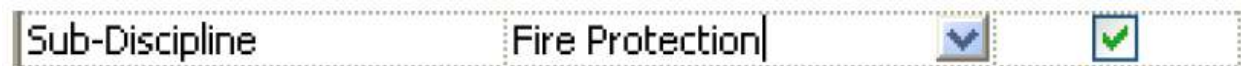
Bottom: Associated Level ▼ Offset: 0' 0"

View Depth

Level: Associated Level ▼ Offset: 0' 0"

OK Cancel Apply Help

The last thing for now is to create a subfolder for the Fire Protection discipline. Since this falls under the mechanical section by default, go to the bottom of the dialog, and type in **Fire Protection** next to the subdiscipline option:



Sub-Discipline Fire Protection ▼ ✓

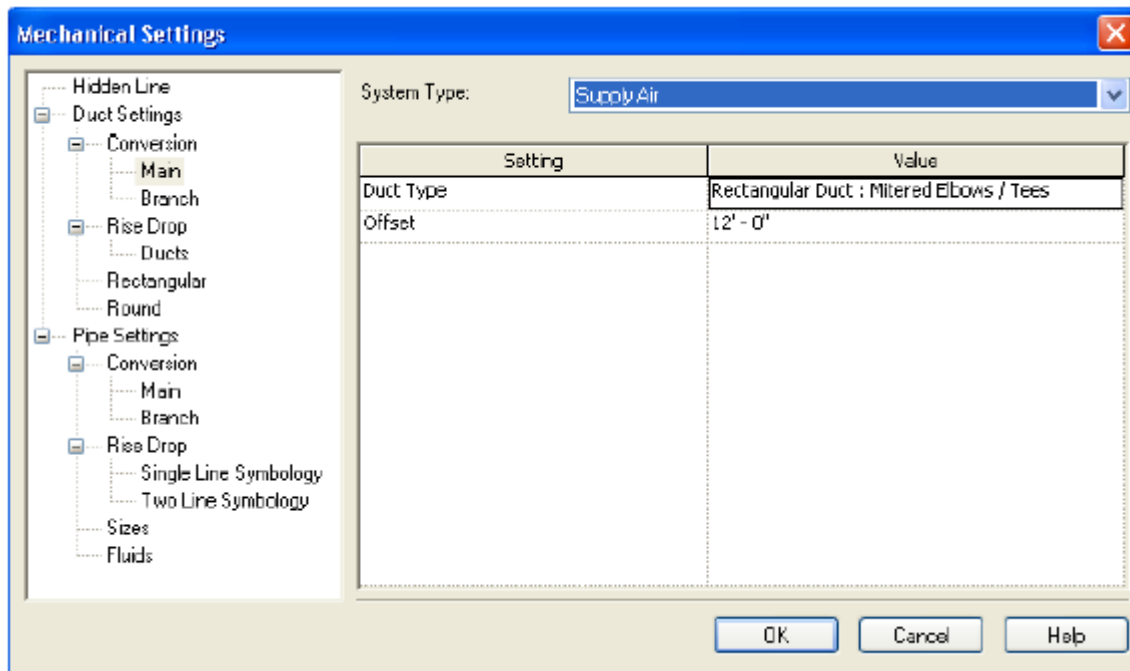
Choose **OK** to close the dialog.

Here's the tip – get those view templates defined early in the template – they'll save the user a lot of time later, and make sure you include the view range, sub-discipline and more as needed!

Routing Tips

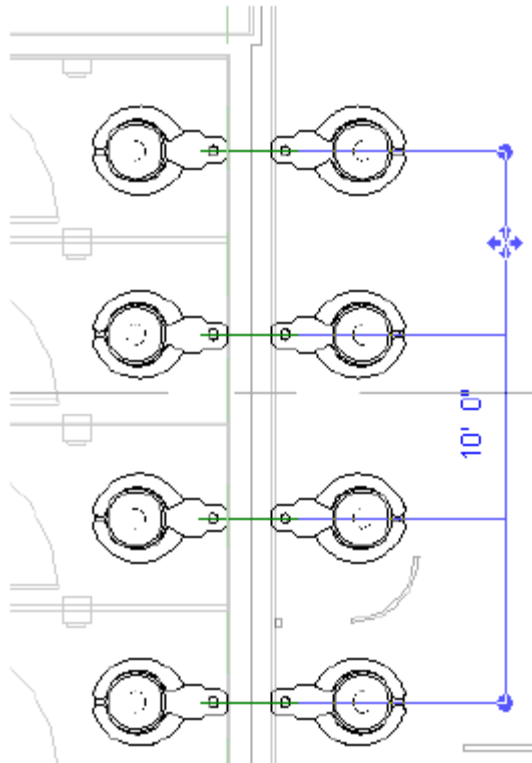
Once you get all of the equipment in place and systems created in the model, it's time to start routing the connecting geometry. The simplest method is to use the Auto-Layout tools to create these shapes – but sometimes you can get some weird or unusable solutions, so here are some best practice tips for getting the best layout.

1. Check your settings first! Make sure you have mains and branches at the same elevation. For ductwork and piping, you can adjust these settings by selecting the Settings menu and then choosing *Mechanical Settings*.



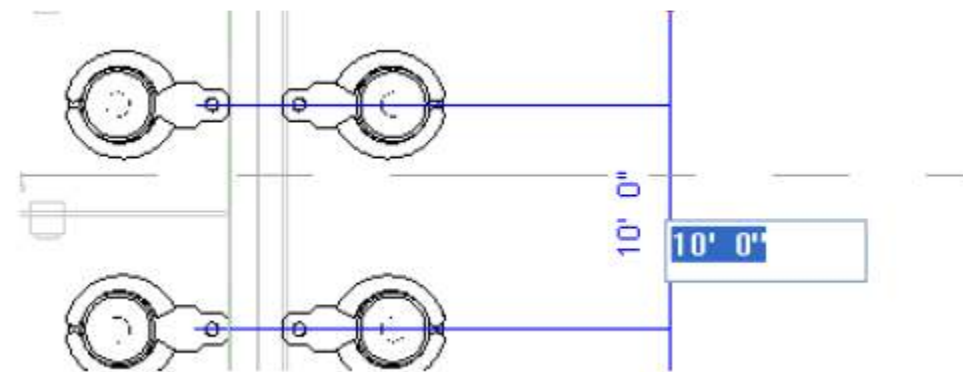
Each system can have its own offset elevation set (which is the relative elevation to the level an item is placed on), so it's a good idea to work out where these areas and elevations will be prior to actually placing any duct or pipe.

2. When working with the auto-layout tools, if none of the default options work, you can select the *Modify* tool on the design bar (while still in the layout paths mode), then select a main or branch you want to move. Once select, use the drag tool to move the pipe as needed:



Be careful that you do not drag past intersections (or to areas that don't have a branch or main running), as this could cause the layout to fail.

3. You can also change the offset elevation of a main or branch by selecting the dimension while using the Modify tool. Exercise caution when using this tool, as it can also cause a layout to fail if a valid solution can't be found.



4. When working with piping that has vertical components such as a riser, work in the 3D view to get a clear picture of how the routing works. Occasionally, fittings may not be placed in the correct direction – if this occurs, simply select the flip grip to change direction of the fitting.

5. Occasionally, when reducing a main duct or pipe down a size, it will appear as though the branches are no longer connected. If this happens, you can correct it by nudging (or moving) the main from side to side – the connections will be re-established and appear correctly on the screen. You can use the drag option to drag the element slightly to one side or another as another means of correcting the problem.

6. Here's a good one – when working with back-to-back plumbing fixtures of the same type (i.e. toilet to toilet), draw a pipe between the two first. Do this all the way down the chase. Next, put in the main line by drawing a pipe at the same elevation over the back-to-back piping – the program will automatically put in the tees (so make sure your system is using the right type of tee first)!

7. If you need to drop a duct down for particular segment, *split* the duct into two pieces using the *delete inner segment* option, and then change the elevation of the segment you want to change. Once you've changed the elevation, hold the CTRL key and select both pieces. On the options bar, select routing options, and let the program come up with alternatives until you find one that works. NOTE: Check your duct type first – by default, each duct type includes a union connection, which automatically be placed whenever a duct is split. Delete the union to get better routing results first!

8. If you need to place duct at an angle other than 90 degrees, the program sometimes may struggle to place the duct correctly. One method one of our clients came up with was to draw the duct at 90 degree angles in the model - once the layout was complete, they placed them all in a group. Next, they rotated the group to the angle they wanted, and then ungrouped the files.

9. Finally, the KISS axiom applies – the more points you give the program to take into account, the more likely you won't get the results you want. It's better in some cases to route some duct segments manually (using the layout paths is not required) if you know you're routing around specific elements in a building, or have a specific path to follow. Make sure that when you're making a connection to be looking for the *point* snap on pieces of equipment, or edge/face snaps on other connecting geometry segments, so the item is properly connected and the system maintained.