Revit MEP 2013   by Jerad Meidinger:

Understanding View Range

When determining why an element in the Revit plan view is not displaying, a user may try to troubleshoot the situation by referring to the View Range. Although the View Range concept itself is easy to comprehend, a full understanding of it requires more than a basic understanding of Revit. With a little bit of clarification regarding definitions and some hands-on practice, View Range concepts can easily be understood. While this article primarily addresses Autodesk® Revit® MEP, the discussion provided within can also apply to Autodesk® Revit® Structure and Autodesk® Revit® Architecture software.

The goals for this article are to decode terminology, to deliver meaningful strategies for visualizing View Range, and to suggest ways for users to confidently set the View Range for desired results.

FLOOR PLAN VERSUS CEILING PLAN

Although four common terms are used to define the View Range, each term has a different definition depending on whether the view is a floor plan or a ceiling plan. A user needs to know that the definitions that apply to a ceiling plan may not apply the same exact way to a floor plan, even though the wording and framework are the same. Fortunately, a small visual cue exists to help users remember which set of rules applies. This visual cue is explained in the Second Term: Cut-plane and Third Term: Bottom sections of this article, as it relates to the ability/inability to modify View Range parameters.

ACCESSING VIEW RANGE

Users can access the View Range with just a few clicks. First, the floor plan or ceiling plan must be opened using the project browser. Once the floor plan or ceiling plan is open, the View Range button becomes available in the Properties panel (see Figure 1).

Clicking the View Range button brings up a dialog box similar to Figure 2 listing four parameters: Top, Cut-plane, Bottom, and View Depth. Each term is explained in more detail in the following four sections.
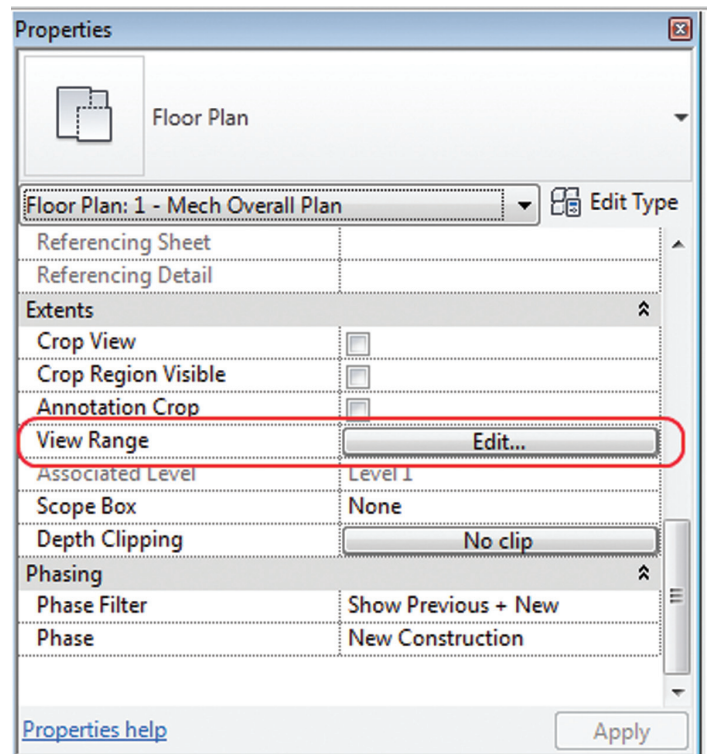

Figure 1: The View Range button must be clicked to access the View Range. The button can be found near the bottom of the Properties menu, as indicated by the scroll bar.
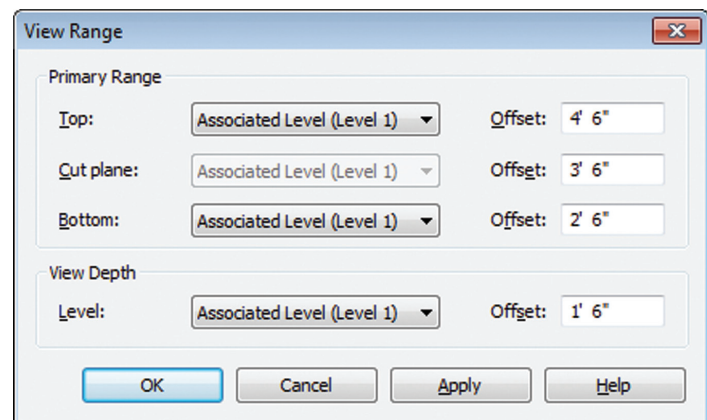

Figure 2: The View Range dialog box has four parameters to set.

FIRST TERM: TOP

The first term in the View Range dialog box is called Top. For both floor plans and ceiling plans, Top is a modifiable parameter. The Top View Range parameter (for both floor and ceiling plans) indicates that any element above the Top will not display.

Most often, the best settings for Top are to the Level Above with an offset of 0'0". Some circumstances may require higher or lower requirements than this offset, which can be adjusted to meet individual user needs.

Top is by far the most intuitive of all the View Range parameters. If only all of the parameters were like Top, an article on View Range would simply not be necessary. Alas, the other View Range parameters are not nearly so intuitive.

SECOND TERM: CUT-PLANE

Cut-plane is the second term in the View Range dialog box. From a section point of view (POV), this parameter is always at an elevation lower than Top. In a floor plan, Cut-plane is a fully modifiable term, allowing users to set both its association and the offset. In ceiling plans, Cut-plane is only a semi-modifiable term. The association is always locked to the associated level, but its offset can be set by the user.

The Cut-plane setting controls how the linked file items (such as windows within walls) display. If the Cut-plane is set at a level where it will cut a window, the window will display in the wall. If the Cut-plane does not cut the element, it will not be displayed. For these reasons, a good offset value to use is 4'0".

A fun way to think about Cut-plane is to envision a typical "doggy door" for a small dog such as a Chihuahua. The doggy door would be low to the ground, below a 4'0" Cut-plane. The Chihuahua may be concerned that its door is not modeled in the plans and will begin to yip out of sadness. (Poor little Chihuahua!) If the doggy door was scaled to accommodate a horse instead, the door would be cut by the Cut-plane and would be displayed in the plan view. (What a happy horse!)

THIRD TERM: BOTTOM

The third term in the View Range dialog box is called Bottom. From a section POV, this term would be at an elevation lower than the Cut-plane. Bottom is the level where anything located below is not desired for display.

When working with floor plans, Bottom is most commonly associated with the level of the floor plan. Although it is usually best to leave this item at a 0'0" offset, there may be times when other offsets are preferred such as rooms with raised floors.

With respect to ceiling plans, working with Bottom can get a little hairy. In fact, an easy trick to remember this is to think "hairy bottoms." First off, one will notice that Bottom is not even a modifiable parameter, as it is grayed out and deactivated. Bottom's offset and association are the same as the Cut-plane's; changing the offset of the Cut-plane will also change the offset of Bottom. Users

may feel a loss of control and surmise Revit has temporarily locked the values, but it is more of a simplification for ceiling plans. This just forces everything that is cut by Bottom (and simultaneously the Cut-plane) to be viewed consistently across ceiling plans.

FOURTH TERM: VIEW DEPTH

View Depth is by far the oddest parameter to set. While the first three parameters are somewhat intuitive (i.e., Top is always toward the top of the building and Bottom is always toward the bottom of the building), View Depth takes a divergent approach.

In ceiling plans, View Depth is toward the top of the building. In floor plans, View Depth is toward the bottom of the building. From the traditional section view POV, this qualifies View Depth as a homonym (same spelling/pronunciation, different definition). To overcome the confusion this may cause, users must realize the difference and mentally adapt the definition to the surrounding environment (ceiling plan versus floor plan).

A great way to mentally adapt the definition is to first envision a floating eyeball that changes position and aim-direction depending on whether the view is a ceiling plan or a floor plan. This eyeball symbolizes the location where an eyeball would have to be to see the intended view. In ceiling plans, the eyeball lies on the ground and looks up at the ceiling. In floor plans, the eyeball is mounted to the ceiling and looks down at the ground. This eyeball symbolism can be seen in Figure 3.
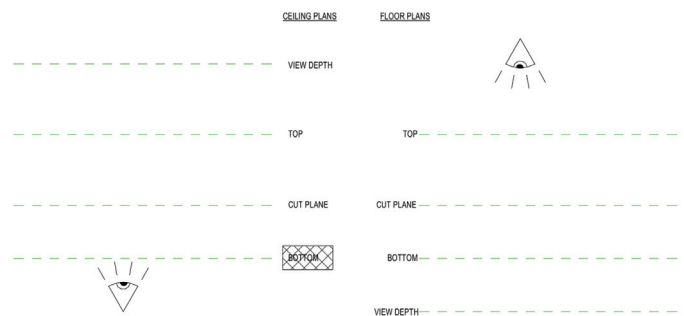

Figure 3: Distinction of eyeball location for ceiling plans versus floor plans. Note: the eyeball is really only useful for the View Depth parameter.

Here is a good definition to follow: View Depth is always the furthest level away from the eyeball's location. Following this rule "semi-eliminates" the homonym problem. The worded definition of it is the same, but the physical location and relationship it has with other View Range parameters behaves like a homonym. Hence, the problem is only semi-eliminated. Whichever way the user prefers to think of the View Depth, the term will be a homonym one way or another.

FLOOR PLAN VIEW DEPTH

In a floor plan, remember that the eyeball is mounted to a ceiling and aimed down. By obeying the rule that the View Depth is always the furthest location away from the eyeball, the View Depth is located at or below the Bottom.

Typically, users will want to have the floor plan's View Depth parameters set to be associated with the associated level, at a 0'0"

offset. In other circumstances, it may be useful to see objects that are mounted in the floor, such as floor boxes, underground pipes, and embedded conduit. If that functionality is desired, a floor plan's View Depth is the parameter to customize. For graphical usefulness, there will be a small visual distinction for those objects falling in the area between Bottom and View Depth.

CEILING PLAN VIEW DEPTH

In a ceiling plan, remember that the eyeball is on the ground, aimed up. Following the rule that the View Depth is always furthest from the eyeball, View Depth is located at or above the Top. From a section POV, this is the opposite location when compared to the floor plan. This is counter-intuitive when viewing the parameter list, as the View Depth parameter is still the fourth item down, which is the same for the dialog of floor plans.

Typically, users will want to have the ceiling plan's View Depth parameter set to be associated with the Level Above, at a 0'0" offset. For situations in which users wish to see further above the Top, the View Depth is the parameter to adjust. Just like a floor plan, there will be a small visual distinction for those objects falling in the area between Top and View Depth. Situations where this could prove useful vary from routing a conduit to stub through the ceiling at a certain spot to seeing the light fixtures at the top of an elevator shaft.

VIEW DEPTH OBJECT DISPLAYS

As indicated previously, anything that is between the View Depth and Bottom (for floor plans) and View Depth and Top (for ceiling plans) always has a special display setting applied to it. This can be useful for designers to visually understand that the object displayed is below the floor plan's Bottom or above the ceiling plan's Top. To control how this behavior works, one must go into the Revit project's Line Styles and access the project's <Beyond> setting as shown in Figure 4. After expanding the list for lines, the <Beyond> setting can be modified for desired settings.
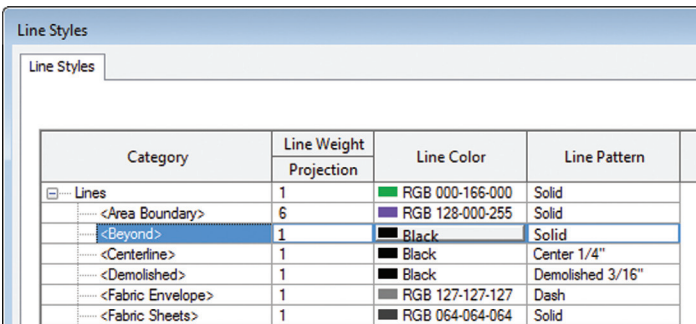
Figure 4: The Line Styles dialog box can be accessed via Manage ribbon -> Settings panel -> Additional Settings dropdown -> Line Styles button.

Note that this only applies to the objects that would not otherwise be displayed if the View Depth was set to its more traditional values, level with the Top (ceiling plans) or Bottom (floor plans). Beware! It is a project setting, so the entire project will display based on these modifications. Figure 5 shows an example of the impact the <Beyond> setting from Figure 4 has on a sample floor plan used for demonstration purposes.
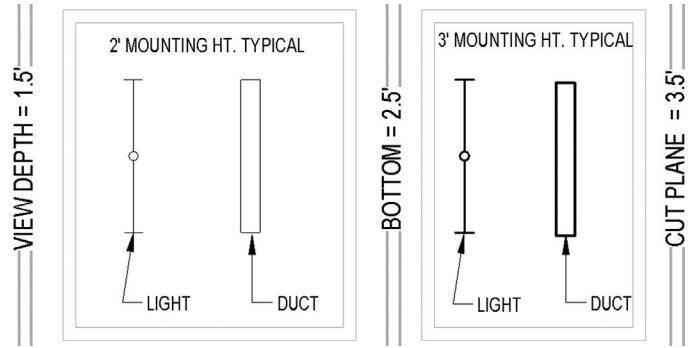
Figure 5: This floor plan View Range example shows <Beyond> settings in action. Notice the objects located between the floor plan's Bottom and View Depth display at lineweights consistent with the <Beyond> settings from Figure 4.

FOOLPROOF RULES

The main thing to remember about View Range is that there are rules for ceiling plans and rules for floor plans. Confusion occurs when one set of rules is applied to the wrong type of plan. Here are the rules:

1. For floor plans, the eyeball is mounted high, looking down. The order of levels below it (from closest to farthest) is Top, Cut-Plane, Bottom, and View Depth.
2. For ceiling plans, the eyeball is mounted low, looking up. The order of levels above it (from closest to farthest) is Bottom, Cut-Plane, Top, and View Depth.

CONCLUSION

View Range affects every single view in a Revit project. It may be a necessary stepping stone when troubleshooting visibility/graphics issues. If View Range must be changed, the concepts can become rather difficult to wrap one's mind around. Fortunately, with enough practice and the right mindset, it can become a quick, easy task.

Jerad Meidinger, EIT, is an electrical engineer with The RMH Group, a mechanical/electrical consulting engineering firm headquartered in metro Denver, Colorado. While with RMH, Jerad has worked on projects in a variety of market sectors including aerospace manufacturing, justice/corrections, military, and higher education. Jerad is a member of The RMH Group's "BIM Task Force," which is focused on advancing BIM capabilities throughout the firm. He has also dabbled in Revit API programming. Jerad earned a B.S. in electrical engineering from the University of Wyoming in 2009. Please send any comments/questions to Jerad via email at jmeidinger@rmhgroup.com