Stack your Sections: Tips for Building Section Sheets Efficiently

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CI1527   Autodesk® AutoCAD® Civil 3D® software provides tools for creating section views and laying them out in preparation for printing. These tools and options work fairly well for people who work in the flatter parts of the world, but for those of us who design in more rugged terrain...not so much. In this class we will discuss section view styles, band styles, group plot styles and how they interact. I will also demonstrate a method that allows you to create stacks of variable-height section views so that the page space is used efficiently.

Learning Objectives

At the end of this class, you will be able to:

- Work with Section View styles

- Work with Group Plot styles

- Create a custom paper size and page setup

- Bring all of the pieces together to create section sheets for printing

About the Speaker

Steve Boon is a Civil Technologist at McElhanney Consulting Services Ltd, and has been an AutoCAD user since 1994. He was an early adopter of Civil 3D and has been using the software daily ever since. Steve is an Autodesk Certified Professional. While waiting for corridor rebuilds Steve is also an active participant on the Civil 3D forum, answering the questions of other users. Steve's contribution to the User Forums was recognized in 2012 when he was invited to become a charter member of the Expert Elite user group.

Background Information

Sections are one of the three primary ways to present a design on paper, along with Plans and Profiles. Civil 3D has styles and tools to help you create the section views and to lay them out in an organized fashion for printing. Each company or approving agency has a preference for how sections should look, and how they're laid out on the page. In my office the default is to build columns of sections, starting at the lower left corner of the sheet.

Sections are often organized into a grid with fixed widths and heights, to fit efficiently on a page. Some of us might even remember when you could buy vellum or mylar with a pre-printed grid on it, ready for hand drafting your sections.
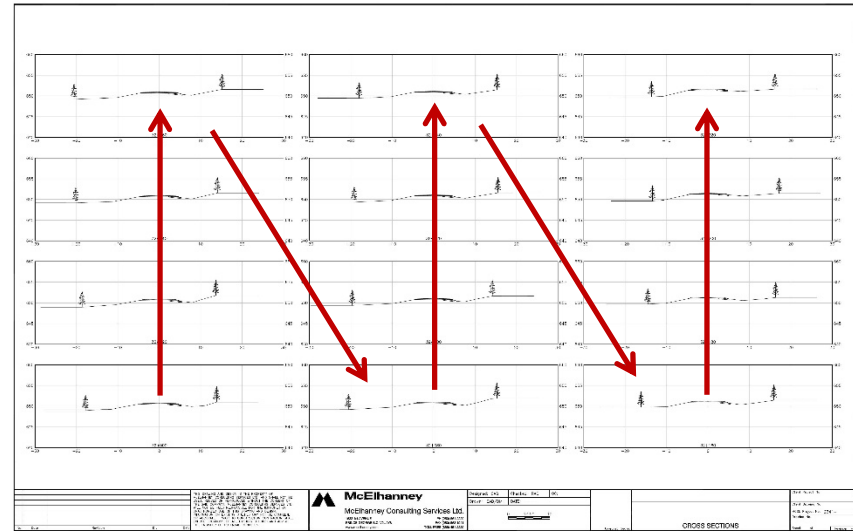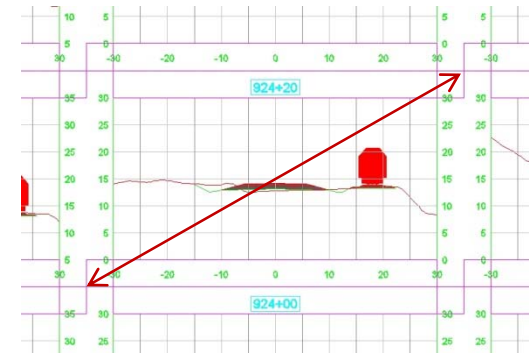

Section View Styles

My section views are pretty basic. I don't use vertical exaggeration. The labels are at 10m intervals at the bottom and 5m on both sides of my sections. Note the major tick interval and the grid padding – they will be important later.
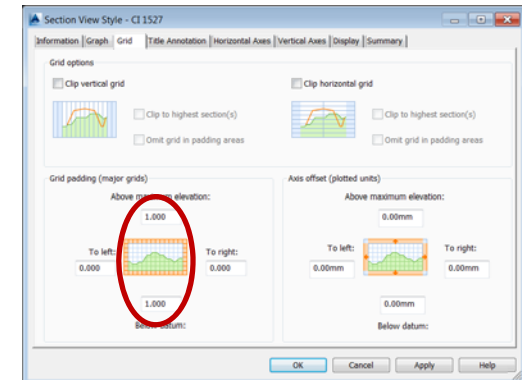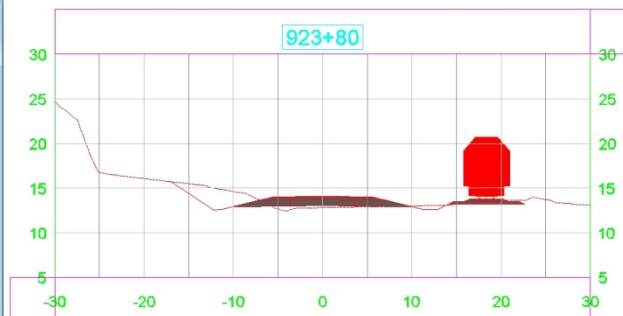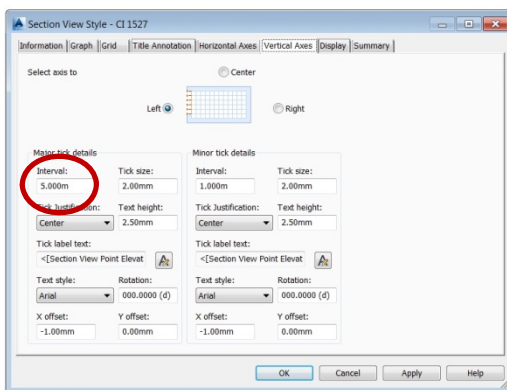
Section view bands are a useful tool for ensuring that section views are spaced correctly. Normally the extents for a section view are defined by the top, bottom, left and right axis. If your view style includes labels which are outside those four lines then you may have problems with overlap. If you add bands then they become the new limits for the section view.

Using Group Plot Styles to layout multiple Section Views

Most users start by using the wizard to lay out sections in draft mode. This gives us a chance to see what the sections look like, so that we can start thinking about how to present them. Most of the options in the wizard aren't really important at the moment, except for the Elevations tab. This is where the Datum elevation at the bottom of each view is set. Once the views have been created the only way to edit them is individually, so getting these settings correct is important. There are four options:

Automatic

Displays the entire section from the lowest elevation to the highest. This is the only option that does not force you to select a view height. Grid padding is applied to the top and bottom of the section view. This display is useful for design and analysis but usually not for presentation.
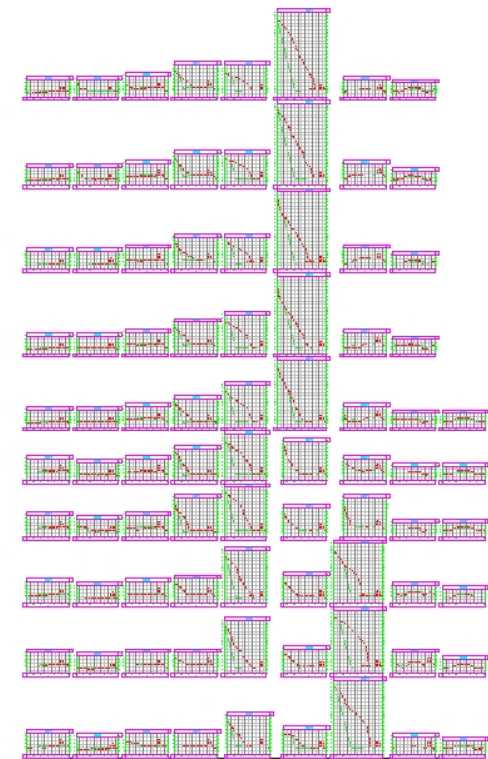
Protip

The software will always build the section view by rounding down from the datum elevation to the next major grid. This elevation may be adjusted further if grid padding is used in the section view style.

ELEVATIONS AUTOMATIC

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Lowest Elevation of All Sections

The lowest elevation of any section in the view will be the datum. Grid padding is applied to the bottom only, and once the view is created the top and bottom elevations are fixed so changes to the padding settings have no effect.

The problem with this method appears if the lowest elevations in your sections aren't consistent. In this set you can see that some sections drop off to the river on the right side, and some don't. This means that some sections have been pushed higher within their view.
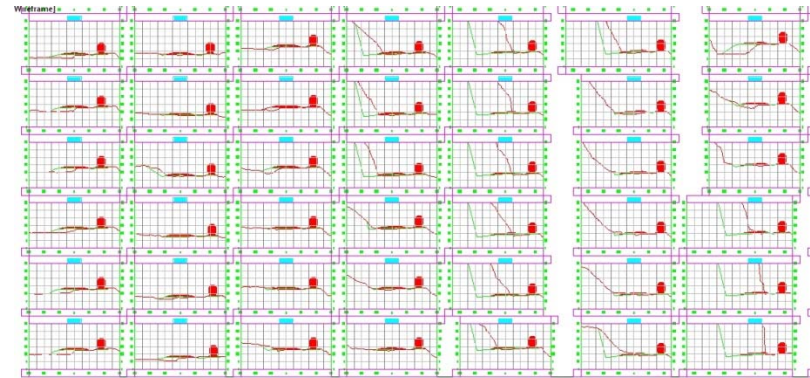
LOWEST ELEVATION
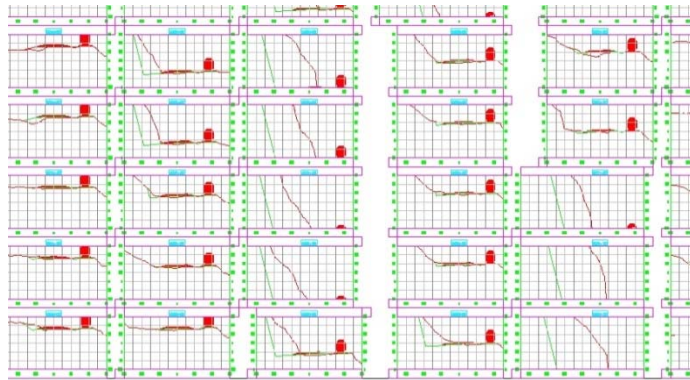
MEAN ELEVATION

Mean Elevation of All Sections

Similar to above but I have never been able to get this method to work properly. Apparently the software ignores both of the grid padding options when using this method.

Follow a Section

This method is essentially the same as the Lowest Elevation, except that it follows the lowest elevation of only one section instead of all of them. Usually this is my default choice if I have sections that are fairly regular. Sometimes I need to plan for space below the section for labels etc. I'll adjust the grid padding for this and recreate the views.

Using Template drawings and Group Plot Styles to Build Section Grids

To this point we have been creating section views in draft mode. When we start creating sections in Production mode we start to see them organized a little differently. The titleblock that I intend to fit these into has a viewport with dimensions of 480mm by 800mm. I know from experience that those dimensions fit nine sections 60m wide by 30m high at this scale.

Bands are used again to help with the positioning of these views. Minor adjustments to these band dimensions or the sheet settings within the group plot style can have some unexpected impacts.

Note the use of major grids again in the sheet style. Each view will be inserted at a major grid intersection and there must be grid lines between adjacent views.
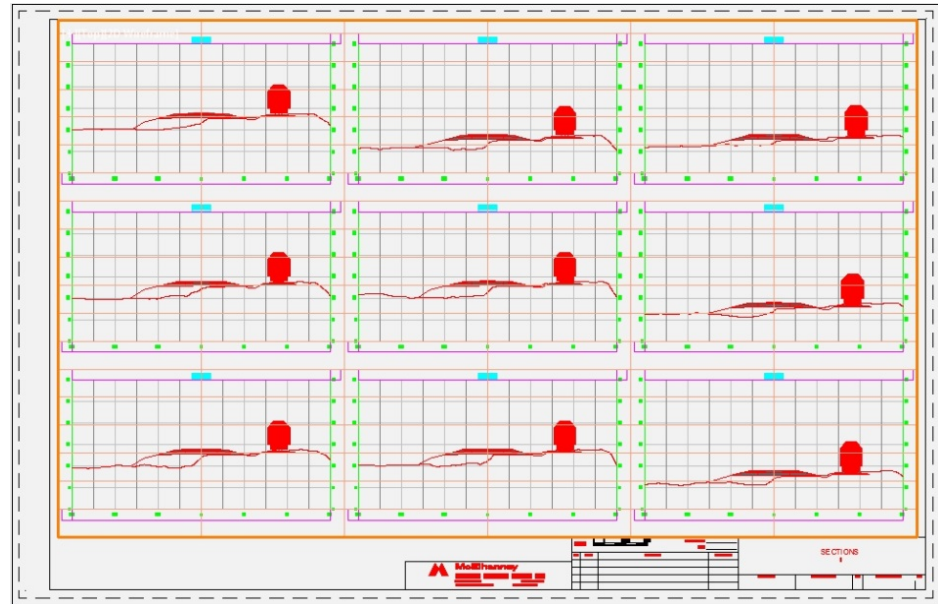

Building Stacks of Variable Height Sections

Arranging section views in a grid is one thing, but for some projects you need more flexibility. Ideally we would like to have the sections stacked up in columns, with each one just tall enough to show the entire section. The problem is the group plot style forces all of the sections in each row to line up also, which wastes a lot of space. The workaround solution is to make the page just wide enough for one column so that each row on a page is only one section wide.

The **secret** – The group plot style organizes the section views to fit within a sheet object. The size of that sheet is tied to a layout and a viewport in your template drawing. That layout is controlled by a page setup which is tied to the dimensions of an actual sheet of paper. When you use the plotter manager utility to add a printer then all of the paper sizes available through the printer driver are added to the pc3 file. **You have the ability in ACad to add your own paper size and create a dummy page setup which uses it.**

The sheet that I intend to fit the sections into is from a client. The basic dimensions of the viewport are 800 x 480mm

Start by creating a new layout in your template. Open the page setup manager and create a new page setup.
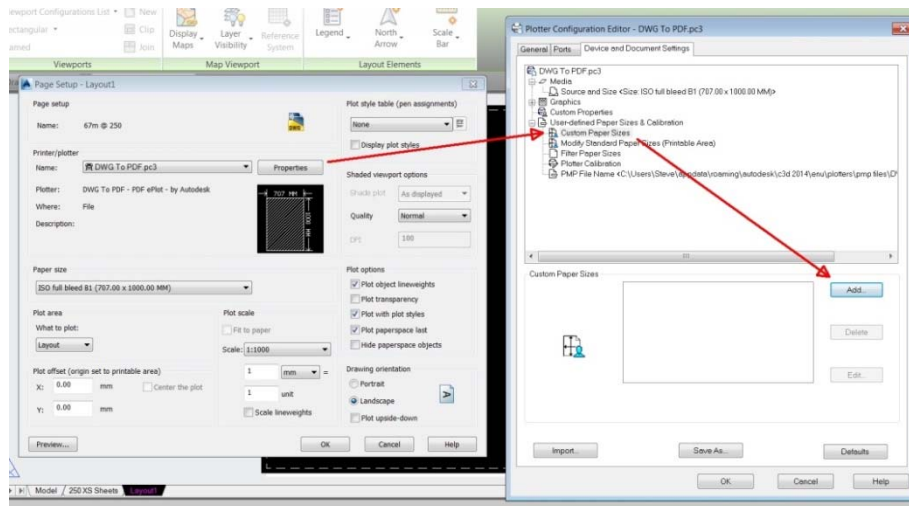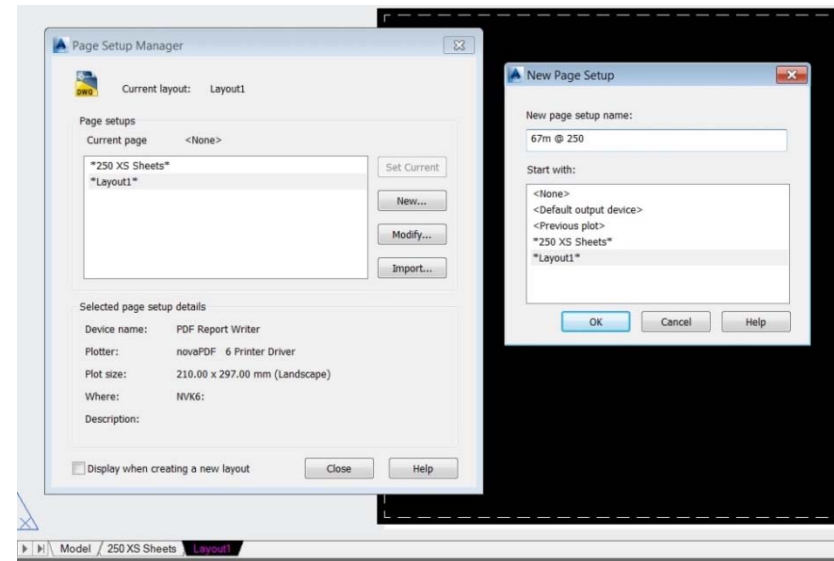
Select an output device – I usually use DwgToPDF. Use the Properties button to open the Plotter Configuration Editor and add a Custom Page size from scratch.

The height will be the same as the final sheet but you need to calculate the width to suit the number of stacks on the page and the available section width at the final plot scale. I've calculated the dimensions for two common scales here:

- 3 stacks at 250 scale. 800 / 3 = 266.67mm (viewport width) * 0.25 = 66.67m (available modelspace width)
- 5 stacks at 500 scale. 800 / 5 = 160mm * 0.50 = 80m
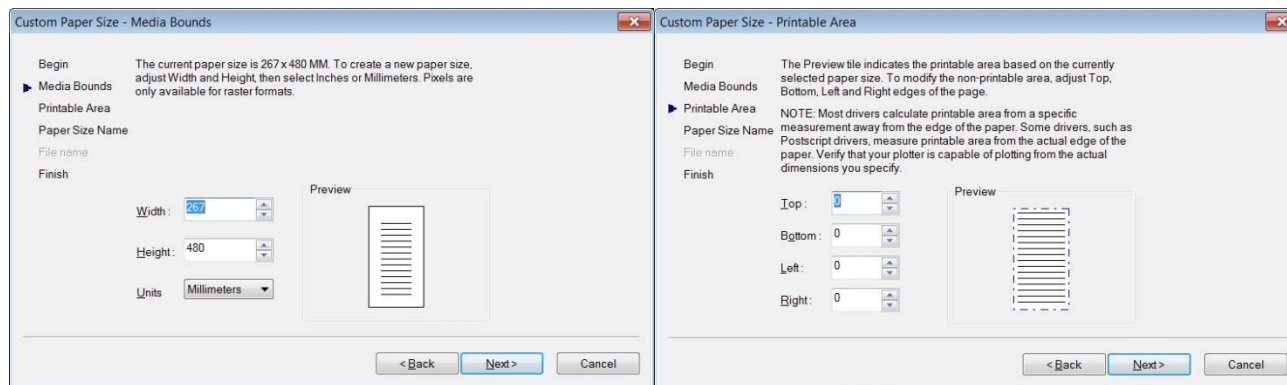
Set all four margins to zero. Give your new paper size a name and exit back to the Page Setup. Set it to plot the layout at 1:1 in portrait mode and exit.

You'll also need a viewport to go with the page setup. Make sure that the dimensions match the sheet size, the scale is correct, and that the type is Section. Save your template file with the new layout and exit.

Returning to the original drawing, now you can create a set of section views.
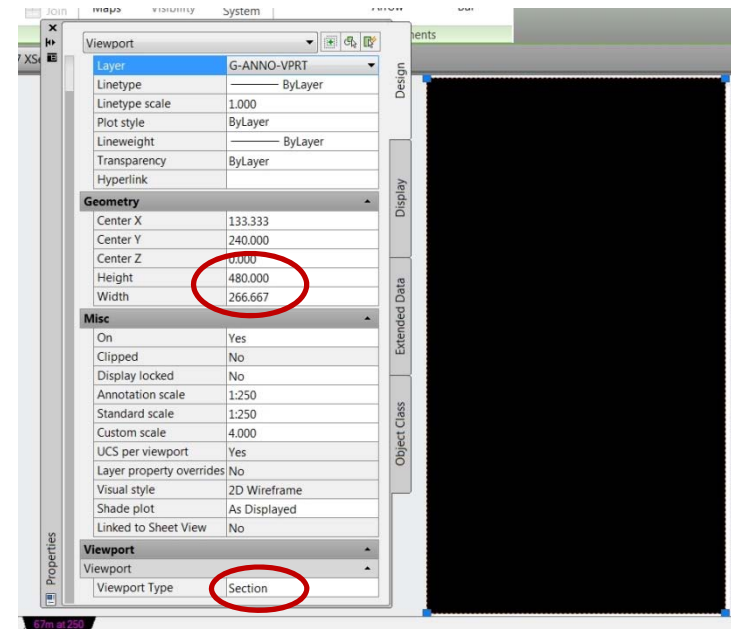
Getting to the Output – Old School

All of the pieces are coming together and we're ready to create the final product. When we run the wizard we use the section style, the band set, and the group plot style you have already seen, the new template layout and automatic widths and heights. We end up with a big row of stacked sections, packed in as efficiently as possible.
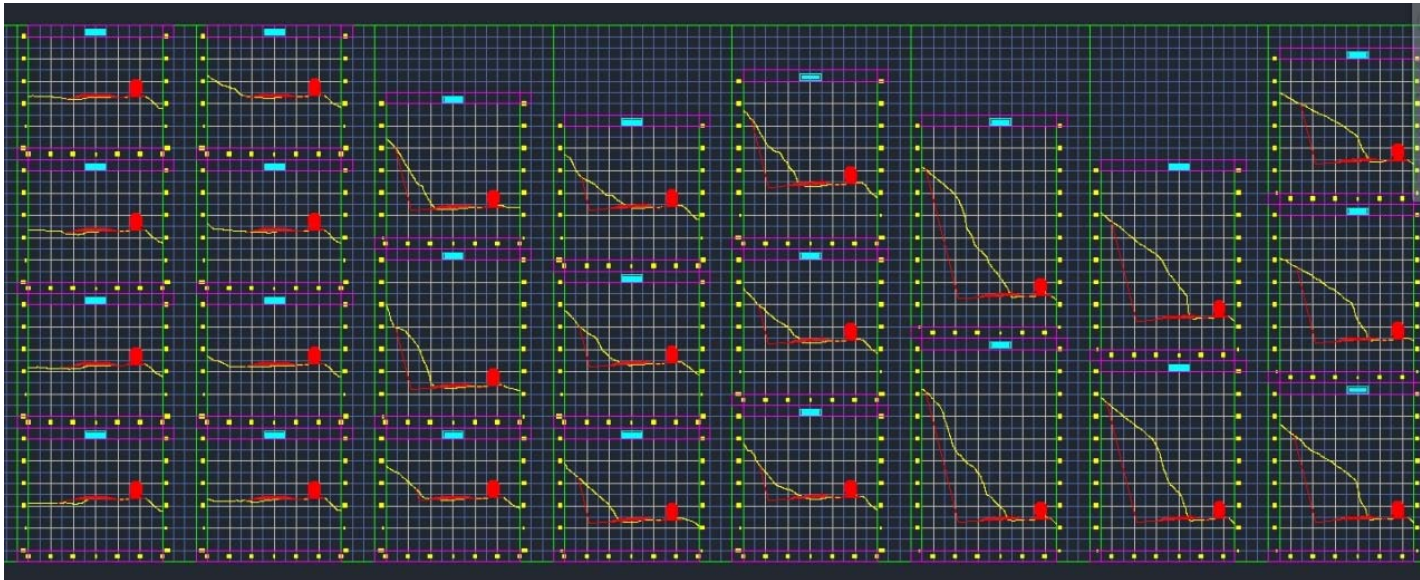
Of course the normal tool for creating section sheets won't work here, since they're linked to a template layout that is definitely not intended to create real sheets.

The workaround for this is to go old school, and create plan sheets that just happen to lay on top of the sections. Create a dummy alignment that runs left to right through the middle of your sections. Next create plan view frames along that alignment. I have a plan view layout in the template which looks like a section titleblock and I can use that to create the sheets. Bonus – unlike the standard method this allows you to put the sheets in separate files instead of all in the current drawing.
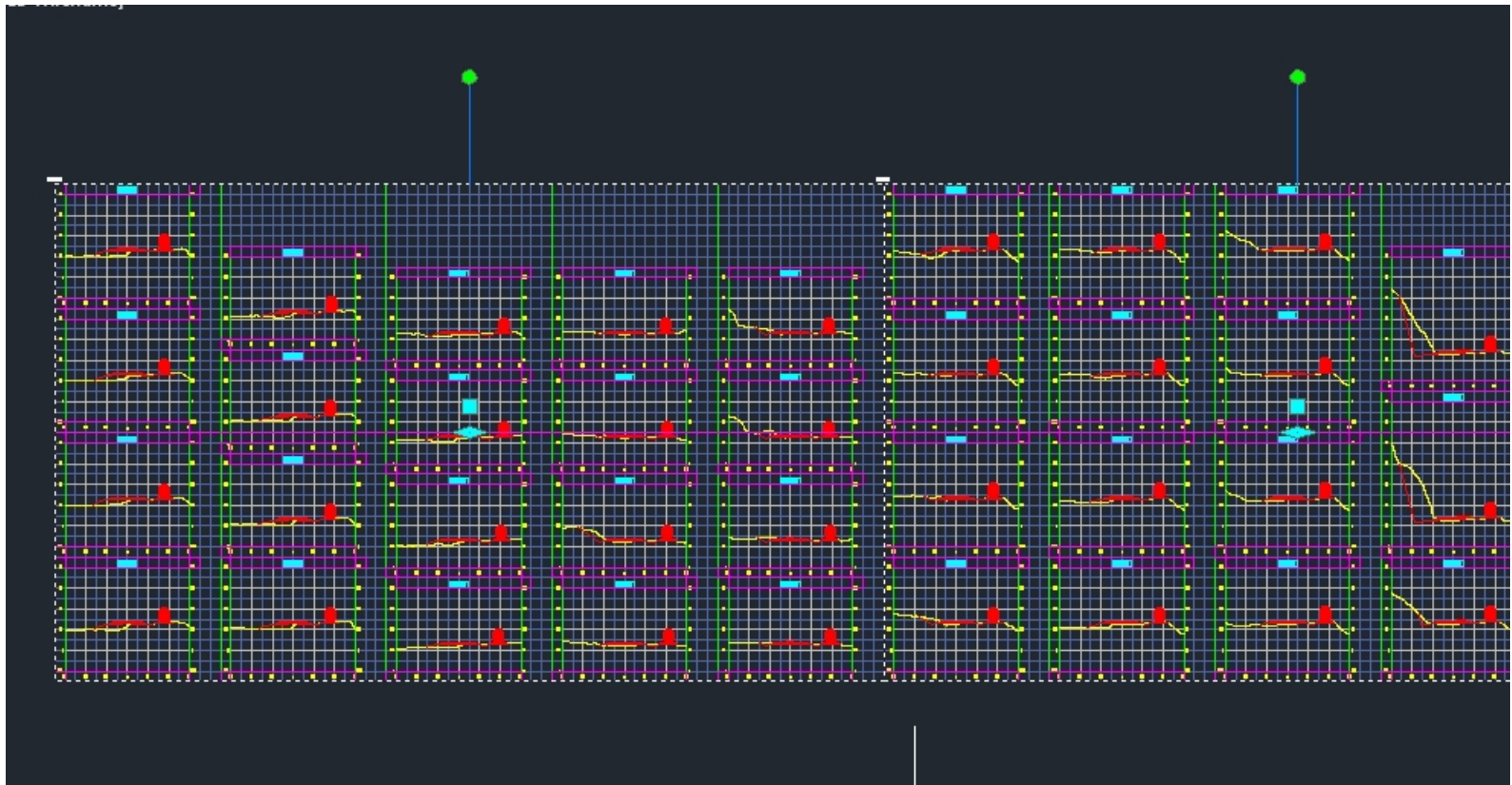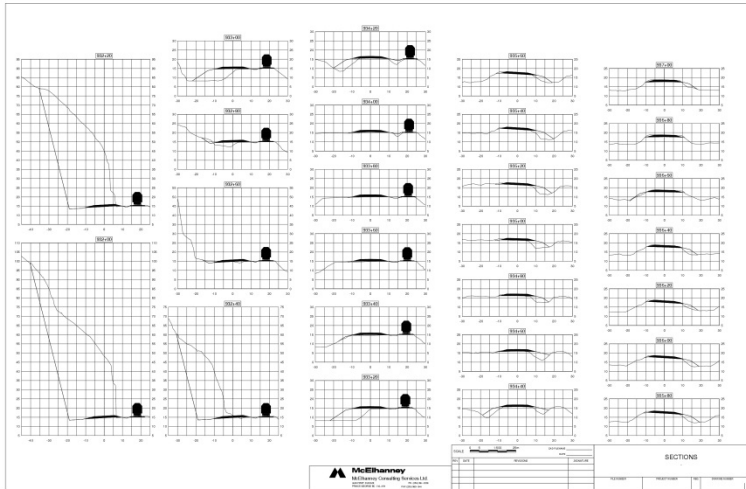
You can also make adjustments to the views if that helps with fitting them onto the sheets. In this example I was able to change the width of one sample line, and adjust the heights of a couple of the taller views so that when the group layout was updated I could eliminate the last sheet.

Closing

If I haven't been able to answer your question during the session or if you need more information the best way to contact me is through the Autodesk Discussion Groups.

Thanks for attending my class.

Rendering of Design Option 2 in Civil 3D