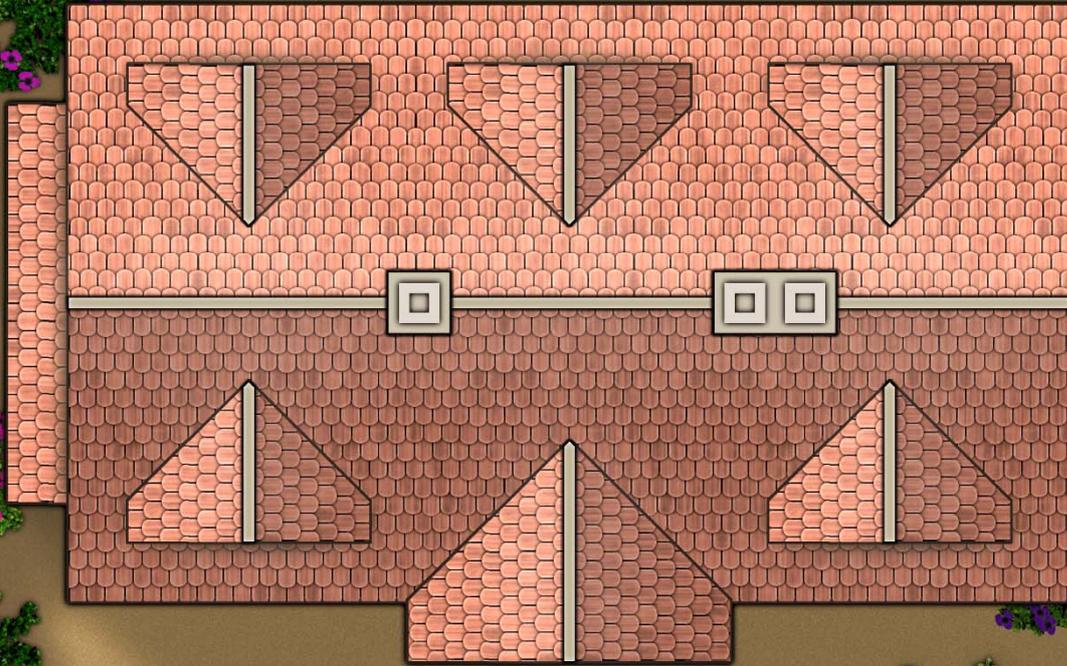


Making new house symbols in CC3



by Sue Daniel

Thank you, Profantasy, for including this tutorial in your blog 😊

Credits:

Assistance building the House Builder template – Ralf Schemmenn, General Manager at Profantasy

Software required:

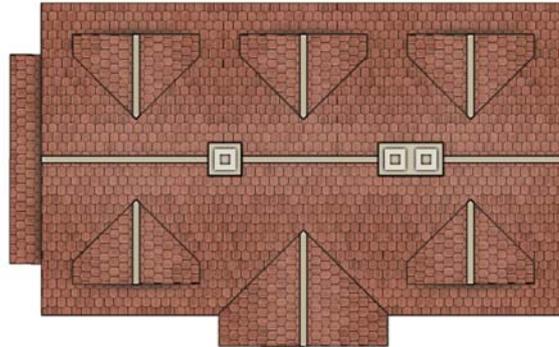
Campaign Cartographer 3 Plus (CC3+) with the City Designer 3 (CD3) add-on
A bitmap editor (The GIMP v 2.10 is used in this tutorial, but any editor will suffice)

You can download a zip folder of the three files that comprise the template for this tutorial called “House Builder (basic)” used in this tutorial here:

[Link](#)

How CD3 house symbols work

Whenever we paste a house symbol into a map what we are actually pasting is a very flat image that probably looks a lot like this one.

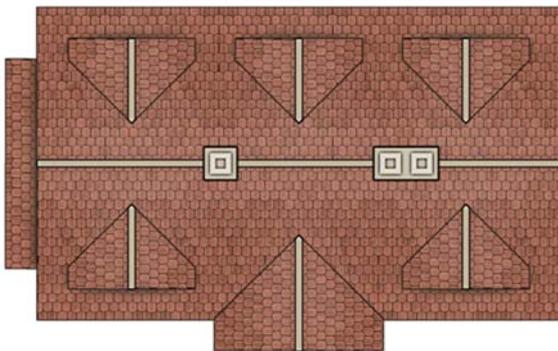


House 01.png, shown working in the title illustration.

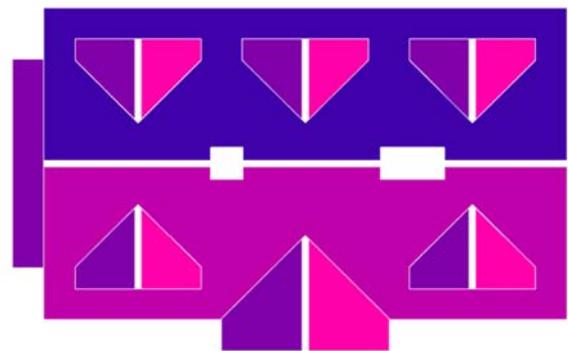
CD3 symbols do not have roof shading. There are no 'dark sides' or 'light sides' in these flat-packed roof images, yet they appear on the map fully shaded the instant the symbol is pasted in the CC3 environment. So how is this happening?

CC3+ obtains information about the pitch and facing direction for each part of the roof by reading the colour coded message in a second file stored in the same location as the image, but which is never shown in the CC3+ environment. This second file has the same name as the image file, but with a "_map" suffix.

We need to make both types of file for our new house symbol, so to distinguish between them I will call them the *image file* and the *map file* respectively.

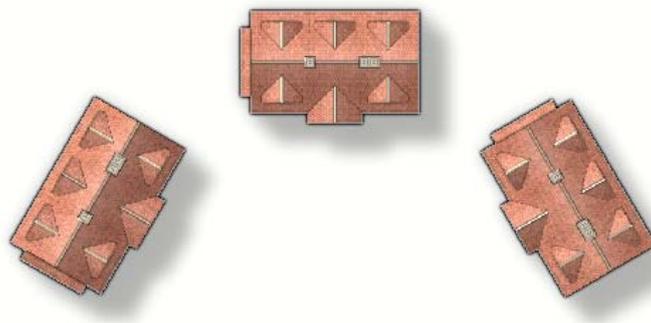


House 01.png – the image file



House 01_map.png – the map file

And here (below) is the symbol *House 01* arranged in CC3 to show how the shading changes with the rotation of the building – all calculated by CC3 using the information contained in the map file, and adjusted to take account of the global sun setting and the rotation of the symbol.



Map file basics

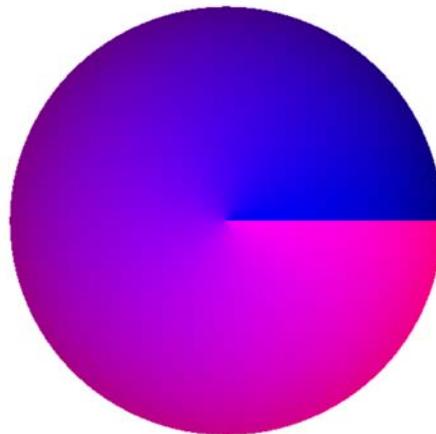
The RGB colour palette, which is a universal palette, is the basis on which everything you see on your screen is produced in the three primary colours of light. It allocates 256 separate shades to each of the three components, red, green and blue, on a scale of zero to 255. When all three colours are zero all you see is black on the screen (a total absence of light). 255 red is brilliant red, 255 blue is brilliant blue, 255 green is brilliant green. All three set to 255 make white.

Map files make use of the red and blue parts of the RGB palette to hold information about the pitch (blue), and the direction in which the roof is facing (red) in the original un-rotated symbol. When you are creating the map file for your house later in this tutorial the map file colours will be provided for you in the palette, so all you need to remember about the colour coding system CC3+ uses to interpret map files is this:

Red = the direction the roof is facing (a range of 0 red to 255 red, where 0 is the total absence of red, and 255 is the full presence of red)

Blue = the pitch or steepness of the slope (ranging from Blue = 128 to Blue = 255, where 255 is flat, and 128 is vertical)

When these two colours are combined in varying proportions the visual effect is that of a range of blue, pink and purple tones. To show this more clearly here is the map file for a dome (below) showing how the blue deepens towards the edge as the pitch becomes steeper, and how the red records the direction the slope is facing, even when that slope is very nearly perfectly flat and bright blue at the peak of the dome.



Dome map.png – rendered from a 3D modelling environment (Blender v 2.79), using a material shader designed by the author to synthesise the correct colours of a map file.

Drawing the image file

Download the [House Builder \(basic\)](#) zip from the link on the title page and unzip it in:

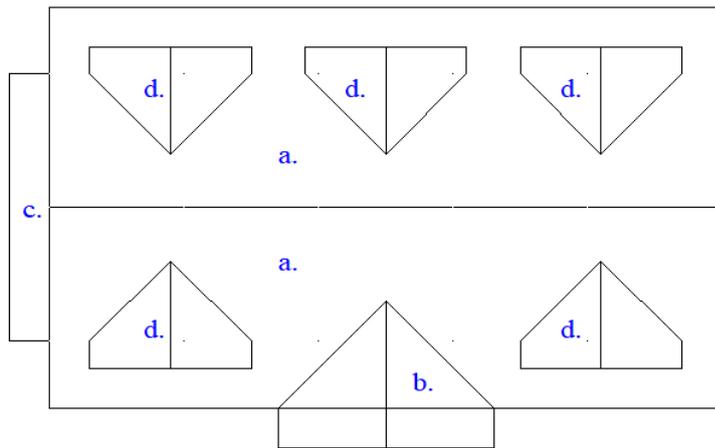
C:\ProgramData\Profantasy\CC3Plus\Templates\Cities\Wizard

Open CC3 and click *File/New*. Pick the *Cities* category with *decide settings myself* checked. [House Builder \(basic\)](#) should appear at the bottom of the list of templates and have an image similar to the one on the title page of this tutorial. You can make it as large or as small as you wish just as long as it is big enough to accommodate two scale drawings of your new house with a reasonable space around it for working. Default size is fine if you aren't sure.

1. Make a plan

Make sure you are on the ---HOUSE PLAN--- sheet and the **IMAGE FILE OBJECTS** layer. Select the **10' grid 10 snap**, turn on Snap, and start to outline the roof elements of your new house in simple rectangles and polygons. You don't have to make exactly the same house as me, but to make use of the multiple levels provided in the sheet structure of the template for the purposes of learning how they all work together, you will need to have at least 2 distinct levels to the roof design.

The scale of the drawing is 1 map unit = 1 foot. Try to draw your house plan to scale, since the new symbol will be exactly the same size as your drawing. I have labelled my plan to show my thinking, but you don't have to do this.



Legend

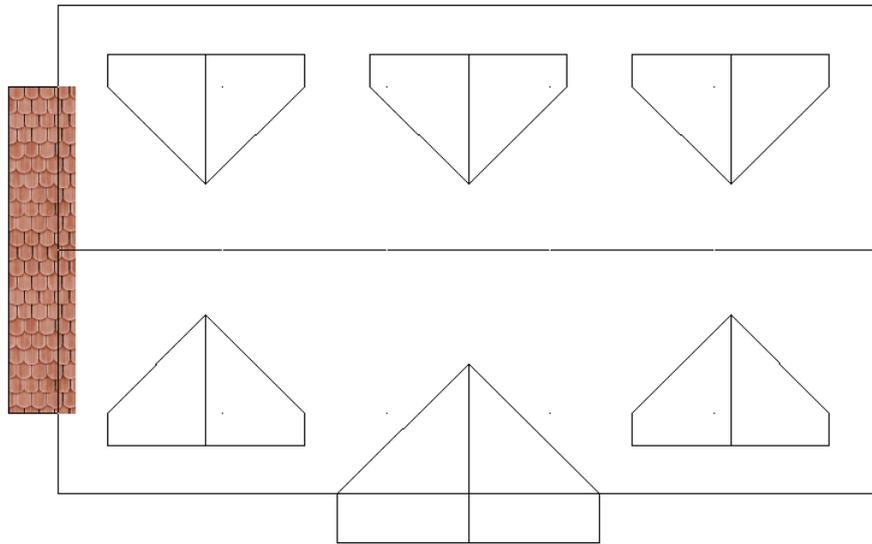
- a. main roof parts
- b. grand porch
- c. side awning
- d. dormer windows

Tip: Switch to the 10' grid 10 snap and use it to align the plan elements. Try to ensure the spine of the building lies on a main grid line, since this will help when positioning smaller elements if you wish there to be a degree of symmetry.

If this looks a bit complicated with all its angled lines, remember the angles are all at 45E, which is the angle you get if you join two pieces of roof that are exactly the same pitch at right angles to one another. Use the snap grid to make sure that you move as many snap points horizontally as you do vertically.

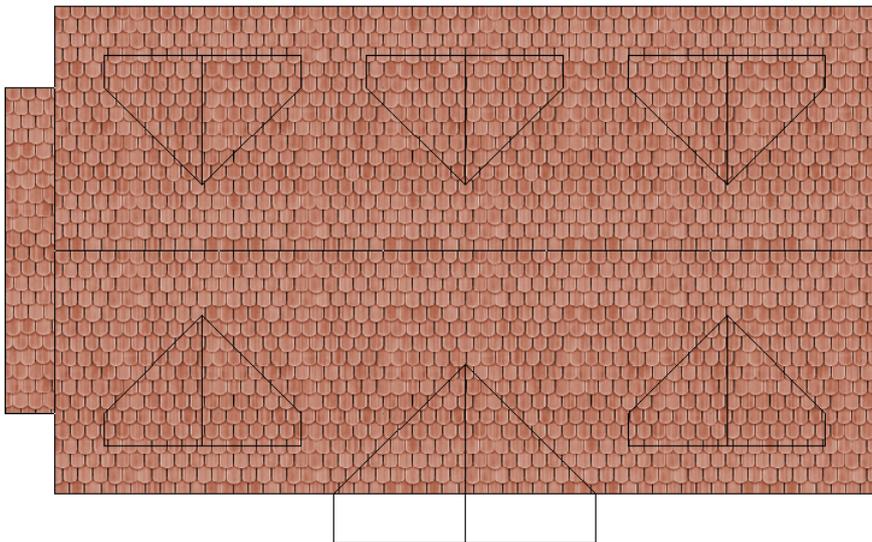
2. Block in the roof parts

Turn sheet effects OFF. Choose a texture for your roof from the range available in the template and switch to the **IMAGE ROOF - level 1** sheet. Ensure the line width is set to zero, pick either the rectangle tool or the polygon tool from the left hand tool bar and draw the parts of your roof that form the lowest level of your design.

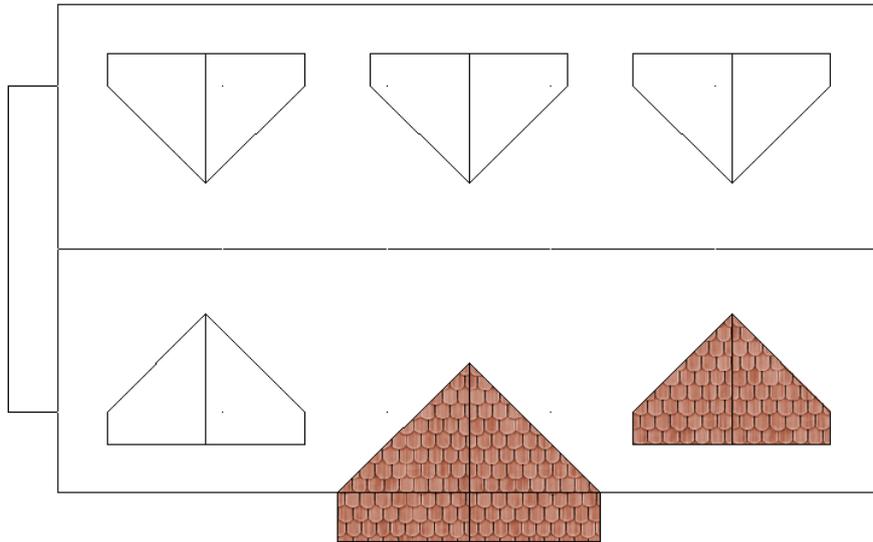


Notice how I have overlapped the awning so that it will disappear under the main roof parts. This is an overlap of just 1' (1 map unit), and will ensure there is no chance of any unsightly gaps appearing in the final image. You don't have to do this, but if later you are using roof textures with a jagged edge (as I have done for some of my own symbols) this overlap becomes important, so it's a good habit to get into.

Next, change the sheet to [IMAGE ROOF - level 2](#), and block in the parts of the roof that are the second level of your plan. Do not be tempted to draw both halves of the roof with the same polygon. Draw each half as a separate polygon or you will not be able to align the fills properly.



Complete the blocking in of the roof parts by switching to [IMAGE ROOF - level 3](#) and drawing at least one of the dormer windows and any other part on that level that isn't identical to the dormer window you have already drawn. If you have several identical parts in your drawing as there are in the example, you can clone the finished part at the end of the drawing to save some time and effort.

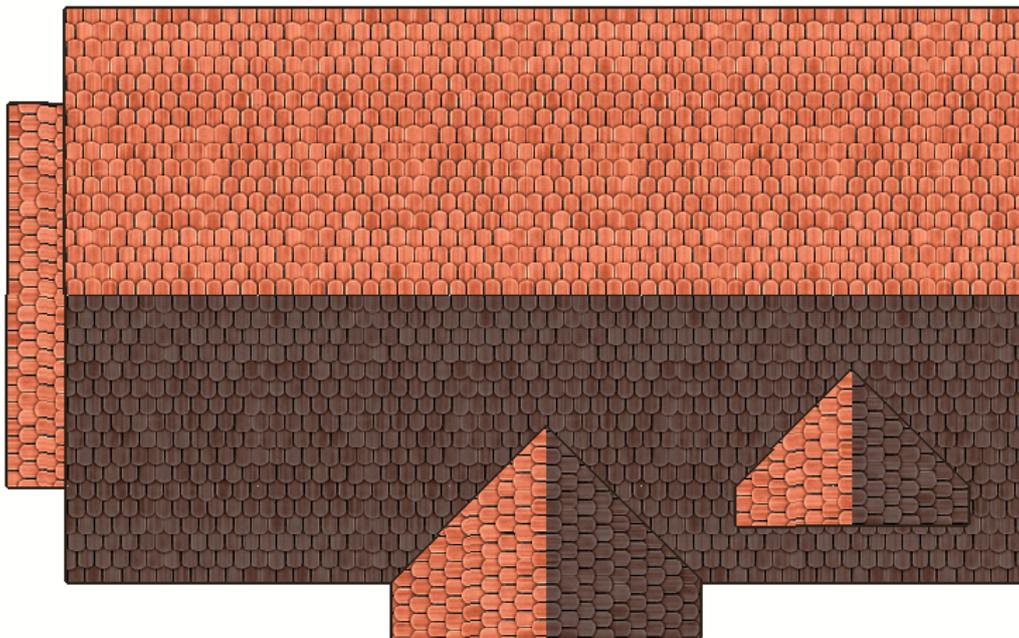


In this screen shot I have hidden the first two roof levels to show clearly the two elements of the third level I drew. All the rest of the dormer windows can be copied from the one once we have finished drawing that one.

3. Align the fills

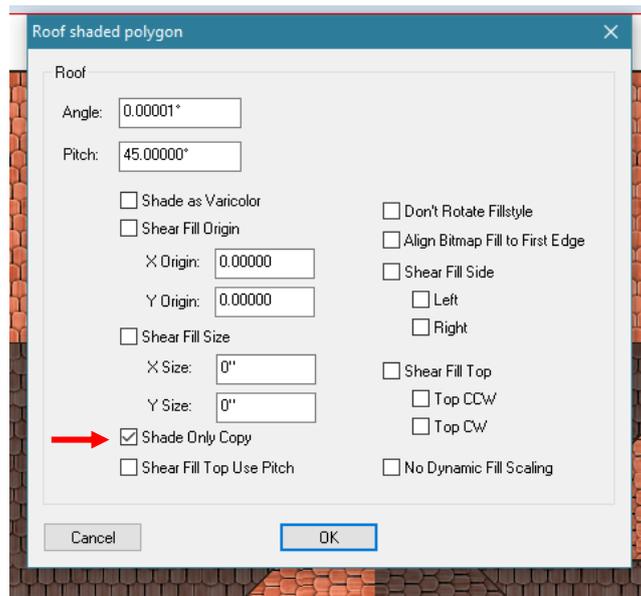
Turn Snap off and Sheet Effects on. This will give each section a dark glow around the edge and make locating the edges of all the parts of the roof easier to find. Show all the sheets, but hide the [--HOUSE PLAN--](#) sheet.

Right click the Polygon tool on the left hand side toolbar, and pick *Shaded Polygon (Angle by Edge)* from the dropdown menu. Click each of the roof parts at their lowest edge. You should end up with something that looks a bit like this:

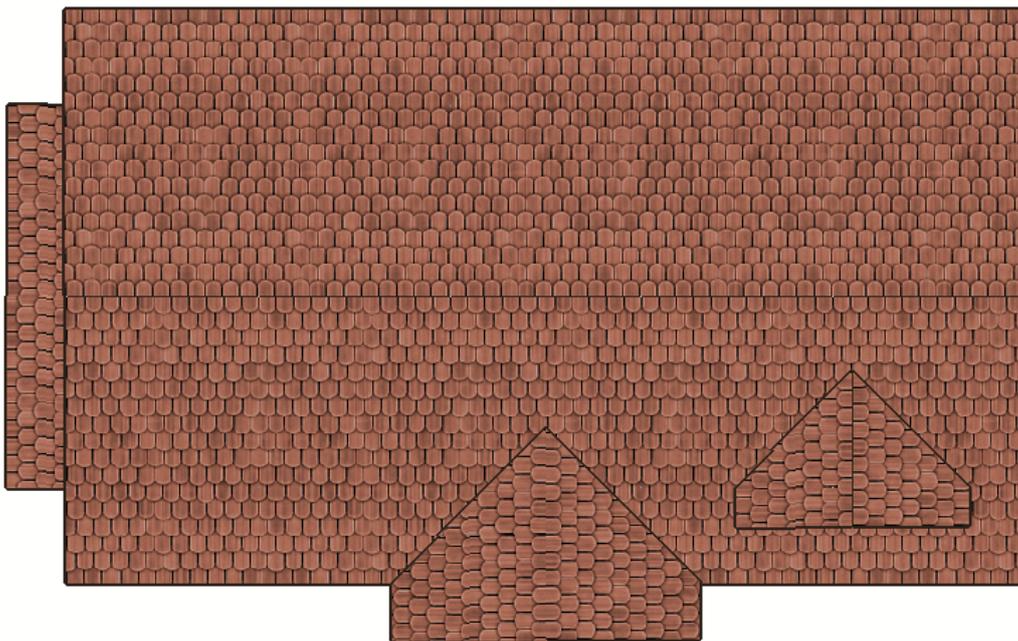


While this has aligned the direction of the roof textures, it has also given us unwanted shading within the image file. It looks pretty, but if you turn this into a symbol the roof shading will not respond to changes in symbol rotation or global sun position, and will also look a bit strange if you compound the effect by using a map file with it. To put this right press ESC once and type "EDITSHADING" on your keyboard. The word

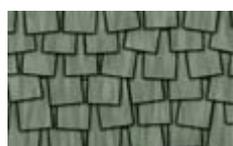
should appear in the command line at the bottom of the window. Press ENTER, and click one of the newly shaded polygons of the roof. Ignore all but the *Shade Only Copy* check box in the dialog that appears. Make sure it is checked and click ok.



Do this for all the roof parts.



By now you will have noticed that the roof texture looks a bit dull and dark compared to the original. This is because there is an *Adjust Hue/Saturation* sheet effect in operation on all the roof sheets to counteract the slight bleaching effect that arises when using a map file with a house symbol. Most of the CD3 house symbols are similarly darkened. This is most obvious if you open the folder containing the Bitmap A Gothic graphics files (not the catalogue but the actual folder) and compare the tone and colour of those buildings with the corresponding Gothic roof texture available in the CD3 roof textures.



Extract from one of



Extract from the

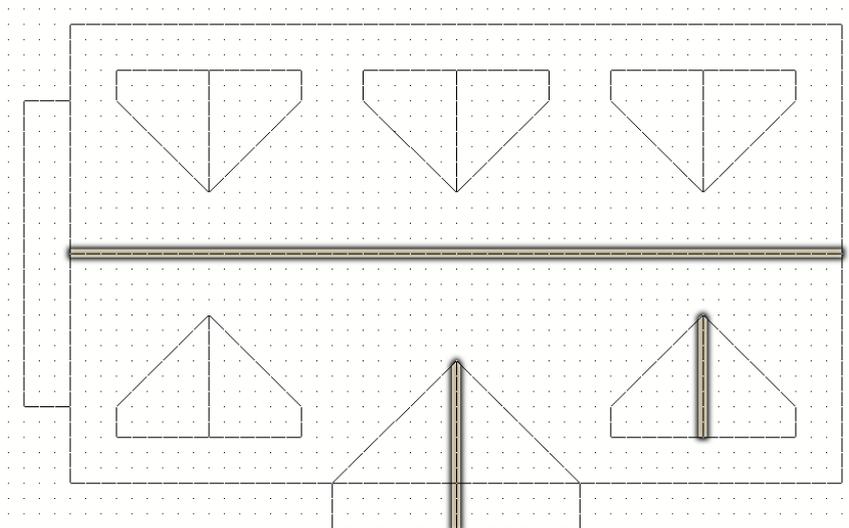
Its ok to turn these darkening sheet effects off as long as you bear in mind that the resulting symbol may not match any shaded polygon houses you construct within the map using the same roof texture, or the buildings created by the House command in that texture.

4. Add the roof ridges, chimney pots, and the separation shadows

Hide all the sheets, then reveal the [---HOUSE PLAN---](#) sheet and [IMAGE RIDGE - level 1](#), [IMAGE RIDGE - level 2](#), and [IMAGE RIDGE - level 3](#). Make whichever level you want to draw a roof ridge on the active level.

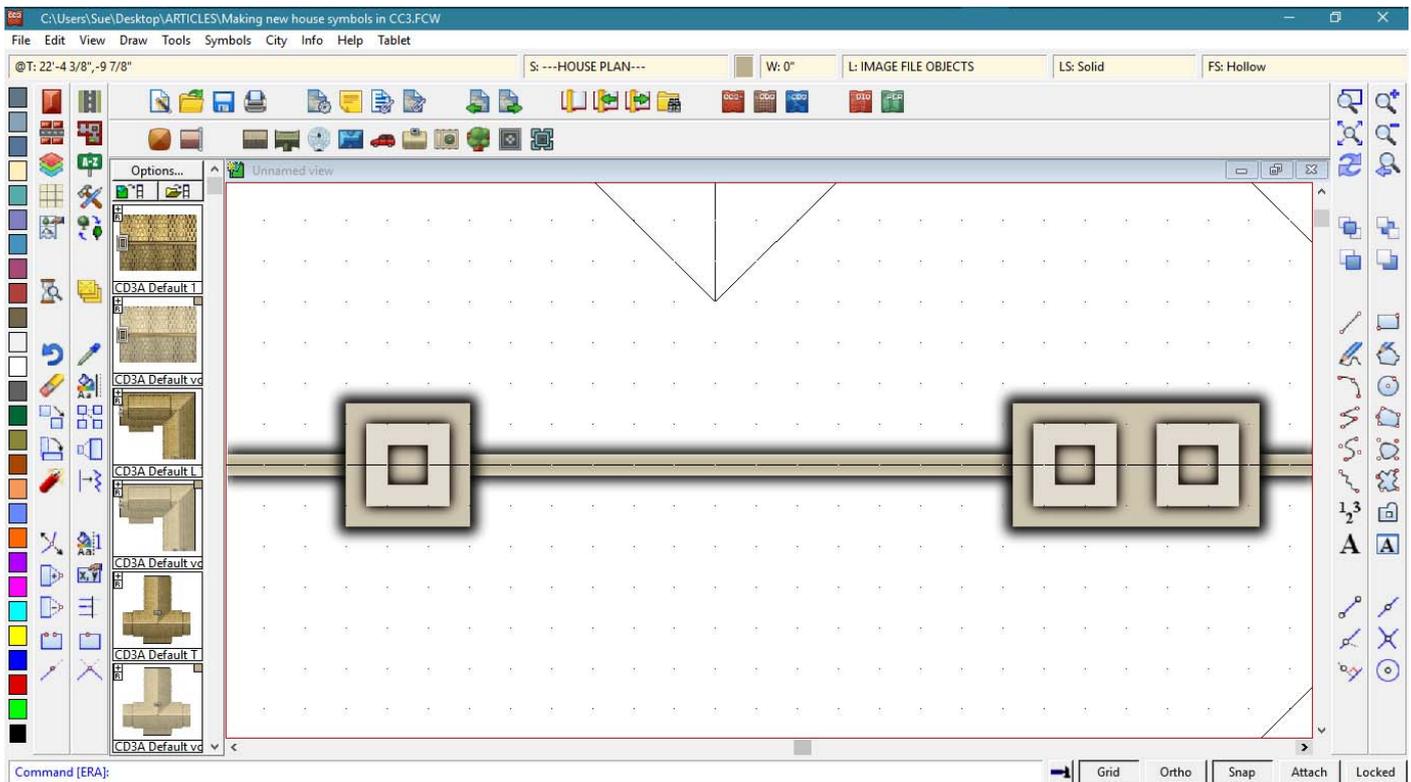
Change the fill to solid and pick a pale colour that will suit as the colour of your roof ridges. Try to make this colour slightly paler than the roof texture is (without the sheet effects on), and also not as brightly coloured as the roof. Instead of choosing pink for my own roof, I have chosen a pale tan colour – colour number 41 in the template palette.

Change the grid to the [1' grid 4 snap](#) and zoom in far enough that you can see to draw a ridge along the join line between the two halves of the roof in question that is 6" wide (two snaps apart on the current snap grid). Do this for all the ridges on the appropriate level IMAGE RIDGE sheet, remembering that you only have to do the ridge on the one dormer window where you have already drawn the roof. Where you have a ridge that ends in a point on the spine of a dormer window roof, sharpen the end of the ridge to follow the shape of the point. The snap grid should provide convenient points to do this.

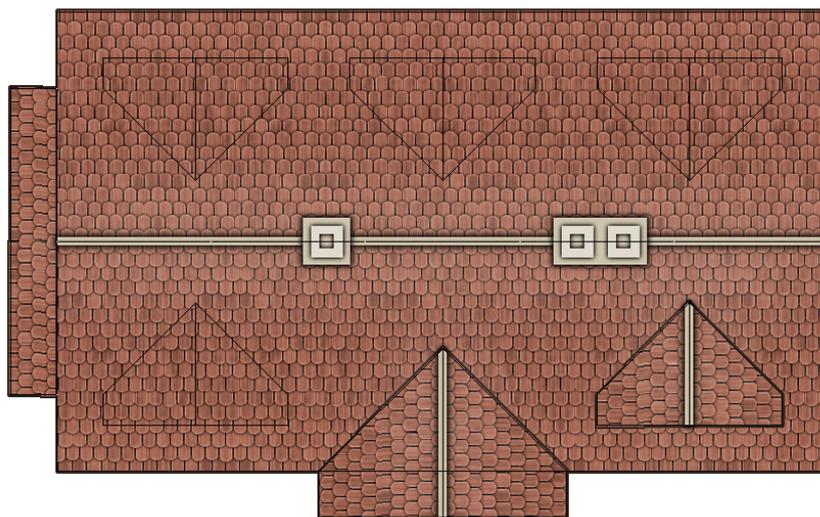


Whatever colour you used as the ridge colour, I recommend using colour 43 or something very similar to draw the chimneys. Make [CHIMNEY](#) the active sheet, and draw chimney stacks where you think they should be. Mine are about 3' square in section. I wouldn't recommend doing them any larger than this unless you have a row of chimneys stuck together. I have one single chimney and one double chimney.

Make the [CHIMNEY – pot](#) sheet active, set the line width value to 6", pick colour 45 or similar, and draw a smaller rectangle one grid click inside the outside edge of the chimney stack.

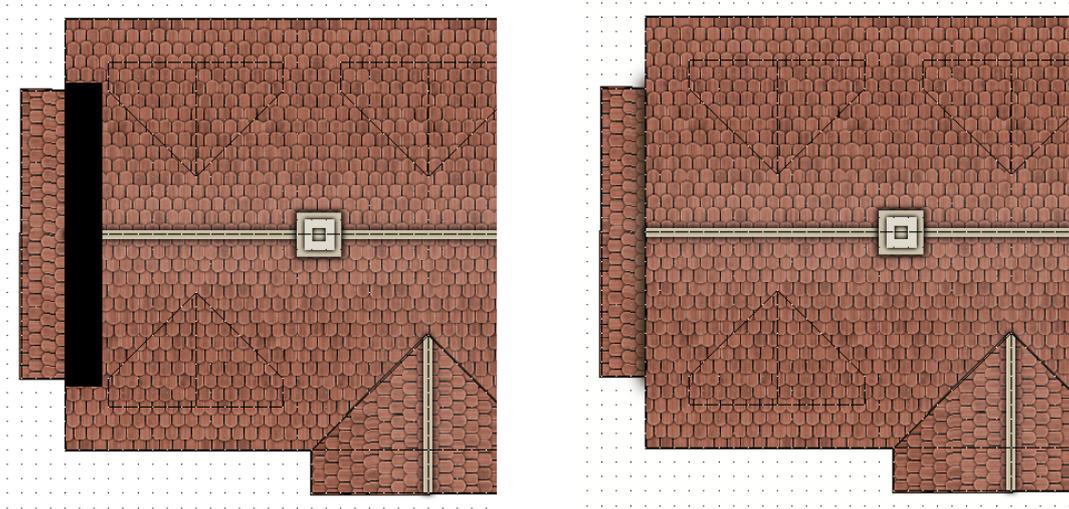


With all the sheets showing and effects on you should have something like this (below).

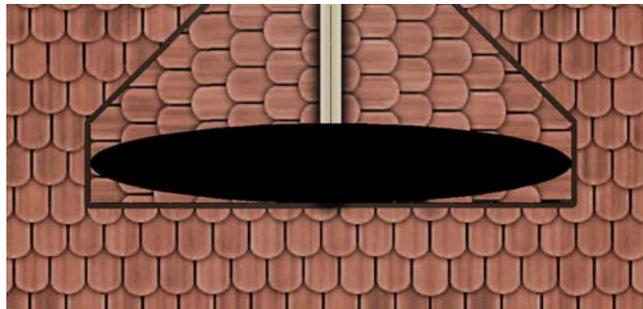


Depending on how observant you are you may have noticed that I wasn't being entirely truthful about there being no shading in the image file. There is, and you can see it in the images at the beginning of the tutorial. There are very slight shadows at the front edge of each dormer window, and over the inner edge of the awning to separate the levels of the roof where there is a significant height difference between the two edges.

Set line width back to zero, pick black as the colour, make *****Separation shadow 1-2** the active sheet, and draw a rectangle of black just inside the extent of the second roof level wherever it overhangs the first roof level, extending it for a couple of clicks of the snap grid beyond the end of that overhang area. When the screen refreshes the effects on that sheet produce the slight shading you can see in the finished image file at the start of the tutorial.



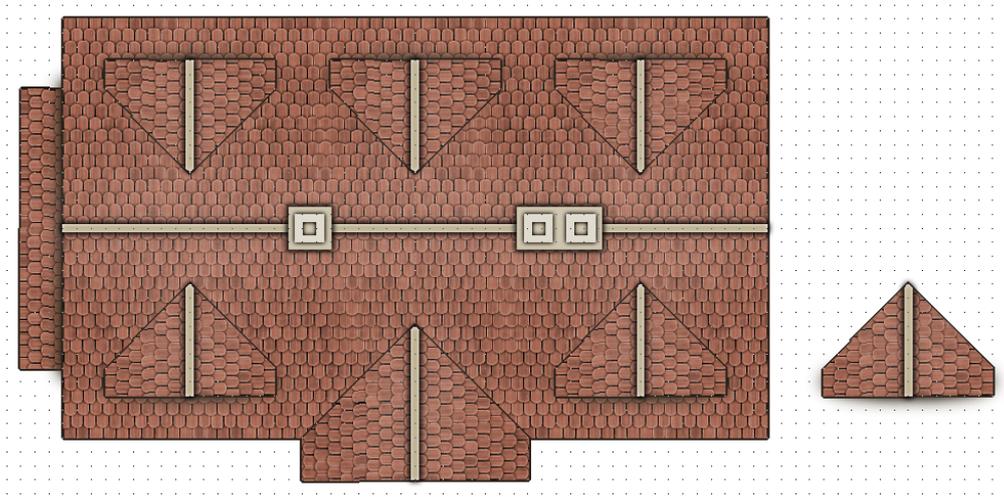
Now focus on the one dormer window you have drawn, switch active sheet to *****Separation shadow 2-3** and draw a black ellipse under the front of the dormer window, like this.



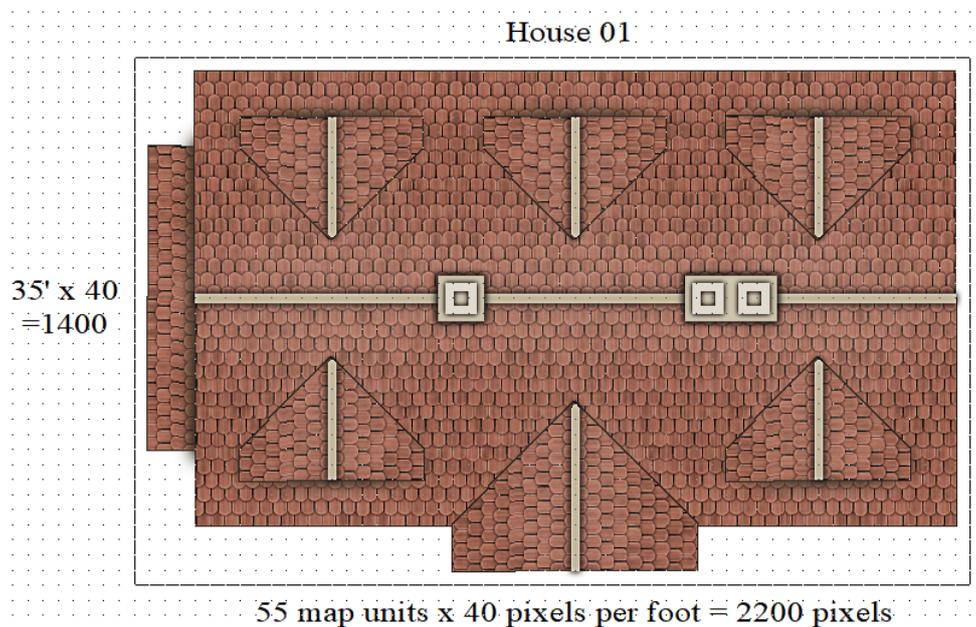
If you haven't used the ellipse tool before right click the circle tool on the right and pick Ellipse, then click once in the middle of where you want the ellipse to be, then at one of the ends, then at the front edge of the window. If you have been drawing everything using the snap grid the 1' grid 4 snap should provide convenient points for all these actions.

Now you are ready to copy the dormer window into all its other positions. The best way to do this is to hide the **---HOUSE PLAN---** sheet, copy all the parts of the dormer window once onto the map beside the house so that you have a copy that isn't tangled up with anything else, then turn the **---HOUSE PLAN---** back on again so that you can see where the other dormer windows should be pasted. Copy the new dormer window back onto the house in all the relevant positions. Holding the SHIFT key down and moving the mouse will rotate the paste image.

Once you have done this there is no further purpose for the plan you drew because all its parts have been turned into bits of house. So hide all the other sheets and delete the plan drawing (not the sheet) to make sure it doesn't accidentally interfere at the rendering stage. You should now have something like this.



Delete the spare dormer window. Set the fill to hollow and make **RENDER AREA** the active sheet. Draw a rectangle around the outside of the whole house, leaving a 1' gap at the closest point on each side. Label the house with its intended symbol name, and use the distance tool (from the info menu) to measure the distance along each of the sides. Multiply the distance by 40 and label the sides with the result of this sum.



Drawing the map file

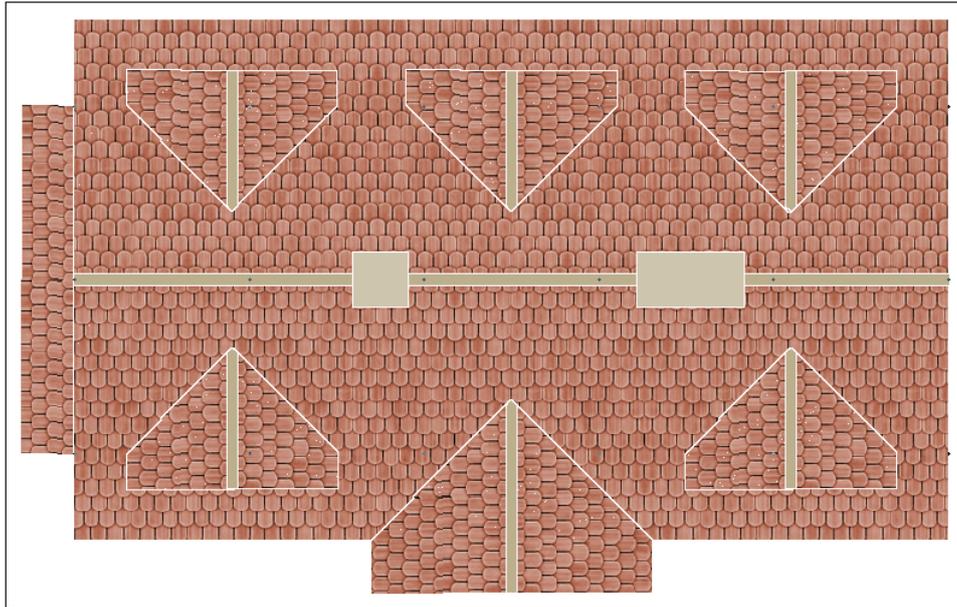
Show all the sheets, set the snap grid to **10' grid 2 snap**, and copy the whole house to one side, leaving about 30 feet between the original and its duplicate. Zoom in on the duplicate, edit the label to show that it is the map file, hide all the sheets except the two *****Separation shadow** sheets and delete the shadows from the map file drawing. Show all the sheets again and delete the chimney pots.

Using the change properties button move the entire map file drawing to the **MAP FILE OBJECTS** layer, and make the **MAP FILE OBJECTS** layer the active layer. Right click the hourglass button on the left and choose *Move to Sheet*, and move all the parts of the house as follows:

- | | | |
|-----------------------|---|---------------------|
| IMAGE ROOF – level 1 | → | MAP ROOF – level 1 |
| IMAGE RIDGE – level 1 | → | MAP RIDGE – level 1 |
| IMAGE ROOF – level 2 | → | MAP ROOF – level 2 |
| IMAGE RIDGE – level 2 | → | MAP RIDGE – level 2 |
| IMAGE ROOF – level 2 | → | MAP ROOF – level 2 |

IMAGE RIDGE – level 2 → MAP RIDGE – level 2
CHIMNEY → MAP CHIMNEY BLANK

You should now have something that looks like this, with a white line defining each section of roof.

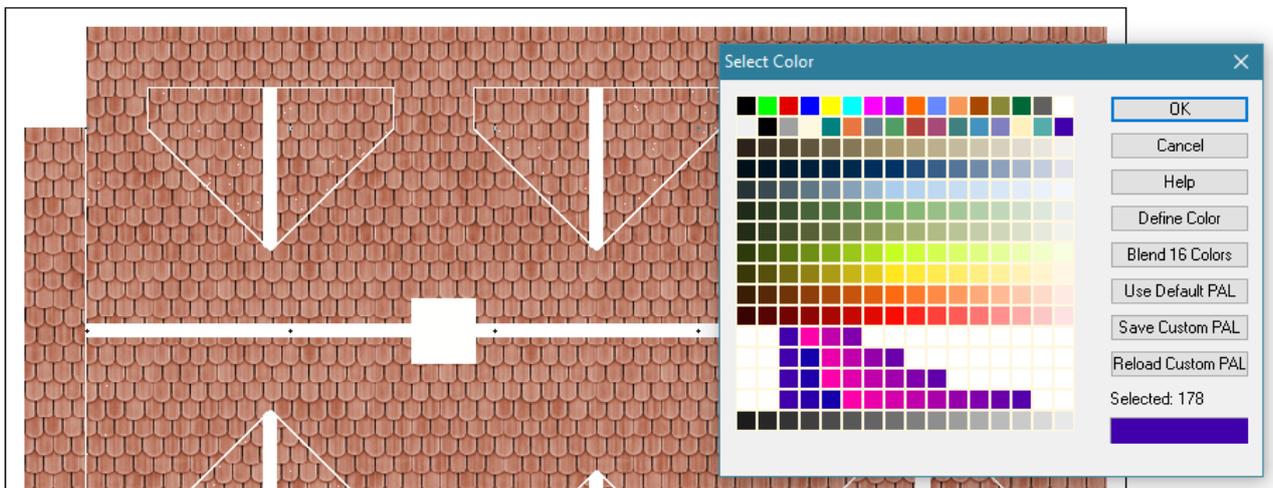


Using the change properties tool, change the fill of all the roof ridges and the chimney stacks to solid white.

Back when we aligned the fills and amended the automatic shading for the image file drawing, that amendment only worked for the textures. As soon as you change the properties of these aligned fill polygons to a solid colour the shaded polygons will show again and affect the blue and red values of the map file drawing, so we need to undo the alignment on all the parts of the roof that are aligned.

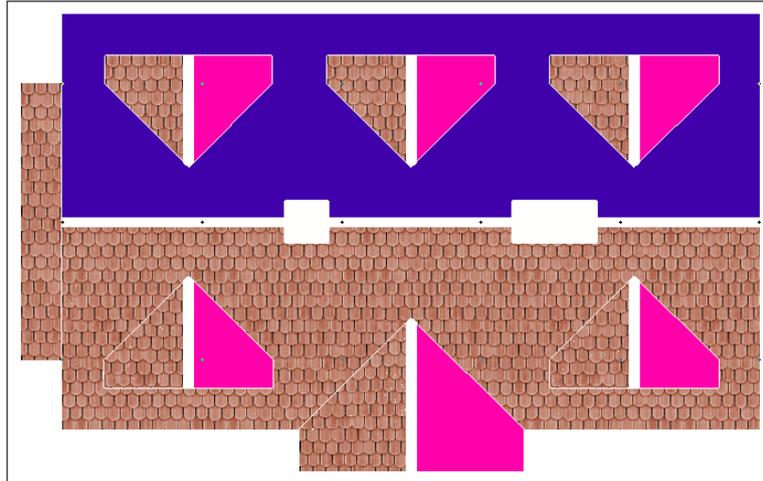
To do this make each of the 3 *****MAP ROOF** sheets active in turn, and explode all the roof parts that are aligned on the active sheet (not the ridges or chimneys) so that the texture falls back to its default state. It is important to be on the right sheet for each roof part or the explosion may have unexpected results.

Open the colour palette and look at the top row of map file colours – the one with four colours in it.

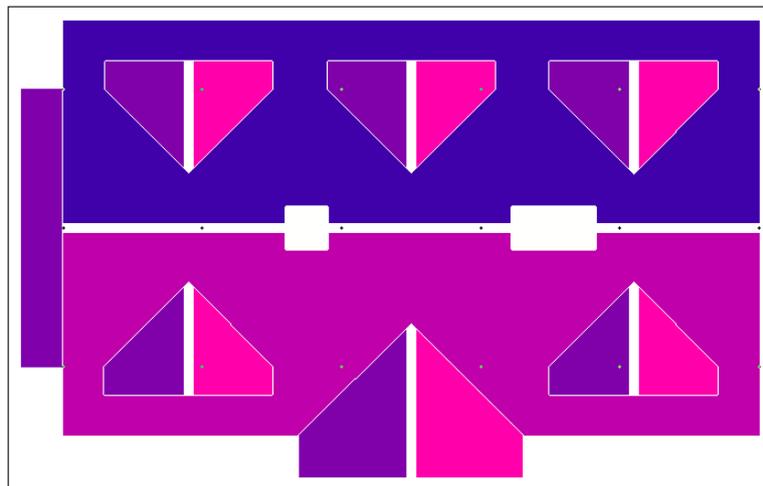


The first map shade (178) is correctly set up for a north facing roof of standard pitch. Select it, and change the properties of the north facing rooftops to solid colour and shade 178. The second map shade (179) is

set up for an east facing roof. Change the properties of all the east facing roof parts to this shade. This is how mine looks at this half way stage.



The third and fourth map shades are for the south and west facing roof parts respectively. So when you have finished changing the properties you should have a map file drawing that looks something like this.

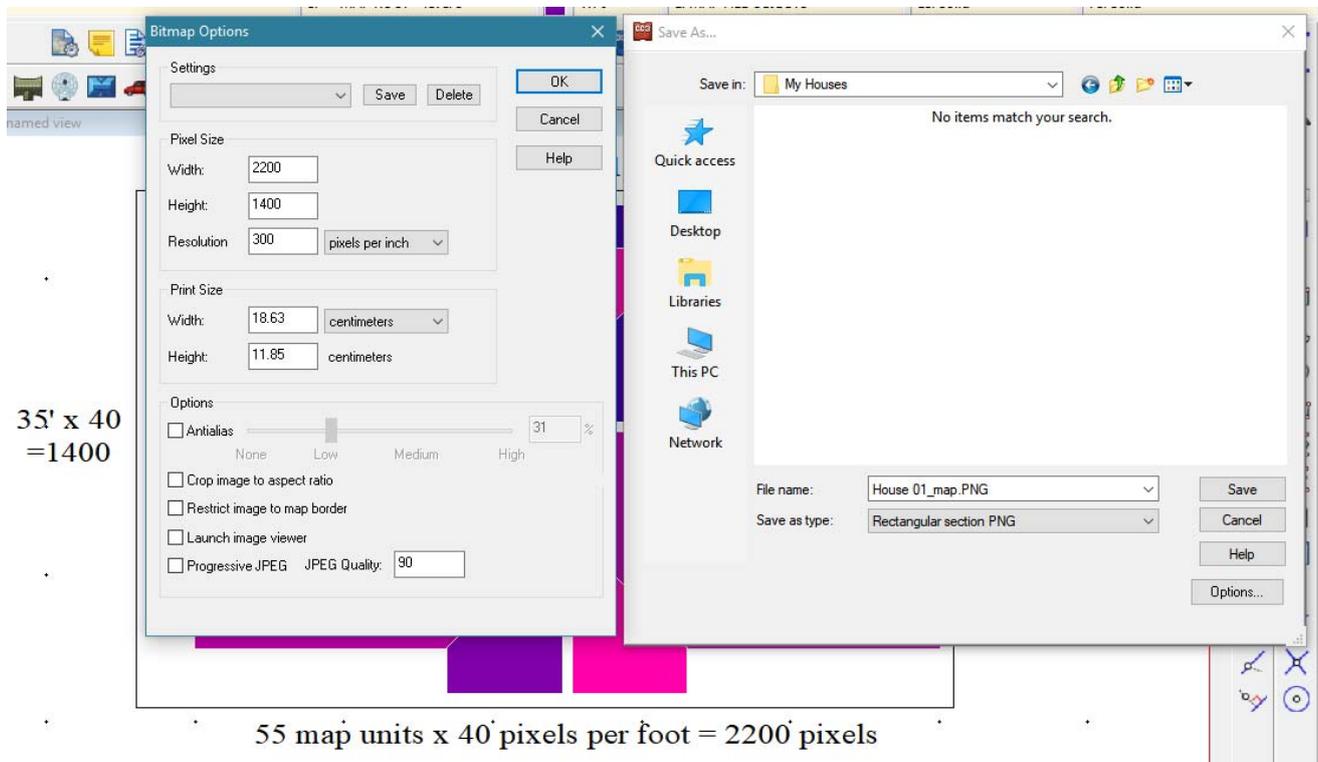


And that's all there is to it. The map file drawing is now complete.

Rendering the files

Create a new folder in the `C:\ProgramData\Profantasy\CC3Plus\Symbols\User` folder to be the home of your new house symbol. Mine is simply called "My Houses".

Ensure that you have the [10' grid 10 snap](#) grid active and set to Snap, then use *Save As...* from the File menu, and pick *Rectangular section PNG* as the file type. Click the *Options* button in the *Save As dialog* and set the *Width* and *Height* dimensions to the dimensions you calculated for the render area rectangle, and which you should be able to read off the map. The filename you want is above the drawing.



Turn OFF the Antialias option.

Click ok and ok again, and when prompted for the first corner of the rectangle by the command line click on the bottom left corner of the rectangle around the map drawing, and then on the top right corner when prompted again for the second corner.

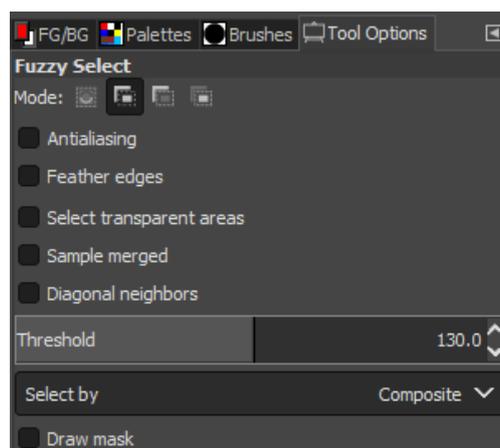
When this is done pan back across the map and do exactly the same thing for the image file drawing.

Making the background of both files transparent

Open the GIMP and go to *File/Open* and navigate to the My Houses folder where you saved your rendered images from CC3.

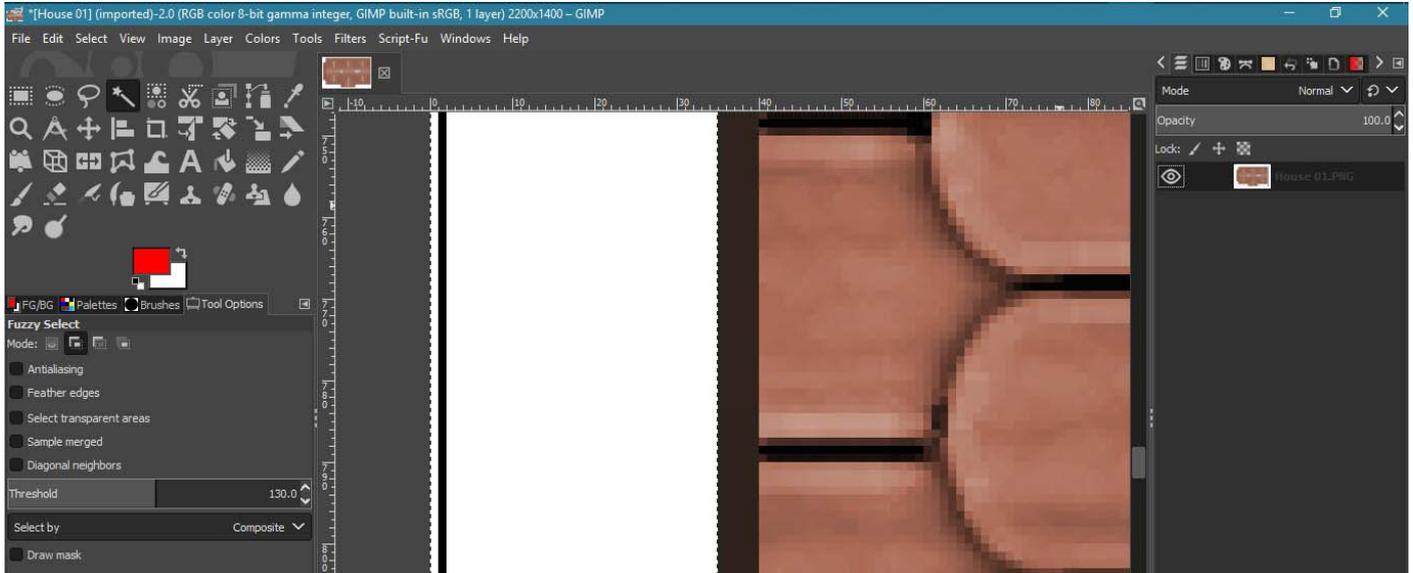
Open the image file.

Click the magic wand tool in the toolbox on the left hand side  and make sure the *Tool Options* in the panel below the toolbox are set up so that the *Mode* is set to *add to the selection*, none of the boxes are checked, the *Threshold* is set to 130, and the *Select by* is set to *Composite*.

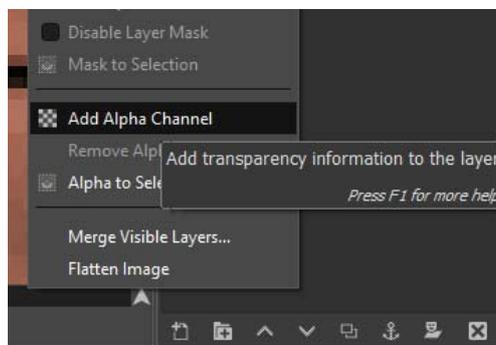


Then zoom in really close to anywhere on the left hand edge of the image by pressing CTRL and scrolling the middle mouse button, and click on the white area away from the house.

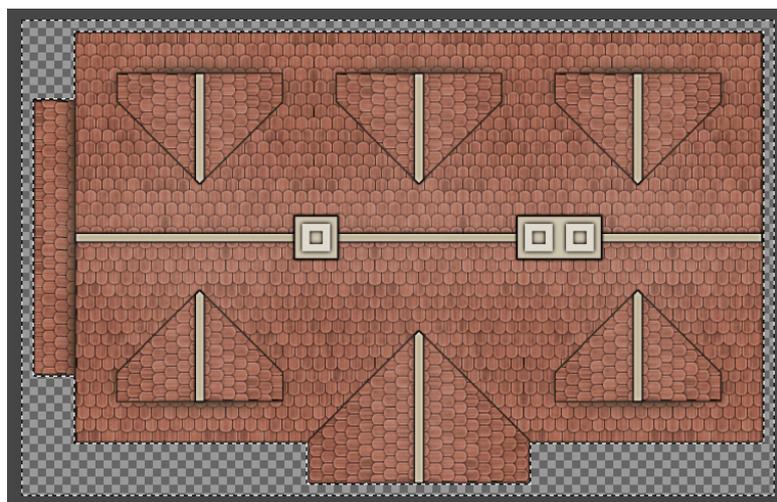
You should be able to see a black line down the edge of the image if you have zoomed in close enough. You need to click this with the wand, and also the white line right down the extreme edge until all the area that is not part of the house is selected in an area of 'crawling ants'.



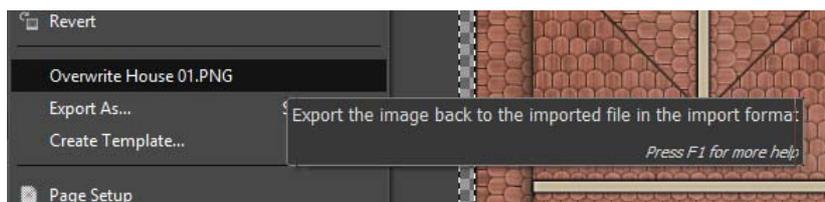
Go to the little thumbnail of the file on the right hand panel and right click it.



Select *Add Alpha Channel* from the drop down list, hover the mouse over the image in the main window again and press DELETE on your keyboard. This should entirely clear the background from the image file and leave a chequered pattern in view.



Don't worry about the fact that the area is still selected. Go to the File menu, find where it says "Overwrite House 01.PNG" and click it.

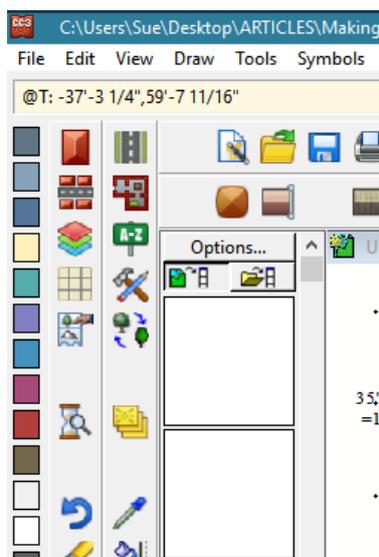


Close the open file without saving it. You have already overwritten it with the new transparent version of the image file.

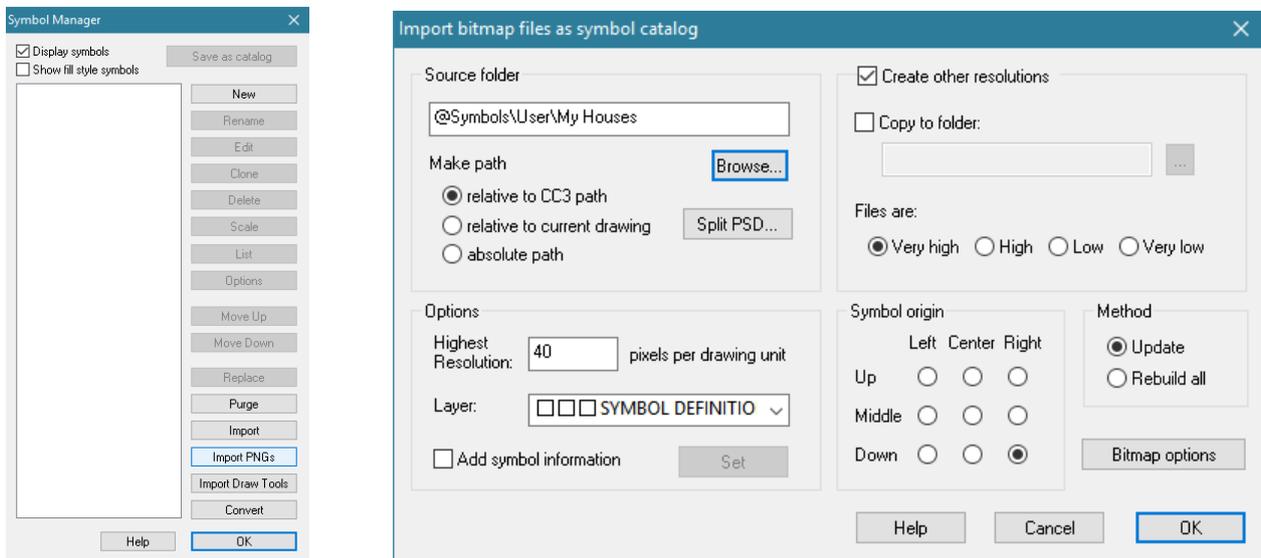
Select the wand tool and lower the *Threshold* setting to 50, then repeat this entire process for the map file, remembering to click the wand tool in all the islands of white in the middle of the map image. Make sure that all the white parts are gone.

Importing the new symbol

Go back to CC3+ and click the little button on the left under the Options button on the catalogue browser. There may already be symbols in there, but just ignore these. I have purged my own map of unused symbols just to make things a bit easier to see.



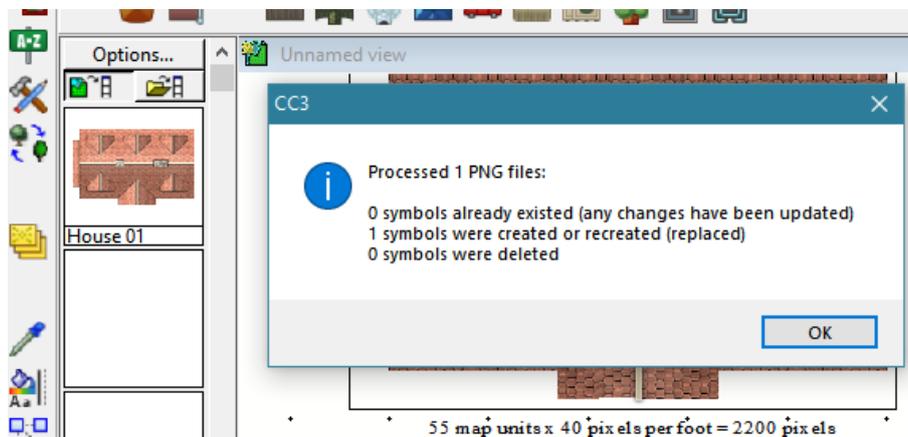
Open the *Symbol Manager* (menu item).



Click the *Import PNGs* button.

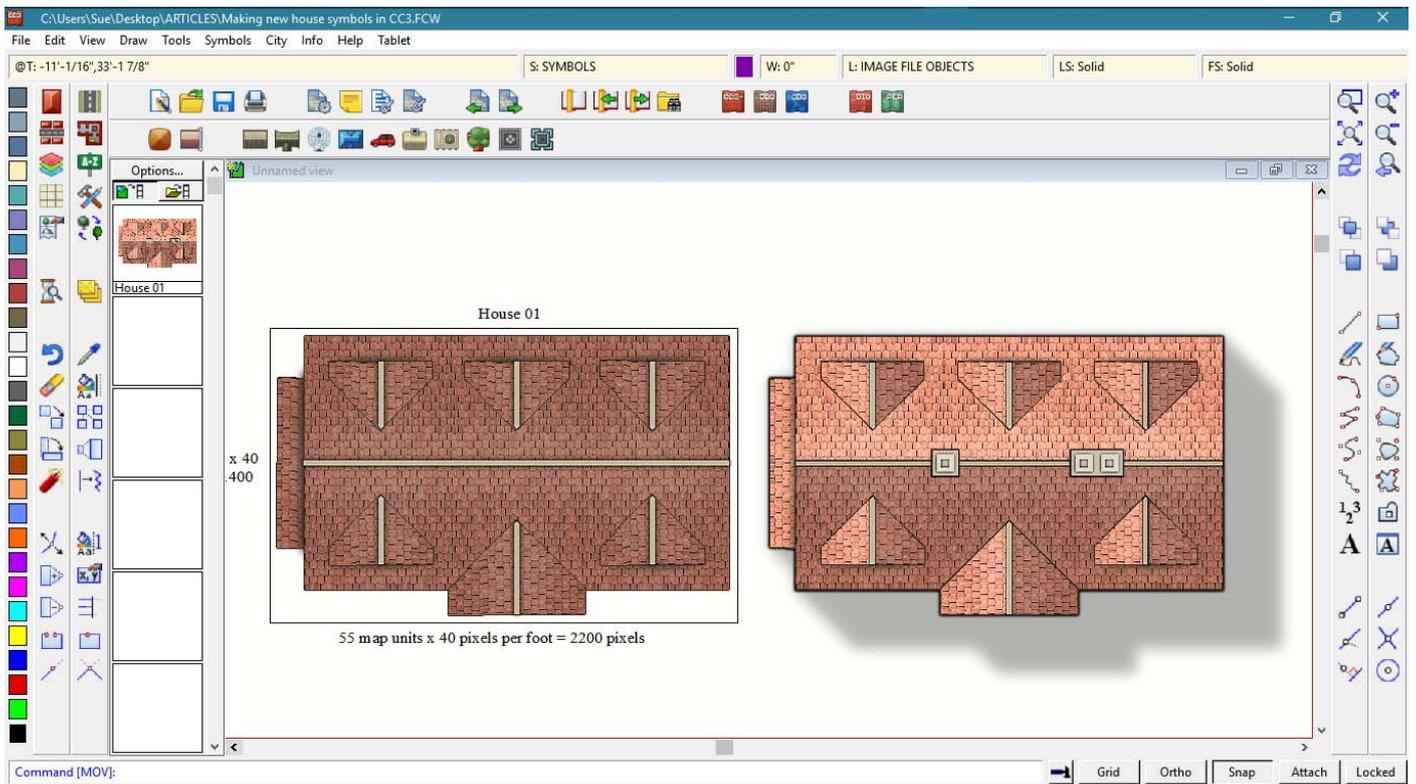
In the second dialog *Browse* to the My Houses folder in the *Source folder* box and double click on either of the files in the folder. The *Highest Resolution* should be set to 40 pixels per drawing unit, which is the default resolution for a city map. Check the *Create other resolutions* option and set the *Symbol origin* to the bottom right corner. Then click OK and wait for CC3+ to do its thing.

You will receive a short message letting you know that 1 new symbol was imported. Now check the view in the catalogue browser and scroll down to see if you can find your house waiting to be pasted.



And there it is.

Your new symbol has no specific settings, so you will have to manually choose the **SYMBOLS** sheet before pasting it to get the shadow around it.



You can carry on drawing and adding new house symbols in the same file until you have all that you want.

To make proper use of your new symbols you will need to make a catalogue of them. How to do this, and how to add the full functionality of a regular CD3 house symbol is covered in the *Tome of Ultimate Mapping*, and in part by a range of tutorials available from the sticky resources thread at the top of the Profantasy forum.

I hope you have enjoyed this tutorial, and that you get at least one new house symbol out of it. If you have any problems creating your new house symbols please drop by the Profantasy Forum and let us know.

Have fun ☺