

Autodesk Inventor for Interconnection Diagrams

Plot Plan Diagrams

For this task I have selected house close to campus with a sunny south facing roof that we will outfit with solar panels:

17 Elwood Ave. in Cortland NY. Google maps give the following aerial photograph:



Collecting house and lot info:

But we need to know distances and setbacks. There are a number of places you can get this information:

- Direct measurement at the location in question,
- Google maps and other general purpose on-line aerial photos and
- The local zoning department (e.g., the Cortland County Planning Department).

Since we aren't actually doing business with the person who owns this house we will use a combination of google maps and Cortland's zoning department, their website (which needs firefox to run) is:

<http://www.cortland-co.org/Planning/index.html>


In particular we will use their GIS (Geographic Information Systems) Data viewer

https://www.caigisonline.com/Cortland_CountyNY/



There are a couple of pieces of info that we can collect from here:

- The lot's tax map parcel number
- The dimensions and orientation of the lot
- Measure the dimensions of the buildings and distances to the lot edge.

But first we need to find the lot. Since there is not a handy search feature we must know where to look.

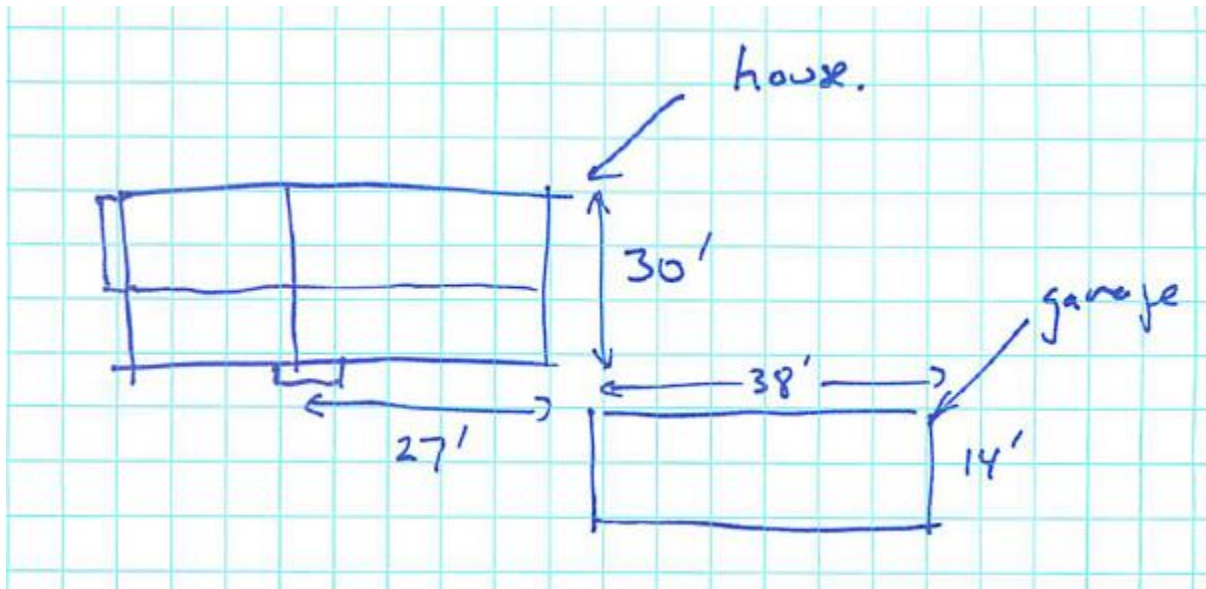
- Zoom in on the city of Cortland and look for Elwood Ave just south of Groton Ave. west of campus. Individual lots are identified by their tax parcel number. Once you have found Ellwood Ave use the use the information icon  to figure out which one has street address #17.
- Switch to the aerial view and zoom in on the house's lot. There is a limit to how far in it is useful to zoom.

Now to collect the info:

- Record the tax map parcel number.
- Use the measure tool, under , in particular the distance tool , to measure distances. Click on one side of the object you are interested in measuring and drag it across the object.
 - the dimensions of the property,
 - the dimensions of the house and garage and
 - the distance from the house to the edge of the property.

Unfortunately you must close and re-open the distance measurement tool each time you want a new starting point.

To speed things along I am including a rough sketch and some of the dimensions.



Lot Tax map parcel number:

Length of house:

Length and width of front entrance:

Length of Lot:

Width of Lot:

Offset from Western edge of lot:

Offset from Northern edge of lot:

Before you close the GIS viewer we need to know where the pole that is providing service is and where the meter is. We will assume the meter is on the western edge of the house's southern side and the pole is right across the street. Measure the width of the street and the deviation of the street from true north (true north is up on map), to the nearest degree is close enough.

Sketch in arrow in figure above pointing to true north assuming the graph paper is parallel to Ellwood Ave.

Angle to true north:

Since we are putting panels on the roof we need to know the pitch of the roof. Estimate this from the street view on google maps. This will allow us to calculate how much to shorten the panels by when projecting them onto the ground.

Roof Pitch:

Distance from peak to eave along roof surface:

Collecting panel info

We will use either Astroenergy ASM6612P-315 or ASM6610P-260 panels. Collect panel dimensions from an online source (e.g., <http://www.wholesalesolar.com/>).

315W panels:

Panel Length:

Panel Width:

Panel projected length in portrait orientation:

Panel projected width in landscape orientation:

260W panels:

Panel Length:

Panel Width:

Panel projected length in portrait orientation:

Panel projected width in landscape orientation:

Drawing it up in Autodesk Inventor

Draw the site

Open Inventor, create a new part with imperial units and start a sketch on the XY plane. **Note, if you don't use the XY plane for this strictly 2D drawing you will have to start your drawing over from scratch.**

Draft a drawing of the lot and buildings pre-solar power using rectangles to represent buildings, edges of the lot and the electrical meter (a cartoon, not to scale). Use a circle to represent the utility pole with a diameter of 18". Use the dimension utility to make everything the correct size.

Save this part as drawingPrePV, it will have the extension .ipt.

Add the panels

Now add the panels, we will add them to the south-facing taller part of the roof. Instead of drawing and arranging each panel separately we will use the rectangular grid tool:

Instructions for rectangular grid:

- Draw object to be repeated.
- Select rectangular pattern
- Highlight object to repeat, it will turn blue
- Click white arrow under Direction 1
- Click line in 2D sketch that is parallel to the first direction to repeat in.
- Enter repetition distance
- Enter # of repetitions
- Use flip button if repetition is going the wrong way.
- Repeat for 2nd direction.

When choosing how to orient your panels maximize power production. (Note, there are building codes that are under discussion that would require 3' paths along the edge and peak of the roof for firefighters. Include these paths or not, as you see fit.).

Editing a rectangular grid

Most things can be edited after being drawn in inventor. To modify the rectangular grid left click on a line in the patter and then right click to be presented with a menu of options including "edit rectangular grid".

Save the "part" with the panels installed as "drawingWithPV".

Create a drawing of your plot plan.

From the initial screen create a new drawing.

Click on base view, select the “part” file to put in the drawing, and select a scale for your drawing. 1/96 would be 1”=8’.

Click on the page to place your “part” on the drawing.

Use the dimension tool to display dimensions relevant to the zoning official (e.g., distance from edge of panels to edge of property).

Use the text tool to label items that are relevant, such as the service pole, the meter, and the PV grid. There are two text tools one that is bare text and one that has an arrow attached.

Make a 2D sketch to add an arrow pointing in the direction of true north and label true north.

Fill in the Title of the drawing as “PV installation at 17 Elmwood Ave. Cortland NY (Tax ID#:____)” and who drew the drawing. Do this by

- clicking on the Ipro button in the top left corner,
- select iProperties,
- select drawing summary
- Fill in values.

Save the drawing as a dwg file for simple editing and as a pdf file for easy sharing.