CE 365K **Exercise 1: GIS Basemap for Design Project** **Spring 2014**
Hydraulic Engineering Design

The purpose of this exercise is for you to construct a basemap in ArcGIS for your design project. You may execute this homework in the Civil Engineering Learning Resource Center, or on your own computer using the software license file that I have provided for you. To install the software on your computer, follow the instructions provided by ESRI: http://www.caee.utexas.edu/prof/maidment/CE365KSpr14/License/ESRILicense.pdf I have prepared some more detailed guidelines that you may also find useful: http://www.caee.utexas.edu/prof/maidment/giswr2013/Docs/InstallingArcGIS102.pdf Besides the **ArcGIS Desktop** installation, you will also need the **Spatial Analyst** and **3D Analyst** extensions that come with the software.

There will be a tutorial session in ECJ 3.402 on Tuesday April 1, 11-12:30, and Thursday April 3, 3:30-5PM, if you need help with this assignment or other aspects of your design projects.

I am going to use the basemap that I prepared for Homework 1 as a goal for this exercise – to define a study area about ECJ:

Step 1: Display Files in ArcGIS

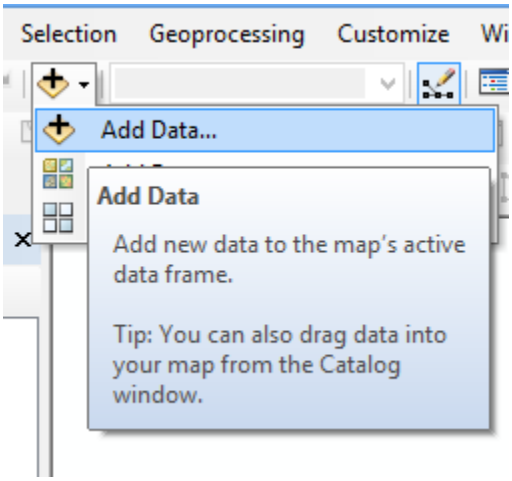
The files showing pipes and related drainage features come from CAD drawings of the campus. You can get these files at:

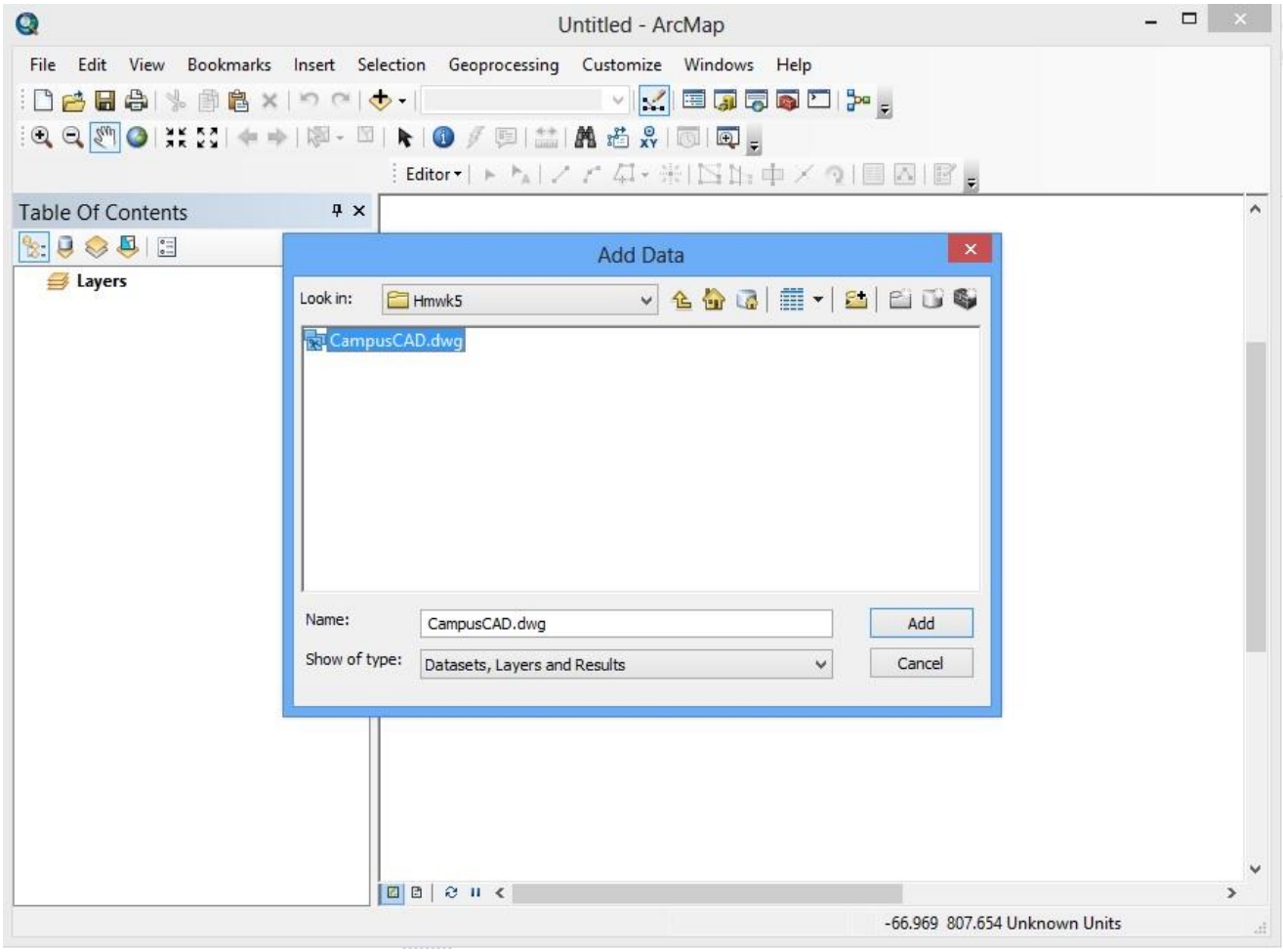
http://www.caee.utexas.edu/prof/maidment/ce365kspr14/hmwk5/campuscad.zip or on the data folders for this class at: \\austin.utexas.edu\disk\engrstu\class\caee\ce365k\hmk5 There is just one file:

This is actually an AutoCAD file but we are going to display it in ArcGIS directly.

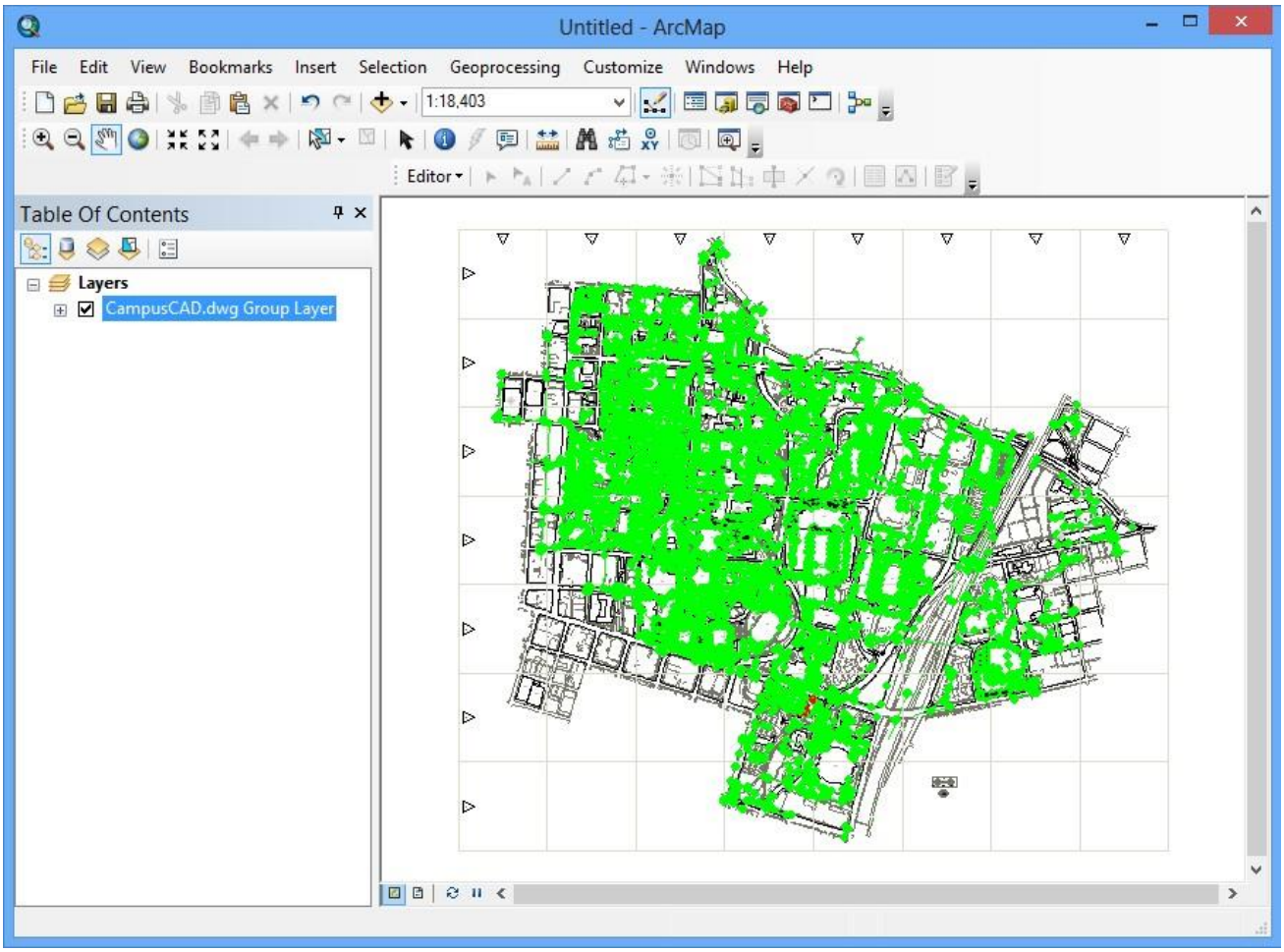
Open ArcMap 

and say "Cancel" to the "ArcMap – Getting Started" screen. Add the **CampusCAD.dwg** file to the ArcMap display.

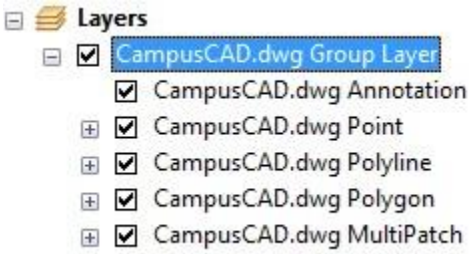




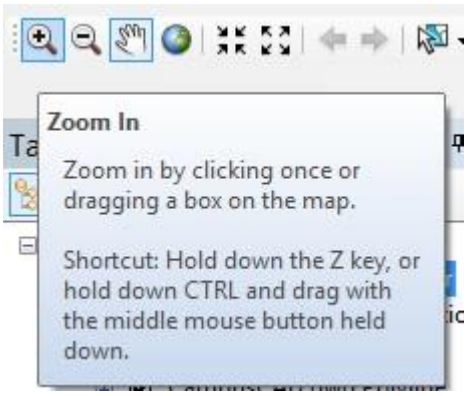
And you'll get a display like this:

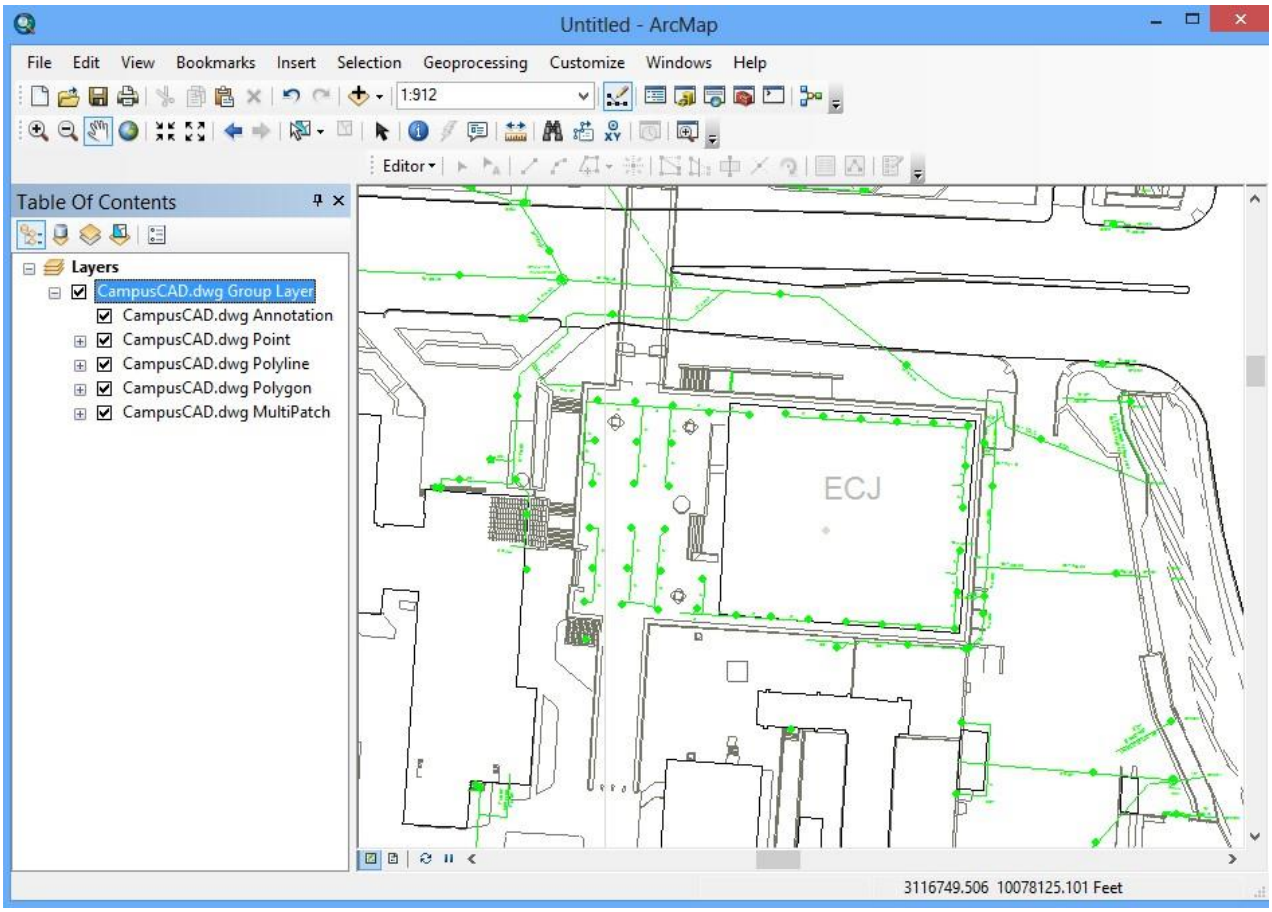


Expand out the drawing file to see the various kinds of data displayed there.

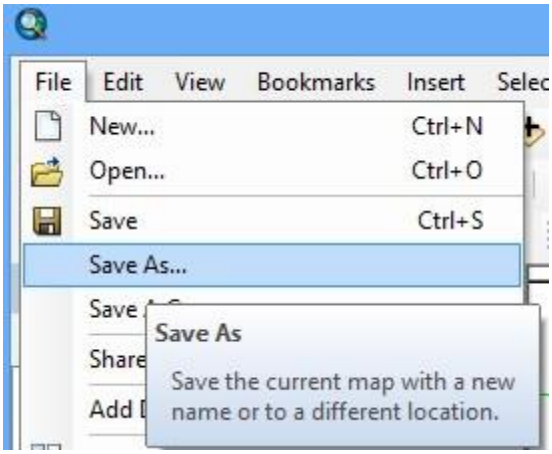


Use the Zoom and Pan buttons to focus in on the area around ECJ





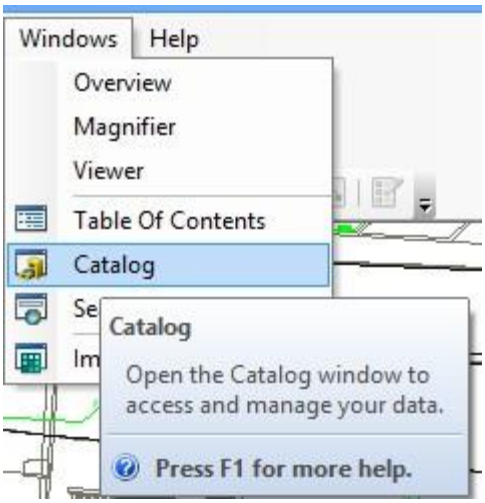
Save your ArcMap file in a **local directory** so that you can open it again at this point in your project.



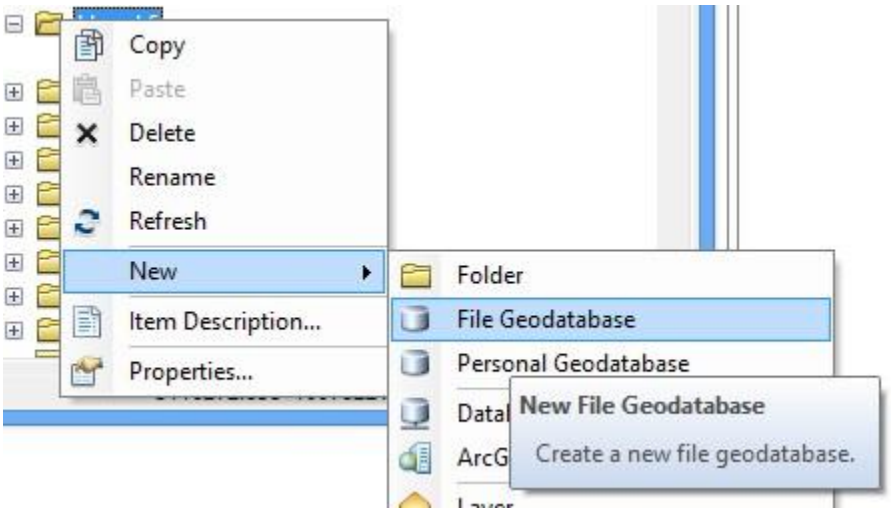
You'll see that it looks like this. I named my file Hmwk5, but you can use any name that you want.

Step 2. Create a Geodatabase for your Project Information

Open **ArcCatalog** and you'll see popups appear on the right hand side of your screen.

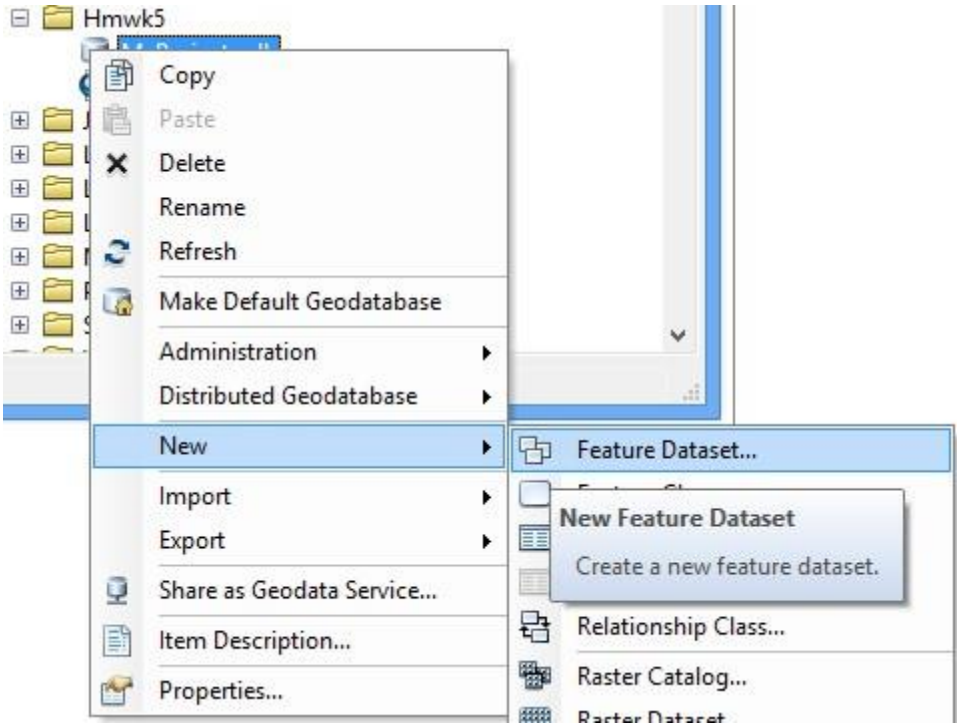


In your working directory, create a new file geodatabase by right clicking in Arc Catalog on the folder in which you want the geodatabase to reside in.

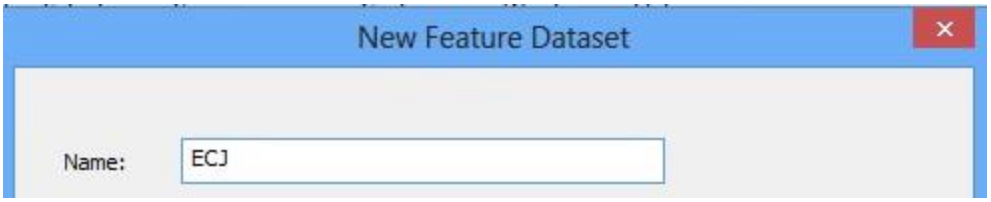


You can call the Geodatabase anything you want. I have called mine **MyProject.gdb**

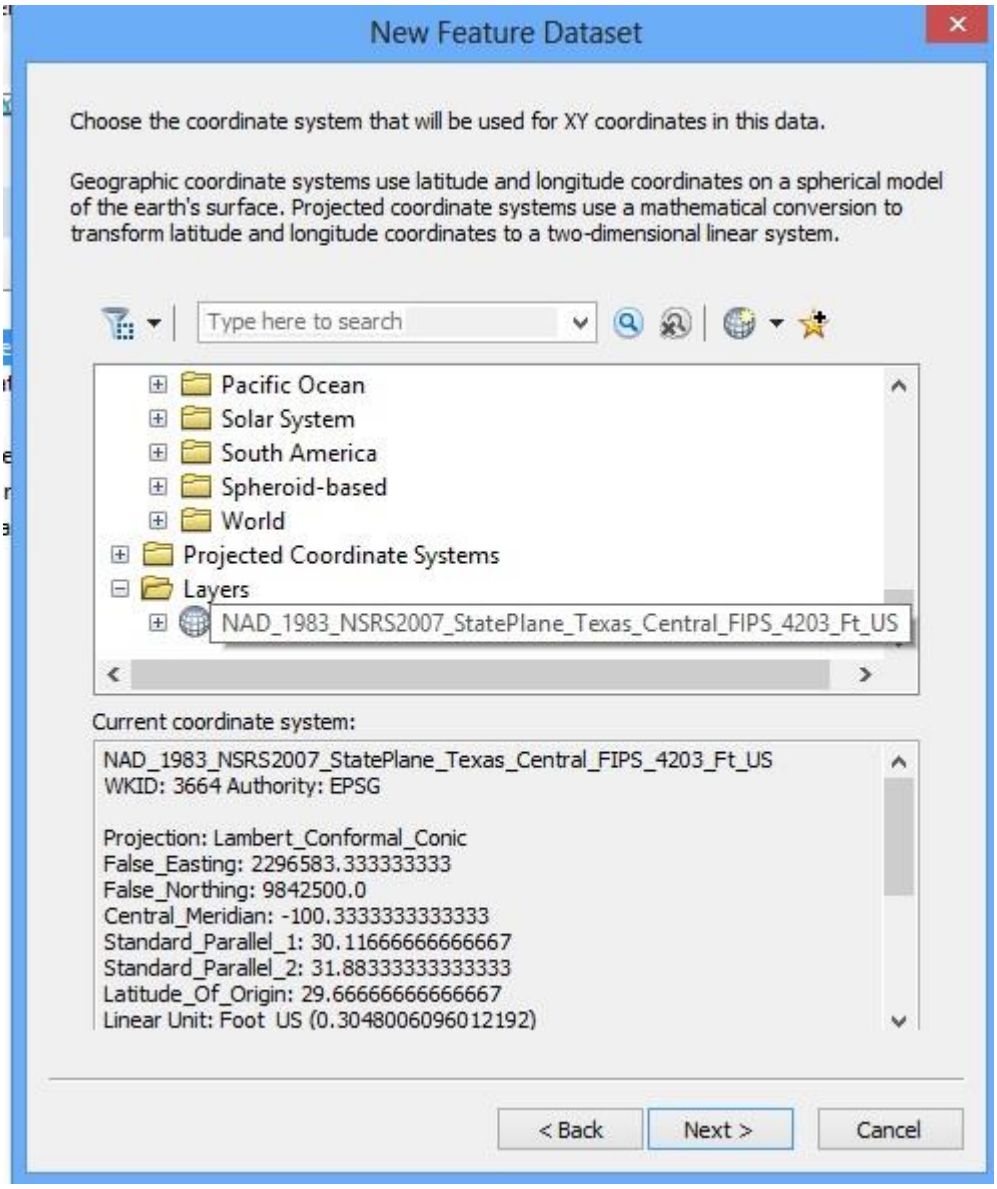
Within the Geodatabase, create a new **Feature Dataset** by right clicking on the geodatabase name.



Call this Feature Dataset, **ECJ** This will be the repository for your project files.



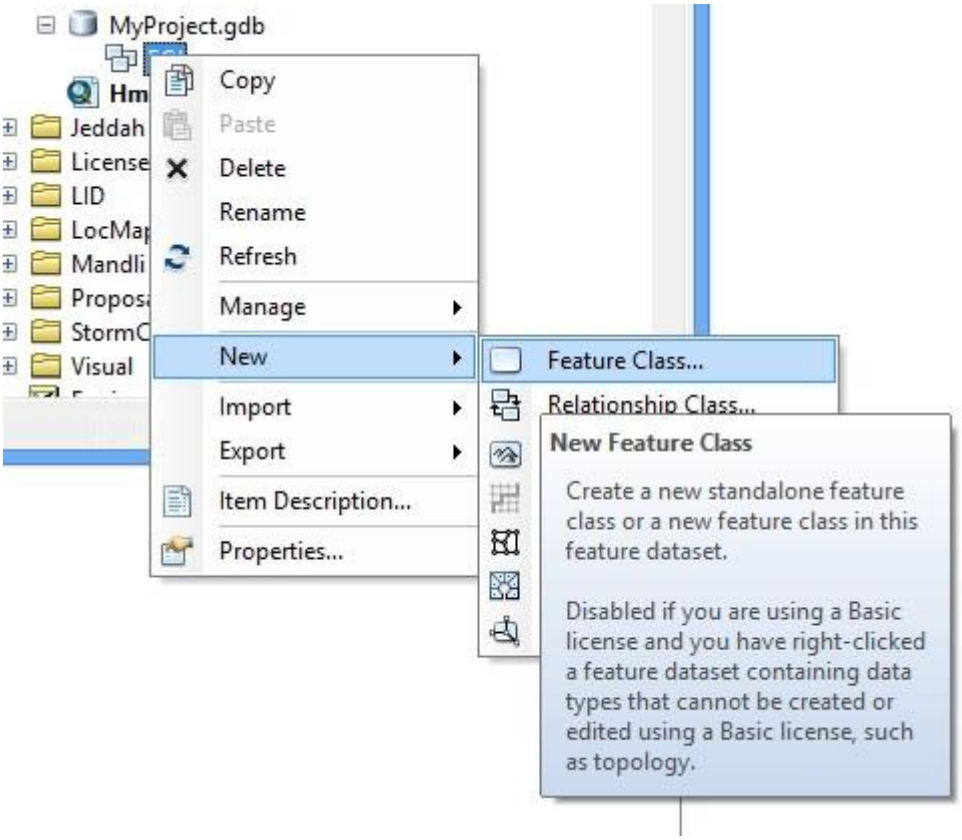
Use the slider bar on the right hand side to go down to the bottom and select the coordinate system from the Layers you have displayed, which is the **State Plane Coordinate System, Central Texas Zone**, the standard for legal boundaries in the Austin area. The earth datum is the **North American Datum of 1983**.



and ignore the rest of the choices to **Finish** the creation of the Feature Dataset.

Step 3. Define the Region of Interest for your Project

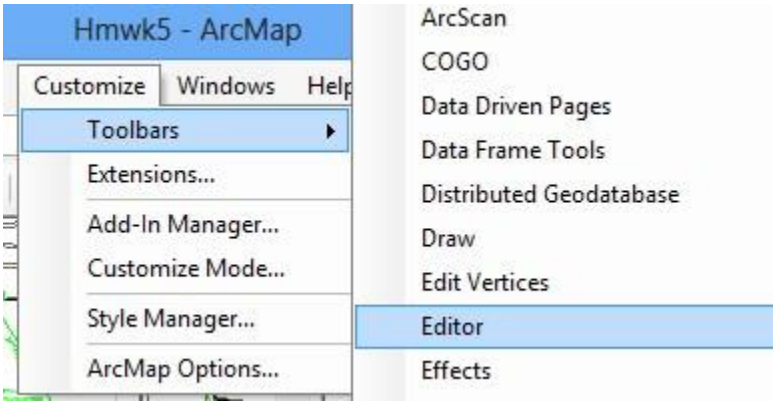
Create a new feature class by right clicking on the Feature Dataset



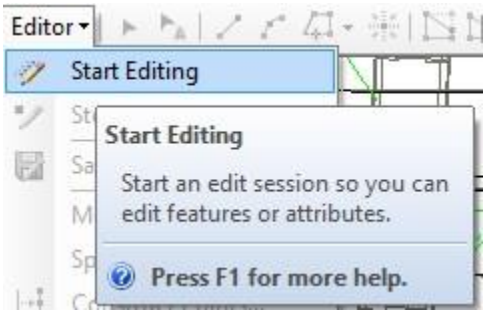
Call this **RegionofInterest** and ensure that you have **Polygon Features** selected (which is the default feature type)

Ignore all the subsequent screens and **Finish** the feature class creation. Now you have a place to define your region of interest but there is nothing in it yet.

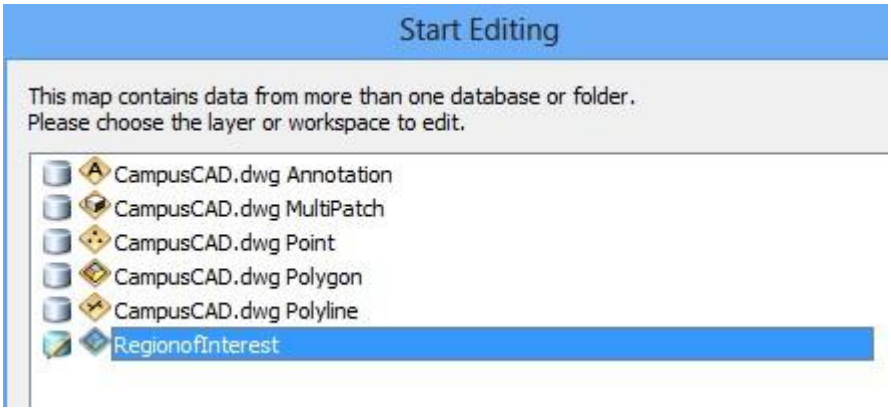
Open the ArcMap Editor:



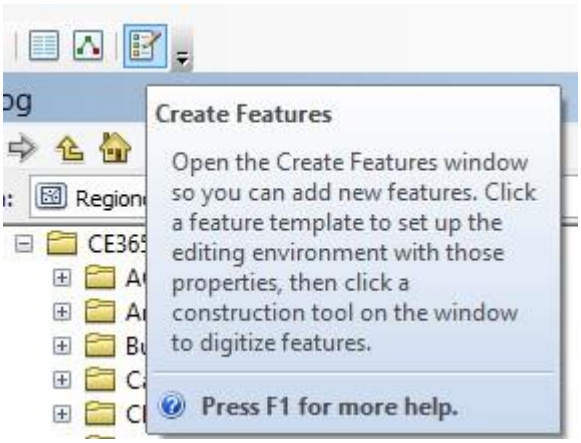
Start Editing



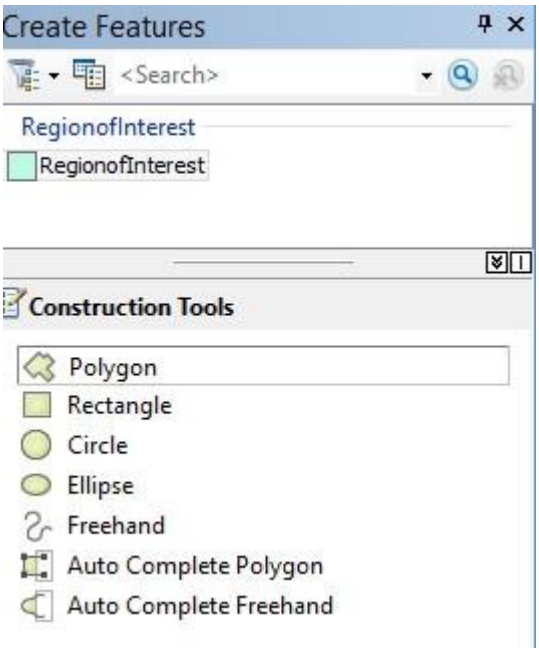
and select **RegionofInterest** as the feature class to be edited.



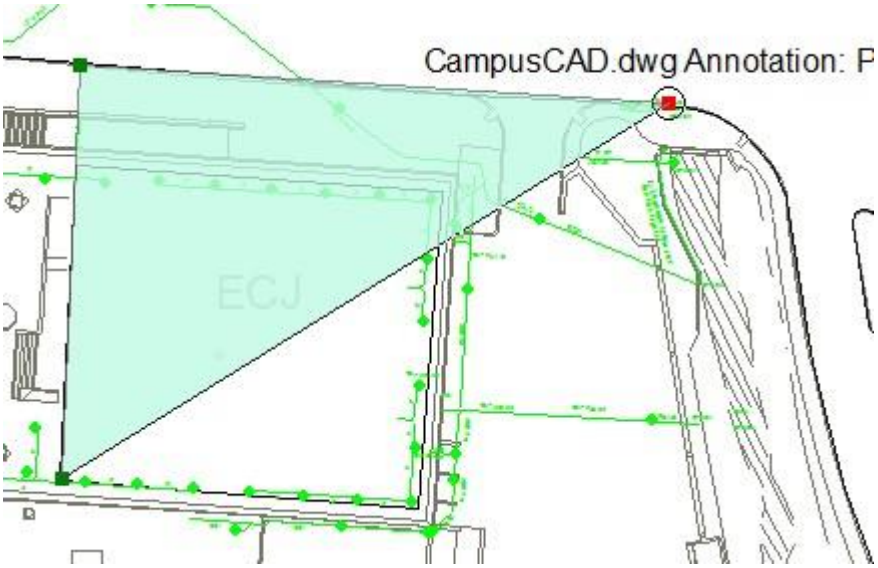
Open the **Create Features** window



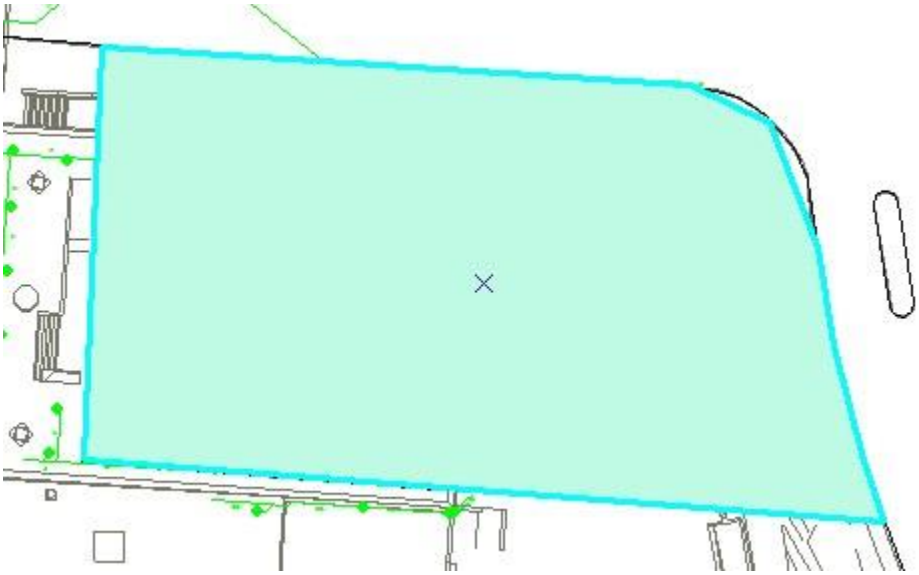
Click on **RegionofInterest** and select **Polygon** as your Construction Tool



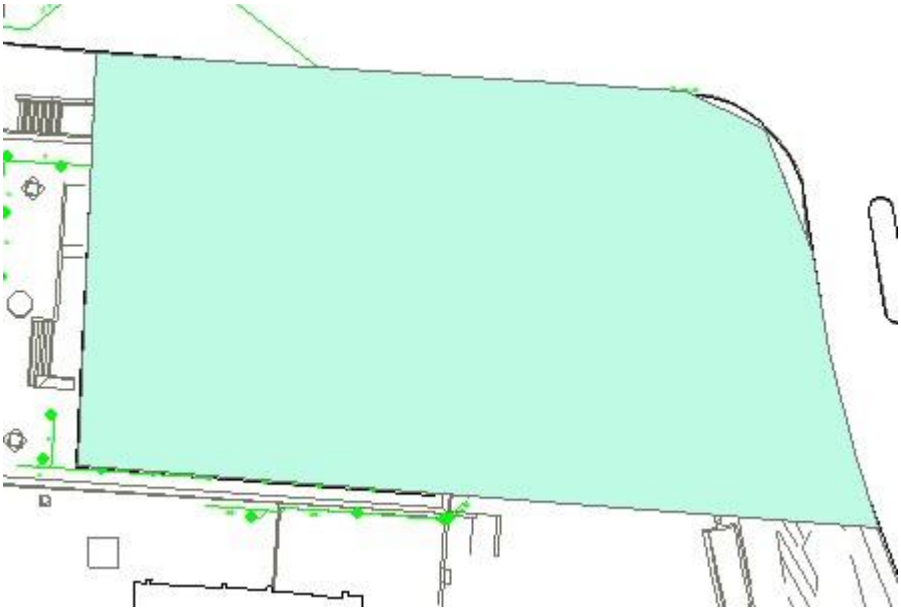
Return to ArcMap and move your cursor around the area that you want to select, clicking points as you go. You'll see that the cursor recognizes features in the underlying drawings that you have and snaps to them.



Once you've got the region defined, double click on the cursor and your Polygon will be completed:

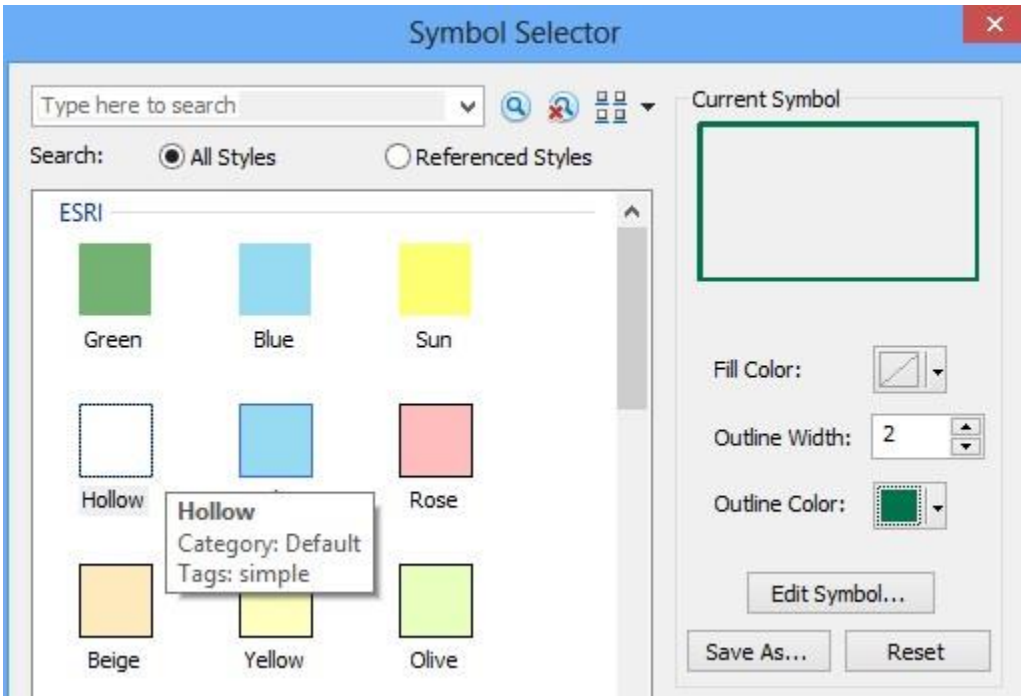


Stop Editing and **Save Your Edits**, so now you've got a new Polygon that defines your Region of Interest. Pretty cool!

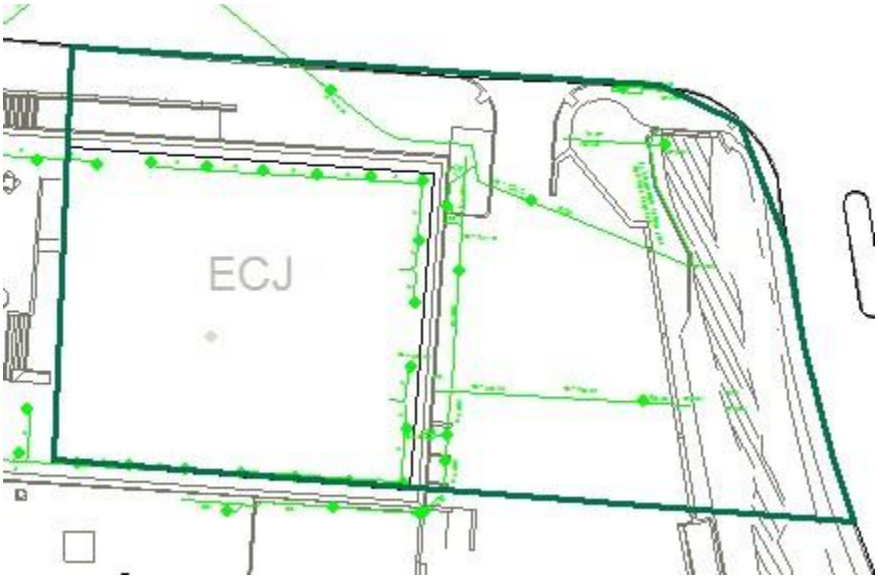


Double click on the RegionofInterest symbol

And open the Symbology Editor, so that you can select a Hollow outline that is Green and of Outline Width 2



Now you have a nice outline of your Region of Interest and can see the features underneath it.

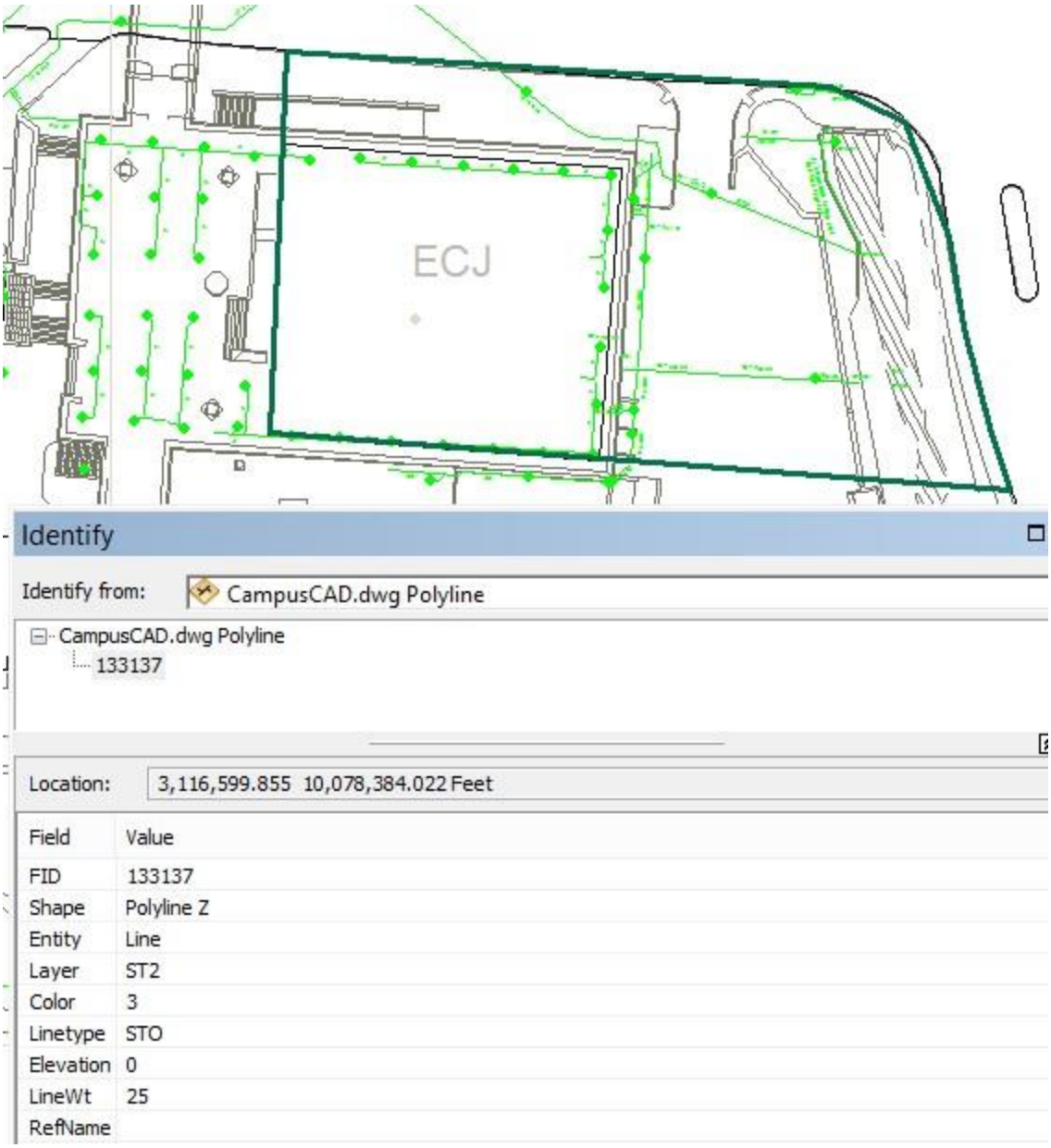


Step 4. Select the Features of Interest

Now, we want to pick out the features from the drawing files within the Region of Interest and copy those into our project geodatabase.

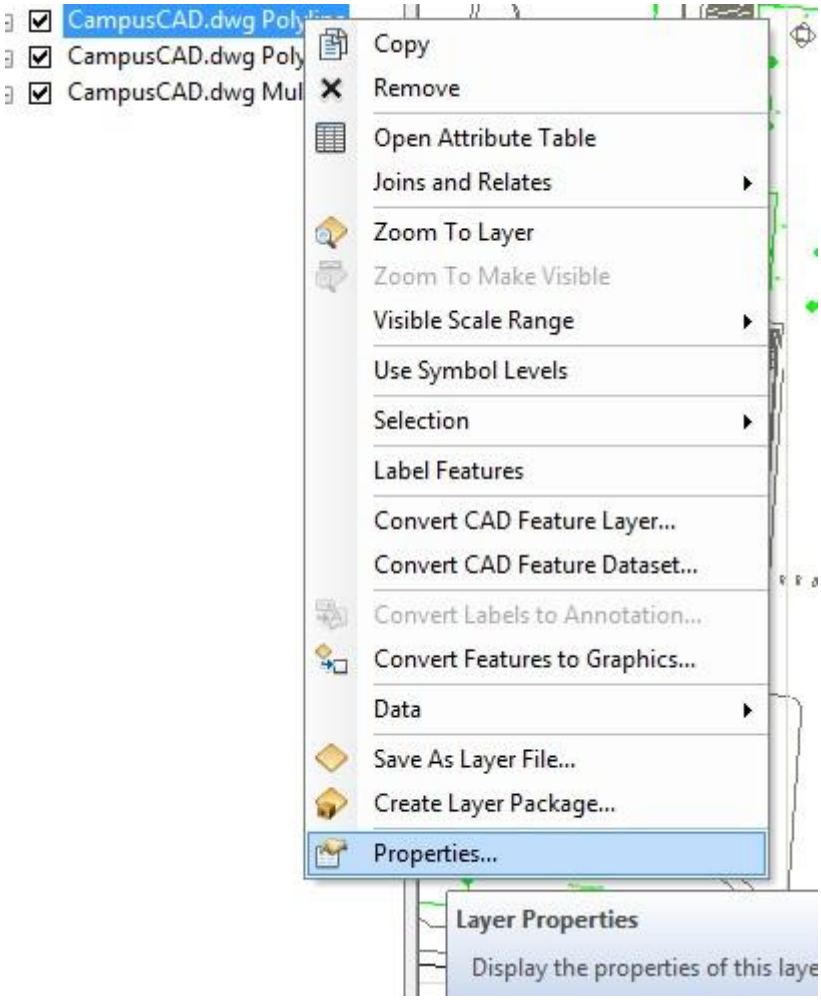
Use the Identify tool 

And click on one of the green pipes in the drawing. Make sure that “Identify from” is set to **CampusCAD.dwg Polyline**

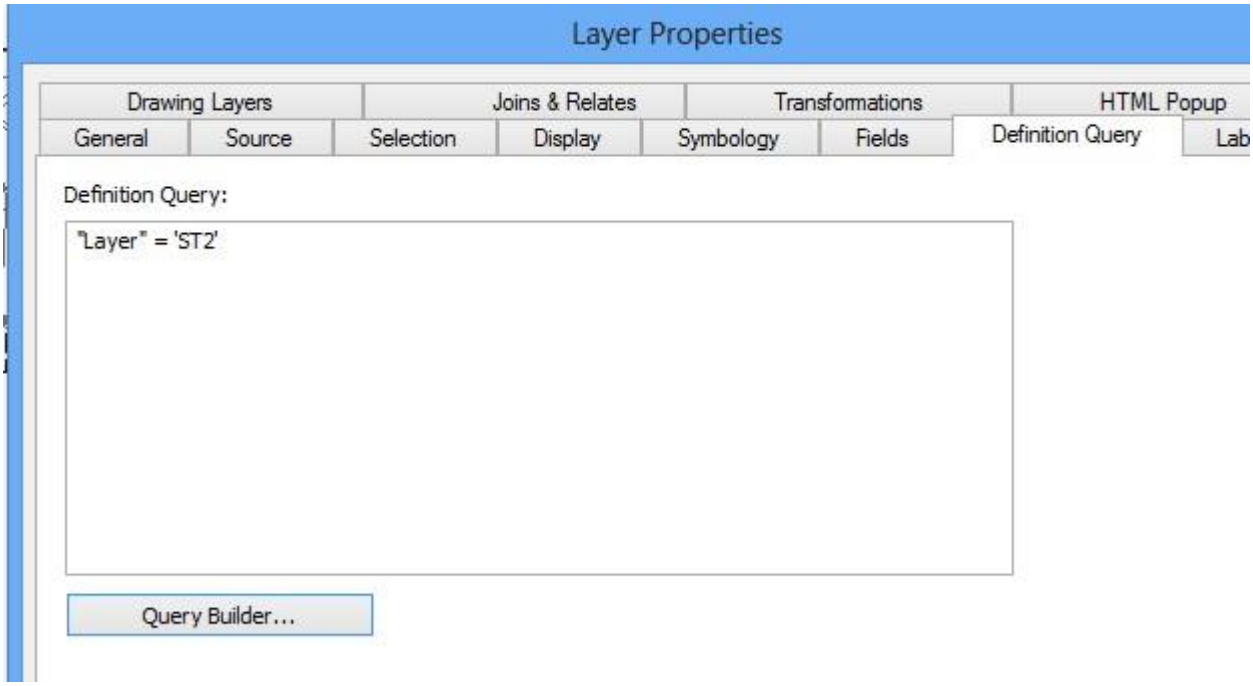


You will see that this is **Layer** type **ST2**

Right click on the **Polyline feature** class in the Legend, open its **Properties**

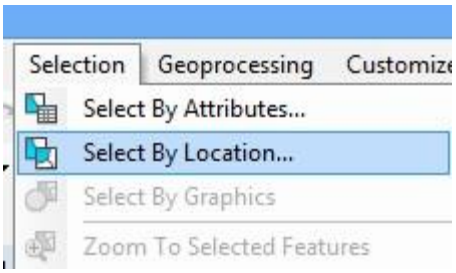


And use the Query Builder to get “Layer” = ‘ST2’ in the display. Or just type it in, but be very careful as you do so.

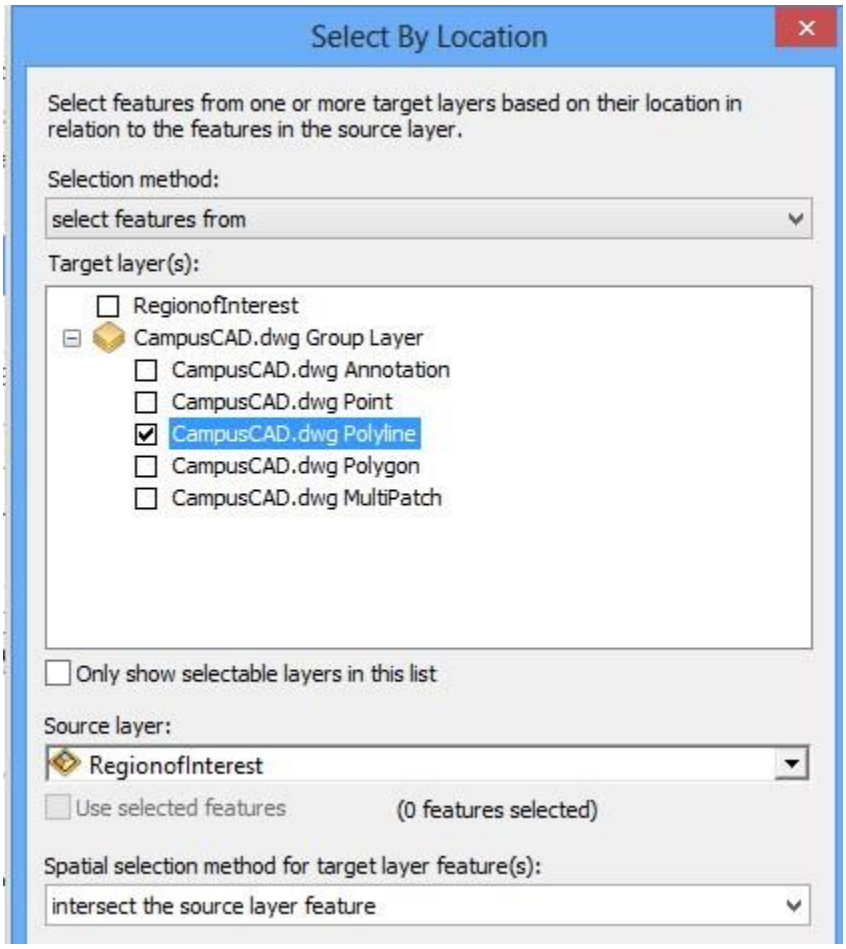


Now you'll see just these kinds of lines in your map:

Use **Select by Location**

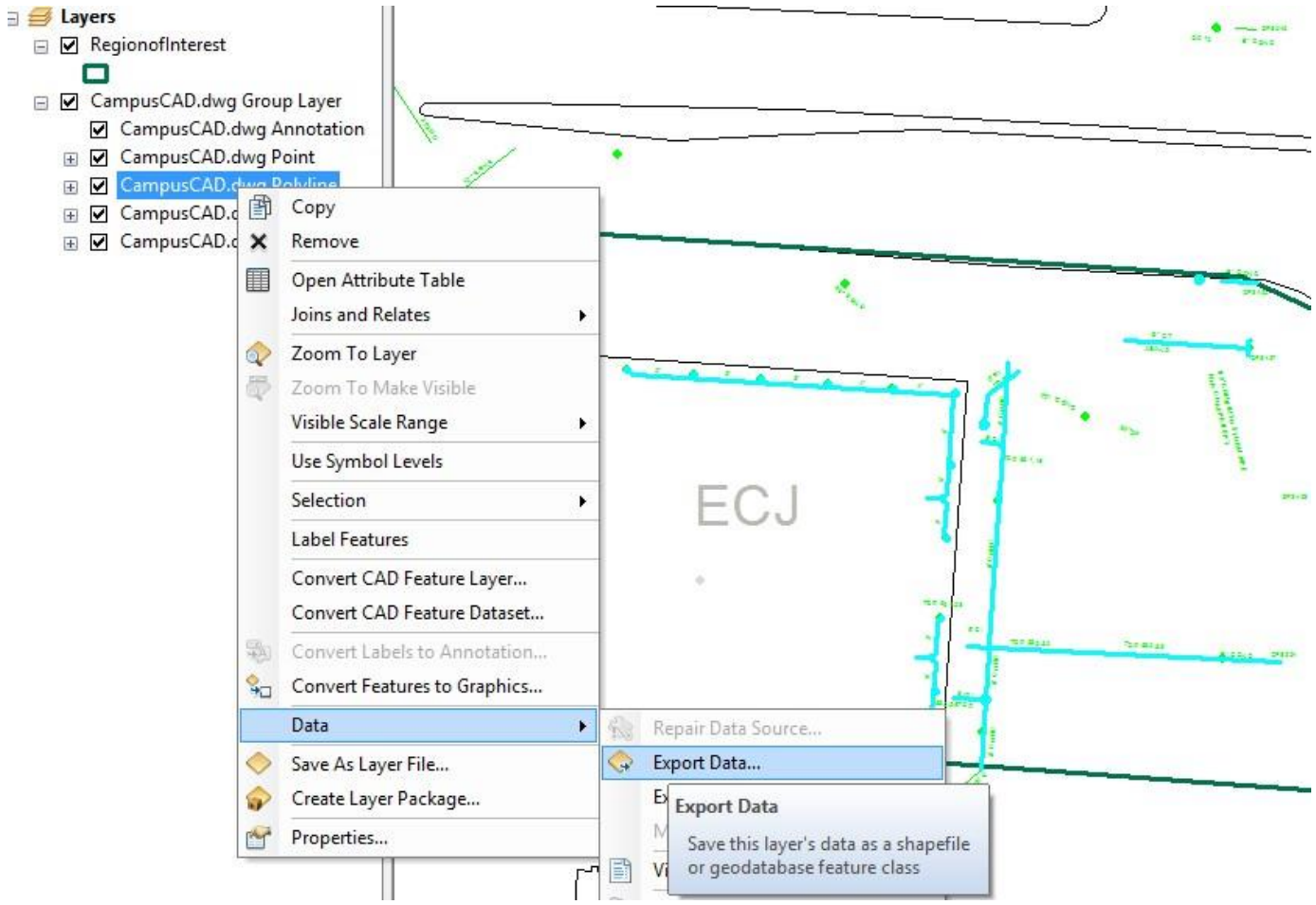


To find those **Polylines** that **Intersect** the **RegionofInterest**

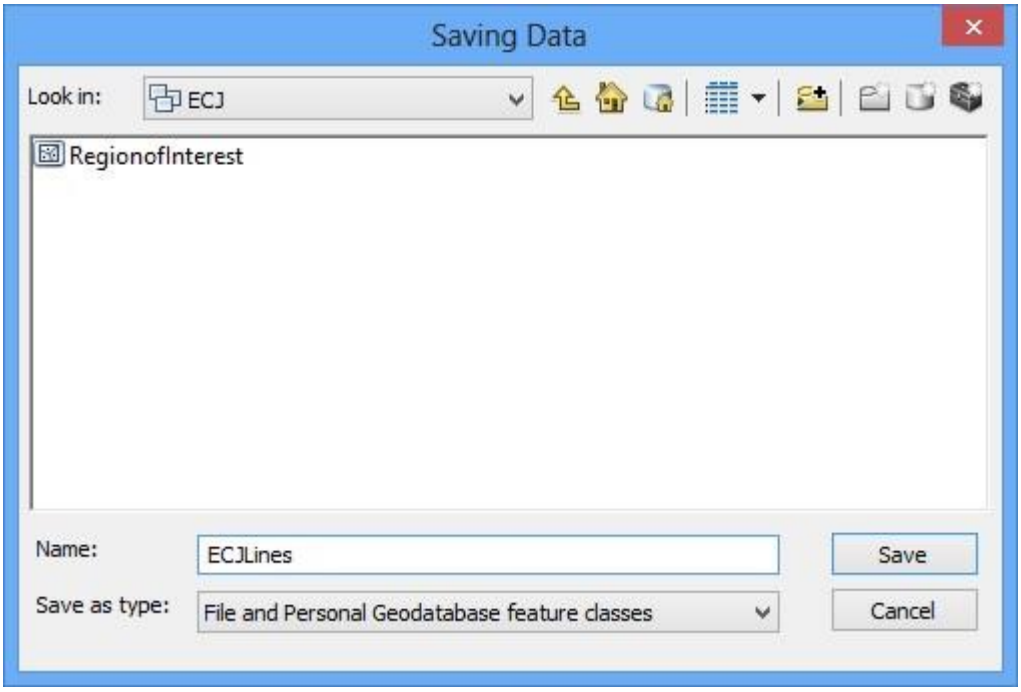


Hit Apply and Ok, and you'll see some lines selected

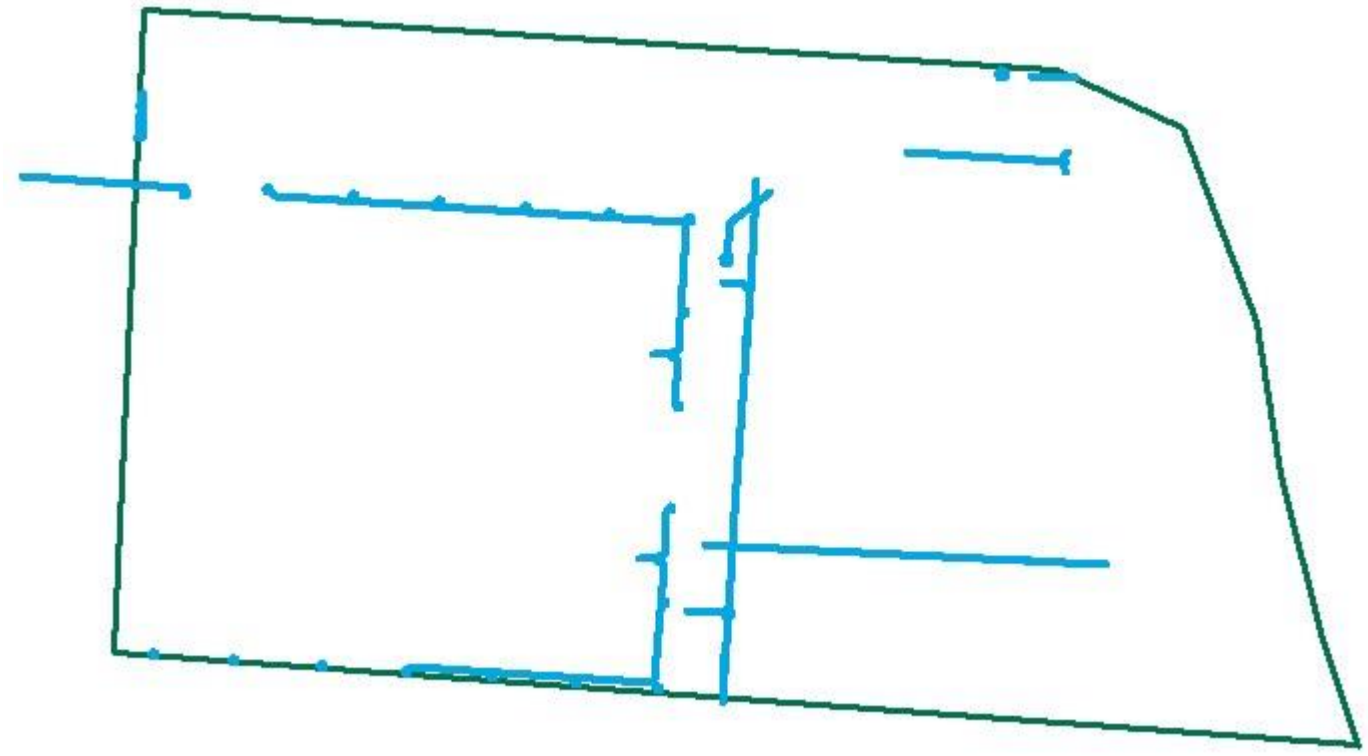
Right click on Polylines and select **Export Data**



Save the data under the name **ECJLines** in your **ECJ** Feature Dataset as type **File and Personal Geodatabase feature classes**.



You might have trouble at this point with a conflict concerning the vertical datum. If so, export the files as a **Shape file**, rather than Personal Geodatabase feature class, and add the result to the map. You can then Export the data from the Shape file into the Personal Geodatabase.

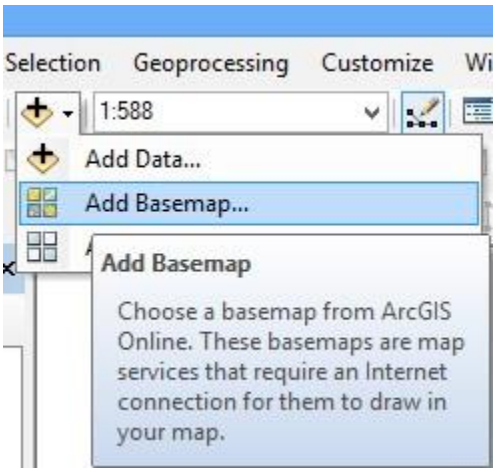


Now your geodatabase has pipes in it as well. Click on the pipe Symbol in the Legend and recolor and resize them to make the display nicer. You can open the Editor and delete or edit the pipes you don't want to make the display better.

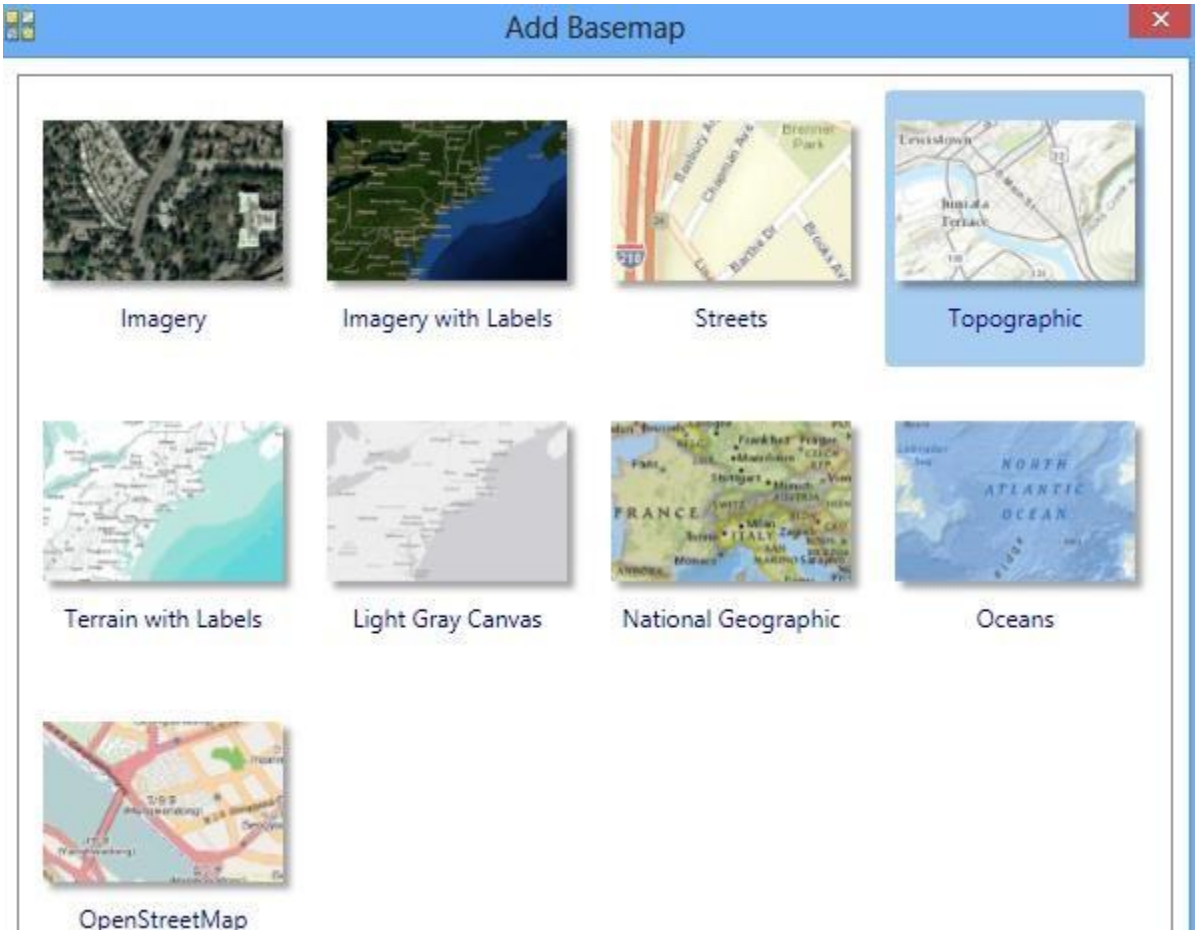
Save your ArcMap document.

Step 5. Add an Image Base Map

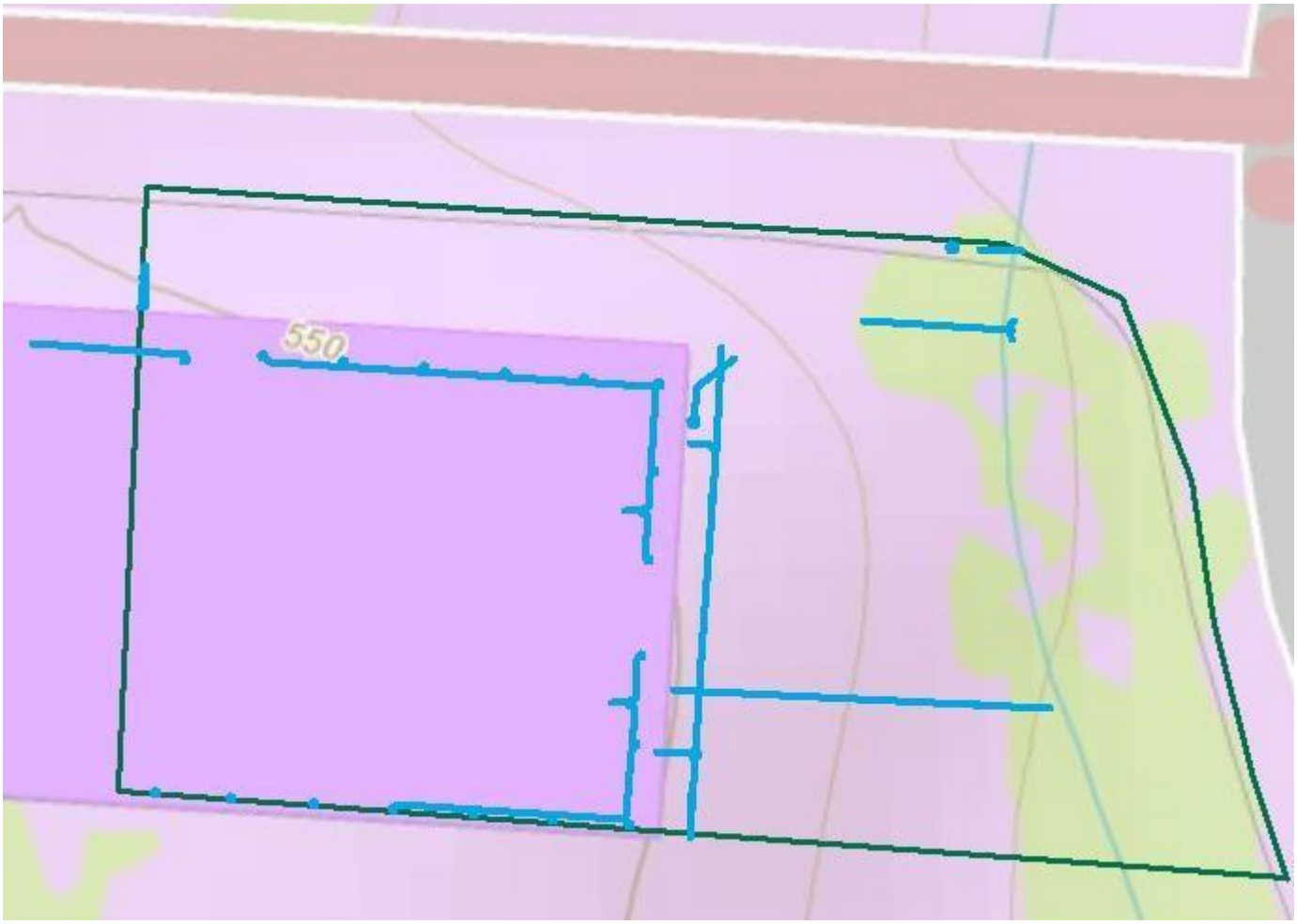
Now lets add a base map to provide some spatial context. Use **Add Data/Add Basemap**



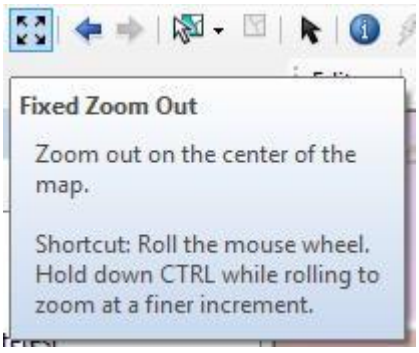
to open a set of basemaps

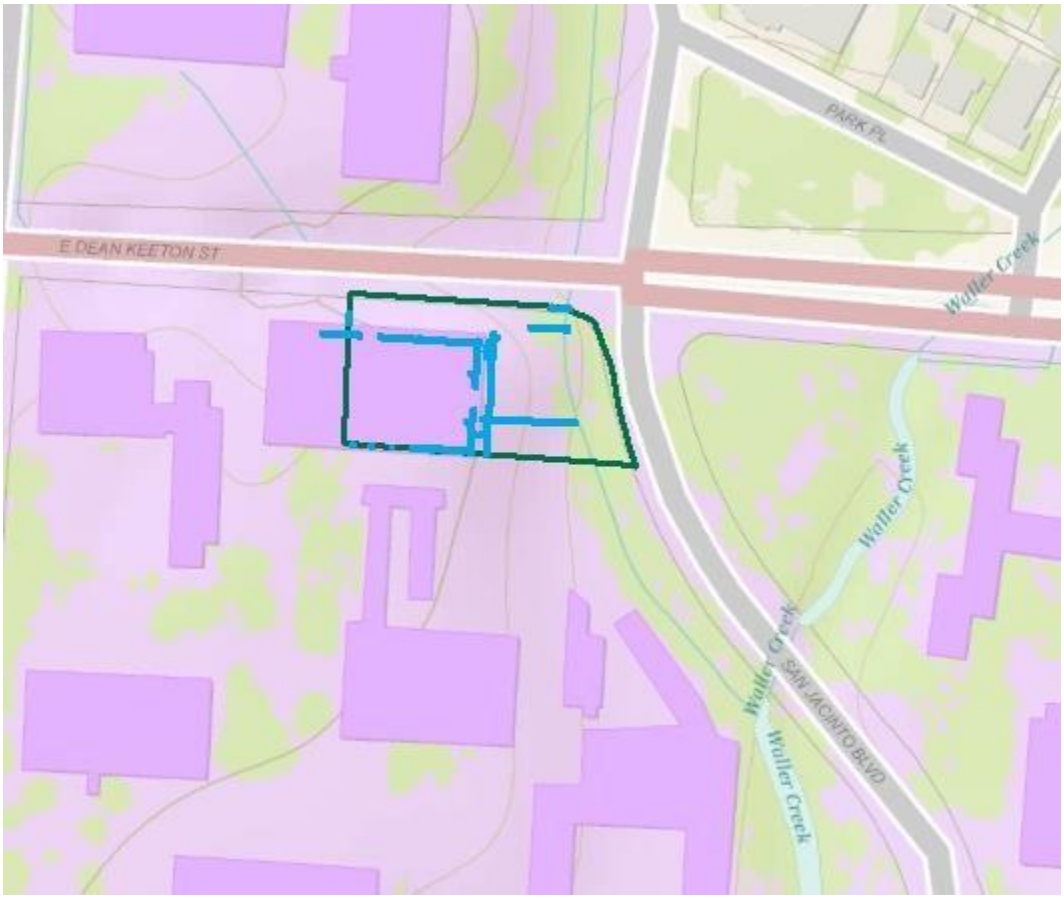


Choose the Topographic basemap and you'll see your data with a little bit of context.



Use Zoom Out to see a bit bigger picture





Here is what the geodatabase now looks like:

If you'd like to see how to make a really formal map with a North Arrow, title, scale bar, etc, see

http://www.caee.utexas.edu/prof/maidment/giswr2013/Ex1/Ex12013.htm#Step8

To be turned in:

(1) A screen capture of your basemap

(2) A screen capture of the contents of your geodatabase