

#5a – Heads-up Digitizing

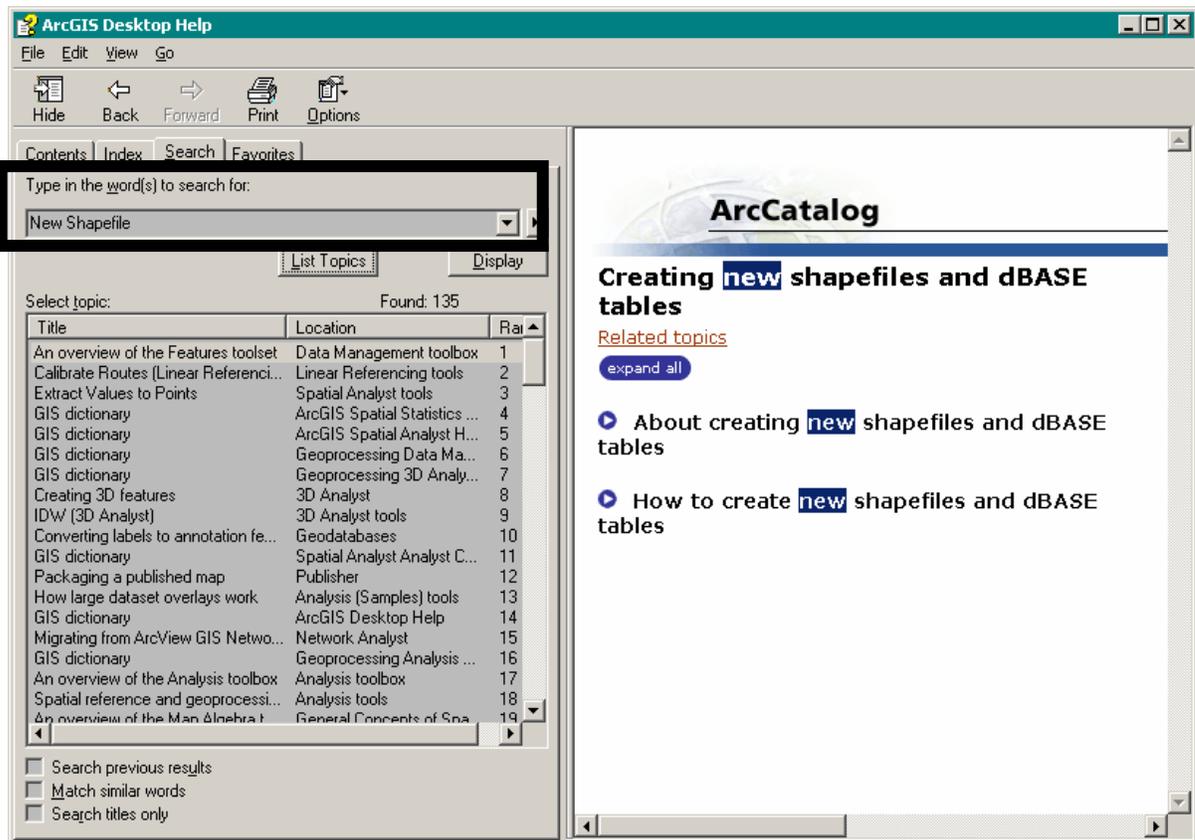
Read Through All Instructions Before Beginning, And follow your project set-up instructions!!

Purpose: Introduces you to heads-up digitizing using a georeferenced image file in the background. Image files may include MrSid, DOQs, DOQQs, DRGs, GeoTiffs, etc. In this project, you will digitize 3 vector datasets: points, lines, and polygons. The point file will contain the point locations of the farmsteads; the line file will contain digitized roads; and a polygon file will store the digitized farm lands.

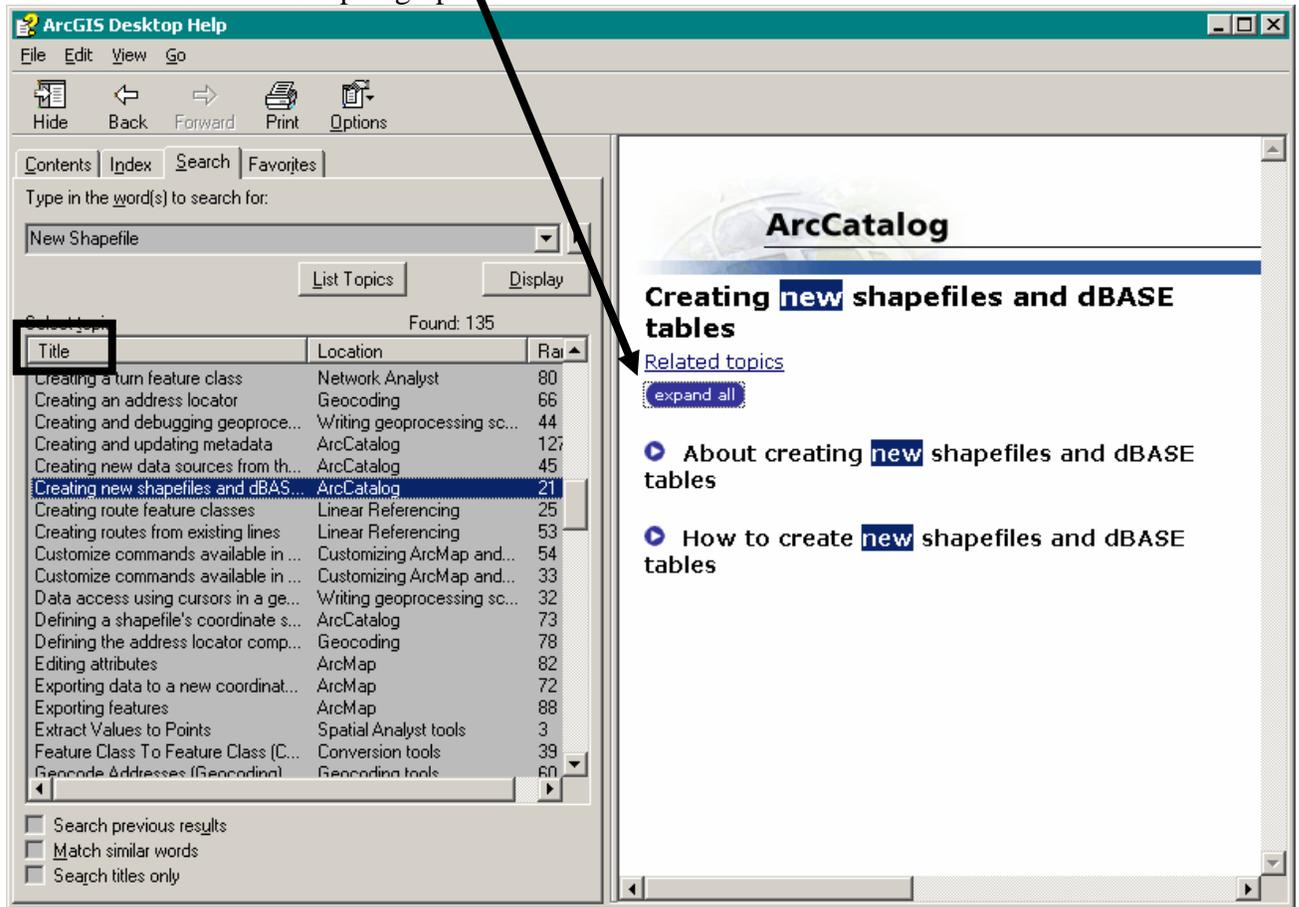
To Turn In: ArcMap Layout of digitized farm parcels.

Data Source: fsa01imq4041sw.sid

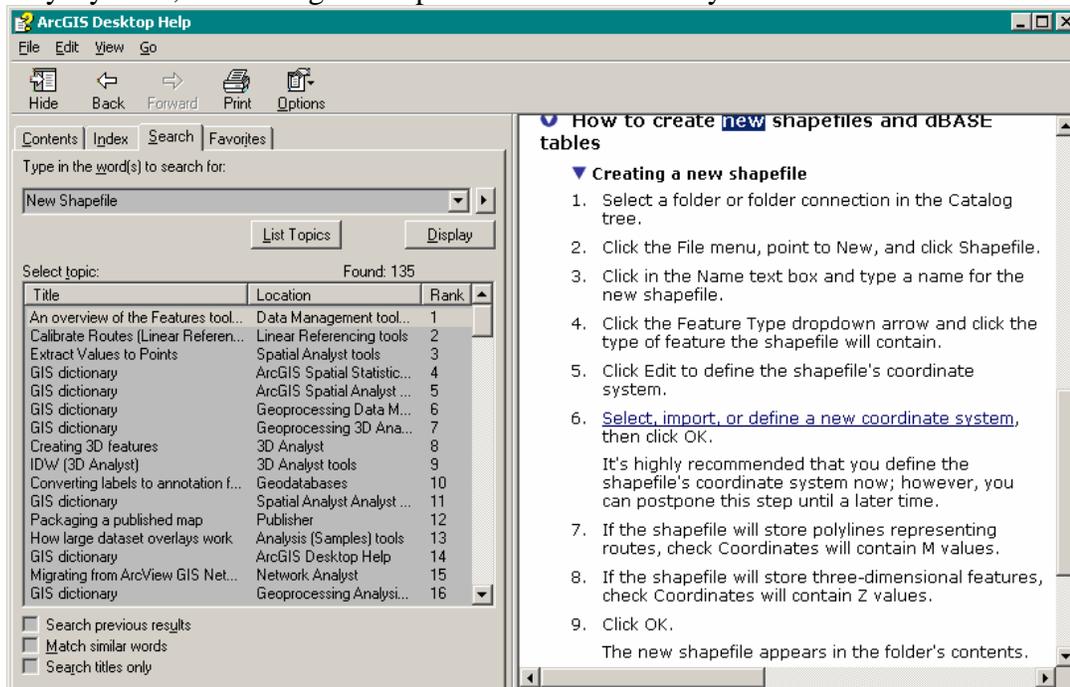
1. First, create a new folder called **Digitize** under your **C:\Projects** folder. Inside this folder, create 3 new folders called:
 - a. **shapes** (stores any shapefiles you create or need for your project)
 - b. **imagery** (where you'll store the MrSid for this project).
 - c. **docs** (stores instructional materials, letters, correspondence, etc., that are part of a project)
2. **Open ArcCatalog**
 - a. Click on Help – ArcGIS Desktop Help
 - b. Click on Search Tab - type: “New Shapefile” – List Topics; now software will search for a list of topics that meet your criteria, so just sit back and wait.



- e. Click on Title to alphabetize. Scroll down until you find “Creating new shapefiles....”
- f. Double-click on it and the info in the right pane will change
- g. Click on the “expand all” button and each of the bullets will open up completely with lots of information. Read the paragraph.



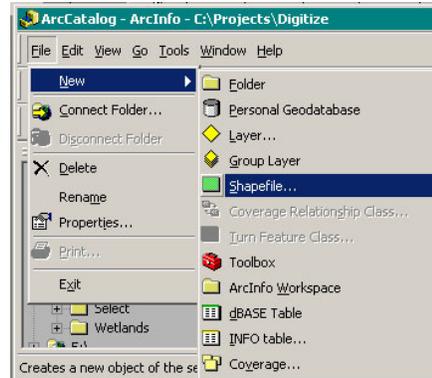
Then towards the bottom is a list of step-by-step instructions. This process follows just about any searches you may try. So, these are good steps to follow whenever you have a “how do I do..???” in ArcGIS.”



- After reading, **close** the Help dialog box and proceed with instructions provided below.

Creating a New Shapefile – In ArcCatalog

1. In ArcCatalog, Click on your new **Digitize/shapes** folder to activate it.
2. Click the **File** menu, click on **New**, and click **Shapefile**.



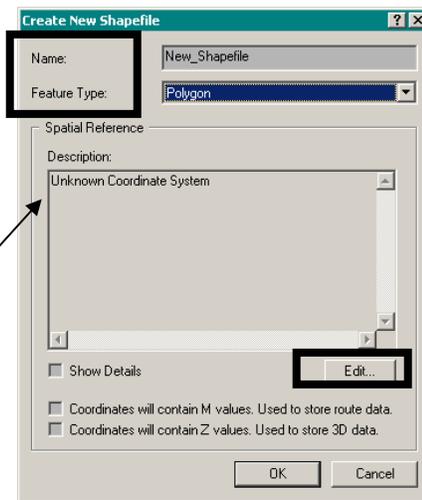
3. Click in the Name text box and type a name for the new shapefile. Call it:

a. **farm_fields**

4. Click the Feature Type dropdown arrow and click the type of feature the shapefile will contain. Select

a. **Polygon**

5. Click Edit to define the shapefile's coordinate system.

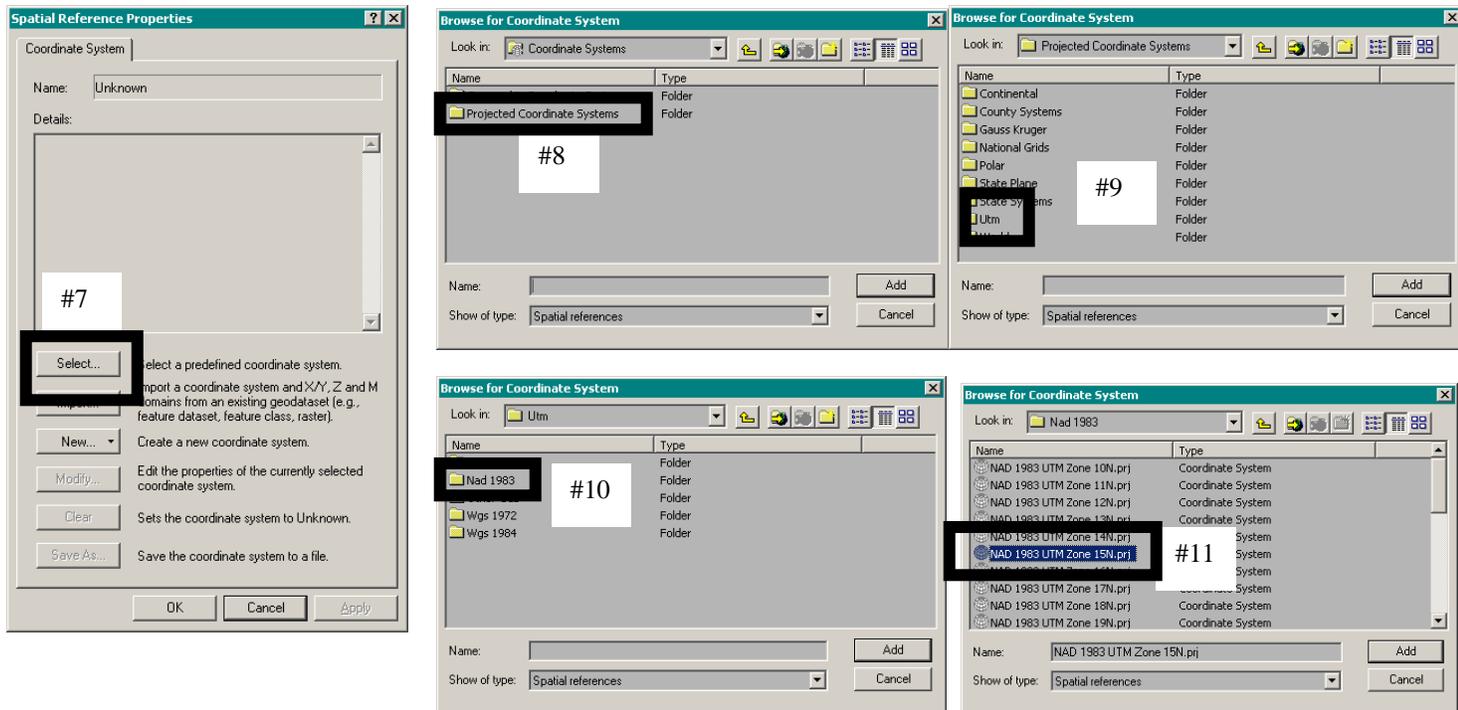


Notice that under Spatial Reference, the Description reads: Unknown Coordinate System.

That tells us we need to define what coordinate system the new shapefile will have. Because the imagery we're using (and all datasets we use here) are in UTM, NAD83, Zone 15, we need to define that for our new shapefile.

To do this:

6. Click on Select (Select a predefined coordinate system.) Click OK.
7. Click on Projected Coordinate Systems. (Double-click, or Single-click and Add)
8. Click on UTM.
9. Click on Nad 1983.
10. Click on NAD 1983 UTM Zone 15North. (Double-click, or Single-click and Add)

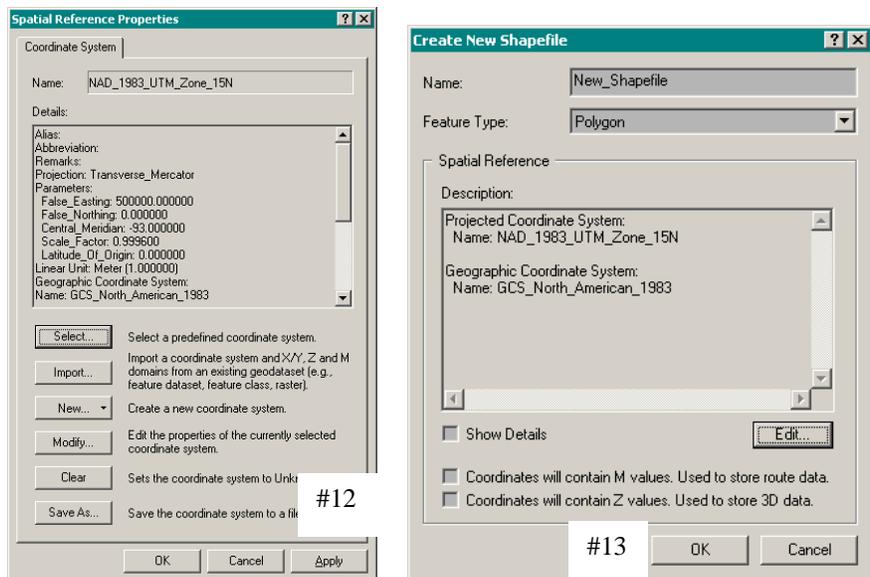


Notice the Spatial Reference Properties have now changed from above (#7) to what's shown at Right.

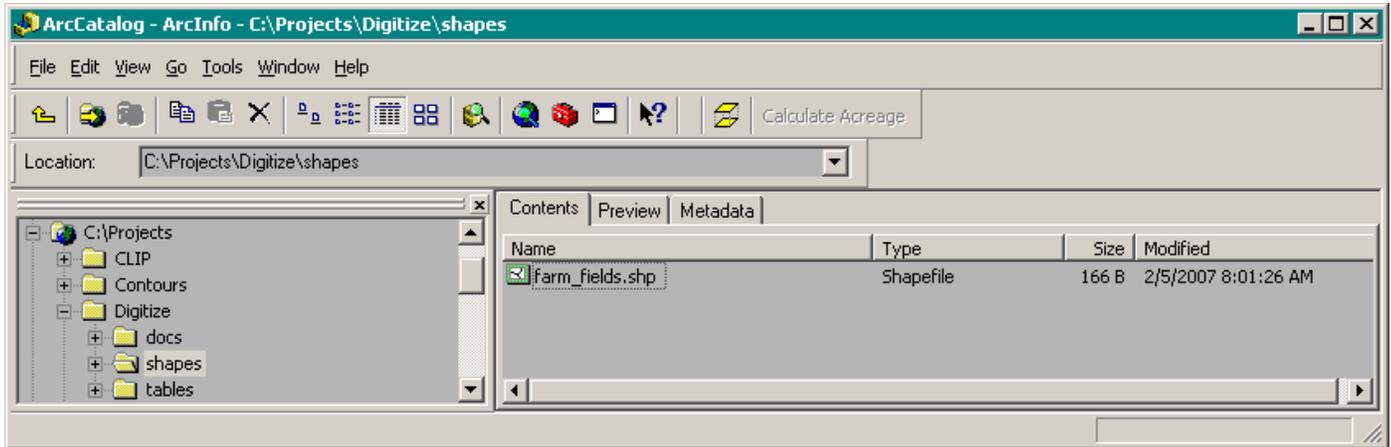
12. Click Apply, and then click OK. (Just clicking OK is okay too.)

Notice the “Create New Shapefile” dialog box now shows the new and the old coordinate systems.

13. Click OK.



The new shapefile now appears in the folder's contents.



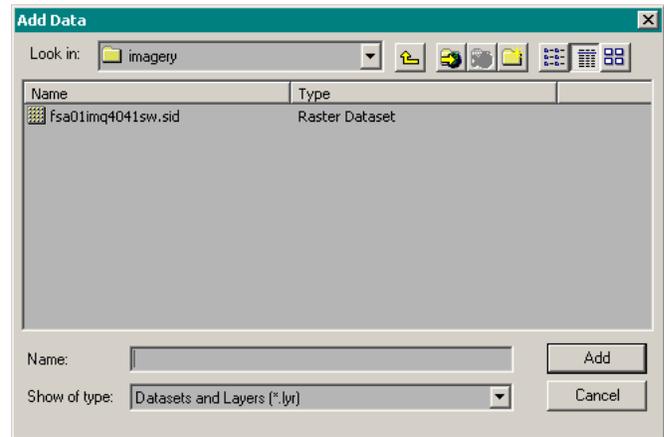
Repeat Steps 1 – 13, twice more with the following guidelines:

- 1. Create a new shapefile called “Roads”. In Step #4, select “Line.”**
- 2. Create a new shapefile called “Farmsteads.” In Step #4, select “Point.”**

A. PREPARATION BEFORE DIGITIZING

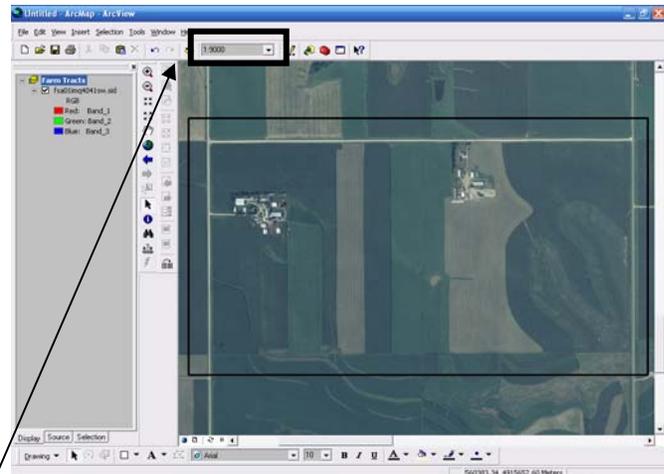
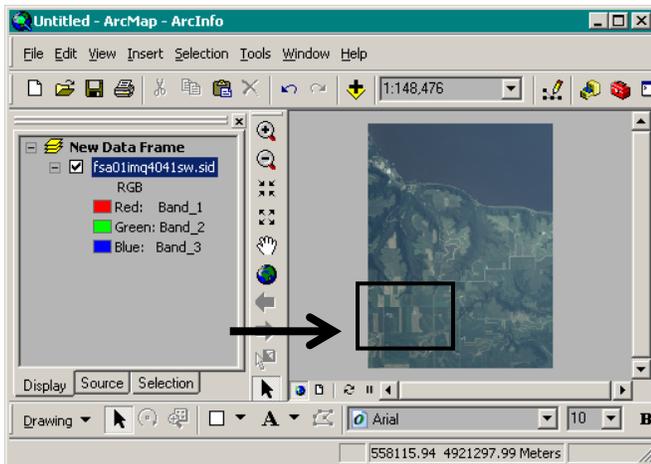
1. Open ArcMap and immediately save your new project and call it, “**Digitize.mxd.**” Save it at your **C:\Projects\Digitize** root level.
2. Make sure your map units and map distance is set to meters, miles, respectively. (See below if you’ve forgotten.)
 - Right-Click Data Frame – Properties - General – Map Distance: Meters; Distance Units: Miles
3. For background imagery to digitize from, you will be using a MrSid image.
4. Copy the **Fsa01imq4041sw.sid** image to your **C:\Projects\Digitize\Imagery** folder. (I will let you know where it is currently stored.)
5. Add it to your project.

The imagery is one of the end products of flights flown by USDA/FSA every year. The imagery was georeferenced and rectified and converted to a DOQQ, which was then further converted to a MrSid file (a process of compressing the file to a smaller size and yet keeping the integrity of the original data).



6. Zoom to the boxed area (see below)

Should now look like below:



You will now begin to set up for digitizing.

- Zoom in further to 1:9000 (Remember: You can also just type these numbers in the little box in the upper center.)

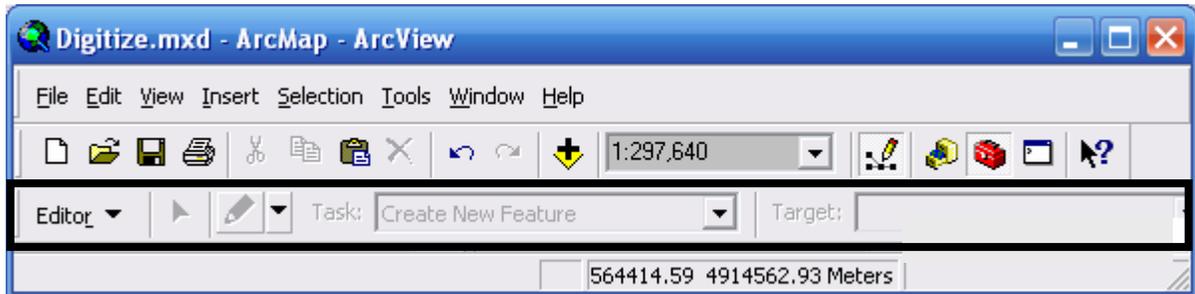
INFO: You will be digitizing the various land parcels within the large square, shown above. Each of the different colored polygons represents a different field (colors show different types of crops grown).

REMEMBER: You must digitize at the same zoom level for all parcels; but you can “pan” around the View.

B. DIGITIZING

Again, Open up the Help and search for Editor - The sketch construction tools. Read thoroughly before proceeding.

1. Back in ArcMap, add your new **Farmstead.shp** to the data frame. (This is your new point shapefile.)
2. Click on **View – Toolbars – Editor** to add the Editor toolbar. Position it like below.

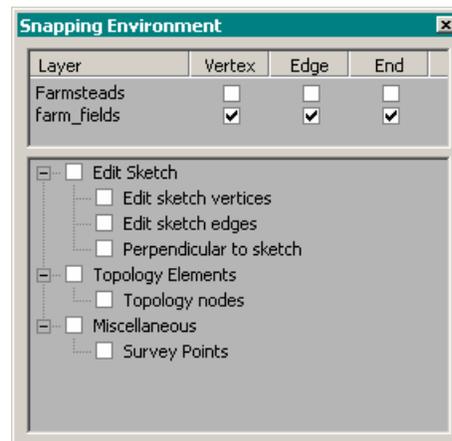


Click on down arrow next to Editor (to set snapping and vertex parameters). Set to the following:

Editor - Options:



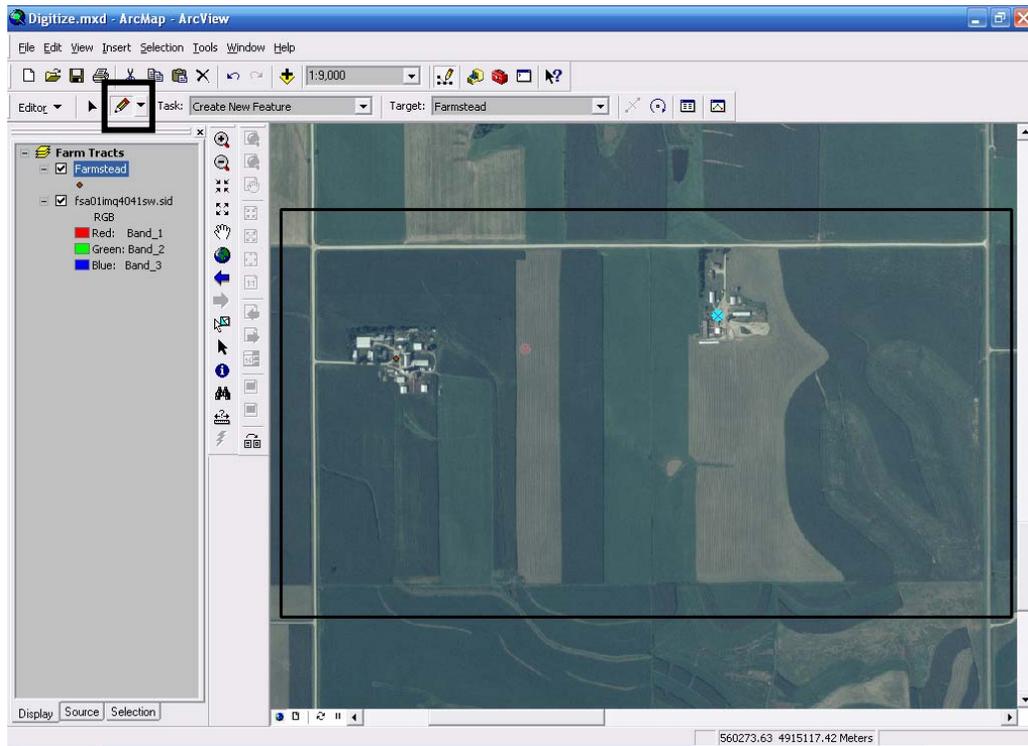
Editor – Snapping:



3. Click on down-arrow on **Editor – Start Editing**. If the **Task** does not default automatically to “**Create New Feature**”, then click the down arrow and select it. Also make sure the **Target** says **Farmstead**.



- Click on the Sketch tool (pencil, below) and just click once on each of the farmsteads. This, basically, puts a point at the location you clicked. Notice the last farmstead is highlighted blue. This means it's still selected.



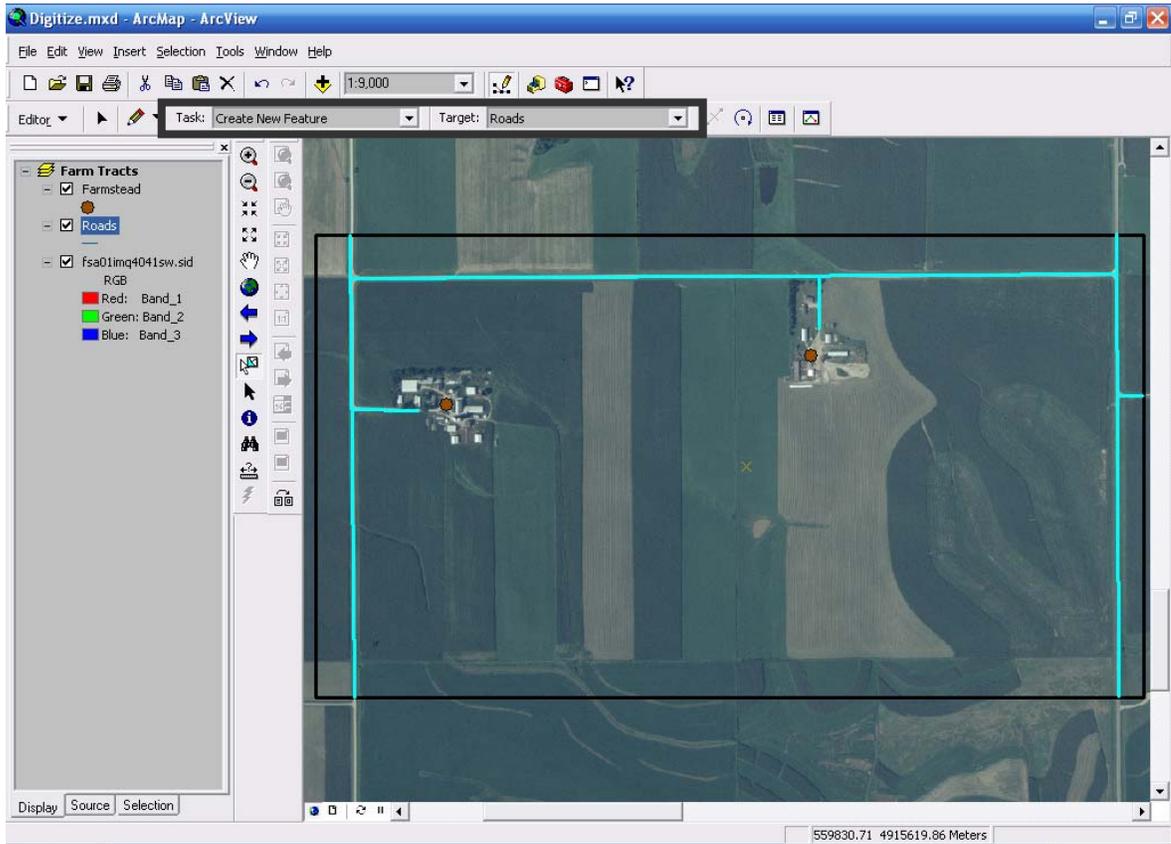
- Now click on **Editor – Save Edits – Stop Editing**. Click **Yes** when asked to save edits. You are now done with your Farmsteads. That was probably a little too easy, but it shows the process. Open the attribute table and take a look at the 2 new records added to your empty shapefile.

Attributes of Farmsteads			
	FID	Shape*	Id
	0	Point	0
	1	Point	0

Record: [Navigation Buttons] 0 [Navigation Buttons] Show: [All] [Selected] Records (1 out of 2 Selected.)

- Next, add your **Roads.shp** to your project. Follow the same process as above. This time make sure your **Target** is your **Roads.shp**.

7. Click on your Sketch tool. Click at the beginning of your line and then just click and drag to where you want your line to end. These roads are very straight; if they were more curved, you would just need to click where the curves occurred. I've highlighted below to show you the roads.

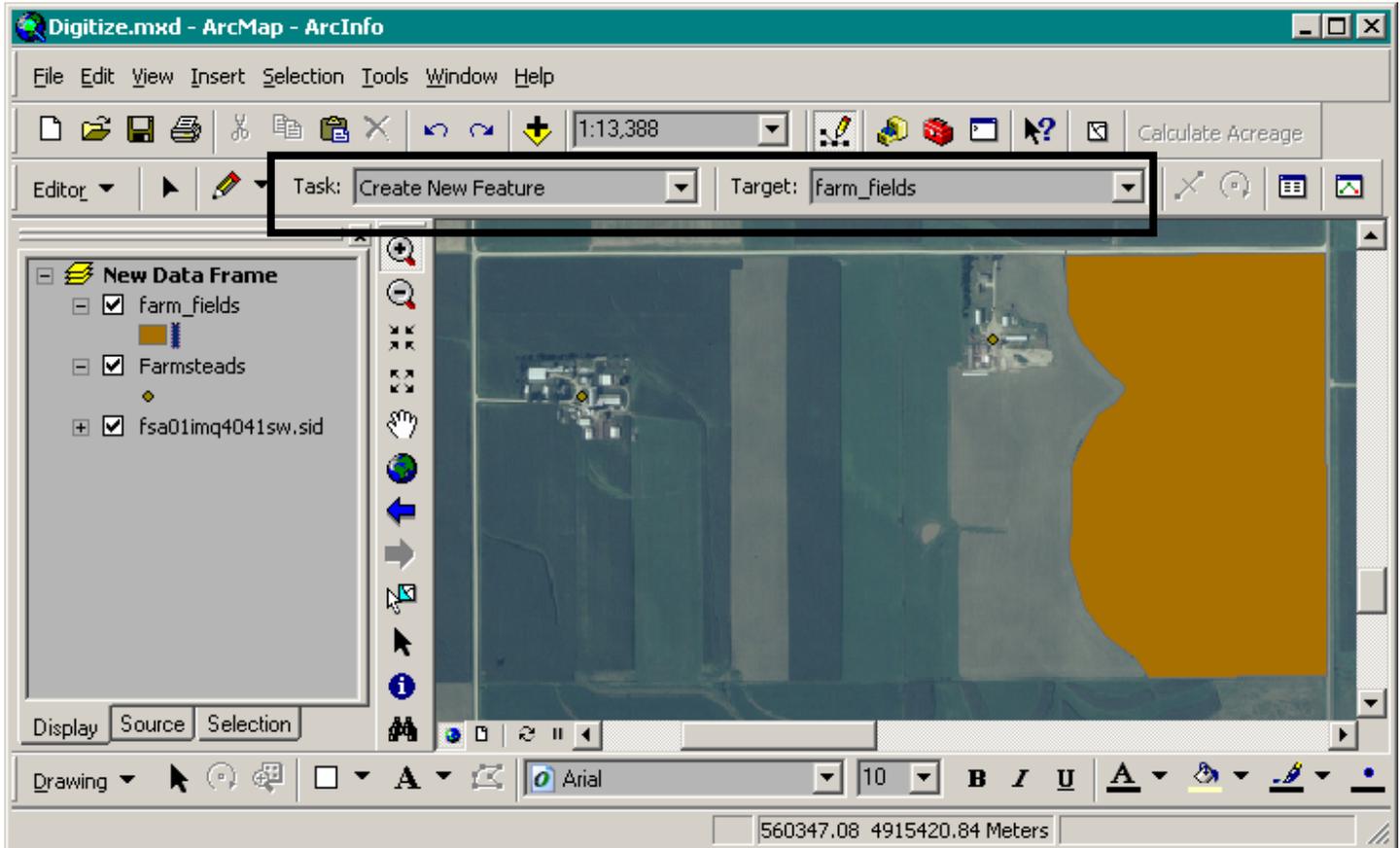


8. Now click on **Editor – Save Edits – Stop Editing**. Click **Yes** when asked to save edits. You are now done with your **Roads**. Again, open the attribute table and look at the roads you've digitized. We, obviously, have NOT added any attribute fields, but you could add new fields at this point and populate as needed.
 - a. Open your attribute table and take a look at it (Right-click Roads – Open Attribute Table). Notice that the first record starts with FID# 0. So, there are actually 6 records that were digitized, not 5 as one would first assume.

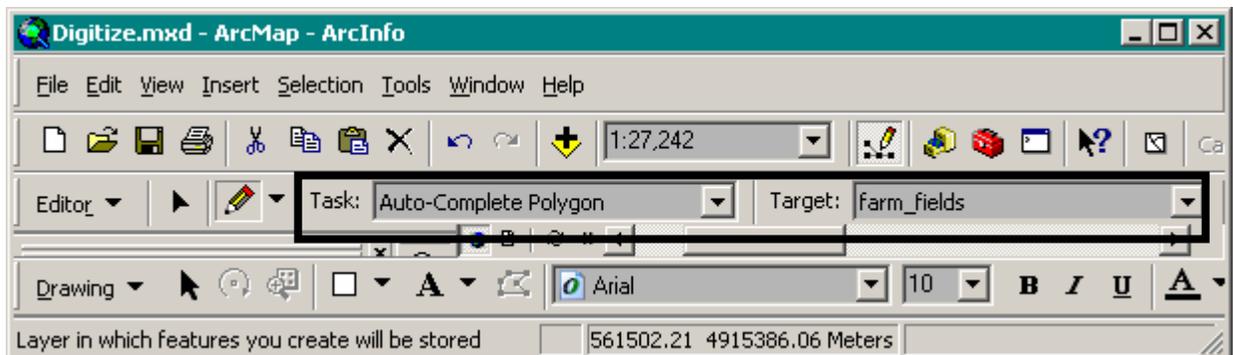
Attributes of Roads			
	FID	Shape*	Id
▶	0	Polyline	0
	1	Polyline	0
	2	Polyline	0
	3	Polyline	0
	4	Polyline	0
	5	Polyline	0

Record: 1 Show: All Selected Records (0 out of 6 Selected.)

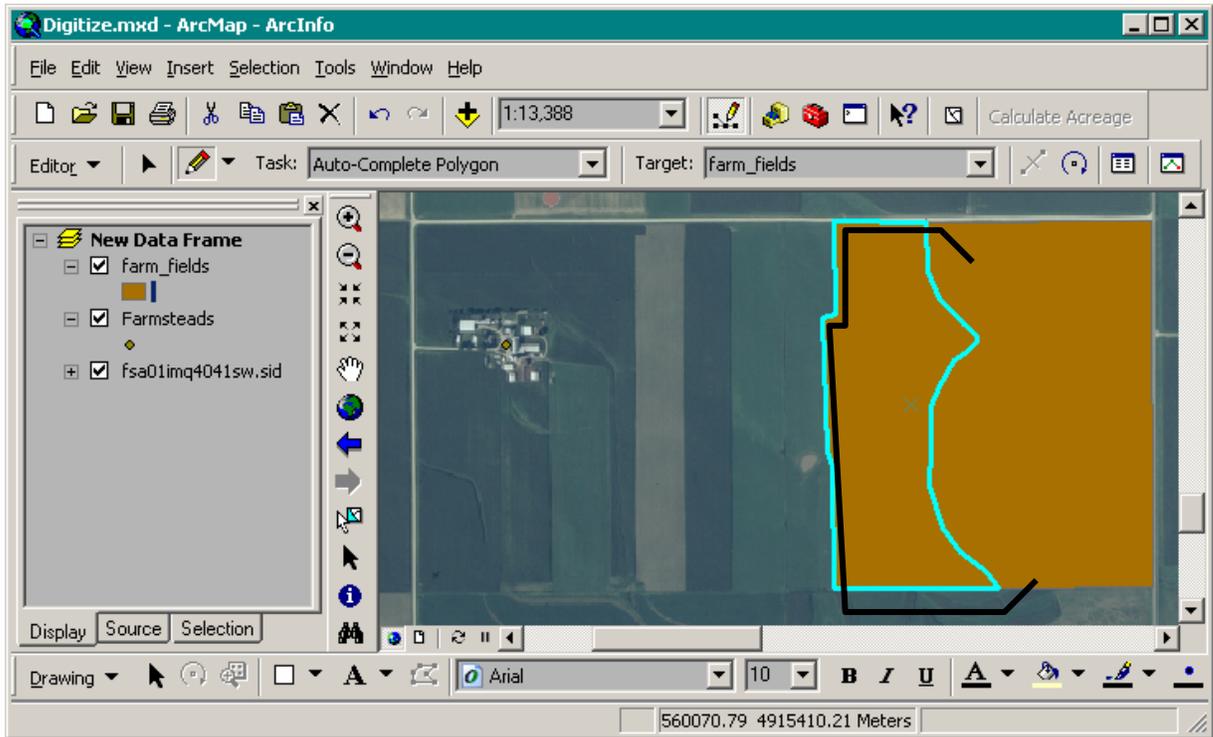
9. Next, add your **Farm_Fields.shp**. This time, things get a little more interesting. Again, make sure your Editor toolbar's **Target** is set to edit your **Farm_Fields** shapefile.
 - a. Again, click on the Sketch tool. Click anywhere on the boundary of the polygon (shown below) and then continue to click around the boundary to trace as shown below. Double-click when done. Because this is a polygon layer, you don't need to necessarily digitize back to the start as the sketch tool knows this instinctively. (You'll see what I mean as you digitize.)
 - b. **SAVE YOUR EDITS – Editor – Save Edits.**



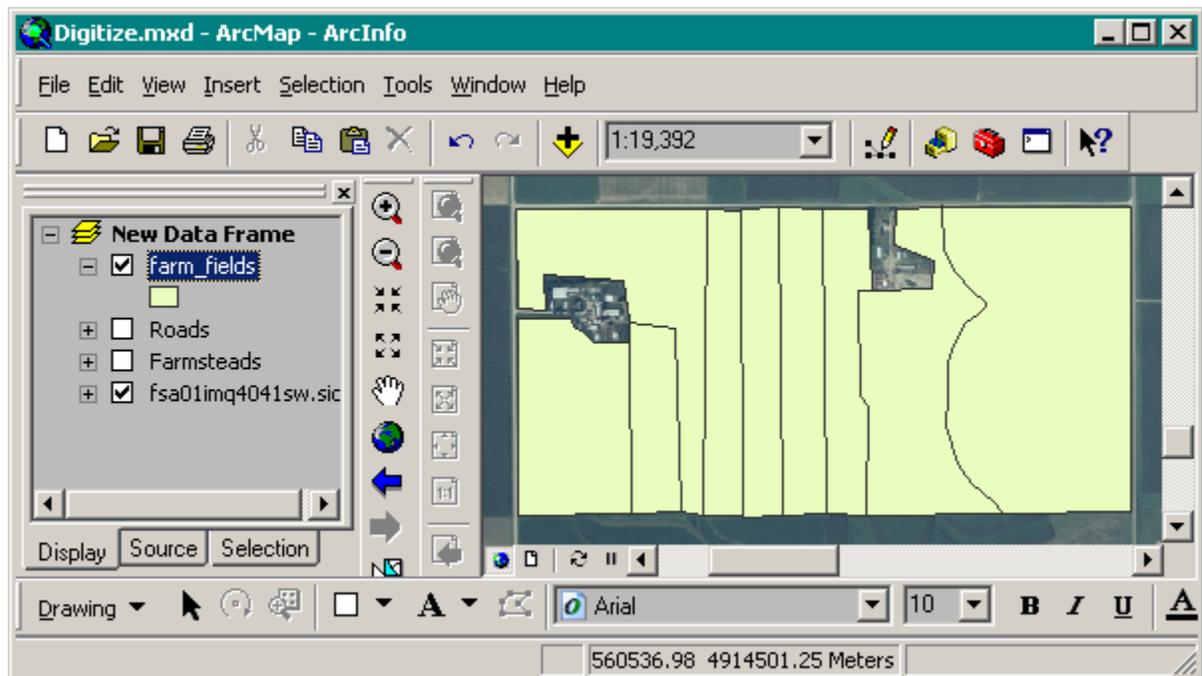
- c. Now to begin digitizing your second field. This time, however, change the **Task** to "**Auto-Complete Polygon**." This tool ensures we don't end up with tiny slivers between the polygons and allows the software to fill in where we don't actually have to digitize. The tricky part here is that you need to begin/end your digitizing at or inside the polygon you are abutting.



This time, click just inside the already digitized polygon. Then continue to move your mouse and click around the boundary to digitize. When you are at the bottom, double-click back inside the polygon. The inside part of the polygon that abuts the first polygon, will automatically fill in – you don't have to digitize – only digitize where I've shown using the black lines below. Notice, however, the blue highlighted polygon; even though you did not digitize the piece next to the first polygon, the software intuitively filled it in correctly.



10. Continue to digitize all of the polygons until your shapefile matches the below diagram. Save often.



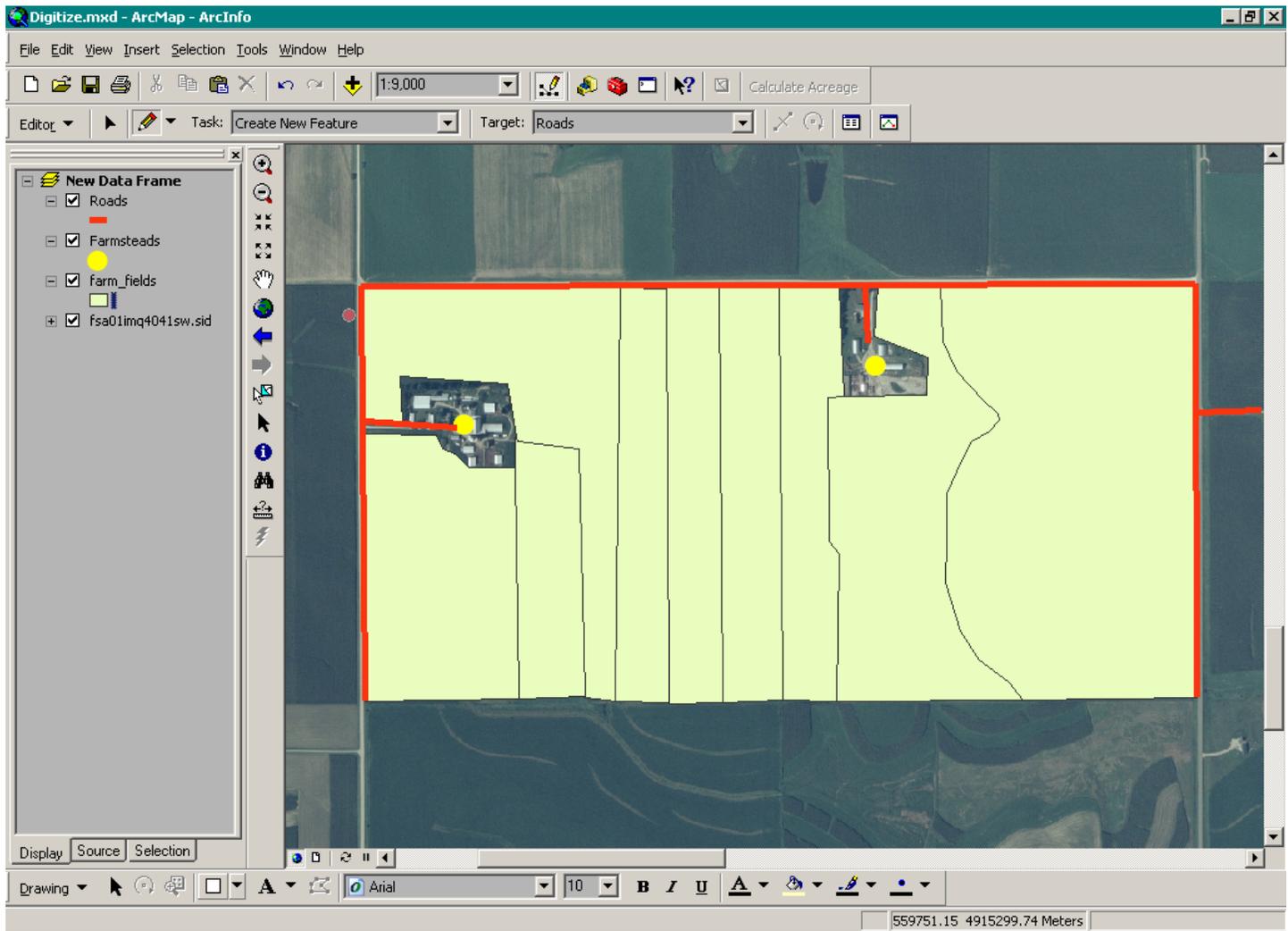
11. Click on Editor – Save Edits – Stop Editing.

12. Open the attribute table and notice how many records you have created. **How many records do you have? You should have 9.**

D. **TO HAND IN:** You have created 3 new shapefiles: a polygon, line, and point.

1. Create 1 layout showing all 3 of these new layers (include the image).

EXAMPLE: An example of what your View, Tables, and Table layout might look like. Hopefully you'll be more creative!!!



2. Next, open up all 3 attribute tables so you can see all of the records. Take a screen shot and paste into Word and print out and hand in along with your map. Make sure your name is on both sheets.