

Right of Way Query with ArcGIS 10.3

April 26, 2017

Introduction

These instructions were created to review the steps required to identify parcels located within or clipped by proposed ROW limits using ESRI ArcGIS software and county parcel data. To assist in preparing right-of-way cost estimates the results will be tabulated in an excel spreadsheet and a map showing the project area and the impacted parcels. These directions were written using ArcGIS version 10.3, but could be used with previous versions. An intermediate skill level with ArcGIS is recommended.

Purpose

This process of parcel data query was created to use existing GIS data so more accurate right of way cost estimates could be created with minimal effort for NCDOT projects early in the project development stages.

Parcel Data Query

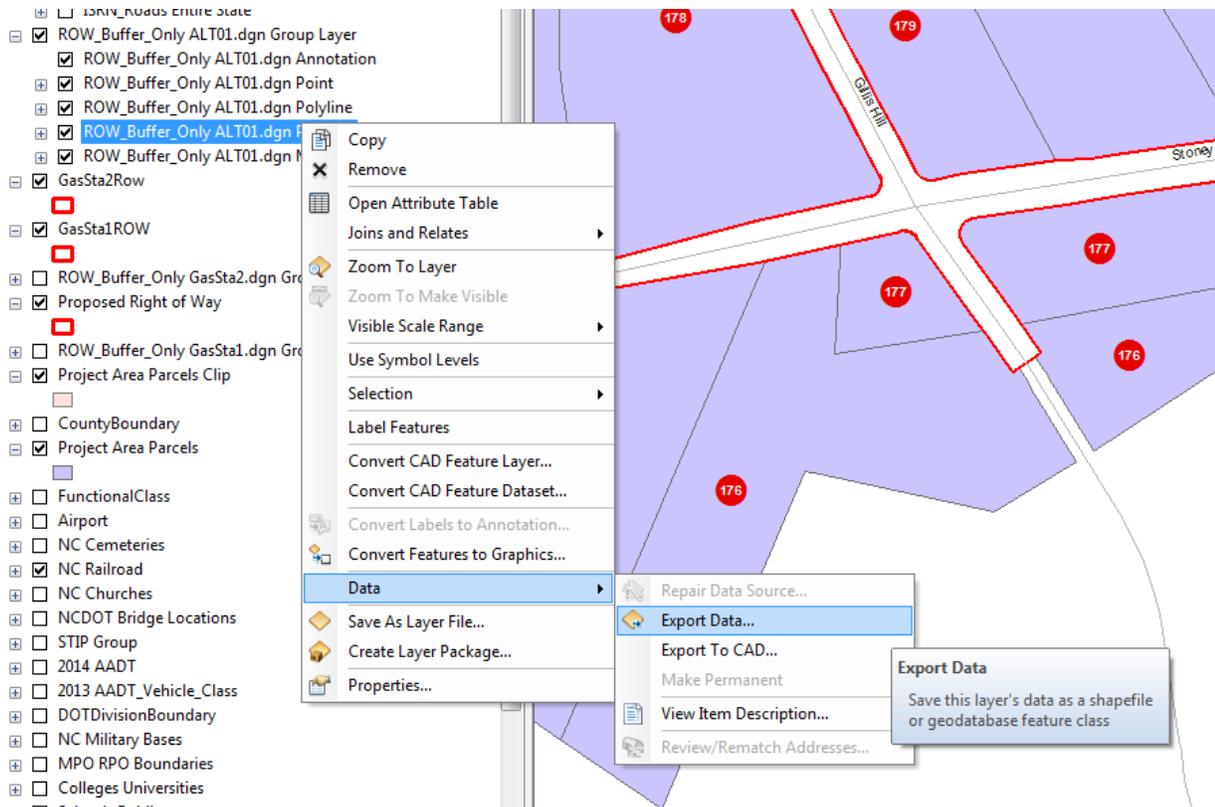
This assumes you have completed the Roadway Design for your project. The next step is to create a polygon that incorporates the ROW limits in microstation. Sometimes you will need more than one. It is recommended that this polygon is placed in a separate microstation file.

In ArcGIS, click on the add data button. Attach your microstation polygon file.

When you import a microstation file into ArcGIS, it comes in as a group layer. You will see: Annotation / Point / Polyline / Polygon / MultiPatch. We want Polygon.

- ROW_Buffer_Only ALT01.dgn Group Layer
 - ROW_Buffer_Only ALT01.dgn Annotation
 - ROW_Buffer_Only ALT01.dgn Point
 - ROW_Buffer_Only ALT01.dgn Polyline
 - ROW_Buffer_Only ALT01.dgn Polygon
 - ROW_Buffer_Only ALT01.dgn MultiPatch

Highlight Polygon with a left click, then right click on the mouse, Select Data, then click on Export Data...



Give your file a name, and save it into a directory where you are keeping all the shape files for the project. For this example we will use ROW_Buffer.shp (Advance users may prefer a geodatabase).

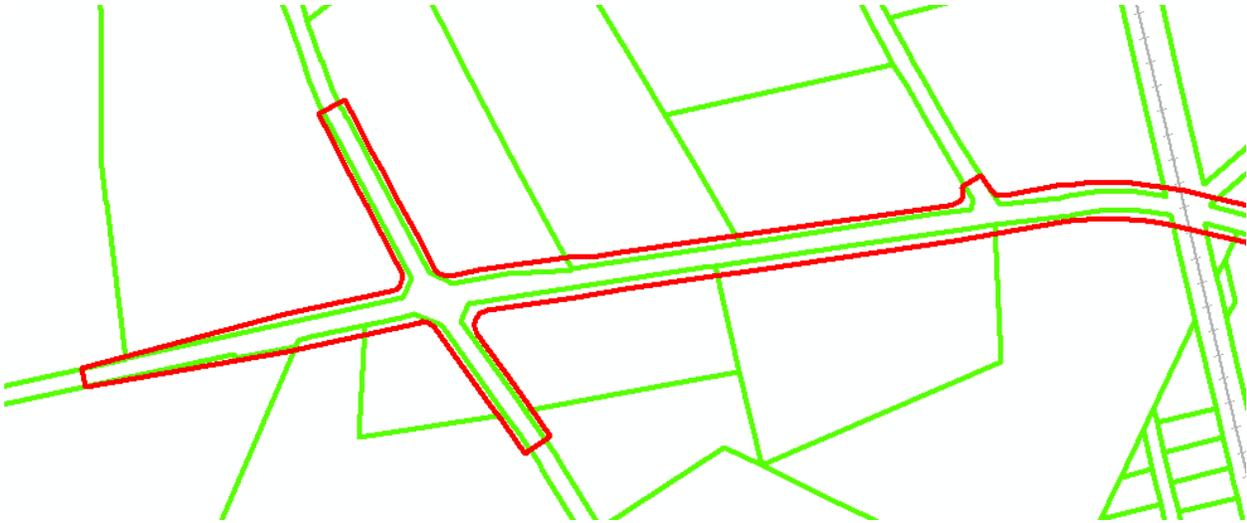
I recommend you create a subdirectory within the project directory called GIS and put everything there.

If it doesn't do it automatically, add your new gis polygon to the map. By default it will come in as a filled polygon. Change that to a hollow polygon with a thick red line as the boundary. Turn off the microstation polygon. Note to delineate between regular R/W and C/A, we recommend you use a different color of boundary for the controlled access areas. We don't have a standard color for C/A, so just pick a color like blue or green and show it on your maps and the legend.

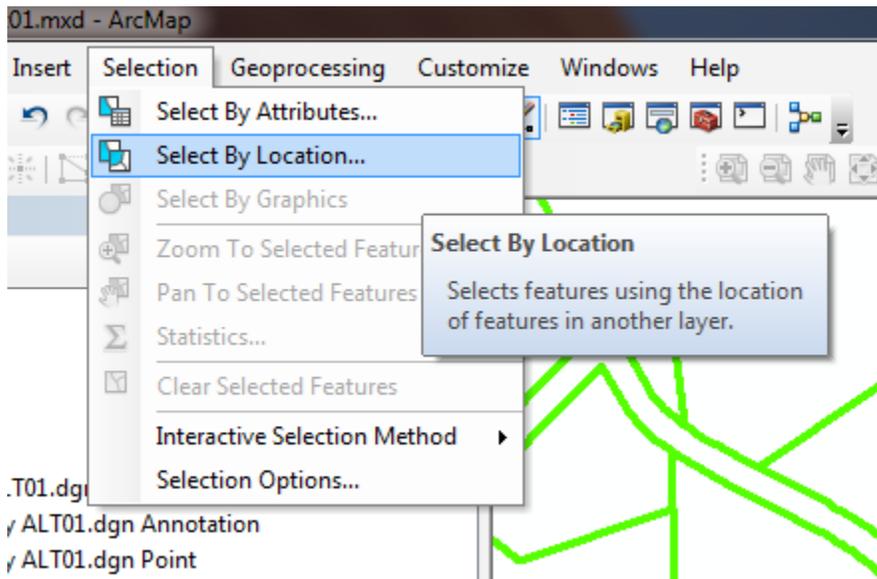
Select By Location

If you haven't already, attach ROW parcels for the county you are working in. For this example, I am using a project in Cumberland County. County parcels may be downloaded from the County website, NC One Map, or you can request them from Feasibility Studies. We have a full set of 2016 parcel data.

Turn everything off except Row parcels and your ROW_Buffer shape. It should look something like this.



Now we are going to select all the parcels that touch the ROW buffer. On the top menu, choose Selection, Select By Location...



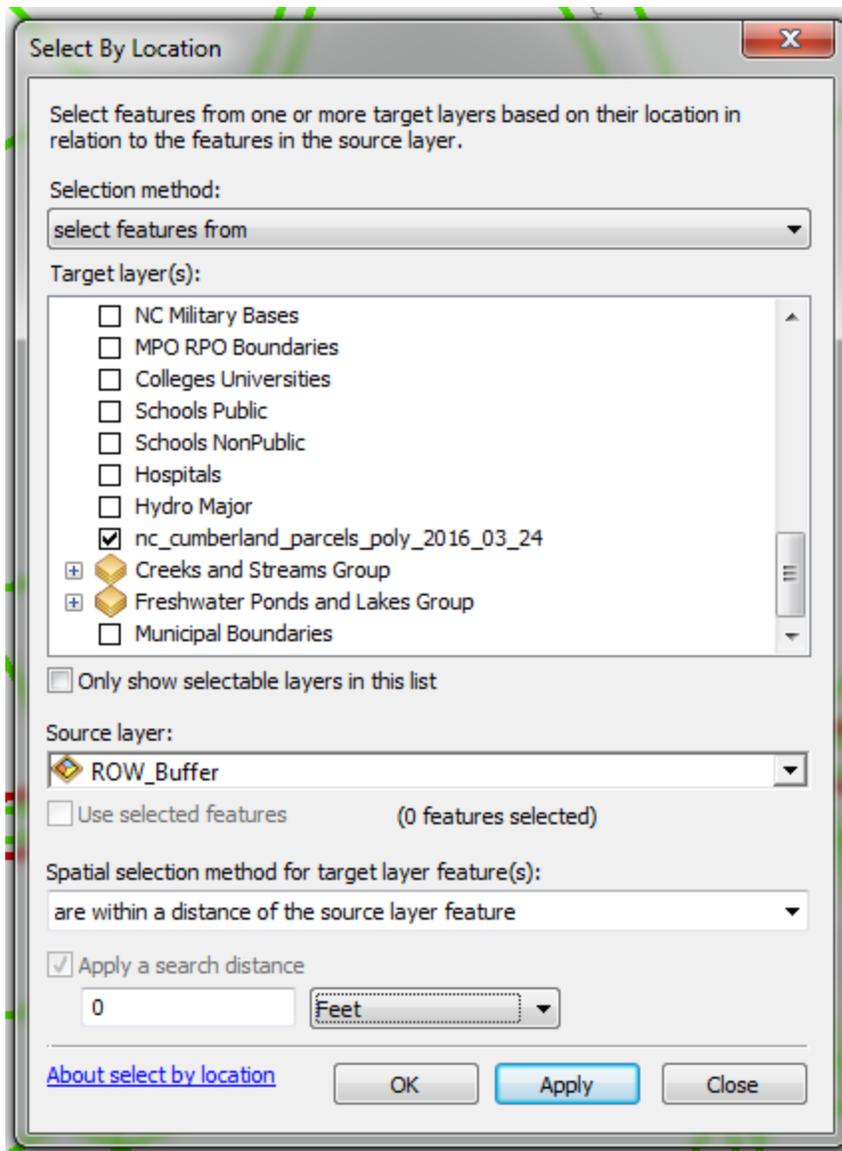
A window will pop up.

The Target layer is NC_cumberland_parcels_poly_2016_03_24.

The Source layer is ROW_Buffer

Spatial Selection Method is "are within a distance of the source layer feature" and put "0" Feet.

It should look like this:



Click OK.

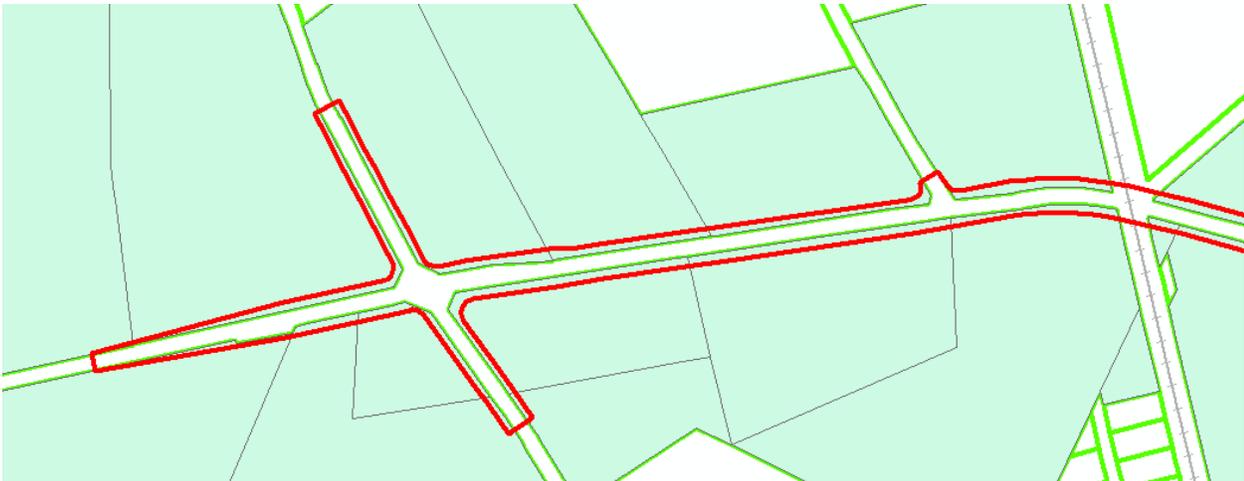
Cumberland County Parcels that are touching the ROW Buffer are now highlighted.

Click on Cumberland County Parcels with your left mouse button in the table of contents so that it is highlighted. Then right click on it. Click on Data, then Export Data...

A window will pop up. Place this file in the place your other shapefiles are in and give it a name. For this example I am calling it "Project_Parcels.shp"

Note that ArcGIS doesn't like spaces in file names, so use an underbar to separate words. Add the new file to the map if it doesn't do that automatically.

Move Project_Parcels below the ROW_Buffer in the table of contents so it looks like this:

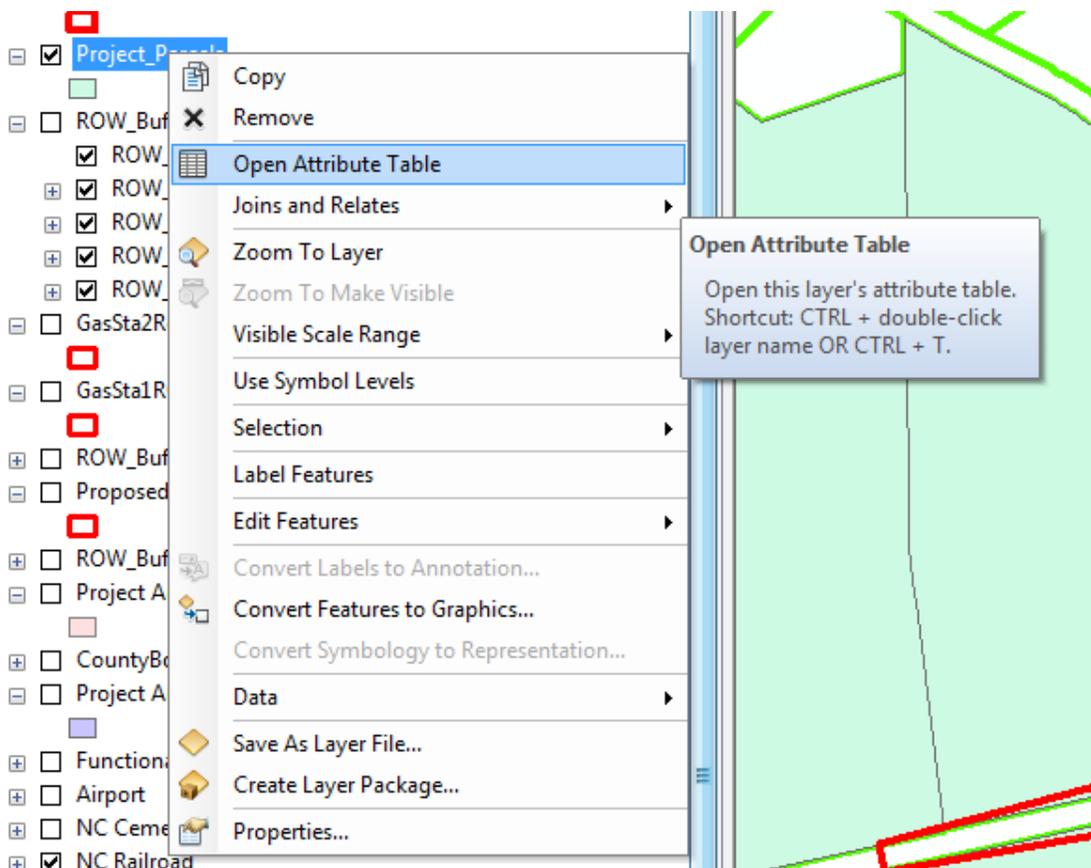


Note: you are welcome to change the colors to whatever you prefer.

Modifying the Attribute Table

Now we are going to make some changes to the data table for Project_Parcels

Left click on Project_Parcels in the Table of Contents, then right click and select Open Attribute Table.



A window will pop up. For Name use "Acres", for Type: use "Double", Click OK

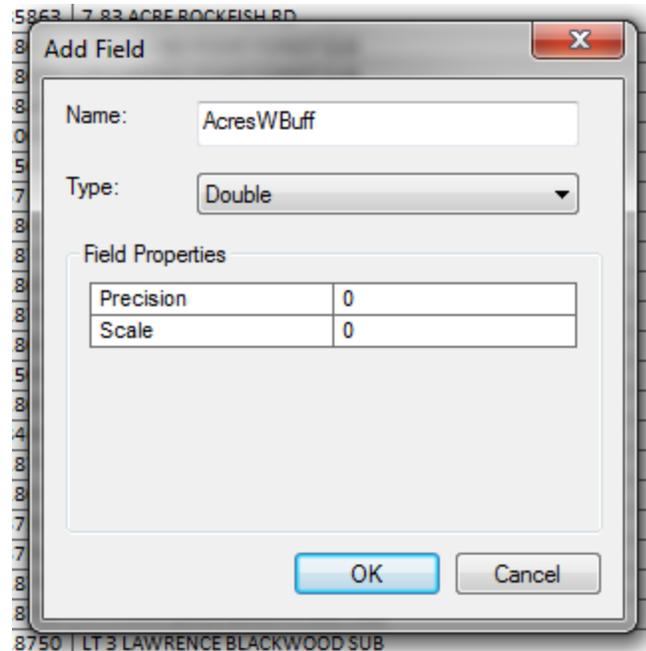
Scroll to the far right of your Attribute Table. You will see a new field called Acres filled with 0 by default.

Repeat the process of adding fields 2 more times.

Name: "AcresWBuff", Type: "Double"

Name: "ROW_ID", Type: "Long Integer"

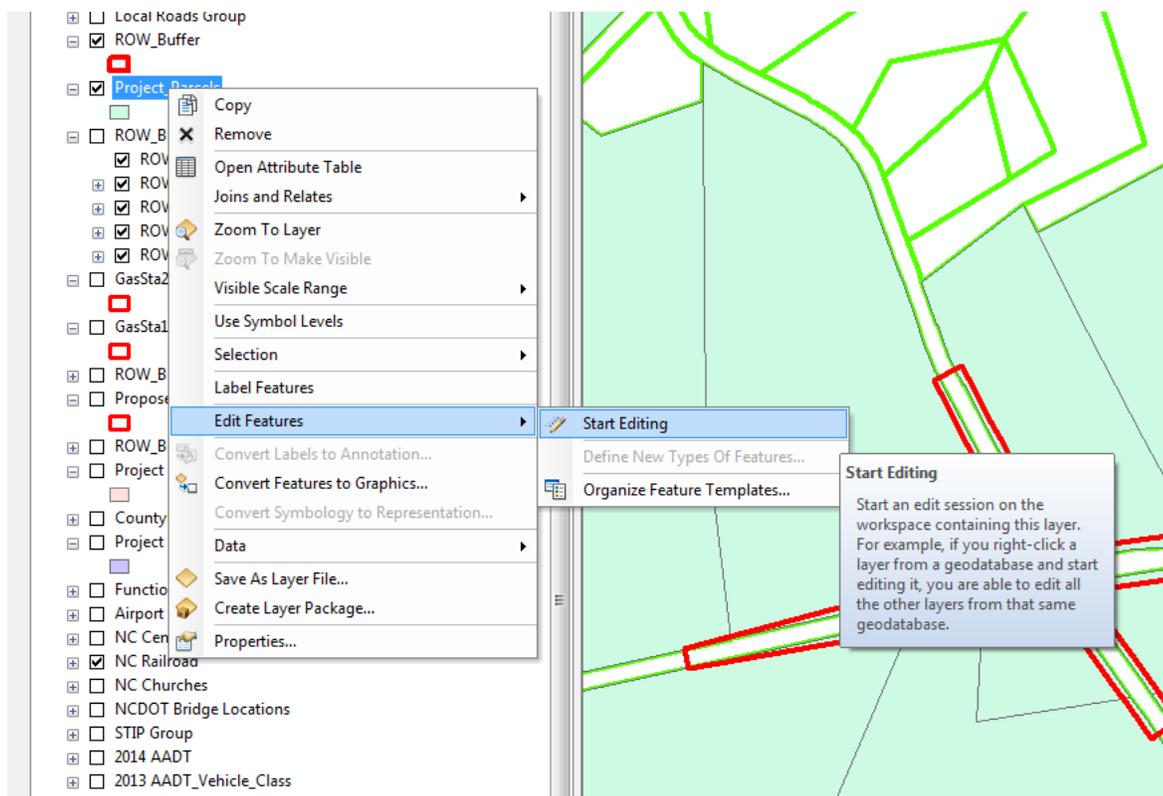
You now have 3 new fields on the far right of your table. All of them are filled with 0 by default.



Calculate Acres

We are now going to fill 2 of the columns with data. To do that we are going to go into Edit mode.

Select Project_Parcels with the left mouse button, then right click on it. Select Edit Features, then select Start Editing.

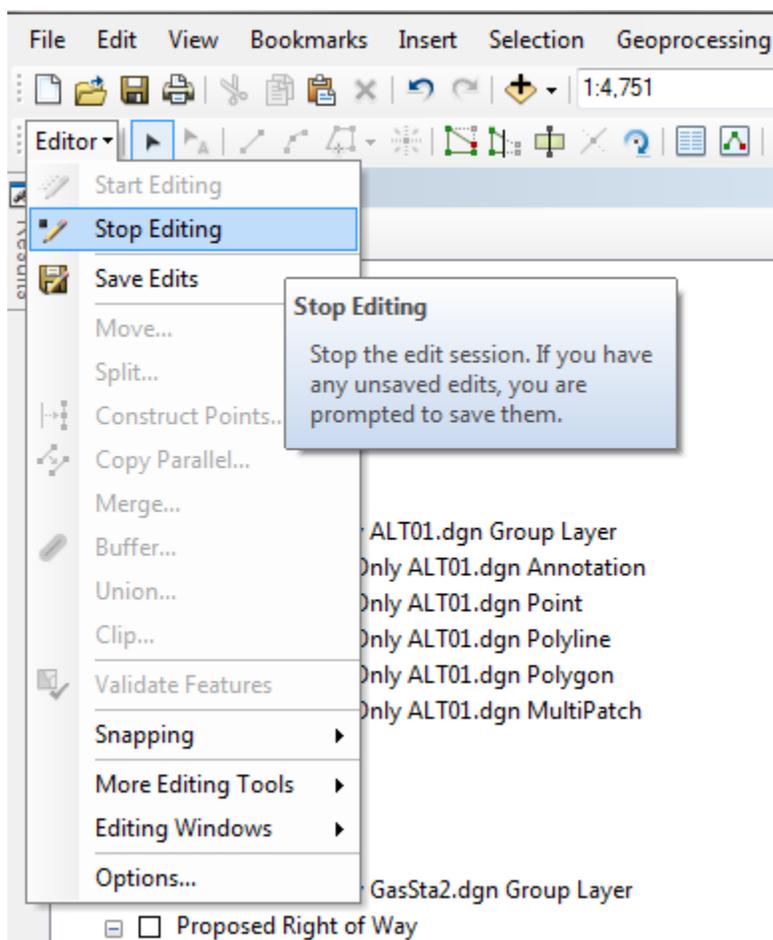


The column is now populated with the total size of the ROW parcel as calculated by ArcGIS.

The next step is to fill the column for ROW_ID. This is the number identifying the parcel on your map. Click in each parcel going left to right or south to north to number them sequentially along your project corridor. Turn on ROW ID as the label for your parcels to help keep track of where you are.

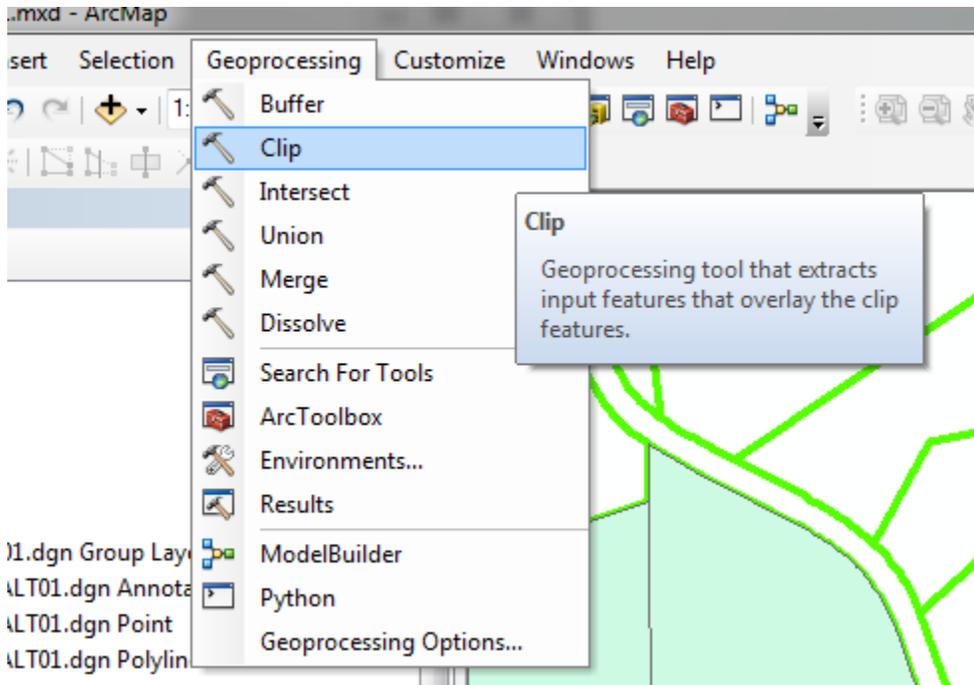
When you are done, Click on Editor on the menu bar and Save Edits and Stop Editing.

If you don't have Editor on your toolbar, you can add it by clicking on "Customize" on the top menu, then click "Toolbars" then click "Editor".



Calculate Acres within the Buffer

Now we are going to use ArcGIS to calculate the amount of acres taken inside our ROW polygon. Click on Geoprocessing, then click on Clip.



A window will pop up.

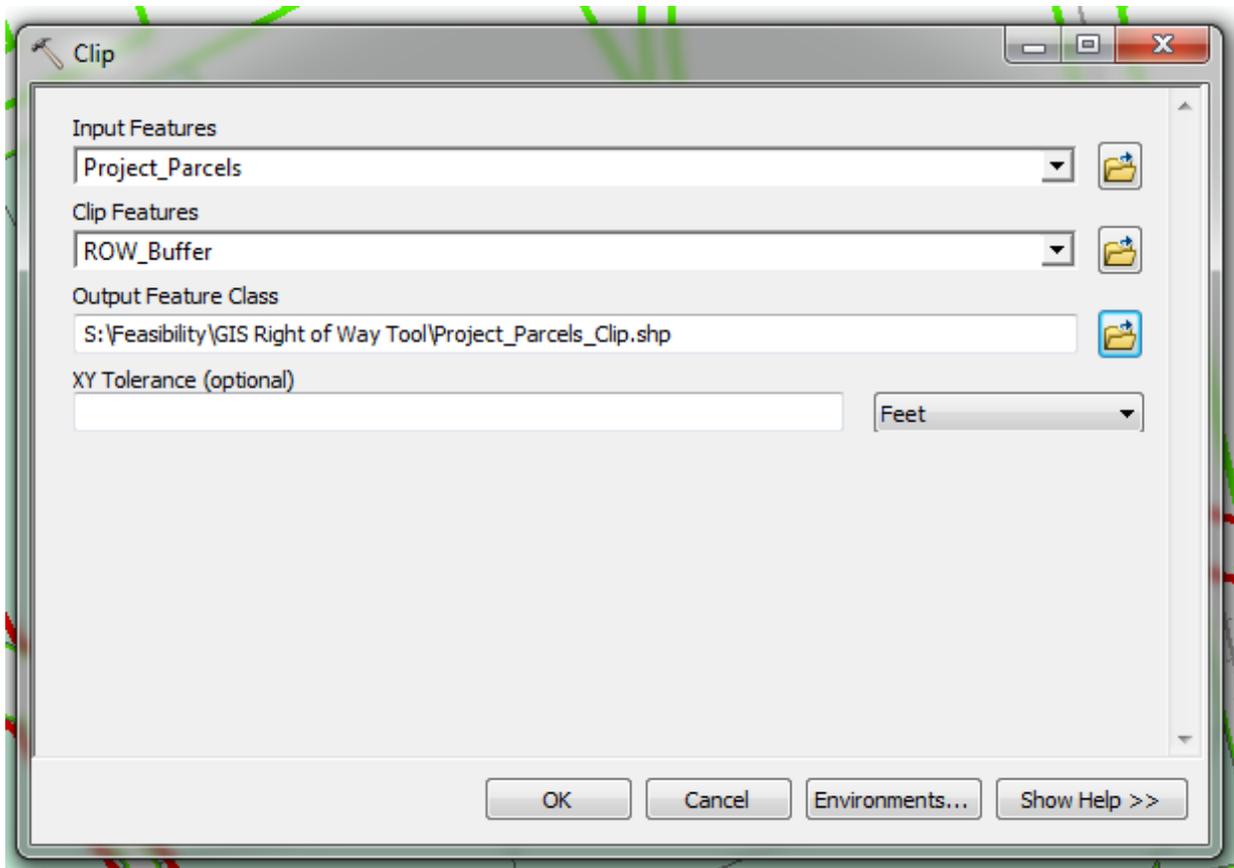
Input Features – “Project_Parcels”

Clip Features – “ROW_Buffer”

Output Feature Class – Select the directory your other shape files are in and add a name.

For this example I chose “Project_Parcels_Clip.shp”

Click OK.



ArcGIS will add the new clip file to the table of contents. It should look like this.



You can change the colors to suit your preference.

Problems with Clipping

Sometimes your clip fails. Microstation will allow you to make a polygon with small gaps or small overlaps in it. ArcGIS has a problem with those gaps/overlaps.

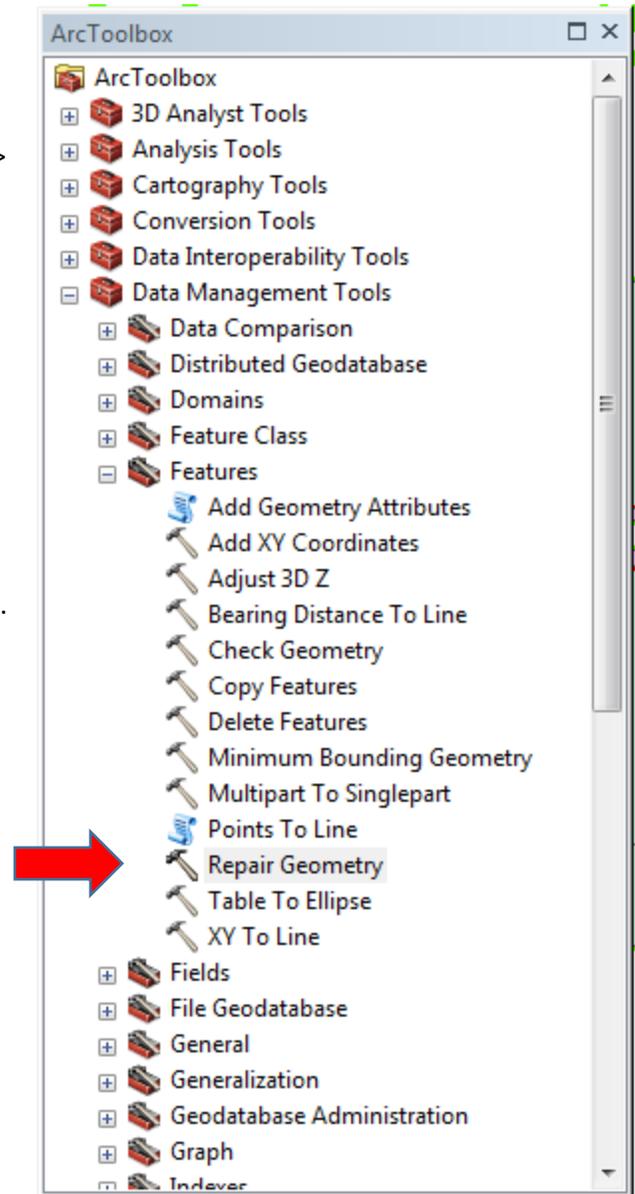
Try the following first:

Run the Repair Geometry tool in Geoprocessing > ArcToolbox > Data Management Tools > Features > Repair Geometry.

After running the Repair Geometry tool, go back and run Check Geometry again to make sure that all corrupt features have been removed.

Rerun the Check Geometry and Repair Geometry tools as many times as required.

If this isn't helping, jump back into microstation and scroll through your microstation polygon up close and see if you can locate and correct any problems. Then re-import the polygon into ArcGIS.

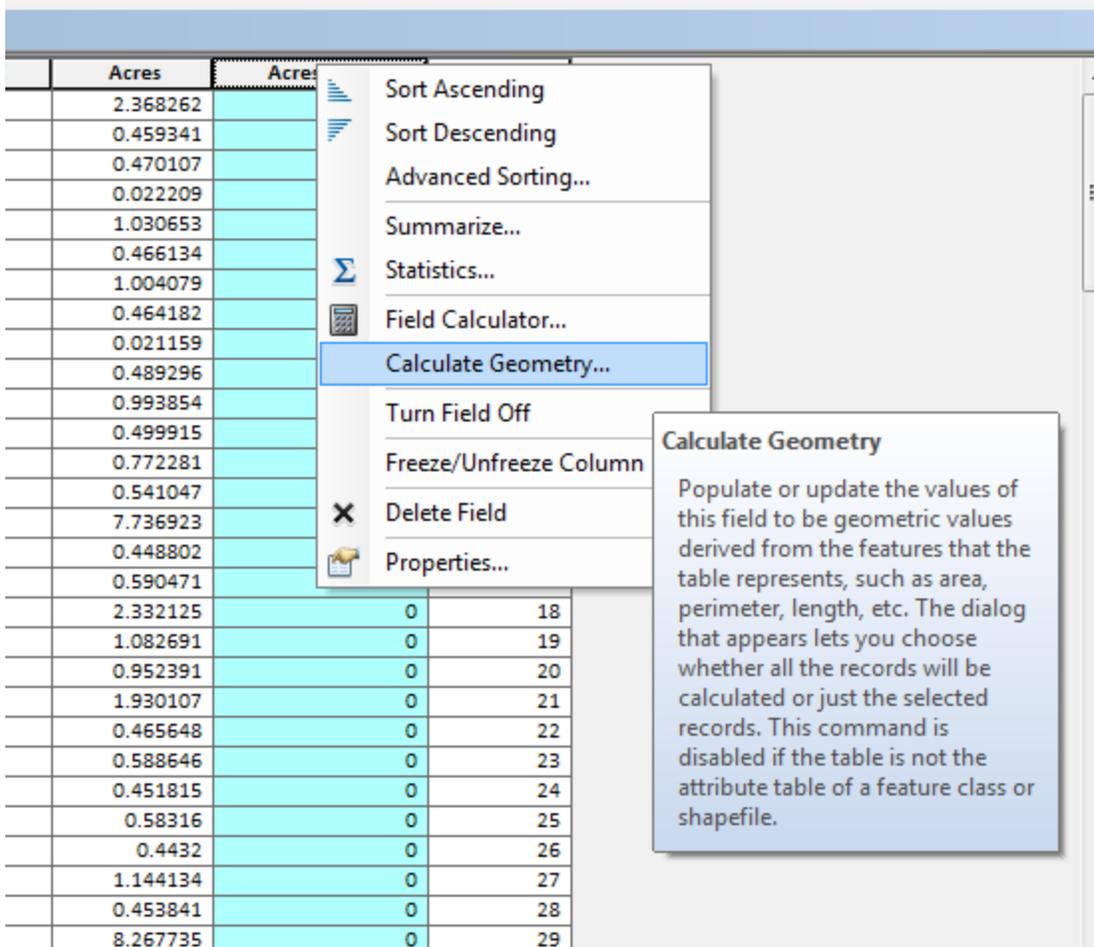


Calculate Geometry

Left click on Project_Parcels_Clip, then right click and select "Open Attribute Table"

Scroll to the far right.

Highlight the column "AcresWBuff", then right click on the header and select Calculate Geometry.



A warning window will pop up asking if you are sure you want to do this outside of an editing session.

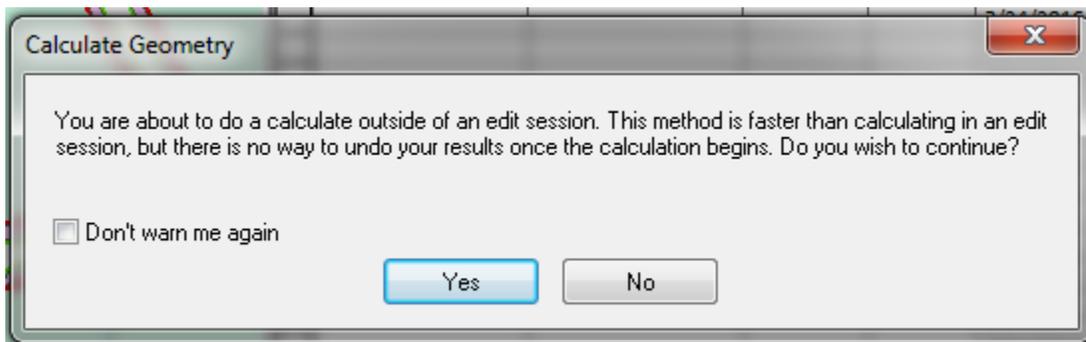
Click "YES"

You don't need to be in edit mode to calculate Acres.

Change Units to "Acres US (ac)"

Click OK

The warning window pops up again. Click Yes.



ArcGIS fills in the AcresWBuff column with the amount of ROW we are proposing to take.

Close the Attribute table.

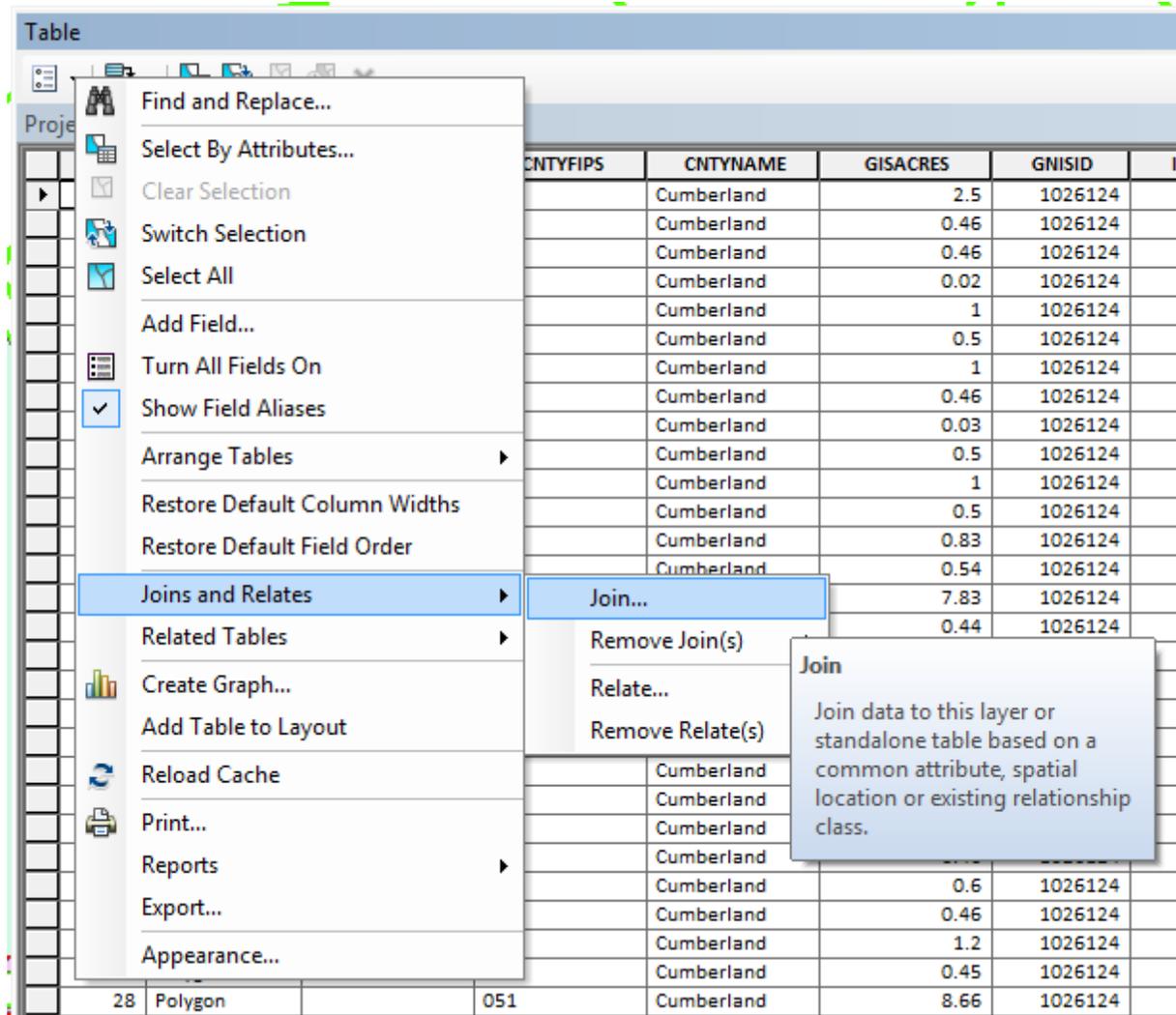
Table Join

We are now going to pull the information from the table for the clipped shape file and add it to the Project Parcels shape file.

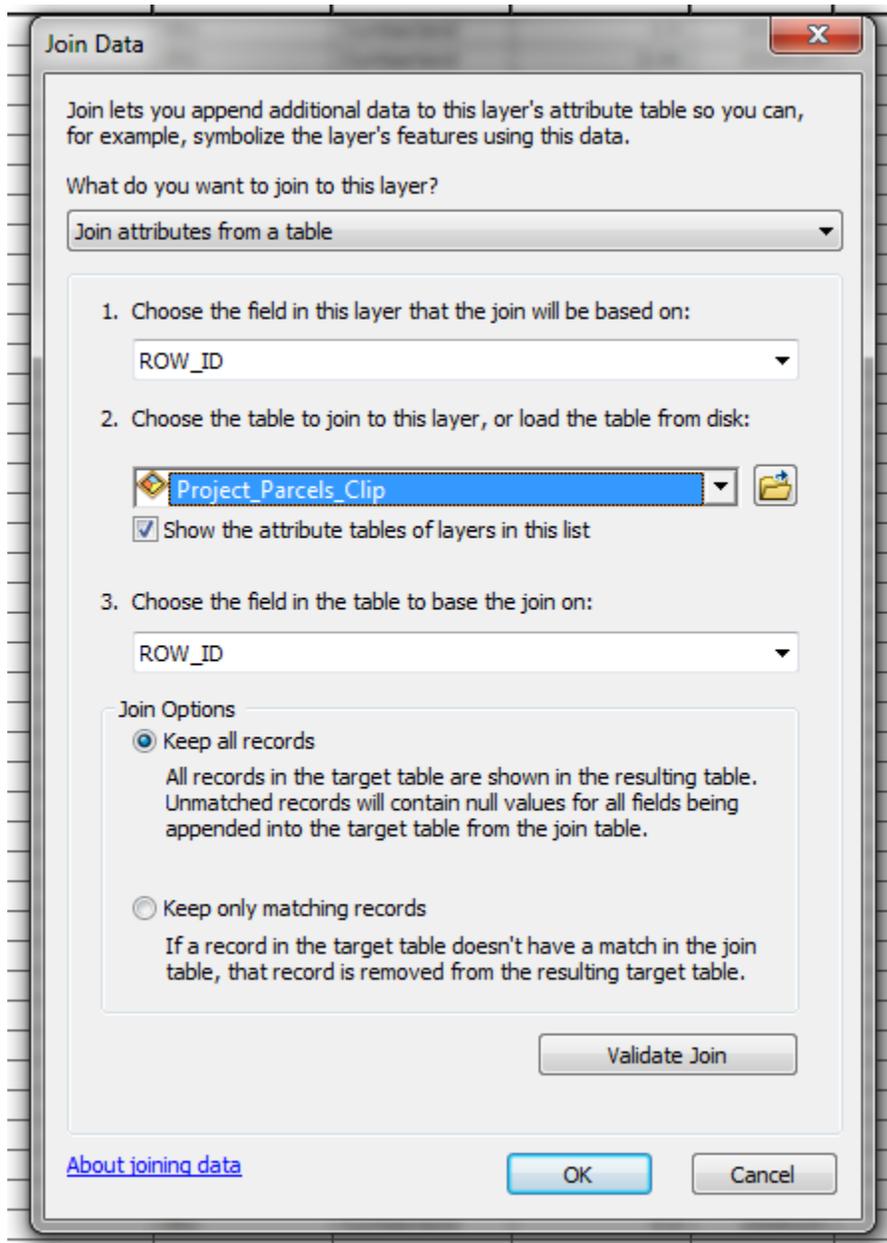
Left click on Project Parcels in the Table of Contents. Then right click and select Edit Features, then click on Start Editing.

Open the Attribute table for Project_Parcels. (It may already be open in the background).

Click on the icon in the top left Table Options, and select Joins and Relates, then click on Join...



The Join Data window pops up.



1 – ROW_ID

2 – Project_Parcels_Clip

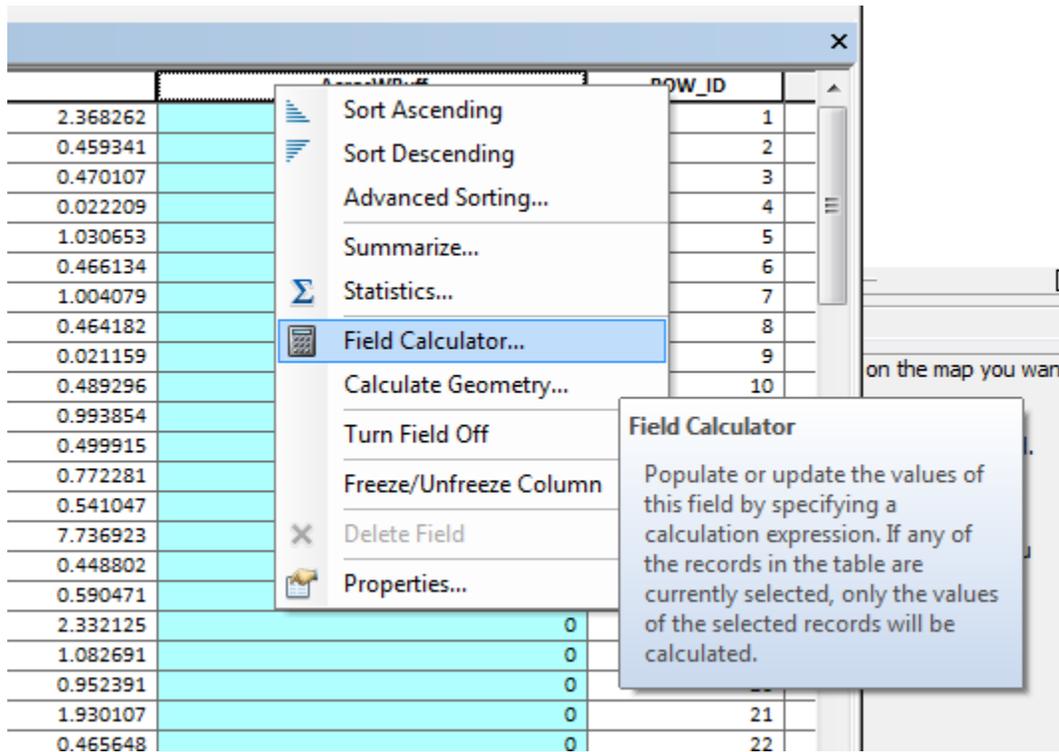
3 – ROW_ID

Click OK

A pop up window appears. It is asking if you want to index your project.

Click No. We are only doing this once.

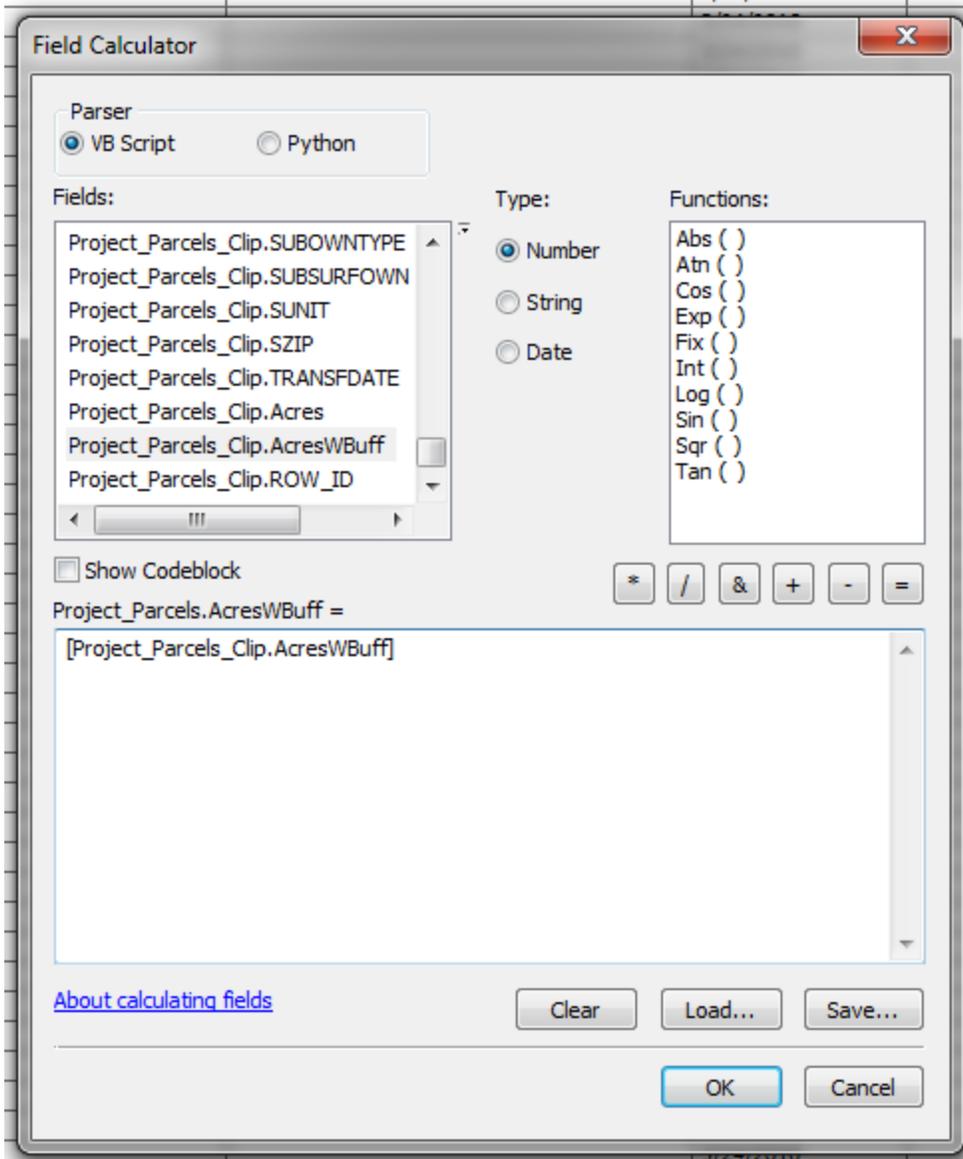
The tables for Project Parcels and Project Parcels Clip are now temporarily joined into one big table. Scroll to the middle of the table and look for the field, "AcresWBuff." It should still be filled with zeroes. Click on the header with the left mouse button to select it. Then right click on it. Select Field Calculator...



The Field Calculator window will pop up.

In the top left window, scroll to the bottom. Double click on Project_Parcels_Clip.AcresWBuff

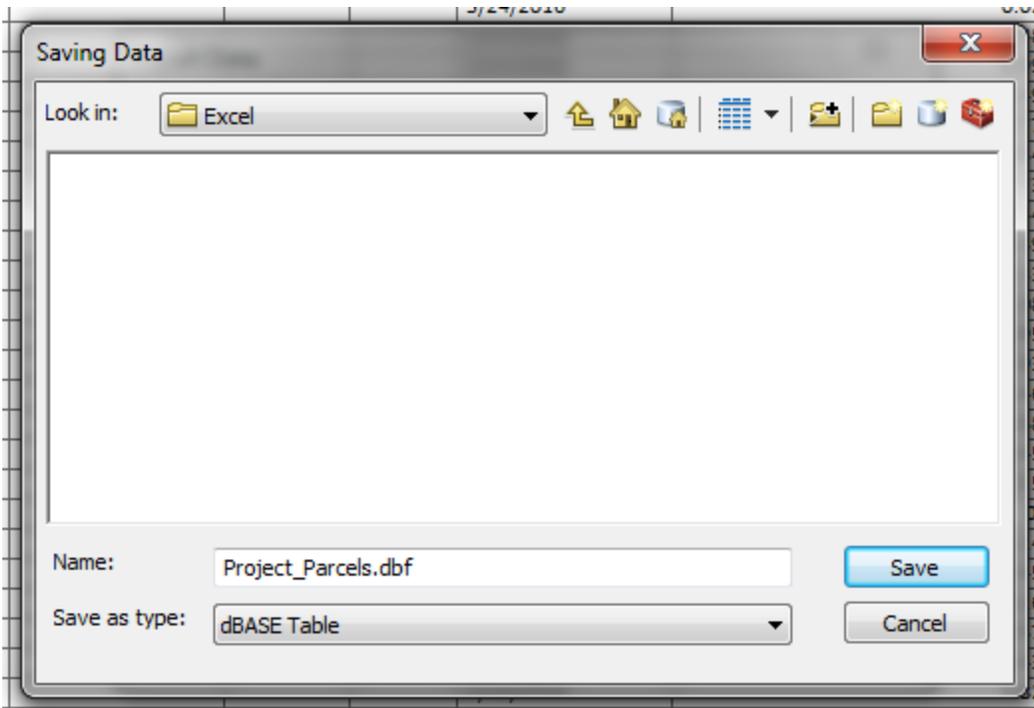
It will appear in the bottom window.



Click OK

ArcGIS will populate the column with acreage.

Click on the icon on the top left of the menu, Table Options. Click on Joins and Relates, then click on Remove Join(s), then click on Project_Parcels_Clip.



Click Save.

Then click OK.

You do not want to add this to your map. Click NO.

We are done with ArcGIS. Save your file.

Excel Spreadsheet

Open Excel

File Open, navigate to the Excel subdirectory we created in GIS.

Change file type to "All files"

Select "Project_Parcels.dbf"

Click on File Save As...

At this point I give the file a real project name such as "FS-1234A_Project_Parcels.xlsx" and save it in Excel file format.

Now comes the hard part. Clean up the Excel file and make it look presentable. Hide any fields that are all blanks, or are redundant. Every county is different, so use your judgement.

Any fields with money in them should be formatted as dollars and cents.

Take the ROW_ID column on the far right and move it to the far left.

Add 1 new field on the far right. Its header is titled “Acres Remaining.”

Use a subtraction formula to calculate “Acres” minus “Acres WBuff.”

If your parcels require multiple pages, make sure to have Excel repeat the headers on every page.

For your parcel maps, make sure to show your ROW ID numbers in the parcels. We don’t have any standards for what parcel maps must look like, so just use your company standard and make sure your legend lists all your shape types.

The submittal to the ROW unit is on paper and electronic.

Let us know if you have any questions, or if you find a mistake in these directions.

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