Topic #1: How to Create Existing Right of Way and Existing Property Lines Using ORD

About this Write Up

We will be outlining multiple workflows in this document to aid in your development of existing right of way and existing property limits. Instead of defining property boundaries, we are merely reproducing legal documents provided to us by others. The purpose will be to provide takes and remainders to Right of Way for others' use in creating legal documents.

ORD Version

This workflow is intended for OpenRoads Designer version 10.08.00.88. The directions outlined below may respond differently in other versions of the Program.

Contact Information

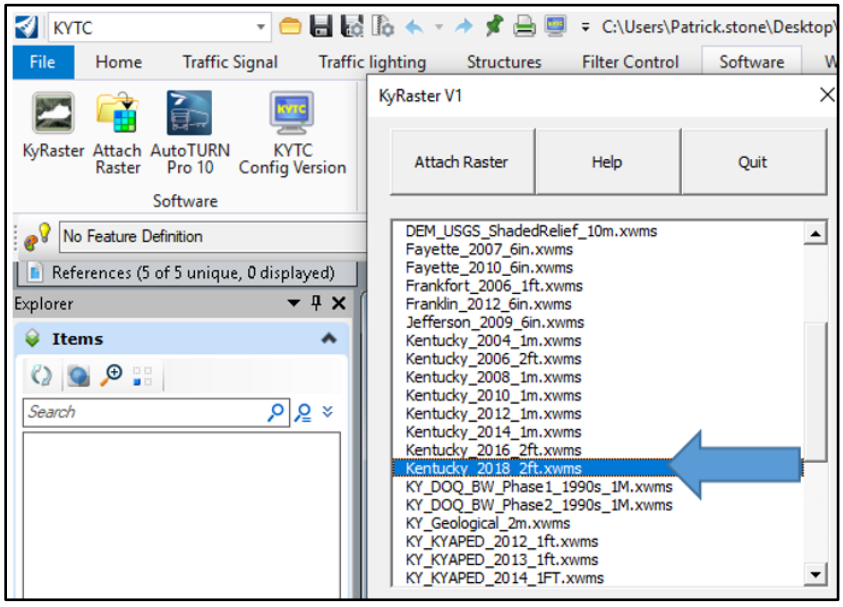
This workflow was produced by Patrick Stone. Please send all questions, errors or overall complaints to KYTCCaddSupport@ky.gov or call 502-564-3280.

Getting Started

The first step we will need to complete is creating an existing right of way file from a seed. For this example, we will call it EX_ROW.dgn. Next, we will reference in our Corridor file with the nesting depth set to one, along with our Terrain file (or you can reference the files in one at a time). The next step is to set your terrain to active (doing so by hovering over the edge of the terrain and selecting the "set to active" button). At this point, I like to attach an image so I can start laying out the existing right of way. There are several ways to attach the image (I will list three):

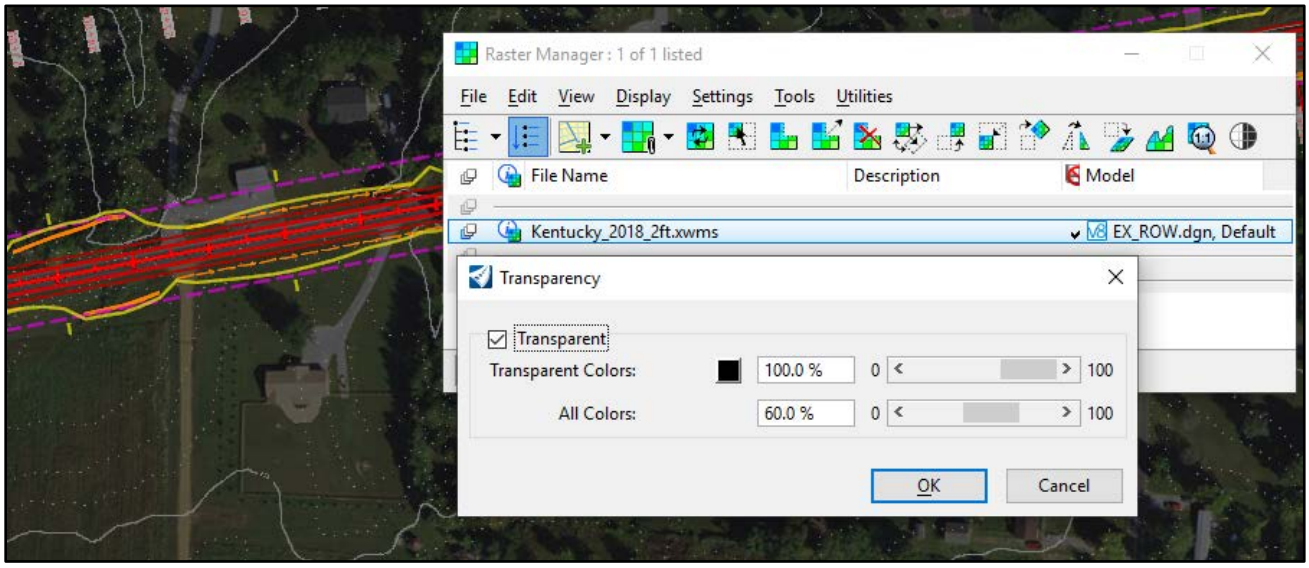
1. View attributes background map - currently this uses Bing maps and the quality of the map will be determined by the area of the state you are working in.
2. KyRaster - these maps are generally better quality than the Bing maps, but once more, it depends on where in the State you are working. These are located under the KYTC workflow and the software tab.
3. Drawing Utilities - Geographic Capture Google Earth Image.

For this workflow, we will be using Method 2: KyRasters.



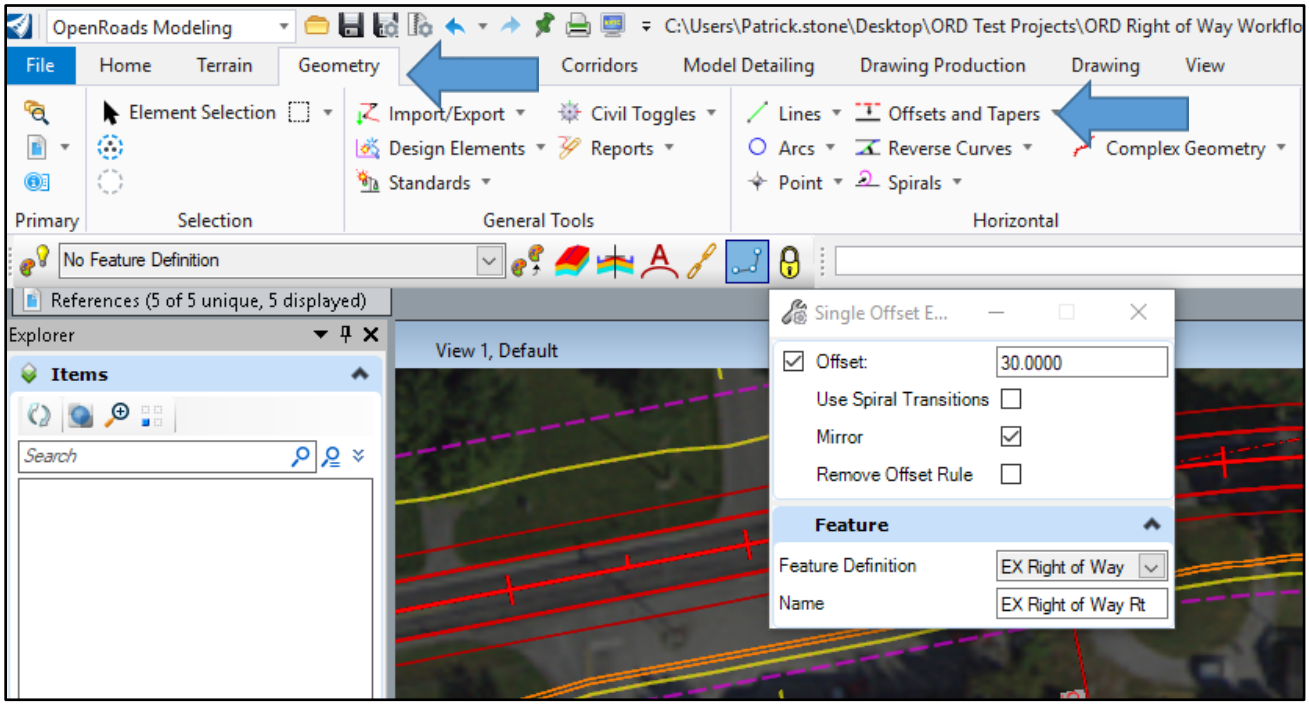
After selecting the map of our choice, select the Attach Raster button.

Your drawing should now look like the one pictured below. I would suggest that you set your Transparency to 60%. This will allow you to see the Existing Right of way lines and Property lines easier.



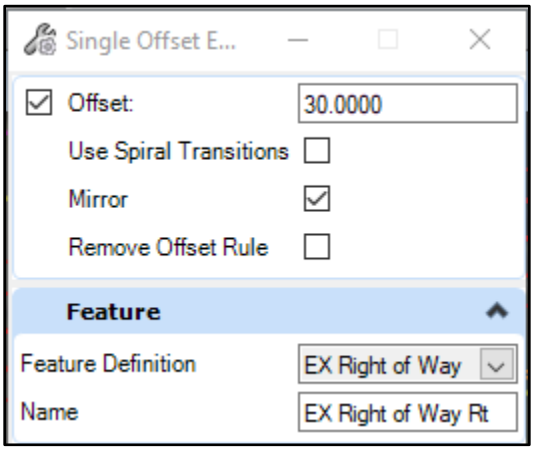
Setting Right of Way

Next, we are going to focus on setting our existing right of way and our property lines. Firstly, we will set the right of way for this project (we have a 60' existing right of way in this case). Note that there are many ways to create the Right Of Way; for this example, we will be using the Offsets and Tapers command under the Horizontal tab, detailed below.



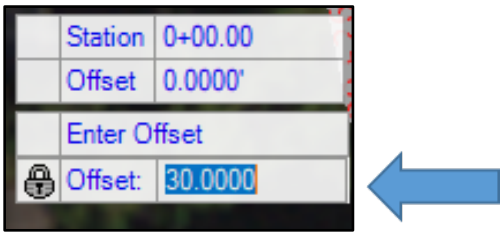
For this example, we will set the Offset to 30'. Turn on Mirror. With the Mirror turned on, this will require us to change the Feature Definition Name on the left side. I find this method of renaming the

Feature to be faster than running the process twice. Set the Feature Definition and the Name appropriately, as seen below.

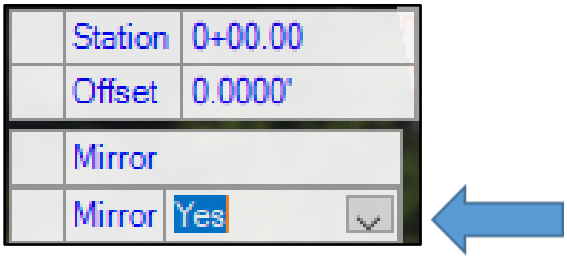


Next, you will follow a series of prompts what ORD will ask for. First, locate the element:

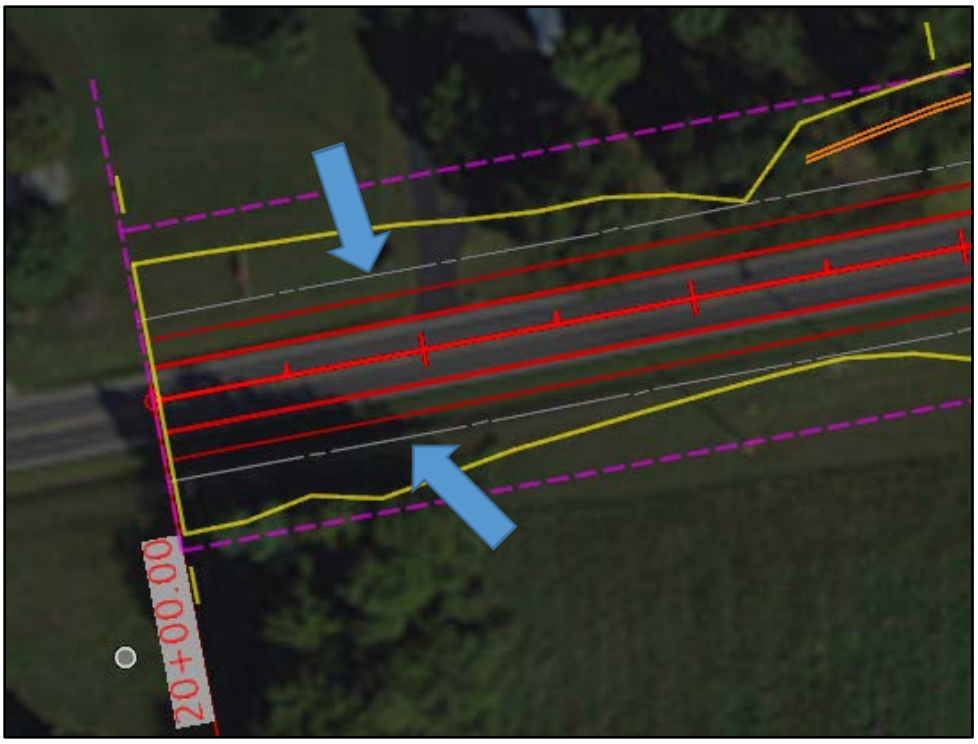
Next, set the offset.



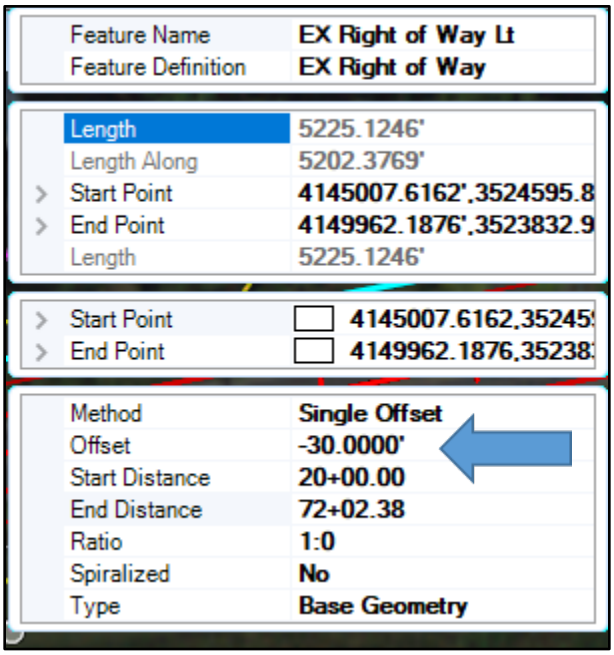
Then, turn on mirror.



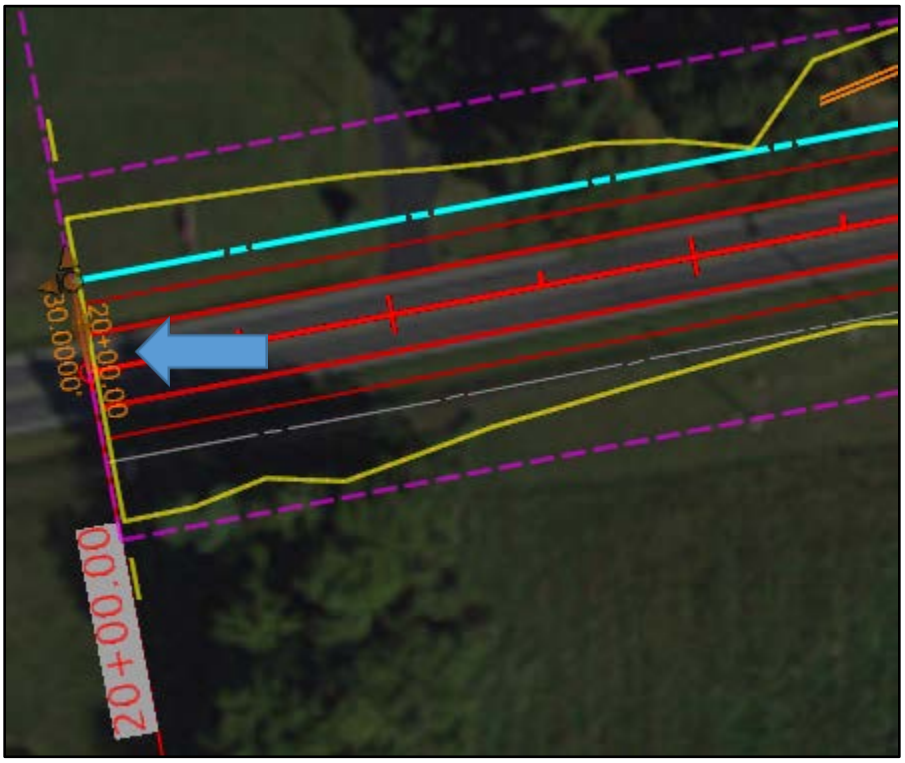
Notice you now have both of your right of way lines placed after completing the series of prompts (see below). Remember that since we set the Feature name to EX Right of Way Rt., that the Feature name of the Northern EX Right of Way line will be EX Right of Way Rt.1.



You can change this naming convention this by hovering over the line and selecting the information button. You will get the menu that pops up to the left. To change the name, simply select the feature name and type in the desired name. In addition, because we used the Single Offset command and used 30' for the offset, if we need to change the offset for any reason we can do it here:



In addition, since the Right of Way lines are ruled to the Centerline, we can also change the offset in the plan view by editing the offset or begin station.

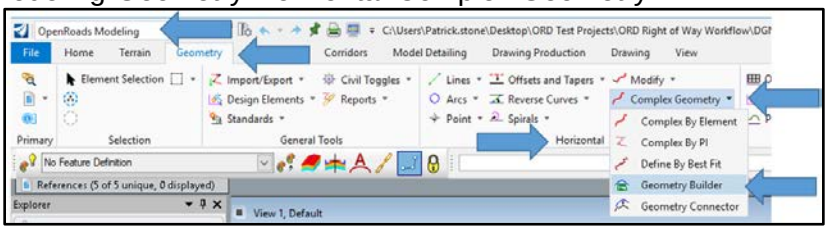


How Geometry Builder Works

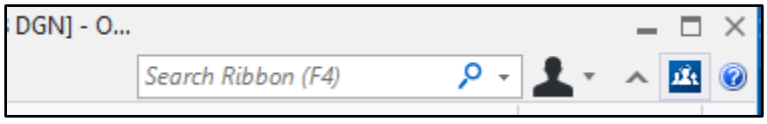
Now that we have the Right of Way set, let us move on to creating the Existing Parcels. There are several ways to create the Existing Parcels. We will be focusing on two methods. The first method will use the Geometry Builder tool. This method is typically used when you have several parcels to input or you may have a large parcel that you cannot get finished before you have to switch tasks. For this case, you can simply save the input file and finish it at another time. Remember: Parcels are just Geometry; they can be open or closed shapes and you can use any of the geometry tools available to create these Parcels.

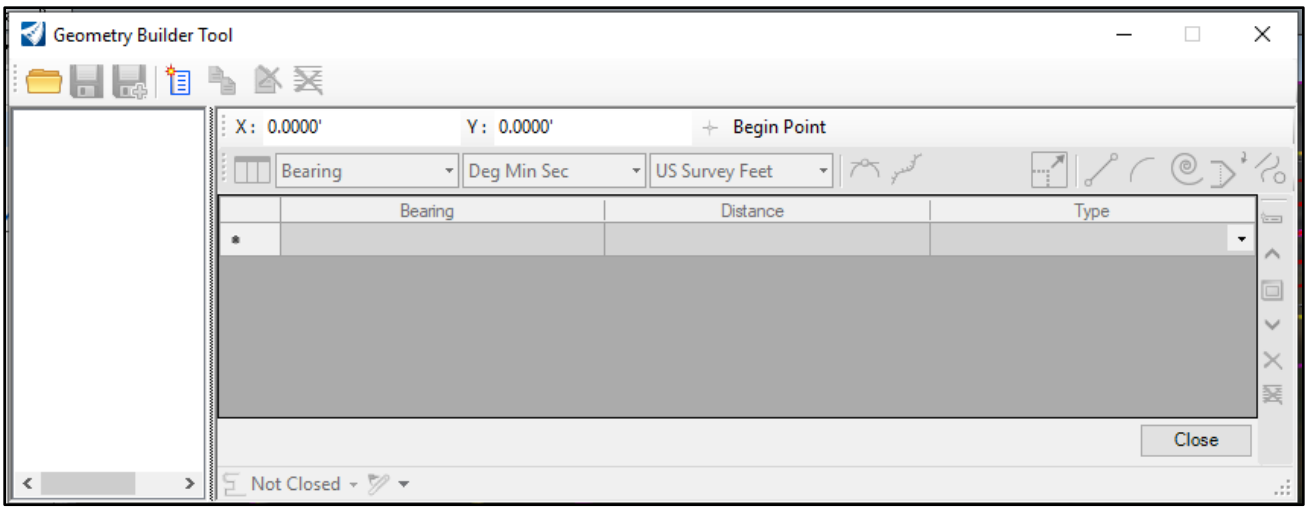
You can find the Geometry Builder tool in a few different places:

1. Open Roads Modeling-Geometry-Horizontal-Complex Geometry



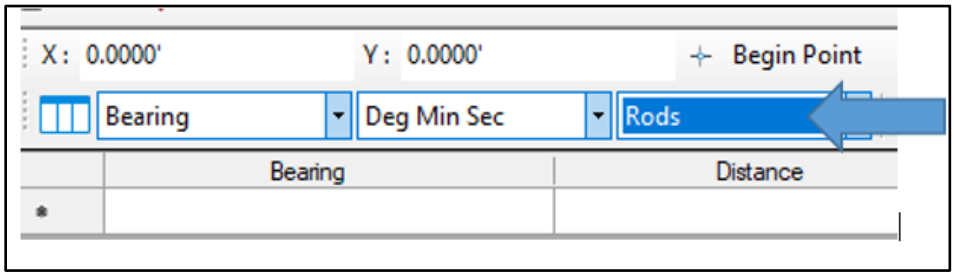
2. Survey-Geometry-Horizontal-Complex Geometry
3. Search for the command in the search ribbon located in the upper right corner



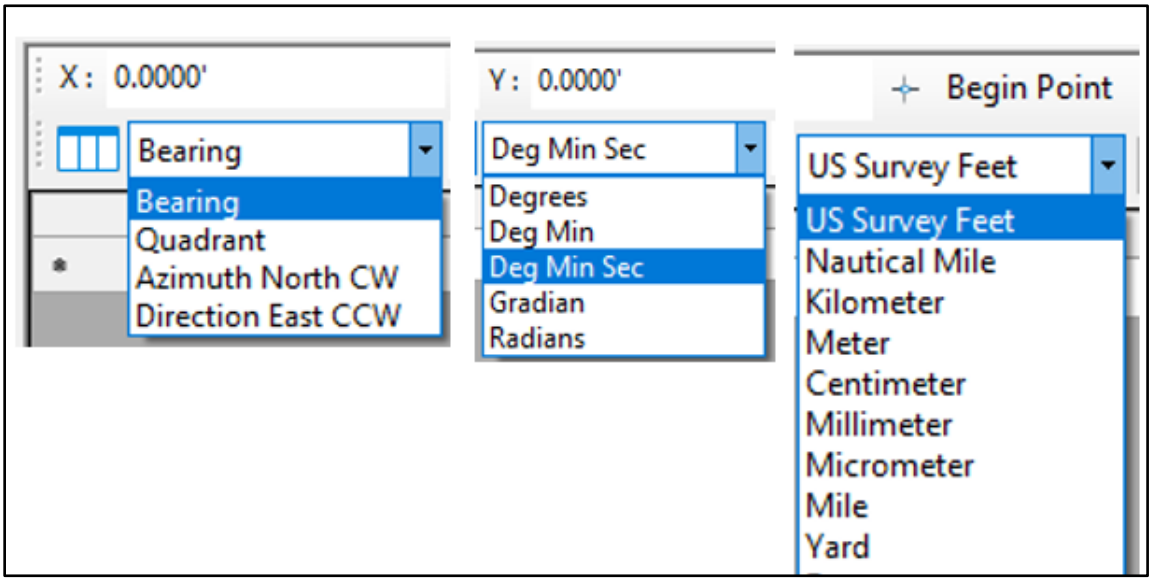


The Geometry Builder (see above) was designed to quickly define and edit geometry; it has surveyor-friendly tabular input. You can also edit existing geometry and graphics and save the geometry to XML files. It also contains the ability to compute closures and generate reports.

With this tool, we have different input methods; this allows input data in a different set of units from what your DGN is set up using. For example, our seed files are set up in US Survey Feet. You could set the linear to “Rods” and the tool will do the conversion for you (see below).



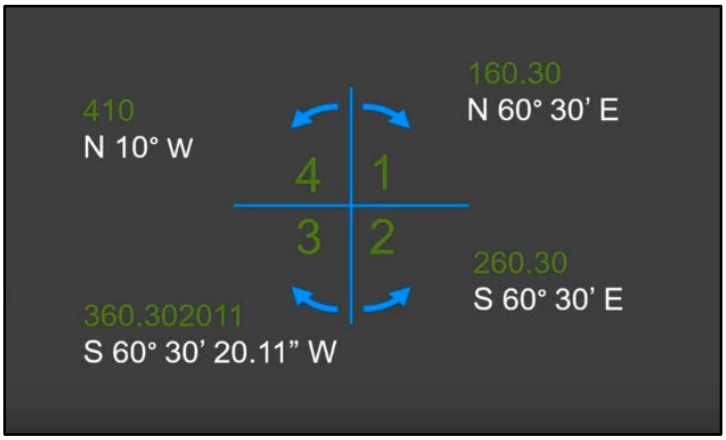
Alternatively, you could have a combination of any inputs:



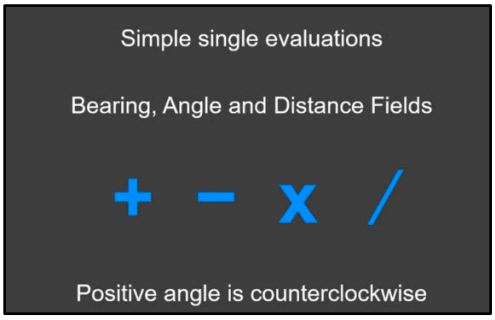
For the angular inputs, be mindful of how OpenRoads interprets:

Input Separator	Angle Format	
	Degrees	Deg Min Sec
Space	North 60 30 East	
	N 60 30 E	
	n60 30e	
^ ' "	North 60^30' East	
	N 60^ 30' East	
Decimal	N 60.30 E interprets to N 60° 18' East	North 60.30 East
		N 60.30 E
		N60.30e

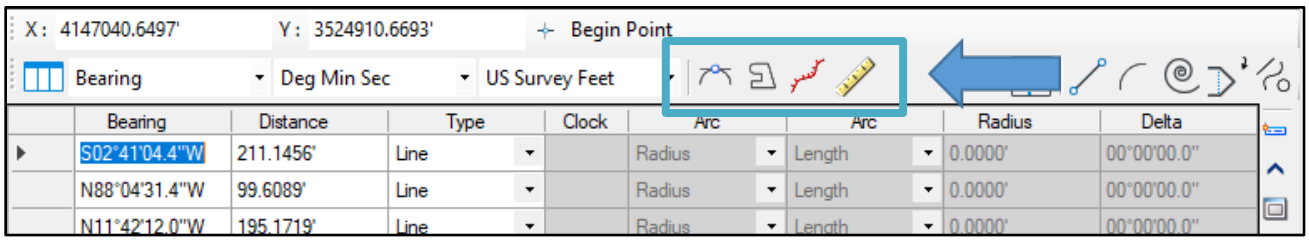
Geometry builder also supports Quadrant Direction entry:



Geometry builder also supports simple math functions. Be careful with these. Example: N 60-30 E will give you N 30 E.



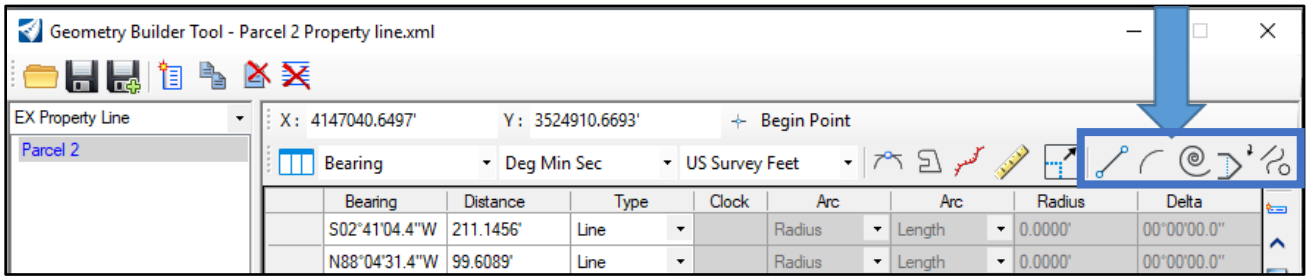
Now, let us look into "Locks" in Geometry Builder:



Below is a description of the Locks, what they are named, and what they do: (from left to right)

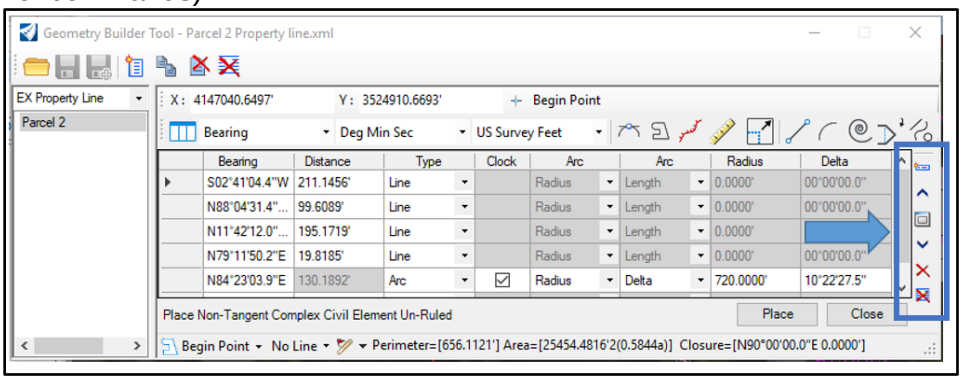
1. Force Tangent Restriction – as we place lines and arcs, if enabled, this will force them to be tangent with one another.
2. Create Simple Elements – a simple element would be individual elements and complex element would chain them together.
3. Create Graphic Elements – when enabled, this will create graphic elements or MicroStation graphics (if this is not enabled you are creating civil geometry).
4. Create Civil Ruled Elements – If you are creating civil geometry, do you want it ruled?

Now, let us examine the "Modify and Insert" Commands, from left to right (or top to bottom), for what they are called and what they do:



1. Modify Item – Allows you to highlight an input and modify the element.
2. Insert Line - This will allow you to graphically place a line and it will appear in the table.
3. Insert Arc - Allows you to graphically place an arc. (Note: this is a three-point arc, in order, the first point is the start, second is the end, and third point is the Radius)
4. Insert Spiral – Allows you graphically place a Spiral.
5. Insert Vertex – Allows you to graphically place a Vertex.
6. Insert Element – Allows you to graphically insert an element or shape into the table.

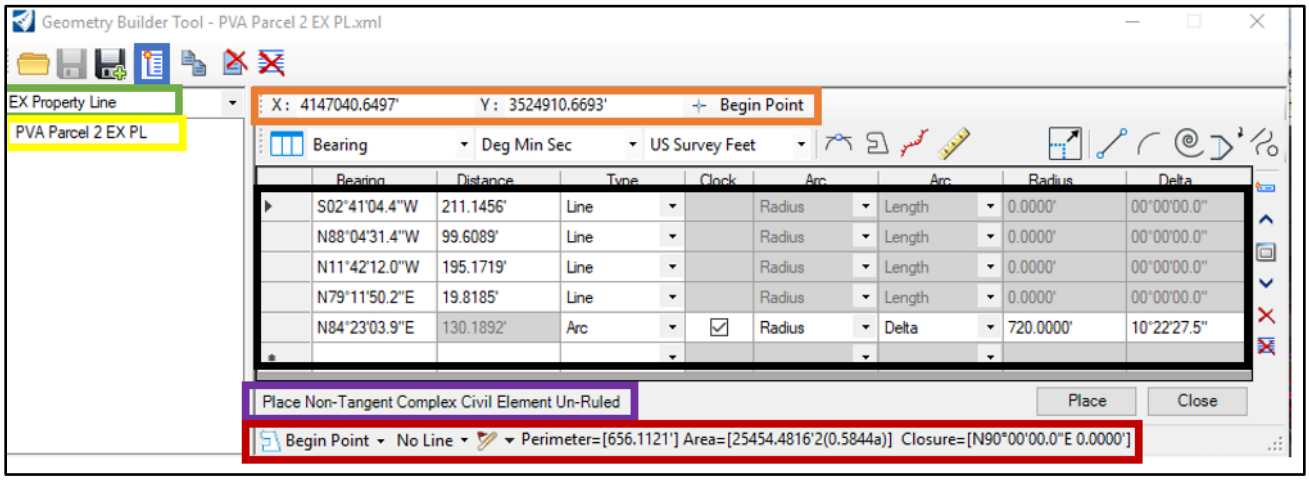
(Continuation of commands)



1. Insert New Item – Allows you to add a row.
2. Move up – Allows you to move a row up.
3. Fit View – Centers any row in the view.
4. Move Down - Allows you to move a row down.
5. Delete – Allows you to delete a row.
6. Delete All – Deletes all elements out of the table.

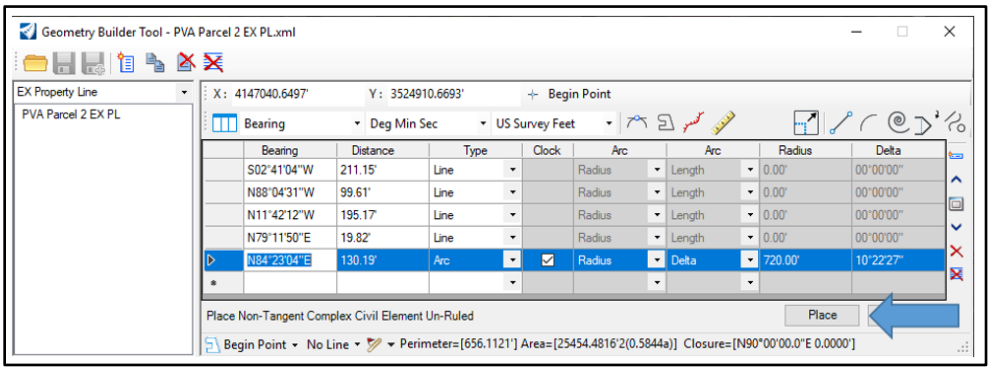
Creating Existing Parcels using Geometry Builder

Next, let us generate a Parcel. Below is a description of the different aspects inside Geometry Builder that are applicable to the creation of a Parcel.



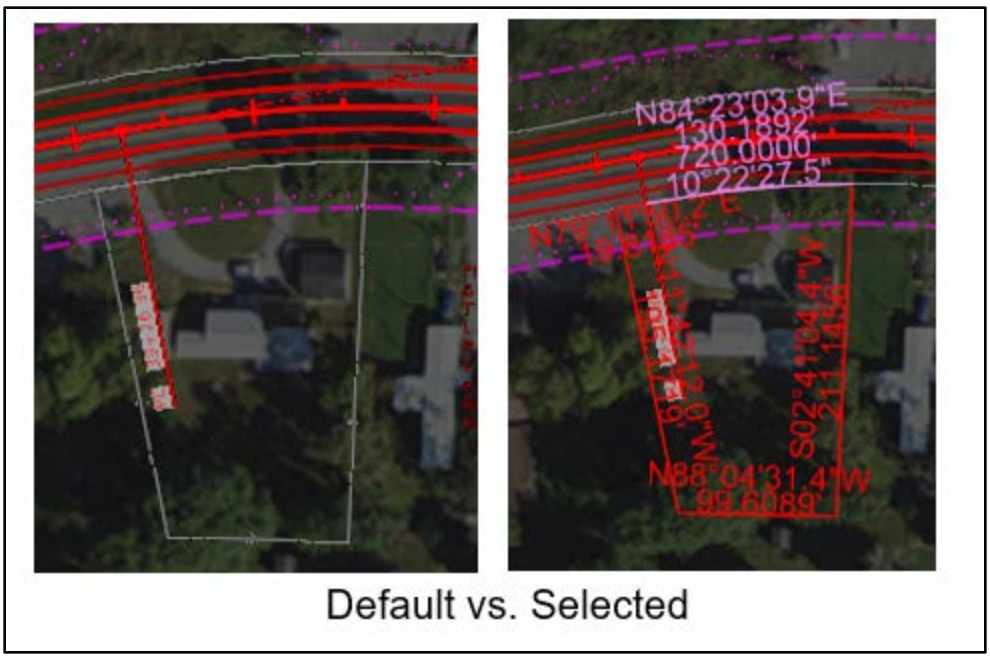
1. Add New Geometry.
2. Set Feature Definition (we will set our Feature Definition to EX Property Line).
3. Name Geometry (for this example we will name this PVA Parcel 2 EX PL).
4. Begin Point (most of the time you will enter a random point, then you will have to move and/or rotate the shape, but for this example we have a known point).
5. This is where we would put in our Parcel boundary; you can key it in or use the insert commands.
6. This tells you what locks you have assigned.
7. This is general information about the Parcel Perimeter, Area, Closure and such.

After you have inputted the appropriate information into Geometry Builder, place the Geometry by selecting the “Place” button, as shown below.



Note: as you key into Geometry Builder, the one highlighted inside Geometry builder is also highlighted in the DGN (before the place button is selected).

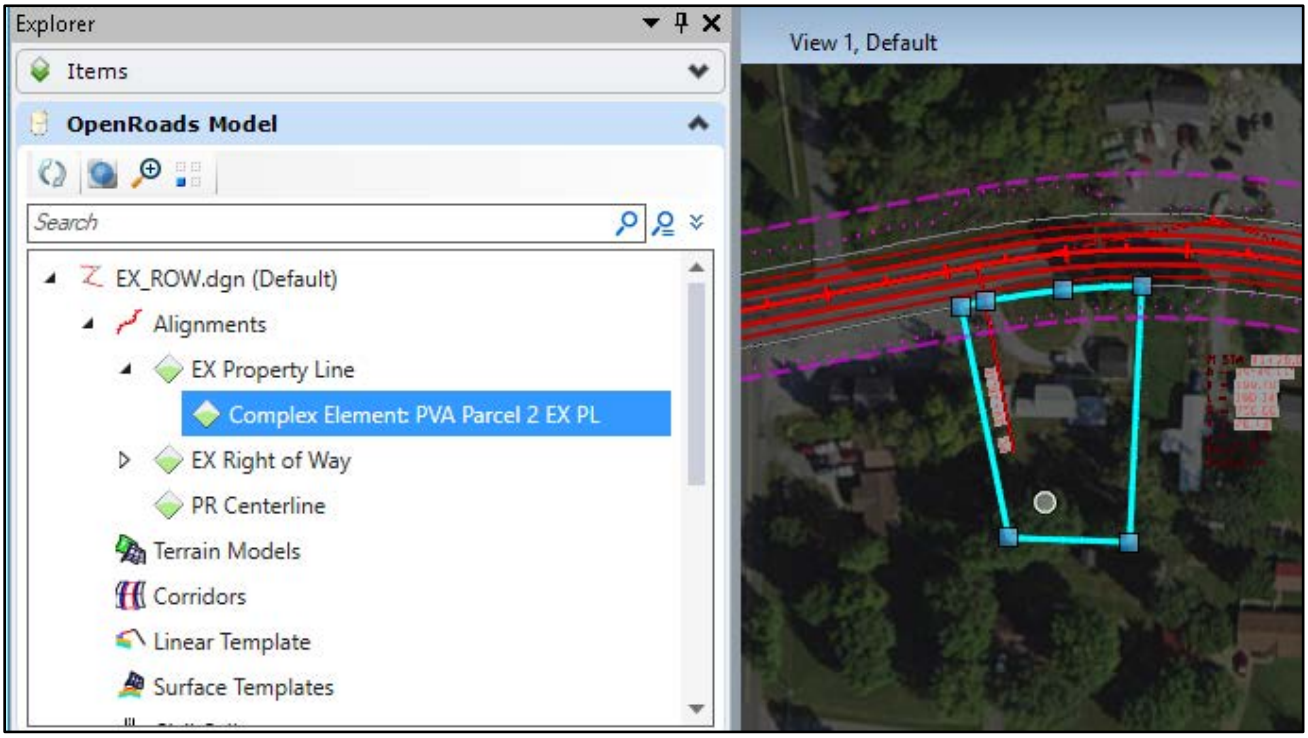
Once placed, the Parcel will be on the Feature Definition you selected earlier. If you did not select a Feature Definition, it will be placed on the default Feature Definition. Outlined below is the difference between pre-selecting the Feature Definition and not selecting one prior.



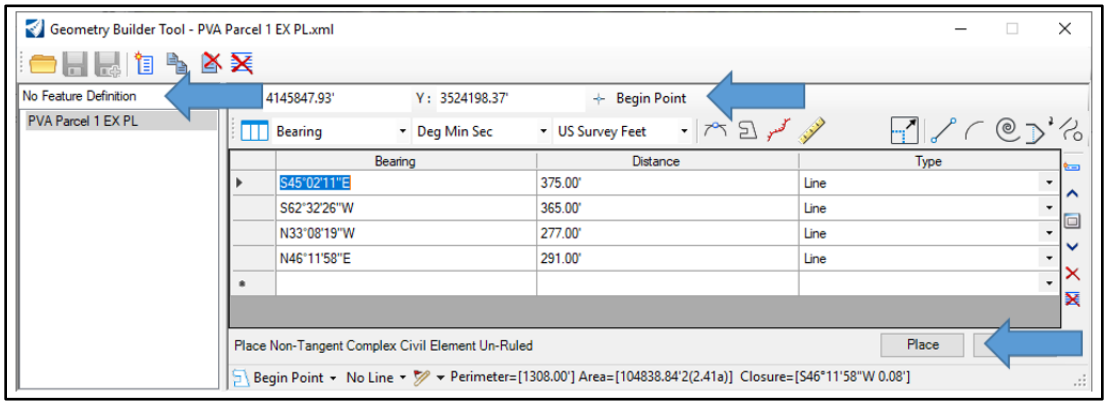
Default vs. Selected

It is important to note the Feature Definition used while creating the existing properties does not need to be set prior to placing the Parcel. Some users may like to set the Feature Definition after; this way they may know the parcel has been checked.

Please note that if you selected the EX Property Line Feature Definition, the PVA Parcel 2 EX PL will show up under the Alignments within the Explorer Tab. Furthermore, when selecting the text, the element will highlight in the drawing, as shown below. Notice the green square next to Complex Element: PVA Parcel 2 EX PL; this indicates that this Alignment has no Civil rules attached to it.

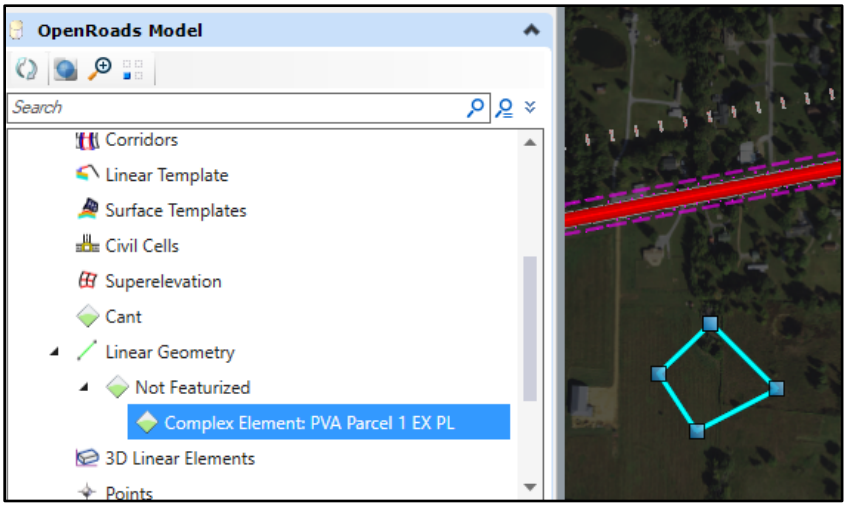


If you do not select a Feature Definition, your Parcel will be stored in a different location (then above). For example, let us place another parcel. It will follow the same workflow as prior, but we will not set a Feature Definition and the start coordinates will not be correct. This is how it may look:



With no Feature Definition set and no beginning coordinates, we can still place the Geometry. However, it is not where the parcel belongs (see below). We will correct this in the following sections of this workflow.

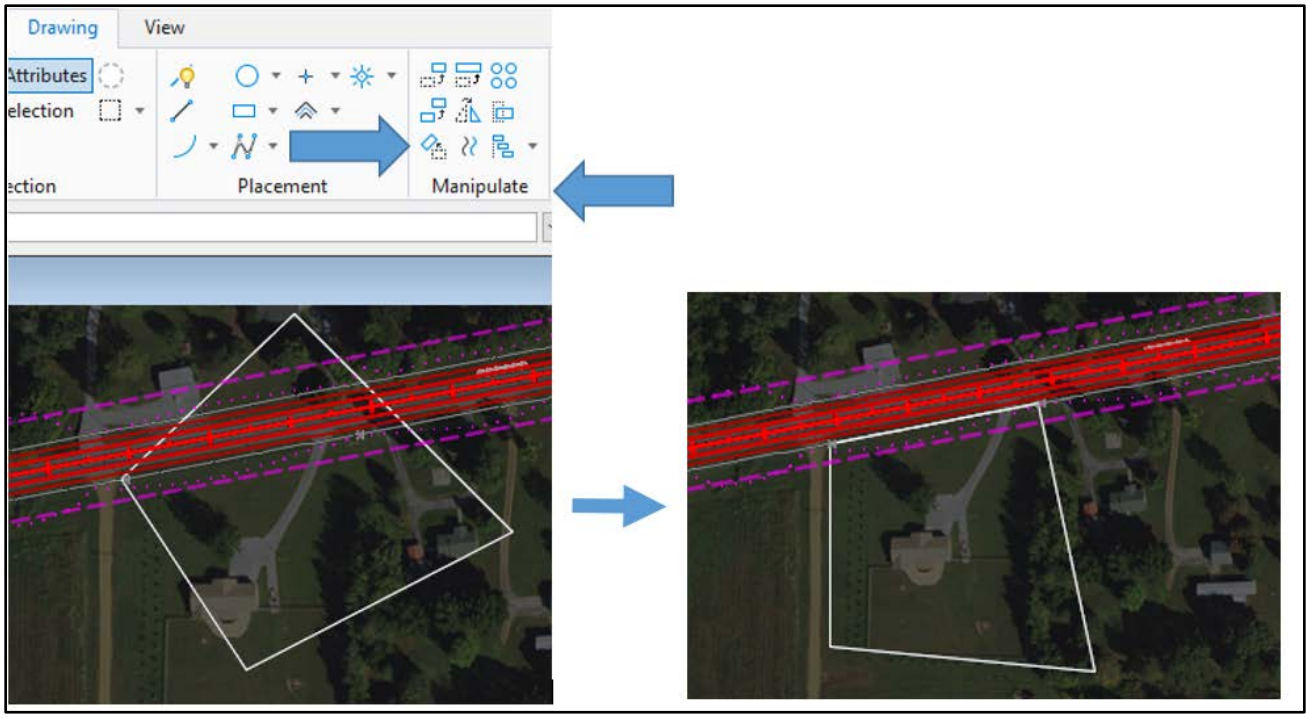
Note: Parcels placed with no Feature Definition assigned are still linear geometry; however, without the specific Feature Definition of EX Property Line set, it will not be grouped with the Alignments (nor is this Geometry ruled). Without this Geometry being ruled, you will have limited ability to modify this parcel in the future. Below is where the Geometry is located if no Feature Definition is applied prior to placement:



Moving and Rotating Existing Parcels

Continuing from our example above, the parcel needs to be shifted north and rotated. These corrections and movements will be commonplace while developing existing property boundaries. First, we will move and rotate this parcel with basic drawing commands. Depending on how you would like your parcels to react to such commands, this may be a perfectly good way to create existing parcels. The downside to this method is that you will have no civil data associated to it. You can add Civil Rules after you get the Parcel to the correct location, if you desire.

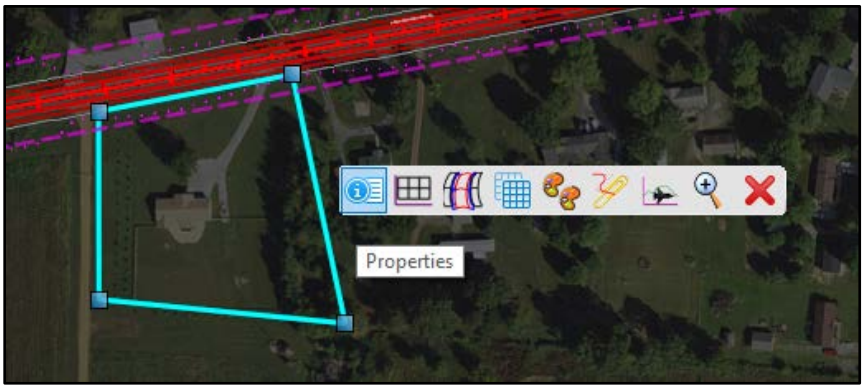
Now we can move and rotate the Linear Geometry. We have found two pins for this property and we will move and rotate the Parcel based on these pins. We will use drawing manipulate commands to reposition our parcel. First, we will move the Parcel with the “Move” command. Next, we will rotate the Parcel, using a 3-point rotate, as seen below.



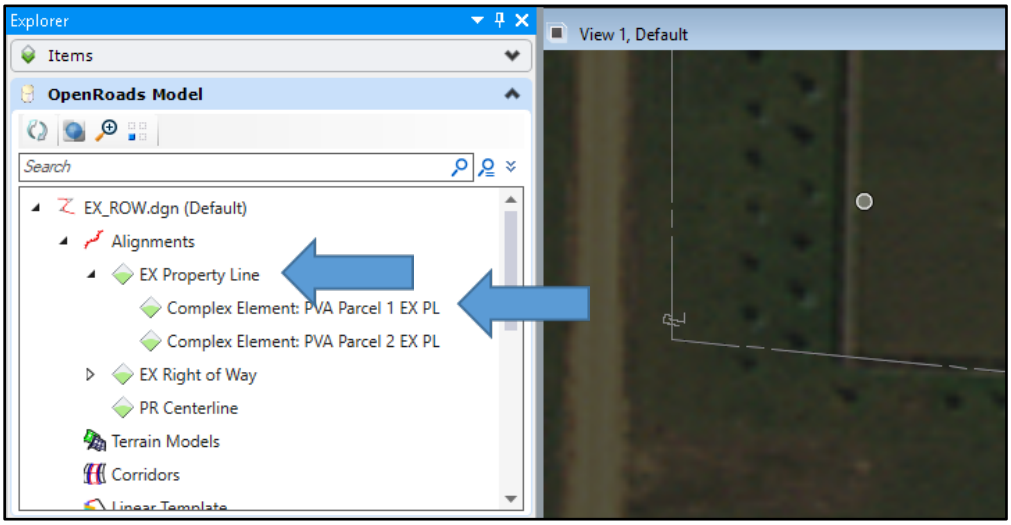
Now we have the parcel rotated and in the desired location.

Setting the Feature Definition

We will now set the Feature Definition. There are multiple ways to set the Feature Definition. For this example, we will select the parcel, hover over it, and select the properties button to set the Feature Definition to EX Property Line, as shown below.



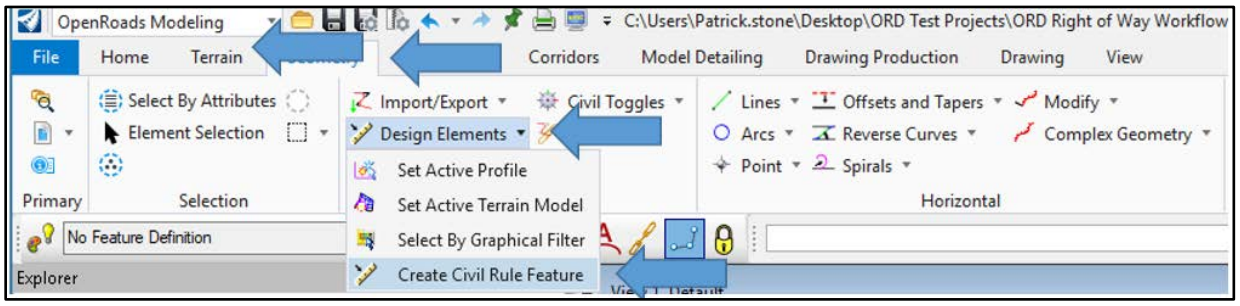
Now you can see with the Feature Definition set, your parcel is moved from the linear geometry to the alignments tab in the Explorer. As of this write up, you may have to close the explorer and reopen it for the move to take place.



Civil Rules

Civil Rules allow you to edit alignments using the Element Selection options. Without Civil Rules, you will not have manipulators available for editing. To demonstrate this, the blue shape has Civil Rules and the yellow does not (see below).

We can add Civil Rules to an element using the Create Civil Rule Feature command. This can be found under OpenRoads Modeling - Geometry – Design Elements - Create Civil Rule Feature (detailed below).



Select the element or elements you would like to have the Civil Rule applied to and follow the prompts.

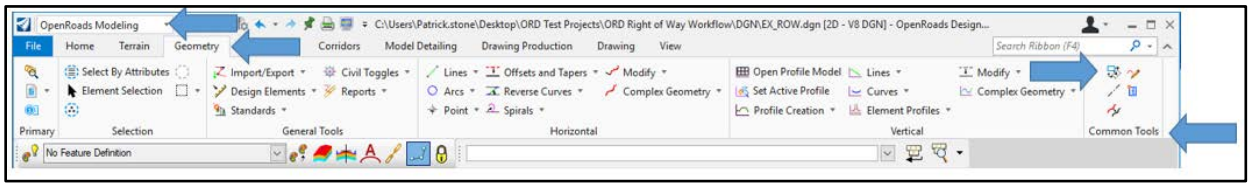
As you can see, from our example, both elements now have Civil Rules:

How to Move Parcels that have Civil Rules Already Attached

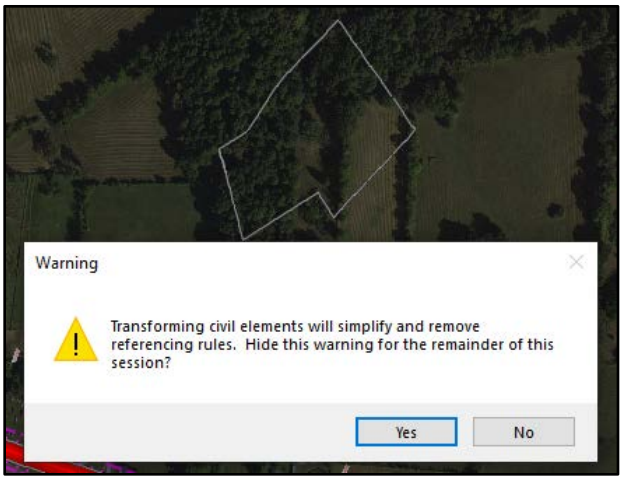
As shown above, the Parcel is not in the desired location and has Civil Rules associated with it. With the Civil Rules applied, we will NOT be able to use the Move command. If attempted, you will receive the error pictured above (Cannot Transform This Element because It Has A Rule). This error occurs because the Civil Rule remembers the coordinate of the point and the bearing. The following topic discuss how to move the desired Parcel.

Transform Elements

In this section, we will discuss two options to move Parcels and retain their Civil Rules. The first method uses the Transform Elements Tool. This tool can be found under the OpenRoads Modeling – Geometry – Common Tools – Transform (detailed below).

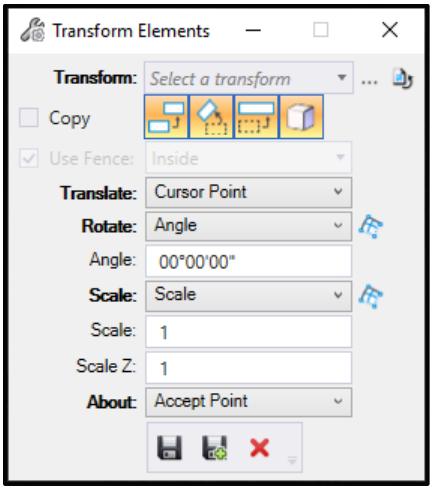


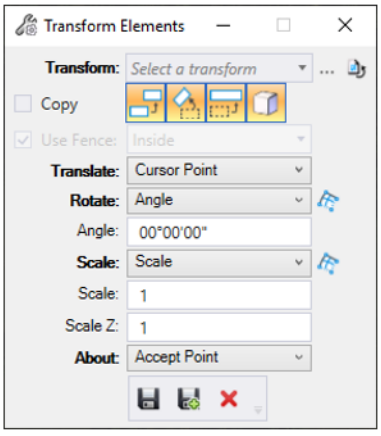
When you first launch this command the following error, shown below, will occur. Transforming civil elements will simplify and remove referencing rules. In this case, if the parcel is referenced to a centerline, when you transform the parcel, you will no longer have it referenced from that centerline. You will still have the reference from point to point and for this case, this is all we need. I usually select yes to hide this warning.



How the Transform Elements Command Works

In this section, we will briefly address how the Transform Elements command works and then focus on its functions that apply to creating existing Parcels. Below is how the command will look:





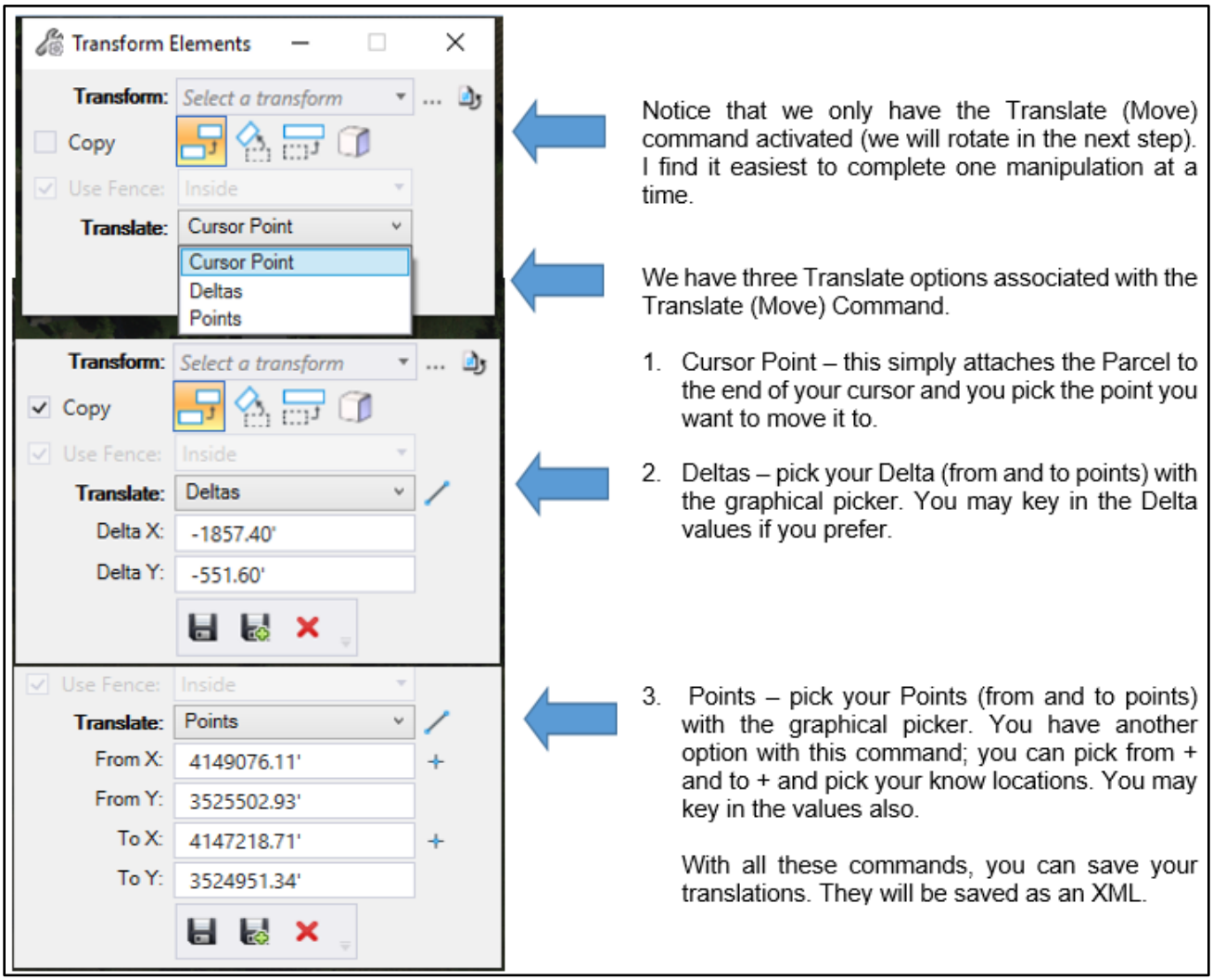
The Transform command deals with unit conversion (Foot to Meter, Foot to US foot, Meter to Foot, Meter to US Foot and US Foot to Meter).

We also have the ability to Translate (Move), Rotate, Scale or Transform to Z or elevation values.

We will be using Move and Rotate.

Please note that any button you have activated, you will have options in the second half of the pallet to enter values for those actions. We will do one action at a time for this example.

Next, open the Transform Elements Command.



Notice that we only have the Translate (Move) command activated (we will rotate in the next step). I find it easiest to complete one manipulation at a time.

We have three Translate options associated with the Translate (Move) Command.

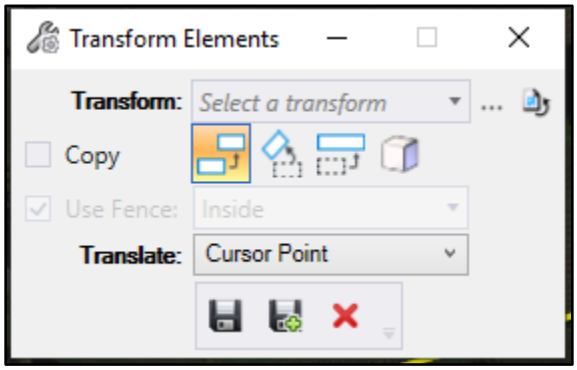
1. Cursor Point – this simply attaches the Parcel to the end of your cursor and you pick the point you want to move it to.
2. Deltas – pick your Delta (from and to points) with the graphical picker. You may key in the Delta values if you prefer.
3. Points – pick your Points (from and to points) with the graphical picker. You have another option with this command; you can pick from + and to + and pick your know locations. You may key in the values also.

With all these commands, you can save your translations. They will be saved as an XML.

Moving Parcels with the Transform Command

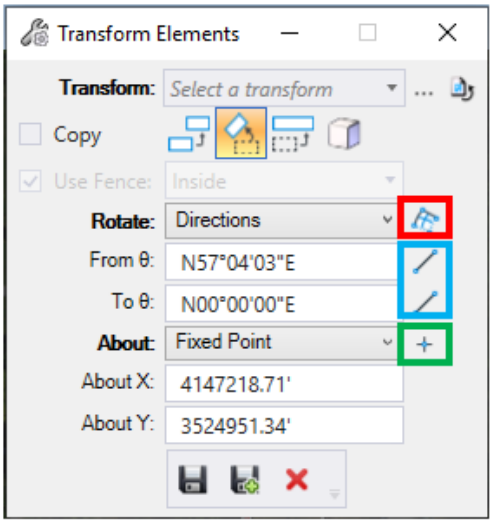
Now that we know how the transform commands works, let us now move our Parcel 4 EX PL that we created with the Geometry Builder. Keeping the Civil Rules attached to our Parcels will help us in later steps. Do not forget that you can perform multiple transformations at a time and you can move and rotate at the same time. For this example, we will move then rotate our Parcel. We will be moving our Parcel the length of the yellow line, detailed below.

Next, activate the Transform Geometry Command. With it, we will use the Translate (Move) command. Select the “from point” button, followed by the destination point. Please note that we only have the Translate (Move) command activated.



Rotating Parcels with the Transform Command

As you can see below, after completing previous steps, we have Translated (Moved) our Parcel. We will now need to rotate our Parcel to align with the project (see below). We have maintained the civil rules.



Please note that we only have the rotate command activated.

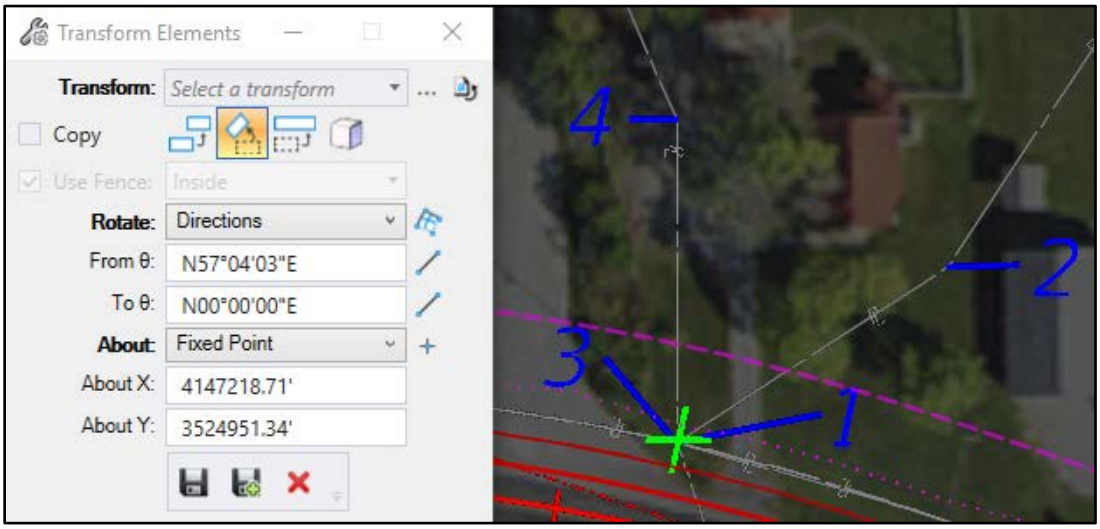
The rotate command has four rotation methods available. 1. Cursor Point, 2. Angle, 3. Active Angle, 4. Directions. We will be using the Directions method.

Please note the red box to the right of Rotate Methods. If selected, this allows you to perform an angular rotation and scale at the same time.

From and to both require two points to set the Bearing.

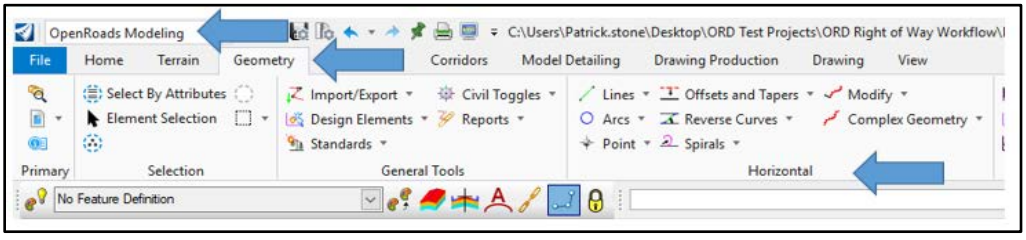
The about command has four methods available also: 1. Accept point, 2. Fixed point, 3. Zero origin, 4. Element Center. We will be using the fixed point method.

With the transform elements command up and running, set your method to rotate, the rotate to Directions, and set the About to Fixed Point. We will now set the X and Y of the fixed point: pick the + beside Fixed Point. Now, select your point on the screen (the example below shows a green +). Select the line symbol beside the From Bearing and select points 1 and 2. Do the same thing for the To Bearing and select points 3 and 4. Next, select the Parcel you want to rotate. The Parcel has now been rotated and has maintained its Civil Rules.

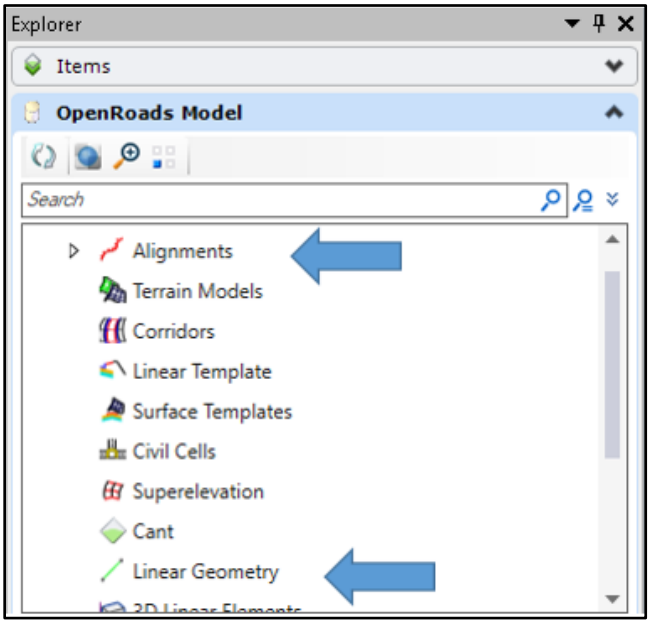


Creating Existing Parcels using Geometry Tools

Now we are going to work on the second method for creating a parcel; we are going to be using the Geometry tools. We can use a combination of any of the Horizontal tools to layout our existing Parcels. As you will find, some of the deeds filed do not close and some do not even resemble the Parcel, as they should. In these cases, you may find yourself needing to use your best judgment; this is when you would use the horizontal tools to solve the puzzle. Below is where our necessary commands are located:



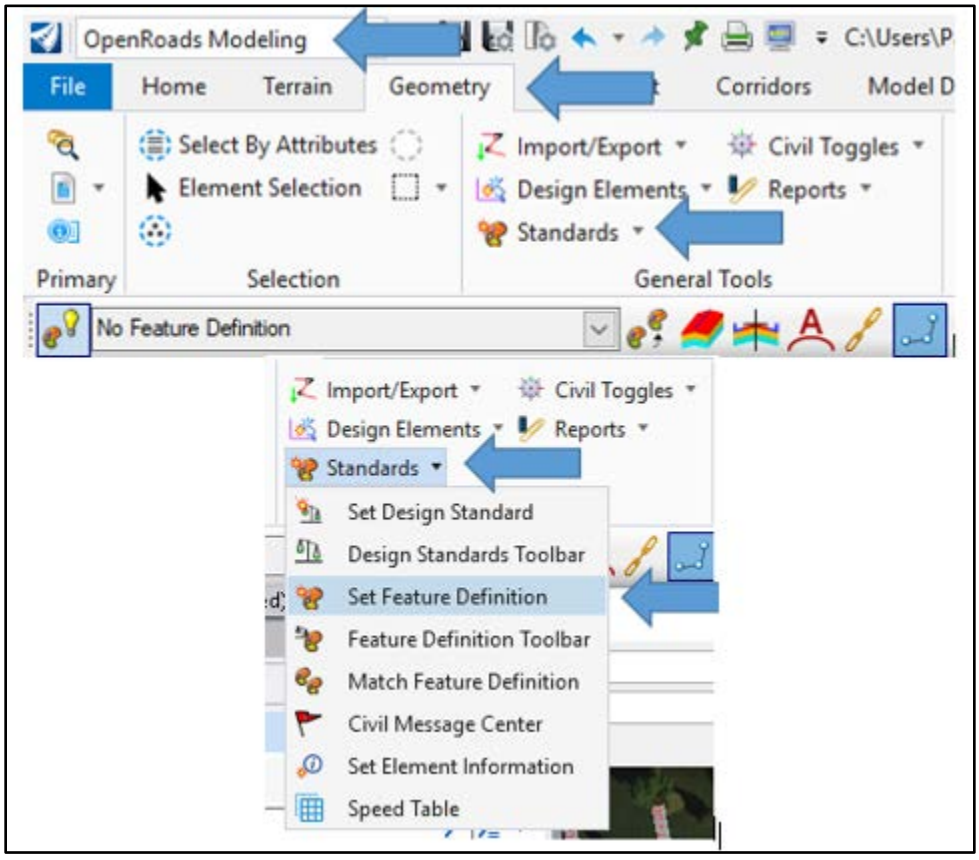
I like to begin drawing these on a construction or default level; this way I can distinguish parcels that are under Linear Geometry or ones that still need work. When the parcels are complete and set to the appropriate Feature Definition, they will automatically move under Alignments (see the different locations below). You may or may not need to make all parcels into an alignment; this will depend on if you will use the “Create Takes and Remains” command or manually plan to create your right of way geometry. This will greatly depend on the existing deeds and plats for your project and the accuracy of those documents. We will talk about the “Create Takes and Remains” command in a different workflow tilted with the same name.



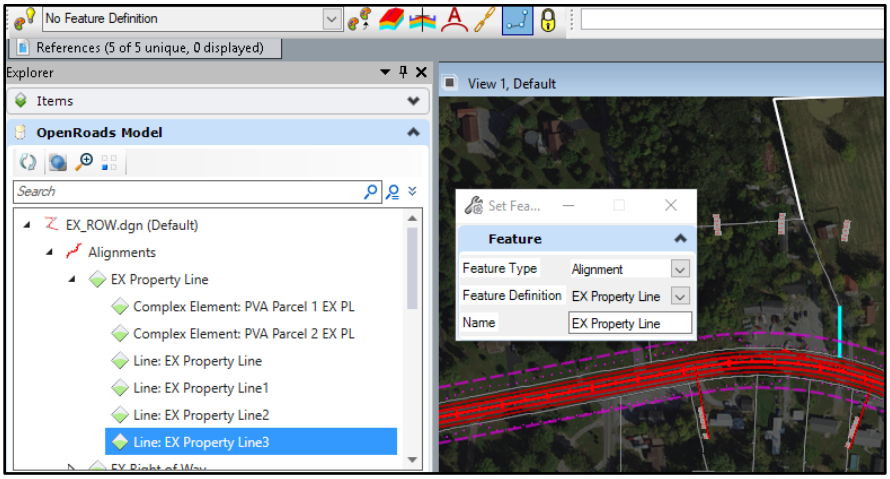
Note: all default lines with a weight of “2” and color of “0” have been drawn using PVA map information and deed descriptions. Most do not close and some do not have enough information to draw fully. For this example, we will make all the parcels to the north using alignments and leave the parcels to the south as non-intelligent graphics.

In the graphic below, for the parcels to the South, simply set the elements that are on default level to the property line level R_PL_RWPL_EX. Once this is complete, they should look like the image below. Remember that all the parcels, but one, to the South are non-intelligent graphics.

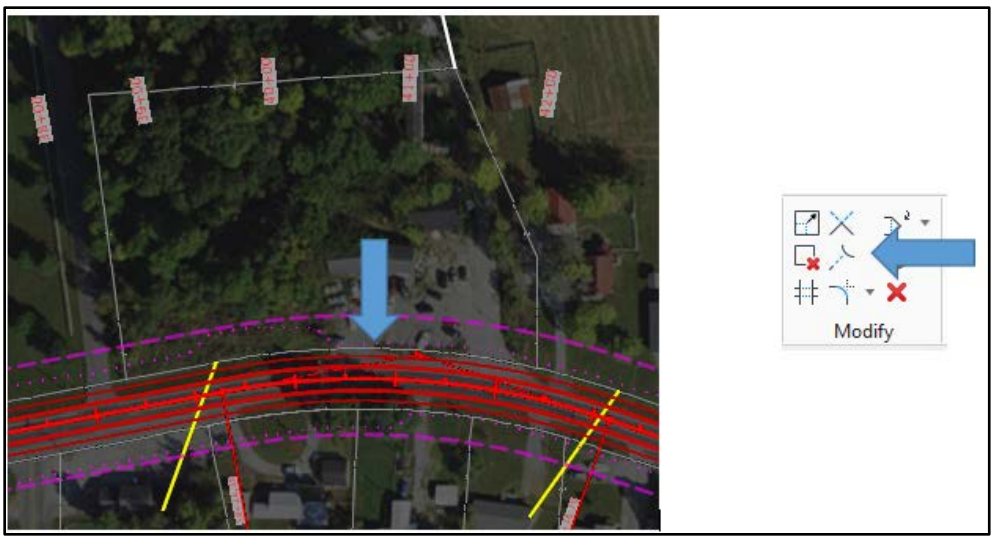
Now we will work on transitioning the parcels to the North as alignments. The first step will be to set the Feature Definition. To do this, go to OpenRoads Modeling-Geometry-General Tools-Standards-Set Feature Definition (see below).



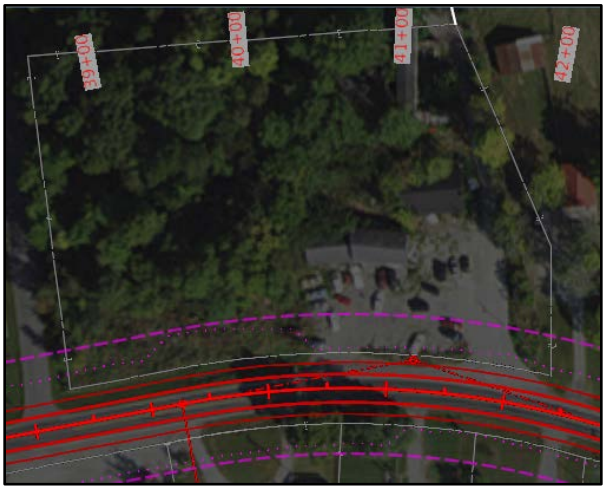
As we set the Feature Definitions, notice the parcels moving from the Linear Geometry group to the Alignments Group, illustrated below. Please note these are individual alignments at this point.



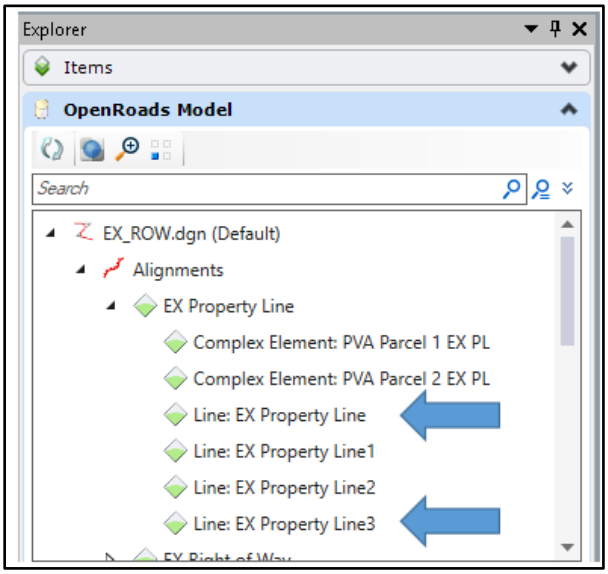
Notice in our example how one parcel contains a curve. There are several ways to include this curve; we will be trimming the curve to fit our parcel. The program will remember our design intent, so clipping the Existing Right of Way Line will not be a problem. Notice the extents of the curve as I have indicated with two yellow lines. We will simply use the trim command, demonstrated be the following graphic.



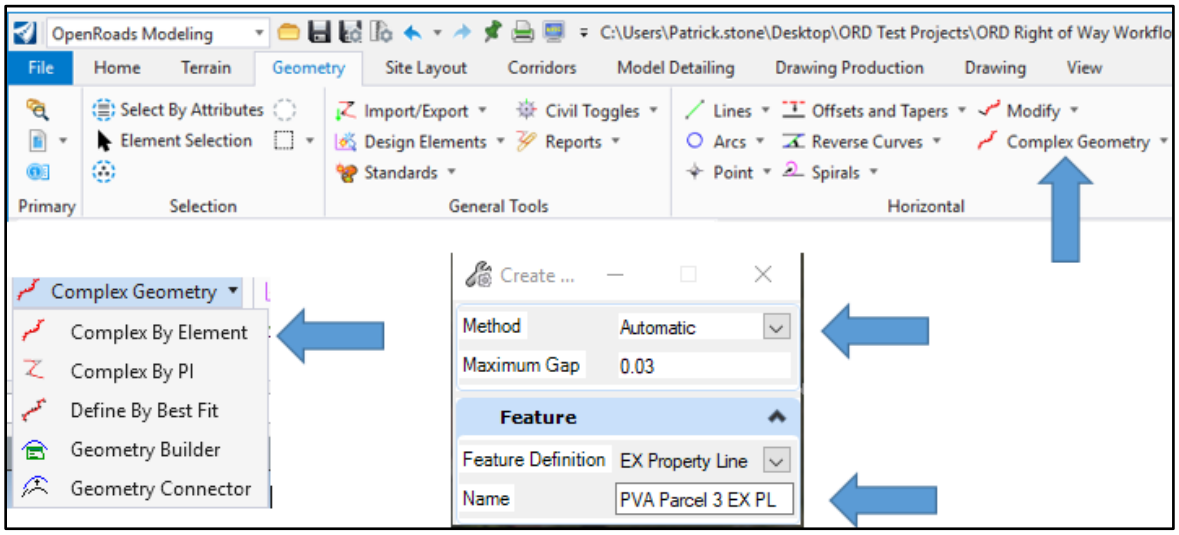
After trimming, your drawing should look like:



Notice the four Line entries is in the below graphic. We will fix these by complexing them and will end up with another Complex Element (PVA Parcel 3 EX PL).



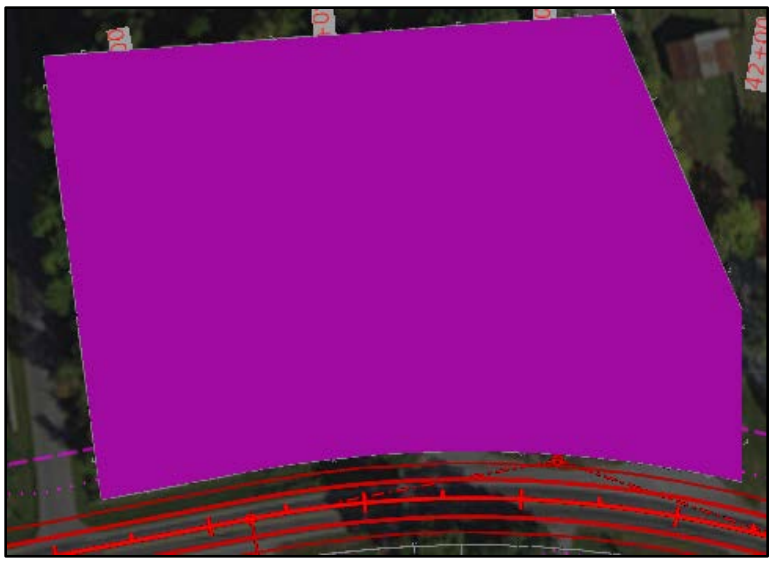
Go to OpenRoads Modeling-Geometry–Horizontal–Complex Geometry-Complex by Element (see below).



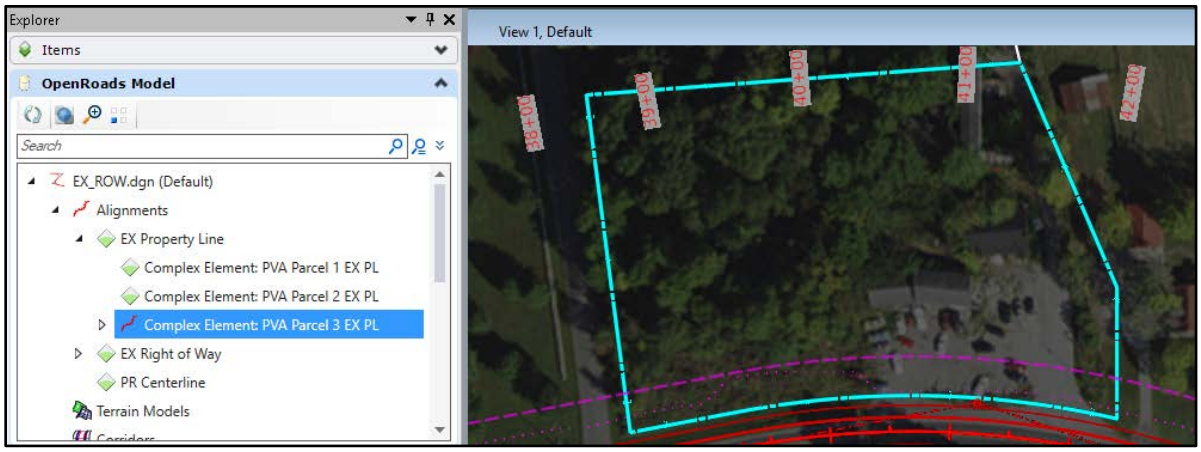
When using this command, you have a couple of choices to make. I like to start out with the Method set to Automatic (see above). However, if the program selects the elements in an order that is not desirable, then I switch the Method to Manual. Also, if you have more than one element on top of each other (for example a common property line) I would recommend using the Manual Method; this will allow you to reset your selection until you get the line you want in your set or Parcel. Set the Feature Definition to Ex Property Line. For this example, we will name it PVA Parcel 3 EX PL (for a real project I would use the PVA map number).

Next, notice below the arrow at the end of the line; this indicates the direction the Parcel will be created. To change the direction, pick at the opposite end. For our example, this is set correctly; we want this to be in a clockwise pattern.

Once completed, the parcel will show up filled in and the final prompt will ask to accept, as shown below.



Once you have all the bounding elements selected in your parcel, hit accept. The newly created parcel will show up under the Alignments group and will be collected under the Feature Definition we defined (in this case EX Property Line). You will notice a couple different symbols beside the newly created Parcels. Parcel 1 and 2 were created using the Geometry Builder with the Create Civil Ruled Elements turned off and Parcel 3 was used with the Geometry Tools and has Civil Rules.



Now create the remaining parcels with the same workflow as above.