State of Florida

Department of Transportation

FDOT Quantities Using Civil 3D 2015 Workshop

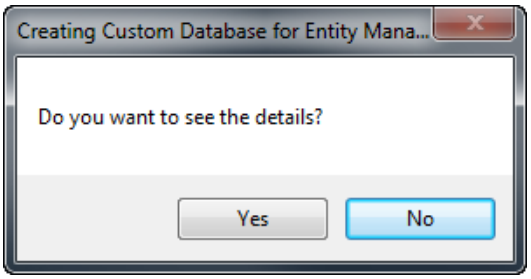
FDOT Civil 3D Quantities Workshop

This workbook should be used in conjunction with the Takeoff Manager & Entity Manager handout which covers commands and functionality in detail. We will start with using EMX first to place pay item data that we will then use FTM to quantify reports.

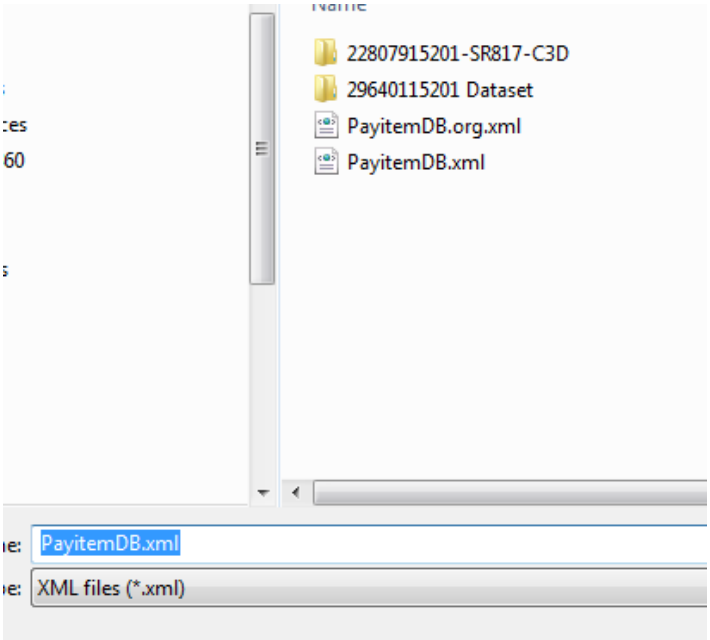
1. Using Entity Manager

- Open QTDSRD01 Blank.dwg

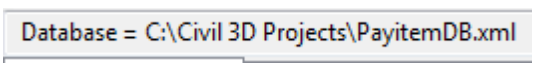
Before using EMX some setup is required. If this is the first time you have used EMX with your design file it will ask you if you want to see the details as it sets up a PayitemDB.xml file.



Select No to expedite the process. It is ok to overwrite an existing PayitemDB file. The only time you may not want to overwrite a file is if you have modified an adhoc value.

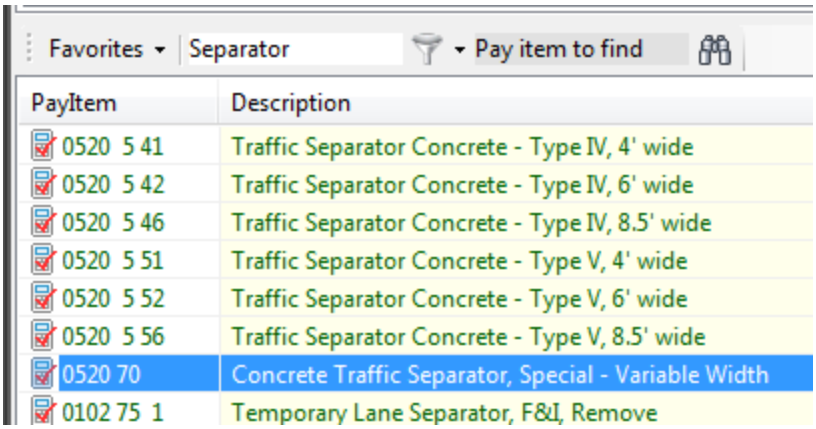


The Default location for the file is in the Civil 3D Projects folder

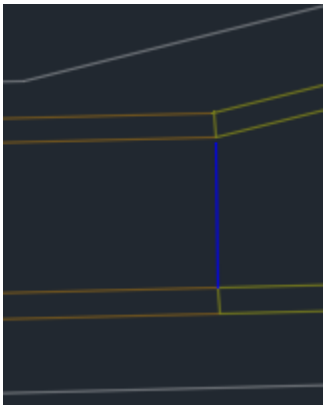


2. Drawing Shapes with EMX

- Open DSGNSP Blank.dwg
- Launch Entity Manager from the FDOT Ribbon
- Search for Separator in the text search as seen below and select the variable width Traffic Separator

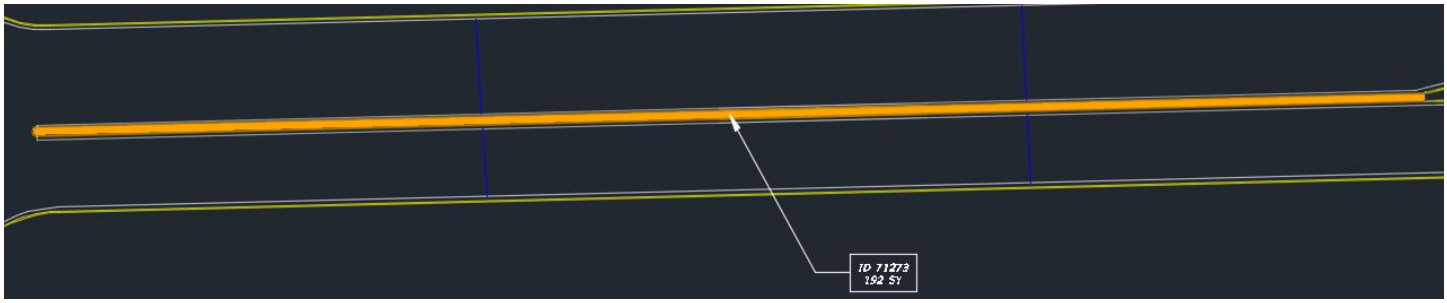


- Once Highlighted using the AutoCAD Line command draw construction lines as shown below to create a closed area for our hatch. Zoom to the 4-way Intersection.

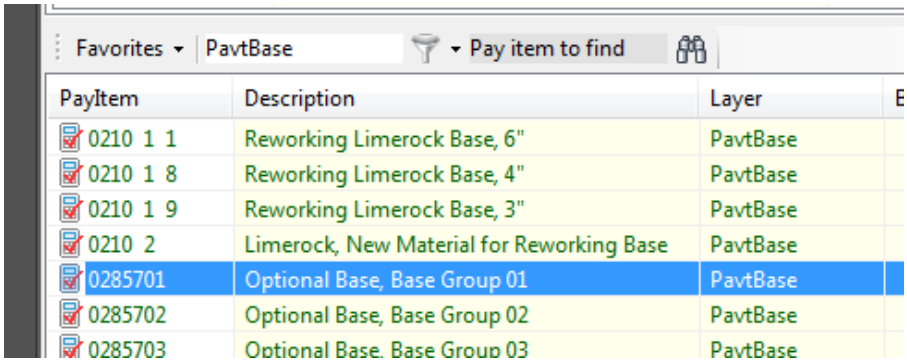


Do this at the remaining 3 points at the intersection

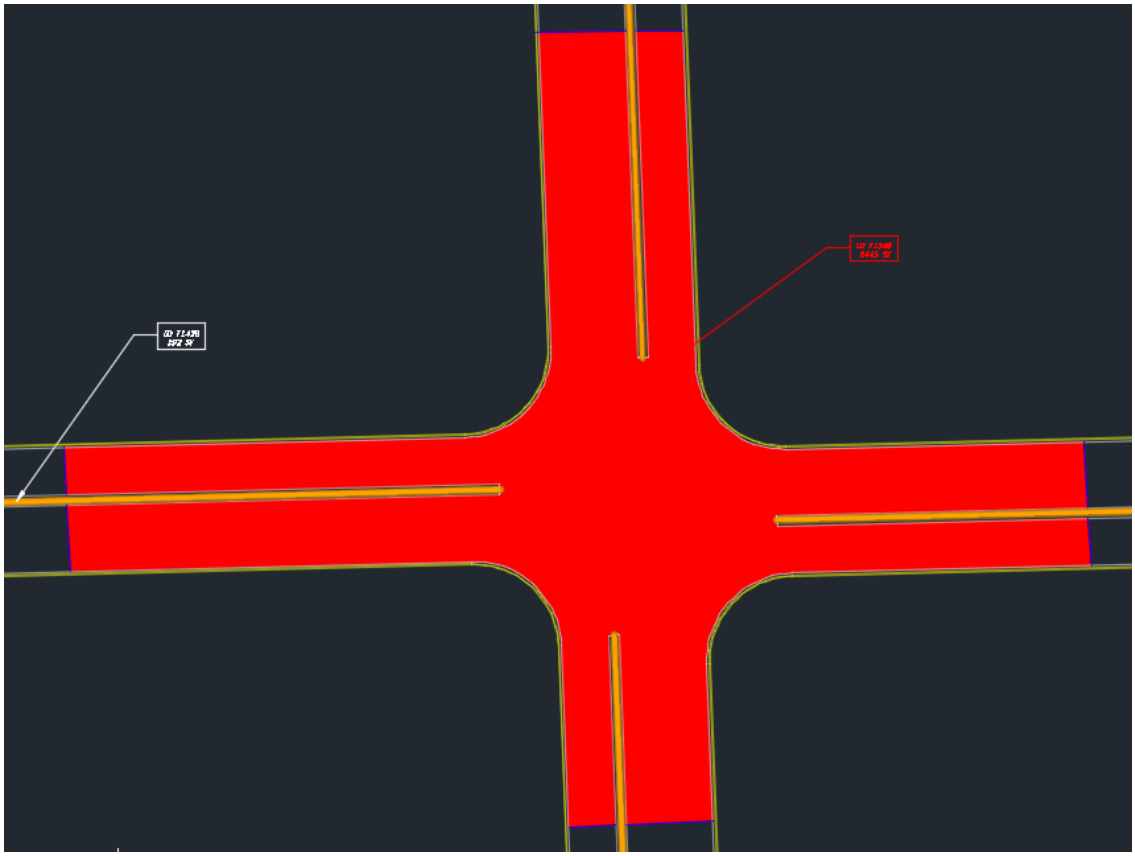
- With the Traffic Sep. still highlighted select the truck symbol with the green hatch on top of the menu bar. If you get lost on their functions you can hover on them to get their tool tip.
- Make sure you have pick point option current. Look at the command line for information < Hover inside the strip to see a preview < Left Click while inside the strip that represents the separator from the line you drew to the end at the intersection < Press Enter to make the Area Label Appear and drag it outside the hatched area. Your Drawing should look like below.



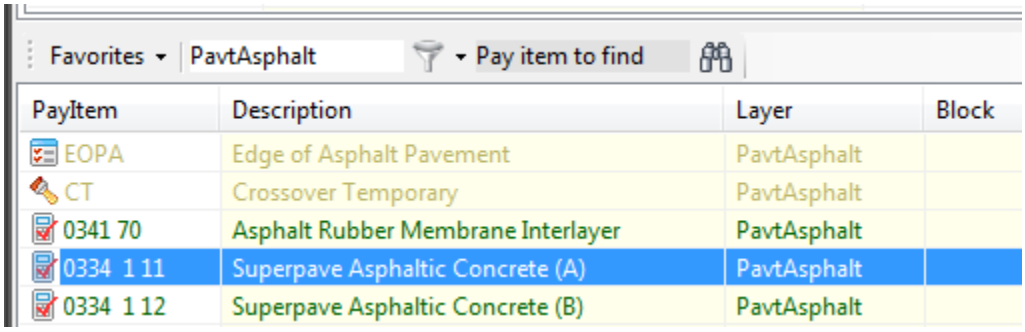
- Hatch the same pattern at the other 3 Intersection points
- Search for PavtBase and select the following



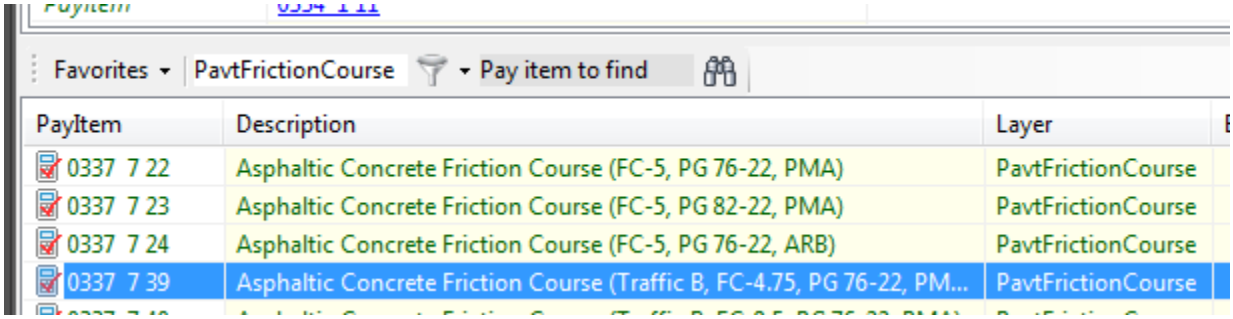
- Before placing this hatch click on the label Icon  to change the layer to PavtBase
- Zoom into the intersection. You will see blue temporary lines drawn creating a closed area for asphalt. You will hatch using the 4 closest blue lines to the center of the intersection
- Hatch as you did before. You should have one large hatch section with the label being red



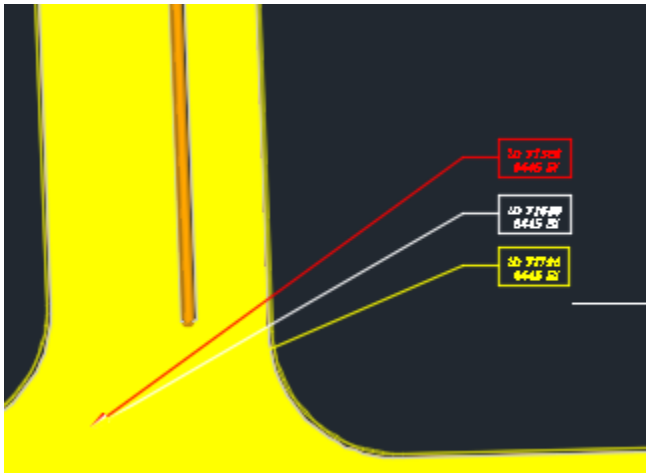
- Repeating this process search for and select the following. Make sure you change the Label Layer to the correct one listed



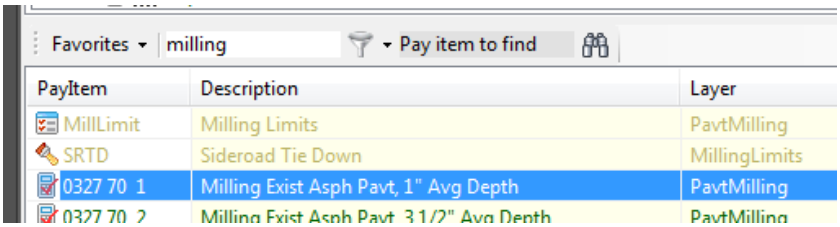
- Hatch the same area as before
- Search for and select the following. Complete as the same steps before

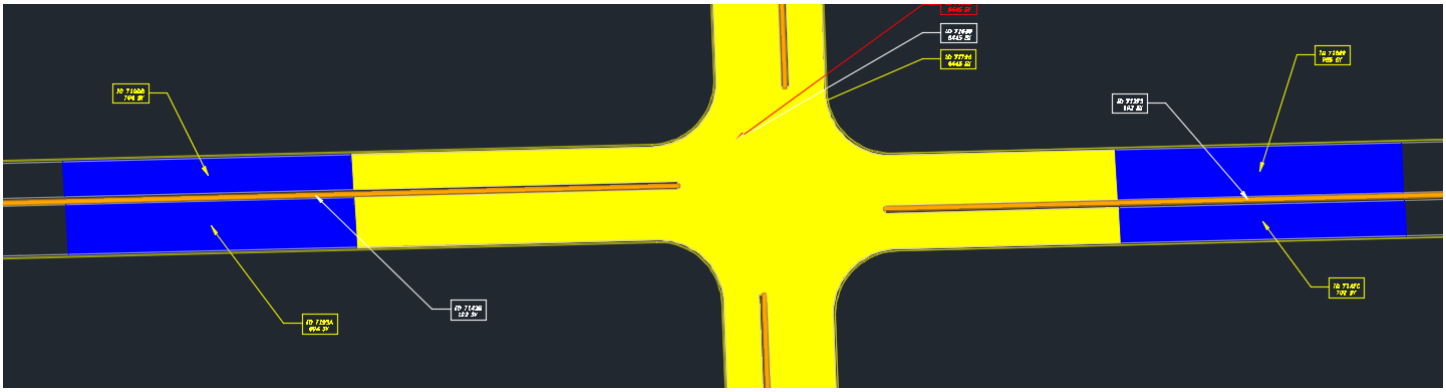


- You should now have a Red, White, & Yellow Label as shown below



- Search for the following and hatch the 2 closed areas east and west of the intersection. You will have to move your separator labels out of the way so they won't interact with your milling hatch, just grip move them. Drawing should look like below

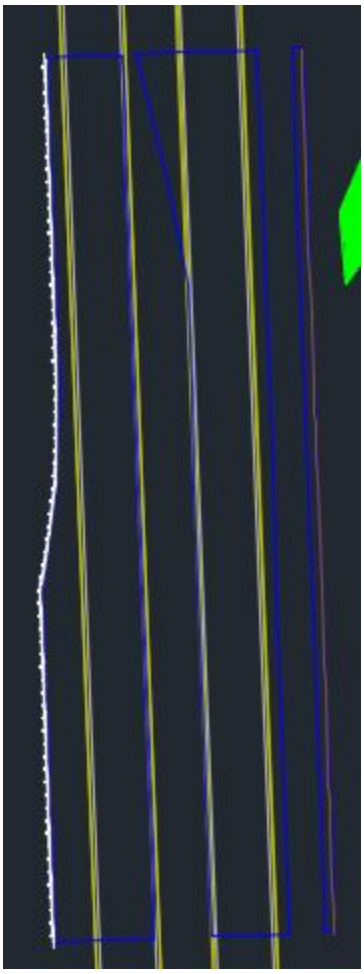




- Now let's add some sod shapes. Search for sod and select pay item 0570 1 2
- Before you hatch the sod change the label text layer back to TextLabel
- Hatch the areas as shown below. I already added your construction lines on Miscellaneous3 Layer

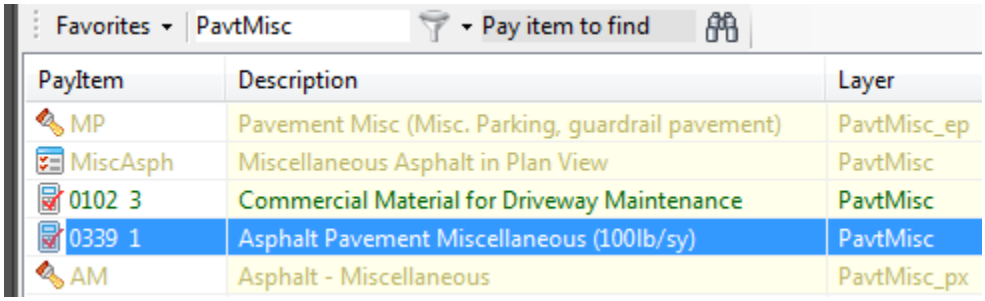
- Save Your File

- Keeping sod selected Draw Closed AutoCAD Polylines randomly along the main alignment outside the pavement areas < Hatch areas just drawn
- In your file Pan to the North of the intersection to the area with Closed Blue Shapes as seen below

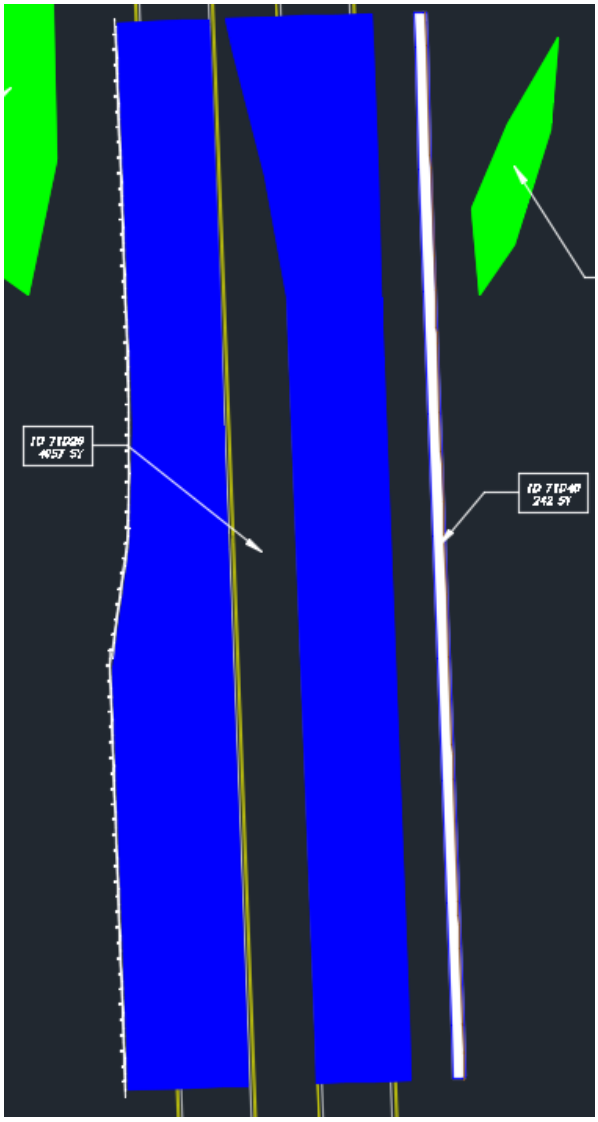


This area represents Asphalt Limits and Sidewalk Limits from a Corridor design file. These are actually Surfaces with just the Border shown which will allow you to flood with appropriate hatch. This is another way to create shapes that will also remain dynamic to the Corridor, meaning as the design file changes these shapes will update. You will how ever have to re-run the quantity reports due to the reports themselves not being dynamic.

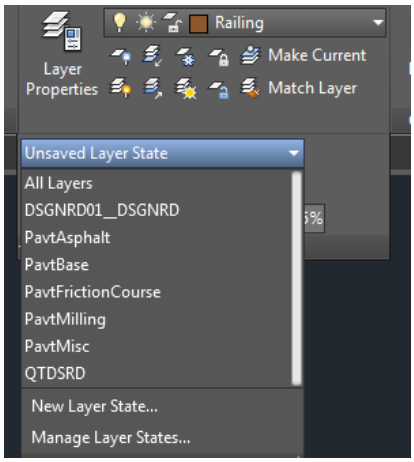
- Hatch the Asphalt Limits with Miscellaneous Asphalt. You will have to change to “S”elect objects on the command line to hatch the entire object due to other linework inside the shapes



- Hatch the Sidewalk Limits with 4” Thick Sidewalk (0522 1) using the same method. The drawing should look like below



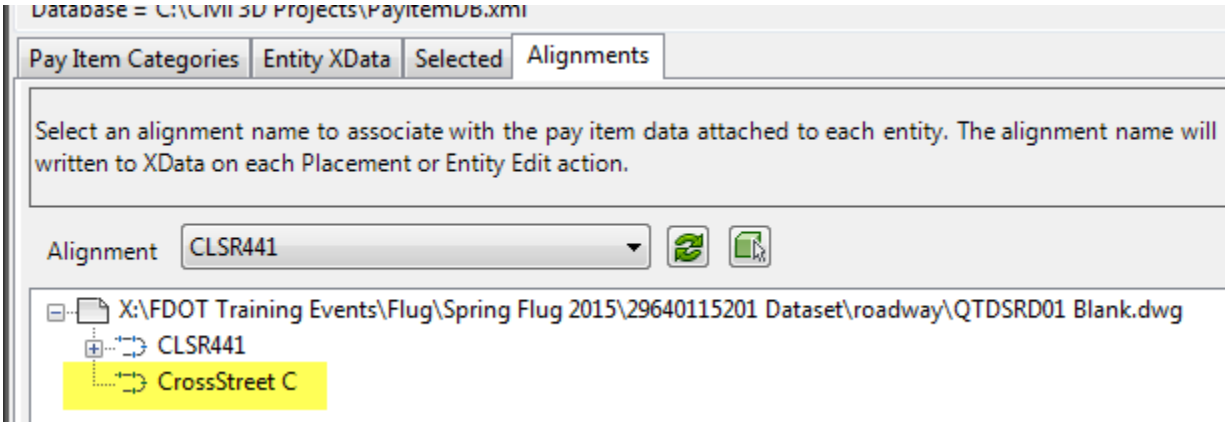
Now let’s look some options to help you view your Shapes that are on top of each other in the same file. On the Home tab under the Layer Pull down you will notice Layer States. Layer States are like snapshots of which layers are on or off so you can recall a previous view. I have already made some States for you.



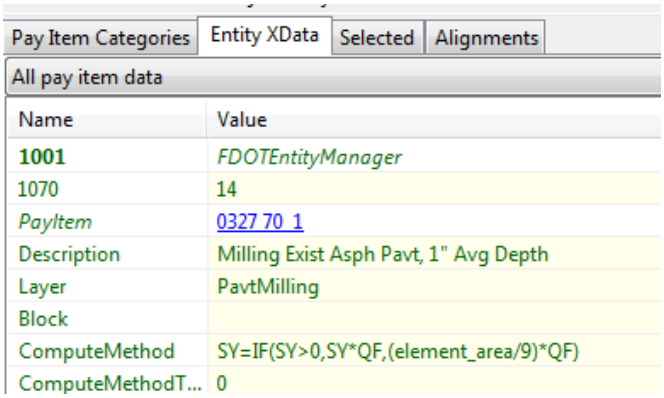
- Zoom back to your intersection where you hatched shapes on top of each other
- Using the Layer States Pull down select one by one to see how they work. For example you can see that if PavtAsphalt is selected it cuts all other layers off for easier viewing.

3. Alignment Association and Shapes

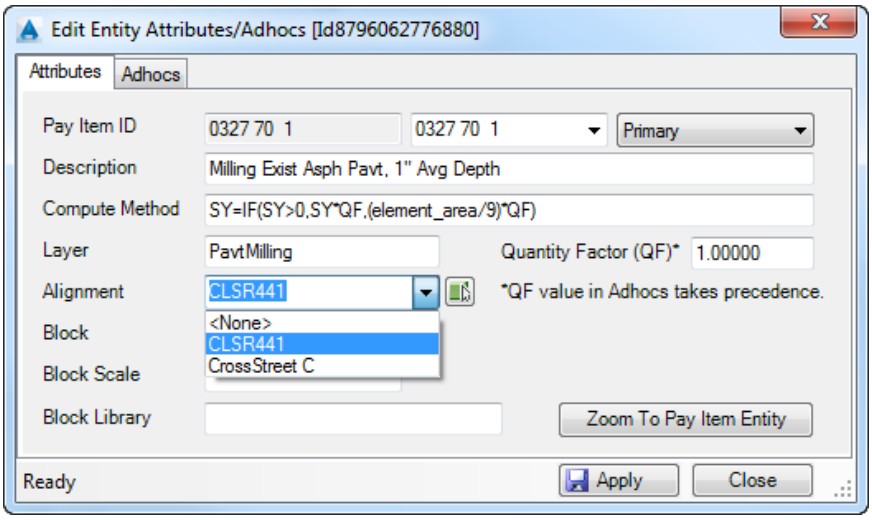
Up until now you have drawn shapes that were associated with the main alignment (CLSR441), but in this file you have another alignment called Cross Street C. Some of the shapes that were drawn need to be associated with this alignment, because if we run a report it will be based off of the main alignment and will not report station and offset correctly. The image below from EMX shows the 2 alignments and as you can tell there is nothing under the CrossStreet C.



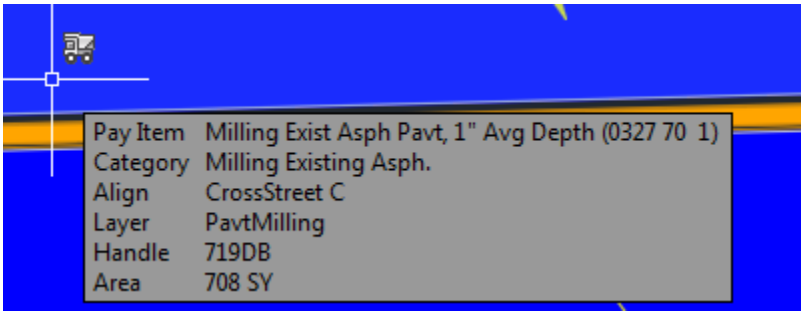
- Zoom to the Intersection and let's change the association of the two milling pavement hatches
- On EMX select the id icon and then select the eastern most milling hatch first < press enter
- Select the blue link on the PayItem Line as shown below



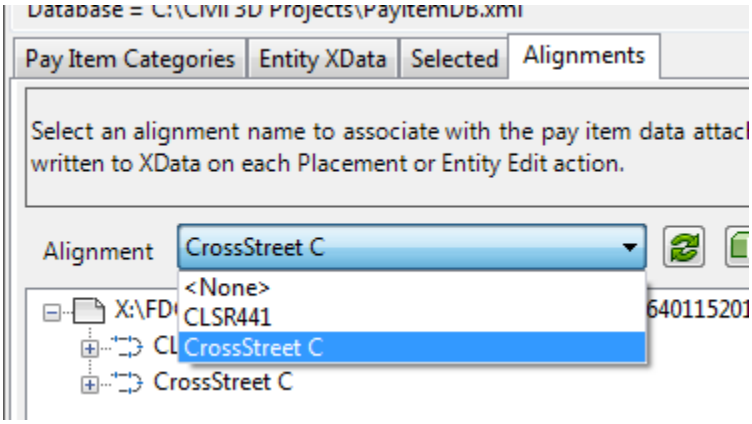
- The Edit Entity Attributes/Adhocs dialog opens < edit as shown below



- Edit the remaining 3 Milling shapes that are on the wrong alignment
- Hover over the Hatch to see the Xdata which also tells you the Alignment association



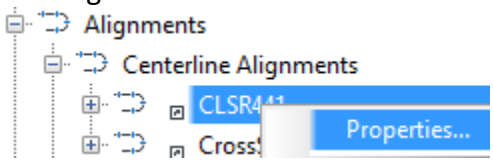
We could have avoided this snafu, but I wanted to show you how to edit the association. The proper way that you should operate is to set the correct Alignment before hatching as shown below from the Alignments tab on EMX.



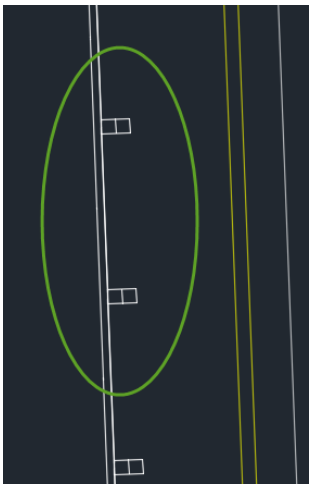
4. Drawing Lines With Pay Item Data

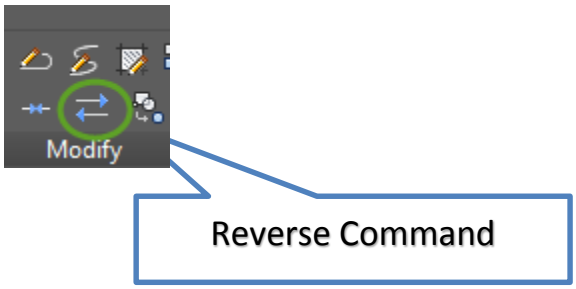
With EMX you can draw Lines under the influence of Pay Item Data which also will place them on the correct layer with the correct linetype. Staying in the current drawing for time saving purposes pan to clean area of the file to the North of the Asphalt Limits you just hatched. We are going to draw items different ways so you can get used to the methods.

- First on the prospector tab expand the alignments and right click on CLSR441 and select properties. Change the object style to FDOT Proposed so we can see the Alignment in the drawing

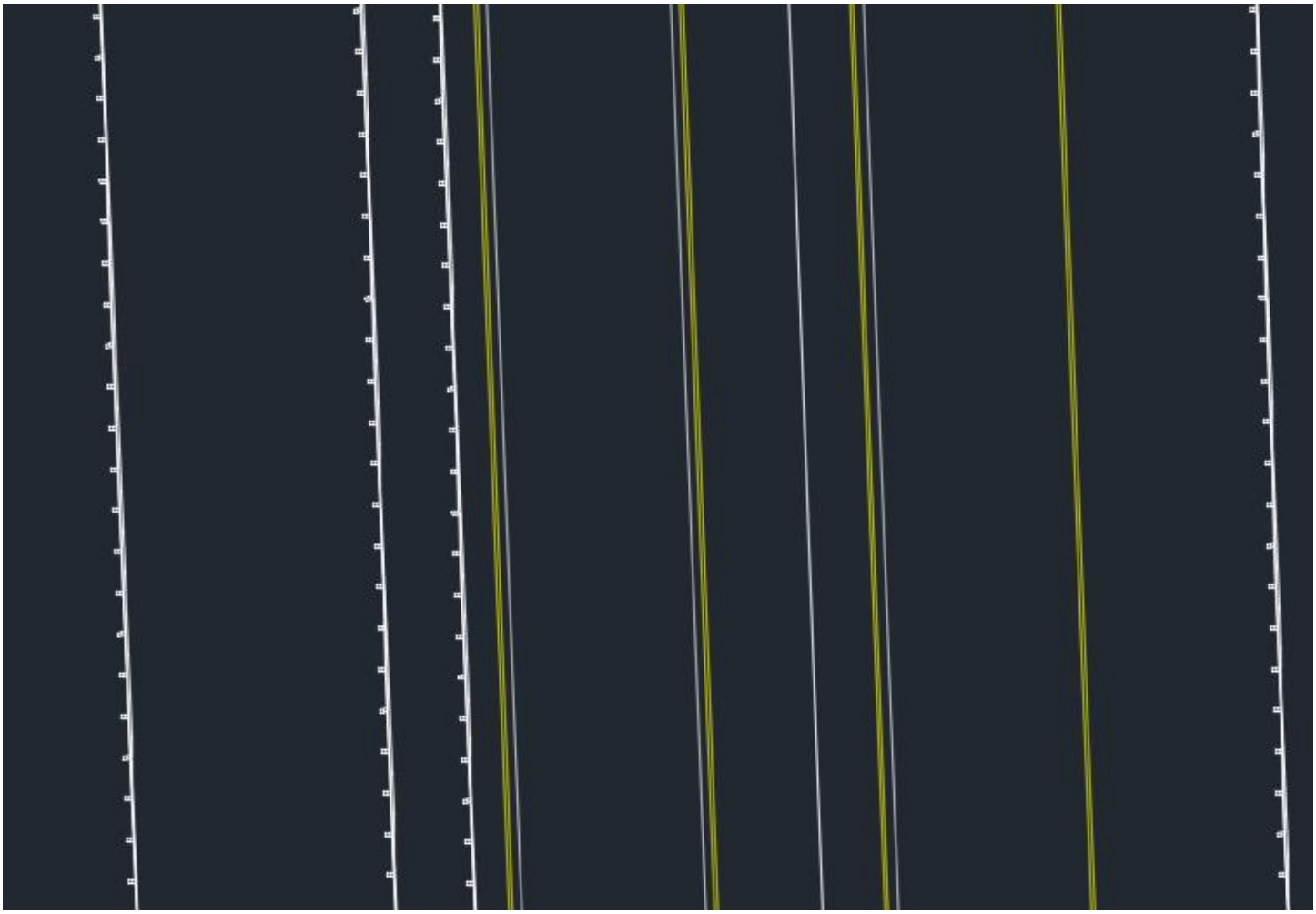


- Next Search for and select GuardrailLt (Guardrail Roadway Left) 0536 1 1
- **Freehand** - Using the EMX Polyline drawing tool draw a simple straight section on the left side outside of the pavement roughly 500'
- **Offset** – Select the Offset command from the drawing tools and zoom in to select the back of curb on the left side < enter 5' as the distance. Notice the preview of the guardrail as you move your mouse left and right of the source object < Left Click then hit enter to eliminate the temporary line. If you notice below the guardrail you just offset is facing the wrong way that is because the offset copies the direction of the source line, to fix this you can reverse this guardrail by using the "Reverse" command under the Modify pull down on the Home Ribbon



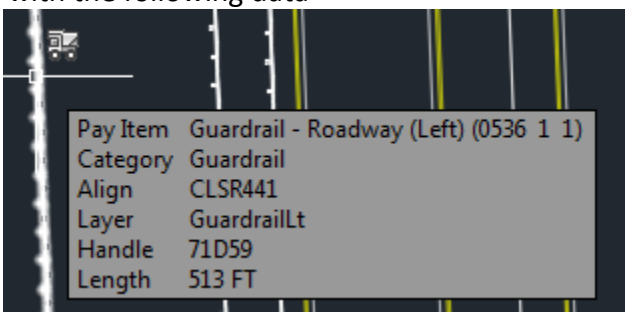


- **Precision** – Select and start the same drawing tool but this time select the Station/Offset Transparent command from the toolbar along the right side of your screen  < Select Alignment < Enter in 9200 for the station and -65 to start the PL on the left side. You can see a + symbol that marks the starting point for the P Line < Enter 9600 and -65 for the end point. You could continue if needed but in this case hit enter twice to exit the commands.
- **AutoCAD Drawn Only** – Keeping the same Guardrail selected use the AutoCAD Polyline **"PL"** command to draw the guardrail to the RIGHT of the pavement area. We will fix this later in the session. Your Drawing should now look similar to below.



5. Editing and Appending X-data to Line Work

Now we will fix that guardrail that we drew with AutoCAD. The Line type is correct but is contains no Entity X data (Pay Item Information). If you hover over any objects drawn or placed with EMX you will see a truck symbol with the following data



- Make sure you still have “Guardrail – Roadway Left” still selected < select the append data truck symbol from EMX < Select Object < hover over object to make sure it has X-Data < You may have to reverse the line to get the rail facing the right direction
- Pan back to the Asphalt and Sidewalk limits. Notice there are 2 lines visible – one representing Guardrail and the other one Hand Railing on the Sidewalk. You may have to zoom into the southern

end of the sidewalk to see the brown line. These lines were created from a corridor and are called feature lines. There are a lot of different feature line styles that reside in the state kit.

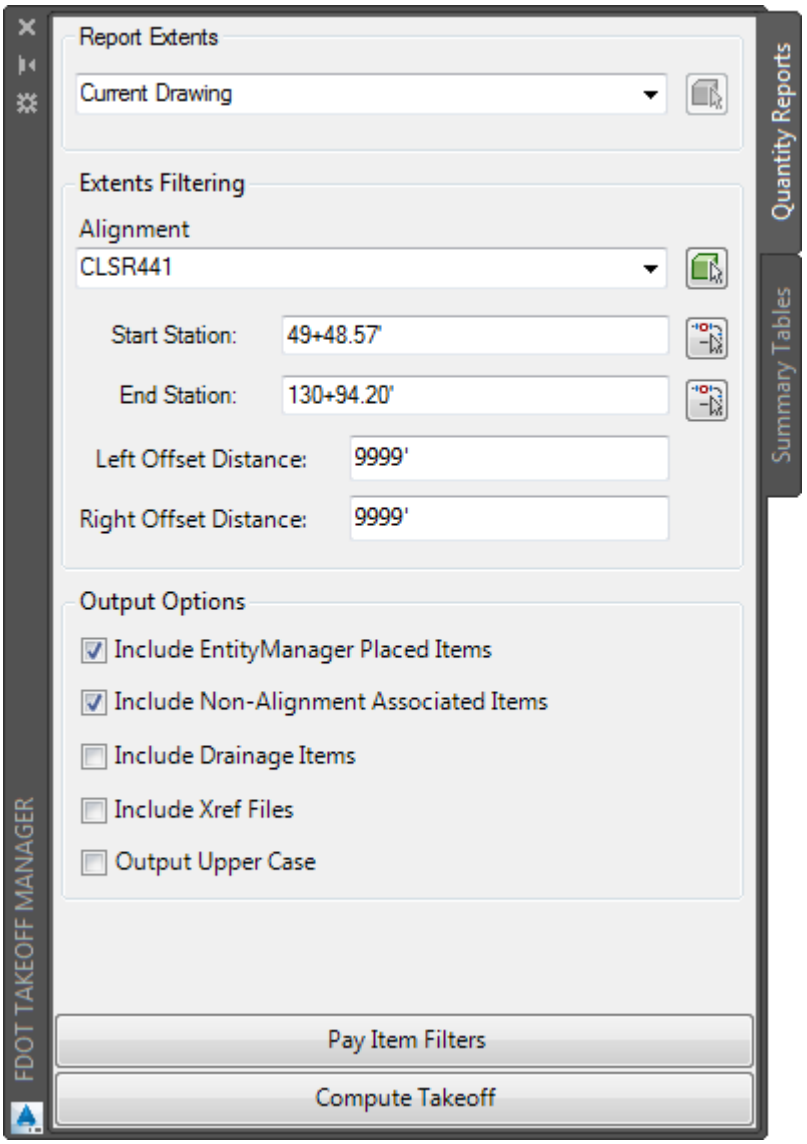
- Append the same guardrail selection to the guardrail
- Search for and select Pipe Handrail 0515 1 2 < Append it to the Brown line near the far side of the Sidewalk < Hover over the line to see the Xdata attached.

If you click the Railing it still retains its feature line association by the Contextual Menu that appears on the Ribbon. It also has the ability to maintain a dynamic relationship with the Corridor this particular one does not since we have moved it from the corridor source file.

Quantity Reporting

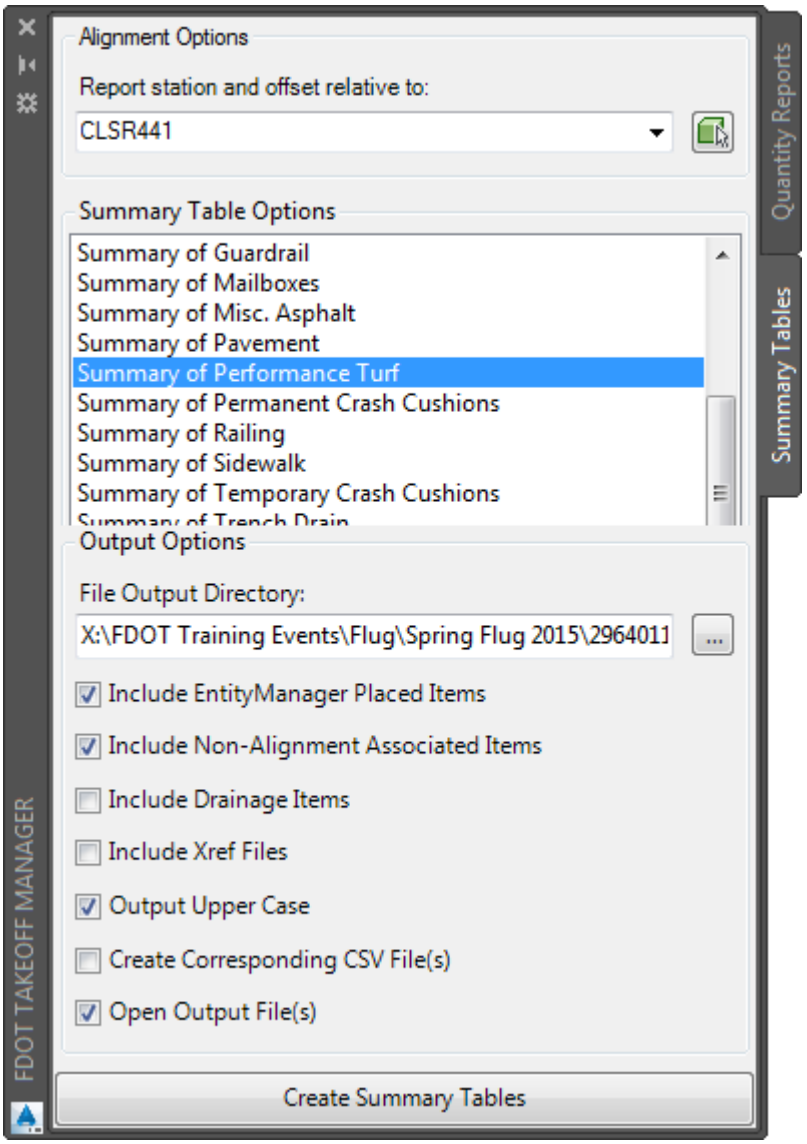
6. Using FDOT Takeoff Manager

- Launch FDOT Takeoff Manager from the FDOT Ribbon
- Match the diagram below and then press Compute Takeoff



The report has 3 different types with data. Browse between the types to see the Linear, Count, & Volume. Now let's switch to the Summary Tables Tab and run some automated reports.

- Match diagram below. Make sure you put all of the reports in your calculations folder in your project when you select the File Output Directory



- Press Create Summary Tables
- Spreadsheet should now open and contain only data under the 0570 1 2 column

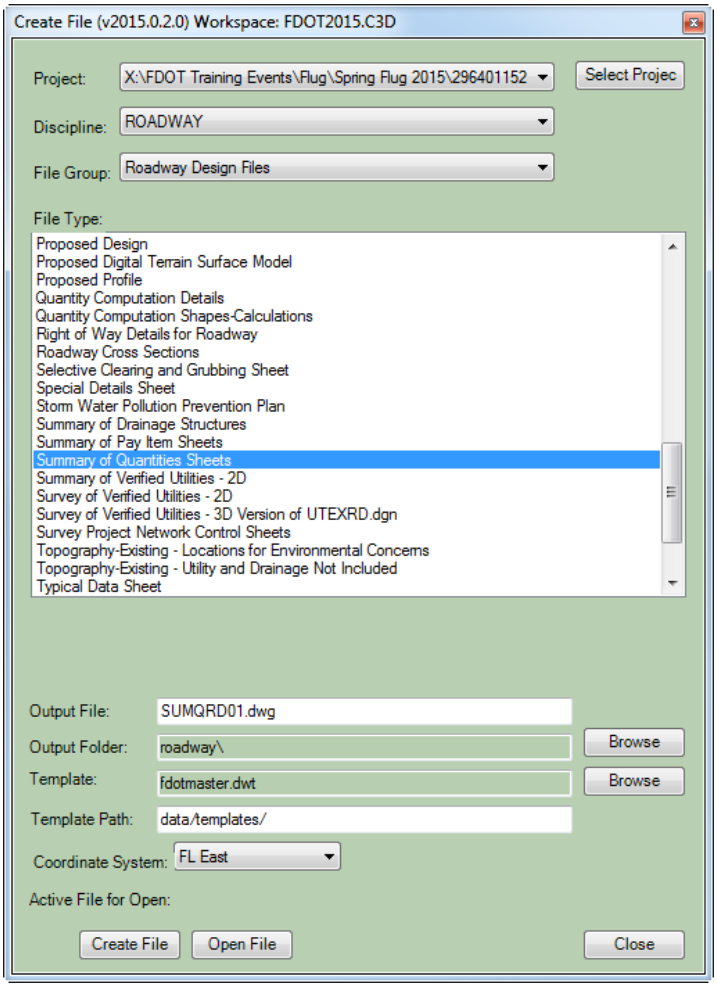
7. Editing and Linking Spreadsheet to Drawing File

- Delete all the columns in the spreadsheet that contain no data. Also delete about 20 Blank rolls to make sure it fits within an 11x17 sheet in the drawing file. The spreadsheet should look like below.

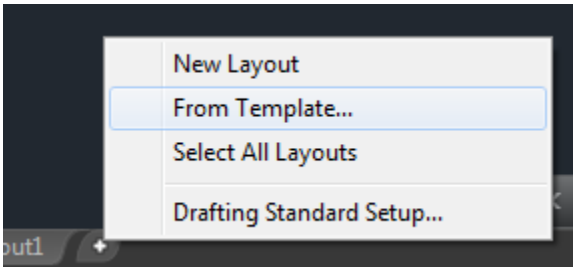
SUMMARY OF PERFORMANCE TURF

LOCATION STA. TO STA.			SIDE	AREA ID	LENGTH	WIDTH	PERFORMANCE TURF (SOD) 0570 1 2 SY P	PERFORMANCE TURF (SOD) 0570 1 2 SY F	DESIGN NOTES	CONSTRUCTION REMARKS
61+75.11	to	70+14.11	LT/RT	71BCE			2251.4			
74+44.58	to	74+61.23	RT	71B2B			336.3			
74+79.41	to	74+95.30	LT	71C70			336.3			
76+06.20	to	82+98.42	LT	71CB7			3441.1			
78+82.62	to	85+68.64	RT	71CC7			1932.4			
89+43.72	to	90+46.90	RT	71CD7			163.2			
89+50.54	to	91+19.11	LT	71CE7			555.9			
						SUB-TOTAL:	9016.5			
						TOTAL:	9017			

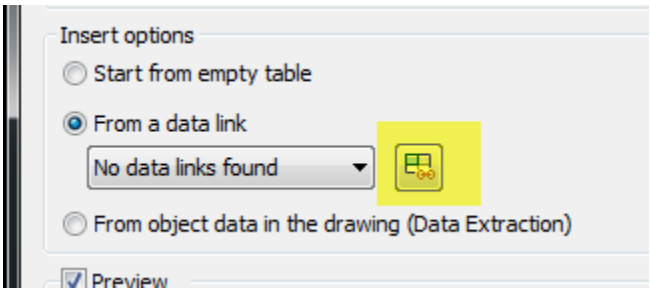
- Using Create File make the following file as shown below



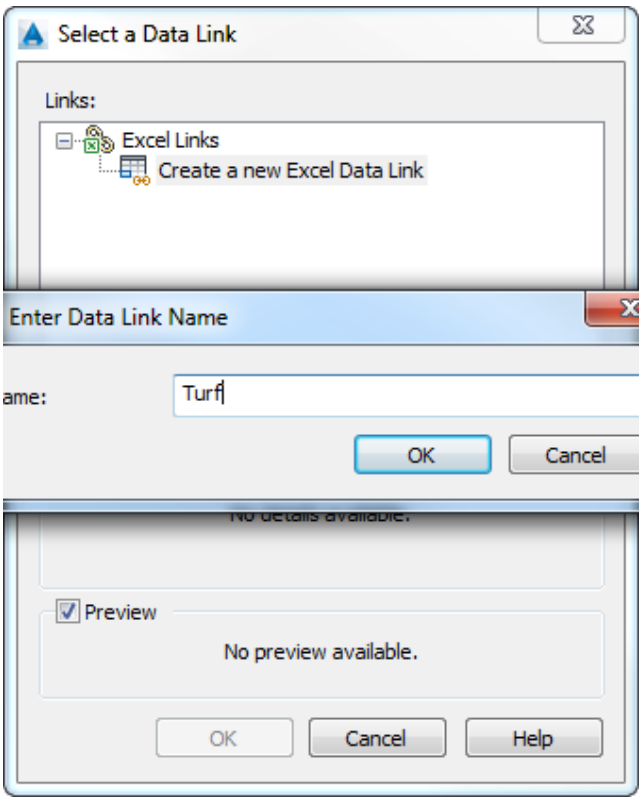
- Press Create File and wait until your screen is done processing before pressing Open File < Close Create File
- Right Click on the + symbol on the bottom of your layout tabs < Select From Template < Browse to the Roadway Folder in the Sheets Folder and select SHPLAN.dwt < Select 1 Scale from the list



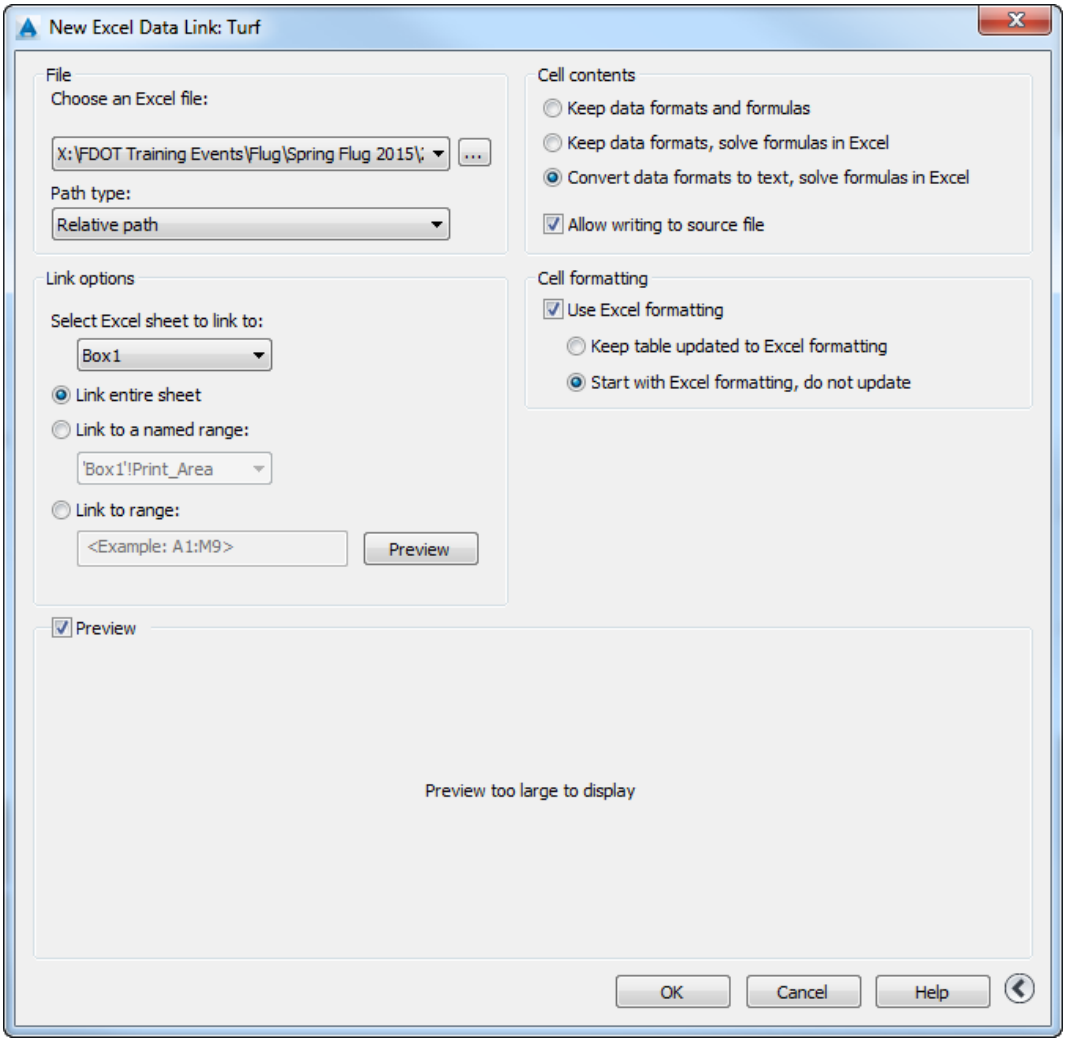
- Click on the new Layout < Delete the North Arrow < Right Click on the Name to Rename it to Turf
- From the FDOT Ribbon select "Table" < select "From a Data Link" and click "Data Link Manager" as highlighted below



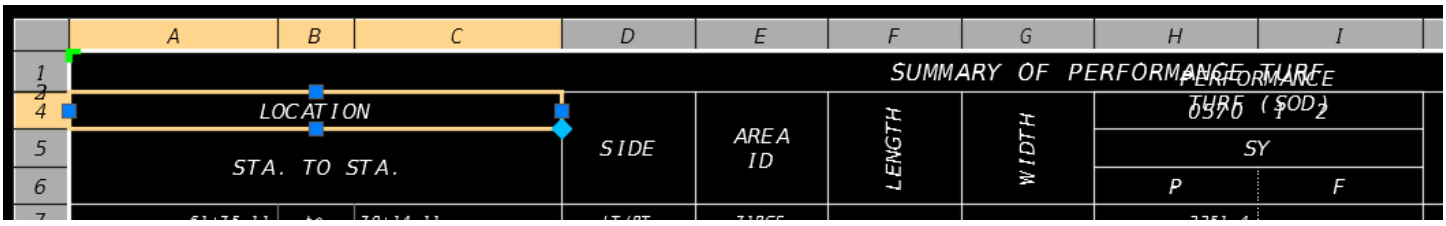
- Select Create a new link < Name it Turf < Select Ok



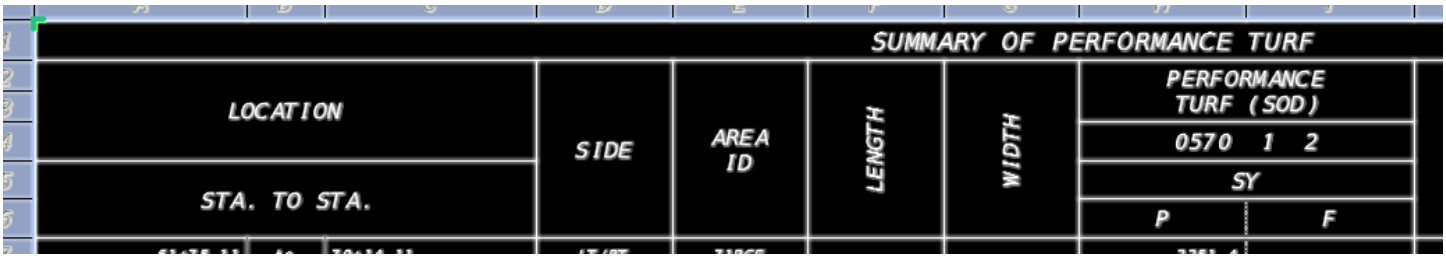
- Browse to your calculations folder and select the Summary of Turf Excel file that you created and modified. Match your selections with the diagram below



- Click Ok until all of the boxes close < Be patient and wait until you see the table connected to your cursor < Left click to place it in your sheet border
- Click inside the Location cell to grip edit the cell to expand it up to fix the Pay Item Column as seen below



Before



SUMMARY OF PERFORMANCE TURF						
LOCATION	SIDE	AREA ID	LENGTH	WIDTH	PERFORMANCE TURF (SOD)	
					0570 1 2	
STA. TO STA.					SY	
					P	F

After

It is important to note that all edits need to be done to the spreadsheet inside Excel before linking it to the Drawing file. All though the file is linked and will dynamically update inside the drawing some anomalies may occur with the formatting. It may be prudent if edits need to be made after the linking process to delete the link and re do the process outlined above.

A Print Preview of how the table will look is below

SUMMARY OF PERFORMANCE TURF								
LOCATION	SIDE	AREA ID	LENGTH	WIDTH	PERFORMANCE TURF (SOD)		DESIGN NOTES	CONSTRUCTION REMARKS
					0570 1 2			
STA. TO STA.					SY			
					P	F		
61+75.11 to 70+14.11	LT/RT	71BCE			2251.4			
74+44.58 to 74+61.23	RT	71B2B			336.3			
74+79.41 to 74+95.30	LT	71C70			336.3			
76+06.20 to 82+98.42	LT	71CB7			3441.1			
78+82.62 to 85+68.64	RT	71CC7			1932.4			
89+43.72 to 90+46.90	RT	71CD7			163.2			
89+50.54 to 91+19.11	LT	71CE7			555.9			
				SUB-TOTAL:	9016.5			
				TOTAL:	9017			

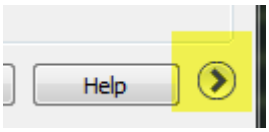
8. Linking Data to Pre-Formatted AutoCAD Tables

- Right Click on the Turf Layout and make a copy < Rename to PoleData < Delete the Summary of Turf Table in the Layout
- From the FDOT Ribbon select “Table” < Pull Down the Table Style menu and select Summary of Pole Data < Toggle all “Table Options” on < Left Click inside the top left corner of the sheet to place
- In your Calculations folder open Pole Data Uncut.xls

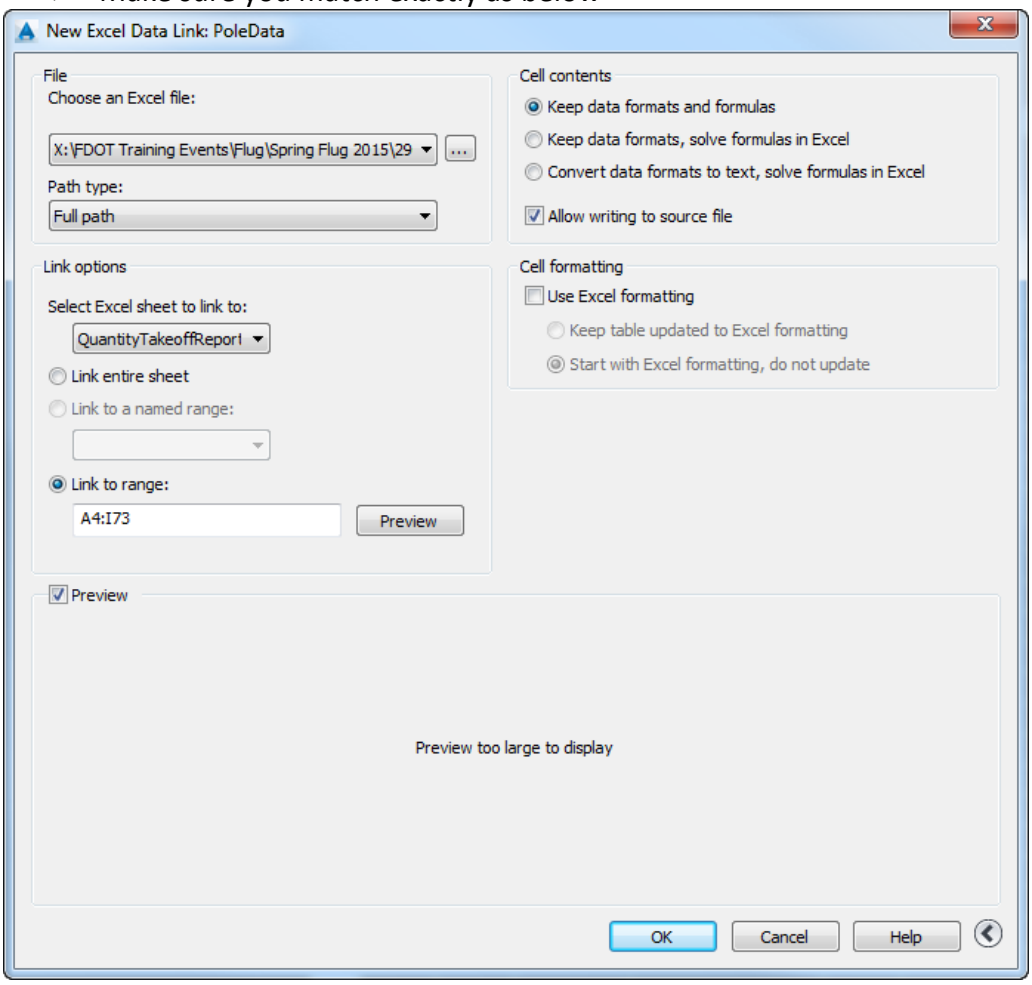
  This file has been formatted for the AutoCAD table. To see how the file looked before formatting open the Pole Data.xls in the same folder which was run from takeoff manager and saved as an excel file.

  Linking into an AutoCAD table is a little different in that you have to know the Cell Range if data you need. This particular table we will be using a cell range from A4 to I73.

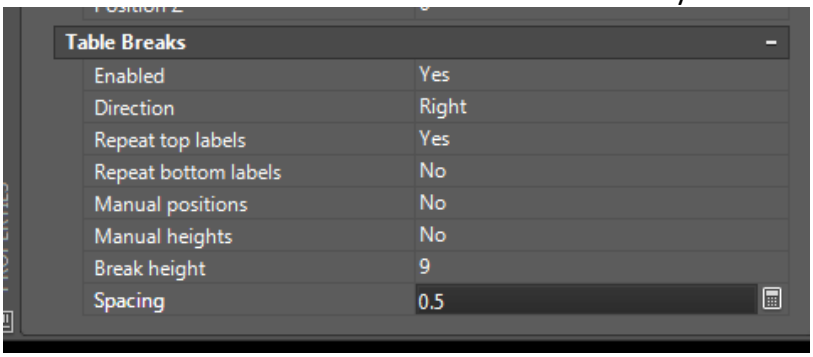
- Close the excel file and go back to the drawing file in the PoleData Layout
- Click in the first cell where data will go in the Table (A5)
- Click “Link Cell” from the ribbon
- Create a new Excel Link and name it PoleData
- Browse to the Pole Data Uncut.xls file



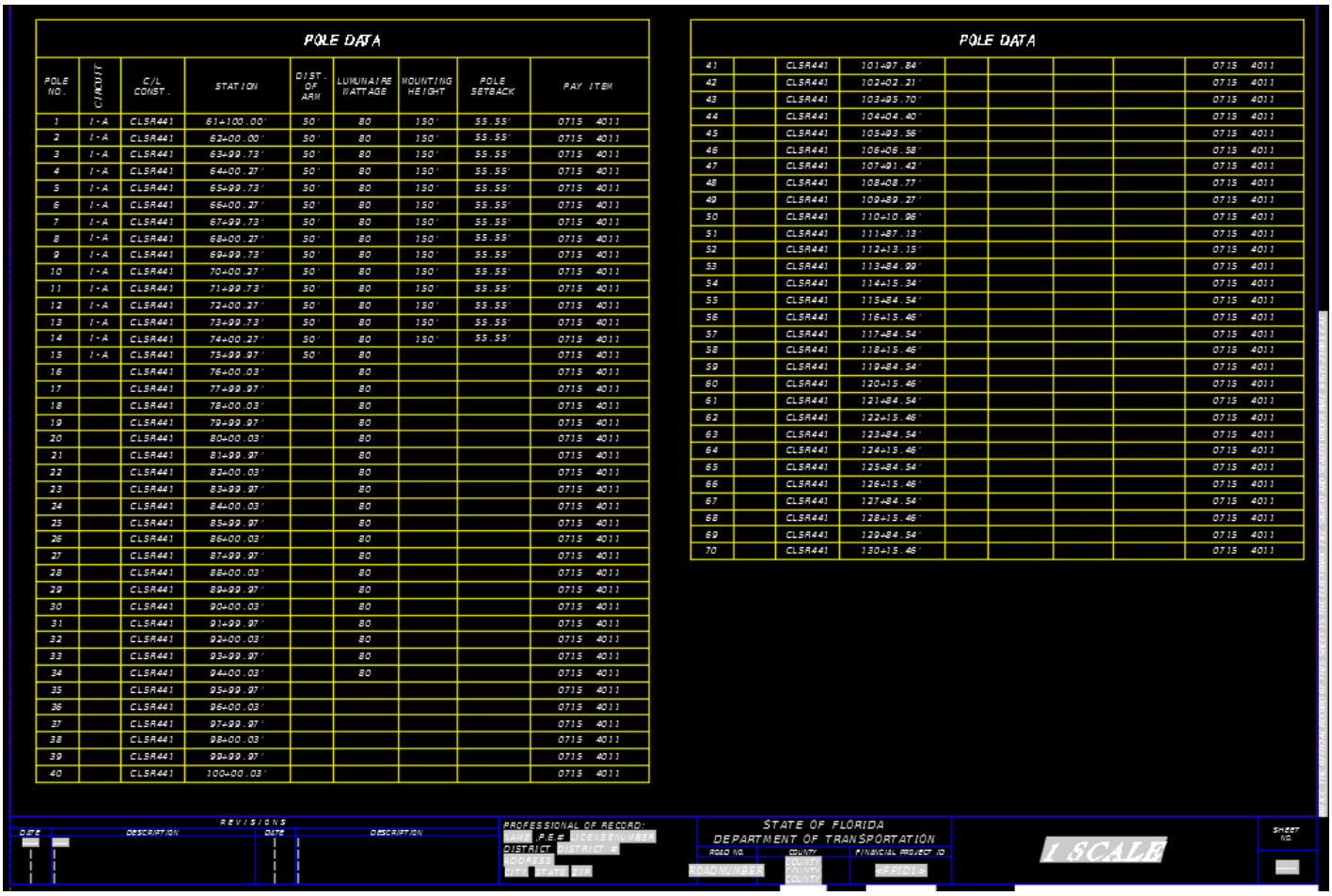
- Expand the DLM dialog to see all the options
- Make sure you match exactly as below



- Click Ok until all boxes go away
- Your table should fill in < Zoom out to see that the Table extends outside your border on the bottom
- Click the border of the Table being careful not to click inside a cell < Right Click Select Properties
- You can break the table so it will fit in the sheet. Play around with the settings to get acclimated.



Your drawing should resemble the diagram below



POLE DATA

POLE NO.	CIRCUIT	C/L CONST.	STATION	DIST. OF ARM	LUMINAIRE WATTAGE	MOUNTING HEIGHT	POLE SETBACK	PAY ITEM
1	1-A	CLSR441	61+100.00'	50'	80	150'	55.55'	0715 4011
2	1-A	CLSR441	62+00.00'	50'	80	150'	55.55'	0715 4011
3	1-A	CLSR441	63+99.73'	50'	80	150'	55.55'	0715 4011
4	1-A	CLSR441	64+00.27'	50'	80	150'	55.55'	0715 4011
5	1-A	CLSR441	65+99.73'	50'	80	150'	55.55'	0715 4011
6	1-A	CLSR441	66+00.27'	50'	80	150'	55.55'	0715 4011
7	1-A	CLSR441	67+99.73'	50'	80	150'	55.55'	0715 4011
8	1-A	CLSR441	68+00.27'	50'	80	150'	55.55'	0715 4011
9	1-A	CLSR441	69+99.73'	50'	80	150'	55.55'	0715 4011
10	1-A	CLSR441	70+00.27'	50'	80	150'	55.55'	0715 4011
11	1-A	CLSR441	71+99.73'	50'	80	150'	55.55'	0715 4011
12	1-A	CLSR441	72+00.27'	50'	80	150'	55.55'	0715 4011
13	1-A	CLSR441	73+99.73'	50'	80	150'	55.55'	0715 4011
14	1-A	CLSR441	74+00.27'	50'	80	150'	55.55'	0715 4011
15	1-A	CLSR441	75+99.97'	50'	80			0715 4011
16		CLSR441	76+00.03'		80			0715 4011
17		CLSR441	77+99.97'		80			0715 4011
18		CLSR441	78+00.03'		80			0715 4011
19		CLSR441	79+99.97'		80			0715 4011
20		CLSR441	80+00.03'		80			0715 4011
21		CLSR441	81+99.97'		80			0715 4011
22		CLSR441	82+00.03'		80			0715 4011
23		CLSR441	83+99.97'		80			0715 4011
24		CLSR441	84+00.03'		80			0715 4011
25		CLSR441	85+99.97'		80			0715 4011
26		CLSR441	86+00.03'		80			0715 4011
27		CLSR441	87+99.97'		80			0715 4011
28		CLSR441	88+00.03'		80			0715 4011
29		CLSR441	89+99.97'		80			0715 4011
30		CLSR441	90+00.03'		80			0715 4011
31		CLSR441	91+99.97'		80			0715 4011
32		CLSR441	92+00.03'		80			0715 4011
33		CLSR441	93+99.97'		80			0715 4011
34		CLSR441	94+00.03'		80			0715 4011
35		CLSR441	95+99.97'					0715 4011
36		CLSR441	96+00.03'					0715 4011
37		CLSR441	97+99.97'					0715 4011
38		CLSR441	98+00.03'					0715 4011
39		CLSR441	99+99.97'					0715 4011
40		CLSR441	100+00.03'					0715 4011

POLE DATA

41		CLSR441	101+97.84'					0715 4011
42		CLSR441	102+02.21'					0715 4011
43		CLSR441	103+95.70'					0715 4011
44		CLSR441	104+04.40'					0715 4011
45		CLSR441	105+93.56'					0715 4011
46		CLSR441	106+06.58'					0715 4011
47		CLSR441	107+91.42'					0715 4011
48		CLSR441	108+08.77'					0715 4011
49		CLSR441	109+89.27'					0715 4011
50		CLSR441	110+10.95'					0715 4011
51		CLSR441	111+87.13'					0715 4011
52		CLSR441	112+13.15'					0715 4011
53		CLSR441	113+84.99'					0715 4011
54		CLSR441	114+15.34'					0715 4011
55		CLSR441	115+84.54'					0715 4011
56		CLSR441	116+15.46'					0715 4011
57		CLSR441	117+84.54'					0715 4011
58		CLSR441	118+15.46'					0715 4011
59		CLSR441	119+84.54'					0715 4011
60		CLSR441	120+15.46'					0715 4011
61		CLSR441	121+84.54'					0715 4011
62		CLSR441	122+15.46'					0715 4011
63		CLSR441	123+84.54'					0715 4011
64		CLSR441	124+15.46'					0715 4011
65		CLSR441	125+84.54'					0715 4011
66		CLSR441	126+15.46'					0715 4011
67		CLSR441	127+84.54'					0715 4011
68		CLSR441	128+15.46'					0715 4011
69		CLSR441	129+84.54'					0715 4011
70		CLSR441	130+15.46'					0715 4011

REVISIONS
DATE | DESCRIPTION | DATE | DESCRIPTION

PROFESSIONAL OF RECORD:
NAME, P.E.# LICENSE NUMBER
DISTRICT DIVISION
ADDRESS
CITY STATE ZIP

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ROAD NO. COUNTY FINANCIAL PROJECT ID
ROAD NUMBER COUNTY COUNTY COUNTY
PROJECT

SCALE

SHEET NO.

Open the Pole Data Uncut.xls and add more data to some of the columns and save the file then go back to the drawing file and update the link to see the table update.

It's always a good practice to run the QC Quick Check from the FDOT Ribbon when construction lines have been used for your design. Run it now to see if any non-standard errors are present. Right Click on one of the errors (if present) and "Zoom To" to correct.

-End-