Florida Department of
TRANSPORTATION

Earthwork Records System (ERS) Plot Plans Reading for ESB and Drainage

March 28, 2023

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What is needed from the Plans for Drainage Plots?

- Flow Line
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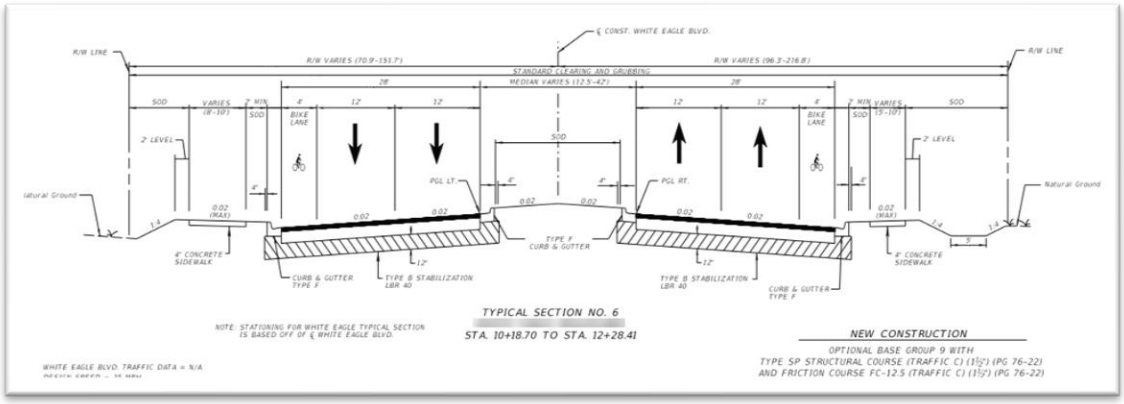
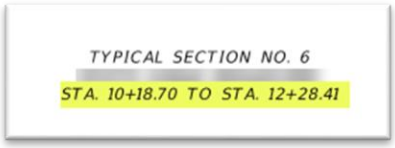
- Structure Slab Thickness
- Pipe Length
- Pipe Size
- Type of Pipe

Chapter 1 – ESB Plot Information from the Plans

A. Typical Section

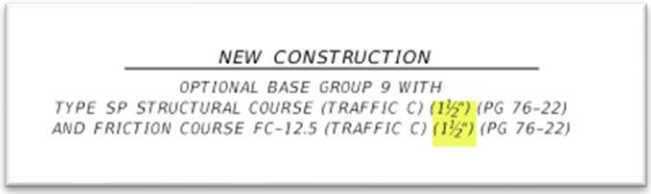


1. Station Limits

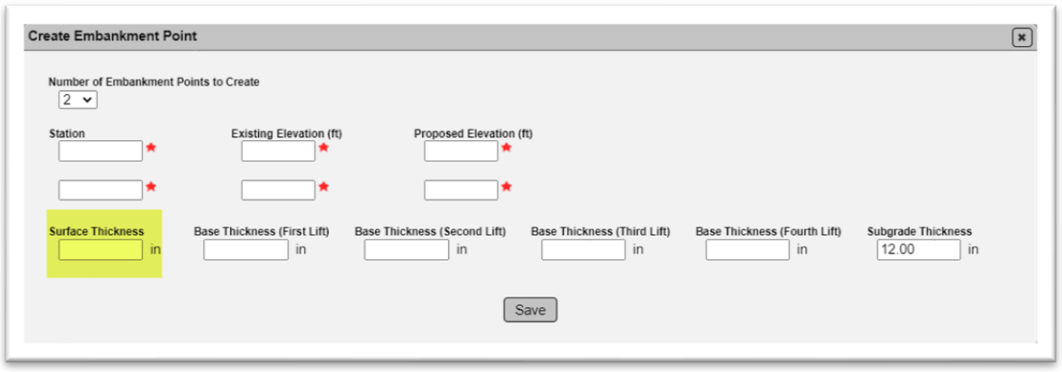


The station limits are needed to determine the areas that will have the same surface, base, and subgrade thicknesses and to plot the logbooks.

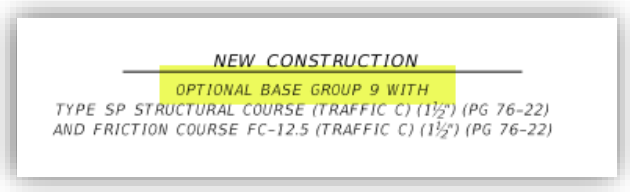
2. Surface Thickness



This value comes from adding the thickness of the structural course and the friction course together. For this typical section it is 1 ½ + 1 ½ = 3.



3. Base Thickness



This comes from two places – the typical section and the Specifications. Also, you need to know which optional base option the Contractor selected. In the beginning one can assume the base as limerock (which is the most commonly used base) to start the plotting process.

Specifications Section 285 has a table with the base group options and thicknesses.

Table 285-1: Optional Base Groups 1 through 7

Base Materials	Base Group (Base Group Pay Item)						
	1 (701)	2 (702)	3 (703)	4 (704)	5 (705)	6 (706)	7 (707)
Limerock, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Cemented Coquina, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Shell Rock, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Bank Run Shell, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Recycled Concrete Aggregate, LBR 150(1)	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Graded Aggregate Base, LBR 100	4-1/2"	5-1/2"	6-1/2"	7-1/2"	8-1/2"	9"	10"
Type B-12.5	4"(3)	4"(3)	4"(3)	4"(3)	4-1/2"	5"	5-1/2"
B-12.5 and 4" Granular Subbase, LBR 100 (2)	-	-	-	-	-	-	-
RAP Base (4)	5"(4)	-	-	-	-	-	-

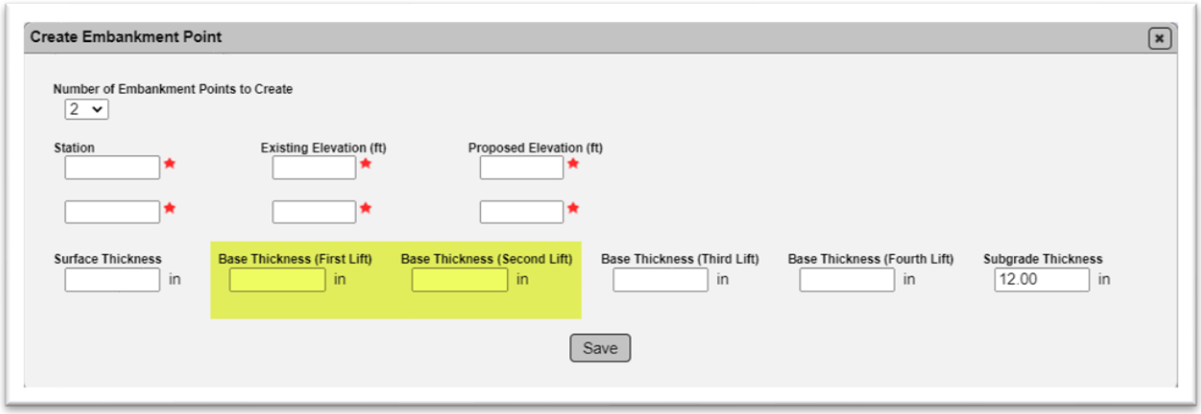
(1) Do not use on interstate roadways.
(2) The construction of both the subbase and Type B-12.5 will be bid and used as Optional Base. Granular subbases include limerock, cemented coquina, shell rock, bank run shell, recycled concrete aggregate and graded aggregate base. All subbase thicknesses are 4" minimum prior to adding the required prime coat.
(3) Based on minimum practical thickness.
(4) Only for use on non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications.
(5) To be used for widening, three feet or less.

Table 285-1(continued): Optional Base Groups 8 through 15

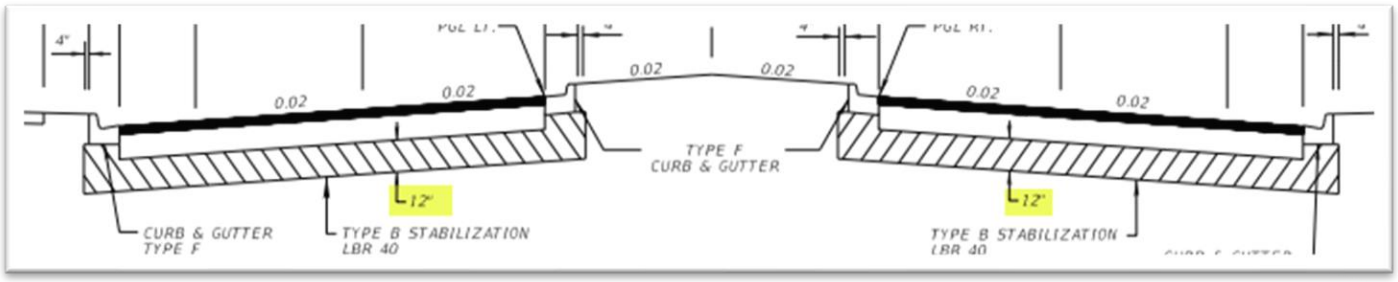
Base Materials	Base Group (Base Group Pay Item)							
	8 (708)	9 (709)	10 (710)	11 (711)	12 (712)	13 (713)	14 (714)	15 (715)
Limerock, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2"(5)	14"(5)	-
Cemented Coquina, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2"(5)	14"(5)	-
Shell Rock, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2"(5)	14"(5)	-
Bank Run Shell, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2"(5)	14(5)	-
Recycled Concrete Aggregate, LBR 150 (1)	9-1/2"	10"	11"	12"	12-1/2"	13-1/2"(5)	14"(5)	-
Graded Aggregate Base, LBR 100	11"	12"	13"	14"	-	-	-	-
Type B-12.5	5-1/2"	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"
B-12.5 and 4" Granular Subbase, LBR 100 (2)	-	4"	4-1/2"	5"	5-1/2"	6"	6-1/2"	7"

For example, if the Typical Section says it's Base Group 9 then the options for thicknesses are 10", 12", 6" and 4" as shown in the highlighted portion of the picture above. If the contractor selected the limerock option, the base thickness would be a total of 10".

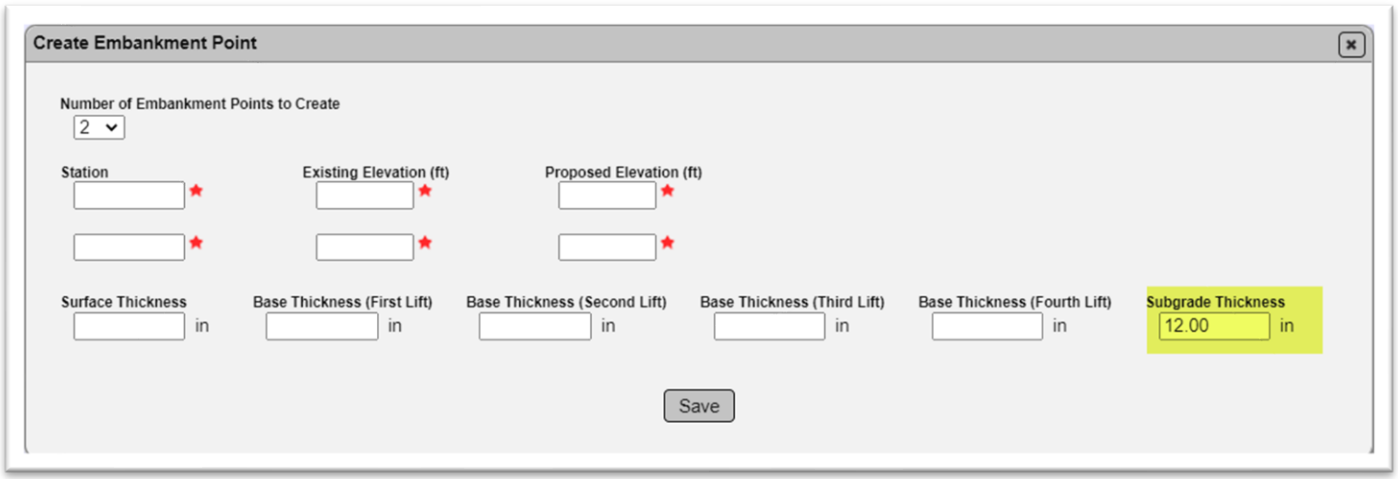
In MAC, this total thickness would be indicated by entering the individual lift thicknesses that add up to this value; either a 6” lift and a 4” lift or two 5” lifts.



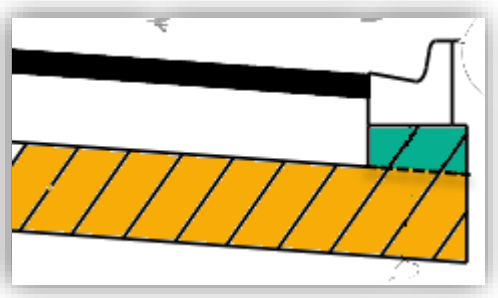
4. Stabilizing Thickness

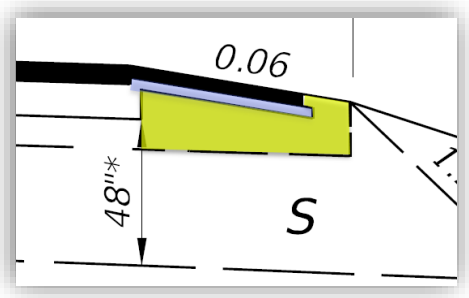


The stabilizing thickness is shown on the typical section diagram. It is almost always 12”. Check the typical section to ensure this is the correct thickness.



5. Sidewalk and Subgrade Pads



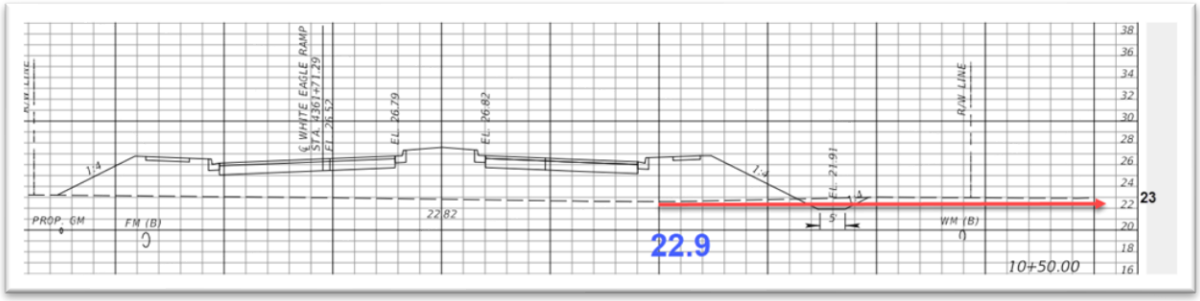


When subgrade and/or base directly under the shoulder, sidewalk, or driveway is not constructed at the same time as the mainline subgrade and/or base as represented on the ESB plot, then the padded portion is plotted as a separate entry. The schematic shown above on the left, the orange represents the subgrade that is included in an ESB plot. The area in green represents a subgrade pad that can't be constructed at the same time as the area in orange. The schematic shown above on the right represents areas of pad that may have been constructed separately from the mainline construction.

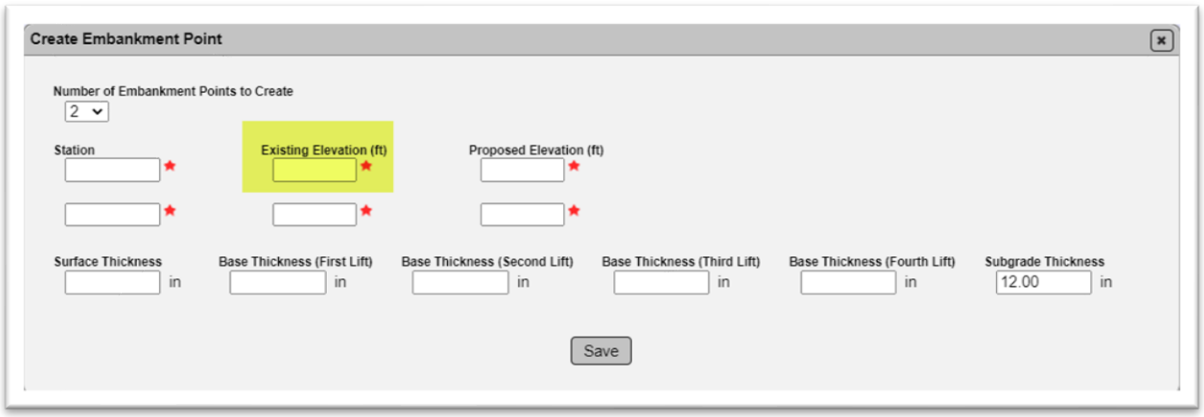
B. Cross Sections

The information needed from the cross sections are elevations.

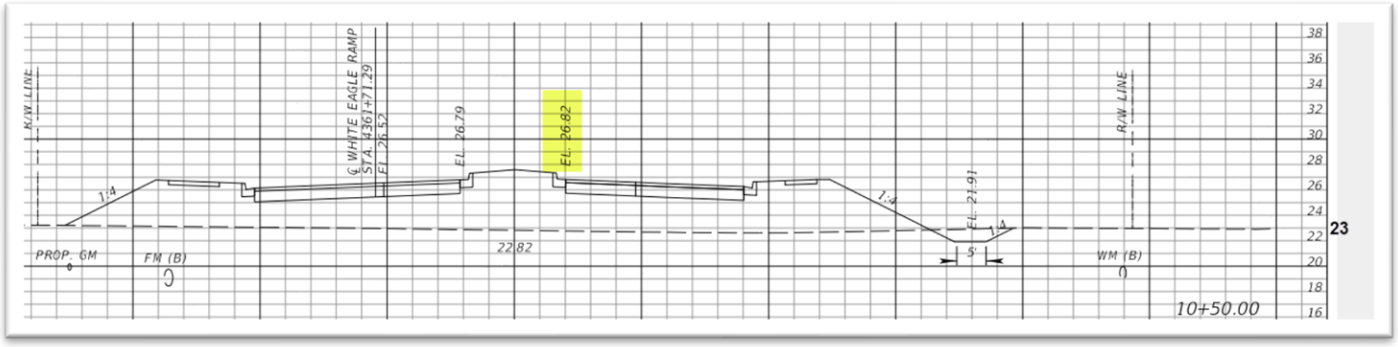
1. Existing Elevation



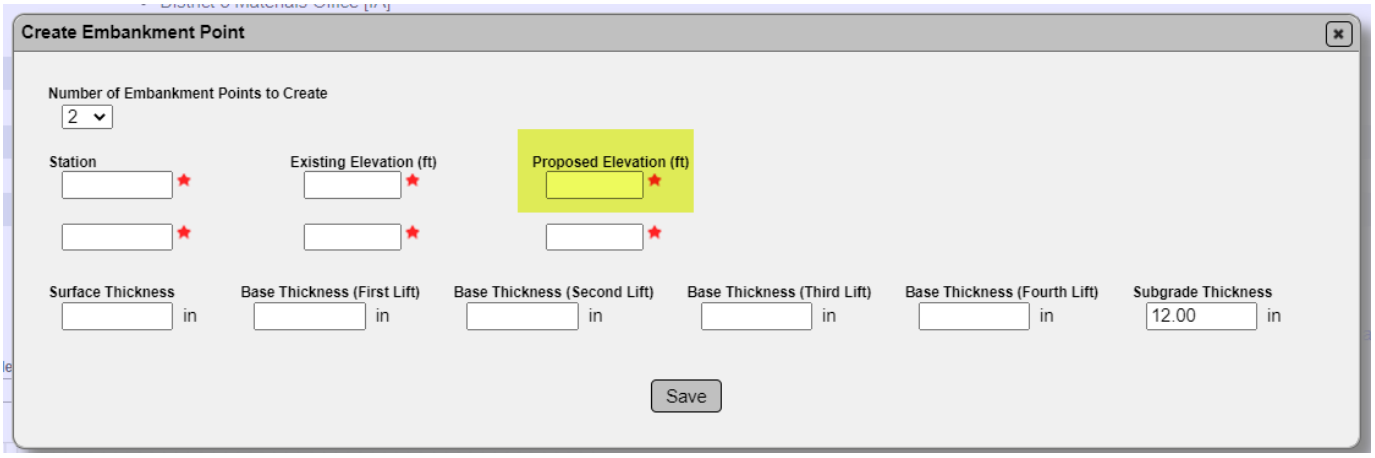
The existing elevation is the *lowest point* across a cross section within a 1:2 control line for a fill section. For cut sections, the existing elevation is the *highest point* within a 1:2 control line. This value is not given. It must be located by selecting the lowest/highest point in the diagram and then scaling to the elevation on the cross section.



2. Proposed Elevation



The proposed elevation on a cross section within a 1:2 control line in most cases is given, but if it is not, scale the elevation from the cross section. The value represents the highest proposed elevation of the finished pavement.



C. Retaining Wall Steps

There are several locations in the plans and shop drawings that are needed to find the data for retaining wall steps.

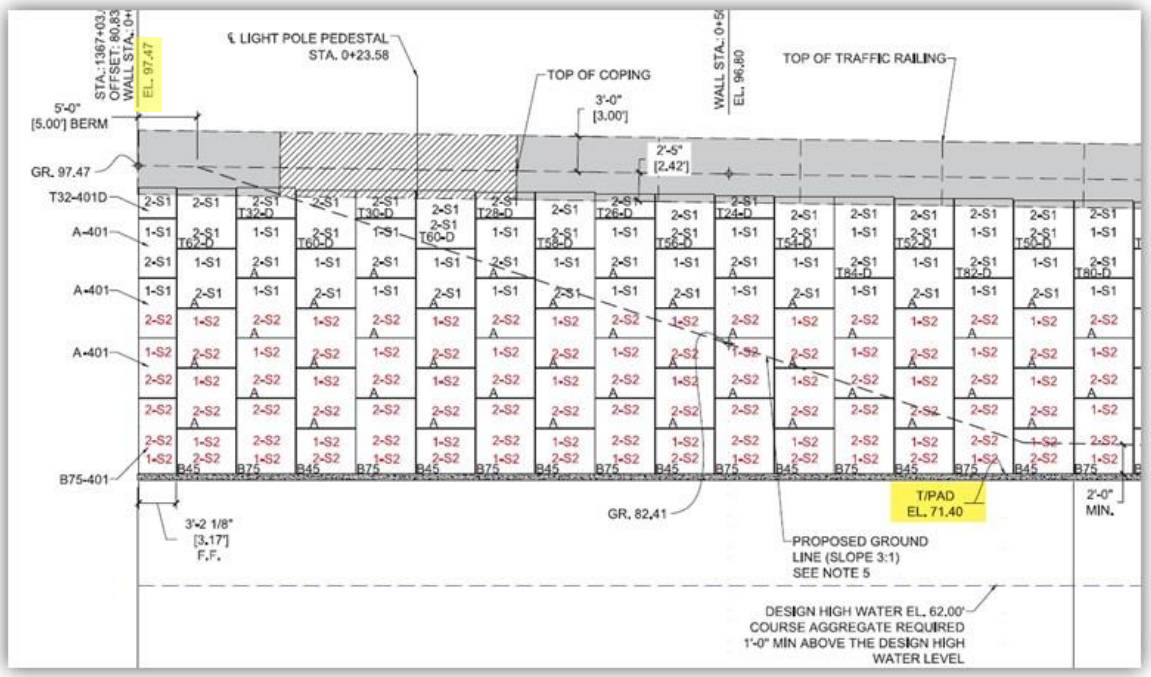
1. Typical Section

You may need some of the same data needed as described in A. Typical Section.

2. Cross Sections

You may need some of the same data needed as described in B. Cross Sections, except that the existing elevation and top of elevation comes from the Wall Shop Drawings.

3. MSE Wall Shop Drawings



i. Obtain top and bottom elevation from the MSE wall shop drawings.

4. Embankment Points

When step lines are needed, new points may be needed for existing elevations for the step lines to be plotted correctly. For example, if you have embankment points at 100+00, 101+00, 102+00, 103+00, 104+00 and 105+00 and steps at 101+35, 101+65, 101+95 and 102+25; you will need to determine the existing and proposed elevations at these locations. If you do not have data points, they may need to be interpolated from existing points taken off the cross sections and MSE wall shop drawings.

Chapter 2 – Drainage Plot Information from the Plans

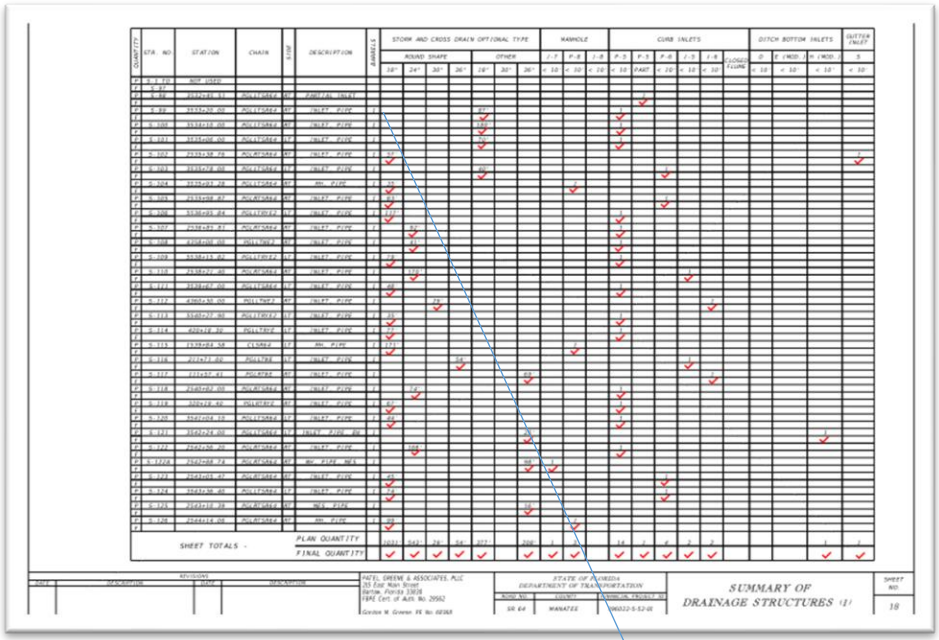
A. Contractor Pipe Option Selected (Pipe Type)

The options that are allowed by Specification Section 430 are:

- 430-7 Specific Requirements for Concrete Pipe
- 430-8 Specific Requirements for Corrugated Metal Pipe
- 430-9 Specific Requirements for Steel Reinforced Polyethylene Ribbed Pipe, Corrugated High-Density Polyethylene Pipe, Polypropylene Pipe, and Polyvinyl Chloride (PVC) Pipe

The Plans may include more details, such as designating a type of pipe that must be used.

B. Length and Size of Pipe

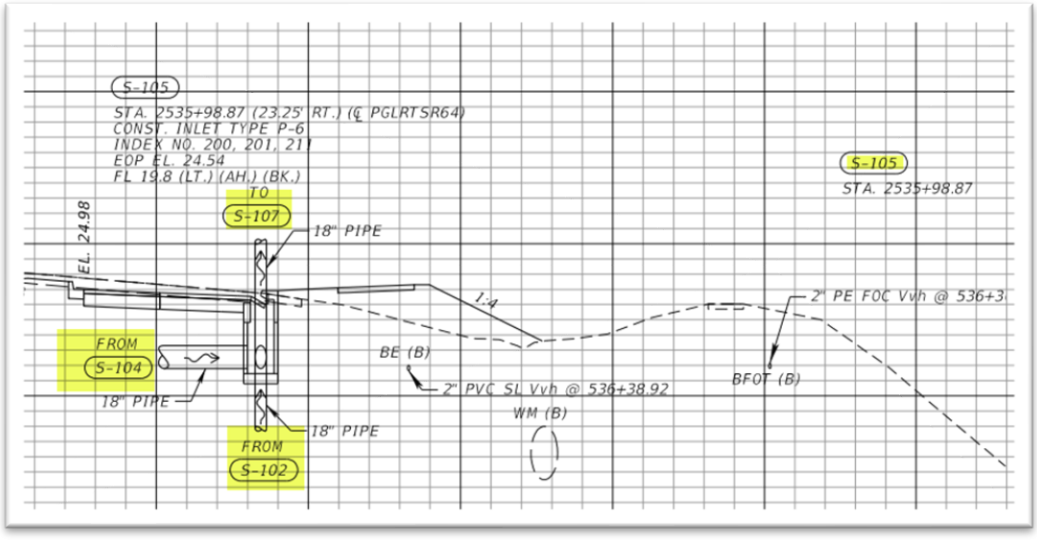


QUANTITY	STR. NO.	STATION	CHAIN	SIDE	DESCRIPTION	BARRELS	STORM AND ROUND	
							18"	24"
P	S-1 TO	NOT USED						
F	S-97							
P	S-98	3532+45.51	PGLLTSR64	RT.	PARTIAL INLET			
F								
P	S-99	3533+20.00	PGLLTSR64	RT.	INLET, PIPE	1		
F								
P	S-100	3534+10.00	PGLLTSR64	RT.	INLET, PIPE	1		
F								
P	S-101	3535+06.00	PGLLTSR64	LT.	INLET, PIPE	1		
F								
P	S-102	2535+38.76	PGLRTSR64	RT.	INLET, PIPE	1	57'	
F								
P	S-103	3535+78.00	PGLLTSR64	LT.	INLET, PIPE	1		

The pipe length and size can be found in the summary of drainage structures.

C. Direction of Pipe (Beginning and Ending of the Pipe Run)

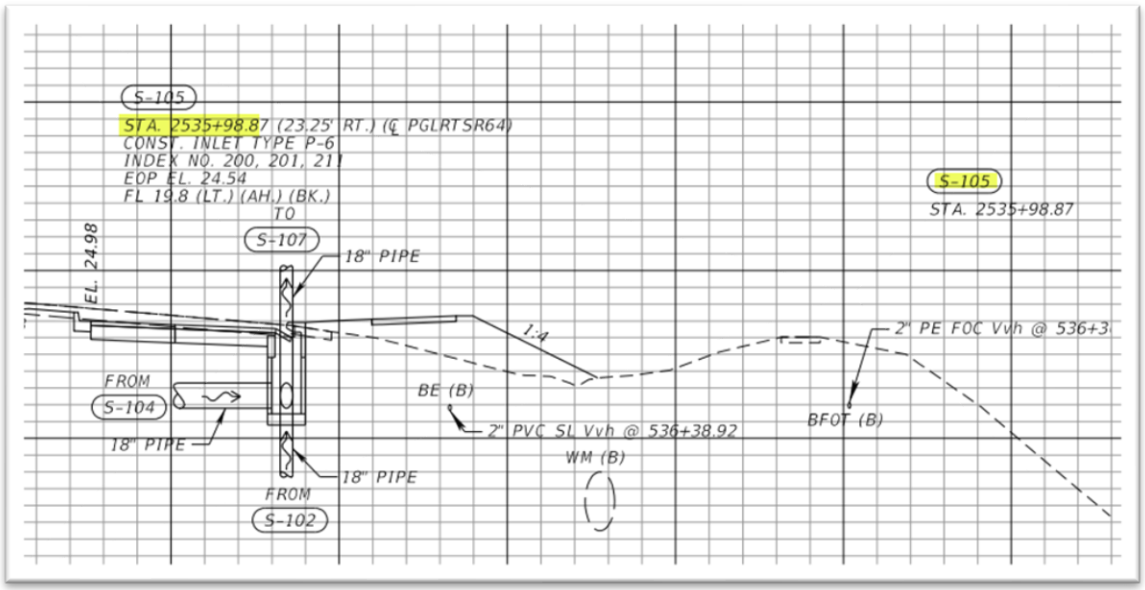
Structures can have more than one pipe run connected to the structure. You can find the specific direction of the pipe run on the Drainage Structure Sheets. You'll need to know the beginning and ending of the pipe run.



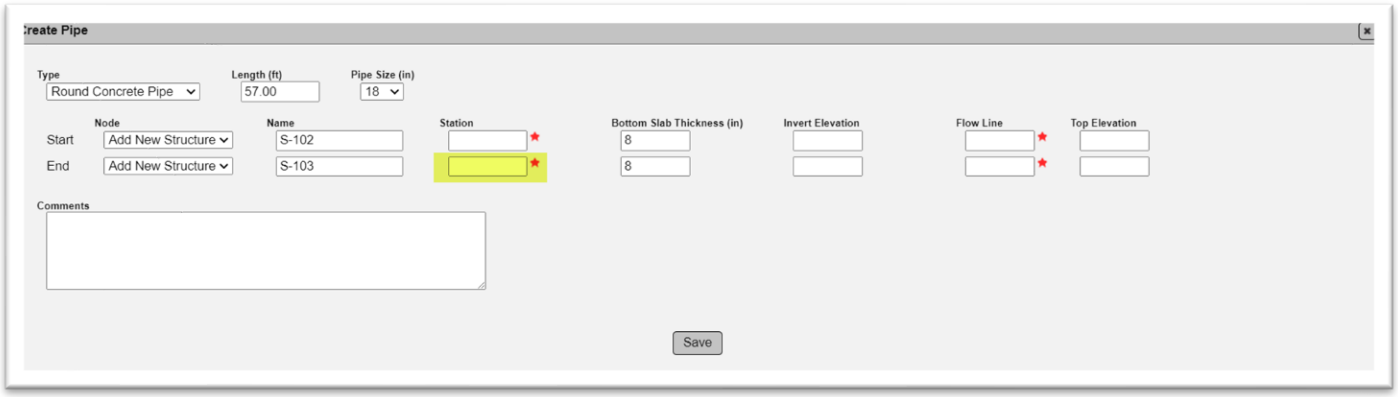
This structure has three other structures connected to it so it would need 3 pipe runs:

- S-105 – S-107
- S-104 – S-105
- S-102 – S-105

D. Structure Station

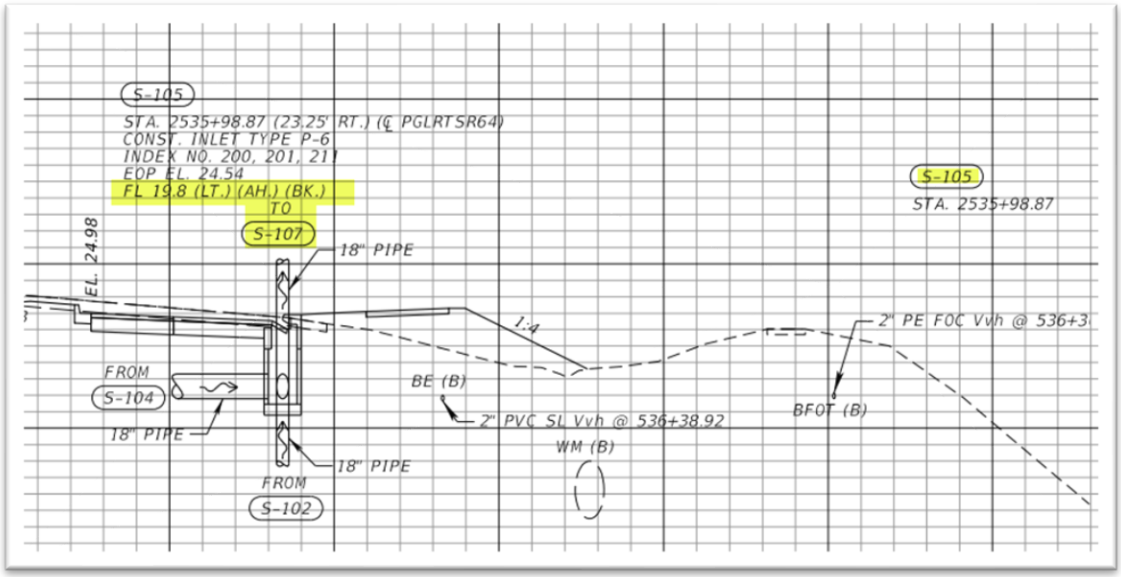


There are several places in the plans where the structure station can be found.



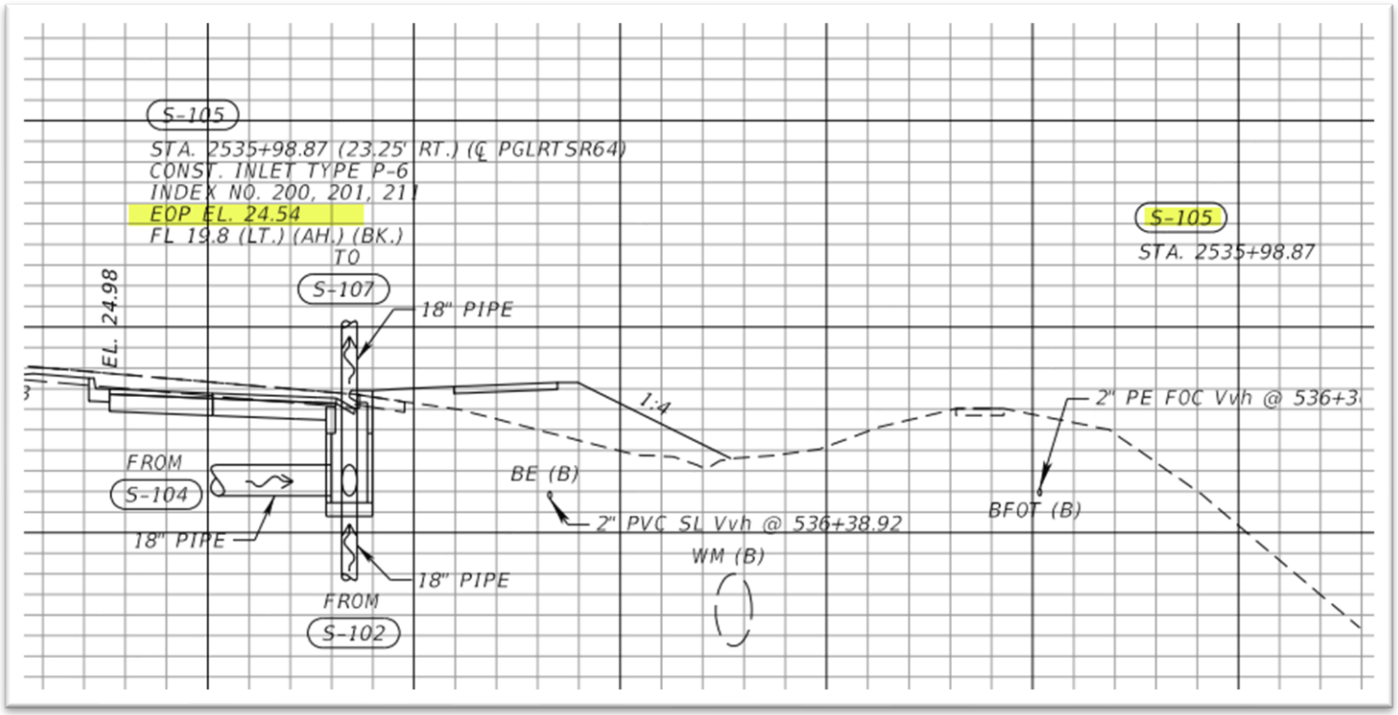
NOTE: When a pipe run has structures on different survey lines; for example, one of the structure's station is from the centerline of the main roadway and the other structure station is from the centerline of a side road; enter the stations in order with the smallest station first.

E. Flow Line Elevation



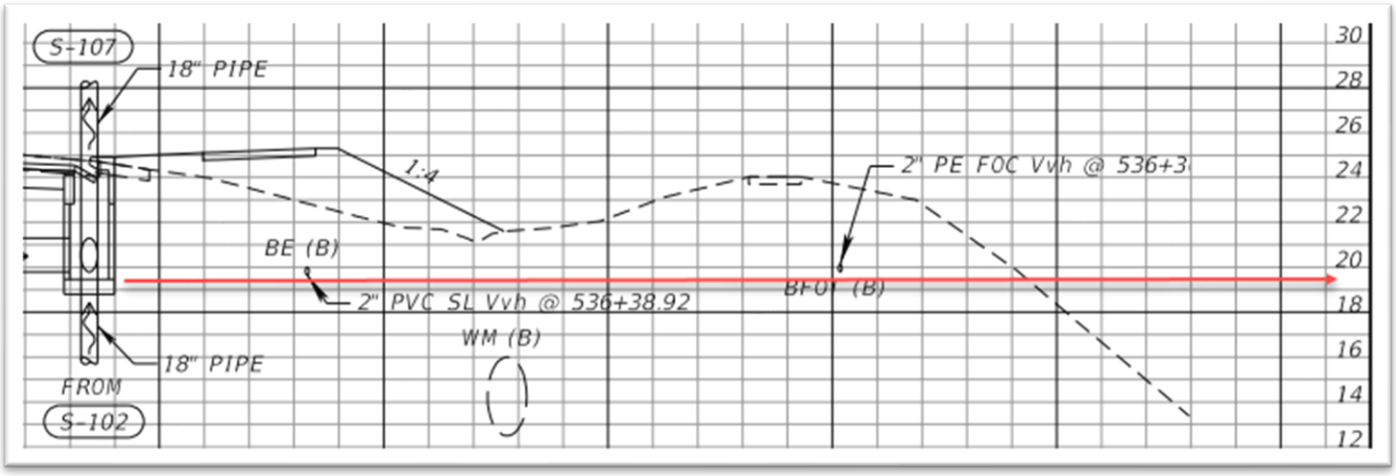
The flow line for each pipe run can be found on the Drainage Structure sheets. This depicts the flowline of S-105 for the pipe run from S-105 to S-107.

F. Top Elevation



This can be represented by different entries. In this example, S-105 is a pipe inlet and the elevation is shown as the EOP (edge of pavement) elevation. Sometimes it may need to be scaled off the Plans.

G. Inlet Invert Elevation



The invert elevation is rarely given on the Plans. If it is not given, then it must be scaled from the Plan cross sections. This drawing does not depict the bottom slab; however, MAC accounts for that. If the structure bottom slab is greater than 8”, make note of that for plotting in MAC later.