Catch Basin Minimum Depths

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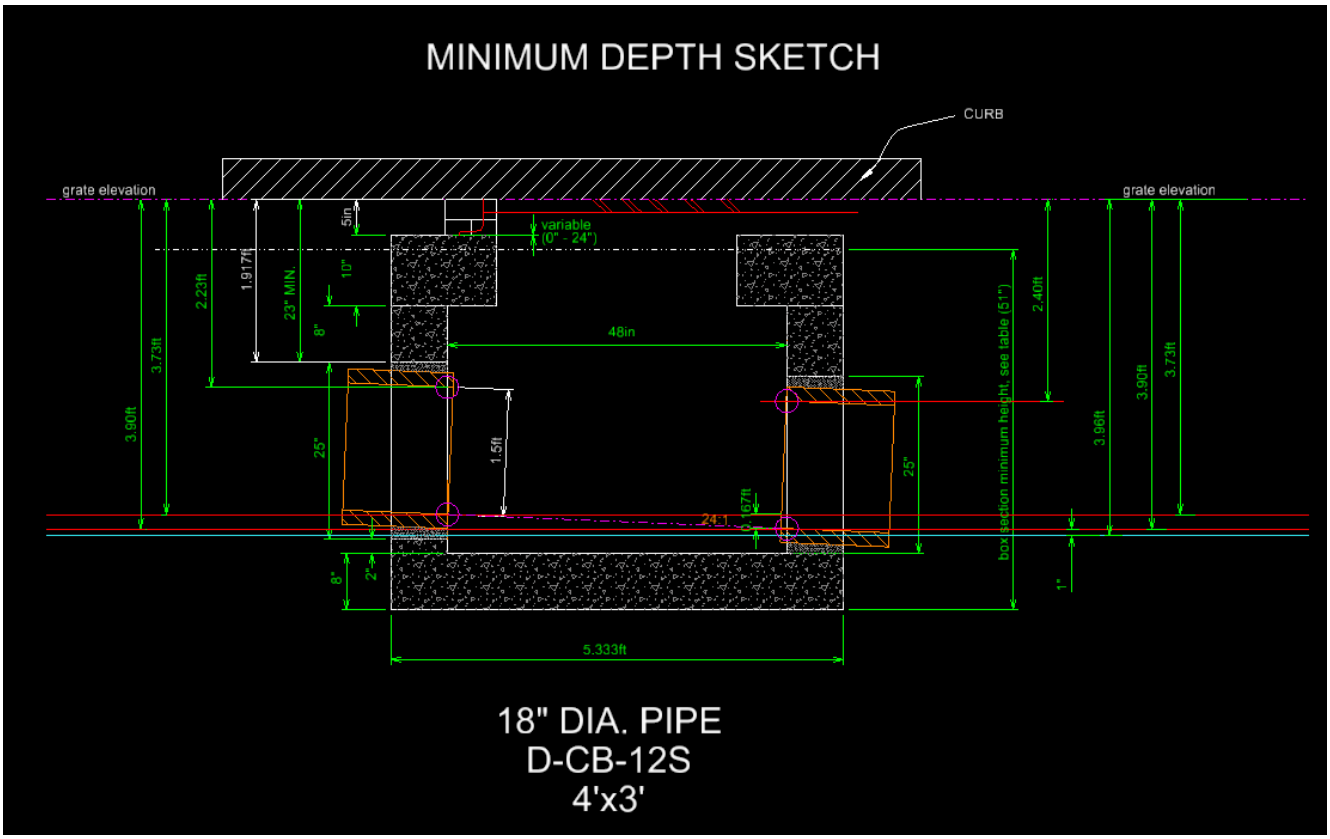
The purpose of this tutorial is to outline the method for checking for the minimum depths on a variety of Catch Basins.

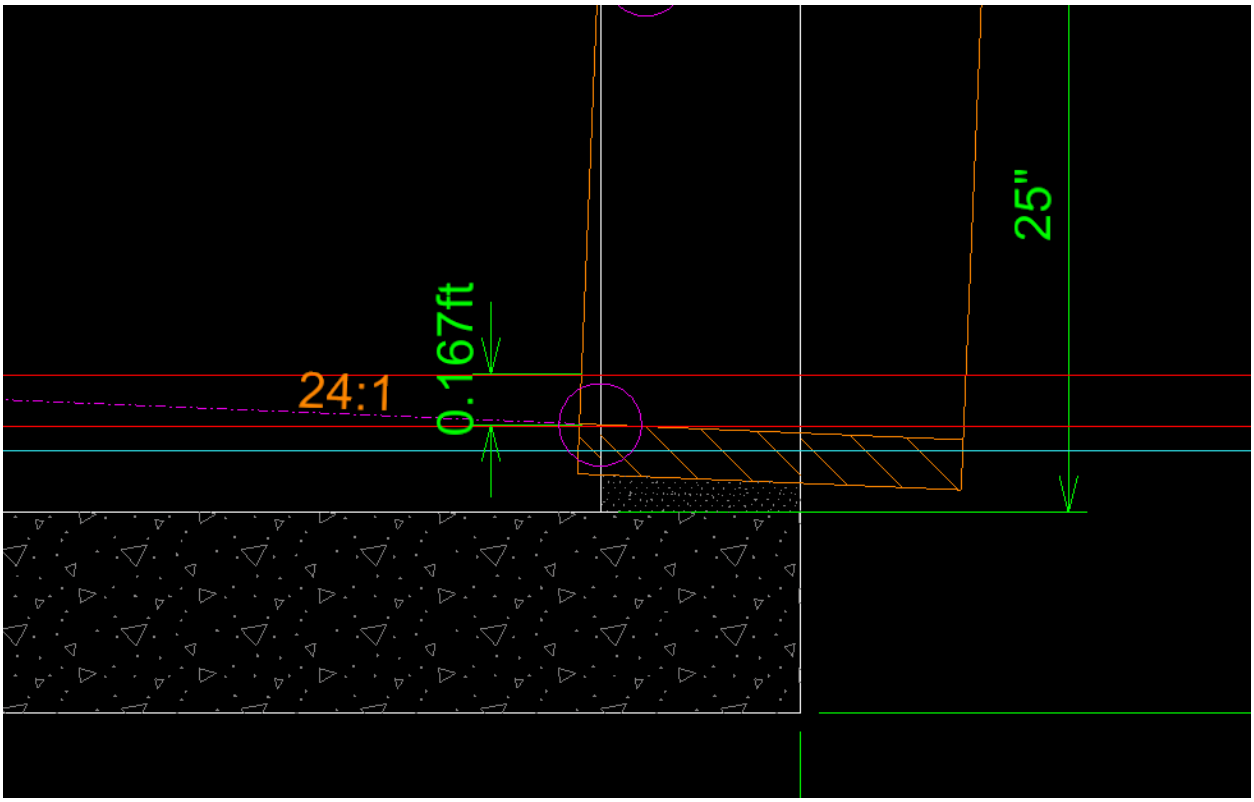
The following example shows the #12 catch basin with an 18” diameter pipe (Std. Dwg. D-CB-12S)



Vertical distances shown are minimums.

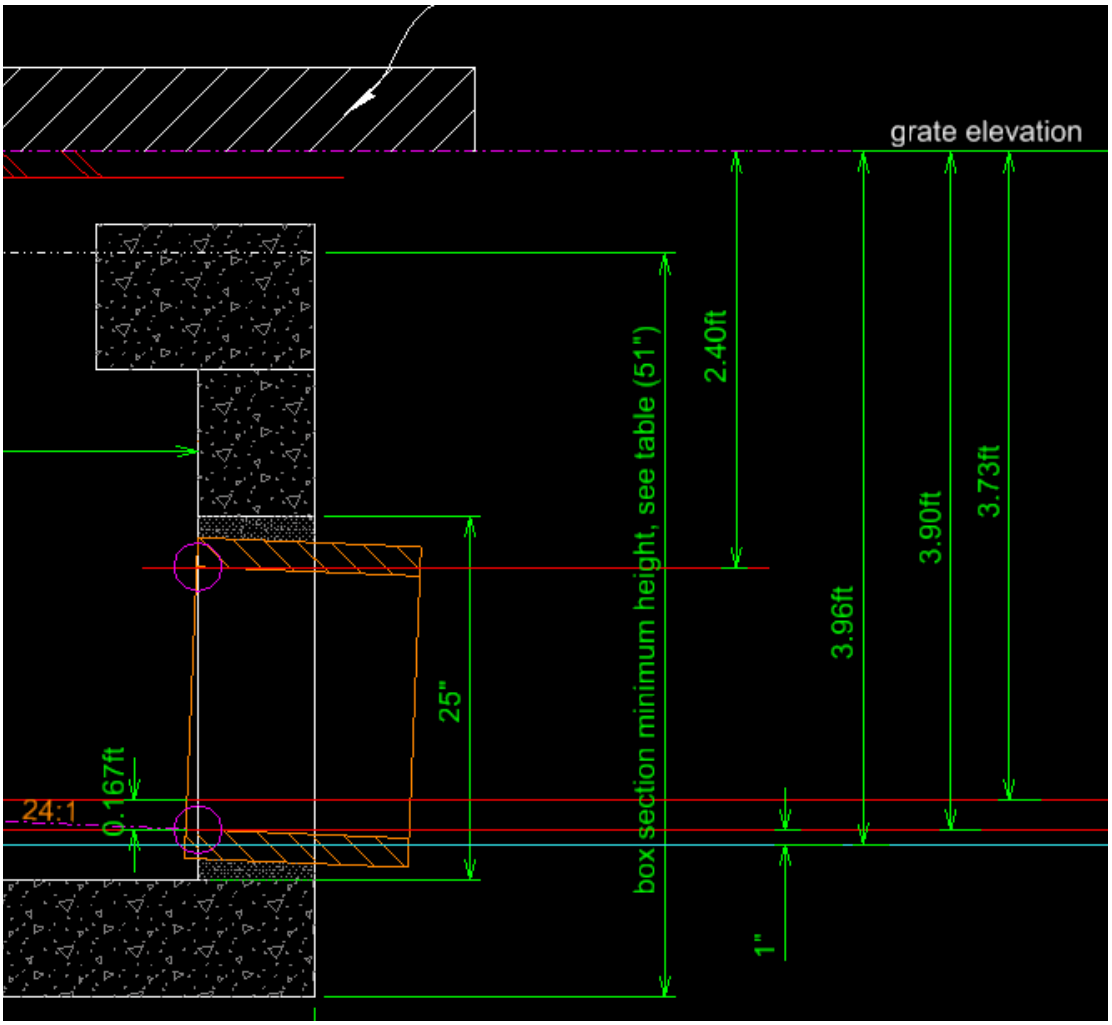
Link to Standard Drawing D-CB-12S

Outlet



The outlet point of the catch basin is where the inside diameter of the outlet pipe intersects the inside edge of the catch basin wall, signified by the purple circle.

Depth



The minimum depth of the catch basin is a known value per the standard drawing.

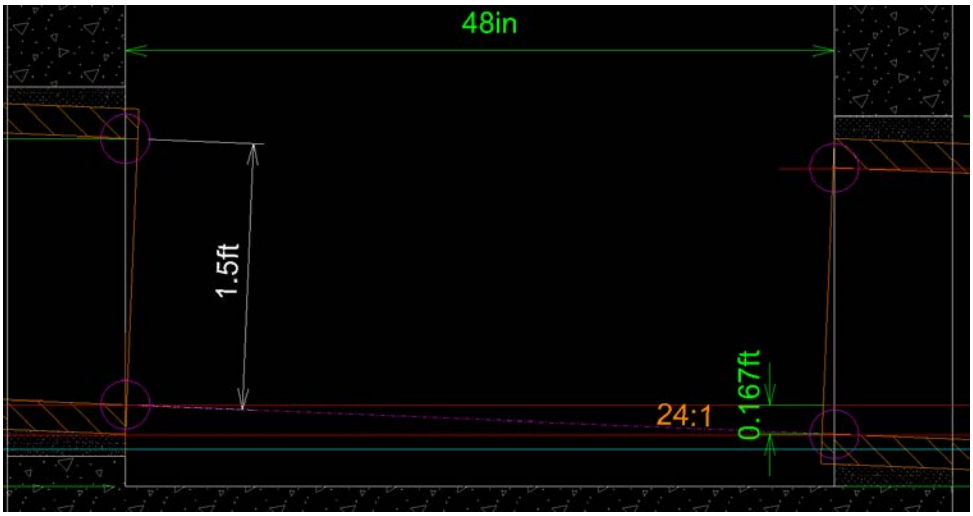
The depth is the vertical distance from the grate elevation to the outlet.

For this example the minimum depth of the #12 catch basin is 3.90 ft.

CATCH BASIN DIMENSIONS				FOR DESIGN USE ONLY CATCH BASIN MINIMUM DESIGN DEPTH (FEET)
INSIDE DIAMETER (D) OF PIPE (INCHES)	PIPE WALL THICKNESS (INCHES)	DIAMETER OF CUT-OUT HOLES (INCHES)	BOX SECTION MINIMUM HEIGHTS (INCHES)	
18	2½	25	53	3.90
24	3	32	60	4.45
(4) 30	3½	39	67	4.99
(4) 36	4	46	74	5.53

Catch Basin Dimensions from D-CB-12S

Drop



The drop is the vertical distance between the inlet elevation and outlet elevation.

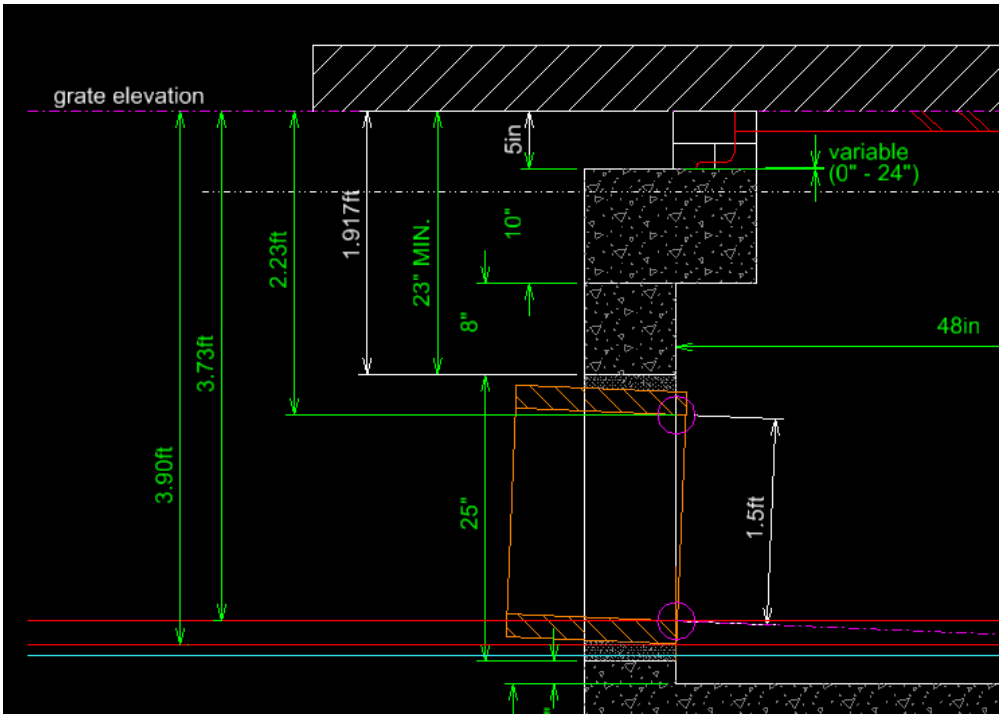
For the #12 CB example, the drop is 1/24 x 4 = 0.167, rounded to 0.17

Inlet Depth

3.90 minimum outlet depth
- 0.17 drop
3.73 minimum inlet depth, for #12 CB -18" pipe dia.

This is the point signified by the lower left purple circle.

Depth of Cover - Inlet

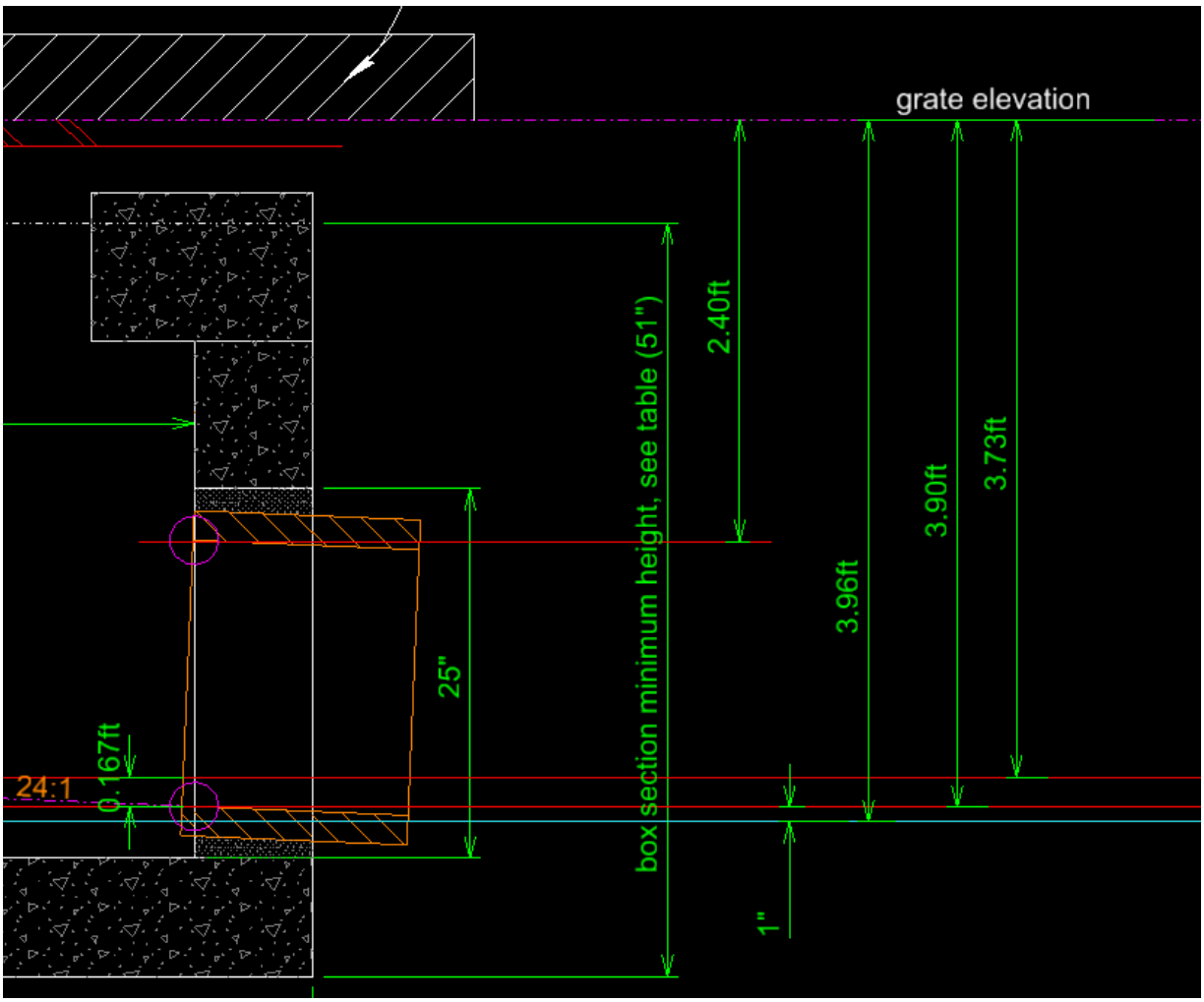


The depth of cover is the vertical distance from the grate elevation to the point where the inside diameter of the inlet pipe intersects the inside edge of the catch basin wall, signified by the upper left purple circle.

If the inlet elevation is known, subtract the pipe diameter for the depth of cover.

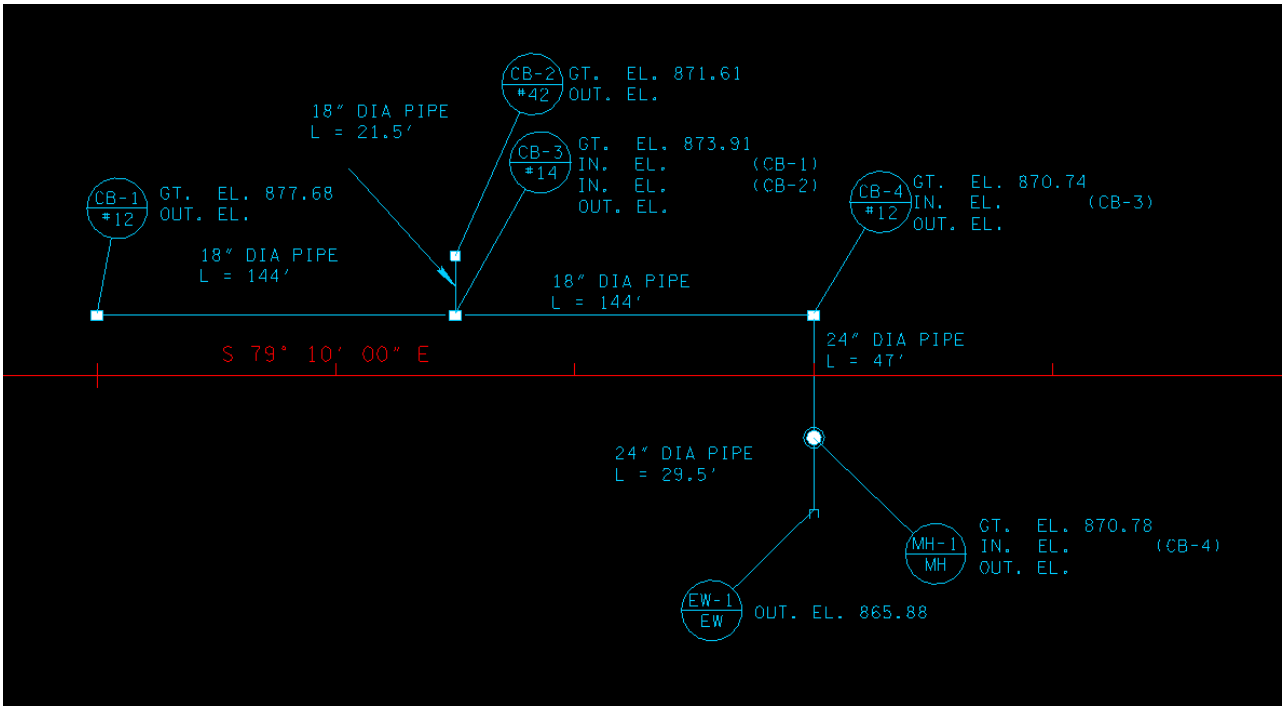
3.73 minimum inlet depth
-1.5 for 18" pipe
2.23 minimum depth of cover

Depth of Cover – Outlet



3.90 minimum outlet depth
-1.5 for 18” pipe
2.40 minimum depth of cover

Example



Node	Type	Drop	Pipe Size	Min. Depth	Max. Depth	Std. Dwg.
plan	plan	TDOT Drainage Nodes Guide	plan	Std. Dwg.	Std. Dwg.	
CB-1	12	0.17	18"	3.90	20	D-CB-12S
CB-2	42	0.17	18"	3.82	28	D-CB-42SB
CB-3	14	0.33	18"	4.07	20	D-CB-14S
CB-4	12	0.17	24"	4.45	20	D-CB-12S
MH-1	MH	0.21	24"	2.18	40	D-MH-2

CB-1

Outlet elevation = Grate el. – min depth

877.68 – 3.90 = 873.78 - This is the elevation at minimum depth.

Normally the outlet of the first catch basin in a network run would be at the minimum depth.

The roadway profile in this section as approx. 2% so the remainder of the catch basins can be minimum depth and the pipes connecting them will be at an adequate grade, at least with respect to the minimum acceptable grade which is 0.5%.

CB-2

Outlet elevation = Grate el. – min depth

871.61– 3.82 = 867.79 (minimum depth elevation)

CB-3

Inlet elevation, from CB-1 = 873.91- 4.07 + 0.33 = 870.17 (min. depth is 4.07 to outlet, add 0.33 drop distance to get inlet elev.)

Inlet elevation, from CB-2 :

Assume 0.5% grade in pipe from CB-2 to CB-3 : 867.79 – (0.005 x 21.5) = 867.68

Outlet elevation = 867.78 – 0.33 = 867.45

CB-4

Outlet elevation, assume min. depth = 870.74 – 3.90 = 866.84

Inlet elevation = 866.84 + 0.17 = 867.01

Since the outlet of CB-3 was lower than min. depth a quick check on grade of pipe may be needed:

(867.45-867.01) / 144 x 100 = 0.31%, this is less than acceptable minimum grade, so assume 0.5% grade:

867.45 – (.005 x 144) = <u>866.73</u> (this will be the inlet elevation)

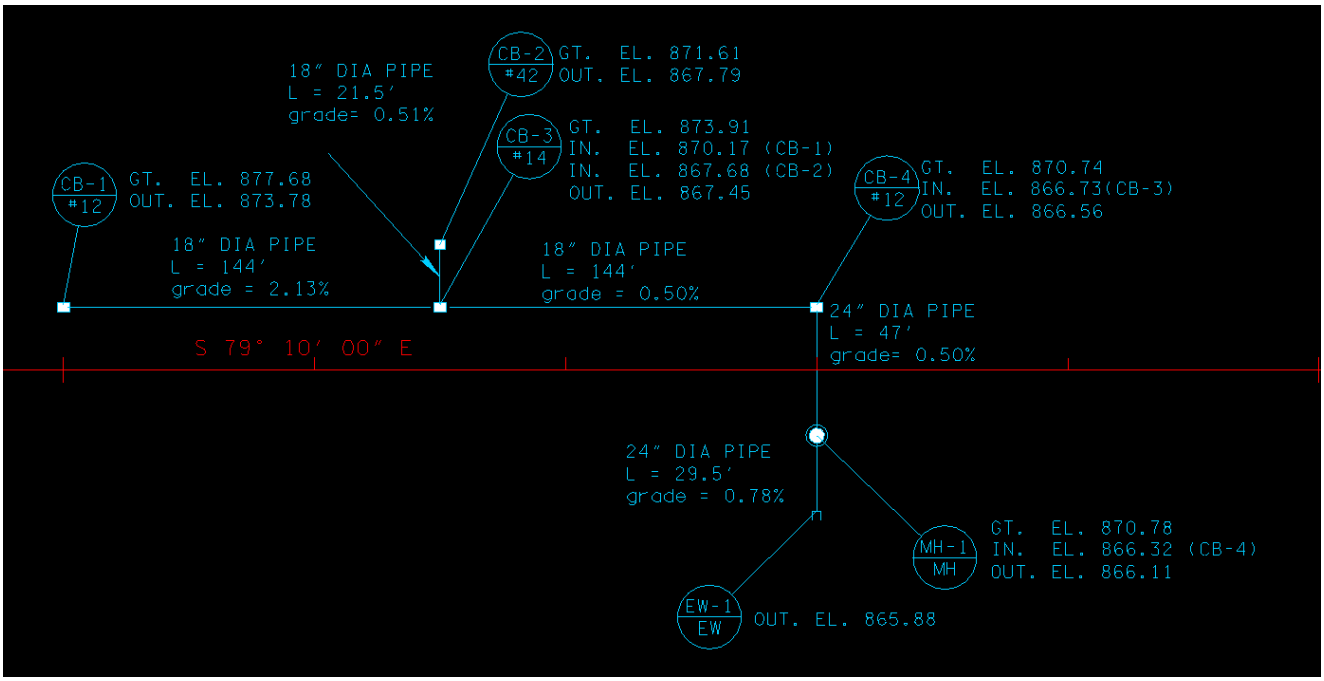
Outlet elevation = 866.73 - 0.17 = <u>866.56</u>

<u>MH-1</u>

Outlet elevation, assume min. depth = 870.78 – 2.68 = 868.10 (this is higher than CB-4 outlet), so

Assume 0.5% grade in pipe from CB-4 to MH-1 : 866.56 – (0.005 x 47) = <u>866.32</u> (this is inlet el. for CB-5)

Outlet elevation =866.32 – 0.21 = <u>866.11</u>



CATCH BASINS AND MANHOLES											
SHEET NO.	LOCATION	STATION	OFFSET (FT.)	DRAINAGE CODE	GRATE/TOP ELEV.	STRUCTURE TYPE	INSIDE DIMENSIONS	DEPTH (FT.)	STANDARD DRAWING	TYPE 3 611-01-02 4' - 12'	TY 611 0
	LT.	5+00	26	CB-1	877.68	#12CB	4' x 3'	3.90	D--CB-12S		
	LT.	6+50	50	CB-2	871.61	#42CB	4' x 4'	3.82	D-CB-42SB		
	LT.	6+50	26	CB-3	873.91	#14CB	8' x 3'	6.46	D-CB-14S		
	LT.	8+00	26	CB-4	870.74	#12CB	4' x 3'	4.18	D-CB-12S		
	RT.	8+00	26	MH-1	870.78	#3MH	5' D	4.37	D-MH-2	1	
TOTALS										1	

Tabulated Quantity Block for Catch Basins and Manholes

An additional note for designers to remember is to consider the riser and casting thicknesses when verifing if minimum depths are met.