

Hydraulic Analysis Report

Project Data

Project Title: Project - Marble Arno LOMR

Designer:

Project Date: Tuesday, April 11, 2023

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Roadway - Lomas Blvd Sta. 25+21.60 to 26+52

Notes: Cross section data from Smith Engineering Company Construction Plans As-Builts Dated November, 2022 (Signed 2/24/2023) page 1-20 section - Lomas Blvd Sta. 25+21.60 to 26+52.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.75	0.0130
5.00	0.67	0.0130
5.50	0.67	0.0130
5.67	0.00	0.0130
7.67	0.04	0.0160
50.04	0.90	0.0130
51.23	0.90	0.0130
51.40	1.40	0.0130
51.90	1.40	0.0130
54.60	1.40	0.0130
55.10	1.40	0.0130
55.27	0.90	0.0130
56.10	0.90	0.0160
87.30	0.28	0.0160
89.30	0.24	0.0130
89.47	0.91	0.0130
89.97	0.91	0.0130
94.97	0.99	-----

Longitudinal Slope: 0.0250 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 104.9149 cfs

Area of Flow: 15.8046 ft²

Wetted Perimeter: 55.8102 ft

Hydraulic Radius: 0.2832 ft

Average Velocity: 6.6383 ft/s

Top Width: 54.9434 ft

Froude Number: 2.1812

Critical Depth: 0.8772 ft

Critical Velocity: 3.4661 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 81.13 ft

Calculated Max Shear Stress: 1.0452 lb/ft²

Calculated Avg Shear Stress: 0.4418 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0153

Channel Analysis: Roadway - Broadway Blvd Sta. Existing @ Lomas Blvd to 5+75

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 3.1% cross slope, east side width ~32 feet @ 2.5 % cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.00	0.79	0.0130
6.50	0.79	0.0130
6.67	0.12	0.0130
8.67	0.16	0.0160
30.67	0.84	0.0160
62.67	0.04	0.0130
64.67	0.00	0.0130
64.84	0.67	0.0130
65.34	0.67	0.0130
71.34	0.79	-----

Longitudinal Slope: 0.0030 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 36.4260 cfs

Area of Flow: 14.6008 ft²

Wetted Perimeter: 46.9752 ft

Hydraulic Radius: 0.3108 ft

Average Velocity: 2.4948 ft/s

Top Width: 46.0096 ft

Froude Number: 0.7804

Critical Depth: 0.6100 ft

Critical Velocity: 3.0427 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 41.64 ft

Calculated Max Shear Stress: 0.1254 lb/ft²

Calculated Avg Shear Stress: 0.0582 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Channel Analysis: Roadway - Broadway Blvd Sta. 5+75 to North of Granite Ave

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 2.9% cross slope, east side width ~22 feet @ 3.4% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.00	0.79	0.0130
6.50	0.79	0.0130
6.67	0.12	0.0130
8.67	0.16	0.0160
30.67	0.80	0.0160
52.00	0.05	0.0130
54.00	0.01	0.0130
54.17	0.68	0.0130
54.67	0.68	0.0130
60.67	0.80	-----

Longitudinal Slope: 0.0012 ft/ft

Depth: 0.7900 ft

Result Parameters

Flow: 29.6984 cfs

Area of Flow: 18.4622 ft²

Wetted Perimeter: 56.2371 ft

Hydraulic Radius: 0.3283 ft

Average Velocity: 1.6086 ft/s

Top Width: 55.1700 ft

Froude Number: 0.4900

Critical Depth: 0.5935 ft

Critical Velocity: 3.0045 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 35.26 ft

Calculated Max Shear Stress: 0.0592 lb/ft²

Calculated Avg Shear Stress: 0.0246 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0152

Channel Analysis: Existing 30" SD in Lomas Blvd East of Edith Blvd

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 2.5000 ft

Longitudinal Slope: 0.0435 ft/ft

Manning's n: 0.0130

Depth: 2.5000 ft

Result Parameters

Flow: 85.5480 cfs

Area of Flow: 4.9087 ft²

Wetted Perimeter: 7.8540 ft

Hydraulic Radius: 0.6250 ft

Average Velocity: 17.4277 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 2.4728 ft

Critical Velocity: 17.4612 ft/s

Critical Slope: 0.0399 ft/ft

Critical Top Width: 0.52 ft

Calculated Max Shear Stress: 6.7860 lb/ft²

Calculated Avg Shear Stress: 1.6965 lb/ft²

Channel Analysis: Existing 48" SD in Lomas Blvd East of Arno St

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 4.0000 ft

Longitudinal Slope: 0.0196 ft/ft

Manning's n: 0.0130

Depth: 4.0000 ft

Result Parameters

Flow: 201.1006 cfs

Area of Flow: 12.5664 ft²

Wetted Perimeter: 12.5664 ft

Hydraulic Radius: 1.0000 ft

Average Velocity: 16.0031 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 3.8496 ft

Critical Velocity: 16.2013 ft/s

Critical Slope: 0.0171 ft/ft

Critical Top Width: 1.52 ft

Calculated Max Shear Stress: 4.8922 lb/ft²

Calculated Avg Shear Stress: 1.2230 lb/ft²

Channel Analysis: Existing 54" SD in Lomas Blvd East of Arno St

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 4.5000 ft

Longitudinal Slope: 0.0206 ft/ft

Manning's n: 0.0130

Depth: 4.5000 ft

Result Parameters

Flow: 282.2446 cfs

Area of Flow: 15.9043 ft²

Wetted Perimeter: 14.1372 ft

Hydraulic Radius: 1.1250 ft

Average Velocity: 17.7464 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 4.3572 ft

Critical Velocity: 17.9168 ft/s

Critical Slope: 0.0181 ft/ft

Critical Top Width: 1.58 ft

Calculated Max Shear Stress: 5.7845 lb/ft²

Calculated Avg Shear Stress: 1.4461 lb/ft²

Channel Analysis: As-built Condition 54" SD Lomas Blvd East of Arno St

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 4.5000 ft

Longitudinal Slope: 0.0162 ft/ft

Manning's n: 0.0130

Depth: 4.5000 ft

Result Parameters

Flow: 250.2935 cfs

Area of Flow: 15.9043 ft²

Wetted Perimeter: 14.1372 ft

Hydraulic Radius: 1.1250 ft

Average Velocity: 15.7375 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 4.2759 ft

Critical Velocity: 16.0355 ft/s

Critical Slope: 0.0140 ft/ft

Critical Top Width: 1.96 ft

Calculated Max Shear Stress: 4.5490 lb/ft²

Calculated Avg Shear Stress: 1.1372 lb/ft²

Channel Analysis: Roadway - Lomas Blvd @ John Street to Sta 21+75

Notes: Assumed 6.85' sidewalk (north side) at 2% cross slope and 4.5' sidewalk (south side) at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.85	0.77	0.0130
7.35	0.77	0.0130
7.52	0.10	0.0130
9.52	0.14	0.0160
52.42	1.00	0.0130
53.25	0.98	0.0130
53.42	1.48	0.0130
53.92	1.48	0.0130
56.62	1.48	0.0130
57.12	1.48	0.0130
57.29	0.98	0.0130
58.12	1.00	0.0160
89.32	0.37	0.0130
91.32	0.33	0.0130
91.49	1.00	0.0130
91.99	1.00	0.0130
96.49	1.09	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.8000 ft

Result Parameters

Flow: 35.3280 cfs

Area of Flow: 24.6208 ft²

Wetted Perimeter: 76.3143 ft

Hydraulic Radius: 0.3226 ft

Average Velocity: 1.4349 ft/s

Top Width: 75.3346 ft

Froude Number: 0.4423

Critical Depth: 0.5976 ft

Critical Velocity: 2.8668 ft/s

Critical Slope: 0.0052 ft/ft

Critical Top Width: 48.28 ft

Calculated Max Shear Stress: 0.0499 lb/ft²

Calculated Avg Shear Stress: 0.0201 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0154

Channel Analysis: Roadway - Broadway Blvd Sta. 0+00 to 1+50

Notes: Assumed 4'(west) & 6'(east) sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ assumed 2% cross slope, east side width ~45 feet @ assumed 2% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	1.21	0.0130
4.00	1.13	0.0130
4.50	1.13	0.0130
4.67	0.46	0.0130
6.67	0.50	0.0160
28.67	0.94	0.0160
63.67	0.04	0.0130
65.67	0.00	0.0130
65.84	0.67	0.0130
66.34	0.67	0.0130
72.34	0.79	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.7900 ft

Result Parameters

Flow: 20.7631 cfs

Area of Flow: 15.7112 ft²

Wetted Perimeter: 55.2129 ft

Hydraulic Radius: 0.2846 ft

Average Velocity: 1.3215 ft/s

Top Width: 54.4204 ft

Froude Number: 0.4334

Critical Depth: 0.5853 ft

Critical Velocity: 2.8252 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 29.65 ft

Calculated Max Shear Stress: 0.0493 lb/ft²

Calculated Avg Shear Stress: 0.0178 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0154

Channel Analysis: As-Built 36" SD at Marble Ave and Arno St

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.0000 ft

Longitudinal Slope: 0.0351 ft/ft

Manning's n: 0.0130

Depth: 3.0000 ft

Result Parameters

Flow: 124.9594 cfs

Area of Flow: 7.0686 ft²

Wetted Perimeter: 9.4248 ft

Hydraulic Radius: 0.7500 ft

Average Velocity: 17.6781 ft/s

Top Width: 0.0000 ft

Froude Number: 0.0000

Critical Depth: 2.9561 ft

Critical Velocity: 17.7313 ft/s

Critical Slope: 0.0318 ft/ft

Critical Top Width: 0.72 ft

Calculated Max Shear Stress: 6.5707 lb/ft²

Calculated Avg Shear Stress: 1.6427 lb/ft²

Channel Analysis: Roadway - Broadway Blvd Sta. Existing @ Lomas Blvd to 5+75 Left

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 3.1% cross slope, east side width ~32 feet @ 2.5 % cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.00	0.79	0.0130
6.50	0.79	0.0130
6.67	0.12	0.0130
8.67	0.16	0.0160
30.67	0.84	-----

Longitudinal Slope: 0.0030 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 20.4971 cfs

Area of Flow: 7.7774 ft²

Wetted Perimeter: 23.0837 ft

Hydraulic Radius: 0.3369 ft

Average Velocity: 2.6355 ft/s

Top Width: 22.5524 ft

Froude Number: 0.7909

Critical Depth: 0.6083 ft

Critical Velocity: 3.1792 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 20.54 ft

Calculated Max Shear Stress: 0.1254 lb/ft²

Calculated Avg Shear Stress: 0.0631 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Channel Analysis: Roadway - Broadway Blvd Sta. Existing @ Lomas Blvd to 5+75 Right

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 3.1% cross slope, east side width ~32 feet @ 2.5 % cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
30.67	0.84	0.0160
62.67	0.04	0.0130
64.67	0.00	0.0130
64.84	0.67	0.0130
65.34	0.67	0.0130
71.34	0.79	-----

Longitudinal Slope: 0.0030 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 24.0719 cfs

Area of Flow: 9.2950 ft²

Wetted Perimeter: 27.8995 ft

Hydraulic Radius: 0.3332 ft

Average Velocity: 2.5898 ft/s

Top Width: 27.3700 ft

Froude Number: 0.7832

Critical Depth: 0.6068 ft

Critical Velocity: 3.1489 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 24.82 ft

Calculated Max Shear Stress: 0.1254 lb/ft²

Calculated Avg Shear Stress: 0.0624 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0151

Channel Analysis: Roadway - Broadway Blvd Sta. 5+75 to North of Granite Ave Left

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 2.9% cross slope, east side width ~22 feet @ 3.4% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.00	0.79	0.0130
6.50	0.79	0.0130
6.67	0.12	0.0130
8.67	0.16	0.0160
30.67	0.80	-----

Longitudinal Slope: 0.0012 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 13.5614 cfs

Area of Flow: 8.1787 ft²

Wetted Perimeter: 24.3570 ft

Hydraulic Radius: 0.3358 ft

Average Velocity: 1.6581 ft/s

Top Width: 23.8263 ft

Froude Number: 0.4987

Critical Depth: 0.5034 ft

Critical Velocity: 2.8918 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 18.06 ft

Calculated Max Shear Stress: 0.0502 lb/ft²

Calculated Avg Shear Stress: 0.0251 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Channel Analysis: Roadway - Broadway Blvd Sta. 5+75 to North of Granite Ave Right

Notes: Assumed 6' sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ 2.9% cross slope, east side width ~22 feet @ 3.4% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
30.67	0.80	0.0160
52.00	0.05	0.0130
54.00	0.01	0.0130
54.17	0.68	0.0130
54.67	0.68	0.0130
60.67	0.80	-----

Longitudinal Slope: 0.0012 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 11.8065 cfs

Area of Flow: 7.0009 ft²

Wetted Perimeter: 20.6199 ft

Hydraulic Radius: 0.3395 ft

Average Velocity: 1.6864 ft/s

Top Width: 20.0872 ft

Froude Number: 0.5034

Critical Depth: 0.5029 ft

Critical Velocity: 2.9185 ft/s

Critical Slope: 0.0049 ft/ft

Critical Top Width: 15.29 ft

Calculated Max Shear Stress: 0.0502 lb/ft²

Calculated Avg Shear Stress: 0.0254 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0149

Channel Analysis: Roadway - Lomas Blvd @ John Street to Sta 21+75 Left

Notes: Assumed 6.85' sidewalk (north side) at 2% cross slope and 4.5' sidewalk (south side) at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.91	0.0130
6.85	0.77	0.0130
7.35	0.77	0.0130
7.52	0.10	0.0130
9.52	0.14	0.0160
52.42	1.00	0.0130
53.25	0.98	0.0130
53.42	1.48	0.0130
53.92	1.48	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 16.5653 cfs

Area of Flow: 11.2564 ft²

Wetted Perimeter: 34.1247 ft

Hydraulic Radius: 0.3299 ft

Average Velocity: 1.4716 ft/s

Top Width: 33.5967 ft

Froude Number: 0.4480

Critical Depth: 0.4859 ft

Critical Velocity: 2.7973 ft/s

Critical Slope: 0.0053 ft/ft

Critical Top Width: 24.37 ft

Calculated Max Shear Stress: 0.0418 lb/ft²

Calculated Avg Shear Stress: 0.0206 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0152

Channel Analysis: Roadway - Lomas Blvd @ John Street to Sta 21+75 Right

Notes: Assumed 6.85' sidewalk (north side) at 2% cross slope and 4.5' sidewalk (south side) at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
56.62	1.48	0.0130
57.12	1.48	0.0130
57.29	0.98	0.0130
58.12	1.00	0.0160
89.32	0.37	0.0130
91.32	0.33	0.0130
91.49	1.00	0.0130
91.99	1.00	0.0130
96.49	1.09	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 16.4696 cfs

Area of Flow: 11.1933 ft²

Wetted Perimeter: 34.7494 ft

Hydraulic Radius: 0.3221 ft

Average Velocity: 1.4714 ft/s

Top Width: 34.2068 ft

Froude Number: 0.4533

Critical Depth: 0.4859 ft

Critical Velocity: 2.7981 ft/s

Critical Slope: 0.0053 ft/ft

Critical Top Width: 24.21 ft

Calculated Max Shear Stress: 0.0418 lb/ft²

Calculated Avg Shear Stress: 0.0201 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Channel Analysis: Roadway - Broadway Blvd Sta. 0+00 to 1+50 Left

Notes: Assumed 4'(west) & 6'(east) sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ assumed 2% cross slope, east side width ~45 feet @ assumed 2% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.74	0.0130
4.00	0.67	0.0130
4.50	0.67	0.0130
4.67	0.00	0.0130
6.67	0.04	0.0160
28.67	0.48	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.4800 ft

Result Parameters

Flow: 6.9809 cfs

Area of Flow: 5.7892 ft²

Wetted Perimeter: 24.5000 ft

Hydraulic Radius: 0.2363 ft

Average Velocity: 1.2058 ft/s

Top Width: 24.1218 ft

Froude Number: 0.4338

Critical Depth: 0.3437 ft

Critical Velocity: 2.3523 ft/s

Critical Slope: 0.0056 ft/ft

Critical Top Width: 17.27 ft

Calculated Max Shear Stress: 0.0300 lb/ft²

Calculated Avg Shear Stress: 0.0147 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0149

Channel Analysis: Roadway - Broadway Blvd Sta. 0+00 to 1+50 Right

Notes: Assumed 4'(west) & 6'(east) sidewalks at 2% cross slope. 2' from edge of sidewalk to edge of gutter/asphalt. Assumed 2% gutter pan slope. West side width ~ 22 feet @ assumed 2% cross slope, east side width ~45 feet @ assumed 2% cross slope.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
28.67	0.94	0.0160
63.67	0.04	0.0130
65.67	0.00	0.0130
65.84	0.67	0.0130
66.34	0.67	0.0130
72.34	0.79	-----

Longitudinal Slope: 0.0010 ft/ft

Depth: 0.7900 ft

Result Parameters

Flow: 19.3980 cfs

Area of Flow: 12.9749 ft²

Wetted Perimeter: 38.3691 ft

Hydraulic Radius: 0.3382 ft

Average Velocity: 1.4950 ft/s

Top Width: 37.8367 ft

Froude Number: 0.4499

Critical Depth: 0.5609 ft

Critical Velocity: 3.0325 ft/s

Critical Slope: 0.0050 ft/ft

Critical Top Width: 22.40 ft

Calculated Max Shear Stress: 0.0493 lb/ft²

Calculated Avg Shear Stress: 0.0211 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0153

Channel Analysis: Roadway - Lomas Blvd Sta. 25+21.60 to 26+52 Left

Notes: Cross section data from Smith Engineering Company Construction Plans As-Builts Dated November, 2022 (Signed 2/24/2023) page 1-20 section - Lomas Blvd Sta. 25+21.60 to 26+52.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	0.75	0.0130
5.00	0.67	0.0130
5.50	0.67	0.0130
5.67	0.00	0.0130
7.67	0.04	0.0160
50.04	0.90	0.0130
51.23	0.90	0.0130
51.40	1.40	0.0130
51.90	1.40	-----

Longitudinal Slope: 0.0250 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 81.9949 cfs

Area of Flow: 11.1341 ft²

Wetted Perimeter: 33.7365 ft

Hydraulic Radius: 0.3300 ft

Average Velocity: 7.3643 ft/s

Top Width: 33.2085 ft

Froude Number: 2.2413

Critical Depth: 0.9175 ft

Critical Velocity: 3.7213 ft/s

Critical Slope: 0.0046 ft/ft

Critical Top Width: 51.24 ft

Calculated Max Shear Stress: 1.0452 lb/ft²

Calculated Avg Shear Stress: 0.5148 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0152

Channel Analysis: Roadway - Lomas Blvd Sta. 25+21.60 to 26+52 Right

Notes: Cross section data from Smith Engineering Company Construction Plans As-Builts Dated November, 2022 (Signed 2/24/2023) page 1-20 section - Lomas Blvd Sta. 25+21.60 to 26+52.

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
54.60	1.40	0.0130
55.10	1.40	0.0130
55.27	0.90	0.0130
56.10	0.90	0.0160
87.30	0.28	0.0160
89.30	0.24	0.0130
89.47	0.91	0.0130
89.97	0.91	0.0130
94.97	0.99	-----

Longitudinal Slope: 0.0250 ft/ft

Depth: 0.6700 ft

Result Parameters

Flow: 80.8927 cfs

Area of Flow: 11.3493 ft²

Wetted Perimeter: 34.7384 ft

Hydraulic Radius: 0.3267 ft

Average Velocity: 7.1276 ft/s

Top Width: 34.2034 ft

Froude Number: 2.1805

Critical Depth: 0.8945 ft

Critical Velocity: 4.0306 ft/s

Critical Slope: 0.0043 ft/ft

Critical Top Width: 39.78 ft

Calculated Max Shear Stress: 1.0452 lb/ft²

Calculated Avg Shear Stress: 0.5097 lb/ft²

Composite Manning's n Equation: Lotter method

Manning's n: 0.0156