



Stormwater Management Narrative

For

**Block 13, Lots 112-18, 20-22
Block 14, Lots 12 & 14
Block 15, Lots 5-12
Borough of Sea Bright
Monmouth County, NJ**

January 17, 2022

Prepared by:

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A. INTRODUCTION

The site is known as Lots 112-18, and 20-22 in Block 13, Lots 12 & 14 in Block 14, and Lots 5-12 in Block 15, in the Borough of Sea Bright, Monmouth County, New Jersey, and consists of approximately 2.66 acres. The entire tract is located within a redevelopment area. Portions of the site is located at the eastern end of Surf Street and New Street, and Church Street, portions are located on the south and north sides of South Street and south of River Street, bordered by the South Shrewsbury River along the eastern property line. The tract has frontage to Front Street, Church Street, South Street, River Street, and an unnamed street traversing from South to River Streets. Currently the site consists of residential dwellings with access driveways and building appurtenances, marine buildings and paved and gravel parking areas, and abandoned commercial buildings with associated parking areas.

The proposed development of the property consists of the construction of 4 (four) single-family homes, 25 (twenty-five) townhouse units distributed in 5 (five) buildings, and residential condominium building with 27 (twenty-seven) residential units. Associated with the construction of the residential development is the construction of access driveways, pedestrian circulation, improvements to the municipal roadways, lighting and landscaping, and a stormwater management system. In addition, approximately 1 acre of the tract area is proposed to be open space. The construction of the project as proposed reduces the impervious coverage to approximately 1.43 acres.

The intent of this report is to analyze the stormwater impact of the proposed development.

B. PRE-DEVELOPED DRAINAGE CONDITIONS

The site currently consists of residential dwellings with access driveways and building appurtenances, marine buildings and paved and gravel parking areas, and abandoned commercial buildings with associated parking areas. Currently, approximately 2.28 acres of the tract area is covered with impervious surfaces. The stormwater runoff generated by northern portion of the site currently flows towards the existing drainage pipe system located in River Street, South Street, and Church Street. These systems discharge discharges directly into South Shrewsbury River through the existing bulkhead discharge culverts. The stormwater generated by the southern portion of the site flows towards the existing drainage pipe system in Front Street and Beach Street, where a pump station exists to pump the stormwater runoff to the South Shrewsbury River. The portion of South Shrewsbury River that border the site is classified as tidal waters.

C. POST-DEVELOPED DRAINAGE CONDITIONS

It is proposed to construct 4 (four) single-family homes, 25 (twenty-five) townhouse units distributed in 5 (five) buildings, and a residential condominium building. In addition, it is proposed to construct access driveways, pedestrian circulation, improvements to the municipal streets, and a stormwater management pipe system. It is proposed to intercept the existing stormwater piping system in River Street, South Street, Church Street, and Front Street, abandon the discharge culverts at the terminus of River Street, South Street, and Church Streets, and convey the stormwater runoff through proposed large diameter piping to vault/pump station in Beach Street for pump discharge into South Shrewsbury River. The development disturbs approximately 3.63 acres and reduces the impervious areas to approximately 1.43 acres. As such, due to the reduction of impervious areas, including reduction to motor vehicle areas, in addition to the South Shrewsbury River discharge waters being tidal, and the project being located

within a redevelopment zone, the project is exempted to meet the NJAC 7:8 requirements for stormwater runoff quality, quantity, and groundwater recharge.

D. STORM SEWER DESIGN

The storm sewer has been designed in accordance with the Borough and NJDEP requirements. Hydraflow Storm Sewers Extension v2021 Software by Autodesk was utilized in the design. The proposed storm sewer was designed using the Rational Method with a minimum time of concentration of 10 minutes and the New Jersey Intensity-Duration-Frequency Table. A composite of “C” Runoff Coefficient of 0.9 for impervious areas, 0.51 for grassed and landscaped areas was utilized for the drainage areas to the stormwater conveyance system. Manning’s Formula with a Coefficient of 0.013 for reinforced concrete pipe was utilized. The storm sewer was designed to convey the 25-year storm frequency.

The pipe drainage system proposed as part of the development includes the pipes maximum capacity flow where the proposed drainage pipes intercept the existing pipes. Conservatively, the maximum capacity of these pipes was calculated assuming the pipes are flowing full and with free discharge (no tailwater). The proposed pipe system will connect to the pump station in Beach Street and ultimately discharge into South Shrewsbury River.

The storm sewer design calculations can be found in the Appendix.

E. CONCLUSION

As the project reduces impervious areas, including reduction in motor vehicle surface, and the creation of approximately 1 (one) acre of open space, no adverse impact to surrounding properties is expected due to the construction of the project as proposed.

APPENDIX A
DRAINAGE PIPE CALCULATIONS

Line No.	Inlet ID	DnStm Ln No	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	Inlet Time (min)	Incr Q (cfs)	Known Q (cfs)	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)
39	CB-S18	22	0.11	0.83	0.09	0.09	10.0	0.52	0.00	0.52	7.00	0.43	15	Cir	0.012	34.000	1.00	0.09	0.43	4.00
38	EX. INLET	13	0.02	0.90	0.02	0.02	10.0	0.10	0.00	0.10	9.27	2.07	15	Cir	0.013	16.000	2.06	0.26	0.59	4.00
37	EX. INLET	13	0.03	0.90	0.03	0.03	10.0	0.15	0.00	0.15	2.80	1.22	15	Cir	0.013	16.000	0.19	0.56	0.59	4.00
36	CB-S7	4	0.06	0.22	0.01	0.01	10.0	0.08	0.00	0.08	6.45	1.64	15	Cir	0.013	30.097	1.00	0.35	0.65	5.00
35	CB-S9	5	0.35	0.20	0.07	0.07	10.0	0.40	0.00	0.40	6.76	2.68	15	Cir	0.013	49.224	1.10	-0.45	0.09	5.00
34	CB-S11	6	0.01	0.20	0.00	0.00	10.0	0.01	0.00	0.01	5.92	0.92	15	Cir	0.013	14.265	0.84	0.50	0.62	4.77
33	CB-B1	32	0.10	0.72	0.07	0.07	10.0	0.41	0.00	0.41	10.64	1.84	18	Cir	0.013	25.318	1.03	-2.25	-1.99	3.67
32	CB-B2	5	0.04	0.34	0.01	0.09	10.0	0.08	0.00	0.46	8.35	1.32	18	Cir	0.013	55.312	0.63	-2.60	-2.25	5.00
31	CB-S13	7	0.01	0.20	0.00	0.00	10.0	0.01	0.00	0.01	4.71	0.01	15	Cir	0.013	9.387	0.53	-1.63	-1.58	4.80
30	CB-S4C	29	0.07	0.35	0.02	0.02	10.0	0.14	0.00	0.14	5.68	1.86	15	Cir	0.013	14.235	0.77	-1.11	-1.00	2.51
29	CB-S4B	28	0.00	0.00	0.00	0.02	10.0	2.00	2.00	2.13	16.77	2.08	24	Cir	0.013	7.278	0.55	-2.65	-2.61	1.76
28	DMH S4A	3	0.00	0.00	0.00	0.02	10.0	19.00	19.00	21.13	62.47	5.43	30	Cir	0.013	81.024	2.32	-5.03	-3.15	2.21
27	CB-Y2	26	0.02	0.33	0.01	0.01	10.0	0.04	0.00	0.04	0.53	0.19	6	Cir	0.012	44.691	0.76	0.61	0.95	2.80
26	CB-B3	25	0.04	0.90	0.04	0.04	10.0	0.21	0.00	0.21	7.44	0.12	18	Cir	0.013	17.918	0.50	-0.48	-0.39	2.80
25	CB-B3A	11	0.02	0.90	0.02	0.06	10.0	0.10	0.00	0.29	7.61	0.16	18	Cir	0.013	41.887	0.53	-0.70	-0.48	3.56
24	CB-E1	23	0.22	0.90	0.20	0.20	10.0	1.13	0.00	1.13	4.20	1.16	15	Cir	0.013	127.900	0.42	1.24	1.78	4.36
23	CB-E2	19	0.19	0.90	0.17	0.37	10.0	0.98	0.00	1.95	5.43	1.59	15	Cir	0.013	83.573	0.71	0.65	1.24	4.20
22	CB-S17	10	0.27	0.79	0.21	0.30	10.0	1.22	0.00	1.66	4.75	1.35	15	Cir	0.013	18.466	0.54	-0.01	0.09	5.17
21	CB-S21	20	0.00	0.00	0.00	0.00	10.0	19.84	19.84	19.84	30.23	4.04	30	Cir	0.013	33.140	0.54	-0.66	-0.48	5.43
20	DMH-S20	19	0.06	0.90	0.05	0.05	10.0	18.25	17.94	38.09	51.22	6.49	36	Cir	0.013	74.592	0.59	-1.10	-0.66	4.20
19	DMH-S19	10	0.00	0.00	0.00	0.42	10.0	0.00	0.00	39.95	47.90	5.89	36	Cir	0.013	91.099	0.52	-1.57	-1.10	5.17
18	CB-Y3	17	0.01	0.20	0.00	0.00	10.0	0.01	0.00	0.01	0.61	0.59	6	Cir	0.012	39.807	1.00	0.60	1.00	3.35
17	CB-Y4	16	0.05	0.57	0.03	0.03	10.0	0.16	0.00	0.13	0.60	2.23	6	Cir	0.012	62.145	0.97	0.00	0.60	4.40
16	CB-C1	14	0.03	0.90	0.03	0.06	10.0	0.15	0.00	0.23	4.81	0.22	15	Cir	0.013	16.204	0.56	-1.35	-1.26	4.16
15	CB-C2	14	0.06	0.90	0.05	0.05	10.0	0.31	0.00	0.31	4.54	2.12	15	Cir	0.013	16.204	0.49	-0.08	0.00	4.16
14	DMH-C3	13	0.00	0.00	0.00	0.11	10.0	0.00	0.00	0.44	9.29	0.38	15	Cir	0.013	41.074	2.07	-2.20	-1.35	4.00
13	EX. DMH	12	0.00	0.00	0.00	0.16	10.0	0.00	0.00	0.60	8.49	0.34	18	Cir	0.013	42.884	0.65	-2.73	-2.45	3.90
12	EX. DMH	8	0.00	0.00	0.00	0.16	10.0	0.00	0.00	0.58	8.27	0.33	18	Cir	0.013	12.897	0.62	-2.81	-2.73	3.92
11	EX. INLET	10	0.07	0.90	0.06	0.12	10.0	0.36	0.00	0.53	10.51	0.30	18	Cir	0.013	94.766	1.00	-1.65	-0.70	5.17

Haven at Sea Bright Number of lines: 39 Date: 1/20/2022

NOTES: ** Critical depth

Line No.	Inlet ID	DnStm Ln No	Drng Area (ac)	Runoff Coeff (C)	Incr CxA	Total CxA	Inlet Time (min)	Incr Q (cfs)	Known Q (cfs)	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Size (in)	Line Type	n-val Pipe	Line Length (ft)	Line Slope (%)	Invert Dn (ft)	Invert Up (ft)	Gnd/Rim El Dn (ft)
10	DMH-S16	9	0.00	0.00	0.00	0.85	10.0	11.54	11.54	52.67	55.21	8.87	36	Cir	0.013	164.912	0.69	-2.89	-1.76	4.00
9	CB-S15	8	0.37	0.68	0.25	1.10	10.0	1.44	0.00	53.62	71.08	7.29	42	Cir	0.013	32.057	0.50	-3.55	-3.39	3.92
8	DMH-S14	7	0.00	0.00	0.00	1.26	10.0	21.00	21.00	74.98	111.46	7.76	48	Cir	0.013	54.812	0.60	-4.38	-4.05	4.80
7	CB-S12	6	0.08	0.87	0.07	1.33	10.0	0.40	0.00	75.23	103.62	7.32	48	Cir	0.013	71.110	0.52	-4.75	-4.38	4.77
6	CB-S10	5	0.14	0.80	0.11	1.44	0.0	0.00	0.00	74.95	97.59	7.16	48	Cir	0.013	75.828	0.46	-5.10	-4.75	5.00
5	CB-S8	4	0.07	0.83	0.06	1.66	0.0	0.00	0.00	75.62	102.18	7.79	48	Cir	0.013	177.886	0.51	-6.00	-5.10	5.00
4	CB-S4	3	0.07	0.90	0.06	1.73	10.0	0.36	0.00	75.82	115.61	7.53	48	Cir	0.013	81.821	0.65	-6.53	-6.00	2.21
3	DMH S4	2	0.00	0.00	0.00	1.76	0.0	0.00	0.00	96.88	115.85	8.98	48	Cir	0.013	69.185	0.65	-6.98	-6.53	1.55
2	DMH S3	1	0.00	0.00	0.00	1.76	0.0	0.00	0.00	96.87	114.18	8.97	48	Cir	0.013	112.376	0.63	-7.69	-6.98	2.16
1	DMH S2	PUMP STA	0.00	0.00	0.00	1.76	0.0	0.00	0.00	96.85	115.64	8.81	48	Cir	0.013	6.172	0.65	-7.73	-7.69	1.95

Haven at Sea Bright	Number of lines: 39	Date: 1/20/2022
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NOTES: ** Critical depth

Gnd/Rim El Up (ft)	
3.50	
0.00	
0.00	
4.75	
3.99	
4.92	
3.37	
3.67	
4.94	
2.75	
2.51	
1.76	
3.00	
2.80	
2.80	
4.89	
4.36	
4.00	
3.85	
5.43	
4.20	
3.00	
3.35	
4.40	
3.60	
4.16	
4.00	
3.90	
3.56	

Haven at Sea Bright	Number of lines: 39	Date: 1/20/2022
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NOTES: ** Critical depth

Gnd/Rim El Up (ft)	
5.17 4.00 3.92 4.80 4.77 5.00 5.00 2.21 1.55 2.16	

Haven at Sea Bright

Number of lines: 39

Date: 1/20/2022

NOTES: ** Critical depth

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
39	15	0.52	0.09	1.84	1.25	1.23	0.43	0.00	1.84	0.006	34.000	0.43	1.84	1.25	1.23	0.43	0.00	1.84	0.006	0.006	0.002	0.50	0.00
38	15	0.10	0.26	0.35	0.09*	0.04	2.50	0.04	0.39	0.000	16.000	0.59	0.71	0.12**	0.06	1.64	0.04	0.76	0.000	0.000	n/a	0.50	n/a
37	15	0.15	0.56	0.76	0.20*	0.13	1.22	0.02	0.78	0.187	16.000	0.59	0.79	0.20	0.13	1.23	0.02	0.81	0.190	0.188	0.030	0.50	0.01
36	15	0.08	0.35	0.45	0.10*	0.04	1.77	0.04	0.48	0.000	30.097	0.65	0.76	0.11**	0.05	1.52	0.04	0.79	0.000	0.000	n/a	0.50	n/a
35	15	0.40	-0.45	-0.24	0.21*	0.13	3.01	0.09	-0.16	0.000	49.224	0.09	0.34	0.25**	0.17	2.35	0.09	0.42	0.000	0.000	n/a	0.50	n/a
34	15	0.01	0.50	0.54	0.04*	0.01	0.93	0.01	0.55	0.832	14.265	0.62	0.66	0.04**	0.01	0.90	0.01	0.67	0.749	0.791	0.113	0.50	0.01
33	18	0.41	-2.25	-1.91	0.34	0.18	1.39	0.08	-1.83	0.000	25.318	-1.99	-1.75 j	0.24**	0.18	2.30	0.08	-1.67	0.000	0.000	n/a	0.50	0.04
32	18	0.46	-2.60	-1.32	1.28	0.19	0.29	0.09	-1.23	0.000	55.312	-2.25	-2.00	0.25**	0.19	2.36	0.09	-1.91	0.000	0.000	n/a	0.60	0.05
31	15	0.01	-1.63	-0.61	1.02	1.07	0.01	0.00	-0.61	0.000	9.387	-1.58	-0.61	0.97	1.02	0.01	0.00	-0.61	0.000	0.000	0.000	0.50	0.00
30	15	0.14	-1.11	-0.97	0.14*	0.07	1.95	0.05	-0.93	0.000	14.235	-1.00	-0.86	0.14**	0.08	1.78	0.05	-0.81	0.000	0.000	n/a	0.50	n/a
29	24	2.13	-2.65	-0.94	1.71	0.63	0.74	0.18	-0.76	0.000	7.278	-2.61	-2.10	0.51**	0.63	3.41	0.18	-1.92	0.000	0.000	n/a	0.60	n/a
28	30	21.13	-5.03	-2.39	2.50	3.22	4.31	0.29	-2.10	0.266	81.024	-3.15	-1.59 j	1.56**	3.22	6.56	0.67	-0.92	0.522	0.394	n/a	0.80	n/a
27	6	0.04	0.61	1.82	0.50	0.20	0.19	0.00	1.82	0.004	44.691	0.95	1.82	0.50	0.20	0.19	0.00	1.82	0.004	0.004	0.002	0.50	0.00
26	18	0.21	-0.48	1.82	1.50	1.77	0.12	0.00	1.82	0.000	17.918	-0.39	1.82	1.50	1.77	0.12	0.00	1.82	0.000	0.000	0.000	0.50	0.00
25	18	0.29	-0.70	1.81	1.50	1.77	0.16	0.00	1.82	0.001	41.887	-0.48	1.82	1.50	1.77	0.16	0.00	1.82	0.001	0.001	0.000	0.80	0.00
24	15	1.13	1.24	2.52	1.25	1.23	0.92	0.01	2.54	0.031	127.900	1.78	2.56	0.78	0.81	1.40	0.03	2.59	0.059	0.045	0.058	0.50	0.02
23	15	1.95	0.65	2.40	1.25	1.23	1.59	0.04	2.44	0.091	83.573	1.24	2.48	1.24	1.23	1.59	0.04	2.52	0.084	0.087	0.073	0.50	0.02
22	15	1.66	-0.01	1.78	1.25	1.23	1.35	0.03	1.81	0.066	18.466	0.09	1.80	1.25	1.23	1.35	0.03	1.82	0.066	0.066	0.012	0.60	0.02
21	30	19.84	-0.66	1.97	2.50	4.91	4.04	0.25	2.23	0.234	33.140	-0.48	2.02	2.50	4.91	4.04	0.25	2.27	0.233	0.234	0.077	0.50	0.13
20	36	38.09	-1.10	1.90	3.00	5.02	5.39	0.89	2.79	0.000	74.592	-0.66	1.35	2.01**	5.02	7.58	0.89	2.24	0.000	0.000	n/a	0.60	n/a
19	36	39.95	-1.57	1.32	2.89	6.98	5.72	0.51	1.82	0.313	91.099	-1.10	1.54	2.64	6.59	6.06	0.57	2.11	0.323	0.318	0.290	0.60	0.34
18	6	0.01	0.60	0.84	0.24	0.01	0.12	0.02	0.86	0.000	39.807	1.00	1.05 j	0.05**	0.01	1.07	0.02	1.07	0.000	0.000	n/a	0.50	n/a
17	6	0.13	0.00	0.16	0.16*	0.05	2.41	0.06	0.22	0.000	62.145	0.60	0.78	0.18**	0.06	2.04	0.06	0.84	0.000	0.000	n/a	0.60	n/a
16	15	0.23	-1.35	-0.28	1.07	1.12	0.21	0.00	-0.28	0.001	16.204	-1.26	-0.28	0.98	1.04	0.22	0.00	-0.28	0.001	0.001	0.000	0.60	0.00
15	15	0.31	-0.08	0.14	0.22*	0.14	2.11	0.07	0.21	0.492	16.204	0.00	0.22	0.22**	0.15	2.12	0.07	0.29	0.503	0.497	0.081	0.50	0.04
14	15	0.44	-2.20	-0.28	1.25	1.23	0.36	0.00	-0.28	0.005	41.074	-1.35	-0.28	1.07	1.12	0.39	0.00	-0.28	0.004	0.004	0.002	0.60	0.00
13	18	0.60	-2.73	-0.28	1.50	1.77	0.34	0.00	-0.28	0.003	42.884	-2.45	-0.28	1.50	1.77	0.34	0.00	-0.28	0.003	0.003	0.001	1.00	0.00
12	18	0.58	-2.81	-0.28	1.50	1.77	0.33	0.00	-0.28	0.003	12.897	-2.73	-0.28	1.50	1.77	0.33	0.00	-0.28	0.003	0.003	0.000	0.50	0.00

Haven at Sea Bright Number of lines: 39 Run Date: 1/20/2022

Notes: * Normal depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
11	18	0.53	-1.65	1.81	1.50	1.77	0.30	0.00	1.81	0.003	94.766	-0.70	1.81	1.50	1.77	0.30	0.00	1.81	0.003	0.003	0.002	0.50	0.00
10	36	52.67	-2.89	-0.55	2.34*	5.92	8.89	1.22	0.67	0.000	164.912	-1.76	0.60	2.36**	5.96	8.84	1.22	1.81	0.000	0.000	n/a	0.80	n/a
9	42	53.62	-3.55	-0.76	2.79	6.67	6.53	1.01	0.24	0.000	32.057	-3.39	-1.10	2.29**	6.67	8.04	1.01	-0.10	0.000	0.000	n/a	0.60	n/a
8	48	74.98	-4.38	-1.16	3.22	8.72	6.91	1.15	-0.01	0.000	54.812	-4.05	-1.43	2.62**	8.72	8.60	1.15	-0.28	0.000	0.000	n/a	0.80	n/a
7	48	75.23	-4.75	-0.86	3.89	8.73	6.03	1.15	0.29	0.000	71.110	-4.38	-1.76	2.62**	8.73	8.61	1.15	-0.60	0.000	0.000	n/a	0.70	n/a
6	48	74.95	-5.10	-1.86	3.24	10.89	6.88	0.74	-1.13	0.279	75.828	-4.75	-1.76	2.99	10.08	7.43	0.86	-0.90	0.329	0.304	0.231	0.80	0.69
5	48	75.62	-6.00	-2.77	3.23	8.76	6.95	1.16	-1.61	0.000	177.886	-5.10	-2.47	2.63**	8.76	8.63	1.16	-1.31	0.000	0.000	n/a	1.00	n/a
4	48	75.82	-6.53	-2.97	3.56	8.77	6.42	1.16	-1.81	0.000	81.821	-6.00	-3.37	2.63**	8.77	8.64	1.16	-2.21	0.000	0.000	n/a	0.80	n/a
3	48	96.88	-6.98	-3.48	3.50	10.04	8.30	1.45	-2.03	0.000	69.185	-6.53	-3.55	2.98**	10.04	9.65	1.45	-2.10	0.000	0.000	n/a	0.90	n/a
2	48	96.87	-7.69	-4.19	3.50	10.04	8.30	1.45	-2.74	0.000	112.376	-6.98	-4.00	2.98**	10.04	9.65	1.45	-2.55	0.000	0.000	n/a	0.80	n/a
1	48	96.85	-7.73	-4.02	3.71	10.04	7.97	1.45	-2.57	0.000	6.172	-7.69	-4.71	2.98**	10.04	9.65	1.45	-3.26	0.000	0.000	n/a	0.70	1.01

Haven at Sea Bright Number of lines: 39 Run Date: 1/20/2022

Notes: * Normal depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

PIPE SIZE	18 INCH
PIPE MATERIAL	RCP
MANNING'S	0.013

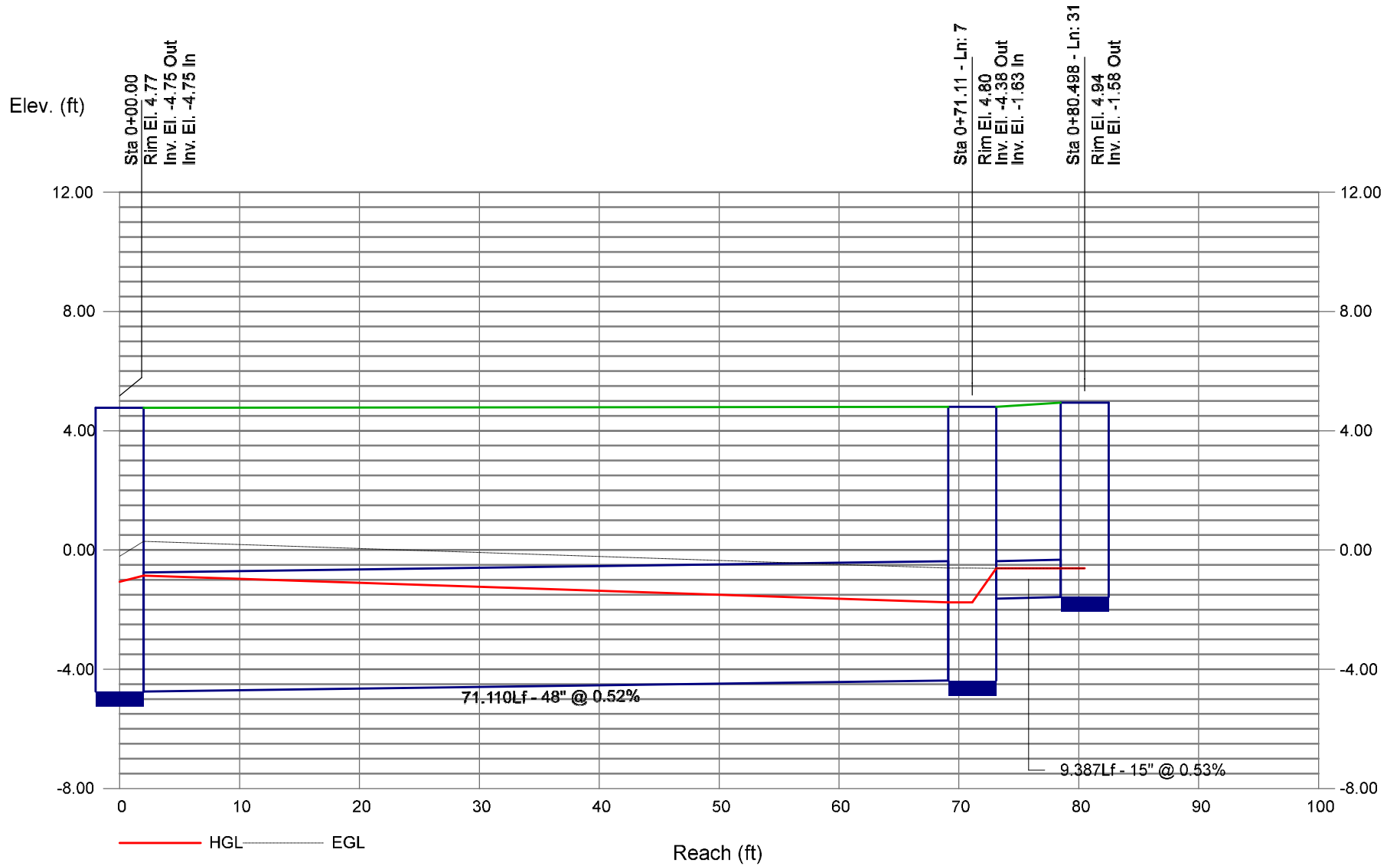
SLOPE	VELOCITY	CAPACITY
0.10%	0.00	FALSE
0.15%	2.31	4.08
0.20%	2.67	4.71
0.25%	2.98	5.27
0.30%	3.26	5.77
0.35%	3.53	6.23
0.40%	3.77	6.66
0.45%	4.00	7.07
0.50%	4.21	7.45
0.55%	4.42	7.81
0.60%	4.62	8.16
0.65%	4.81	8.49
0.70%	4.99	8.81
0.75%	5.16	9.12
0.80%	5.33	9.42
0.85%	5.50	9.71
0.90%	5.65	9.99
0.95%	5.81	10.27
1.00%	5.96	10.53
1.05%	6.11	10.79
1.10%	6.25	11.05
1.15%	6.39	11.29
1.20%	6.53	11.54
1.25%	6.66	11.78
1.30%	6.80	12.01
1.35%	6.93	12.24
1.40%	7.05	12.46
1.45%	7.18	12.68
1.50%	7.30	12.90
1.55%	7.42	13.11
1.60%	7.54	13.32
1.65%	7.66	13.53
1.70%	7.77	13.73
1.75%	7.88	13.93
1.80%	8.00	14.13
1.85%	8.11	14.33
1.90%	8.22	14.52
1.95%	8.32	14.71
2.00%	8.43	14.90

SLOPE	VELOCITY	CAPACITY
2.10%	8.64	15.26
2.15%	8.74	15.44
2.20%	8.84	15.62
2.25%	8.94	15.80
2.30%	9.04	15.97
2.35%	9.14	16.15
2.40%	9.23	16.32
2.45%	9.33	16.49
2.50%	9.42	16.65
2.55%	9.52	16.82
2.60%	9.61	16.98
2.65%	9.70	17.15
2.70%	9.79	17.31
2.75%	9.88	17.47
2.80%	9.97	17.62
2.85%	10.06	17.78
2.90%	10.15	17.94
2.95%	10.24	18.09
3.00%	10.32	18.24
3.05%	10.41	18.39
3.10%	10.49	18.54
3.15%	10.58	18.69
3.20%	10.66	18.84
3.25%	10.74	18.99
3.30%	10.83	19.13
3.35%	10.91	19.28
3.40%	10.99	19.42
3.45%	11.07	19.56
3.50%	11.15	19.70
3.55%	11.23	19.84
3.60%	11.31	19.98
3.65%	11.39	20.12
3.70%	11.46	20.26
3.75%	11.54	20.40
3.80%	11.62	20.53
3.85%	11.69	20.67
3.90%	11.77	20.80
3.95%	11.85	20.93
4.00%	11.92	21.07

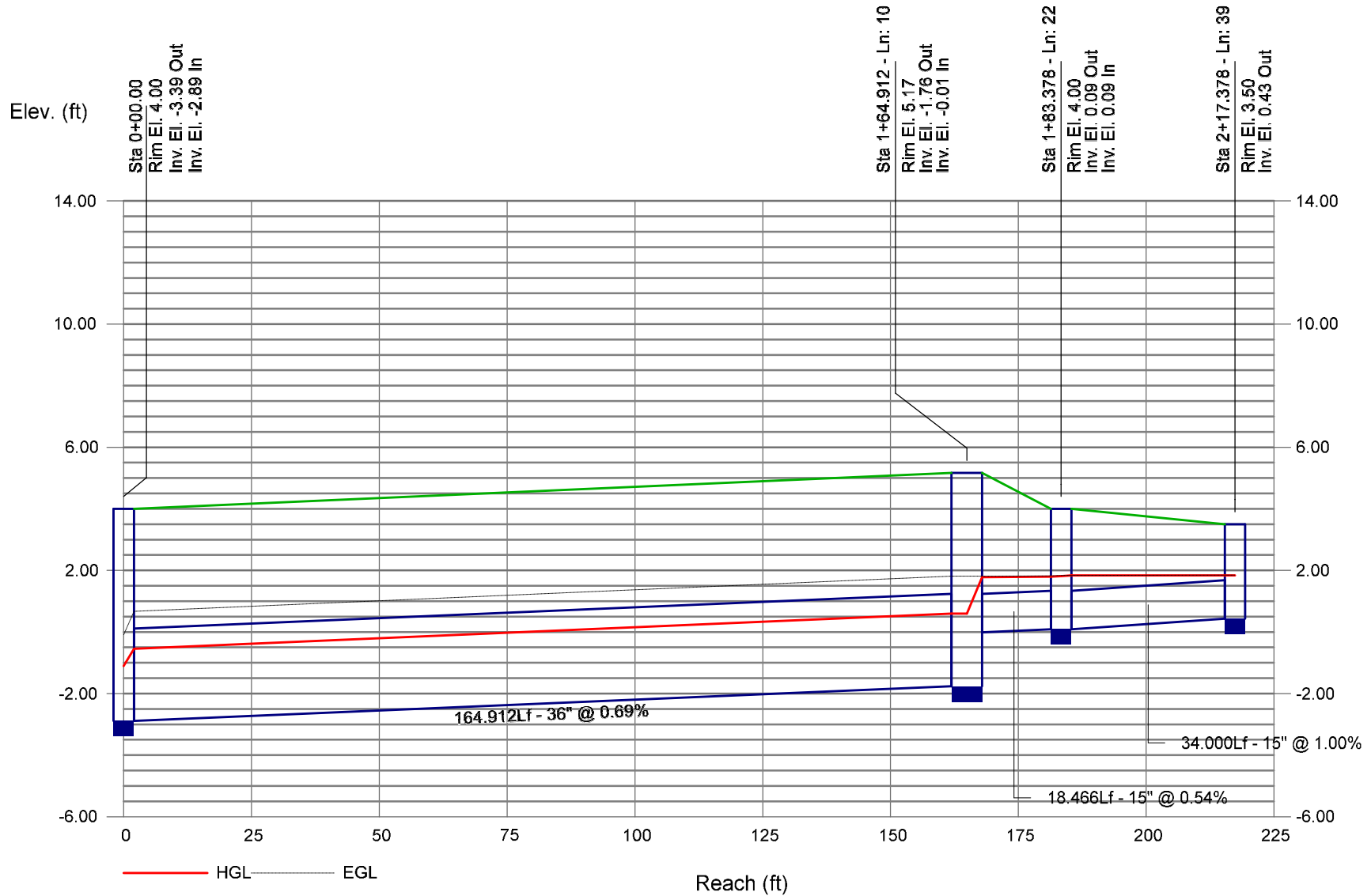
SLOPE	VELOCITY	CAPACITY
4.10%	12.07	21.33
4.15%	12.14	21.46
4.20%	12.21	21.59
4.25%	12.29	21.71
4.30%	12.36	21.84
4.35%	12.43	21.97
4.40%	12.50	22.09
4.45%	12.57	22.22
4.50%	12.64	22.34
4.55%	12.71	22.47
4.60%	12.78	22.59
4.65%	12.85	22.71
4.70%	12.92	22.83
4.75%	12.99	22.96
4.80%	13.06	23.08
4.85%	13.13	23.20
4.90%	13.19	23.31
4.95%	13.26	23.43
5.00%	13.33	23.55
5.05%	13.39	23.67
5.10%	13.46	23.79
5.15%	13.53	23.90
5.20%	13.59	24.02
5.25%	13.66	24.13
5.30%	13.72	24.25
5.35%	13.79	24.36
5.40%	13.85	24.48
5.45%	13.91	24.59
5.50%	13.98	24.70
5.55%	14.04	24.81
5.60%	14.10	24.92
5.65%	14.17	25.04
5.70%	14.23	25.15
5.75%	14.29	25.26
5.80%	14.35	25.37
5.85%	14.42	25.47
5.90%	14.48	25.58
5.95%	14.54	25.69
6.00%	14.60	25.80

APPENDIX B
DRAINAGE PIPE PROFILES

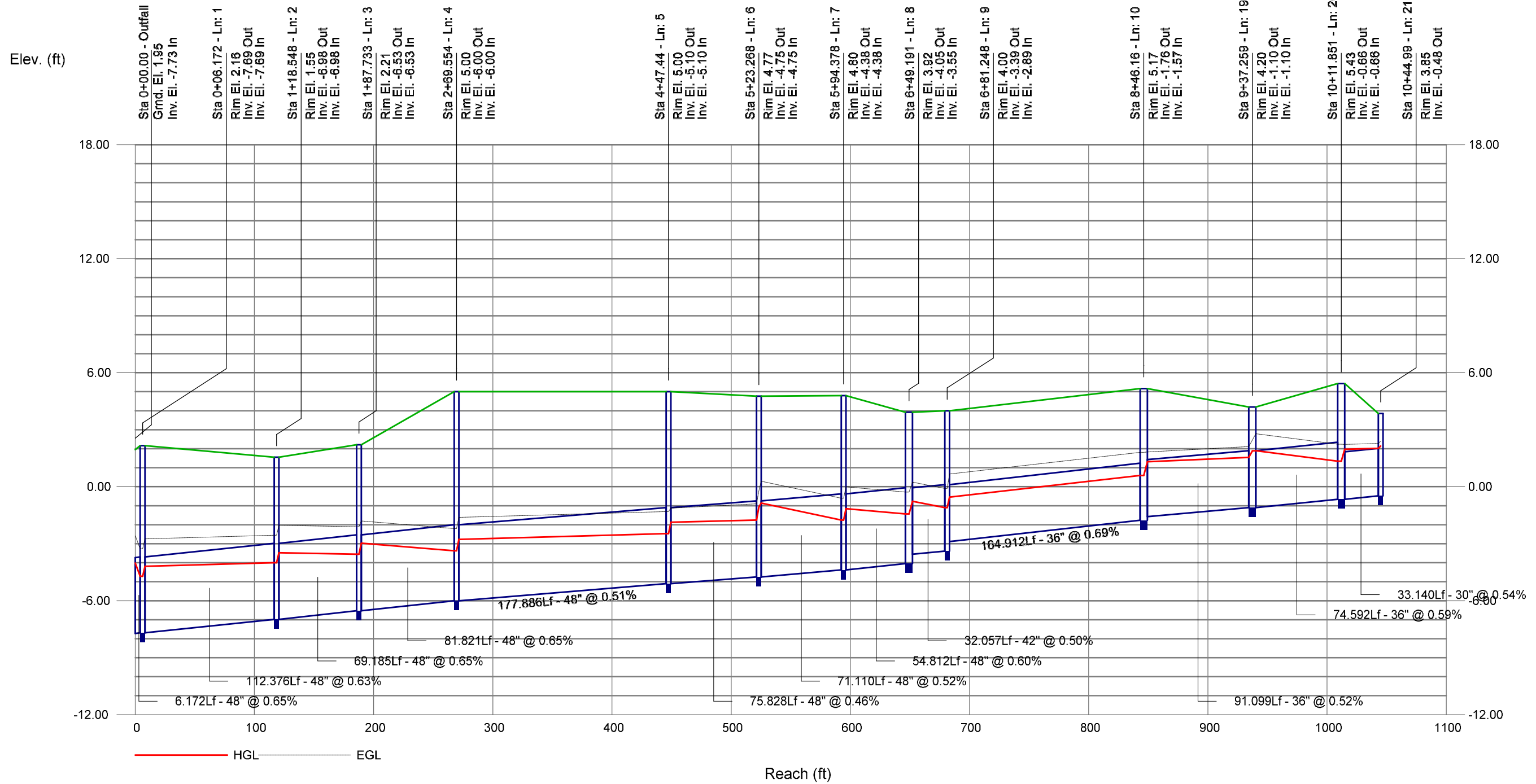
Storm Sewer Profile CB-S13 TO CB-S12

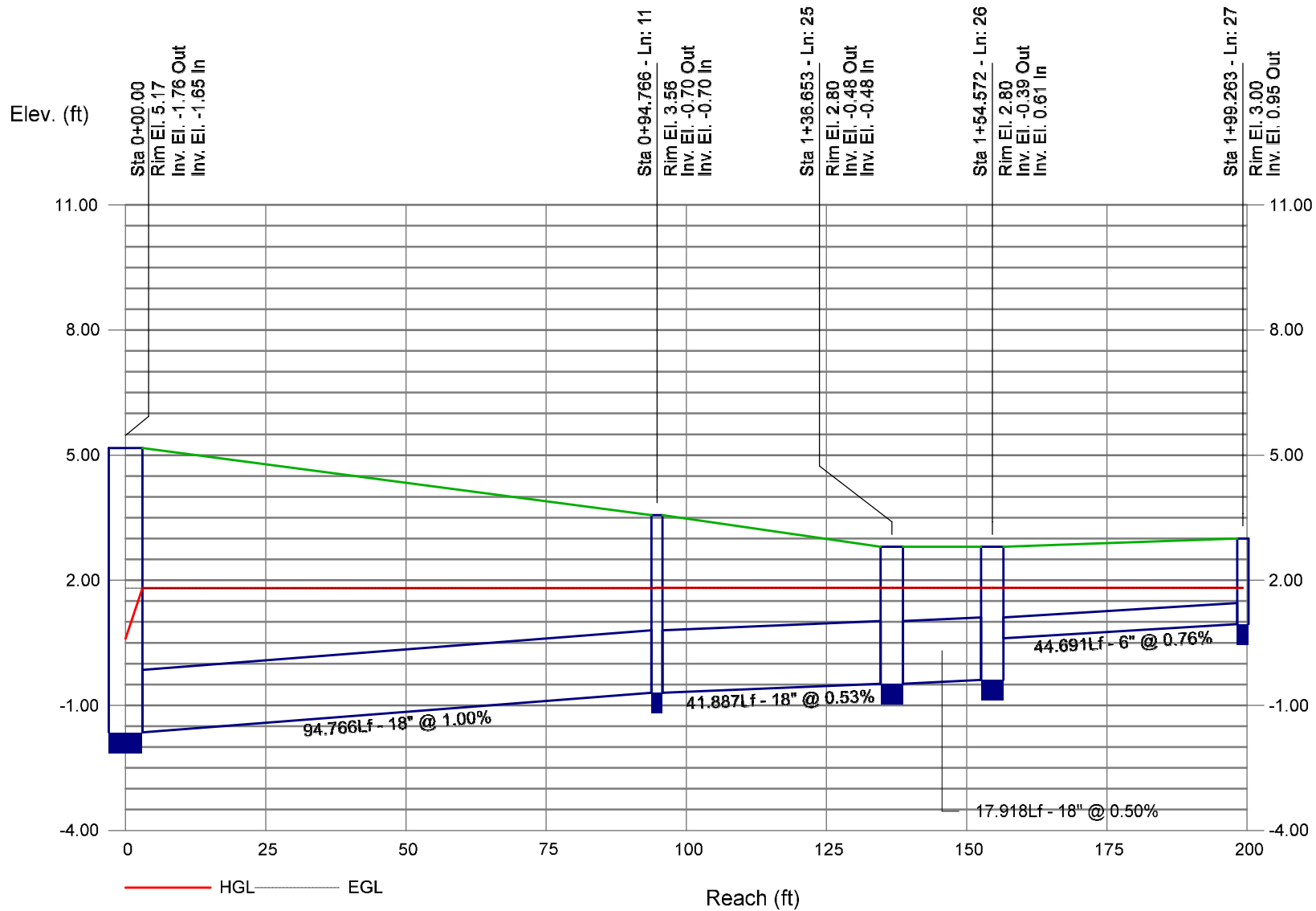


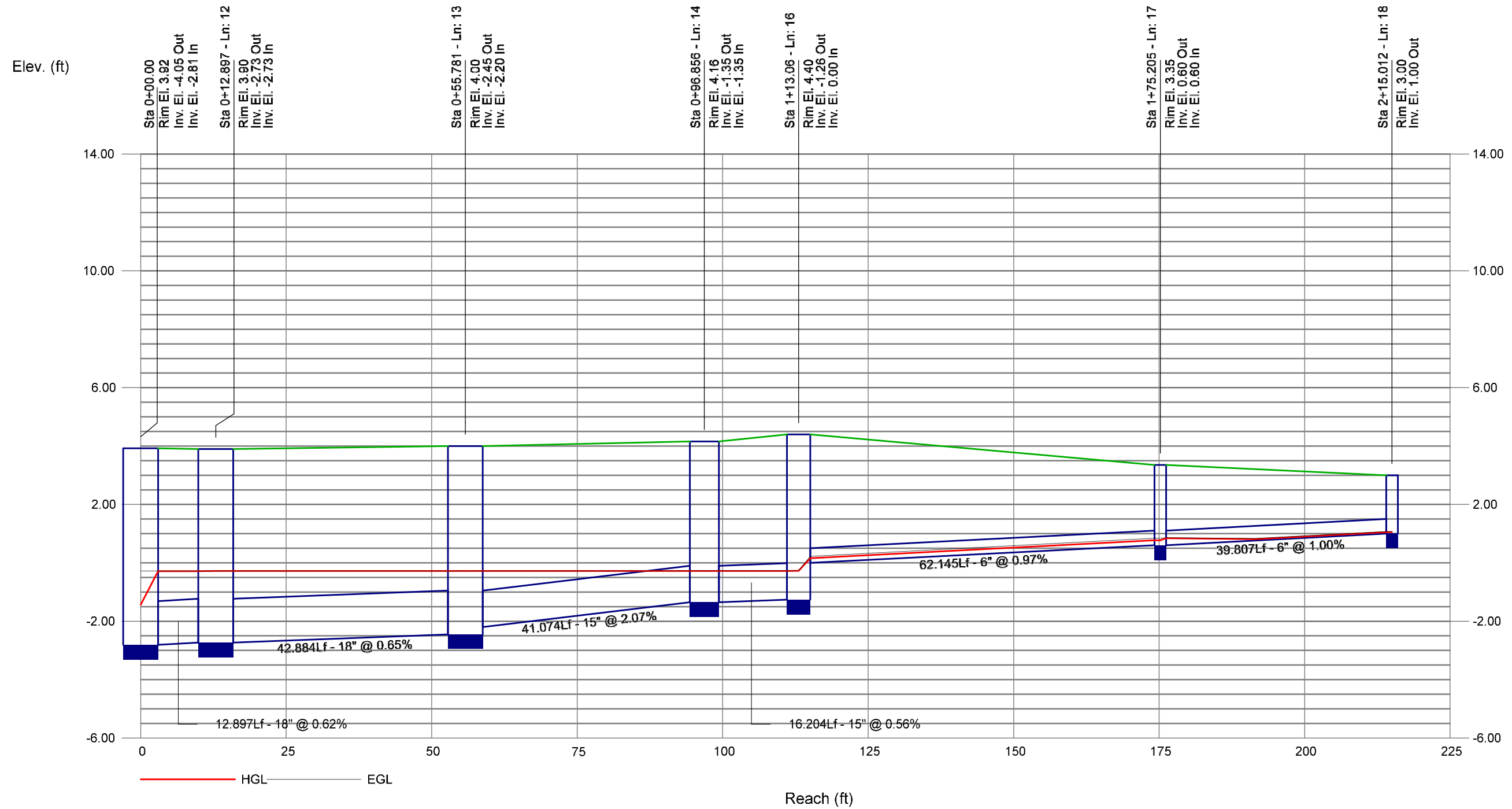
Storm Sewer Profile CB-S18 TO DMH-S16

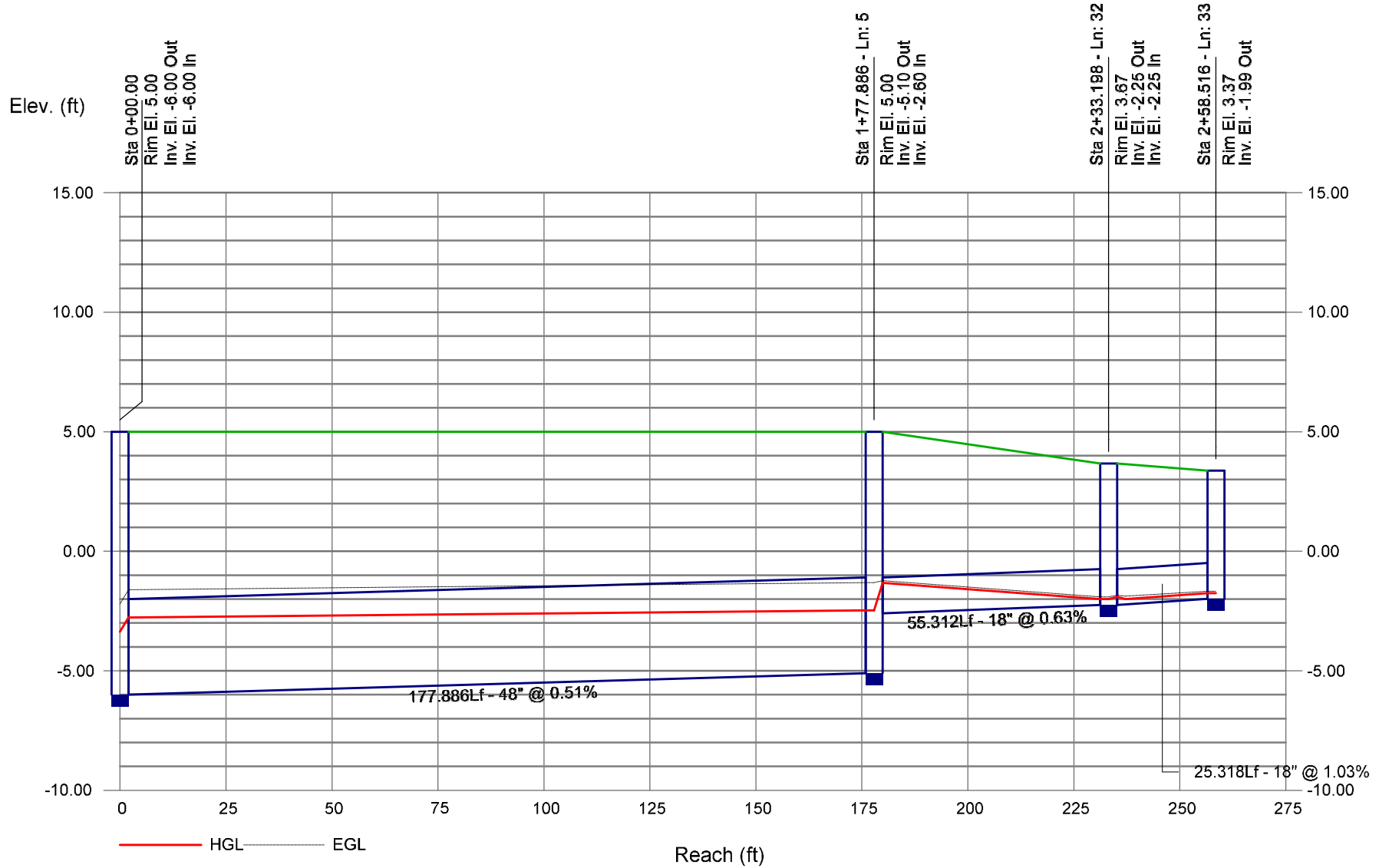


Storm Sewer Profile CB-21 TO PUMP STATION

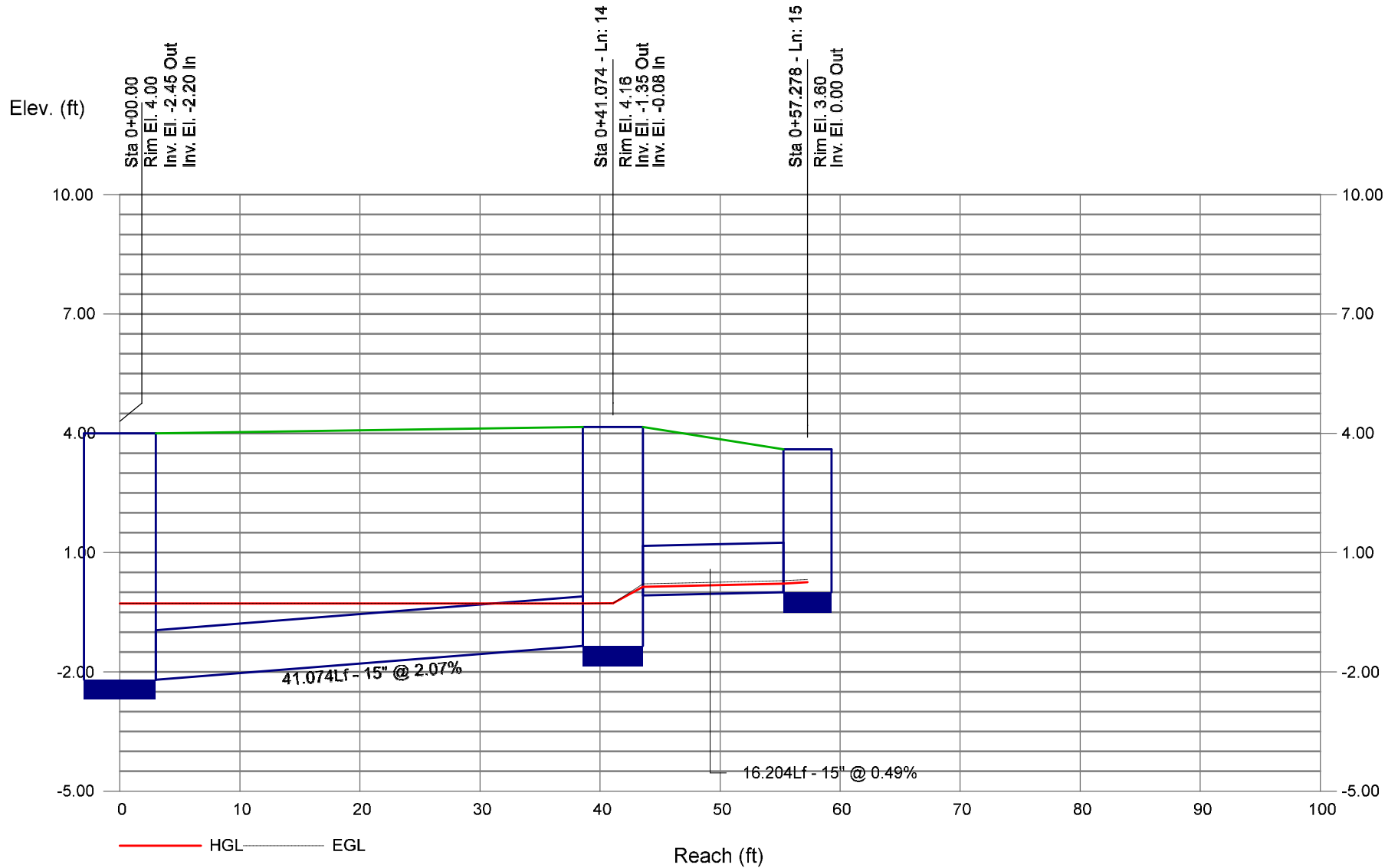


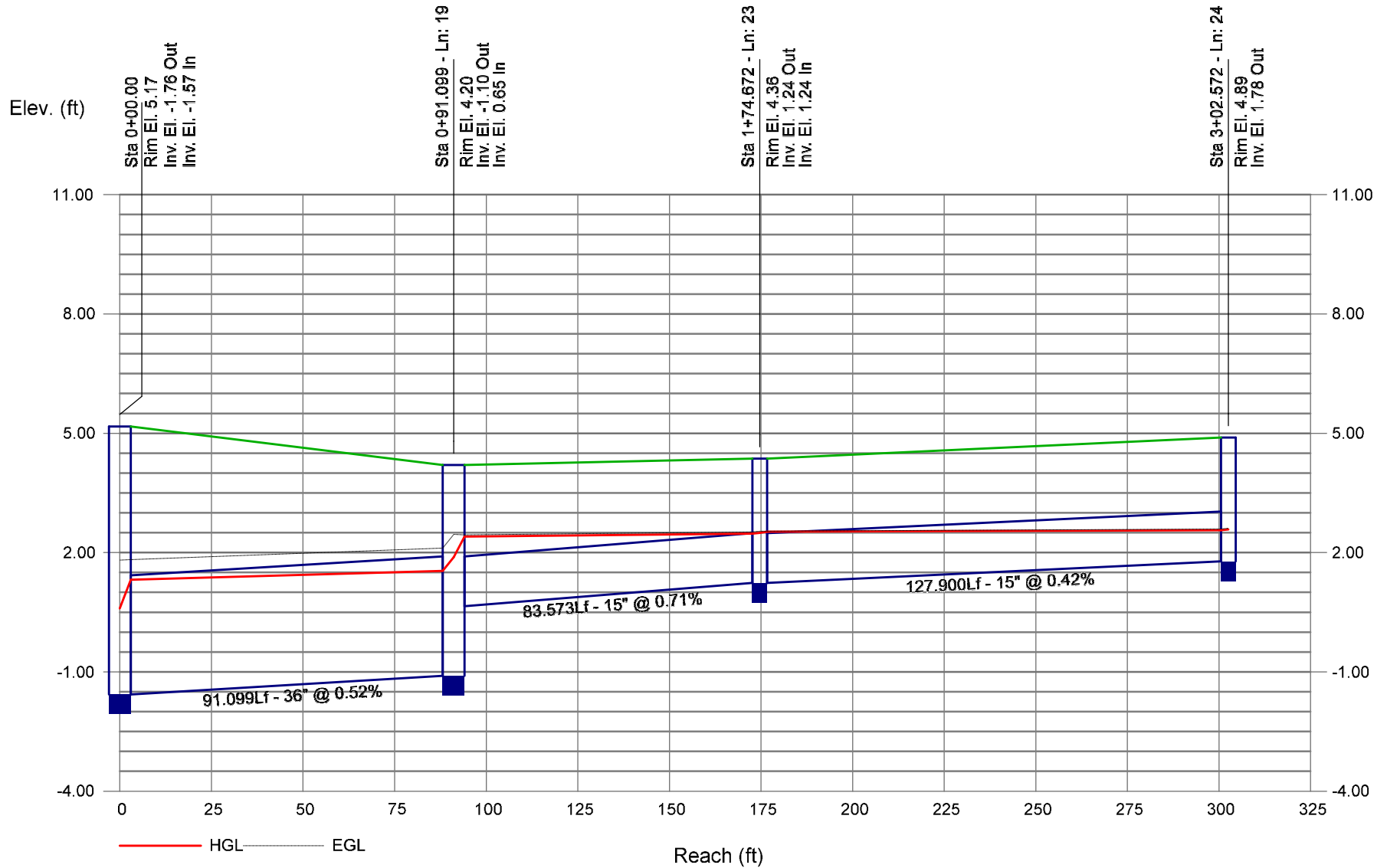


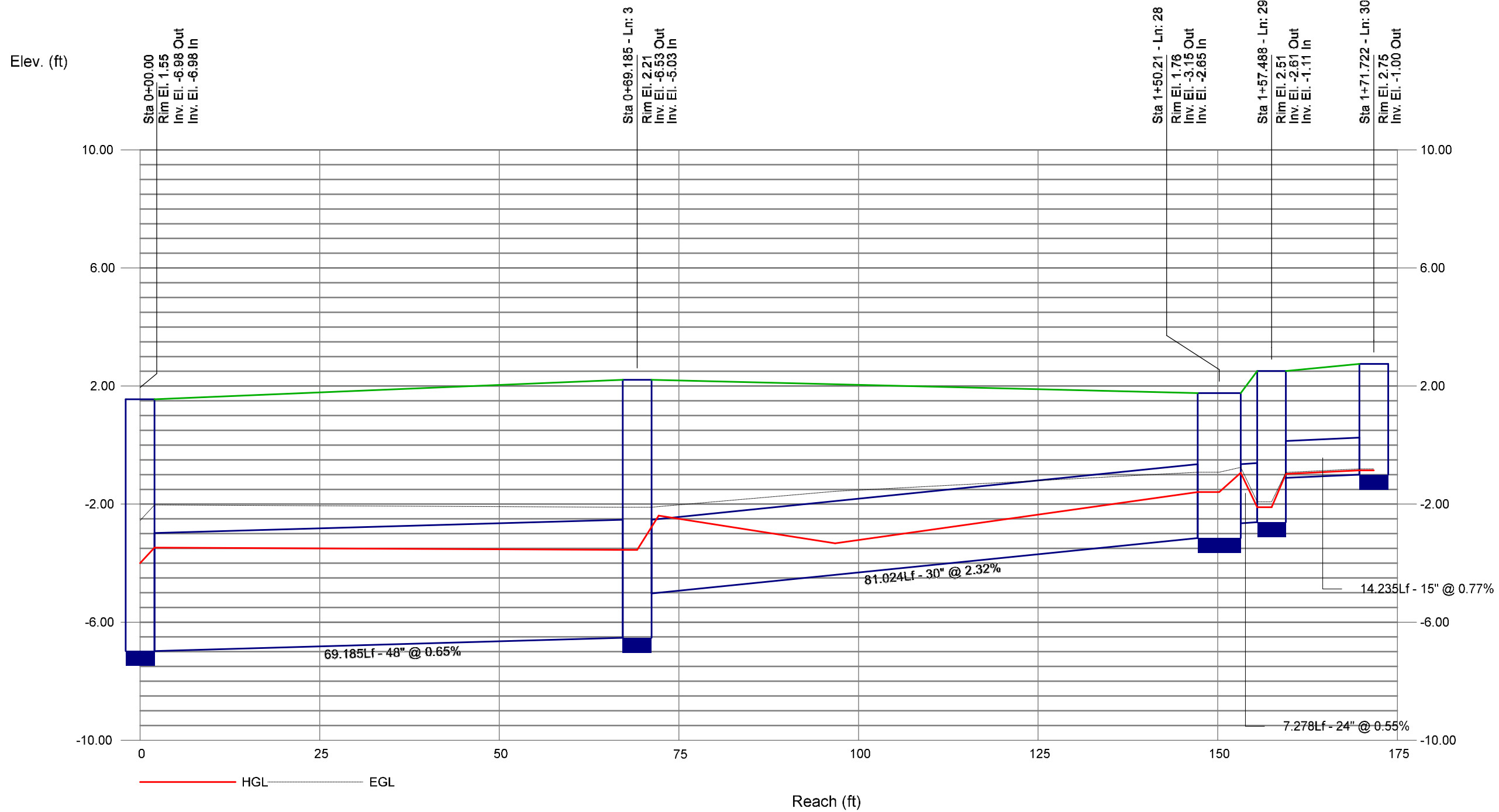




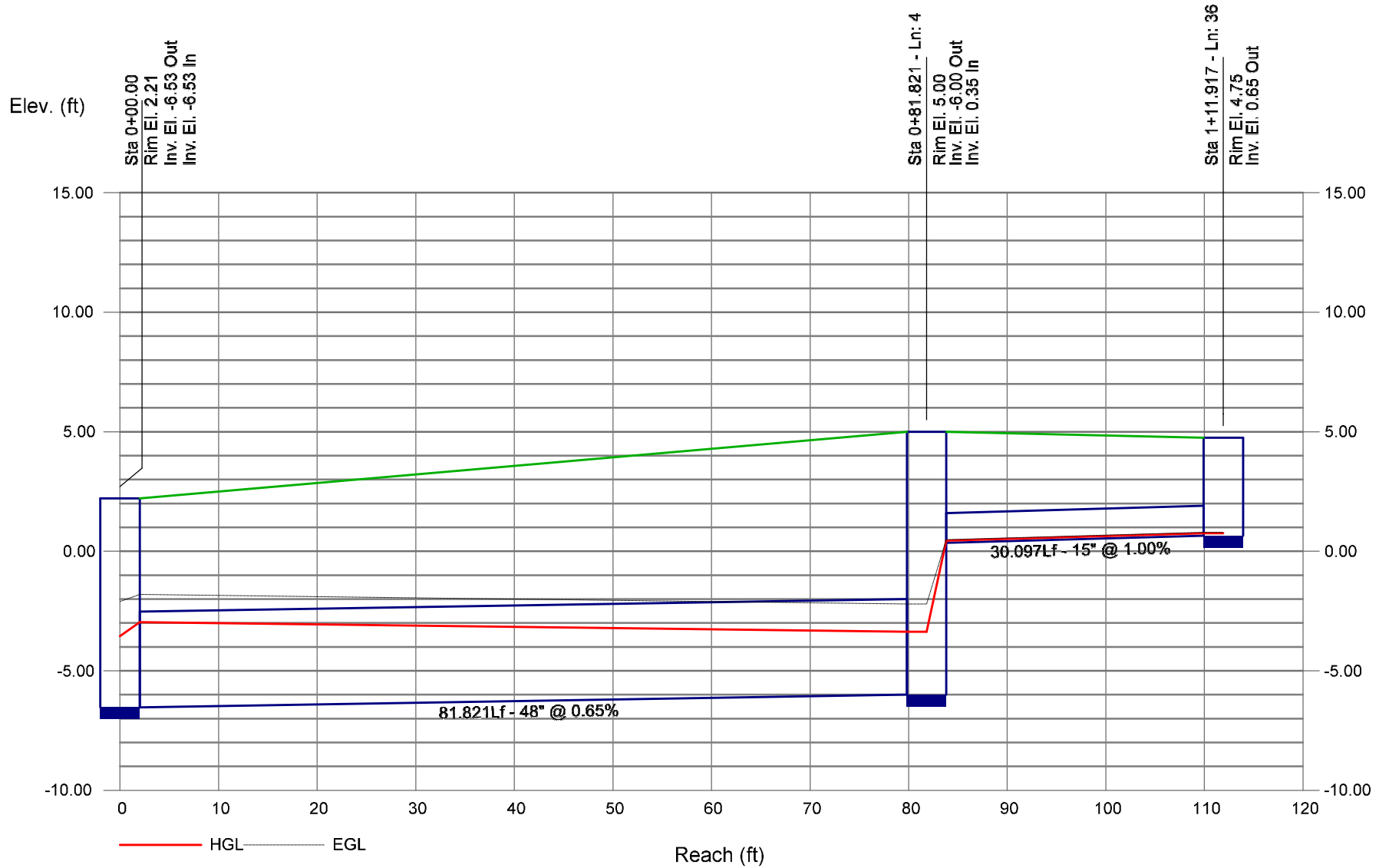
Storm Sewer Profile CB-C2 TO DMH-C3



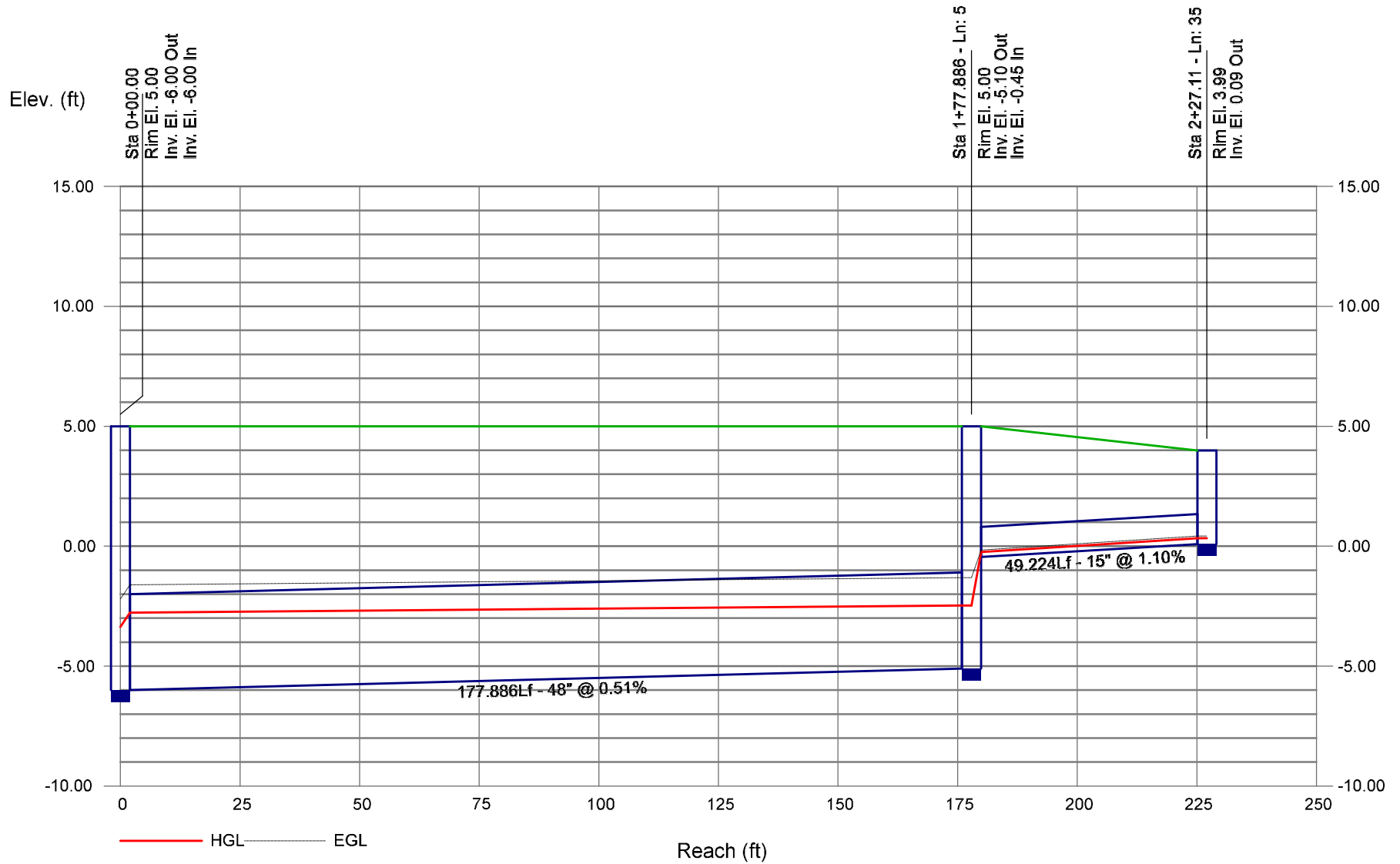




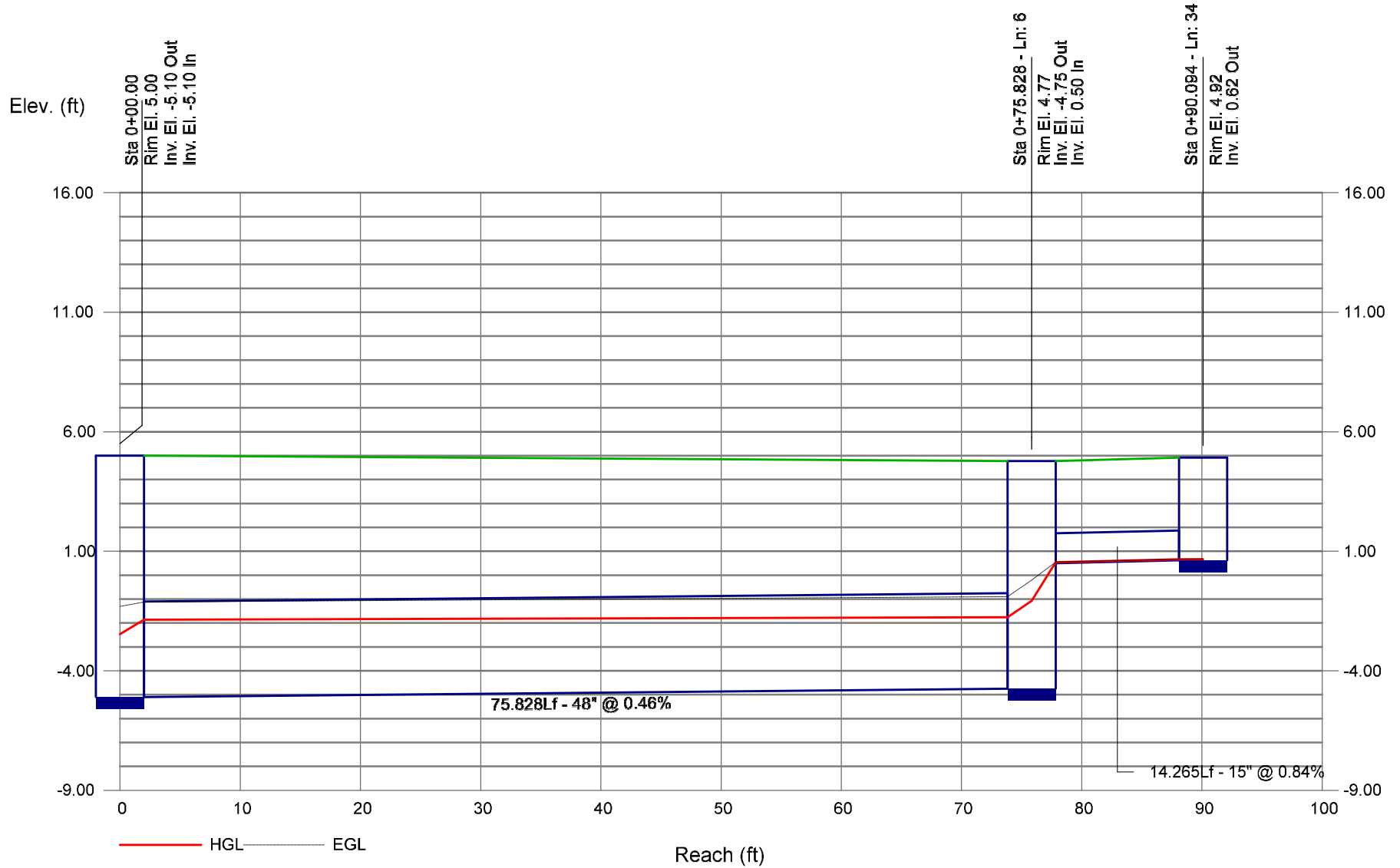
Storm Sewer Profile CB-S7 TO CB-S6



Storm Sewer Profile CB-S9 TO CB-S8

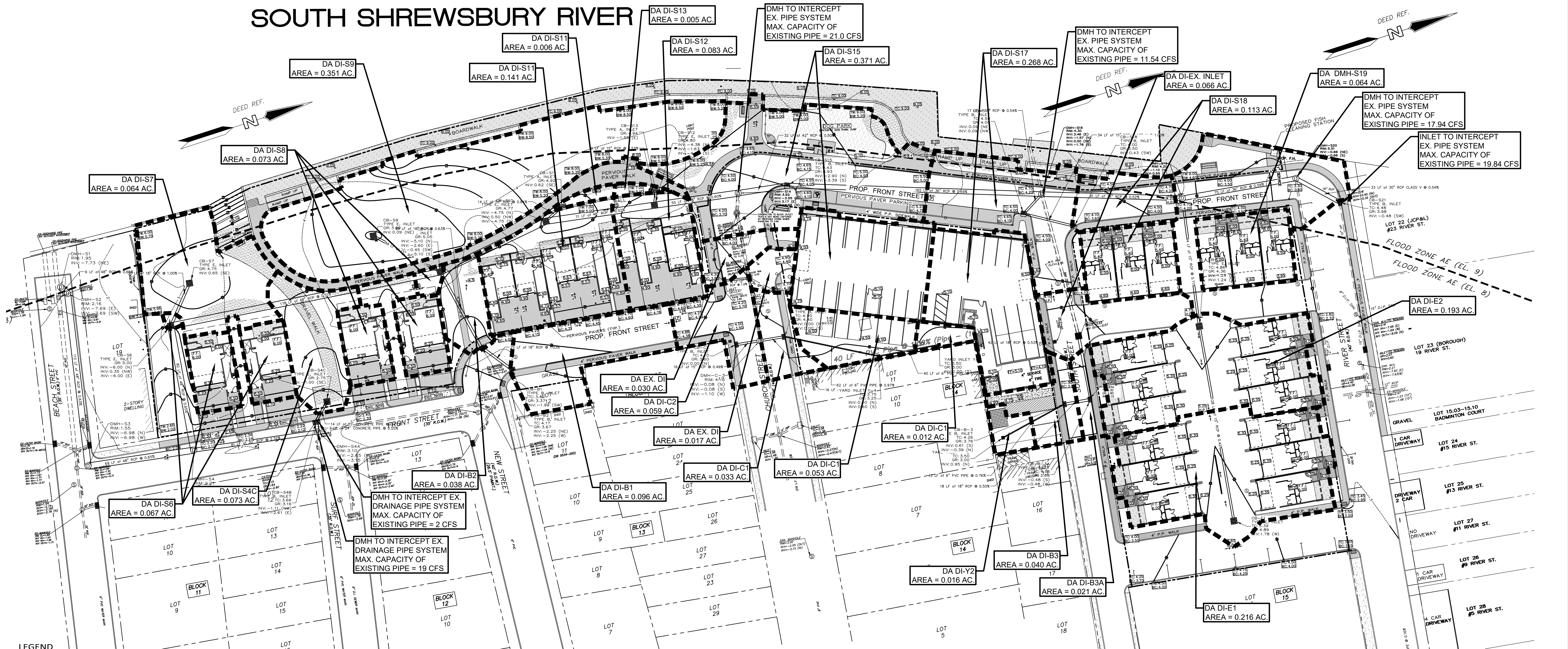


Storm Sewer Profile CB-S11 TO CB-S10

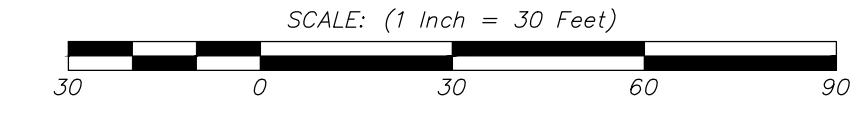


APPENDIX C
DRAINAGE INLET MAP

SOUTH SHREWSBURY RIVER



- LEGEND**
- GAS VALVE
 - WATER VALVE
 - WATER WELL
 - UTILITY MANHOLE
 - DRAINAGE MANHOLE
 - ELECTRICAL MANHOLE
 - SANITARY MANHOLE
 - TELEPHONE MANHOLE
 - TRAFFIC SIGN
 - TRAFFIC SIGN (2 POST)
 - STREET SIGN
 - LIGHT POST
 - GROUND LIGHT
 - UTILITY POLE
 - FIRE HYDRANT
 - DRAINAGE INLET (TYPE "A")
 - DRAINAGE INLET (TYPE "B")
 - DRAINAGE INLET (TYPE "E")
 - DRAINAGE LINE
 - ELECTRIC LINE
 - GAS LINE
 - SANITARY SEWER LINE
 - TELEPHONE LINE
 - WATER LINE
 - OVERHEAD WIRES
 - MONITORING WELL
 - IRON/ALUMINUM PIPE FOUND
 - IRON BAR FOUND
 - CONCRETE MONUMENT FOUND
 - SURVEY
 - FILE MAP
 - GAS METER
 - D.C. DEPRESSED CURB
 - F.C. FLUSH CURB



NO.	DATE	DESCRIPTION	DRAWN BY

PRELIMINARY MAJOR SITE PLAN
 BLOCK 13 LOTS 12,13,14,15,16,17,18,20,21,22
 BLOCK 14 LOTS 12,14
 BLOCK 15 LOTS 5,6,7,8,9,10,11,12
 BOROUGH OF SEA BRIGHT MONMOUTH COUNTY NEW JERSEY

WJH
ENGINEERING

CERT. OF AUTH. NO. 24GA28117300
 257 MONMOUTH ROAD,
 BLDG. A, STE. 7,
 OAKHURST, NJ 07755
 PHONE: 732-223-1313
 WWW.WJHENGINEERING.COM

DRAINAGE INLET MAP

WALTER JOSEPH HOPKIN
 N.J. PROFESSIONAL ENGINEER, LIC. No. 40673

SCALE:	DRAWN BY:	DATE:	JOB No.:	SHEET No.:
1" = 20'	JUL	1/17/22	19179A	1 OF 1