HYDROLOGIC AND HYDRAULICS STUDY

North Coast Highway 101, Encinitas CA

Pre-Final Submittal

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INTRODUCTION AND BACKGROUND

The City of Encinitas is proposing to install street improvements, new inlets, and a new 60" RCP storm drain underneath Coast Highway 101, from Basil Street north to La Costa Ave (See Figure 1). These improvements will reduce localized flooding known to frequently occur along this corridor. The proposed 60" storm drain and new laterals convey runoff north to the Batiquitos Lagoon and have been designed in conjunction with hydrologic and hydraulic results developed by Q3 Consultants as part of a recent Watershed Mater Plan for the City, more discussion is included herein.

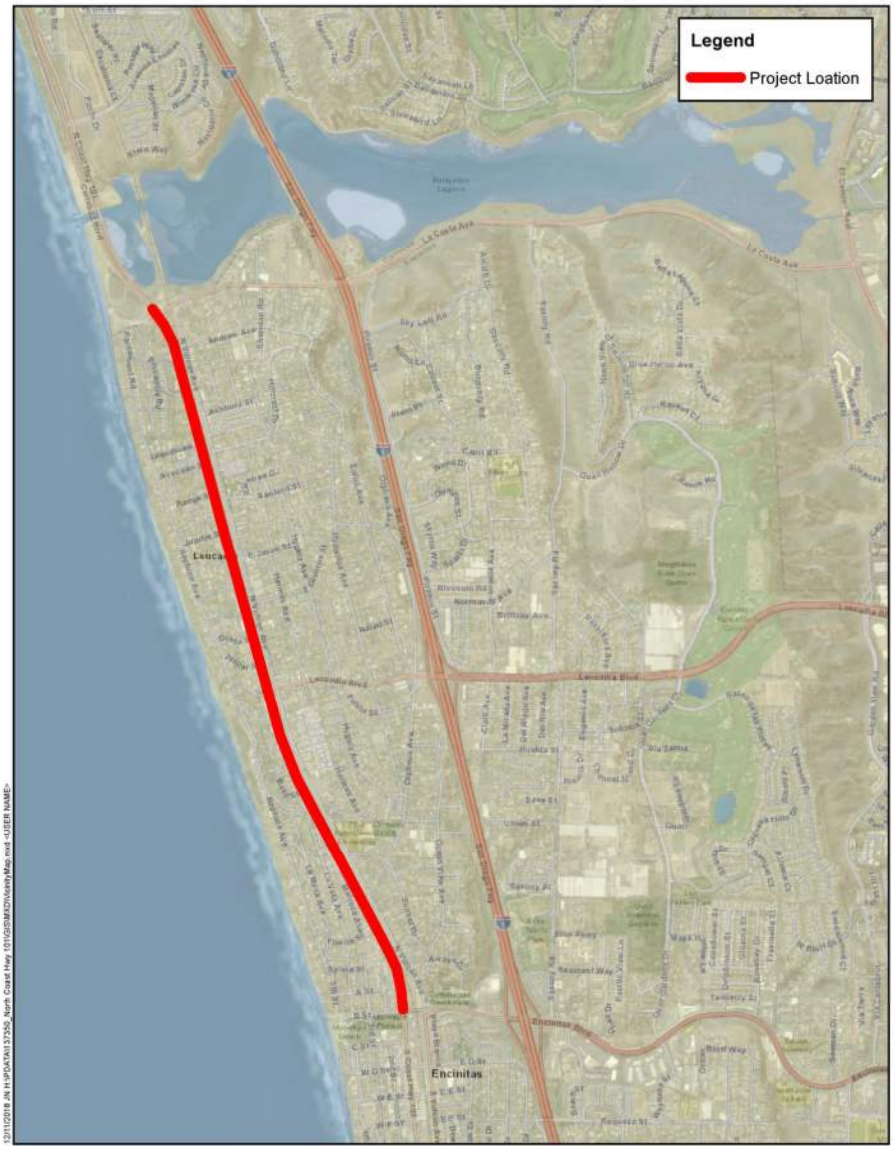

FIGURE 1: PROJECT VICINITY MAP

SCOPE OF ANALYSIS

The scope of this report includes:

1. Determination of the 50- and 100-year storm peak flow rates within the project area,
2. Determination of street hydraulic characteristics as a result of proposed infrastructure,
3. Determination of inlet and pipe hydraulic characteristics as a result of proposed infrastructure.

The hydrologic and hydraulic analyses derived within this report are intentionally limited to the newly proposed storm drain inlets and associated laterals that connect to the new 60" mainline, ultimately discharging into the Batiquitos Lagoon via two existing outfalls. The proposed 60" mainline storm drain has been analyzed under separate cover by Q3, the resultant HGL's are used herein. A separate analysis for proposed improvements to an existing system that discharges southerly to Moonlight Beach has been included in Appendix H & Appendix I for reference.

Refer to Modeling Approach section below for further discussion.

METHODOLOGY

HYDROLOGY

Project flow rates have been determined using the "Rational Method" as specified within the Section 3 of the County of San Diego Hydrology Manual (June 2003) for watersheds of less than 0.5 square mile. Calculations have been performed utilizing these parameters within the Hydraflow Storm Sewers computer program.

$$Q = C\ I\ A$$

Equation 1 : Rational Method

Where,

Q = Peak Discharge, (cubic feet per second)

C = Runoff Coefficient, (unit-less)

I = Average Rainfall Intensity, (inches per hour)

A = Drainage Area, (acres)

Drainage Area (A)

The drainage areas for each storm drain system analyzed in this report were developed using two-foot topography obtained from the San Diego Geographic Information Source (SanGIS). Aerial imaging, Google

Earth Street View, and field verification (MBI 3-26-2020 and 4-10-2020) were used in conjunction with the topography to develop drainage areas. Refer to the Hydrologic Work Map, found in Appendix C of this report, for a graphical representation of the project drainage areas.

Precipitation Loss/Runoff Coefficient (C)

Runoff coefficients were determined from Table 3-1 found in the County of San Diego Hydrology Manual (Hydrology Manual). Land use information from aerial photography was used to determine the number of dwelling units per acre and correlated with the hydrologic soil type. The City of Encinitas' Engineering Manual assumes type D soil for all areas per Section 6.202. A summary of these runoff coefficients can be found within Table 1 and Table 2, in the Results section of this study.

Time of Concentration (T_c)

The time of concentration (T_c) is the sum of the initial time (T_i) and travel time (T_t), as identified in section 3 of the Hydrology Manual. The initial time of concentration is based on Table 3-2 of the Hydrology Manual.

T_t is computed by dividing the gutter or street flow path in a particular drainage subarea by the computed flow velocity for the segment in question. Flow velocity is conservatively based on a 0.5-foot depth (full gutter flow) condition in Figure 3-6 of the Hydrology Manual. A minimum Tc of 5 minutes was used per the Hydrology Manual. Calculations can be found in Appendix C.

Rainfall Intensity (I)

This study considers the 50 and 100-year storm intensities based upon Figure 3-2 and the Isohyetal maps found in Appendix B of the hydrology manual.

HYDRAULICS

Hydraulic analyses for each new inlet and storm drain lateral have been performed using Hydraflow Storm Sewers. Gutter, inlet, and pipe hydraulics have been developed and analyzed internally within the Hydraflow model. Flow rates have been manually input into the program at each inlet for 50-year and 100-year analyses. The starting HGL (i.e. tailwater condition) for each lateral correlates with the respective 60" mainline HGL as determined in Q3's Watershed Master Plan.

Gutter Hydraulics

Hydraflow uses trial and error with a modification of Manning's Equation to determine depth and spread of gutter flow. With this geometry, Hydraflow determines the amount of flow that bypasses curb inlets. This bypass flow is transferred to another inlet, based on adjacent slopes and drainage patterns.

$$D = \left(\frac{Q * n}{K_C * Z * \sqrt{S}}\right)^{0.375}$$

Equation 2 : Gutter Spread

Where,

D = Depth of flow in gutter, (ft)

Q = Flow in gutter, (cfs)

Kc = 0.56 (empirically derived)

n = Manning's roughness coefficient

Z = Reciprocal of the cross slope

S = Longitudinal gutter slope

Inlet Hydraulics

Inlet hydraulic calculations have been determined within Hydraflow Storm Sewers based on the standard equations from FHWA HEC 22 for inlets on-grade and in-sump (whose performance varies based upon structural type and the governing condition of weir, orifice, or transitional flow). Hydraflow uses the gutter hydraulic results to determine flow bypass and ponding depth at sump inlets. For on-grade inlets, bypass flow is transferred to another inlet within the model, based on user specification.

$$\boldsymbol{Q = C_W * L_W * d^{3/2}}$$

Equation 3 : Curb Inlets in Sump When Operating as Weir

Where,

Q = inlet capacity, (CFS)

C_w = 2.3 (empirically derived coefficient).

L_w = length of curb opening, (ft.)

d = Flow depth at face of curb, (ft.)

$$\boldsymbol{Q = C_o * h * L * (2gd)^{1/2}}$$

Equation 4 : Curb Inlets in Sump When Operating as an Orifice

Where,

Q = inlet capacity, (CFS)

Co = 0.67 (empirically derived coefficient).

h= throat height of curb opening (ft.)

L = length of curb opening, (ft.)

g = 32.2 (gravitational constant)

d = Flow depth at face of curb, (ft.)

$$Q = C_o * A * (2gd)^{1/2}$$

Equation 5 : Grate Inlets in Sump When Operating as an Orifice

Where,

Q = inlet capacity, (CFS)

Co = 0.67 (empirically derived coefficient).

A = clear opening area (sq. ft.)

g = 32.2 (gravitational constant)

d = Flow depth over grate, (ft.)

$$Q = C_W * P * h^{3/2}$$

Equation 6 : Grate Inlets in Sump When Operating as Weir and Combination Inlets

Where,

Q = inlet capacity, (CFS)

C_w = 3.0 (empirically derived coefficient).

P = Perimeter of grate, disregarding the side against the curb (ft.)

d = Flow depth over grate, (ft.)

Pipe Hydraulics

Pipe hydraulic calculations have been determined within Hydraflow Storm Sewers and are based upon the Standard Step Method. This method uses a combination of Bernoulli's energy equation and Manning's equation, in an iterative process between upstream and downstream ends, to determine hydraulic profiles. The method includes head losses due to friction and other minor losses, based on user defined loss coefficients found within the County Hydraulic Manual 2014.

$$\frac{V_1{}^2}{2 * g} + Z_1 + Y_1 = \frac{V_2{}^2}{2 * g} + Z_2 + Y_2 + HL$$

Equation 7 : Bernoulli's Equation

Where,

V = Velocity, (FPS)

g = gravitational acceleration constant, in (ft/s^2)

Z = Invert elevation, (ft)

Y = Difference between the hydraulic grade line and invert elevation, (ft)

HL = Head losses, (ft)

Modeling Approach

Each of new laterals and inlets have been modeled in Hydraflow Storm Sewers to determine the hydraulic grade line (HGL) under post-development 50- and 100-year conditions. This modeling approach intentionally omits a pre-development analysis, that analysis has been completed by others (Q3 Watershed Master Plan) and is the genesis of the analyses herein.

The newly proposed 60" mainline was identified in the Watershed Master Plan and studied using 2-dimensional, split flow analysis. This report develops local peak flow for each new inlet and lateral and utilizes mainline HGL's from the Watershed Master Plan.

At the downstream limits (La Costa Avenue near the Batiquitos Lagoon), proposed storm drain improvements include a new diversion structure that utilizes two existing outfalls. These existing outfalls (18" & 24" RCP draining west to the Ponto Beach Parking lot and a separate 24" RCP draining east to the Batiquitos Lagoon) cannot be upsized due to environmental constraints.

The proposed diversion structure was analyzed as part of the Q3 Watershed Master Plan and is not included within the Hydraflow Storm Sewer modeling within this report due to software limitations. This report is not intended to derive HGL's for the new 60" mainline HGL's, those come from the Watershed Master Plan (Q3). As such, a hydraulic analysis of the diversion structure is not warranted herein.

RESULTS

Inlet Hydraulics

Tables 1, 2, and 3 on the following pages summarize results from the Hydraflow Storm Sewers analysis for the proposed inlets along Coast Highway 101. Refer to Appendix D for complete output reports generated by Hydraflow Storm Sewers. All proposed inlets in-sag are sized to capture the entire 100-YR flow rate with ponding limited to 6" or less. In most cases, new on-grade inlets have been designed to capture 85% of the 50-year peak flow rate, consistent with the County of San Diego Hydraulic standards. The following on-grade inlets do not capture the full 85% of the 50-year peak flow rate due to site constraints as follows:

- Inlet 38a (4' curb inlet): Located on the southwest side of Diana: The inlet length is constrained by an existing driveway immediately west of the proposed curb bulb-out. Bypass from this inlet is captured by the in-sag combination inlet (#27).
- Inlet 29 (7.5' curb inlet): Located on the southwest side of Phoebe: The inlet length by the existing post office driveway. Bypass from this inlet is captured by the in-sag curb inlet (#27).
- Inlet 26 (4' curb inlet): Located on the southwest side of Jason, the inlet length is constrained by an existing parking lot immediately west of the proposed inlet location. Bypass from this inlet is captured by the in-sag combination inlet (#27).
- Inlet 25 (15' curb inlet): Located on the northwest side of Jason, the inlet length is constrained by existing utilities and an existing palm tree immediately west of the inlet location. Bypass from this inlet is captured by the in-sag combination inlet (#27).
- Inlet 23 (13' curb inlet): Located on the southwest side of Jupiter St., the inlet length is constrained by an existing storefront driveway immediately east of the proposed inlet location. Bypass from this inlet is captured by the in-sag combination inlet (#24).
- Inlet 6 (20' curb inlet): Located on the southwest side of Bishopsgate, the inlet utilizes the maximum length (20') and there is no additional curb space to install and additional on-grade curb inlet due to the existing parking lot immediately west of the proposed inlet location. Bypass from this inlet is captured by the in-sag combination inlet (#7).

Storm Drain Main Hydraulics

The results of the XPSWMM analysis conducted by Q3 Consultants as part of a recent Watershed Mater Plan for the City. Results for the mainline 60" RCP can be viewed in Appendix E, including HGL's.

Storm Drain Lateral Hydraulics

The results of the Hydraflow Storm Sewers analysis can be viewed in Appendices F and G. Results show the HGL's for the laterals are generally beneath the finished surface. In some cases, where the 60" mainline HGL (from the Watershed Master Plan) approaches or exceeds the finished surface elevation, the resultant lateral HGL's are out of the ground. This is ultimately a function of the two existing outfalls and the associated limited conveyance capacity, as compared to the new 60" mainline and peak flow runoff during large storm events. These existing outfalls create backwater effects within the newly proposed 60" mainline and associated laterals during larger storm events. Summary results and profiles of each lateral system can be viewed in appendix F.

TABLE 1. ON-GRADE INLET SUMMARY (Q_{50})

On-Grade Inlets Results (Capture 85% of Q50)										
Inlet ID	Type	Location	Known Q_{50}	Q_{50} Captured	Q_{50} Bypassed	% Captured	Curb Length	Throat Ht	Gutter Spread	Bypass Inlet ID
#			(cfs)	(cfs)	(cfs)		(ft)	(ft)	(ft)	#
1	Curb	Coast 101	8.00	8.00	0.00	100%	20.00	6.0	13.15	7
5	Curb	Bishopgate (SW)	2.00	1.90	0.10	95%	8.00	6.0	6.35	2
6	Curb	Bishopgate (NW)	16.30	12.91	3.39	79%	20.00	6.0	15.20	4
12	Curb	Grand View (NW)	6.00	5.78	0.22	96%	20.00	6.0	12.25	11
13	Curb	Grand View (SW)	6.40	5.98	0.42	93%	20.00	6.0	14.10	14
20	Grate	1444 Coast 101	14.10	5.90	8.20	42%	....	....	12.95	20a
22	Curb	Jupiter (NW)	4.20	1.69	2.51	40%	13.00	6.0	2.10	21
23	Curb	Jupiter (SW)	5.30	2.02	3.28	38%	13.00	6.0	2.70	24
25	Curb	Jason (NW)	9.30	7.07	2.23	76%	15.00	6.0	11.00	27
26	Curb	Jason (SW)	7.50	2.85	4.65	38%	4.00	4.0	13.90	27
28	Curb	Phoebe (NW)	6.70	6.33	0.37	94%	14.00	6.0	12.25	27
29	Curb	Phoebe (SW)	5.40	3.78	1.62	70%	7.50	6.0	11.25	30
32	Curb	Glaucus (NW)	5.40	5.12	0.28	95%	12.00	4.0	14.00	31
33	Curb	Glaucus (SW)	4.80	4.75	0.05	99%	13.00	6.0	13.87	34
37	Curb	Diana (NW)	3.90	3.78	0.12	97%	11.50	6.0	9.25	36
38a	Curb	Diana (SW)	5.10	1.75	3.35	34%	4.00	6.0	8.55	38

TABLE 2. ON-GRADE INLET SUMMARY (Q_{100})

On-Grade Inlets Results (Q100 Capture Results)										
Inlet ID	Type	Location	Known Q_{100}	Q_{100} Captured	Q_{100} Bypassed	% Captured	Curb Length	Throat Ht	Gutter Spread	Bypass Inlet ID
#			(cfs)	(cfs)	(cfs)		(ft)	(ft)	(ft)	#
1	Curb	Coast 101	8.60	8.38	0.22	97%	20.00	6.0	13.48	7
5	Curb	Bishopgate (SW)	2.30	1.96	0.34	85%	8.00	6.0	6.72	2
6	Curb	Bishopgate (NW)	18.50	12.72	5.78	69%	20.00	6.0	15.90	4
12	Curb	Grand View (NW)	6.80	5.95	0.85	88%	20.00	6.0	12.85	11
13	Curb	Grand View (SW)	7.30	6.08	1.22	83%	20.00	6.0	14.82	14
20	Grate	1444 Coast 101	15.50	6.24	9.26	40%	....	....	13.45	20a
22	Curb	Jupiter (NW)	4.81	1.64	3.17	34%	13.00	6.0	2.34	21
23	Curb	Jupiter (SW)	6.00	1.93	4.07	32%	13.00	6.0	2.90	24
25	Curb	Jason (NW)	10.60	6.94	3.66	65%	15.00	6.0	11.52	27
26	Curb	Jason (SW)	8.50	2.69	5.81	32%	4.00	4	14.54	27
28	Curb	Phoebe (NW)	7.63	6.50	1.13	85%	14.00	6.0	12.86	27
29	Curb	Phoebe (SW)	6.13	3.68	2.45	60%	7.50	6.0	11.78	30
32	Curb	Glaucus (NW)	6.19	5.27	0.92	85%	12.00	4.0	14.71	31
33	Curb	Glaucus (SW)	5.50	5.04	0.46	92%	13.00	6.0	14.59	34
37	Curb	Diana (NW)	4.50	3.96	0.54	88%	11.50	6.0	9.80	36
38a	Curb	Diana (SW)	5.81	1.66	4.15	29%	4.00	6.0	9.00	38

TABLE 3. IN-SAG INLETS SUMMARY (Q_{100})

In-Sag Inlets Results (Capture 100% of Q100)							
Inlet ID	Known Q_{100}	Q_{100} Carryover	Q_{100} Captured	Curb Length	Throat Ht	Gutter Spread	JunctType
#	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	
2	15.20	0.00	15.20	20.00	6.0	17.01	Curb
3	4.20	0.00	4.20	5.50	6.0	14.13	Curb
4	4.10	0.20	4.30	6.00	6.0	13.78	Curb
7	0.01	4.58	4.59	8.50	6.0	12.03	Curb
8	7.40	0.00	7.40	10.00	6.0	16.12	Curb
9	10.00	0.00	10.00	13.00	6.0	17.17	Curb
10	8.40	0.00	8.40	11.00	6.0	16.84	Curb
11	1.50	0.45	1.95	4.00	6.0	8.59	Curb
14	11.50	0.76	12.26	15.20	6.0	17.82	Curb
15	1.70	0.00	1.70	4.00	6.0	7.57	Curb
17	2.50	0.00	2.50	10.00	6.0	6.27	Curb
18	15.10	0.00	15.10	20.00	6.0	13.60	Comb.
19	11.60	0.00	11.60	20.00	8.0	3.34	Curb
20a	5.00	0.00	5.00	4.00	4.0	17.10	Comb.
21	2.20	2.96	5.16	4.00	6.0	19.17	Curb
24	6.20	3.83	10.03	13.50	4.0	16.71	Curb
27	6.30	9.12	15.42	8.00	6.0	24.75	Comb.
30	4.60	2.05	6.65	4.00	6.0	24.74	Curb
31	4.90	0.54	5.44	8.50	6.0	13.84	Curb
34	7.10	0.18	7.28	10.00	6.0	15.91	Curb
35	5.10	0.00	5.10	8.00	6.0	13.58	Curb
36	4.60	0.28	4.88	10.50	6.0	11.14	Curb
38b	5.54	3.94	9.48	4.00	6.0	31.83	Curb

In-Sag Inlets Results (Capture 100% of Q100)							
Inlet ID	Known Q_{100}	Q_{100} Carryover	Q_{100} Captured	Curb Length	Throat Ht	Gutter Spread	JunctType
#	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	
39a	2.40	0.00	2.40	4.00	6.0	10.30	Curb
39b	0.10	0.00	0.10	4.00	6.0	0.64	Curb
40	1.10	0.00	1.10	4.00	6.0	4.90	Curb
41	1.90	0.00	1.90	4.00	6.0	8.38	Curb
43	3.80	0.00	3.80	5.00	6.0	13.64	Curb
44	2.40	0.00	2.40	4.00	6.0	10.30	Curb
45	3.20	0.00	3.20	4.00	6.0	9.48	Curb
62	4.70	0.00	4.70	3.00	9.0	32.42	Dp-Curb
63	1.57	0.00	1.57	3.00	9.0	15.60	Dp-Curb
64	4.18	0.00	4.18	....	....	18.38	Grate
65a	2.30	0.00	2.30	....	....	12.18	Grate
65b	2.30	0.00	2.30	....	....	12.18	Grate
67	6.00	0.00	3.74	9.00	6.0	9.00	Curb
68	2.60	0.00	2.60	....	....	13.26	Grate
69	5.40	0.00	5.40	3.00	9.0	35.56	Dp-Curb
70	0.80	0.00	0.80	3.00	9.0	9.95	Dp-Curb
71	4.10	0.00	4.10	....	....	18.14	Grate
72	4.40	0.00	4.40	3.00	9.0	31.02	Dp-Curb
73	1.10	0.00	1.10	3.00	9.0	12.31	Dp-Curb
74	1.20	0.00	1.20	3.00	9.0	13.04	Dp-Curb
75	0.60	0.00	0.60	3.00	9.0	8.21	Dp-Curb
77a	1.20	0.00	1.20	3.00	9.0	13.04	Dp-Curb
77b	1.20	0.00	1.20	3.00	9.0	13.04	Dp-Curb
78	2.90	0.00	2.90	....	....	14.30	Grate
79	2.30	0.00	2.30	....	....	12.18	Grate
80	7.00	0.00	7.00	3.00	9.0	42.28	Dp-Curb

In-Sag Inlets Results (Capture 100% of Q100)							
Inlet ID	Known Q_{100}	Q_{100} Carryover	Q_{100} Captured	Curb Length	Throat Ht	Gutter Spread	JunctType
82	2.40	2.40	0.00	3.00	9.0	20.71	Dp-Curb
83a	0.90	0.90	0.00	3.00	9.0	10.76	Dp-Curb
83b	0.90	0.90	0.00	4.00	6.0	3.91	Curb
85	1.10	1.10	0.00	3.00	9.0	12.31	Dp-Curb
86	6.20	6.20	0.00	3.00	9.0	39.00	Dp-Curb
82	2.40	2.40	0.00	3.00	9.0	20.71	Dp-Curb
83a	0.90	0.90	0.00	3.00	9.0	10.76	Dp-Curb
83b	0.90	0.90	0.00	4.00	6.0	3.91	Curb
85	1.10	1.10	0.00	3.00	9.0	12.31	Dp-Curb
86	6.20	6.20	0.00	3.00	9.0	39.00	Dp-Curb

CONCLUSION

The 50- and 100-year project site peak flow rates have been developed for each proposed inlet using the Rational Method. This approach is consistent with local methodology and appropriate given the relatively small tributary drainage areas. The project does not proposed any in new hardscape.

Proposed inlets and storm drain laterals have been hydraulically analyzed using project site peak flow rates to determine spread width, capture capacity, and hydraulic grade line within the laterals. In all cases, spread width for the 100-year event provides a dry-lane for emergency vehicles along North Coast Highway 101, an improvement when compared to pre-development flood conditions.

In most cases, newly proposed on-grade inlets capture at least 85-percent of the 50-year approach flow. In a few isolated locations, capture capacity is below 50-percent due to site constraints that prevent installation of a larger inlet. In these cases, it is not economically feasible to re-route existing utilities such that a larger inlet can be installed, nor is extending additional storm drain and inlets further upstream into the local watershed considered feasible based on, in part, lack of residential curb and gutter. All inlet bypass flow is accounted for, and captured, at the next downstream inlet.

The mainline 60" RCP has been hydrologically and hydraulically analyzed and designed as part of Q3's Watershed Master Plan for the City of Encinitas. A new downstream diversion structure at La Costa Avenue will connect the 60" mainline to existing outfalls that cannot be upsized (due to environmental constraints). The 50-year and 100-year HGL determination from Q3's Watershed Master Plan has been utilized herein to represent the starting HGL, or tailwater condition, for each new lateral.

New inlets and storm drain will significantly reduce flooding along North Coast Highway 101. The newly proposed 60" mainline provides added conveyance for storm water and also provides additional sub-grade storage. As storm intensity increases, peak flow within the 60" mainline will start to back up at the new diversion structure, based on limited outfall conveyance. This backwater effect has an impact on the HGL's within the new laterals and is the reason not all laterals show HGL's below the ground.

Newly proposed storm drain infrastructure improvements will result in reduced flooding along North Coast Highway 101 for all storm events, as compared to pre-development conditions. The most benefit will be realized during smaller, more frequent storm events. Ultimately, the two existing outfalls have limited capacity and cannot be upsized.

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Appendix A – FEMA Documents

Included within this appendix:

FEMA FIRM Panels

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FEMA FIRMs

ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

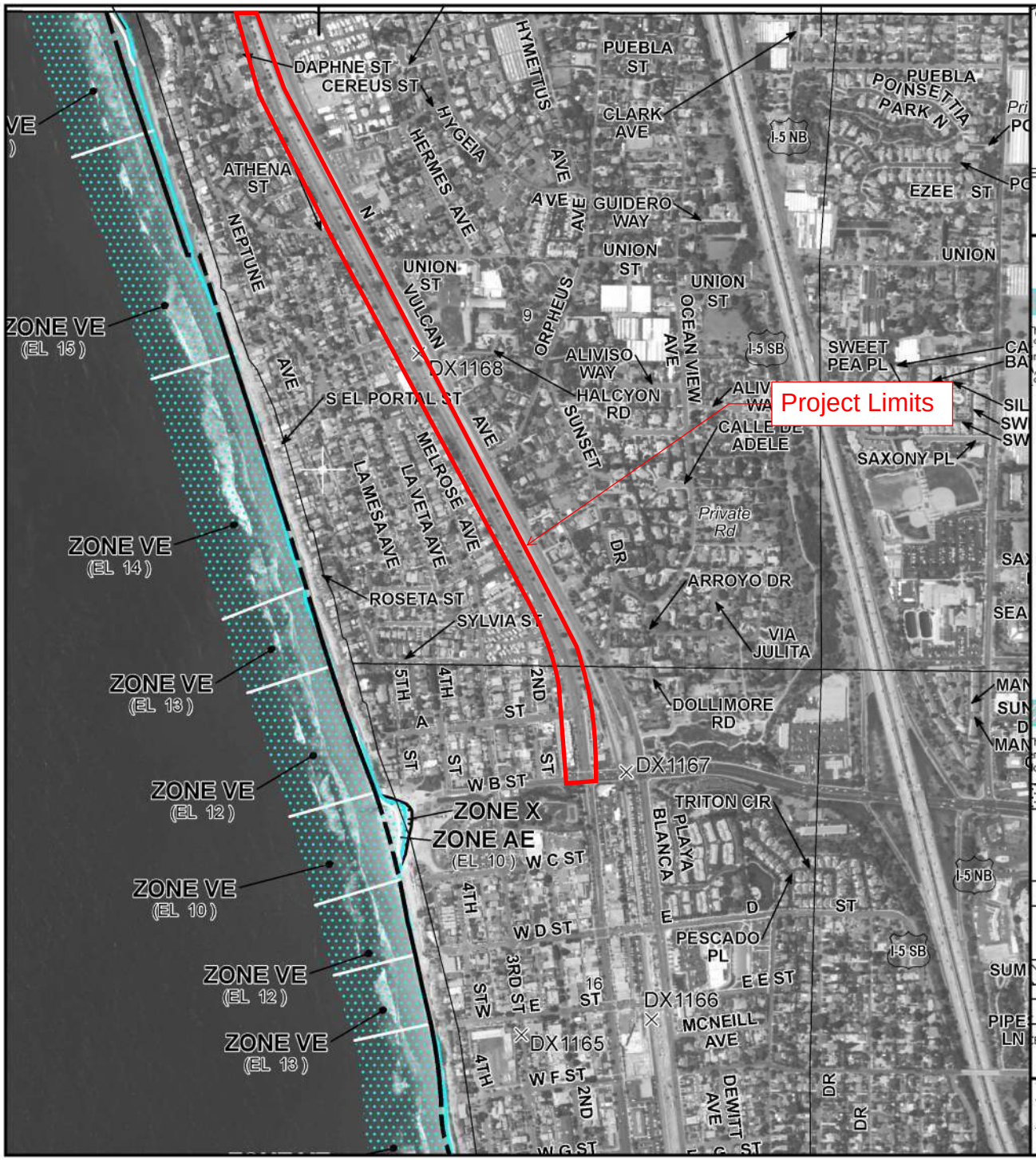
OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.



ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

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INTERNATIONAL

Appendix B - Excerpts from County of San Diego Hydrology Manual & Other Sources

Included within this appendix:

County of San Diego Hydrology Manual Excerpts
Runoff Coefficient Table 3-1
Intensity Duration Design Chart Figure 3-2
Isopluvial Maps

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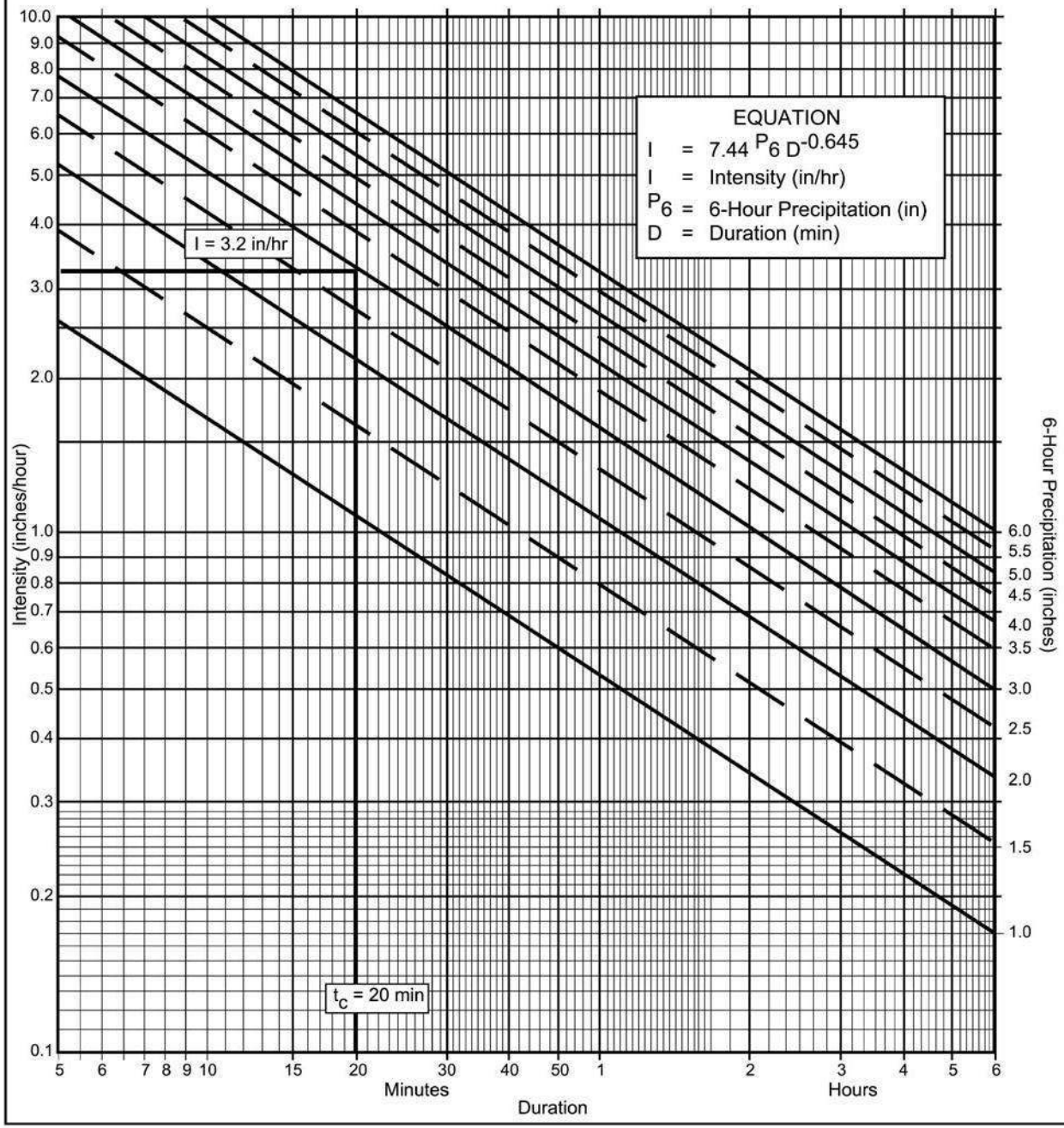
County of San Diego
Hydrology Manual Excerpts

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 3 in., P_{24} = 5.5, $\frac{P_6}{P_{24}}$ = 54.5 %(2)

(c) Adjusted P_6(2) = 3 in.

(d) t_x = 20 min.

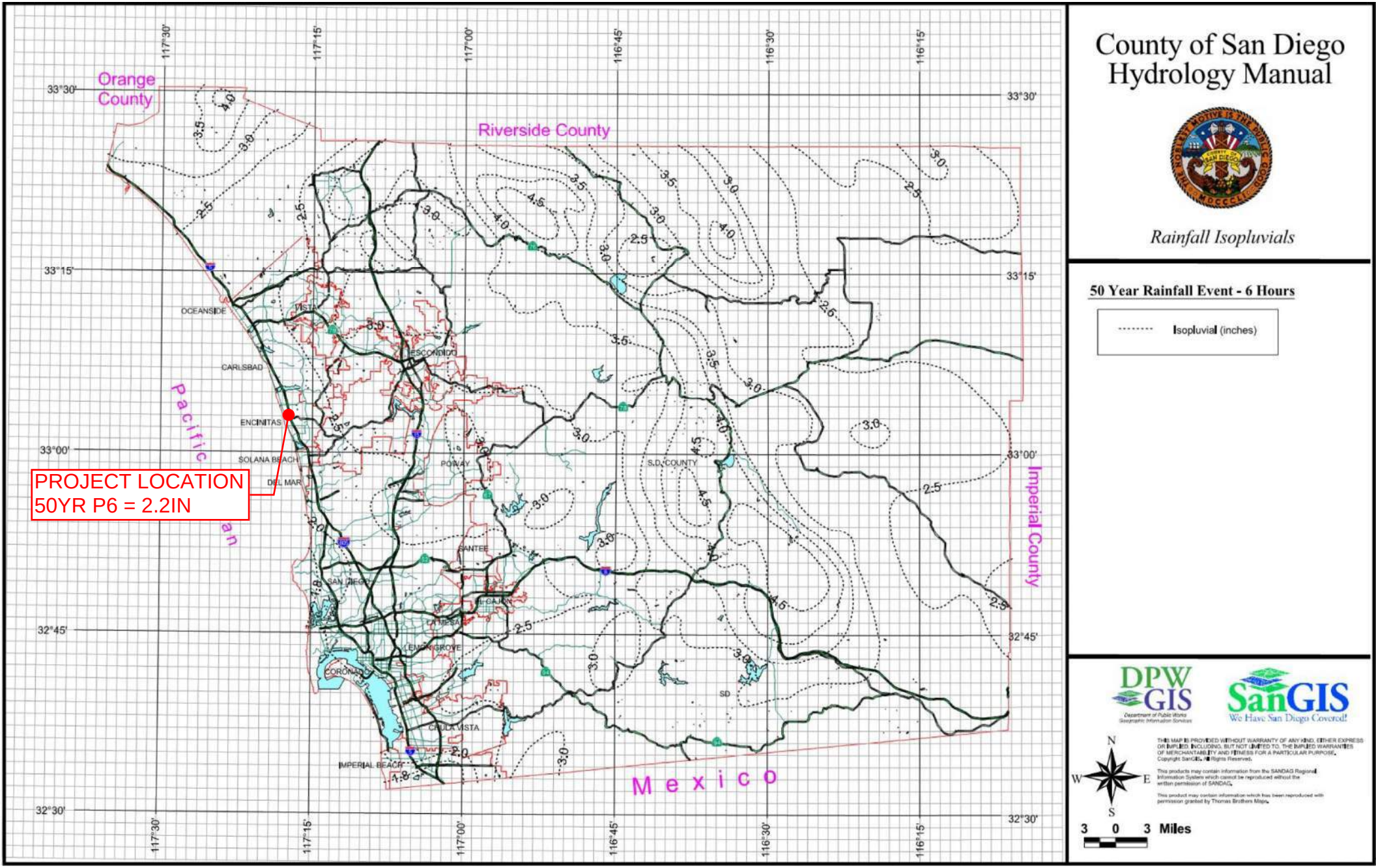
(e) I = 3.2 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

FIGURE 3-2



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

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Appendix C – Hydrology Analysis Input and Output

Included within this appendix:

Drainage Work Map
50 & 100 Year Peak Flow Calculations
Inlet Tc Calculations
Runoff Coefficient Inputs

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Drainage Work Map

ID: 1
Area (Ac): 3.2
Runoff C: 0.52
Q100 (cfs): 8.8

ID: 86
Area (Ac): 1.85
Runoff C: 0.82
Q100 (cfs): 6.2

ID: 2
Area (Ac): 4.92
Runoff C: 0.63
Q100 (cfs): 15.2

ID: 3
Area (Ac): 0.8
Runoff C: 0.79
Q100 (cfs): 4.2

ID: 5
Area (Ac): 1.22
Runoff C: 0.52
Q100 (cfs): 2.3

ID: 4
Area (Ac): 0.79
Runoff C: 0.79
Q100 (cfs): 4.1

ID: 85
Area (Ac): 0.21
Runoff C: 0.82
Q100 (cfs): 1.1

ID: 84
Area (Ac): 0.17
Runoff C: 0.82
Q100 (cfs): 0.9

ID: 83
Area (Ac): 0.34
Runoff C: 0.82
Q100 (cfs): 1.8

ID: 8
Area (Ac): 1.42
Runoff C: 0.79
Q100 (cfs): 7.4

ID: 6
Area (Ac): 8.12
Runoff C: 0.57
Q100 (cfs): 18.5

ID: 82
Area (Ac): 0.46
Runoff C: 0.82
Q100 (cfs): 2.4

ID: 9
Area (Ac): 2.43
Runoff C: 71
Q100 (cfs): 10

ID: 81
Area (Ac): 0.7
Runoff C: 0.82
Q100 (cfs): 3.5

ID: 10
Area (Ac): 1.81
Runoff C: 0.71
Q100 (cfs): 8.4

ID: 11
Area (Ac): 0.28
Runoff C: 0.79
Q100 (cfs): 1.5

ID: 12
Area (Ac): 2.29
Runoff C: 0.57
Q100 (cfs): 6.8

ID: 80
Area (Ac): 1.67
Runoff C: 0.82
Q100 (cfs): 7.0

ID: 13
Area (Ac): 2.6
Runoff C: 0.6
Q100 (cfs): 7.3

ID: 14
Area (Ac): 2.47
Runoff C: 0.71
Q100 (cfs): 11.5

Legend

- Flow_Path
- Coast 101 Drainage Areas
- Proposed Batiquitos SD System

0 125 250 500 Feet

Source:

4/24/2020 JN \\CARLCA1FS1.bkr.mbakercorp.com\HROOT\PDATA\137350_North Coast Hwy 101\GIS\MXD\Drainage Exhibit Sheet_1_v2.mxd <USER NAME>

N. Coast HWY 101

Drainage Exhibit

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Runoff C: 0.57
Q100 (cfs): 18.5

ID: 8
Area (Ac): 1.42
Runoff C: 0.79
Q100 (cfs): 7.4

ID: 9
Area (Ac): 2.43
Runoff C: 71
Q100 (cfs): 10

ID: 10
Area (Ac): 1.81
Runoff C: 0.71
Q100 (cfs): 8.4

ID: 11
Area (Ac): 0.28
Runoff C: 0.79
Q100 (cfs): 1.5

ID: 12
Area (Ac): 2.29
Runoff C: 0.57
Q100 (cfs): 6.8

ID: 13
Area (Ac): 2.6
Runoff C: 0.6
Q100 (cfs): 7.3

ID: 14
Area (Ac): 2.47
Runoff C: 0.71
Q100 (cfs): 11.5

ID: 15
Area (Ac): 0.68
Runoff C: 0.57
Q100 (cfs): 1.7

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Area (Ac): 3.7
Runoff C: 0.57
Q100 (cfs): 8.1

ID: 17
Area (Ac): 0.49
Runoff C: 0.79
Q100 (cfs): 2.5

ID: 18
Area (Ac): 3.24
Runoff C: 0.71
Q100 (cfs): 15.1

ID: 19
Area (Ac): 3.37
Runoff C: 0.71
Q100 (cfs): 11.6

ID: 20
Area (Ac): 6.11
Runoff C: 0.52
Q100 (cfs): 20.5

ID: 21
Area (Ac): 0.46
Runoff C: 0.79
Q100 (cfs): 2.2

ID: 22
Area (Ac): 2.03
Runoff C: 0.52
Q100 (cfs): 4.8

ID: 23
Area (Ac): 1.83
Runoff C: 0.63
Q100 (cfs): 6.0

ID: 24
Area (Ac): 1.39
Runoff C: 0.79
Q100 (cfs): 6.2

ID: 25
Area (Ac): 4.35
Runoff C: 0.6
Q100 (cfs): 10.6

ID: 76
Area (Ac): 1.76
Runoff C: 0.82
Q100 (cfs): 5.7

ID: 77
Area (Ac): 0.43
Runoff C: 0.82
Q100 (cfs): 2.3

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Runoff C: 0.82
Q100 (cfs): 2.9

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Runoff C: 0.82
Q100 (cfs): 2.3

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Runoff C: 0.82
Q100 (cfs): 7.0

ID: 81
Area (Ac): 0.7
Runoff C: 0.82
Q100 (cfs): 3.5

ID: 82
Area (Ac): 0.46
Runoff C: 0.82
Q100 (cfs): 2.4

Soho Rd
Kennington Rd
Aldersgate Rd
Hwy 101
Stonesteps Way
Reef Break Way
Shorebreak Way
Coral Cove Way
Hillcrest Dr
N Vulcan Ave
N Coast Hwy 101
Grandview St
Avocado St
Lorraine Dr
Edgeburt Dr
Range St
Coop Ct
Coop St
Jupiter St
Neptune Ave
Leucadia Oaks Park

Legend

- Flow_Path
- Coast 101 Drainage Areas
- Proposed Batiquitos SD System

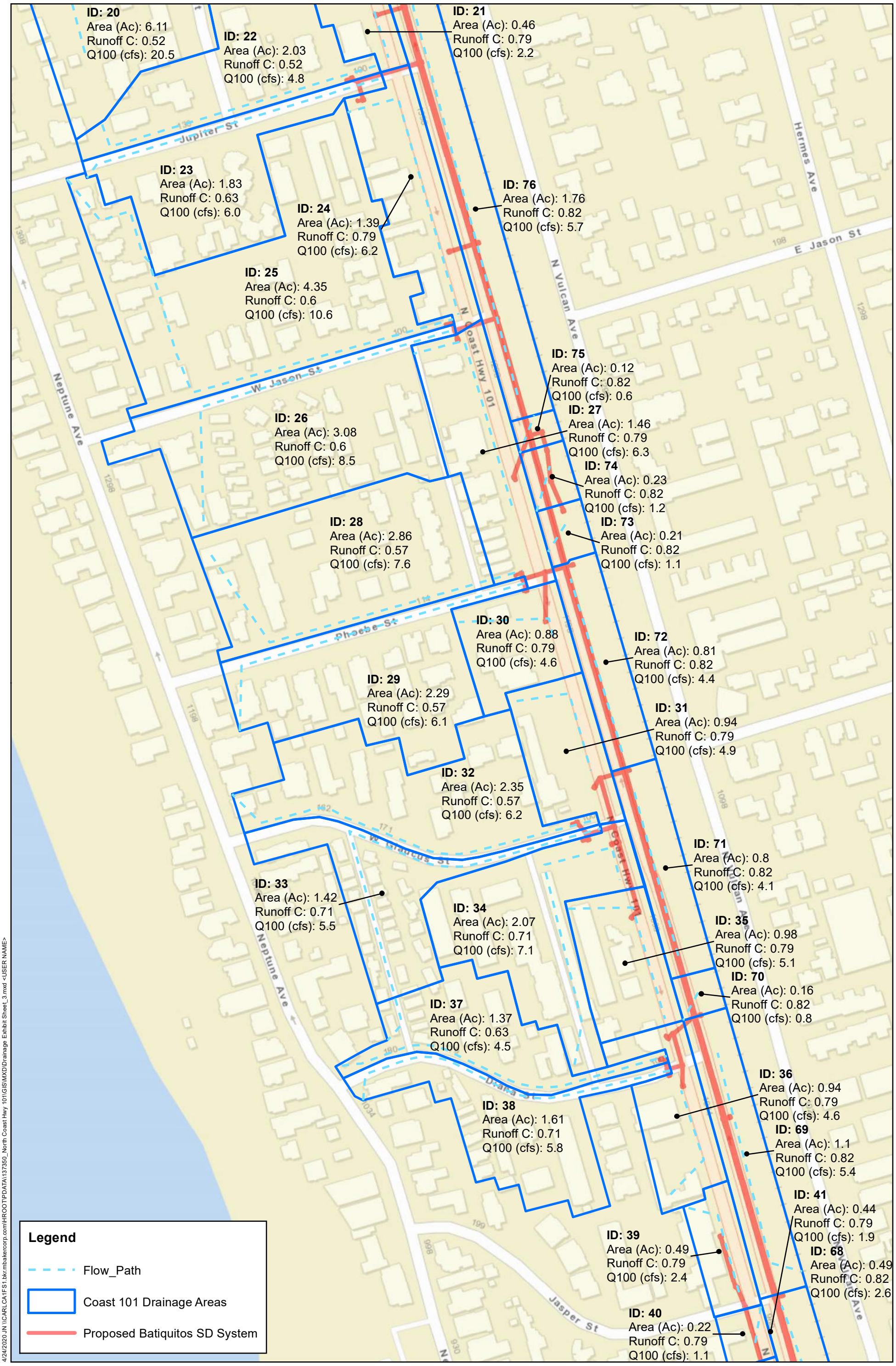
0 125 250 500 Feet

Source:

N. Coast HWY 101

Drainage Exhibit

Sheet 2 of 5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Q100 (cfs): 20.5
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Runoff C: 0.52
Q100 (cfs): 4.8
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Area (Ac): 0.46
Runoff C: 0.79
Q100 (cfs): 2.2
Jupiter St
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Area (Ac): 1.83
Runoff C: 0.63
Q100 (cfs): 6.0
ID: 24
Area (Ac): 1.39
Runoff C: 0.79
Q100 (cfs): 6.2
ID: 76
Area (Ac): 1.76
Runoff C: 0.82
Q100 (cfs): 5.7
Hermes Ave
E Jason St
N Vulcan Ave
ID: 25
Area (Ac): 4.35
Runoff C: 0.6
Q100 (cfs): 10.6
N Coast Hwy 101
W Jason St
Neptune Ave
ID: 75
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Q100 (cfs): 0.6
ID: 27
Area (Ac): 1.46
Runoff C: 0.79
Q100 (cfs): 6.3
ID: 26
Area (Ac): 3.08
Runoff C: 0.6
Q100 (cfs): 8.5
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Runoff C: 0.82
Q100 (cfs): 1.2
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Runoff C: 0.57
Q100 (cfs): 7.6
ID: 73
Area (Ac): 0.21
Runoff C: 0.82
Q100 (cfs): 1.1
Phoebe St
ID: 30
Area (Ac): 0.88
Runoff C: 0.79
Q100 (cfs): 4.6
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Area (Ac): 0.81
Runoff C: 0.82
Q100 (cfs): 4.4
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Area (Ac): 2.29
Runoff C: 0.57
Q100 (cfs): 6.1
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Area (Ac): 0.94
Runoff C: 0.79
Q100 (cfs): 4.9
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Area (Ac): 2.35
Runoff C: 0.57
Q100 (cfs): 6.2
W Circulus St
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Area (Ac): 0.8
Runoff C: 0.82
Q100 (cfs): 4.1
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Area (Ac): 1.42
Runoff C: 0.71
Q100 (cfs): 5.5
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Area (Ac): 2.07
Runoff C: 0.71
Q100 (cfs): 7.1
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Runoff C: 0.79
Q100 (cfs): 5.1
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Runoff C: 0.82
Q100 (cfs): 0.8
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Area (Ac): 1.37
Runoff C: 0.63
Q100 (cfs): 4.5
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Area (Ac): 0.94
Runoff C: 0.79
Q100 (cfs): 4.6
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Area (Ac): 1.1
Runoff C: 0.82
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Runoff C: 0.71
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Area (Ac): 0.44
Runoff C: 0.79
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Runoff C: 0.79
Q100 (cfs): 2.4
ID: 68
Area (Ac): 0.49
Runoff C: 0.82
Q100 (cfs): 2.6
Jasper St
ID: 40
Area (Ac): 0.22
Runoff C: 0.79
Q100 (cfs): 1.1
Legend
Flow_Path
Coast 101 Drainage Areas
Proposed Batiquitos SD System
0
125
250
500
Feet
Source:
N. Coast HWY 101
Drainage Exhibit
Sheet 3 of 5
4/24/2020 JN \\CARLCA1FS1.bkr.mbakercorp.com\HROOT\PDATA\137350_North Coast Hwy 101\GIS\MXD\Drainage Exhibit Sheet_3.mxd <USER NAME>

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Q100 (cfs): 2.4

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Area (Ac): 1.1
Runoff C: 0.82
Q100 (cfs): 5.4

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Runoff C: 0.79
Q100 (cfs): 1.1

ID: 68
Area (Ac): 0.49
Runoff C: 0.82
Q100 (cfs): 2.6

ID: 41
Area (Ac): 0.44
Runoff C: 0.79
Q100 (cfs): 1.9

ID: 66
Area (Ac): 1.6
Runoff C: 0.82
Q100 (cfs): 6.0

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Area (Ac): 0.83
Runoff C: 0.82
Q100 (cfs): 3.8

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Area (Ac): 0.91
Runoff C: 0.82
Q100 (cfs): 4.6

ID: 44
Area (Ac): 0.66
Runoff C: 0.79
Q100 (cfs): 2.4

ID: 64
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Runoff C: 0.82
Q100 (cfs): 5.6

ID: 45
Area (Ac): 0.77
Runoff C: 0.82
Q100 (cfs): 3.2

ID: 63
Area (Ac): 0.39
Runoff C: 0.82
Q100 (cfs): 2.1

ID: 46
Area (Ac): 0.27
Runoff C: 0.82
Q100 (cfs): 1.3

ID: 62
Area (Ac): 1.3
Runoff C: 0.82
Q100 (cfs): 4.7

ID: 47
Area (Ac): 0.44
Runoff C: 0.82
Q100 (cfs): 2.1

ID: 48
Area (Ac): 0.37
Runoff C: 0.82
Q100 (cfs): 1.6

Legend

- Flow_Path
- Coast 101 Drainage Areas
- Proposed Batiquitos SD System

0 125 250 500 Feet

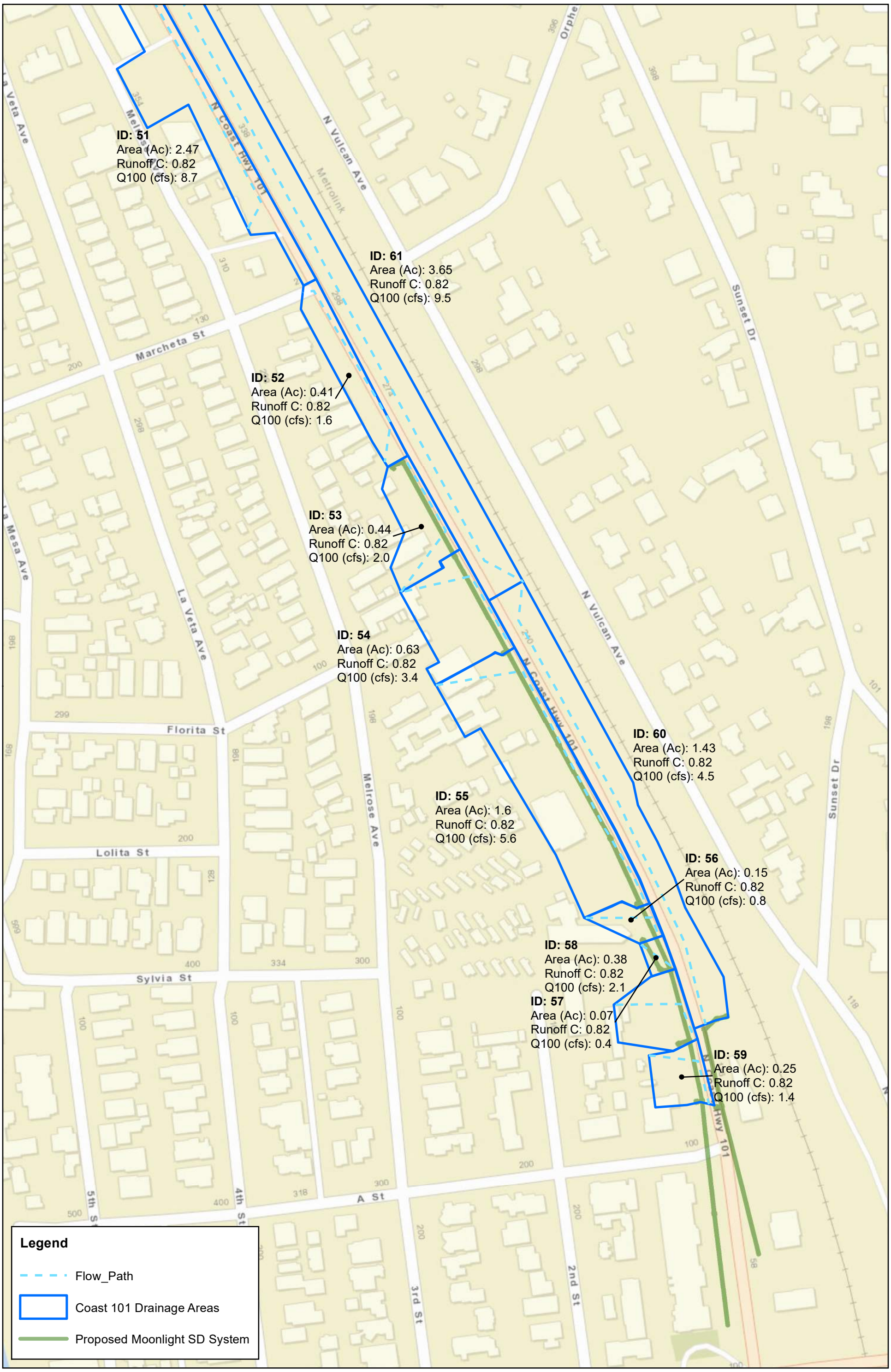
Source:

N. Coast HWY 101

Drainage Exhibit

Sheet 4 of 5

4/24/2020 JN \\CARLCA1FS1.bkr.mbakercorp.com\HROOT\PDATA\137350_North Coast Hwy 101\GIS\MXD\Drainage Exhibit Sheet_4.mxd <USER NAME>



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N. Coast HWY 101

Drainage Exhibit

Michael Baker
INTERNATIONAL

50 & 100 Year Peak Flow Rate

On-Site Drainage Subarea ID #	Inlet Type	Area (ac)	Land Use Per Table 3-1	C[1]	Tc (min)	50 Year			100 Year		
						P6	I (in/hr) [1]	Q_{50} (cfs)	P6	I (in/hr) [1]	Q_{100} (cfs)
Encinitas 1	On-Grade	3.20	MDR (4.3)	0.52	11.9	3.2	4.82	8.0	3.5	5.27	8.8
Encinitas 2	In-Sag	4.91	MDR (14.5)	0.63	7.9	2.2	4.32	13.4	2.5	4.91	15.2
Encinitas 3	In-Sag	0.80	N. Commerical	0.79	5.0	2.2	5.80	3.7	2.5	6.59	4.2
Encinitas 4	In-Sag	0.78	N. Commerical	0.79	5.0	2.2	5.80	3.6	2.5	6.59	4.1
Encinitas 5	On-Grade	1.21	MDR (4.3)	0.52	12.7	2.2	3.17	2.0	2.5	3.60	2.3
Encinitas 6	On-Grade	8.11	MDR (7.3)	0.57	10.8	2.2	3.53	16.3	2.5	4.01	18.5
Encinitas 7	HOLD PLACE										
Encinitas 8	In-Sag	1.42	N. Commerical	0.79	5.0	2.2	5.80	6.5	2.5	6.59	7.4
Encinitas 9	In-Sag	2.43	HDR (24)	0.71	6.1	2.2	5.11	8.8	2.5	5.80	10.0
Encinitas 10	In-Sag	1.80	HDR (24)	0.71	5.0	2.2	5.80	7.4	2.5	6.59	8.4
Encinitas 11	In-Sag	0.28	N. Commerical	0.79	5.0	2.2	5.80	1.3	2.5	6.59	1.5
Encinitas 12	On-Grade	2.28	MDR (7.3)	0.57	7.2	2.2	4.59	6.0	2.5	5.21	6.8
Encinitas 13	On-Grade	2.59	MDR (10.9)	0.6	8.5	2.2	4.12	6.4	2.5	4.68	7.3
Encinitas 14	In-Sag	2.46	HDR (24)	0.71	5.0	2.2	5.80	10.1	2.5	6.59	11.5
Encinitas 15	In-Sag	0.68	MDR (7.3)	0.57	9.0	2.2	3.97	1.5	2.5	4.51	1.7
Encinitas 16	Ex. Inlet OG	3.69	MDR (7.3)	0.57	11.5	2.2	3.39	7.1	2.5	3.86	8.1
Encinitas 17	In-Sag	0.49	N. Commerical	0.79	5.0	2.2	5.80	2.2	2.5	6.59	2.5
Encinitas 18	In-Sag	3.23	HDR (24)	0.71	5.0	2.2	5.80	13.3	2.5	6.59	15.1
Encinitas 19	In-Sag	3.37	HDR (24)	0.71	8.0	2.2	4.27	10.2	2.5	4.86	11.6
Encinitas 20	In-Sag	6.11	MDR (4.3)	0.52	8.7	3.2	5.91	18.8	3.5	6.46	20.5
Encinitas 21	In-Sag	0.45	N. Commerical	0.79	5.4	2.2	5.51	2.0	2.5	6.26	2.2
Encinitas 22	On-Grade	2.03	MDR (4.3)	0.52	8.8	2.2	4.01	4.2	2.5	4.56	4.8
Encinitas 23	On-Grade	1.82	MDR (14.5)	0.63	7.2	2.2	4.59	5.3	2.5	5.22	6.0
Encinitas 24	In-Sag	1.39	N. Commerical	0.79	6.4	2.2	4.94	5.4	2.5	5.62	6.2
Encinitas 25	On-Grade	4.35	MDR (10.9)	0.6	10.6	2.2	3.58	9.3	2.5	4.07	10.6
Encinitas 26	On-Grade	3.07	MDR (10.9)	0.6	8.6	2.2	4.07	7.5	2.5	4.63	8.5
Encinitas 27	In-Sag	1.45	N. Commerical	0.79	6.7	2.2	4.81	5.5	2.5	5.46	6.3
Encinitas 28	On-Grade	2.86	MDR (7.3)	0.57	8.5	2.2	4.12	6.7	2.5	4.68	7.6
Encinitas 29	On-Grade	2.29	MDR (7.3)	0.57	8.5	2.2	4.13	5.4	2.5	4.69	6.1
Encinitas 30	In-Sag	0.88	N. Commerical	0.79	5.0	2.2	5.80	4.0	2.5	6.59	4.6
Encinitas 31	In-Sag	0.94	N. Commerical	0.79	5.0	2.2	5.80	4.3	2.5	6.59	4.9
Encinitas 32	On-Grade	2.34	MDR (7.3)	0.57	8.6	2.2	4.08	5.4	2.5	4.64	6.2
Encinitas 33	On-Grade	1.42	HDR (24)	0.71	6.8	2.2	4.76	4.8	2.5	5.41	5.5
Encinitas 34	In-Sag	2.06	HDR (24)	0.71	8.0	2.2	4.28	6.3	2.5	4.86	7.1
Encinitas 35	In-Sag	0.98		0.79	5.0	2.2	5.80	4.5	2.5	6.59	5.1

[1] Per Figure 3-2 of SDCHM

On-Site Drainage Subarea ID #	Inlet Type	Area (ac)	Land Use Per Table 3-1	C[1]	Tc (min)	50 Year			100 Year		
						P6	I (in/hr) [1]	Q_{50} (cfs)	P6	I (in/hr) [1]	Q_{100} (cfs)
Encinitas 36	In-Sag	0.94	N. Commerical	0.79	5.5	2.2	5.45	4.0	2.5	6.19	4.6
Encinitas 37	On-Grade	1.37	MDR (14.5)	0.63	7.3	2.2	4.54	3.9	2.5	5.16	4.5
Encinitas 38	On-Grade	1.60	HDR (24)	0.71	7.4	2.2	4.50	5.1	2.5	5.12	5.8
Encinitas 39	In-Sag	0.49	N. Commerical	0.79	5.5	2.2	5.43	2.1	2.5	6.17	2.4
Encinitas 40	EX. Inlet	0.21	N. Commerical	0.79	5.0	2.2	5.80	1.0	2.5	6.59	1.1
Encintias 41	In-Sag	0.44	N. Commerical	0.79	6.5	2.2	4.89	1.7	2.5	5.56	1.9
Encintias 42	HOLD PLACE										
Encintias 43	In-Sag	0.82	G. Commerical	0.82	6.4	2.2	4.96	3.3	2.5	5.63	3.8
Encinitas 44	In-Sag Median	0.66	N. Commerical	0.79	8.8	2.2	4.03	2.1	2.5	4.58	2.4
Encintias 45	In-Sag Median	0.76	G. Commerical	0.82	7.2	2.2	4.56	2.8	2.5	5.19	3.2
Encintias 46	No Inlet	0.26	N. Commerical	0.79	5.6	2.2	5.39	1.1	2.5	6.13	1.3
Encintias 47	No Inlet	0.43	N. Commerical	0.79	5.7	2.2	5.32	1.8	2.5	6.04	2.1
Encintias 48	No Inlet	0.37	N. Commerical	0.79	6.9	2.2	4.72	1.4	2.5	5.36	1.6
Encintias 49	No Inlet	0.19	N. Commerical	0.79	5.0	2.2	5.80	0.9	2.5	6.59	1.0
Encintias 50	No Inlet	0.11	N. Commerical	0.79	5.0	2.2	5.80	0.5	2.5	6.59	0.6
Encintias 51	No Inlet	2.46	N. Commerical	0.79	9.2	2.2	3.92	7.6	2.5	4.46	8.7
Encintias 52	No Inlet	0.4	N. Commerical	0.79	7.6	2.2	4.43	1.4	2.5	5.03	1.6
Encintias 53	In-Sag	0.44	N. Commerical	0.79	6.0	2.2	5.18	1.8	2.5	5.88	2.0
Encintias 54	In-Sag	0.63	G. Commerical	0.82	5.1	2.2	5.75	3.0	2.5	6.54	3.4
Encintias 55	In-Sag	1.60	G. Commerical	0.82	9.8	2.2	3.75	4.9	2.5	4.26	5.6
Encintias 56	In-Sag	0.15	G. Commerical	0.82	5.0	2.2	5.80	0.7	2.5	6.59	0.8
Encintias 57	In-Sag	0.07	G. Commerical	0.82	5.0	2.2	5.80	0.3	2.5	6.59	0.4
Encintias 58	In-Sag	0.38	G. Commerical	0.82	5.0	2.2	5.80	1.8	2.5	6.59	2.1
Encintias 59	In-Sag	0.25	G. Commerical	0.82	5.0	2.2	5.80	1.2	2.5	6.59	1.4
Encintias 60	In-Sag	1.42	G. Commerical	0.82	11.4	2.2	3.41	4.0	2.5	3.87	4.5
Encintias 61	In-Sag	3.65	G. Commerical	0.82	15.6	2.2	2.78	8.3	2.5	3.16	9.5
Encintias 62	In-Sag	1.30	G. Commerical	0.82	9.3	2.2	3.87	4.1	2.5	4.40	4.7
Encintias 63	In-Sag	0.39	G. Commerical	0.82	5.0	2.2	5.80	1.9	2.5	6.59	2.1
Encintias 64	In-Sag	1.04	G. Commerical	0.82	5.0	2.2	5.80	4.9	2.5	6.59	5.6
Encintias 65	In-Sag	0.90	G. Commerical	0.82	5.5	2.2	5.45	4.0	2.5	6.19	4.6
Encintias 66	In-Sag	1.60	G. Commerical	0.82	8.8	2.2	4.02	5.3	2.5	4.56	6.0
Encintias 67	HOLD PLACE										
Encintias 68	In-Sag	0.48	G. Commerical	0.82	5.0	2.2	5.80	2.3	2.5	6.59	2.6
Encintias 69	In-Sag	1.09	G. Commerical	0.82	5.7	2.2	5.34	4.8	2.5	6.06	5.4
Encintias 70	In-Sag	0.15	G. Commerical	0.82	5.0	2.2	5.80	0.7	2.5	6.59	0.8

[1] Per Figure 3-2 of SDCHM

On-Site Drainage Subarea ID #	Inlet Type	Area (ac)	Land Use Per Table 3-1	C[1]	Tc (min)	50 Year			100 Year		
						P6	I (in/hr) [1]	Q_{50} (cfs)	P6	I (in/hr) [1]	Q_{100} (cfs)
Encintias 71	In-Sag	0.80	G. Commerical	0.82	5.4	2.2	5.54	3.6	2.5	6.30	4.1
Encintias 72	In-Sag	0.81	G. Commerical	0.82	5.0	2.2	5.80	3.8	2.5	6.59	4.4
Encintias 73	In-Sag	0.21	G. Commerical	0.82	5.0	2.2	5.80	1.0	2.5	6.59	1.1
Encintias 74	In-Sag	0.22	G. Commerical	0.82	5.0	2.2	5.80	1.0	2.5	6.59	1.2
Encintias 75	In-Sag	0.11	G. Commerical	0.82	5.0	2.2	5.80	0.5	2.5	6.59	0.6
Encintias 76	In-Sag	1.76	G. Commerical	0.82	11.0	2.2	3.48	5.0	2.5	3.96	5.7
Encintias 77	In-Sag	0.43	G. Commerical	0.82	5.0	2.2	5.80	2.0	2.5	6.59	2.3
Encintias 78	In-Sag	0.53	G. Commerical	0.82	5.0	2.2	5.80	2.5	2.5	6.59	2.9
Encintias 79	In-Sag	0.42	G. Commerical	0.82	5.0	2.2	5.80	2.0	2.5	6.59	2.3
Encintias 80	In-Sag	1.67	G. Commerical	0.82	7.5	2.2	4.47	6.1	2.5	5.08	7.0
Encintias 81	In-Sag	0.69	G. Commerical	0.82	5.4	2.2	5.52	3.1	2.5	6.27	3.5
Encintias 82	In-Sag	0.45	G. Commerical	0.82	5.0	2.2	5.80	2.1	2.5	6.59	2.4
Encintias 83	In-Sag	0.34	G. Commerical	0.82	5.0	2.2	5.80	1.6	2.5	6.59	1.8
Encintias 84	In-Sag	0.17	G. Commerical	0.82	5.0	2.2	5.80	0.8	2.5	6.59	0.9
Encintias 85	In-Sag	0.21	G. Commerical	0.82	5.0	2.2	5.80	1.0	2.5	6.59	1.1
Encintias 86	In-Sag	1.85	G. Commerical	0.82	10.4	2.2	3.61	5.5	2.5	4.10	6.2

[1] Per Figure 3-2 of SDCHM

Michael Baker
INTERNATIONAL

Tc Calculations

On-Site Drainage Subarea	Total Path of Travel	Initial Travel Time[1]			Surface/Gutter Travel Time							Tc (min)
ID #	L (ft)	Slope (%)	Lm (ft)	T_i (min)	Slope (%)	US Elv	DS Elv	Delta Elv	L (ft)	V (ft/s) [2]	T_t (min)	
Encinitas 1	675.00	0.5%	50	10.2	5%	87	56	31	625.0	6.10	1.7	11.9
Encinitas 2	690	12%	100	4.3	1.0%	62	56	6	590.0	2.75	3.6	7.9
Encinitas 3	220	4%	90	2.9	0.8%	57	56	1	130.0	2.40	0.9	5.0
Encinitas 4	210	6%	90	2.9	0.8%	57	56	1	120.0	2.40	0.8	5.0
Encinitas 5	890.00	0.5%	50	10.2	4%	87	56	31	840.0	5.50	2.5	12.7
Encinitas 6	1175.00	3.0%	95	7.0	3%	88	56	32	1080.0	4.75	3.8	10.8
Encinitas 7												
Encinitas 8	315	6%	95	3.4	3.2%	61	54	7	220.0	4.75	0.8	5.0
Encinitas 9	550	6%	95	4.3	2.2%	64	54	10	455.0	4.25	1.8	6.1
Encinitas 10	520	10%	95	3.4	2.8%	66	54	12	425.0	4.75	1.5	5.0
Encinitas 11	185	2%	75	4.0	0.9%	55	54	1	110.0	2.60	0.7	5.0
Encinitas 12	615.00	5.0%	100	6.0	7%	92	54	38	515.0	7.25	1.2	7.2
Encinitas 13	775.00	2.0%	80	6.9	7%	100	54	46	695.0	7.25	1.6	8.5
Encinitas 14	680	10%	100	2.7	3.8%	76	54	22	580.0	5.50	1.8	5.0
Encinitas 15	730.00	2.0%	80	7.4	6%	96	54	42	650.0	6.75	1.6	9.0
Encinitas 16	1075.00	1.0%	65	8.4	4%	96	54	42	1010.0	5.50	3.1	11.5
Encinitas 17	240	2%	70	3.1	0.6%	55	54	1	170.0	2.10	1.3	5.0
Encinitas 18	625	10%	100	3.5	6.9%	90	54	36	525.0	7.25	1.2	5.0
Encinitas 19	830	3.0%	90	6.0	4.9%	90	54	36	740.0	6.10	2.0	8.0
Encinitas 20	975	3%	90	6.0	4.1%	90	54	36	885.0	5.50	2.7	8.7
Encinitas 21	225	1%	60	4.1	0.6%	55	54	1	165.0	2.10	1.3	5.4
Encinitas 22	580.00	3.0%	95	7.8	8%	94	56	38	485.0	7.75	1.0	8.8
Encinitas 23	600.00	3.0%	90	6.0	7%	94	56	38	510.0	7.25	1.2	7.2
Encinitas 24	520	8%	100	2.4	0.2%	55	54	1	420.0	1.75	4.0	6.4
Encinitas 25	1040.00	1.0%	65	7.9	5%	99	54	45	975.0	6.10	2.7	10.6
Encinitas 26	715.00	2.0%	80	6.9	5%	88	54	34	635.0	6.10	1.7	8.6
Encinitas 27	430	3%	85	3.4	0.3%	55	54	1	345.0	1.75	3.3	6.7
Encinitas 28	700.00	3.0%	95	7.0	6%	90	54	36	605.0	6.75	1.5	8.5
Encinitas 29	685.00	3.0%	95	7.0	6%	90	54	36	590.0	6.75	1.5	8.5
Encinitas 30	220	3%	85	3.4	0.7%	55	54	1	135.0	2.20	1.0	5.0
Encinitas 31	250	2%	75	3.6	0.6%	55	54	1	175.0	2.10	1.4	5.0
Encinitas 32	745.00	3.0%	95	7.0	6%	90	54	36	650.0	6.75	1.6	8.6
Encinitas 33	915.00	5.0%	95	4.3	4%	87	54	33	820.0	5.50	2.5	6.8
Encinitas 34	580	2%	75	4.0	0.6%	57	54	3	505.0	2.10	4.0	8.0
Encinitas 35	345											
Encinitas 36	275	2%	75	3.6	0.5%	55	54	1	200.0	1.75	1.9	5.5

On-Site Drainage Subarea	Total Path of Travel	Initial Travel Time[1]			Surface/Gutter Travel Time							Tc (min)
ID #	L (ft)	Slope (%)	Lm (ft)	T_i (min)	Slope (%)	US Elv	DS Elv	Delta Elv	L (ft)	V (ft/s) [2]	T_t (min)	
Encinitas 37	655.00	3.0%	90	6.0	7%	91	54	37	565.0	7.25	1.3	7.3
Encinitas 38	655.00	3.0%	90	6.0	6%	90	54	36	565.0	6.75	1.4	7.4
Encinitas 39	230	1%	60	4.5	1%	55	54	1	170.0	2.75	1.0	5.5
Encinitas 40	100	1%	60	4.5	0.0%	55	55	0	40.0	2.00	0.3	5.0
Encintias 41	390	1%	60	4.5	1%	56	54	2	330.0	2.75	2.0	6.5
Encintias 42												
Encintias 43	435	1%	60	4.1	1%	56	54	2	375.0	2.75	2.3	6.4
Encinitas 44	510	1%	60	4.5	0.4%	68	66	2	450.0	1.75	4.3	8.8
Encintias 45	390	1%	60	4.1	0.3%	69	68	1	330.0	1.75	3.1	7.2
Encintias 46	240	1%	60	4.5	1%	69	68	1	180.0	2.75	1.1	5.6
Encintias 47	260	1%	60	4.5	1%	70	68	2	200.0	2.75	1.2	5.7
Encintias 48	310	1%	60	4.5	0.4%	73	72	1	250.0	1.75	2.4	6.9
Encintias 49	140	1%	60	4.5	1%	73	72	1	80.0	2.75	0.5	5.0
Encintias 50	140	1%	60	4.5	1%	72	71	1	80.0	2.75	0.5	5.0
Encintias 51	830	1%	60	4.5	1%	78	74	4	770.0	2.75	4.7	9.2
Encintias 52	385	1%	60	4.5	0.3%	78	77	1	325.0	1.75	3.1	7.6
Encintias 53	300	1%	60	4.5	1%	76	74	2	240.0	2.75	1.5	6.0
Encintias 54	290	1%	60	4.1	2%	82	78	4	230.0	4.00	1.0	5.1
Encintias 55	660	1%	60	4.1	0.2%	78	77	1	600.0	1.75	5.7	9.8
Encintias 56	165	1%	60	4.1	1%	78	77	1	105.0	2.75	0.6	5.0
Encintias 57	100	1%	60	4.1	2.5%	76	75	1	40.0	4.25	0.2	5.0
Encintias 58	200	1%	60	4.1	1%	76	74	2	140.0	2.75	0.8	5.0
Encintias 59	180	1%	60	4.1	1%	74	73	1	120.0	2.75	0.7	5.0
Encintias 60	920	1%	60	3.2	0.2%	78	76	2	860.0	1.75	8.2	11.4
Encintias 61	1625	1%	60	3.2	0.6%	76	66	10	1565.0	2.10	12.4	15.6
Encintias 62	705	1%	60	3.2	0.2%	70	69	1	645.0	1.75	6.1	9.3
Encintias 63	200	1%	60	3.2	1.4%	68	66	2	140.0	3.50	0.7	5.0
Encintias 64	455	1%	60	3.2	1.8%	69	62	7	395.0	4.00	1.6	5.0
Encintias 65	440	1%	60	3.2	1%	62	58	4	380.0	2.75	2.3	5.5
Encintias 66	770	1%	60	3.2	0.6%	62	58	4	710.0	2.10	5.6	8.8
Encintias 67												
Encintias 68	230	1%	60	3.2	1.2%	60	58	2	170.0	2.75	1.0	5.0
Encintias 69	470	1%	60	3.2	1%	60	56	4	410.0	2.75	2.5	5.7
Encintias 70	100	1%	60	3.2	2.5%	57	56	1	40.0	4.25	0.2	5.0
Encintias 71	345	1%	60	3.2	0.7%	58	56	2	285.0	2.20	2.2	5.4
Encintias 72	340	1%	60	3.2	1.4%	58	54	4	280.0	3.50	1.3	5.0

On-Site Drainage Subarea	Total Path of Travel	Initial Travel Time[1]			Surface/Gutter Travel Time							Tc (min)
ID #	L (ft)	Slope (%)	Lm (ft)	T_i (min)	Slope (%)	US Elv	DS Elv	Delta Elv	L (ft)	V (ft/s) [2]	T_t (min)	
Encintias 73	100	1%	60	3.2	2.5%	55	54	1	40.0	4.25	0.2	5.0
Encintias 74	100	1%	60	3.2	2.5%	55	54	1	40.0	4.25	0.2	5.0
Encintias 75	100	1%	60	3.2	2.5%	53	52	1	40.0	4.25	0.2	5.0
Encintias 76	880	1%	60	3.2	0.2%	56	54	2	820.0	1.75	7.8	11.0
Encintias 77	215	1%	60	3.2	0.6%	57	56	1	155.0	2.10	1.2	5.0
Encintias 78	160	1%	60	3.2	1.0%	56	55	1	100.0	2.75	0.6	5.0
Encintias 79	160	1%	60	3.2	1.0%	56	55	1	100.0	2.75	0.6	5.0
Encintias 80	510	1%	60	3.2	0.4%	56	54	2	450.0	1.75	4.3	7.5
Encintias 81	350	1%	60	3.2	0.7%	56	54	2	290.0	2.20	2.2	5.4
Encintias 82	220	1%	60	3.2	1.3%	56	54	2	160.0	3.00	0.9	5.0
Encintias 83	175	1%	60	3.2	1.7%	54	52	2	115.0	3.50	0.5	5.0
Encintias 84	100	1%	60	3.2	5.0%	56	54	2	40.0	6.10	0.1	5.0
Encintias 85	100	1%	60	3.2	5.0%	56	54	2	40.0	6.10	0.1	5.0
Encintias 86	820	1%	60	3.2	0.5%	58	54	4	760.0	1.75	7.2	10.4

[1] Assumed initial slope of 2%, travel length of 80 feet, which yields a Ti of 6.5 minutes per Table 3-2 of SDCHM

[2] Per Figure 3-6 of SDCHM

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Runoff Coefficient Inputs

On-Site Drainage Subarea ID #	Inlet Type	Land Use Per Table 3-1	C[1]
Encinitas 1	On-Grade	MDR (4.3)	0.52
Encinitas 2	In-Sag	MDR (14.5)	0.63
Encinitas 3	In-Sag	N. Commerical	0.79
Encinitas 4	In-Sag	N. Commerical	0.79
Encinitas 5	On-Grade	MDR (4.3)	0.52
Encinitas 6	On-Grade	MDR (7.3)	0.57
Encinitas 7	HOLD PLACE		
Encinitas 8	In-Sag	N. Commerical	0.79
Encinitas 9	In-Sag	HDR (24)	0.71
Encinitas 10	In-Sag	HDR (24)	0.71
Encinitas 11	In-Sag	N. Commerical	0.79
Encinitas 12	On-Grade	MDR (7.3)	0.57
Encinitas 13	On-Grade	MDR (10.9)	0.6
Encinitas 14	In-Sag	HDR (24)	0.71
Encinitas 15	In-Sag	MDR (7.3)	0.57
Encinitas 16	Ex. Inlet OG	MDR (7.3)	0.57
Encinitas 17	In-Sag	N. Commerical	0.79
Encinitas 18	In-Sag	HDR (24)	0.71
Encinitas 19	In-Sag	HDR (24)	0.71
Encinitas 20	In-Sag	MDR (4.3)	0.52
Encinitas 21	In-Sag	N. Commerical	0.79
Encinitas 22	On-Grade	MDR (4.3)	0.52
Encinitas 23	On-Grade	MDR (14.5)	0.63
Encinitas 24	In-Sag	N. Commerical	0.79
Encinitas 25	On-Grade	MDR (10.9)	0.6
Encinitas 26	On-Grade	MDR (10.9)	0.6
Encinitas 27	In-Sag	N. Commerical	0.79
Encinitas 28	On-Grade	MDR (7.3)	0.57
Encinitas 29	On-Grade	MDR (7.3)	0.57
Encinitas 30	In-Sag	N. Commerical	0.79
Encinitas 31	In-Sag	N. Commerical	0.79
Encinitas 32	On-Grade	MDR (7.3)	0.57
Encinitas 33	On-Grade	HDR (24)	0.71
Encinitas 34	In-Sag	HDR (24)	0.71
Encinitas 35	In-Sag	N. Commerical	0.79
Encinitas 36	In-Sag	N. Commerical	0.79
Encinitas 37	On-Grade	MDR (14.5)	0.63
Encinitas 38	On-Grade	HDR (24)	0.71
Encinitas 39	In-Sag	N. Commerical	0.79
Encinitas 40		N. Commerical	0.79
Encintias 41		N. Commerical	0.79
Encintias 42	HOLD PLACE		
Encintias 43	In-Sag	G. Commerical	0.82
Encinitas 44	No Inlet	N. Commerical	0.79
Encintias 45	No Inlet	G. Commerical	0.82
Encintias 46	No Inlet	N. Commerical	0.79
Encintias 47	No Inlet	N. Commerical	0.79
Encintias 48	No Inlet	N. Commerical	0.79
Encintias 49	No Inlet	N. Commerical	0.79

On-Site Drainage Subarea ID #	Inlet Type	Land Use Per Table 3-1	C[1]
Encintias 50	No Inlet	N. Commerical	0.79
Encintias 51	No Inlet	N. Commerical	0.79
Encintias 52	No Inlet	N. Commerical	0.79
Encintias 53	In-Sag	N. Commerical	0.79
Encintias 54	In-Sag	G. Commerical	0.82
Encintias 55	In-Sag	G. Commerical	0.82
Encintias 56	In-Sag	G. Commerical	0.82
Encintias 57	In-Sag	G. Commerical	0.82
Encintias 58	In-Sag	G. Commerical	0.82
Encintias 59	In-Sag	G. Commerical	0.82
Encintias 60	In-Sag	G. Commerical	0.82
Encintias 61	In-Sag	G. Commerical	0.82
Encintias 62	In-Sag	G. Commerical	0.82
Encintias 63	In-Sag	G. Commerical	0.82
Encintias 64	In-Sag	G. Commerical	0.82
Encintias 65	In-Sag	G. Commerical	0.82
Encintias 66	In-Sag	G. Commerical	0.82
Encintias 67	HOLD PLACE		
Encintias 68	In-Sag	G. Commerical	0.82
Encintias 69	In-Sag	G. Commerical	0.82
Encintias 70	In-Sag	G. Commerical	0.82
Encintias 71	In-Sag	G. Commerical	0.82
Encintias 72	In-Sag	G. Commerical	0.82
Encintias 73	In-Sag	G. Commerical	0.82
Encintias 74	In-Sag	G. Commerical	0.82
Encintias 75	In-Sag	G. Commerical	0.82
Encintias 76	In-Sag	G. Commerical	0.82
Encintias 77	In-Sag	G. Commerical	0.82
Encintias 78	In-Sag	G. Commerical	0.82
Encintias 79	In-Sag	G. Commerical	0.82
Encintias 80	In-Sag	G. Commerical	0.82
Encintias 81	In-Sag	G. Commerical	0.82
Encintias 82	In-Sag	G. Commerical	0.82
Encintias 83	In-Sag	G. Commerical	0.82
Encintias 84	In-Sag	G. Commerical	0.82
Encintias 85	In-Sag	G. Commerical	0.82
Encintias 86	In-Sag	G. Commerical	0.82

[1] Using Table 3-1 of the San Diego County Hydrology Manual (SDCHM) Assumes High Density Residential Land Use (43

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Appendix D – Inlet Results Input and Output

Included within this appendix:

50 Year Inlet Results Summary
100 Year Inlet Results Summary

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50 Year Inlet Result Summary

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
1		0.00	....	....	....	....	....	n/a	MH	....
2		0.00	....	....	....	....	....	n/a	MH	....
3		0.00	....	....	....	....	....	n/a	MH	....
4		0.00	....	....	....	....	....	n/a	MH	....
5		0.00	....	....	....	....	....	n/a	MH	....
6		0.00	....	....	....	....	....	n/a	MH	....
7		0.00	....	....	....	....	....	n/a	MH	....
8		0.00	....	....	....	....	....	n/a	MH	....
9		0.00	....	....	....	....	....	n/a	MH	....
10		0.00	....	....	....	....	....	n/a	MH	....
11		0.00	....	....	....	....	....	n/a	MH	....
12		0.00	....	....	....	....	....	n/a	MH	....
13		0.00	....	....	....	....	....	n/a	MH	....
14		0.00	....	....	....	....	....	n/a	MH	....
15		0.00	....	....	....	....	....	n/a	MH	....
16		0.00	....	....	....	....	....	n/a	MH	....
17		0.00	....	....	....	....	....	n/a	MH	....
18		0.00	....	....	....	....	....	n/a	MH	....
19		0.00	....	....	....	....	....	n/a	MH	....
20		0.00	....	....	....	....	....	n/a	MH	....
21		0.00	....	....	....	....	....	n/a	MH	....
22		0.00	....	....	....	....	....	n/a	MH	....
23		0.00	....	....	....	....	....	n/a	MH	....
24		0.00	....	....	....	....	....	n/a	MH	....
25		0.00	....	....	....	....	....	n/a	MH	....
26		0.00	....	....	....	....	....	n/a	MH	....
27		0.00	....	....	....	....	....	n/a	MH	....
28		0.00	....	....	....	....	....	n/a	MH	....
29	62	4.10	4.10	0.00	3.00	9.0	29.59	Sag	Dp-Curb	0.00
30	63	1.90	1.90	0.00	3.00	9.0	17.72	Sag	Dp-Curb	0.00
31		0.00	....	....	....	....	....	n/a	MH	....
32	64	4.90	4.90	0.00	....	....	20.49	Sag	Grate	0.00
33	45	2.80	2.80	0.00	4.00	6.0	8.29	Sag	Curb	0.00
34	65a	2.00	2.00	0.00	....	....	11.05	Sag	Grate	0.00
35	65b	2.00	2.00	0.00	....	....	11.05	Sag	Grate	0.00
36	67	5.30	3.50	1.80	9.00	6.0	8.55	Offsite	Curb	0.00
37		0.00	....	....	....	....	....	n/a	MH	....
38		1.00	....	....	....	....	....	n/a	MH	....
39	41	1.70	1.70	0.00	4.00	6.0	7.57	Sag	Curb	0.00
40	43	3.30	3.30	0.00	5.00	6.0	12.14	Sag	Curb	0.00
41	68	2.30	2.30	0.00	....	....	12.18	Sag	Grate	0.00
42	69	4.80	4.80	0.00	3.00	9.0	32.88	Sag	Dp-Curb	0.00
43	70	0.70	0.70	0.00	3.00	9.0	9.10	Sag	Dp-Curb	0.00
44		0.00	....	....	....	....	....	n/a	MH	....
45	36	4.00	4.12	0.00	10.50	6.0	9.63	Sag	Curb	0.12
46		0.00	....	....	....	....	....	n/a	MH	....
47	38b	5.54	8.89	0.00	4.00	6.0	30.14	Sag	Curb	3.35
48		0.00	....	....	....	....	....	n/a	MH	....
49	37	3.90	3.78	0.12	11.50	6.0	9.25	45	Curb	0.00

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
50	38a	5.10	1.75	3.35	4.00	6.0	8.55	47	Curb	0.00
51	71	3.60	3.60	0.00	....	....	16.59	Sag	Grate	0.00
52		0.00	....	....	....	....	....	n/a	MH	....
53	31	4.30	4.58	0.00	8.50	6.0	12.01	Sag	Curb	0.28
54		0.00	....	....	....	....	....	n/a	MH	....
55		0.00	....	....	....	....	....	n/a	MH	....
56		5.00	....	....	....	....	....	n/a	MH	....
57	34	6.30	6.35	0.00	10.00	6.0	14.25	Sag	Curb	0.05
58	35	4.50	4.50	0.00	8.00	6.0	12.25	Sag	Curb	0.00
59		0.00	....	....	....	....	....	n/a	MH	....
60	33	4.80	4.75	0.05	13.00	6.0	13.87	57	Curb	0.00
61	32	5.40	5.12	0.28	12.00	4.0	14.00	53	Curb	0.00
62	72	3.80	3.80	0.00	3.00	9.0	28.13	Sag	Dp-Curb	0.00
63		0.00	....	....	....	....	....	n/a	MH	....
64	30	4.00	5.62	0.00	4.00	6.0	20.44	Sag	Curb	1.62
65		0.00	....	....	....	....	....	n/a	MH	....
66	29	5.40	3.78	1.62	7.50	6.0	11.25	64	Curb	0.00
67	28	6.70	6.33	0.37	14.00	6.0	12.25	68	Curb	0.00
68	27	5.50	12.74	0.00	8.00	6.0	22.35	Sag	Comb.	7.24
69	75	0.50	0.50	0.00	3.00	9.0	7.27	Sag	Dp-Curb	0.00
70	74	1.00	1.00	0.00	3.00	9.0	11.55	Sag	Dp-Curb	0.00
71		0.00	....	....	....	....	....	n/a	MH	....
72	73	1.00	1.00	0.00	3.00	9.0	11.55	Sag	Dp-Curb	0.00
73		0.00	....	....	....	....	....	n/a	MH	....
74	25	9.30	7.07	2.23	15.00	6.0	11.00	68	Curb	0.00
75	26	7.50	2.85	4.65	4.00	4.0	13.90	68	Curb	0.00
76	24	5.00	8.28	0.00	13.50	4.0	15.13	Sag	Curb	3.28
77		0.00	....	....	....	....	....	n/a	MH	....
78	22	4.20	1.69	2.51	13.00	6.0	2.10	80	Curb	0.00
79	23	5.30	2.02	3.28	13.00	6.0	2.70	76	Curb	0.00
80	21	2.00	4.51	0.00	4.00	6.0	17.24	Sag	Curb	2.51
81	78	2.50	2.50	0.00	....	....	12.90	Sag	Grate	0.00
82	77a	1.00	1.00	0.00	3.00	9.0	11.55	Sag	Dp-Curb	0.00
83	77b	1.00	1.00	0.00	3.00	9.0	11.55	Sag	Dp-Curb	0.00
84	79	2.00	2.00	0.00	....	....	11.05	Sag	Grate	0.00
85	18	13.30	13.30	0.00	20.00	6.0	12.05	Sag	Comb.	0.00
86	17	2.20	2.20	0.00	10.00	6.0	5.51	Sag	Curb	0.00
87	15	1.50	1.50	0.00	4.00	6.0	6.72	Sag	Curb	0.00
88		0.00	....	....	....	....	....	n/a	MH	....
89	80	6.10	6.10	0.00	3.00	9.0	38.57	Sag	Dp-Curb	0.00
90		0.00	....	....	....	....	....	n/a	MH	....
91		0.00	....	....	....	....	....	n/a	MH	....
92	13	6.40	5.98	0.42	20.00	6.0	14.10	93	Curb	0.00
93	14	10.10	10.52	0.00	15.20	6.0	15.80	Sag	Curb	0.42
94		0.00	....	....	....	....	....	n/a	MH	....
95	10	7.40	7.40	0.00	11.00	6.0	15.23	Sag	Curb	0.00
96	11	1.30	1.52	0.00	4.00	6.0	6.79	Sag	Curb	0.22
97		0.00	....	....	....	....	....	n/a	MH	....
98	82	2.10	2.10	0.00	3.00	9.0	18.94	Sag	Dp-Curb	0.00

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
99	9	8.80	8.80	0.00	13.00	6.0	15.52	Sag	Curb	0.00
100		0.00	....	....	....	....	....	n/a	MH	....
101	83a	0.80	0.80	0.00	3.00	9.0	9.95	Sag	Dp-Curb	0.00
102	83b	0.80	0.80	0.00	4.00	6.0	3.39	Sag	Curb	0.00
103		0.00	....	....	....	....	....	n/a	MH	....
104		0.00	....	....	....	....	....	n/a	MH	....
105	7	0.01	3.40	0.00	8.50	6.0	9.30	Sag	Curb	3.39
106	6	16.30	12.91	3.39	20.00	6.0	15.20	105	Curb	0.00
107	5	2.00	1.90	0.10	8.00	6.0	6.35	109	Curb	0.00
108	85	1.00	1.00	0.00	3.00	9.0	11.55	Sag	Dp-Curb	0.00
109	4	3.60	3.70	0.00	6.00	6.0	12.19	Sag	Curb	0.10
110		0.00	....	....	....	....	....	n/a	MH	....
111	86	5.50	5.50	0.00	3.00	9.0	36.00	Sag	Dp-Curb	0.00
112	2	13.40	13.40	0.00	20.00	6.0	15.40	Sag	Curb	0.00
113	3	3.70	3.70	0.00	5.50	6.0	12.74	Sag	Curb	0.00
114	1	8.00	8.00	0.00	20.00	6.0	13.15	112	Curb	0.00
115		0.00	....	....	....	....	....	n/a	MH	....
116	44	2.10	2.10	0.00	4.00	6.0	9.17	Sag	Curb	0.00
117		0.00	....	....	....	....	....	n/a	MH	....
118	40	1.10	1.10	0.00	4.00	6.0	4.90	Sag	Curb	0.00
119	39a	2.10	2.10	0.00	4.00	6.0	9.17	Sag	Curb	0.00
120	12	6.00	5.78	0.22	20.00	6.0	12.25	96	Curb	0.00
121	39b	0.10	0.10	0.00	4.00	6.0	0.64	Sag	Curb	0.00
122	8	6.50	6.50	0.00	10.00	6.0	14.53	Sag	Curb	0.00
123	19	10.20	10.20	0.00	20.00	8.0	3.07	Sag	Curb	0.00
124		0.00	....	....	....	....	....	n/a	MH	....
125		4.70	4.70	0.00	4.00	4.0	16.40	Sag	Comb.	0.00
126		0.00	....	....	....	....	....	n/a	MH	....
127		14.10	5.90	8.20	....	....	12.95	126	Grate	0.00

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100 Year Inlet Result Summary

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
1		0.00	....	....	....	....	....	n/a	MH	....
2		0.00	....	....	....	....	....	n/a	MH	....
3		0.00	....	....	....	....	....	n/a	MH	....
4		0.00	....	....	....	....	....	n/a	MH	....
5		0.00	....	....	....	....	....	n/a	MH	....
6		0.00	....	....	....	....	....	n/a	MH	....
7		0.00	....	....	....	....	....	n/a	MH	....
8		0.00	....	....	....	....	....	n/a	MH	....
9		0.00	....	....	....	....	....	n/a	MH	....
10		0.00	....	....	....	....	....	n/a	MH	....
11		0.00	....	....	....	....	....	n/a	MH	....
12		0.00	....	....	....	....	....	n/a	MH	....
13		0.00	....	....	....	....	....	n/a	MH	....
14		0.00	....	....	....	....	....	n/a	MH	....
15		0.00	....	....	....	....	....	n/a	MH	....
16		0.00	....	....	....	....	....	n/a	MH	....
17		0.00	....	....	....	....	....	n/a	MH	....
18		0.00	....	....	....	....	....	n/a	MH	....
19		0.00	....	....	....	....	....	n/a	MH	....
20		0.00	....	....	....	....	....	n/a	MH	....
21		0.00	....	....	....	....	....	n/a	MH	....
22		0.00	....	....	....	....	....	n/a	MH	....
23		0.00	....	....	....	....	....	n/a	MH	....
24		0.00	....	....	....	....	....	n/a	MH	....
25		0.00	....	....	....	....	....	n/a	MH	....
26		0.00	....	....	....	....	....	n/a	MH	....
27		0.00	....	....	....	....	....	n/a	MH	....
28		0.00	....	....	....	....	....	n/a	MH	....
29	62	4.70	4.70	0.00	3.00	9.0	32.42	Sag	Dp-Curb	0.00
30	63	1.57	1.57	0.00	3.00	9.0	15.60	Sag	Dp-Curb	0.00
31		0.00	....	....	....	....	....	n/a	MH	....
32	64	4.18	4.18	0.00	....	....	18.38	Sag	Grate	0.00
33	45	3.20	3.20	0.00	4.00	6.0	9.48	Sag	Curb	0.00
34	65a	2.30	2.30	0.00	....	....	12.18	Sag	Grate	0.00
35	65b	2.30	2.30	0.00	....	....	12.18	Sag	Grate	0.00
36	67	6.00	3.74	2.26	9.00	6.0	9.00	Offsite	Curb	0.00
37		0.00	....	....	....	....	....	n/a	MH	....
38		1.00	....	....	....	....	....	n/a	MH	....
39	41	1.90	1.90	0.00	4.00	6.0	8.38	Sag	Curb	0.00
40	43	3.80	3.80	0.00	5.00	6.0	13.64	Sag	Curb	0.00
41	68	2.60	2.60	0.00	....	....	13.26	Sag	Grate	0.00
42	69	5.40	5.40	0.00	3.00	9.0	35.56	Sag	Dp-Curb	0.00
43	70	0.80	0.80	0.00	3.00	9.0	9.95	Sag	Dp-Curb	0.00
44		0.00	....	....	....	....	....	n/a	MH	....
45	36	4.60	4.88	0.00	10.50	6.0	11.14	Sag	Curb	0.28
46		0.00	....	....	....	....	....	n/a	MH	....
47	38b	5.54	9.48	0.00	4.00	6.0	31.83	Sag	Curb	3.94
48		0.00	....	....	....	....	....	n/a	MH	....
49	37	4.50	4.22	0.28	11.50	6.0	9.85	45	Curb	0.00

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
50	38a	5.80	1.86	3.94	4.00	6.0	9.05	47	Curb	0.00
51	71	4.10	4.10	0.00	....	....	18.14	Sag	Grate	0.00
52		0.00	....	....	....	....	....	n/a	MH	....
53	31	4.90	5.44	0.00	8.50	6.0	13.84	Sag	Curb	0.54
54		0.00	....	....	....	....	....	n/a	MH	....
55		0.00	....	....	....	....	....	n/a	MH	....
56		5.00	....	....	....	....	....	n/a	MH	....
57	34	7.10	7.28	0.00	10.00	6.0	15.91	Sag	Curb	0.18
58	35	5.10	5.10	0.00	8.00	6.0	13.58	Sag	Curb	0.00
59		0.00	....	....	....	....	....	n/a	MH	....
60	33	5.50	5.32	0.18	13.00	6.0	14.67	57	Curb	0.00
61	32	6.19	5.65	0.54	12.00	4.0	14.75	53	Curb	0.00
62	72	4.40	4.40	0.00	3.00	9.0	31.02	Sag	Dp-Curb	0.00
63		0.00	....	....	....	....	....	n/a	MH	....
64	30	4.60	6.65	0.00	4.00	6.0	24.74	Sag	Curb	2.05
65		0.00	....	....	....	....	....	n/a	MH	....
66	29	6.10	4.05	2.05	7.50	6.0	11.80	64	Curb	0.00
67	28	7.60	6.94	0.66	14.00	6.0	12.90	68	Curb	0.00
68	27	6.30	15.42	0.00	8.00	6.0	24.75	Sag	Comb.	9.12
69	75	0.60	0.60	0.00	3.00	9.0	8.21	Sag	Dp-Curb	0.00
70	74	1.20	1.20	0.00	3.00	9.0	13.04	Sag	Dp-Curb	0.00
71		0.00	....	....	....	....	....	n/a	MH	....
72	73	1.10	1.10	0.00	3.00	9.0	12.31	Sag	Dp-Curb	0.00
73		0.00	....	....	....	....	....	n/a	MH	....
74	25	10.60	7.61	2.99	15.00	6.0	11.55	68	Curb	0.00
75	26	8.50	3.02	5.48	4.00	4.0	14.60	68	Curb	0.00
76	24	6.20	10.03	0.00	13.50	4.0	16.71	Sag	Curb	3.83
77		0.00	....	....	....	....	....	n/a	MH	....
78	22	4.80	1.84	2.96	13.00	6.0	2.35	80	Curb	0.00
79	23	6.00	2.17	3.83	13.00	6.0	2.95	76	Curb	0.00
80	21	2.20	5.16	0.00	4.00	6.0	19.17	Sag	Curb	2.96
81	78	2.90	2.90	0.00	....	....	14.30	Sag	Grate	0.00
82	77a	1.20	1.20	0.00	3.00	9.0	13.04	Sag	Dp-Curb	0.00
83	77b	1.20	1.20	0.00	3.00	9.0	13.04	Sag	Dp-Curb	0.00
84	79	2.30	2.30	0.00	....	....	12.18	Sag	Grate	0.00
85	18	15.10	15.10	0.00	20.00	6.0	13.60	Sag	Comb.	0.00
86	17	2.50	2.50	0.00	10.00	6.0	6.27	Sag	Curb	0.00
87	15	1.70	1.70	0.00	4.00	6.0	7.57	Sag	Curb	0.00
88		0.00	....	....	....	....	....	n/a	MH	....
89	80	7.00	7.00	0.00	3.00	9.0	42.28	Sag	Dp-Curb	0.00
90		0.00	....	....	....	....	....	n/a	MH	....
91		0.00	....	....	....	....	....	n/a	MH	....
92	13	7.30	6.54	0.76	20.00	6.0	14.90	93	Curb	0.00
93	14	11.50	12.26	0.00	15.20	6.0	17.82	Sag	Curb	0.76
94		0.00	....	....	....	....	....	n/a	MH	....
95	10	8.40	8.40	0.00	11.00	6.0	16.84	Sag	Curb	0.00
96	11	1.50	1.95	0.00	4.00	6.0	8.59	Sag	Curb	0.45
97		0.00	....	....	....	....	....	n/a	MH	....
98	82	2.40	2.40	0.00	3.00	9.0	20.71	Sag	Dp-Curb	0.00

Line No.	Inlet ID	Known Q	Q Captured	Q Bypass	Curb Length	Throat Ht	Gutter Spread	Bypass Line No.	Junct Type	Q Carryover
		(cfs)	(cfs)	(cfs)	(ft)	(in)	(ft)			(cfs)
99	9	10.00	10.00	0.00	13.00	6.0	17.17	Sag	Curb	0.00
100		0.00	....	....	....	....	....	n/a	MH	....
101	83a	0.90	0.90	0.00	3.00	9.0	10.76	Sag	Dp-Curb	0.00
102	83b	0.90	0.90	0.00	4.00	6.0	3.91	Sag	Curb	0.00
103		0.00	....	....	....	....	....	n/a	MH	....
104		0.00	....	....	....	....	....	n/a	MH	....
105	7	0.01	4.59	0.00	8.50	6.0	12.03	Sag	Curb	4.58
106	6	18.50	13.92	4.58	20.00	6.0	15.95	105	Curb	0.00
107	5	2.30	2.10	0.20	8.00	6.0	6.75	109	Curb	0.00
108	85	1.10	1.10	0.00	3.00	9.0	12.31	Sag	Dp-Curb	0.00
109	4	4.10	4.30	0.00	6.00	6.0	13.78	Sag	Curb	0.20
110		0.00	....	....	....	....	....	n/a	MH	....
111	86	6.20	6.20	0.00	3.00	9.0	39.00	Sag	Dp-Curb	0.00
112	2	15.20	15.20	0.00	20.00	6.0	17.01	Sag	Curb	0.00
113	3	4.20	4.20	0.00	5.50	6.0	14.13	Sag	Curb	0.00
114	1	8.60	8.60	0.00	20.00	6.0	13.55	112	Curb	0.00
115		0.00	....	....	....	....	....	n/a	MH	....
116	44	2.40	2.40	0.00	4.00	6.0	10.30	Sag	Curb	0.00
117		0.00	....	....	....	....	....	n/a	MH	....
118	40	1.10	1.10	0.00	4.00	6.0	4.90	Sag	Curb	0.00
119	39a	2.40	2.40	0.00	4.00	6.0	10.30	Sag	Curb	0.00
120	12	6.80	6.35	0.45	20.00	6.0	12.92	96	Curb	0.00
121	39b	0.10	0.10	0.00	4.00	6.0	0.64	Sag	Curb	0.00
122	8	7.40	7.40	0.00	10.00	6.0	16.12	Sag	Curb	0.00
123	19	11.60	11.60	0.00	20.00	8.0	3.34	Sag	Curb	0.00
124		0.00	....	....	....	....	....	n/a	MH	....
125		5.00	5.00	0.00	4.00	4.0	17.10	Sag	Comb.	0.00
126		0.00	....	....	....	....	....	n/a	MH	....
127		15.50	6.24	9.26	....	....	13.45	126	Grate	0.00

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Appendix E – Q3 XPSWMM Main Storm Drain Input and Output

Included within this appendix:

50 Year Main Pipe Q3 XPSWMM Results Summary
100 Year Main Pipe Q3 XPSWMM Results Summary

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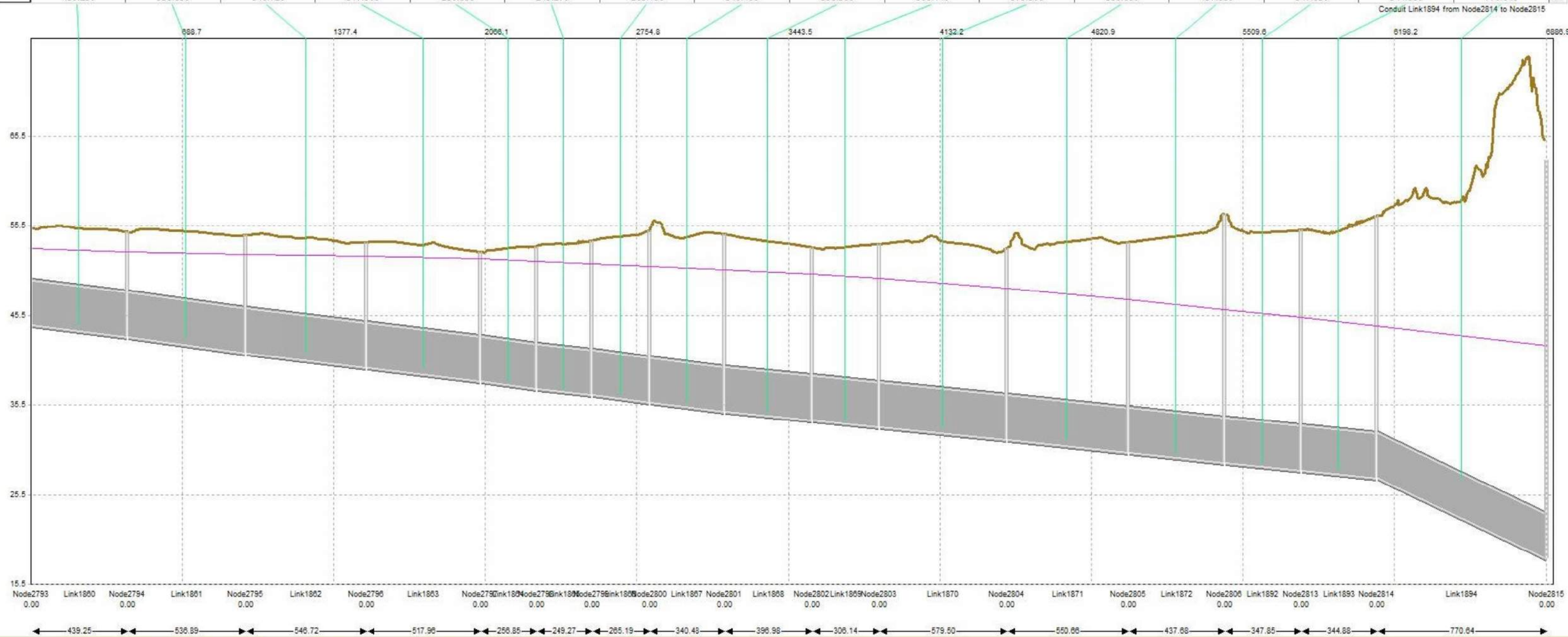
50 Year Main Pipe Q3 XPSWMM Results

	Link1860	Link1861	Link1862	Link1863	Link1864	Link1865	Link1866	Link1867	Link1868	Link1869	Link1870	Link1871	Link1872	Link1892	Link1893	Link1894
Special Condu																
Downstream I	43.158	41.352	39.712	38.158	37.388	36.640	35.844	34.823	33.831	33.065	31.616	30.240	29.146	28.276	27.414	18.424
Upstream Inve	44.476	43.158	41.352	39.712	38.158	37.388	36.640	35.844	34.823	33.831	33.065	31.616	30.240	29.146	28.276	27.414
Conduit Slope	0.300	0.336	0.300	0.300	0.300	0.300	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	1.167
Diameter (Hei	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
Length	439.250	536.890	546.720	517.960	256.850	249.270	265.190	340.480	396.980	306.140	579.500	550.660	437.680	347.850	344.880	770.640



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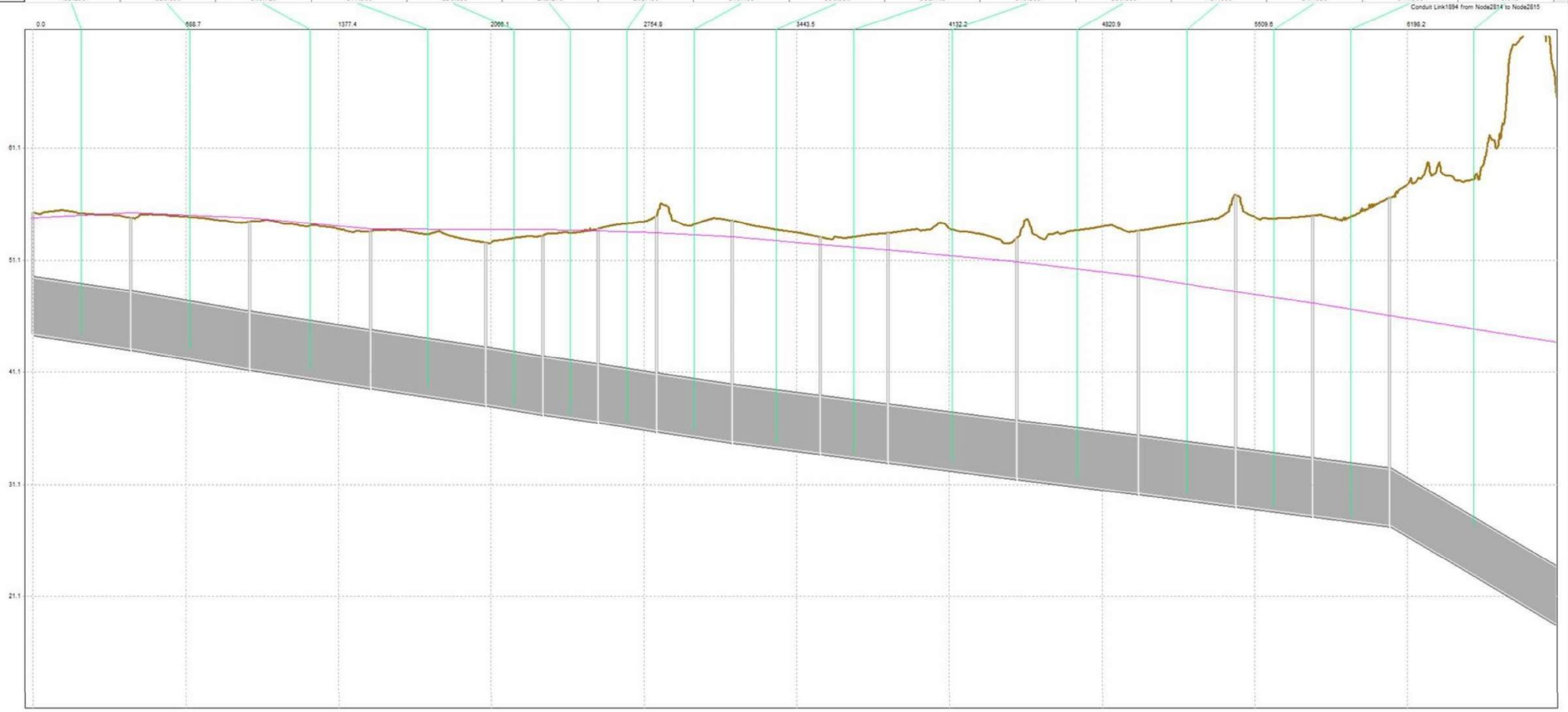
100 Year Main Pipe Q3 XPSWMM Results

Untitled
Day [0] Time 00:00:00 Step 0

link

	Link1860	Link1861	Link1862	Link1863	Link1864	Link1865	Link1866	Link1867	Link1868	Link1869	Link1870	Link1871	Link1872	Link1892	Link1893	Link1894
Upstream Invert Elevation	44.476	43.158	41.352	39.712	38.158	37.388	36.640	35.844	34.823	33.831	33.065	31.616	30.240	29.146	28.276	27.414
Conduit Slope	0.300	0.336	0.300	0.300	0.300	0.300	0.300	0.300	0.250	0.250	0.250	0.250	0.250	0.250	0.250	1.167
Diameter (Height)	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
Maximum Water Elevation (US)	54.867	55.333	54.813	53.836	53.775	53.812	53.646	53.485	53.164	52.429	51.952	50.932	49.633	48.223	47.210	46.127
Maximum Water Elevation (DS)	55.333	54.813	53.836	53.775	53.812	53.646	53.485	53.164	52.429	51.952	50.932	49.633	48.223	47.211	46.128	43.685
Length	439.250	536.890	546.720	517.960	256.850	249.270	265.190	340.480	396.980	306.140	579.500	550.660	437.680	347.850	344.880	770.640



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Appendix F – 100 Year Lateral Storm Drain Input and Output

Included within this appendix:

100 Year Lateral Pipe Results Summary

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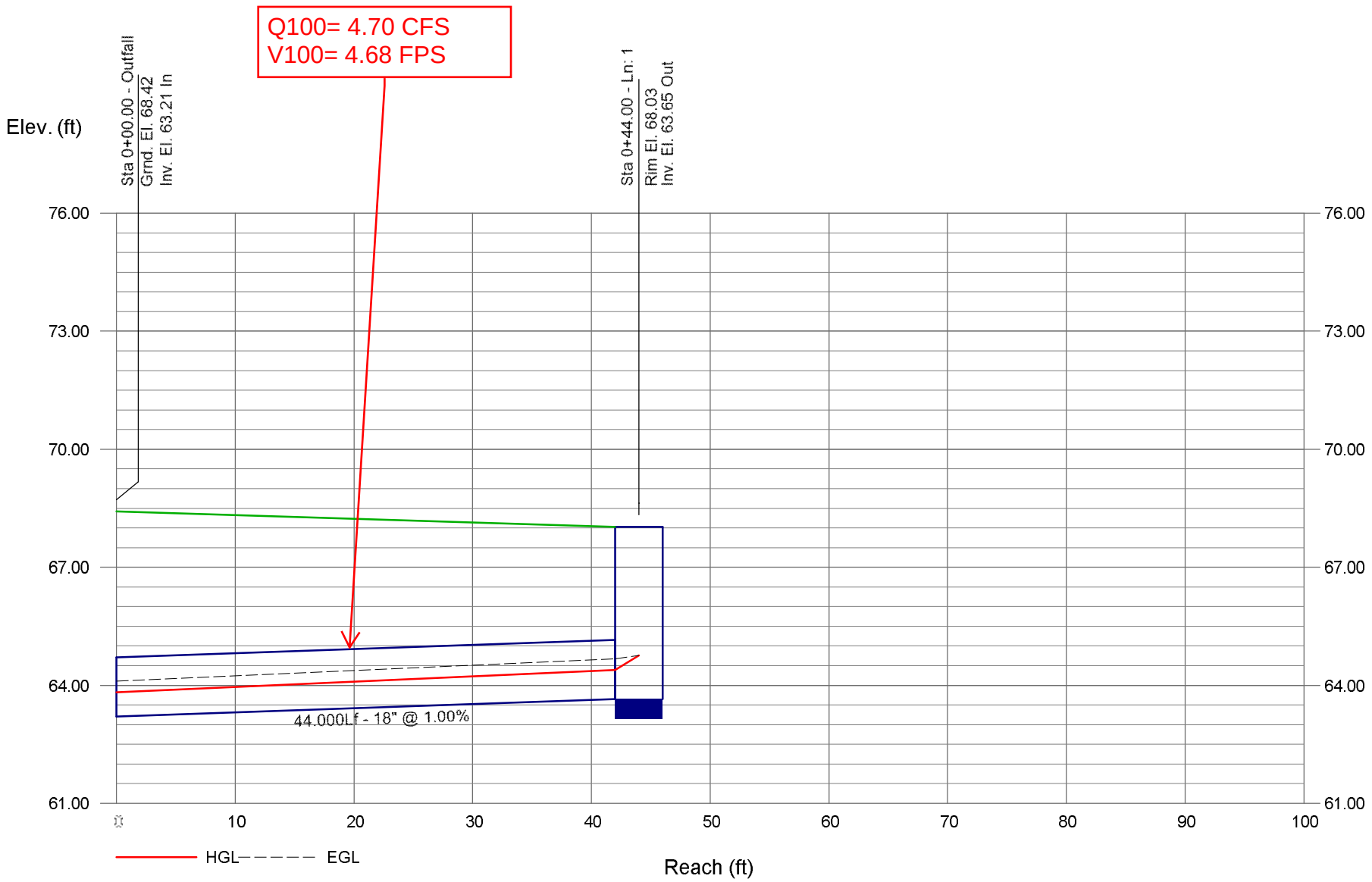
100 Year Lateral Pipe Results

Storm Sewer Profile

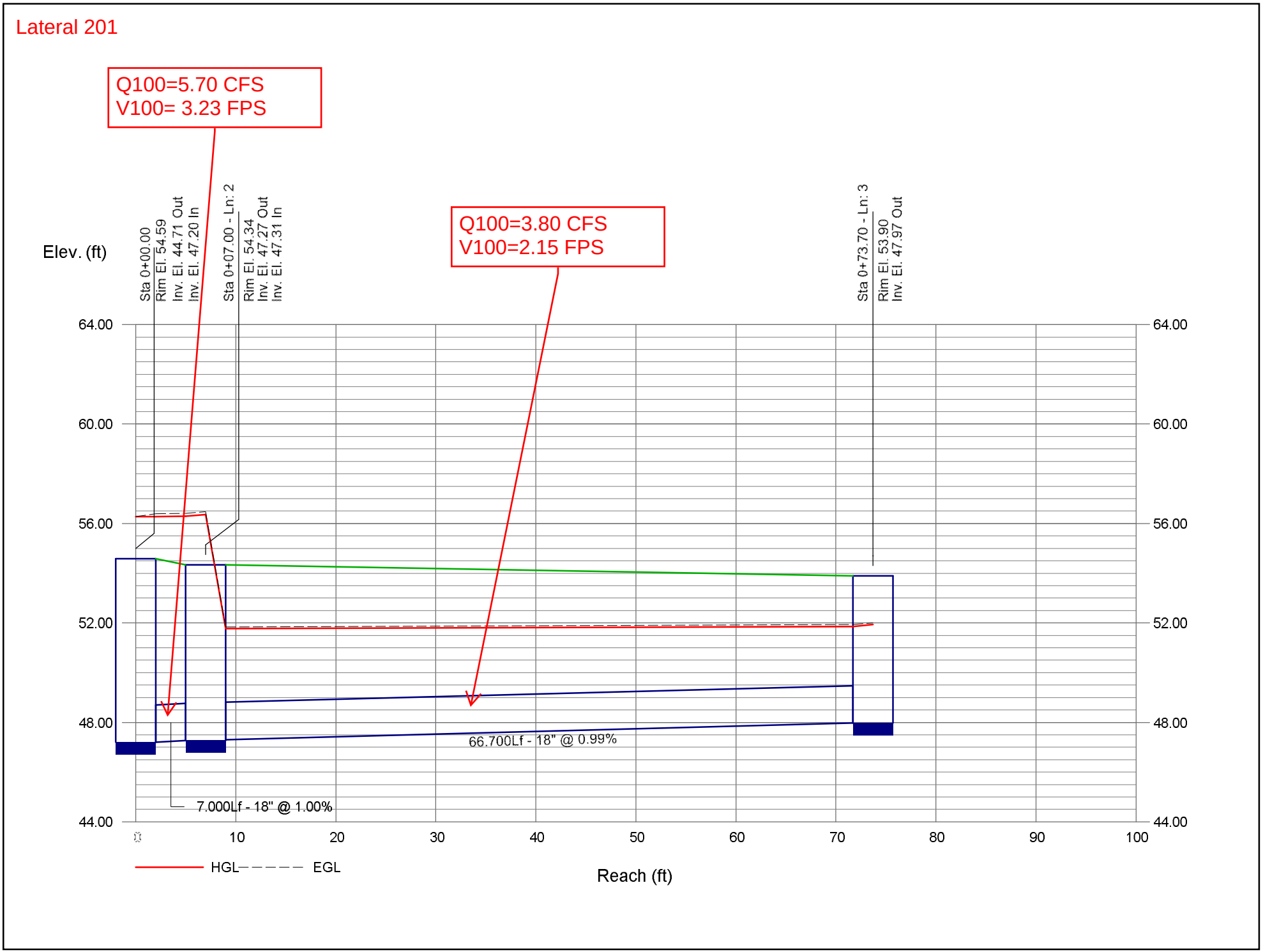
Proj. file: lateral 101.stm

LATERAL 101



Storm Sewer Profile

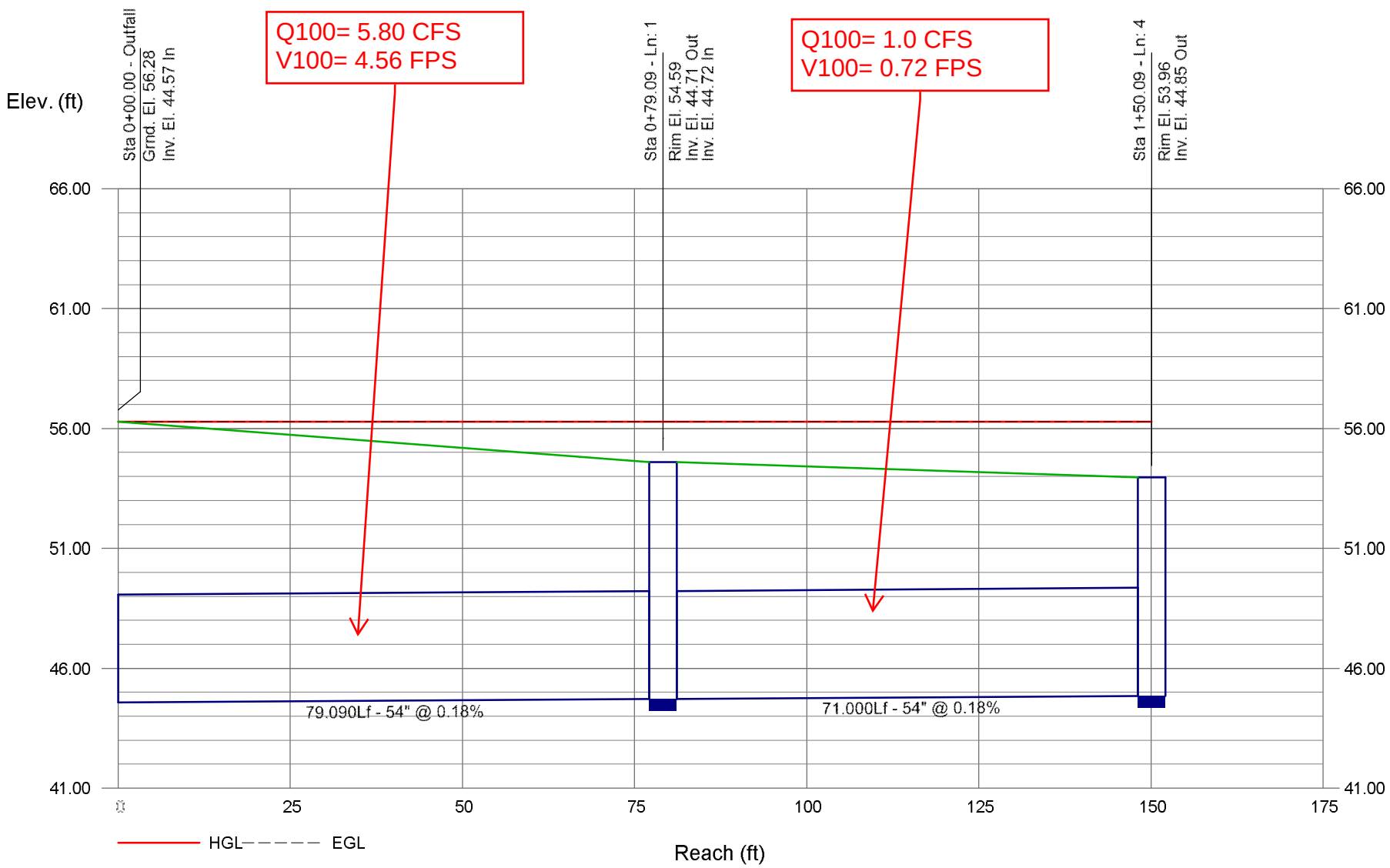
Proj. file: Coast HWY 101 - West_Leucadia.stm



Storm Sewer Profile

Proj. file: Coast HWY 101 - West_Leucadia.stm

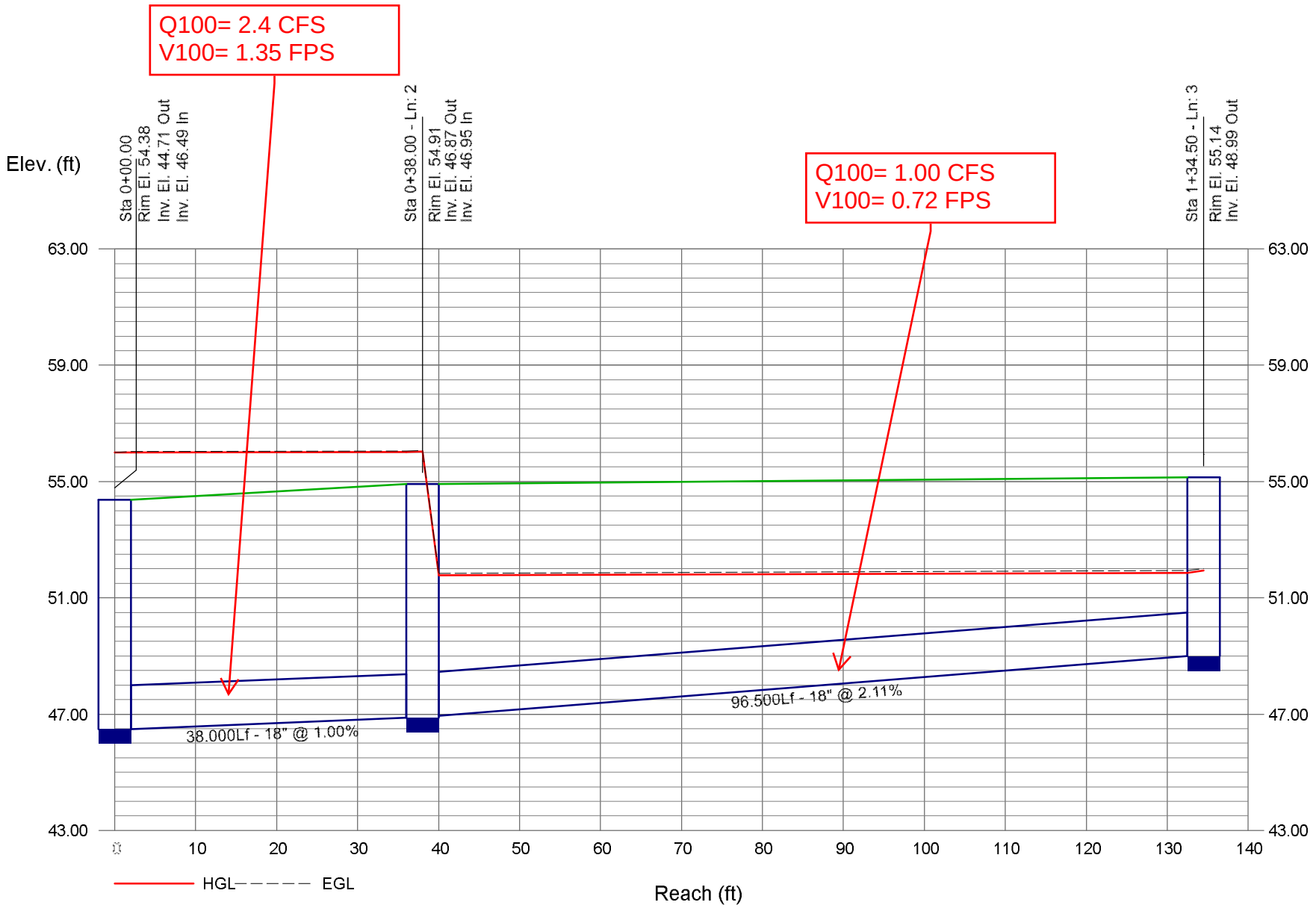
MAIN LINE 201



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jasper.stm

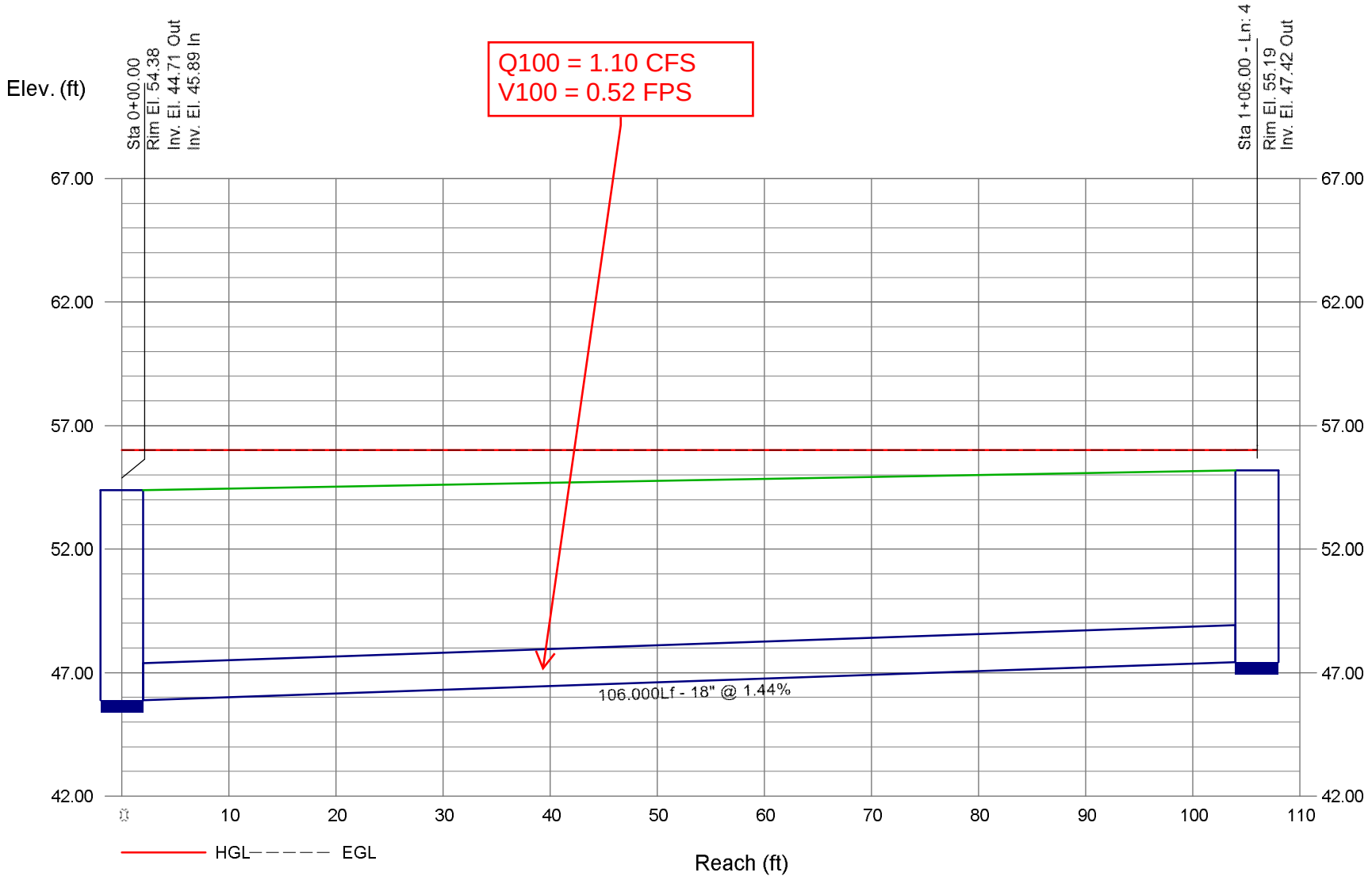
LATERAL 106A AND 106B 1OF2



Storm Sewer Profile

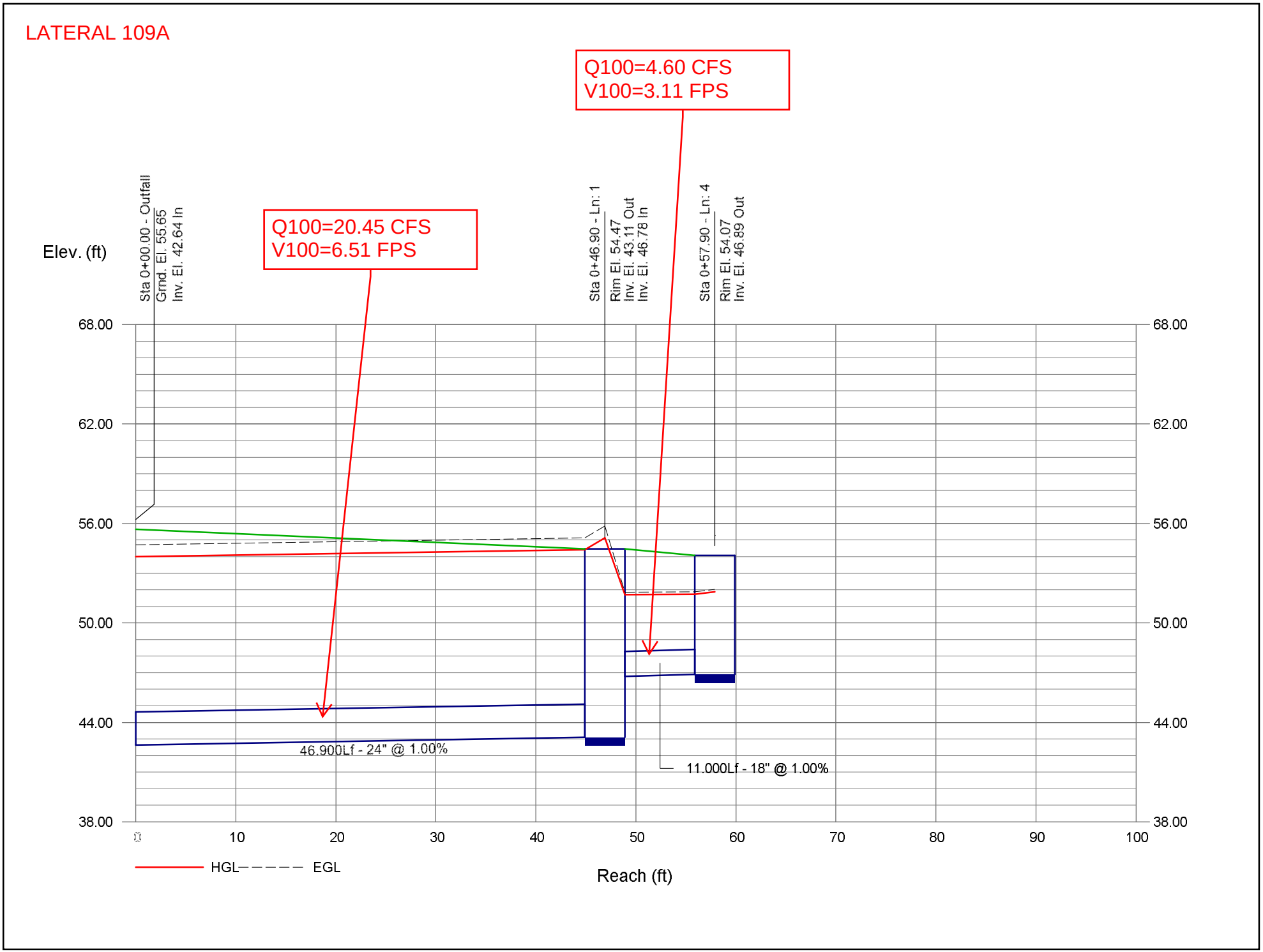
Proj. file: Coast HWY 101 - Jasper.stm

LATERAL 106A AND 106B 2 OF 2



Storm Sewer Profile

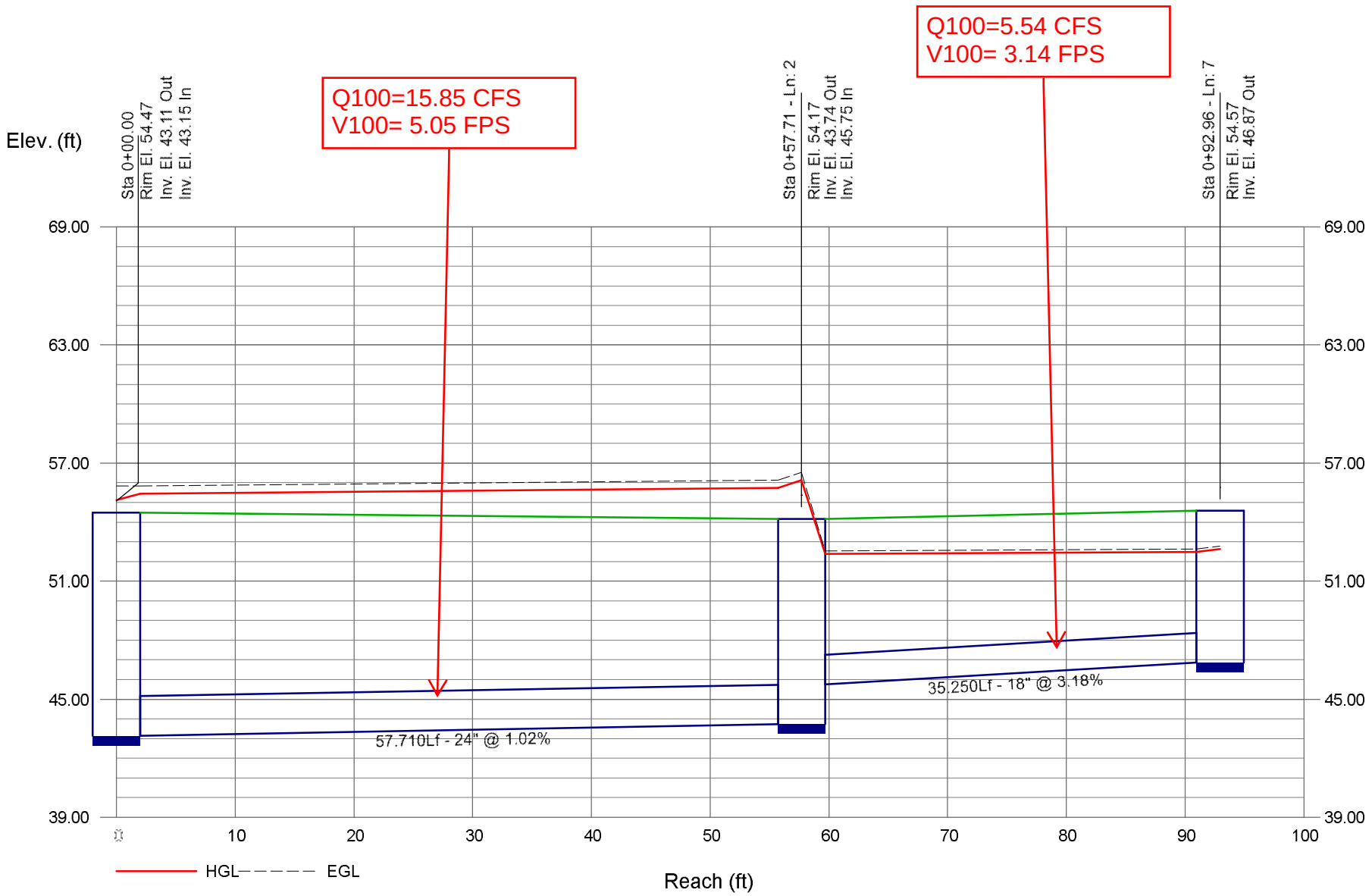
Proj. file: Coast HWY 101 - Diana.stm



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

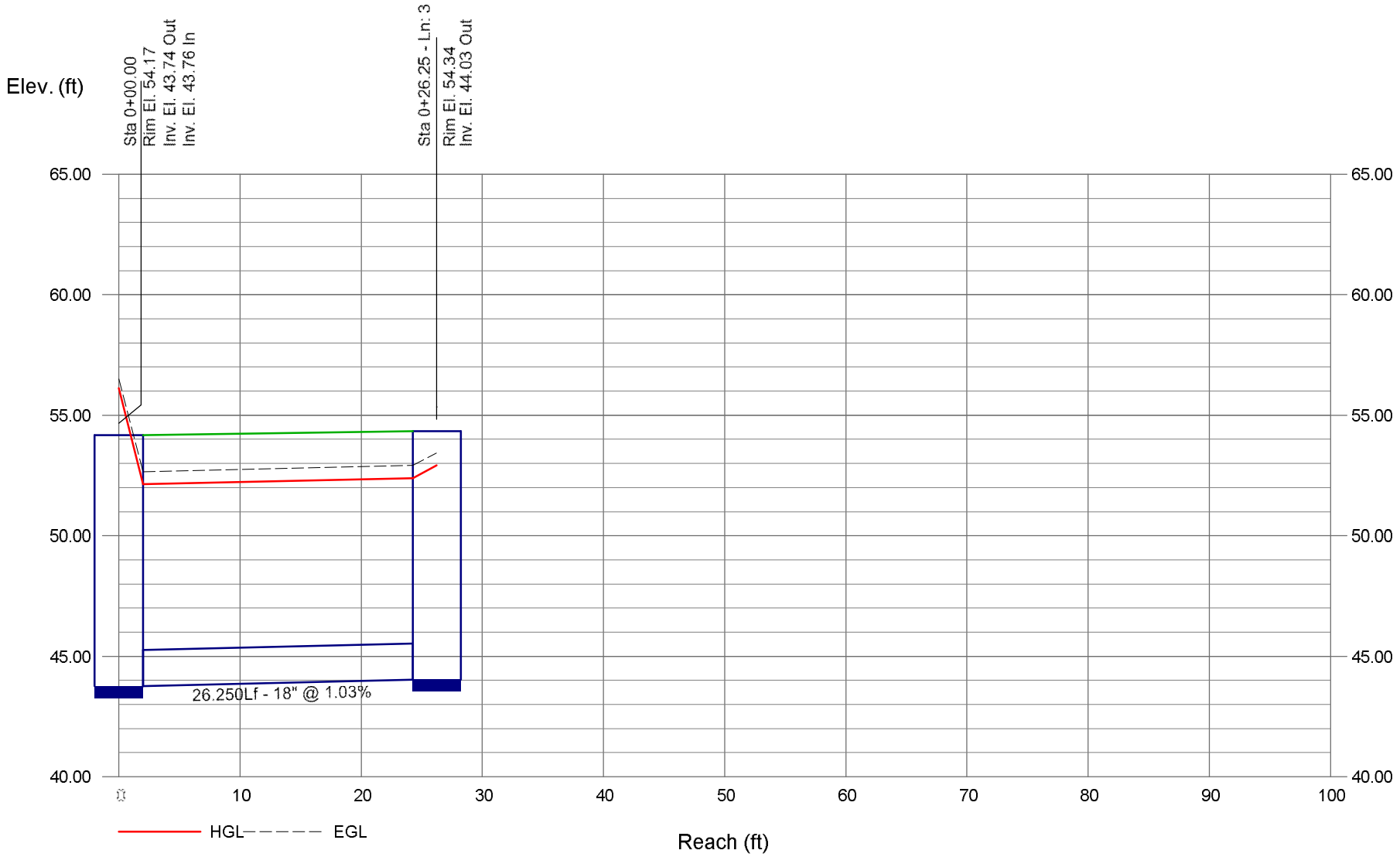
LATERAL 109A-1



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

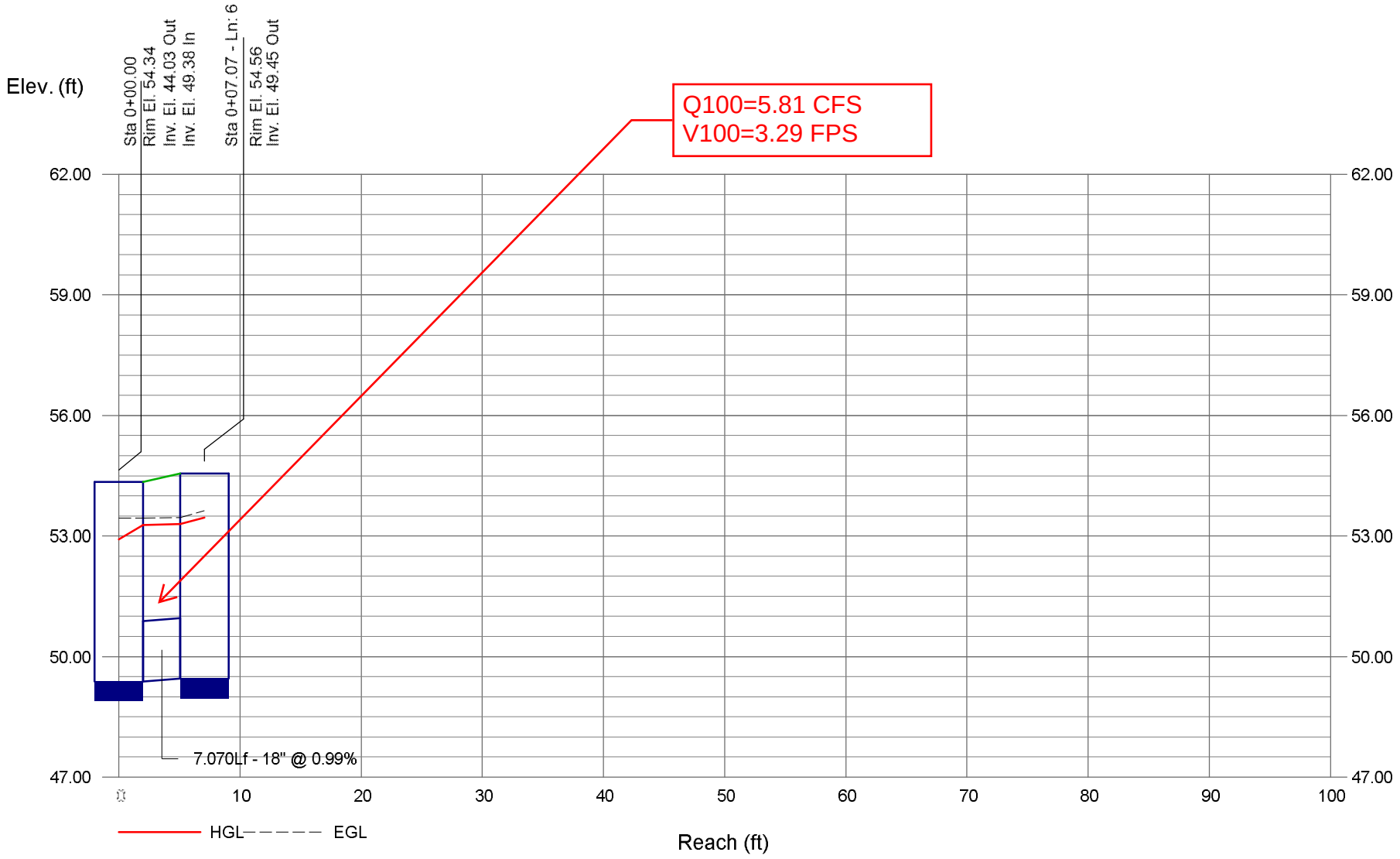
LATERAL 109A-2



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

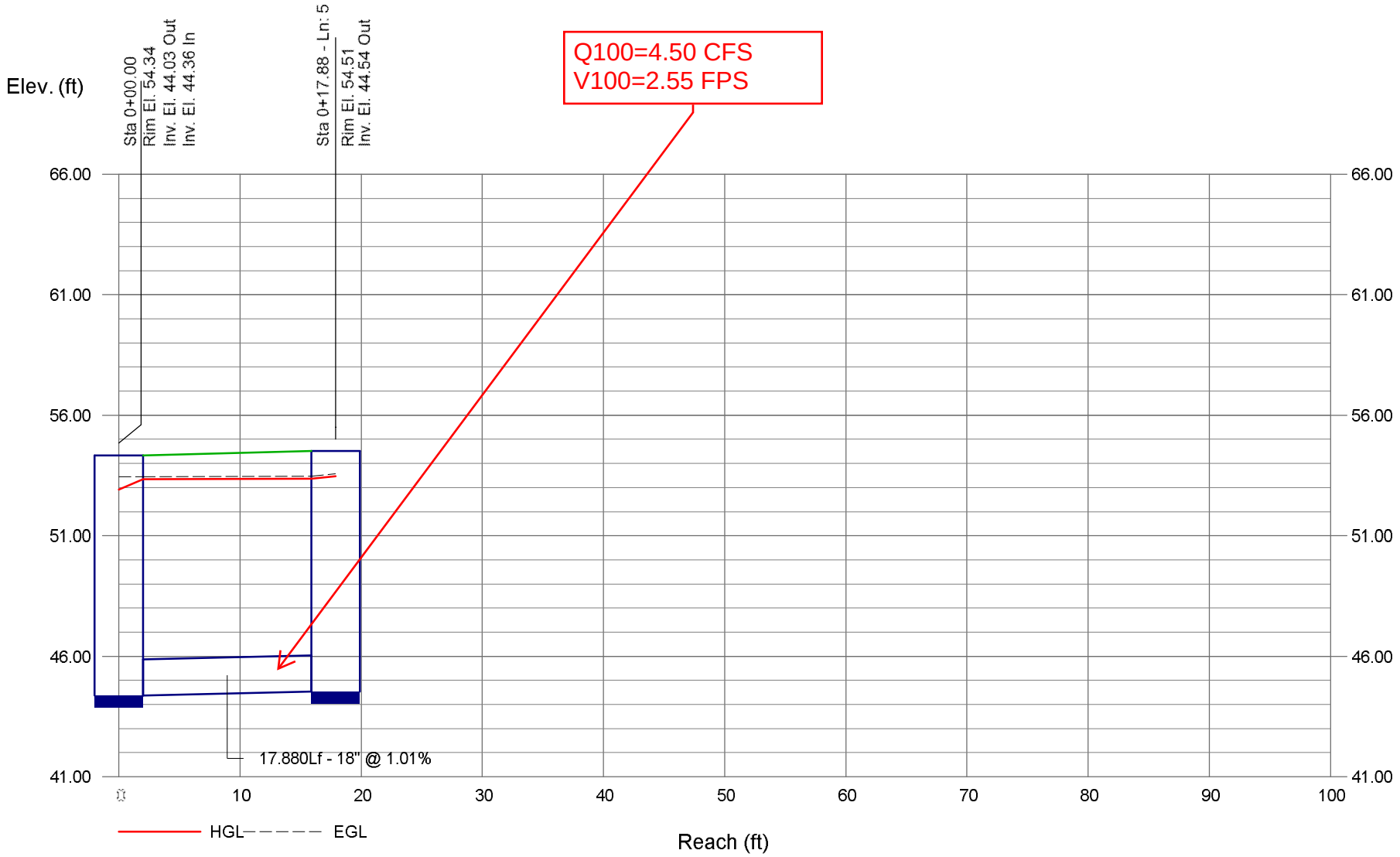
LATERAL 109A-3



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

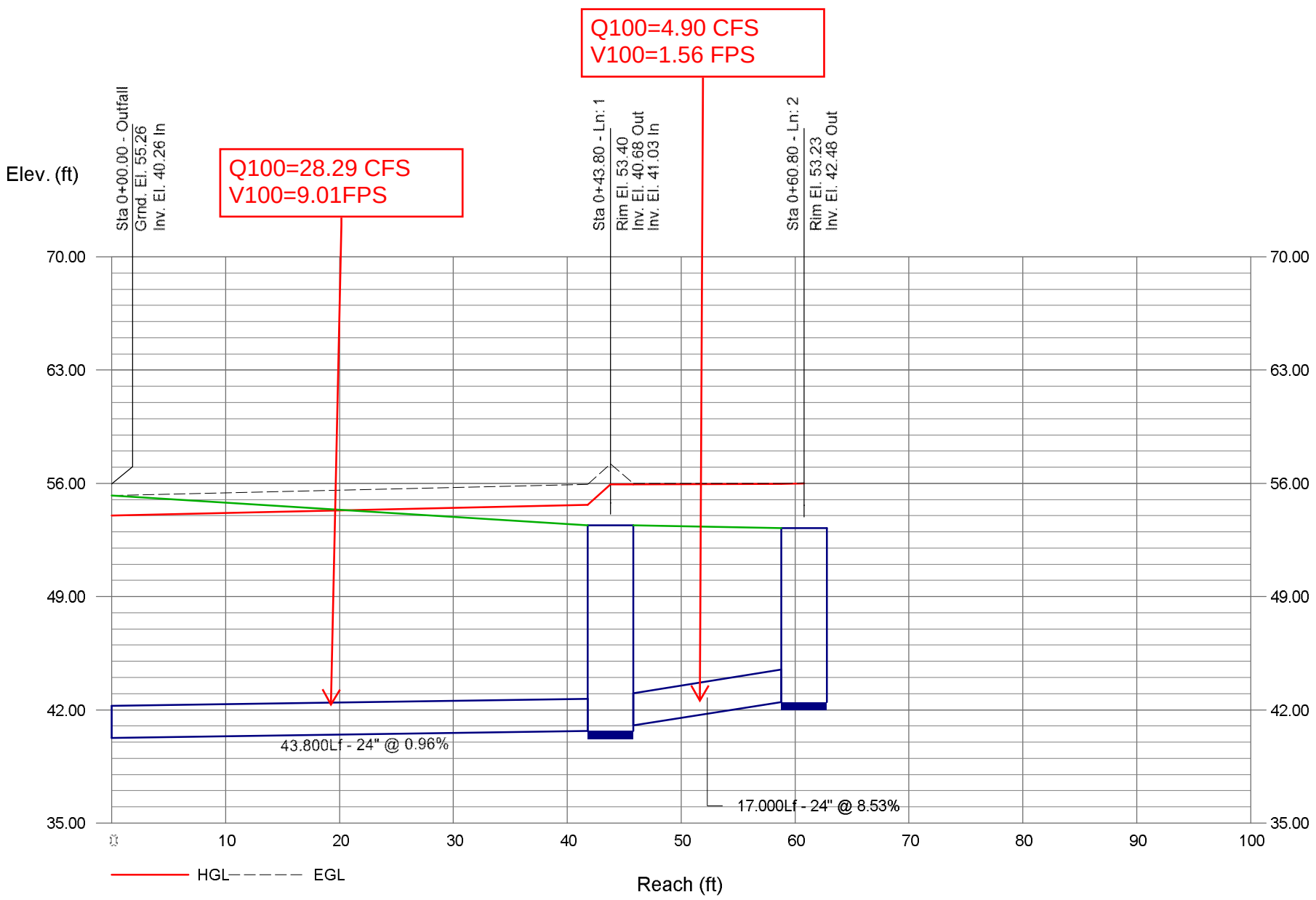
LATERAL 109A-4



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

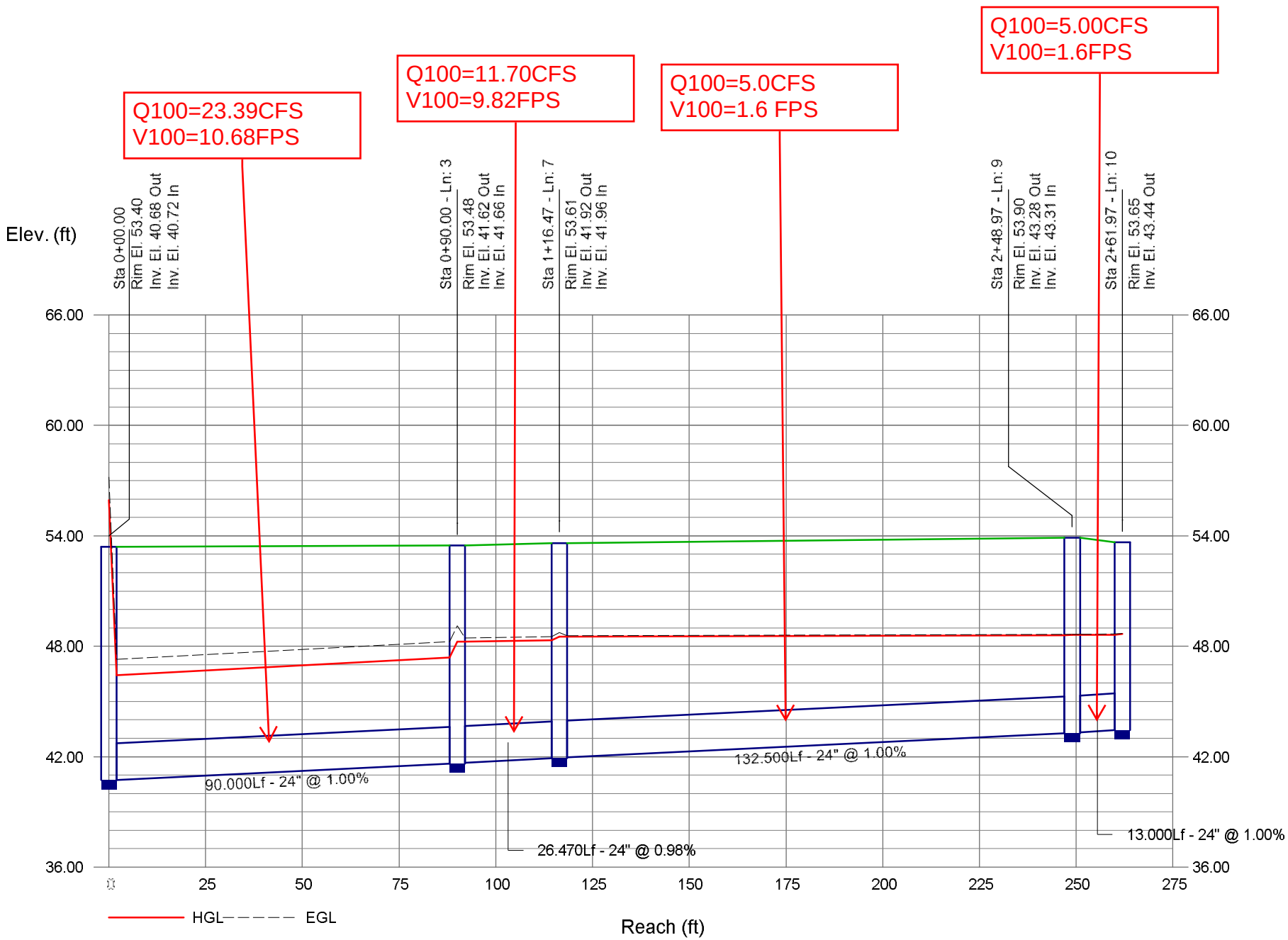
LATERAL 110A



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

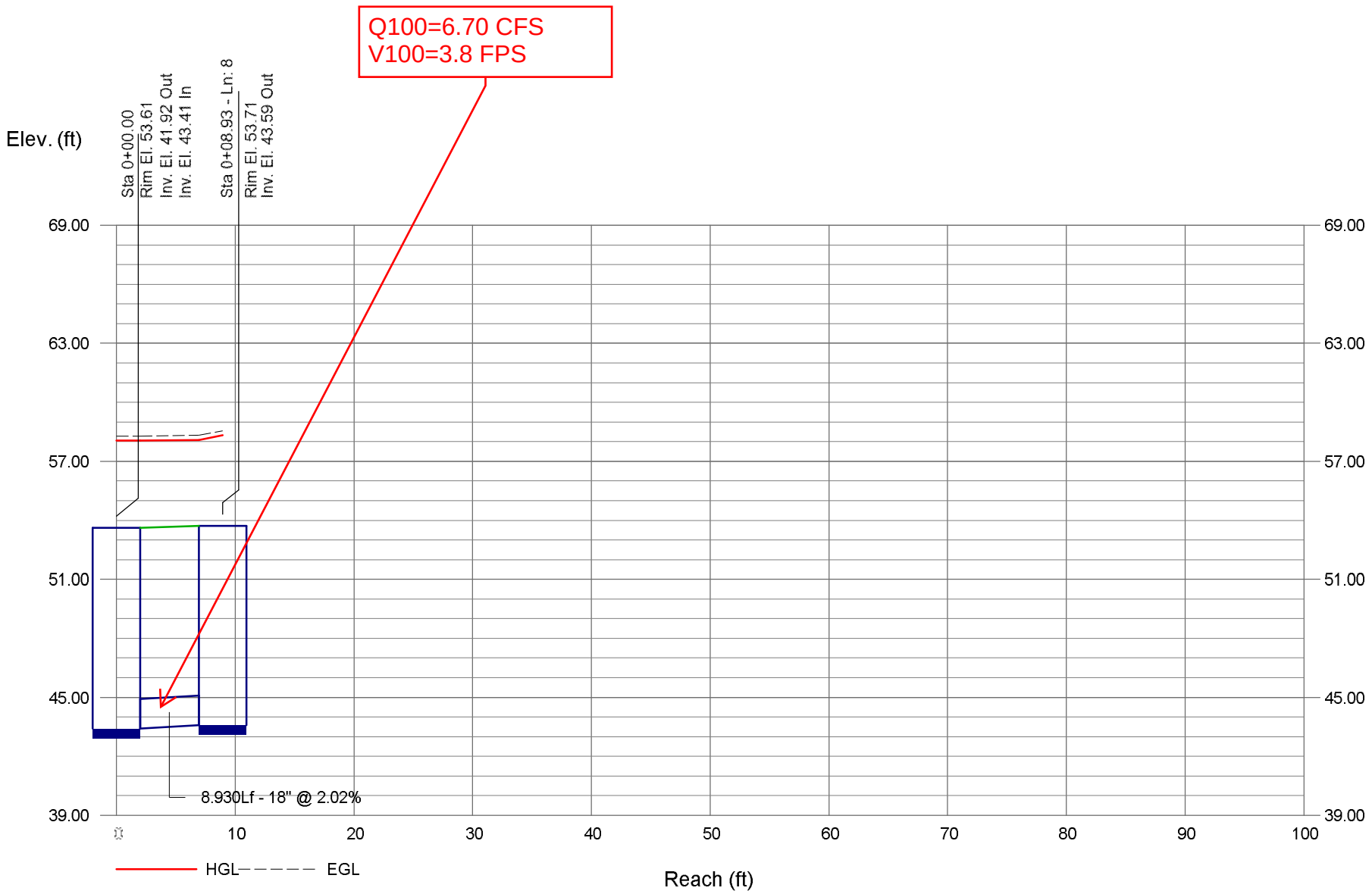
LATERAL 110A-1



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

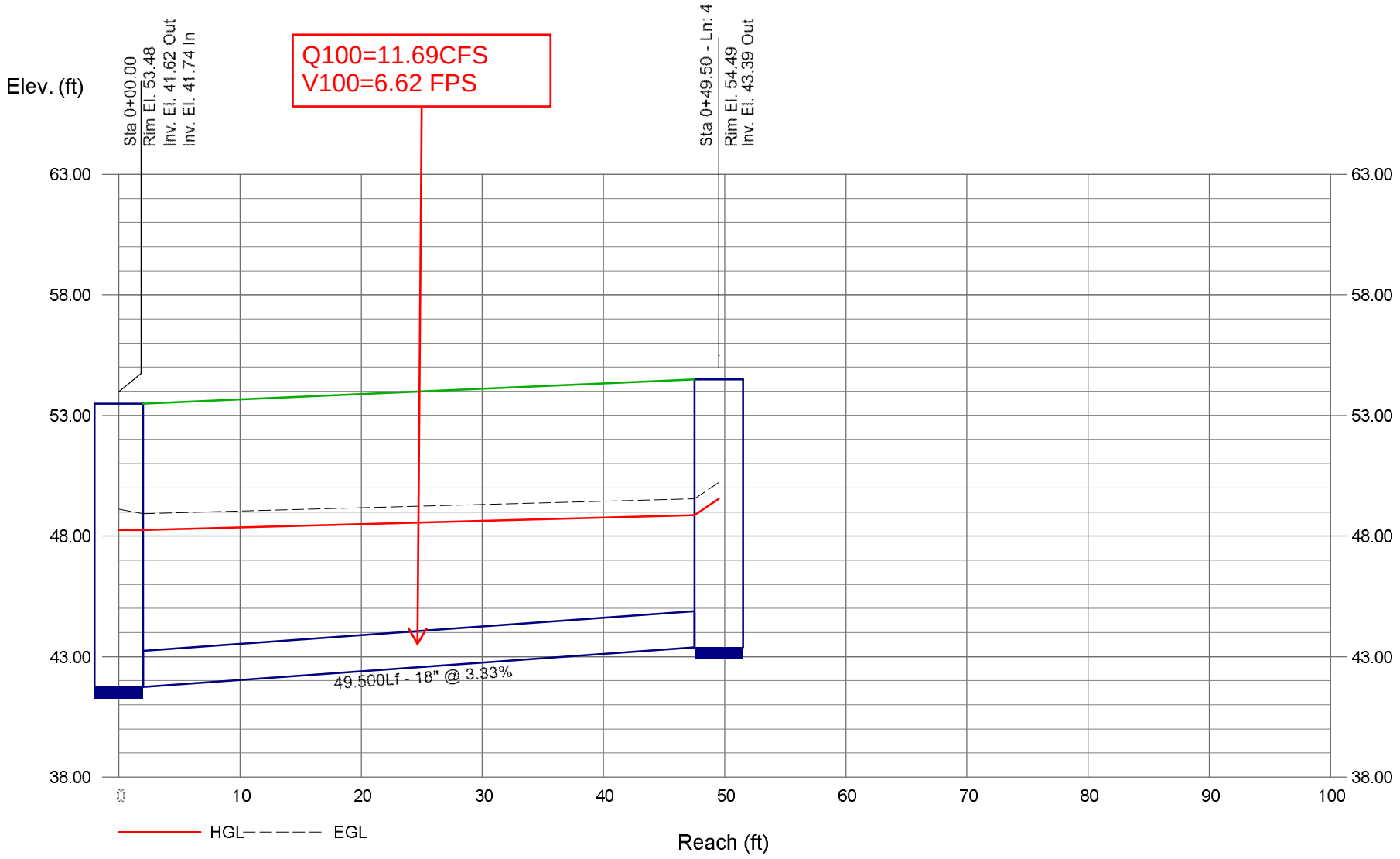
LATERAL 110A2



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

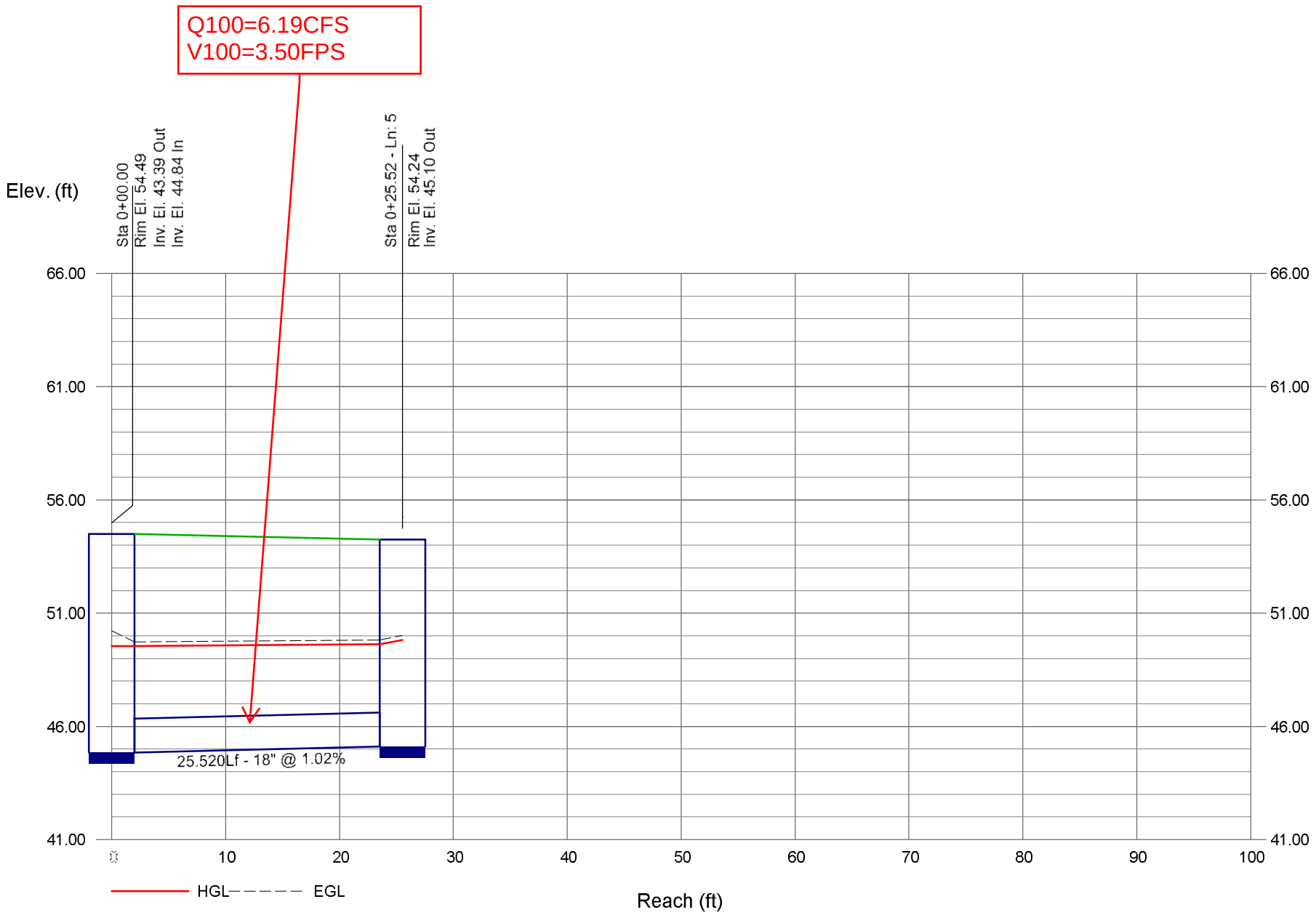
LATERAL 110A-3



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

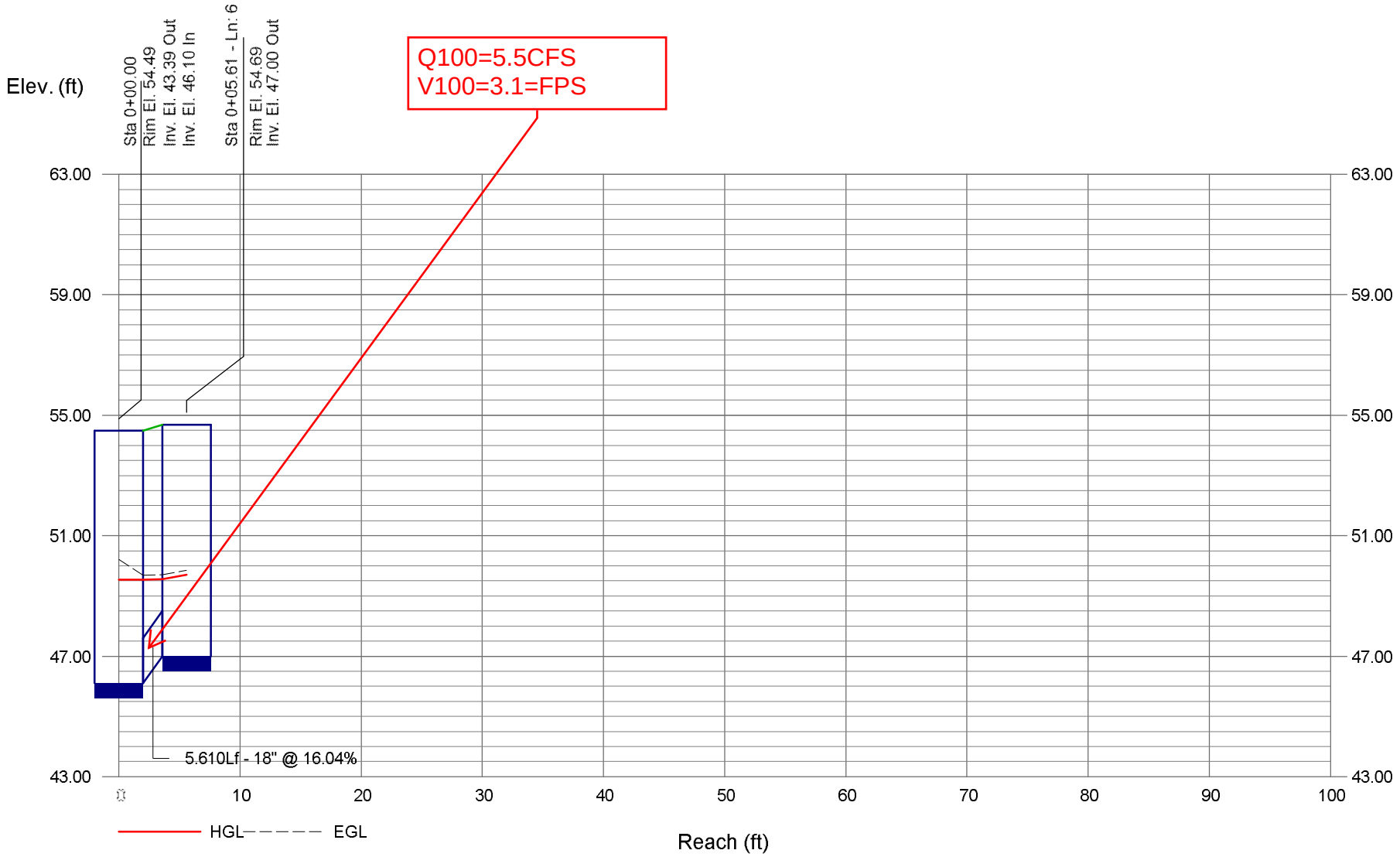
LATERAL 110-A4



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

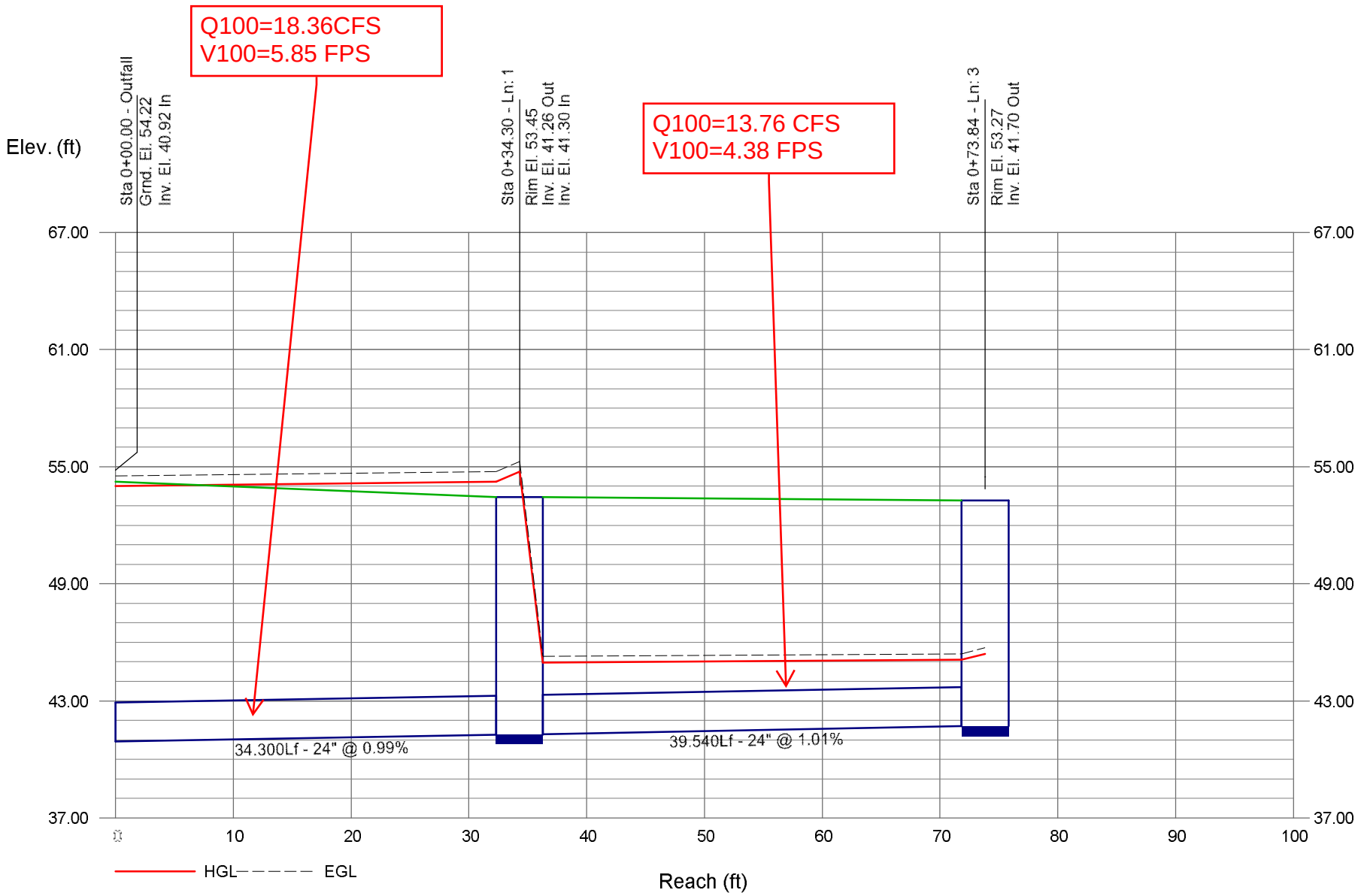
LATERAL 110A-5



Storm Sewer Profile

Proj. file: Coast HWY 101 - Phoebe.stm

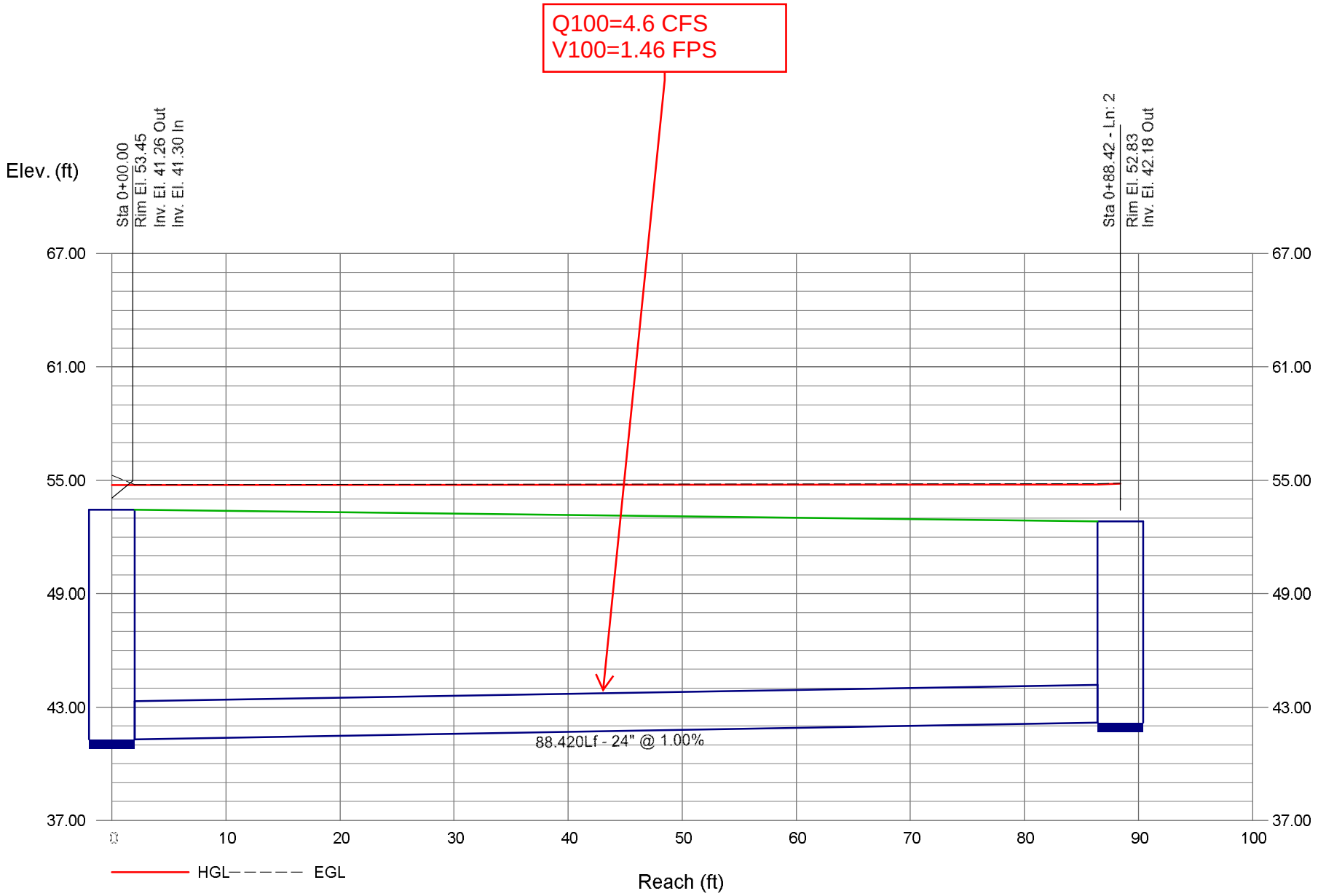
LATERAL 111A



Storm Sewer Profile

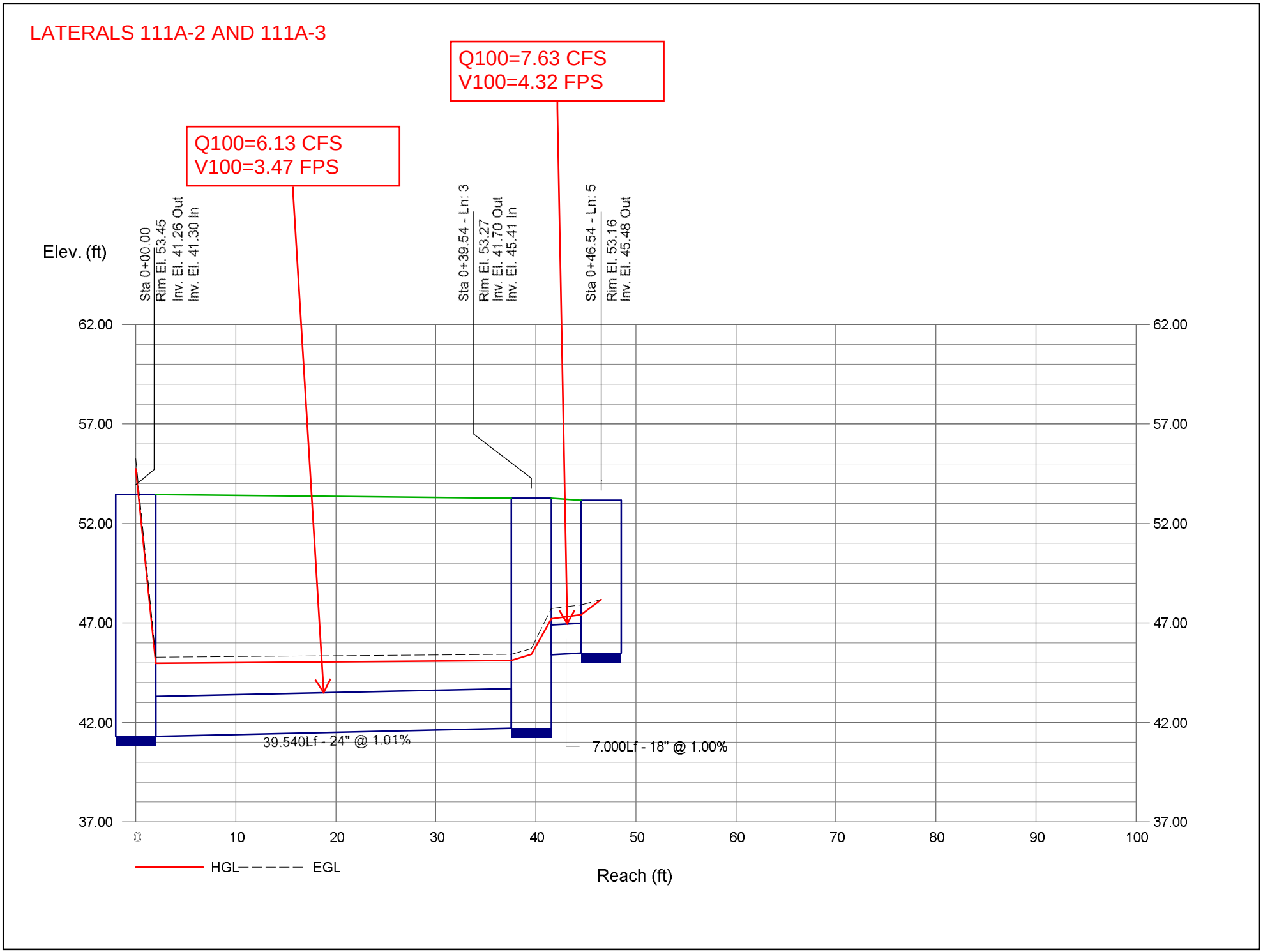
Proj. file: Coast HWY 101 - Phoebe.stm

LATERAL 111A-1



Storm Sewer Profile

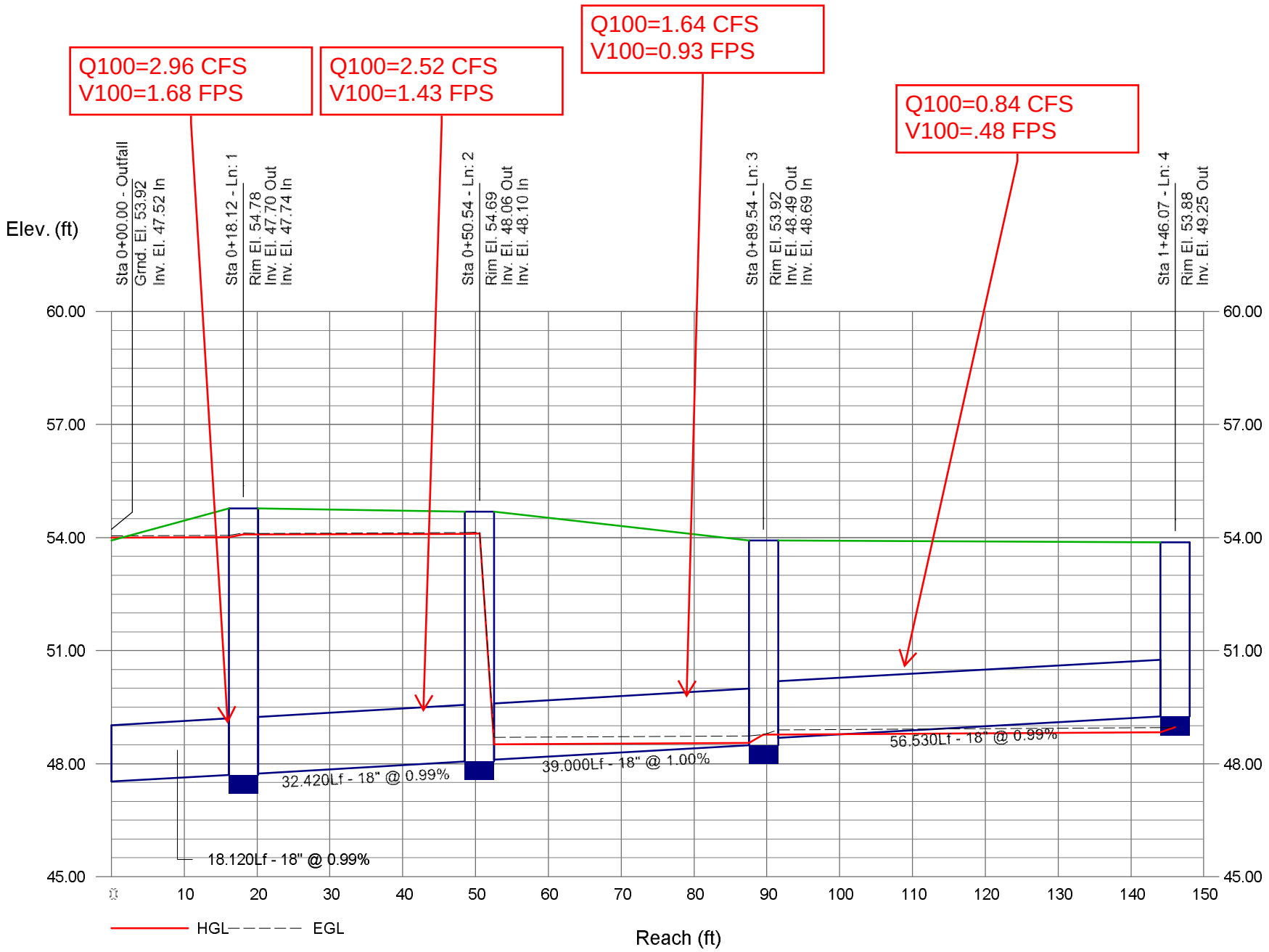
Proj. file: Coast HWY 101 - Phoebe.stm



Storm Sewer Profile

Proj. file: lateral 12A_12B.stm

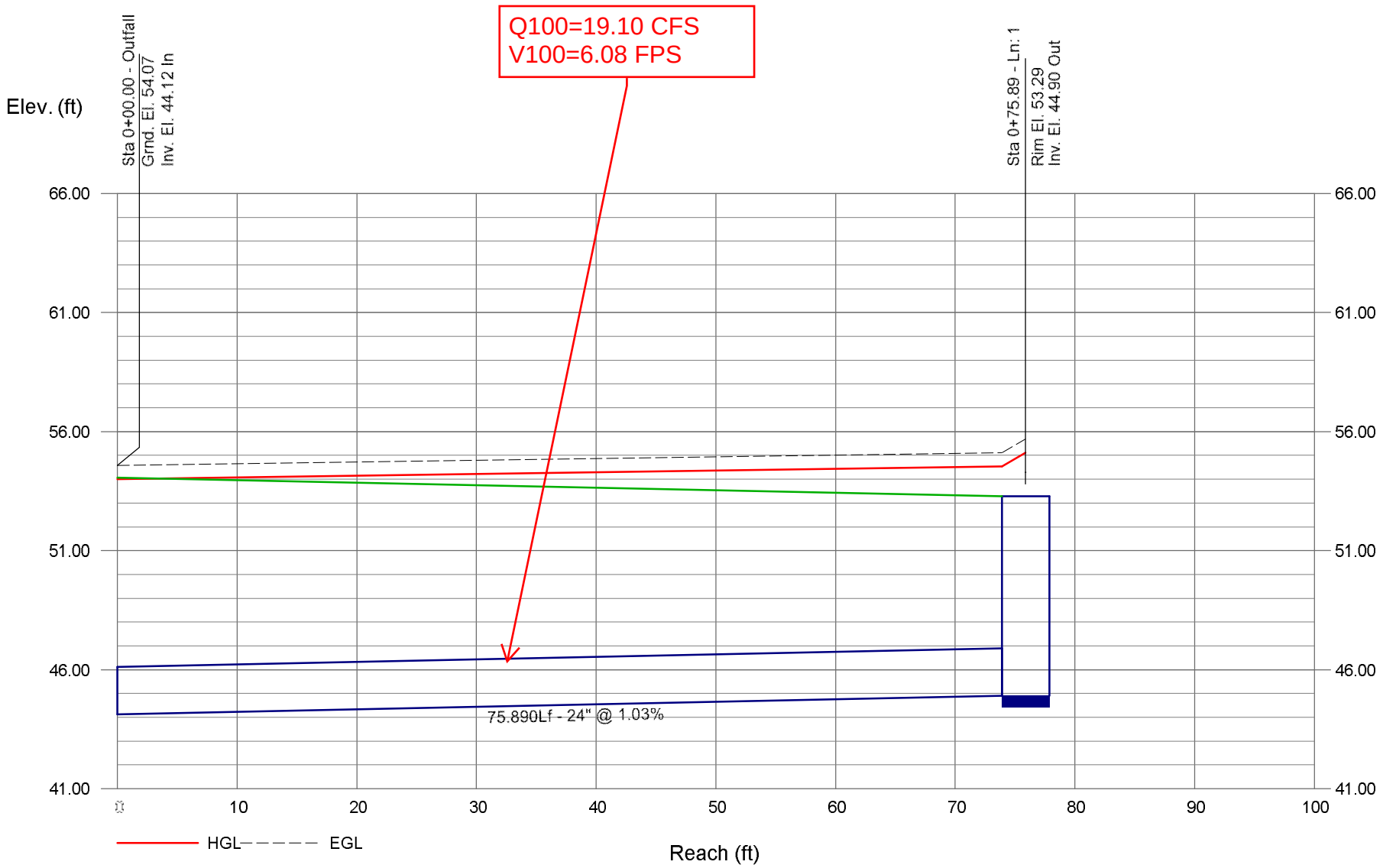
LATERAL 112B



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jason.stm

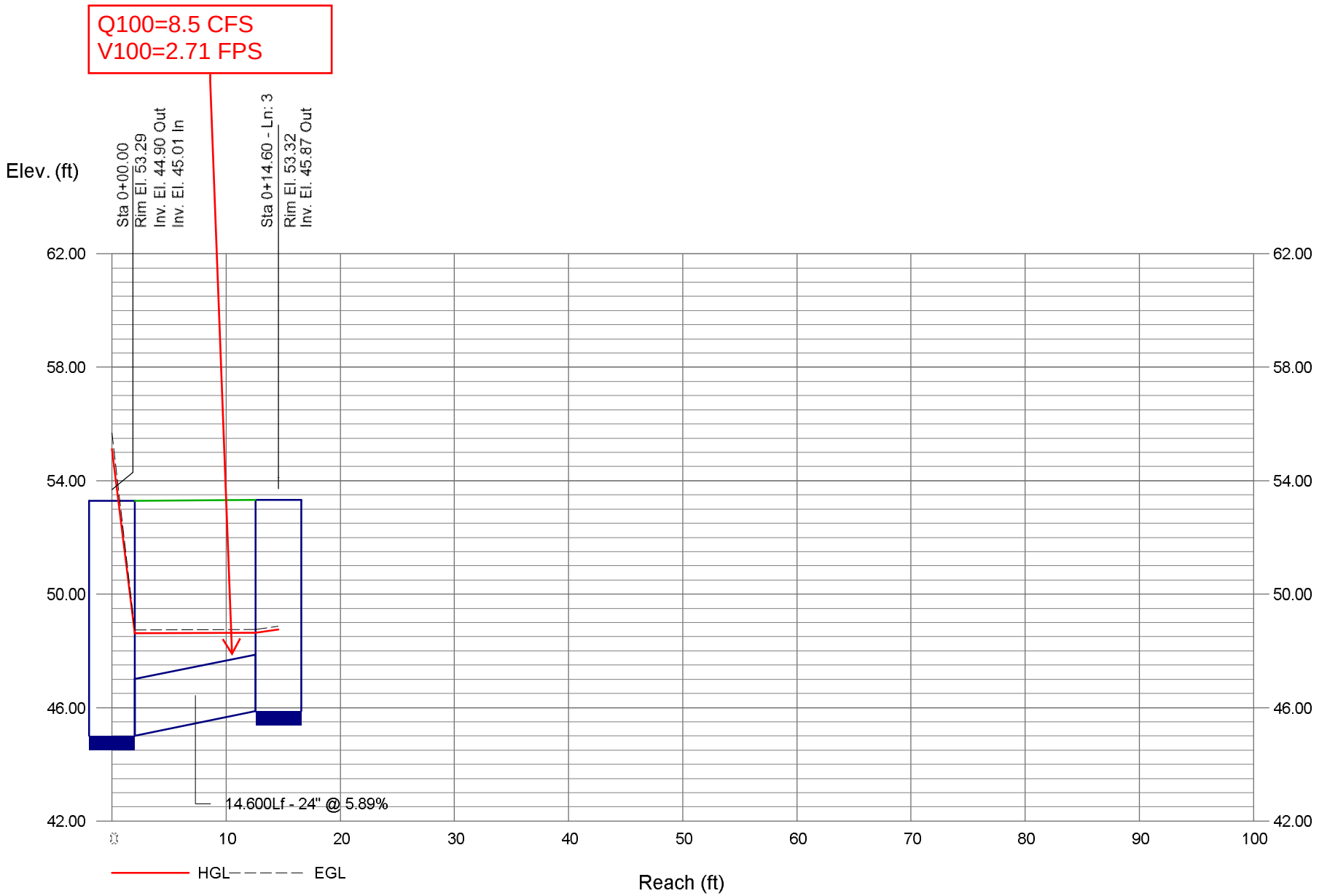
Lateral 113A



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jason.stm

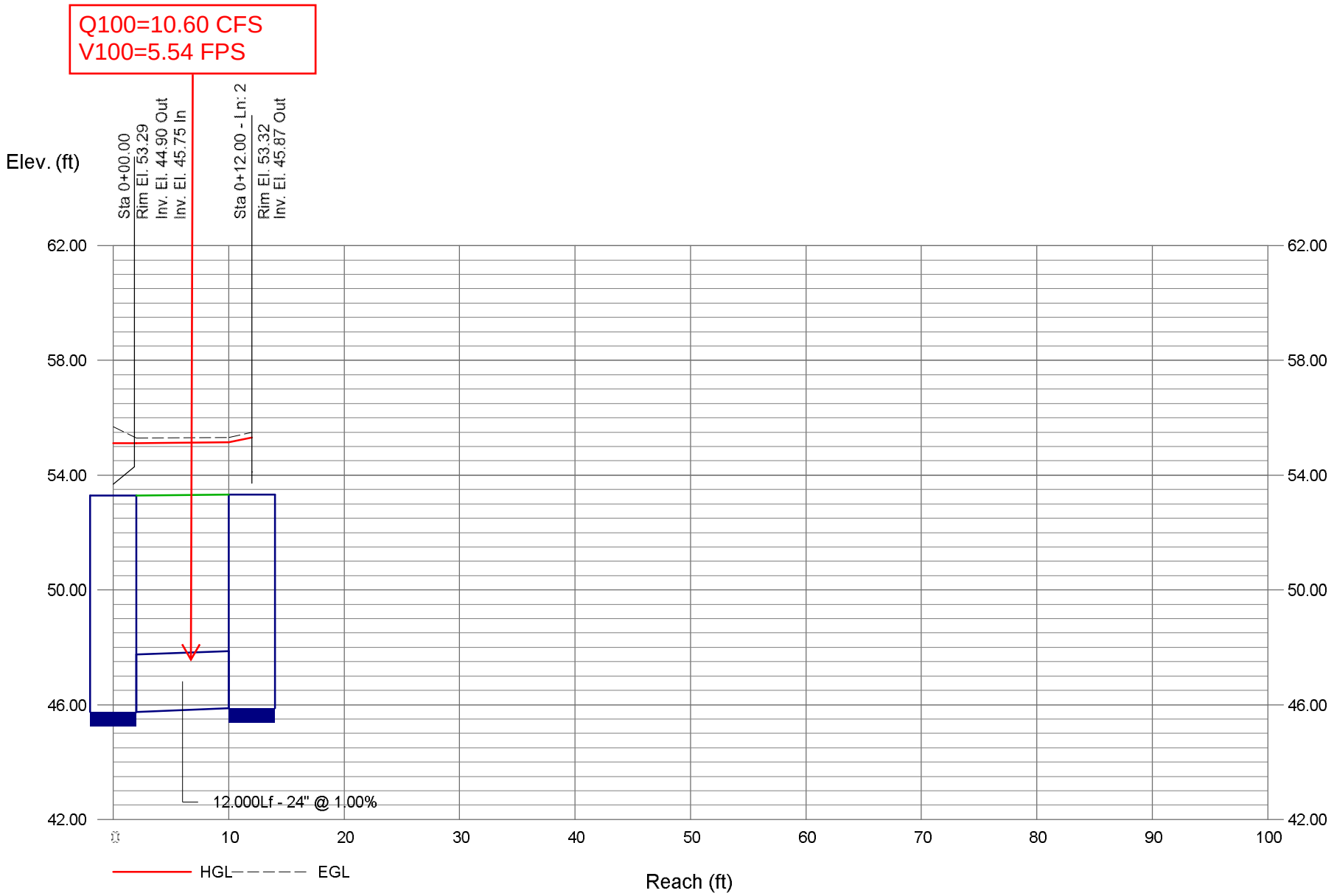
LATERAL 113A-1



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jason.stm

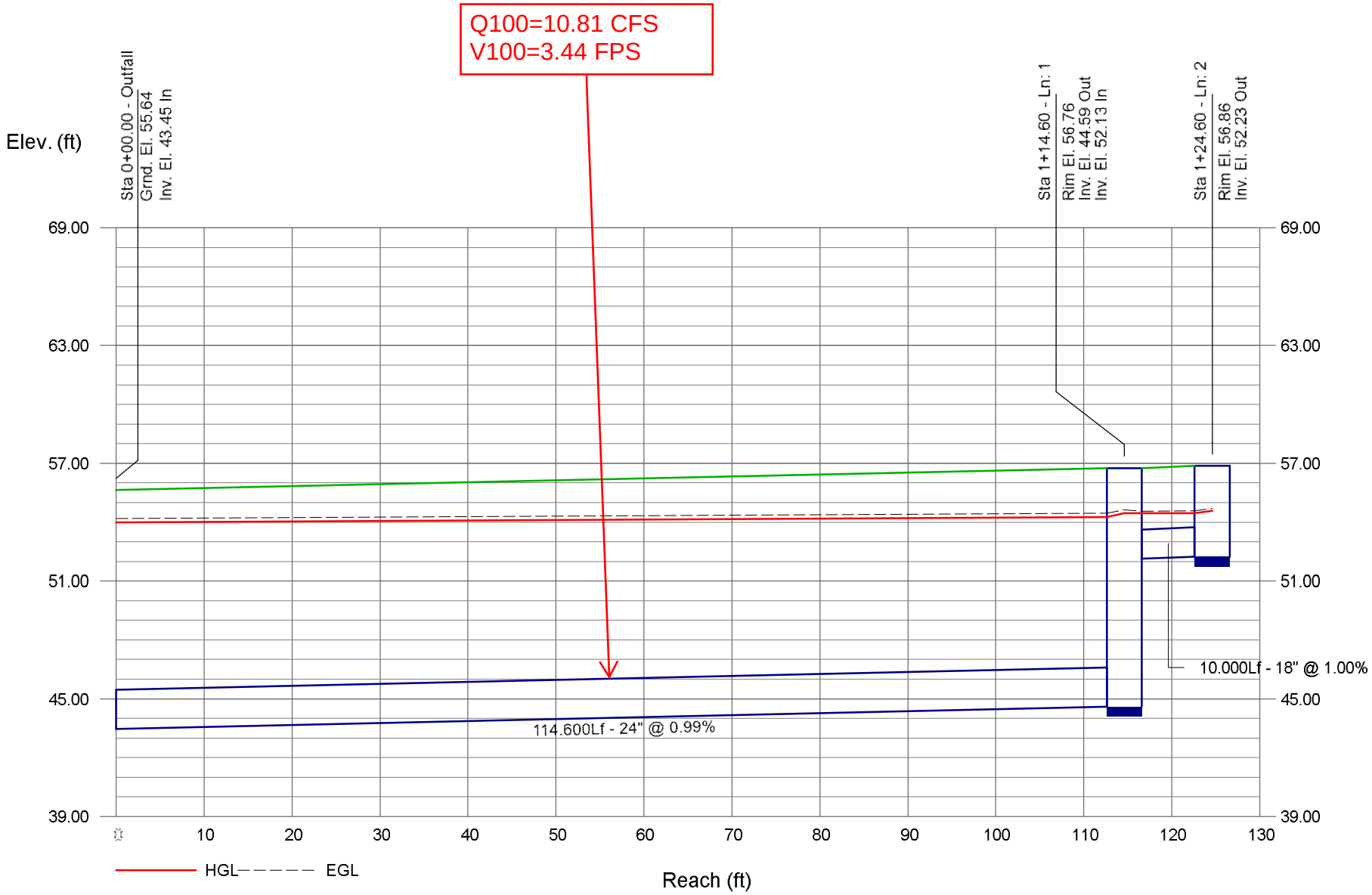
LATERAL 113A-2



Storm Sewer Profile

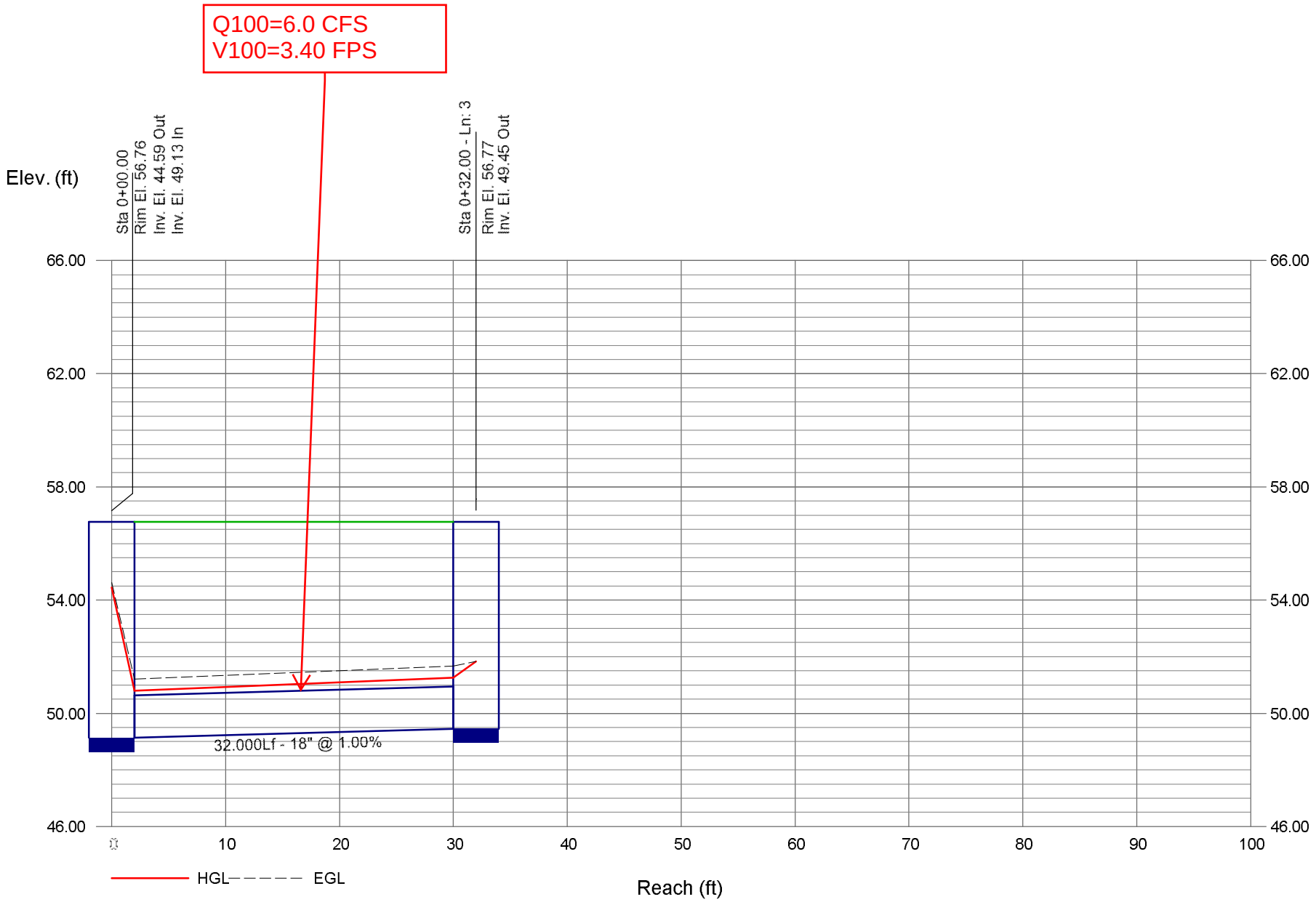
Proj. file: Coast HWY 101 - Jupiter.stm

LATERAL 115A



Storm Sewer Profile

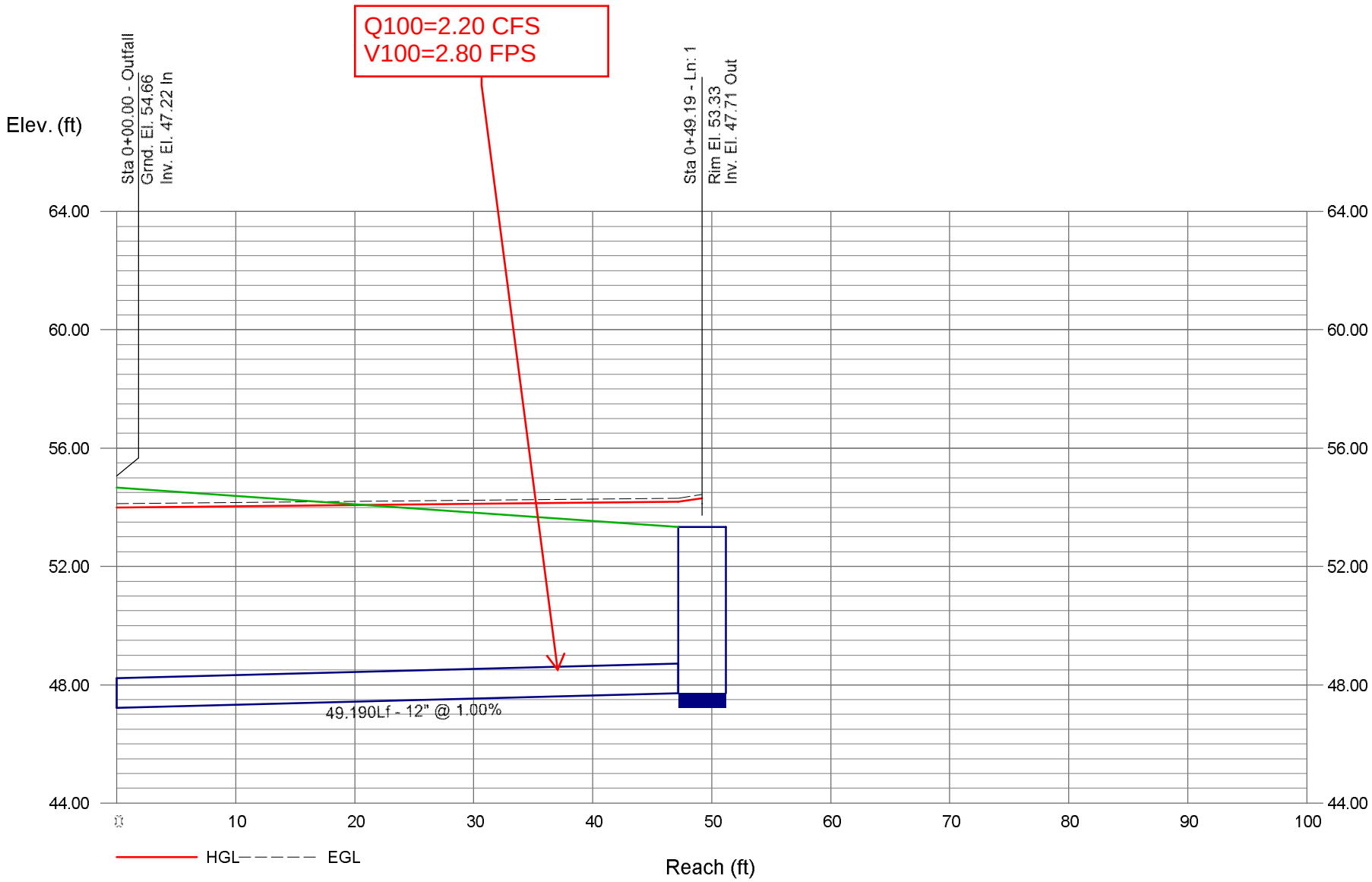
LATERAL 115A-1



Storm Sewer Profile

Proj. file: lateral 116.stm

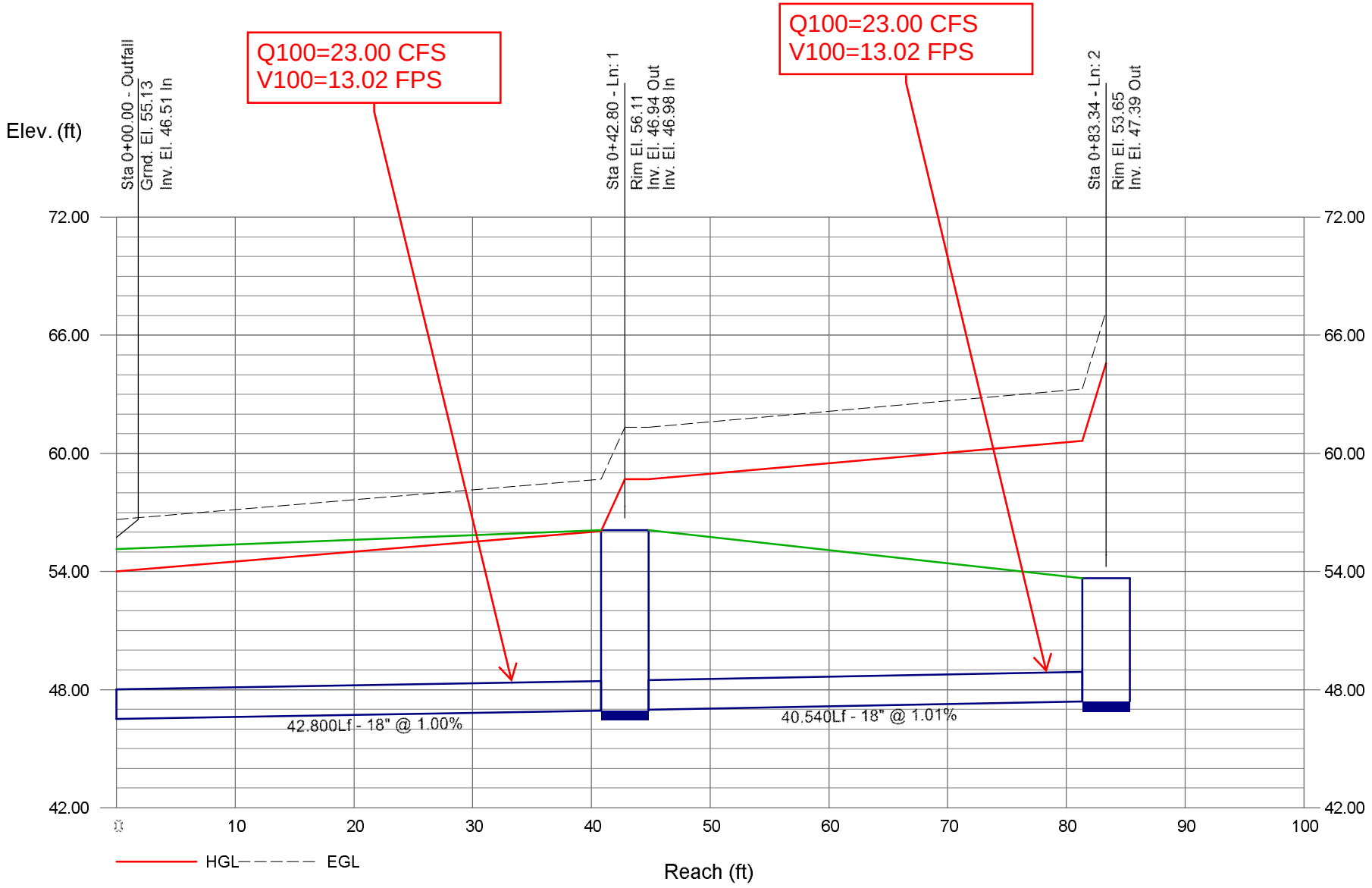
Lateral 116



Storm Sewer Profile

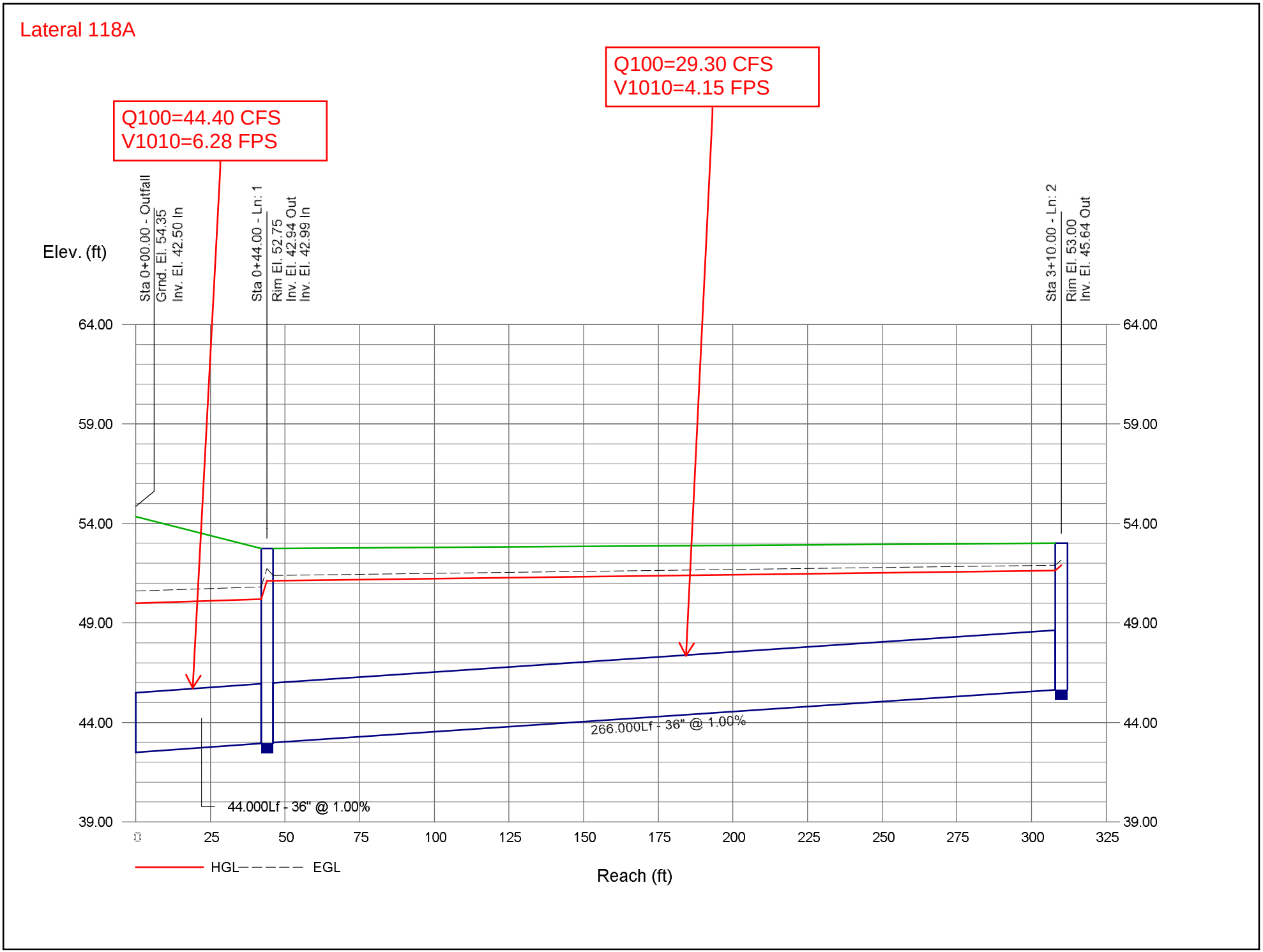
Proj. file: lateral 117.stm

LATERAL 117A



Storm Sewer Profile

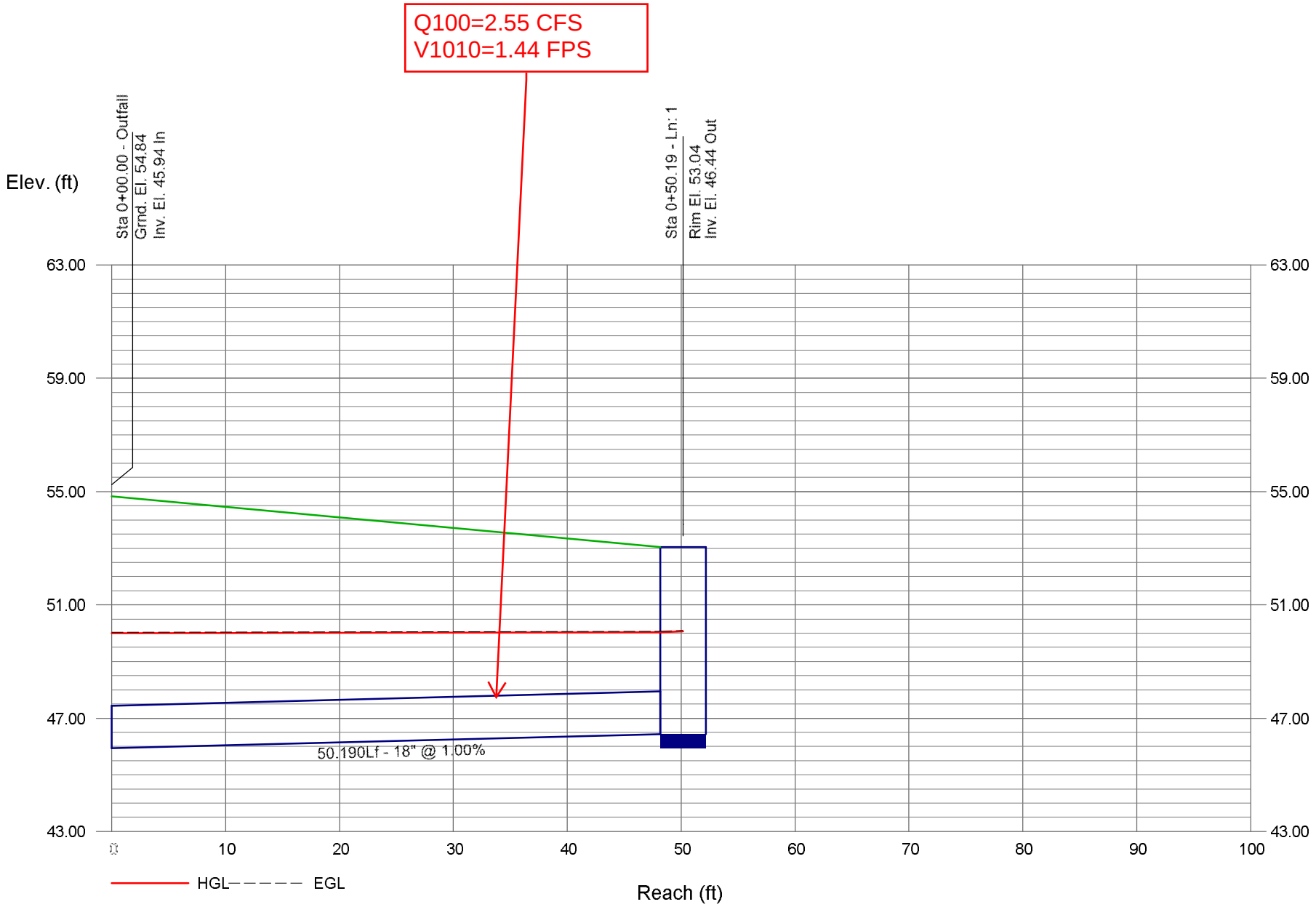
Proj. file: lateral 118A.stm



Storm Sewer Profile

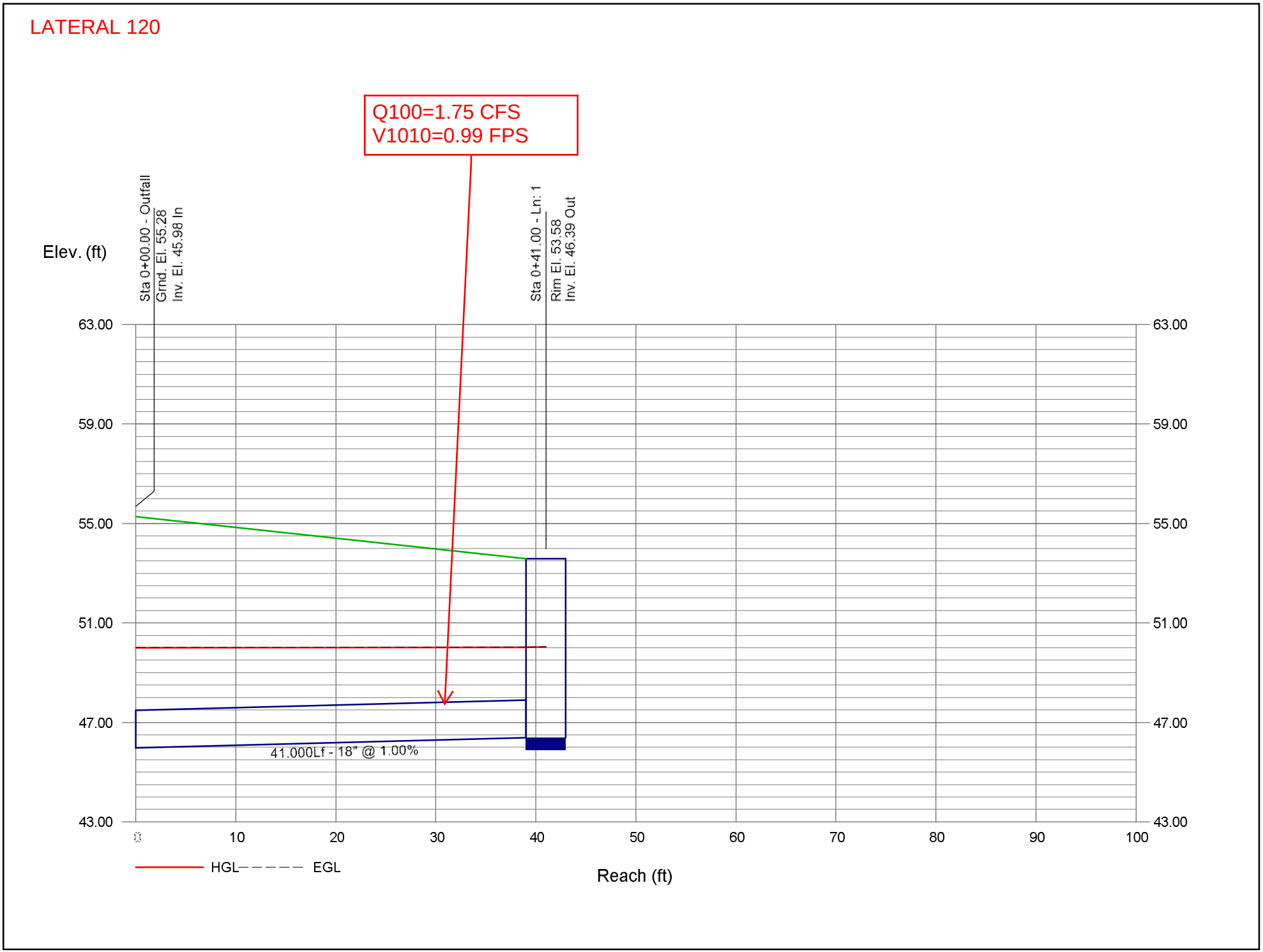
Proj. file: lateral 119.stm

LATERAL 119



Storm Sewer Profile

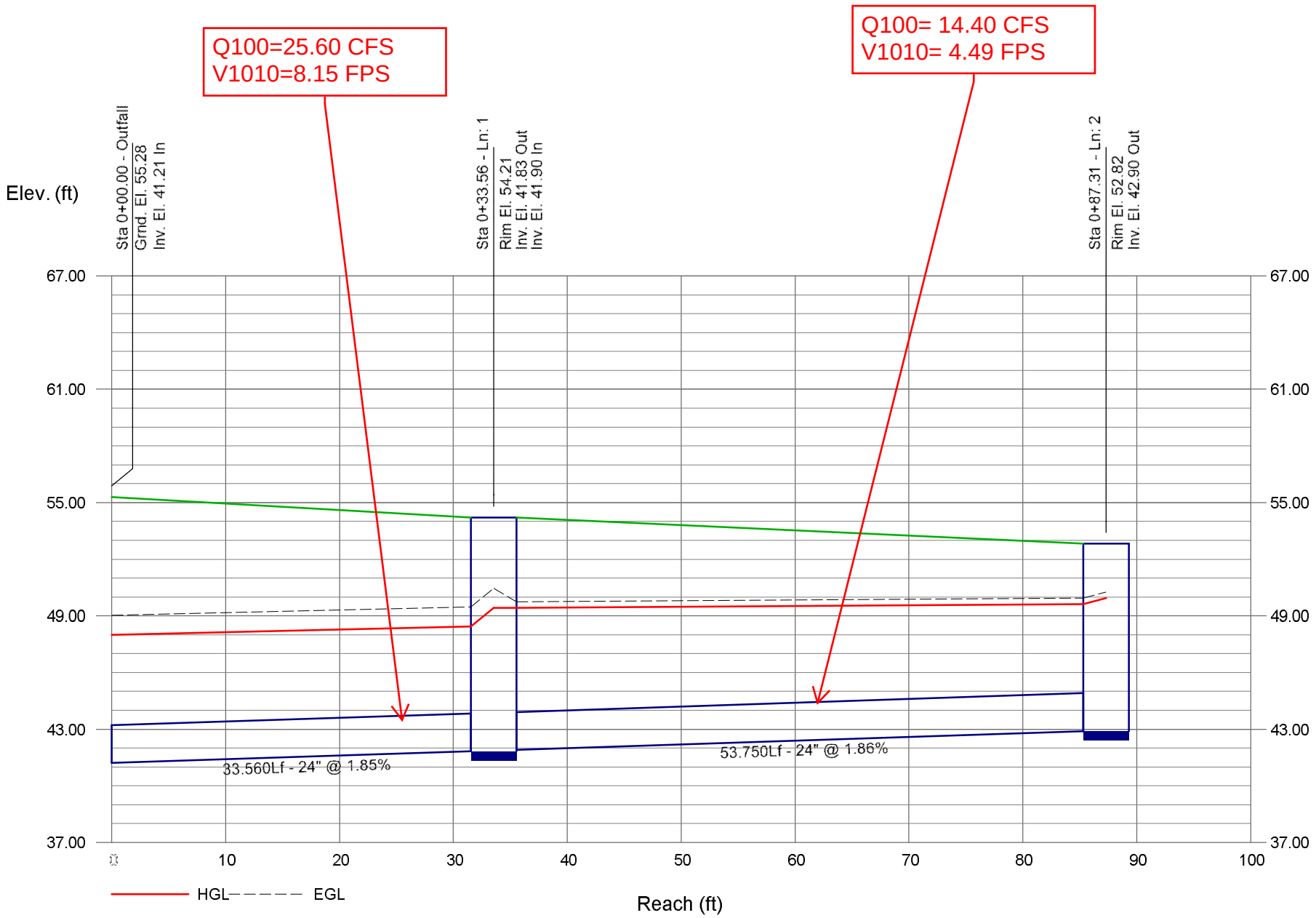
Proj. file: lateral 120.stm



Storm Sewer Profile

Proj. file: Coast HWY 101 - Grand View.stm

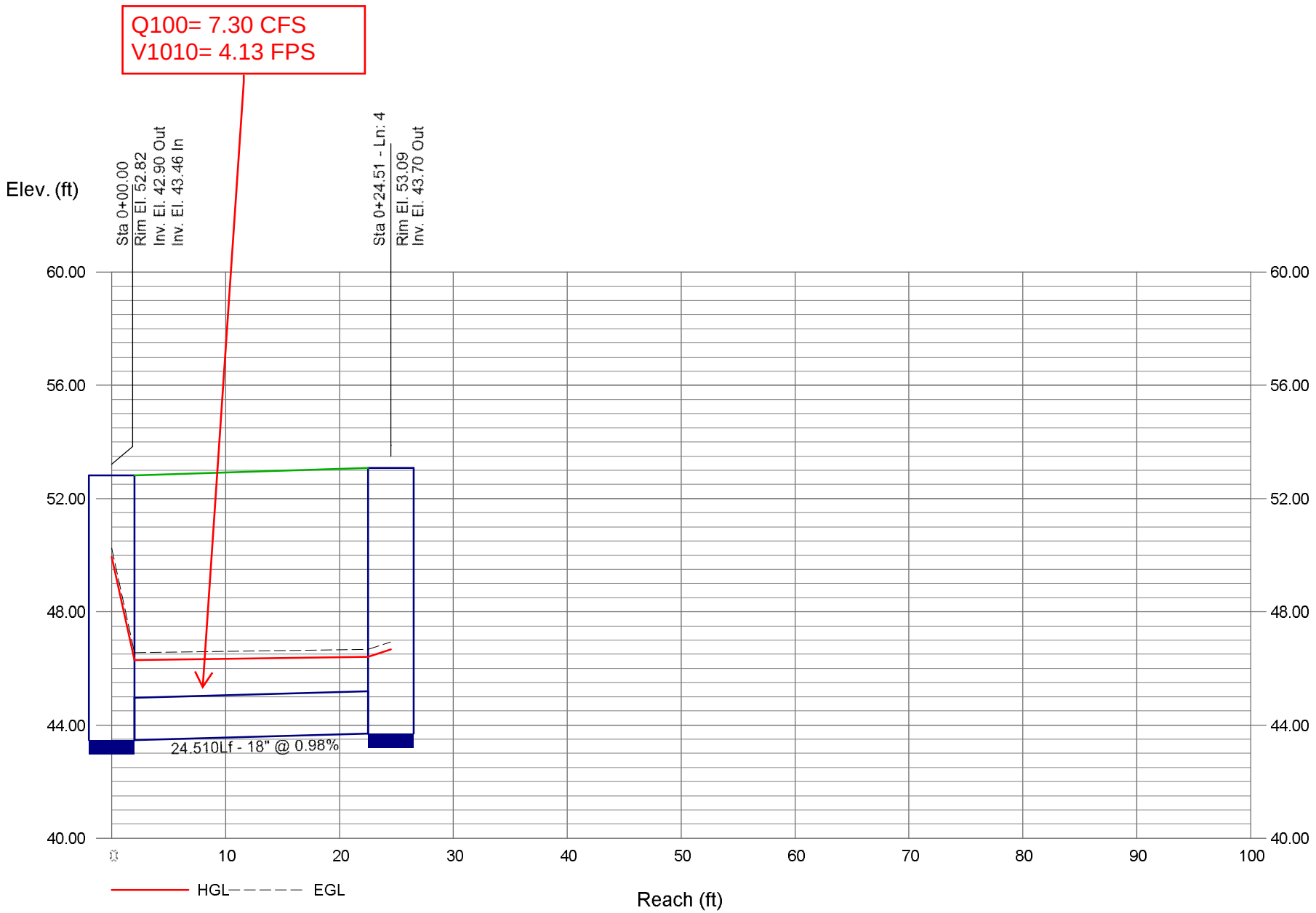
LATERAL 121A



Storm Sewer Profile

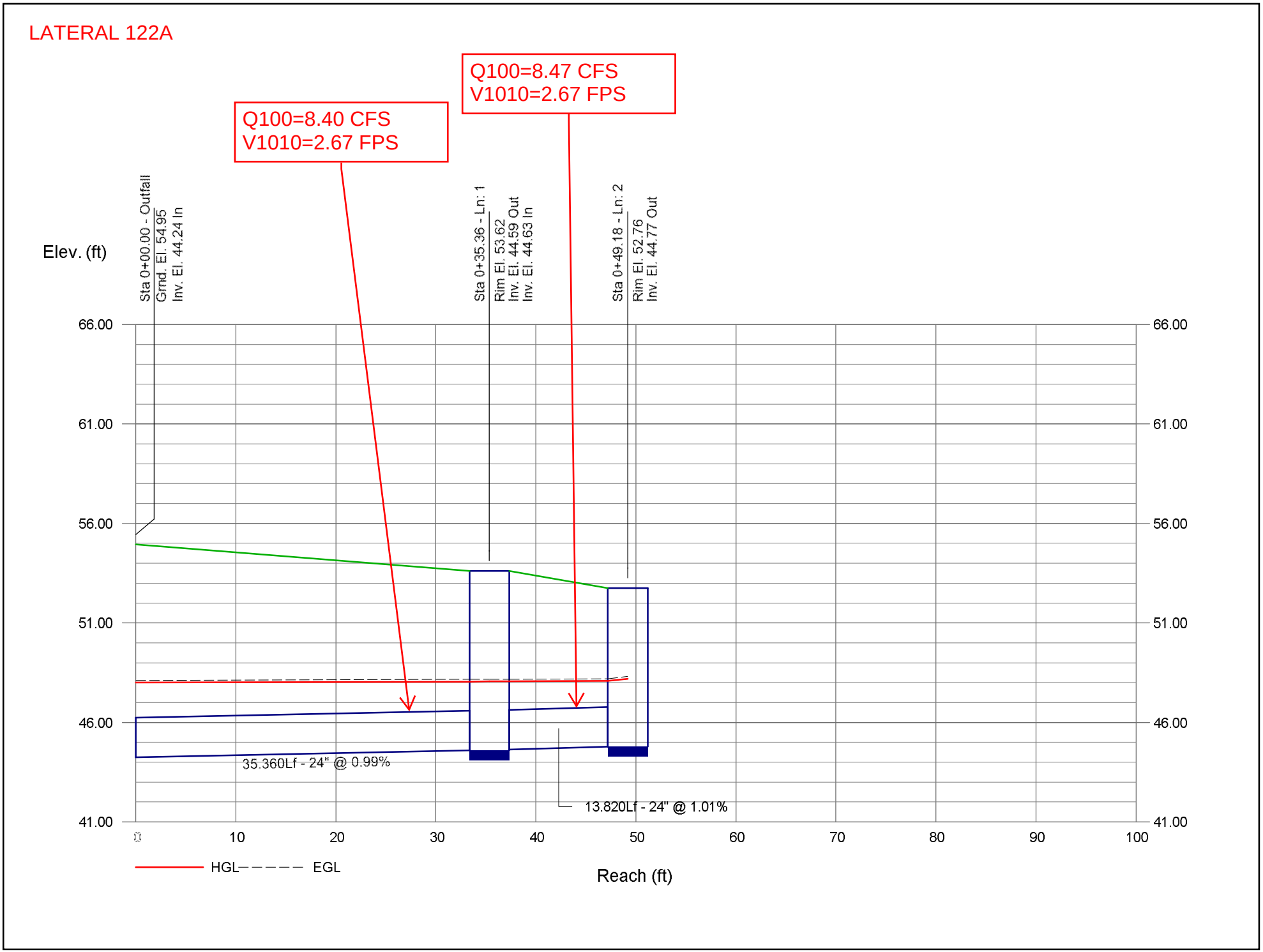
Proj. file: Coast HWY 101 - Grand View.stm

LATERAL 121A-2



Storm Sewer Profile

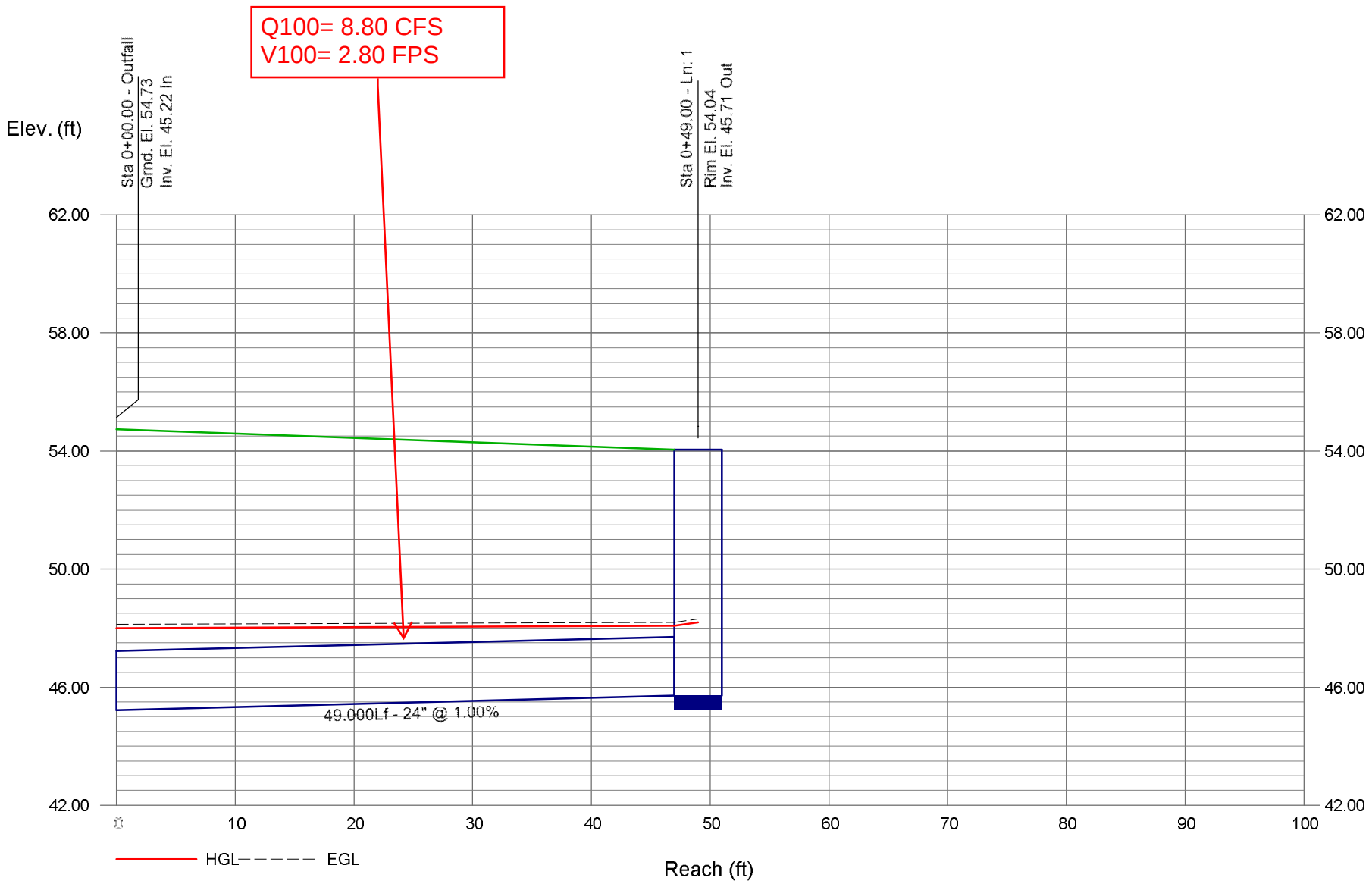
Proj. file: lateral 122A.stm



Storm Sewer Profile

Proj. file: lateral 123A.stm

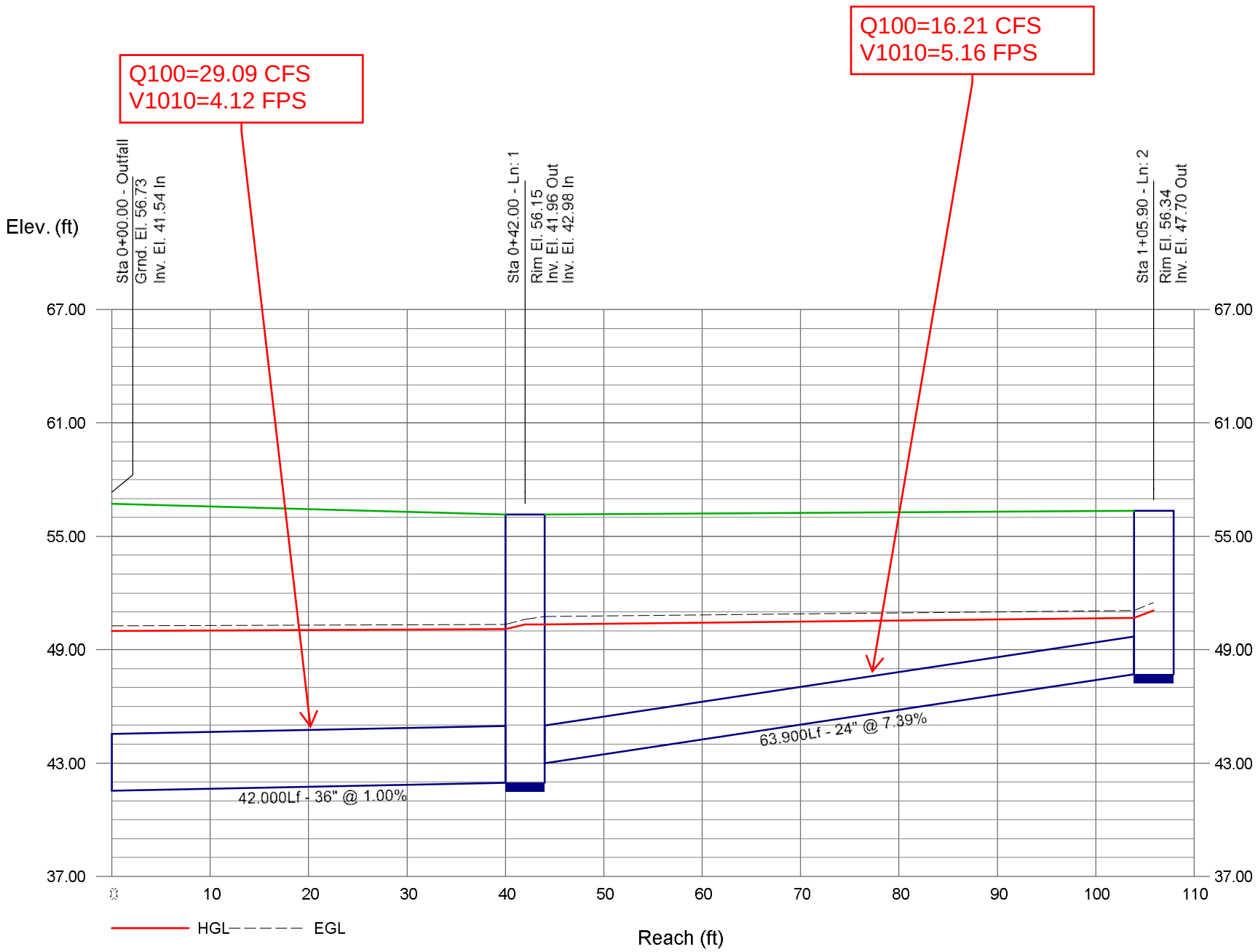
LATERAL 123A



Storm Sewer Profile

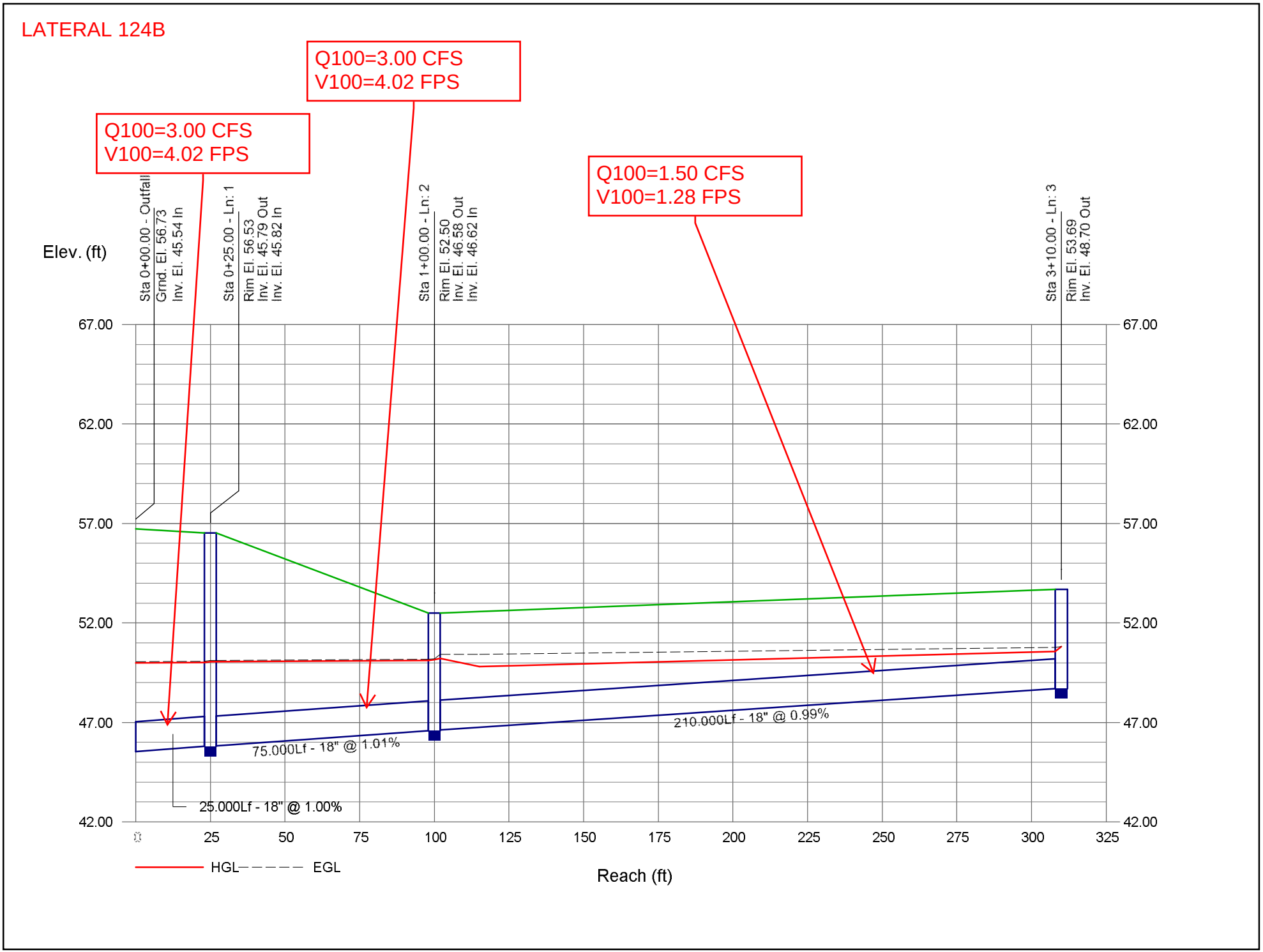
Proj. file: Coast HWY 101 - Bishops Gate.stm

LATERAL 124A



Storm Sewer Profile

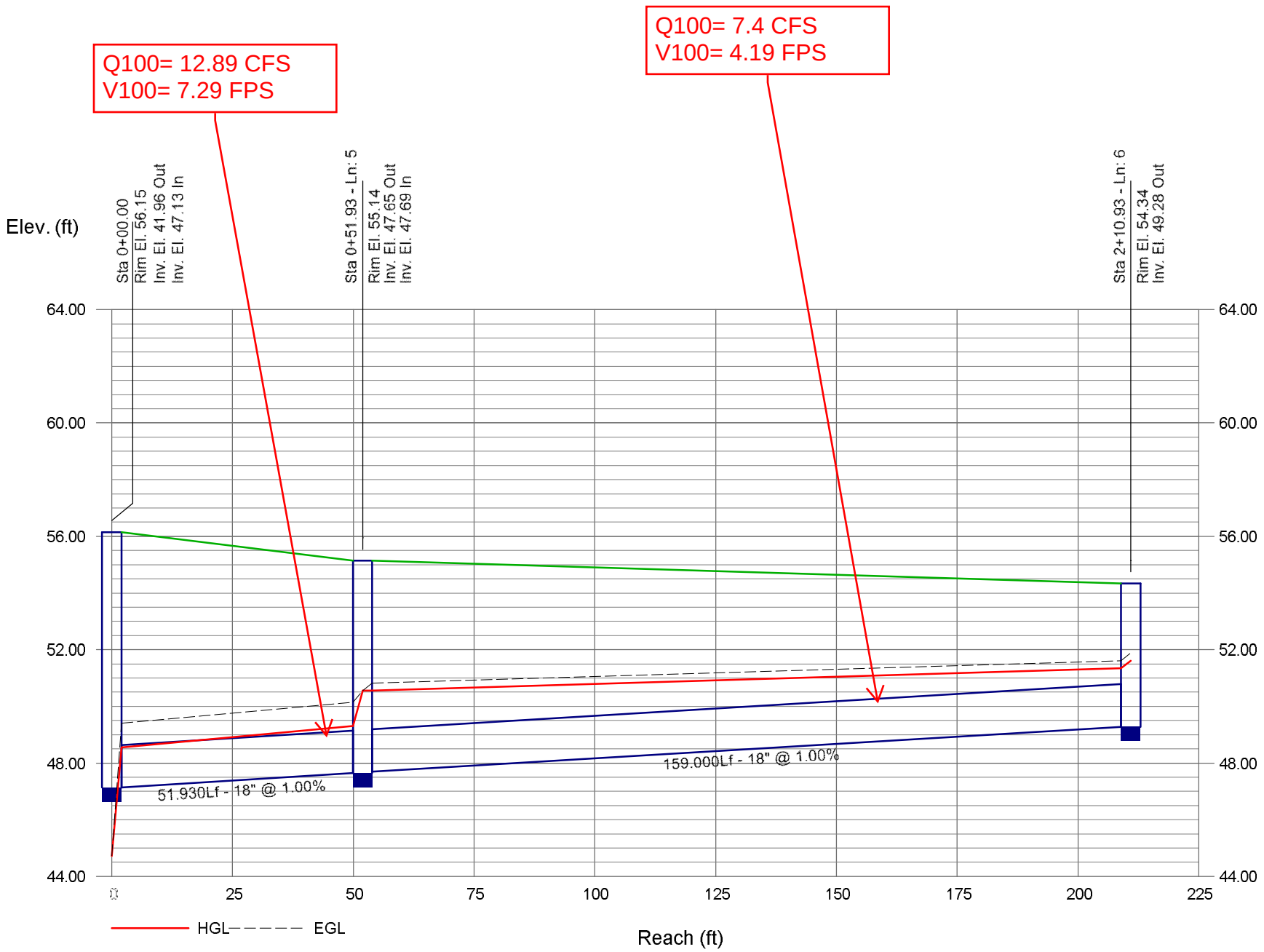
Proj. file: Lateral 124B.stm



Storm Sewer Profile

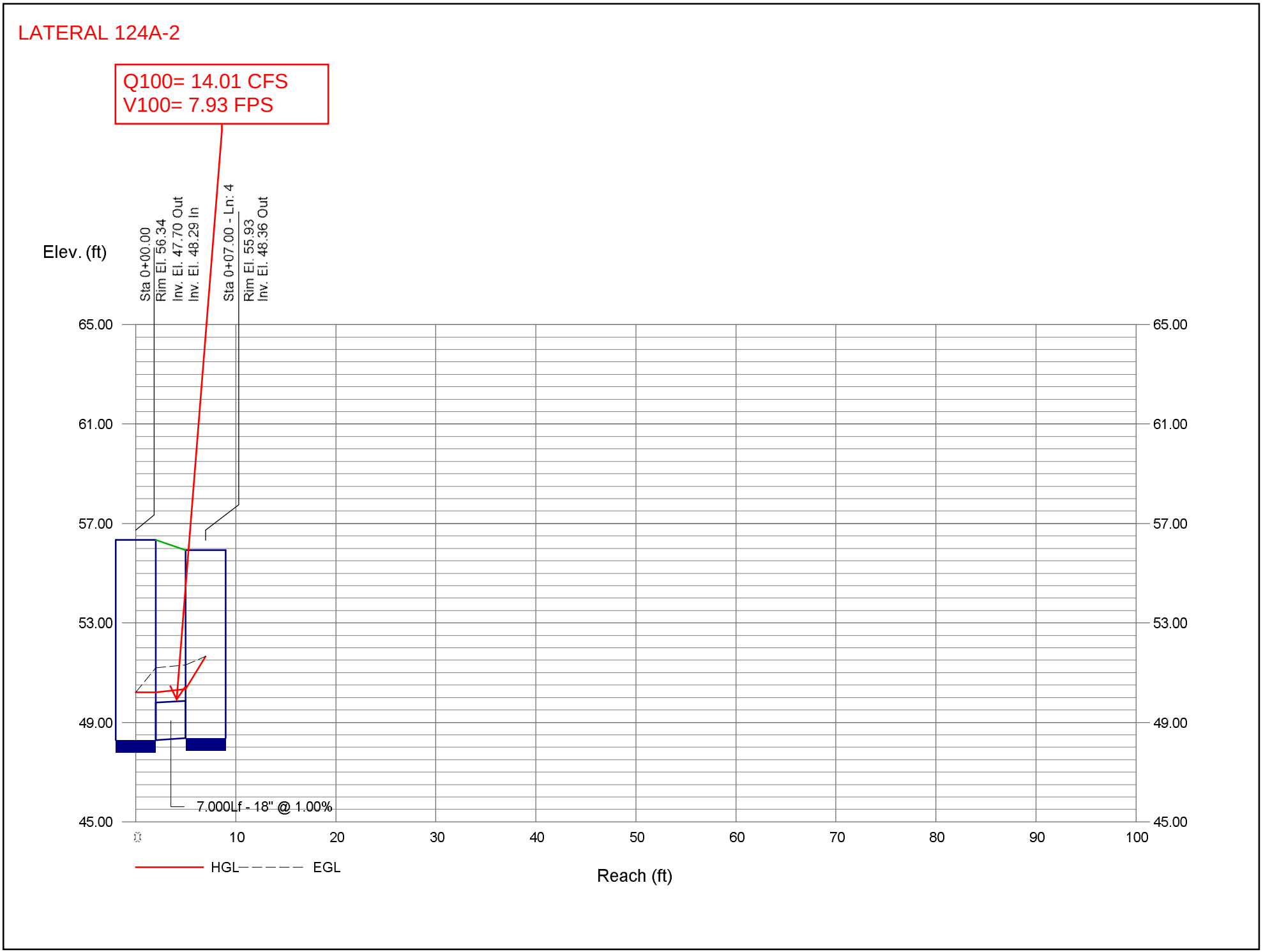
Proj. file: Coast HWY 101 - Bishops Gate.stm

LATERAL 124A-1



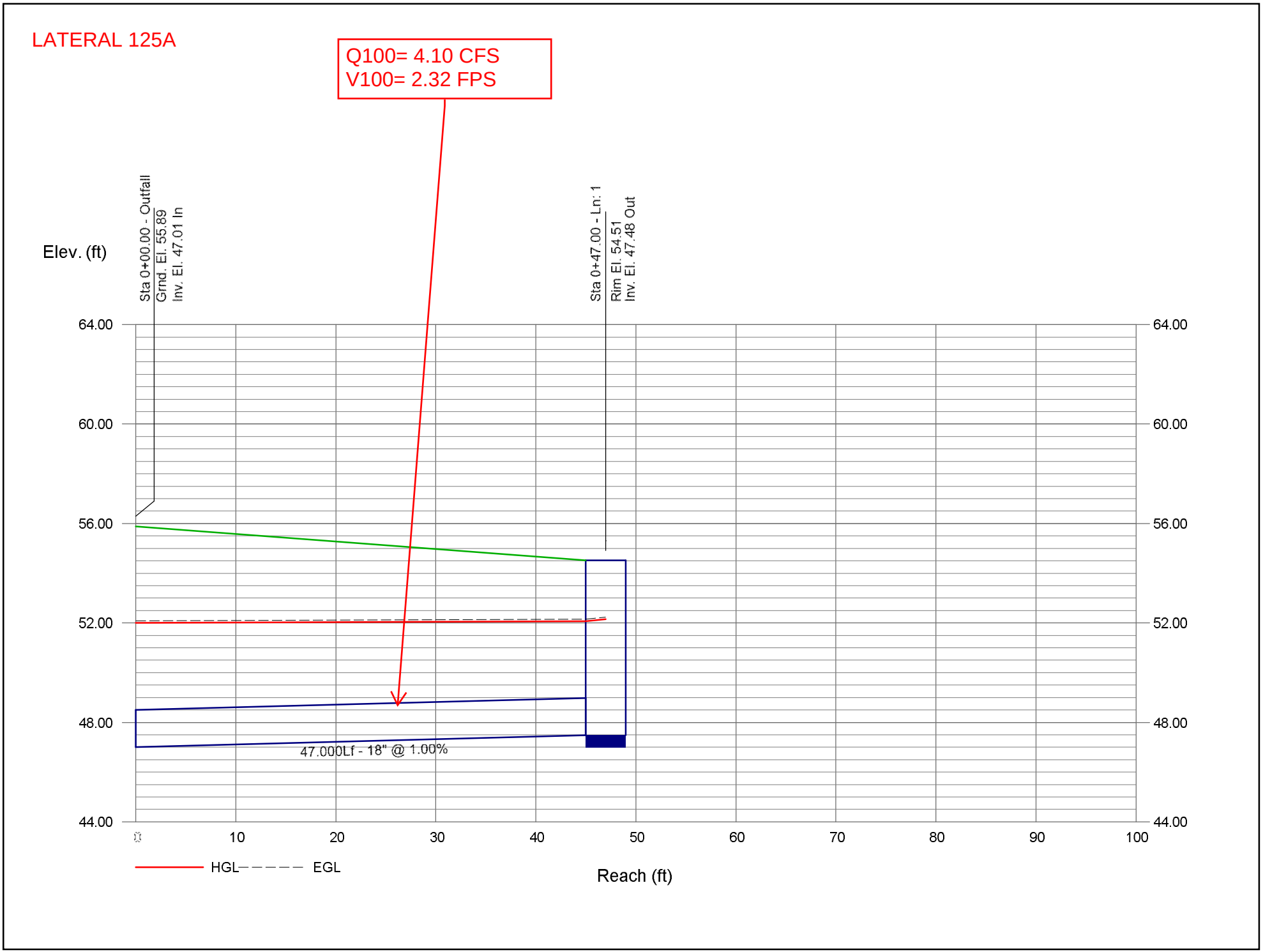
Storm Sewer Profile

Proj. file: Coast HWY 101 - Bishops Gate.stm



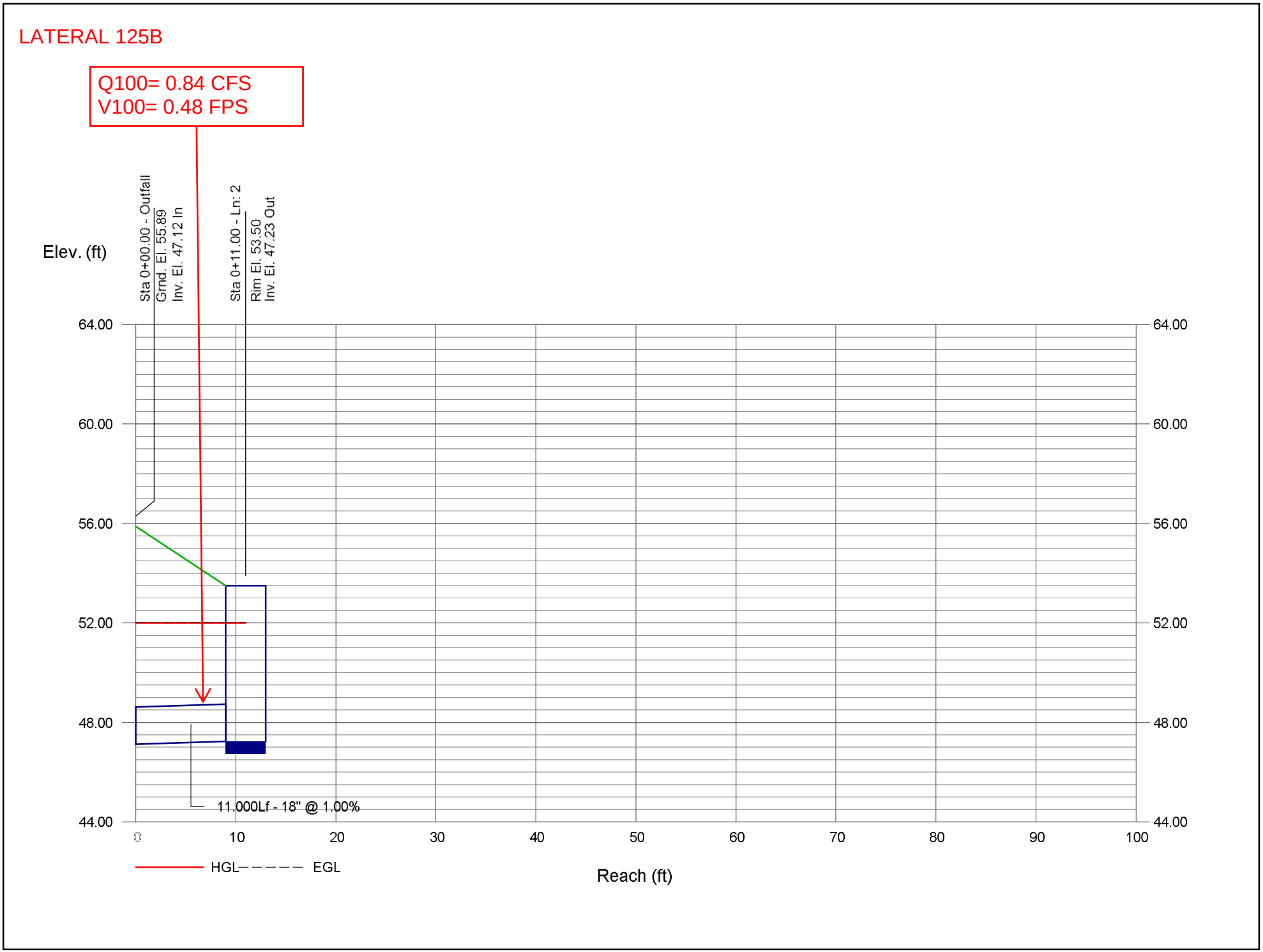
Storm Sewer Profile

Proj. file: Lateral 125A & 125B.stm



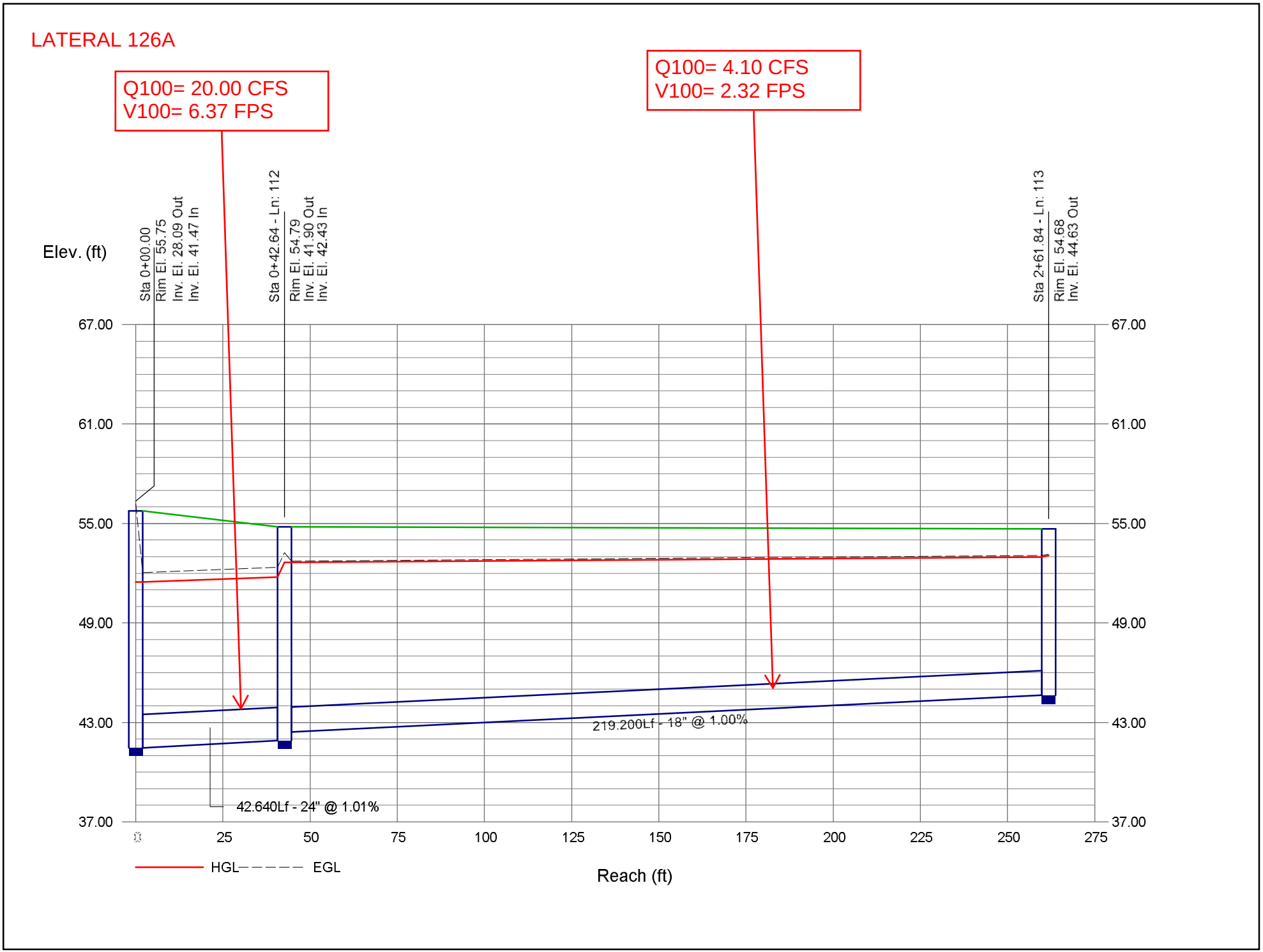
Storm Sewer Profile

Proj. file: Lateral 125A & 125B.stm



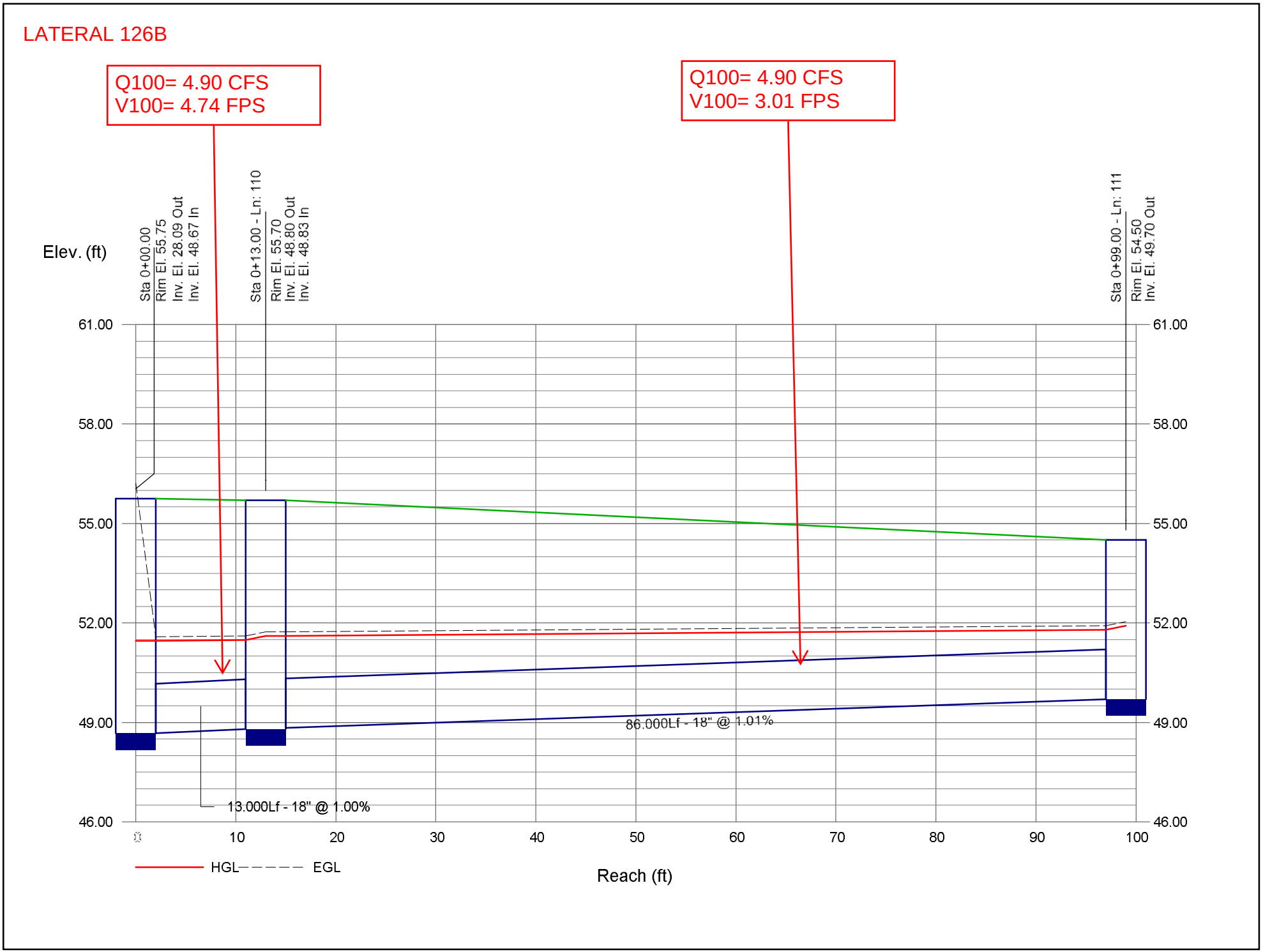
Storm Sewer Profile

Proj. file: lateral 126A & 126B.stm



Storm Sewer Profile

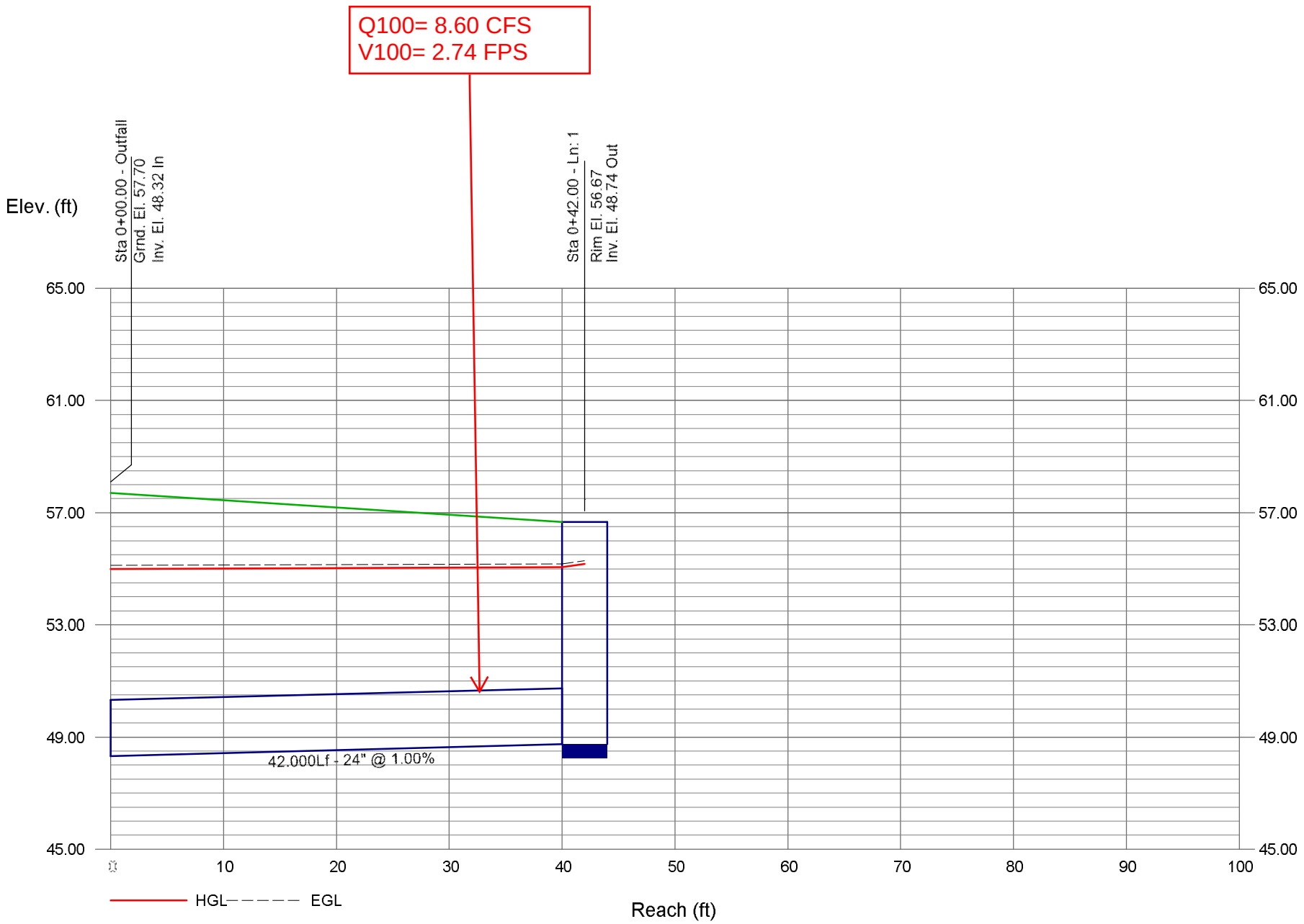
Proj. file: lateral 126A & 126B.stm



Storm Sewer Profile

Proj. file: lateral 127.stm

LATERAL 127



Michael Baker
INTERNATIONAL

Appendix G – 50 Year Lateral Storm Drain Input and Output

Included within this appendix:

50 Year Lateral Pipe Results Summary

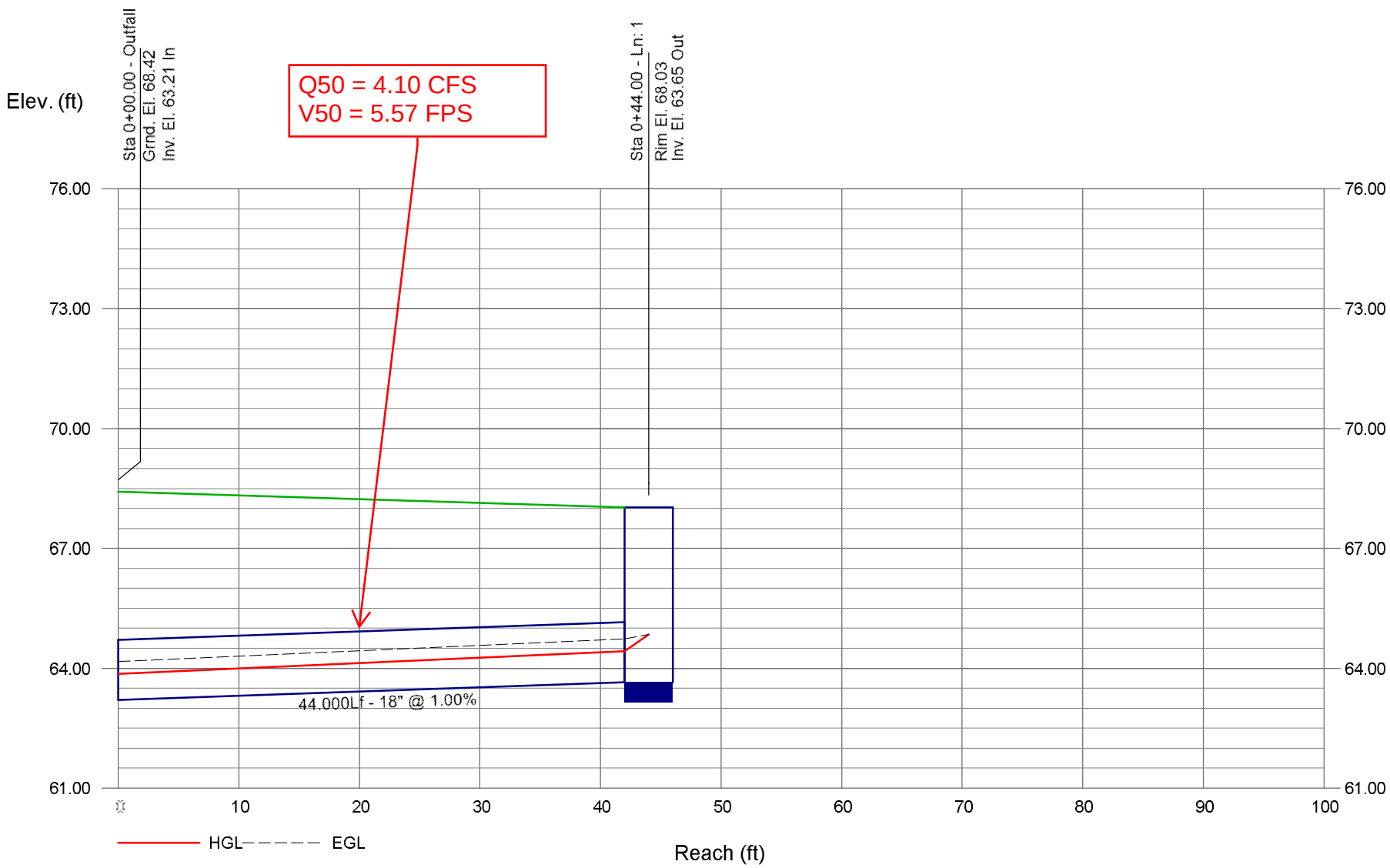
Michael Baker
INTERNATIONAL

50 Year Lateral Pipe Results

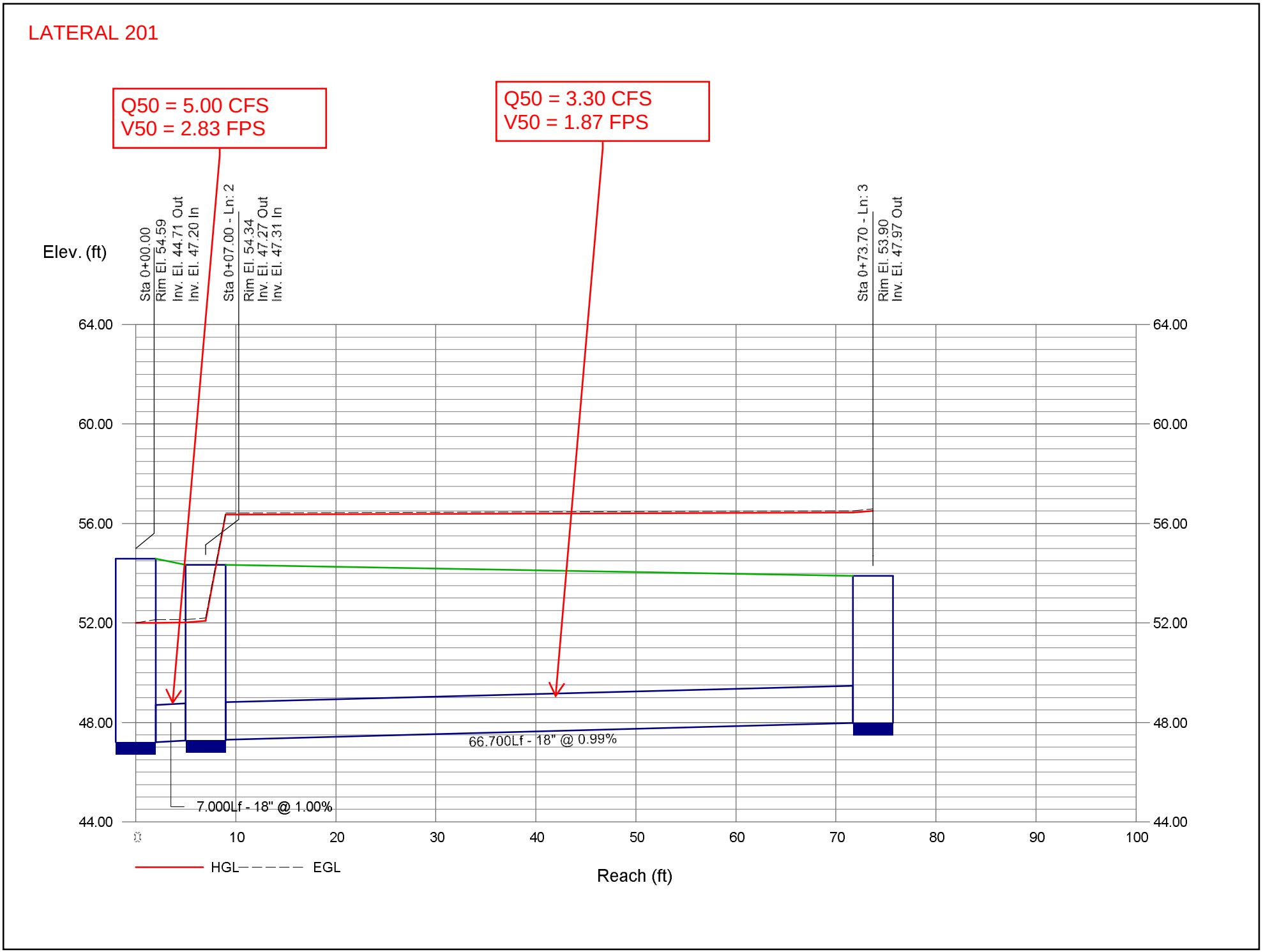
Storm Sewer Profile

Proj. file: lateral 101.stm

LATERAL 101

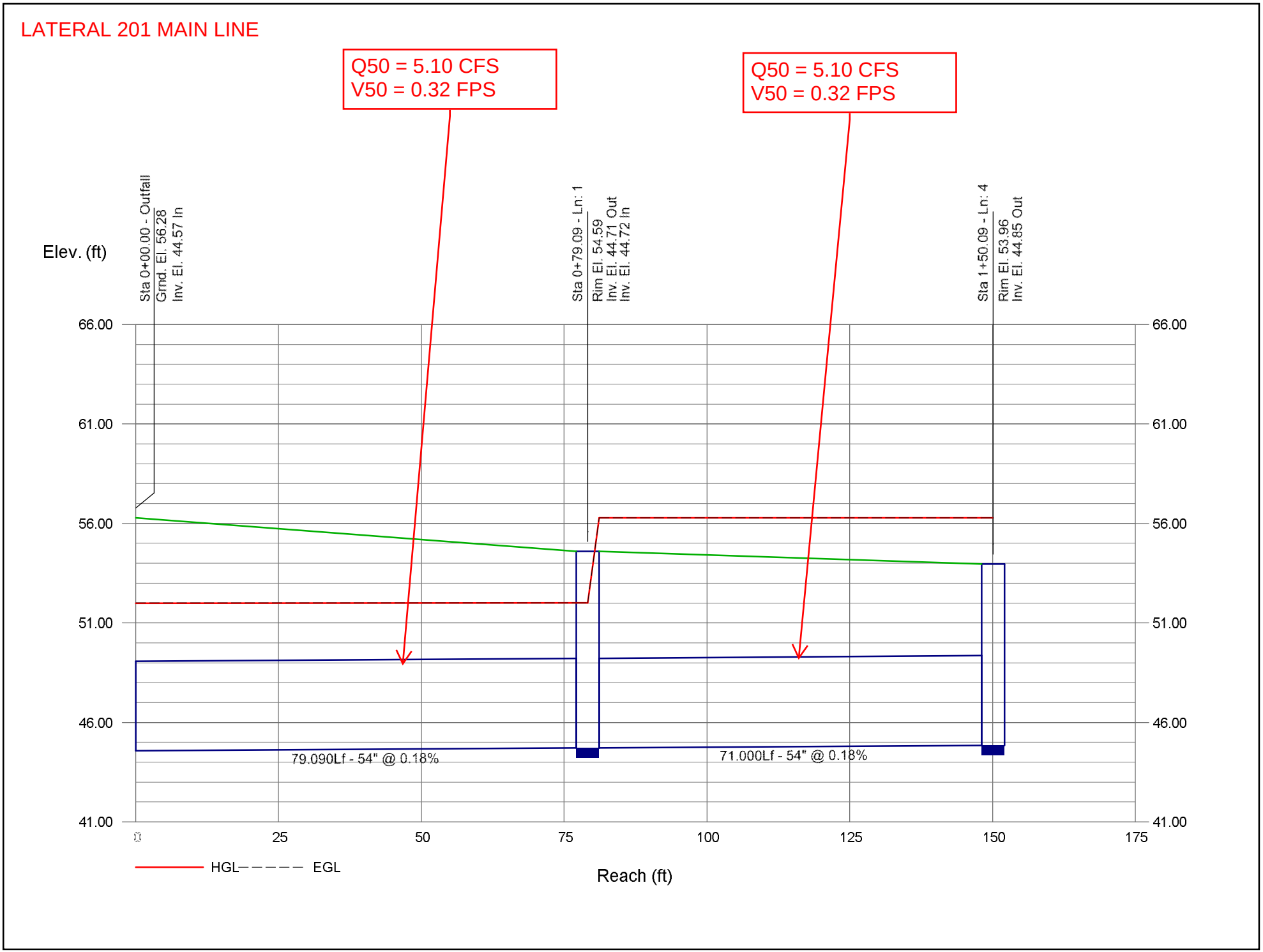


Storm Sewer Profile



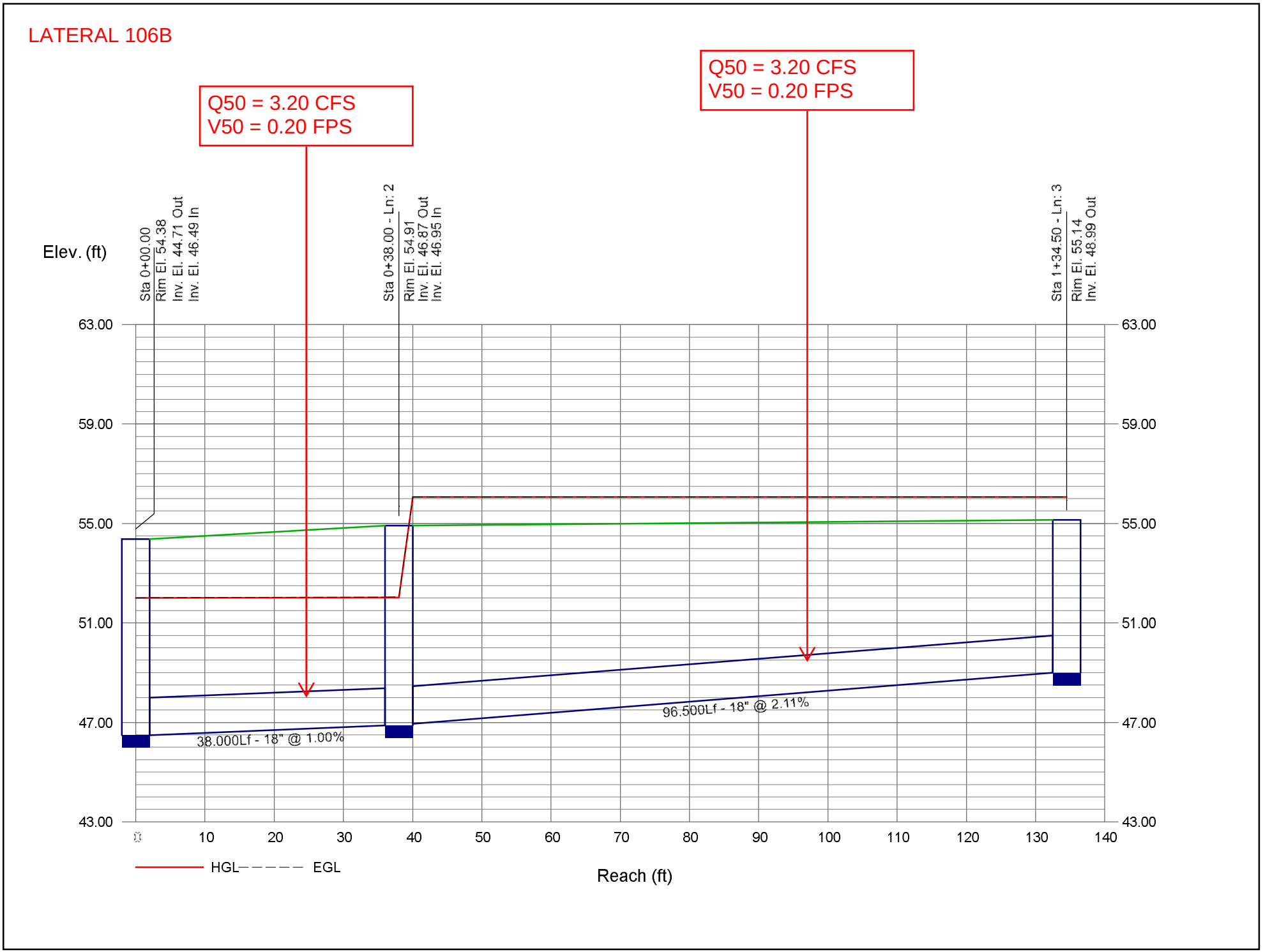
Storm Sewer Profile

Proj. file: Coast HWY 101 - West_Leucadia.stm



Storm Sewer Profile

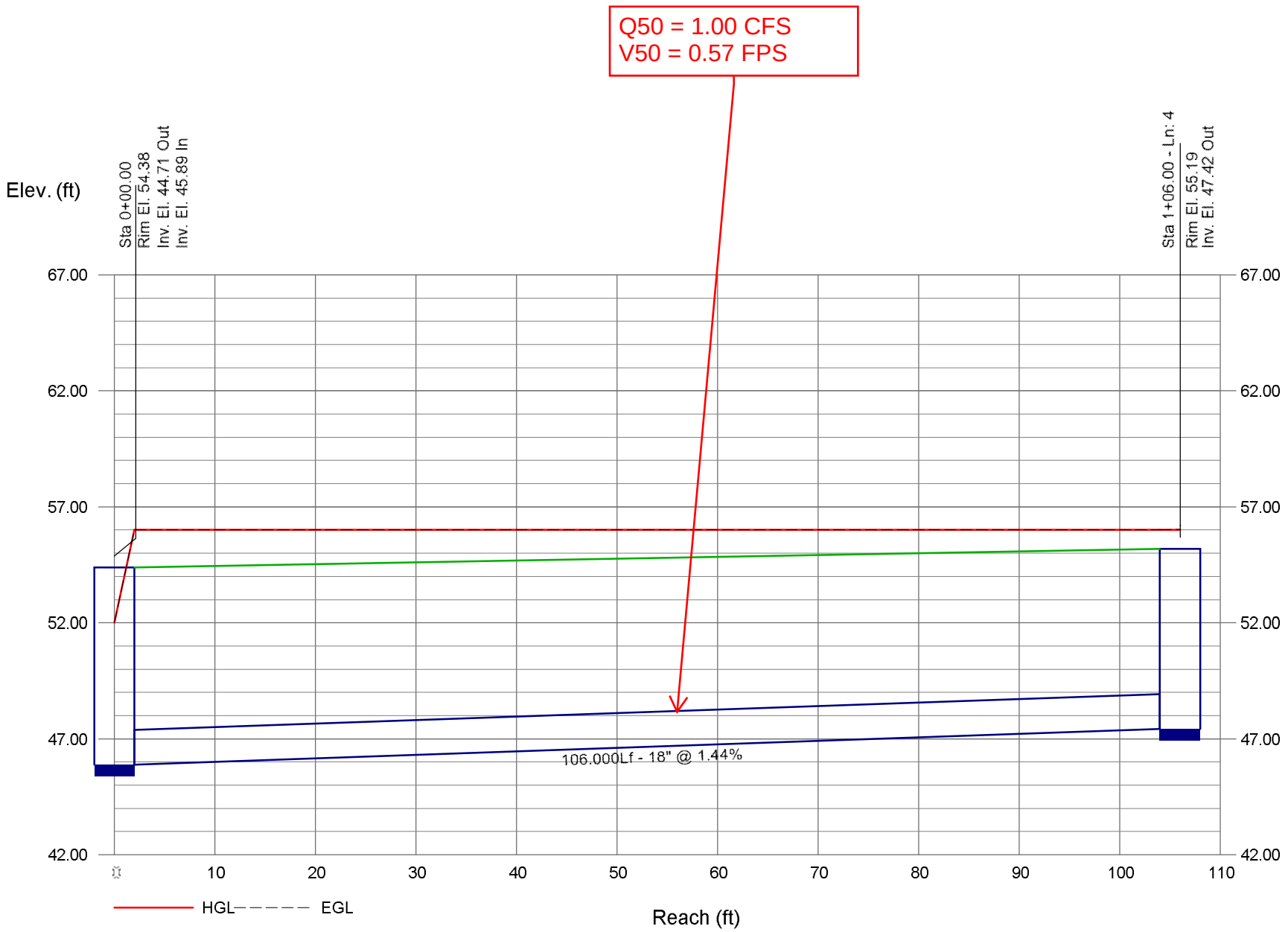
Proj. file: Coast HWY 101 - Jasper.stm



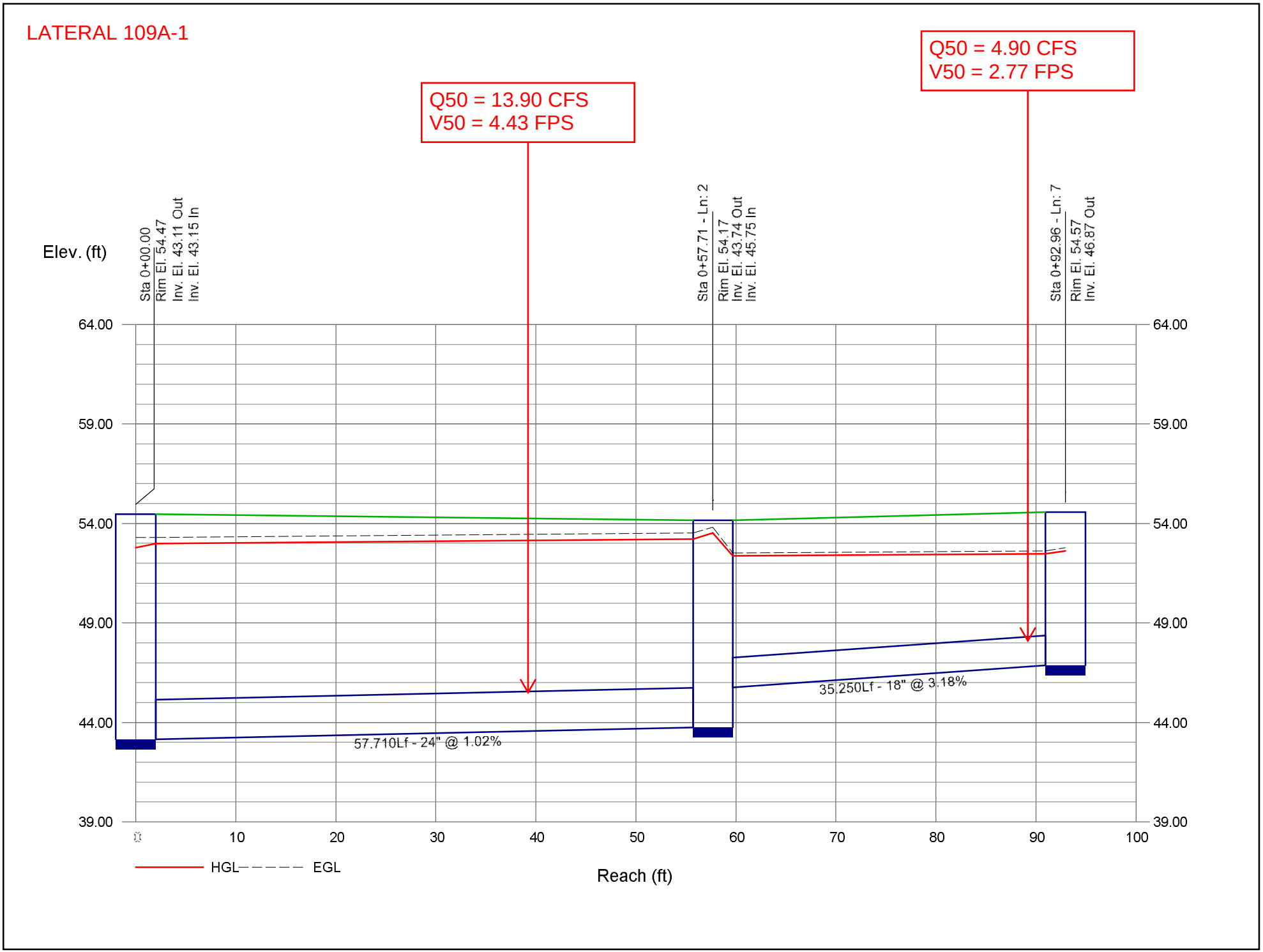
Storm Sewer Profile

Proj. file: Coast HWY 101 - Jasper.stm

LATERAL 106 A



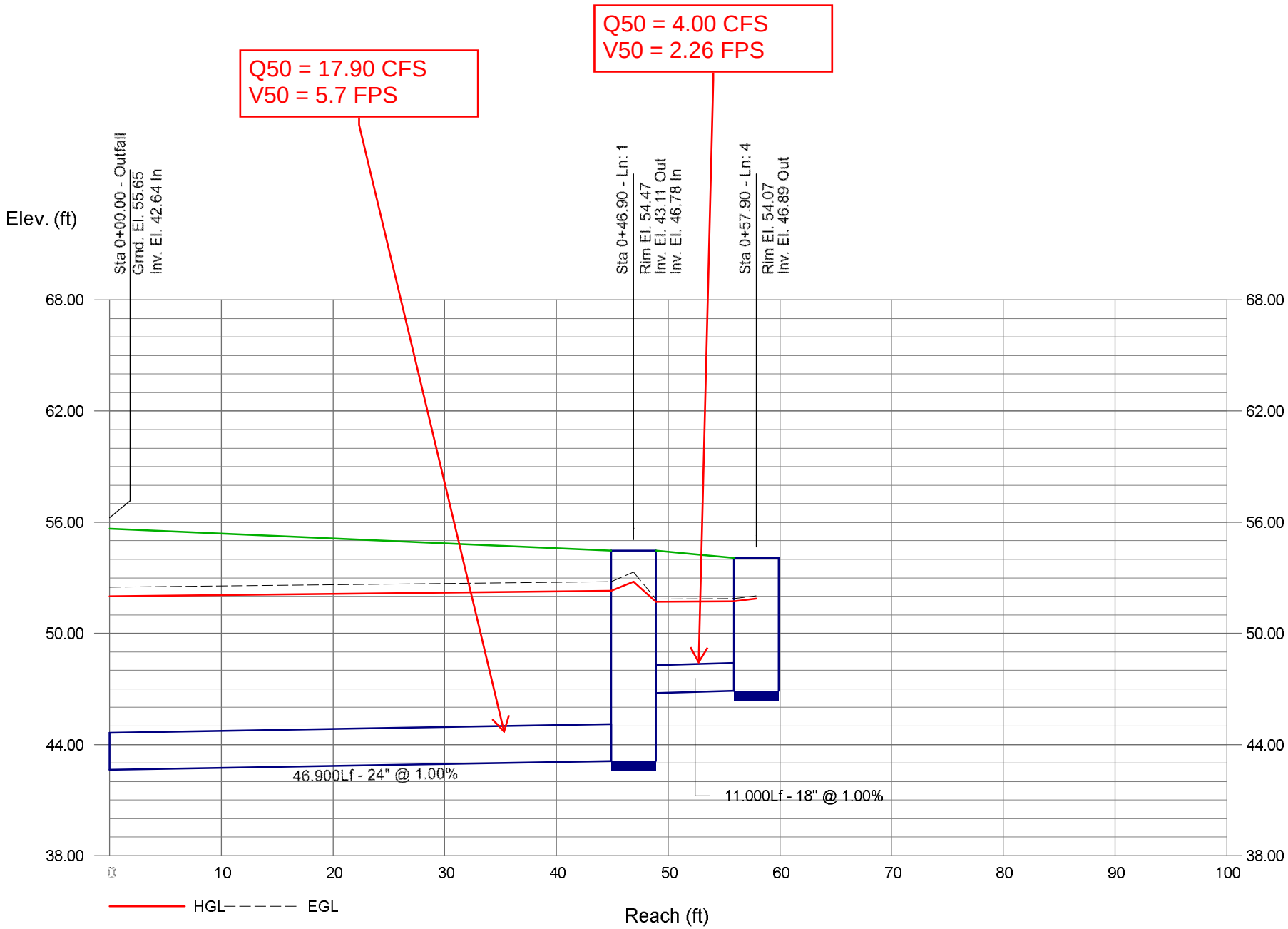
Storm Sewer Profile



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

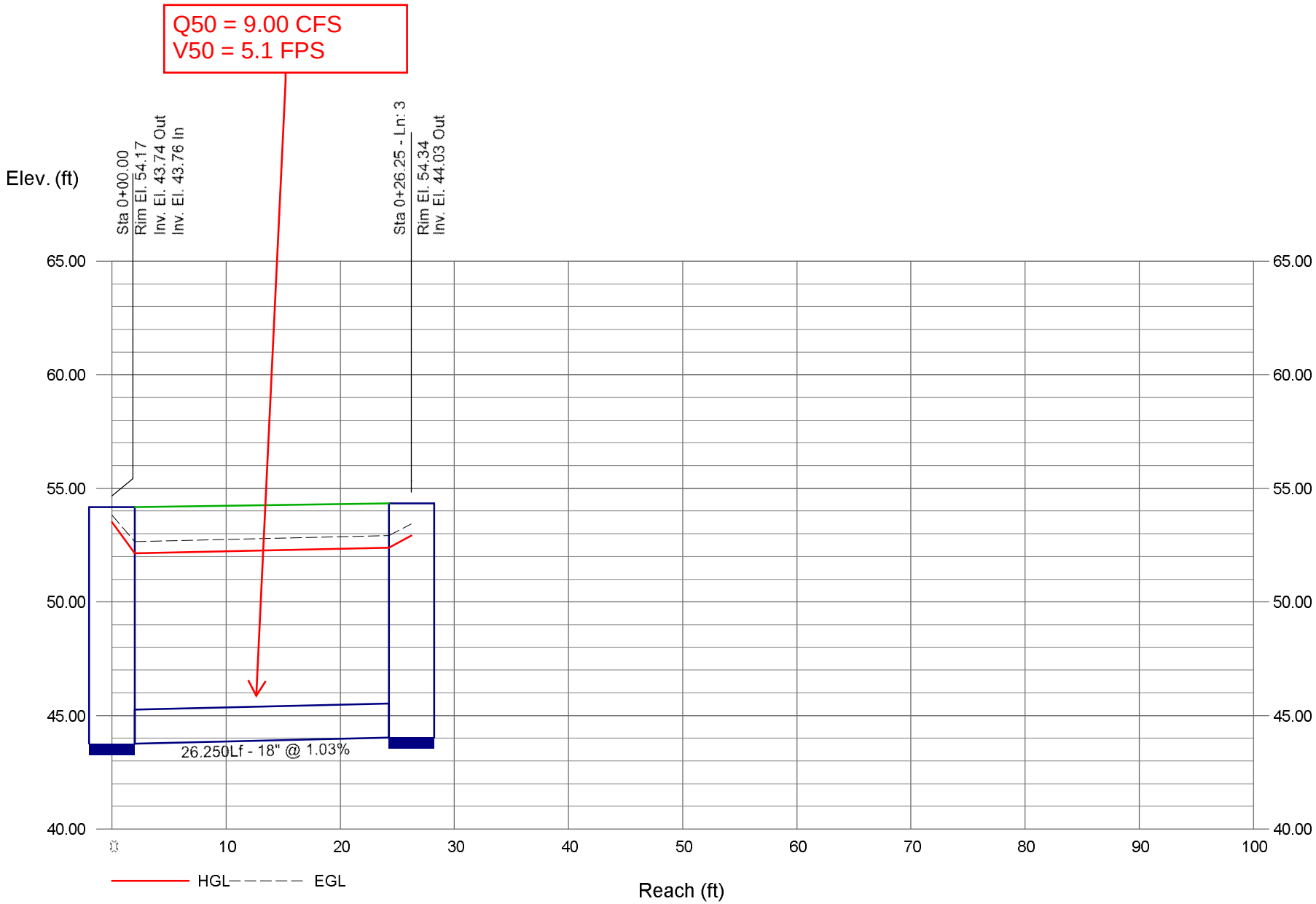
LATERAL 109A



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

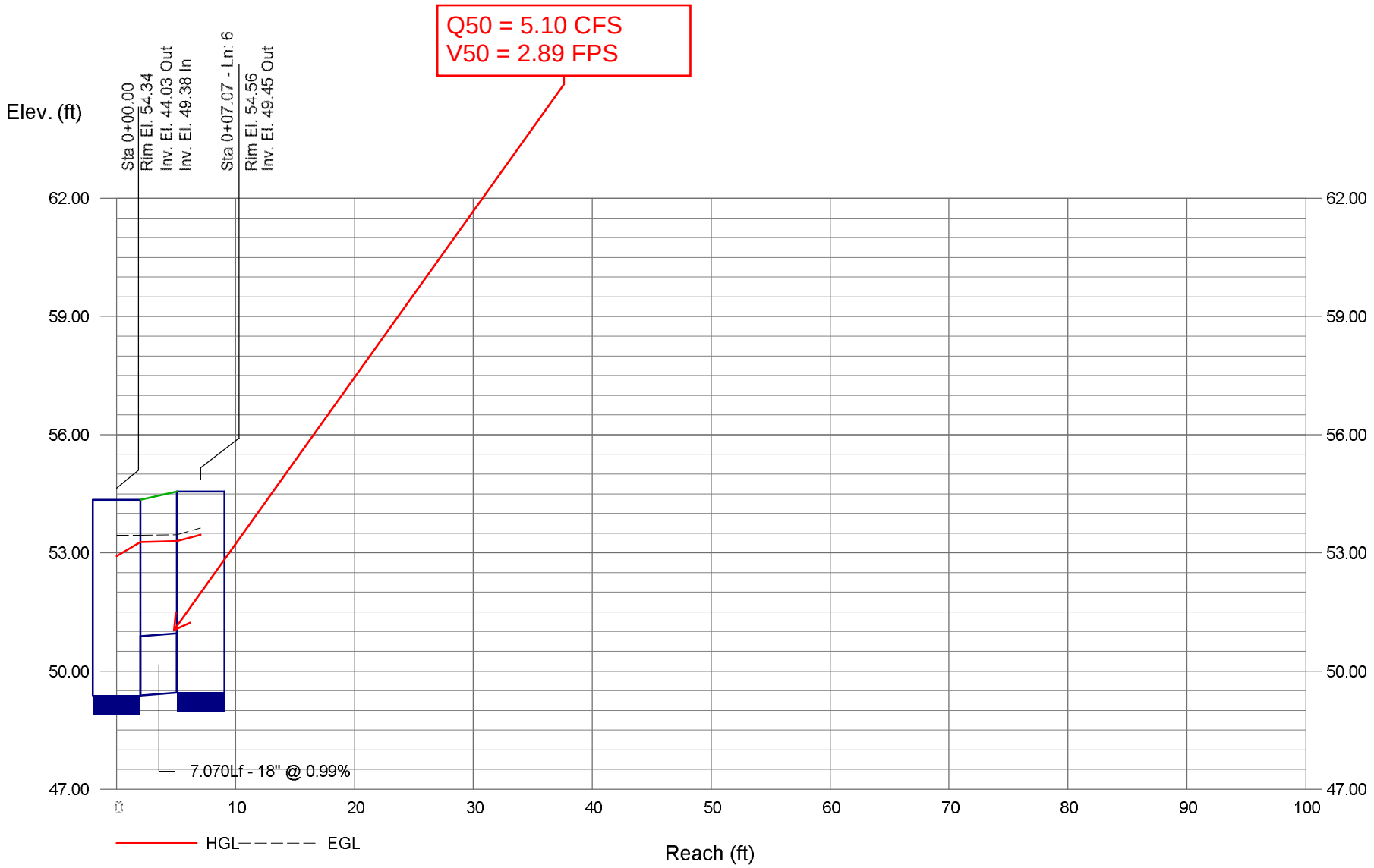
LATERAL 109A-2



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

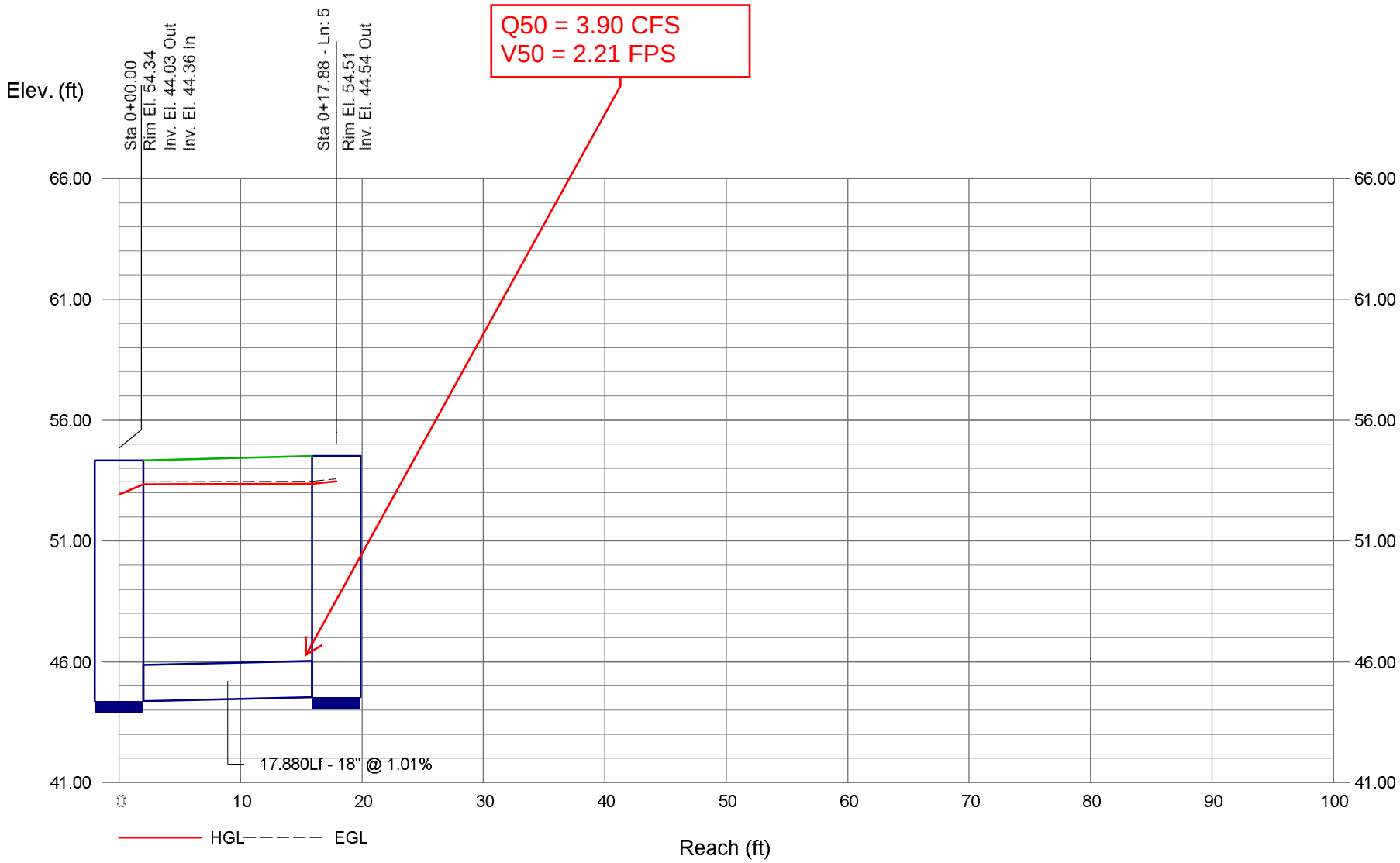
LATERAL 109A-3



Storm Sewer Profile

Proj. file: Coast HWY 101 - Diana.stm

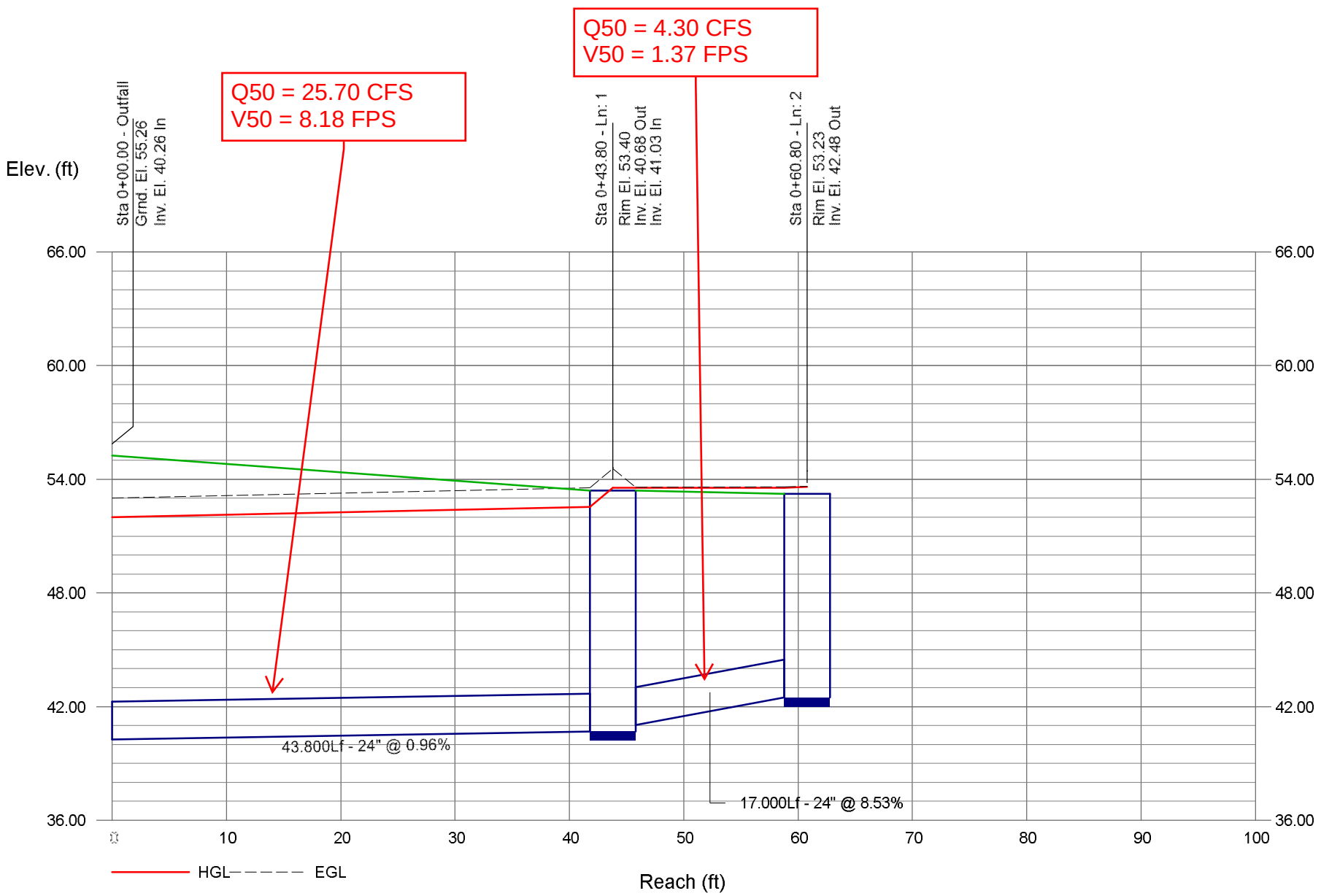
LATERAL 109A-4



Storm Sewer Profile

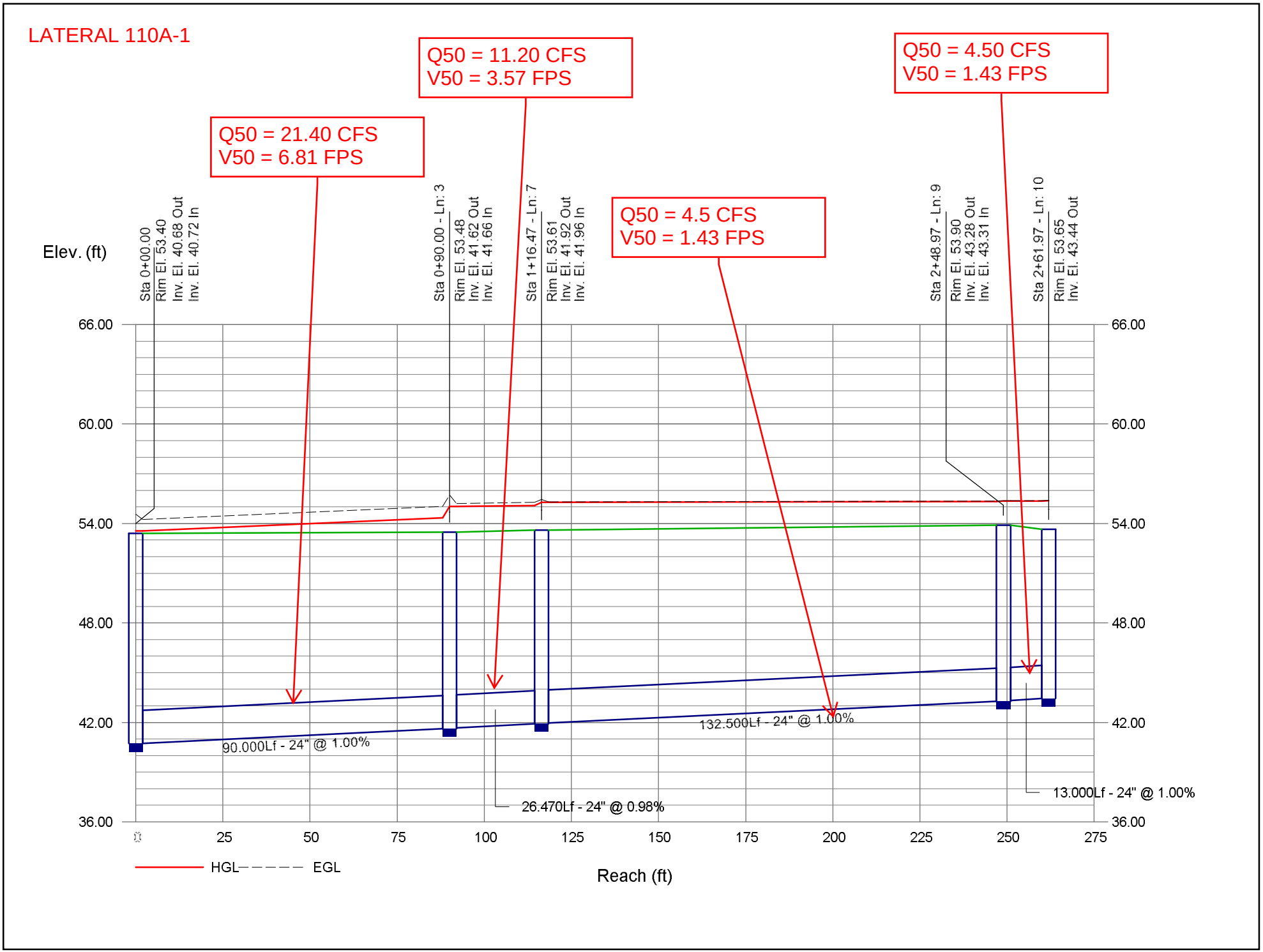
Proj. file: Coast HWY 101 - Glaucus.stm

LATERAL 110A



Storm Sewer Profile

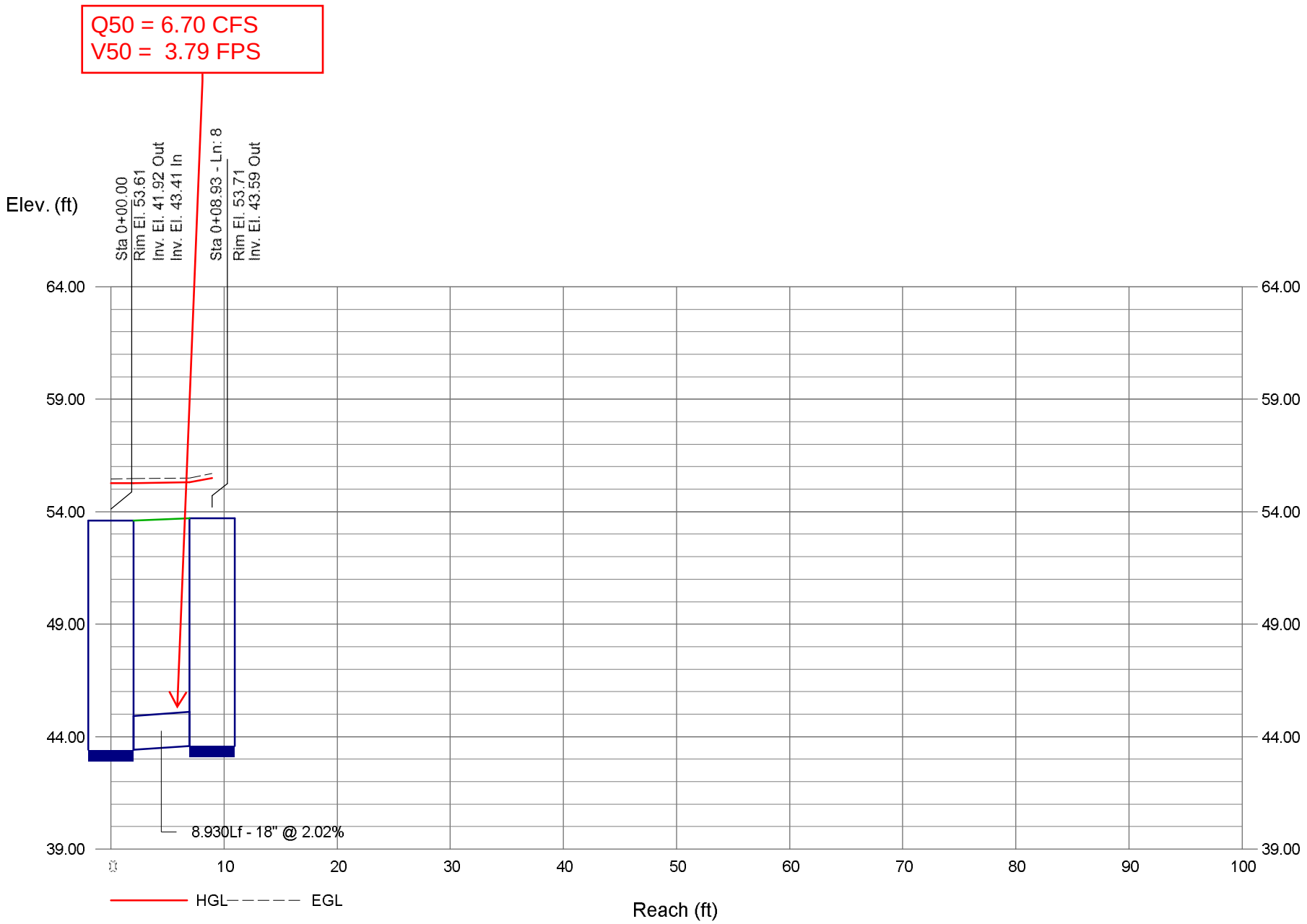
Proj. file: Coast HWY 101 - Glaucus.stm



Storm Sewer Profile

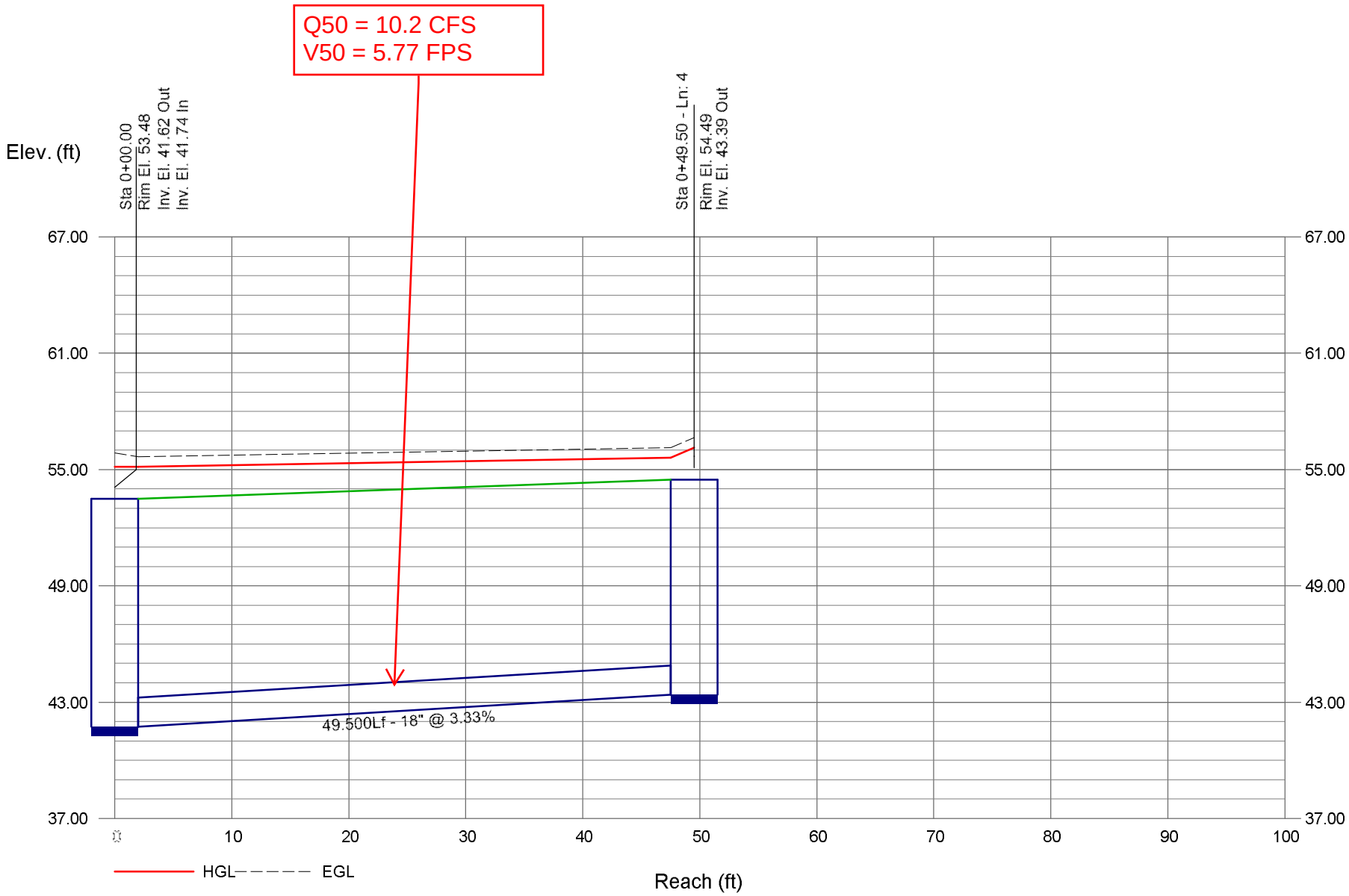
Proj. file: Coast HWY 101 - Glaucus.stm

LATERAL 110A-2



Storm Sewer Profile

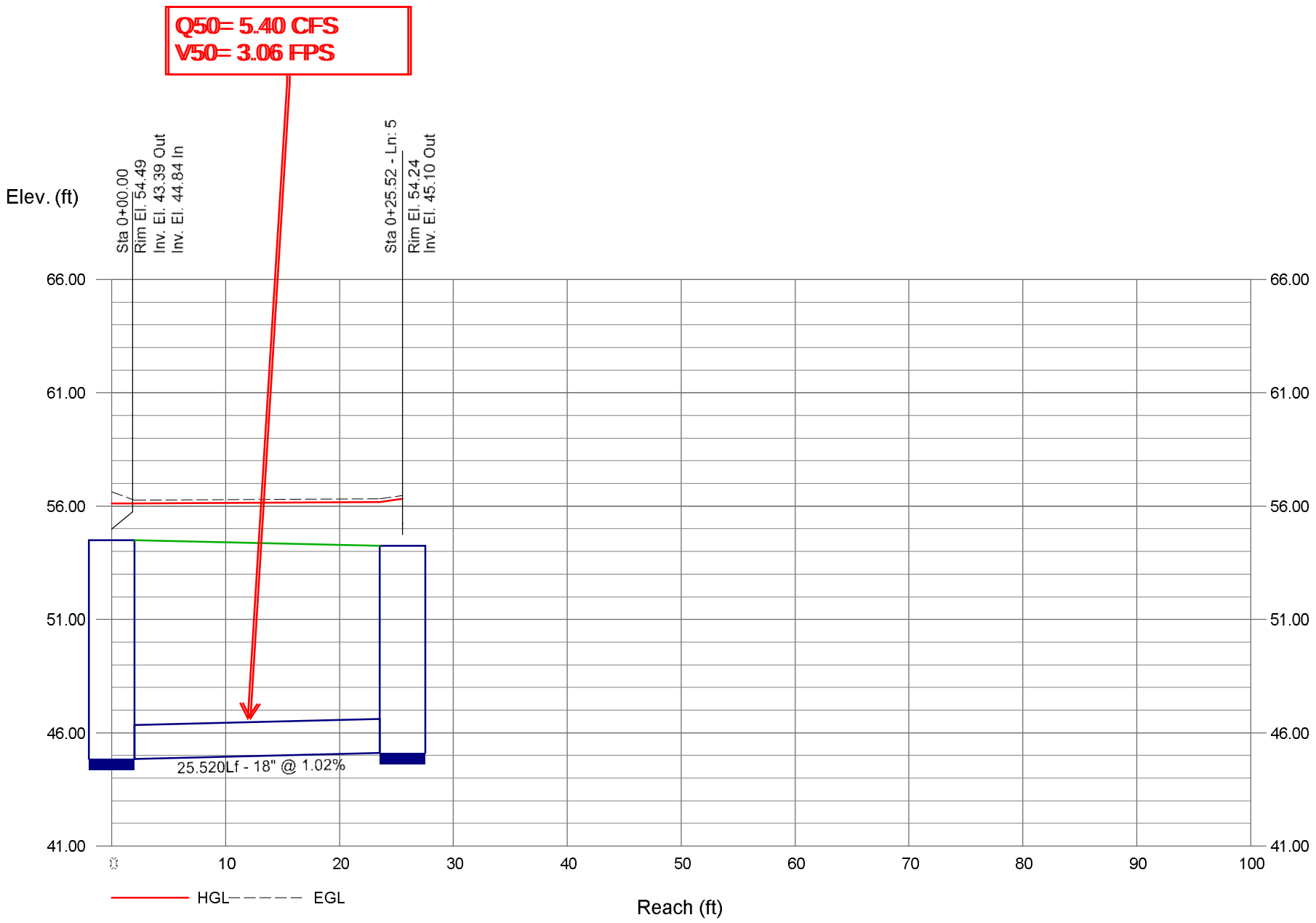
LATERAL 110A-3



Storm Sewer Profile

Proj. file: Coast HWY 101 - Glaucus.stm

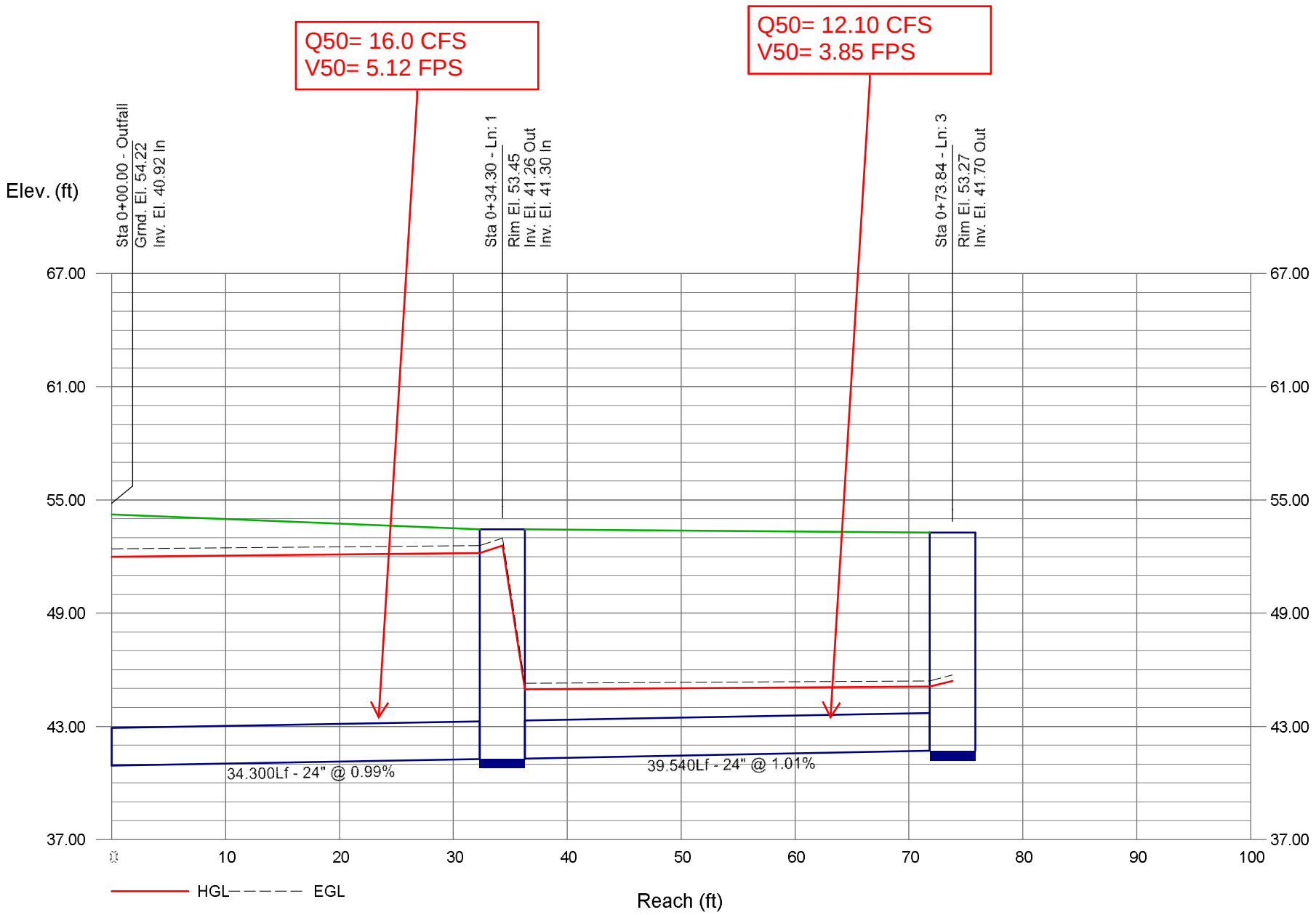
LATERAL 110A-4



Storm Sewer Profile

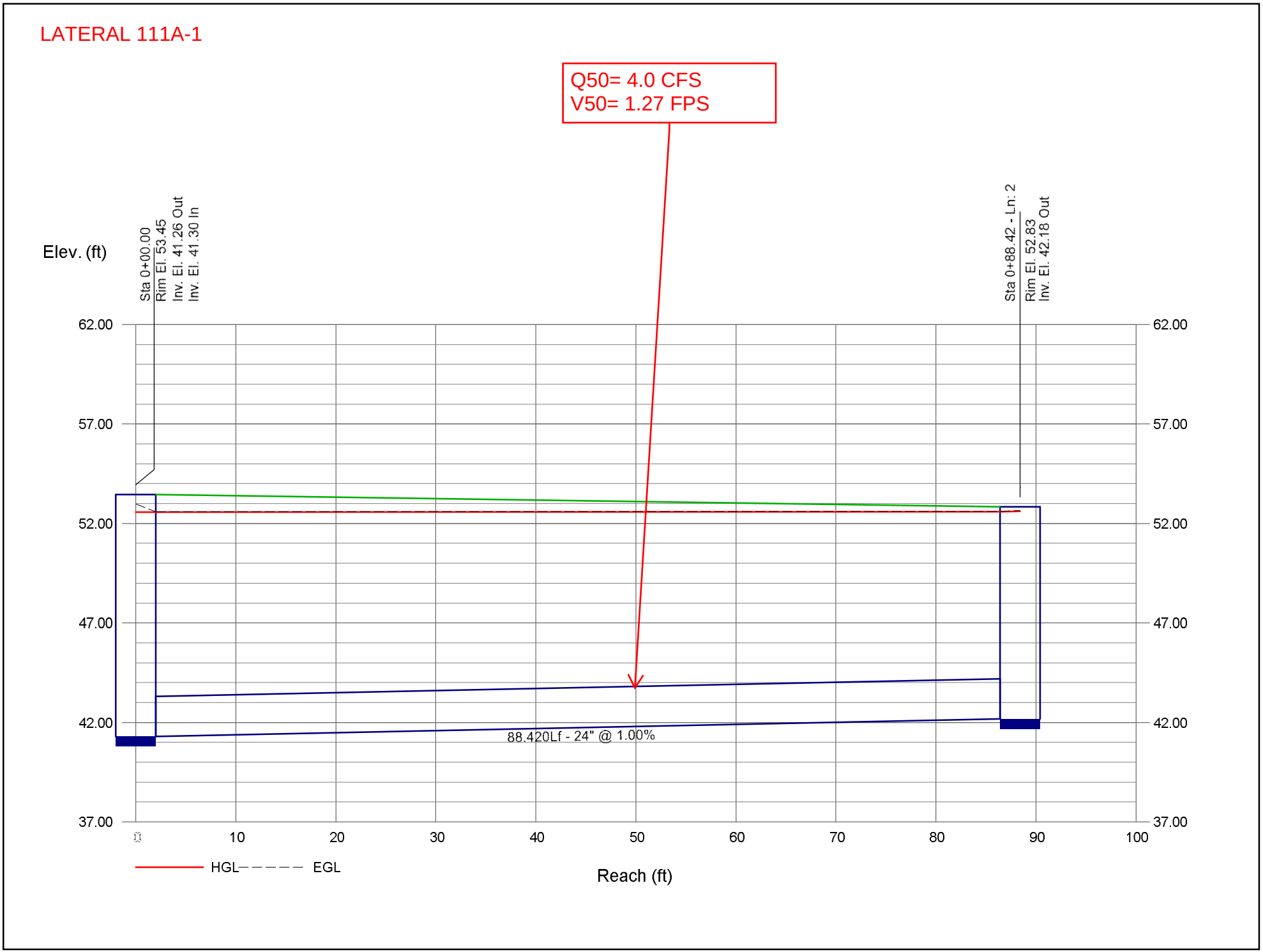
Proj. file: Coast HWY 101 - Phoebe.stm

LATERAL 111A



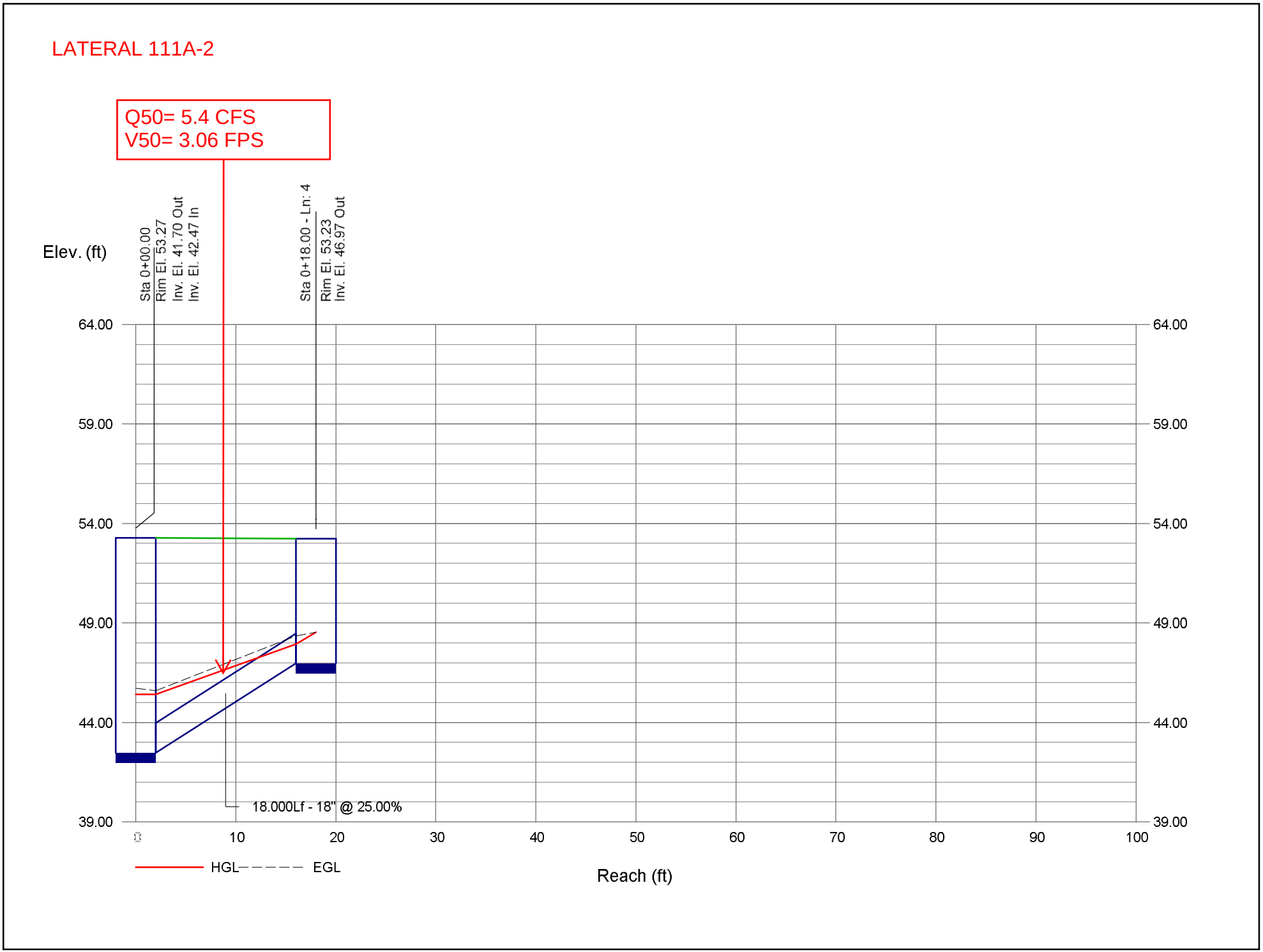
Storm Sewer Profile

Proj. file: Coast HWY 101 - Phoebe.stm



Storm Sewer Profile

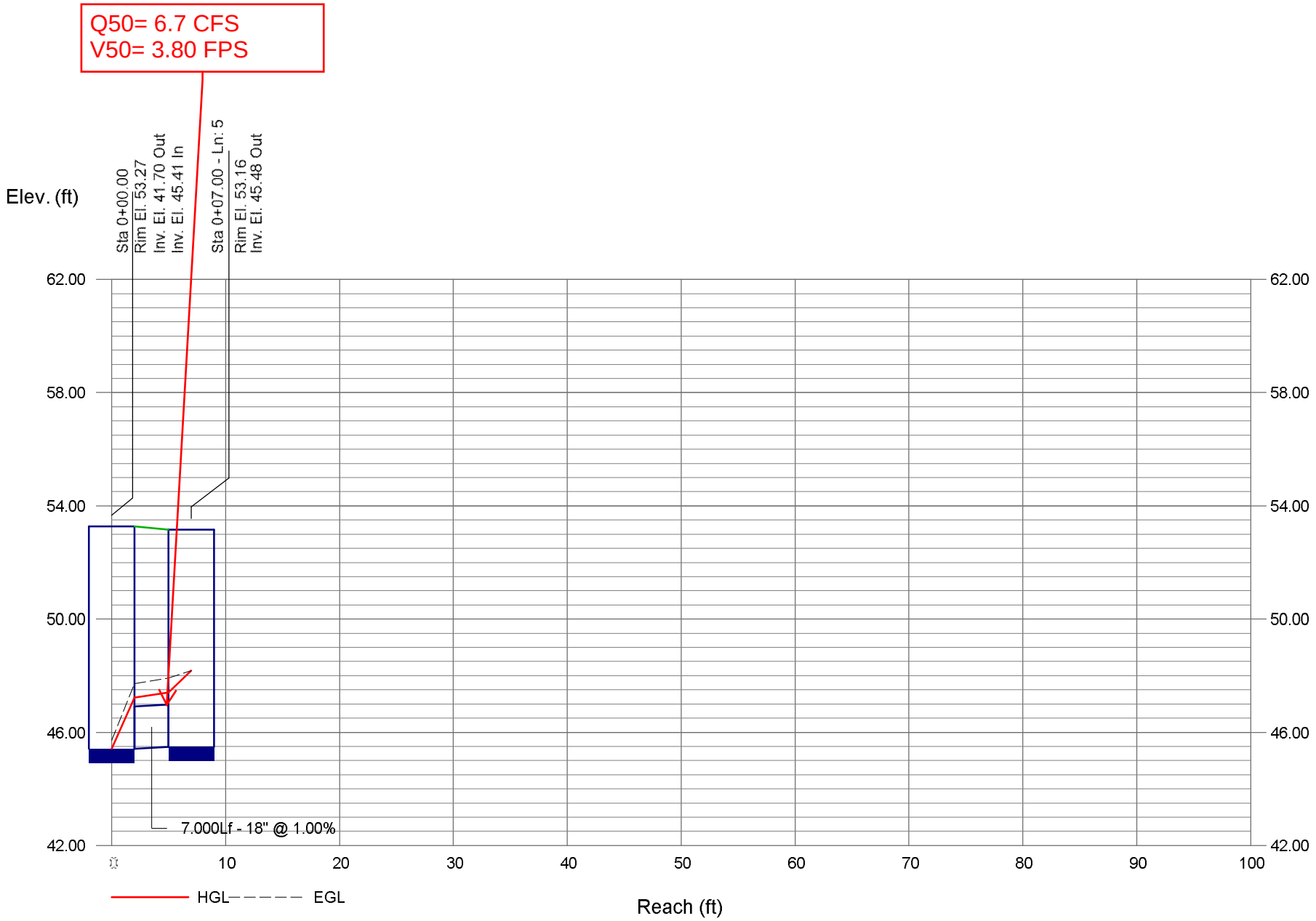
Proj. file: Coast HWY 101 - Phoebe.stm



Storm Sewer Profile

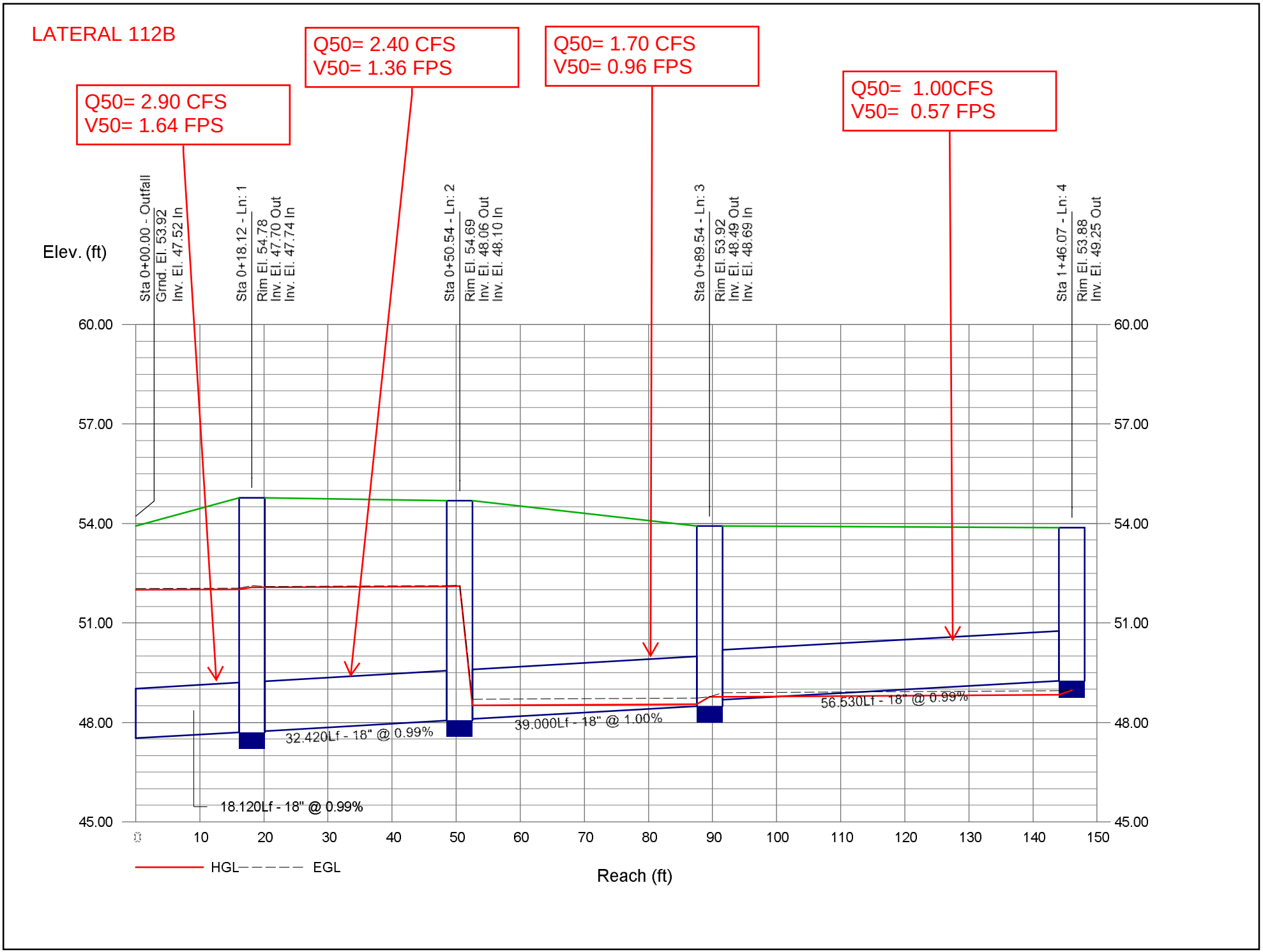
Proj. file: Coast HWY 101 - Phoebe.stm

LATERAL 111A-3



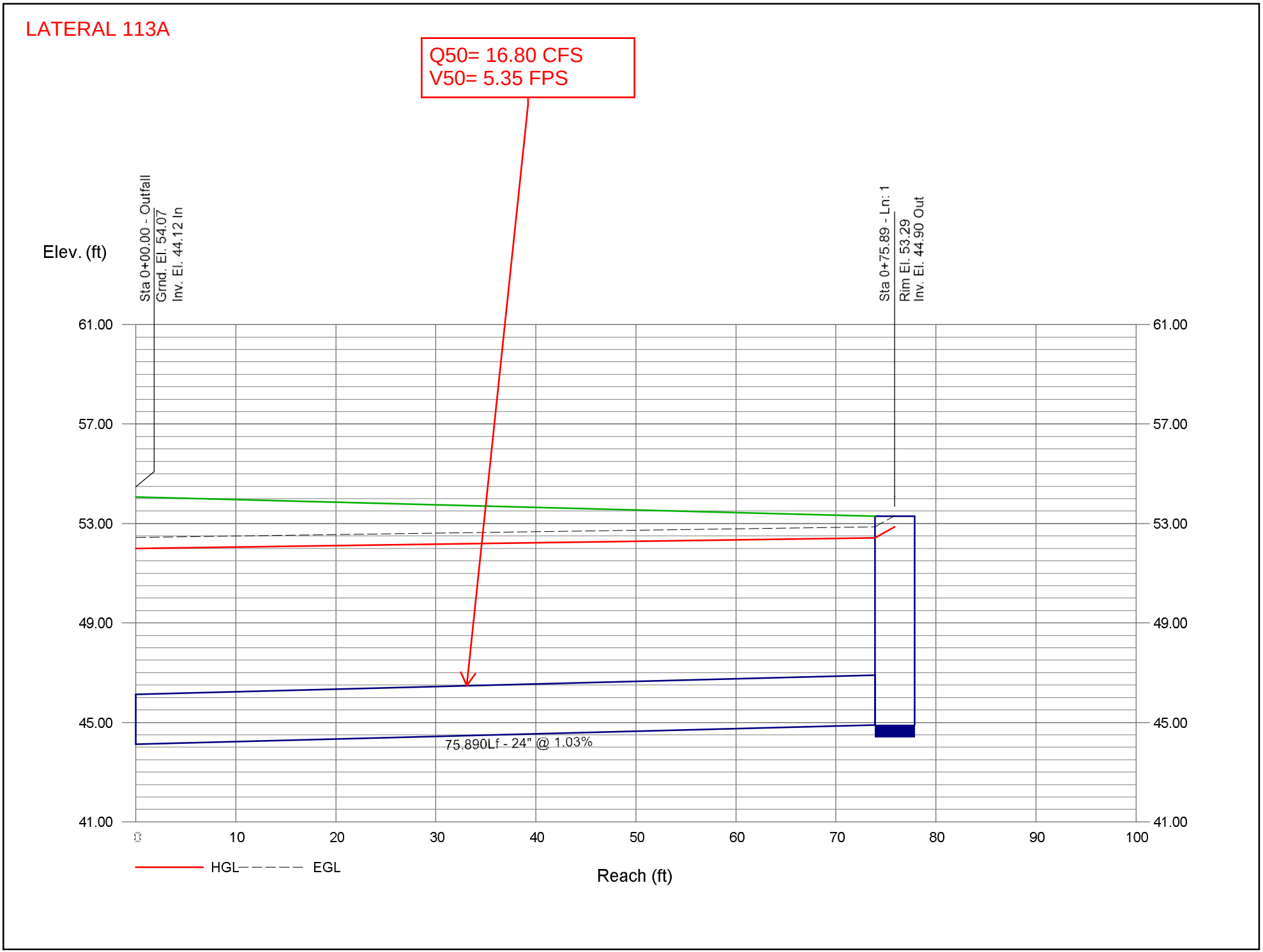
Storm Sewer Profile

Proj. file: lateral 12A_12B.stm



Storm Sewer Profile

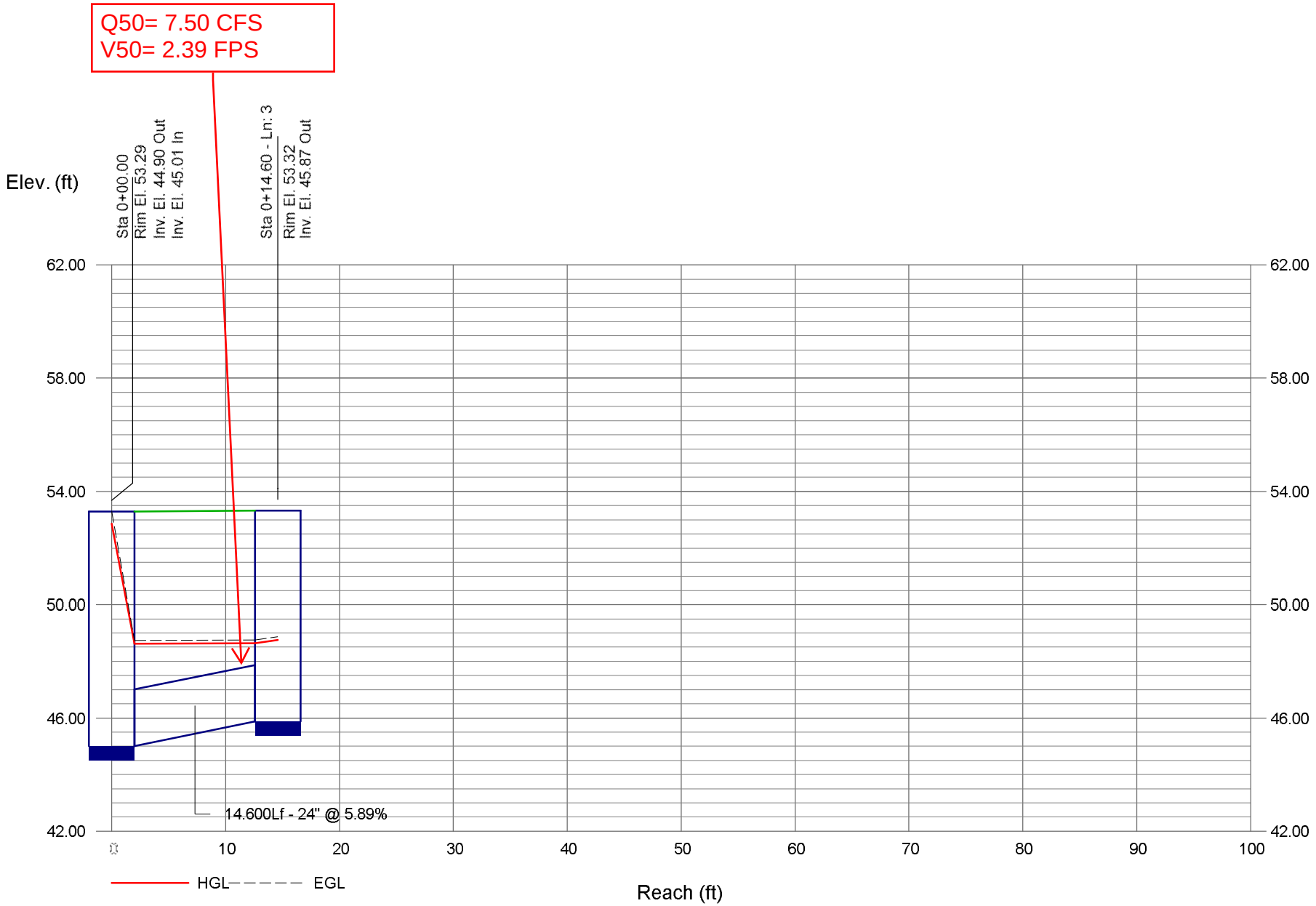
Proj. file: Coast HWY 101 - Jason.stm



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jason.stm

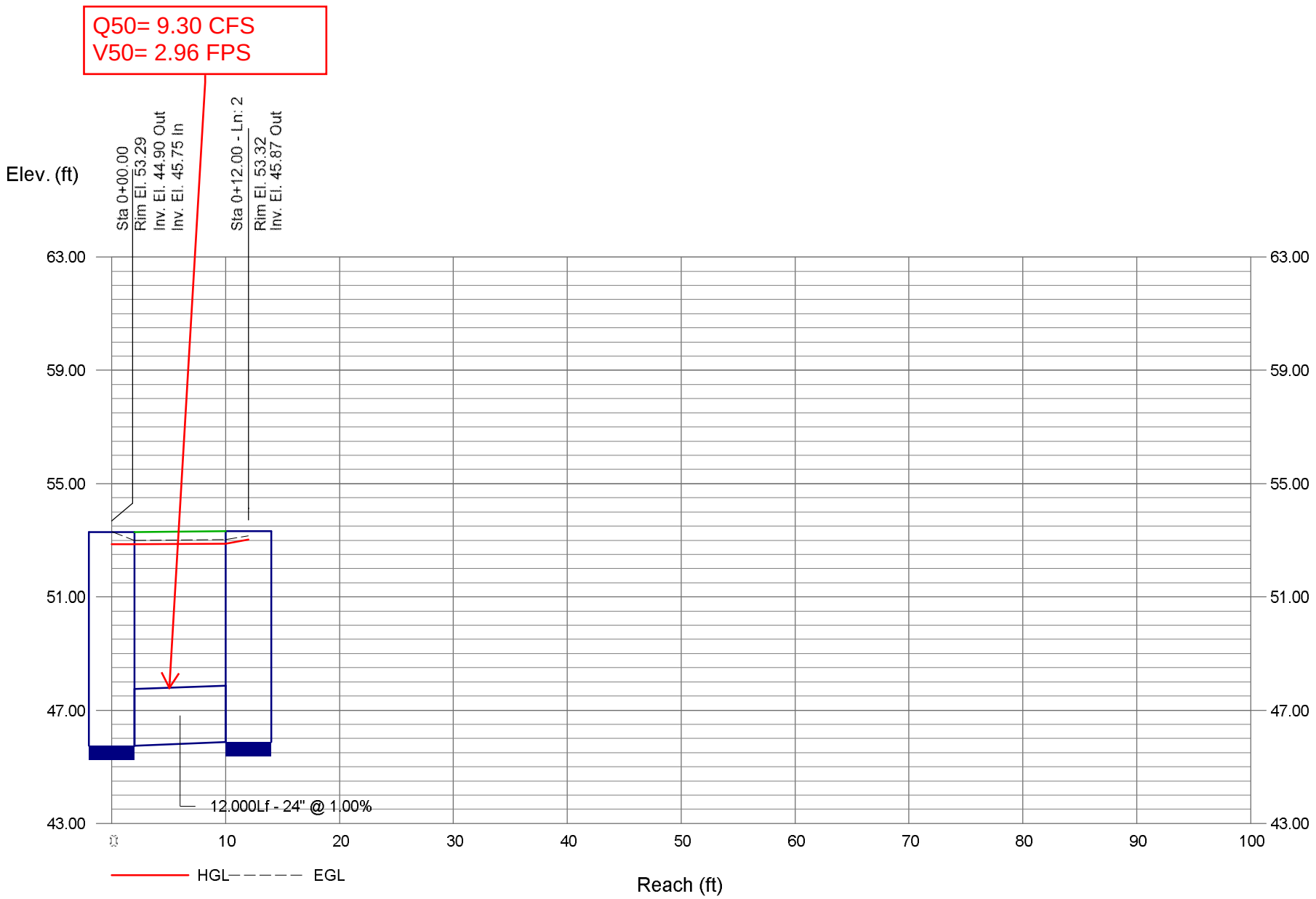
LATERAL 113A-1



Storm Sewer Profile

Proj. file: Coast HWY 101 - Jason.stm

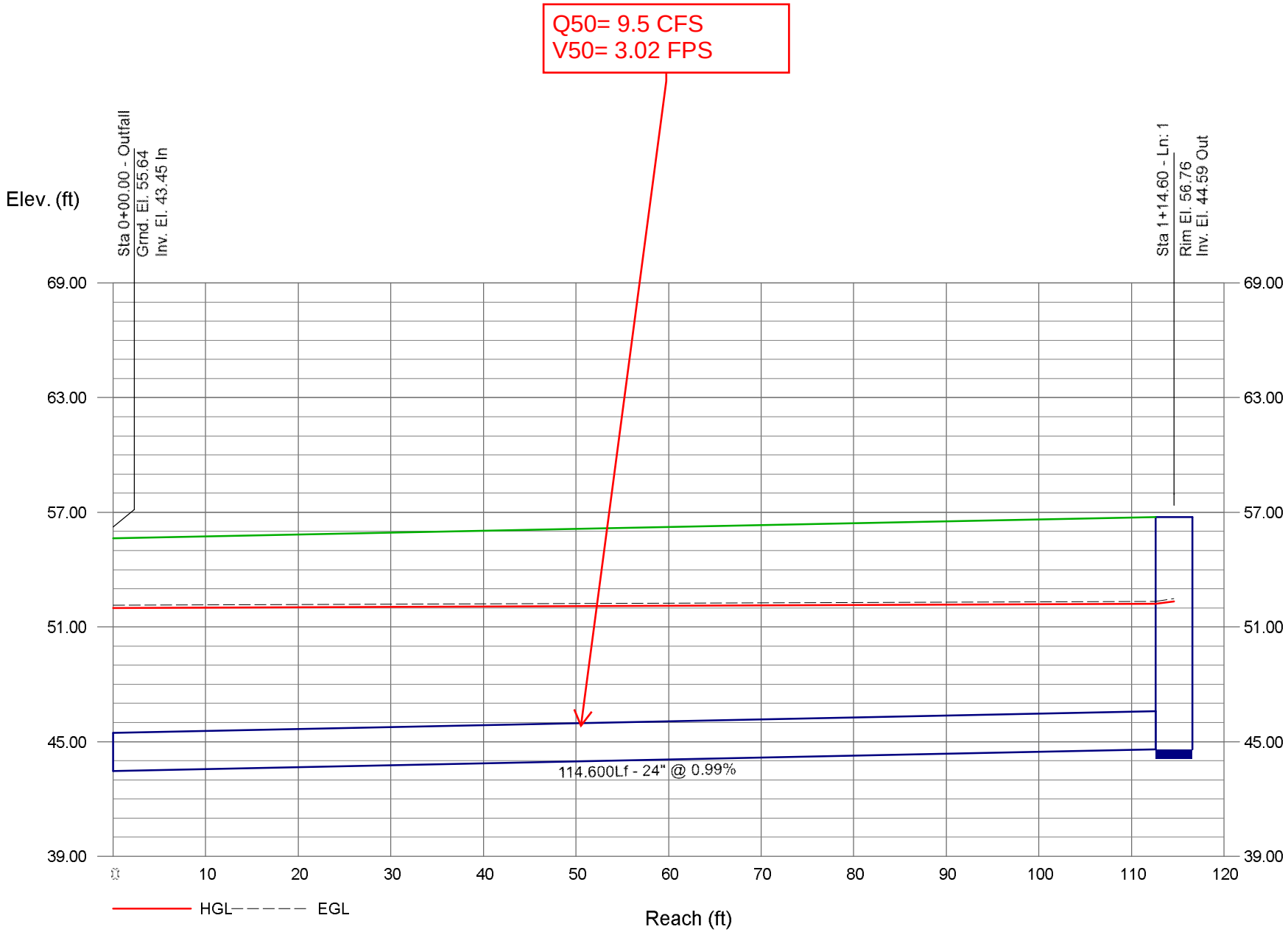
LATERAL 113A-2



Storm Sewer Profile

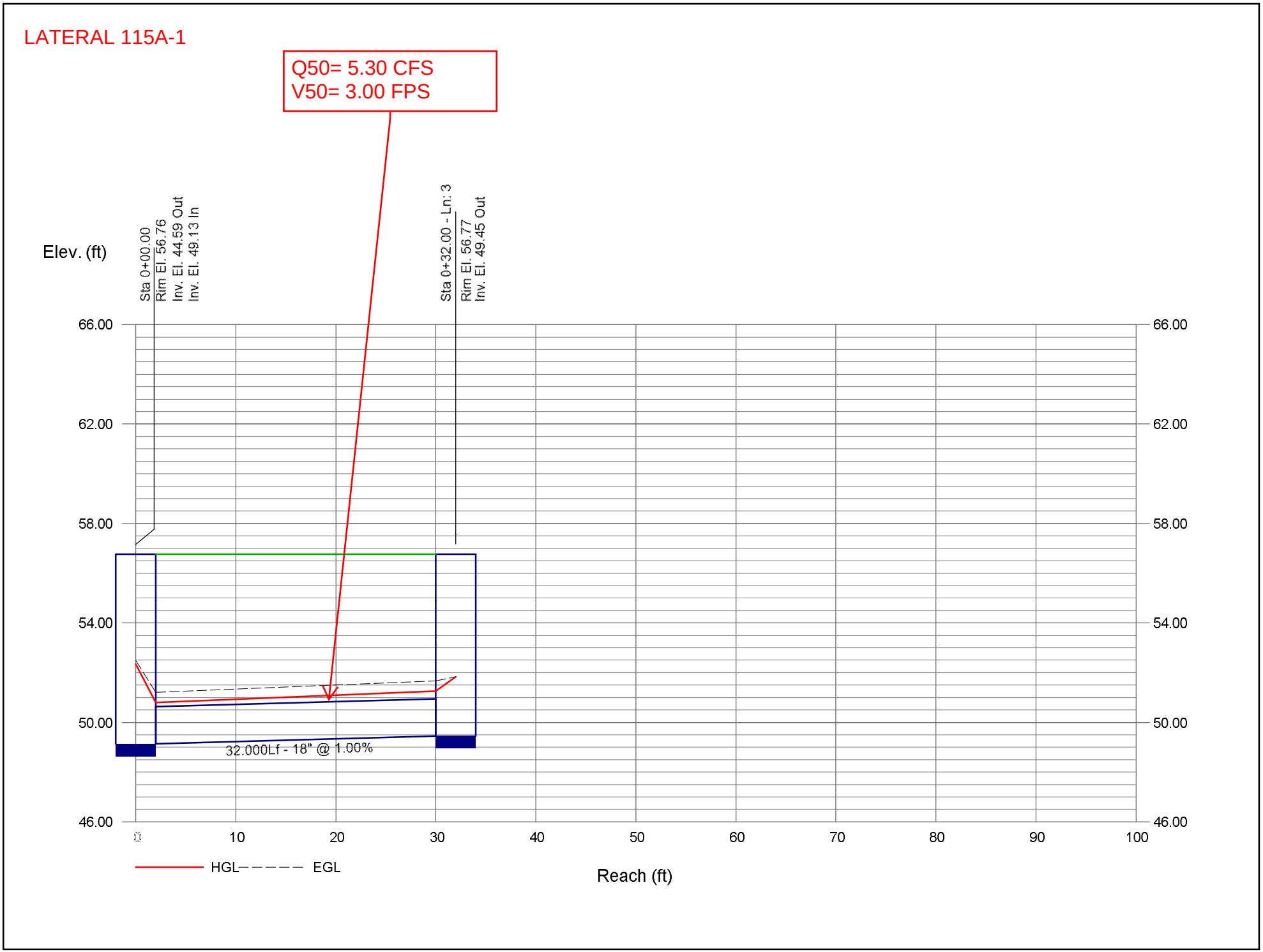
Proj. file: Coast HWY 101 - Jupiter.stm

LATERAL 115A



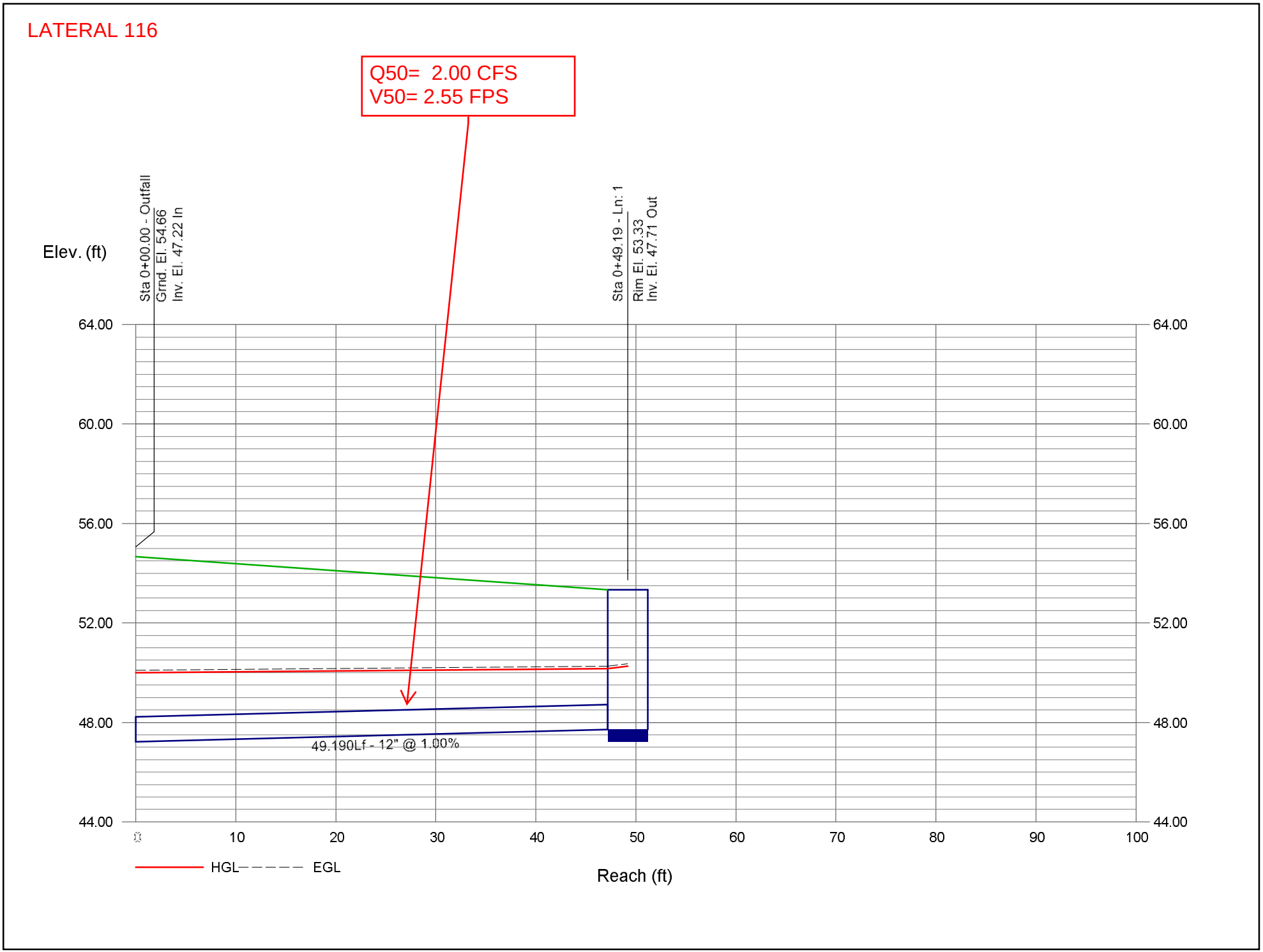
Storm Sewer Profile

Proj. file: Coast HWY 101 - Jupiter.stm



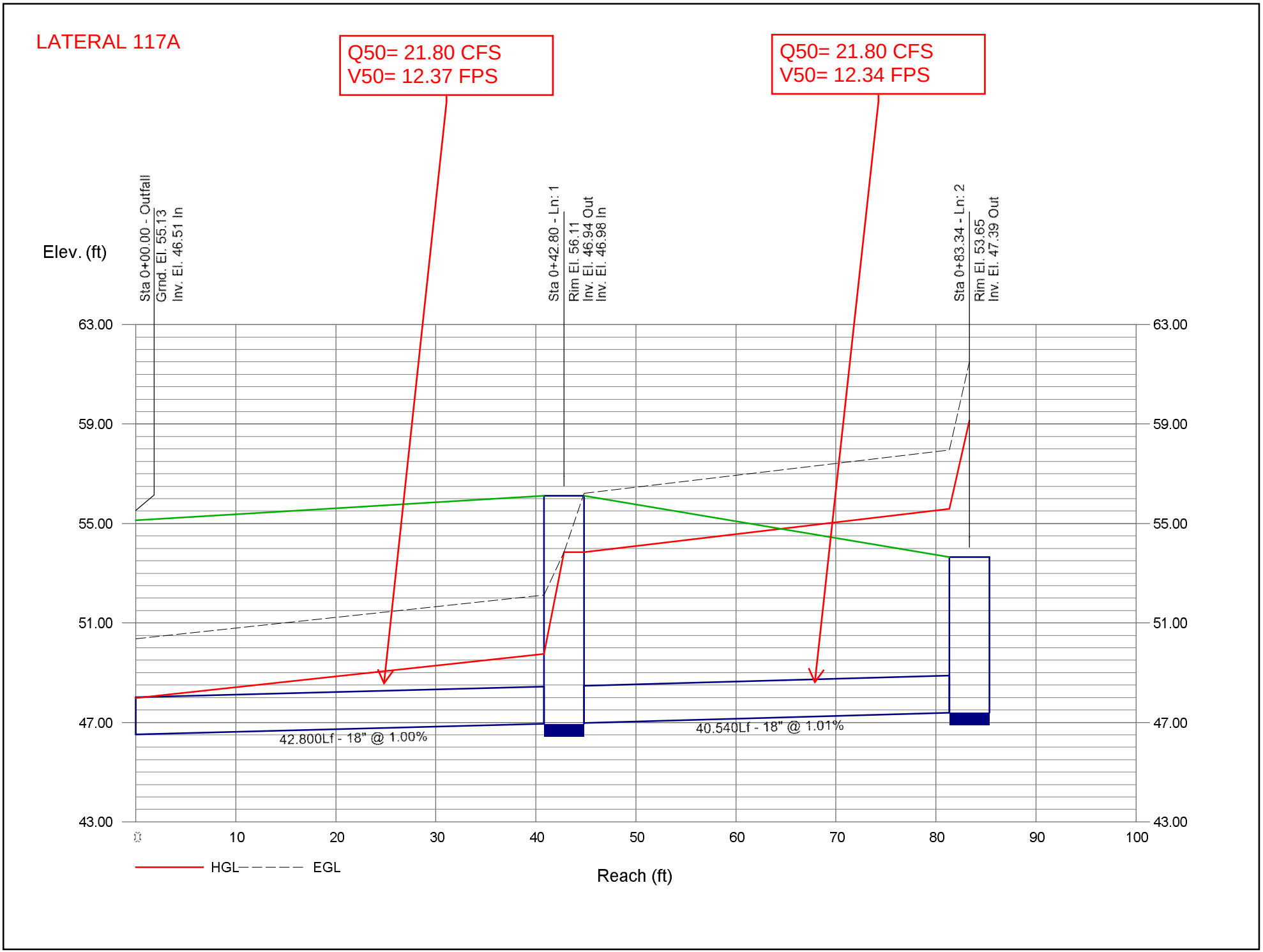
Storm Sewer Profile

Proj. file: lateral 116.stm



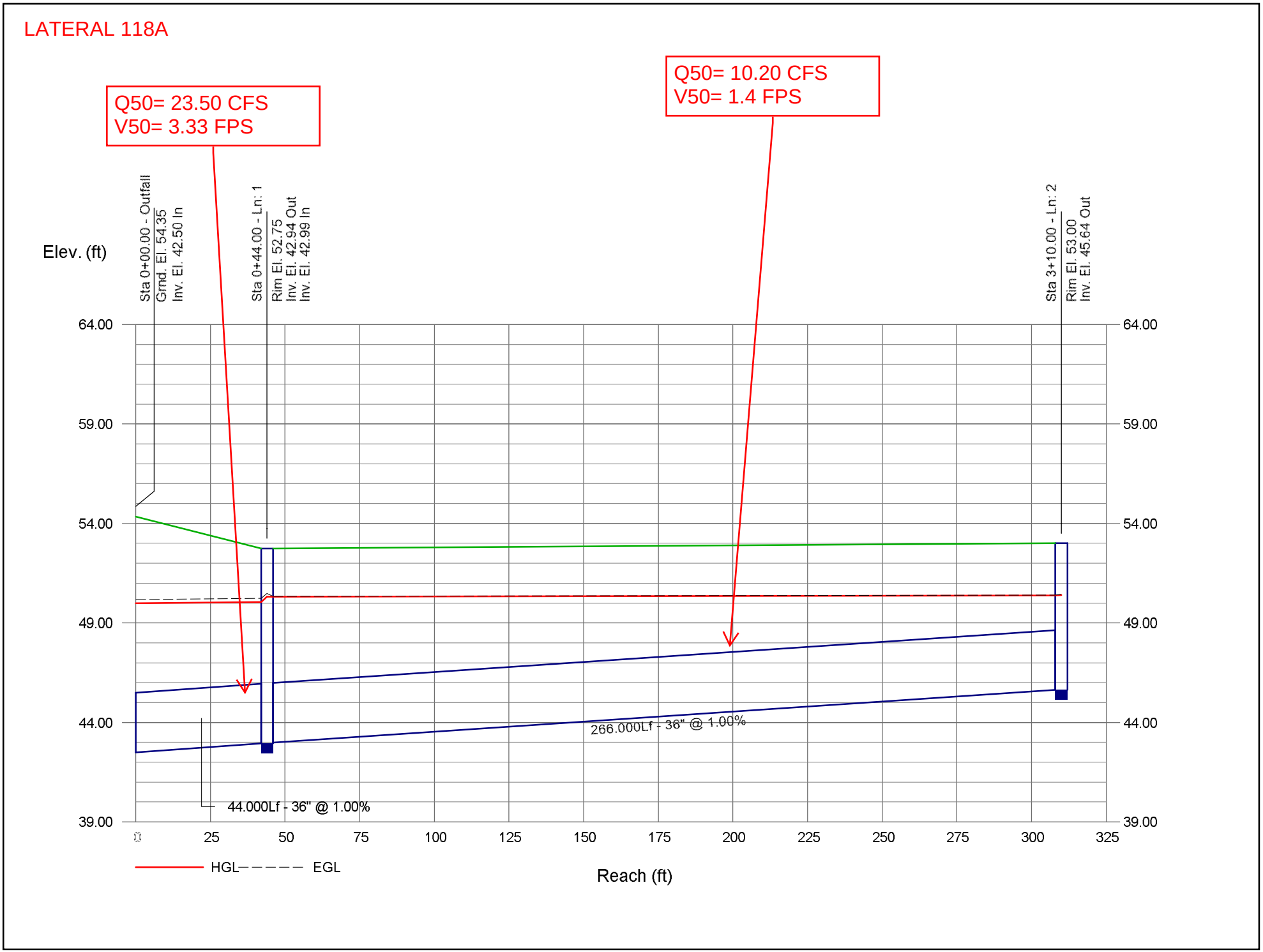
Storm Sewer Profile

Proj. file: lateral 117A.stm



Storm Sewer Profile

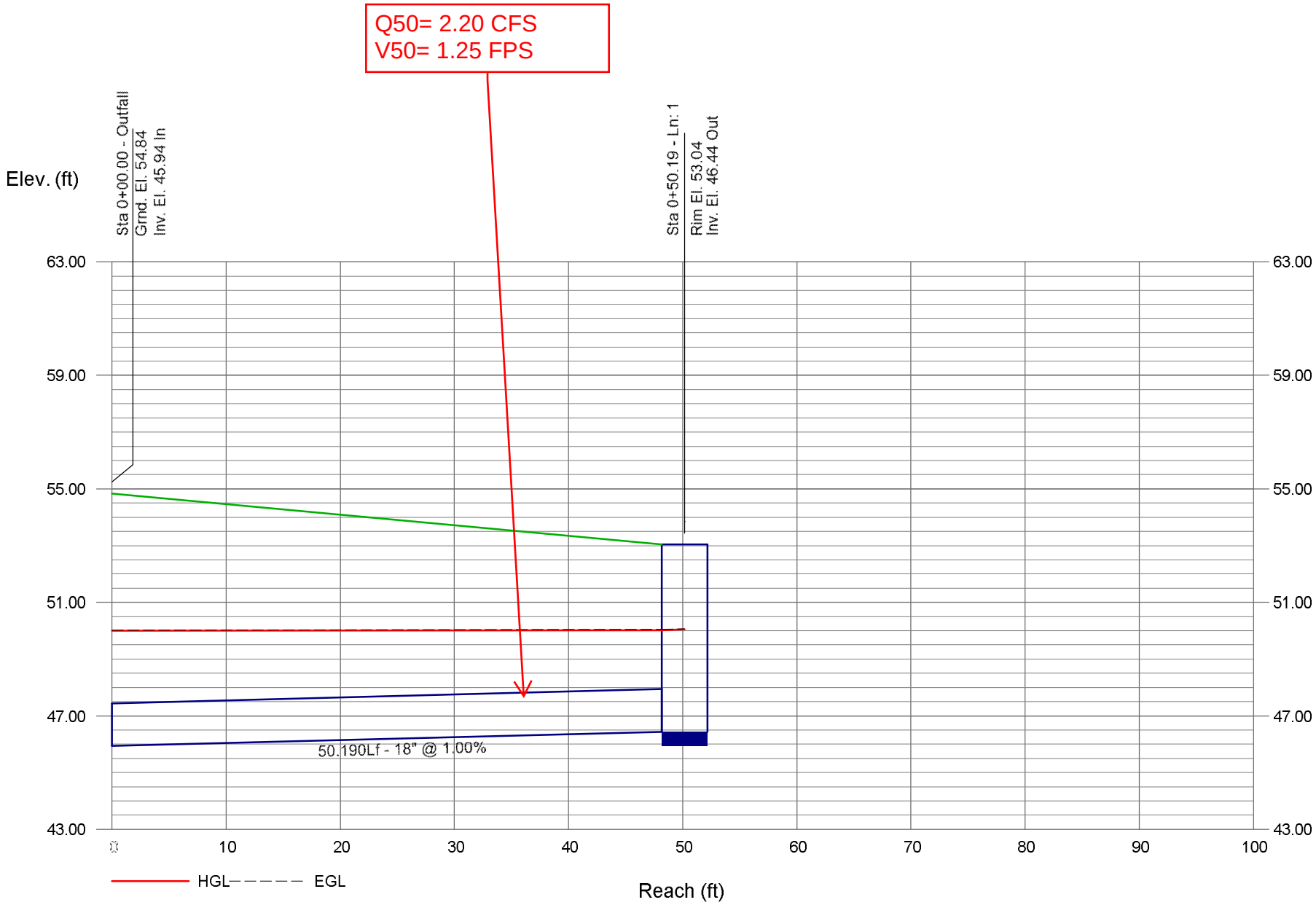
Proj. file: lateral 118A.stm



Storm Sewer Profile

Proj. file: lateral 119.stm

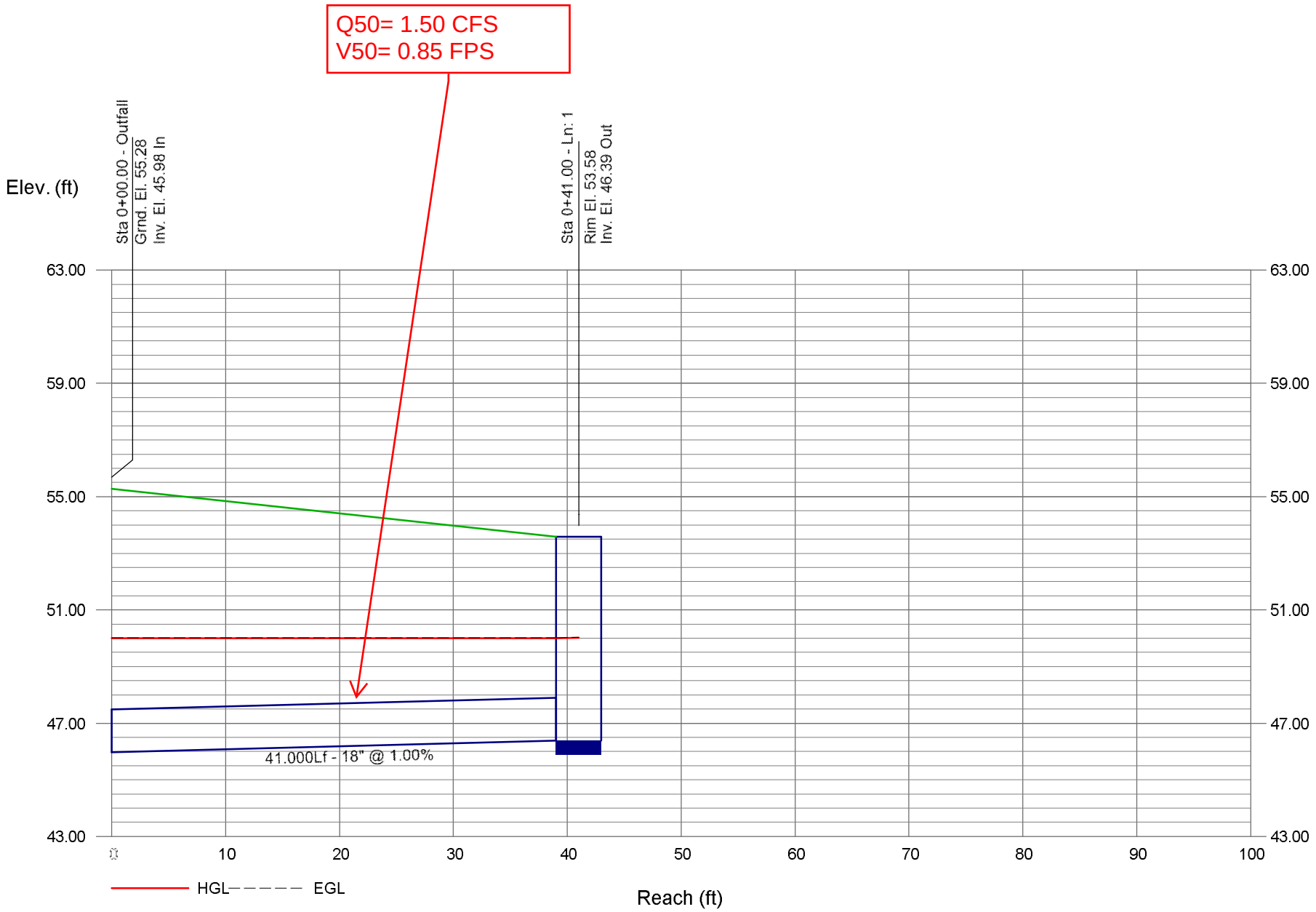
Lateral 119



Storm Sewer Profile

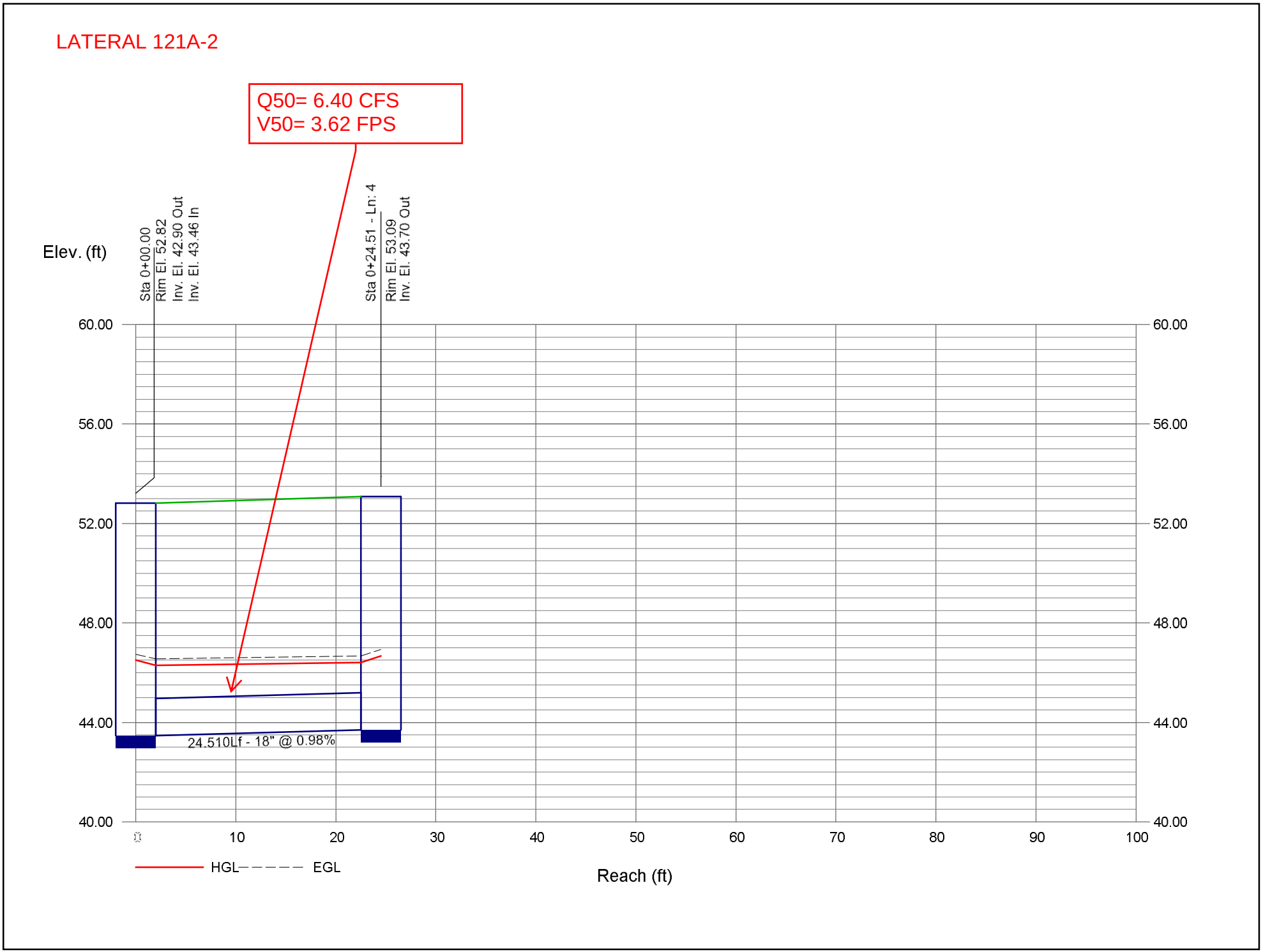
Proj. file: lateral 120.stm

Lateral 120



Storm Sewer Profile

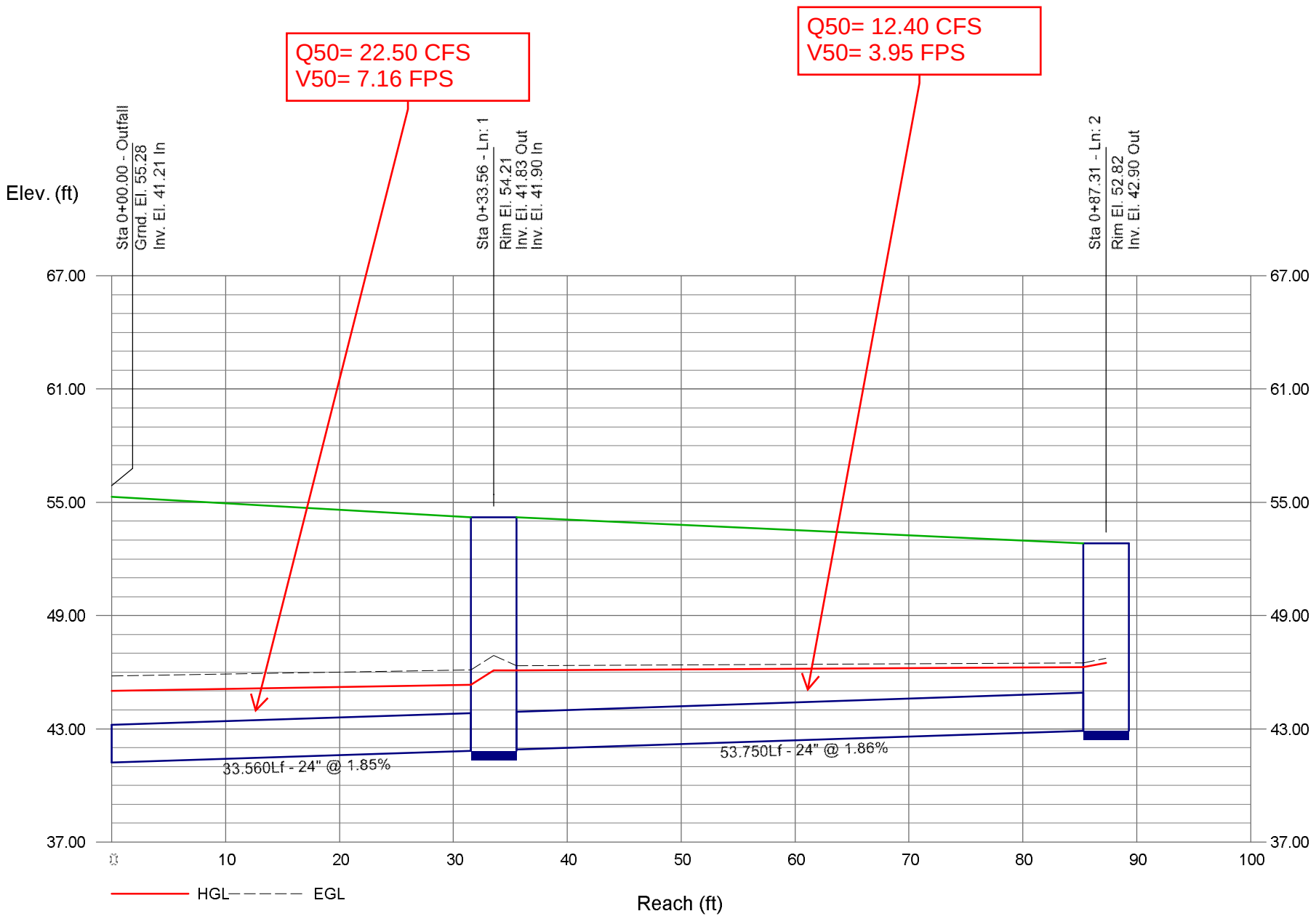
Proj. file: Coast HWY 101 - Grand View.stm



Storm Sewer Profile

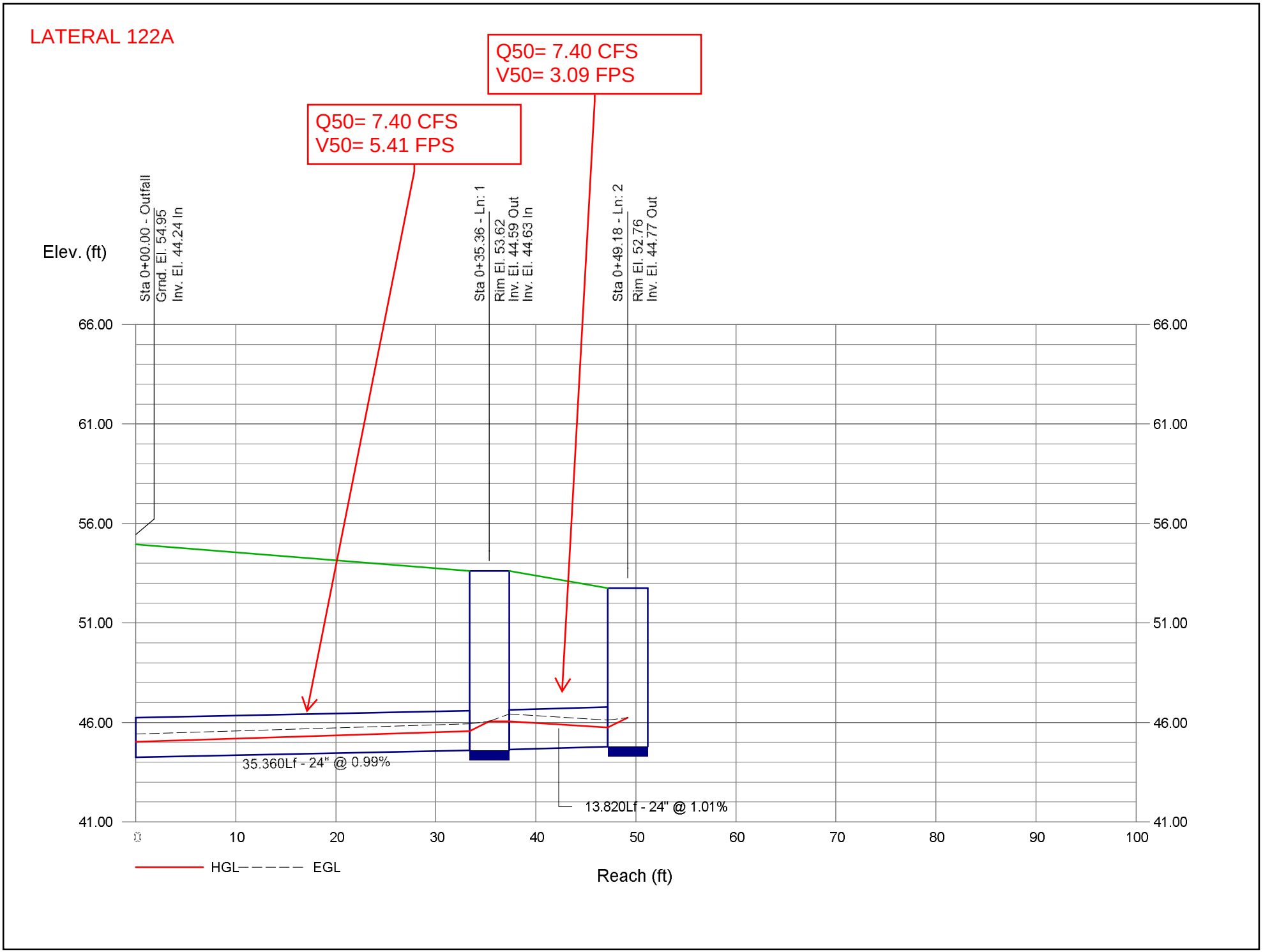
Proj. file: Coast HWY 101 - Grand View.stm

LATERAL 121A



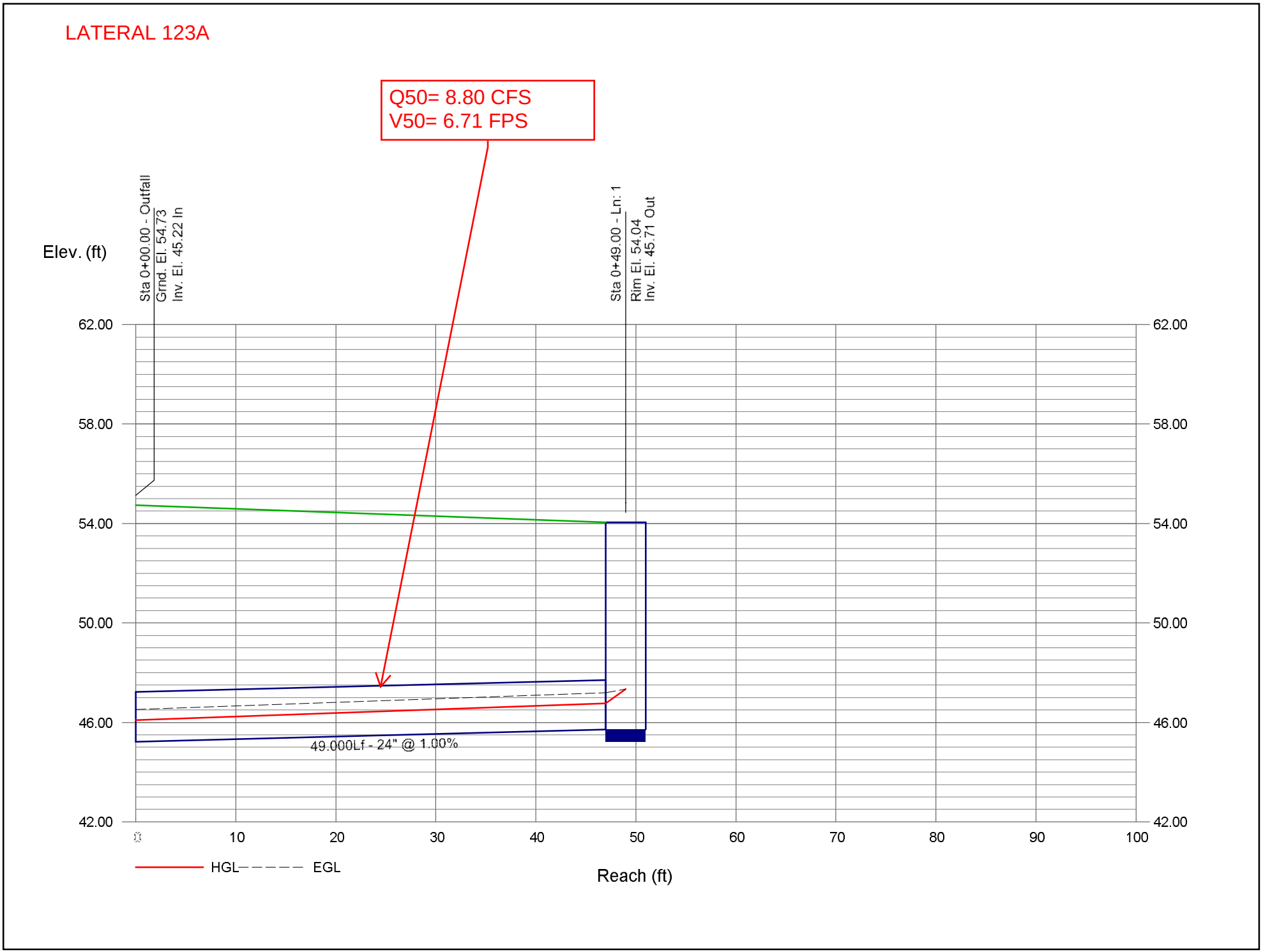
Storm Sewer Profile

Proj. file: lateral 122A.stm



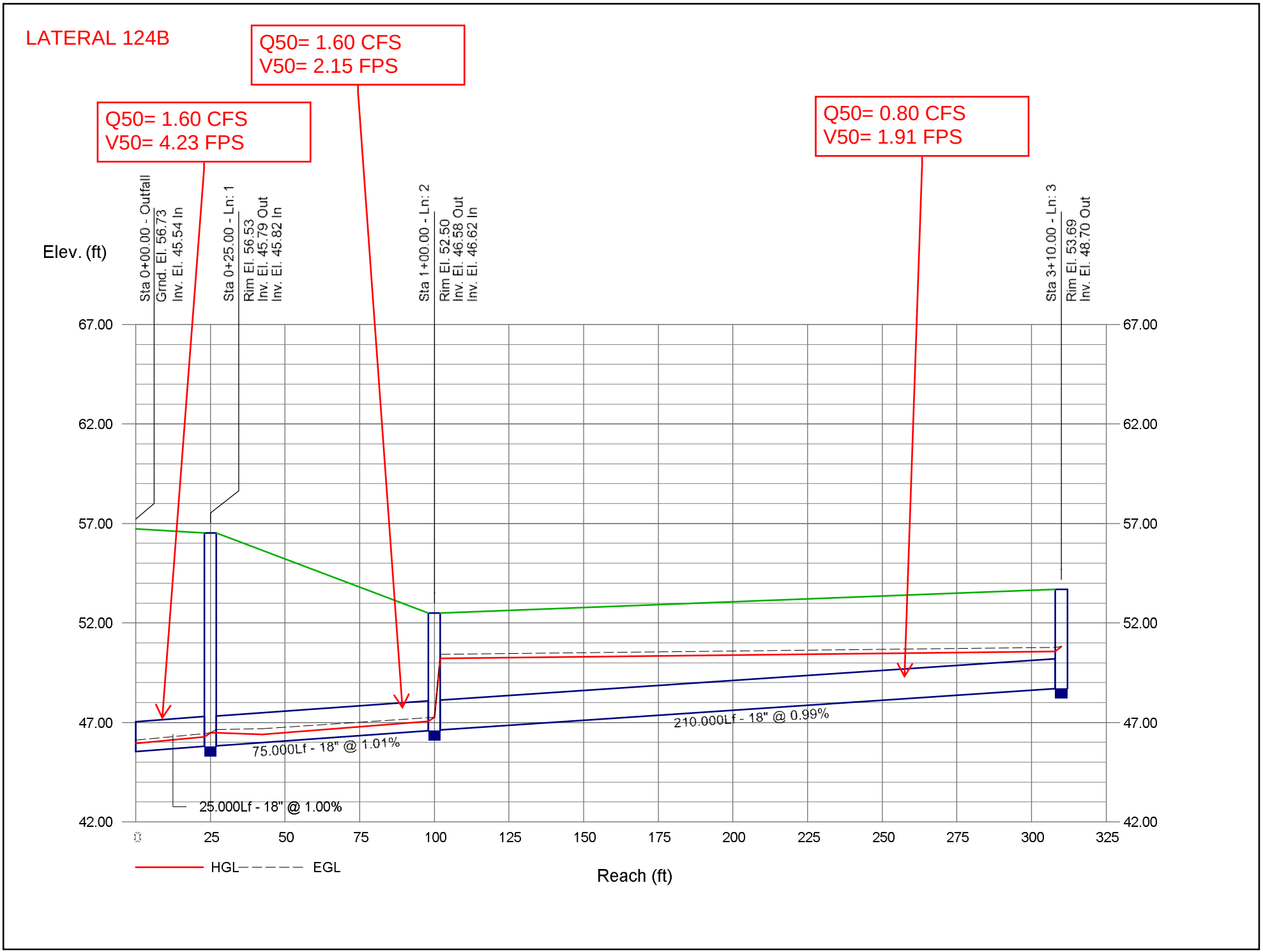
Storm Sewer Profile

Proj. file: lateral 123A.stm



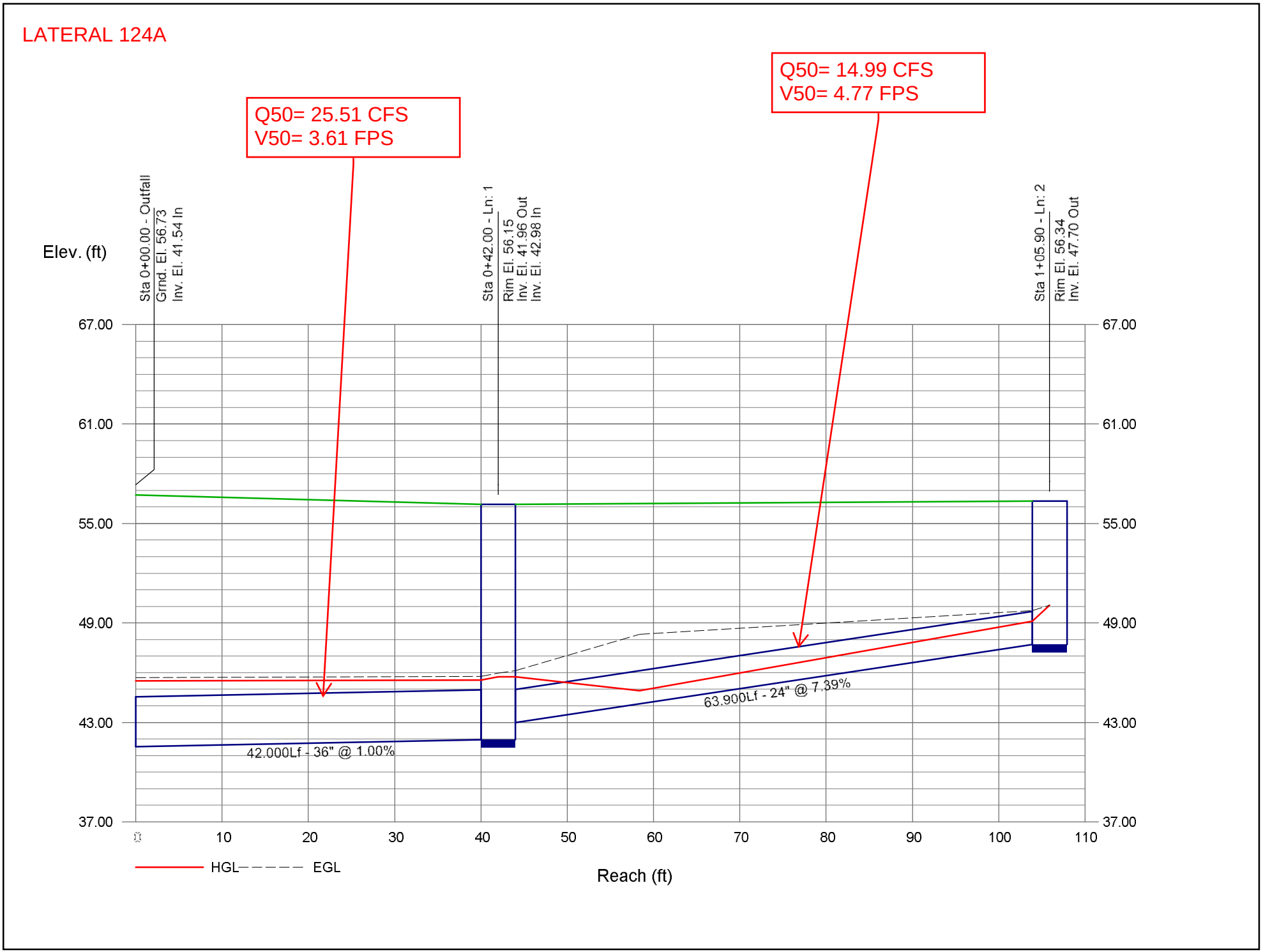
Storm Sewer Profile

Proj. file: Lateral 124B.stm



Storm Sewer Profile

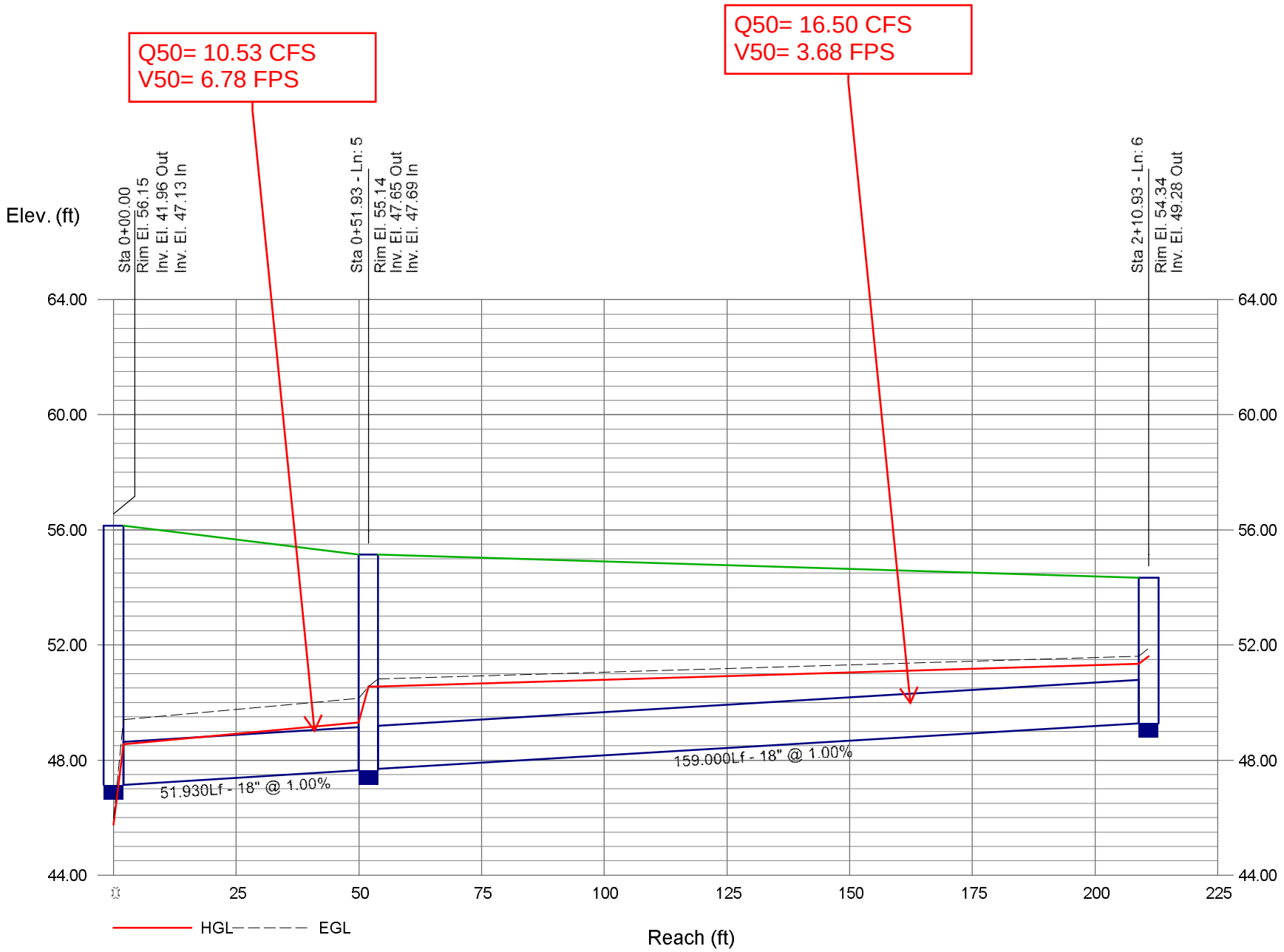
Proj. file: Coast HWY 101 - Bishops Gate.stm



Storm Sewer Profile

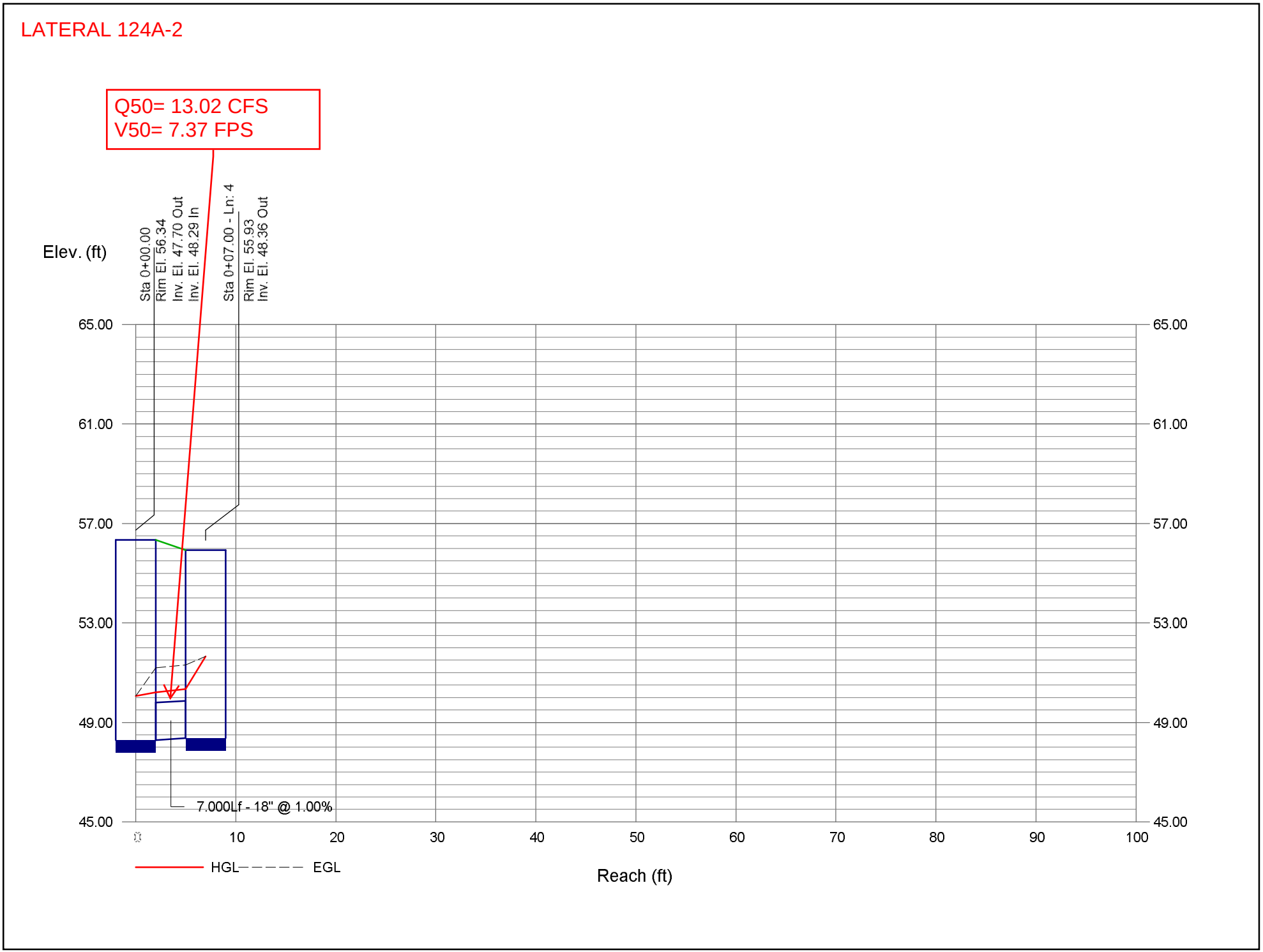
Proj. file: Coast HWY 101 - Bishops Gate.stm

LATERAL 124A-1



Storm Sewer Profile

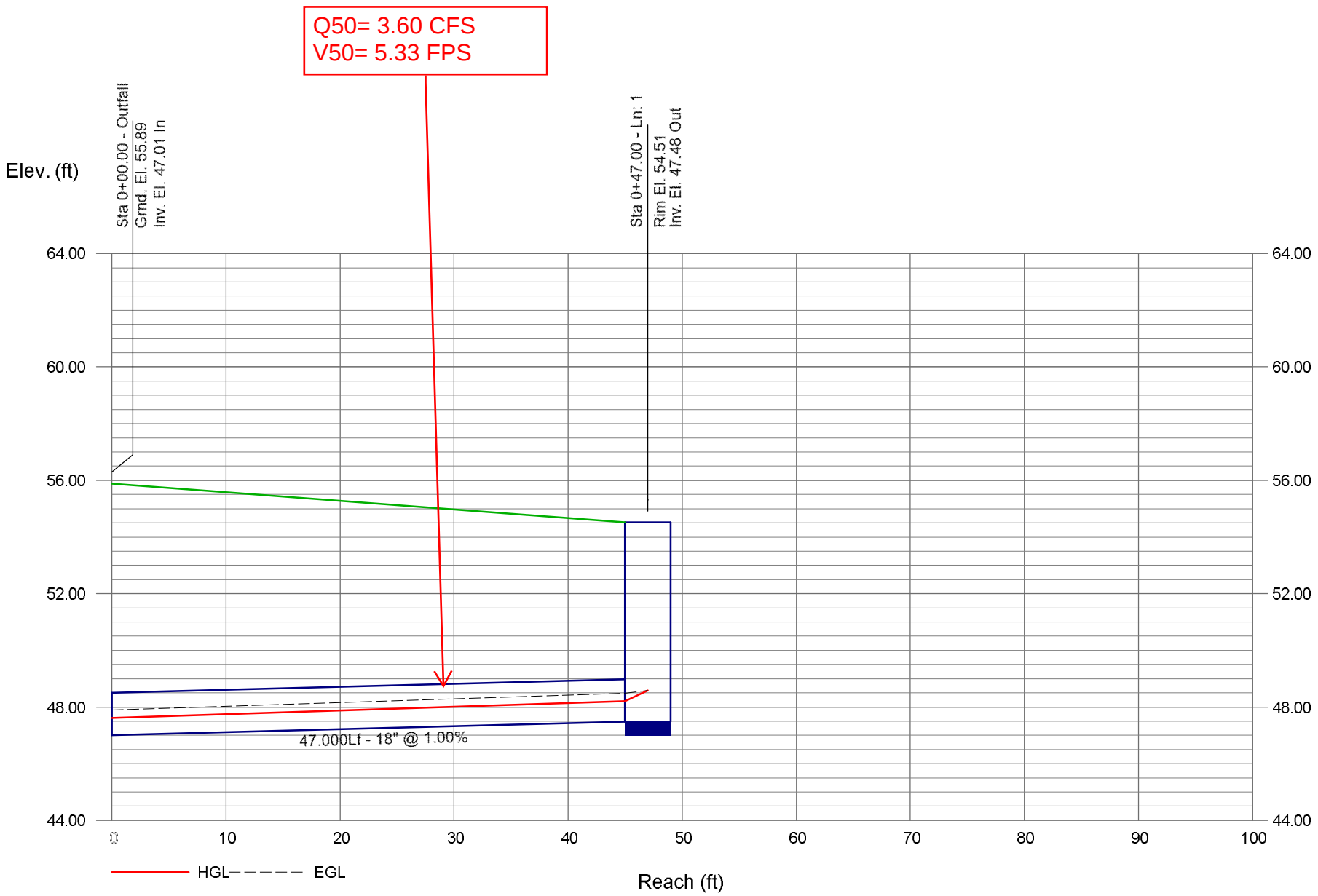
LATERAL 124A-2



Storm Sewer Profile

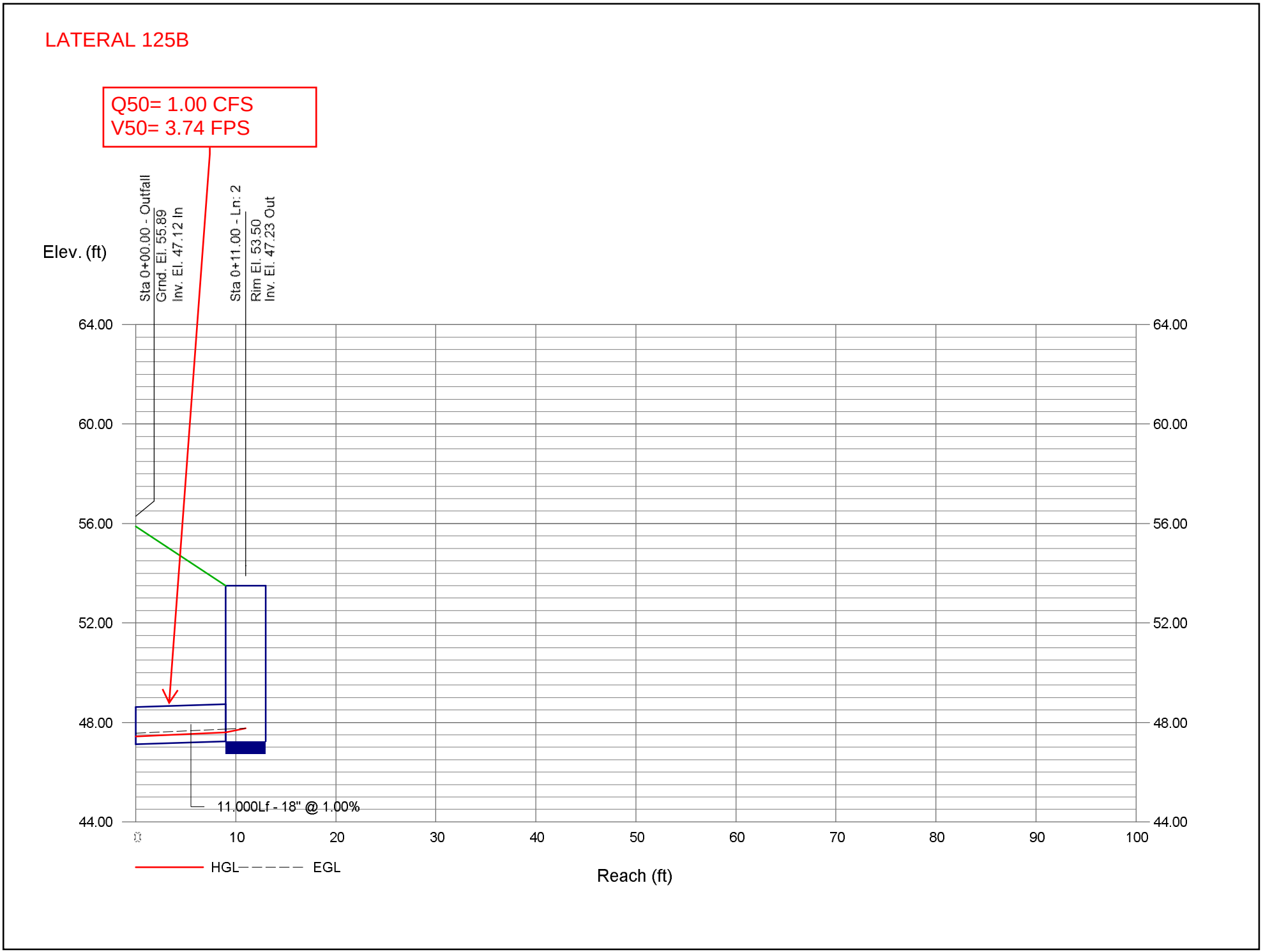
Proj. file: Lateral 125A & 125B.stm

LATERAL 125A



Storm Sewer Profile

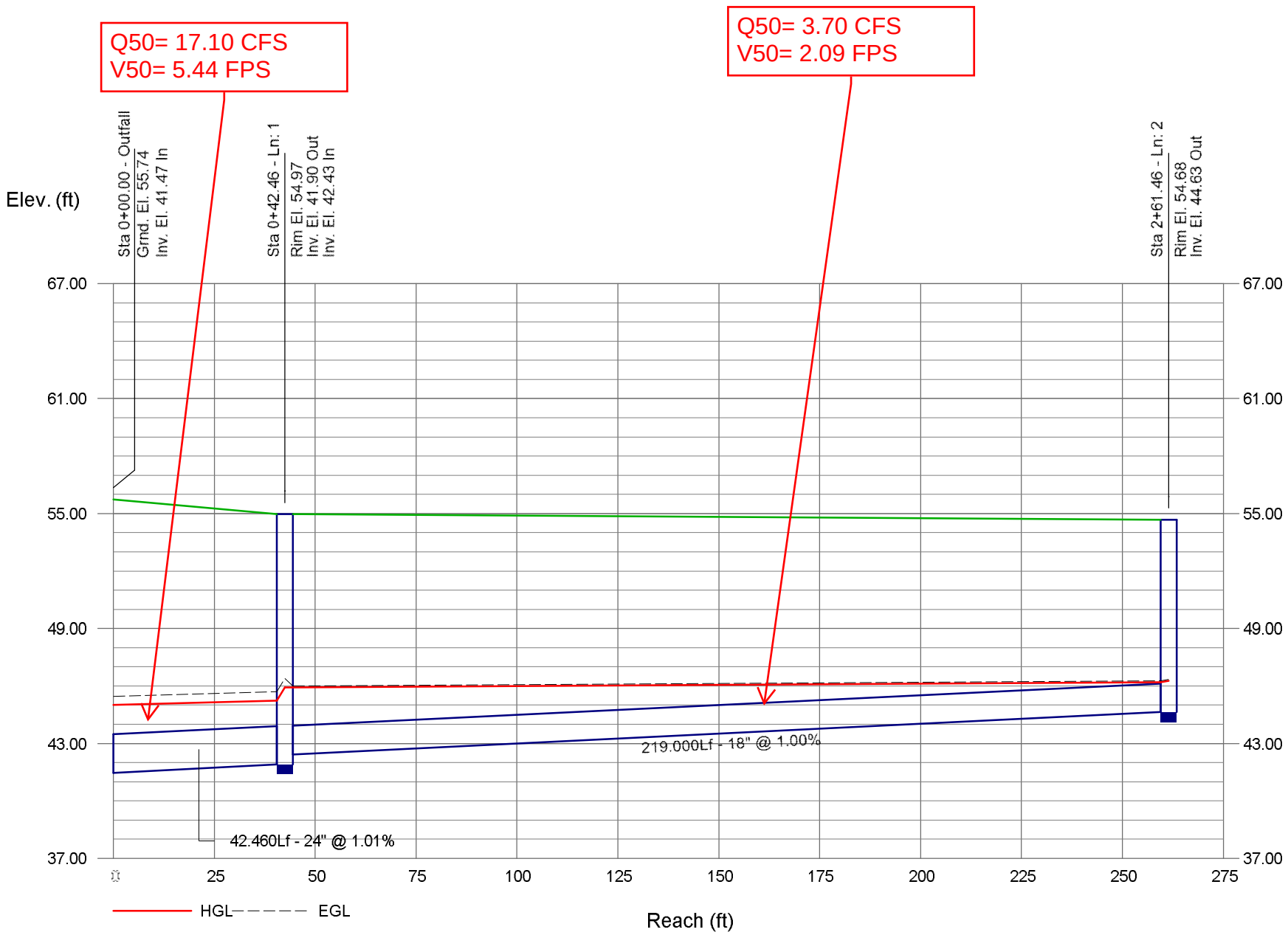
Proj. file: Lateral 125A & 125B.stm



Storm Sewer Profile

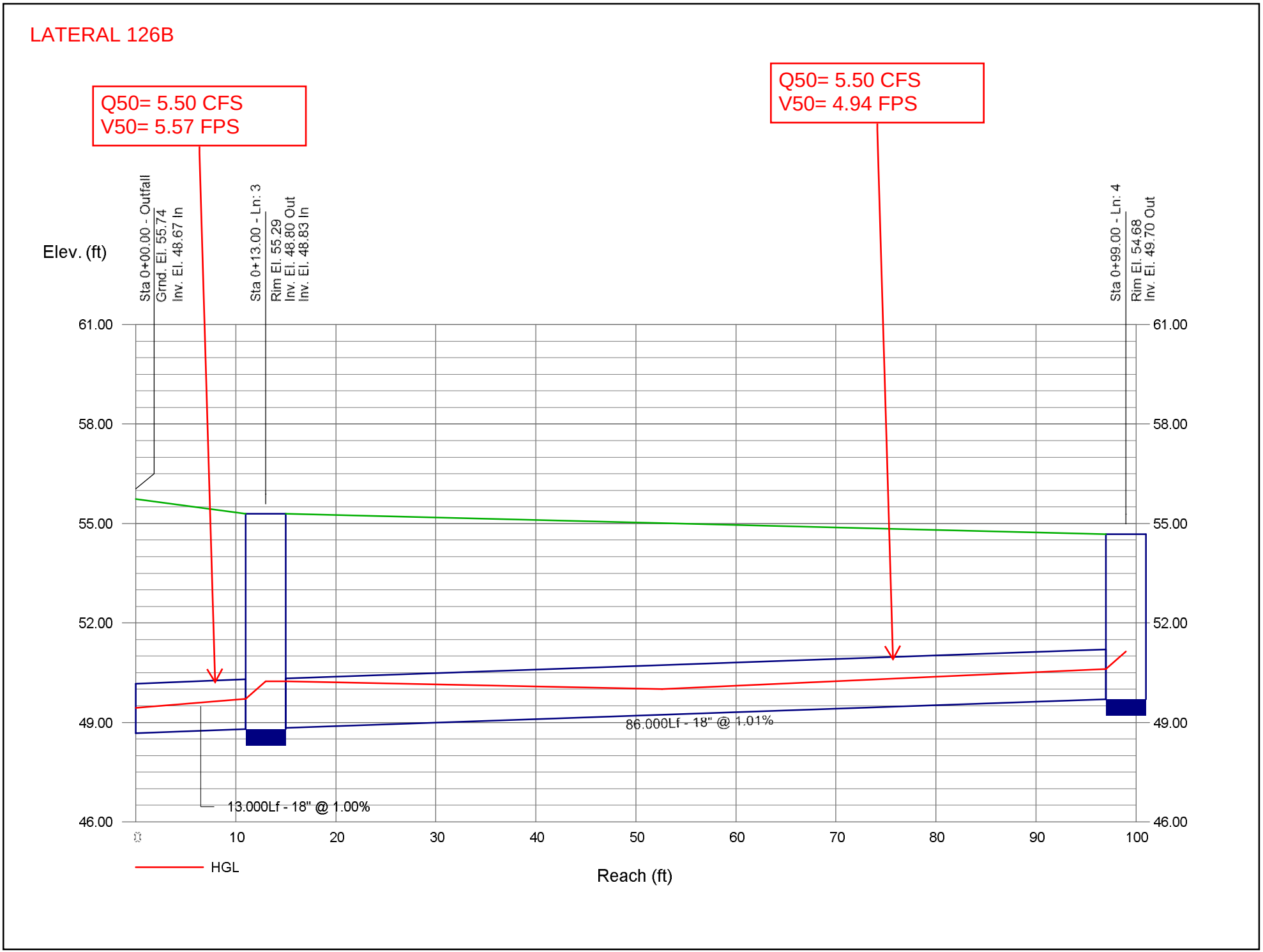
Proj. file: Laterals 126A & 126B.stm

LATERAL 126A



Storm Sewer Profile

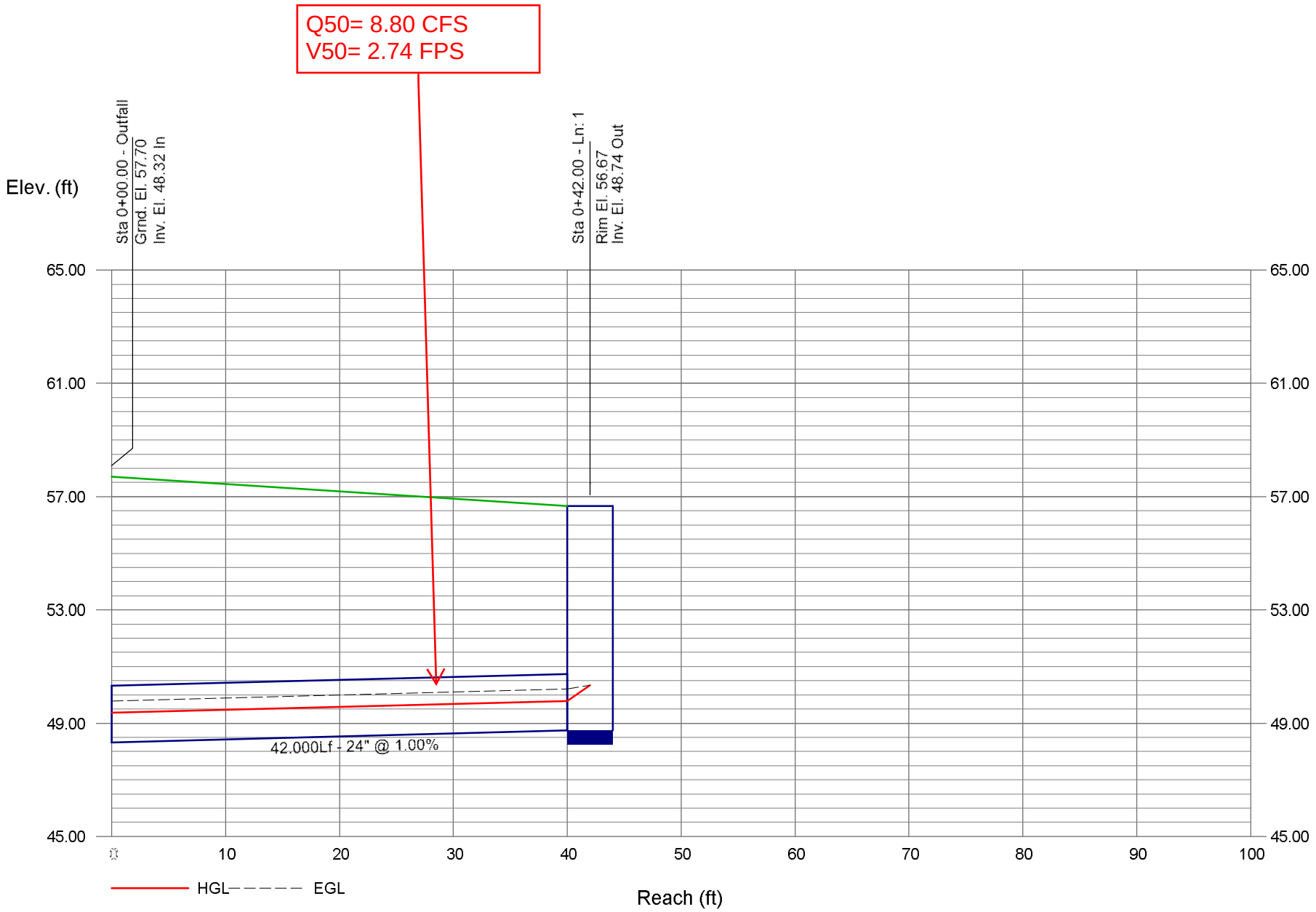
Proj. file: Laterals 126A & 126B.stm



Storm Sewer Profile

Proj. file: lateral 127.stm

LATERAL 127



Michael Baker
INTERNATIONAL

Appendix H – 50 Year Lateral Storm Drain Moonlight Beach SD System

Included within this appendix:

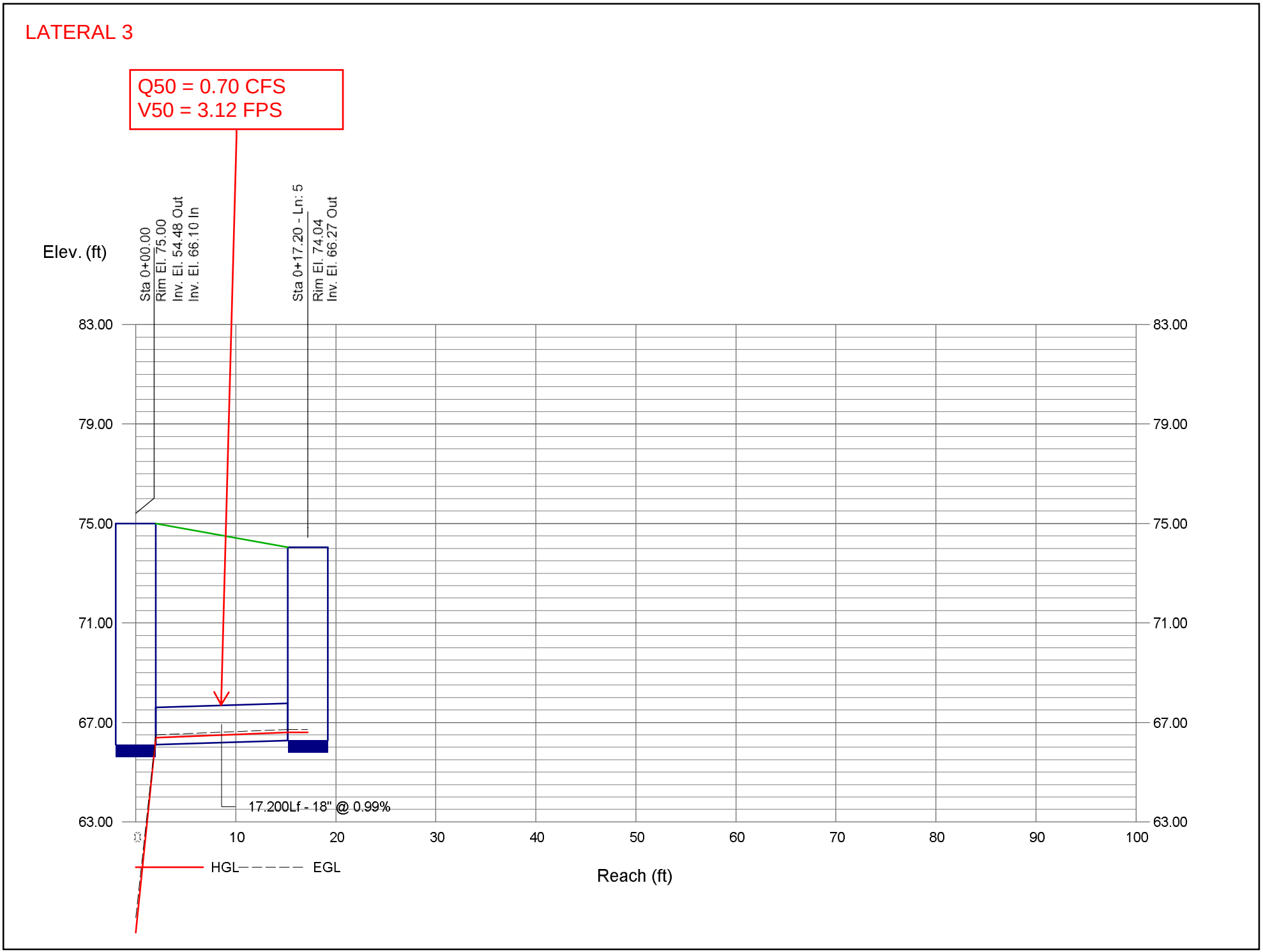
50 Year Lateral Pipe Results Summary

Michael Baker
INTERNATIONAL

50 Year Lateral Pipe Results

Storm Sewer Profile

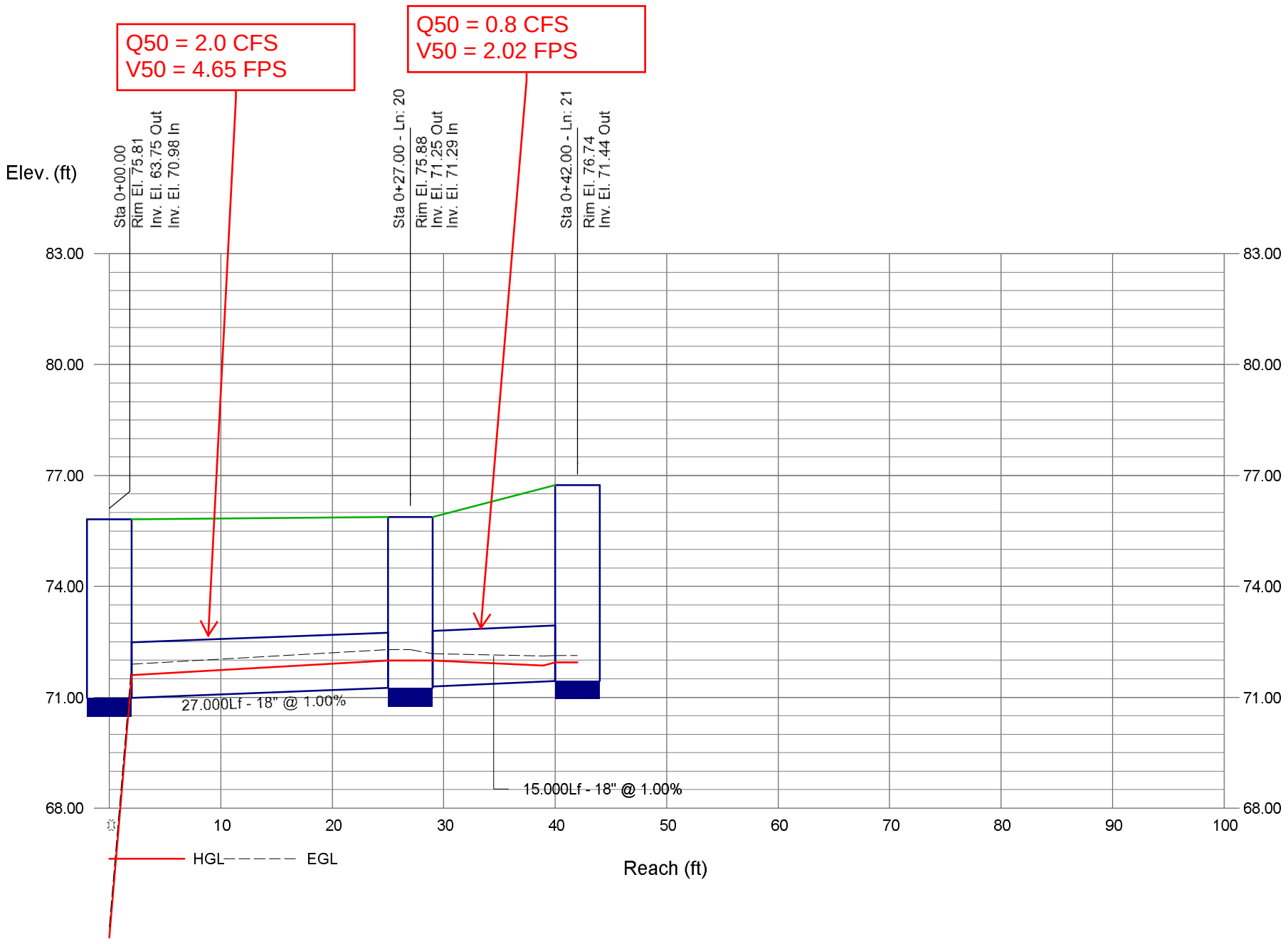
Proj. file: backbone_south.stm



Storm Sewer Profile

Proj. file: backbone_south.stm

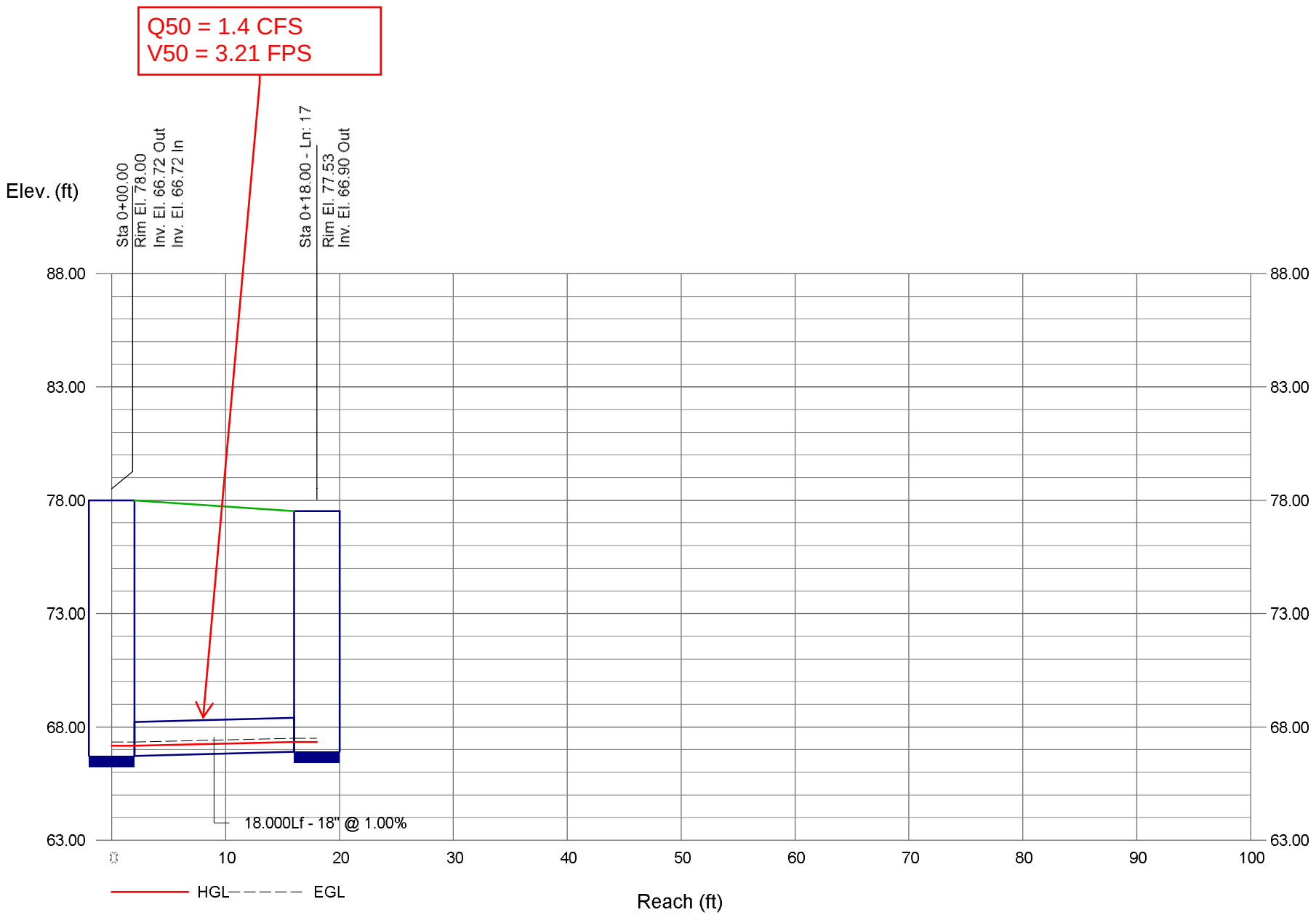
LATERAL 4



Storm Sewer Profile

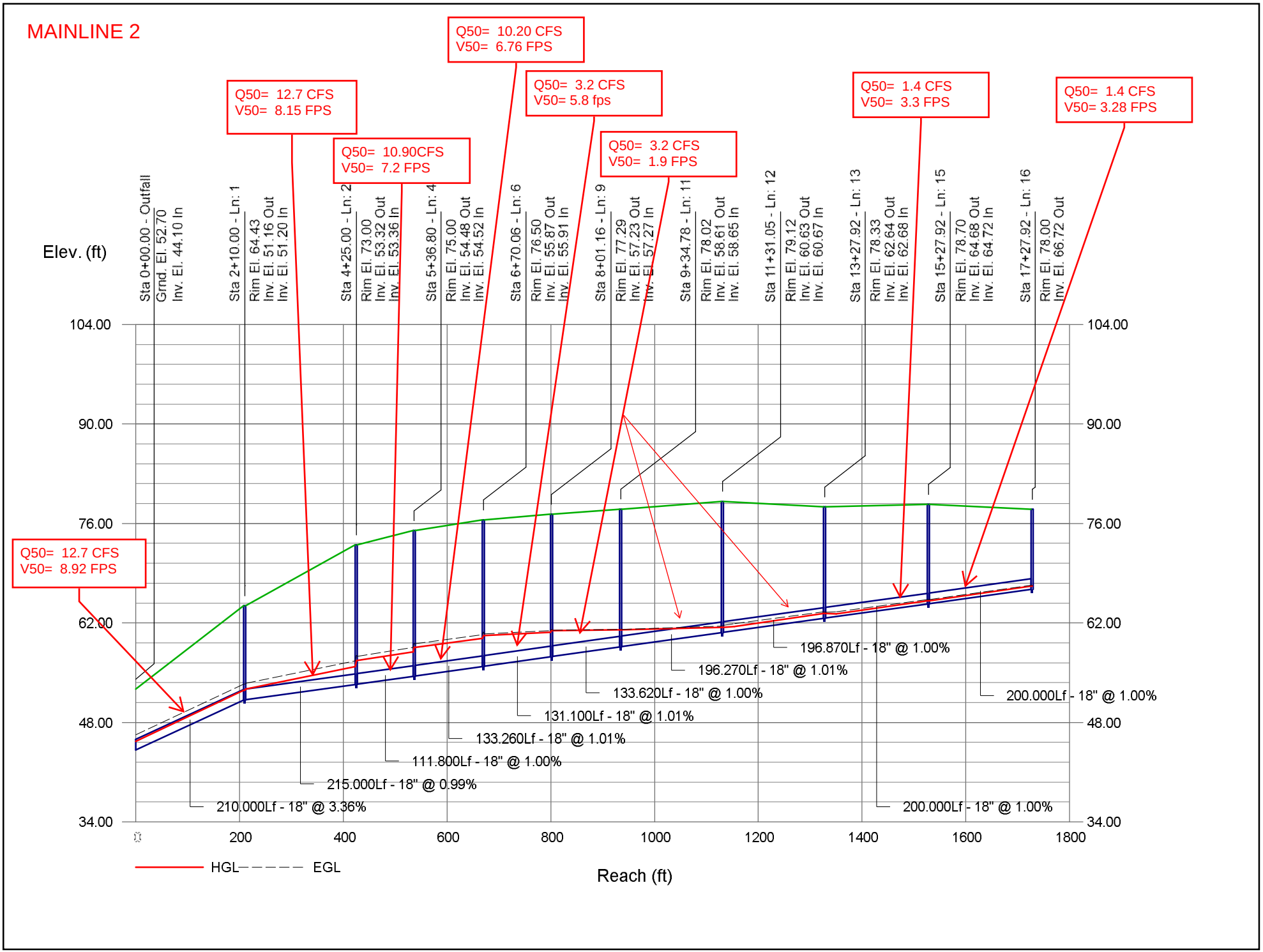
Proj. file: backbone_south.stm

LATERAL 8



Storm Sewer Profile

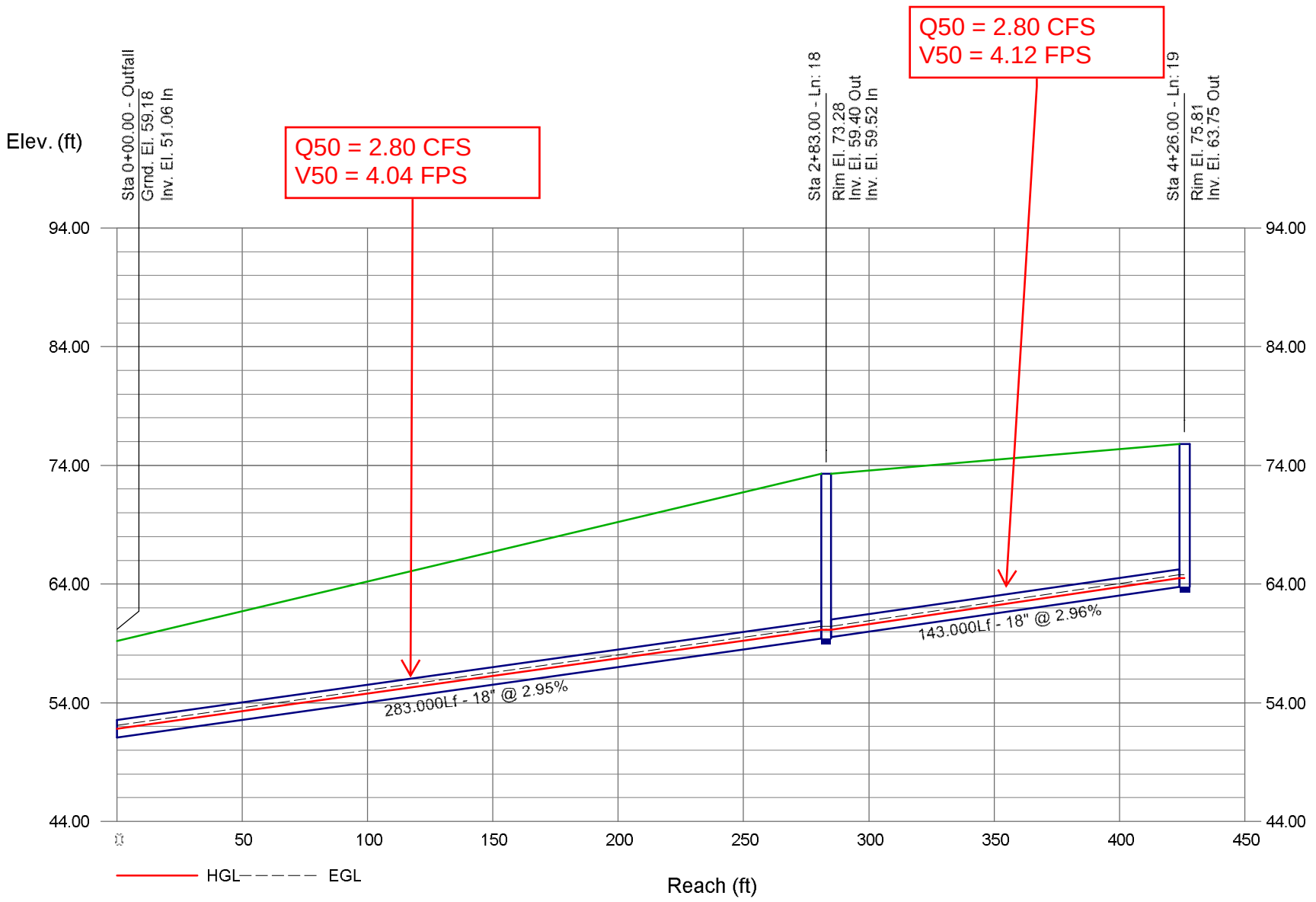
Proj. file: backbone_south.stm



Storm Sewer Profile

Proj. file: backbone_south.stm

MAINLINE 1



Michael Baker
INTERNATIONAL

Appendix I – 100 Year Lateral Storm Drain Moonlight Beach SD System

Included within this appendix:

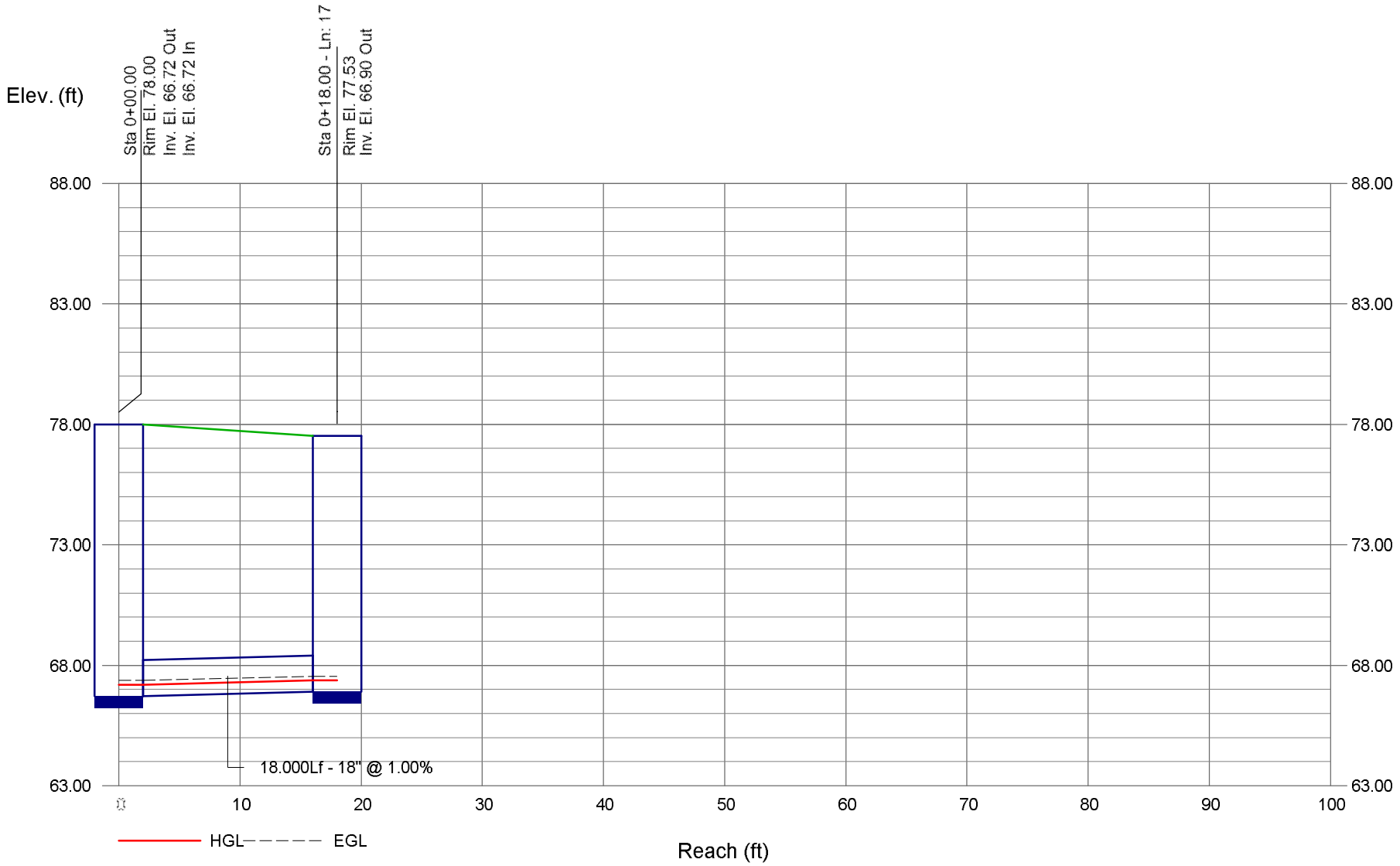
100 Year Lateral Pipe Results Summary

Michael Baker
INTERNATIONAL

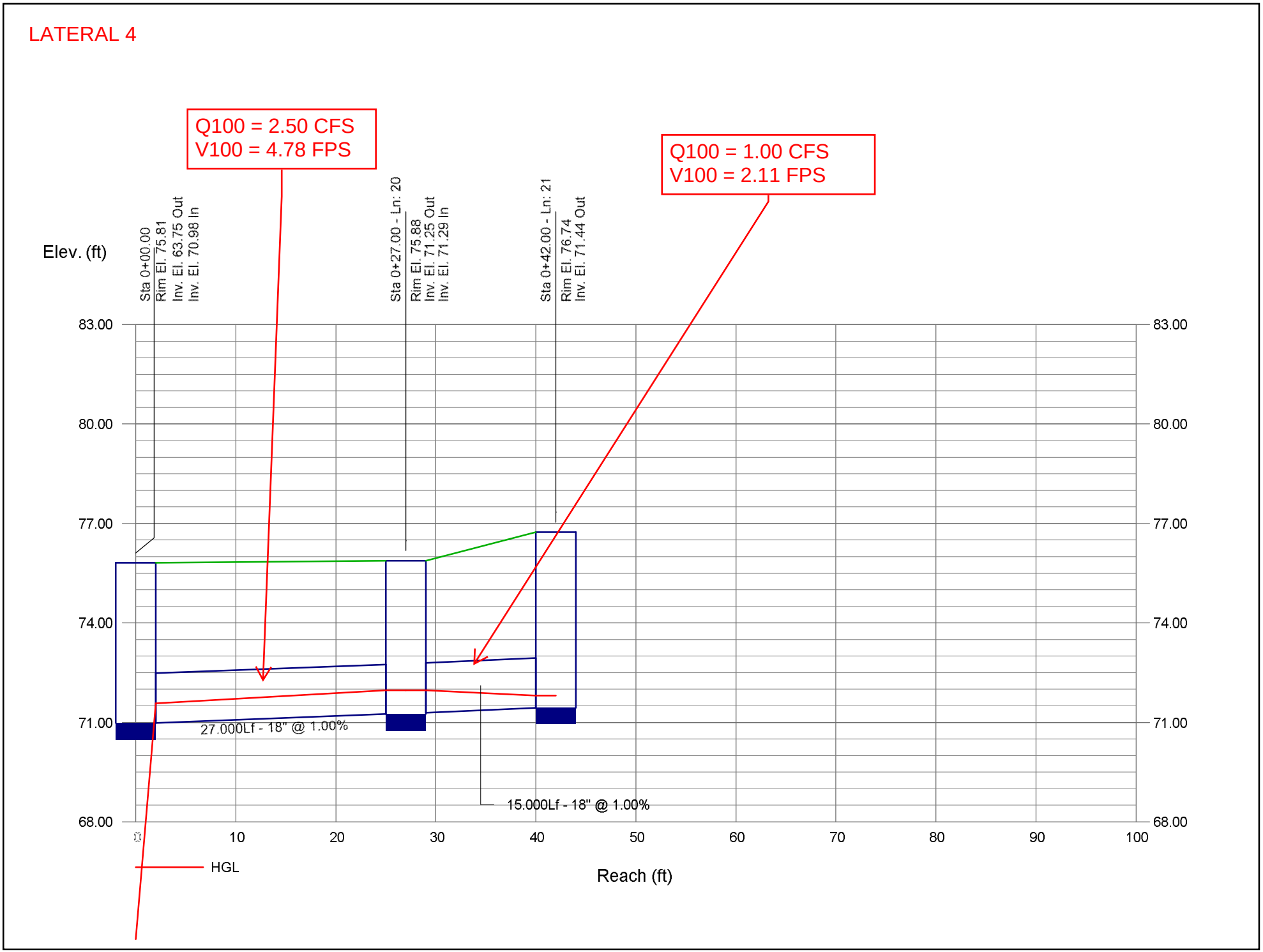
100 Year Lateral Pipe Results

Storm Sewer Profile

LATERAL 8
Q100=1.6 CFS
V100= 3.3 FPS

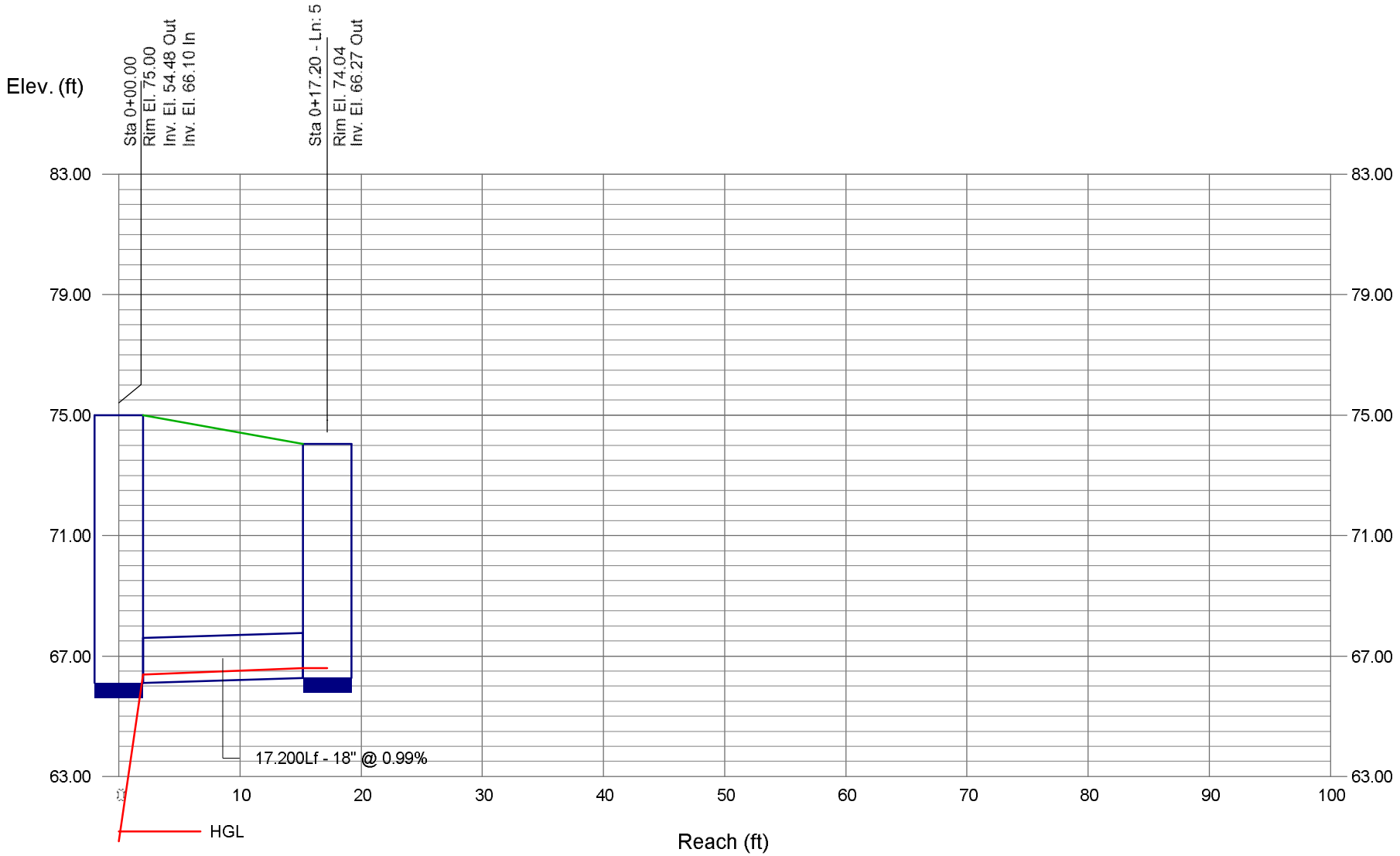


Storm Sewer Profile



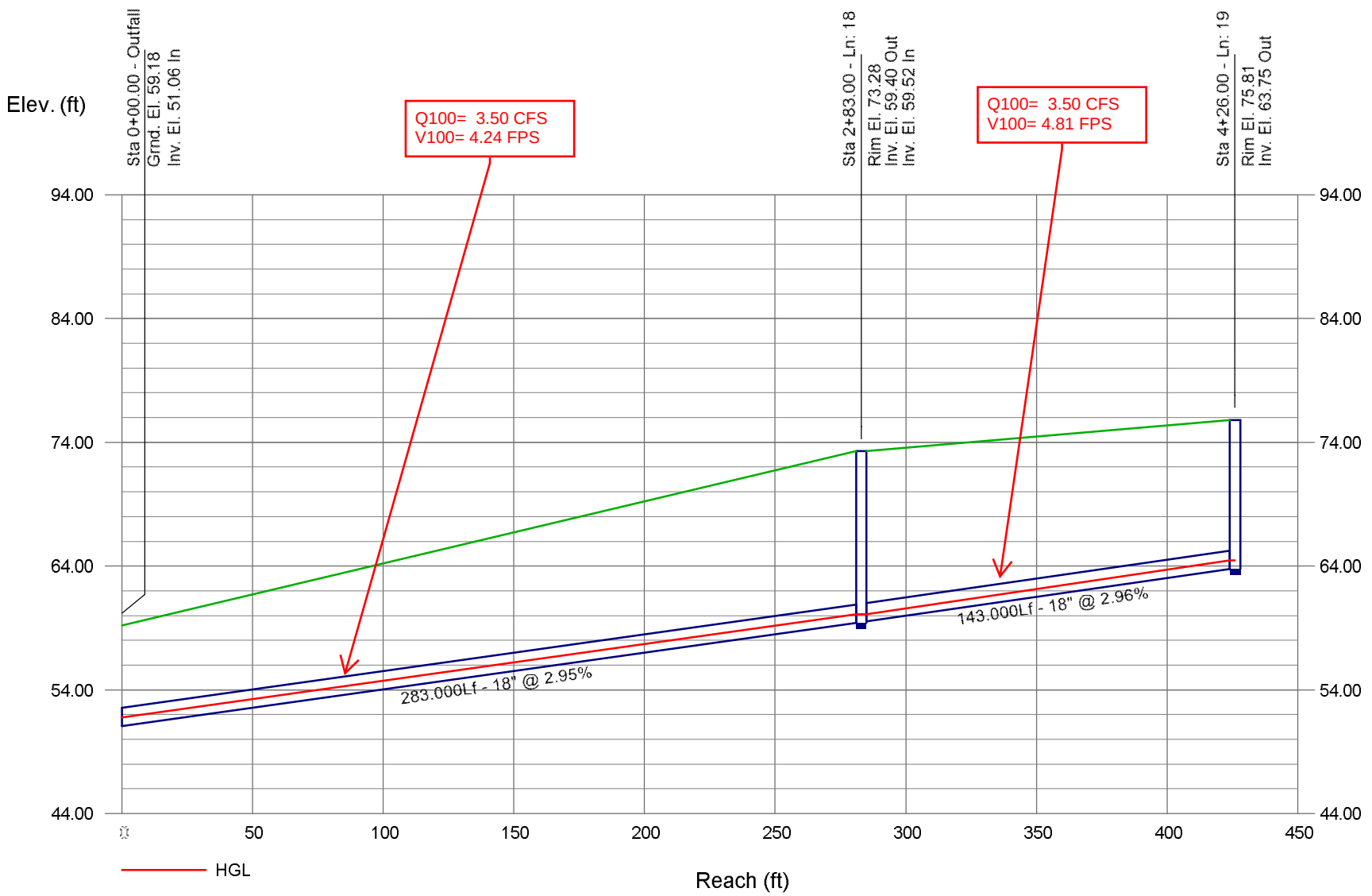
Storm Sewer Profile

LATERAL 3
Q100 = 0.80 CFS
V100 = 3.12 FPS



Storm Sewer Profile

MAINLINE 1 - MOONLIGHT



Storm Sewer Profile