HYDROLOGIC AND HYDRAULICS STUDY

North Coast Highway 101 Streetscape from Marcheta Street to Basil Street

Final Submittal

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INTRODUCTION AND BACKGROUND

The City of Encinitas is proposing to install street improvements, new inlets, and storm drain infrastructure underneath Coast Highway 101. The entirety of the project will span from A street to La Costa Avenue. The project will be divided into phases that are detailed in Appendix G. This report will provide hydrologic and hydraulic analysis for Phase 1B: roadway improvements from Marcheta to Basil Street, Phase1C: storm drain improvements from 'A' Street to Marcheta Street (Hydrologic analysis only), and Phase 1E: El Portal Storm Drain Extension.

The El Portal North County Transit District pedestrian undercrossing that is to be constructed by T.Y. Lin is incorporated into this study. Flow from the undercrossing is pumped into a biofiltration basin which outlets into Michael Baker's proposed storm drain. This flow is accounted for in the hydraulic calculations presented in this report.

A FEMA Federal Insurance Rate Map is included in Appendix A. The FIRM map details the project limits in proximity to Special Flood Hazard Areas subject to inundation by the 1% annual chance flood.

The proposed storm drain mains and laterals in Phases 1C & 1E will convey runoff to existing storm drain systems that will discharge to Moonlight beach.

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 for Phases 1C & 1E. The 50-year peak flow rate was developed to analyze the affects of a lower than standards storm through the proposed drainage infrastructure.
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 ultimately discharging to Moonlight beach. Separate reports for proposed improvements related to other phases of the project will be provided at a later date.

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. Rational method flow rates and their associated time of concentration were confluenced and routed through the storm drain using AES – Hydrowin 2013 (Advanced Engineering Solutions) to produce a total peak flow rate at each node in the system.

$$Q = C\ I\ A$$

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). Aerial photography and the hydrologic soil type were used to determine the appropriate land use classification detailed in table 3-1 of the San Diego County Hydrology Manual. A General Commercial land use designation is applied to drainage areas west of the 101 and the corresponding runoff coefficient from table 3-1 is used. Drainage areas east of the 101 are roughly 65% impervious and the corresponding 24.0 DU/A or less runoff coefficient from table 3-1 is applied.

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 in Appendix C.

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 Isopluvial 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. Street flow and spread lengths will allow a travel lane for emergency vehicles.

Gutter Hydraulics

Hydraflow uses trial and error with a modification of Manning's Equation to determine depth and spread of gutter flow.

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

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 sizing calculations for sump and on grade inlets have been performed in accordance with the San Diego Hydrology Manual. Hydraflow storm sewers is used to calculate gutter spread. On-grade inlets will collect 100% of the Q50 and Q100 with no bypass. Proposed inlets are located at low points or points along the roadway profile where cross/longitudinal slope is changing.

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

Equation 3 : 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, (0.5 ft.)

$$\frac{Q}{L_T} = 0.7 * (a + y)^{3/2}$$

Equation 4 : Curb Inlets on Grade

Where,

Q = inlet capacity, (CFS)

L_T = length of clear opening of inlet for total interception (ft)

a = depth of depression of curb at inlet (0.33 ft)

y= depth of flow approaching the curb inlet (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 5 : 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

Proposed 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. The improvements detailed in T.Y. Lin's study "El Portal Bicycle/Pedestrian Undercrossing Final Drainage Report" are incorporated into the hydraulic model.

A biofiltration basin that was designed by T.Y. Lin is located immediately south of the proposed El Portal roundabout. This basin will be connected to the Phase 1E storm drain per this plan set. T.Y. Lin's undercrossing will pump approximately 0.9 cfs into the southerly biofiltration basin. This additional flow is incorporated into the Hydraulic model. The lateral storm drains that connect to the biofiltration basin and the El Portal roundabout curb inlet are flat with a slope that is less than 0.50%.

RESULTS

Inlet Hydraulics

Appendix D summarizes the sump and on grade inlet calculations that are in accordance with standards detailed by the San Diego County Hydrology Manual. 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. Proposed on-grade inlets have been designed to capture 100% of the 100-year peak flow rate with no bypass flow.

Storm Drain Main and Lateral Hydraulics

The HGLs for all storm drain systems are beneath the finished surface for the peak 50-year flow rate.

The HGLs for the storm drain improvements from A street to Marcheta street is beneath the finished surface for the 100-year peak flow rate.

The HGL for the El Portal storm drain extension is out of the ground along the upstream extent of the proposed pipe during the 100-year peak flow rate. This occurs because the storm drain reach that connects to the El Portal intersection and existing sump has a slope that is less than 0.5% and the pipe is bucking grade.

The Hydraflow Storm Sewers Modeling results and corresponding storm drain main/lateral profiles are presented in Appendices E and F.

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.

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 is under 20 feet, which meets the criteria of Section 2.2.1. of the County's Drainage Design Manual. In all cases, newly proposed on-grade inlets capture 100% of the 100-year approach flow.

The storm drain system from A Street to Marcheta Street has been designed to convey the 50- and 100-year peak flow rate while maintaining an HGL that is under the finished surface. This storm drain system will be constructed with the Streetscape Improvements from 'A' Street to Marcheta Street at a later date.

The El Portal storm drain extension system will be able to convey the 50-year peak flow rate while maintaining the HGL under the finished surface. The 100-year peak flow rate HGL is completely under the finished surface expect for the upstream portion of the pipe that connects to the El Portal intersection and existing localized sump. This localized low point along the El Portal intersection is going to remain the same as in the existing condition but the benefit provided by this project is that proposed storm drain system will be able to convey this existing flooding to the Moonlight Beach outfall.

Newly proposed storm drain infrastructure improvements will reduce 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.

DECLERATION OF RESPONSIBLE CHARGES

I, hereby declare that I am the Civil Engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current design.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for the project design.

8-24-2020

Christopher Leary RCE 87309 Date

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Appendix A – FEMA Documents

Included within this appendix:

FEMA FIRM Panels

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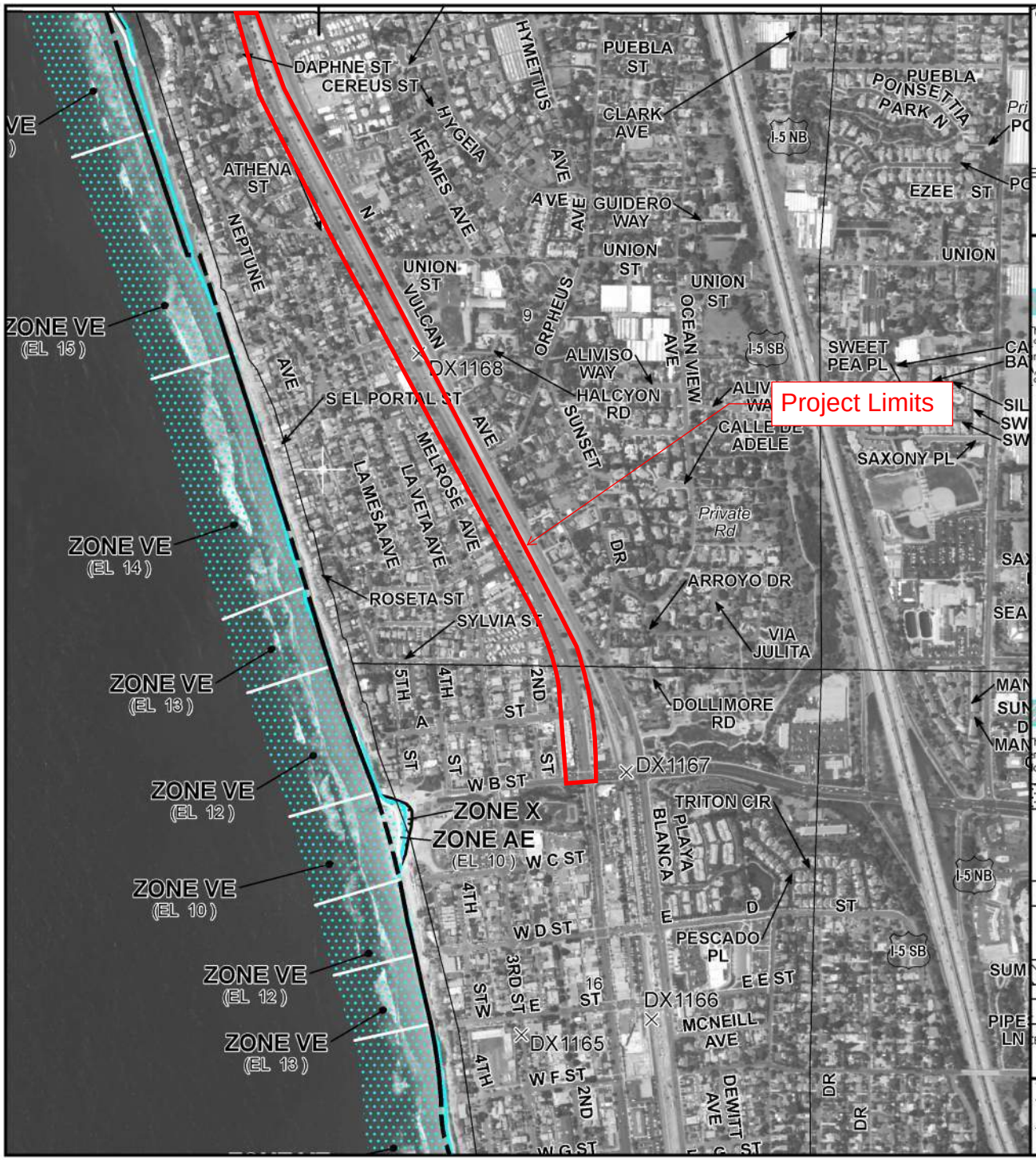
FEMA FIRMs



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.

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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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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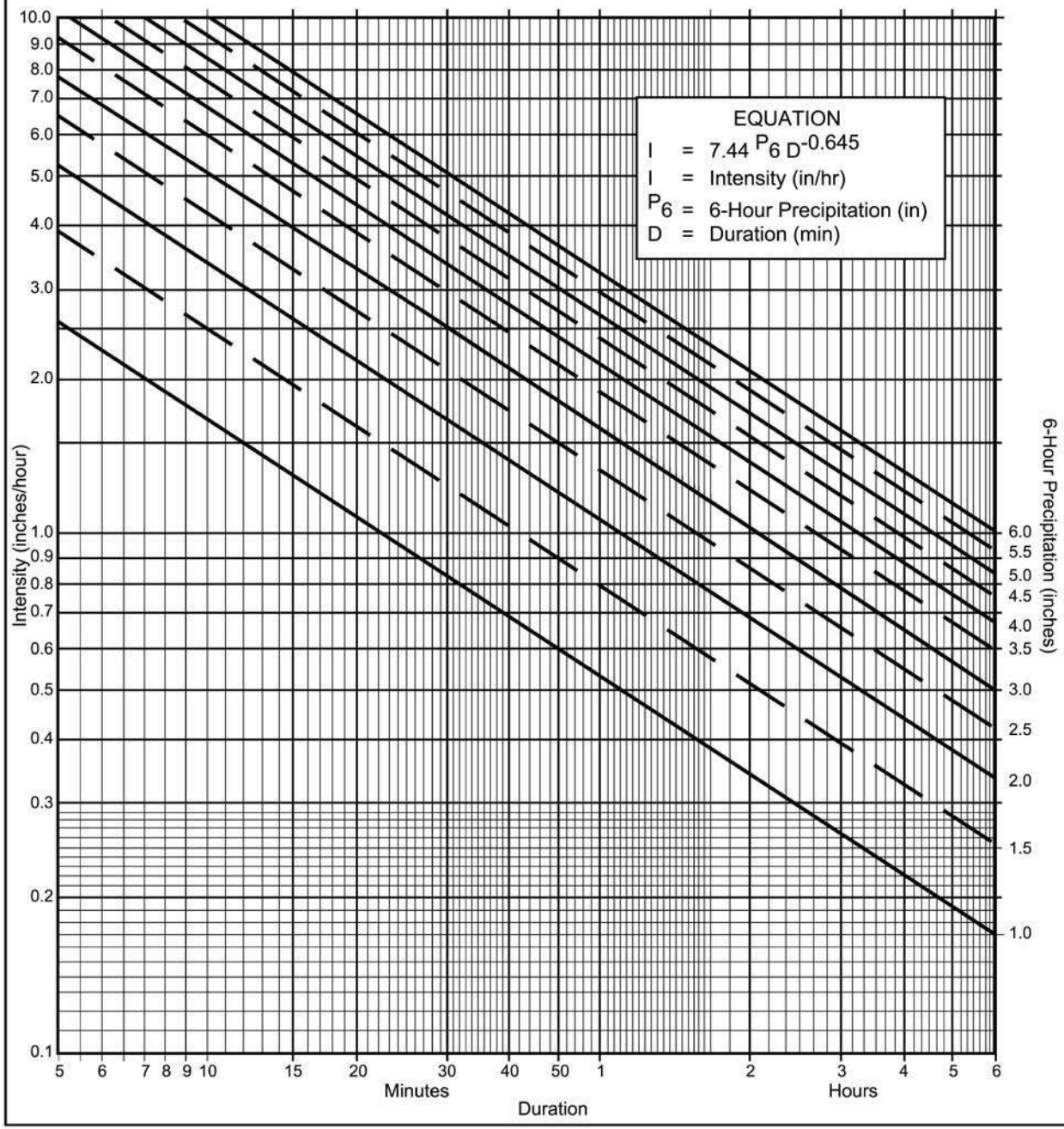
County of San Diego
Hydrology Manual Excerpts

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 = 2.2 in., P_{24} = 3.75, $\frac{P_6}{P_{24}}$ = 59 %(2)

(c) Adjusted $P_6^{(2)}$ = 2.2 in.

(d) t_x = _____ min.

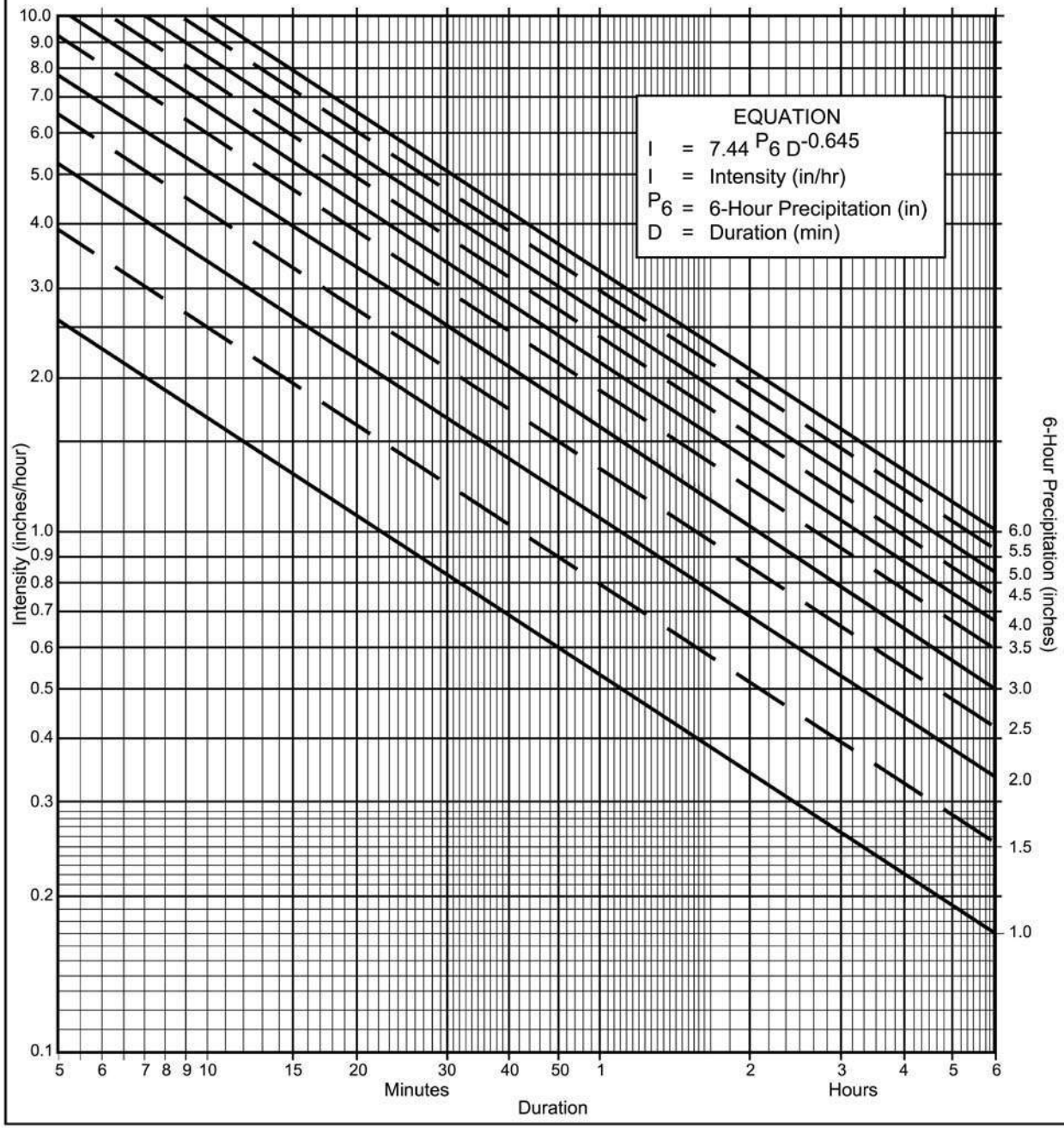
(e) I = _____ in./hr.

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 - Template

FIGURE 3-1



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 100 year

(b) P_6 = 2.5 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = .625 %(2)

(c) Adjusted P_6(2) = 2.5 in.

(d) t_x = _____ min.

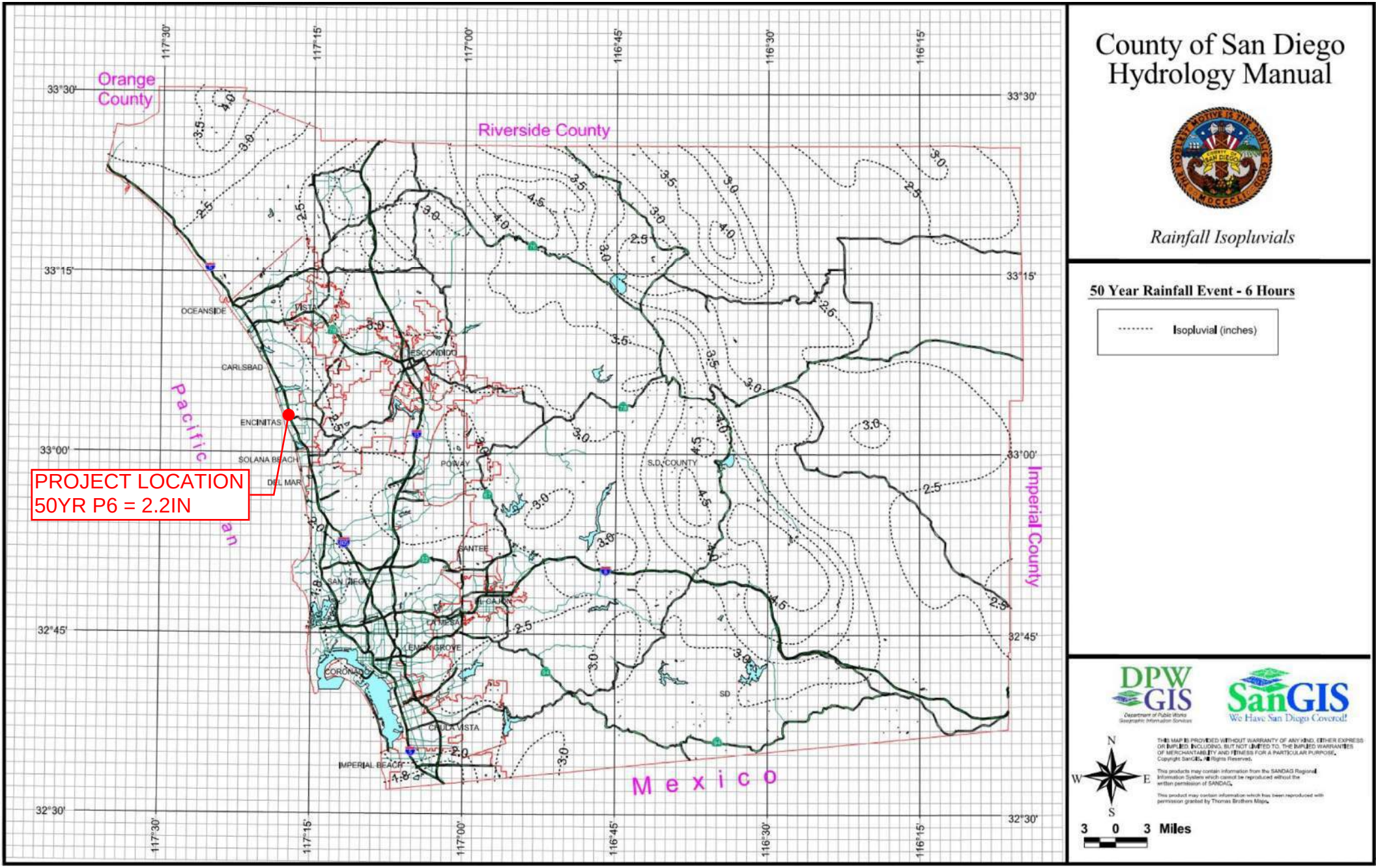
(e) I = _____ in./hr.

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 - Template

FIGURE 3-1



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!

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N W E S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

PROJECT LOCATION
50YR P24 = 3.75 IN

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
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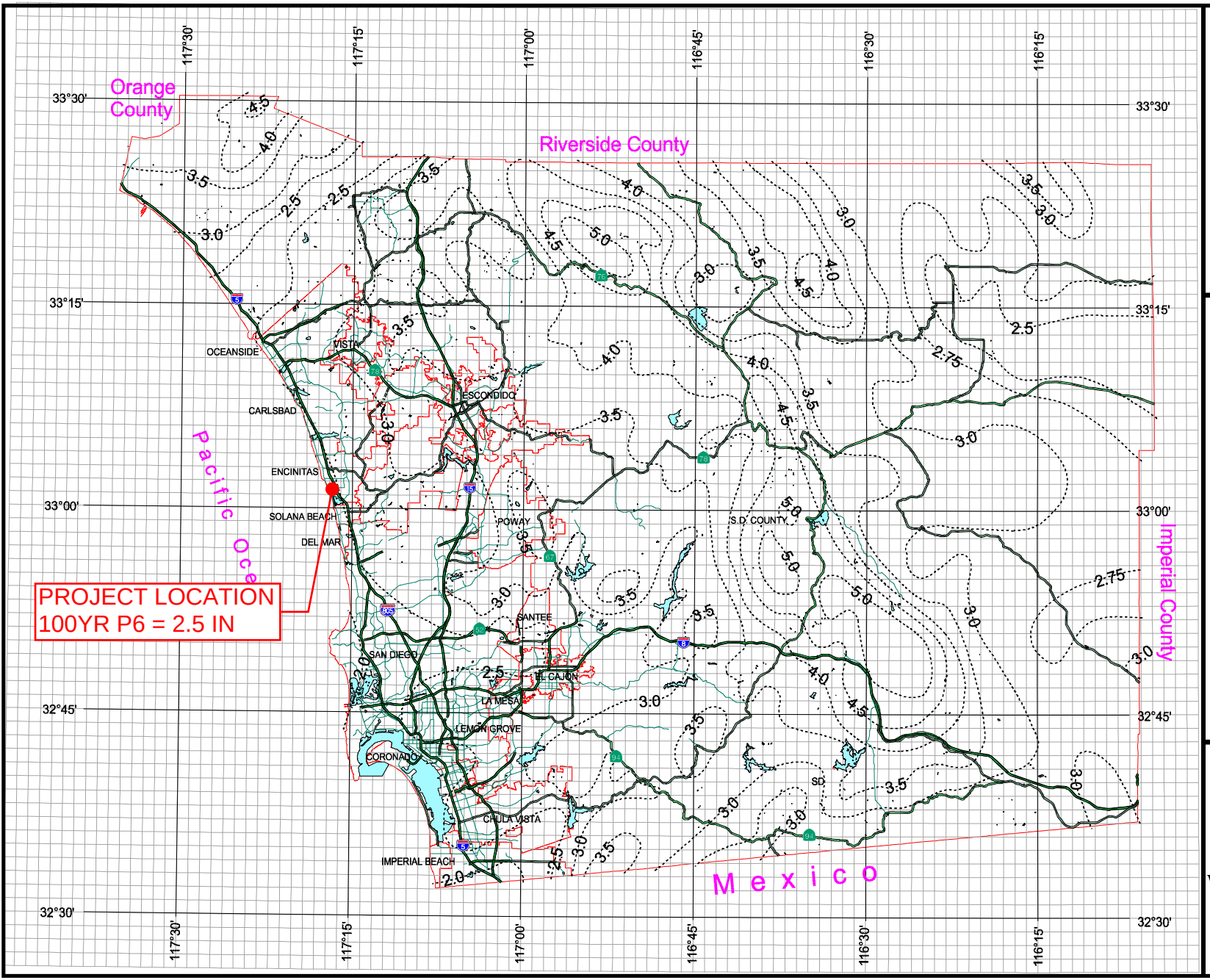
N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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3 0 3 Miles

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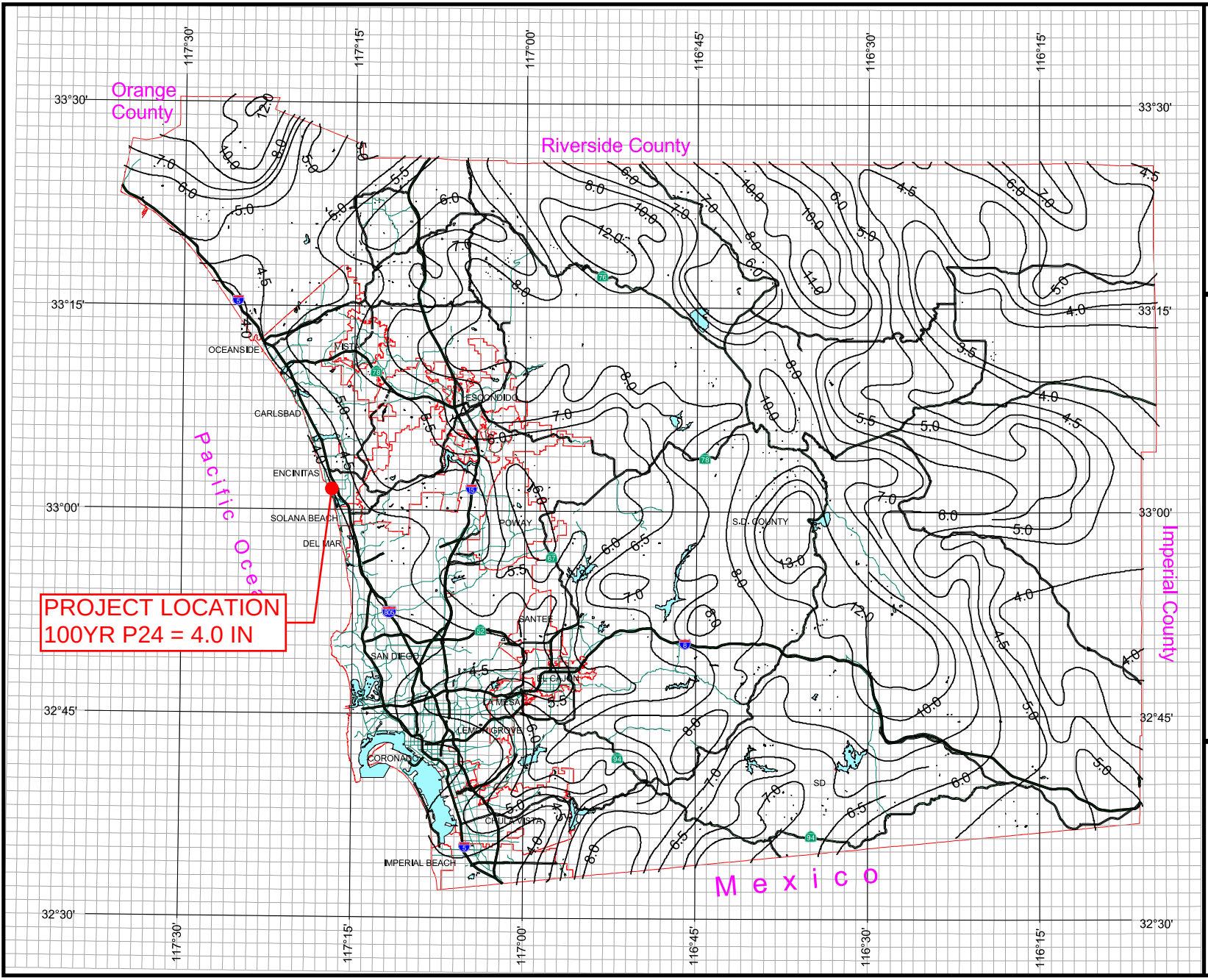
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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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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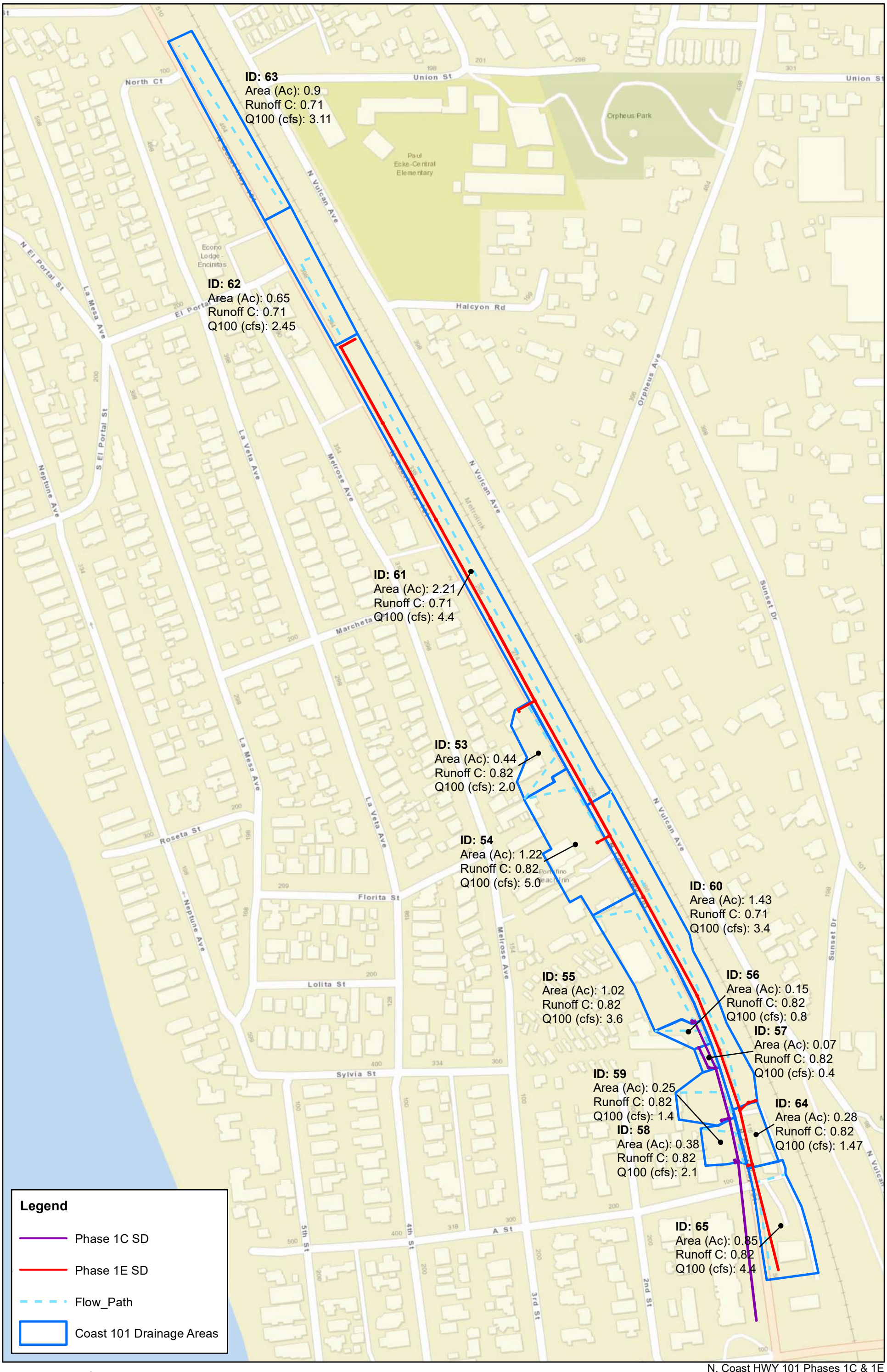
Drainage Work Map



7/29/2020 JN H:\PDATA\137350_North Coast Hwy 101\GIS\MXD\Drainage Exhibit Phase 1C and 1E.mxd <USER NAME>

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0 125 250 500 Feet

Source:

N. Coast HWY 101 Phases 1C & 1E

Drainage Exhibit

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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) [2]	Q_{50} (cfs)	P6	I (in/hr) [2]	Q_{100} (cfs)
Encintias 53	On-Grade	0.44	N. Commerical	0.79	6.0	2.2	5.18	1.8	2.5	5.88	2.0
Encintias 54	In-Sag	1.22	G. Commerical	0.82	7.8	2.2	4.35	4.4	2.5	4.94	5.0
Encintias 55	On-Grade	1.02	G. Commerical	0.82	9.8	2.2	3.75	3.1	2.5	4.26	3.6
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	On-Grade	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	24.0 Du/A or less	0.71	14.2	2.2	2.95	3.0	2.5	3.35	3.4
Encintias 61	In-Sag	2.21	24.0 Du/A or less	0.71	18.5	2.2	2.49	3.9	2.5	2.83	4.4
Encinitas 62	In-Sag	0.65	24.0 Du/A or less	0.71	7.0	2.2	4.68	2.2	2.5	5.32	2.5
Encinitas 63	On-Grade	0.90	24.0 Du/A or less	0.71	8.0	2.2	4.28	2.7	2.5	4.86	3.1
Encinitas 64	On-Grade	0.28	G. Commerical	0.82	5.2	2.2	5.64	1.3	2.5	6.41	1.5
Encinitas 65	On-Grade	0.85	G. Commerical	0.82	5.3	2.2	5.60	3.9	2.5	6.36	4.4

[1] Per Table 3-1 of SDCHM

[2] Per Figure 3-2 of SDCHM

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1264

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* COAST HIGHWAY 101 - PHASE 1C                                          *
* MARCHETA STREET TO BASIL STREET                                       *
* MICHAEL BAKER INTERNATIONAL                                           *
 ************************************************************************

  FILE NAME: C:\USERS\X\02\1.DAT
  TIME/DATE OF STUDY: 12:18 07/27/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 1.00
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+------------------------------------------------------------------------+
```

```
| COAST HIGHWAY 101 - PHASE 1C                                                |
| BASIL STREET TO MARHETA STREET                                              |
| MICHAEL BAKER INTERNATIONAL                                                 |
+-----------------------------------------------------------------------------+

+-----------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN 55                                     |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                        |
|                                                                             |
+-----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.80   RAIN INTENSITY(INCH/HOUR) =  4.27
  TOTAL AREA(ACRES) =     1.02   TOTAL RUNOFF(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.30  DOWNSTREAM(FEET) =    57.20
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.10
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     55.50 =       5.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.50 TO NODE     57.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.23  DOWNSTREAM(FEET) =    55.91
  FLOW LENGTH(FEET) =   131.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.10
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.23
```

```
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     136.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     57.50 TO NODE     57.50 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 56                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
 TOTAL AREA(ACRES) =     0.15   TOTAL RUNOFF(CFS) =      0.70

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.25 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    56.50  DOWNSTREAM(FEET) =    55.90
 FLOW LENGTH(FEET) =    60.53   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.70
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.30
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.25 =     196.63 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     57.25 TO NODE     57.25 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.30
 RAINFALL INTENSITY(INCH/HR) =   6.34
 TOTAL STREAM AREA(ACRES) =     0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.70
```

```
+----------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 57                    |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                 |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =   7
----------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
======================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
  TOTAL AREA(ACRES) =     0.07   TOTAL RUNOFF(CFS) =      0.30

**********************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.25 IS CODE =   1
----------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
======================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.70     5.30        6.345          0.15
      2        0.30     5.00        6.587          0.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        0.96     5.00       6.587
      2        0.99     5.30       6.345

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.99   Tc(MIN.) =    5.30
  TOTAL AREA(ACRES) =        0.2
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.25 =     196.63 FEET.

**********************************************************************
```

```
  FLOW PROCESS FROM NODE     57.25 TO NODE     57.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    56.00  DOWNSTREAM(FEET) =    55.89
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.99
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.37
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     211.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.50 TO NODE     57.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.99     5.37       6.288        0.22
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     211.63 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.10    10.23       4.150        1.02
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     136.10 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.62       5.37        6.288
      2       3.75      10.23        4.150

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.75   Tc(MIN.) =   10.23
  TOTAL AREA(ACRES) =        1.2

****************************************************************************
  FLOW PROCESS FROM NODE     57.50 TO NODE     58.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    55.87  DOWNSTREAM(FEET) =    54.52
```

```
  FLOW LENGTH(FEET) =   133.25   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.75
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =     344.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     58.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.05
  TOTAL STREAM AREA(ACRES) =     1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.75

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINTIAS 58                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
  TOTAL AREA(ACRES) =     0.38   TOTAL RUNOFF(CFS) =      1.80

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    66.27  DOWNSTREAM(FEET) =    66.10
  FLOW LENGTH(FEET) =    17.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.80
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.06
```

```
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =      17.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     58.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.06
  RAINFALL INTENSITY(INCH/HR) =   6.53
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.75    10.64        4.047          1.24
      2        1.80     5.06        6.532          0.38

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.59     5.06       6.532
      2        4.87    10.64       4.047

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.87   Tc(MIN.) =   10.64
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =     344.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.48  DOWNSTREAM(FEET) =    53.36
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.96
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     456.88 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   3.97
  TOTAL STREAM AREA(ACRES) =     1.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.87

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 59                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.00   RAIN INTENSITY(INCH/HOUR) =  4.21
  TOTAL AREA(ACRES) =     0.25   TOTAL RUNOFF(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    53.50  DOWNSTREAM(FEET) =    53.30
  FLOW LENGTH(FEET) =     6.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.20
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =      23.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.02
  RAINFALL INTENSITY(INCH/HR) =   4.21
  TOTAL STREAM AREA(ACRES) =     0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.87    10.96        3.970          1.62
      2        1.20    10.02        4.208          0.25

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        5.79    10.02       4.208
      2        6.00    10.96       3.970

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.00   Tc(MIN.) =   10.96
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     456.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    53.32  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.00
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     881.88 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.9  TC(MIN.) =     11.82
  PEAK FLOW RATE(CFS)   =       6.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1264

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* COAST HIGHWAY 101 - PHASE 1E                                          *
* MARCHETA STREET TO BASIL STREET                                       *
* MICHAEL BAKER INTERNATIONAL                                           *
 ************************************************************************

  FILE NAME: C:\USERS\X\01\1.DAT
  TIME/DATE OF STUDY: 12:20 07/27/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 1.00
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+------------------------------------------------------------------------+
```

```
| COAST HIGHWAY 101 - PHASE 1E STORM DRAIN                                |
| BASIL STREET TO MARHETA STREET                                          |
| THIS MODEL INCLUDES FLOW FROM STUBS 24+50 AND 28+50                     |
+-------------------------------------------------------------------------+

+-------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 63                       |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                    |
|                                                                         |
+-------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.00   RAIN INTENSITY(INCH/HOUR) =  4.86
  TOTAL AREA(ACRES) =     0.90   TOTAL RUNOFF(CFS) =      2.70

**************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     62.50 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.60  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.70
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    8.97
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =     190.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     62.50 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   4.52
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.70

+-------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 62                       |
```

```
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                    |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   7.00   RAIN INTENSITY(INCH/HOUR) =  5.30
  TOTAL AREA(ACRES) =     0.65   TOTAL RUNOFF(CFS) =      2.20

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.99  DOWNSTREAM(FEET) =    59.98
  FLOW LENGTH(FEET) =     2.45   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.20
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.01
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =       2.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     62.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.01
  RAINFALL INTENSITY(INCH/HR) =   5.30
  TOTAL STREAM AREA(ACRES) =     0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.70     8.97        4.518          0.90
      2        2.20     7.01        5.296          0.65

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.31     7.01       5.296
      2        4.58     8.97       4.518

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.58   Tc(MIN.) =    8.97
  TOTAL AREA(ACRES) =        1.5
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =     190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     61.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.97  DOWNSTREAM(FEET) =    59.20
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.58
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.50 TO NODE     61.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.11
  RAINFALL INTENSITY(INCH/HR) =   4.18
  TOTAL STREAM AREA(ACRES) =     1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.58

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 61                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
```

```
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.50   RAIN INTENSITY(INCH/HOUR) =  2.83
  TOTAL AREA(ACRES) =     2.21   TOTAL RUNOFF(CFS) =      3.90

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.26  DOWNSTREAM(FEET) =    59.20
  FLOW LENGTH(FEET) =    21.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.90
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   18.60
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =      23.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.50 TO NODE     61.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.60
  RAINFALL INTENSITY(INCH/HR) =   2.82
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.90

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.58    10.11        4.182          1.55
      2        3.90    18.60        2.823          2.21

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.70    10.11       4.182
      2        6.99    18.60       2.823

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.99   Tc(MIN.) =   18.60
  TOTAL AREA(ACRES) =        3.8
```

```
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.50 TO NODE     53.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    59.12  DOWNSTREAM(FEET) =    55.98
 FLOW LENGTH(FEET) =  1063.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.99
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.99
 PIPE TRAVEL TIME(MIN.) =   4.44    Tc(MIN.) =   23.04
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =    1503.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     53.50 TO NODE     53.50 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   23.04
 RAINFALL INTENSITY(INCH/HR) =   2.46
 TOTAL STREAM AREA(ACRES) =     3.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.99

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 53                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE REPORT                      |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   6.00   RAIN INTENSITY(INCH/HOUR) =  5.86
 TOTAL AREA(ACRES) =     0.44   TOTAL RUNOFF(CFS) =      1.80

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     53.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    66.90  DOWNSTREAM(FEET) =    66.43
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.80
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.18
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =      70.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.50 TO NODE     53.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.18
  RAINFALL INTENSITY(INCH/HR) =   5.75
  TOTAL STREAM AREA(ACRES) =     0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.99    23.04        2.458          3.76
      2        1.80     6.18        5.748          0.44

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.79     6.18       5.748
      2        7.76    23.04       2.458

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.76   Tc(MIN.) =   23.04
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =    1503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.50 TO NODE     54.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    55.97  DOWNSTREAM(FEET) =    54.77
```

```
  FLOW LENGTH(FEET) =   406.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.76
  PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   24.71
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =    1909.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     54.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   24.71
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 54                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.30   RAIN INTENSITY(INCH/HOUR) =  5.67
  TOTAL AREA(ACRES) =     1.22   TOTAL RUNOFF(CFS) =      5.00

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.68  DOWNSTREAM(FEET) =    67.64
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.00
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    6.52
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =     104.45 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     54.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.52
  RAINFALL INTENSITY(INCH/HR) =   5.55
  TOTAL STREAM AREA(ACRES) =     1.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.76    24.71        2.350          4.20
      2        5.00     6.52        5.550          1.22

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.29     6.52       5.550
      2        9.88    24.71       2.350

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.88   Tc(MIN.) =   24.71
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =    1909.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     60.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.75  DOWNSTREAM(FEET) =    52.37
  FLOW LENGTH(FEET) =   800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.36
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.88
  PIPE TRAVEL TIME(MIN.) =   3.06    Tc(MIN.) =   27.77
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =    2709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     60.50 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.77
  RAINFALL INTENSITY(INCH/HR) =   2.18
  TOTAL STREAM AREA(ACRES) =     5.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.88

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 60                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.20   RAIN INTENSITY(INCH/HOUR) =  3.36
  TOTAL AREA(ACRES) =     1.43   TOTAL RUNOFF(CFS) =      3.00

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    71.25  DOWNSTREAM(FEET) =    70.98
  FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.00
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   14.29
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =     131.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     60.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.29
```

```
  RAINFALL INTENSITY(INCH/HR) =   3.35
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.88    27.77        2.180          5.42
      2        3.00    14.29        3.346          1.43

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.43    14.29       3.346
      2       11.83    27.77       2.180

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.83   Tc(MIN.) =   27.77
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =    2709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     64.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.36  DOWNSTREAM(FEET) =    51.93
  FLOW LENGTH(FEET) =   143.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.49
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.83
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   28.30
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =    2852.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     64.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.30
  RAINFALL INTENSITY(INCH/HR) =   2.15
  TOTAL STREAM AREA(ACRES) =     6.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.83
```

```
+----------------------------------------------------------------------------+
| USER SPECIFY HYDROLOOGY FROM SUB BASIN ENCINITAS 64                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                       |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.20   RAIN INTENSITY(INCH/HOUR) =  6.42
  TOTAL AREA(ACRES) =     0.28   TOTAL RUNOFF(CFS) =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    68.80  DOWNSTREAM(FEET) =    68.72
  FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.30
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =     139.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     64.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.23
  RAINFALL INTENSITY(INCH/HR) =   6.40
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.83    28.30        2.153          6.85
      2        1.30     5.23        6.396          0.28
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.28     5.23       6.396
      2       12.27    28.30       2.153

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.27   Tc(MIN.) =   28.30
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =    2852.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     65.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.92  DOWNSTREAM(FEET) =    51.06
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.27
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   29.35
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     65.50 =    3137.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.50 TO NODE     65.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   29.35
  RAINFALL INTENSITY(INCH/HR) =   2.10
  TOTAL STREAM AREA(ACRES) =     7.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.27

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 65                        |
| REFERENCE HYDROLOGY CALCULATIONS AND DRAIANGE EXHIBIT                    |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =   7
```

```
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.30   RAIN INTENSITY(INCH/HOUR) =  6.34
  TOTAL AREA(ACRES) =     0.85   TOTAL RUNOFF(CFS) =      3.90

****************************************************************************
  FLOW PROCESS FROM NODE     65.50 TO NODE     65.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.30
  RAINFALL INTENSITY(INCH/HR) =   6.34
  TOTAL STREAM AREA(ACRES) =     0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.90

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.27    29.35        2.103          7.13
      2        3.90     5.30        6.344          0.85

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.97     5.30       6.344
      2       13.56    29.35       2.103

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.56   Tc(MIN.) =   29.35
  TOTAL AREA(ACRES) =        8.0
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     65.50 =    3137.10 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.0  TC(MIN.) =     29.35
  PEAK FLOW RATE(CFS)   =      13.56
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1264

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* COAST HIGHWAY 101 - PHASE 1C                                          *
* MARCHETA STREET TO BASIL STREET                                       *
* MICHAEL BAKER INTERNATIONAL                                           *
 ************************************************************************

  FILE NAME: C:\USERS\0\02\1.DAT
  TIME/DATE OF STUDY: 10:31 07/27/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 1.00
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+------------------------------------------------------------------------+
```

```
| COAST HIGHWAY 101 - PHASE 1C                                                |
| BASIL STREET TO MARHETA STREET                                              |
| MICHAEL BAKER INTERNATIONAL                                                 |
+-----------------------------------------------------------------------------+

+-----------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN 55                                     |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                        |
|                                                                             |
+-----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.80   RAIN INTENSITY(INCH/HOUR) =  4.27
  TOTAL AREA(ACRES) =     1.02   TOTAL RUNOFF(CFS) =      3.60

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.30  DOWNSTREAM(FEET) =    57.20
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.60
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     55.50 =       5.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.50 TO NODE     57.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    57.23  DOWNSTREAM(FEET) =    55.91
  FLOW LENGTH(FEET) =   131.10   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.60
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.22
```

```
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     136.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.50 TO NODE     57.50 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 56                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
  TOTAL AREA(ACRES) =     0.15   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.25 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    56.50  DOWNSTREAM(FEET) =    55.90
  FLOW LENGTH(FEET) =    60.53   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.80
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.25 =     196.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.25 TO NODE     57.25 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   6.35
  TOTAL STREAM AREA(ACRES) =     0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80
```

```
+----------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 57                    |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                 |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =   7
----------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
======================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
  TOTAL AREA(ACRES) =     0.07   TOTAL RUNOFF(CFS) =      0.40

**********************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.25 IS CODE =   1
----------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
======================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.80     5.29        6.354          0.15
      2        0.40     5.00        6.587          0.07

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.16     5.00       6.587
      2        1.19     5.29       6.354

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.19   Tc(MIN.) =    5.29
  TOTAL AREA(ACRES) =        0.2
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.25 =     196.63 FEET.

**********************************************************************
```

```
  FLOW PROCESS FROM NODE     57.25 TO NODE     57.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    56.00  DOWNSTREAM(FEET) =    55.89
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.36
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     211.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.50 TO NODE     57.50 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.19     5.36       6.299        0.22
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     211.63 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.60    10.22       4.154        1.02
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     57.50 =     136.10 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.07       5.36        6.299
      2       4.38      10.22        4.154

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.38   Tc(MIN.) =   10.22
  TOTAL AREA(ACRES) =        1.2

****************************************************************************
  FLOW PROCESS FROM NODE     57.50 TO NODE     58.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    55.87  DOWNSTREAM(FEET) =    54.52
```

```
  FLOW LENGTH(FEET) =   133.25   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =     344.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     58.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   4.06
  TOTAL STREAM AREA(ACRES) =     1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.38

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINTIAS 58                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  6.59
  TOTAL AREA(ACRES) =     0.38   TOTAL RUNOFF(CFS) =      2.10

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    66.27  DOWNSTREAM(FEET) =    66.10
  FLOW LENGTH(FEET) =    17.20   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.10
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.06
```

```
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =      17.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     58.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.06
  RAINFALL INTENSITY(INCH/HR) =   6.53
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.38    10.61        4.055          1.24
      2        2.10     5.06        6.535          0.38

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.19     5.06       6.535
      2        5.69    10.61       4.055

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.69   Tc(MIN.) =   10.61
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     58.50 =     344.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.50 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.48  DOWNSTREAM(FEET) =    53.36
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.69
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     456.88 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.98
  TOTAL STREAM AREA(ACRES) =     1.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.69

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 59                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.00   RAIN INTENSITY(INCH/HOUR) =  4.21
  TOTAL AREA(ACRES) =     0.25   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    53.50  DOWNSTREAM(FEET) =    53.30
  FLOW LENGTH(FEET) =     6.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.40
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =      23.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.02
  RAINFALL INTENSITY(INCH/HR) =   4.21
  TOTAL STREAM AREA(ACRES) =     0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.69    10.91        3.981          1.62
      2        1.40    10.02        4.208          0.25

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.78    10.02       4.208
      2        7.01    10.91       3.981

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.01   Tc(MIN.) =   10.91
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     456.88 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.50 TO NODE     59.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    53.32  DOWNSTREAM(FEET) =    44.10
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.01
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   11.74
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     59.50 =     881.88 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.9  TC(MIN.) =     11.74
  PEAK FLOW RATE(CFS)   =       7.01
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1264

                              Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* COAST HIGHWAY 101 - PHASE 1E                                          *
* MARCHETA STREET TO BASIL STREET                                       *
* MICHAEL BAKER INTERNATIONAL                                           *
 ************************************************************************

  FILE NAME: C:\USERS\0\01\1.DAT
  TIME/DATE OF STUDY: 11:48 07/23/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 1.00
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+------------------------------------------------------------------------+
```

```
| COAST HIGHWAY 101 - PHASE 1E STORM DRAIN                                |
| BASIL STREET TO MARHETA STREET                                          |
| THIS MODEL INCLUDES FLOW FROM STUBS 24+50 AND 28+50                     |
+-------------------------------------------------------------------------+

+-------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 63                       |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                    |
|                                                                         |
+-------------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.00   RAIN INTENSITY(INCH/HOUR) =  4.86
  TOTAL AREA(ACRES) =     0.90   TOTAL RUNOFF(CFS) =      3.10

**************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     62.50 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    60.60  DOWNSTREAM(FEET) =    60.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.10
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =     190.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     62.50 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.94
  RAINFALL INTENSITY(INCH/HR) =   4.53
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.10

+-------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 62                       |
```

```
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                    |
|                                                                         |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   7.00   RAIN INTENSITY(INCH/HOUR) =  5.30
  TOTAL AREA(ACRES) =     0.65   TOTAL RUNOFF(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.99  DOWNSTREAM(FEET) =    59.98
  FLOW LENGTH(FEET) =     2.45   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.50
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.01
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =       2.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     62.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.01
  RAINFALL INTENSITY(INCH/HR) =   5.30
  TOTAL STREAM AREA(ACRES) =     0.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.10     8.94        4.529          0.90
      2        2.50     7.01        5.296          0.65

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.93     7.01       5.296
      2        5.24     8.94       4.529

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.24   Tc(MIN.) =    8.94
  TOTAL AREA(ACRES) =        1.5
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     62.50 =     190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.50 TO NODE     61.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.97  DOWNSTREAM(FEET) =    59.20
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.24
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.50 TO NODE     61.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.05
  RAINFALL INTENSITY(INCH/HR) =   4.20
  TOTAL STREAM AREA(ACRES) =     1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.24

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 61                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
```

```
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  18.50   RAIN INTENSITY(INCH/HOUR) =  2.83
  TOTAL AREA(ACRES) =     2.21   TOTAL RUNOFF(CFS) =      5.30

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.26  DOWNSTREAM(FEET) =    59.20
  FLOW LENGTH(FEET) =    21.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.30
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   18.60
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =      23.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.50 TO NODE     61.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.60
  RAINFALL INTENSITY(INCH/HR) =   2.82
  TOTAL STREAM AREA(ACRES) =     2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.24    10.05        4.198          1.55
      2        5.30    18.60        2.823          2.21

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.10    10.05       4.198
      2        8.82    18.60       2.823

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.82   Tc(MIN.) =   18.60
  TOTAL AREA(ACRES) =        3.8
```

```
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     61.50 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.50 TO NODE     53.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    59.12  DOWNSTREAM(FEET) =    55.98
  FLOW LENGTH(FEET) =  1063.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.82
  PIPE TRAVEL TIME(MIN.) =   4.16    Tc(MIN.) =   22.76
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =    1503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.50 TO NODE     53.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.76
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =     3.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.82

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 53                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE REPORT                      |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.00   RAIN INTENSITY(INCH/HOUR) =  5.86
  TOTAL AREA(ACRES) =     0.44   TOTAL RUNOFF(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    66.90  DOWNSTREAM(FEET) =    66.43
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.17
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =      70.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.50 TO NODE     53.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.17
  RAINFALL INTENSITY(INCH/HR) =   5.75
  TOTAL STREAM AREA(ACRES) =     0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.82    22.76        2.478          3.76
      2        2.00     6.17        5.751          0.44

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.80     6.17       5.751
      2        9.68    22.76       2.478

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.68   Tc(MIN.) =   22.76
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     53.50 =    1503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.50 TO NODE     54.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    55.97  DOWNSTREAM(FEET) =    54.77
```

```
  FLOW LENGTH(FEET) =   406.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.68
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   24.32
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =    1909.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     54.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   24.32
  RAINFALL INTENSITY(INCH/HR) =   2.37
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.68

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 54                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   6.30   RAIN INTENSITY(INCH/HOUR) =  5.67
  TOTAL AREA(ACRES) =     1.22   TOTAL RUNOFF(CFS) =      5.70

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    67.68  DOWNSTREAM(FEET) =    67.64
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.70
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.70
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    6.51
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =     104.45 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     54.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.51
  RAINFALL INTENSITY(INCH/HR) =   5.56
  TOTAL STREAM AREA(ACRES) =     1.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        9.68    24.32        2.374          4.20
      2        5.70     6.51        5.556          1.22

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.84     6.51       5.556
      2       12.12    24.32       2.374

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.12   Tc(MIN.) =   24.32
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     54.50 =    1909.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.50 TO NODE     60.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    54.75  DOWNSTREAM(FEET) =    52.37
  FLOW LENGTH(FEET) =   800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.48
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.12
  PIPE TRAVEL TIME(MIN.) =   2.98    Tc(MIN.) =   27.30
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =    2709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     60.50 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.30
  RAINFALL INTENSITY(INCH/HR) =   2.20
  TOTAL STREAM AREA(ACRES) =     5.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.12

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 60                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                     |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.20   RAIN INTENSITY(INCH/HOUR) =  3.36
  TOTAL AREA(ACRES) =     1.43   TOTAL RUNOFF(CFS) =      3.40

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    71.25  DOWNSTREAM(FEET) =    70.98
  FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.40
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   14.28
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =     131.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     60.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.28
```

```
  RAINFALL INTENSITY(INCH/HR) =   3.35
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.12    27.30        2.204          5.42
      2        3.40    14.28        3.347          1.43

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.38    14.28       3.347
      2       14.36    27.30       2.204

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.36   Tc(MIN.) =   27.30
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     60.50 =    2709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.50 TO NODE     64.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    52.36  DOWNSTREAM(FEET) =    51.93
  FLOW LENGTH(FEET) =   143.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.79
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.36
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   27.80
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =    2852.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     64.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.80
  RAINFALL INTENSITY(INCH/HR) =   2.18
  TOTAL STREAM AREA(ACRES) =     6.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.36
```

```
+----------------------------------------------------------------------------+
| USER SPECIFY HYDROLOOGY FROM SUB BASIN ENCINITAS 64                        |
| REFER TO HYDROLOGY CALCULATIONS AND DRAINAGE EXHIBIT                       |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.20   RAIN INTENSITY(INCH/HOUR) =  6.42
  TOTAL AREA(ACRES) =     0.28   TOTAL RUNOFF(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    68.80  DOWNSTREAM(FEET) =    68.72
  FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.23
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =     139.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     64.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.23
  RAINFALL INTENSITY(INCH/HR) =   6.40
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.36    27.80        2.178          6.85
      2        1.50     5.23        6.397          0.28
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.39     5.23       6.397
      2       14.87    27.80       2.178

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.87   Tc(MIN.) =   27.80
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     64.50 =    2852.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.50 TO NODE     65.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    51.92  DOWNSTREAM(FEET) =    51.06
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.87
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   28.78
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     65.50 =    3137.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.50 TO NODE     65.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.78
  RAINFALL INTENSITY(INCH/HR) =   2.13
  TOTAL STREAM AREA(ACRES) =     7.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.87

+--------------------------------------------------------------------------+
| USER SPECIFY HYDROLOGY FOR SUB BASIN ENCINITAS 65                        |
| REFERENCE HYDROLOGY CALCULATIONS AND DRAIANGE EXHIBIT                    |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =   7
```

```
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.30   RAIN INTENSITY(INCH/HOUR) =  6.34
  TOTAL AREA(ACRES) =     0.85   TOTAL RUNOFF(CFS) =      4.40

****************************************************************************
  FLOW PROCESS FROM NODE     65.50 TO NODE     65.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.30
  RAINFALL INTENSITY(INCH/HR) =   6.34
  TOTAL STREAM AREA(ACRES) =     0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.87    28.78        2.130          7.13
      2        4.40     5.30        6.344          0.85

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.39     5.30       6.344
      2       16.35    28.78       2.130

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.35   Tc(MIN.) =   28.78
  TOTAL AREA(ACRES) =        8.0
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE     65.50 =    3137.10 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.0  TC(MIN.) =     28.78
  PEAK FLOW RATE(CFS)   =      16.35
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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)	
Encintias 53	300	1%	60	4.5	1%	76	74	2	240.0	2.75	1.5	6.0
Encintias 54	450	1%	60	4.1	0.3%	79	78	1	390.0	1.75	3.7	7.8
Encintias 55	660	1%	60	4.1	0.3%	79	77	2	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%	65	6.1	0.2%	78	76	2	855.0	1.75	8.1	14.2
Encintias 61	1625	1%	65	6.1	0.6%	76	66	10	1560.0	2.10	12.4	18.5
Encintias 62	237	1%	65	6.1	1.7%	67	64	3	172.0	3.30	0.9	7.0
Encintias 63	488	1%	65	6.1	2.1%	72	63	9	423.0	3.70	1.9	8.0
Encinitas 64	245	1%	60	4.1	1.1%	75	73	2	185.0	2.75	1.1	5.2
Encinitas 65	343	1%	60	4.1	4.9%	73	59	14	283.0	4.0	1.2	5.3

[1] 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]
Encintias 53	On-Grade	N. Commerical	0.79
Encintias 54	In-Sag	G. Commerical	0.82
Encintias 55	On-Grade	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	On-Grade	G. Commerical	0.82
Encintias 60*	In-Sag	24.0 Du/A or less	0.71
Encintias 61*	In-Sag	24.0 Du/A or less	0.71
Encintias 62*	In-Sag	24.0 Du/A or less	0.71
Encinitas 63*	On-Grade	24.0 Du/A or less	0.71
Encinitas 64	On-Grade	G. Commercial	0.82
Encinitas 65	On-Grade	G. Commercial	0.82

[1] Using Table 3-1 of the San Diego County Hydrology Manual (SDCHM)

*Land use for Encinitas 60, 61, 62, and 63 was determined using 65% imperviousness.

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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

Curb Inlet Sizing

Project: Coast Highway 101 - Moonlight
INLETS ON GRADE

Type of Inlet	Inlet Location/Map ID	Avg. Street Slope[1] S (%)	Peak 50-yr Flow [2] Q (cfs)	Gutter Depression a (ft)	Flow Depth[3] y (ft)	Required Length L (ft) [4]	Use Length [5]	50-yr Gutter Spread [6]
ON-GRADE	Encinitas 53	2.00%	1.8	0.33	0.23	6.1	8.00	7.70
ON-GRADE	Encinitas 55	1.00%	3.1	0.33	0.32	8.5	10.00	9.70
ON-GRADE	Encinitas 59	1.00%	1.2	0.33	0.23	4.1	6.00	5.40
ON-GRADE	Encinitas 64	2.00%	1.3	0.33	0.21	4.7	6.00	5.65
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								

1. Taken from Improvement Plan
2. From hydrology calculations
3. Per section 2.3.1 of the San Diego County Hydrology Manual
4. From Equation: Q = 0.7L(a+y)^3/2
5. Length shown on plans (Required Length of Opening + 1 foot)
6. Gutter Spread calculated in storm sewers (20' max per 2.2.1 of SDCHDM)

Curb Inlet Sizing

SUMP INLETS

Type of Inlet	Inlet Location/Map ID	Surface Flow [1] Q 50 (cfs)	Required Length of Opening [2] (ft)	Use 3 Length [3] (ft.)	50-yr Gutter Spread [4]
SUMP	Encinitas 54	4.4	2.4	5	18.35
SUMP	Encintias 56	0.7	0.4	5	5.38
SUMP	Encinitas 57	0.3	0.2	5	3.06
SUMP	Encinitas 58	1.8	1.0	5	10.11
SUMP	Encinitas 60	3.0	1.7	5	14.21
SUMP	Encinitas 62	2.2	1.2	5	9.15

1. From hydrology calculations
2. From The Orifice Equation: $Q = C*A\ (2*g*H)^{1/2}$

   The Orifice Coefficient, C = 0.6, and Gravitational Constant, g = 32.2 ft/s^2, and AREA, A = L*h

   The Inlet Openinig Height, h = 0.5 ft, Per SDRSD D-2

   The Head Measured from the Centroid of Orifice, H = 10" (Ponded to TC)-3" (centroid) = 0.58 ft

   ∴ $Q = .6*L*0.5*(2*32.2*0.58)^{1/2}$, Therefore L=Q/1.8
3. Length shown on plans (Required Length of Opening + 1 foot)
4. Gutter Spread calculated in storm sewers (20' max per 2.2.1 of SDCHDM)

Line No.	Inlet ID	Area	Inlet Time	Int.	Runoff Coeff.	Q = CIA	Q Carry-over	Q Captured	Q Bypassed	Junct Type	Curb Height	Curb Length	Grate Area	Grate Length	Grate Width	Gutter Slope	Gutter Width	Cross Slope, Sw	Cross Slope, Sx	Local Depr.	Inlet Depth
		(ac)	(min)	(in/hr)	(C)	(cfs)	(cfs)	(cfs)	(cfs)		(in)	(ft)	(sqft)	(ft)	(ft)	(ft/ft)	(ft)	(ft/ft)	(ft/ft)	(in)	(ft)
1		0.00	0.0	0.00	0.00	6.00	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
2		0.00	0.0	0.00	0.00	6.00	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
3		0.00	0.0	0.00	0.00	1.20	0.00	1.20	0.00	Curb	4.0	16.76	....	....	....	0.020	2.00	0.050	0.020	0.33	0.20
4		0.00	0.0	0.00	0.00	4.87	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
5		0.00	0.0	0.00	0.00	1.80	0.00	1.80	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.26
6		0.00	0.0	0.00	0.00	3.75	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
7		0.00	0.0	0.00	0.00	0.30	0.00	0.30	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.12
8		0.00	0.0	0.00	0.00	0.70	0.00	0.70	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.17
9		0.00	0.0	0.00	0.00	3.10	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
10		0.00	0.0	0.00	0.00	3.10	0.00	2.06	1.04	Curb	6.0	11.00	....	....	....	0.010	2.00	0.050	0.020	0.0	0.25
11	New	0.00	0.0	0.00	0.00	13.56	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
12	New	0.00	0.0	0.00	0.00	12.27	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
13		0.00	0.0	0.00	0.00	1.30	0.00	0.57	0.73	Curb	6.0	5.00	....	....	....	0.020	2.00	0.050	0.020	0.0	0.17
14		0.00	0.0	0.00	0.00	11.83	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
15		0.00	0.0	0.00	0.00	3.00	0.00	3.00	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.34
16		0.00	0.0	0.00	0.00	0.01	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
17		0.00	0.0	0.00	0.00	9.88	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
18		0.00	0.0	0.00	0.00	4.40	0.00	4.40	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.43
19		0.00	0.0	0.00	0.00	7.76	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
20		0.00	0.0	0.00	0.00	1.80	0.00	1.16	0.64	Curb	6.0	8.00	....	....	....	0.010	2.00	0.050	0.020	0.0	0.21
21		0.00	0.0	0.00	0.00	6.99	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
22		0.00	0.0	0.00	0.00	6.99	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
23		0.00	0.0	0.00	0.00	4.80	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
24		0.00	0.0	0.00	0.00	4.58	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
25		0.00	0.0	0.00	0.00	2.20	0.00	2.20	0.00	Curb	4.0	4.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.31
26		0.00	0.0	0.00	0.00	2.70	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....

Line No.	Bypass Depth	Bypass Spread	Gutter Depth	Gutter Spread	Bypass Line No.
	(ft)	(ft)	(ft)	(ft)	
1	....	....	....	....	....
2	....	....	....	....	....
3	0.00	0.00	0.17	5.43	2
4	....	....	....	....	....
5	n/a	n/a	0.26	10.11	Sag
6	....	....	....	....	....
7	n/a	n/a	0.12	3.06	Sag
8	n/a	n/a	0.17	5.38	Sag
9	....	....	....	....	....
10	0.18	5.99	0.25	9.69	9
11	....	....	....	....	....
12	....	....	....	....	....
13	0.14	4.19	0.17	5.65	12
14	....	....	....	....	....
15	n/a	n/a	0.34	14.21	Sag
16	....	....	....	....	....
17	....	....	....	....	....
18	n/a	n/a	0.43	18.35	Sag
19	....	....	....	....	....
20	0.15	4.69	0.21	7.69	19
21	....	....	....	....	....
22	....	....	....	....	....
23	....	....	....	....	....
24	....	....	....	....	....
25	n/a	n/a	0.31	12.55	Sag
26	....	....	....	....	....

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100 Year Inlet Result Summary

Curb Inlet Sizing

Project: Coast Highway 101 - Moonlight
INLETS ON GRADE

Type of Inlet	Inlet Location/Map ID	Avg. Street Slope[1] S (%)	Peak 100-yr Flow [2] Q (cfs)	Gutter Depression a (ft)	Flow Depth[3] y (ft)	Required Length L (ft) [4]	Use Length [5]	100-yr Gutter Spread [6]
ON-GRADE	Encinitas 53	2.00%	2.0	0.33	0.24	6.6	8.00	8.10
ON-GRADE	Encinitas 55	1.00%	3.6	0.33	0.34	9.5	11.00	10.30
ON-GRADE	Encinitas 59	1.00%	1.4	0.33	0.24	4.6	6.00	5.90
ON-GRADE	Encinitas 64	2.00%	1.5	0.33	0.22	5.3	7.00	5.65
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								
ON-GRADE								

1. Taken from Improvement Plan
2. From hydrology calculations
3. Per section 2.3.1 of the San Diego County Hydrology Manual
4. From Equation: Q = 0.7L(a+y)^3/2
5. Length shown on plans (Required Length of Opening + 1 foot)
6. Gutter Spread calculated in storm sewers (20' max per 2.2.1 of SDCHDM)

Curb Inlet Sizing

SUMP INLETS

Type of Inlet	Inlet Location/Map ID	Surface Flow [1] Q 100 (cfs)	Required Length of Opening [2] (ft)	Use 3 Length [3] (ft.)	100-yr Gutter Spread [4]
SUMP	Encinitas 54	5.0	2.8	5	19.98
SUMP	Encintias 56	0.8	0.4	5	5.90
SUMP	Encinitas 57	0.4	0.2	5	3.71
SUMP	Encinitas 58	2.1	1.2	5	11.20
SUMP	Encinitas 60	3.4	1.9	5	15.50
SUMP	Encinitas 62	2.5	1.4	5	9.15

1. From hydrology calculations
2. From The Orifice Equation: $Q = C*A\ (2*g*H)^{1/2}$

   The Orifice Coefficient, C = 0.6, and Gravitational Constant, g = 32.2 ft/s^2, and AREA, A = L*h

   The Inlet Openinig Height, h = 0.5 ft, Per SDRSD D-2

   The Head Measured from the Centroid of Orifice, H = 10" (Ponded to TC)-3" (centroid) = 0.58 ft

   ∴ $Q = .6*L*0.5*(2*32.2*0.58)^{1/2}$, Therefore L=Q/1.8
3. Length shown on plans (Required Length of Opening + 1 foot)
4. Gutter Spread calculated in storm sewers (20' max per 2.2.1 of SDCHDM)

Line No.	Inlet ID	Area	Inlet Time	Int.	Runoff Coeff.	Q = CIA	Q Carry-over	Q Captured	Q Bypassed	Junct Type	Curb Height	Curb Length	Grate Area	Grate Length	Grate Width	Gutter Slope	Gutter Width	Cross Slope, Sw	Cross Slope, Sx	Local Depr.	Inlet Depth
		(ac)	(min)	(in/hr)	(C)	(cfs)	(cfs)	(cfs)	(cfs)		(in)	(ft)	(sqft)	(ft)	(ft)	(ft/ft)	(ft)	(ft/ft)	(ft/ft)	(in)	(ft)
1		0.00	0.0	0.00	0.00	7.03	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
2		0.00	0.0	0.00	0.00	7.03	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
3		0.00	0.0	0.00	0.00	1.40	0.00	1.40	0.00	Curb	4.0	16.76	....	....	....	0.020	2.00	0.050	0.020	0.33	0.20
4		0.00	0.0	0.00	0.00	5.69	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
5		0.00	0.0	0.00	0.00	2.10	0.00	2.10	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.28
6		0.00	0.0	0.00	0.00	4.38	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
7		0.00	0.0	0.00	0.00	0.40	0.00	0.40	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.13
8		0.00	0.0	0.00	0.00	0.80	0.00	0.80	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.18
9		0.00	0.0	0.00	0.00	3.60	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
10		0.00	0.0	0.00	0.00	3.60	0.00	2.26	1.34	Curb	6.0	11.00	....	....	....	0.010	2.00	0.050	0.020	0.0	0.27
11	New	0.00	0.0	0.00	0.00	16.37	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
12	New	0.00	0.0	0.00	0.00	14.87	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
13		0.00	0.0	0.00	0.00	1.50	0.00	0.61	0.89	Curb	6.0	5.00	....	....	....	0.020	2.00	0.050	0.020	0.0	0.18
14		0.00	0.0	0.00	0.00	14.36	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
15		0.00	0.0	0.00	0.00	3.40	0.00	3.40	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.37
16		0.00	0.0	0.00	0.00	0.01	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
17		0.00	0.0	0.00	0.00	12.12	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
18		0.00	0.0	0.00	0.00	5.00	0.00	5.00	0.00	Curb	6.0	5.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.46
19		0.00	0.0	0.00	0.00	9.00	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
20		0.00	0.0	0.00	0.00	2.00	0.00	1.24	0.76	Curb	6.0	8.00	....	....	....	0.010	2.00	0.050	0.020	0.0	0.22
21		0.00	0.0	0.00	0.00	8.82	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
22		0.00	0.0	0.00	0.00	8.82	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
23		0.00	0.0	0.00	0.00	5.30	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
24		0.00	0.0	0.00	0.00	5.24	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....
25		0.00	0.0	0.00	0.00	2.45	0.00	2.45	0.00	Curb	4.0	4.00	....	....	....	Sag	2.00	0.050	0.020	0.0	0.33
26		0.00	0.0	0.00	0.00	3.11	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....

Line No.	Bypass Depth	Bypass Spread	Gutter Depth	Gutter Spread	Bypass Line No.
	(ft)	(ft)	(ft)	(ft)	
1	....	....	....	....	....
2	....	....	....	....	....
3	0.00	0.00	0.18	5.86	2
4	....	....	....	....	....
5	n/a	n/a	0.28	11.20	Sag
6	....	....	....	....	....
7	n/a	n/a	0.13	3.71	Sag
8	n/a	n/a	0.18	5.89	Sag
9	....	....	....	....	....
10	0.20	6.75	0.27	10.31	9
11	....	....	....	....	....
12	....	....	....	....	....
13	0.15	4.65	0.18	6.05	12
14	....	....	....	....	....
15	n/a	n/a	0.37	15.45	Sag
16	....	....	....	....	....
17	....	....	....	....	....
18	n/a	n/a	0.46	19.98	Sag
19	....	....	....	....	....
20	0.16	5.15	0.22	8.05	19
21	....	....	....	....	....
22	....	....	....	....	....
23	....	....	....	....	....
24	....	....	....	....	....
25	n/a	n/a	0.33	13.48	Sag
26	....	....	....	....	....

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Appendix E – 100 Year Storm Drain Phases 1C & 1E

Included within this appendix:

100 Year Pipe Results Summary

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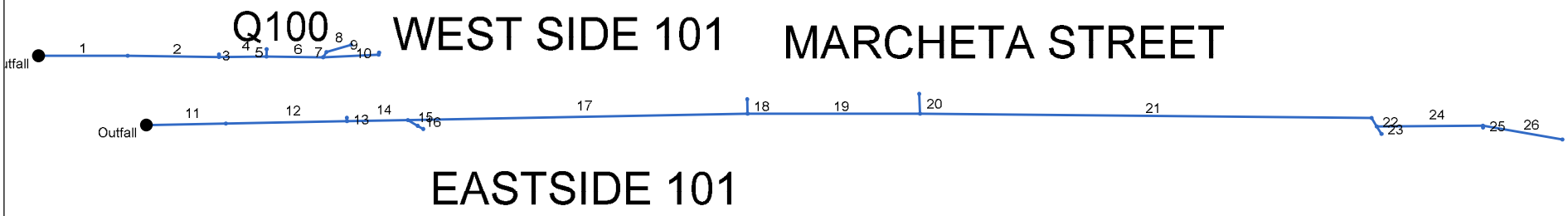
100 Year Pipe Results

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: moonlight Phases 1C 1E.stm	Number of lines: 26	Date: 7/27/2020

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1		Manhole	64.43	Cir	4.00	4.00	18	Cir	51.16	18	Cir	51.20
2		Manhole	73.00	Cir	4.00	4.00	18	Cir	53.32	18 18	Cir Cir	53.30 53.36
3		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	53.50			
4		Manhole	75.00	Cir	4.00	4.00	18	Cir	54.48	18 18	Cir Cir	66.10 54.52
5		Curb-Horiz	74.04	Cir	4.00	4.00	18	Cir	66.27			
6		Manhole	76.50	Cir	4.00	4.00	18	Cir	55.87	18 18	Cir Cir	55.89 55.91
7		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	56.00	18	Cir	55.90
8		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	56.50			
9		Manhole	77.29	Cir	4.00	4.00	18	Cir	57.23	18	Cir	57.20
10		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	57.30			
11	New	Manhole	59.38	Cir	4.00	4.00	18	Cir	51.06	24	Cir	51.06
12	New	Manhole	73.45	Cir	4.00	4.00	24	Cir	51.92	18 24	Cir Cir	68.72 51.93
13		Curb-Horiz	73.44	Cir	4.00	4.00	18	Cir	68.80			
14		Manhole	76.02	Cir	4.00	4.00	24	Cir	52.36	18 24	Cir Cir	70.98 52.37
15		Curb-Horiz	75.88	Cir	4.00	4.00	18	Cir	71.25	18	Cir	71.29
16		Manhole	76.74	Cir	4.00	4.00	18	Cir	71.44			
17		Manhole	79.08	Cir	4.00	4.00	24	Cir	54.75	18 24	Cir Cir	67.64 54.77
18		Curb-Horiz	79.50	Cir	4.00	4.00	18	Cir	67.98			
19		Manhole	78.86	Cir	4.00	4.00	24	Cir	55.97	18 24	Cir Cir	66.43 55.98

Project File: moonlight Phases 1C 1E.stm | Number of Structures: 26 | Run Date: 7/27/2020

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
20		Curb-Horiz	79.00	Cir	4.00	4.00	18	Cir	66.90			
21		Manhole	66.92	Cir	4.00	4.00	24	Cir	59.12	18	Cir	59.12
22		Manhole	66.15	Cir	4.00	4.00	18	Cir	59.19	18 18	Cir Cir	59.20 59.20
23		Manhole	64.64	Cir	4.00	4.00	18	Cir	59.26			
24		Manhole	64.43	Cir	4.00	4.00	18	Cir	59.97	18 18	Cir Cir	59.98 60.00
25		Curb-Horiz	64.58	Cir	4.00	4.00	18	Cir	59.99			
26		Manhole	63.00	Cir	4.00	4.00	18	Cir	60.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PHASE 1 C MAIN	7.03	18	Cir	210.000	44.10	51.16	3.362	45.41	52.19	n/a	52.19 j	End	Manhole
2	PHASE 1 C MAIN	7.03	18	Cir	215.000	51.20	53.32	0.986	52.19	54.35	n/a	54.35	1	Manhole
3	A 58 Lateral 2 (No Profile)	1.40	18	Cir	6.000	53.30	53.50	3.333	54.35	53.94	n/a	53.94	2	Curb-Horiz
4	PHASE 1 C MAIN	5.69	18	Cir	111.800	53.36	54.48	1.002	54.35	55.40	n/a	55.40 j	2	Manhole
5	A56 Lateral 3 16+25	2.10	18	Cir	17.200	66.10	66.27	0.988	66.56	66.82	0.20	66.82	4	Curb-Horiz
6	PHASE 1 C MAIN	4.38	18	Cir	133.260	54.52	55.87	1.013	55.40	56.67	n/a	56.67 j	4	Manhole
7	A55 Lateral 5 (No Profile)	0.40	18	Cir	14.700	55.89	56.00	0.748	56.67	56.23	0.09	56.23	6	Curb-Horiz
8	A55 Lateral 5 (No Profile)	0.80	18	Cir	60.530	55.90	56.50	0.991	56.23	56.83	n/a	56.83	7	Curb-Horiz
9	PHASE 1 C MAIN	3.60	18	Cir	131.100	55.91	57.23	1.007	56.67	57.95	n/a	57.95 j	6	Manhole
10	A 54 Lateral 6 (No Profile)	3.60	18	Cir	5.000	57.20	57.30	2.000	57.95	58.02	n/a	58.02 j	9	Curb-Horiz
11	EX 18 INCH	16.37	18	Cir	187.250	43.05	51.06	4.278	52.84*	57.39*	0.20	57.59	End	Manhole
12	PHASE 1 E MAIN	14.87	24	Cir	285.000	51.06	51.92	0.302	57.59*	58.82*	0.35	59.17	11	Manhole
13	LAT 14+96.96	1.50	18	Cir	8.000	68.72	68.80	1.000	69.10	69.26	n/a	69.26	12	Curb-Horiz
14	PHASE 1 E MAIN	14.36	24	Cir	143.410	51.93	52.36	0.300	59.17*	59.75*	0.19	59.94	12	Manhole
15	LAT 4 16+44.34	3.40	18	Cir	27.000	70.98	71.25	1.000	71.57	71.95	n/a	71.95	14	Curb-Horiz
16	LAT 4 16+44.34	0.01	18	Cir	15.000	71.29	71.44	1.000	71.95	71.48	n/a	71.48	15	Manhole
17	PHASE 1 E MAIN	12.12	24	Cir	800.000	52.37	54.75	0.298	59.94*	62.24*	0.23	62.47	14	Manhole
18	LAT 24+45.71	5.70	18	Cir	34.000	67.64	67.98	1.000	68.43	68.90	n/a	68.90	17	Curb-Horiz
19	PHASE 1 E MAIN	9.00	24	Cir	405.900	54.77	55.97	0.296	62.47*	63.11*	0.13	63.24	17	Manhole
20	LAT 28+53.97	2.00	18	Cir	47.000	66.43	66.90	1.000	66.87	67.43	n/a	67.43	19	Curb-Horiz
21	PHASE 1 E MAIN	8.82	24	Cir	1063.000	55.98	59.12	0.295	63.24*	64.86*	0.11	64.96	19	Manhole
22	BASIN LAT 38+94.76 B	8.82	18	Cir	23.200	59.12	59.19	0.302	64.96*	65.13*	0.34	65.47	21	Manhole
23	BASIN LAT 38+94.76 A	5.30	18	Cir	21.000	59.20	59.26	0.286	65.47*	65.52*	0.14	65.66	22	Manhole
24	E.P. LAT 41+75	5.24	18	Cir	250.000	59.20	59.97	0.308	65.47*	66.09*	0.14	66.23	22	Manhole

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Known Qs only ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	E.P. CURB INLET	2.45	18	Cir	4.430	59.98	59.99	0.226	66.23*	66.23*	0.03	66.26	24	Curb-Horiz
26	BASIN LAT 43+50	3.11	18	Cir	190.000	60.00	60.60	0.316	66.23*	66.39*	0.05	66.44	24	Manhole

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Known Qs only ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1		7.03*	0.00	0.00	7.03	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2		7.03*	0.00	0.00	7.03	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3		1.40*	0.00	1.40	0.00	Curb	4.0	16.76	0.00	0.00	0.00	0.020	2.00	0.050	0.020	0.013	0.18	5.86	0.03	0.00	0.3	2
4		5.69*	0.00	0.00	5.69	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5		2.10*	0.00	2.10	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.28	11.20	0.28	11.20	0.0	Off
6		4.38*	0.00	0.00	4.38	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7		0.40*	0.00	0.40	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.13	3.71	0.13	3.71	0.0	Off
8		0.80*	0.00	0.80	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.18	5.89	0.18	5.89	0.0	Off
9		3.60*	1.34	0.00	4.94	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10		3.60*	0.00	2.26	1.34	Curb	6.0	11.00	0.00	0.00	0.00	0.010	2.00	0.050	0.020	0.013	0.27	10.31	0.20	6.75	0.0	9
11	New	16.37*	0.00	0.00	16.37	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
12	New	14.87*	0.89	0.00	15.76	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
13		1.50*	0.00	0.61	0.89	Curb	6.0	5.00	0.00	0.00	0.00	0.020	2.00	0.050	0.020	0.013	0.18	6.05	0.15	4.65	0.0	12
14		14.36*	0.00	0.00	14.36	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
15		3.40*	0.00	3.40	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.37	15.45	0.37	15.45	0.0	Off
16		0.01*	0.00	0.00	0.01	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17		12.12*	0.00	0.00	12.12	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
18		5.70*	0.00	5.70	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.50	21.80	0.50	21.80	0.0	Off
19		9.00*	0.76	0.00	9.76	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
20		2.00*	0.00	1.24	0.76	Curb	6.0	8.00	0.00	0.00	0.00	0.010	2.00	0.050	0.020	0.013	0.22	8.05	0.16	5.15	0.0	19
21		8.82*	0.00	0.00	8.82	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
22		8.82*	0.00	0.00	8.82	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
23		5.30*	0.00	0.00	5.30	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Inlet N-Values = 0.016; Known Qs only; * Indicates Known Q added. All curb inlets are Horiz throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24		5.24*	0.00	0.00	5.24	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
25		2.45*	0.00	2.45	0.00	Curb	4.0	4.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.33	13.48	0.33	13.48	0.0	Off
26		3.11*	0.00	0.00	3.11	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Inlet N-Values = 0.016; Known Qs only; * Indicates Known Q added. All curb inlets are Horiz throat.

MyReport

Line No.	Area Dn (sqft)	Area Up (sqft)	Byp Ln No	Coeff C1 (C)	Coeff C2 (C)	Coeff C3 (C)	Capac Full (cfs)	Crit Depth (ft)	Cross Sl, Sw (ft/ft)	Cross Sl, Sx (ft/ft)	Curb Len (ft)	Defl Ang (Deg)	Depth Dn (ft)	Depth Up (ft)	DnStm Ln No	Drng Area (ac)	Easting X (ft)	EGL Dn (ft)	EGL Up (ft)	Energy Loss (ft)
1	1.29	1.29	n/a	0.20	0.50	0.90	19.25	1.03	....	....	....	0.000	1.31	1.03**	Outfall	0.00	338.22	45.87	52.65	0.000
2	1.23	1.29	n/a	0.20	0.50	0.90	10.43	1.03	....	....	....	0.741	0.99	1.03**	1	0.00	553.20	52.65	54.81	0.000
3	0.44	0.44	2	0.20	0.50	0.90	19.17	0.44	0.050	0.020	16.76	-91.397	1.05	0.44**	2	0.00	553.13	54.51	54.10	0.000
4	1.14	1.14	n/a	0.20	0.50	0.90	10.51	0.92	....	....	....	-1.264	0.99	0.92**	2	0.00	665.00	54.74	55.79	0.000
5	0.45	0.58	Sag	0.20	0.50	0.90	10.44	0.55	0.050	0.020	5.00	-88.736	0.46	0.55**	4	0.00	665.22	66.76	67.02	0.000
6	0.96	0.96	n/a	0.20	0.50	0.90	10.57	0.80	....	....	....	1.264	0.88	0.80**	4	0.00	798.25	55.72	56.99	0.000
7	0.18	0.18	Sag	0.20	0.50	0.90	9.08	0.23	0.050	0.020	5.00	-59.036	0.78	0.23**	6	0.00	805.97	56.75	56.31	0.000
8	0.29	0.29	Sag	0.20	0.50	0.90	10.46	0.33	0.050	0.020	5.00	42.070	0.33	0.33**	7	0.00	864.09	56.35	56.95	0.000
9	0.84	0.84	n/a	0.20	0.50	0.90	10.54	0.72	....	....	....	-3.447	0.76	0.72**	6	0.00	929.20	56.95	58.24	0.000
10	0.84	0.84	9	0.20	0.50	0.90	14.85	0.72	0.050	0.020	11.00	-79.121	0.75	0.72**	9	0.00	929.91	58.24	58.31	0.000
11	1.77	1.77	n/a	0.20	0.50	0.90	21.72	1.43	....	....	....	-1.085	1.50	1.50	Outfall	0.00	569.39	54.17	58.73	4.551
12	3.14	3.14	n/a	0.20	0.50	0.90	12.42	1.39	....	....	....	0.000	2.00	2.00	11	0.00	854.34	57.94	59.17	1.232
13	0.36	0.46	12	0.20	0.50	0.90	10.50	0.46	0.050	0.020	5.00	-90.261	0.38	0.46**	12	0.00	854.15	69.27	69.43	0.000
14	3.14	3.14	n/a	0.20	0.50	0.90	12.38	1.36	....	....	....	0.000	2.00	2.00	12	0.00	997.72	59.50	60.08	0.578
15	0.64	0.81	Sag	0.20	0.50	0.90	10.50	0.70	0.050	0.020	5.00	31.347	0.59	0.70**	14	0.00	1021.04	71.84	72.22	0.000
16	0.01	0.01	n/a	0.20	0.50	0.90	10.50	0.04	....	....	....	0.000	0.66	0.04**	15	0.00	1034.00	71.96	71.49	0.000
17	3.14	3.14	n/a	0.20	0.50	0.90	12.34	1.25	....	....	....	0.000	2.00	2.00	14	0.00	1797.58	60.17	62.47	2.298
18	0.94	1.14	Sag	0.20	0.50	0.90	10.50	0.92	0.050	0.020	5.00	-90.727	0.79	0.92**	17	0.00	1796.50	68.82	69.29	0.000
19	3.14	3.14	n/a	0.20	0.50	0.90	12.30	1.07	....	....	....	1.129	2.00	2.00	17	0.00	2203.48	62.60	63.24	0.643
20	0.44	0.56	19	0.20	0.50	0.90	10.50	0.53	0.050	0.020	8.00	-92.737	0.44	0.53**	19	0.00	2201.27	67.07	67.63	0.000
21	3.14	3.14	n/a	0.20	0.50	0.90	12.29	1.06	....	....	....	0.497	2.00	2.00	19	0.00	3266.43	63.36	64.98	1.617
22	1.77	1.77	n/a	0.20	0.50	0.90	5.77	1.15	....	....	....	58.098	1.50	1.50	21	0.00	3278.51	65.35	65.51	0.164
23	1.77	1.77	n/a	0.20	0.50	0.90	5.61	0.89	....	....	....	-1.044	1.50	1.50	22	0.00	3289.76	65.61	65.66	0.054

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Line No.	Area Dn (sqft)	Area Up (sqft)	Byp Ln No	Coeff C1 (C)	Coeff C2 (C)	Coeff C3 (C)	Capac Full (cfs)	Crit Depth (ft)	Cross Sl, Sw (ft/ft)	Cross Sl, Sx (ft/ft)	Curb Len (ft)	Defl Ang (Deg)	Depth Dn (ft)	Depth Up (ft)	DnStm Ln No	Drng Area (ac)	Easting X (ft)	EGL Dn (ft)	EGL Up (ft)	Energy Loss (ft)	
24	1.77	1.77	n/a	0.20	0.50	0.90	5.83	0.88	....	....	....	-59.072	1.50	1.50	22	0.00	3528.50	65.60	66.23	0.623	
25	1.77	1.77	Sag	0.20	0.50	0.90	4.99	0.59	0.050	0.020	4.00	87.948	1.50	1.50	24	0.00	3528.69	66.26	66.26	0.002	
26	1.77	1.77	n/a	0.20	0.50	0.90	5.90	0.67	....	....	....	10.300	1.50	1.50	24	0.00	3715.69	66.27	66.44	0.167	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Flow Rate (cfs)	Sf Ave (ft/ft)	Sf Dn (ft/ft)	Grate Area (sqft)	Grate Len (ft)	Grate Width (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	Gutter Depth (ft)	Gutter Slope (ft/ft)	Gutter Spread (ft)	Gutter Width (ft)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	HGL Jmp Dn (ft)	HGL Jmp Up (ft)	Incr CxA	Incr Q (cfs)	Inlet Depth (ft)	Inlet Eff (%)
7.03	0.000	0.000	....	....	....	52.70	64.43	....	....	....	....	45.41	52.19 j	52.19	45.83	45.68	0.00	7.03	....	....
7.03	0.000	0.000	....	....	....	64.43	73.00	....	....	....	....	52.19	54.35	54.35	....	....	0.00	7.03	....	....
1.40	0.000	0.000	....	....	....	73.00	0.00	0.18	0.020	5.86	2.00	54.35	53.94	53.94	....	....	0.00	1.40	0.20	100
5.69	0.000	0.000	....	....	....	73.00	75.00	....	....	....	....	54.35	55.40 j	55.40	54.40	54.34	0.00	5.69	....	....
2.10	0.000	0.000	....	....	....	75.00	74.04	0.28	Sag	11.20	2.00	66.56	66.82	66.82	....	....	0.00	2.10	0.28	100
4.38	0.000	0.000	....	....	....	75.00	76.50	....	....	....	....	55.40	56.67 j	56.67	55.46	55.39	0.00	4.38	....	....
0.40	0.000	0.000	....	....	....	76.50	0.00	0.13	Sag	3.71	2.00	56.67	56.23	56.23	....	....	0.00	0.40	0.13	100
0.80	0.000	0.000	....	....	....	0.00	0.00	0.18	Sag	5.89	2.00	56.23	56.83	56.83	....	....	0.00	0.80	0.18	100
3.60	0.000	0.000	....	....	....	76.50	77.29	....	....	....	....	56.67	57.95 j	57.95	56.77	56.70	0.00	3.60	....	....
3.60	0.000	0.000	....	....	....	77.29	0.00	0.27	0.010	10.31	2.00	57.95	58.02 j	58.02	57.94	57.93	0.00	3.60	0.27	63
16.37	2.431	2.431	....	....	....	49.95	59.38	....	....	....	....	52.84	57.39	57.59	....	....	0.00	16.37	....	....
14.87	0.432	0.432	....	....	....	59.38	73.45	....	....	....	....	57.59	58.82	59.17	....	....	0.00	14.87	....	....
1.50	0.000	0.000	....	....	....	73.45	73.44	0.18	0.020	6.05	2.00	69.10	69.26	69.26	....	....	0.00	1.50	0.18	41
14.36	0.403	0.403	....	....	....	73.45	76.02	....	....	....	....	59.17	59.75	59.94	....	....	0.00	14.36	....	....
3.40	0.000	0.000	....	....	....	76.02	75.88	0.37	Sag	15.45	2.00	71.57	71.95	71.95	....	....	0.00	3.40	0.37	100
0.01	0.000	0.000	....	....	....	75.88	76.74	....	....	....	....	71.95	71.48	71.48	....	....	0.00	0.01	....	....
12.12	0.287	0.287	....	....	....	76.02	79.08	....	....	....	....	59.94	62.24	62.47	....	....	0.00	12.12	....	....
5.70	0.000	0.000	....	....	....	79.08	79.50	0.50	Sag	21.80	2.00	68.43	68.90	68.90	....	....	0.00	5.70	0.50	100
9.00	0.158	0.158	....	....	....	79.08	78.86	....	....	....	....	62.47	63.11	63.24	....	....	0.00	9.00	....	....
2.00	0.000	0.000	....	....	....	78.86	79.00	0.22	0.010	8.05	2.00	66.87	67.43	67.43	....	....	0.00	2.00	0.22	62
8.82	0.152	0.152	....	....	....	78.86	66.92	....	....	....	....	63.24	64.86	64.96	....	....	0.00	8.82	....	....
8.82	0.706	0.706	....	....	....	66.92	66.15	....	....	....	....	64.96	65.13	65.47	....	....	0.00	8.82	....	....
5.30	0.255	0.255	....	....	....	66.15	64.64	....	....	....	....	65.47	65.52	65.66	....	....	0.00	5.30	....	....

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Flow Rate (cfs)	Sf Ave (ft/ft)	Sf Dn (ft/ft)	Grate Area (sqft)	Grate Len (ft)	Grate Width (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	Gutter Depth (ft)	Gutter Slope (ft/ft)	Gutter Spread (ft)	Gutter Width (ft)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	HGL Jmp Dn (ft)	HGL Jmp Up (ft)	Incr CxA	Incr Q (cfs)	Inlet Depth (ft)	Inlet Eff (%)
5.24	0.249	0.249	....	....	....	66.15	64.43	....	....	....	....	65.47	66.09	66.23	....	....	0.00	5.24	....	....
2.45	0.054	0.054	....	....	....	64.43	64.58	0.33	Sag	13.48	2.00	66.23	66.23	66.26	....	....	0.00	2.45	0.33	100
3.11	0.088	0.088	....	....	....	64.43	63.00	....	....	....	....	66.23	66.39	66.44	....	....	0.00	3.11	....	....

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Inlet ID	Inlet Loc	(ft)	Inlet Time (min)	i Sys (in/hr)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Jump Loc (ft)	Jump Len (ft)	Vel Hd Jmp Dn (ft)	Vel Hd Jmp Up (ft)	J-Loss Coeff	Junct Type	Known Q (cfs)	Cost RCP	Cost CMP	Cost PVC	
	Sag		0.0	0.00	0.00	44.10	51.16	21.00	5.13	0.46	1.19	0.15 z	MH	7.03	11,685	10,517	9,932	
	Sag		0.0	0.00	0.00	51.20	53.32	....	....	0.00	0.00	1.00 z	MH	7.03	14,943	13,448	12,701	
	On Grade		0.0	0.00	0.00	53.30	53.50	....	....	0.00	0.00	1.00 z	Curb	1.40	313	281	266	
	Sag		0.0	0.00	0.00	53.36	54.48	11.18	4.62	0.39	0.52	1.00 z	MH	5.69	8,363	7,526	7,108	
	Sag		0.0	0.00	0.00	66.10	66.27	....	....	0.00	0.00	1.00 z	Curb	2.10	963	866	818	
	Sag		0.0	0.00	0.00	54.52	55.87	13.33	4.01	0.32	0.47	0.88 z	MH	4.38	9,975	8,978	8,479	
	Sag		0.0	0.00	0.00	55.89	56.00	....	....	0.00	0.00	1.07 z	Curb	0.40	638	574	542	
	Sag		0.0	0.00	0.00	55.90	56.50	....	....	0.00	0.00	1.00 z	Curb	0.80	2,036	1,832	1,731	
	Sag		0.0	0.00	0.00	55.91	57.23	13.11	3.62	0.28	0.43	0.99 z	MH	3.60	9,825	8,843	8,351	
	On Grade		0.0	0.00	0.00	57.20	57.30	0.50	2.50	0.28	0.34	1.00 z	Curb	3.60	278	250	236	
New	Sag		0.0	0.00	0.00	43.05	51.06	....	....	0.00	0.00	0.15	MH	16.37	8,765	7,889	7,450	
New	Sag		0.0	0.00	0.00	51.06	51.92	....	....	0.00	0.00	1.00	MH	14.87	21,168	19,051	17,992	
	On Grade		0.0	0.00	0.00	68.72	68.80	....	....	0.00	0.00	1.00 z	Curb	1.50	440	396	374	
	Sag		0.0	0.00	0.00	51.93	52.36	....	....	0.00	0.00	0.58	MH	14.36	12,155	10,940	10,332	
	Sag		0.0	0.00	0.00	70.98	71.25	....	....	0.00	0.00	0.50 z	Curb	3.40	1,200	1,080	1,020	
	Sag		0.0	0.00	0.00	71.29	71.44	....	....	0.00	0.00	1.00 z	MH	0.01	720	648	612	
	Sag		0.0	0.00	0.00	52.37	54.75	....	....	0.00	0.00	1.00	MH	12.12	68,000	61,200	57,800	
	Sag		0.0	0.00	0.00	67.64	67.98	....	....	0.00	0.00	1.00 z	Curb	5.70	2,020	1,818	1,717	
	Sag		0.0	0.00	0.00	54.77	55.97	....	....	0.00	0.00	1.00	MH	9.00	34,468	31,021	29,297	
	On Grade		0.0	0.00	0.00	66.43	66.90	....	....	0.00	0.00	1.00 z	Curb	2.00	2,980	2,682	2,533	
	Sag		0.0	0.00	0.00	55.98	59.12	....	....	0.00	0.00	0.87	MH	8.82	79,432	71,488	67,517	
	Sag		0.0	0.00	0.00	59.12	59.19	....	....	0.00	0.00	0.88	MH	8.82	1,165	1,049	990	
	Sag		0.0	0.00	0.00	59.20	59.26	....	....	0.00	0.00	1.00	MH	5.30	1,023	920	869	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: Known Qs only. ; ** Critical depth

MyReport

Inlet ID	Inlet Loc	(ft)	Inlet Time (min)	i Sys (in/hr)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Jump Loc (ft)	Jump Len (ft)	Vel Hd Jmp Dn (ft)	Vel Hd Jmp Up (ft)	J-Loss Coeff	Junct Type	Known Q (cfs)	Cost RCP	Cost CMP	Cost PVC	
	Sag		0.0	0.00	0.00	59.20	59.97	....	....	0.00	0.00	1.00	MH	5.24	10,595	9,536	9,006	
	Sag		0.0	0.00	0.00	59.98	59.99	....	....	0.00	0.00	1.00	Curb	2.45	280	252	238	
	Sag		0.0	0.00	0.00	60.00	60.60	....	....	0.00	0.00	1.00	MH	3.11	6,500	5,850	5,525	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: Known Qs only. ; ** Critical depth

MyReport

Line ID	Line Length (ft)	Line Size (in)	Line Slope (%)	Line Type	Local Depr (in)	n-val Gutter	n-val Pipe	Minor Loss (ft)	Northing Y (ft)	Pipe Travel (min)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Line Rise (in)	Runoff Coeff (C)	Line Span (in)	Area A1 (ac)	Area A2 (ac)	Area A3 (ac)
PHASE 1 C MAIN	210.000	18	3.36	Cir	....	....	0.013	n/a	203.69	0.88	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	215.000	18	0.99	Cir	....	....	0.013	n/a	200.91	0.90	....	....	....	18	0.00	18	0.00	0.00	0.00
A 58 Lateral 2 (No Profile)	6.000	18	3.33	Cir	0.33	0.013	0.013	n/a	206.91	0.13	0.00	1.40	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	111.800	18	1.00	Cir	....	....	0.013	n/a	201.93	0.58	....	....	....	18	0.00	18	0.00	0.00	0.00
A56 Lateral 3 16+25	17.200	18	0.99	Cir	0.0	....	0.013	0.20	219.13	0.24	0.00	2.10	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	133.260	18	1.01	Cir	....	....	0.013	n/a	200.21	0.90	....	....	....	18	0.00	18	0.00	0.00	0.00
A55 Lateral 5 (No Profile)	14.700	18	0.75	Cir	0.0	....	0.013	0.09	212.71	1.08	0.00	0.40	0.00	18	0.00	18	0.00	0.00	0.00
A55 Lateral 5 (No Profile)	60.530	18	0.99	Cir	0.0	....	0.013	n/a	229.62	2.23	0.00	0.80	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	131.100	18	1.01	Cir	....	....	0.013	n/a	206.40	1.07	....	....	....	18	0.00	18	0.00	0.00	0.00
A 54 Lateral 6 (No Profile)	5.000	18	2.00	Cir	0.0	0.013	0.013	n/a	211.34	0.04	1.34	2.26	0.00	18	0.00	18	0.00	0.00	0.00
EX 18 INCH	187.250	18	4.28	Cir	....	....	0.013	0.20	43.91	0.34	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	285.000	24	0.30	Cir	....	....	0.013	0.35	49.30	1.00	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 14+96.96	8.000	18	1.00	Cir	0.0	0.013	0.013	n/a	57.30	0.16	0.89	0.61	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	143.410	24	0.30	Cir	....	....	0.013	0.19	52.02	0.52	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 4 16+44.34	27.000	18	1.00	Cir	0.0	....	0.013	n/a	38.41	0.23	0.00	3.40	0.00	18	0.00	18	0.00	0.00	0.00
LAT 4 16+44.34	15.000	18	1.00	Cir	....	....	0.013	n/a	30.85	44.18	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	800.000	24	0.30	Cir	....	....	0.013	0.23	67.17	3.46	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 24+45.71	34.000	18	1.00	Cir	0.0	....	0.013	n/a	101.15	0.18	0.00	5.70	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	405.900	24	0.30	Cir	....	....	0.013	0.13	66.86	2.36	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 28+53.97	47.000	18	1.00	Cir	0.0	0.013	0.013	n/a	113.81	0.69	0.76	1.24	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	1063.000	24	0.30	Cir	....	....	0.013	0.11	56.82	6.31	....	....	....	24	0.00	24	0.00	0.00	0.00
BASIN LAT 38+94.76 B	23.200	18	0.30	Cir	....	....	0.013	0.34	37.01	0.08	....	....	....	18	0.00	18	0.00	0.00	0.00
BASIN LAT 38+94.76 A	21.000	18	0.29	Cir	....	....	0.013	0.14	19.28	0.12	....	....	....	18	0.00	18	0.00	0.00	0.00

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Line ID	Line Length (ft)	Line Size (in)	Line Slope (%)	Line Type	Local Depr (in)	n-val Gutter	n-val Pipe	Minor Loss (ft)	Northing Y (ft)	Pipe Travel (min)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Line Rise (in)	Runoff Coeff (C)	Line Span (in)	Area A1 (ac)	Area A2 (ac)	Area A3 (ac)
E.P. LAT 41+75	250.000	18	0.31	Cir	....	....	0.013	0.14	38.90	1.41	....	....	....	18	0.00	18	0.00	0.00	0.00
E.P. CURB INLET	4.430	18	0.23	Cir	0.0	....	0.013	0.03	34.47	0.05	0.00	2.45	0.00	18	0.00	18	0.00	0.00	0.00
BASIN LAT 43+50	190.000	18	0.32	Cir	....	....	0.013	0.05	6.34	1.80	....	....	....	18	0.00	18	0.00	0.00	0.00

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Tc (min)	Throat Ht (in)	Total Area (ac)	Total CxA	Total Runoff (cfs)	Vel Ave (ft/s)	Vel Dn (ft/s)	Vel Hd Dn (ft)	Vel Hd Up (ft)	Vel Up (ft/s)	Cover Dn (ft)	Cover Up (ft)	Storage (cft)
5.7	....	0.00	0.00	0.00	4.88	4.29	0.46	0.46	5.46	7.10	11.77	309.00
4.8	....	0.00	0.00	0.00	5.59	5.71	0.46	0.46	5.46	11.73	18.18	270.73
0.0	4.0	0.00	0.00	0.00	2.14	1.06	0.16	0.16	3.21	18.20	n/a	5.25
4.2	....	0.00	0.00	0.00	4.82	4.62	0.39	0.39	5.01	18.14	19.02	132.32
0.0	6.0	0.00	0.00	0.00	4.11	4.62	0.20	0.20	3.61	7.40	6.27	8.91
3.3	....	0.00	0.00	0.00	4.31	4.07	0.32	0.32	4.56	18.98	19.13	135.83
2.2	6.0	0.00	0.00	0.00	1.36	0.43	0.08	0.08	2.28	19.11	n/a	7.87
0.0	6.0	0.00	0.00	0.00	2.74	2.73	0.12	0.12	2.75	n/a	n/a	17.67
0.0	....	0.00	0.00	0.00	4.13	3.99	0.28	0.28	4.26	19.09	18.56	114.43
0.0	6.0	0.00	0.00	0.00	4.16	4.05	0.28	0.28	4.26	18.59	n/a	4.33
45.9	....	0.00	0.00	0.00	9.26	9.27	1.33	1.33	9.26	5.40	6.82	330.83
44.9	....	0.00	0.00	0.00	4.73	4.73	0.35	0.35	4.73	6.32	19.53	895.18
0.0	6.0	0.00	0.00	0.00	3.74	4.21	0.17	0.17	3.27	3.23	3.14	3.26
44.4	....	0.00	0.00	0.00	4.57	4.57	0.32	0.32	4.57	19.52	21.66	450.45
44.2	6.0	0.00	0.00	0.00	4.74	5.30	0.27	0.27	4.18	3.54	3.13	19.62
0.0	....	0.00	0.00	0.00	0.45	0.01	0.01	0.01	0.89	3.09	3.80	5.04
12.0	....	0.00	0.00	0.00	3.86	3.86	0.23	0.23	3.86	21.65	22.33	2512.78
0.0	6.0	0.00	0.00	0.00	5.54	6.06	0.39	0.39	5.01	9.94	10.02	35.32
9.6	....	0.00	0.00	0.00	2.87	2.87	0.13	0.13	2.86	22.31	20.89	1274.92
0.0	6.0	0.00	0.00	0.00	4.07	4.58	0.20	0.20	3.56	10.93	10.60	23.47
3.3	....	0.00	0.00	0.00	2.81	2.81	0.12	0.12	2.81	20.88	5.80	3338.85
3.2	....	0.00	0.00	0.00	4.99	4.99	0.39	0.39	4.99	6.30	5.46	40.99
0.0	....	0.00	0.00	0.00	3.00	3.00	0.14	0.14	3.00	5.45	3.88	37.10

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Tc (min)	Throat Ht (in)	Total Area (ac)	Total CxA	Total Runoff (cfs)	Vel Ave (ft/s)	Vel Dn (ft/s)	Vel Hd Dn (ft)	Vel Hd Up (ft)	Vel Up (ft/s)	Cover Dn (ft)	Cover Up (ft)	Storage (cft)	
1.8	....	0.00	0.00	0.00	2.97	2.97	0.14	0.14	2.97	5.45	2.96	441.70	
0.0	4.0	0.00	0.00	0.00	1.39	1.39	0.03	0.03	1.39	2.95	3.09	7.83	
0.0	....	0.00	0.00	0.00	1.76	1.76	0.05	0.05	1.76	2.93	0.90	335.69	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	7.03	44.10	45.41	1.31	1.29	4.29	0.46	45.87	0.000	210.000	51.16	52.19 j	1.03**	1.29	5.46	0.46	52.65	0.000	0.000	n/a	0.15	n/a
2	18	7.03	51.20	52.19	0.99	1.23	5.71	0.46	52.65	0.000	215.000	53.32	54.35	1.03**	1.29	5.46	0.46	54.81	0.000	0.000	n/a	1.00	n/a
3	18	1.40	53.30	54.35	1.05	0.44	1.06	0.16	54.51	0.000	6.000	53.50	53.94	0.44**	0.44	3.21	0.16	54.10	0.000	0.000	n/a	1.00	n/a
4	18	5.69	53.36	54.35	0.99	1.14	4.62	0.39	54.74	0.000	111.800	54.48	55.40 j	0.92**	1.14	5.01	0.39	55.79	0.000	0.000	n/a	1.00	0.39
5	18	2.10	66.10	66.56	0.46*	0.45	4.62	0.20	66.76	0.000	17.200	66.27	66.82	0.55**	0.58	3.61	0.20	67.02	0.000	0.000	n/a	1.00	0.20
6	18	4.38	54.52	55.40	0.88	0.96	4.07	0.32	55.72	0.000	133.260	55.87	56.67 j	0.80**	0.96	4.56	0.32	56.99	0.000	0.000	n/a	0.88	0.28
7	18	0.40	55.89	56.67	0.78	0.18	0.43	0.08	56.75	0.000	14.700	56.00	56.23	0.23**	0.18	2.28	0.08	56.31	0.000	0.000	n/a	1.07	0.09
8	18	0.80	55.90	56.23	0.33	0.29	2.73	0.12	56.35	0.000	60.530	56.50	56.83	0.33**	0.29	2.75	0.12	56.95	0.000	0.000	n/a	1.00	n/a
9	18	3.60	55.91	56.67	0.76	0.84	3.99	0.28	56.95	0.000	131.100	57.23	57.95 j	0.72**	0.84	4.26	0.28	58.24	0.000	0.000	n/a	0.99	n/a
10	18	3.60	57.20	57.95	0.75	0.84	4.05	0.28	58.24	0.000	5.000	57.30	58.02 j	0.72**	0.84	4.26	0.28	58.31	0.000	0.000	n/a	1.00	n/a
11	18	16.37	43.05	52.84	1.50	1.77	9.27	1.33	54.17	2.431	187.250	51.06	57.39	1.50	1.77	9.26	1.33	58.73	2.430	2.431	4.551	0.15	0.20
12	24	14.87	51.06	57.59	2.00	3.14	4.73	0.35	57.94	0.432	285.000	51.92	58.82	2.00	3.14	4.73	0.35	59.17	0.432	0.432	1.232	1.00	0.35
13	18	1.50	68.72	69.10	0.38*	0.36	4.21	0.17	69.27	0.000	8.000	68.80	69.26	0.46**	0.46	3.27	0.17	69.43	0.000	0.000	n/a	1.00	n/a
14	24	14.36	51.93	59.17	2.00	3.14	4.57	0.32	59.50	0.403	143.410	52.36	59.75	2.00	3.14	4.57	0.32	60.08	0.403	0.403	0.578	0.58	0.19
15	18	3.40	70.98	71.57	0.59*	0.64	5.30	0.27	71.84	0.000	27.000	71.25	71.95	0.70**	0.81	4.18	0.27	72.22	0.000	0.000	n/a	0.50	n/a
16	18	0.01	71.29	71.95	0.66	0.01	0.01	0.01	71.96	0.000	15.000	71.44	71.48	0.04**	0.01	0.89	0.01	71.49	0.000	0.000	n/a	1.00	n/a
17	24	12.12	52.37	59.94	2.00	3.14	3.86	0.23	60.17	0.287	800.000	54.75	62.24	2.00	3.14	3.86	0.23	62.47	0.287	0.287	2.298	1.00	0.23
18	18	5.70	67.64	68.43	0.79*	0.94	6.06	0.39	68.82	0.000	34.000	67.98	68.90	0.92**	1.14	5.01	0.39	69.29	0.000	0.000	n/a	1.00	n/a
19	24	9.00	54.77	62.47	2.00	3.14	2.87	0.13	62.60	0.158	405.900	55.97	63.11	2.00	3.14	2.86	0.13	63.24	0.158	0.158	0.643	1.00	0.13
20	18	2.00	66.43	66.87	0.44*	0.44	4.58	0.20	67.07	0.000	47.000	66.90	67.43	0.53**	0.56	3.56	0.20	67.63	0.000	0.000	n/a	1.00	n/a
21	24	8.82	55.98	63.24	2.00	3.14	2.81	0.12	63.36	0.152	1063.000	59.12	64.86	2.00	3.14	2.81	0.12	64.98	0.152	0.152	1.617	0.87	0.11
22	18	8.82	59.12	64.96	1.50	1.77	4.99	0.39	65.35	0.706	23.200	59.19	65.13	1.50	1.77	4.99	0.39	65.51	0.705	0.706	0.164	0.88	0.34

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

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

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	18	5.30	59.20	65.47	1.50	1.77	3.00	0.14	65.61	0.255	21.000	59.26	65.52	1.50	1.77	3.00	0.14	65.66	0.255	0.255	0.054	1.00	0.14
24	18	5.24	59.20	65.47	1.50	1.77	2.97	0.14	65.60	0.249	250.000	59.97	66.09	1.50	1.77	2.97	0.14	66.23	0.249	0.249	0.623	1.00	0.14
25	18	2.45	59.98	66.23	1.50	1.77	1.39	0.03	66.26	0.054	4.430	59.99	66.23	1.50	1.77	1.39	0.03	66.26	0.054	0.054	0.002	1.00	0.03
26	18	3.11	60.00	66.23	1.50	1.77	1.76	0.05	66.27	0.088	190.000	60.60	66.39	1.50	1.77	1.76	0.05	66.44	0.088	0.088	0.167	1.00	0.05

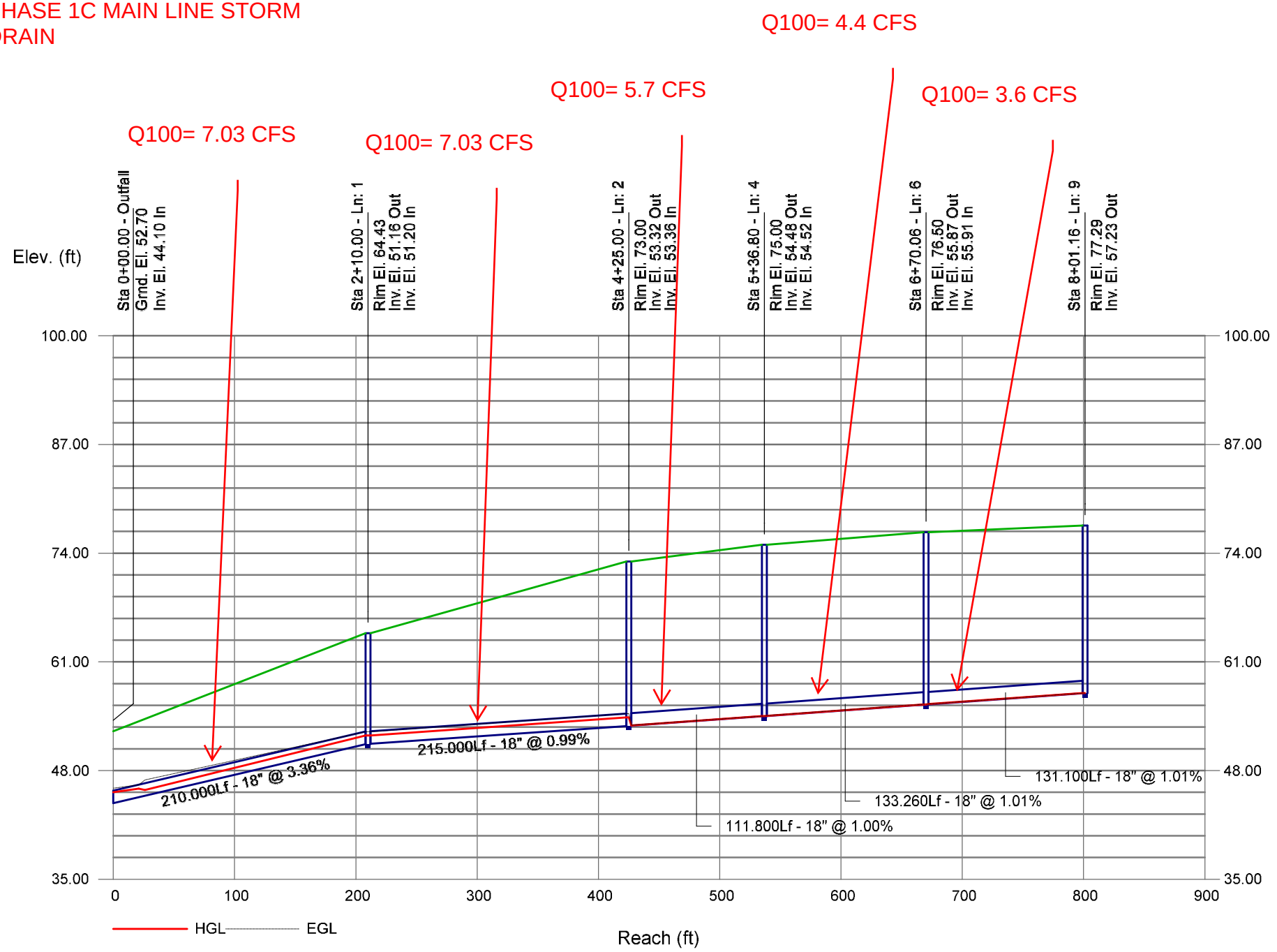
Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

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

Storm Sewer Profile

Proj. file: confluenced_Phase1E_with stubs.stm

PHASE 1C MAIN LINE STORM DRAIN

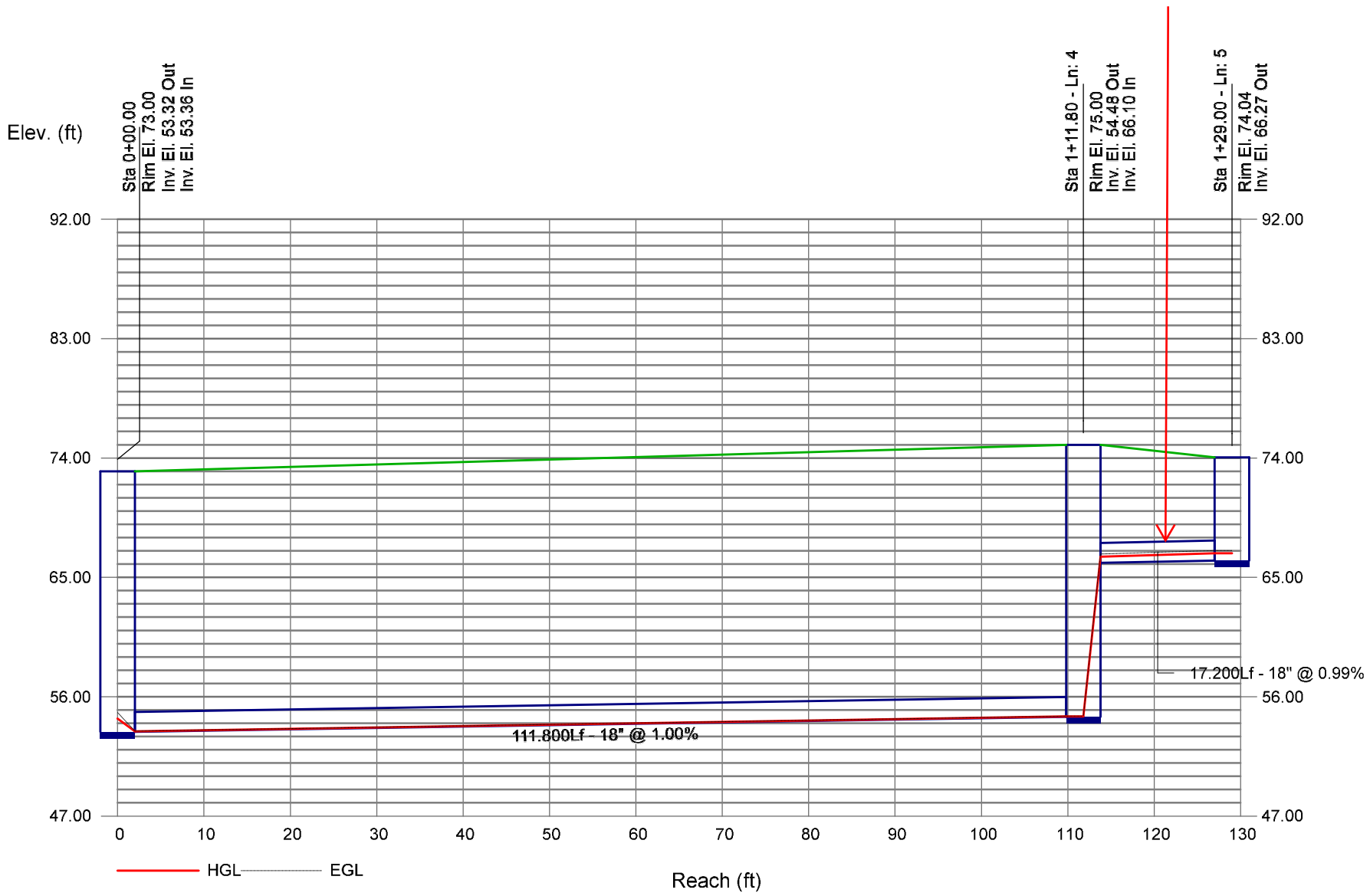


Storm Sewer Profile

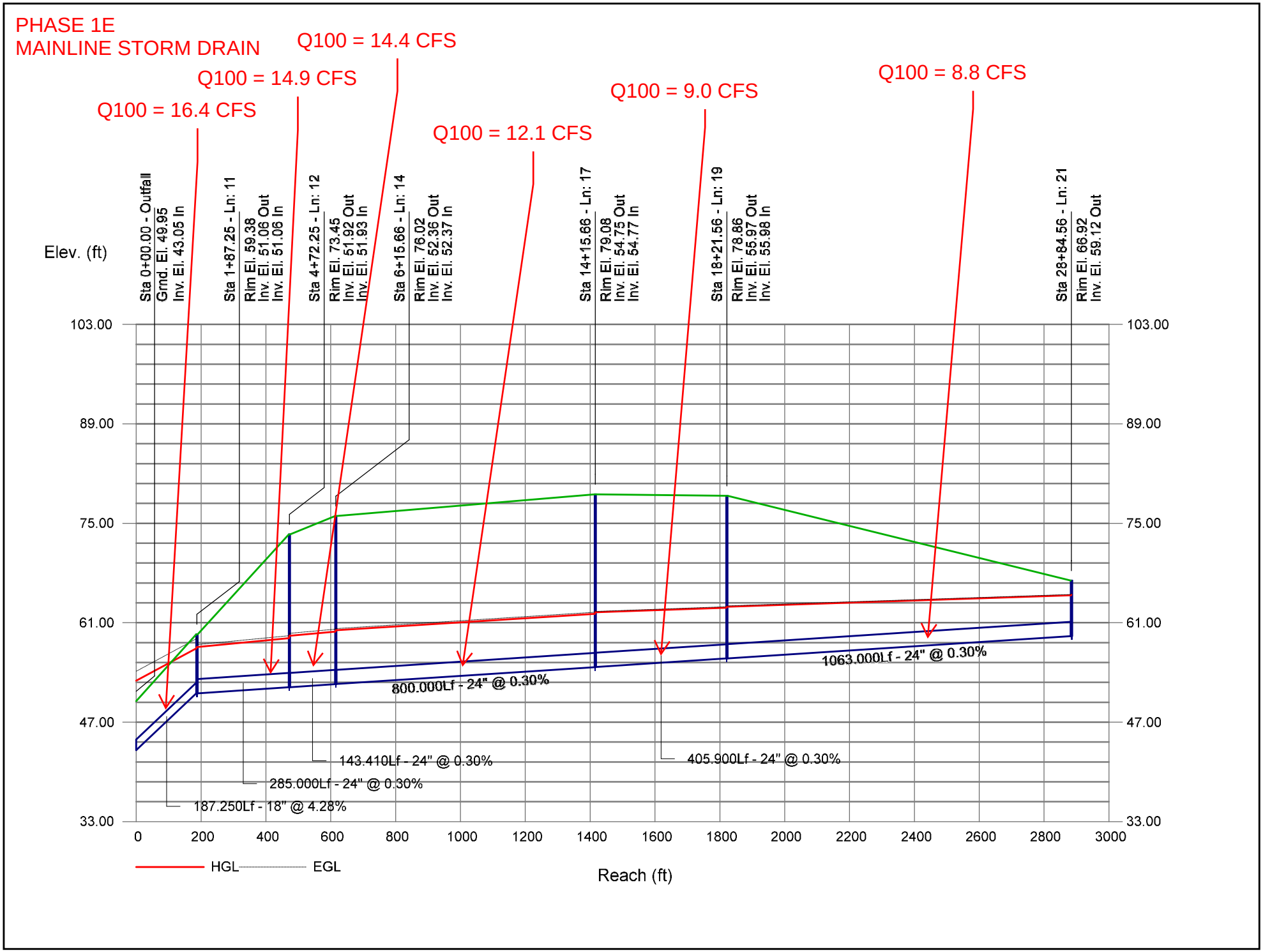
Proj. file: confluenced_Phase1E_with stubs.stm

PHASE 1C
LATERAL 16+25

Q100 = 2.1 CFS



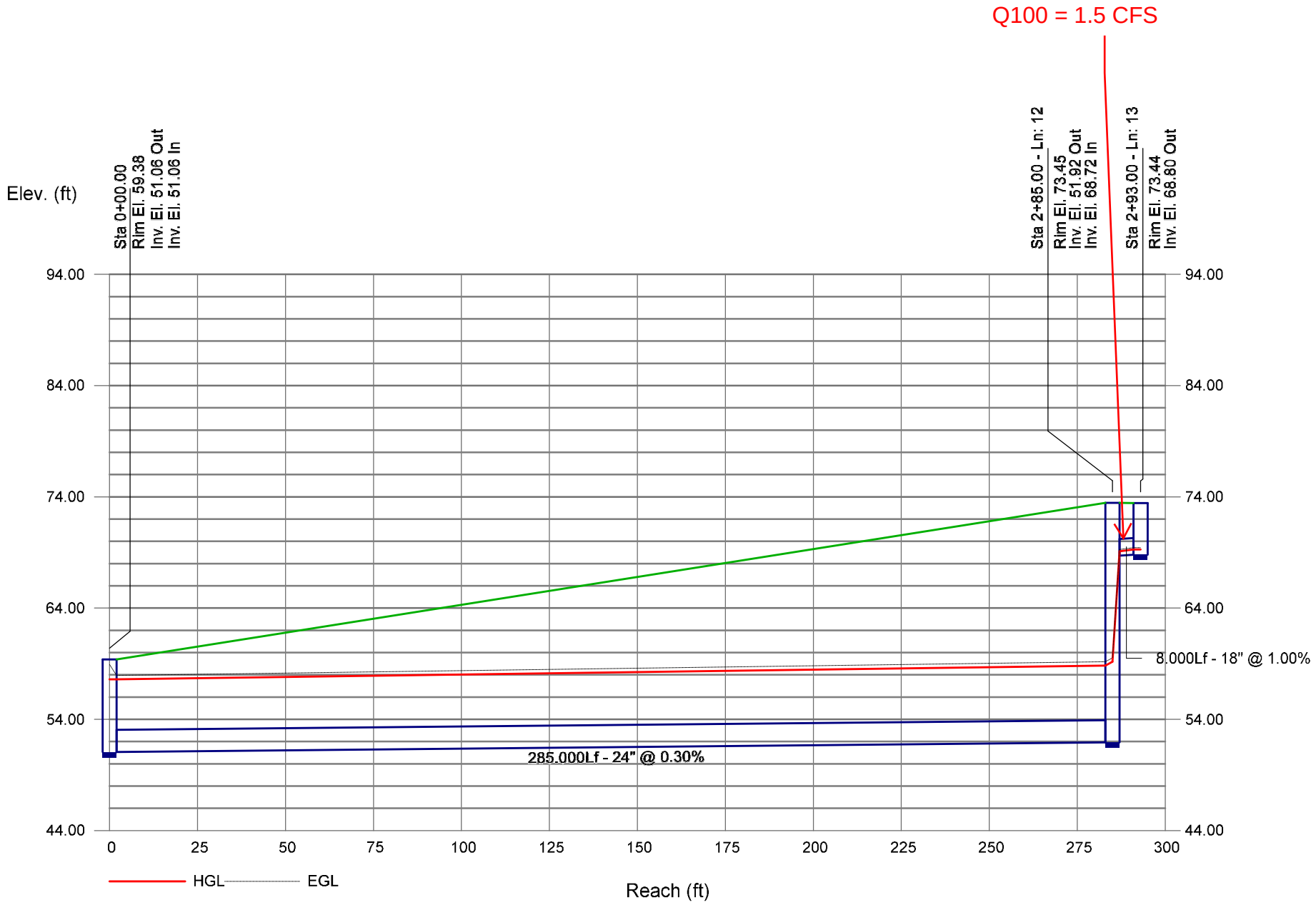
Storm Sewer Profile



Storm Sewer Profile

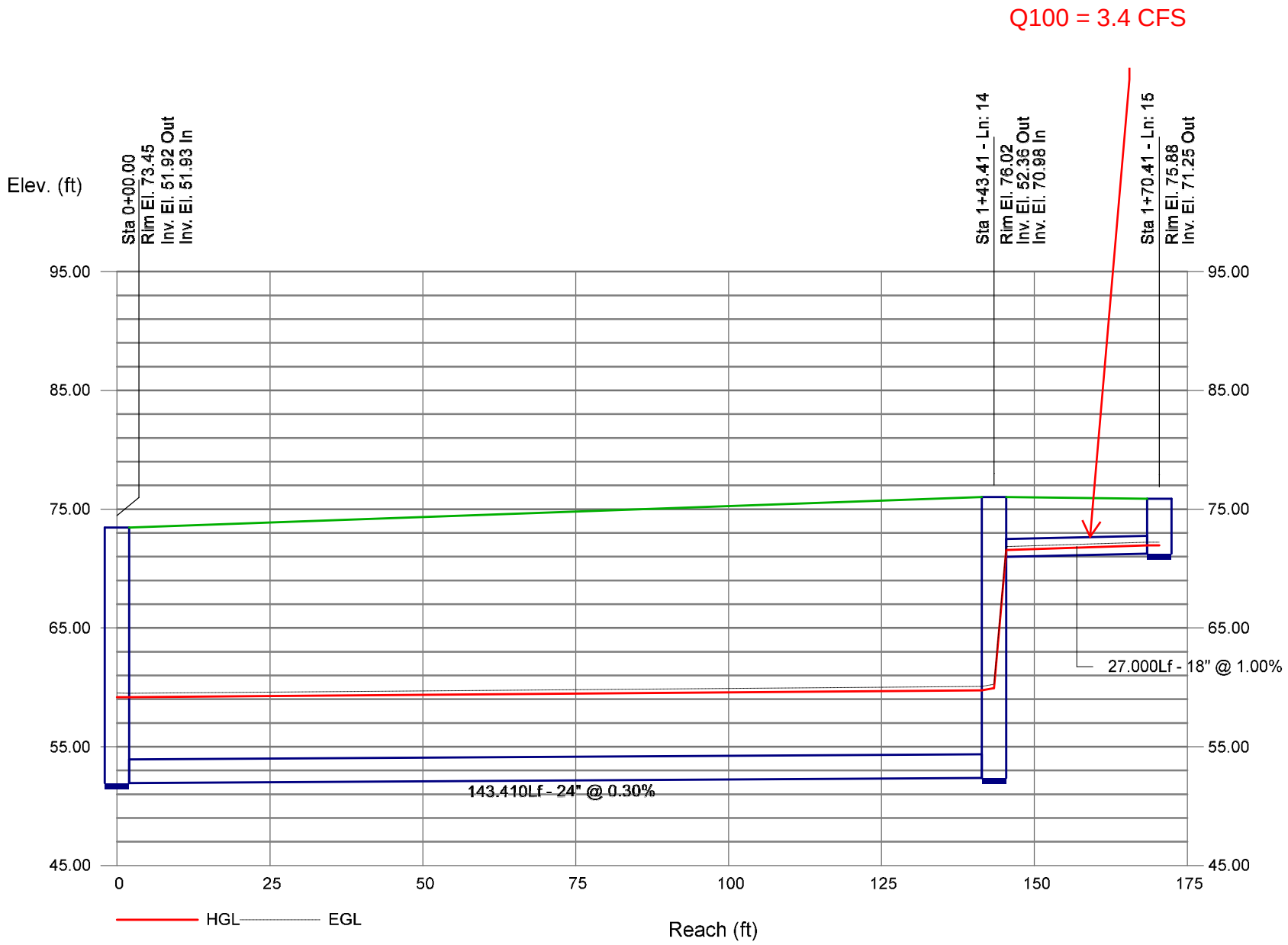
Proj. file: moonlight Phases 1C 1E.stm

PHASE 1E
LATERAL 14+96.96



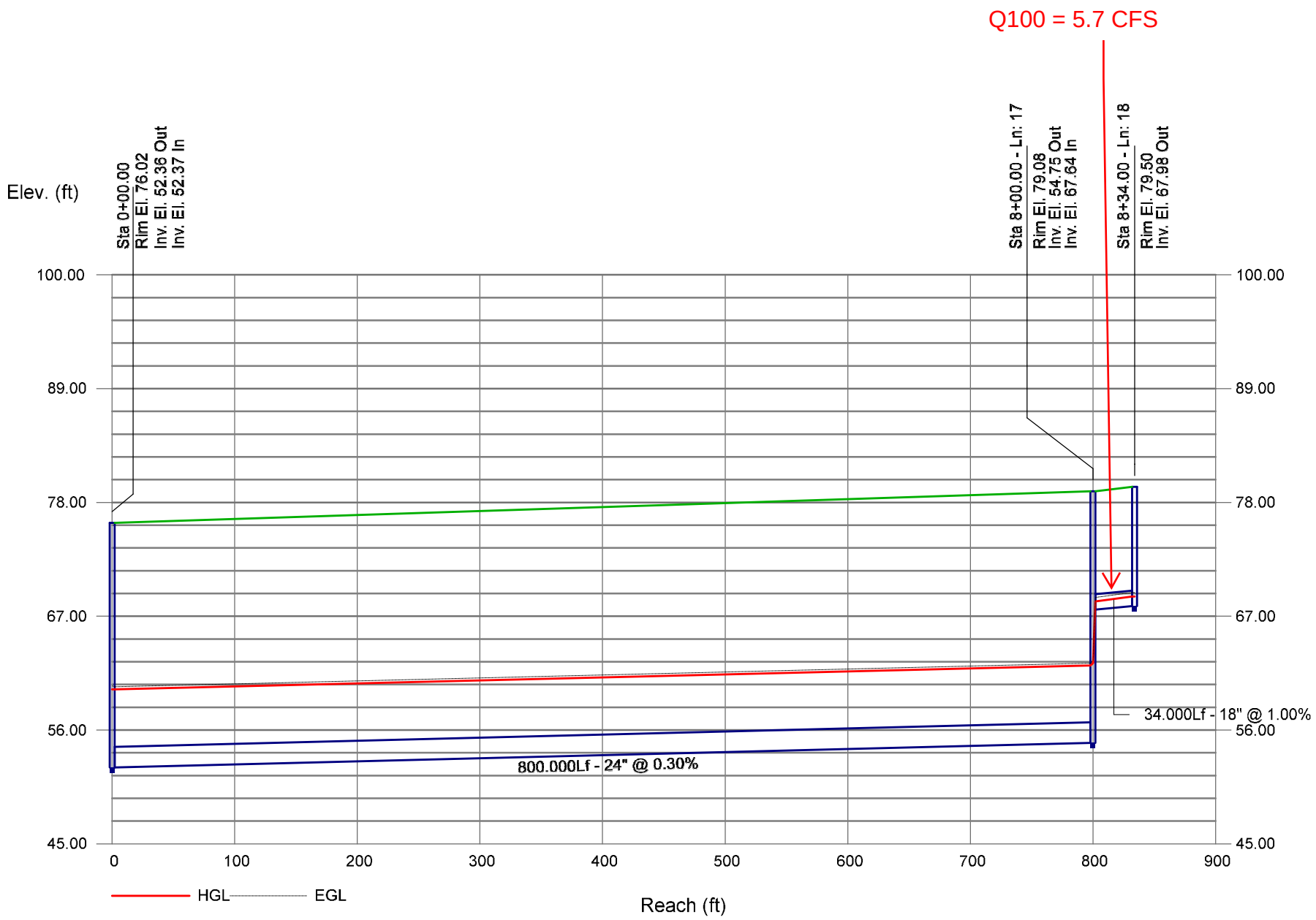
Storm Sewer Profile

PHASE 1E
LATERAL 16+44.34



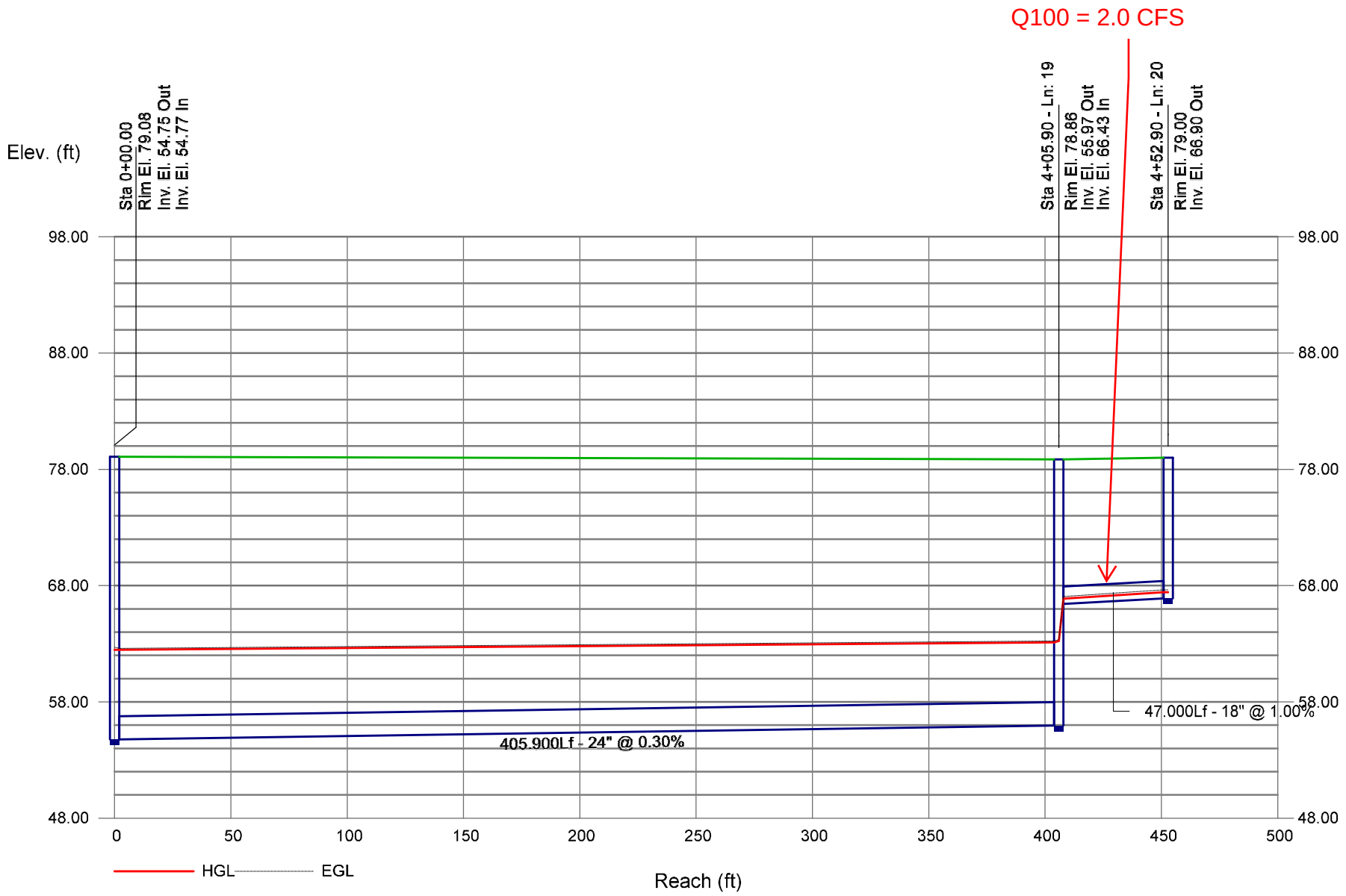
Storm Sewer Profile

PHASE 1E
LATERAL 24+45.71



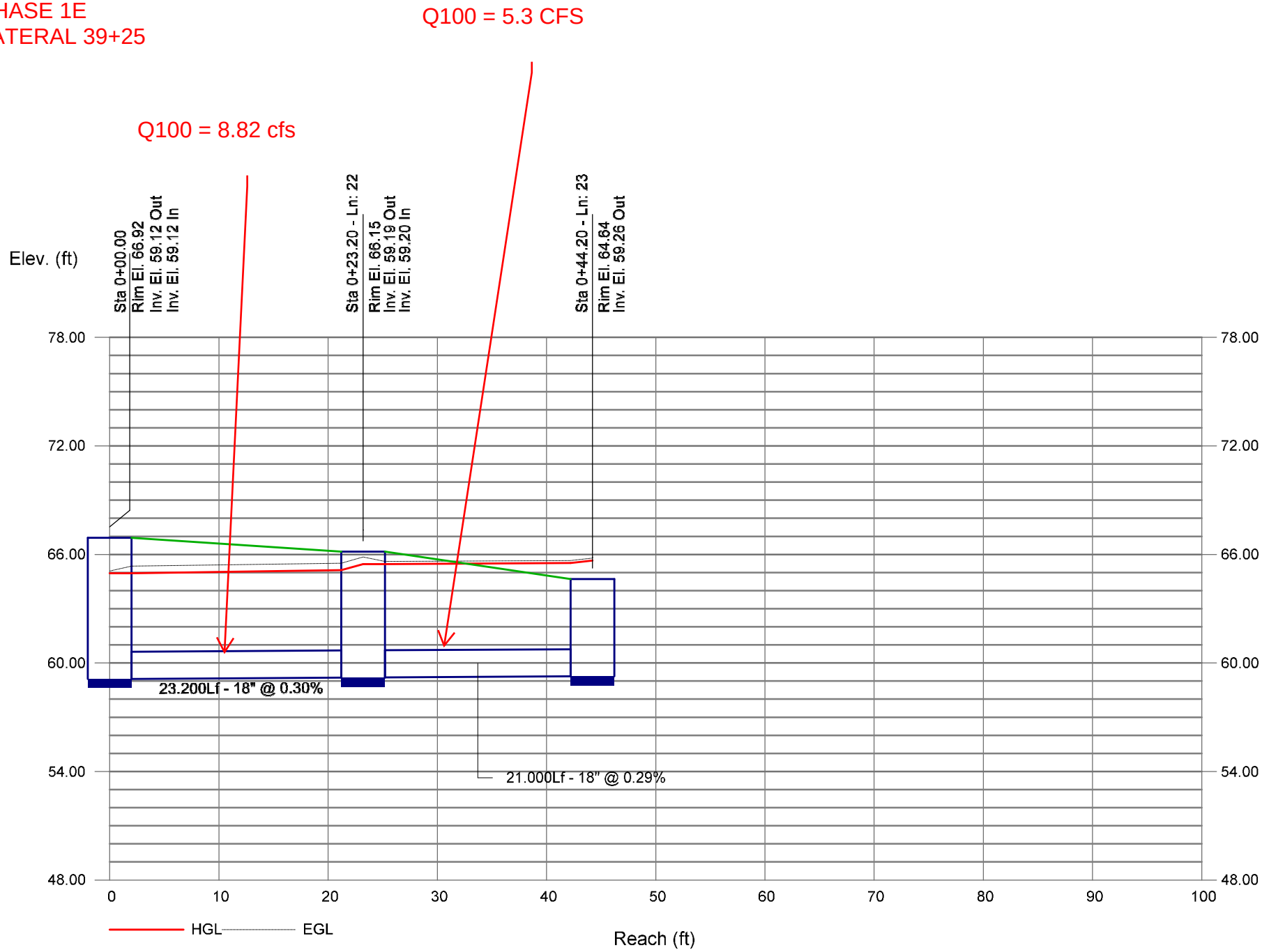
Storm Sewer Profile

PHASE 1E
LATERAL 28+53.97



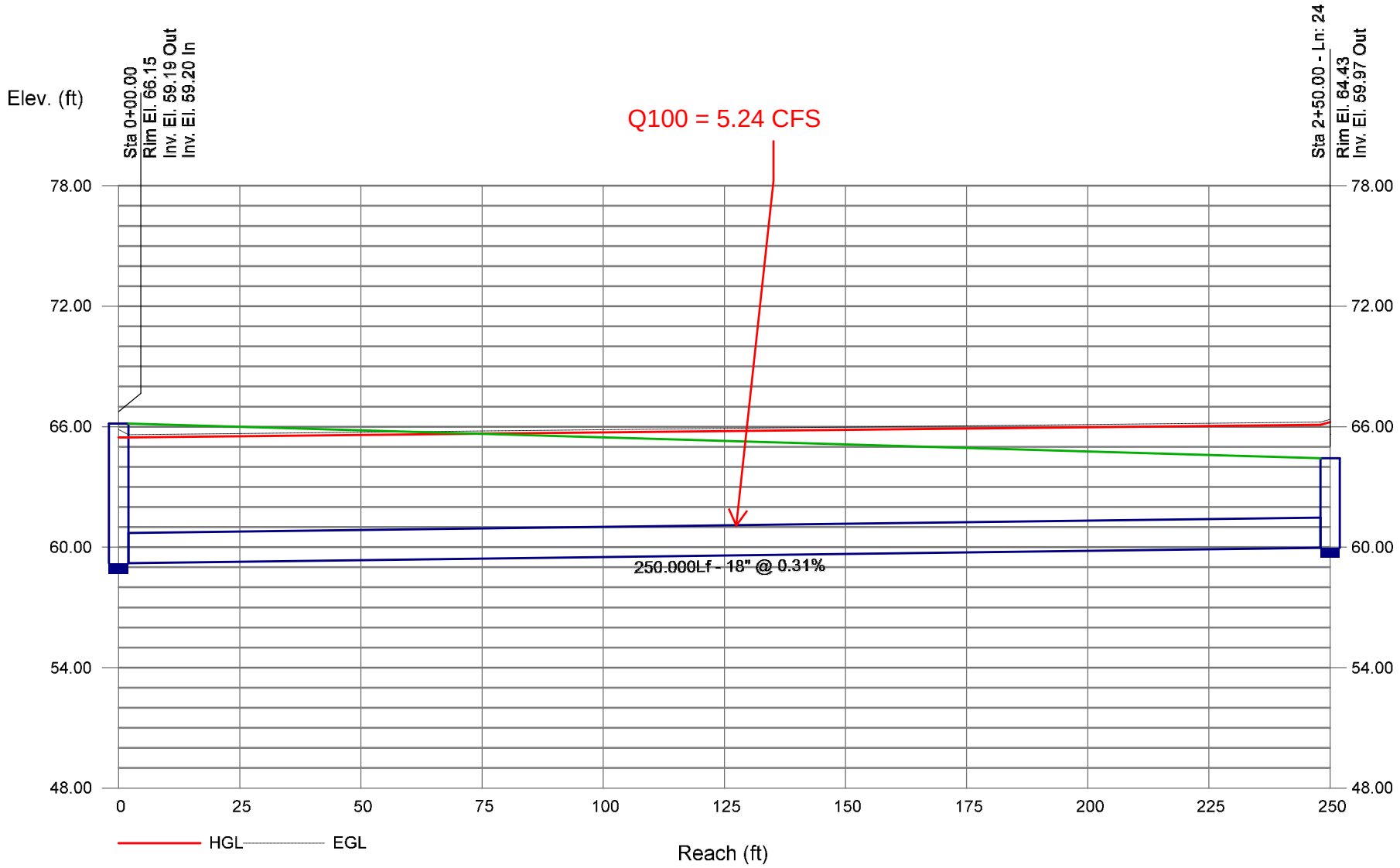
Storm Sewer Profile

PHASE 1E
LATERAL 39+25



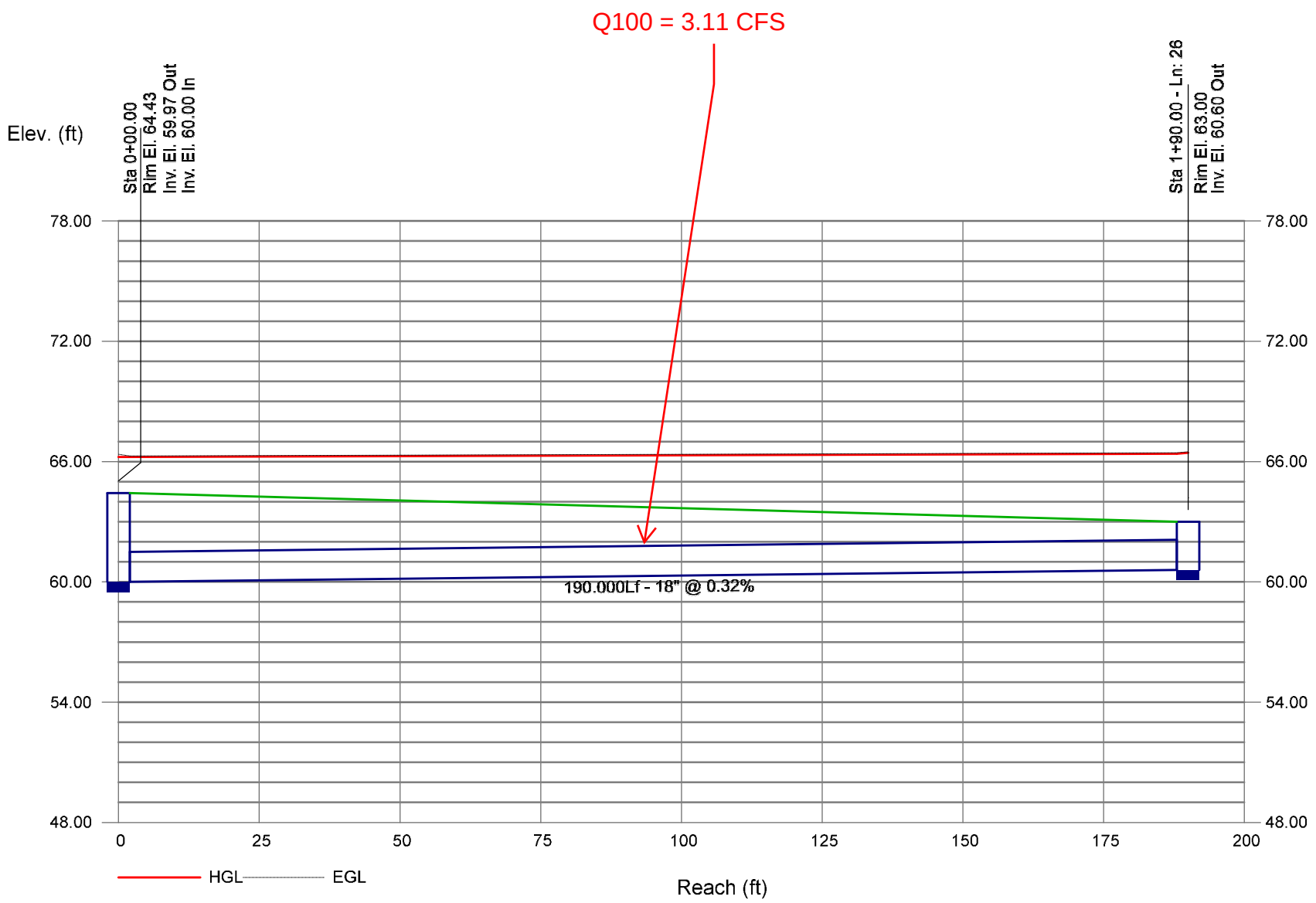
Storm Sewer Profile

PHASE 1E
EL PORTAL LATERAL
41+75



Storm Sewer Profile

PHASE 1E
LATERAL 43+50



Michael Baker
INTERNATIONAL

Appendix F – 50 Year Storm Drain Phases 1C and 1E

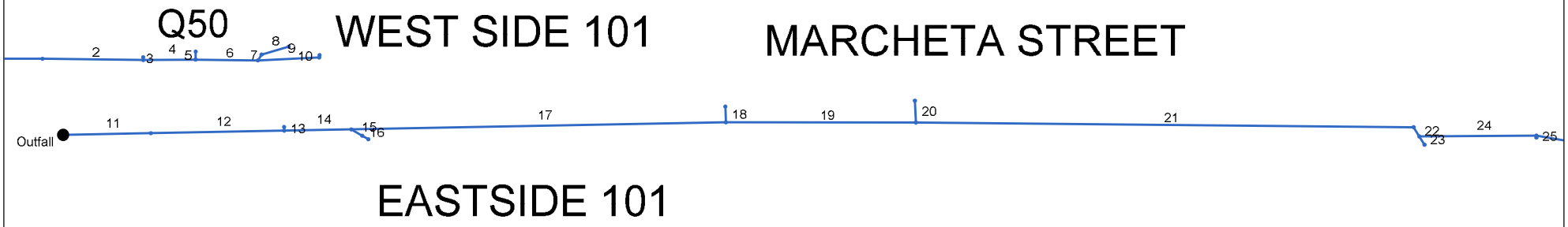
Included within this appendix:

50 Year Pipe Results Summary

Michael Baker
INTERNATIONAL

50 Year Pipe Results

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: moonlight Phases 1C 1E.stm	Number of lines: 26	Date: 7/27/2020

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1		Manhole	64.43	Cir	4.00	4.00	18	Cir	51.16	18	Cir	51.20
2		Manhole	73.00	Cir	4.00	4.00	18	Cir	53.32	18 18	Cir Cir	53.30 53.36
3		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	53.50			
4		Manhole	75.00	Cir	4.00	4.00	18	Cir	54.48	18 18	Cir Cir	66.10 54.52
5		Curb-Horiz	74.04	Cir	4.00	4.00	18	Cir	66.27			
6		Manhole	76.50	Cir	4.00	4.00	18	Cir	55.87	18 18	Cir Cir	55.89 55.91
7		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	56.00	18	Cir	55.90
8		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	56.50			
9		Manhole	77.29	Cir	4.00	4.00	18	Cir	57.23	18	Cir	57.20
10		Curb-Horiz	0.00	Cir	4.00	4.00	18	Cir	57.30			
11	New	Manhole	59.38	Cir	4.00	4.00	18	Cir	51.06	24	Cir	51.06
12	New	Manhole	73.45	Cir	4.00	4.00	24	Cir	51.92	18 24	Cir Cir	68.72 51.93
13		Curb-Horiz	73.44	Cir	4.00	4.00	18	Cir	68.80			
14		Manhole	76.02	Cir	4.00	4.00	24	Cir	52.36	18 24	Cir Cir	70.98 52.37
15		Curb-Horiz	75.88	Cir	4.00	4.00	18	Cir	71.25	18	Cir	71.29
16		Manhole	76.74	Cir	4.00	4.00	18	Cir	71.44			
17		Manhole	79.08	Cir	4.00	4.00	24	Cir	54.75	18 24	Cir Cir	67.64 54.77
18		Curb-Horiz	79.50	Cir	4.00	4.00	18	Cir	67.98			
19		Manhole	78.86	Cir	4.00	4.00	24	Cir	55.97	18 24	Cir Cir	66.43 55.98

Project File: moonlight Phases 1C 1E.stm | Number of Structures: 26 | Run Date: 7/27/2020

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
20		Curb-Horiz	79.00	Cir	4.00	4.00	18	Cir	66.90			
21		Manhole	66.92	Cir	4.00	4.00	24	Cir	59.12	18	Cir	59.12
22		Manhole	66.15	Cir	4.00	4.00	18	Cir	59.19	18 18	Cir Cir	59.20 59.20
23		Manhole	64.64	Cir	4.00	4.00	18	Cir	59.26			
24		Manhole	64.43	Cir	4.00	4.00	18	Cir	59.97	18 18	Cir Cir	59.98 60.00
25		Curb-Horiz	64.58	Cir	4.00	4.00	18	Cir	59.99			
26		Manhole	63.00	Cir	4.00	4.00	18	Cir	60.60			

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	PHASE 1 C MAIN	6.00	18	Cir	210.000	44.10	51.16	3.362	45.41	52.11	n/a	52.11 j	End	Manhole
2	PHASE 1 C MAIN	6.00	18	Cir	215.000	51.20	53.32	0.986	52.11	54.27	0.41	54.27	1	Manhole
3	A 58 Lateral 2 (No Profile)	1.20	18	Cir	6.000	53.30	53.50	3.333	54.27	53.91	n/a	53.91	2	Curb-Horiz
4	PHASE 1 C MAIN	4.87	18	Cir	111.800	53.36	54.48	1.002	54.27	55.33	n/a	55.33 j	2	Manhole
5	A56 Lateral 3 16+25	1.80	18	Cir	17.200	66.10	66.27	0.988	66.52	66.77	n/a	66.77	4	Curb-Horiz
6	PHASE 1 C MAIN	3.75	18	Cir	133.260	54.52	55.87	1.013	55.33	56.61	n/a	56.61 j	4	Manhole
7	A55 Lateral 5 (No Profile)	0.30	18	Cir	14.700	55.89	56.00	0.748	56.61	56.20	n/a	56.20	6	Curb-Horiz
8	A55 Lateral 5 (No Profile)	0.70	18	Cir	60.530	55.90	56.50	0.991	56.20	56.81	n/a	56.81	7	Curb-Horiz
9	PHASE 1 C MAIN	3.10	18	Cir	131.100	55.91	57.23	1.007	56.61	57.90	n/a	57.90 j	6	Manhole
10	A 54 Lateral 6 (No Profile)	3.10	18	Cir	5.000	57.20	57.30	2.000	57.90	57.97	n/a	57.97 j	9	Curb-Horiz
11	EX 18 INCH	13.56	18	Cir	187.250	43.05	51.06	4.278	52.84*	55.96*	0.14	56.10	End	Manhole
12	PHASE 1 E MAIN	12.27	24	Cir	285.000	51.06	51.92	0.302	56.10*	56.94*	0.24	57.18	11	Manhole
13	LAT 14+96.96	1.30	18	Cir	8.000	68.72	68.80	1.000	69.08	69.23	n/a	69.23	12	Curb-Horiz
14	PHASE 1 E MAIN	11.83	24	Cir	143.410	51.93	52.36	0.300	57.18*	57.57*	0.13	57.70	12	Manhole
15	LAT 4 16+44.34	3.00	18	Cir	27.000	70.98	71.25	1.000	71.53	71.91	0.13	71.91	14	Curb-Horiz
16	LAT 4 16+44.34	0.01	18	Cir	15.000	71.29	71.44	1.000	71.91	71.48	n/a	71.48	15	Manhole
17	PHASE 1 E MAIN	9.88	24	Cir	800.000	52.37	54.75	0.298	57.70*	59.22*	0.15	59.38	14	Manhole
18	LAT 24+45.71	5.00	18	Cir	34.000	67.64	67.98	1.000	68.37	68.84	0.35	68.84	17	Curb-Horiz
19	PHASE 1 E MAIN	7.76	24	Cir	405.900	54.77	55.97	0.296	59.38*	59.86*	0.09	59.95	17	Manhole
20	LAT 28+53.97	1.80	18	Cir	47.000	66.43	66.90	1.000	66.85	67.40	n/a	67.40	19	Curb-Horiz
21	PHASE 1 E MAIN	6.99	24	Cir	1063.000	55.98	59.12	0.295	59.95	60.90	0.08	60.97	19	Manhole
22	BASIN LAT 38+94.76 B	6.99	18	Cir	23.200	59.12	59.19	0.302	60.97*	61.08*	0.21	61.29	21	Manhole
23	BASIN LAT 38+94.76 A	4.80	18	Cir	21.000	59.20	59.26	0.286	61.29*	61.34*	0.11	61.45	22	Manhole
24	E.P. LAT 41+75	4.58	18	Cir	250.000	59.20	59.97	0.308	61.29*	61.77*	0.10	61.87	22	Manhole

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Known Qs only ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	E.P. CURB INLET	2.20	18	Cir	4.430	59.98	59.99	0.226	61.87*	61.87*	0.02	61.90	24	Curb-Horiz
26	BASIN LAT 43+50	2.70	18	Cir	190.000	60.00	60.60	0.316	61.87	61.99	0.04	62.03	24	Manhole

Project File: moonlight Phases 1C 1E.stm

Number of lines: 26

Run Date: 7/27/2020

NOTES: Known Qs only ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1		6.00*	0.00	0.00	6.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2		6.00*	0.00	0.00	6.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3		1.20*	0.00	1.20	0.00	Curb	4.0	16.76	0.00	0.00	0.00	0.020	2.00	0.050	0.020	0.013	0.17	5.43	0.03	0.00	0.3	2
4		4.87*	0.00	0.00	4.87	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5		1.80*	0.00	1.80	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.26	10.11	0.26	10.11	0.0	Off
6		3.75*	0.00	0.00	3.75	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7		0.30*	0.00	0.30	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.12	3.06	0.12	3.06	0.0	Off
8		0.70*	0.00	0.70	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.17	5.38	0.17	5.38	0.0	Off
9		3.10*	1.04	0.00	4.14	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10		3.10*	0.00	2.06	1.04	Curb	6.0	11.00	0.00	0.00	0.00	0.010	2.00	0.050	0.020	0.013	0.25	9.69	0.18	5.99	0.0	9
11	New	13.56*	0.00	0.00	13.56	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
12	New	12.27*	0.73	0.00	13.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
13		1.30*	0.00	0.57	0.73	Curb	6.0	5.00	0.00	0.00	0.00	0.020	2.00	0.050	0.020	0.013	0.17	5.65	0.14	4.19	0.0	12
14		11.83*	0.00	0.00	11.83	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
15		3.00*	0.00	3.00	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.34	14.21	0.34	14.21	0.0	Off
16		0.01*	0.00	0.00	0.01	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
17		9.88*	0.00	0.00	9.88	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
18		5.00*	0.00	5.00	0.00	Curb	6.0	5.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.46	19.98	0.46	19.98	0.0	Off
19		7.76*	0.64	0.00	8.40	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
20		1.80*	0.00	1.16	0.64	Curb	6.0	8.00	0.00	0.00	0.00	0.010	2.00	0.050	0.020	0.013	0.21	7.69	0.15	4.69	0.0	19
21		6.99*	0.00	0.00	6.99	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
22		6.99*	0.00	0.00	6.99	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
23		4.80*	0.00	0.00	4.80	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Inlet N-Values = 0.016; Known Qs only; * Indicates Known Q added. All curb inlets are Horiz throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24		4.58*	0.00	0.00	4.58	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
25		2.20*	0.00	2.20	0.00	Curb	4.0	4.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.31	12.55	0.31	12.55	0.0	Off
26		2.70*	0.00	0.00	2.70	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

NOTES: Inlet N-Values = 0.016; Known Qs only; * Indicates Known Q added. All curb inlets are Horiz throat.

MyReport

Line No.	Area Dn (sqft)	Area Up (sqft)	Byp Ln No	Coeff C1 (C)	Coeff C2 (C)	Coeff C3 (C)	Capac Full (cfs)	Crit Depth (ft)	Cross Sl, Sw (ft/ft)	Cross Sl, Sx (ft/ft)	Curb Len (ft)	Defl Ang (Deg)	Depth Dn (ft)	Depth Up (ft)	DnStm Ln No	Drng Area (ac)	Easting X (ft)	EGL Dn (ft)	EGL Up (ft)	Energy Loss (ft)
1	1.17	1.17	n/a	0.20	0.50	0.90	19.25	0.95	....	....	....	0.000	1.31	0.95**	Outfall	0.00	338.22	45.82	52.51	0.000
2	1.11	1.17	n/a	0.20	0.50	0.90	10.43	0.95	....	....	....	0.741	0.91	0.95**	1	0.00	553.20	52.51	54.67	0.000
3	0.39	0.39	2	0.20	0.50	0.90	19.17	0.41	0.050	0.020	16.76	-91.397	0.97	0.41**	2	0.00	553.13	54.41	54.06	0.000
4	1.03	1.03	n/a	0.20	0.50	0.90	10.51	0.85	....	....	....	-1.264	0.91	0.85**	2	0.00	665.00	54.61	55.68	0.000
5	0.41	0.52	Sag	0.20	0.50	0.90	10.44	0.50	0.050	0.020	5.00	-88.736	0.42	0.50**	4	0.00	665.22	66.71	66.96	0.000
6	0.87	0.87	n/a	0.20	0.50	0.90	10.57	0.74	....	....	....	1.264	0.81	0.74**	4	0.00	798.25	55.62	56.90	0.000
7	0.14	0.14	Sag	0.20	0.50	0.90	9.08	0.20	0.050	0.020	5.00	-59.036	0.72	0.20**	6	0.00	805.97	56.68	56.27	0.000
8	0.25	0.26	Sag	0.20	0.50	0.90	10.46	0.31	0.050	0.020	5.00	42.070	0.30	0.31**	7	0.00	864.09	56.31	56.92	0.000
9	0.76	0.76	n/a	0.20	0.50	0.90	10.54	0.67	....	....	....	-3.447	0.70	0.67**	6	0.00	929.20	56.87	58.16	0.000
10	0.76	0.76	9	0.20	0.50	0.90	14.85	0.67	0.050	0.020	11.00	-79.121	0.70	0.67**	9	0.00	929.91	58.16	58.23	0.000
11	1.77	1.77	n/a	0.20	0.50	0.90	21.72	1.37	....	....	....	-1.085	1.50	1.50	Outfall	0.00	569.39	53.76	56.88	3.123
12	3.14	3.14	n/a	0.20	0.50	0.90	12.42	1.26	....	....	....	0.000	2.00	2.00	11	0.00	854.34	56.34	57.18	0.839
13	0.32	0.41	12	0.20	0.50	0.90	10.50	0.43	0.050	0.020	5.00	-90.261	0.36	0.43**	12	0.00	854.15	69.23	69.38	0.000
14	3.14	3.14	n/a	0.20	0.50	0.90	12.38	1.23	....	....	....	0.000	2.00	2.00	12	0.00	997.72	57.40	57.79	0.392
15	0.59	0.75	Sag	0.20	0.50	0.90	10.50	0.66	0.050	0.020	5.00	31.347	0.55	0.66**	14	0.00	1021.04	71.78	72.16	0.000
16	0.01	0.01	n/a	0.20	0.50	0.90	10.50	0.04	....	....	....	0.000	0.62	0.04**	15	0.00	1034.00	71.92	71.49	0.000
17	3.14	3.14	n/a	0.20	0.50	0.90	12.34	1.12	....	....	....	0.000	2.00	2.00	14	0.00	1797.58	57.85	59.38	1.527
18	0.85	1.05	Sag	0.20	0.50	0.90	10.50	0.86	0.050	0.020	5.00	-90.727	0.73	0.86**	17	0.00	1796.50	68.72	69.19	0.000
19	3.14	3.14	n/a	0.20	0.50	0.90	12.30	0.99	....	....	....	1.129	2.00	2.00	17	0.00	2203.48	59.47	59.95	0.478
20	0.41	0.52	19	0.20	0.50	0.90	10.50	0.50	0.050	0.020	8.00	-92.737	0.42	0.50**	19	0.00	2201.27	67.04	67.59	0.000
21	3.14	2.95	n/a	0.20	0.50	0.90	12.29	0.94	....	....	....	0.497	2.00	1.78	19	0.00	3266.43	60.03	60.99	0.960
22	1.77	1.77	n/a	0.20	0.50	0.90	5.77	1.02	....	....	....	58.098	1.50	1.50	21	0.00	3278.51	61.22	61.32	0.103
23	1.77	1.77	n/a	0.20	0.50	0.90	5.61	0.84	....	....	....	-1.044	1.50	1.50	22	0.00	3289.76	61.41	61.45	0.044

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Line No.	Area Dn (sqft)	Area Up (sqft)	Byp Ln No	Coeff C1 (C)	Coeff C2 (C)	Coeff C3 (C)	Capac Full (cfs)	Crit Depth (ft)	Cross Sl, Sw (ft/ft)	Cross Sl, Sx (ft/ft)	Curb Len (ft)	Defl Ang (Deg)	Depth Dn (ft)	Depth Up (ft)	DnStm Ln No	Drng Area (ac)	Easting X (ft)	EGL Dn (ft)	EGL Up (ft)	Energy Loss (ft)	
24	1.77	1.77	n/a	0.20	0.50	0.90	5.83	0.82	....	....	....	-59.072	1.50	1.50	22	0.00	3528.50	61.40	61.87	0.476	
25	1.77	1.77	Sag	0.20	0.50	0.90	4.99	0.56	0.050	0.020	4.00	87.948	1.50	1.50	24	0.00	3528.69	61.90	61.90	0.002	
26	1.77	1.71	n/a	0.20	0.50	0.90	5.90	0.62	....	....	....	10.300	1.50	1.39	24	0.00	3715.69	61.91	62.03	0.117	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Flow Rate (cfs)	Sf Ave (ft/ft)	Sf Dn (ft/ft)	Grate Area (sqft)	Grate Len (ft)	Grate Width (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	Gutter Depth (ft)	Gutter Slope (ft/ft)	Gutter Spread (ft)	Gutter Width (ft)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	HGL Jmp Dn (ft)	HGL Jmp Up (ft)	Incr CxA	Incr Q (cfs)	Inlet Depth (ft)	Inlet Eff (%)
6.00	0.000	0.000	....	....	....	52.70	64.43	....	....	....	....	45.41	52.11 j	52.11	45.75	45.60	0.00	6.00	....	....
6.00	0.000	0.000	....	....	....	64.43	73.00	....	....	....	....	52.11	54.27	54.27	....	....	0.00	6.00	....	....
1.20	0.000	0.000	....	....	....	73.00	0.00	0.17	0.020	5.43	2.00	54.27	53.91	53.91	....	....	0.00	1.20	0.20	100
4.87	0.000	0.000	....	....	....	73.00	75.00	....	....	....	....	54.27	55.33 j	55.33	54.32	54.26	0.00	4.87	....	....
1.80	0.000	0.000	....	....	....	75.00	74.04	0.26	Sag	10.11	2.00	66.52	66.77	66.77	....	....	0.00	1.80	0.26	100
3.75	0.000	0.000	....	....	....	75.00	76.50	....	....	....	....	55.33	56.61 j	56.61	55.39	55.33	0.00	3.75	....	....
0.30	0.000	0.000	....	....	....	76.50	0.00	0.12	Sag	3.06	2.00	56.61	56.20	56.20	....	....	0.00	0.30	0.12	100
0.70	0.000	0.000	....	....	....	0.00	0.00	0.17	Sag	5.38	2.00	56.20	56.81	56.81	....	....	0.00	0.70	0.17	100
3.10	0.000	0.000	....	....	....	76.50	77.29	....	....	....	....	56.61	57.90 j	57.90	56.71	56.65	0.00	3.10	....	....
3.10	0.000	0.000	....	....	....	77.29	0.00	0.25	0.010	9.69	2.00	57.90	57.97 j	57.97	57.88	57.88	0.00	3.10	0.25	66
13.56	1.668	1.668	....	....	....	49.95	59.38	....	....	....	....	52.84	55.96	56.10	....	....	0.00	13.56	....	....
12.27	0.294	0.294	....	....	....	59.38	73.45	....	....	....	....	56.10	56.94	57.18	....	....	0.00	12.27	....	....
1.30	0.000	0.000	....	....	....	73.45	73.44	0.17	0.020	5.65	2.00	69.08	69.23	69.23	....	....	0.00	1.30	0.17	43
11.83	0.274	0.274	....	....	....	73.45	76.02	....	....	....	....	57.18	57.57	57.70	....	....	0.00	11.83	....	....
3.00	0.000	0.000	....	....	....	76.02	75.88	0.34	Sag	14.21	2.00	71.53	71.91	71.91	....	....	0.00	3.00	0.34	100
0.01	0.000	0.000	....	....	....	75.88	76.74	....	....	....	....	71.91	71.48	71.48	....	....	0.00	0.01	....	....
9.88	0.191	0.191	....	....	....	76.02	79.08	....	....	....	....	57.70	59.22	59.38	....	....	0.00	9.88	....	....
5.00	0.000	0.000	....	....	....	79.08	79.50	0.46	Sag	19.98	2.00	68.37	68.84	68.84	....	....	0.00	5.00	0.46	100
7.76	0.118	0.118	....	....	....	79.08	78.86	....	....	....	....	59.38	59.86	59.95	....	....	0.00	7.76	....	....
1.80	0.000	0.000	....	....	....	78.86	79.00	0.21	0.010	7.69	2.00	66.85	67.40	67.40	....	....	0.00	1.80	0.21	65
6.99	0.090	0.096	....	....	....	78.86	66.92	....	....	....	....	59.95	60.90	60.97	....	....	0.00	6.99	....	....
6.99	0.443	0.443	....	....	....	66.92	66.15	....	....	....	....	60.97	61.08	61.29	....	....	0.00	6.99	....	....
4.80	0.209	0.209	....	....	....	66.15	64.64	....	....	....	....	61.29	61.34	61.45	....	....	0.00	4.80	....	....

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Flow Rate (cfs)	Sf Ave (ft/ft)	Sf Dn (ft/ft)	Grate Area (sqft)	Grate Len (ft)	Grate Width (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	Gutter Depth (ft)	Gutter Slope (ft/ft)	Gutter Spread (ft)	Gutter Width (ft)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	HGL Jmp Dn (ft)	HGL Jmp Up (ft)	Incr CxA	Incr Q (cfs)	Inlet Depth (ft)	Inlet Eff (%)
4.58	0.190	0.190	....	....	....	66.15	64.43	....	....	....	....	61.29	61.77	61.87	....	....	0.00	4.58	....	....
2.20	0.044	0.044	....	....	....	64.43	64.58	0.31	Sag	12.55	2.00	61.87	61.87	61.90	....	....	0.00	2.20	0.31	100
2.70	0.062	0.066	....	....	....	64.43	63.00	....	....	....	....	61.87	61.99	62.03	....	....	0.00	2.70	....	....

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Inlet ID	Inlet Loc	(ft)	Inlet Time (min)	i Sys (in/hr)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Jump Loc (ft)	Jump Len (ft)	Vel Hd Jmp Dn (ft)	Vel Hd Jmp Up (ft)	J-Loss Coeff	Junct Type	Known Q (cfs)	Cost RCP	Cost CMP	Cost PVC	
	Sag		0.0	0.00	0.00	44.10	51.16	21.00	4.73	0.41	1.11	0.15 z	MH	6.00	11,685	10,517	9,932	
	Sag		0.0	0.00	0.00	51.20	53.32	....	....	0.00	0.00	1.00 z	MH	6.00	14,943	13,448	12,701	
	On Grade		0.0	0.00	0.00	53.30	53.50	....	....	0.00	0.00	1.00 z	Curb	1.20	313	281	266	
	Sag		0.0	0.00	0.00	53.36	54.48	11.18	4.26	0.34	0.48	1.00 z	MH	4.87	8,363	7,526	7,108	
	Sag		0.0	0.00	0.00	66.10	66.27	....	....	0.00	0.00	1.00 z	Curb	1.80	963	866	818	
	Sag		0.0	0.00	0.00	54.52	55.87	13.33	3.70	0.29	0.43	0.88 z	MH	3.75	9,975	8,978	8,479	
	Sag		0.0	0.00	0.00	55.89	56.00	....	....	0.00	0.00	1.07 z	Curb	0.30	638	574	542	
	Sag		0.0	0.00	0.00	55.90	56.50	....	....	0.00	0.00	1.00 z	Curb	0.70	2,036	1,832	1,731	
	Sag		0.0	0.00	0.00	55.91	57.23	13.11	3.35	0.26	0.39	0.99 z	MH	3.10	9,825	8,843	8,351	
	On Grade		0.0	0.00	0.00	57.20	57.30	0.50	2.50	0.25	0.31	1.00 z	Curb	3.10	278	250	236	
New	Sag		0.0	0.00	0.00	43.05	51.06	....	....	0.00	0.00	0.15	MH	13.56	8,765	7,889	7,450	
New	Sag		0.0	0.00	0.00	51.06	51.92	....	....	0.00	0.00	1.00	MH	12.27	21,168	19,051	17,992	
	On Grade		0.0	0.00	0.00	68.72	68.80	....	....	0.00	0.00	1.00 z	Curb	1.30	440	396	374	
	Sag		0.0	0.00	0.00	51.93	52.36	....	....	0.00	0.00	0.58	MH	11.83	12,155	10,940	10,332	
	Sag		0.0	0.00	0.00	70.98	71.25	....	....	0.00	0.00	0.50 z	Curb	3.00	1,200	1,080	1,020	
	Sag		0.0	0.00	0.00	71.29	71.44	....	....	0.00	0.00	1.00 z	MH	0.01	720	648	612	
	Sag		0.0	0.00	0.00	52.37	54.75	....	....	0.00	0.00	1.00	MH	9.88	68,000	61,200	57,800	
	Sag		0.0	0.00	0.00	67.64	67.98	....	....	0.00	0.00	1.00 z	Curb	5.00	2,020	1,818	1,717	
	Sag		0.0	0.00	0.00	54.77	55.97	....	....	0.00	0.00	1.00	MH	7.76	34,468	31,021	29,297	
	On Grade		0.0	0.00	0.00	66.43	66.90	....	....	0.00	0.00	1.00 z	Curb	1.80	2,980	2,682	2,533	
	Sag		0.0	0.00	0.00	55.98	59.12	....	....	0.00	0.00	0.87	MH	6.99	79,432	71,488	67,517	
	Sag		0.0	0.00	0.00	59.12	59.19	....	....	0.00	0.00	0.88	MH	6.99	1,165	1,049	990	
	Sag		0.0	0.00	0.00	59.20	59.26	....	....	0.00	0.00	1.00	MH	4.80	1,023	920	869	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: Known Qs only. ; ** Critical depth

MyReport

Inlet ID	Inlet Loc	(ft)	Inlet Time (min)	i Sys (in/hr)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Jump Loc (ft)	Jump Len (ft)	Vel Hd Jmp Dn (ft)	Vel Hd Jmp Up (ft)	J-Loss Coeff	Junct Type	Known Q (cfs)	Cost RCP	Cost CMP	Cost PVC	
	Sag		0.0	0.00	0.00	59.20	59.97	....	....	0.00	0.00	1.00	MH	4.58	10,595	9,536	9,006	
	Sag		0.0	0.00	0.00	59.98	59.99	....	....	0.00	0.00	1.00	Curb	2.20	280	252	238	
	Sag		0.0	0.00	0.00	60.00	60.60	....	....	0.00	0.00	1.00	MH	2.70	6,500	5,850	5,525	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: Known Qs only. ; ** Critical depth

MyReport

Line ID	Line Length (ft)	Line Size (in)	Line Slope (%)	Line Type	Local Depr (in)	n-val Gutter	n-val Pipe	Minor Loss (ft)	Northing Y (ft)	Pipe Travel (min)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Line Rise (in)	Runoff Coeff (C)	Line Span (in)	Area A1 (ac)	Area A2 (ac)	Area A3 (ac)
PHASE 1 C MAIN	210.000	18	3.36	Cir	....	....	0.013	n/a	203.69	1.03	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	215.000	18	0.99	Cir	....	....	0.013	0.41	200.91	1.06	....	....	....	18	0.00	18	0.00	0.00	0.00
A 58 Lateral 2 (No Profile)	6.000	18	3.33	Cir	0.33	0.013	0.013	n/a	206.91	0.15	0.00	1.20	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	111.800	18	1.00	Cir	....	....	0.013	n/a	201.93	0.68	....	....	....	18	0.00	18	0.00	0.00	0.00
A56 Lateral 3 16+25	17.200	18	0.99	Cir	0.0	....	0.013	n/a	219.13	0.28	0.00	1.80	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	133.260	18	1.01	Cir	....	....	0.013	n/a	200.21	1.05	....	....	....	18	0.00	18	0.00	0.00	0.00
A55 Lateral 5 (No Profile)	14.700	18	0.75	Cir	0.0	....	0.013	n/a	212.71	1.44	0.00	0.30	0.00	18	0.00	18	0.00	0.00	0.00
A55 Lateral 5 (No Profile)	60.530	18	0.99	Cir	0.0	....	0.013	n/a	229.62	2.55	0.00	0.70	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 C MAIN	131.100	18	1.01	Cir	....	....	0.013	n/a	206.40	1.25	....	....	....	18	0.00	18	0.00	0.00	0.00
A 54 Lateral 6 (No Profile)	5.000	18	2.00	Cir	0.0	0.013	0.013	n/a	211.34	0.05	1.04	2.06	0.00	18	0.00	18	0.00	0.00	0.00
EX 18 INCH	187.250	18	4.28	Cir	....	....	0.013	0.14	43.91	0.41	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	285.000	24	0.30	Cir	....	....	0.013	0.24	49.30	1.22	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 14+96.96	8.000	18	1.00	Cir	0.0	0.013	0.013	n/a	57.30	0.18	0.73	0.57	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	143.410	24	0.30	Cir	....	....	0.013	0.13	52.02	0.63	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 4 16+44.34	27.000	18	1.00	Cir	0.0	....	0.013	0.13	38.41	0.27	0.00	3.00	0.00	18	0.00	18	0.00	0.00	0.00
LAT 4 16+44.34	15.000	18	1.00	Cir	....	....	0.013	n/a	30.85	44.18	....	....	....	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	800.000	24	0.30	Cir	....	....	0.013	0.15	67.17	4.24	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 24+45.71	34.000	18	1.00	Cir	0.0	....	0.013	0.35	101.15	0.20	0.00	5.00	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	405.900	24	0.30	Cir	....	....	0.013	0.09	66.86	2.74	....	....	....	24	0.00	24	0.00	0.00	0.00
LAT 28+53.97	47.000	18	1.00	Cir	0.0	0.013	0.013	n/a	113.81	0.77	0.64	1.16	0.00	18	0.00	18	0.00	0.00	0.00
PHASE 1 E MAIN	1063.000	24	0.30	Cir	....	....	0.013	0.08	56.82	7.96	....	....	....	24	0.00	24	0.00	0.00	0.00
BASIN LAT 38+94.76 B	23.200	18	0.30	Cir	....	....	0.013	0.21	37.01	0.10	....	....	....	18	0.00	18	0.00	0.00	0.00
BASIN LAT 38+94.76 A	21.000	18	0.29	Cir	....	....	0.013	0.11	19.28	0.13	....	....	....	18	0.00	18	0.00	0.00	0.00

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Line ID	Line Length (ft)	Line Size (in)	Line Slope (%)	Line Type	Local Depr (in)	n-val Gutter	n-val Pipe	Minor Loss (ft)	Northing Y (ft)	Pipe Travel (min)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Line Rise (in)	Runoff Coeff (C)	Line Span (in)	Area A1 (ac)	Area A2 (ac)	Area A3 (ac)
E.P. LAT 41+75	250.000	18	0.31	Cir	....	....	0.013	0.10	38.90	1.61	....	....	....	18	0.00	18	0.00	0.00	0.00
E.P. CURB INLET	4.430	18	0.23	Cir	0.0	....	0.013	0.02	34.47	0.06	0.00	2.20	0.00	18	0.00	18	0.00	0.00	0.00
BASIN LAT 43+50	190.000	18	0.32	Cir	....	....	0.013	0.04	6.34	2.07	....	....	....	18	0.00	18	0.00	0.00	0.00

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Tc (min)	Throat Ht (in)	Total Area (ac)	Total CxA	Total Runoff (cfs)	Vel Ave (ft/s)	Vel Dn (ft/s)	Vel Hd Dn (ft)	Vel Hd Up (ft)	Vel Up (ft/s)	Cover Dn (ft)	Cover Up (ft)	Storage (cft)	
6.8	....	0.00	0.00	0.00	4.39	3.66	0.41	0.41	5.12	7.10	11.77	297.84	
5.7	....	0.00	0.00	0.00	5.25	5.38	0.41	0.41	5.12	11.73	18.18	245.90	
0.0	4.0	0.00	0.00	0.00	2.04	1.00	0.15	0.15	3.07	18.20	n/a	4.75	
5.0	....	0.00	0.00	0.00	4.55	4.37	0.35	0.35	4.73	18.14	19.02	119.87	
0.0	6.0	0.00	0.00	0.00	3.93	4.42	0.18	0.18	3.45	7.40	6.27	7.98	
4.0	....	0.00	0.00	0.00	4.09	3.87	0.29	0.29	4.32	18.98	19.13	122.43	
2.5	6.0	0.00	0.00	0.00	1.24	0.36	0.07	0.07	2.11	19.11	n/a	6.91	
0.0	6.0	0.00	0.00	0.00	2.70	2.76	0.11	0.11	2.65	n/a	n/a	15.67	
0.0	....	0.00	0.00	0.00	3.95	3.84	0.26	0.26	4.06	19.09	18.56	102.93	
0.0	6.0	0.00	0.00	0.00	3.95	3.84	0.26	0.26	4.06	18.59	n/a	3.93	
46.3	....	0.00	0.00	0.00	7.67	7.67	0.92	0.92	7.67	5.40	6.82	330.83	
45.1	....	0.00	0.00	0.00	3.91	3.91	0.24	0.24	3.91	6.32	19.53	895.18	
0.0	6.0	0.00	0.00	0.00	3.59	4.04	0.15	0.15	3.14	3.23	3.14	2.94	
44.4	....	0.00	0.00	0.00	3.77	3.77	0.22	0.22	3.77	19.52	21.66	450.45	
44.2	6.0	0.00	0.00	0.00	4.57	5.12	0.25	0.25	4.02	3.54	3.13	17.97	
0.0	....	0.00	0.00	0.00	0.45	0.01	0.01	0.01	0.89	3.09	3.80	4.59	
14.5	....	0.00	0.00	0.00	3.15	3.15	0.15	0.15	3.14	21.65	22.33	2512.78	
0.0	6.0	0.00	0.00	0.00	5.32	5.87	0.35	0.35	4.77	9.94	10.02	32.30	
11.7	....	0.00	0.00	0.00	2.47	2.47	0.09	0.09	2.47	22.31	20.89	1274.92	
0.0	6.0	0.00	0.00	0.00	3.94	4.44	0.18	0.18	3.45	10.93	10.60	21.78	
3.8	....	0.00	0.00	0.00	2.30	2.23	0.08	0.09	2.37	20.88	5.80	3305.20	
3.7	....	0.00	0.00	0.00	3.96	3.96	0.24	0.24	3.96	6.30	5.46	40.99	
0.0	....	0.00	0.00	0.00	2.72	2.72	0.11	0.11	2.72	5.45	3.88	37.10	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

MyReport

Tc (min)	Throat Ht (in)	Total Area (ac)	Total CxA	Total Runoff (cfs)	Vel Ave (ft/s)	Vel Dn (ft/s)	Vel Hd Dn (ft)	Vel Hd Up (ft)	Vel Up (ft/s)	Cover Dn (ft)	Cover Up (ft)	Storage (cft)	
2.1	....	0.00	0.00	0.00	2.59	2.59	0.10	0.10	2.59	5.45	2.96	441.70	
0.0	4.0	0.00	0.00	0.00	1.25	1.25	0.02	0.02	1.24	2.95	3.09	7.83	
0.0	....	0.00	0.00	0.00	1.56	1.53	0.04	0.04	1.58	2.93	0.90	333.77	

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Date: 7/27/2020

NOTES: ** Critical depth

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
1	18	6.00	44.10	45.41	1.31	1.17	3.66	0.41	45.82	0.000	210.000	51.16	52.11 j	0.95**	1.17	5.12	0.41	52.51	0.000	0.000	n/a	0.15	0.06
2	18	6.00	51.20	52.11	0.91	1.11	5.38	0.41	52.51	0.000	215.000	53.32	54.27	0.95**	1.17	5.12	0.41	54.67	0.000	0.000	n/a	1.00	0.41
3	18	1.20	53.30	54.27	0.97	0.39	1.00	0.15	54.41	0.000	6.000	53.50	53.91	0.41**	0.39	3.07	0.15	54.06	0.000	0.000	n/a	1.00	n/a
4	18	4.87	53.36	54.27	0.91	1.03	4.37	0.35	54.61	0.000	111.800	54.48	55.33 j	0.85**	1.03	4.73	0.35	55.68	0.000	0.000	n/a	1.00	0.35
5	18	1.80	66.10	66.52	0.42*	0.41	4.42	0.18	66.71	0.000	17.200	66.27	66.77	0.50**	0.52	3.45	0.18	66.96	0.000	0.000	n/a	1.00	n/a
6	18	3.75	54.52	55.33	0.81	0.87	3.87	0.29	55.62	0.000	133.260	55.87	56.61 j	0.74**	0.87	4.32	0.29	56.90	0.000	0.000	n/a	0.88	n/a
7	18	0.30	55.89	56.61	0.72	0.14	0.36	0.07	56.68	0.000	14.700	56.00	56.20	0.20**	0.14	2.11	0.07	56.27	0.000	0.000	n/a	1.07	n/a
8	18	0.70	55.90	56.20	0.30	0.25	2.76	0.11	56.31	0.000	60.530	56.50	56.81	0.31**	0.26	2.65	0.11	56.92	0.000	0.000	n/a	1.00	n/a
9	18	3.10	55.91	56.61	0.70	0.76	3.84	0.26	56.87	0.000	131.100	57.23	57.90 j	0.67**	0.76	4.06	0.26	58.16	0.000	0.000	n/a	0.99	n/a
10	18	3.10	57.20	57.90	0.70	0.76	3.84	0.26	58.16	0.000	5.000	57.30	57.97 j	0.67**	0.76	4.06	0.26	58.23	0.000	0.000	n/a	1.00	n/a
11	18	13.56	43.05	52.84	1.50	1.77	7.67	0.92	53.76	1.668	187.250	51.06	55.96	1.50	1.77	7.67	0.92	56.88	1.668	1.668	3.123	0.15	0.14
12	24	12.27	51.06	56.10	2.00	3.14	3.91	0.24	56.34	0.294	285.000	51.92	56.94	2.00	3.14	3.91	0.24	57.18	0.294	0.294	0.839	1.00	0.24
13	18	1.30	68.72	69.08	0.36*	0.32	4.04	0.15	69.23	0.000	8.000	68.80	69.23	0.43**	0.41	3.14	0.15	69.38	0.000	0.000	n/a	1.00	n/a
14	24	11.83	51.93	57.18	2.00	3.14	3.77	0.22	57.40	0.274	143.410	52.36	57.57	2.00	3.14	3.77	0.22	57.79	0.274	0.274	0.392	0.58	0.13
15	18	3.00	70.98	71.53	0.55*	0.59	5.12	0.25	71.78	0.000	27.000	71.25	71.91	0.66**	0.75	4.02	0.25	72.16	0.000	0.000	n/a	0.50	0.13
16	18	0.01	71.29	71.91	0.62	0.01	0.01	0.01	71.92	0.000	15.000	71.44	71.48	0.04**	0.01	0.89	0.01	71.49	0.000	0.000	n/a	1.00	n/a
17	24	9.88	52.37	57.70	2.00	3.14	3.15	0.15	57.85	0.191	800.000	54.75	59.22	2.00	3.14	3.14	0.15	59.38	0.191	0.191	1.527	1.00	0.15
18	18	5.00	67.64	68.37	0.73*	0.85	5.87	0.35	68.72	0.000	34.000	67.98	68.84	0.86**	1.05	4.77	0.35	69.19	0.000	0.000	n/a	1.00	0.35
19	24	7.76	54.77	59.38	2.00	3.14	2.47	0.09	59.47	0.118	405.900	55.97	59.86	2.00	3.14	2.47	0.09	59.95	0.118	0.118	0.478	1.00	0.09
20	18	1.80	66.43	66.85	0.42*	0.41	4.44	0.18	67.04	0.000	47.000	66.90	67.40	0.50**	0.52	3.45	0.18	67.59	0.000	0.000	n/a	1.00	n/a
21	24	6.99	55.98	59.95	2.00	3.14	2.23	0.08	60.03	0.096	1063.000	59.12	60.90	1.78	2.95	2.37	0.09	60.99	0.085	0.090	0.960	0.87	0.08
22	18	6.99	59.12	60.97	1.50	1.77	3.96	0.24	61.22	0.443	23.200	59.19	61.08	1.50	1.77	3.96	0.24	61.32	0.443	0.443	0.103	0.88	0.21

Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

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

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
	(in)	(cfs)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(sqft)	(ft/s)	(ft)	(ft)	(%)	(%)	(ft)	(K)	(ft)
23	18	4.80	59.20	61.29	1.50	1.77	2.72	0.11	61.41	0.209	21.000	59.26	61.34	1.50	1.77	2.72	0.11	61.45	0.209	0.209	0.044	1.00	0.11
24	18	4.58	59.20	61.29	1.50	1.77	2.59	0.10	61.40	0.190	250.000	59.97	61.77	1.50	1.77	2.59	0.10	61.87	0.190	0.190	0.476	1.00	0.10
25	18	2.20	59.98	61.87	1.50	1.77	1.25	0.02	61.90	0.044	4.430	59.99	61.87	1.50	1.77	1.24	0.02	61.90	0.044	0.044	0.002	1.00	0.02
26	18	2.70	60.00	61.87	1.50	1.77	1.53	0.04	61.91	0.066	190.000	60.60	61.99	1.39	1.71	1.58	0.04	62.03	0.057	0.062	0.117	1.00	0.04

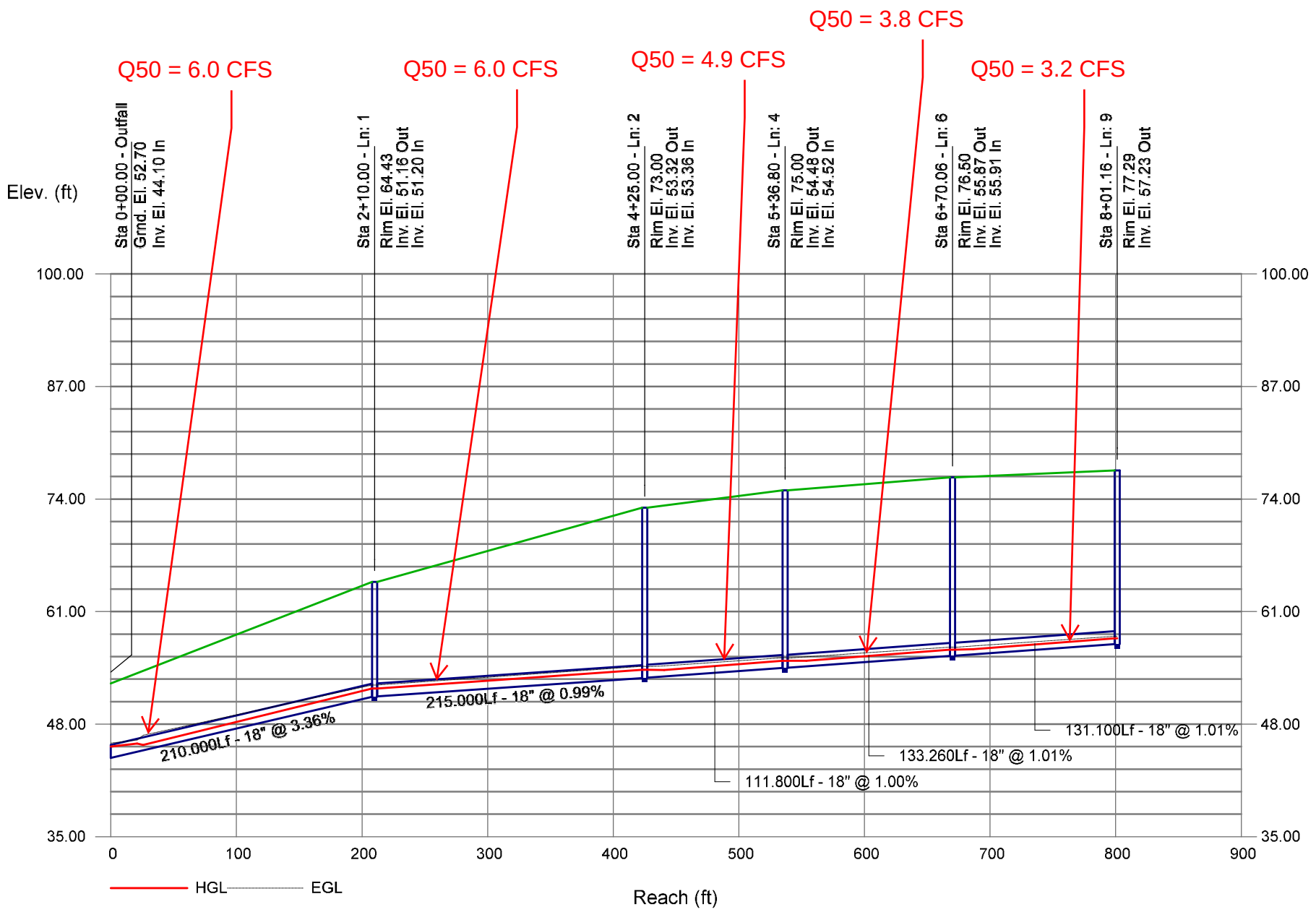
Project File: moonlight Phases 1C 1E.stm | Number of lines: 26 | Run Date: 7/27/2020

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

Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

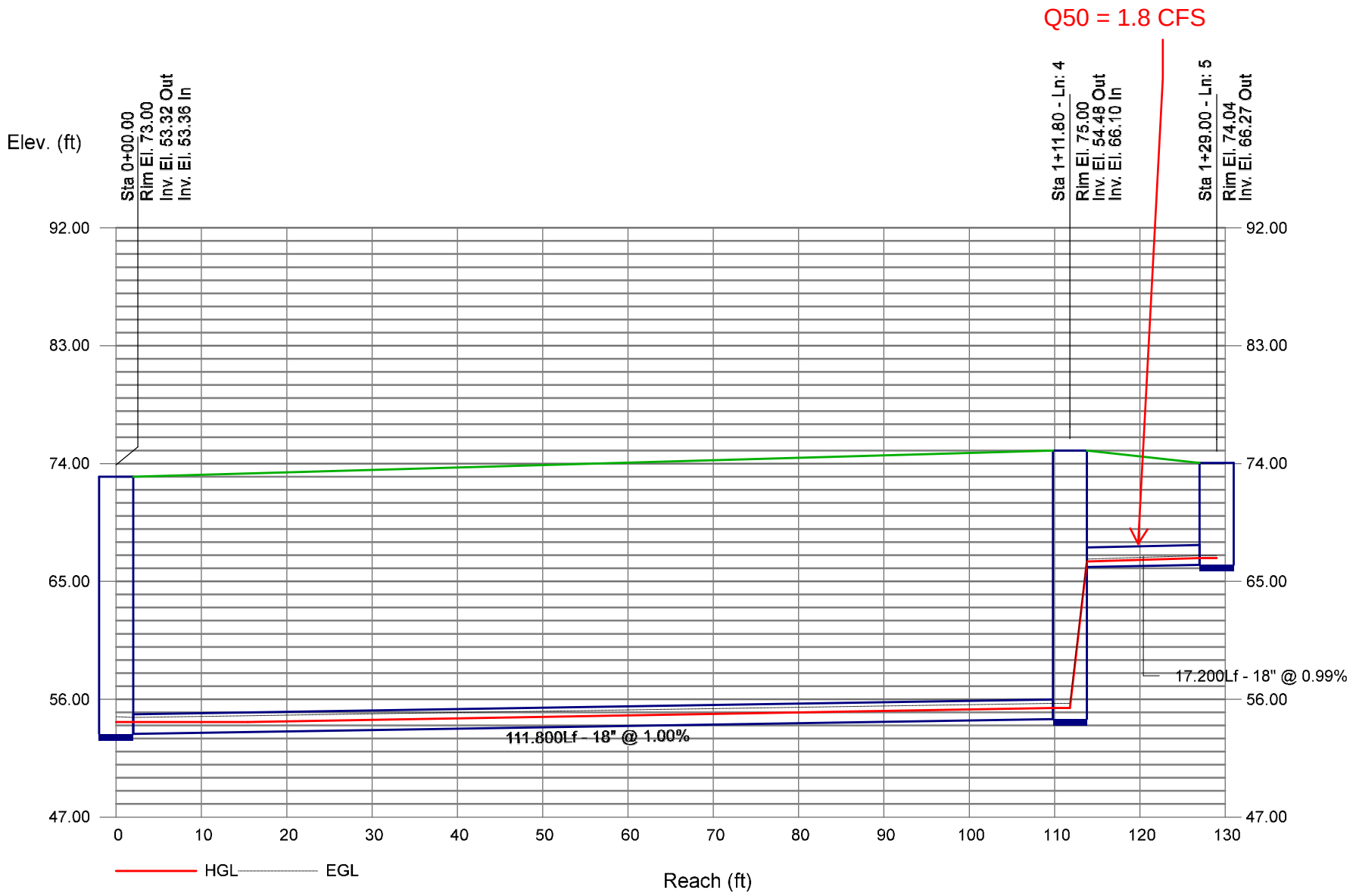
PHASE 1C
MAINLINE STORM DRAIN



Storm Sewer Profile

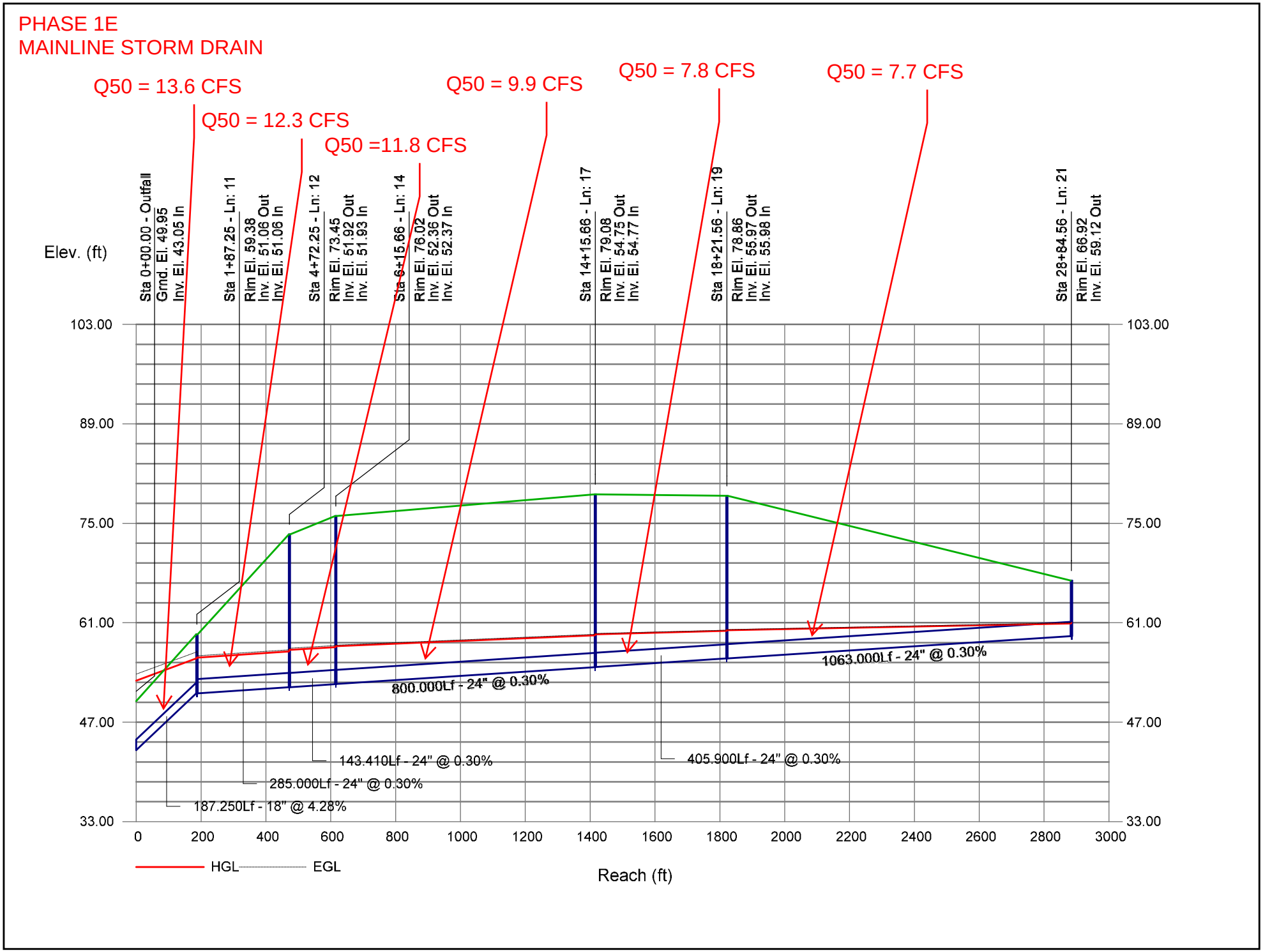
Proj. file: moonlight Phases 1C 1E.stm

PHASE 1C
LATERAL 16+25



Storm Sewer Profile

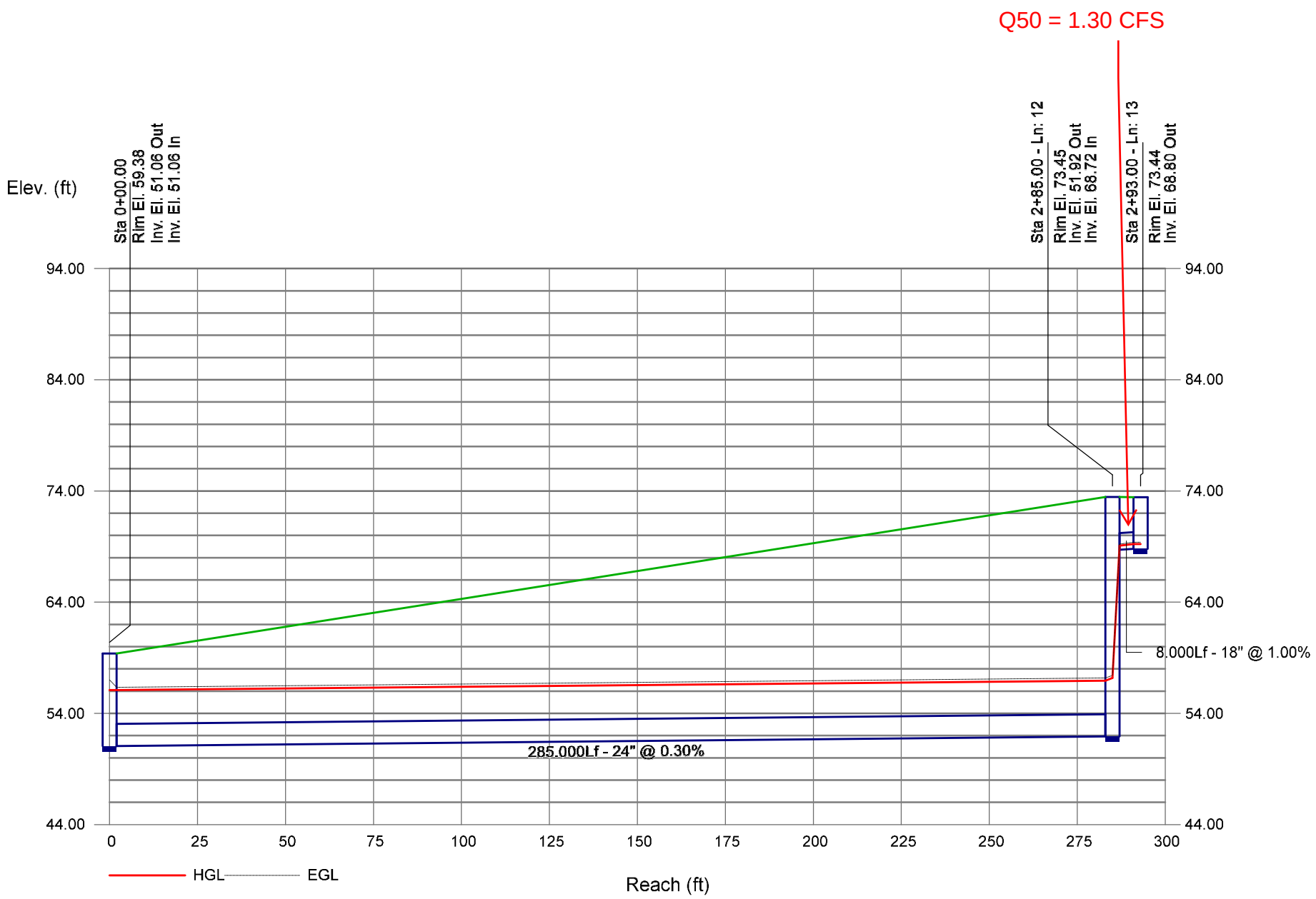
Proj. file: moonlight Phases 1C 1E.stm



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

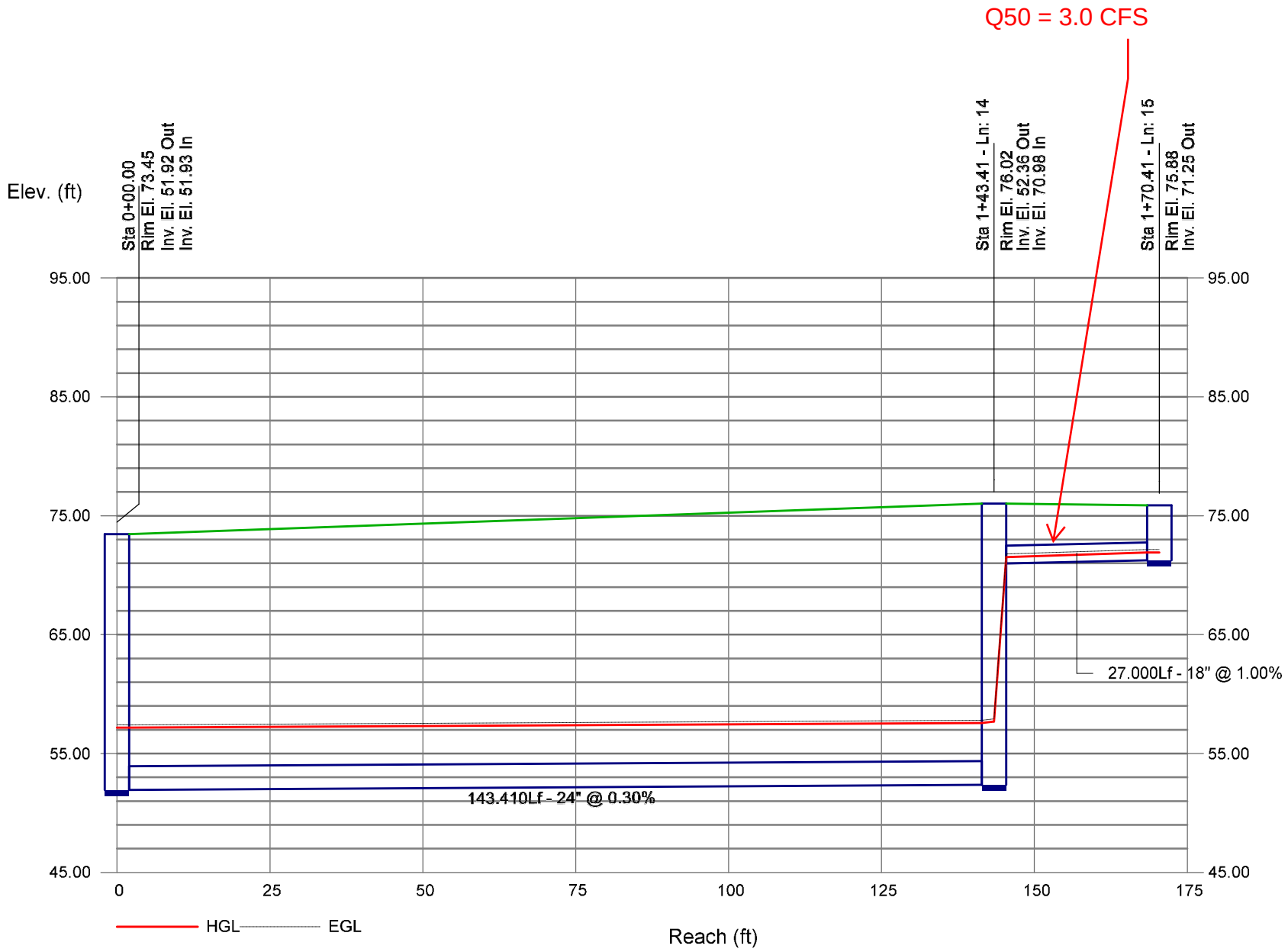
PHASE 1E
LATERAL 14+96.96



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

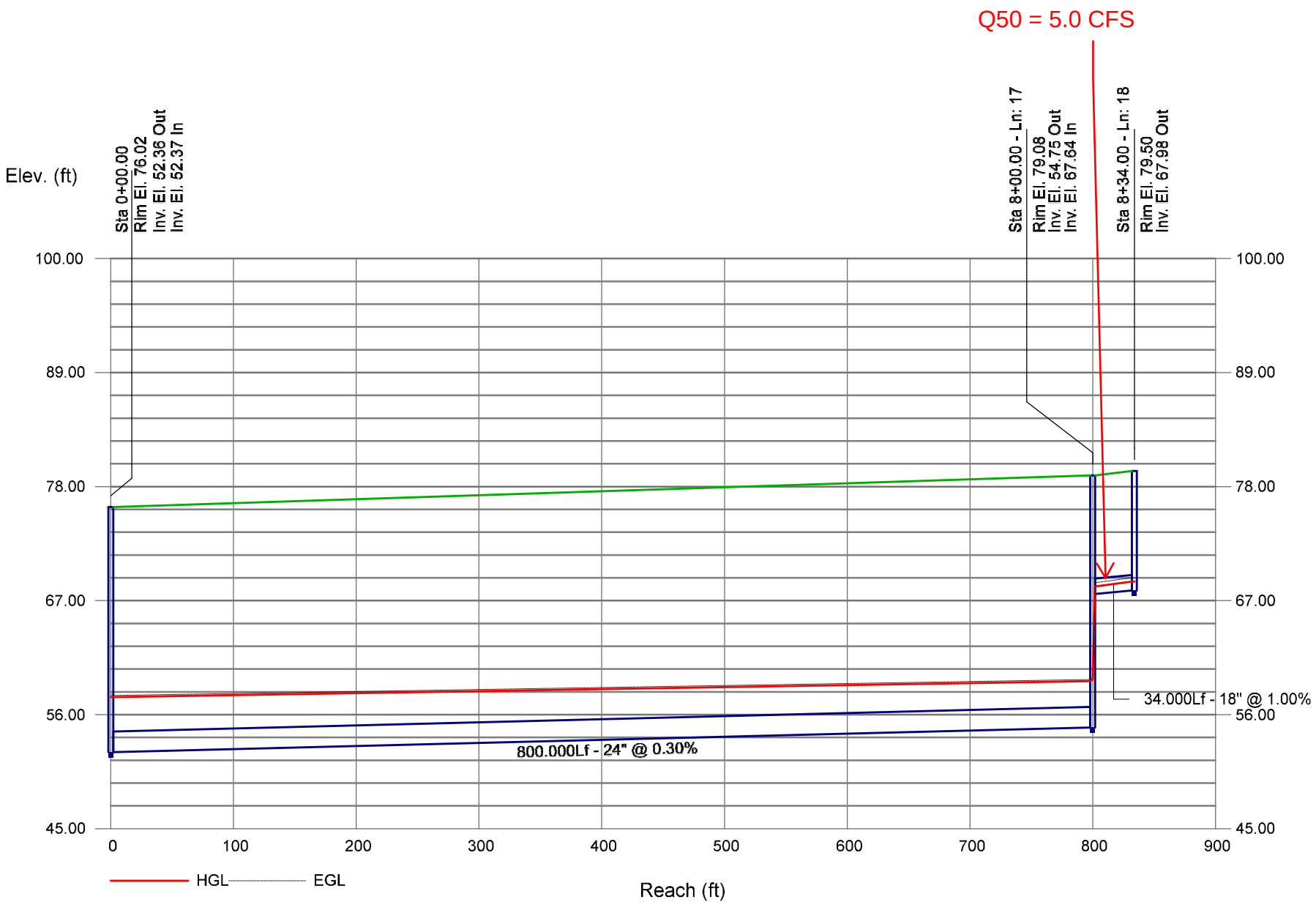
PHASE 1E
LATERAL 16+44.34



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

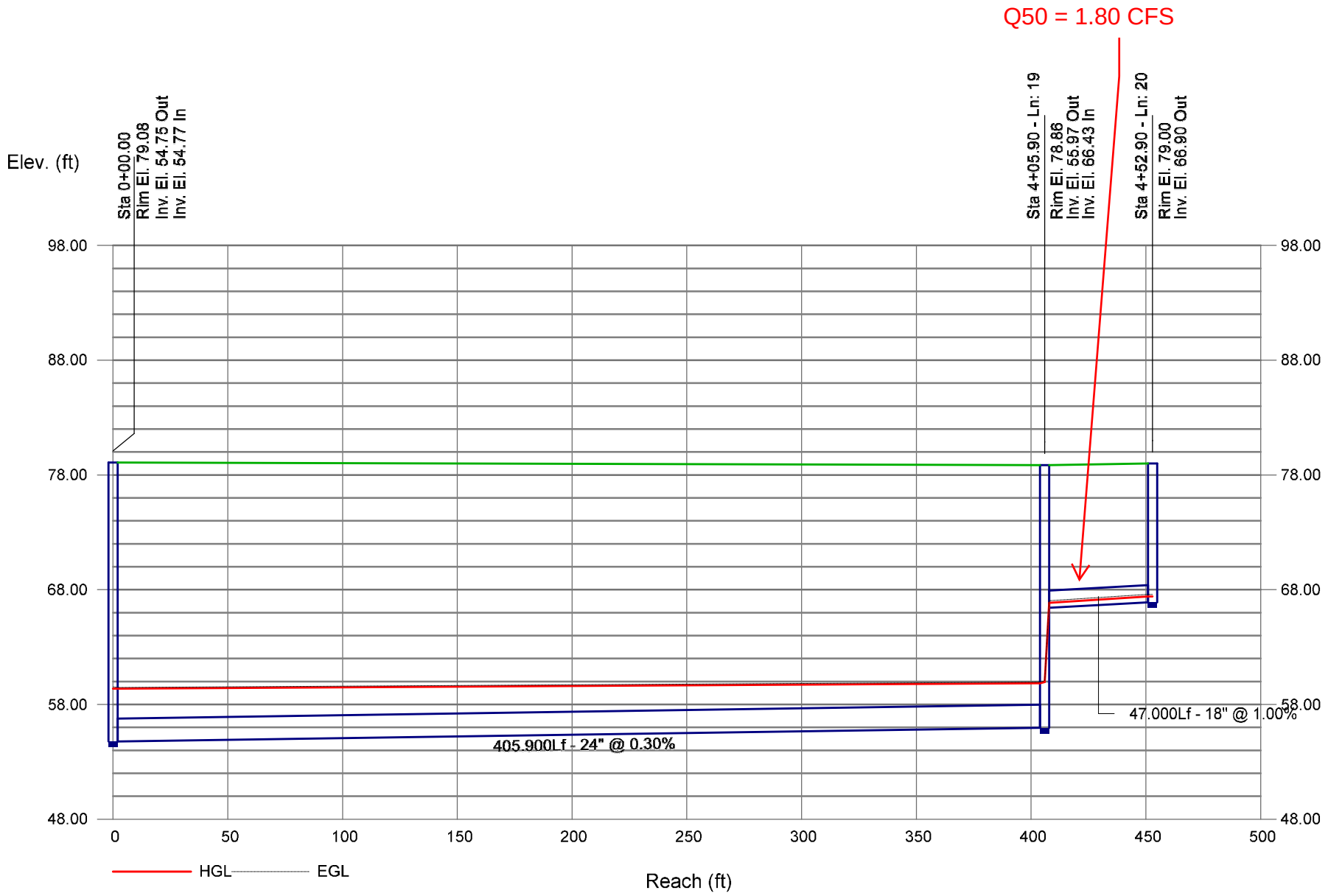
PHASE 1E
LATERAL 24+45.71



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

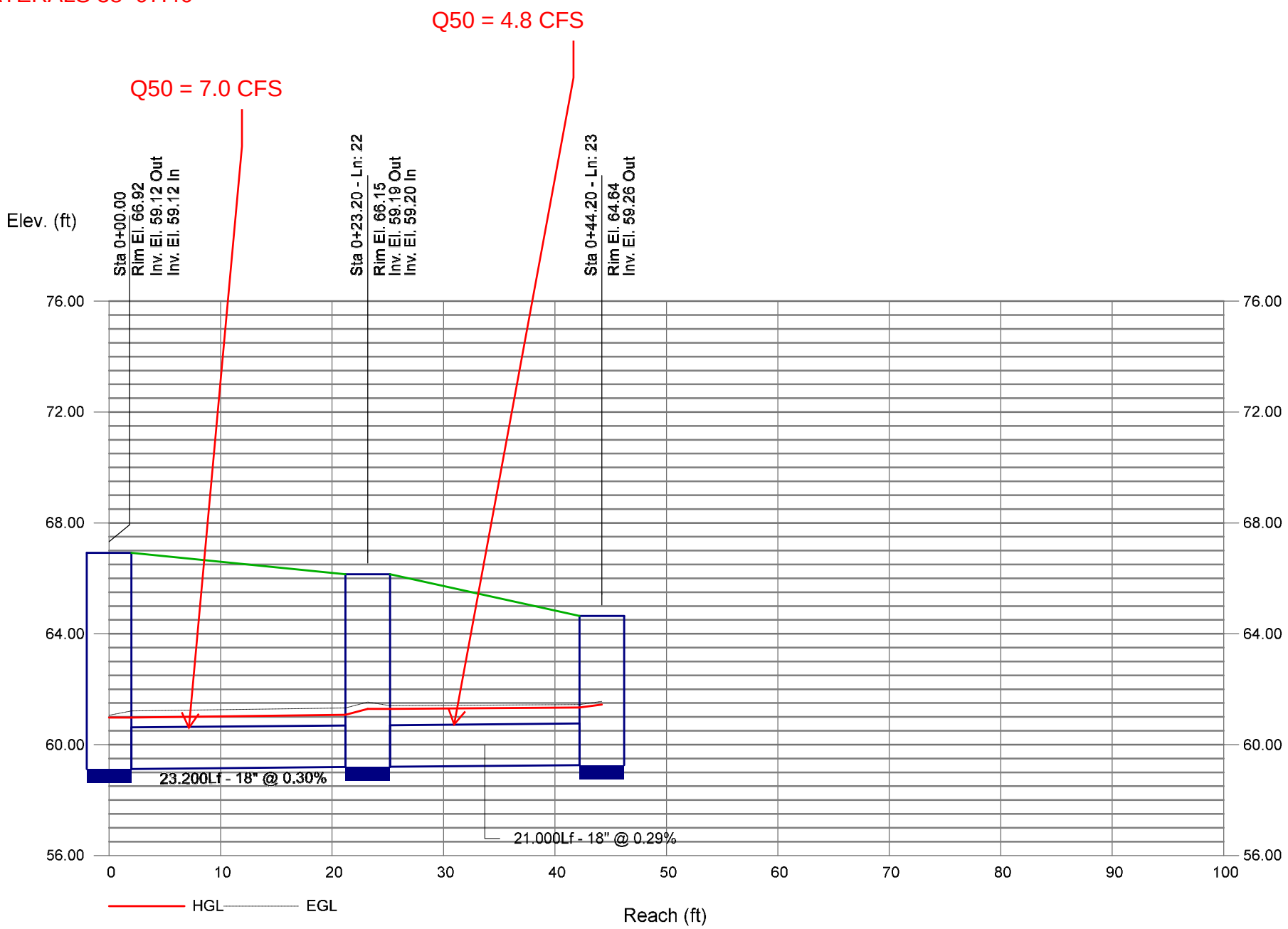
PHASE 1E
LATERAL 28+53.97



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

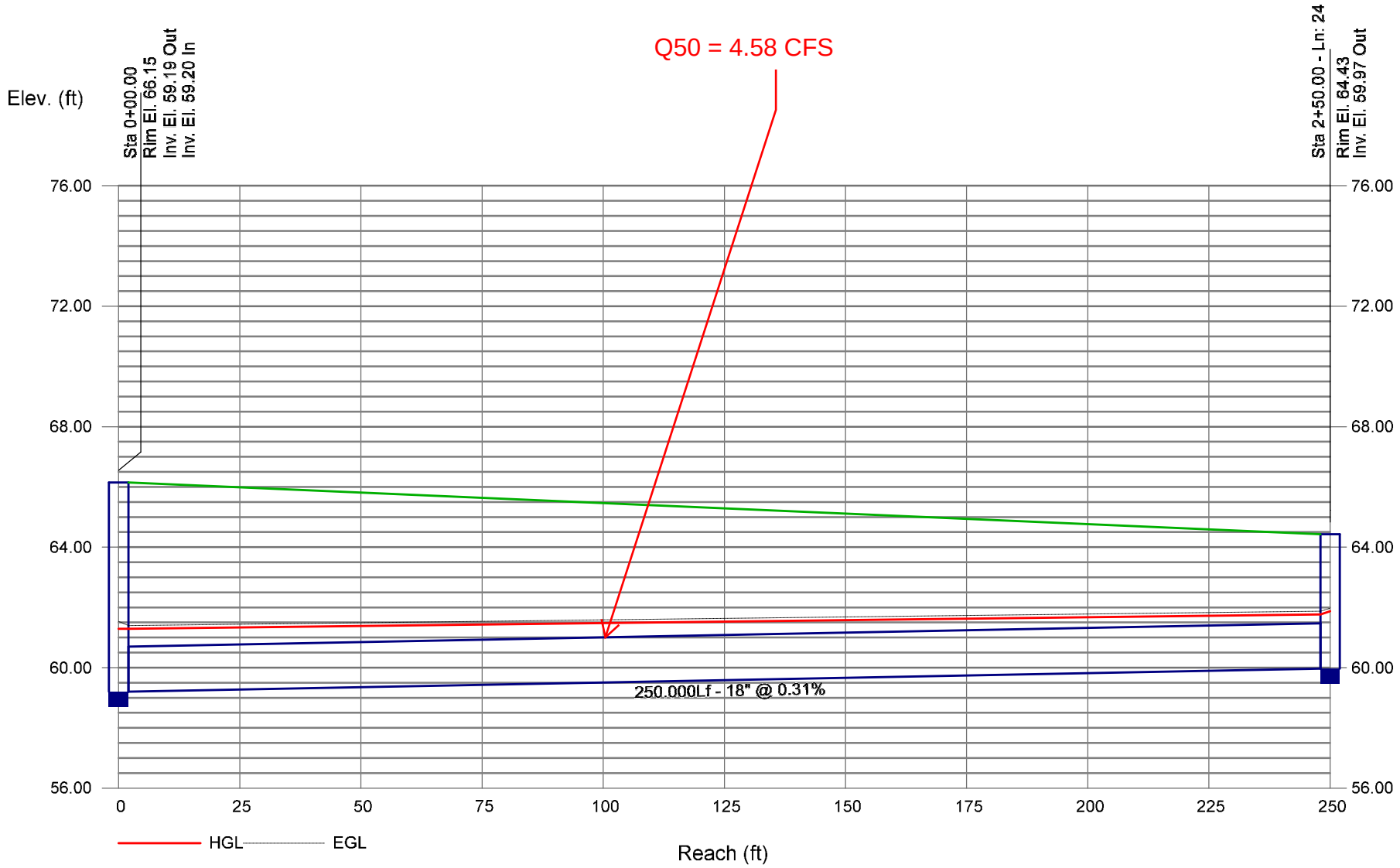
PHASE 1E
LATERALS 38+97.46



Storm Sewer Profile

Proj. file: moonlight Phases 1C 1E.stm

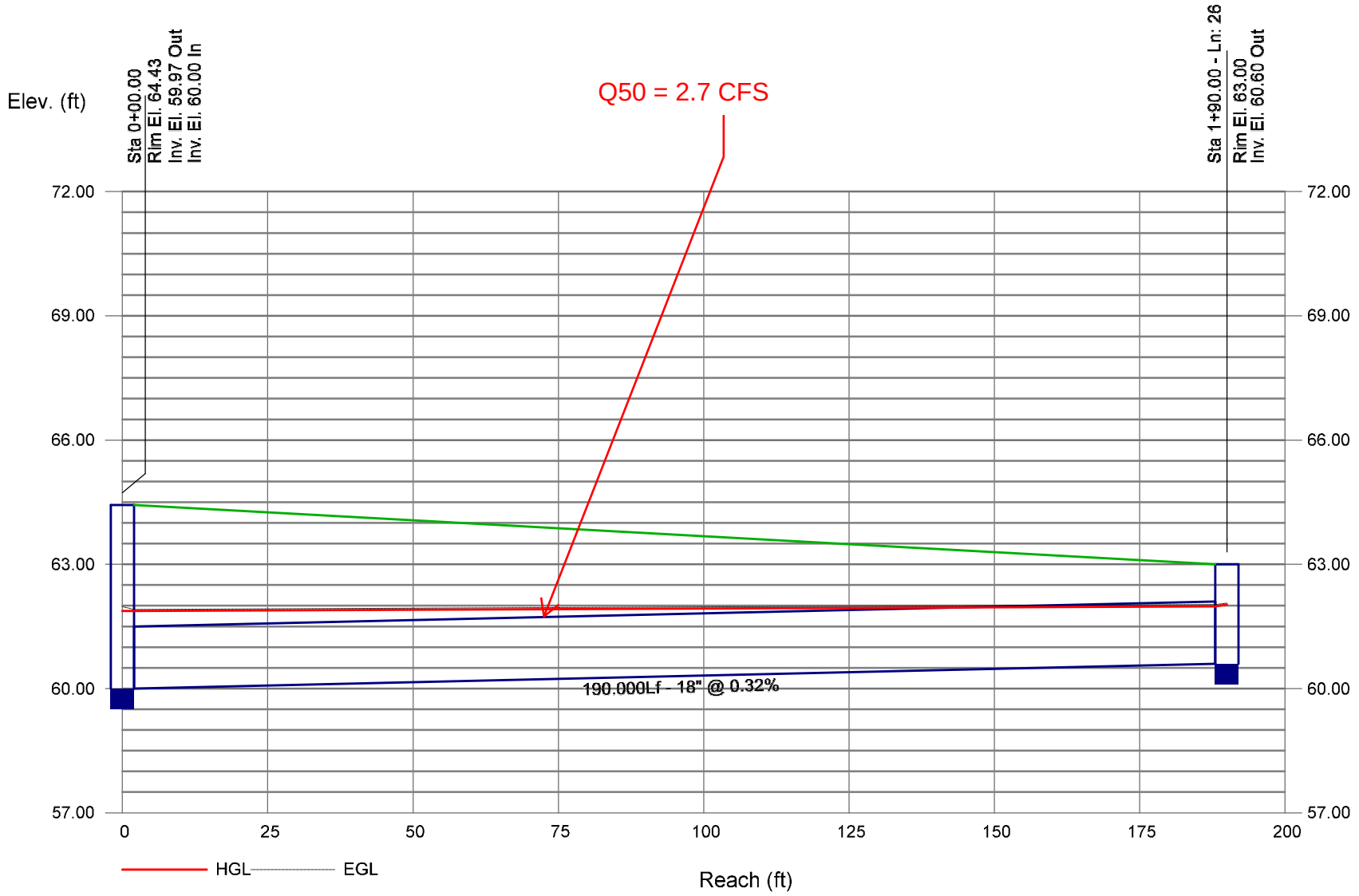
PHASE 1E
LATERAL 41+75



Storm Sewer Profile

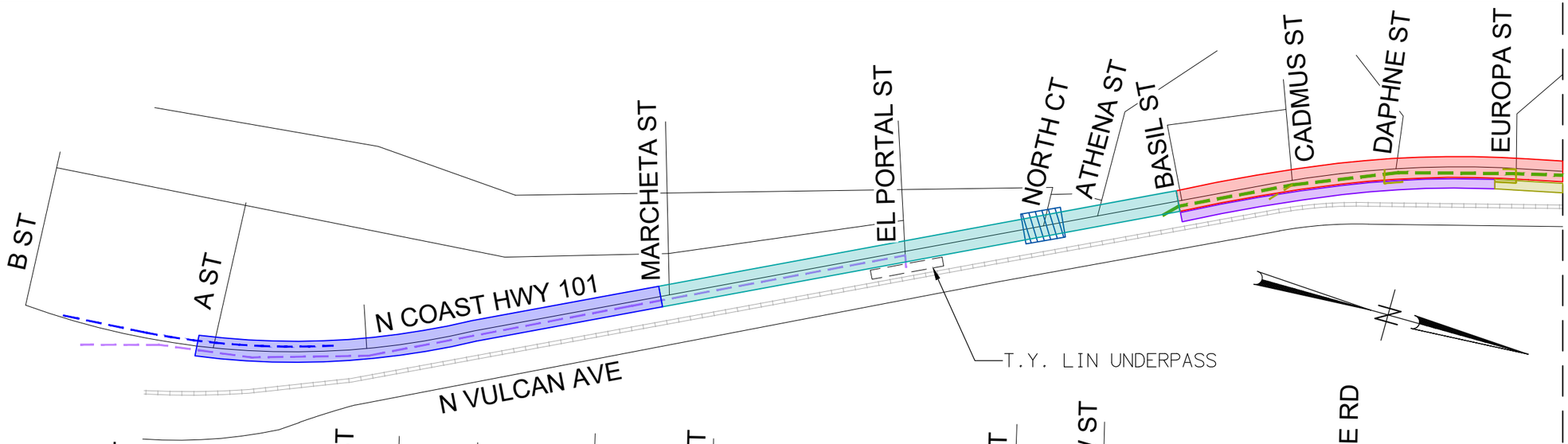
Proj. file: moonlight Phases 1C 1E.stm

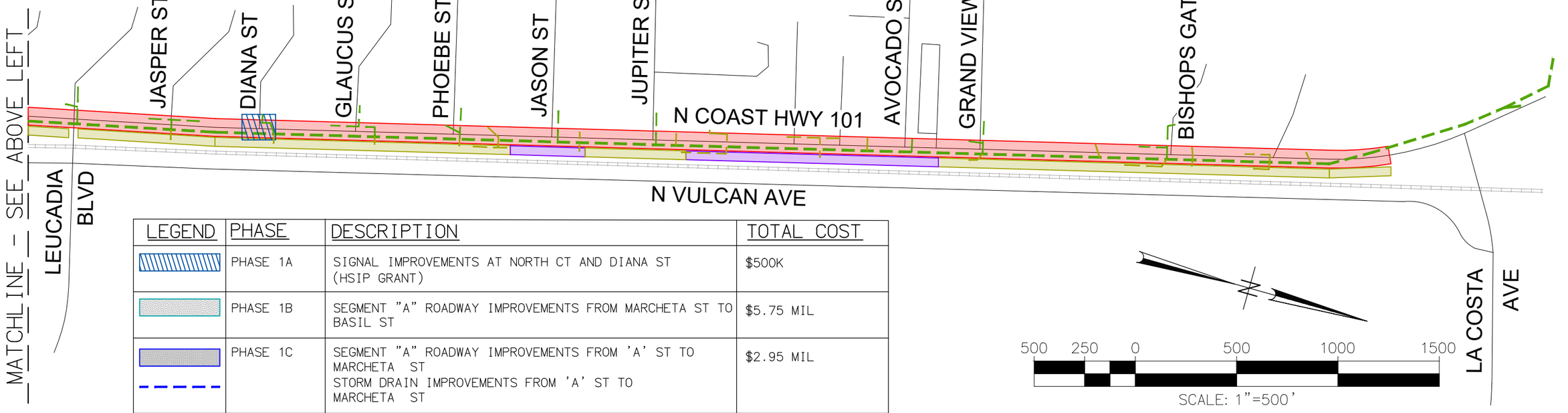
PHASE 1E
LATERAL 43+50



Appendix G – NCH 101 Construction Phase Exhibit

Michael Baker
INTERNATIONAL





LEGEND	PHASE	DESCRIPTION	TOTAL COST
	PHASE 1A	SIGNAL IMPROVEMENTS AT NORTH CT AND DIANA ST (HSIP GRANT)	$500K
	PHASE 1B	SEGMENT "A" ROADWAY IMPROVEMENTS FROM MARCHETA ST TO BASIL ST	$5.75 MIL
	PHASE 1C	SEGMENT "A" ROADWAY IMPROVEMENTS FROM 'A' ST TO MARCHETA ST STORM DRAIN IMPROVEMENTS FROM 'A' ST TO MARCHETA ST	$2.95 MIL
	PHASE 1D	PARKING PODS AT 1)BASIL ST TO DAPHNE ST 2)JASON ST 3)JUPITER ST TO AVOCADO ST	$350K
	PHASE 1E	EL PORTAL STORM DRAIN EXTENSION	$1.6 MIL (APPROX)
	PHASE 2A	STORM DRAIN MAIN LINE AND LATERALS TO SIDE STREETS, FROM BASIL ST TO LA COSTA AVE	$8.7 MIL
	PHASE 2B	COMPLETE EAST SIDE PARKING, STORM DRAIN, AND BIORETENTION AREAS	$800K (APPROX)
	PHASE 3	SOUTHBOUND AND NORTHBOUND ROADWAY AND LANDSCAPING, FROM BASIL TO LA COSTA	$23.5 MIL (APPROX)
		TOTAL COST OF PROJECT BY PHASES	$44.2 MIL

NORTH COAST HIGHWAY 101
CONSTRUCTION PHASE EXHIBIT
MAY 21, 2020
MAY 26, 2020 (REV. 1)

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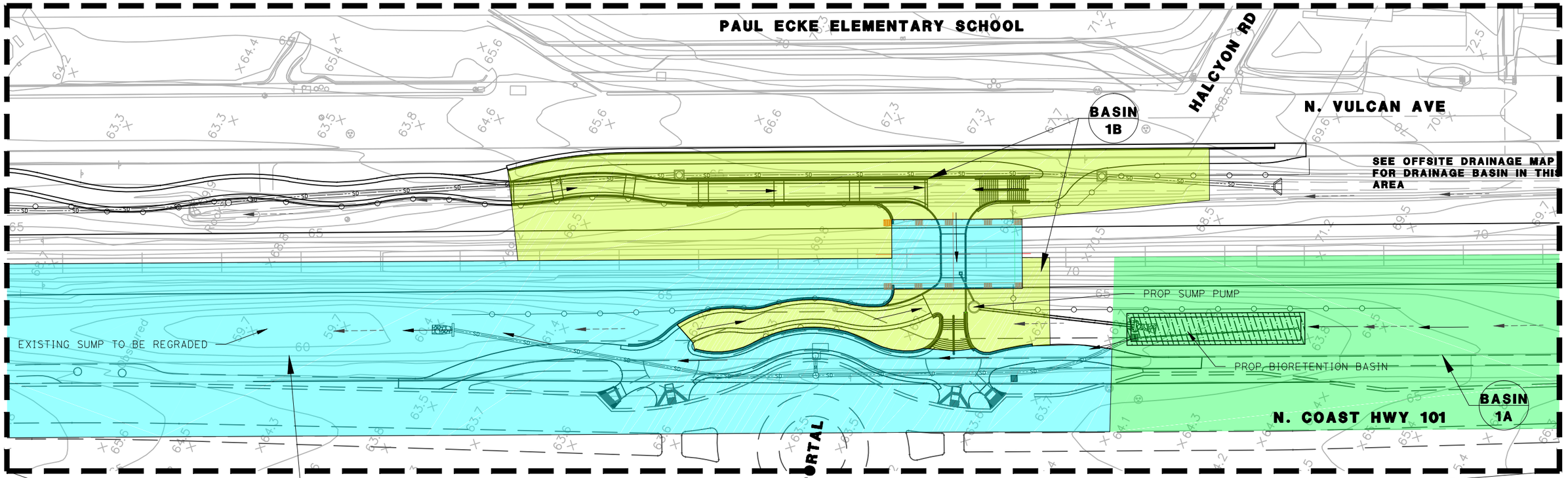
INTERNATIONAL

Appendix H – Excerpts from T.Y. Lin's El Portal Drainage Study



LEGEND:

- EXISTING FLOW
- PROPOSED FLOW
- PROPOSED STORM DRAIN
- PROPOSED RETAINING WALL

BASIN	AREA (AC)	Tc (MIN)	RUNOFF COEF.	Q100 (CFS)
1A	4.14	27.4	0.46	3.03
1B	0.45	5	0.54	0.89
1C	1.56	5	0.50	2.86

FLOW FROM BASIN 1B IS PUMPED FROM THE EL PORTAL NCTS PEDESTRIAN UNDERCROSSING INTO THE SOUTHERLY BASIN. THIS FLOW ENTERS THE MBI PHASE 1E STORM DRAIN AND IS ACCOUNTED FOR IN ALL HYDRAULIC CALCULATIONS.

EL PORTAL BICYCLE / PEDESTRIAN UNDERCROSSING PROPOSED DRAINAGE EXHIBIT