APPENDIX HYDRO

DRAINAGE CONCEPT/HYDROLOGY REPORT
SEWER SYSTEM HYDRAULIC ANALYSIS

HUNSAKER
& ASSOCIATES
I R V I N E , I N C .

PLANNING
ENGINEERING
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GOVERNMENT RELATIONS

IRVINE
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Sewer System Hydraulic Analysis

Date: September 19, 2024

For: City of Torrance
Community Development Department

By: Katie O'Connor, P.E.
Hunsaker & Associates Irvine, Inc.

Project: **Tentative Tract 83498, Del Amo**

Hunsaker & Associates Irvine, Inc. (H&A) is pleased to submit the Sewer System Hydraulic Analysis for Tentative Tract 83498. This analysis has been prepared to examine the existing sewer system for the addition of flows from the aforementioned multi-family development project in the City of Torrance. The project lies within the jurisdiction of the City of Torrance and their standards have been used for this report.

This evaluation is based on existing and known conditions and should be re-evaluated if these conditions change or new information becomes available. Any interpretation of the information presented in this report should be referred to H&A to ensure the integrity of the results.

FOUNDING PARTNERS:
RICHARD HUNSAKER
TOM R. McGANNON
JOHN A. MICHLER
DOUGLAS G. SNYDER

Project Location

The Tentative Tract 83498 Del Amo project is located north of Carson Street, south of Fashion Way, and west of Madrona Avenue, in the City of Torrance. The general project location is shown on exhibit entitled, “Vicinity Map.”

PRINCIPALS:
FRED GRAYLEE
BRADLEY HAY
PAUL HUDDLESTON
KAMAL H. KARAM
DOUGLAS L. STALEY
KRIS WEBER
JOSEPH E. WIGHTMAN

Summary of Findings

1. The development will include a maximum of 274 residential units and a community park on approximately 16 acres.

2. The sewer system schematic is shown on the attached exhibit “Sewer System Model.” The exhibit identifies the project site, points of sewer connection, existing sewer reaches, and flow monitoring locations.

3. The project site was previously studied by Tait & Associates within the Del Amo Fashion Center Sewer Study Addendum 2. The Del Amo Fashion Center Sewer Study Addendum 2 (Tait 2015) examined the potential for a future development on the Tentative Tract 83498 project site. This site is referred to as the Madrona Parcel. In this report, it was assumed that the development of the Madrona Parcel would contribute 0.56 cfs of peak flow to the sewer system. This flow would enter the sewer system at a lateral at the intersection of Fashion Way and Madrona. The sewer system in Madrona and Opal, as well as a lateral from the intersection of Fashion Way and Madrona Ave were sized to accommodate the 0.56 cfs of peak flows from the Madrona Parcel. A copy of this report can be found in the Appendix.

4. The City of Torrance (the City) follows the guidelines and design criteria required by the Los Angeles County Sanitation District. During discussions

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with the City, it was determined that the Los Angeles County duty factor for a 2-3 bedroom apartment (275 gpd/DU) should be applied to the project.

The proposed development of 274 residential units will contribute 0.12 cubic feet per second (cfs) of average flow and 0.39 cfs of peak flow to the system studied in the Del Amo Fashion Center Sewer Study Addendum 2. The Tentative Tract 83498 average and peaked flow calculations can be found in Table 1 below.

Table 1: Tentative Tract 83498 Sewer Generation

DWELLING UNITS	AVERAGE FLOW DUTY FACTOR	AVERAGE FLOW Q_{avg}	AVERAGE FLOW Q_{avg}	PEAK FLOW $Q_{peak} = 2.65*(Q_{avg})^{0.906}$
274 DU	275 gpd/DU	75,350 gpd	0.12 cfs	0.39 cfs

This peaked flow (0.39 cfs) is significantly less than the anticipated flow (0.56 cfs) and will not have a negative impact on the existing system.

5. It was discovered during diligence that the proposed lateral discussed in the Tait 2015 study to service the Madrona Parcel was not constructed to the right of way of the property. The lateral terminates in the intersection of Fashion Way and Madrona Avenue, approximately 83 feet from the manhole. The as-built plans for this lateral can be found in the Appendix.

   Additionally, Chevron Pipe Line Company has as many as six gasoline, oil, and/or jet fuel lines that run the length of the Madrona Parcel along Fashion Way and Madrona Avenue. In order to utilize the lateral in the intersection of Fashion Way and Madrona Avenue, these lines would need to be crossed. Encroachment into this pipeline easement, for potholing to identify elevations and construction, would require special construction techniques and coordination due to the nature of the lines being crossed. Correspondence from Chevron Pipe Line Company can be found in the Appendix.

6. The Fashion Way/ Madrona lateral is located at the high point in elevation of the site. Due to the topography of the site, if this lateral is utilized and extended into the project site, a sanitary sewer lift station would be required in the southwest portion of the of the Madrona Parcel.

   Upon review of the site with City engineers, with consideration of the location of the Madrona Parcel lateral, existing site topography, a possible sanitary sewer lift station, and Chevron pipelines, it was determined that an additional alternative to connect the site to the existing sewer system should be considered.

7. In discussions with the City, it was determined that the existing sewer system in Carson Street, Madrona Avenue, Sepulveda Boulevard, and Mapel Avenue, as it connects to the trunk sewer line in Lomita Boulevard should be

examined. H&A was provided with the direction to monitor four different locations in the existing sewer system for two weeks with measurements taken every 15 minutes. A copy of the City correspondence and provided flow monitoring locations can be found in the Appendix. Additionally, "Sewer System Model" exhibit identifies the sewer flow monitoring locations.

As required by the City of Torrance, the 14-day sewer flow monitoring study was conducted to determine if the existing sewer system had the capacity to accept the proposed project flows. The sewer study was completed by US[3] and is provided in the Appendix.

8. The flow monitoring was performed between April 7, 2022 and April 21, 2022. A summary of the flow monitoring data is below:

Table 2: April 2022 Sewer Flow Monitoring

SITE	PIPE DIAMETER (inches)	AVGERAGE Q (gpm)	AVERAGE d/D	MAXIMUM Q (gpm)	MAXIMUM d/D
1	10	2.57	0.03	13.74	0.11
2	12	104.22	0.50	262.78	0.62
3	15	217.51	0.22	421.53	0.29
4	18	229.50	0.23	435.07	0.28

The results of the April 2022 flow monitoring indicate that there was a capacity issue at Site 2, near the intersection of Sepulveda Boulevard and Mapel Avenue. The peak flow at Site 2 has a maximum depth of 62% full. This depth of flow seemed unusual considering the upstream depth of flow of 11% and the downstream depth of flow of 29%. The City of Torrance design criteria allows percentage full (d/D) during peak flow to be up to 0.50 for pipes 12 inches in diameter.

9. In order to determine the cause of the discrepancy in depths of flow, a CCTV inspection of the pipes was performed in October 2022 at the location of the potential problem (Site 2.) US[3] was contracted to perform the inspection. The CCTV inspection was scheduled for October 6, 2022. CCTV identified an obstruction in the sewer line. The CCTV investigation found that the pipe was approximately 5% full and increased to 35% full before the CCTV robot had to abandon the video documentation of the pipe. The obstruction appeared to be a sludge-like substance that was being added to the sewer system from the Madrona Marsh Sump Pump House through a sewer lateral. City of Torrance engineers were not aware of a connection from the Sump Pump House to the sewer main in Sepulveda Boulevard. There are no other connections to the sewer main within Sepulveda Boulevard.

10. On October 14, 2022 that stretch of pipe was cleaned, obstructions removed, and CCTV inspection was repeated. During the October 14, 2022 CCTV inspections, flow levels in the existing pipe dropped significantly. The water

level in the sewer main never increased beyond 10% full. The CCTV results and photos of the area where the discharge is entering the system can be found in the Appendix.

At the City's request, a repeat of the original flow monitoring study was scheduled for December 8, 2022 to December 22, 2022.

11. The second flow monitoring study was performed between December 8, 2022 and December 22, 2022. A summary of the flow monitoring data is below:

Table 3: December 2022 Sewer Flow Monitoring

SITE	PIPE DIAMETER (inches)	AVGERAGE Q (gpm)	AVERAGE d/D	MAXIMUM Q (gpm)	MAXIMUM d/D
1	10	9.27	0.08	29.29	0.15
2	12	141.42	0.53	371.93	0.66
3	15	282.24	0.28	490.81	0.37
4	18	304.84	0.25	783.75	0.44

The results of the December 2022 sewer flow monitoring study were essentially the same as the results of the April 2022 sewer flow monitoring study. It was determined that the sewer line downstream of Site 2 was, once again, obstructed with sludge. The results of the sewer study, completed by US^3, is provided in the Appendix. Please note that there was a significant rain storm between the cleaning of the pipe in October 2022 and the second flow monitoring study in December 2022. It is suspected that the Madrona Marsh Sump Pump House dumps into the existing sewer system during rain events.

12. Due to the obstruction of flows and diminished capacities from these obstructions, the peaked sewer flow for the area that contributes to flow monitoring Site 2 was calculated using Los Angeles County sewer generation zone flow rate coefficient. This coefficient is used for design of sewer systems and the analysis of existing systems. The table below calculates the existing sewer flow for the area in question.

Table 4: Existing Commercial Sewer Flow Generation

ZONE	AREA	ZONE FOW COEFFICIENT (cfs/acre)	FLOW PER AREA (cfs)
Commercial	19.84 acres	0.0150	0.30 cfs

The existing sewer flow monitored at Site 1 with the additional flow calculated for the area tributary to Site 2 will provide a good estimation of the existing sewer flows at Site 2.

Table 5: Calculated Existing Site 2 Sewer Flow

SITE	MAXIMUM PEAKED FLOW FROM MONITORING	CALCULATED PEAKED FLOW	TOTAL FLOW AT SITE
Site 1	29.29 gpm =0.07 cfs	N/A	29.29 gpm =0.07 cfs
Site 2	N/A	0.30 cfs	**0.37 cfs**

The calculated existing flows at Site 2 indicate that the existing 12-inch pipe has a d/D of 0.337 (with a flow of 0.37 cfs.) The additional peaked flows from the proposed 274 residential units for Tentative Tract 83498 (0.39 cfs) would impact this sewer main and increase the d/D to 0.50 with a total peaked sewer flow of 0.76 cfs in the existing 12-inch pipe at Site 2. The City of Torrance design criteria allows percentage full (d/D) during peak flow to be up to 0.50 for pipes 12 inches in diameter. The hydraulic models were prepared using Bentley Systems modeling software to model the peak flows for the proposed and existing flows in the sewer system. The results can be found in the Appendix.

13. The results of this Sewer Hydraulic Analysis have determined that there are three possible options for connecting this site to the existing public sewer system. All options gravity drain into the Los Angeles County Sanitation District trunk sewers through existing City of Torrance sewer mains. All options require obstacles to be overcome in order for this project to be viable.

14. **Option 1 Opal Street Sewer & Sewer Lift Station:** This option would be to connect the proposed sewer system to the Fashion Way/ Madrona lateral near the northeastern corner of the site. This option requires the existing Fashion Way/ Madrona lateral to be extended into the site. This extension of pipe would require significant coordination with Chevron Pipe Line Company to cross the existing gas, oil, and jet fuel lines that border the site on the north and east. The lateral extension would need to be constructed to the additional specifications required when crossing gas, oil, and jet fuel lines. Additionally, this option would require the construction of a sewer lift station and force main to pump the sewer flows from the site to the Fashion Way/ Madron lateral. Typically, gravity flow connections are preferable to installing sewer lift stations due to the increased operational concerns, maintenance requirements, and potential for future failures.

15. **Option 2 El Dorado Street Sewer & Sewer Lift Station:** This option would be to connect the proposed sewer system to the existing on-site sewer lateral that drains onto El Dorado Street. The existing lateral is on-site near the intersection of Madrona Avenue and El Dorado Street. The existing sewer in El Dorado joins the existing sewer in Mapel Ave and flows north toward the

trunk line in Maricopa Street. This option would require the construction of a sewer lift station and force main to pump the sewer flows from the site to the El dorado/ Madron lateral but would avoid constructing a new lateral to the site and the special construction methods required when crossing gas. Oil, and jet fuel lines. Typically, gravity flow connections are preferable to installing sewer lift stations due to the increased operational concerns, maintenance requirements, and potential for future failures

16. **Option 3 Gravity System:** This option would be to connect to the existing sewer system in Carson Street to take advantage of the existing gravity system. Through two 14-day sewer flow monitoring studies, CCTV inspection, and cleaning of the sewer line in Sepulveda Boulevard, it was determined that connecting the proposed Tentative Tract 83498 sewer system to the existing sewer system in Carson Street is a viable option as long as some conditions are met. The Madrona Marsh is discharging a sludge-like substance into the Sepulveda Boulevard sewer main. The discharge, as seen on the CCTV inspection, does not appear to be typical sewage discharge and is blocking the flow in the pipe. This discharge negatively impacts the existing sewer system. When this discharge is addressed, the existing system should have sufficient capacity for the proposed development.

The intent of the project is to utilize the sewer constructed in Opal Street.

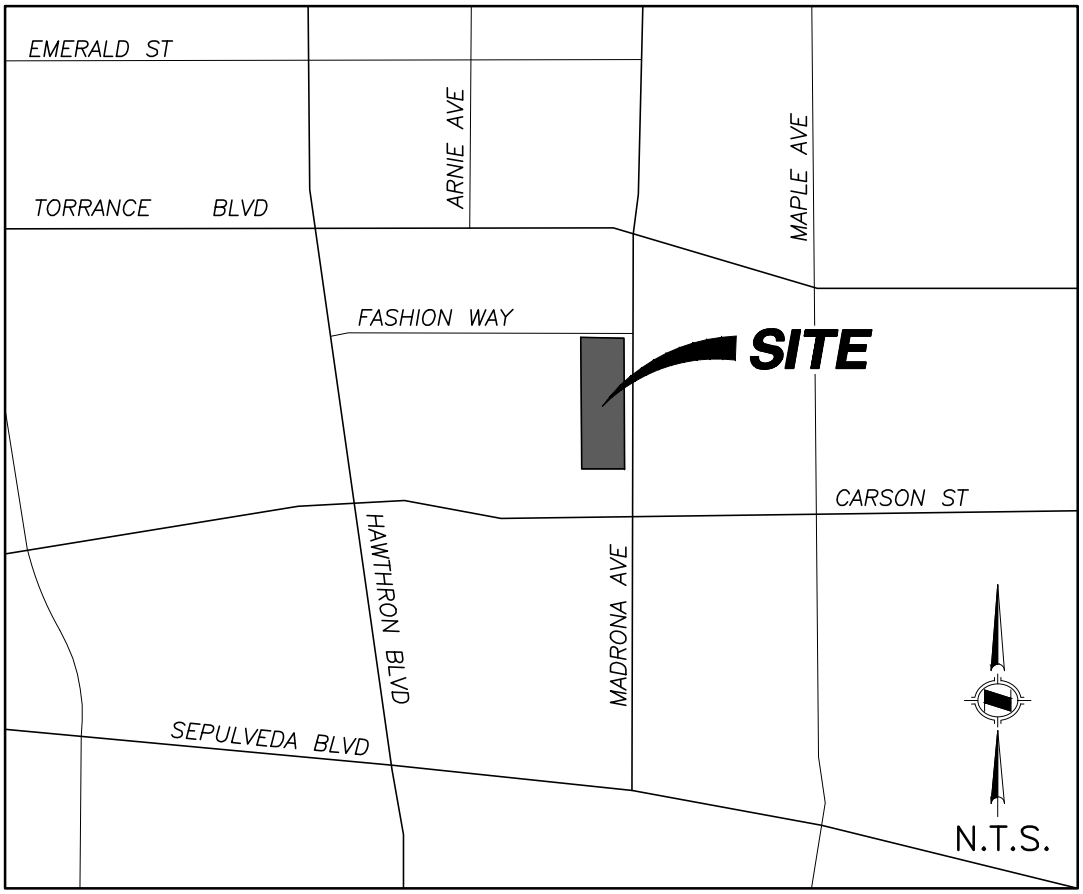
Please contact me at (949) 458-5437 if there are any questions or concerns.

KLO
Enclosures
xc: Gary Jones, Lennar
Brian Bencz, Lennar
Don Lamm, Diamond Star Associates, Inc.

W.O. 3916-88

(F:\1180\Engineering\SY_WS Studies\Sewer\Del Amo Sewer Study Options.doc)

VICINITY MAP



OPAL STREET

FASHION WAY

OPTION 2 POC

EL DORADO STREET

OPTION 3 POC

MAPLE AVE

MADRONA PARCEL TTM 83498

SONOMA STREET

OPTION 1 POC

CARSON STREET

1

MADRONA AVE

MAPLE AVE

SEPULVEDA BLVD

2

3

LOMITA BLVD

4

LEGEND

- EXISTING SEWER OPTION 1
- EXISTING SEWER OPTION 2
- EXISTING SEWER OPTION 3
- EXISTING SEWER
- PROPOSED SEWER
- EXISTING LOMITA SEWER TRUNK LINE (LACSD)
- CHEVRON LINES
- X — FLOW MONITORING SITES

TENTATIVE TRACT 83498

SEWER SYSTEM MODEL

6 JUNE 2024

W.O.: 3916-00

PLOTTED BY: Katie OConnor DATE: Jun. 06, 2024 11:00:20 AM FILE: F:\1180\Engineering\SY_WS Studies\Sewer\SEWER SYSTEM EXHIBIT.dwg

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TAIT
RISING TO THE CHALLENGE
701 N. Parkcenter Drive, Santa Ana, CA 92705
p:714/560/8200 www.tait.com

September 09, 2015

Mr. Ted Symons
City of Torrance
3031 Torrance Blvd.
Torrance, CA 90503

Re: Del Amo Fashion Center – Sewer Study Addendum

Dear Mr. Symons:

This letter is to serve as an Addendum to the previously submitted Sewer Study prepared by our office, last revised March, 17, 2014. The potential has been discussed for the Nordstrom building and Great Maple restaurant sewer to be routed, at a future date, to a pump station on the north side of the parking lot, where the sewer would be fed via gravity flow eastward along Fashion Way and connect to the existing Fashion Way sewer.

The square footages for this contributing area are outlined below:

Proposed Additional Flows to Fashion Way

Building	Use/Type	Unit	Average Daily Flow (gpd/unit)	Total Daily Flow (gpd)
Mall Retail	Commercial Shops & Stores	138,000 SF	100 /1000 Gross SF	13,800
Mall Restaurant	Restaurant	8,085 SF	1000 /1000 Gross SF	8,085
			Total	**21,885**

Fashion Way Added Sewer Flow

Building	Total Daily Flow (gpd)	Average Flow (cfs)	Peak Flow (cfs) 2.65*[(Avg Flow)^0.906]
Additional Flows	21,885	0.034	0.123

The proposed diversion sewer is calculated to add 0.123 cfs peak flow. Please refer to the updated Figure 2 depicting the building square footages which would contribute to this sewer diversion.

As part of the proposed mall development, a new sewer line (15" VCP at 0.33% slope per sewer plan SS-390) is to be constructed within Madrona Avenue and Opal Street. This line will pick up all of the flows from Fashion Way, which will now be routed to the north on Madrona Avenue, then east on Opal Street to a newly constructed manhole within Maple Avenue. Previously, these flows were routed south on Madrona Avenue, then east on El Dorado Street, to a manhole within Maple Avenue.

The peak flow under originally proposed conditions in the Fashion Way sewer is 0.505 cfs per the March 17, 2014, sewer study. This entire flow will be routed through the newly constructed

Madrona/Opal sewer, and will be the "existing" flow in this sewer line once this sewer is operational. (Scenario 1)

There also is the potential for a future development to be constructed immediately east of the mall, between the mall property and Madrona Avenue (Madrona parcel). The City of Torrance has indicated that such a development could add up to 0.56 cfs peak flow based on current zoning. This flow would enter at the newly constructed manhole at the intersection of Fashion Way and Madrona Avenue. (Scenario 2)

The existing single family residences on the north side of Opal Street could also tie into the Opal Street sewer at a future date. There are a total of 25 residences which could contribute sewer flows to this sewer line. (Scenario 3)

Proposed Additional Flows to Opal Street

Building	Use/Type	Unit	Average Daily Flow (gpd/unit)	Total Daily Flow (gpd)
Residences (Single Family) (North Side of Street)	Single Family	25 ea	260 /unit	6,500
			Total	**6,500**

Opal Street Residences (North Side) Added Sewer Flow

Building	Total Daily Flow (gpd)	Average Flow (cfs)	Peak Flow (cfs) 2.65*[(Avg Flow)^0.906]
Additional Flows	6,500	0.010	0.041

The future potential connections from all of the Opal Street residences on the north side of the street are calculated to add 0.041 cfs peak flow.

These three different "base" scenarios for Madrona/Opal are summarized below:

Scenario	Street	Diameter (inches)	Slope (%)	Peak Flow (cfs)	Depth (in)	Velocity (ft/sec)	Percent Full (%)
1	Madrona Avenue/Opal Street (Fashion Way peak flows only)	15	0.33	0.505	3.74	2.11	24.92
2	Madrona Avenue/Opal Street (Scenario 1 + Madrona Parcel Peak Flow)	15	0.33	1.065	5.50	2.61	36.67
3	Madrona Avenue/Opal Street (Scenario 2 + Opal Residences Peak Flow)	15	0.33	1.106	5.61	2.64	37.42

Taking into account the mall sewer diversion flows (0.123 cfs), the total flows under the mall sewer diversion condition are summarized below.

Scenario	Street	Diameter (inches)	Slope (%)	Base Peak Flow (cfs)	Proposed Peak Flow (Base Peak Plus Additional Peak) (cfs)	Depth (in)	Velocity (ft/sec)	Percent Full (%)
--	Fashion Way	10	0.36	0.505	0.628	4.87	2.38	48.68
1	Madrona/Opal (Fashion Way peak flows only)	15	0.33	0.505	0.628	4.17	2.25	27.83
2	Madrona/Opal (Scenario 1 + Madrona Parcel Peak Flow)	15	0.33	1.065	1.188	5.84	2.69	38.90
3	Madrona /Opal (Scenario 2 + Opal Residences Peak Flow)	15	0.33	1.106	1.229	5.94	2.72	39.62

The proposed flow for this condition still increases the capacity to less than 50%; therefore it does not warrant an increase in pipe size.

We trust that the enclosed information is sufficient for your review and approval. Please let us know if you need any additional information.

Thank you for your continued assistance on this project.

Sincerely,
TAIT & ASSOCIATES, INC.

MICHAEL P. SILVEY, PE
Vice President

OPAL STREET SEWER PROJECT

MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE

SANITARY SEWER GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION AND SUPPLEMENTS THERETO, AS WRITTEN AND PROMULGATED BY PUBLIC WORKS STANDARDS, INC., HEREINAFTER REFERRED TO AS THE STANDARD SPECIFICATIONS, THE TORRANCE STANDARDS, AND TO THE SATISFACTION OF THE COMMUNITY DEVELOPMENT OR PUBLIC WORKS DIRECTOR.

2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE, VERIFY DEPTH AND PROTECT ALL STRUCTURES, INCLUDING SUBSTRUCTURES, SHOWN ON THE PLAN. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF REPAIRING OR REPLACING ANY OF SAID STRUCTURES DAMAGED BY HIM/HER DURING PROSECUTION OF THE WORK. ALL REPAIRS AND REPLACEMENTS SHALL BE DONE IN THE PRESENCE OF THE INSPECTOR. ALL LOCATIONS SHOWN ON THE PLAN FOR UTILITY LINES HAVE BEEN TAKEN FROM AVAILABLE RECORDS AND THEIR COMPLETENESS AND CORRECTNESS ARE IN NO WAY GUARANTEED.

3. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA) AT 1-800-227-2600 AND ALL PUBLIC UTILITY COMPANIES AND OWNERS OF PRIVATE FACILITIES WITHIN THE AREA OF CONSTRUCTION AT LEAST 2 WORKING DAYS IN ADVANCE OF PERFORMING ANY WORK WITHIN SAID AREA.

4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY BEFORE COMMENCING WORK. THE CONTRACTOR SHALL SUBMIT TRAFFIC CONTROL PLANS STAMPED AND SIGNED BY A TRAFFIC ENGINEER. TRAFFIC CONTROL WITHIN PUBLIC STREET RIGHTS OF WAY SHALL BE IN CONFORMANCE WITH CITY STANDARDS AND/OR THE "CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD CALIFORNIA SUPPLEMENT MANUAL)" LATEST EDITION. THE CONTRACTOR SHALL PROVIDE A 24-HOUR TELEPHONE NUMBER FOR EMERGENCY REPAIRS TO TRAFFIC CONTROL AND PAVEMENT MARKINGS.

5. OVERHEAD UTILITY LINE CAUTION: REVIEW APPROVED CONSTRUCTION PLAN. IF CONSTRUCTION REQUIRES WORKERS AND/OR EQUIPMENT TO BE WITHIN 6 FEET OR CRANES OR HOISTING DEVICES TO BE WITHIN 10 FEET OF OVERHEAD ELECTRIC/UTILITY LINES, CALL SOUTHERN CALIFORNIA EDISON CO. AT 310-783-9336.

6. PRIOR TO COMMENCEMENT OF WORK, ALL SURVEY MONUMENTS IN THE PROJECT AREA SHALL BE LOCATED AND TIED OUT. ALL CENTERLINE MONUMENTS OR TIES LOST OR DESTROYED BY THIS WORK SHALL BE REPLACED EITHER BY A LICENSED SURVEYOR OR A CIVIL ENGINEER REGISTERED PRIOR TO JANUARY 1, 1982 AND NEW TIE SHEETS PROVIDED. METHOD OF ESTABLISHMENT SHALL BE STATED ON THE TIE SHEET.

7. GRADE SHEETS PREPARED AND STAMPED BY A LICENSED ENGINEER OR SURVEYOR SHALL BE DELIVERED TO THE INSPECTOR 24 HRS PRIOR TO COMMENCEMENT OF WORK.

8. THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT AT 310-781-6900 PRIOR TO TRIMMING, REMOVING OR RELOCATING ANY EXISTING STREET TREES.

9. UNLESS OTHERWISE SHOWN, ALL TRAFFIC SIGNS SHALL BE RELOCATED OR REMOVED BY THE CONTRACTOR.

10. EXISTING DOWNSTREAM MANHOLES SHALL BE BULKHEADED WITH BRICK AND MORTAR OR PLUGS APPROVED BY THE INSPECTOR AT NEW INLET DURING CONSTRUCTION OF NEW UPSTREAM LINES. BRICK AND MORTAR OR PLUG SHALL BE REMOVED IN THE PRESENCE OF THE INSPECTOR(S) DURING CLEANING OF THE FIRST UPSTREAM SECTION OF THE NEW SYSTEM.

11. TRENCHES CUT INTO AN EXISTING ROADWAY WITHIN THE PUBLIC RIGHT OF WAY SHALL BE BACKFILLED AND PAVED AS PER TORRANCE STANDARD T116.

12. TRENCH RESURFACING SHALL BE OF THE SAME TYPE AS THE EXISTING PAVEMENT PLUS ONE INCH, EXCEPT IF EXISTING PAVEMENT IS A.C. OVER P.C.C., RESURFACING MAY BE FULL-DEPTH A.C.

13. MANHOLE COVER SHALL BE CAST WITH THE WORDS "TORRANCE SEWER" FOR CITY MAINTAINED LINES AND "PRIVATE SEWER" FOR PRIVATELY MAINTAINED LINES.

14. ALL SEWER LINES CONSTRUCTED TO PUBLIC STANDARDS SHALL BE VITRIFIED CLAY PIPE (VCP). PVC MAY BE USED SUBJECT TO PRIOR WRITTEN APPROVAL FROM THE PUBLIC WORKS DIRECTOR. ALL HOUSE CONNECTION LATERALS SHALL BE MINIMUM 6 INCH DIAMETER.

15. CONTRACTOR SHALL SET ALL MANHOLE FRAMES AND COVERS TO FINISHED GRADE.

16. CONCRETE ENCASEMENT SHALL BE REQUIRED FOR SEWER MAIN LINE AND HOUSE LATERALS WITH LESS THAN 3 FEET OF COVER.

17. THE CONTRACTOR SHALL MAKE AVAILABLE FOR THE INSPECTOR'S REVIEW, ON A DAILY BASIS, AS-BUILT DRAWINGS FOR WORK PERFORMED UP TO AND INCLUDING THE PREVIOUS DAY'S ACTIVITIES. WORK SHALL NOT BE CONSIDERED AS COMPLETE UNTIL AS-BUILT DRAWINGS ARE SUBMITTED TO AND ACCEPTED BY THE COMMUNITY DEVELOPMENT/PUBLIC WORKS DIRECTOR.

COUNTY SANITATION DISTRICT (CSD) NOTES

1. NO CONNECTION FOR THE DISPOSAL OF INDUSTRIAL WASTES SHALL BE MADE TO SEWERS SHOWN ON THESE DRAWINGS UNTIL A PERMIT FOR INDUSTRIAL WASTE WATER DISCHARGE HAS BEEN ISSUED BY THE COUNTY SANITATION DISTRICTS FOR SAID CONNECTION.

2. PRIOR TO FINAL ACCEPTANCE OF THE PROJECT, NOTIFY THE CSD SUPERINTENDENT OF MAINTENANCE AT (310) 638-1161 TO REPORT COMPLETION OF CONSTRUCTION OF THIS LOCAL SEWER THAT INDIRECTLY CONNECTS TO THE CSD SEWER SYSTEM.

STANDARD DRAWINGS

CITY OF TORRANCE

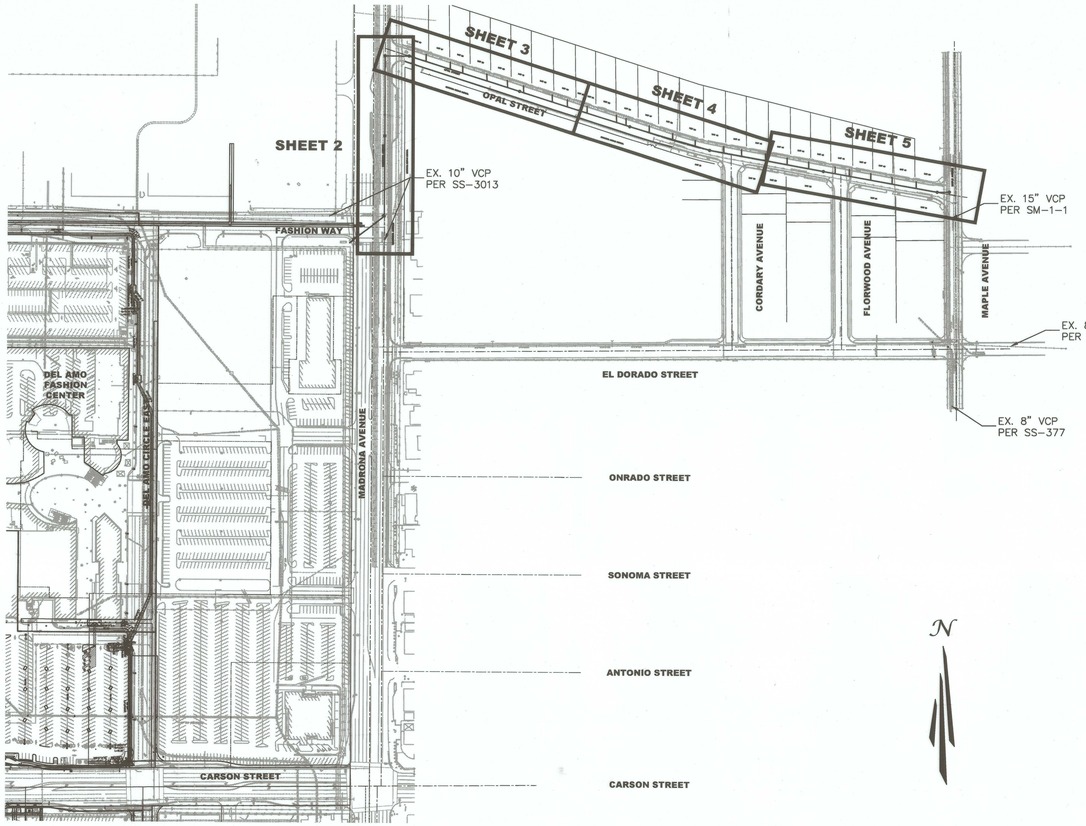
T116	TRENCH BACKFILL & PAVEMENT REPAIRS
T200	SANITARY SEWER GENERAL NOTES
T204	BEDDING FOR SEWER PIPE
T206	SEWER AND WATER SEPARATION RIGHTS

SPPWC

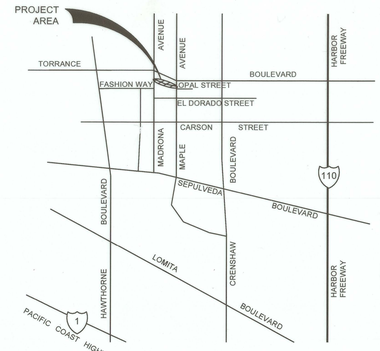
111-5	CURB RAMP
120-2	CURB AND GUTTER
208-2	BREAKING INTO EXISTING MANHOLES
208-2	BREAKING INTO EXISTING MANHOLES

REFERENCE

SM-1-1	SEWER PLAN
SS-377	SEWER PLAN
SS-3013	SEWER PLAN



INDEX MAP
N.T.S.



VICINITY MAP
N.T.S.

CONSTRUCTION NOTES / QUANTITIES

A	REMOVE INTERFERING PORTIONS OF PIPE AND MANHOLE.	1 EA
1	CONSTRUCT 15" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.	1,950 LF
2	CONSTRUCT SEWER MANHOLE PER SPPWC STD. 200 (60" DIA.).	12 EA
3	CONSTRUCT 10" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.	120 LF
4	CONSTRUCT MANHOLE BASE AS PER SPPWC STD. 208, SEE DETAIL A.	1 EA
5	PROTECT IN PLACE EXISTING IMPROVEMENT.	N/A
6	PLUG SEWER FOR FUTURE CONNECTION.	1 EA
7	PROVIDE SEWER BY-PASS AND CONSTRUCT MANHOLE BASE PER DETAIL B.	1 EA
8	CONSTRUCT 6" SEWER LATERAL PER CITY OF TORRANCE STD. T203 AND SPPWC STD. 222-2, TYPE C., TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.	440 LF
9	INSTALL TERMINAL CLEANOUT PER SPPWC 204-2.	24 EA
10	SLURRY SEAL OPAL STREET, ENTIRE STREET WIDTH FOLLOWING TRENCH REPAIR, REPAINT PAVEMENT MARKERS.	51,300 SF
11	RECONSTRUCT RAMP PER SPPWC 111-5 CASE A TYPE 1.	1 EA
12	CONSTRUCT CURB AND GUTTER PER SPPWC STD. 120-2.	730 LF
13	RECONSTRUCT RAMP PER SPPWC 111-5 CASE C.	1 EA
14	REMOVE EXISTING AC PAVEMENT AND CONSTRUCT PCC SIDEWALK AND DRIVEWAY APPROACHES PER SPPWC STD. 110 (TYPE B) AND 112 RESPECTIVELY.	9,150 SF

ENGINEERS NOTE TO CONTRACTOR:
THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION OF THOSE UNDERGROUND UTILITIES TO BE USED AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON. IF THE CONTRACTOR ENCOUNTERS ANY DISCREPANCIES, CONFLICTS OR AREAS WHICH HE FEELS UNWORKABLE, HE SHALL NOTIFY THE GRADING ENGINEER IMMEDIATELY PRIOR TO CONTINUING OR DEVIATING FROM THIS PLAN.

UNAUTHORIZED CHANGES & USES:
THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

COUNTY SANITATION DISTRICT No. 5
OF LOS ANGELES COUNTY, CALIFORNIA
GRACE ROBINSON HYDE-CHIEF ENGINEER AND GENERAL MANAGER
APPROVED BY: _____ OFFICE ENGINEER DATE: 1/6/2016

BENCH MARK

QUAD. YEAR	ELEV. FOOT	DESCRIPTION	BM NUMBER	DATUM
TORRANCE (2005)	97.315	DPW BM TAG IN E CB 2M(6.5 FT) S/O BCR @ SE COR FASHION WAY & HAWTHORNE BLVD	Y 10948	NAVD 1988

RECORD DRAWING

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

DRAWN:
DESIGNED:
PROJECT ENGINEER:
ENGINEERING MANAGER:

APPROVED: _____ 11/5/2016
CRAIG BILEZERIAN, PE CITY ENGINEER R.C.E. NO. 55339 (EXP. 12/31/2016) DATE

SCALE: AS SHOWN SHEET 1 OF 5
PLAN NO. SS-390

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.
811 Know what's below. Call before you dig.
TWO WORKING DAYS BEFORE YOU DIG

PLANS PREPARED BY:
TAIT
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701 N. Parkcenter Drive
Santa Ana, CA 92705
p: 714/560/8200 f: 714/560/8211
www.tait.com
Los Angeles Ontario Sacramento San Diego San Francisco Boise Dallas Denver Phoenix Portland

REVISIONS				
REV	DATE	BY	CHECKED	DESCRIPTION

OPAL STREET
SEWER PROJECT
(MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE)
TITLE SHEET

PREPARED UNDER THE SUPERVISION OF TAIT & ASSOCIATES, INC.
MICHAEL P. SILVEY, RCE No. 58651
12/15/15 DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No.C058651 Exp.12/31/2016 CIVIL STATE OF CALIFORNIA SEAL

OPAL-SWR-1

EARL PALE CORP. IRVINE, CA
SS-390
OPAL ST. SEWER PROJECT

Dec 15, 2015 - 12:22pm by epalafox K:\Drawings\SP\SP0795\DWG\Phase II\Phase II\SP0795-ST-SWR-OPAL.dwg

SEE COUNTY SANITATION DISTRICTS FOR SPECIAL CONNECTION CHARGES. (562) 908-4288, EXT.2727

EXISTING GRADE

NOTE: EXISTING UTILITY DEPTHS ARE UNKNOWN. CONTRACTOR TO POTHOLE ALL EXISTING UTILITIES TO DETERMINE EXACT LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.

Q=1.21 CFS
V=2.70 FT/S
d/D=39.30

STA 10+26.81
INV=82.94
STA 3+41.36
SS-3013

STA 17+18.67
INV=83.70

STA 15+06.65
INV=94.63

EXISTING 10" VCP SEWER
SS-3013

208.6' 15" VCP @ 0.34%

80.94 INV.

80.74 INV.

SEE SHEET 3 FOR CONTINUATION OF LINE "A"

83.03 INV.

79.82 INV.

208.6' 15" VCP @ 0.34%

79.22 INV.

79.02 INV.

62.5' 15" VCP @ 0.34%

78.83 INV.

APPROXIMATE EXISTING GAS LINE

APPROXIMATE EXISTING 4" GAS LINE

APPROXIMATE EXISTING OIL LINE

APPROXIMATE EXISTING 8" WATER LINE

STA: 14+60 MATCHLINE - SEE SHEET 3

90

80

20+00 19+00 18+00 17+00 16+00 15+00

SCALES:
1"=20' HORIZ.
1"=2' VERT.

N

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 inch = 20 ft.

CONSTRUCTION NOTES

- (A) REMOVE INTERFERING PORTIONS OF PIPE AND MANHOLE.
- (1) CONSTRUCT 15" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
- (2) CONSTRUCT SEWER MANHOLE PER SPPWC STD. 200 (60" DIA.).
- (3) CONSTRUCT 10" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
- (4) CONSTRUCT MANHOLE BASE AS PER SPPWC STD. 208, SEE DETAIL A.
- (5) PROTECT IN PLACE EXISTING IMPROVEMENT.
- (9) INSTALL TERMINAL CLEANOUT PER SPPWC 204-2.
- (13) RECONSTRUCT RAMP PER SPPWC 111-5 CASE C.

FASHION WAY

EXISTING SEWER TO REMAIN IN SERVICE

EX. SMH
(92.24 RIM/89.8± RIM PER SS-3013)
(80.94 INV W 10"ø/79.25 INV PER SS-3013)
(80.94 INV S 10"ø/79.00 INV PER SS-3013)
(80.89 INV N 8"ø)

EX. 10" VCP SEWER PER SS-3013

LINE A SEE SHEET 3

EXISTING SEWER TO REMAIN IN SERVICE
EX. 10" VCP SEWER PER SS-3013

STA:19+26.81 SS
STA:3+41.36 SS-3013

SEE DETAIL "A" HEREON

MADRONA AVENUE

MADRONA AVENUE

MADRONA MIDDLE SCHOOL

EXISTING CURB AND GUTTER

EXISTING CONCRETE GUTTER

EXISTING CURB AND GUTTER

EX. 4" GAS

EX. 4" GAS

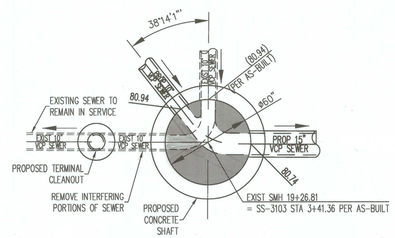
CENTERLINE

OPAL STREET

EXISTING ROW FROM PARCEL MAP

EXISTING ROW FROM PARCEL MAP

STA: 14+60 MATCHLINE - SEE SHEET 3



EXIST SMH AT STA 19+26.81
= SS-3013 STA 3+41.36

A
SCALE: 1/4" = 1'

NOTES:

1. WHEN ALLOWED BY THE CITY ENGINEER/INSPECTOR, THE CONTRACTOR SHALL INSTALL A FLEXIBLE SLEEVE SEWER BY-PASS THROUGH THE MANHOLE TO CONTAIN THE FLOW AND COMPLETE CHANNELIZATION OF THE MANHOLE BASE IN THE DRY.
2. AS-BUILT INVERT INFORMATION AND STATIONING REFERS TO CITY SEWER PLAN SS-3013. EXISTING INVERTS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.

RECORD DRAWING

BENCH MARK

QUAD. YEAR	ELEV. FOOT	DESCRIPTION	BM NUMBER	DATUM
TORRANCE (2005)	97.315	DPW BM TAG IN E CB 2M(6.5 FT) S/O BCR @ SE COR FASHION WAY & HAWTHORNE BLVD	Y 10948	NAVD 1988

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REVISIONS

REV	DATE	BY	CHECKED	DESCRIPTION
1	JUN 2023	VP		ADJUSTED LINE A

OPAL STREET
SEWER PROJECT
(MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE)
19+26.00 TO 14+60.00

PREPARED UNDER THE SUPERVISION OF TAIT & ASSOCIATES, INC.
MICHAEL P. SILVEY
RCE No. 58651
6/10/15
DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No.COS8651 Exp.12/31/2016 CIVIL STATE OF CALIFORNIA
SEAL

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

DRAWN:
DESIGNED:
PROJECT ENGINEER:
ENGINEERING MANAGER:

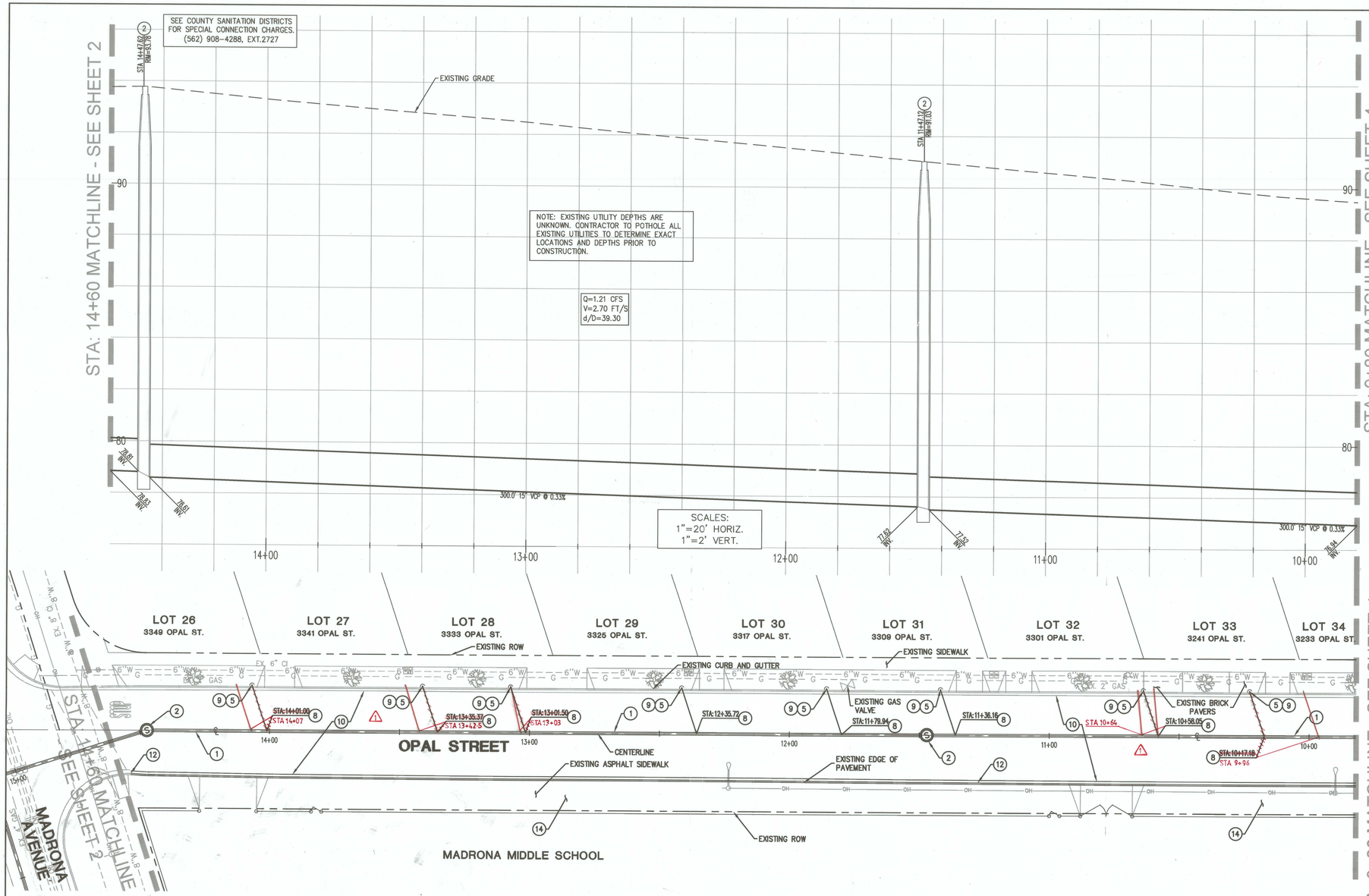
APPROVED: 11/5/2016
DATE
CRAIG BILEZERIAN, PE
CITY ENGINEER
R.C.E. NO. 55339 (EXP. 12/31/2016)

SCALE: AS SHOWN SHEET 2 OF 5
PLAN NO. SS-390

OPAL-SWR-2

EASY FILE CORP. IRVINE, CA
SS SS-390 2 of 5
OPAL ST SEWER PROJECT

Dec 18, 2015 - 11:15am by sgoldstein K:\Drawings\LA\LSP03700\LSW03\Phase III\Phase III\LSP03700-LU1-SWR-OPAL.dwg



CONSTRUCTION NOTES

1. CONSTRUCT 15" EXTRA STRENGTH VCP SEWER PIPE, BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
2. CONSTRUCT SEWER MANHOLE PER SPPWC STD. 200 (60" DIA.).
3. CONSTRUCT 10" EXTRA STRENGTH VCP SEWER PIPE, BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
5. PROTECT IN PLACE EXISTING IMPROVEMENT.
8. CONSTRUCT 6" SEWER LATERAL PER CITY OF TORRANCE STD. T203 AND SPPWC STD. 222-2, TYPE C., TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
9. INSTALL TERMINAL CLEANOUT PER SPPWC 204-2.
10. SLURRY SEAL OPAL STREET, ENTIRE STREET WIDTH FOLLOWING TRENCH REPAIR, REPAINT PAVEMENT MARKERS.
11. RECONSTRUCT RAMP PER SPPWC 111-5 CASE A TYPE 1.
12. CONSTRUCT CURB AND GUTTER PER SPPWC STD. 120-2.
14. REMOVE EXISTING AC PAVEMENT AND CONSTRUCT PCC SIDEWALK AND DRIVEWAY APPROACHES PER SPPWC STD. 110 (TYPE B) AND 112 RESPECTIVELY.

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 inch = 20 ft.

RECORD DRAWING

BENCH MARK

QUAD. YEAR	ELEV. FOOT	DESCRIPTION	BM NUMBER	DATUM
TORRANCE (2005)	97.315	DPW BM TAG IN E CB 2M(6.5 FT) S/O BCR @ SE COR FASHION WAY & HAWTHORNE BLVD	Y 10948	NAVD 1988

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

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Santa Ana, CA 92705
p: 714/560/8200 f: 714/560/8211
www.tait.com
Los Angeles Ontario Sacramento San Diego San Francisco Boise Dallas Denver Phoenix Portland

REVISIONS				
REV	DATE	BY	CHECKED	DESCRIPTION
1	10/15/2018	VP	JD	CHANGED LOCATIONS OF LATERALS
2	JUN 2023	VP	SF	REDUCED LENGTH OF PLAN/PROFILE OF LINE A

OPAL STREET
SEWER PROJECT
(MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE)
14+60.00 TO 9+80.00

PREPARED UNDER THE SUPERVISION OF TAIT & ASSOCIATES, INC.
MICHAEL P. SILVEY
RCE No. 58651
12/18/15
DATE

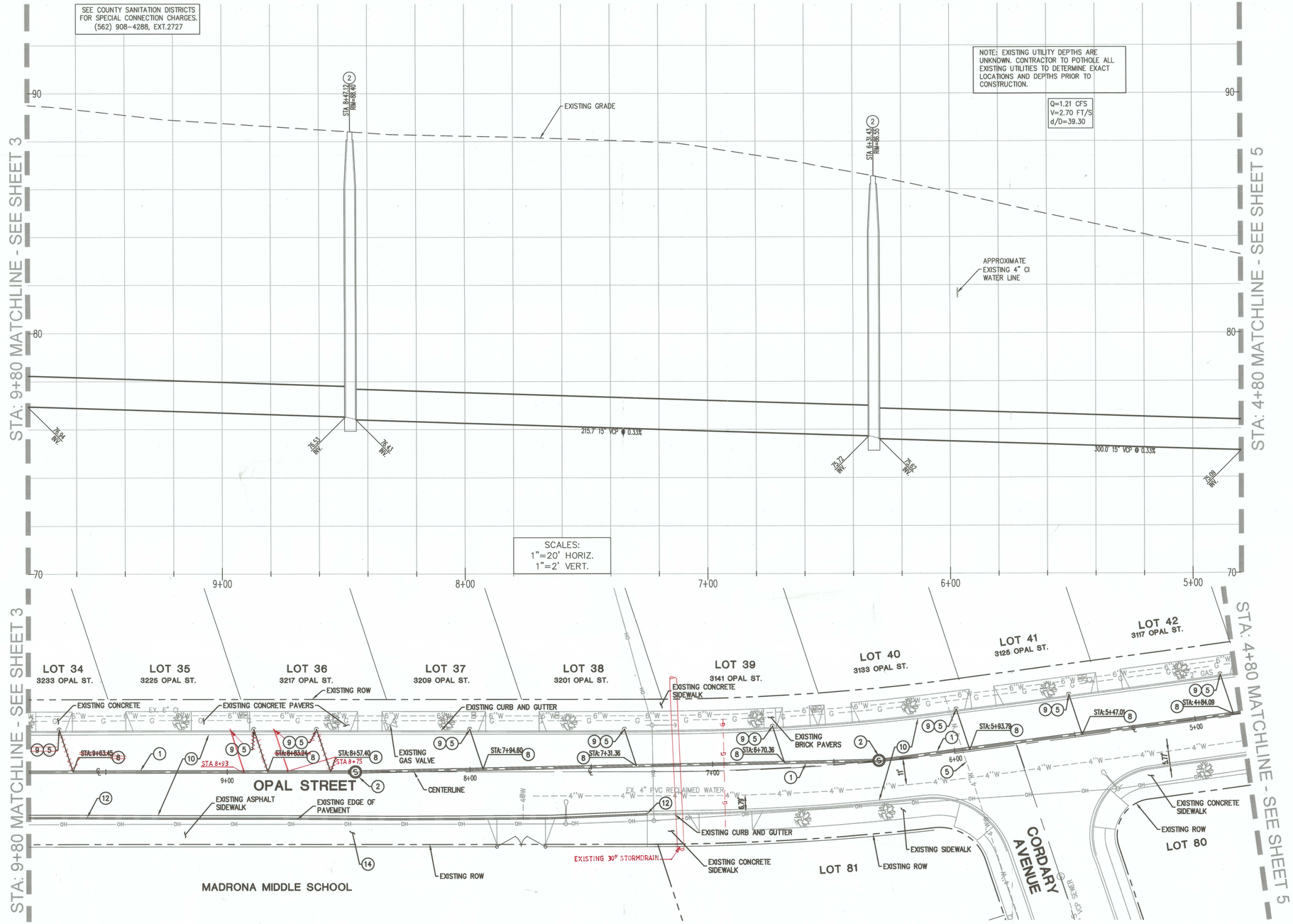
REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No.C058651 Exp.12/31/2016 CIVIL STATE OF CALIFORNIA
SEAL

DRAWN:
DESIGNED:
PROJECT ENGINEER:
ENGINEERING MANAGER:
APPROVED: 1/5/2016
CRAIG BILEZERIAN, PE CITY ENGINEER R.C.E. NO. 55339 (EXP. 12/31/2016)
DATE
SCALE: AS SHOWN
SHEET 3 OF 5
PLAN NO. SS-390

OPAL-SWR-3

CSP PILE CORP IRVINE, CA
SS-390
OPAL ST. SEWER PROJECT
3 OF 5

Dec 18, 2015 - 11:15am by rgabidon K:\Drawings\SPLSP\SS3762\DWG\Sheet 1\Sheet 1.dwg SPLSP-22-24-26W-28W-OPAL.dwg



CONSTRUCTION NOTES

1. CONSTRUCT 15" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
2. CONSTRUCT SEWER MANHOLE PER SPPWC STD. 200 (60" DIA.).
5. PROTECT IN PLACE EXISTING IMPROVEMENT.
8. CONSTRUCT 6" SEWER LATERAL PER CITY OF TORRANCE STD. T203 AND SPPWC STD. 222-2, TYPE C., TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
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10. SLURRY SEAL OPAL STREET, ENTIRE STREET WIDTH FOLLOWING TRENCH REPAIR, REPAINT PAVEMENT MARKERS.
12. CONSTRUCT CURB AND GUTTER PER SPPWC STD. 120-2.
14. REMOVE EXISTING AC PAVEMENT AND CONSTRUCT PCC SIDEWALK AND DRIVEWAY APPROACHES PER SPPWC STD. 110 (TYPE B) AND 112 RESPECTIVELY.

RECORD DRAWING

BENCH MARK

QUAD. YEAR	ELEV. FOOT	DESCRIPTION	BM NUMBER	DATUM
TORRANCE (2005)	97.315	DPW BM TAG IN E CB 2M(6.5 FT) S/O BCR @ SE COR FASHION WAY & HAWTHORNE BLVD	Y 10948	NAVD 1988

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.

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Santa Ana, CA 92705
p: 714/560/8200 f: 714/560/8211
www.tait.com
Los Angeles Sacramento San Francisco Dallas Phoenix
Ontario San Diego Boise Denver Portland

REVISIONS

REV	DATE	BY	CHECKED	DESCRIPTION
	10/15/2018	V.P	JD	CHANGED LOCATION OF LATERAL / ADD MISSING UTILITY

OPAL STREET
SEWER PROJECT
(MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE)
9+80.00 TO 4+80.00

PREPARED UNDER THE SUPERVISION OF TAIT & ASSOCIATES, INC.
MICHAEL P. SILVEY
RCE No. 58651
12/12/18
DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No.CO58851 Exp.12/31/2016 CIVIL STATE OF CALIFORNIA
SEAL

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

DRAWN:
DESIGNED:
PROJECT ENGINEER:
ENGINEERING MANAGER:

APPROVED: 11/5/2016
CRAIG BILEZERIAN, PE DATE
CITY ENGINEER
R.C.E. NO. 55339 (EXP. 12/31/2016)

SCALE: AS SHOWN | SHEET 4 OF 5

PLAN NO. SS-390

OPAL-SWR-4

E-Sign FILE COPY IRVINE CA
4 of 5
55390
OPAL ST. SEWER PROJECT

Dec 18, 2018 - 11:15am by ygabbidon K:\Drawings\ENTJPW\SWR\SS390\Plans\ PLPlans 11x17\PW11-01-SWR-OPAL.dwg

EASI FILE CORP IRVINE, CA

SS-390

OPAL STREET SEWER PROJECT

EPH 84

Dec 18, 2015 - 11:05am by rgabbidon K:\Drawings\JOBS\SS390\SS-390-Phase III\Phase III\SS390-SS-390-OPAL.dwg

SEE COUNTY SANITATION DISTRICTS FOR SPECIAL CONNECTION CHARGES. (562) 908-4288, EXT.2727

NOTE: EXISTING UTILITY DEPTHS ARE UNKNOWN. CONTRACTOR TO POTHOLE ALL EXISTING UTILITIES TO DETERMINE EXACT LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.

Q=1.21 CFS
V=2.70 FT/S
d/D=39.30

STA: 4+80 MATCHLINE - SEE SHEET 4

EXISTING GRADE

STA: 3+31.54
RIM=80.82

APPROXIMATE EXISTING 4" CI WATER LINE

APPROXIMATE EXISTING 2" TELE LINE

APPROXIMATE EXISTING 4" ABANDONED OIL LINE

STA: 0+31.43
RIM=77.55

STA: 0+00.00
RIM=76.80
SM-1-1

STA 6+55.26
SM-1-1

APPROXIMATE EXISTING 2" GAS LINE

APPROXIMATE EXISTING 8" CI WATER LINE

APPROXIMATE EXISTING 6" UNKNOWN IP

EXISTING 15" VCP SEWER SS-1-1

74.08 INV.

74.62 INV.

74.52 INV.

300.0' 15" VCP @ 0.33%

31.4' 15" VCP @ 0.35%

72.62 INV.

72.42 INV.

72.31 INV.

72.11 INV.

80

70

4+00

3+00

2+00

1+00

0+00

-0+50

SCALES:
1"=20' HORIZ.
1"=2' VERT.

N

GRAPHIC SCALE

0 20 40 80

(IN FEET)
1 inch = 20ft.

CONSTRUCTION NOTES

1. CONSTRUCT 15" EXTRA STRENGTH VCP SEWER PIPE. BEDDING PER CITY OF TORRANCE STD. T204, TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
2. CONSTRUCT SEWER MANHOLE PER SPPWC STD. 200 (60" DIA.).
5. PROTECT IN PLACE EXISTING IMPROVEMENT.
7. PROVIDE SEWER BY-PASS AND CONSTRUCT MANHOLE BASE PER DETAIL B.
8. CONSTRUCT 6" SEWER LATERAL PER CITY OF TORRANCE STD. T203 AND SPPWC STD. 222-2, TYPE C., TRENCHING AND PAVEMENT REPAIR PER CITY OF TORRANCE STD. T116.
9. INSTALL TERMINAL CLEANOUT PER SPPWC 204-2.
10. SLURRY SEAL OPAL STREET, ENTIRE STREET WIDTH FOLLOWING TRENCH REPAIR, REPAINT PAVEMENT MARKERS.

STA: 4+80 MATCHLINE - SEE SHEET 4

LOT 43 3109 OPAL ST.
LOT 44 3101 OPAL ST.
LOT 45 3041 OPAL ST.
LOT 46 3033 OPAL ST.
LOT 47 3025 OPAL ST.
LOT 48 3017 OPAL ST.
LOT 49 3009 OPAL ST.
LOT 50 3001 OPAL ST.

EXISTING CONCRETE SIDEWALK
EXISTING CURB AND GUTTER
EXISTING ROW
EX. 6" CI
EX. 2" GAS
EX. 4" PVC RECLAIMED WATER
EX. TELEPHONE
EX. 8" VCP SEWER PER M.T.D. 12-C-1
EX. 8" ABANDONED OIL
EX. 15" VCP SEWER PER M.T.D. 12-C-1
EX. 24" RCP
EX. 42" STEEL RECLAIMED WATER
MAPLE AVENUE

STA:4+27.07
STA:3+70.15
STA:3+00.62
STA:2+63.00
STA 2+61.00
STA:2+06.34
STA:1+50.29
STA:0+86.61
STA:0+00.00 SS
STA: 6+55.26
72.09 INV PER SM-1-1

OPAL STREET

CENTERLINE

SEE DETAIL "B" HEREON

LOT 80
LOT 65
LOT 64
LOT 51

FLORWOOD AVENUE

RECORD DRAWING

PROPOSED CONCRETE SHAFT
90°/0°
74.41
PROP 15" VCP SEWER
60°
(PER AS-BUILT)
(73.91)
EX. 15" VCP SEWER
PROPOSED MH STA 0+00.00
= STA 3+85.96 PER AS-BUILT

PROPOSED MH AT STA 0+00.00
= SM-1-1 STA 3+85.96
B
SCALE: 1/4" = 1'

NOTES:
1. AS-BUILT INVERT INFORMATION AND STATIONING REFERS TO CITY SEWER PLAN SM-1-1. EXISTING INVERTS SHALL BE VERIFIED PRIOR TO CONSTRUCTION.

BENCH MARK

QUAD. YEAR	ELEV. FOOT	DESCRIPTION	BM NUMBER	DATUM
TORRANCE (2005)	97.315	DPW BM TAG IN E CB 2M(6.5 FT) S/O BOR @ SE COR FASHION WAY & HAWTHORNE BLVD	Y 10948	NAVD 1988

NO WORK SHALL BE DONE ON THIS SITE UNTIL BELOW AGENCY IS NOTIFIED OF INTENTION TO GRADE OR EXCAVATE.

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TAIT
Since 1964

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p: 714/560/8200 f: 714/560/8211
www.tait.com

Los Angeles Sacramento San Francisco Dallas Phoenix
Ontario San Diego Boise Denver Portland

REV	DATE	BY	CHECKED	DESCRIPTION
	10/3/18	VP	JD	CHANGED LOCATION OF GAS LINE & MANHOLE

OPAL STREET
SEWER PROJECT
(MADRONA AVENUE BETWEEN FASHION WAY AND OPAL STREET AND OPAL STREET BETWEEN MADRONA AVENUE AND MAPLE AVENUE)
4+80.00 TO 0+00.00

PREPARED UNDER THE SUPERVISION OF TAIT & ASSOCIATES, INC.

MICHAEL P. SILVEY
RCE No. 58651
12/10/15
DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No.C058651 Exp.12/31/2016 CIVIL STATE OF CALIFORNIA
SEAL

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

DRAWN:
DESIGNED:
PROJECT ENGINEER:
ENGINEERING MANAGER:

APPROVED: 1/5/2016
CRAIG BILEZERIAN, PE CITY ENGINEER
R.C.E. NO. 55339 (EXP. 12/31/2016)
DATE

SCALE: AS SHOWN
SHEET 5 OF 5
PLAN NO. **SS-390**

OPAL-SWR-5

Dave Zerler
Contract Land Analyst

March 17, 2022

To: Katie O'Connor:

Chevron Pipe Line Company has determined that it ***has*** facilities inside the scope of your proposed **Development Project affecting the Southwest corner of Madrona Avenue and Fashion Way, Torrance.** Along with this letter you will find information showing the location of Chevron facilities. **This information is considered confidential and must not be distributed for any other purposes outside of this project**. If depth or elevation of our facilities is required for your project we strongly recommend potholing. Use the Underground Service Alert process and a Chevron Field Inspector will respond and observe the pot holing of CPL Facilities. Please review and adhere to our specifications for working near our facilities. If you require other information about our facilities do not hesitate to call me.

If a conflict cannot be avoided and your project or your client's project is subject to the CEQA/NEPA (California Environmental Quality Act/ National Environmental Policy Act), then our work is an integral component of yours or your client's project (Action). As such, we will look to you or your client to acquire any and all resource agency permitting, necessary for our integral component of the Action. Additionally, we will look to you or your client to administer all applicable conditions and/or measures stemming from the Action's EIS (Environmental Impact Statement) or equivalent and/or associated permits.

Sincerely,

Dave Zerler
Chevron Pipeline & Power

Chevron Pipe Line Co.
601 S. Vail Avenue. Montebello, CA 90640
Mobile 970-260-8959
DaveZerler@chevron.com

Zerler, Dave A [Spectrum Land Services]

From: Katie OConnor <KOConnor@hunsaker.com>
Sent: Wednesday, March 16, 2022 1:46 PM
To: Zerler, Dave A [Spectrum Land Services]
Cc: Wilson, Jeff; Dunn, Jill A; Downs, Jason
Subject: [**EXTERNAL**] RE: DEL AMO - TORRANCE, CA Chevron Pipeline
Attachments: CPL Facility Inquiry Form waived - California (004).pdf

Be aware this external email contains an attachment and/or link.
Ensure the email and contents are expected. If there are concerns, please submit suspicious messages to the Cyber Intelligence Center using the Report Phishing button.

Hi Dave,
Jason Downs sent me the facility inquiry application and asked that I complete it to be sent to you. I represent Hunsaker & Associates, a civil engineering firm in Orange County. We are doing some research for our client who is interested in developing the a piece of property on the southwest corner of the Fashion Way and Madrona Ave intersection. In our research, we have found that there are Chevron pipelines in both Fashion Way and Madrona Ave, adjacent to the property in question.

I have been going through the steps to determine the current state of those pipelines. Are those pipelines still active? And what would it take to cross those pipelines with a sewer line?

The goal would be to join the existing sewer in Fashion Way or Madrona Ave.

I have attached the following documents:

- Chevron Pipeline Facility Inquiry Application Form
- Aerial photo of the site with the project site and surrounding streets labeled.
- An exhibit from First American Title Insurance Company with the project site labeled
- Existing conditions exhibit with the location of the existing oil/ gas lines labeled
- ALTA of the site

Please let me know if you need any additional information from me or further details about the site in question. Thank you in advance of looking into this matter.

Sincerely,
Katie

Katie O'Connor, P.E.

Hunsaker & Associates
Three Hughes Irvine, CA 92618
Office: (949) 458-5437

From: Downs, Jason <jasondowns@chevron.com>
Sent: Tuesday, March 15, 2022 2:20 PM
To: Katie OConnor <KOConnor@hunsaker.com>

Cc: Wilson, Jeff <jwfw@chevron.com>; Dunn, Jill A <jilldunn@chevron.com>; Zerler, Dave A [Spectrum Land Services] <DaveZerler@chevron.com>
Subject: RE: DEL AMO - TORRANCE, CA Chevron Pipeline

Hello Katie,

Attached is our facility inquiry application. Please complete the application and send by email to Dave Zerler for review.

Dave Zerler
Contract Land Analyst
Spectrum Land Services
DaveZerler@chevron.com

Chevron Pipeline & Power
Chevron Pipe Line Company
601 S. Vail Avenue
Montebello, CA 90640
Mobile 970-260-8959

Much appreciated,

Jason M. Downs, CPL
Senior Land Representative
jasondowns@chevron.com

Chevron Pipeline & Power
Chevron Pipe Line Company
601 S. Vail Avenue
Montebello, CA 90640
Tel 310 669 4005
Mobile 310 616 6985

From: Katie OConnor <KOConnor@hunsaker.com>
Sent: Monday, March 14, 2022 6:22 AM
To: Wilson, Jeff <jwfw@chevron.com>
Cc: Dunn, Jill A <jilldunn@chevron.com>
Subject: [**EXTERNAL**] RE: DEL AMO - TORRANCE, CA

Be aware this external email contains an attachment and/or link.
Ensure the email and contents are expected. If there are concerns, please submit suspicious messages to the Cyber Intelligence Center using the Report Phishing button.

Jeff,
I appreciate your efforts on this matter. Please let me know if there is anything else I can do to make this easier for you.
Sincerely,
Katie

From: Wilson, Jeff <jwfw@chevron.com>
Sent: Friday, March 11, 2022 12:40 PM
To: Katie OConnor <KOConnor@hunsaker.com>

Cc: Dunn, Jill A <jilldunn@chevron.com>
Subject: RE: DEL AMO - TORRANCE, CA

Katie, thanks for this reply and terribly sorry for delay as I just pulled this out of spam folder. I will reach out to our pipeline folks and get you in touch with the right entity to discuss. Thanks - Jeff

-----Original Message-----
From: Wilson, Jeff <jwfw@chevron.com>
Sent: Friday, March 11, 2022 12:38 PM
To: Wilson, Jeff <jwfw@chevron.com>
Subject: FW: DEL AMO - TORRANCE, CA

-----Original Message-----
From: Katie OConnor <KOConnor@hunsaker.com>
Sent: Tuesday, March 8, 2022 1:24 PM
To: Wilson, Jeff <jwfw@chevron.com>
Subject: [**EXTERNAL**] DEL AMO - TORRANCE, CA

Be aware this external email contains an attachment and/or link.
Ensure the email and contents are expected. If there are concerns, please submit suspicious messages to the Cyber Intelligence Center using the Report Phishing button.

Hi Jeff,

Thank you for taking my call today. I represent Hunsaker & Associates, a civil engineering firm in Orange County. We are doing some research for our client who is interested in developing the a piece of property on the southwest corner of the Fashion Way and Madrona Ave intersection. In our research, we have found that there are Chevron pipeline in both Fashion Way and Madrona Ave, adjacent to the property in question.

Are those pipelines still active? And what would it take to cross those pipelines with a sewer line?

The goal would be to join the existing sewer in Fashion Way or Madrona Ave.

I have attached a quick exhibit of the site for your reference.

Please let me know if you need any additional information in my end. I appreciate you getting me in contact with the right people.

Talk to you soon,

Katie

Katie O'Connor, P.E.

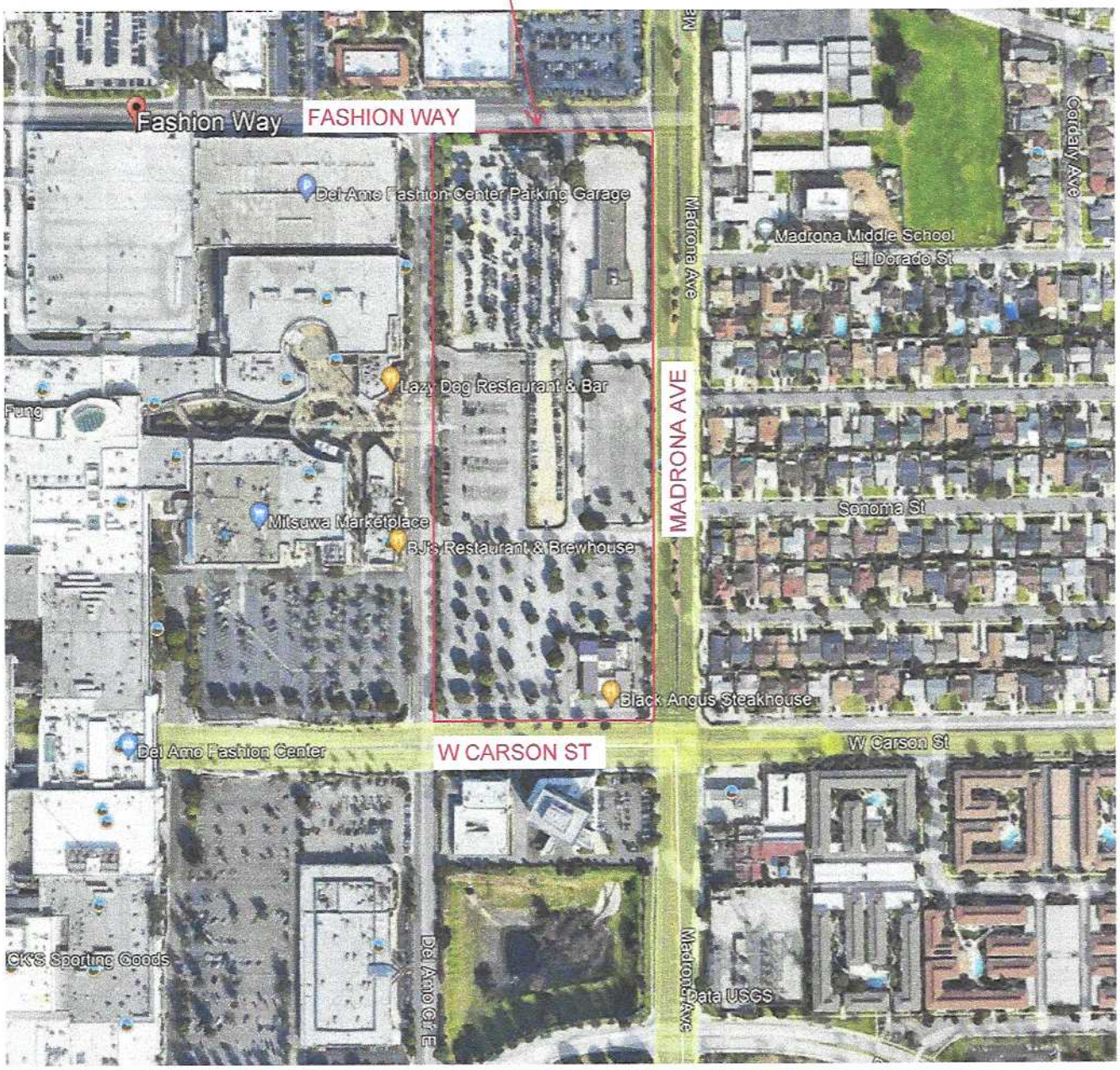
Hunsaker & Associates
Three Hughes Irvine, CA 92618
Office: (949) 458-5437

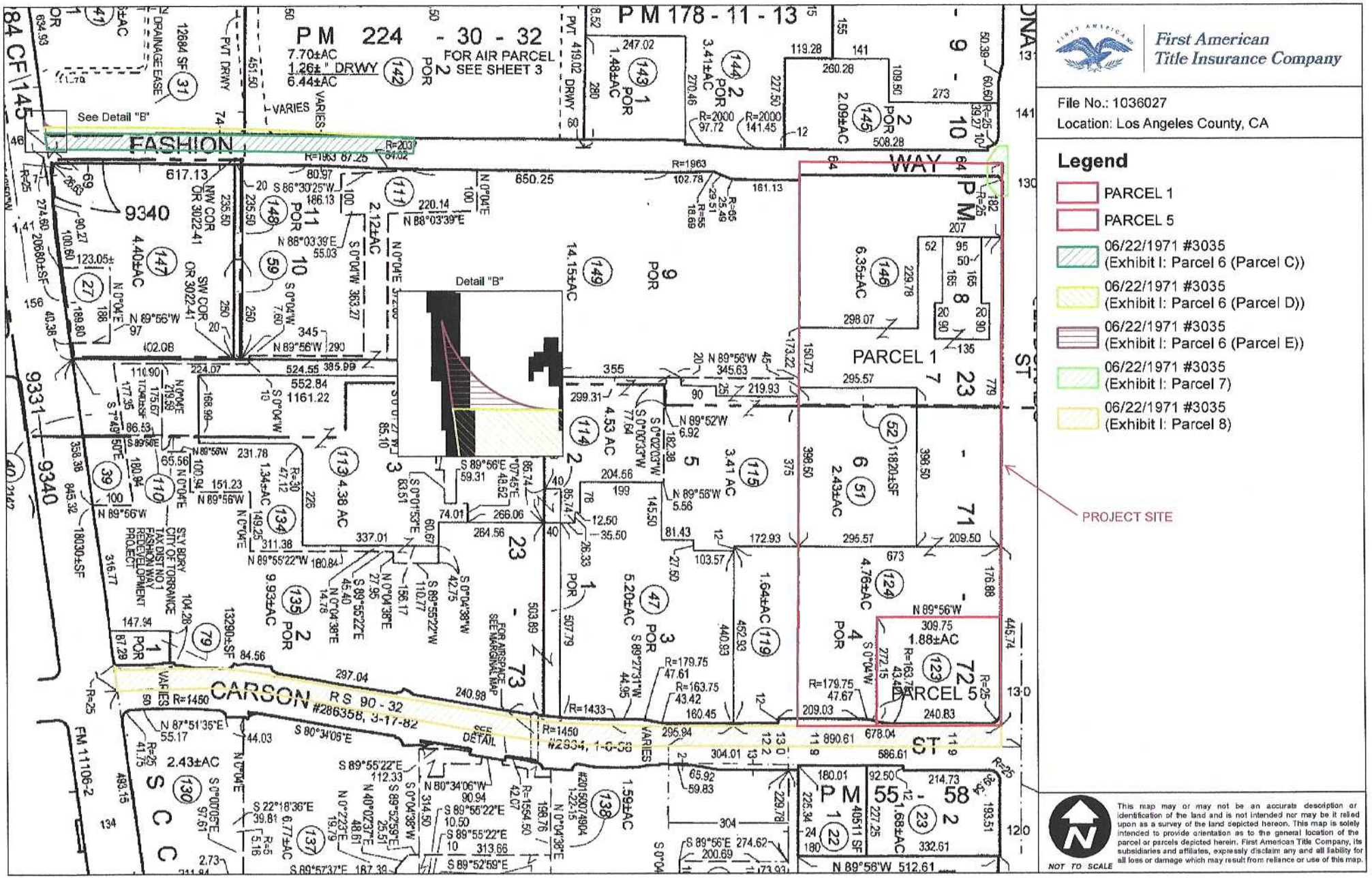
Disclaimer

The information contained in this communication from the sender is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, distribution or taking action in relation of the contents of this information is strictly prohibited and may be unlawful.

This email has been scanned for viruses and malware, and may have been automatically archived by Mimecast Ltd, an innovator in Software as a Service (SaaS) for business. Providing a safer and more useful place for your human generated data. Specializing in; Security, archiving and compliance. To find out more Click Here <http://www.mimecast.com/products/> .

PROJECT SITE




First American Title Insurance Company
File No.: 1036027
Location: Los Angeles County, CA
Legend
PARCEL 1
PARCEL 5
06/22/1971 #3035 (Exhibit I: Parcel 6 (Parcel C))
06/22/1971 #3035 (Exhibit I: Parcel 6 (Parcel D))
06/22/1971 #3035 (Exhibit I: Parcel 6 (Parcel E))
06/22/1971 #3035 (Exhibit I: Parcel 7)
06/22/1971 #3035 (Exhibit I: Parcel 8)
PROJECT SITE
PARCEL 1
PARCEL 5
FASHION WAY
CARSON ST
PM 224 - 30 - 32
PM 178 - 11 - 13
Detail "B"
See Detail "B"
NOT TO SCALE
This map may or may not be an accurate description or identification of the land and is not intended nor may be it relied upon as a survey of the land depicted hereon. This map is solely intended to provide orientation as to the general location of the parcel or parcels depicted herein. First American Title Company, its subsidiaries and affiliates, expressly disclaim any and all liability for all loss or damage which may result from reliance or use of this map.





VICINITY MAP
N.T.S.

0 25 50 100 150 200
SCALE: 1" = 50'

NO.	DATE	REVISIONS	APPROVED

DRAWN BY: TN
DESIGNED BY: AO
CHECKED BY: AO

PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

DEL AMO
MADRONA AVE & FASHION WAY
EXISTING CONDITIONS PLAN
CITY OF TORRANCE

SHEET
C-0

PLOTTED By: Kelle OConnor DATE: Mar. 16, 2022 01:20:27 PM FILE: P:\1180\Engineering\SY_WS Studies\Sewer\Reference\Chevron\SHEET C-0 EXISTING CONDITIONS.dwg

W.O. 3918 DEL AMO TORRANCE

A.L.T.A./N.S.P.S. LAND TITLE SURVEY

CITY OF TORRANCE, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA
DATE OF SURVEY: NOVEMBER, 2020 W.O. 3916-68X

TITLE REPORT:

LEGAL DESCRIPTION:

PARCEL 1:

PARCEL 2:

PARCEL 2-A:

PARCEL 2-B:

PARCEL 3:

PARCEL 4:

PARCEL 5:

PARCEL 6:

LEGAL DESCRIPTION CONT'D:

PARCEL 7:

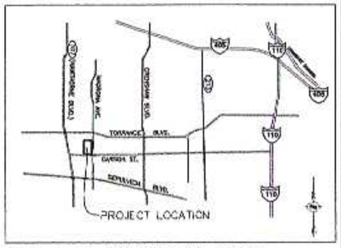
PARCEL 8:

SCHEDULE B EXCEPTIONS:

SCHEDULE B EXCEPTIONS CONT'D:

SCHEDULE B EXCEPTIONS CONT'D:

SCHEDULE B EXCEPTIONS CONT'D:



VICINITY MAP

N.T.S.

RECORD AND MEASURED DATA NOTES:

MONUMENT NOTES:

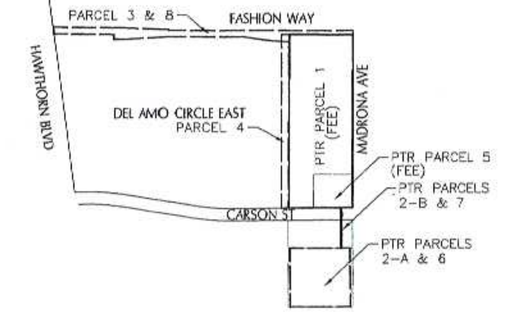
M1
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17

DATUM STATEMENT:

BASIS OF BEARINGS:

BENCHMARK:

NOTES:



TITLE REPORT PARCELS

SCALE 1"=400'

PREPARED FOR:

LENNAR

15131 ALTON PKWY, SUITE 365
IRVINE, CA 92618
(949) 349-8000

PREPARED BY:

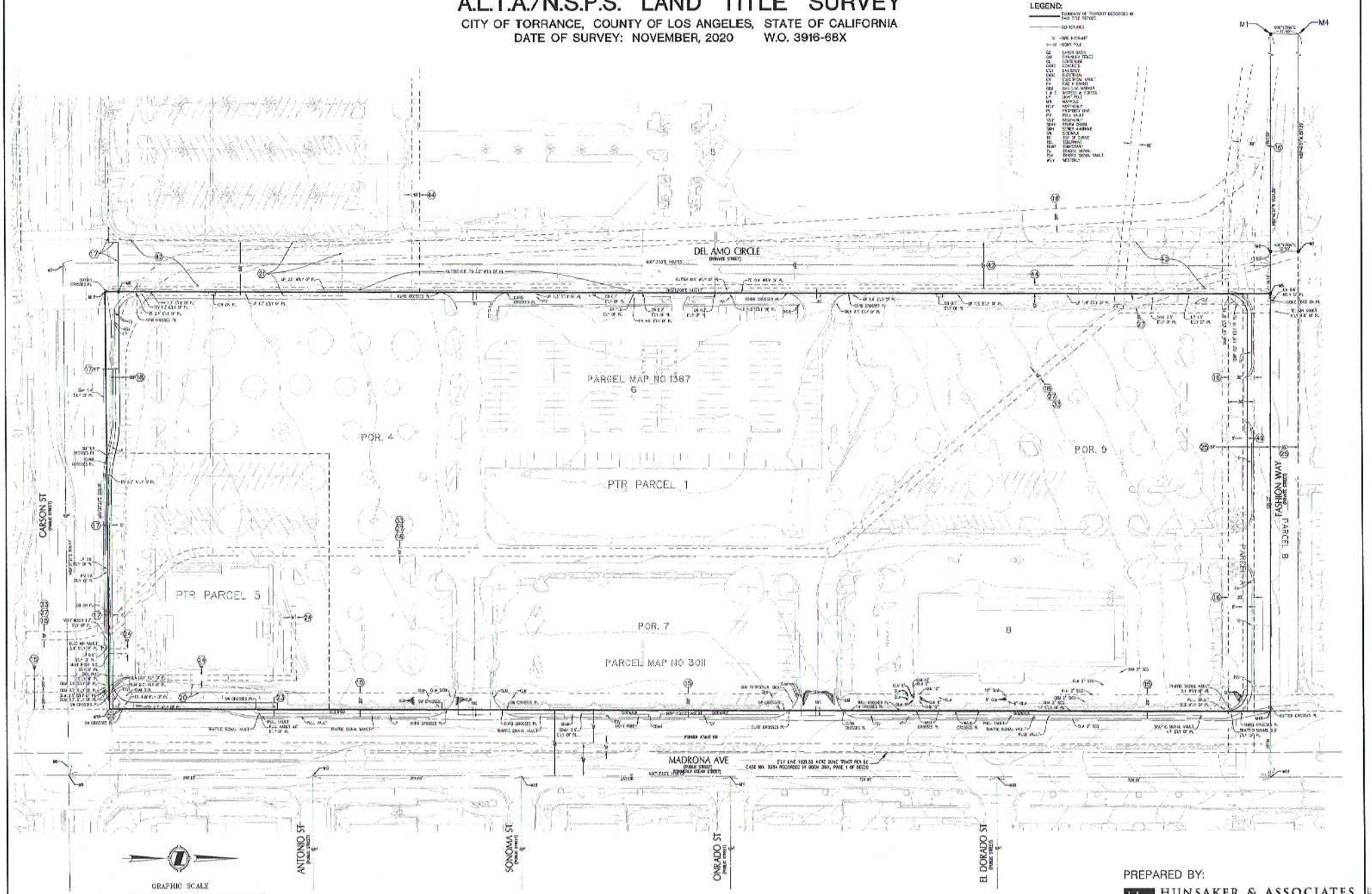
HUNSAKER & ASSOCIATES
I R V I N E , I N C .
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

SURVEYORS CERTIFICATE:

12/03/2020
DATE

A.L.T.A./N.S.P.S. LAND TITLE SURVEY

CITY OF TORRANCE, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA
DATE OF SURVEY: NOVEMBER, 2020 W.O. 3916-68X



PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ■ ENGINEERING ■ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

PLOTTED BY: Ralph Jesus DATE: Dec. 31, 2020 11:58:28 AM FILE: I:\DelAmoTorrance\Alta\S-H02.dwg

FACILITY INQUIRY APPLICATION FORM

SUBMIT TO: CHEVRON PIPE LINE COMPANY
CPL LAND DEPARTMENT C/O Melissa Horiuchi
1400 SMITH STREET, 38 FLOOR
HOUSTON. TX 77002

APPLICATION DATE: 17 MARCH 2022 **PROPERTY ADDRESS:** SOUTH WEST CORNER OF FASHION WAY & MADRONA AVE (AS SHOWN ON ATTACHED ALTA

NAME OF APPLICANT: (PRINT OR TYPE)

KATIE O'CONNOR	CIVIL ENGINEER	HUNSAKER & ASSOCIATES
Name	Title	Company

3 HUGHES	IRVINE	CA	92618
Address	City	State	Zip Code

APPLICANT CONTACT INFORMATION:

KATIE O'CONNOR	949-458-5437	KOCONNOR@HUNSAKER.COM
Name	Phone Number	Email

3 HUGHES	IRVINE	CA	92618
Address	City	State	Zip Code

THE FOLLOWING MUST BE INCLUDED WITH THIS APPLICATION:

One-time waived fee by JD

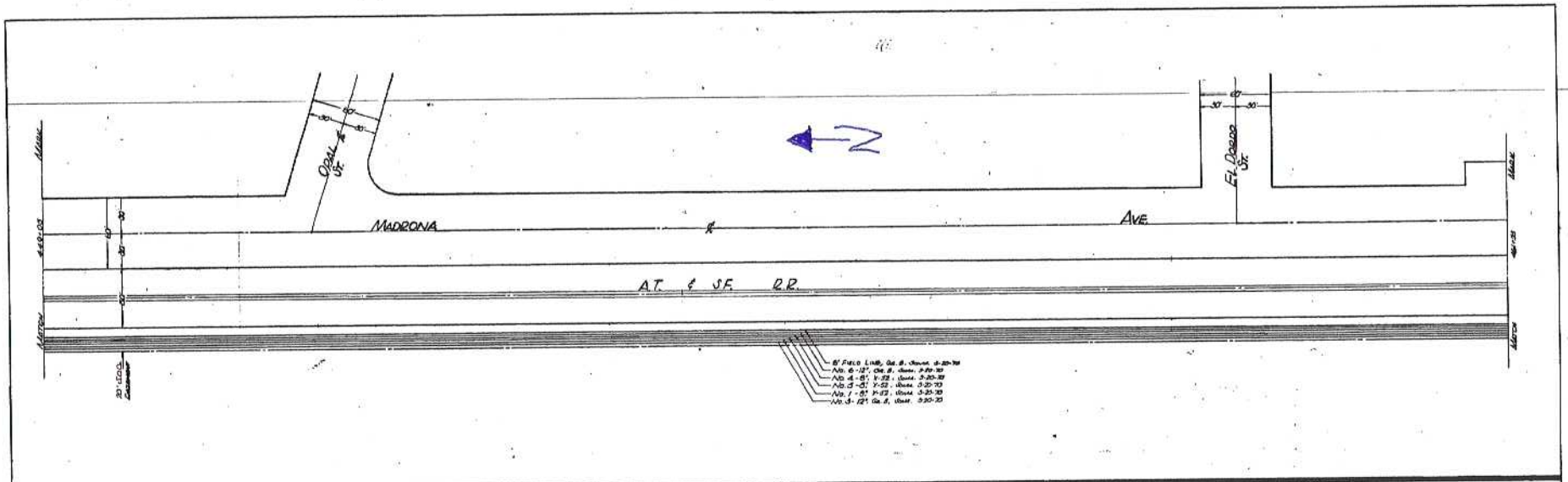
1. A **non-refundable** application fee of ~~$200.00 (paid by check)~~ for all Third Parties (Non-Government Agencies) and Third Parties Representing Federal, State or Local Agencies for each Initial and Subsequent Requests made payable to Chevron Pipe Line Company ("CPL") along with the first page of this application.
2. Email a survey or drawing of the property with the scope of area highlighted along with the following:
   a. Assessor Parcel Map with the subject Tax Assessor Parcel Number identified
   b. Additional recorded County Maps (I.E. Tract, Parcel, Deed, Survey, etc.)
   c. A Google Earth screenshot or aerial map of general area
3. Email the property deed and any additional information that may aid review. (I.E Vesting Deed, Preliminary Title Report, ALTA Survey, etc.)
4. A written description/explanation of the request

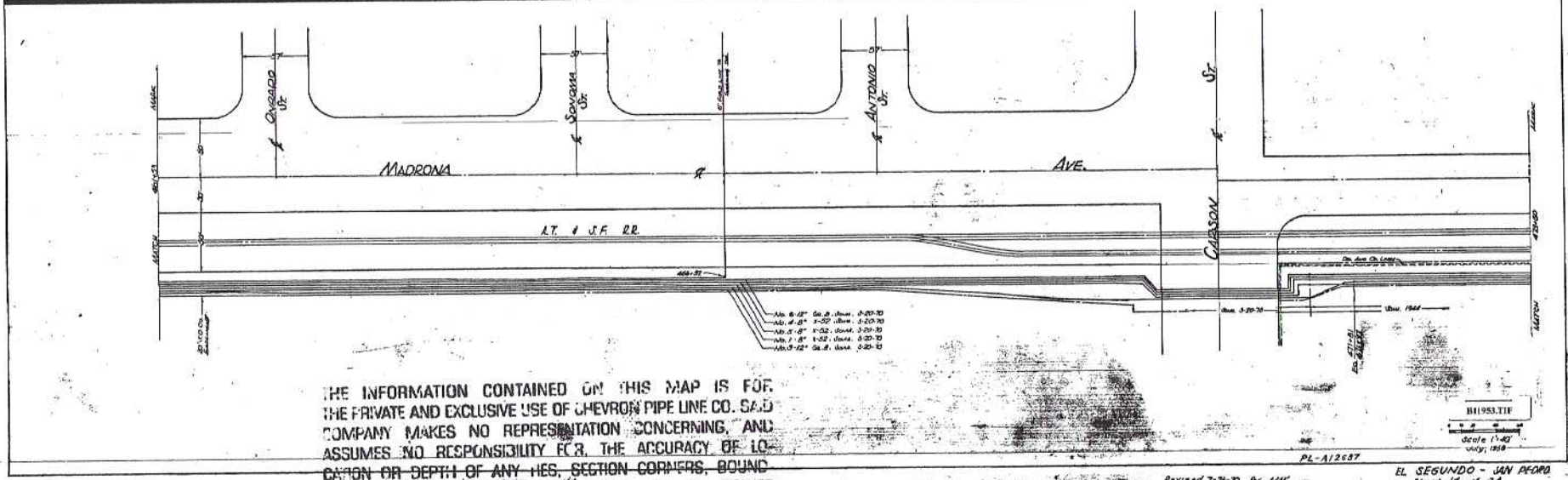
Please note: The purpose of this application is for CPL to determine whether it or another affiliated legal entity managed within Chevron's pipeline business unit currently owns and/or operates the pipeline system. If it is determined that a legal entity managed within Chevron's pipeline business unit is the owner, then an initial conflict/no conflict response will be determined; otherwise, your request will need to be directed elsewhere.

APPLICANT ACKNOWLEDGES THAT APPLICANT'S SUBMISSION OF AND CPL'S PROCESSING OF THIS APPLICATION DOES NOT GUARANTEE APPROVAL OF APPLICANT'S REQUEST FOR PROJECT REVIEW, APPROVAL OR RELEASE. APPLICANT FURTHER ACKNOWLEDGES THAT AT ANY TIME DURING THE PROCESSING OF ITS APPLICATION, APPLICANT'S REQUEST MAY BE DENIED FOR ANY BUSINESS, COMMERCIAL, ENVIRONMENTAL OR OTHER REASON, AND ALL FEES PAID AND COSTS) BY APPLICANT ARE NON-REFUNDABLE.

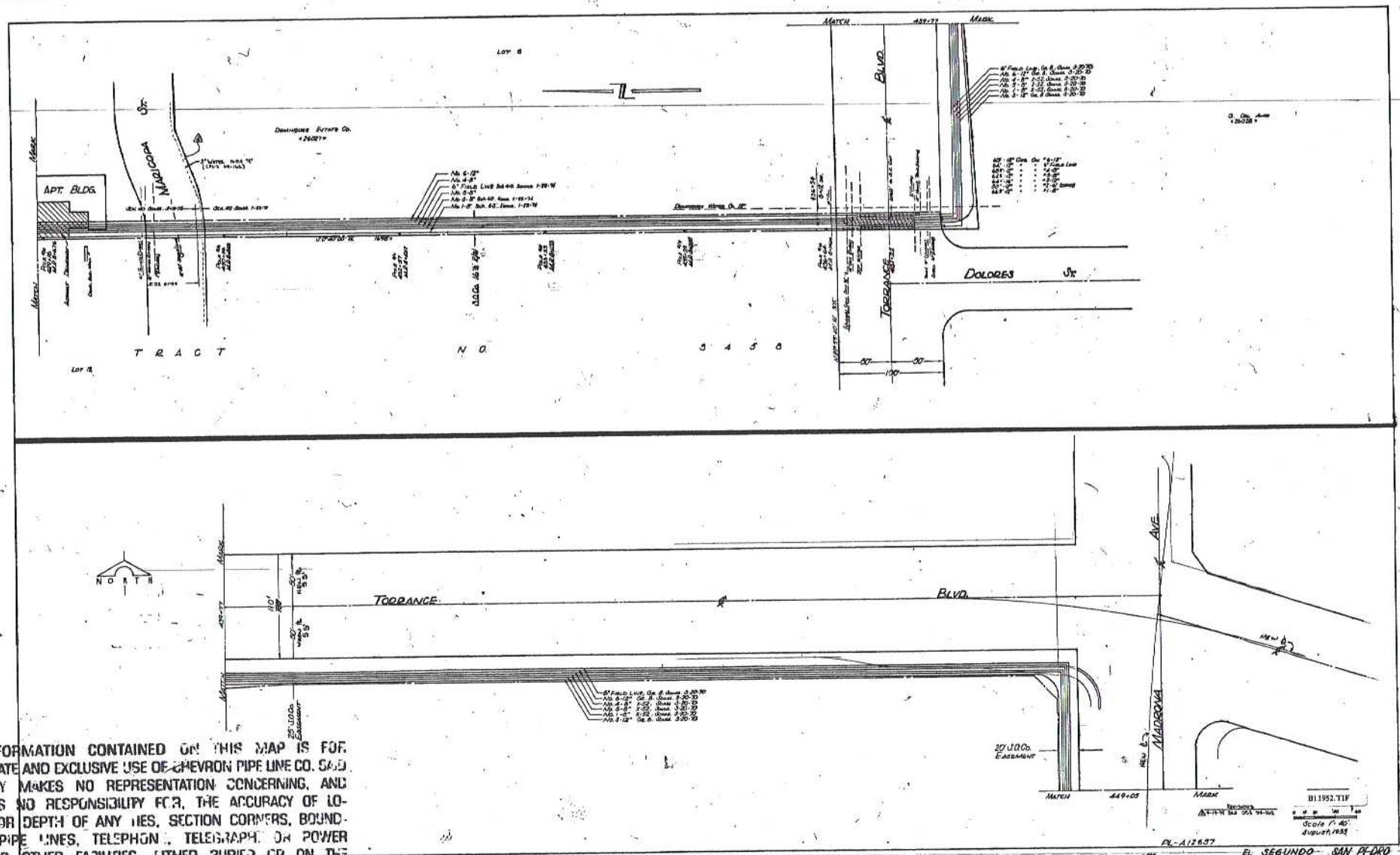
Katie O'Connor

Signature of Requestor/Applicant





THE INFORMATION CONTAINED ON THIS MAP IS FOR THE PRIVATE AND EXCLUSIVE USE OF CHEVRON PIPE LINE CO. SAID COMPANY MAKES NO REPRESENTATION CONCERNING, AND ASSUMES NO RESPONSIBILITY FOR, THE ACCURACY OF LOCATION OR DEPTH OF ANY LINES, SECTION CORNERS, BOUNDARIES, PIPE LINES, TELEPHONE, TELEGRAPH, OR POWER LINES OR OTHER FACILITIES, EITHER BURIED OR ON THE SURFACE OF THE GROUND, INDICATED ON THIS MAP. THIS COMPANY SHOULD BE COMMUNICATED WITH BEFORE ANY EXPLORATORY WORK OF ANY KIND IS DONE IN THE VICINITY OF THE FACILITIES SHOWN ON THIS MAP.



THE INFORMATION CONTAINED ON THIS MAP IS FOR THE PRIVATE AND EXCLUSIVE USE OF CHEVRON PIPE LINE CO. SAID COMPANY MAKES NO REPRESENTATION CONCERNING, AND ASSUMES NO RESPONSIBILITY FOR, THE ACCURACY OF LOCATION OR DEPTH OF ANY TIES, SECTION CORNERS, BOUNDARIES, PIPE LINES, TELEPHONE, TELEGRAPH OR POWER LINES OR OTHER FACILITIES, EITHER BURIED OR ON THE SURFACE OF THE GROUND, INDICATED ON THIS MAP. THE COMPANY SHOULD BE COMMUNICATED WITH BEFORE ANY EXPLORATORY WORK OF ANY KIND IS DONE IN THE VICINITY OF THE FACILITIES SHOWN ON THIS MAP.

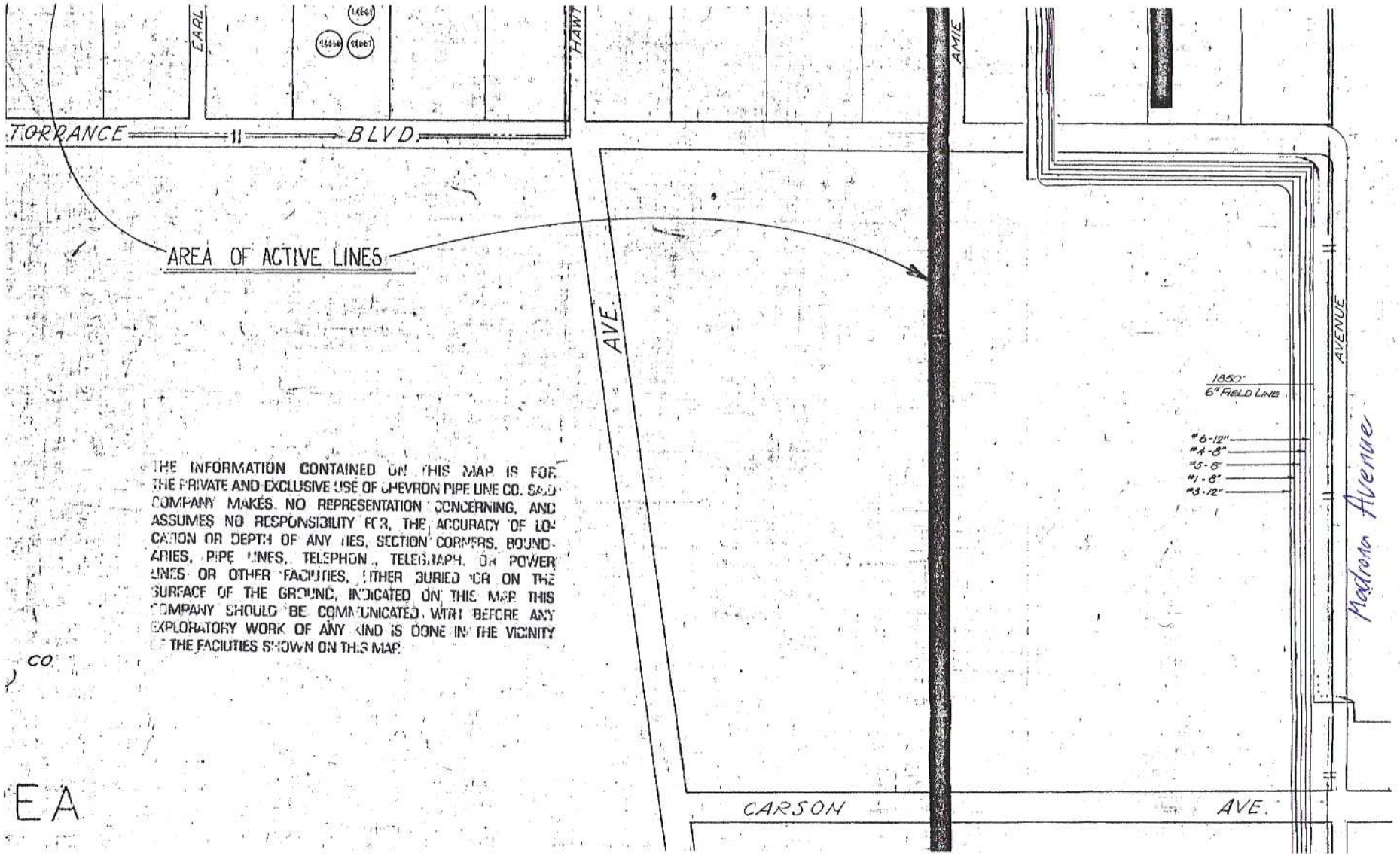
B11952.TIF

Scale 1"=40'
August, 1959

PL-A12637

Revised 10-2-76 By AMH

EL SEGUNDO - SAN PEDRO
Sheet 18 of 34



THE INFORMATION CONTAINED ON THIS MAP IS FOR THE PRIVATE AND EXCLUSIVE USE OF CHEVRON PIPE LINE CO. SAID COMPANY MAKES NO REPRESENTATION CONCERNING, AND ASSUMES NO RESPONSIBILITY FOR, THE ACCURACY OF LOCATION OR DEPTH OF ANY TIES, SECTION CORNERS, BOUNDARIES, PIPE LINES, TELEPHONE, TELEGRAPH, OR POWER LINES OR OTHER FACILITIES, EITHER BURIED OR ON THE SURFACE OF THE GROUND, INDICATED ON THIS MAP. THIS COMPANY SHOULD BE COMMUNICATED WITH BEFORE ANY EXPLORATORY WORK OF ANY KIND IS DONE IN THE VICINITY OF THE FACILITIES SHOWN ON THIS MAP.

CO.

EA

Inv Map 430

UNCONTROLLED WHEN PRINTED
UNCONTROLLED WHEN PRINTED
UNCONTROLLED WHEN PRINTED

RIGHT OF WAY

QUORUM/PARCEL NUMBER, OWNER, FOOTAGE, AND STATIONING:

UNKNOWN
100FT
449+60 to 466+67

COUNTY: Los Angeles, California

PLS: T 4S R 14W SEC 9

HCA: CA SEG

CLASS LOCATION

ALIGNMENT

SURVEY STATIONING OF: ALL CROSSINGS & VALVES

450+19 XING UNKNOWN STANDPIPE

455+18 XING UNKNOWN STANDPIPE

455+93 SHEET NOTE FENCE

460+08 XING UNKNOWN STANDPIPE

465+09 XING UNKNOWN STANDPIPE



DEPTH OF COVER - FEET

MATERIAL

PIPE

449+60

R1 459+10

A 1,603

465+63

Horizontal Directional Drill

PROFILE - FEET

106
96
86
76

449+60 450+00 455+00 460+00 465+00 465+63

MATERIAL SUMMARY

Pipe Segments & Predominate Coating

Index	Description	Length
A	8" X 0 WT ASTM A053 B SOMASTIC	1,603

Reducer

Index	Description	Count
R1	8" x 12"	1

Product Class - Operating Status

- Crude - Active/Idle
- Gas - Active/Idle
- RPRD - Active/Idle
- CO2 - Active/Idle
- Inert - Active/Idle
- HVL - Active/Idle
- Crude - Abnd
- Gas - Abnd
- RPRD - Abnd
- CO2 - Abnd
- Inert - Abnd
- HVL - Abnd

Legend

- Casing
- Sleeve
- Bend
- Elbow
- Tap
- Tee
- Block/Mainline Valve
- Check Valve
- Other Valves
- Flange
- Anode/Rectifier
- Test/Bond Lead
- PI
- Equation
- Reducer
- HDD Tie-In
- Cable
- Electric
- Fence
- Fiber Optic
- Foreign Line
- Sewer
- Telephone
- Unknown Crossing
- Railroad
- Waterline
- Waterway
- Overhead Power
- HDD

Profile Legend

- Ground Surface Elevation
- Pipeline Profile

PipeList

ROUTE	PIPELINE
CAG3238	6", CRUDE , 4S 14W 9 - 10 6" GATHERING
CAL0346	6/8", JET , No. 5: El Segundo - Navy
CAL0348	8", JET , No. 1: El Segundo - Navy
CAL0352	8/12", JET , No. 3: El Segundo - San Pedro
CAL0344	8/12", CRUDE , Torrance - El Segundo

The location of pipeline facilities as shown hereon must be considered as approximate only. Before digging or for an exact location please contact your state's underground utility service.

SCALE (Does not apply to pipeline length)

0 25 50 100

1 " = 50 '

IMAGE DATA	Image Source: ESRI
AS/LS Projection	NAD_1983_UTM_Zone_15N
AS/LS Template	AlignmentSheets.mxd

OPERATED BY Chevron

COMPANY CONFIDENTIAL

Route Code: CAL0352 | **County, State:** Los Angeles, California

From/To Station: 449+60 to 465+63 | **From/To Milepost:** 6.86 to 7.16

Route: 8/12" ,JET ,No. 3: El Segundo - San Pedro

Line: El Segundo - San Pedro

SubSystem: El Segundo - San Pedro

Alignment Sheet #: 025

Filename: CAL0352-AS-F-025 | **Date Created:** 05/04/2020

UNCONTROLLED WHEN PRINTED
UNCONTROLLED WHEN PRINTED
UNCONTROLLED WHEN PRINTED

UNCONTROLLED WHEN PRINTED

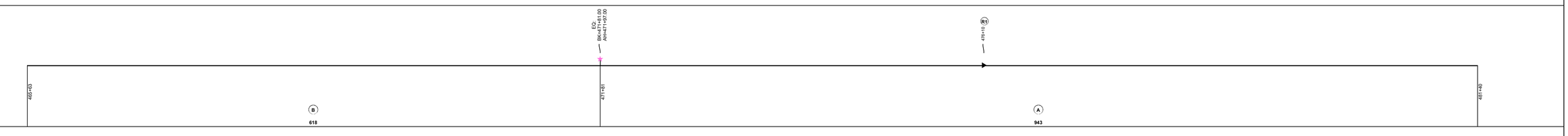
RIGHT OF WAY	UNKNOWN 1762 FT 449+99 to 465+67
	UNKNOWN 1437 FT 466+47 to 469+81
	CARSON ST 100 FT 469+81 to 470+81
	UNKNOWN 1307 FT 470+81 to 484+04
QUORUM/PARCEL NUMBER, CROSSING TYPE/USE, AND STATIONING:	
COUNTY	Los Angeles, California
PLS	T 4S R 14W SEC 9 / T 4S R 14W SEC 16
HCA	CA SEG
CLASS LOCATION	
ALIGNMENT	467+09 31°24" PI RIGHT
SURVEY STATIONING OF: ALL CROSSINGS & VALVES	469+41 37°12" PI LEFT
	469+95 XING 5 INCH ELECTRIC/POWER LINE - BELOW GROUND
	471+28 21°33\" PI LEFT
	471+72 21°25\45" PI RIGHT
	471+81 EQ BK=471+81.00 AH=471+97.00



DEPTH OF COVER - FEET

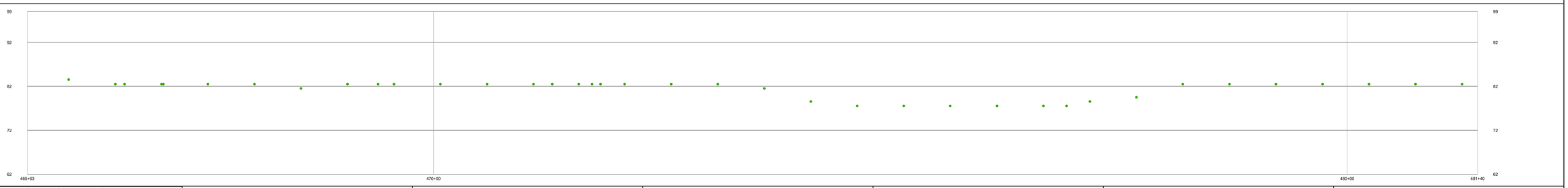
MATERIAL

PIPE



Horizontal Directional Drill

PROFILE - FEET



MATERIAL SUMMARY

Pipe Segments & Predominate Coating

Index	Description	Length
A	8" X 0 WT	943
B	8" X 0 WT ASTM A053 B SOMASTIC	618

Reducer

Index	Description	Count
R1	8" x 12"	1

Product Class - Operating Status

Crude - Active/Idle	Crude - Abnd
Gas - Active/Idle	Gas - Abnd
RPRD - Active/Idle	RPRD - Abnd
CO2 - Active/Idle	CO2 - Abnd
Inert - Active/Idle	Inert - Abnd
HVL - Active/Idle	HVL - Abnd

Legend

Casing	Block/Mainline Valve	PI	Cable	Telephone
Sleeve	Check Valve	Equation	Electric	Unknown Crossing
Bend	Other Valves	Reducer	Fence	Railroad
Elbow	Flange	HDD Tie-In	Fiber Optic	Waterline
Tap	Anode/Rectifier		Foreign Line	Waterway
Tee	Test/Bond Lead		Sewer	Overhead Power
				HDD

Profile Legend

- Ground Surface Elevation
- Pipeline Profile

PipeList

ROUTE	PIPELINE
CAG3238	6", CRUDE , 4S 14W 9 - 10 .6" GATHERING
CAL0346	6/8", JET , No. 5: El Segundo - Navy
CAL0348	8", JET , No. 1: El Segundo - Navy
CAL0352	8/12", JET , No. 3: El Segundo - San Pedro
CAL0344	8/12", CRUDE , Torrance - El Segundo

The location of pipeline facilities as shown hereon must be considered as approximate only. Before digging or for an exact location please contact your state's underground utility service.

SCALE (Does not apply to pipeline length)

0 25 50 100

1 " = 50 '

IMAGE DATA	Image Source: ESRI
AS/LS Projection	NAD_1983_UTM_Zone_15N
AS/LS Template	AlignmentSheets.mxd

OPERATED BY Chevron

COMPANY CONFIDENTIAL

Route Code: CAL0352	**County, State:** Los Angeles, California
From/To Station: 465+63 to 481+40	**From/To Milepost:** 7.16 to 7.46
Route: 8/12", JET, No. 3: El Segundo - San Pedro	
Line: El Segundo - San Pedro	
SubSystem: El Segundo - San Pedro	
Alignment Sheet #: 026	
Filename: CAL0352-AS-F-026	**Date Created:** 05/04/2020

UNCONTROLLED WHEN PRINTED

California State Fire Marshal
Information Bulletin

Issued June 22, 2020
Revised September 25, 2019

ENCROACHMENTS INTO or OVER HIGH PRESSURE GAS PIPELINES

Section 51014.6 of the California Government Code states, "[illegible] interest or the holder's tenant from planting and harvesting seasonal agricultural crops on a pipeline

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]
[illegible]
3780 Kilroy Airport Way #500
Long Beach [illegible] 806[illegible] [illegible]0350[illegible]

CITY OF TORRANCE

SANITARY SEWERS

DRAWN: TT DATE: Dec 11, 2018

CHECKED: NA, SY REV:

LEGEND

8" SEWER UNLESS INDICATED

STA. DEPTH

0+00 (6.6)

1 + 00 HC TO PL

0 + 90 CHIMNEY

0 + 75 "Y" C.O.

0 + 50 "D" C.O. TO CURB

LIFT STATION M.H. SS - 100 PLAN NO.

COUNTY SEWER

PRIVATE SEWER

ABAND. SEWER & MH

STREET CENTER LINE

SEWER EASEMENT

100 0 100 200

48	49	50
55	56	57
62	63	64

SHEET NO. 56

CITY OF TORRANCE

SANITARY SEWERS		
DRAWN: TT	DATE: Sep 18, 2012	
CHECKED: NA	REV:	

LEGEND

8" SEWER UNLESS INDICATED

1+00 H.C. TO P.L. — 0+90 CHIMNEY — 0+75 "Y" C.O. — 0+50 "D" H.C. TO CURB — STA. DEPTH 0+00 (5.6) — LIFT STATION — M.H. — SS-100 PLAN NO.

COUNTY SEWER
PRIVATE SEWER
ABAND. SEWER & MH
STREET CENTER LINE
SEWER EASEMENT

100 0 100 200

55	56	57
62	63	64
69	70	71

SHEET NO. 63

1

2

3

4

5

6

MADRONA AVE

PLAZA DEL AMO

MAPLE AVE

SEPULVEDA BLVD

224TH ST

225TH ST

OSAGE CT

AVIS CT

STUBS

CITY OF TORRANCE

SANITARY SEWERS

DRAWN: TT DATE: Mar 2, 2014

CHECKED: NA, SY REV:

LEGEND

8" SEWER UNLESS INDICATED

CHIMNEY

LIFT STATION

M.H.

COUNTY SEWER

PRIVATE SEWER

ABAND. SEWER & MH

STREET CENTER LINE

SEWER EASEMENT

62	63	64
69	70	71
77	78	79

SHEET NO. 70

1

2

3

4

5

6

MADRONA AVE

226TH ST

227TH ST

227TH PL

228TH PL

229TH PL

NADINE CIR

MAPLE AVE

FELBAR AVE

FONTHILL AVE

BENNER AVE

BENNER CT

JUNIPER AVE

AVIS ST

225TH ST

229TH ST

230TH ST

232ND ST

CITY OF TORRANCE

SANITARY SEWERS

DRAWN: TT DATE: Apr 04, 2007

CHECKED: NA REV:

LEGEND

8" SEWER UNLESS INDICATED

STA. DEPTH

0+00 (6.6)

1+00 HC TOP

0+00 MH

0+75 "V" C.C.

0+50 C.C. CURB

CHIMNEY

LIFT STATION

M.H.

SS-100 PLAN NO.

COUNTY SEWER

PRIVATE SEWER

ABAND. SEWER & MH

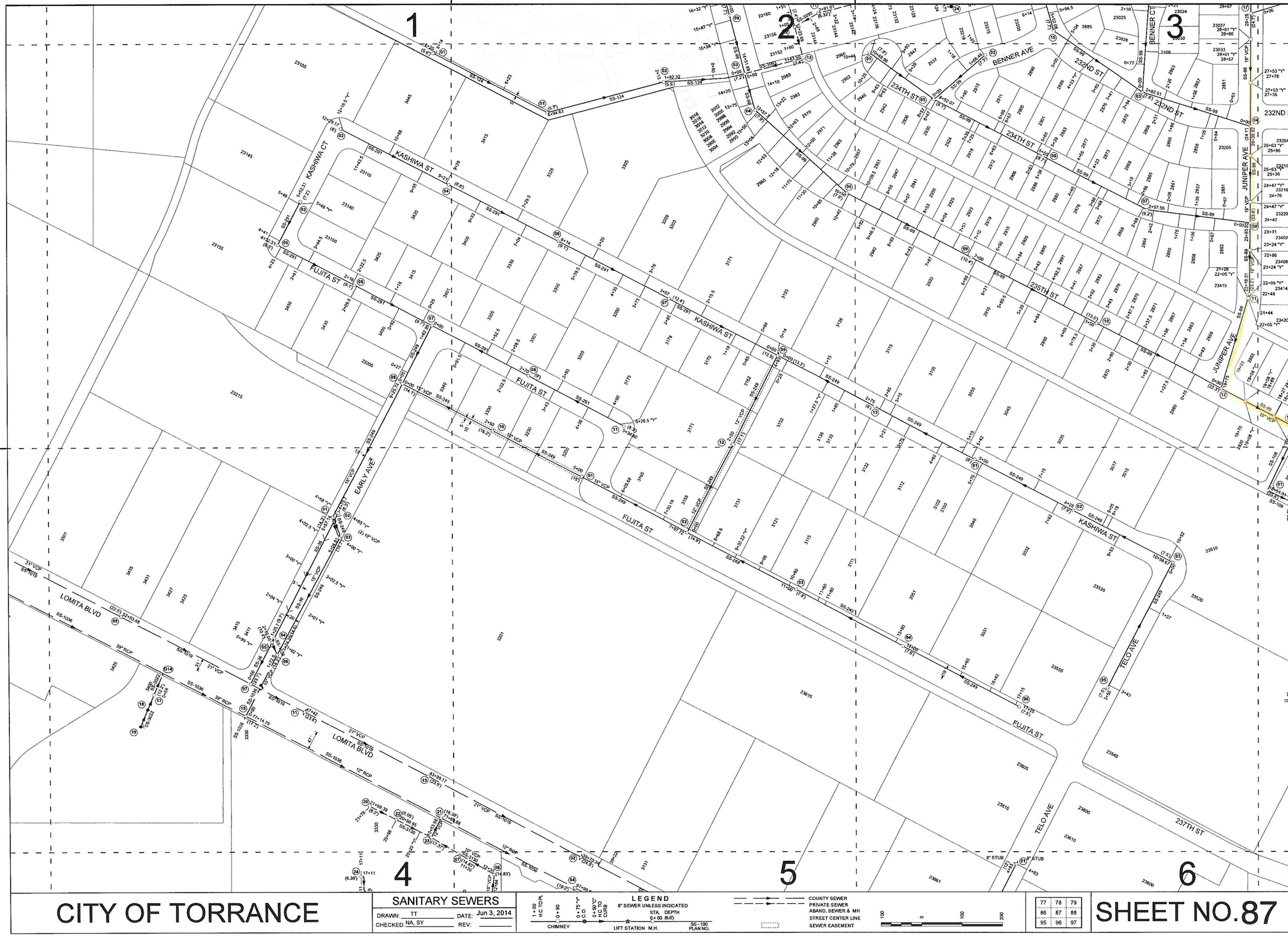
STREET CENTER LINE

SEWER EASEMENT

100 0 100 200

69	70	71
77	78	79
86	87	88

SHEET NO. 78



CITY OF TORRANCE
SANITARY SEWERS
DRAWN: TT
CHECKED: NA, SY
DATE: Jun 3, 2014
REV:
LEGEND
8" SEWER UNLESS INDICATED
1 + 00 H.C. TO PL
CHIMNEY
0 + 90
0 + 75 "Y" C.O.
0 + 50 "C" H.C. TO CURB
LIFT STATION
M.H.
STA. DEPTH 0+00 (6.6')
SS - 100 PLAN NO.
COUNTY SEWER
PRIVATE SEWER
ABAND. SEWER & MH
STREET CENTER LINE
SEWER EASEMENT
SHEET NO.87
LOMITA BLVD
EARLY AVE
FUJITA ST
KASHIWA ST
KASHIWA CT
TELO AVE
237TH ST
235TH ST
234TH ST
232ND ST
BENNER AVE
BENNER CT
JUNIPER AVE

1

2

3

4

5

6

CITY OF TORRANCE

SANITARY SEWERS

DRAWN: TT DATE: Mar 14, 2011

CHECKED: NA REV:

LEGEND

8" SEWER UNLESS INDICATED

1 + 00 HC TOP

0 + 90

0 + 75 "V" C.O.

0 + 50 "D" HOT CURB

STA. DEPTH

0 + 00 (6.6)

CHIMNEY

LIFT STATION

M.H.

SS - 100 PLAN NO.

COUNTY SEWER

PRIVATE SEWER

ABAND. SEWER & MH

STREET CENTER LINE

SEWER EASEMENT

100 0 100 200

78	79	80
87	88	89
96	97	98

SHEET NO. 88

1

2

3

4

5

6

CRENSHAW BLVD

LOMITA BLVD

237TH

237TH ST

236TH ST

236TH PL

235TH PL

237TH PL

238TH ST

239TH ST

STUB

ABANDONED

CITY OF TORRANCE

SANITARY SEWERS

DRAWN: TT DATE: May 10, 2016

CHECKED: NA, SY REV:

LEGEND

8" SEWER UNLESS INDICATED

STA. DEPTH

0+00 (6.6)

1+00 HC TOP

0+90 HC TOP

0+75 "Y" C.O.

0+50 "C" HC TO CURB

CHIMNEY

LIFT STATION M.H.

SS-100 PLAN NO.

COUNTY SEWER

PRIVATE SEWER

ABAND. SEWER & MH

STREET CENTER LINE

SEWER EASEMENT

100 0 100 200

87	88	89
96	97	98
105	106	107

SHEET NO. 97

ABANDONED

MADRONA AVE

SS-345 - 6" CI FORCE MAIN

SH-4-1

SH-4-2

ANTO

21615

21624

SS-1 10" VCP

2+00 "Y"

3405

4+00

0+94.77

5+26.56

5+87.14

1+41.20

SS-16

SS-345

8" STUB

48.5'

CARSON ST

3440

3424

21711

20+08.6

19+50 "Y"

17+36 "Y"

15+93 "Y"

SS-212 10" VCP

1+95.20

0+24 "Y"

1+24.5 "Y"

1+99 "Y"

3328

3316

3300

3230

19+69

21720

18+39 "Y"

17+60 "Y"

21760

15+89 "Y"

18+76.62

SS-212

18+30

PLAZA DEL AMO

2-8" STUBS

END

4+82.06

PLUG

3+90.39 "Y"

3+02.39 "Y"

2+34.14 "Y"

SS-219

PRIVATE LINE

1+44.14

14+80

13+77

12+20

STUBS

21770

11+00 "Y"

11+07 "Y"

N

sh. 63

4

Katie OConnor

From: Symons, Ted <TSymons@TorranceCA.gov>
Sent: Thursday, February 24, 2022 12:12 PM
To: Katie OConnor; Woolsey, Mike
Cc: Martinez, Oscar; Don Lamm; Oorts, Leo; Kamal Karam; Gary Jones; Brian Bencz; Alan Oveisi; John Pham; Maatubang, Anthony
Subject: RE: Lennar Del Amo- Public Works Referral- Sewer Connection Issue
Attachments: Lennar Homes project

Hi Katie,

I've attached the sewer index maps from the proposed project to the LA County San District line in Lomita Blvd and also to the sewer main that leads to the new mainline in Opal St. I circled the locations where flow monitoring needs to be done. Flow monitoring is to be for two weeks with measurements taken every 15 minutes.

More info to follow.

TED SYMONS
Acting Assistant Building Regulations Manager – Community Development Department
City of Torrance | 3031 Torrance Boulevard | Torrance CA 90503 | 310.618.2831 | 310.618.2846 fax | TSymons@TorranceCA.Gov | www.TorranceCA.Gov | www.TorranceCA.Gov/SocialMedia | www.TorranceCA.Gov/COVID19 | Give Us Your Feedback

---

From: Katie OConnor <KOConnor@hunsaker.com>
Sent: Wednesday, February 23, 2022 1:35 PM
To: Woolsey, Mike <MWoolsey@TorranceCA.gov>; Symons, Ted <TSymons@TorranceCA.gov>
Cc: Martinez, Oscar <OMartinez@TorranceCA.gov>; Don Lamm <don@dstarassociates.com>; Oorts, Leo <LOorts@TorranceCA.gov>; Kamal Karam <Kamal.Karam@hunsaker.com>; Gary Jones <gary.jones@lennar.com>; Brian Bencz <brian.bencz@lennar.com>; Alan Oveisi <AOveisi@hunsaker.com>; John Pham <JPham@hunsaker.com>
Subject: RE: Lennar Del Amo- Public Works Referral- Sewer Connection Issue

WARNING: External e-mail
Please verify sender before opening attachments or clicking on links.

Hi Ted,
I was just checking in to see if you were able to find any information for me regarding the trunk line that the Cason Street (SS-1) and Madrona (SS-212) sewers drain into. Please see my email from Feb 16 (below) for details re: information requested. I also wanted to check in on my Feb 18 question re: the stub into the project site, just south of El Dorado St.

Please let me know if you need any additional information from me.
Thanks,
Katie

From: Katie OConnor
Sent: Friday, February 18, 2022 9:49 AM
To: 'Woolsey, Mike' <MWoolsey@torranceca.gov>; 'Symons, Ted' <TSymons@torranceca.gov>

Methods & Procedures & Equipment

Methods and Procedures

Utility Systems Science & Software provided Hunsaker and Associates with an off the shelf, non-proprietary flow monitoring solution that included four state of the art Hach Flo-Dar® AV Sensor systems. The project course of action is listed below. The US^3 team:

- Assessed permitting and traffic control at the sites in Torrance, CA.
- Prepared the traffic control plans and obtained a City Encroachment Permit.
- Installed and removed traffic control in accord with approved traffic control plans per site-specific California Temporary Traffic Control Handbook (CATTCH) requirements for both the installation and removal of equipment.
- Validated the sites for suitability for sewer flow monitoring for the Del Amo Project.
  - The Site 1 Madrona Av MH had no laterals and slow to moderate open channel hydraulics with some normal system solids observed in the trough.
  - The Site 2 Sepulveda MH had no laterals and slow to moderate open channel hydraulics with ~1.5 inches of sediment in the trough.
  - The Site 3 235th St MH had no laterals and moderate open channel hydraulics with a slight bend in the trough.
  - The original Site 4 Lomita Blvd MH could not be accessed due to the damaged vehicles parked on and around it. Therefore, the next manhole downstream was inspected. It had inlets from the north and west and slow to moderate open channel hydraulics with some turbulence at the confluence of flows.
- Installed and calibrated the flow monitoring equipment at the sites per manufacturer recommendations on 4/07/2022.
  - Follow-up on the installations confirmed equipment was reading properly.
  - Collected 15-minute interval depth and velocity data points over the entire monitoring period.
- Removed the equipment on 4/22/2022 and validated the data.
  - All of the equipment went through diagnostic testing before and after the study with less than a 1% deviation between manual and meter level readings and less than a 5% deviation between manual and meter velocity readings.
  - Equipment calibration was verified in accordance with manufacturer specifications.
- Prepared the data reports.
  - The table on the following page contains a summary of the average (Avg) and maximum (Max) velocities (Vel) and levels (Lev) collected during this study as well as the calculated flow rates (Flow) and depth versus diameter ratios (d/D).

Site	Pipe Size (in)	Avg Vel (fps)	Max Vel (fps)	Avg Lev (in)	Max Lev (in)	Avg Flow (gpm)	Max Flow (gpm)	Avg d/D	Max d/D
1	10	0.82	2.31	0.32	1.08	2.57	13.74	0.03	0.11
2	12	0.69	1.76	5.95	7.40	104.22	262.78	0.50	0.62
3	15	2.22	3.22	3.25	4.41	217.51	421.53	0.22	0.29
4	18	1.61	2.55	4.05	5.04	229.50	435.07	0.23	0.28

Equipment



Figure above: Web-Enabled Flo-Dar® AV Sensor, Radar-Based Velocity/Area Flow Meter

FloDar® AV Sensor Specifications:

- **Enclosure**
  - IP68 Waterproof rating, Polystyrene
- **Dimensions**
  - 160.5 W x 432.2 L x 297 D mm (6.32 x 16.66 x 11.7 in.),
  - With SVS, D = 387 mm (15.2 in.)
- **Weight**
  - 4.8 kg (10.5 lbs.)
- **Operating Temperature**
  - -10 to 50°C (14 to 122°F)
- **Storage Temperature**
  - -40 to 60°C (-40 to 140°F)
- **Power Requirements**
  - Supplied by FL900 Flow Logger, Flo-Logger, or Flo-Station
- **Interconnecting Cable**
  - Disconnect available at both sensor and logger or Flo-Station
  - Polyurethane, 0.400 (±0.015) in. diameter; IP68
  - Standard length 9 m (30 ft), maximum 305 m (1000 ft)
- **Cables – available in two styles:**
  - connectors at both ends
  - connector from sensor with open leads to desiccant hub, desiccant hub with connector to logger. A potting/sealant kit will be included. This can be used to run the cable through conduit.
- **Certification**
  - Certified to: FCC Part 15.245: FCC ID: VIC-FLODAR24
  - Industry Canada Spec. RSS210. v7: IC No.: 6149A-FLODAR24

SURCHARGE DEPTH MEASUREMENT

  - Auto zero function maintains zero error below 0.5 cm (0.2 in.)
- **Method**
  - Piezo-resistive pressure transducer with stainless steel diaphragm
- **Range**
  - 3.5 m (138 in.), overpressure rating 2.5 x full scale

VELOCITY MEASUREMENT

- **Method**
  - Radar
- **Range**
  - 0.23 to 6.10 m/s (0.75 to 20 ft/s)

- **Frequency Range**
  - 24.075 to 24.175 GHz, 15.2 mW (max.)
- **Accuracy**
  - ±0.5%; ±0.03 m/s (±0.1 ft/s)

DEPTH MEASUREMENT

- **Method**
  - Ultrasonic
- **Standard Operating Range from Flo-Dar® Housing to Liquid**
  - 0 to 152.4 cm (0 to 60 in.)
- **Optional Extended Level Operating Range from Transducer Face to Liquid**
  - 0 to 6.1 m (0 to 20 ft.) with 43.18 cm (17 in.) dead band, temperature compensated.
- **Accuracy**
  - ±1%; ±0.25 cm (±0.1 in.)

FLOW MEASUREMENT

- **Method**
  - Based on Continuity Equation
- **Accuracy**
  - ±5% of reading typical where flow is in a channel with uniform flow conditions and is not surcharged, ±1% full scale max.

SURCHARGE CONDITIONS DEPTH/VELOCITY DEPTH (Std with Flo-Dar® Sensor)

- **Surcharge depth supplied by Flo-Dar® sensor.**

VELOCITY (Optional Surcharge Velocity Sensor)

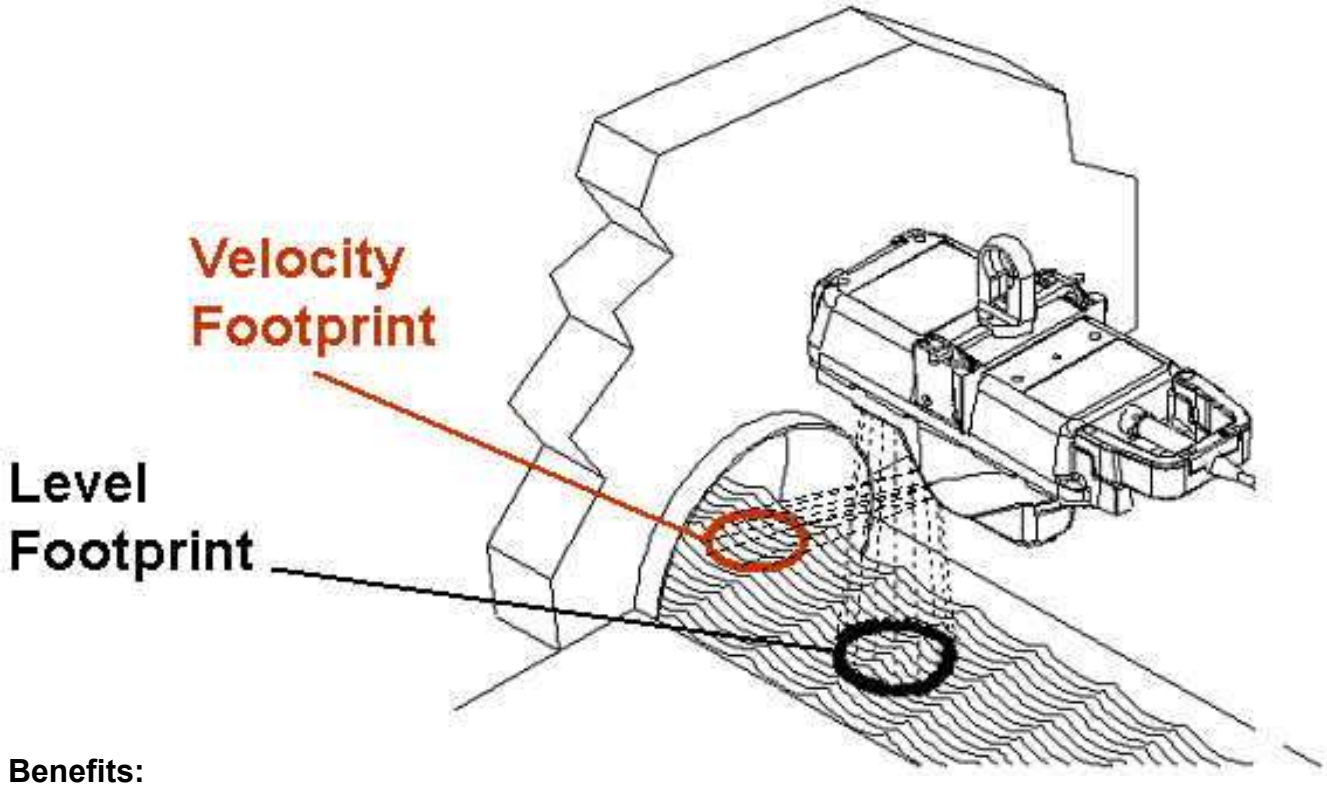
- **Method**
  - Electromagnetic
- **Range**
  - ±4.8 m/s (±16 ft/s)
- **Accuracy**
  - ±0.15 ft/s or 4% of reading, whichever is greater.
- **Zero Stability**
  - ±0.05 ft/s

The Flo-Dar® Open Channel Flow Meters provide an innovative approach to open channel flow monitoring. Combining digital Doppler radar velocity sensing with ultrasonic pulse echo level sensing Flo-Dar® provides accurate open channel flow monitoring without the fouling problems associated with submerged sensors.

Perfect Solution for Difficult Flow Conditions:

- Flows with High Solids Content
- High Temperature Flows
- Caustic Flows
- Large Man-Made Channel
- High Velocities
- Shallow Flows





Benefits:

1. Personnel have no contact with the flow during installation.
2. Maintenance caused by sensor fouling is eliminated
3. Field Replaceable/Interchangeable Sensors and Monitors

How It Works

Flo-Dar® transmits a digital Doppler radar beam that interacts with the fluid and reflects back signals at a different frequency than that which was transmitted. These reflected signals are compared with the transmitted frequency. The resulting frequency shift provides an accurate measure of the velocity and the direction of the flow. Level is detected by ultrasonic pulse echo. Flow is then calculated based on the Continuity Equation:

Q = V x A, Where Q = Flow, V = Average Velocity and A = Area

Accurate Flow Measurements

Flo-Dar® provides the user with highly accurate flow measurements under a wide range of flows and site conditions. By measuring the velocity of the fluid from above, Flo-Dar® eliminates accuracy problems inherent with submerged sensors including sensor disturbances, high solids content and distribution of reflectors.

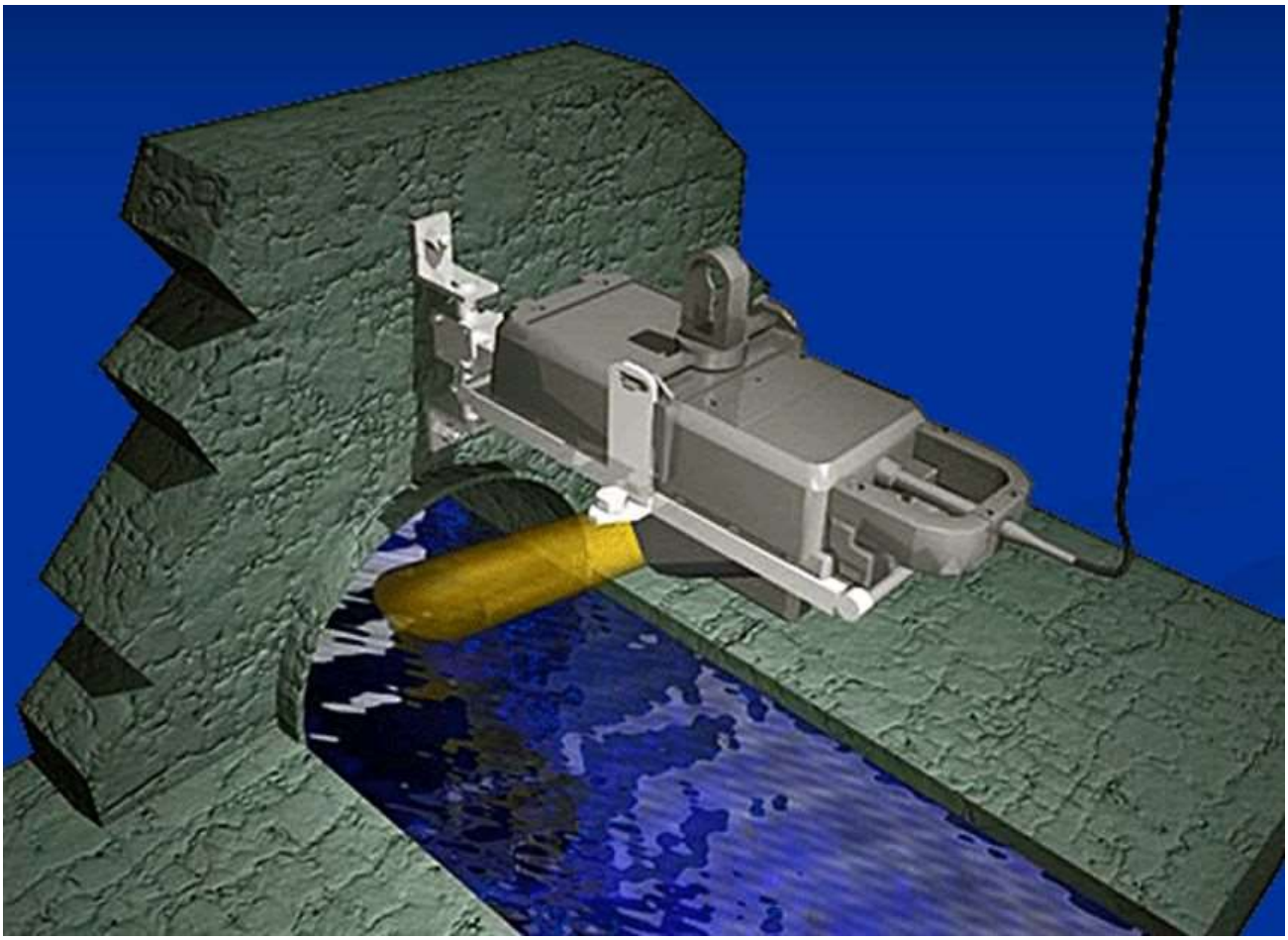


Figure above: US^3 utilizes exclusively Hach March-McBirney Flo-Dar® Meters

US³ Company Information

US³ is a California Corporation **Federal ID No. 33-0729605** and qualifies as a Minority Business Enterprise. US³ has certified as an MBE with the California Public Utility Commission's authorized clearinghouse, **Verification Number: 97ES0008.**

US³ is a specialty service company for the Water & Waste Water industry, providing monitoring and control for Utilities since 1996. US³ is in the forefront of this industry by taking the proven technological approaches developed in other high-tech industries and applying them to protect one of our most precious natural resources - our water.

US³ engineers and technical personnel have applied advanced instrumentation system technology to water/wastewater open channel flow monitoring, pipeline evaluation, engineering, and data analysis, all coupled to the power of the Internet. This unique integrated systems approach allows the company to bring greater insight and intelligence to gathering information about water/wastewater system performance of our clients, and in turn, to support the fulfillment of their commitments to manage and cost effectively design, operate, and maintain these systems.

Moreover, ***US³*** supports Municipalities, Consulting Engineering firms and other water/waste water systems integrators by providing temporary technical services for engineering, software programming and technical site maintenance and calibration site support work, primarily in the Water and Waste Water industries.



Figure at right: All US³ technicians are certified for Confined Space Entry.

Key Personnel Assigned

US³ provided the necessary resources to fully implement this project. Primary in support of this effort were the following personnel:

Mr. Mark Serres: Mr. Serres is a degreed electrical engineer with over 25 years of experience with fresh/wastewater systems, project management, and systems integration in relation to complex industrial systems. This includes experience in industrial automation and water/wastewater industries. Mr. Serres is responsible for assuring client satisfaction and marshalling the required resources to meet the project requirements.

Mr. Thomas Williams: Mr. Williams is an Engineering Manager with over 20 years of experience in complex systems development for wastewater monitoring. This experience includes hydraulic compatibility, instrumentation, communications and analysis. Mr. Williams is responsible for assuring that the required equipment is designed and calibrated to meet the project requirements.

Darlene Szczublewski, PE: Mrs. Szczublewski is a licensed Civil Engineer in multiple states. She has over 15 years of engineering experience with stormwater/wastewater related projects. She assisted in the completion of several Sanitary Sewer Evaluation Surveys and Capacity Analysis projects to meet Consent Decrees as well as completing numerous Infiltration and Inflow (I&I) studies for other clients. Mrs. Szczublewski has developed numerous flow data analysis techniques to present a clear informative picture of flow in a monitored system. Her work also includes the development of training programs for clients describing I&I and capacity analysis methodologies. Mrs. Szczublewski is responsible for analyzing the data as well as the data collection process and assuring that the reports meet the project requirements.

Name, title, address and telephone number of persons to contact regarding this US³ project.

Darlene Szczublewski, PE
Senior Civil Engineer
darlene.szczublewski@uscubed.com

9314 Bond Av, Suite A
El Cajon, CA 92021
619-546-4281 (work)
619-246-5304 (cell)

Tom Williams
Engineering Manager
tom.williams@uscubed.com

9314 Bond Av, Suite A
El Cajon, CA 92021
619-546-4281 (work)
619-398-7799 (cell)

Site Report 4/26/2022

Confidential Proprietary Information

Hunsaker & Associates

2022.04 Site 1 Madrona Av MH

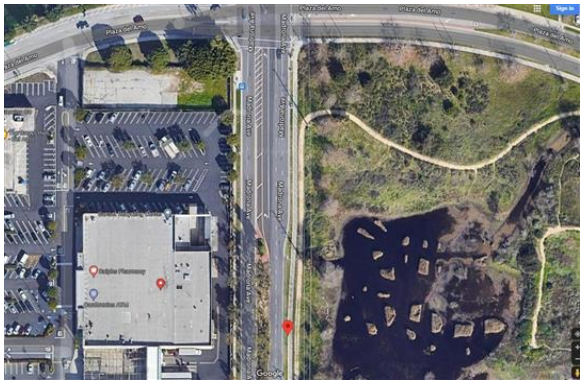
MH at ~3455 Sepulveda Blvd
Torrance, CA 90503
MH # unknown

Access:
4th MH N of Sepulveda on east sidewalk of Madrona, east of address

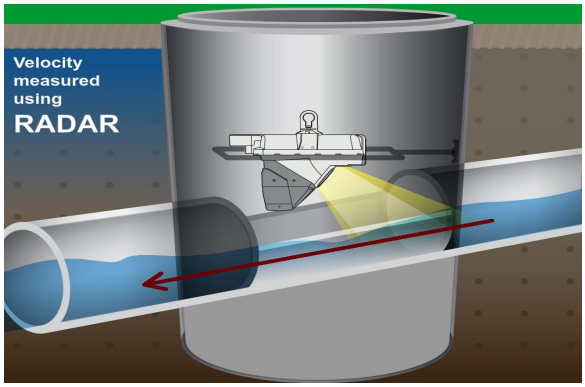
System Type:
Sanitary [X] Storm [ ]

Install Date: 4/07/2022

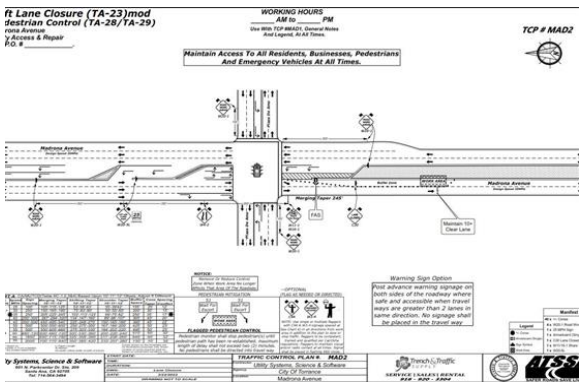
Map



Technology



Traffic Plan



Flow Meter			
Meter Depth: 103"			
MH Coordinates: 33.827870, -118.344882			
Slow to moderate open channel hydraulics with some normal system solids observed in trough			
Avg Velocity	Avg Measured Level		Multiplier
0.8 fps	0.3"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.			
Traffic Safety			
Used cones & signs in accord with site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	118"
Monitored Pipe Size	10"
Inner Pipe Size (In/Out)	10"/10"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	14.9"
Sensor Dist. to Crown	4.9"
Sensor Direction	Upstream
Flow Heading	South

Meter Site Document

2022.04 Site 1 Madrona Av MH

MH at ~3455 Sepulveda Blvd

Torrance, CA 90503

Site



Manhole Before Install



Installation Process



Installed



Upstream



Upstream Pipe Size



Temporary Flow Study

Hunsaker & Associates

2022.04 Site 1 Madrona Av MH

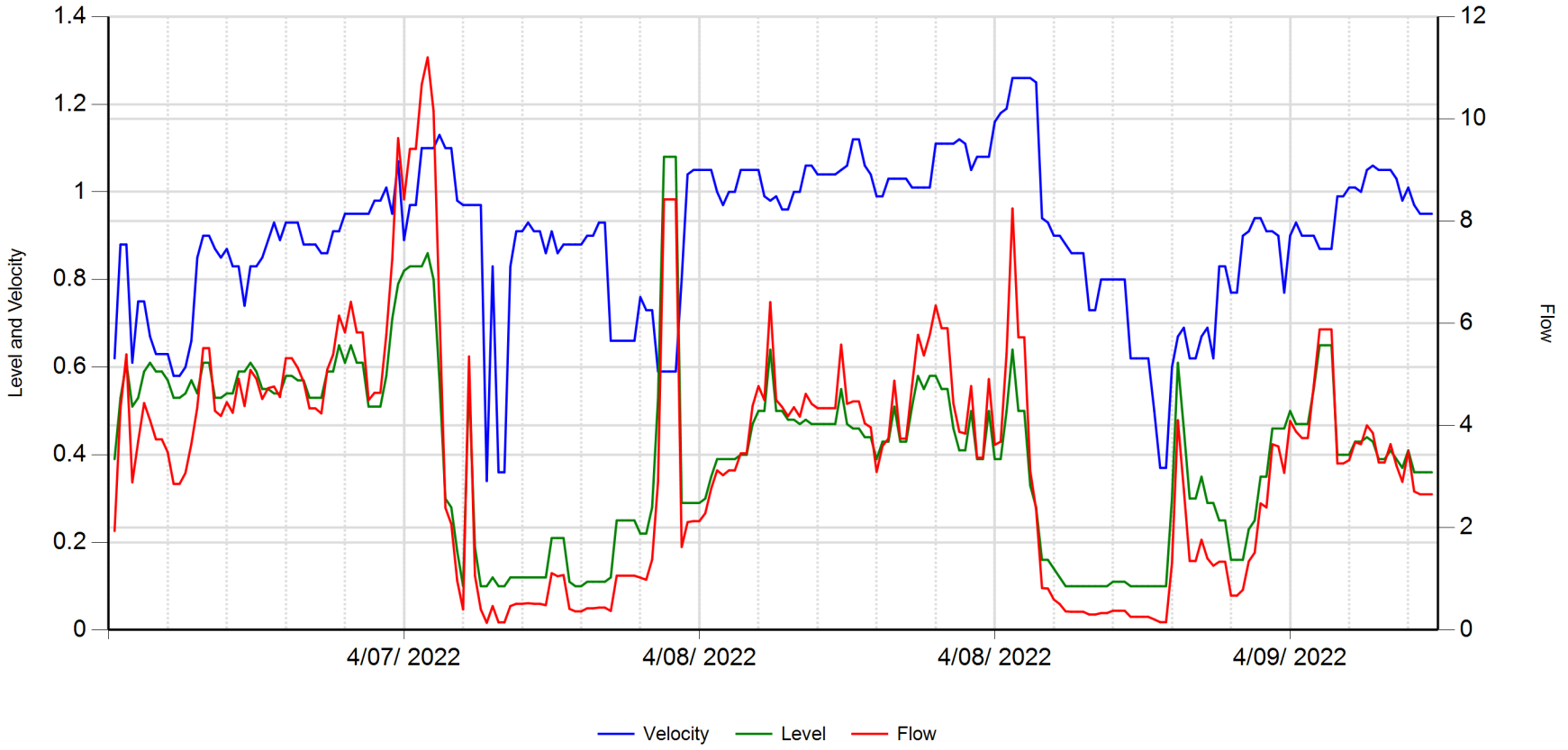
Meter Start Date		From	4/7/2022
Meter Stop Date		To	4/22/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	0.827	0.324	0.004
Maximum	2.310	1.080	0.020
Minimum	0.000	0.000	0.000
Pipe Size		10.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

9314 Bond Av, Suite A
El Cajon, CA 92021

601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

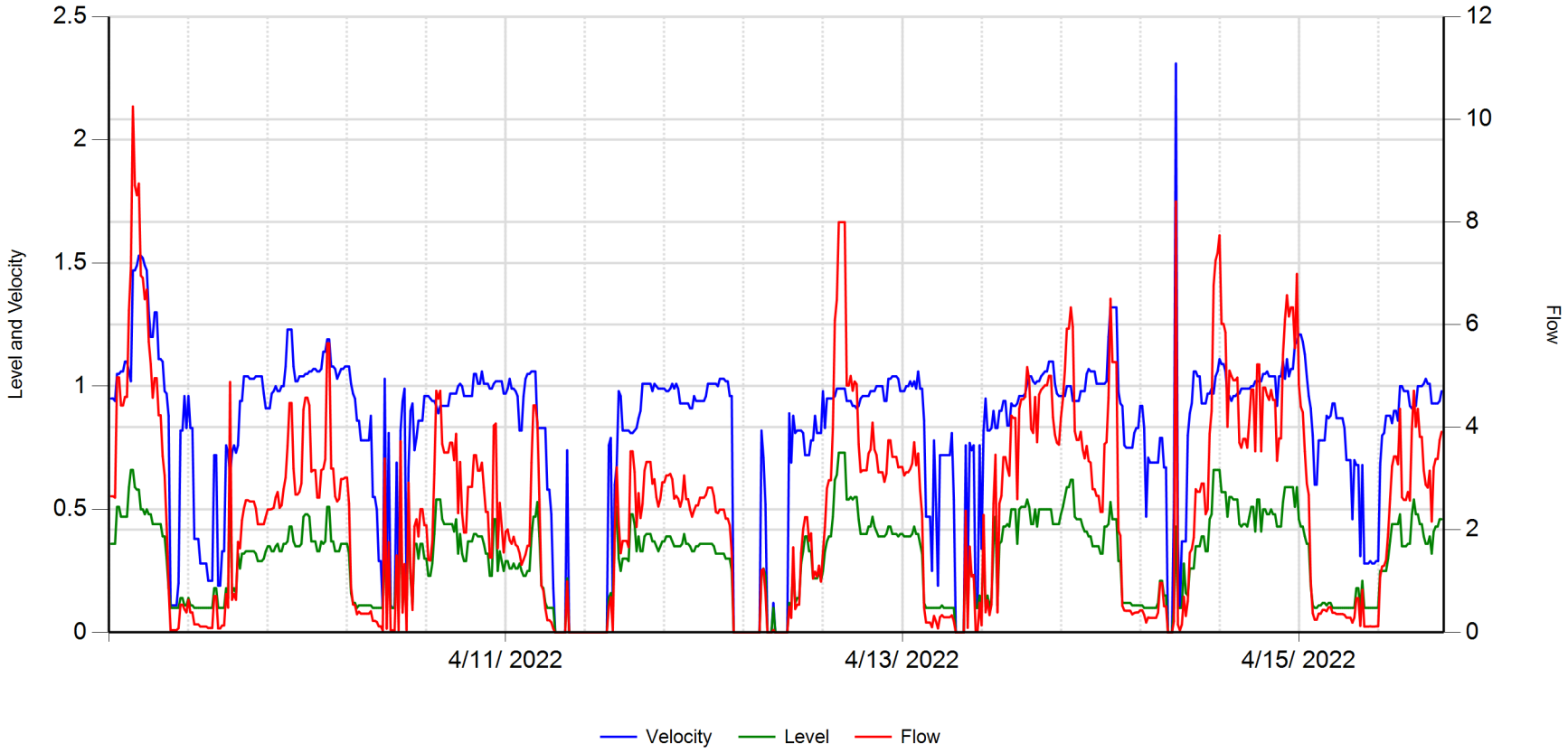
2022.04 Site 1 Madrona Av MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.898	0.406	3.358	**RainFall**	Inches
Maximum	1.260	1.080	11.204		
Minimum	0.340	0.100	0.141		

4/25/2022

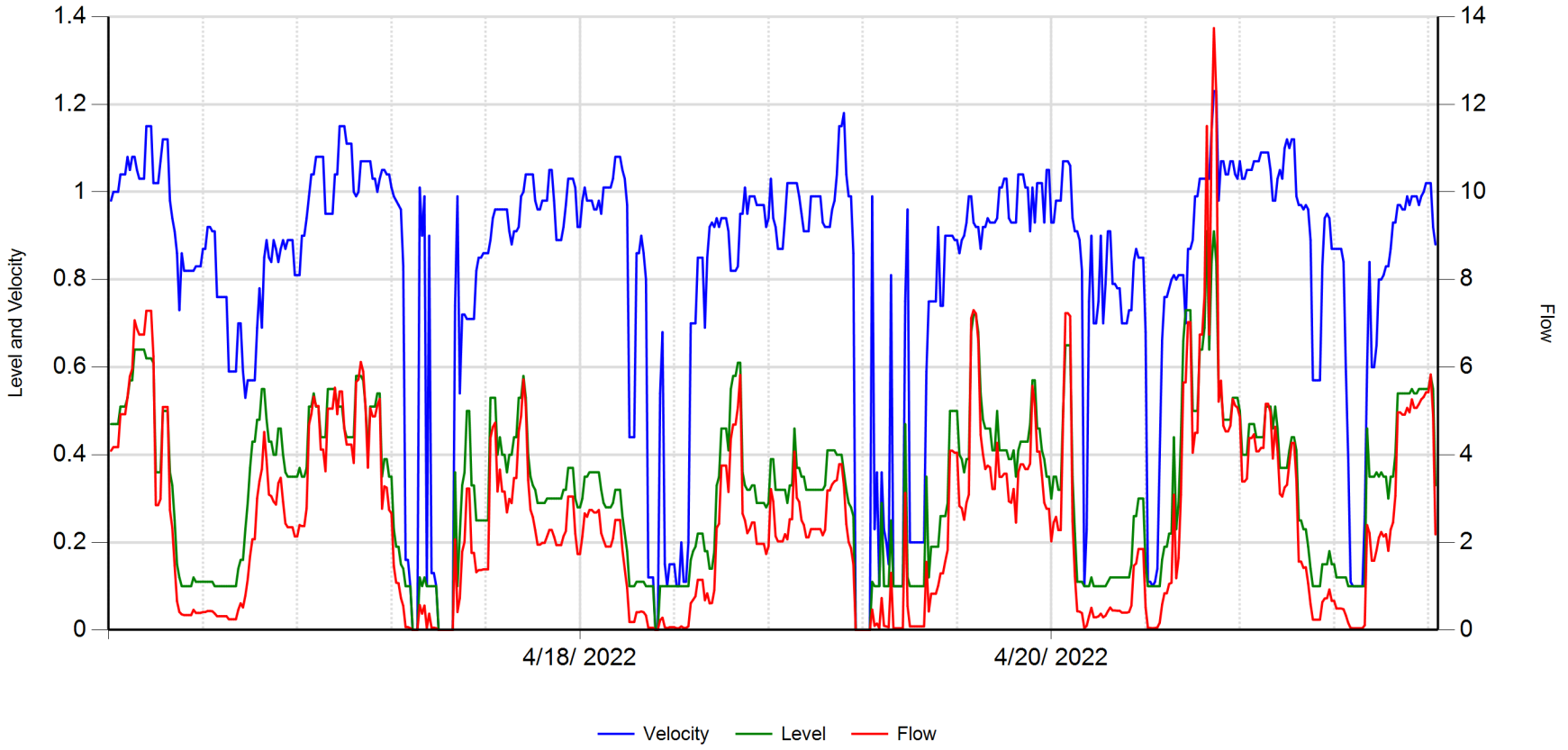
2022.04 Site 1 Madrona Av MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.810	0.298	2.368	**RainFall**	Inches
Maximum	2.310	0.730	10.251		
Minimum	0.000	0.000	0.000		

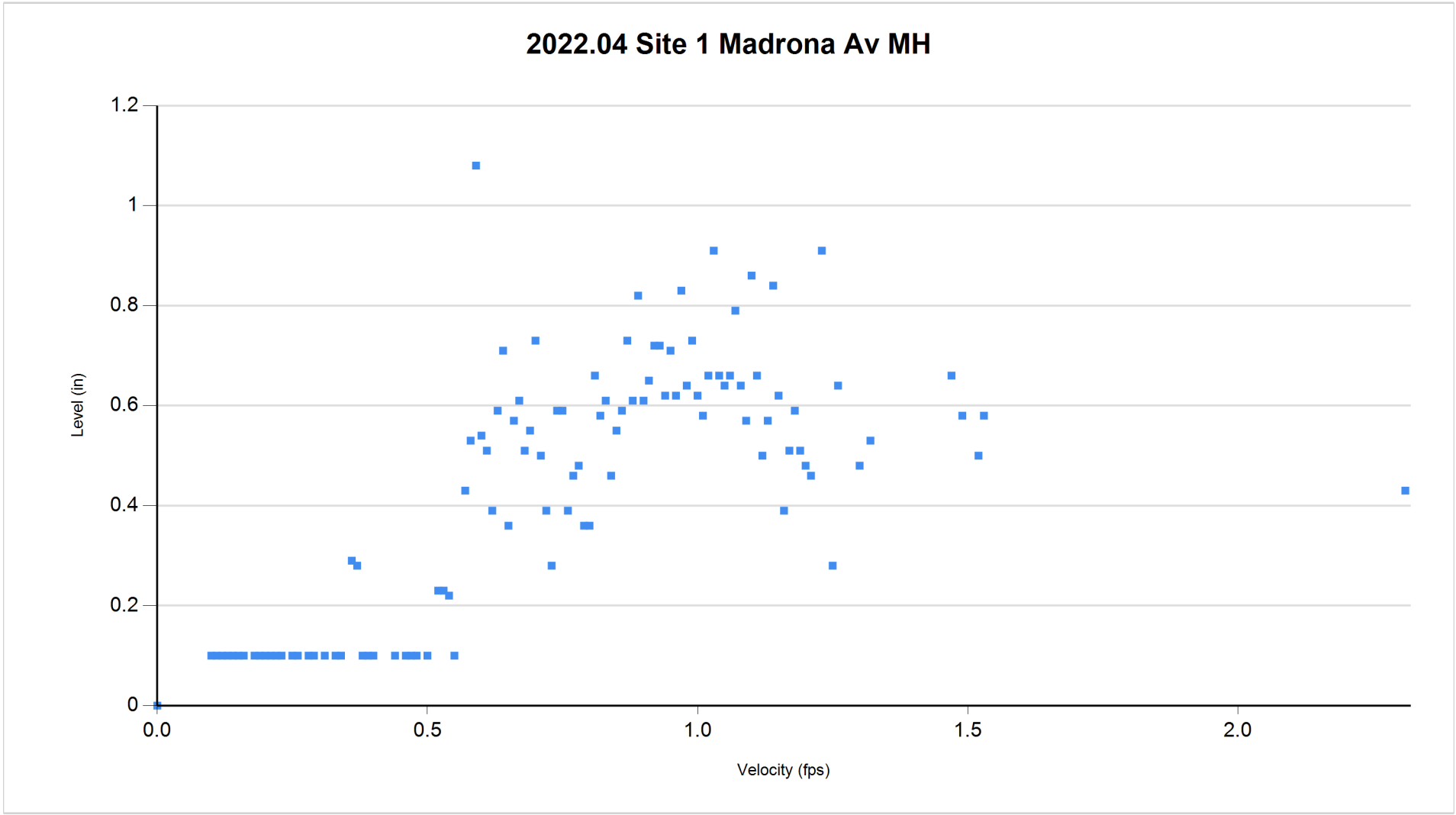
4/25/2022

2022.04 Site 1 Madrona Av MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.813	0.320	2.504	**RainFall**	Inches
Maximum	1.230	0.910	13.738		
Minimum	0.000	0.000	0.000		

4/25/2022



4/7/2022 thru 4/22/2022

4/25/2022 1:23:14 PM

Site Report 4/26/2022

Confidential Proprietary Information

Hunsaker & Associates

2022.04 Site 2 Sepulveda MH

MH at ~3323 Sepulveda Blvd
Torrance, CA 90505
MH # unknown

Access:
MH in westbound curb lane, SW of address

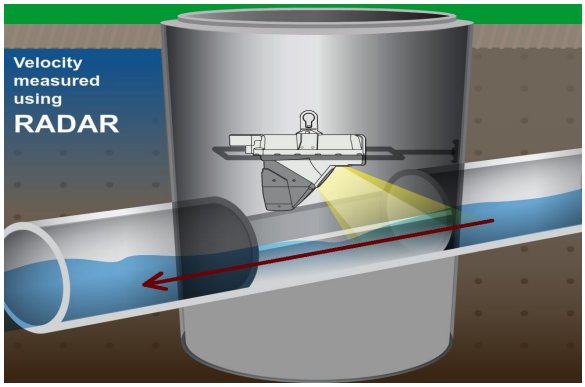
System Type:
Sanitary [X] Storm [ ]

Install Date: 4/07/2022

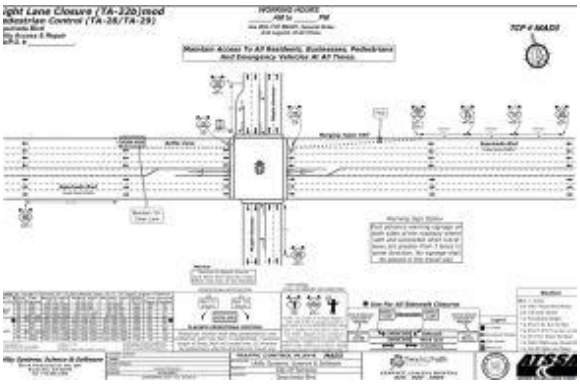
Map



Technology



Traffic Plan



Flow Meter			
Meter Depth: 180"			
MH Coordinates: 33.824510, -118.340839			
Slow to moderate open channel hydraulics with sediment in line			
Avg Velocity	Avg Measured Level		Multiplier
0.7 fps	6.0"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.			
Traffic Safety			
Used arrow board, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	197"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	1.5"
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	17.0"
Sensor Dist. to Crown	5.0"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.04 Site 2 Sepulveda MH

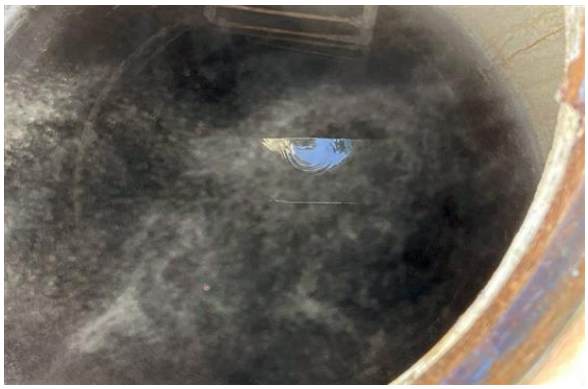
MH at ~3323 Sepulveda Blvd

Torrance, CA 90505

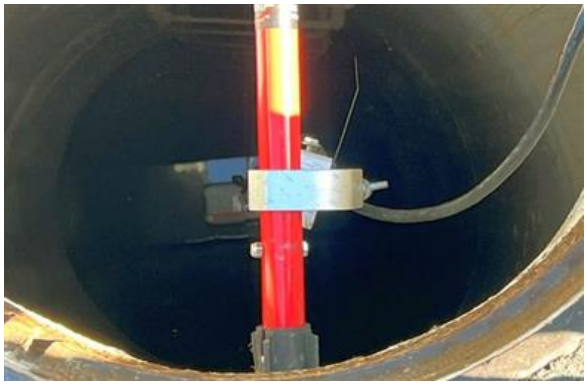
Site



Manhole Before Install



Installation Process



Installed



Upstream



Upstream Pipe Size



Temporary Flow Study

Hunsaker & Associates

2022.04 Site 2 Sepulveda MH

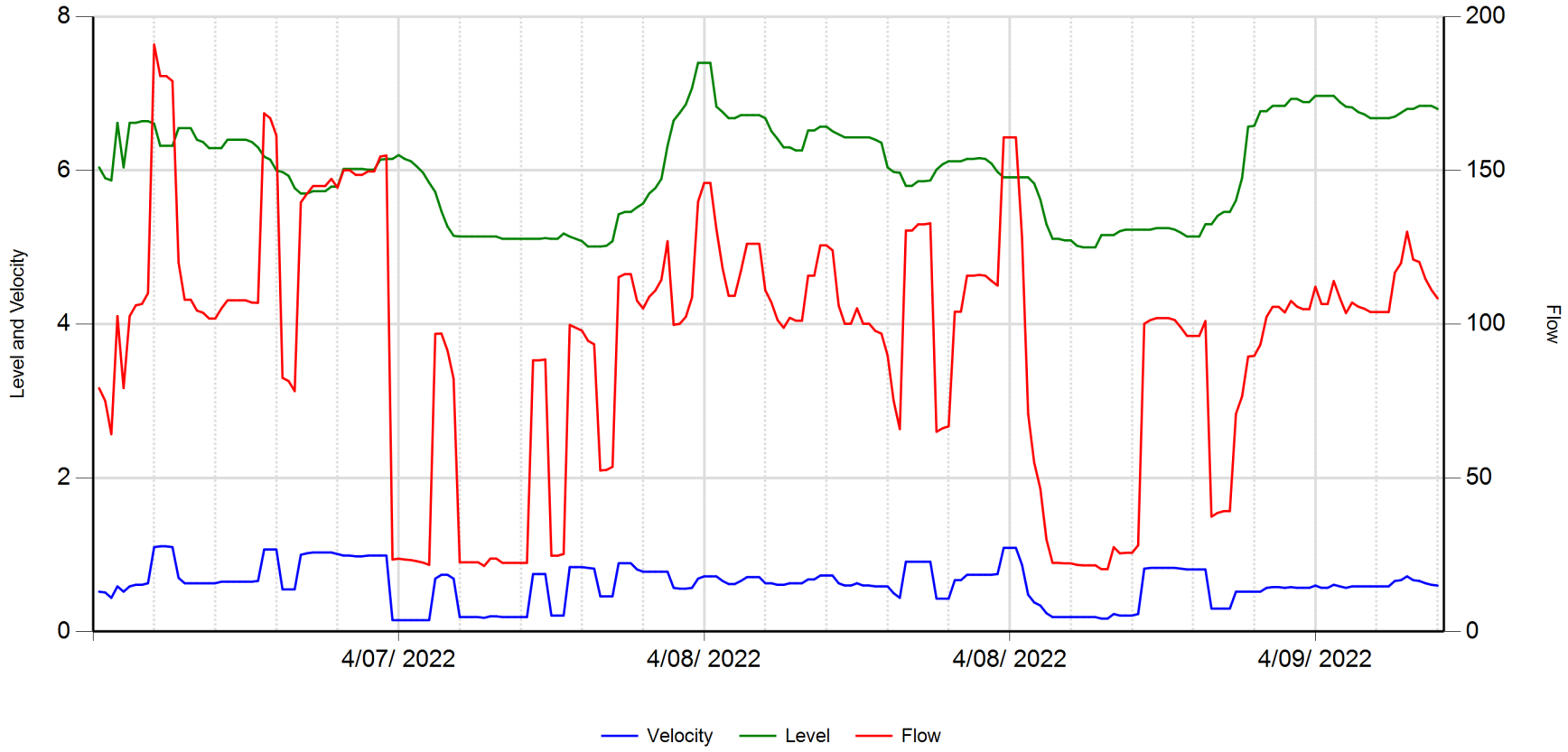
Meter Start Date		From	4/7/2022
Meter Stop Date		To	4/22/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	0.680	5.963	0.149
Maximum	1.660	7.400	0.378
Minimum	0.100	4.730	0.016
Pipe Size		12.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

9314 Bond Av, Suite A
El Cajon, CA 92021

601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

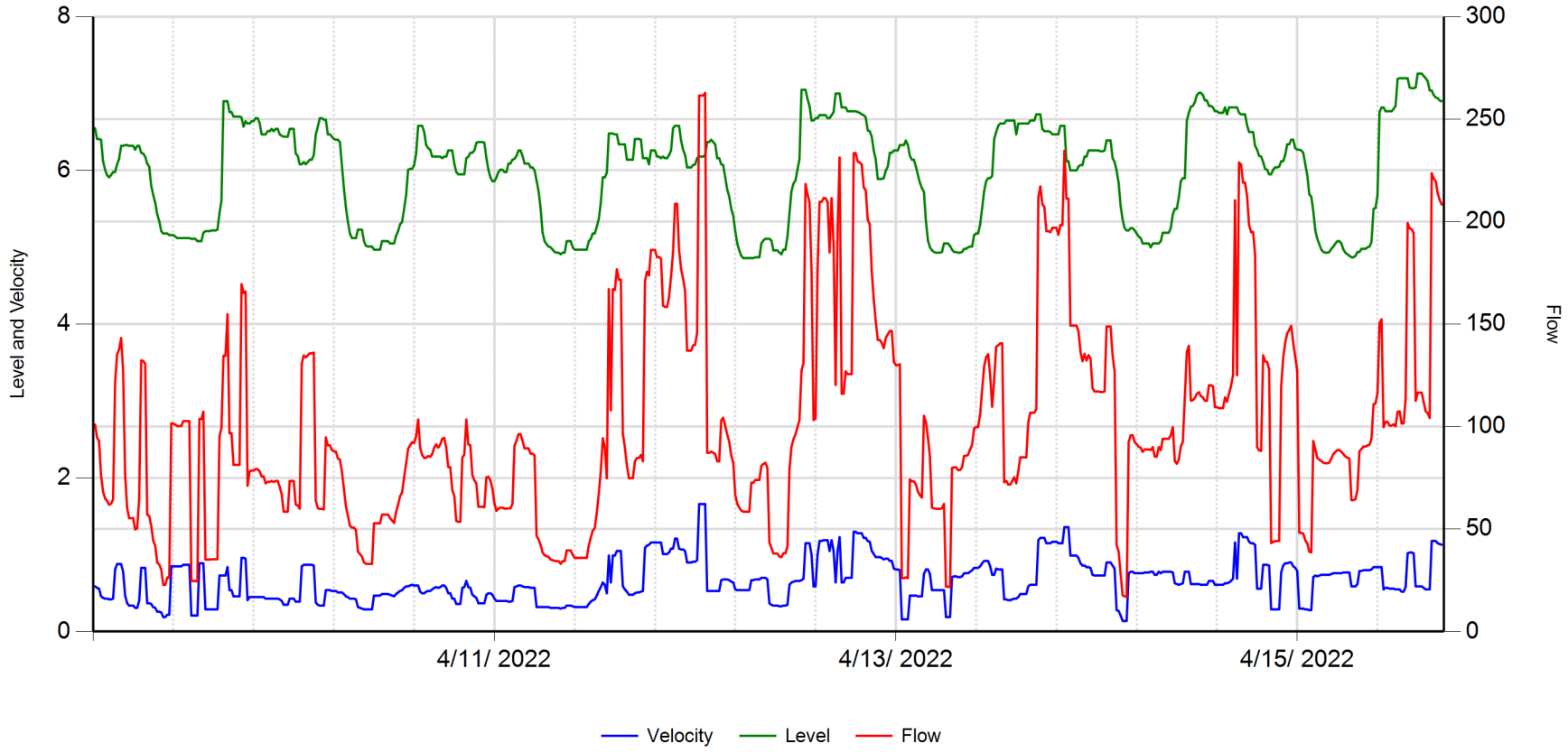
2022.04 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.613	6.011	94.275	**RainFall**	Inches
Maximum	1.110	7.400	190.958		
Minimum	0.150	5.000	20.316		

4/25/2022

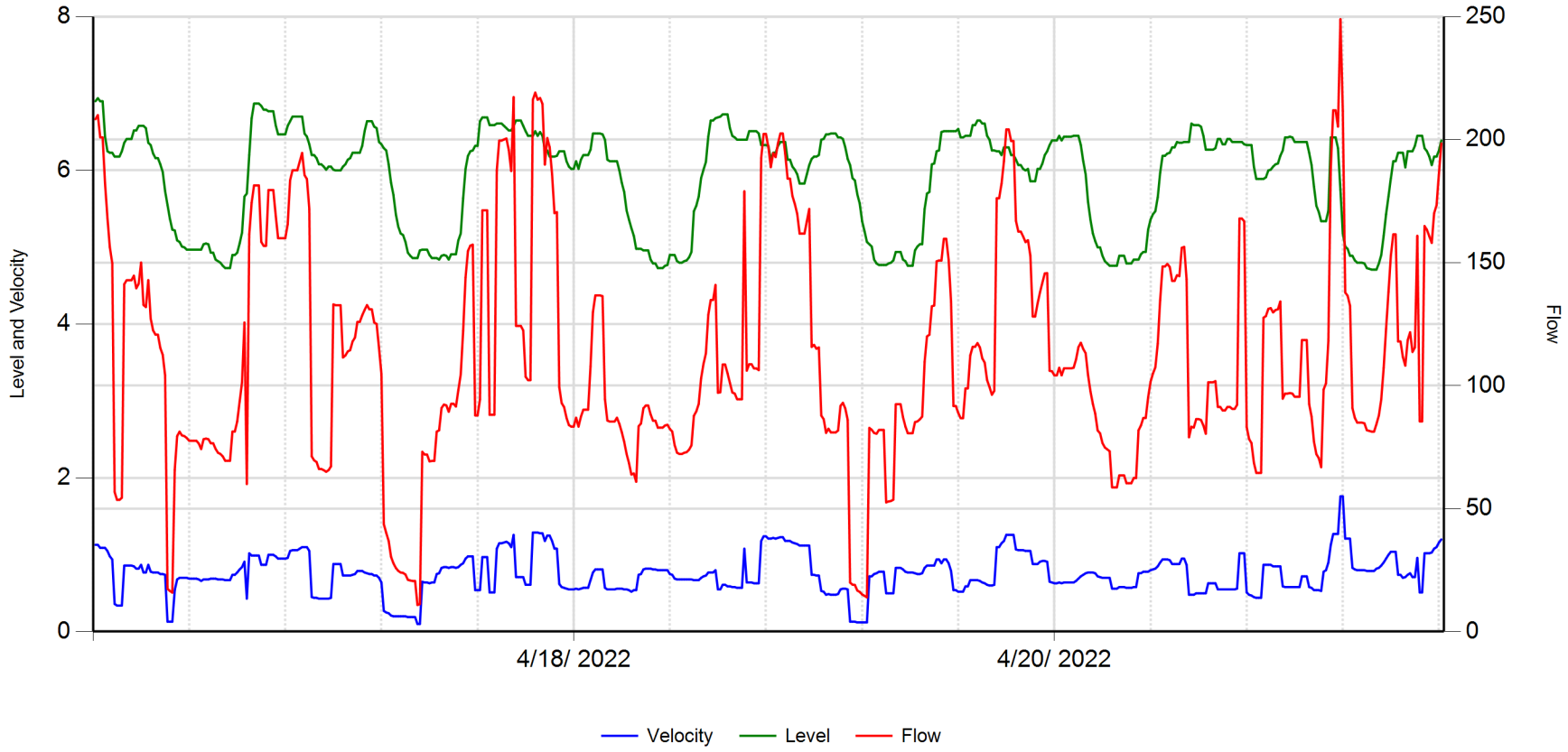
2022.04 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.660	5.974	100.854	**RainFall**	Inches
Maximum	1.660	7.260	262.780		
Minimum	0.140	4.860	17.042		

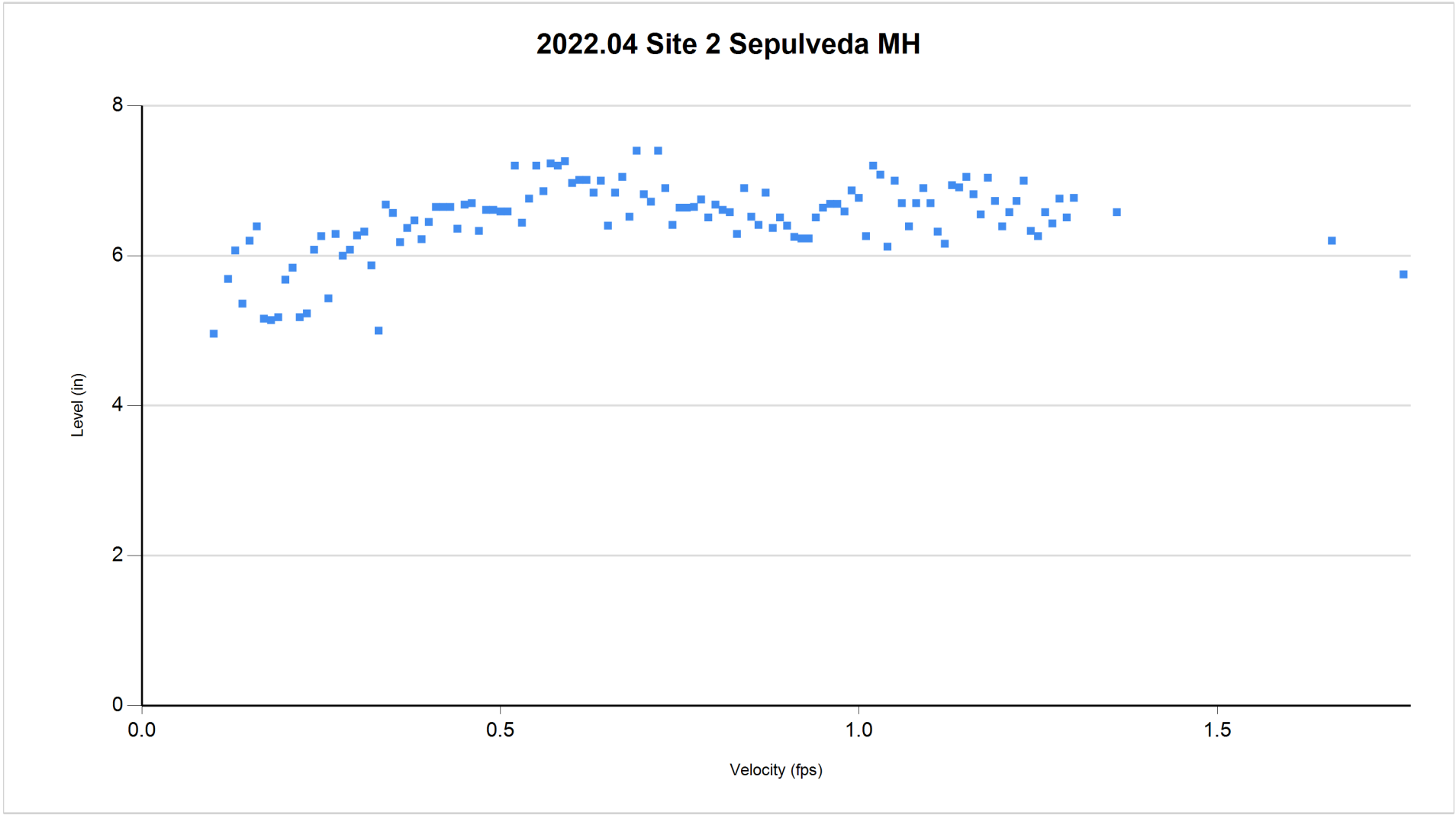
4/25/2022

2022.04 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.754	5.902	112.163	**RainFall**	Inches
Maximum	1.760	6.940	248.994		
Minimum	0.100	4.710	10.844		

4/25/2022



4/7/2022 thru 4/22/2022

4/25/2022 1:22:25 PM

Site Report 4/26/2022

Confidential Proprietary Information

Hunsaker & Associates

2022.04 Site 3 235th St MH

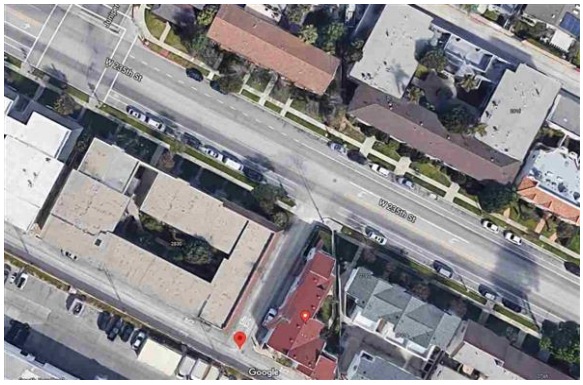
MH at ~2818 W. 235th St
Torrance, CA 90505
MH # unknown

Access:
MH in center of alley intersection, SW of address

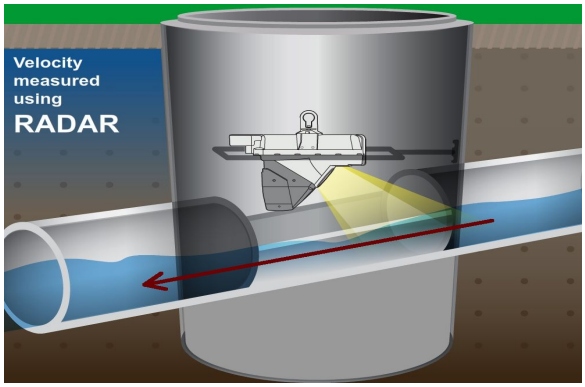
System Type:
Sanitary [X] Storm [ ]

Install Date: 4/07/2022

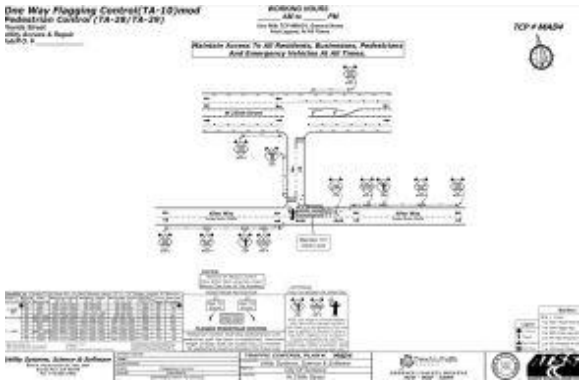
Map



Technology



Traffic Plan



Flow Meter			
Meter Depth: 295"			
MH Coordinates: 33.814518, -118.336471			
Moderate open channel hydraulics with bend in trough			
Avg Velocity	Avg Measured Level		Multiplier
2.2 fps	3.3"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.			
Traffic Safety			
Used flaggers, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	317"
Monitored Pipe Size	15"
Inner Pipe Size (In/Out)	15"/15"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Brick
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	22.2"
Sensor Dist. to Crown	7.2"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.04 Site 3 235th St MH

MH at ~2818 W. 235th St

Torrance, CA 90505

Site



Manhole Before Install



Installation Process



Installed



Temporary Flow Study

Hunsaker & Associates

2022.04 Site 3 235th St MH

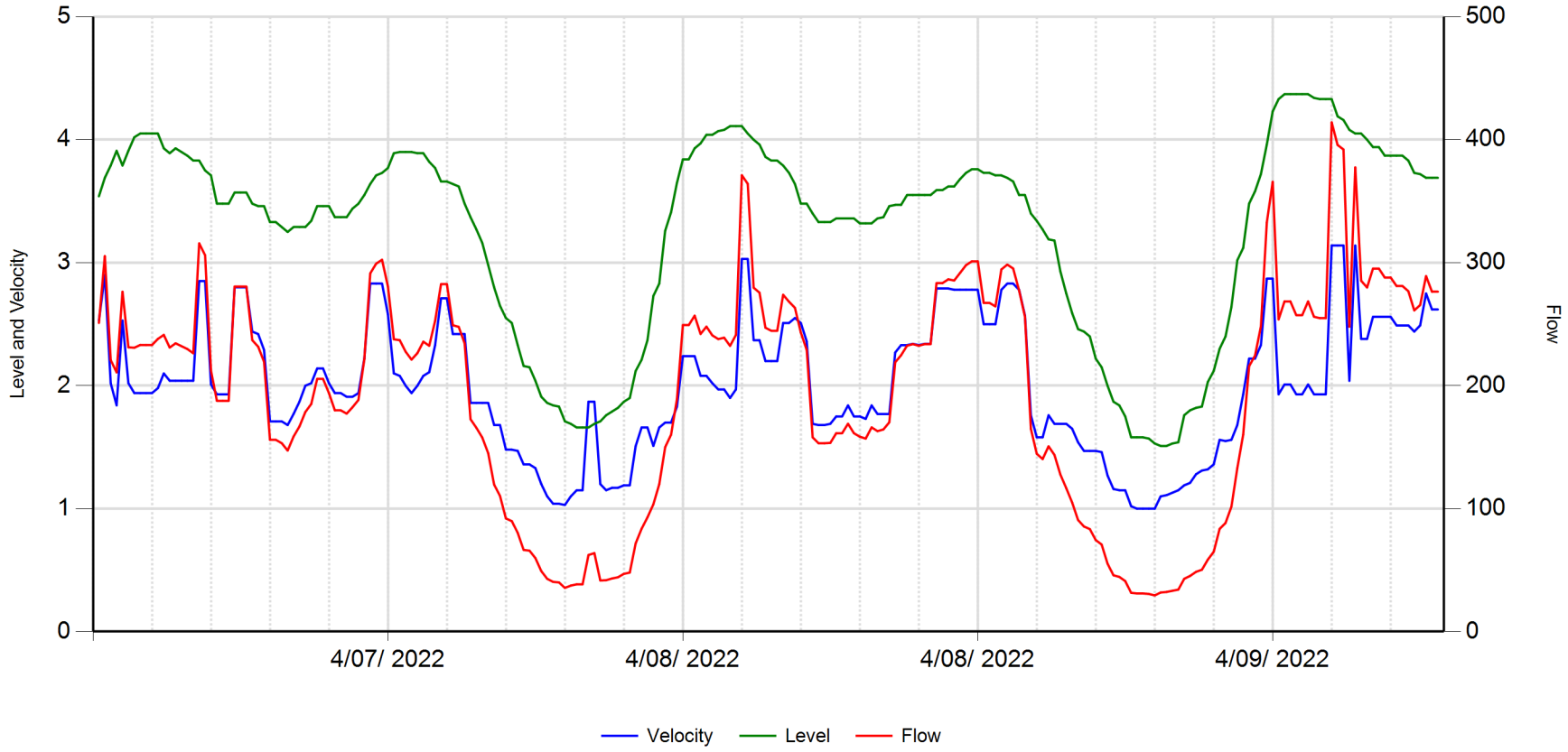
Meter Start Date		From	4/7/2022
Meter Stop Date		To	4/22/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	2.222	3.256	0.315
Maximum	3.220	4.410	0.607
Minimum	0.940	1.460	0.040
Pipe Size		15.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

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Santa Ana, CA 92705

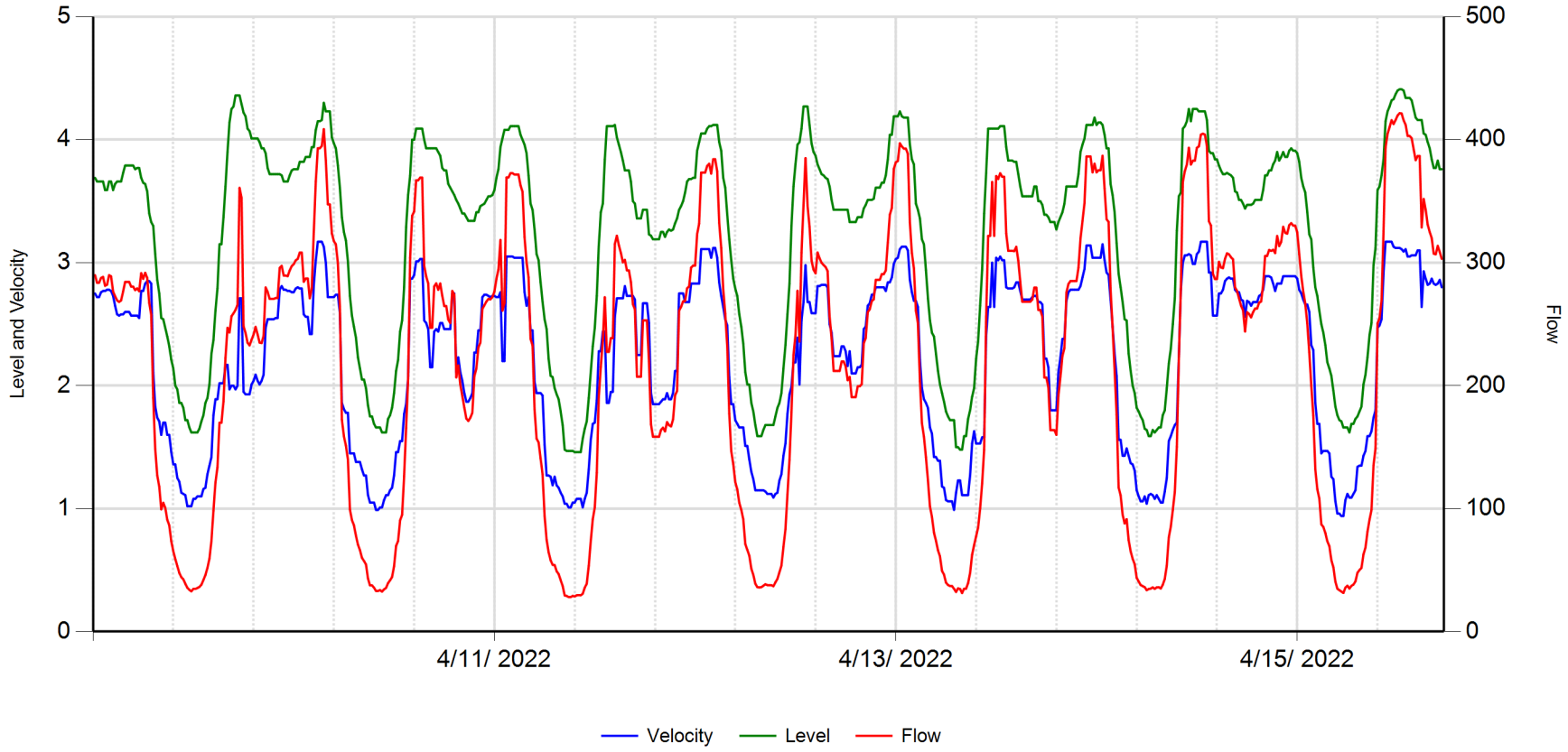
2022.04 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.000	3.266	192.419	**RainFall**	Inches
Maximum	3.140	4.370	414.117		
Minimum	1.000	1.510	29.498		

4/25/2022

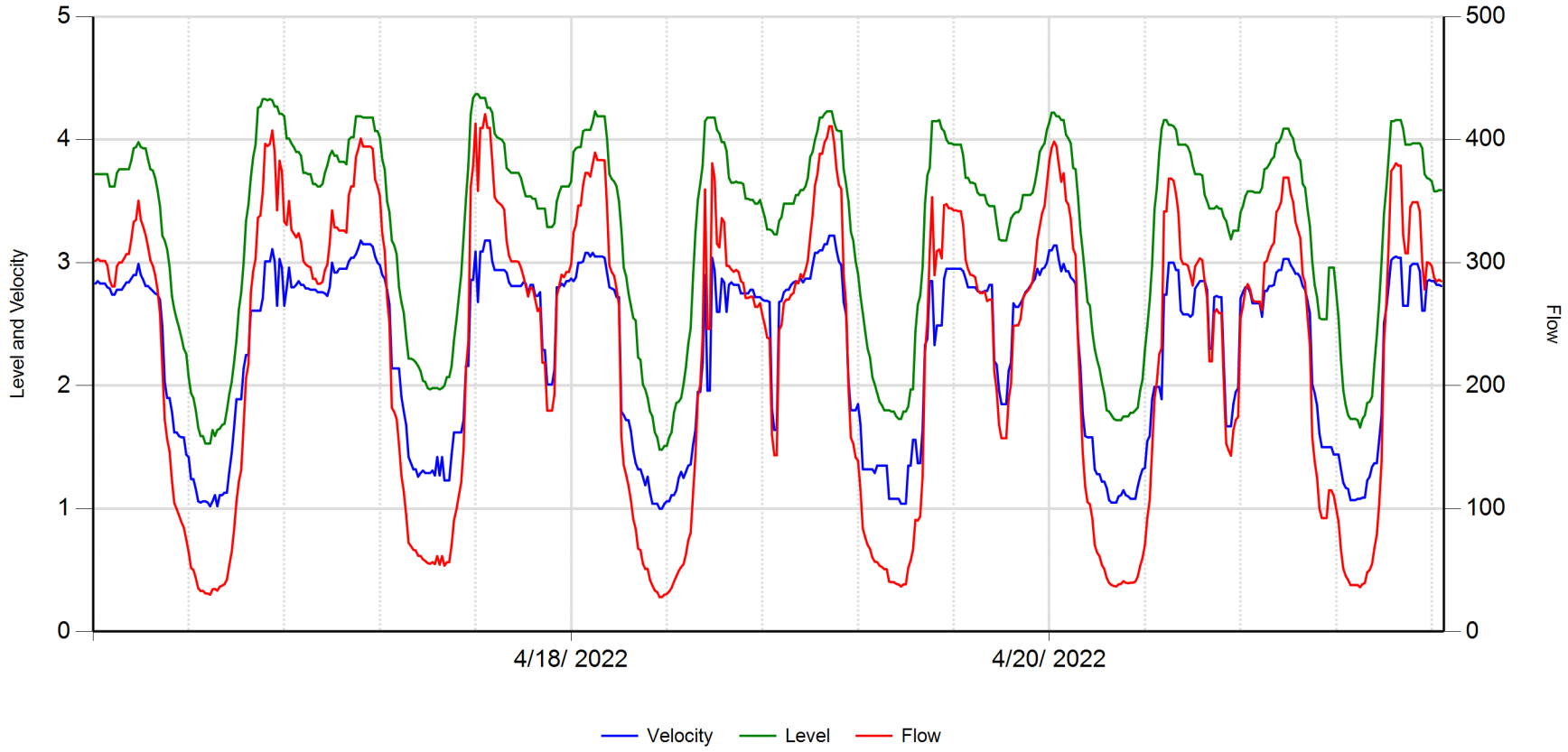
2022.04 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.219	3.227	217.366	**RainFall**	Inches
Maximum	3.170	4.410	421.530		
Minimum	0.940	1.460	28.147		

4/25/2022

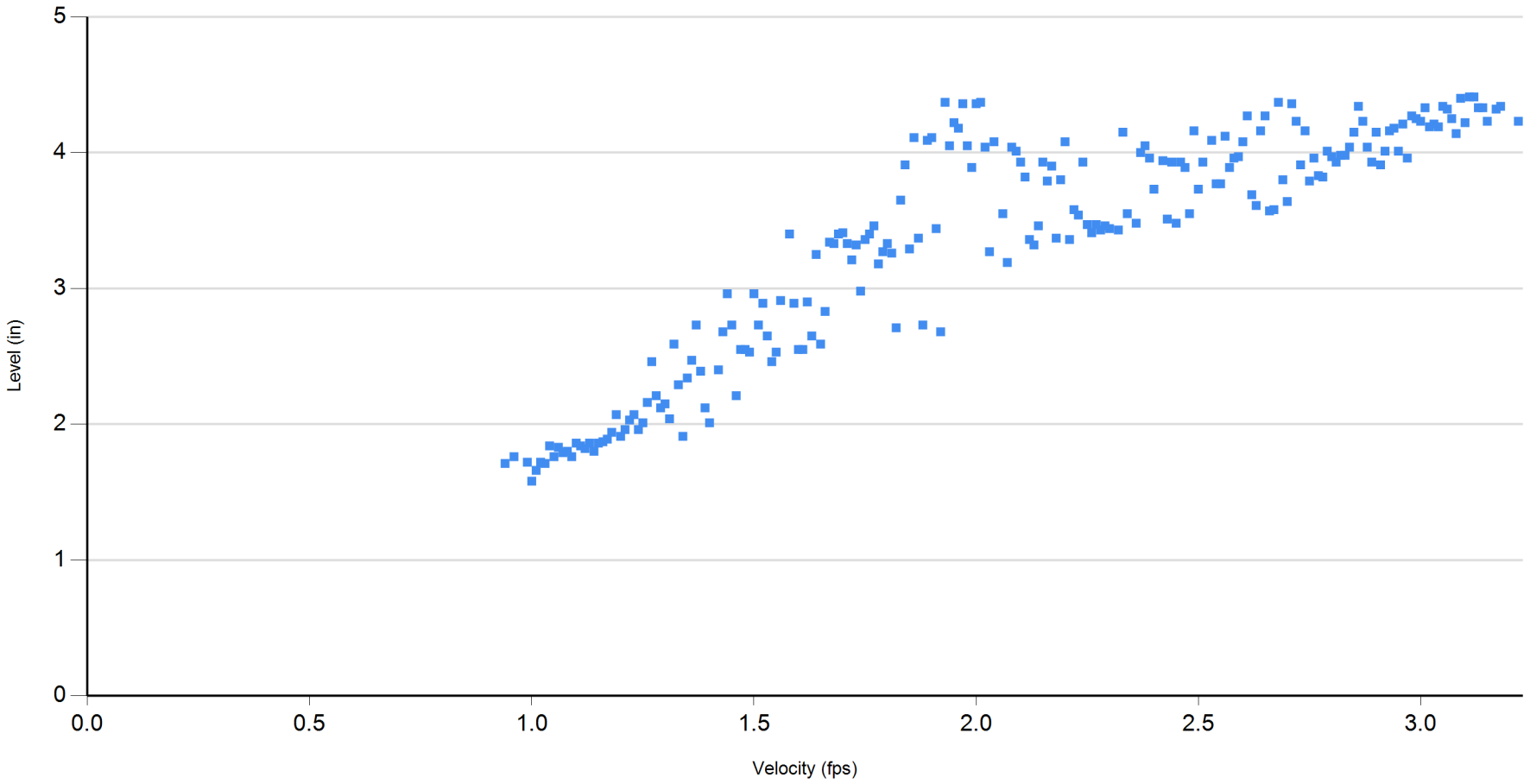
2022.04 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.298	3.263	227.813	**RainFall**	Inches
Maximum	3.220	4.370	420.814		
Minimum	1.000	1.480	28.108		

4/25/2022

2022.04 Site 3 235th St MH



4/7/2022 thru 4/22/2022

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Site Report 4/26/2022

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Hunsaker & Associates

2022.04 Site 4 Lomita Blvd MH

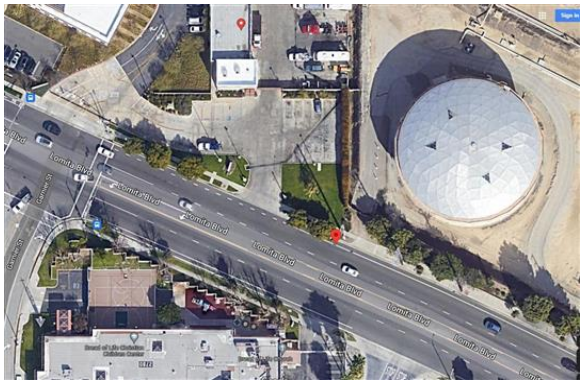
MH at ~2755 Lomita Blvd
Torrance, CA 90505
MH # unknown

Access:
MH in curb lane, south of address

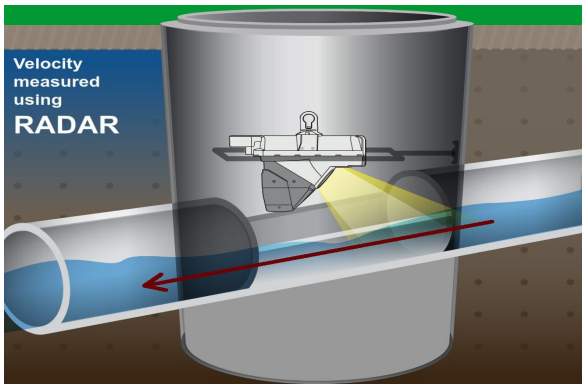
System Type:
Sanitary [X] Storm [ ]

Install Date: 4/07/2022

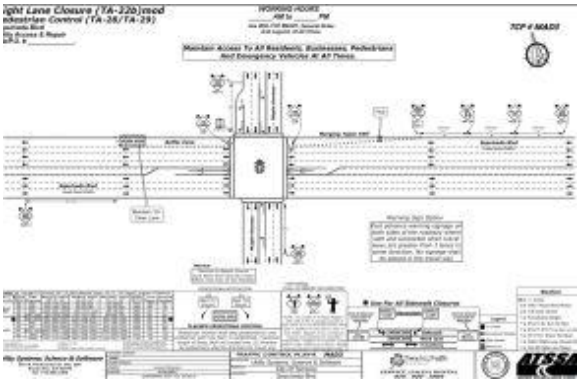
Map



Technology



Traffic Plan



Flow Meter			
Meter Depth: 321"			
MH Coordinates: 33.809563, -118.336242			
Moderate open channel hydraulics with some turbulence at confluence of flows			
Avg Velocity	Avg Measured Level		Multiplier
1.6 fps	4.1"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Inlets from north & west; monitored US N line to get total flow from original MH, which could not be accessed due to presence of parked vehicles.			
Traffic Safety			
Used arrow board, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	348"
Monitored Pipe Size	18"
Inner Pipe Size (In/Out)	18"/18"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	27.4"
Sensor Dist. to Crown	9.4"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.04 Site 4 Lomita Blvd MH

MH at ~2755 Lomita Blvd

Torrance, CA 90505

Site



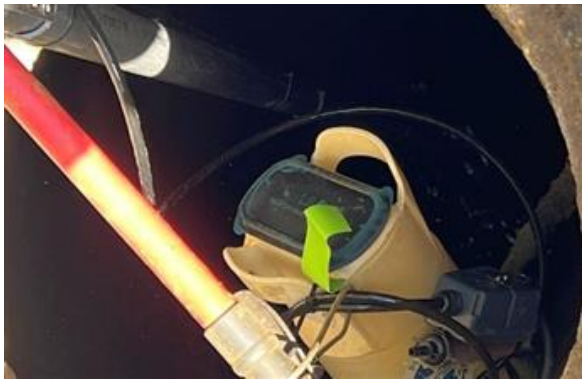
Manhole Before Install



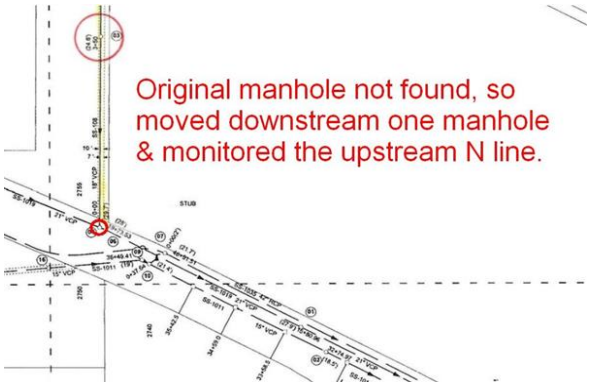
Installation Process



Installed



Moved DS One MH



Original MH Unaccessable



Temporary Flow Study

Hunsaker & Associates

2022.04 Site 4 Lomita Blvd MH

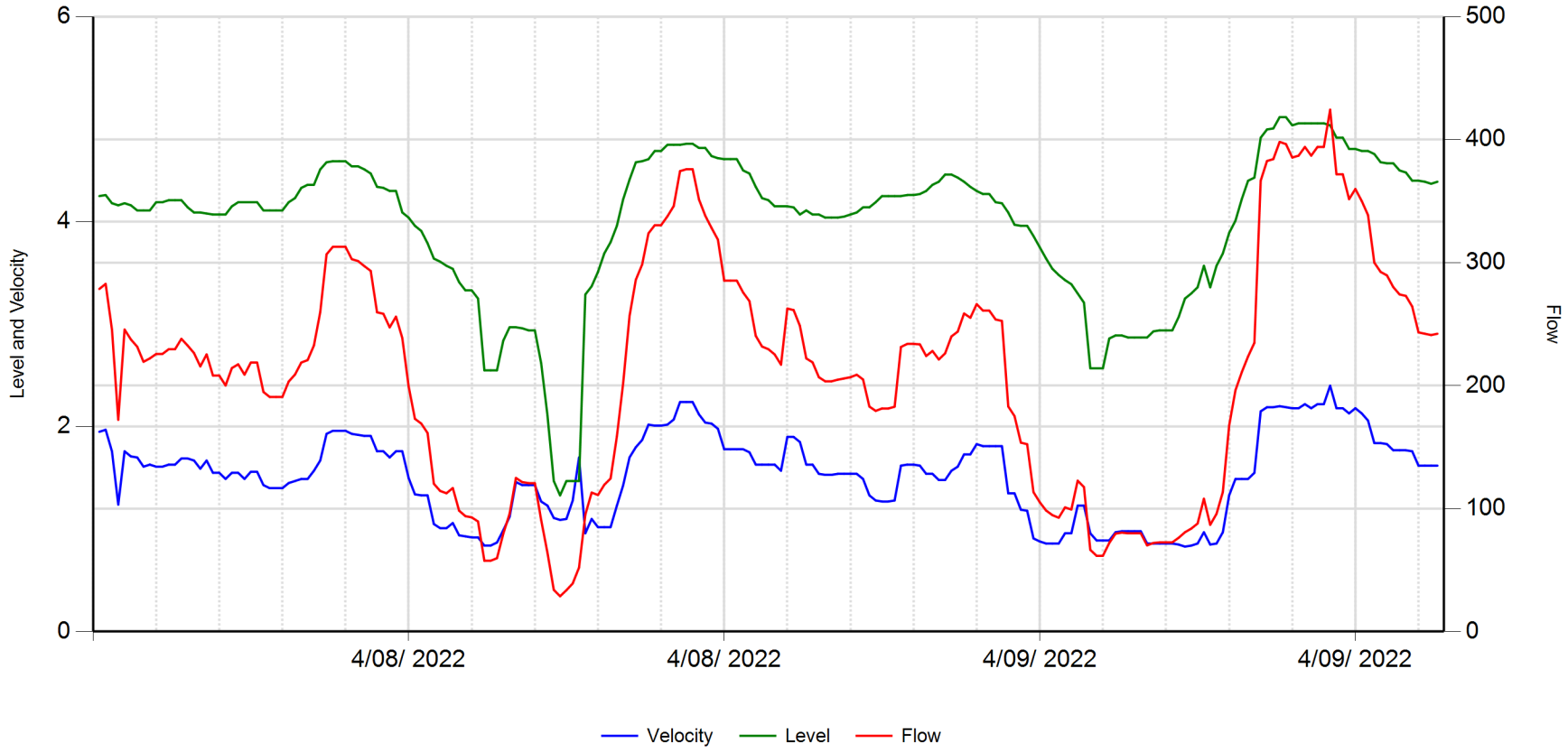
Meter Start Date		From	4/7/2022
Meter Stop Date		To	4/22/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	1.611	4.054	0.332
Maximum	2.550	5.040	0.626
Minimum	0.430	1.330	0.041
Pipe Size		18.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

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601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

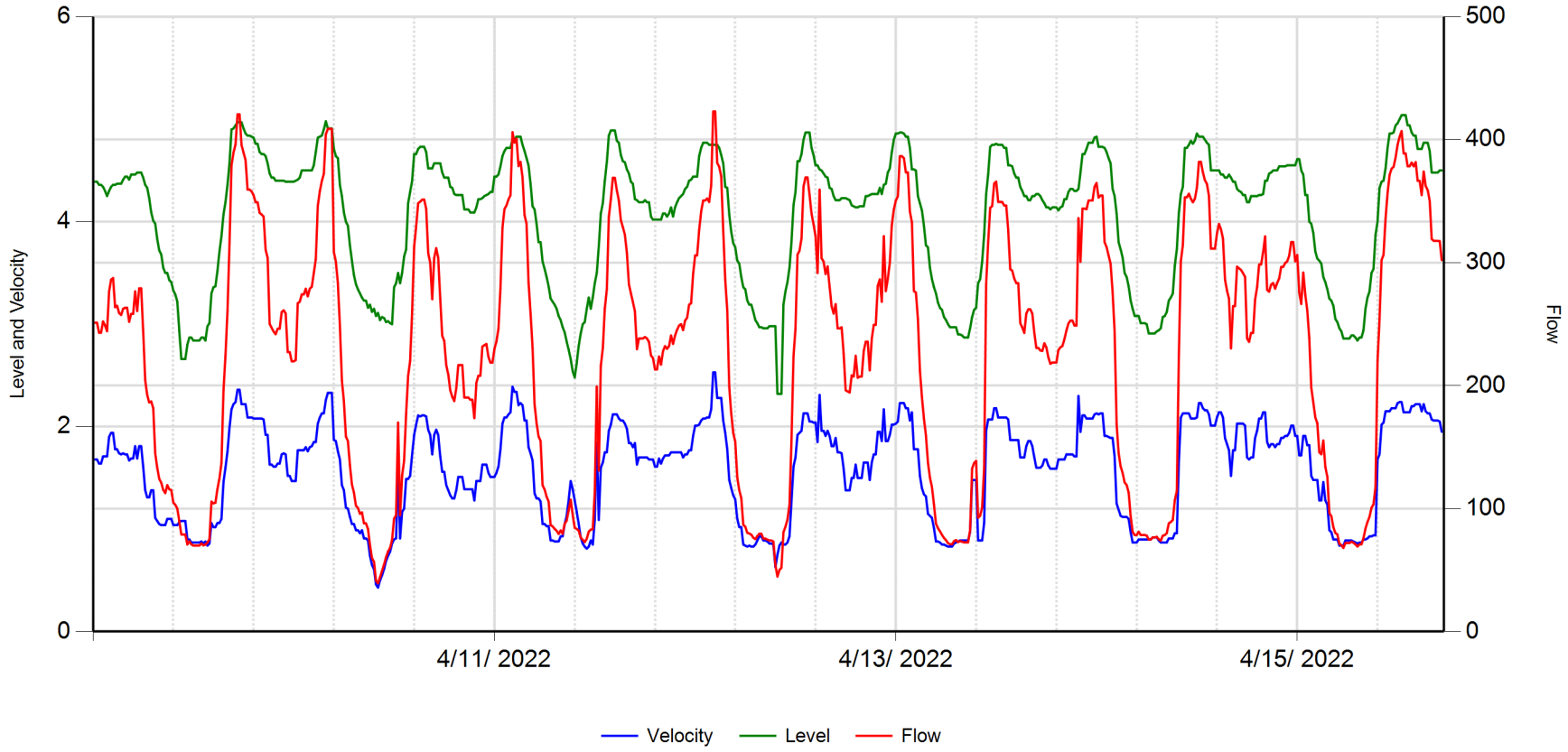
2022.04 Site 4 Lomita Blvd MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.523	3.984	210.956	**RainFall**	Inches
Maximum	2.400	5.020	424.405		
Minimum	0.830	1.330	28.816		

4/25/2022

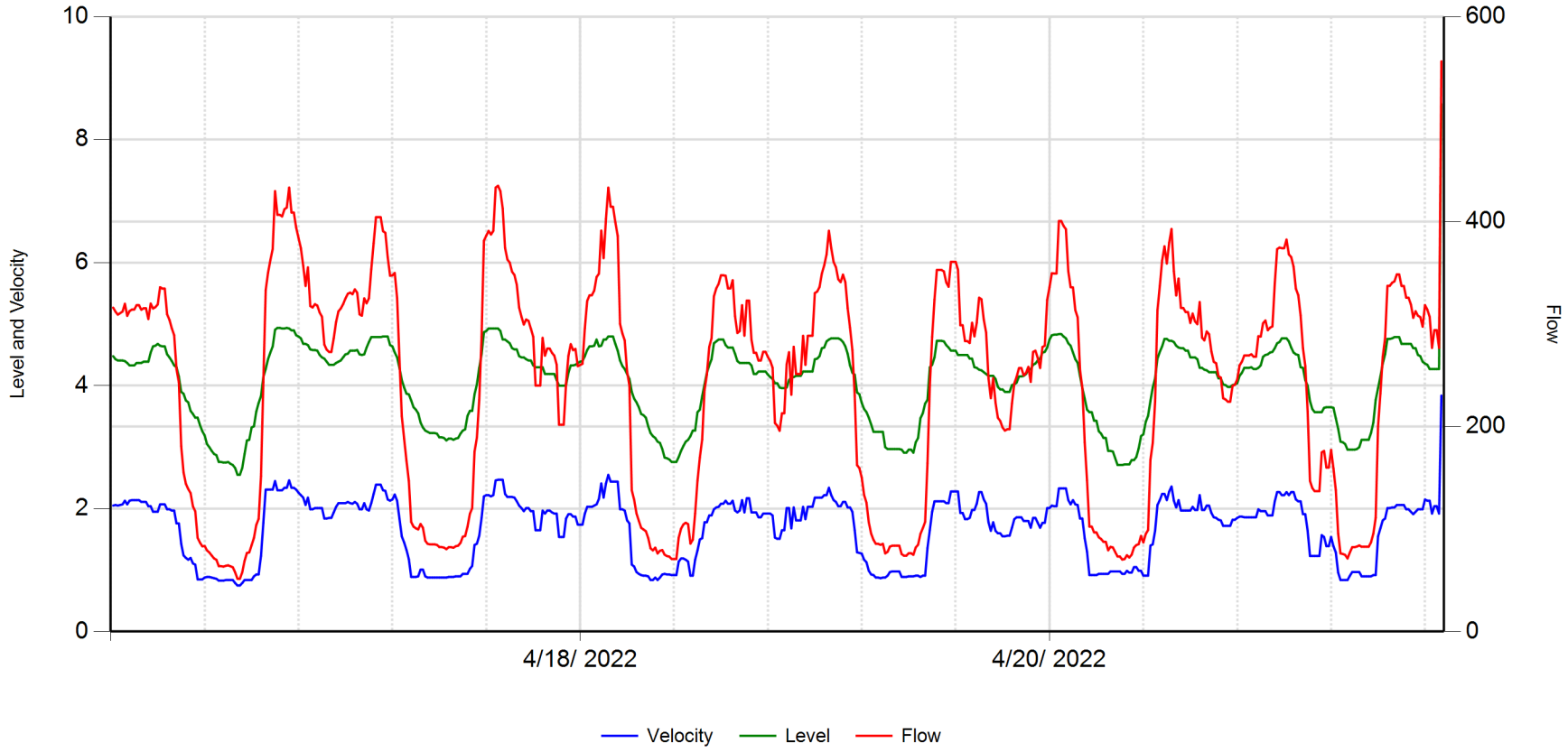
2022.04 Site 4 Lomita Blvd MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.577	4.062	226.399	**RainFall**	Inches
Maximum	2.530	5.040	422.918		
Minimum	0.430	2.320	39.355		

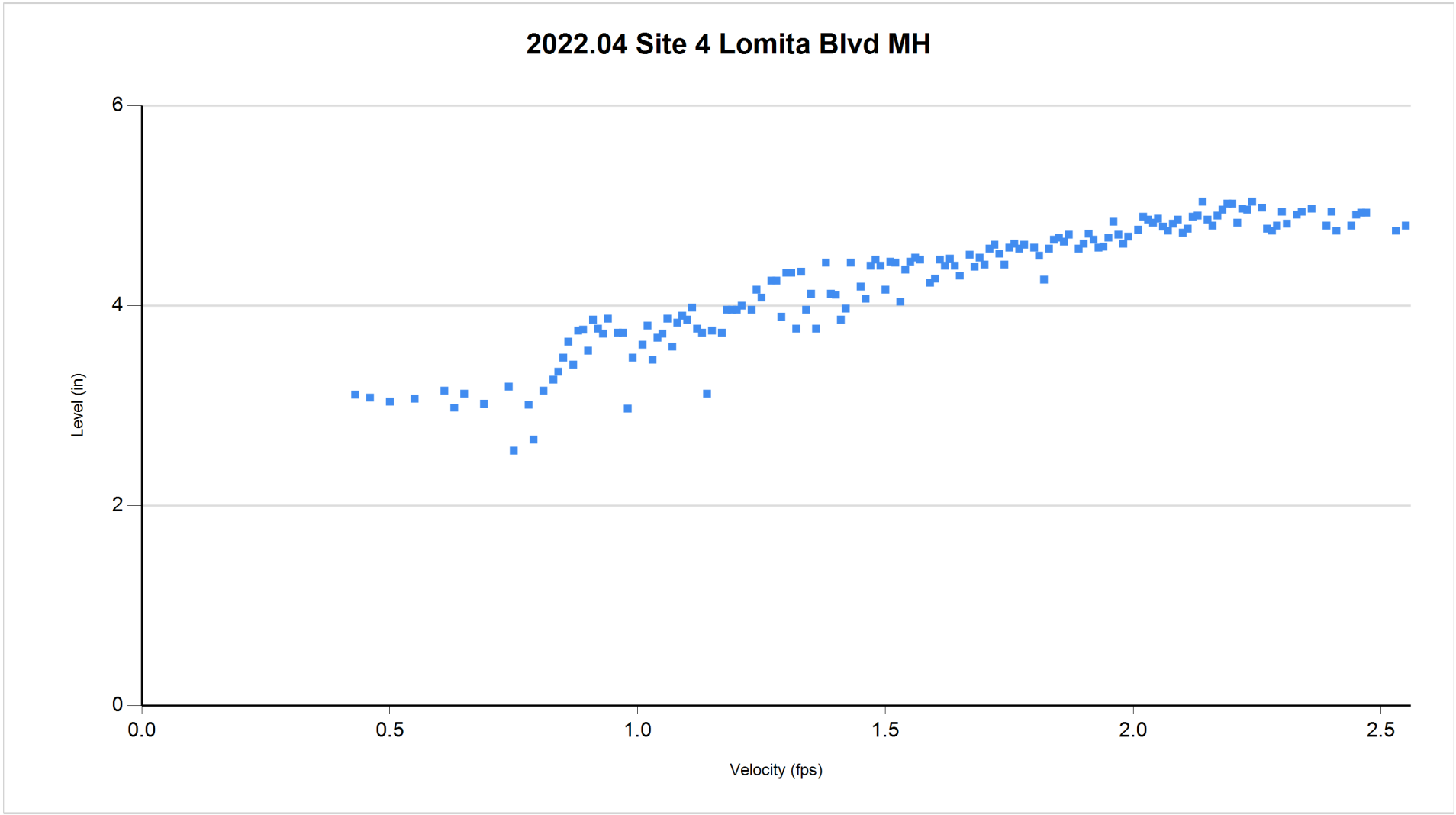
4/25/2022

2022.04 Site 4 Lomita Blvd MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.678	4.056	240.199	**RainFall**	Inches
Maximum	2.550	4.940	435.066		
Minimum	0.750	2.550	51.582		

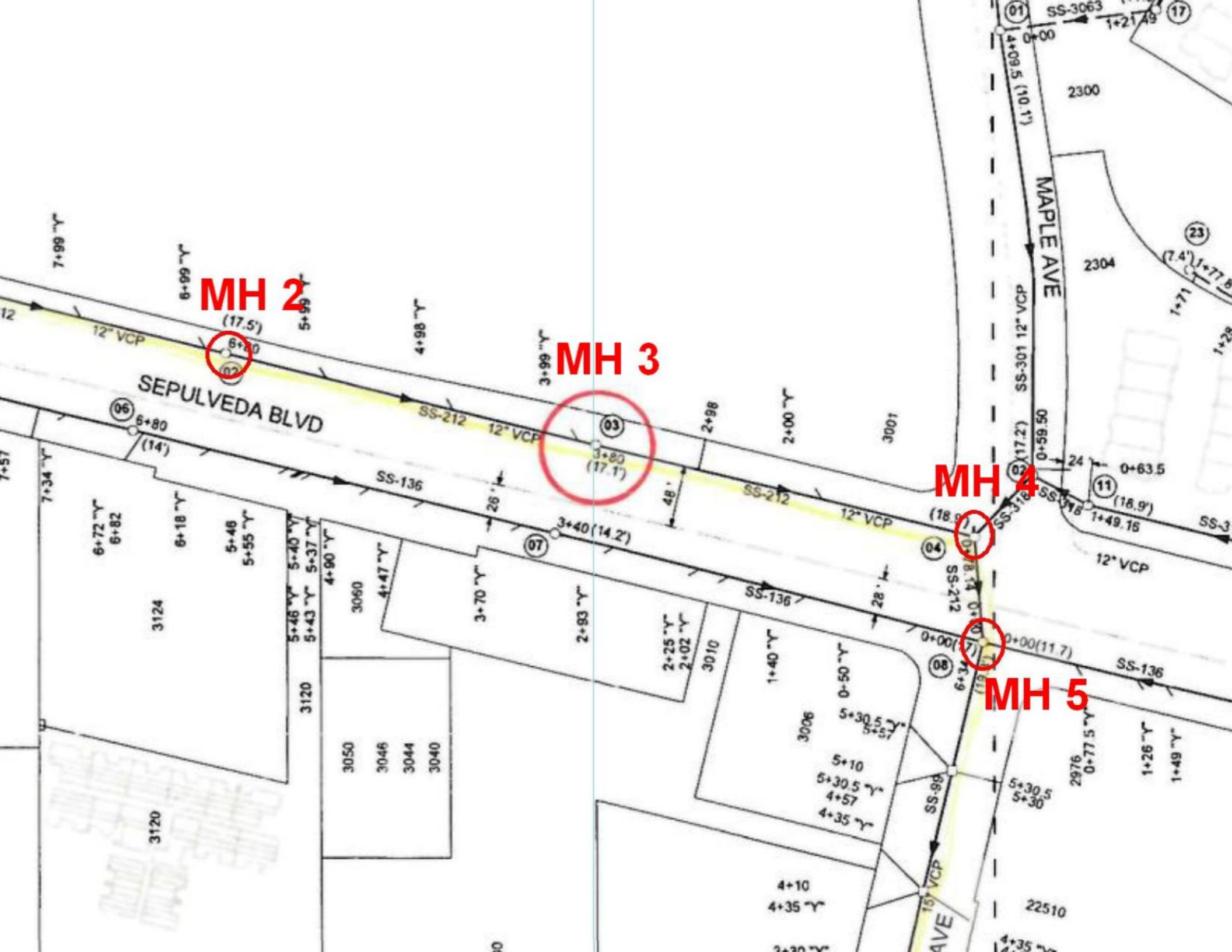
4/25/2022



4/7/2022 thru 4/22/2022

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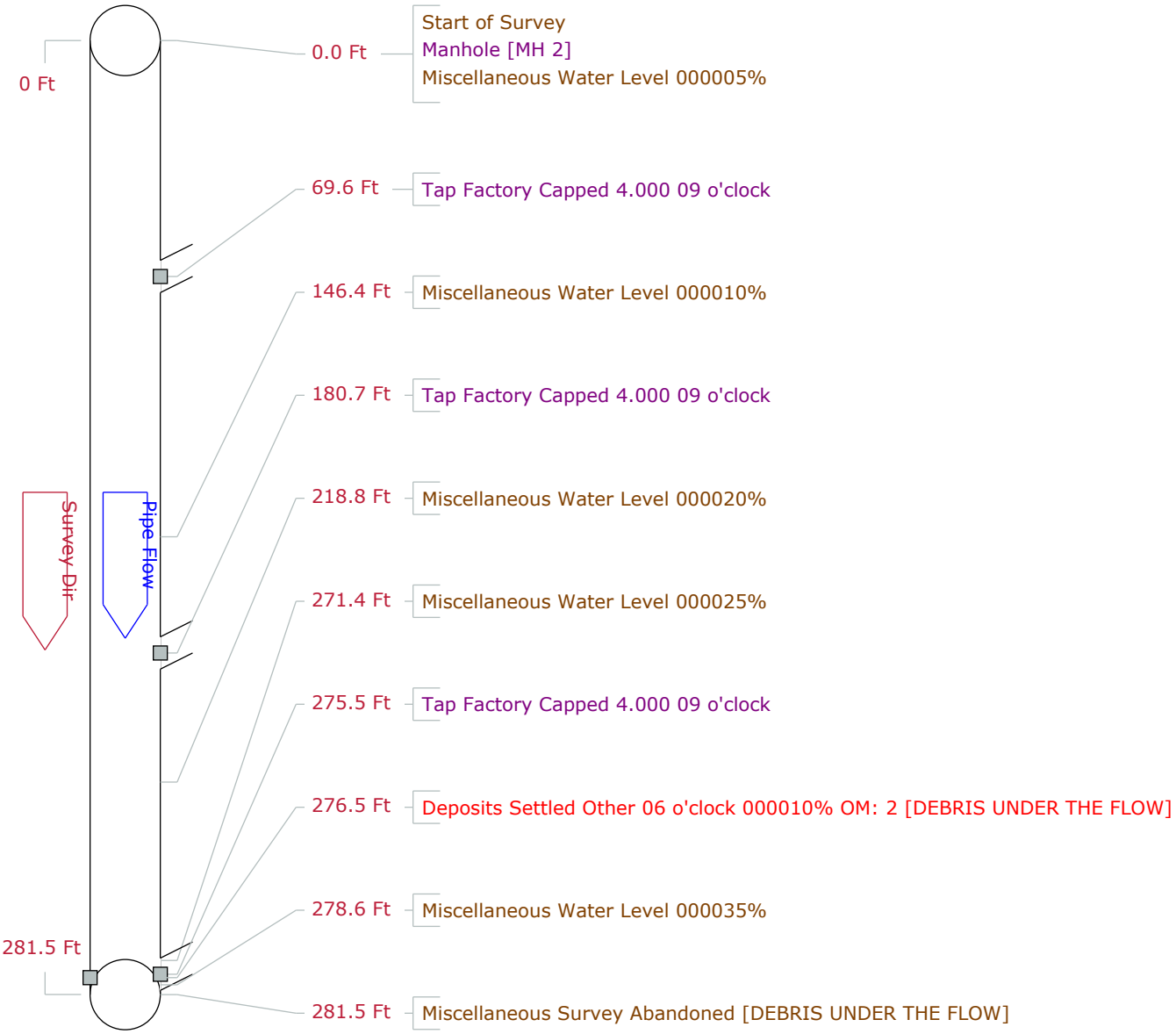

MH 2
MH 3
MH 4
MH 5
SEPULVEDA BLVD
MAPLE AVE
12" VCP
SS-212
SS-136
SS-301
SS-3063
SS-99
SS-316
SS-318
2300
2304
3001
3124
3120
3060
3050
3046
3044
3040
3010
3006
2976
22510

Pipe Graphic Report of PLR MH 2 to MH 3 for **Hunsaker and Associates, Inc.**

Setup	1	Surveyed By	M.NASRI	Certificate #	U06180703002113
Owner					
Reviewed By		Reviewer #		Work Order	
Customer	**Hunsaker and Associates, Inc.**			P/O #	
Media Label		Project	TORRENCE SEPULVEDA AND MAPLE		
Date	2022/10/06	Time	12:06	Weather	
Pre-Cleaning	X	Date Cleaned			
Flow control		Survey Purpose		Direction	Downstream
Street	SEPULVEDA	City	TORRENCE	Drainage area	
Location Code				Pipe Use	Sanitary Sewage Pipe
Location details				Height	12
Width	ins				
Shape	Circular	Material	Vitrified Clay Pipe	Lining	
Coating		Pipe Joint length	Ft	Total length	Ft
Length Surveyed	281.50 Ft	Year Constructed		Year Renewed	

Structural	O & M		
Miscellaneous	Constructional		

Up	MH 2	Rim to invert		Grade to invert	Rim to grade	Ft
Down	MH 3	Rim to invert		Grade to invert	Rim to grade	Ft



Tabular Report of PSR MH 2 to MH 3 for **Hunsaker and Associates, Inc.**

Setup 1 Surveyed By M.NASRI Certificate # U06180703002113 Owner
Reviewed By Reviewer # Work Order
Customer **Hunsaker and Associates, Inc.** P/O #
Media Label Project TORRENCE SEPULVEDA AND MAPLE
Date 2022/10/06 Time 12:06 Weather Pre-Cleaning X Date Cleaned
Flow control Survey Purpose Direction Down
Inspection Status Incomplete Inspection Consequence Of Failure Pressure
Inspection Technology Used ☒ CCTV ☐ Laser ☐ Sonar ☐ Sidewall ☐ Zoom ☐ Other

Street SEPULVEDA City TORRENCE Drainage area
Location Code Pipe Use Sanitary Sewage Pipe
Location details Height 12 Width ins
Shape Circular Material Vitrified Clay Pipe Lining
Coating Pipe Joint length Ft Total length Ft
Length Surveyed 281.5 Ft Year Constructed Year Renewed

Up MH 2 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Down MH 3 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Coordinate System Vertical Datum
GPS Accuracy
Additional info

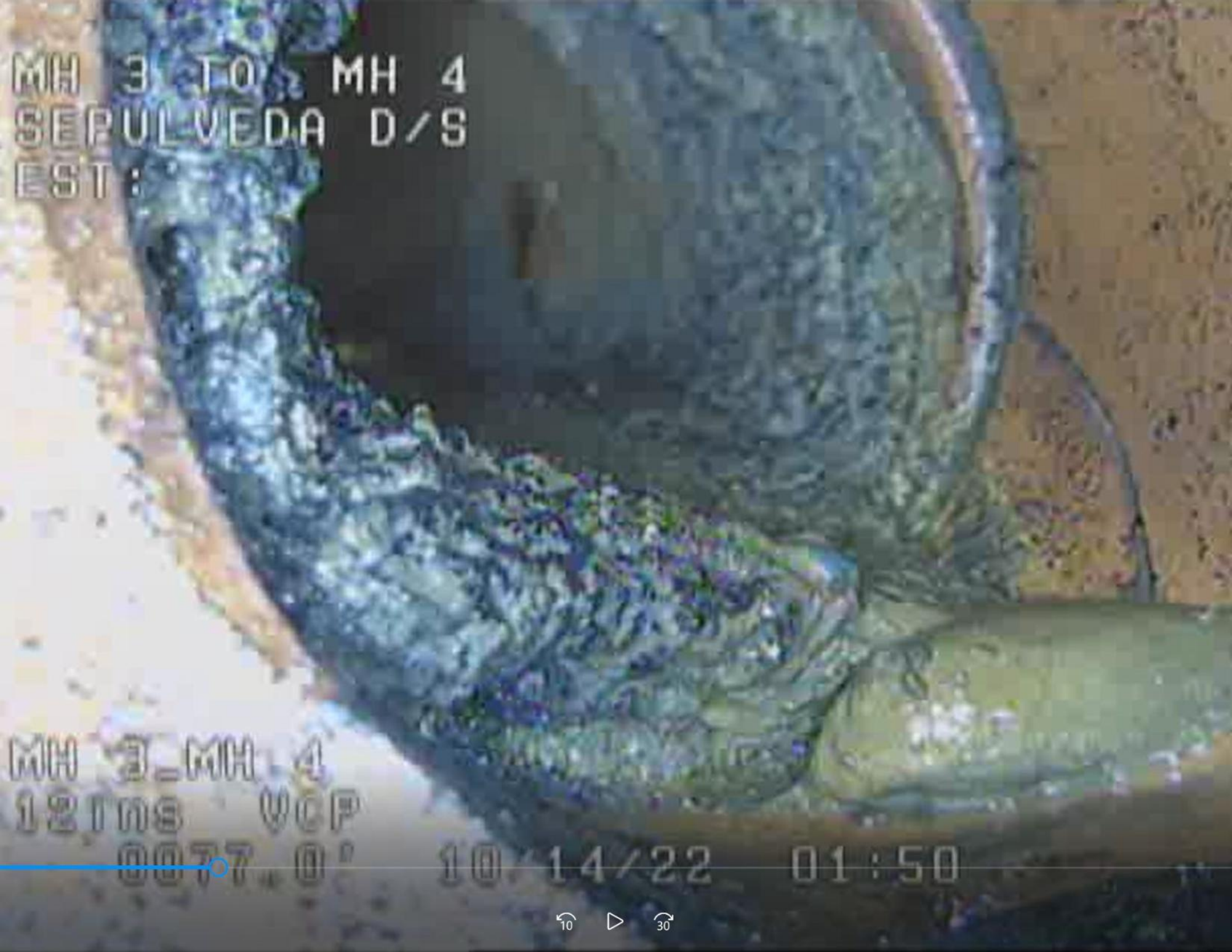
Structural O & M
Miscellaneous Constructional

Count	Video	CD	Code		Val1	Val2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								MH 2
0.0			MWL	Miscellaneous Water Level			5.000					
69.6			TFC	Tap Factory Capped	4.000				09			
146.4			MWL	Miscellaneous Water Level			10.000					
180.7			TFC	Tap Factory Capped	4.000				09			
218.8			MWL	Miscellaneous Water Level			20.000					
271.4			MWL	Miscellaneous Water Level			25.000					
275.5			TFC	Tap Factory Capped	4.000				09			
276.5			DSZ	Deposits Settled Other			10.000		06			DEBRIS UNDER THE FLOW
278.6			MWL	Miscellaneous Water Level			35.000					
281.5			MSA	Miscellaneous Survey Abandoned								DEBRIS UNDER THE FLOW

281.5 Ft Total Length Surveyed

Scores

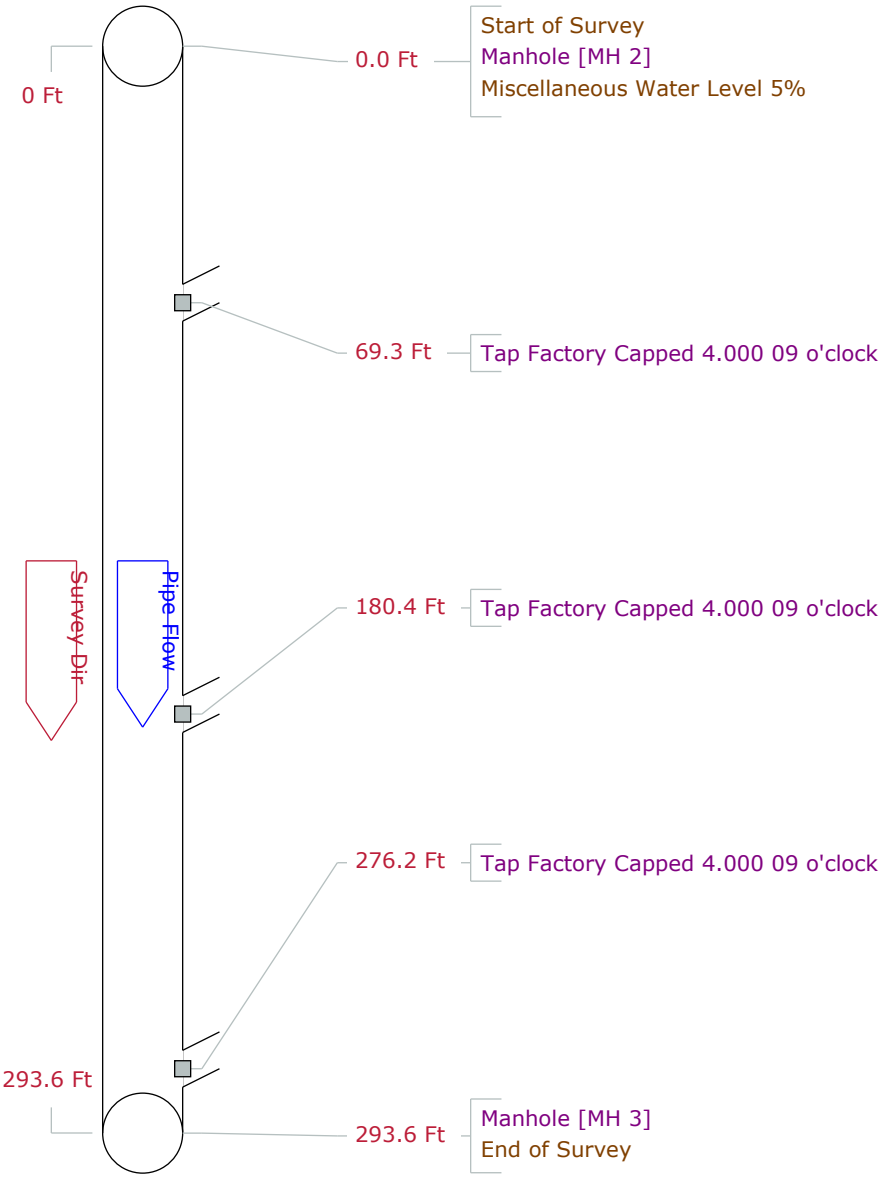
Structural:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
O&M:	Pipe Rating 2	Pipe Ratings Index 2	Quick Rating 2100
Overall	Pipe Rating 2	Pipe Ratings Index 2	Quick Rating 2100


MH 3 TO MH 4
SEPULVEDA D/S
EST:
MH 3_MH 4
12INS VCP
0077.0' 10/14/22 01:50

Pipe Graphic Report of PLR MH 2 to MH 3 AFTER CLEANING for **Hunsaker and Associates, Inc.**

Setup	2	Surveyed By	M.NASRI	Certificate #	U06180703002113
Owner					
Reviewed By		Reviewer #		Work Order	
Customer	**Hunsaker and Associates, Inc.**			P/O #	
Media Label		Project	TORRENCE SEPULVEDA AND MAPLE		
Date	2022/10/14	Time	1:06	Weather	
Pre-Cleaning	H	Date Cleaned			
Flow control		Survey Purpose		Direction	Downstream
Street	SEPULVEDA	City	TORRENCE	Drainage area	
Location Code				Pipe Use	Sanitary Sewage Pipe
Location details				Height	12
Width	ins				
Shape	Circular	Material	Vitrified Clay Pipe	Lining	
Coating		Pipe Joint length	Ft	Total length	293.6 Ft
Length Surveyed	293.60 Ft	Year Constructed		Year Renewed	

Structural	O & M				
Miscellaneous	Constructional				
Up	MH 2	Rim to invert		Grade to invert	Rim to grade Ft
Down	MH 3	Rim to invert		Grade to invert	Rim to grade Ft



Tabular Report of PSR MH 2 to MH 3 AFTER CLEANING for **Hunsaker and Associates, Inc.**

Setup 2 Surveyed By M.NASRI Certificate # U06180703002113 Owner
Reviewed By Reviewer # Work Order
Customer **Hunsaker and Associates, Inc.** P/O #
Media Label Project TORRENCE SEPULVEDA AND MAPLE
Date 2022/10/14 Time 1:06 Weather Pre-Cleaning H Date Cleaned
Flow control Survey Purpose Direction Down
Inspection Status Complete Inspection Consequence Of Failure Pressure
Inspection Technology Used ☒ CCTV ☐ Laser ☐ Sonar ☐ Sidewall ☐ Zoom ☐ Other

Street SEPULVEDA City TORRENCE Drainage area
Location Code Pipe Use Sanitary Sewage Pipe
Location details Height 12 Width ins
Shape Circular Material Vitrified Clay Pipe Lining
Coating Pipe Joint length Ft Total length 293.6 Ft
Length Surveyed 293.6 Ft Year Constructed Year Renewed

Up MH 2 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Down MH 3 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Coordinate System Vertical Datum
GPS Accuracy
Additional info

Structural O & M
Miscellaneous Constructional

Count	Video		CD	Code		Val1	Val2	%	Jnt	Fr	To	ImRef	Remarks
0.0				ST	Start of Survey								
0.0				AMH	Manhole								MH 2
0.0				MWL	Miscellaneous Water Level			5.000					
69.3				TFC	Tap Factory Capped	4.000				09			
180.4				TFC	Tap Factory Capped	4.000				09			
276.2				TFC	Tap Factory Capped	4.000				09			
293.6				AMH	Manhole								MH 3
293.6				FH	End of Survey								

293.6 Ft Total Length Surveyed

Scores

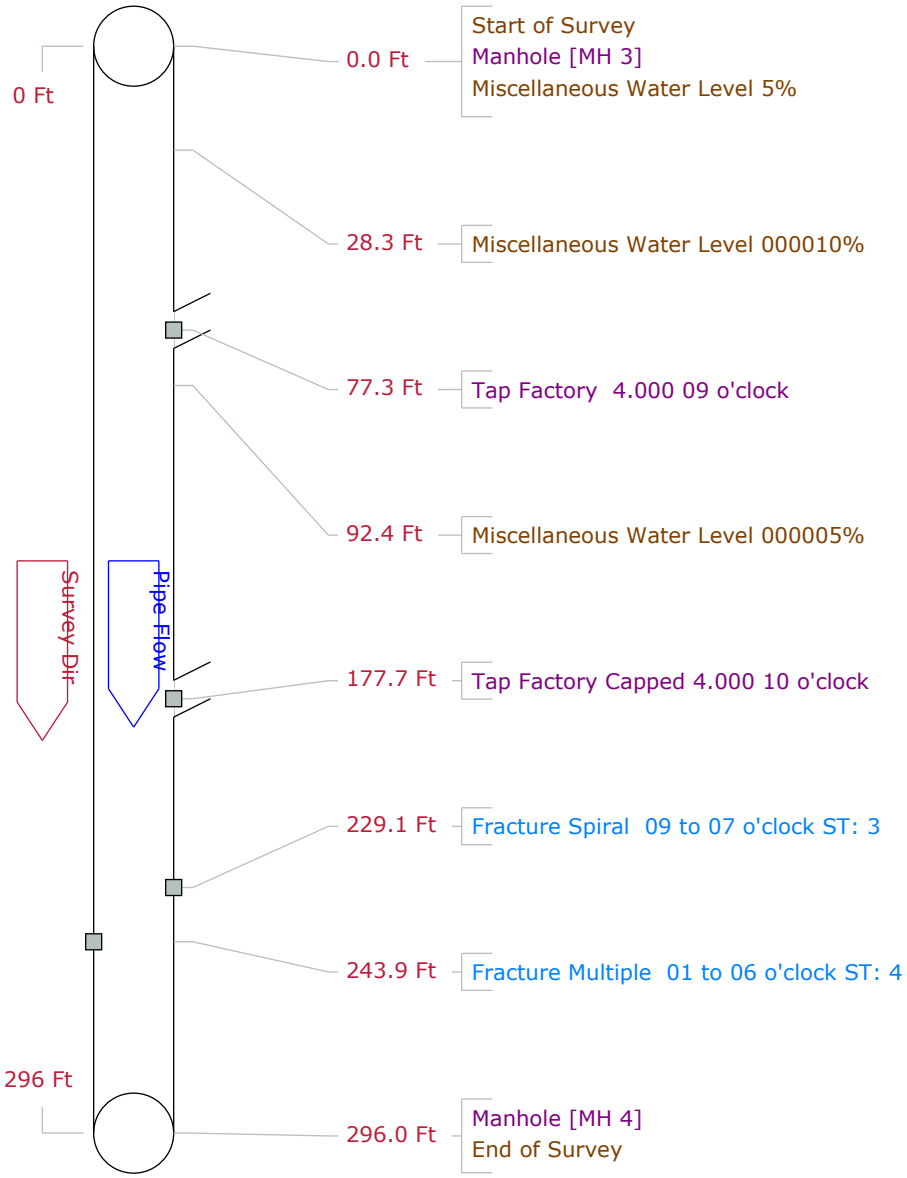
Structural:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
O&M:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
Overall	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000

Pipe Graphic Report of PLR MH 3 to MH 4 for **Hunsaker and Associates, Inc.**

Setup	3	Surveyed By	M.NASRI	Certificate #	U06180703002113
Owner					
Reviewed By		Reviewer #		Work Order	
Customer	**Hunsaker and Associates, Inc.**			P/O #	
Media Label		Project	TORRENCE SEPULVEDA AND MAPLE		
Date	2022/10/14	Time	1:45	Weather	
Pre-Cleaning	H	Date Cleaned			
Flow control		Survey Purpose		Direction	Downstream
Street	SEPULVEDA	City	TORRENCE	Drainage area	
Location Code				Pipe Use	Sanitary Sewage Pipe
Location details				Height	12
Width	ins				
Shape	Circular	Material	Vitrified Clay Pipe	Lining	
Coating		Pipe Joint length	Ft	Total length	296.0 Ft
Length Surveyed	296.00 Ft	Year Constructed		Year Renewed	

Structural	O & M		
Miscellaneous	Constructional		

Up	MH 3	Rim to invert		Grade to invert	Rim to grade Ft
Down	MH 4	Rim to invert		Grade to invert	Rim to grade Ft



Tabular Report of PSR MH 3 to MH 4 for **Hunsaker and Associates, Inc.**

Setup 3 Surveyed By M.NASRI Certificate # U06180703002113 Owner
Reviewed By Reviewer # Work Order
Customer **Hunsaker and Associates, Inc.** P/O #
Media Label Project TORRENCE SEPULVEDA AND MAPLE
Date 2022/10/14 Time 1:45 Weather Pre-Cleaning H Date Cleaned
Flow control Survey Purpose Direction Down
Inspection Status Complete Inspection Consequence Of Failure Pressure
Inspection Technology Used ☒ CCTV ☐ Laser ☐ Sonar ☐ Sidewall ☐ Zoom ☐ Other

Street SEPULVEDA City TORRENCE Drainage area
Location Code Pipe Use Sanitary Sewage Pipe
Location details Height 12 Width ins
Shape Circular Material Vitrified Clay Pipe Lining
Coating Pipe Joint length Ft Total length 296.0 Ft
Length Surveyed 296.0 Ft Year Constructed Year Renewed

Up MH 3 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Down MH 4 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Coordinate System Vertical Datum
GPS Accuracy
Additional info

Structural O & M
Miscellaneous Constructional

Count	Video	CD	Code		Val1	Val2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								MH 3
0.0			MWL	Miscellaneous Water Level			5.000					
28.3			MWL	Miscellaneous Water Level			10.000					
77.3			TF	Tap Factory	4.000				09			
92.4			MWL	Miscellaneous Water Level			5.000					
177.7			TFC	Tap Factory Capped	4.000				10			
229.1			FS	Fracture Spiral				J	09	07		
243.9			FM	Fracture Multiple				J	01	06		
296.0			AMH	Manhole								MH 4
296.0			FH	End of Survey								

296.0 Ft Total Length Surveyed

Scores

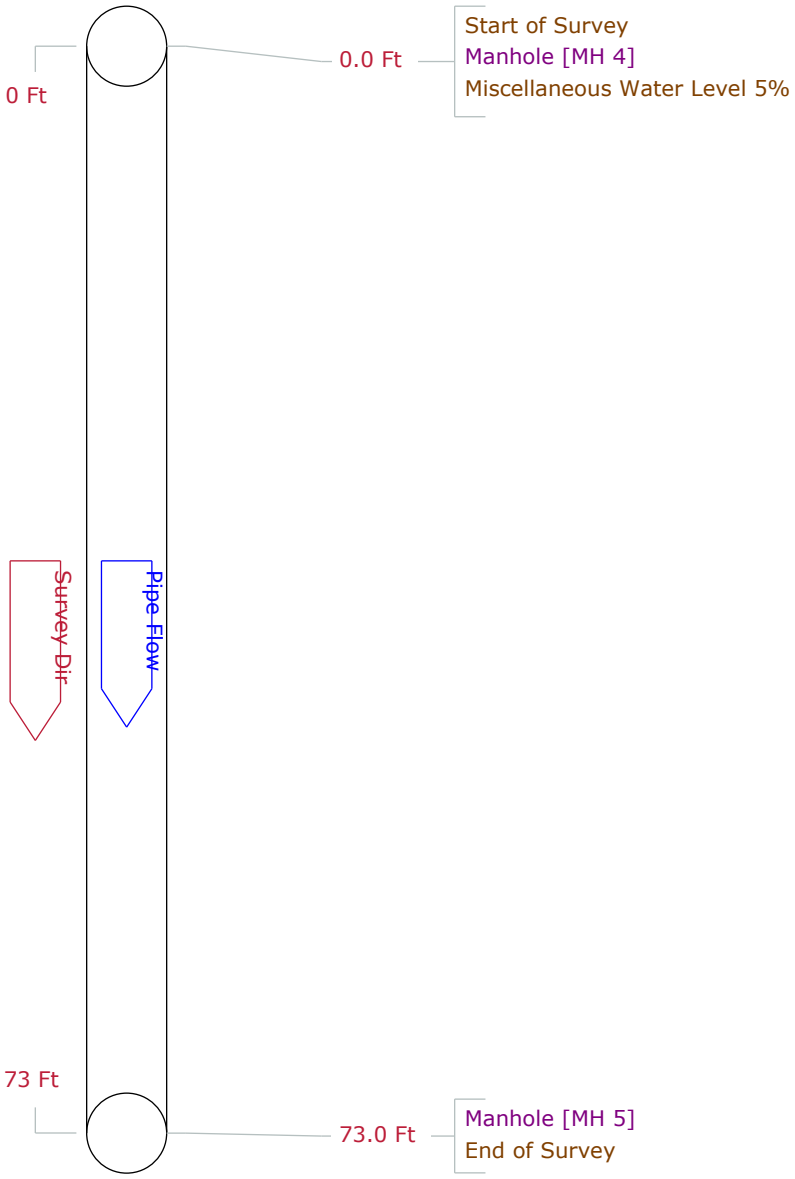
Structural:	Pipe Rating 7	Pipe Ratings Index 3.5	Quick Rating 4131
O&M:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
Overall	Pipe Rating 7	Pipe Ratings Index 3.5	Quick Rating 4131

Pipe Graphic Report of PLR MH 4 to MH 5 for **Hunsaker and Associates, Inc.**

Setup	4	Surveyed By	M.NASRI	Certificate #	U06180703002113
Owner					
Reviewed By		Reviewer #		Work Order	
Customer	**Hunsaker and Associates, Inc.**			P/O #	
Media Label		Project	TORRENCE SEPULVEDA AND MAPLE		
Date	2022/10/14	Time	2:27	Weather	
Pre-Cleaning	H	Date Cleaned			
Flow control		Survey Purpose		Direction	Downstream
Street	MAPLE	City	TORRENCE	Drainage area	
Location Code				Pipe Use	Sanitary Sewage Pipe
Location details				Height	12
Width	ins				
Shape	Circular	Material	Vitrified Clay Pipe	Lining	
Coating		Pipe Joint length	Ft	Total length	73.0 Ft
Length Surveyed	73.00 Ft	Year Constructed		Year Renewed	

Structural	O & M		
Miscellaneous	Constructional		

Up	MH 4	Rim to invert		Grade to invert	Rim to grade Ft
Down	MH 5	Rim to invert		Grade to invert	Rim to grade Ft



Tabular Report of PSR MH 4 to MH 5 for **Hunsaker and Associates, Inc.**

Setup 4 Surveyed By M.NASRI Certificate # U06180703002113 Owner
Reviewed By Reviewer # Work Order
Customer **Hunsaker and Associates, Inc.** P/O #
Media Label Project TORRENCE SEPULVEDA AND MAPLE
Date 2022/10/14 Time 2:27 Weather Pre-Cleaning H Date Cleaned
Flow control Survey Purpose Direction Down
Inspection Status Complete Inspection Consequence Of Failure Pressure
Inspection Technology Used ☒ CCTV ☐ Laser ☐ Sonar ☐ Sidewall ☐ Zoom ☐ Other

Street MAPLE City TORRENCE Drainage area
Location Code Pipe Use Sanitary Sewage Pipe
Location details Height 12 Width ins
Shape Circular Material Vitrified Clay Pipe Lining
Coating Pipe Joint length Ft Total length 73.0 Ft
Length Surveyed 73.0 Ft Year Constructed Year Renewed

Up MH 4 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Down MH 5 Rim to invert Grade to invert Rim to grade Ft
Northing Easting Elevation

Coordinate System Vertical Datum
GPS Accuracy
Additional info

Structural O & M
Miscellaneous Constructional

Count	Video	CD	Code		Val1	Val2	%	Jnt	Fr	To	ImRef	Remarks
0.0			ST	Start of Survey								
0.0			AMH	Manhole								MH 4
0.0			MWL	Miscellaneous Water Level			5.000					
73.0			AMH	Manhole								MH 5
73.0			FH	End of Survey								

73.0 Ft Total Length Surveyed

Scores						
	Structural:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
	O&M:	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000
	Overall	Pipe Rating 0	Pipe Ratings Index 0	Quick Rating 0000

Methods & Procedures & Equipment

Methods and Procedures

Utility Systems Science & Software provided Hunsaker and Associates with an off the shelf, non-proprietary flow monitoring solution that included four state of the art Hach Flo-Dar® AV Sensor systems. The project course of action is listed below. The US^3 team:

- Assessed permitting and traffic control at the sites in Torrance, CA.
- Prepared the traffic control plans and obtained a City Encroachment Permit.
- Installed and removed traffic control in accord with approved traffic control plans per site-specific California Temporary Traffic Control Handbook (CATTCH) requirements for both the installation and removal of equipment.
- Validated the sites for suitability for sewer flow monitoring for the Del Amo Project.
    - The Site 1 Madrona Av manhole (MH) had no laterals and slow to moderate open channel hydraulics with some normal system solids observed in the trough.
    - The Site 2 Sepulveda MH had no laterals and slow to moderate open channel hydraulics with some sediment observed in the trough.
    - The Site 3 235th St MH had no laterals and moderate open channel hydraulics with a bend in the trough.
    - The original Site 4 Lomita Blvd MH could not be accessed due to the several vehicles parked on and around the MH. Therefore, the next manhole downstream was inspected. The MH had inlets from the north and west with moderate open channel hydraulics and some turbulence at the confluence of flows.
- Installed and calibrated the flow monitoring equipment at the sites per manufacturer recommendations on 12/08/2022.
    - Follow-up on the installations confirmed equipment was reading properly.
    - Collected 15-minute interval depth and velocity data points over the entire monitoring period.
- Removed the equipment on 12/23/2022 and validated the data.
    - All of the equipment went through diagnostic testing before and after the study with less than a 1% deviation between manual and meter level readings and less than a 5% deviation between manual and meter velocity readings.
    - Equipment calibration was verified in accordance with manufacturer specifications.

- Prepared the data reports.
  - The table on the following page contains a summary of the average (Avg) and maximum (Max) velocities (Vel) and levels (Lev) collected during this study as well as the calculated flow rates (Flow) and depth versus diameter ratios (d/D).

Site	Pipe Size (in)	Avg Vel (fps)	Max Vel (fps)	Avg Lev (in)	Max Lev (in)	Avg Flow (gpm)	Max Flow (gpm)	Avg d/D	Max d/D
1	10	1.01	1.30	0.76	1.48	9.27	29.29	0.08	0.15
2	12	0.74	1.52	6.38	7.97	141.42	371.93	0.53	0.66
3	15	2.14	2.76	4.18	5.52	282.24	490.81	0.28	0.37
4	18	1.85	2.62	4.52	7.83	304.84	783.75	0.25	0.44

Equipment



Figure above: Web-Enabled Flo-Dar® AV Sensor, Radar-Based Velocity/Area Flow Meter

FloDar® AV Sensor Specifications:

- **Enclosure**
  - IP68 Waterproof rating, Polystyrene
- **Dimensions**
  - 160.5 W x 432.2 L x 297 D mm (6.32 x 16.66 x 11.7 in.),
  - With SVS, D = 387 mm (15.2 in.)
- **Weight**
  - 4.8 kg (10.5 lbs.)
- **Operating Temperature**
  - -10 to 50°C (14 to 122°F)
- **Storage Temperature**
  - -40 to 60°C (-40 to 140°F)
- **Power Requirements**
  - Supplied by FL900 Flow Logger, Flo-Logger, or Flo-Station
- **Interconnecting Cable**
  - Disconnect available at both sensor and logger or Flo-Station
  - Polyurethane, 0.400 (±0.015) in. diameter; IP68
  - Standard length 9 m (30 ft), maximum 305 m (1000 ft)
- **Cables – available in two styles:**
  - connectors at both ends
  - connector from sensor with open leads to desiccant hub, desiccant hub with connector to logger. A potting/sealant kit will be included. This can be used to run the cable through conduit.
- **Certification**
  - Certified to: FCC Part 15.245: FCC ID: VIC-FLODAR24
  - Industry Canada Spec. RSS210. v7: IC No.: 6149A-FLODAR24

SURCHARGE DEPTH MEASUREMENT

  - Auto zero function maintains zero error below 0.5 cm (0.2 in.)
- **Method**
  - Piezo-resistive pressure transducer with stainless steel diaphragm
- **Range**
  - 3.5 m (138 in.), overpressure rating 2.5 x full scale

VELOCITY MEASUREMENT

- **Method**
  - Radar
- **Range**
  - 0.23 to 6.10 m/s (0.75 to 20 ft/s)

- **Frequency Range**
  - 24.075 to 24.175 GHz, 15.2 mW (max.)
- **Accuracy**
  - ±0.5%; ±0.03 m/s (±0.1 ft/s)

DEPTH MEASUREMENT

- **Method**
  - Ultrasonic
- **Standard Operating Range from Flo-Dar® Housing to Liquid**
  - 0 to 152.4 cm (0 to 60 in.)
- **Optional Extended Level Operating Range from Transducer Face to Liquid**
  - 0 to 6.1 m (0 to 20 ft.) with 43.18 cm (17 in.) dead band, temperature compensated.
- **Accuracy**
  - ±1%; ±0.25 cm (±0.1 in.)

FLOW MEASUREMENT

- **Method**
  - Based on Continuity Equation
- **Accuracy**
  - ±5% of reading typical where flow is in a channel with uniform flow conditions and is not surcharged, ±1% full scale max.

SURCHARGE CONDITIONS DEPTH/VELOCITY DEPTH (Std with Flo-Dar® Sensor)

- **Surcharge depth supplied by Flo-Dar® sensor.**

VELOCITY (Optional Surcharge Velocity Sensor)

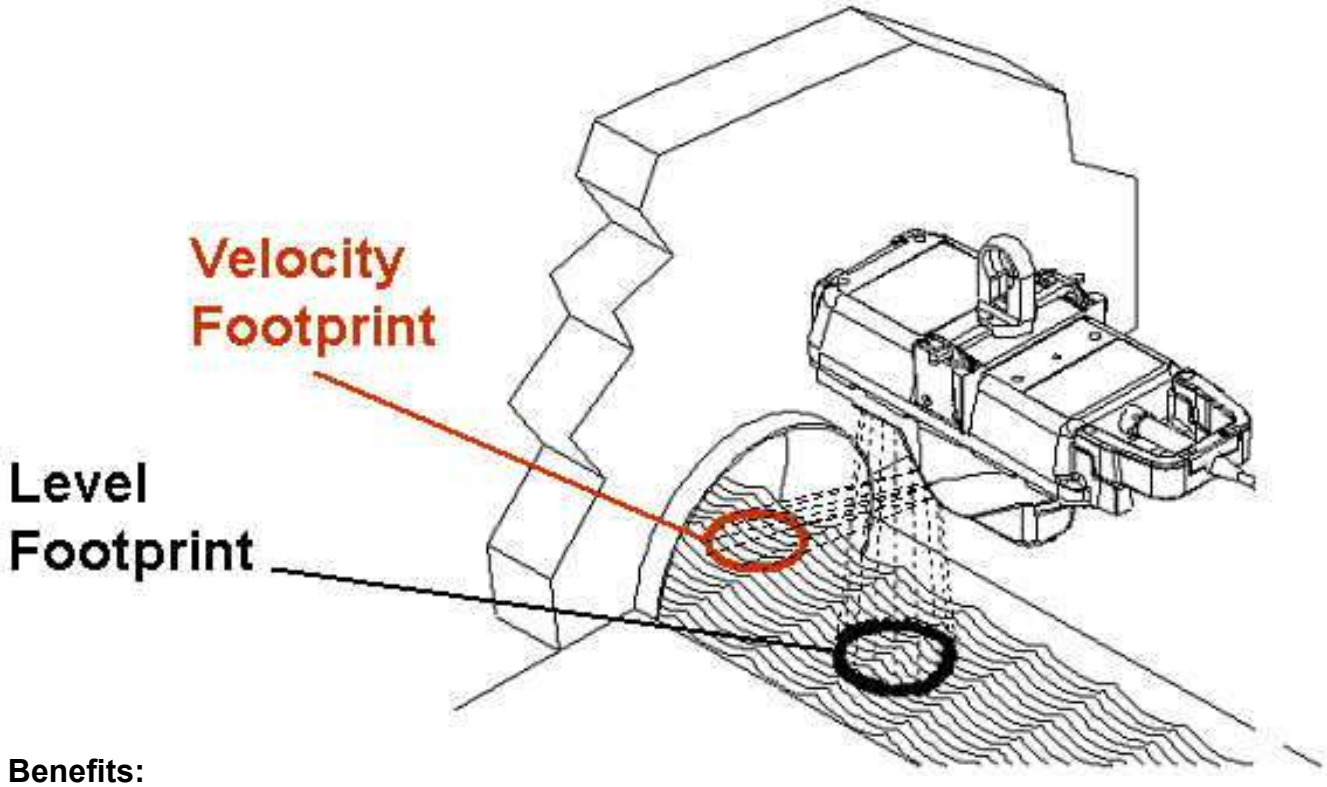
- **Method**
  - Electromagnetic
- **Range**
  - ±4.8 m/s (±16 ft/s)
- **Accuracy**
  - ±0.15 ft/s or 4% of reading, whichever is greater.
- **Zero Stability**
  - ±0.05 ft/s

The Flo-Dar® Open Channel Flow Meters provide an innovative approach to open channel flow monitoring. Combining digital Doppler radar velocity sensing with ultrasonic pulse echo level sensing Flo-Dar® provides accurate open channel flow monitoring without the fouling problems associated with submerged sensors.

Perfect Solution for Difficult Flow Conditions:

- Flows with High Solids Content
- High Temperature Flows
- Caustic Flows
- Large Man-Made Channel
- High Velocities
- Shallow Flows





Benefits:

1. Personnel have no contact with the flow during installation.
2. Maintenance caused by sensor fouling is eliminated
3. Field Replaceable/Interchangeable Sensors and Monitors

How It Works

Flo-Dar® transmits a digital Doppler radar beam that interacts with the fluid and reflects back signals at a different frequency than that which was transmitted. These reflected signals are compared with the transmitted frequency. The resulting frequency shift provides an accurate measure of the velocity and the direction of the flow. Level is detected by ultrasonic pulse echo. Flow is then calculated based on the Continuity Equation:

$$Q = V \times A, \text{ Where } Q = \text{Flow, } V = \text{Average Velocity and } A = \text{Area}$$

Accurate Flow Measurements

Flo-Dar® provides the user with highly accurate flow measurements under a wide range of flows and site conditions. By measuring the velocity of the fluid from above, Flo-Dar® eliminates accuracy problems inherent with submerged sensors including sensor disturbances, high solids content and distribution of reflectors.

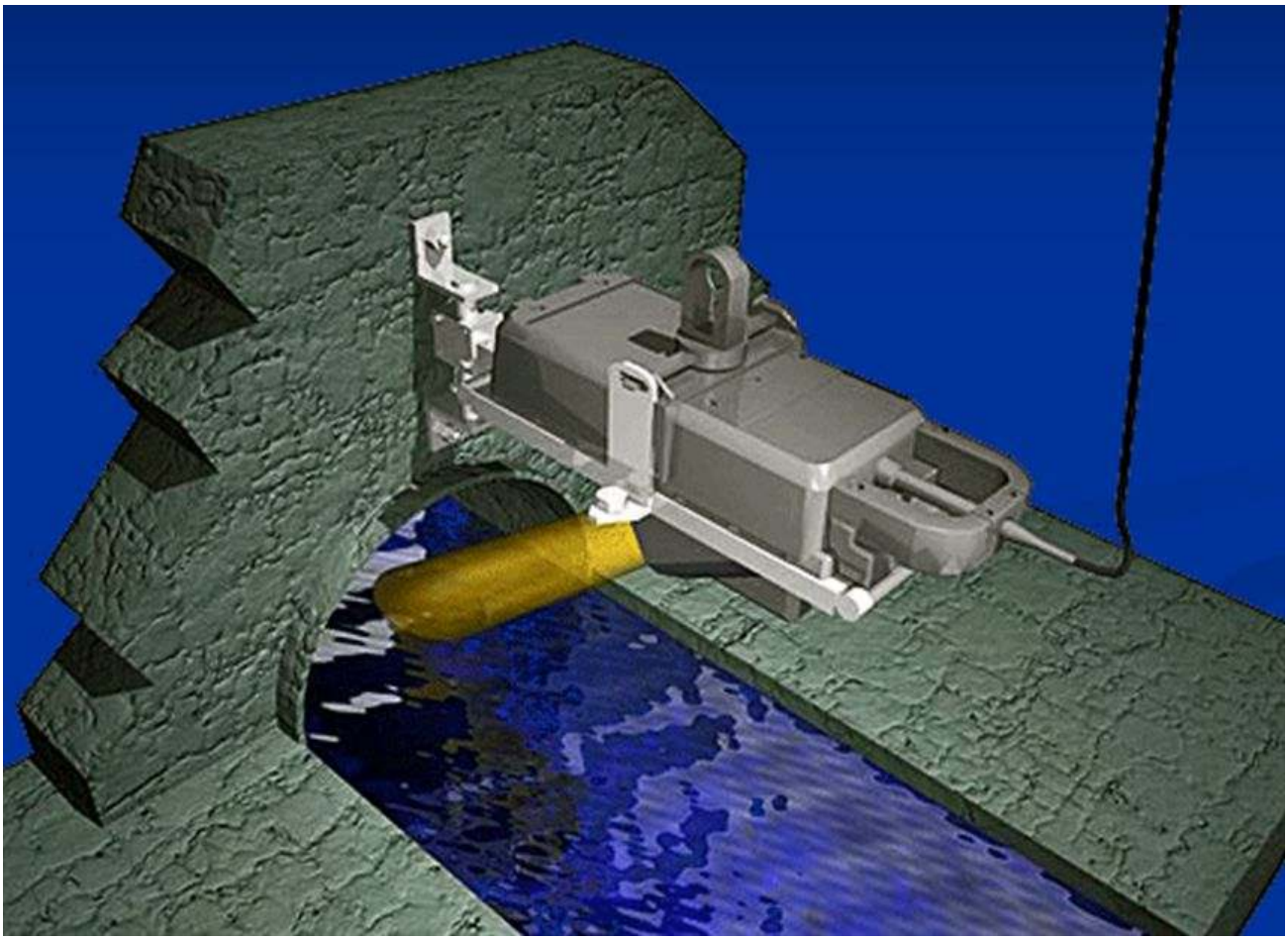


Figure above: US^3 utilizes exclusively Hach March-McBirney Flo-Dar® Meters

US³ Company Information

US³ is a California Corporation **Federal ID No. 33-0729605** and qualifies as a Minority Business Enterprise. US³ has certified as an MBE with the California Public Utility Commission's authorized clearinghouse, **Verification Number: 97ES0008.**

US³ is a specialty service company for the Water & Waste Water industry, providing monitoring and control for Utilities since 1996. US³ is in the forefront of this industry by taking the proven technological approaches developed in other high-tech industries and applying them to protect one of our most precious natural resources - our water.

US³ engineers and technical personnel have applied advanced instrumentation system technology to water/wastewater open channel flow monitoring, pipeline evaluation, engineering, and data analysis, all coupled to the power of the Internet. This unique integrated systems approach allows the company to bring greater insight and intelligence to gathering information about water/wastewater system performance of our clients, and in turn, to support the fulfillment of their commitments to manage and cost effectively design, operate, and maintain these systems.

Moreover, ***US³*** supports Municipalities, Consulting Engineering firms and other water/waste water systems integrators by providing temporary technical services for engineering, software programming and technical site maintenance and calibration site support work, primarily in the Water and Waste Water industries.



Figure at right: All US³ technicians are certified for Confined Space Entry.

Key Personnel Assigned

US³ provided the necessary resources to fully implement this project. Primary in support of this effort were the following personnel:

Mr. Mark Serres: Mr. Serres is a degreed electrical engineer with over 25 years of experience with fresh/wastewater systems, project management, and systems integration in relation to complex industrial systems. This includes experience in industrial automation and water/wastewater industries. Mr. Serres is responsible for assuring client satisfaction and marshalling the required resources to meet the project requirements.

Mr. Thomas Williams: Mr. Williams is an Engineering Manager with over 20 years of experience in complex systems development for wastewater monitoring. This experience includes hydraulic compatibility, instrumentation, communications and analysis. Mr. Williams is responsible for assuring that the required equipment is designed and calibrated to meet the project requirements.

Darlene Szczublewski, PE: Mrs. Szczublewski is a licensed Civil Engineer in multiple states. She has over 15 years of engineering experience with stormwater/wastewater related projects. She assisted in the completion of several Sanitary Sewer Evaluation Surveys and Capacity Analysis projects to meet Consent Decrees as well as completing numerous Infiltration and Inflow (I&I) studies for other clients. Mrs. Szczublewski has developed numerous flow data analysis techniques to present a clear informative picture of flow in a monitored system. Her work also includes the development of training programs for clients describing I&I and capacity analysis methodologies. Mrs. Szczublewski is responsible for analyzing the data as well as the data collection process and assuring that the reports meet the project requirements.

Name, title, address and telephone number of persons to contact regarding this US³ project.

Darlene Szczublewski, PE
Senior Civil Engineer
darlene.szczublewski@uscubed.com

1300 Hill Street
El Cajon, CA 92020
619-546-4281 (work)
619-246-5304 (cell)

Tom Williams
Engineering Manager
tom.williams@uscubed.com

1300 Hill Street
El Cajon, CA 92020
619-546-4281 (work)
619-398-7799 (cell)

Site Report 12/27/2022

Confidential Proprietary Information

Hunsaker & Associates

2022.12 Site 1 Madrona MH

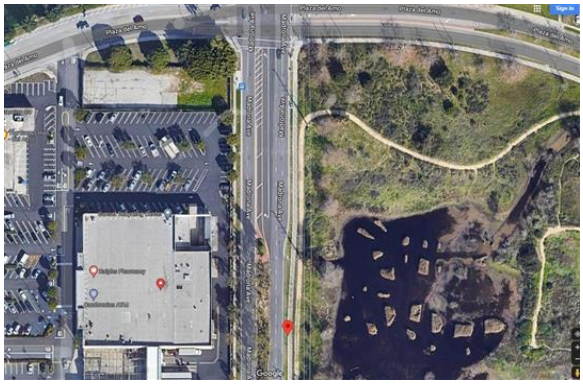
MH at ~3455 Sepulveda Blvd
Torrance, CA 90503
MH # unknown

Access:
North of Sepulveda on Madrona Av, east of address.

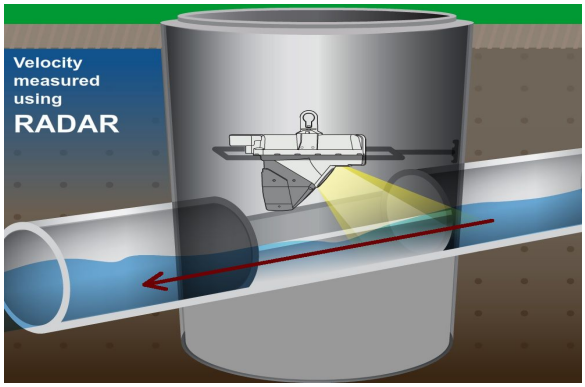
System Type:
Sanitary [X] Storm [ ]

Install Date: 12/08/2022

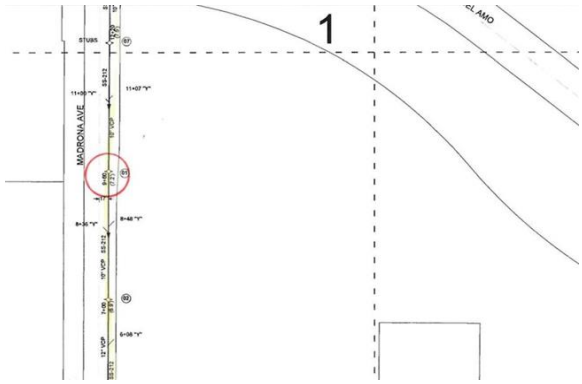
Map



Technology



Sewer Plan



Flow Meter			
Meter Depth: 90.5"			
MH Coordinates: 33.827870, -118.344882			
Slow to moderate open channel hydraulics with some normal system solids observed in trough.			
Avg Velocity	Avg Measured Level		Multiplier
1.0 fps	0.8"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.			
Traffic Safety			
Used cones & signs in accord w/site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	106.5"
Monitored Pipe Size	10"
Inner Pipe Size (In/Out)	10"/10"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	16.0"
Sensor Dist. to Crown	6.0"
Sensor Direction	Upstream
Flow Heading	South

Meter Site Document

2022.12 Site 1 Madrona MH

MH at ~3455 Sepulveda Blvd

Torrance, CA 90503

Site



Manhole Before Install



Installation Process



Installed



Upstream



Upstream Pipe Size



Temporary Flow Study

Hunsaker & Associates

2022.12 Site 1 Madrona MH

Meter Start Date		From	12/8/2022
Meter Stop Date		To	12/23/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	1.013	0.761	0.013
Maximum	1.300	1.480	0.042
Minimum	0.580	0.320	0.002
Pipe Size		10.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

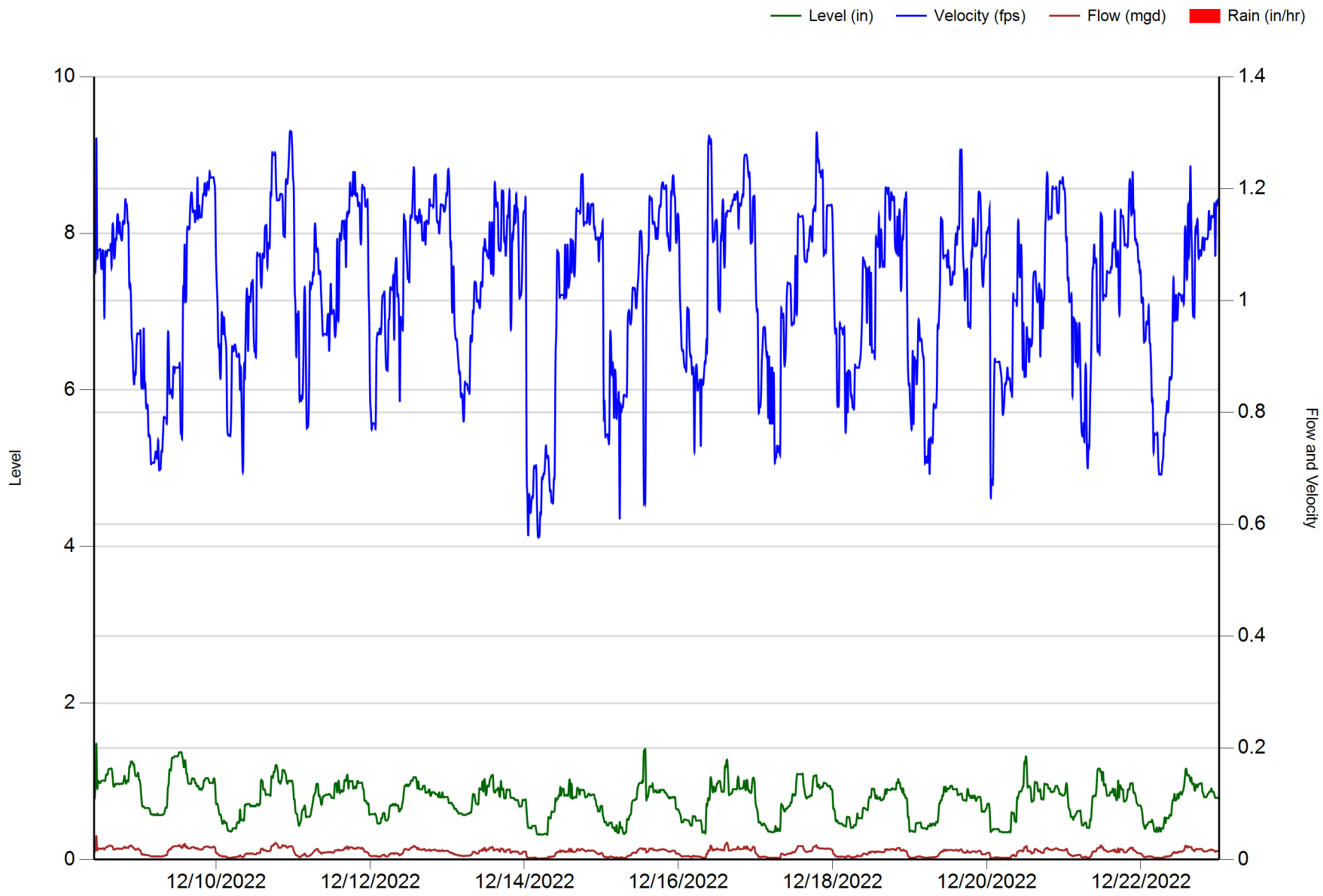
Utility Systems, Science and Software

1300 Hill St
El Cajon, CA 92020

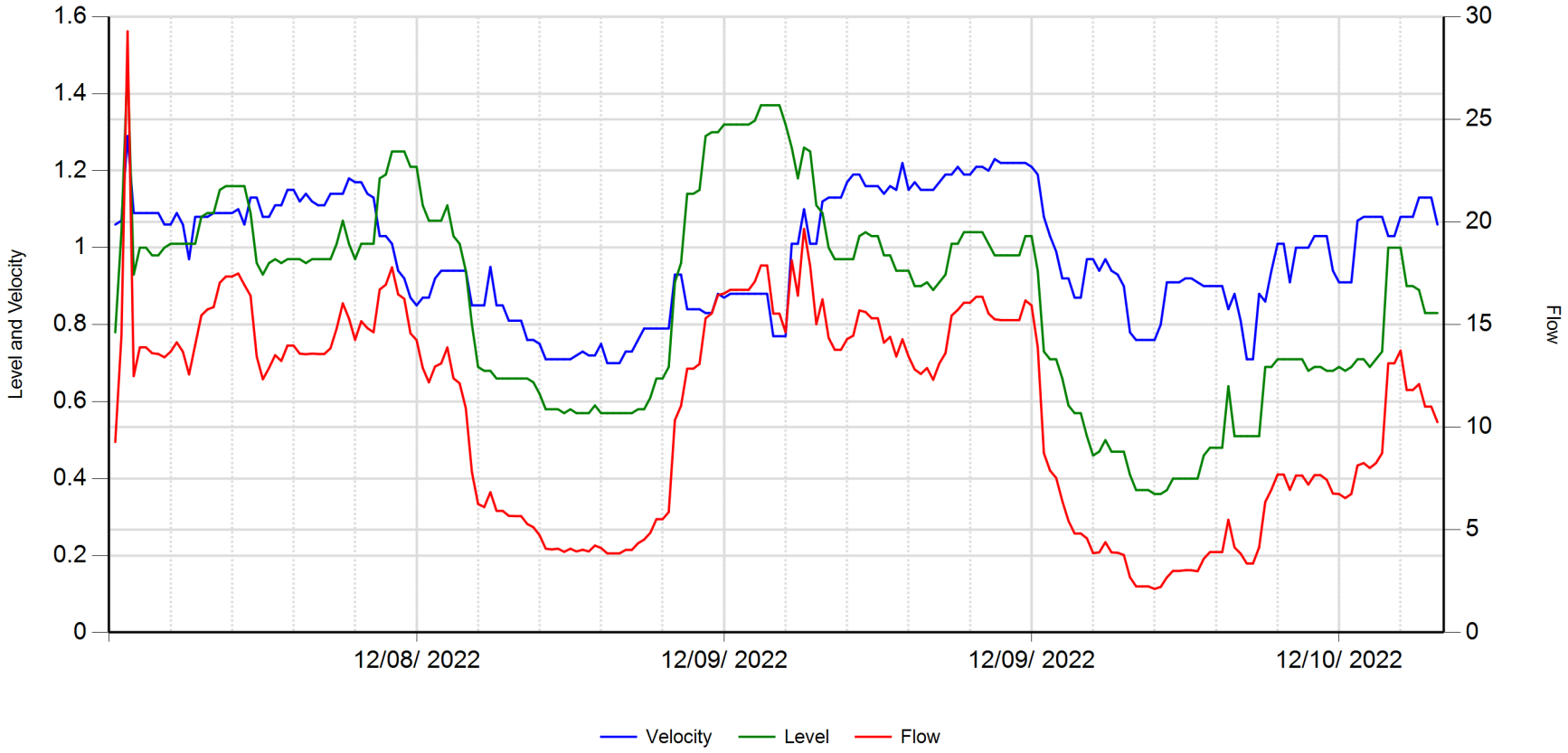
601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

Report Date: 12/27/2022
Customer: Hunsaker & Associates
Group: Del Amo Project
Site: 2022.12 Site 1 Madrona MH

2022.12 Site 1 Madrona MH:
12/08/2022 thru 12/23/2022



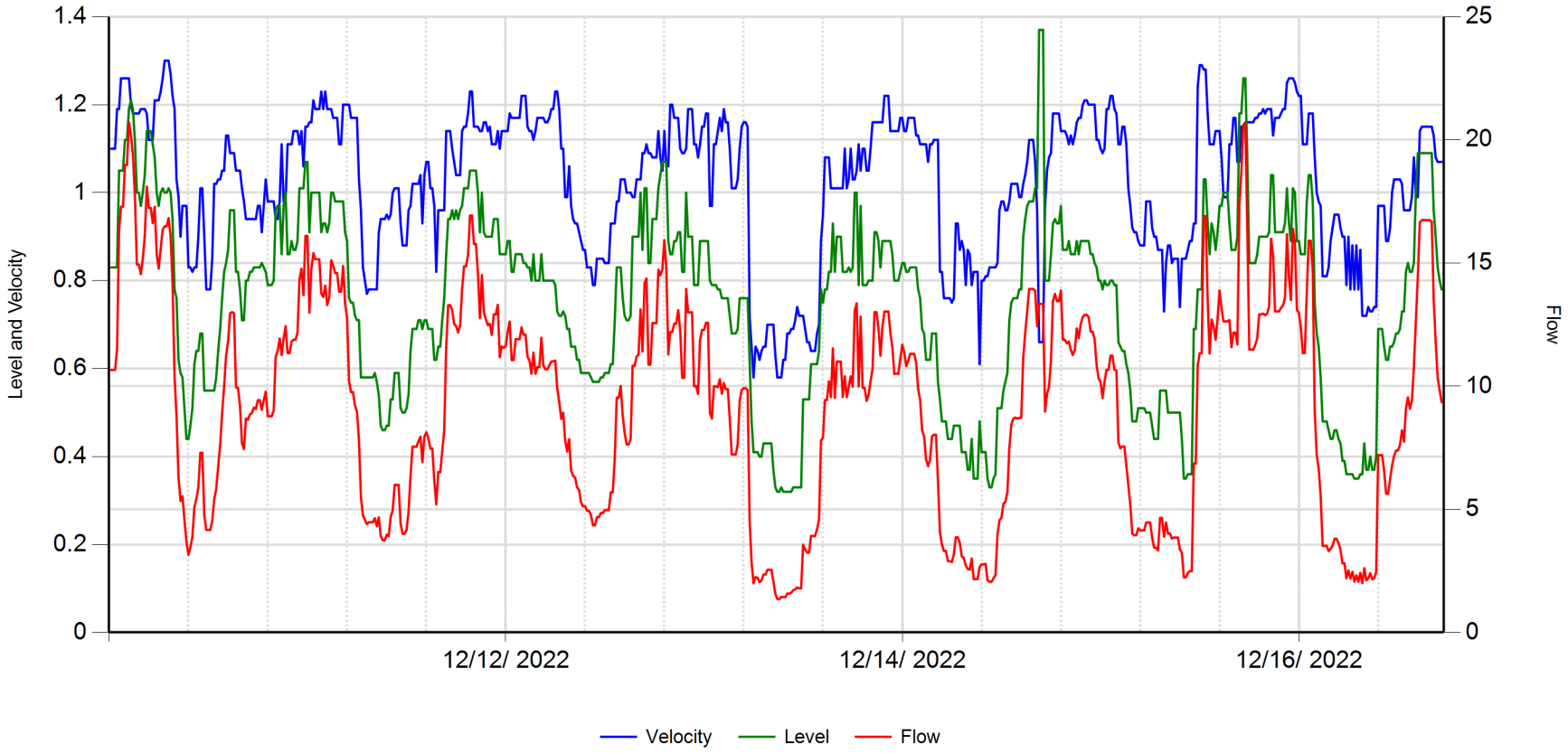
2022.12 Site 1 Madrona MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.983	0.864	10.719	**RainFall**	Inches
Maximum	1.290	1.480	29.291		
Minimum	0.700	0.360	2.124		

12/27/2022

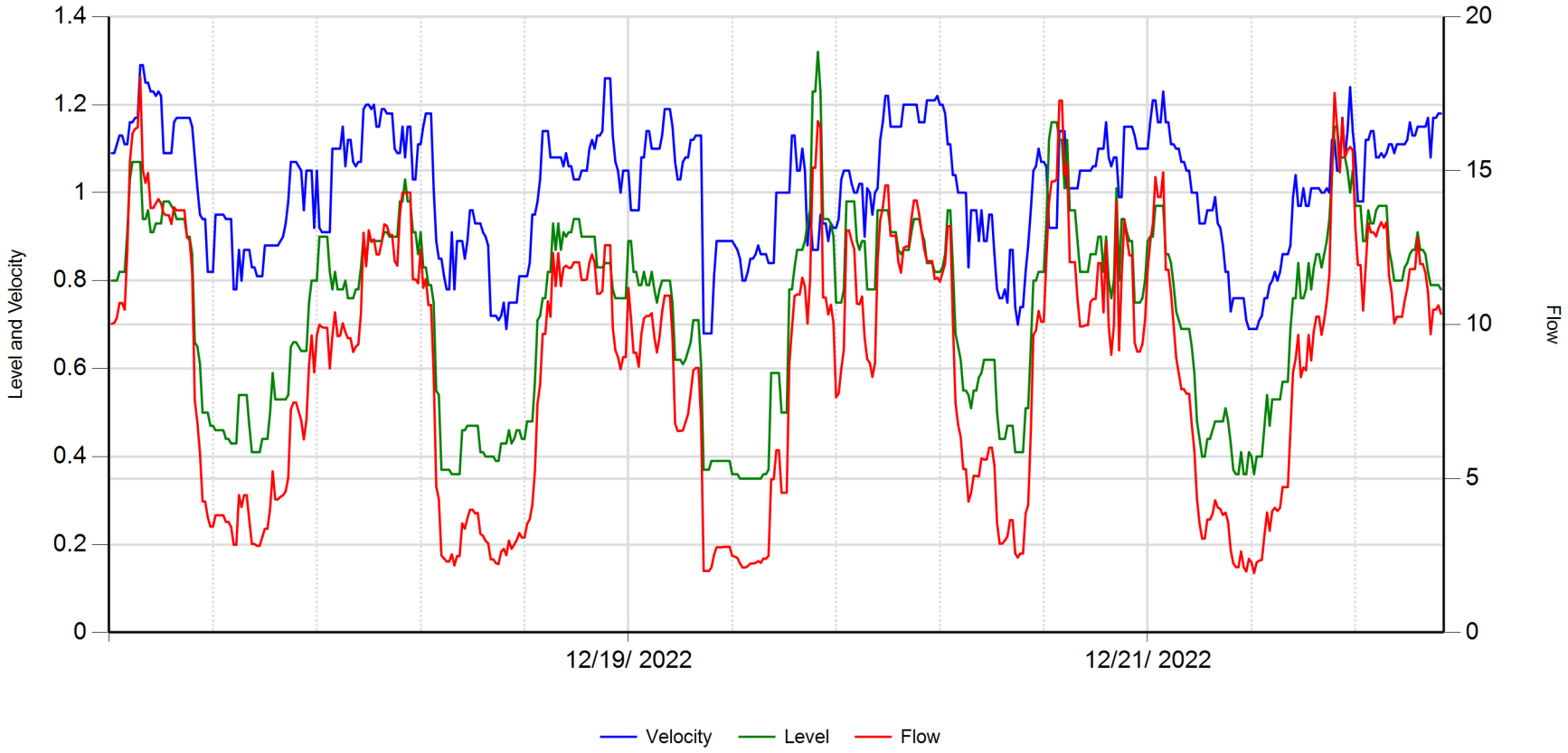
2022.12 Site 1 Madrona MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.025	0.753	9.251	**RainFall**	Inches
Maximum	1.300	1.370	20.720		
Minimum	0.580	0.320	1.359		

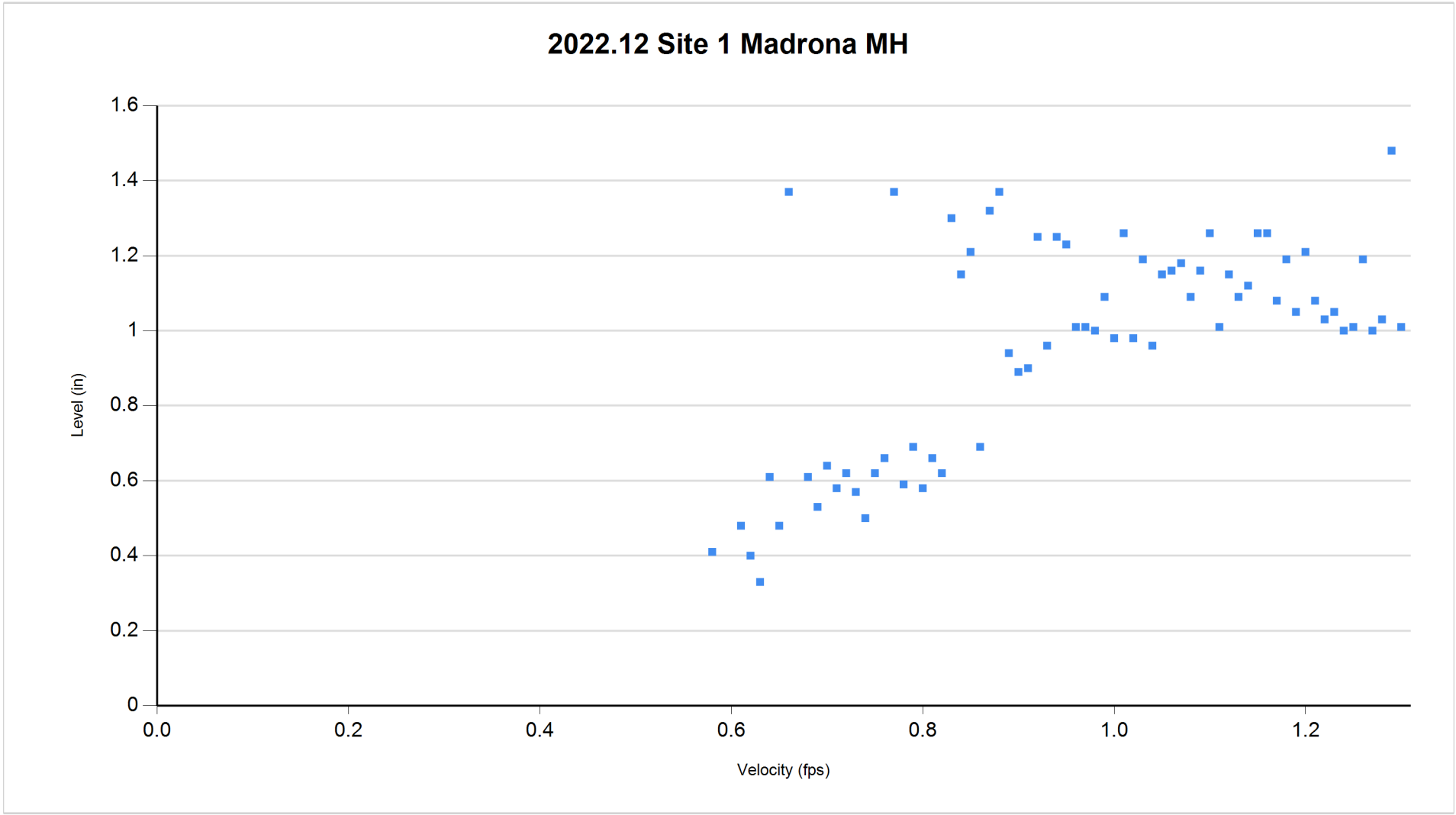
12/27/2022

2022.12 Site 1 Madrona MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.010	0.729	8.677	**RainFall**	Inches
Maximum	1.290	1.320	18.026		
Minimum	0.680	0.350	1.932		

12/27/2022



12/8/2022 thru 12/23/2022

12/27/2022 11:49:46 AM

Site Report 12/27/2022

Confidential Proprietary Information

Hunsaker & Associates

~3323 Sepulveda Blvd
Torrance, CA 90505
MH # unknown

2022.12 Site 2 Sepulveda MH

Access:
MH in WB curb lane, SW of address

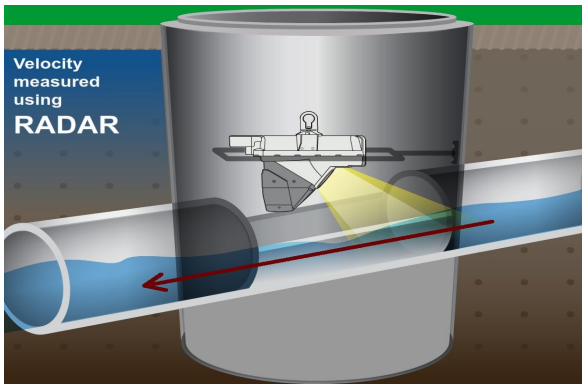
System Type:
Sanitary [X] Storm [ ]

Install Date: 12/08/2022

Map



Technology



Sewer Plan



Flow Meter			
Meter Depth: 179"			
MH Coordinates: 33.824510, -118.340839			
Slow to moderate open channel hydraulics with sediment in the trough			
Avg Velocity	Avg Measured Level		Multiplier
0.7 fps	6.4"		1.0

Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.

Traffic Safety
Used arrow board, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.

Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	197"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	17.8"
Sensor Dist. to Crown	5.8"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.12 Site 2 Sepulveda MH

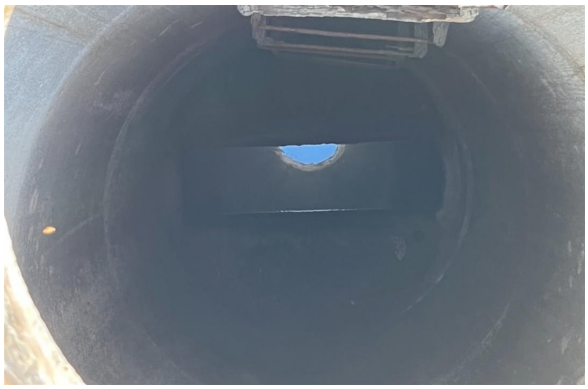
~3323 Sepulveda Blvd

Torrance, CA 90505

Site



Manhole Before Install



Installation Process



Installed



Upstream



Upstream Pipe Size



Temporary Flow Study

Hunsaker & Associates

2022.12 Site 2 Sepulveda MH

Meter Start Date		From	12/8/2022
Meter Stop Date		To	12/23/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	0.741	6.377	0.204
Maximum	1.520	7.970	0.536
Minimum	0.380	4.930	0.084
Pipe Size		12.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

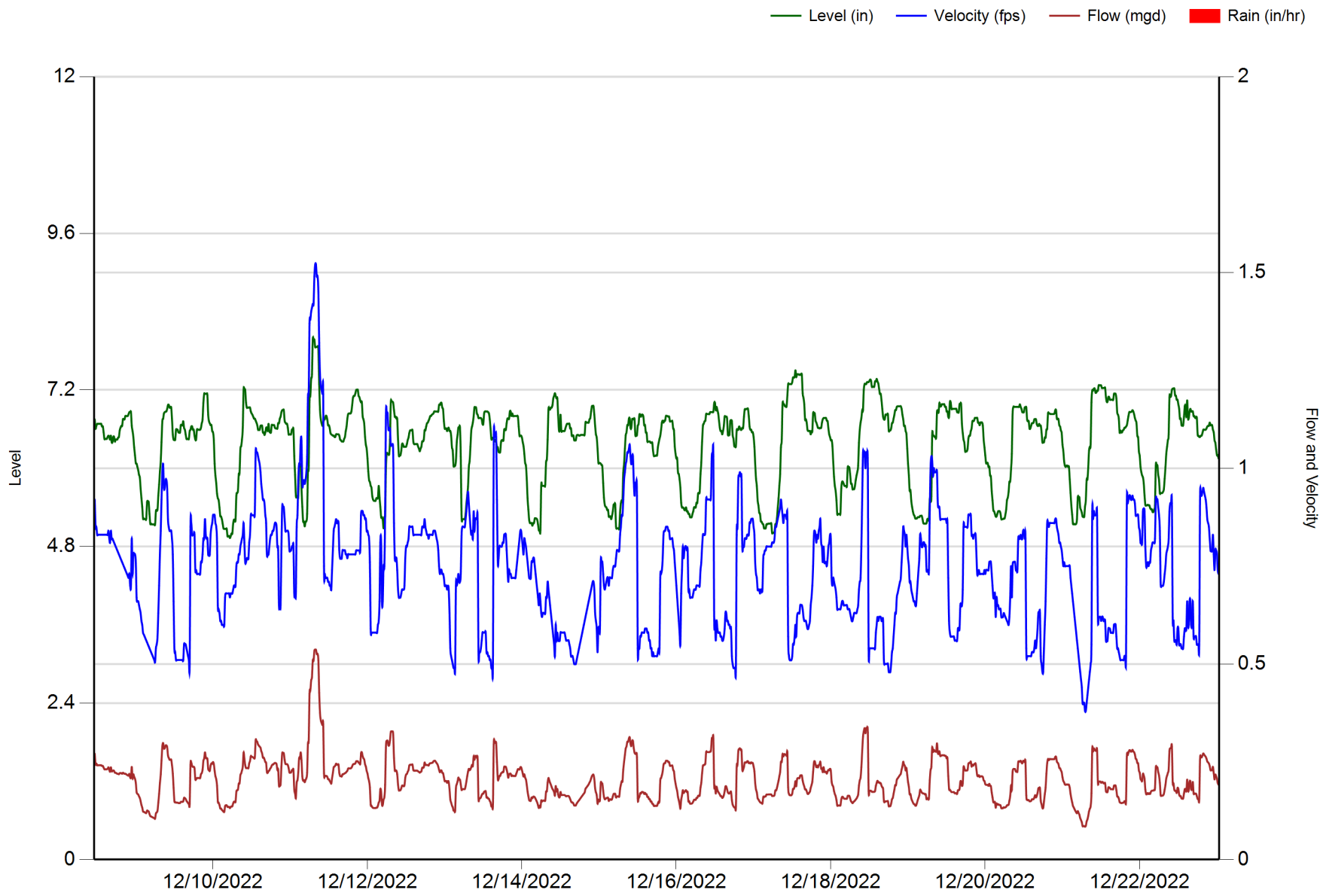
Utility Systems, Science and Software

1300 Hill St
El Cajon, CA 92020

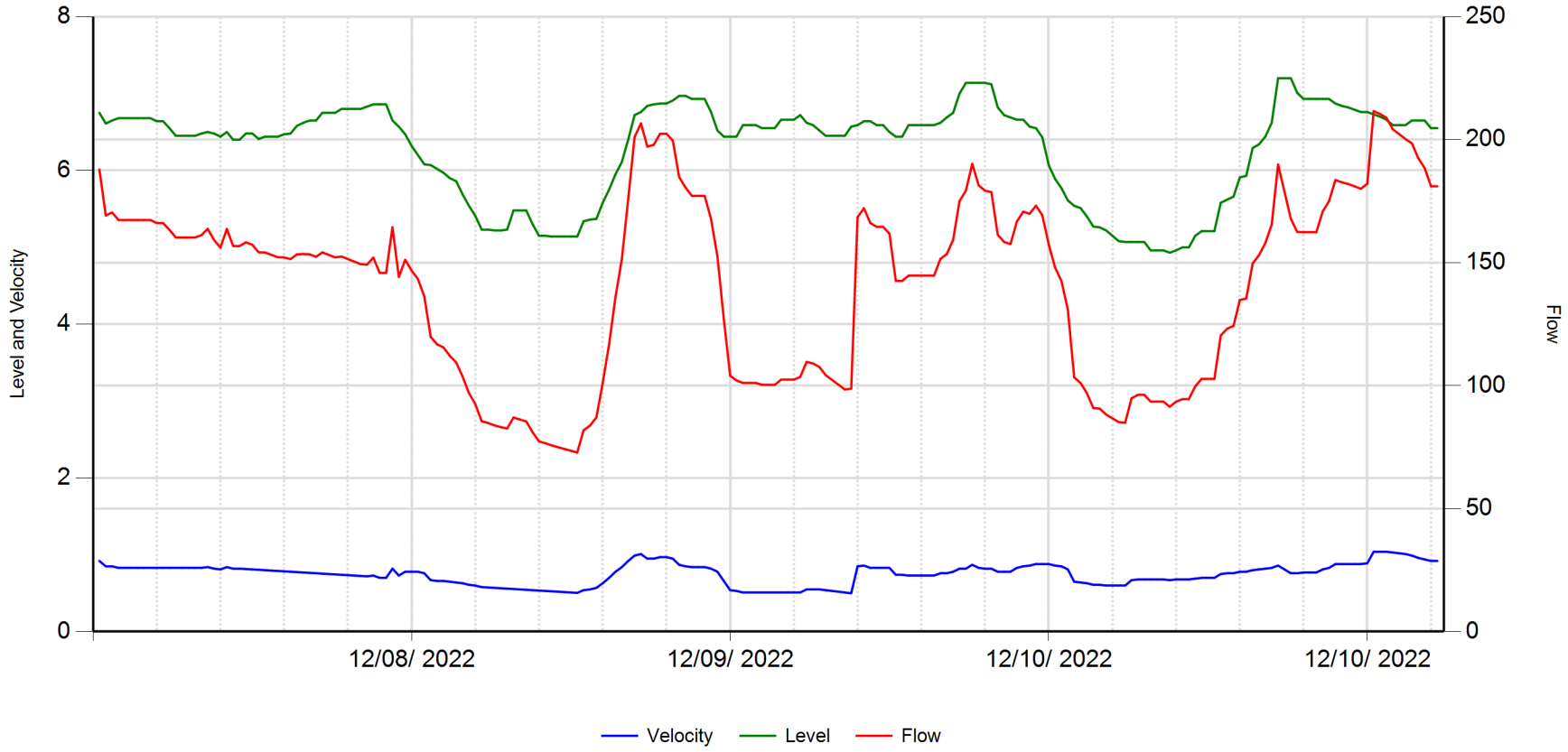
601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

Report Date: 12/27/2022
Customer: Hunsaker & Associates
Group: Del Amo Project
Site: 2022.12 Site 2 Sepulveda MH

2022.12 Site 2 Sepulveda MH:
12/08/2022 thru 12/23/2022



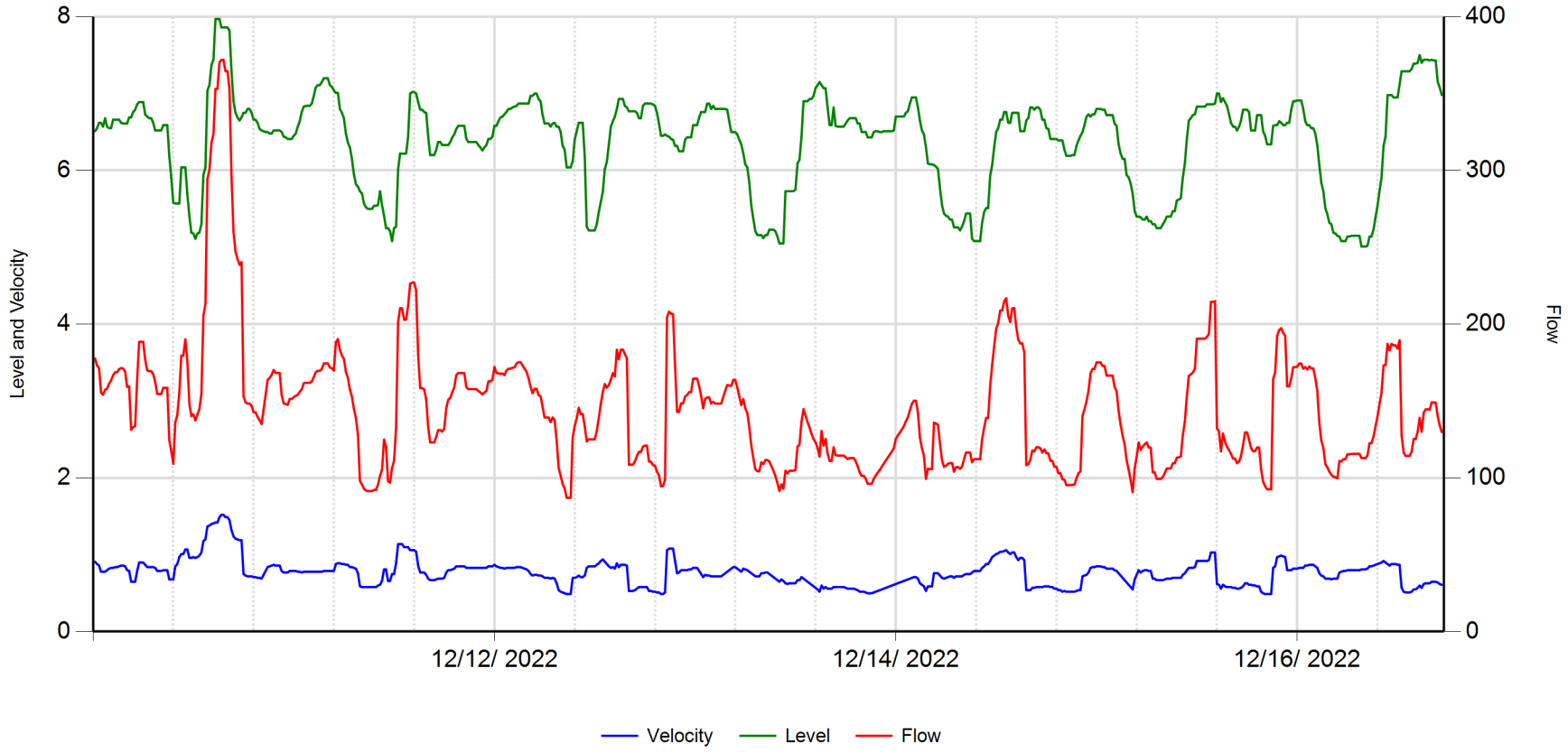
2022.12 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.746	6.284	141.095	**RainFall**	Inches
Maximum	1.040	7.200	211.630		
Minimum	0.500	4.930	72.820		

12/27/2022

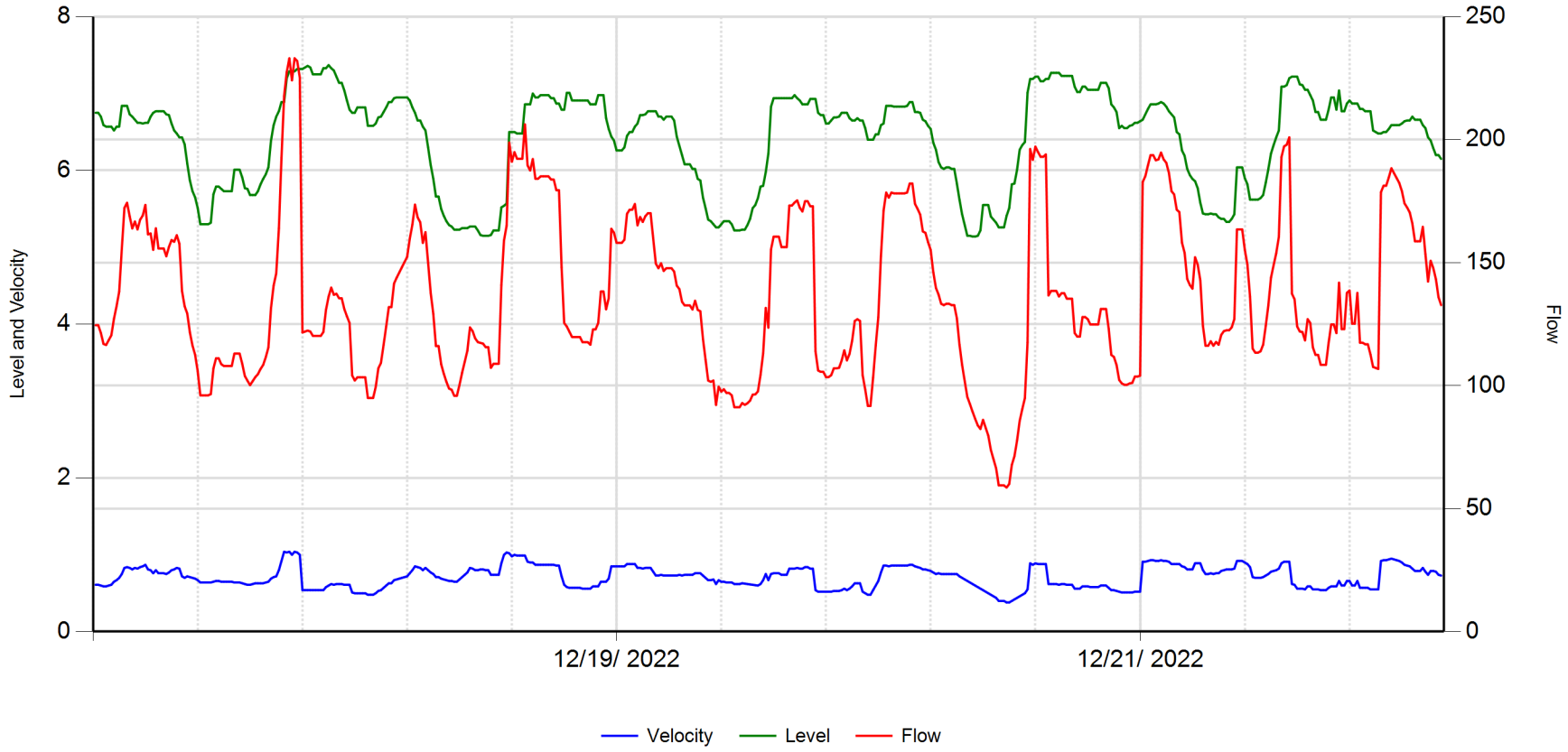
2022.12 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.763	6.375	145.569	**RainFall**	Inches
Maximum	1.520	7.970	371.931		
Minimum	0.490	5.010	87.098		

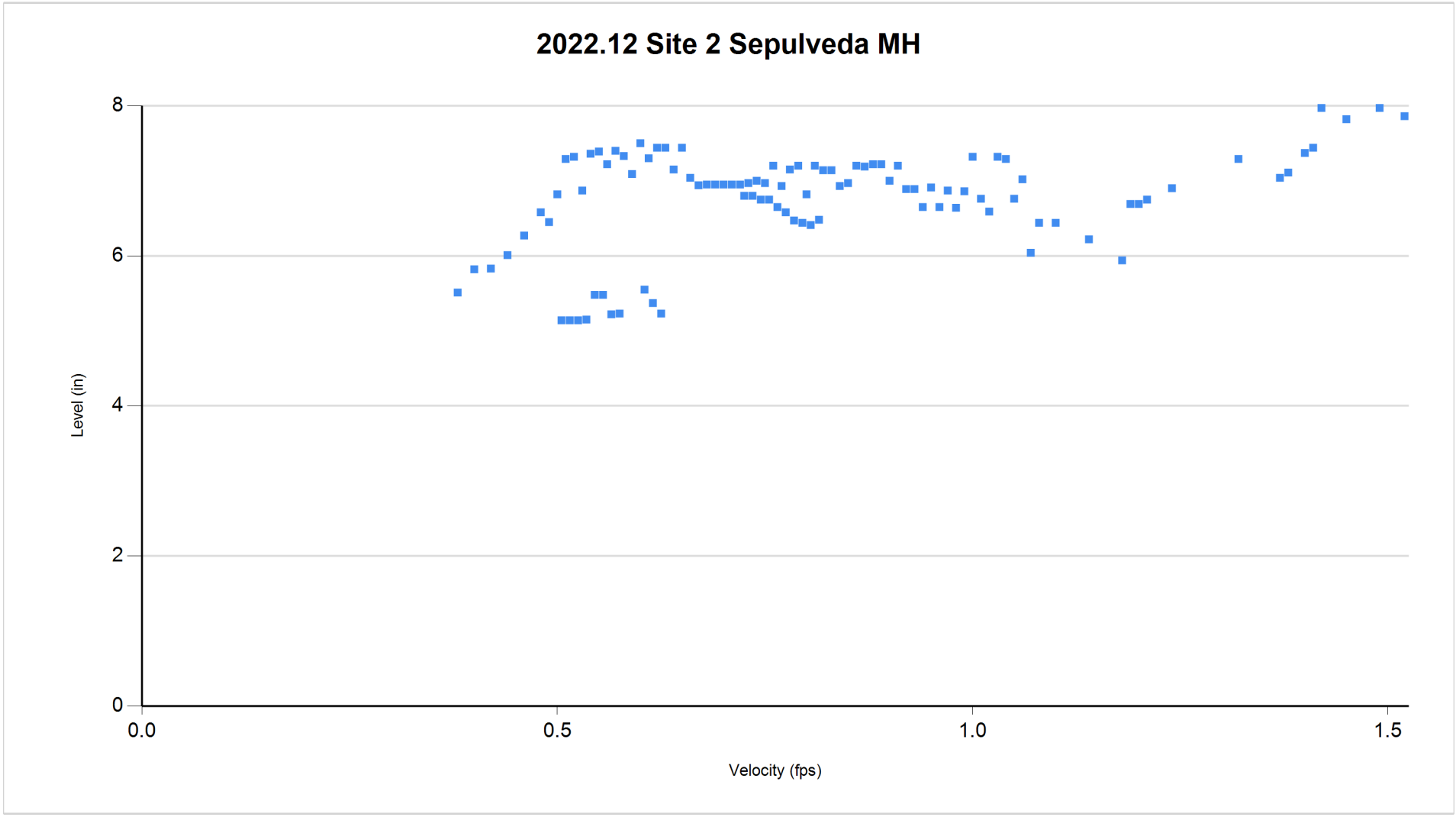
12/27/2022

2022.12 Site 2 Sepulveda MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.709	6.415	136.151	**RainFall**	Inches
Maximum	1.040	7.370	233.094		
Minimum	0.380	5.140	58.605		

12/27/2022



12/8/2022 thru 12/23/2022

12/27/2022 11:51:46 AM

Site Report 12/27/2022

Confidential Proprietary Information

Hunsaker & Associates

~2818 W. 235th St
Torrance, CA 90505
MH # unknown

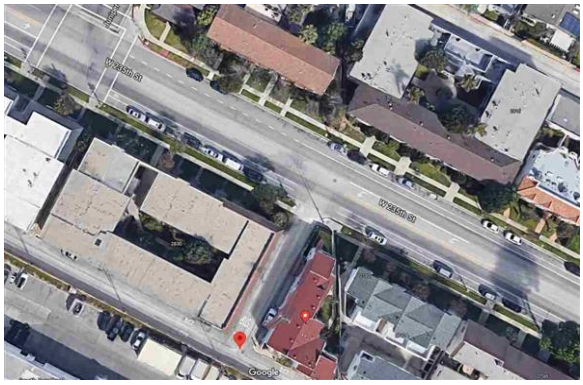
2022.12 Site 3 235th St MH

Access:
MH in center of alley intersection, SW of address

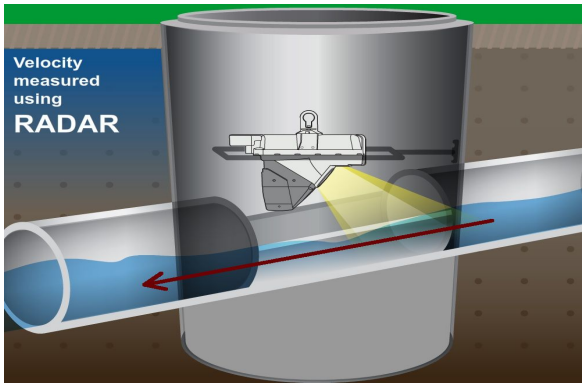
System Type:
Sanitary [X] Storm [ ]

Install Date: 12/08/2022

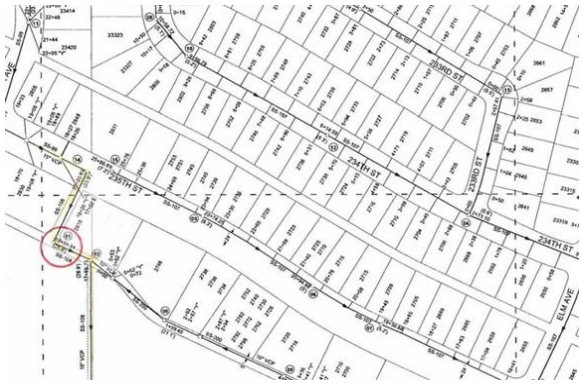
Map



Technology



Sewer Plan



Flow Meter			
Meter Depth: 293"			
MH Coordinates: 33.814518, -118.336471			
Moderate open channel hydraulics with bend in trough.			
Avg Velocity	Avg Measured Level		Multiplier
2.1 fps	4.2"		0.84
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
No laterals; monitored the upstream line as it provided the best hydraulics during inspection.			
Traffic Safety			
Used flaggers, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	317"
Monitored Pipe Size	15"
Inner Pipe Size (In/Out)	15"/15"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Brick
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	23.9"
Sensor Dist. to Crown	8.9"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.12 Site 3 235th St MH

~2818 W. 235th St

Torrance, CA 90505

Site



Manhole Before Install



Installation Process



Installed



Temporary Flow Study

Hunsaker & Associates

2022.12 Site 3 235th St MH

Meter Start Date		From	12/8/2022
Meter Stop Date		To	12/23/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	2.141	4.176	0.407
Maximum	2.760	5.520	0.707
Minimum	1.030	2.540	0.100
Pipe Size		15.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

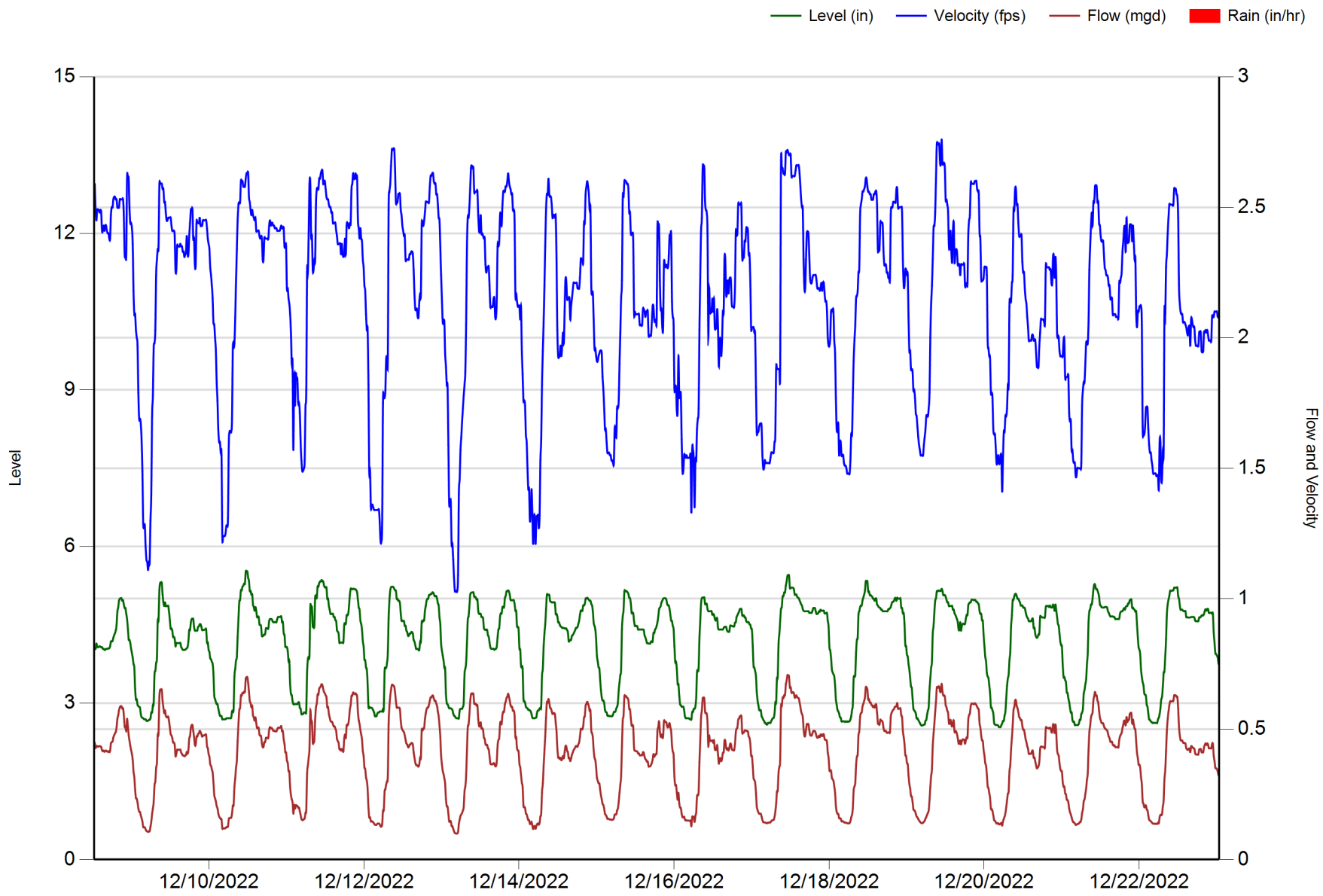
Utility Systems, Science and Software

1300 Hill St
El Cajon, CA 92020

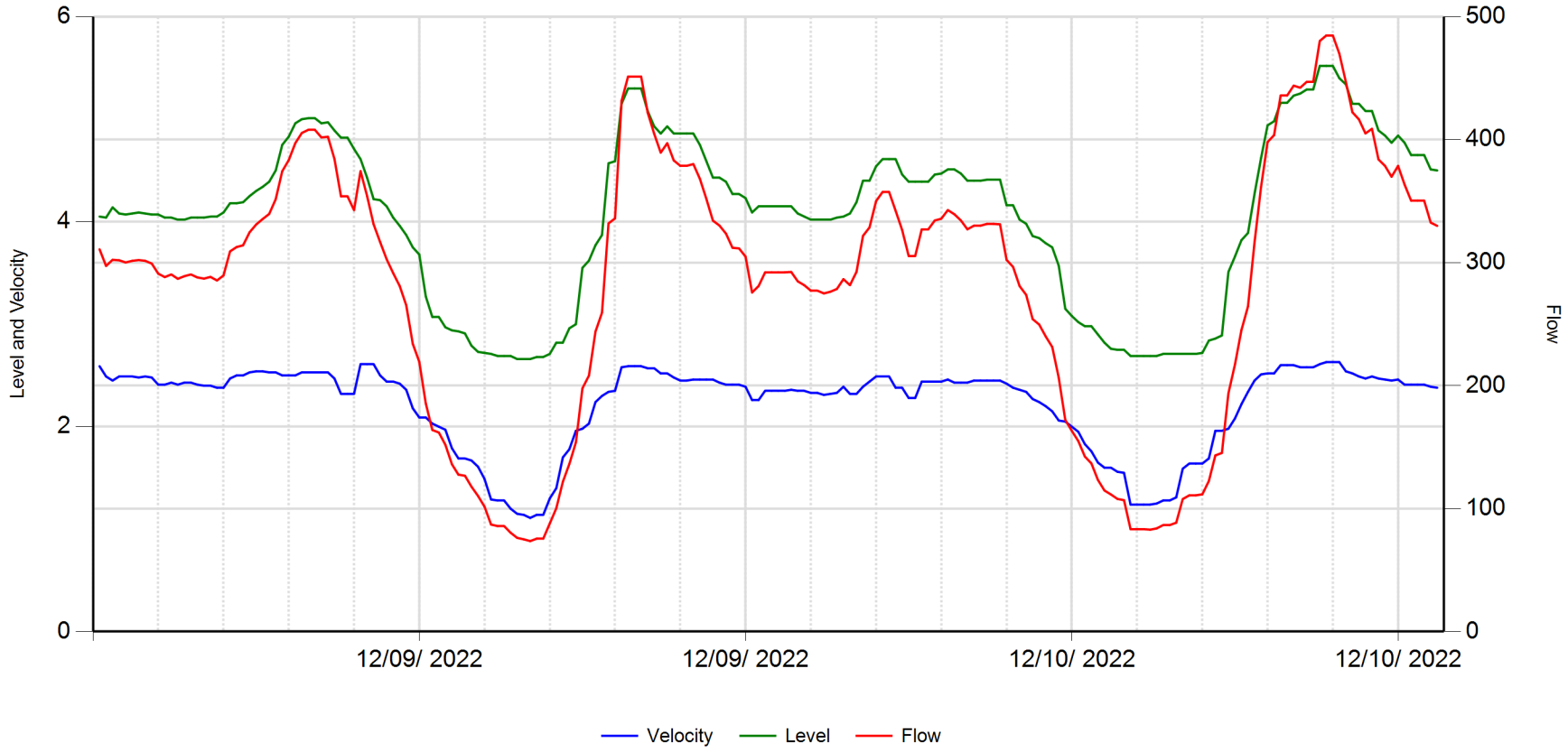
601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

Report Date: 12/27/2022
Customer: Hunsaker & Associates
Group: Del Amo Project
Site: 2022.12 Site 3 235th St MH

2022.12 Site 3 235th St MH:
12/08/2022 thru 12/23/2022



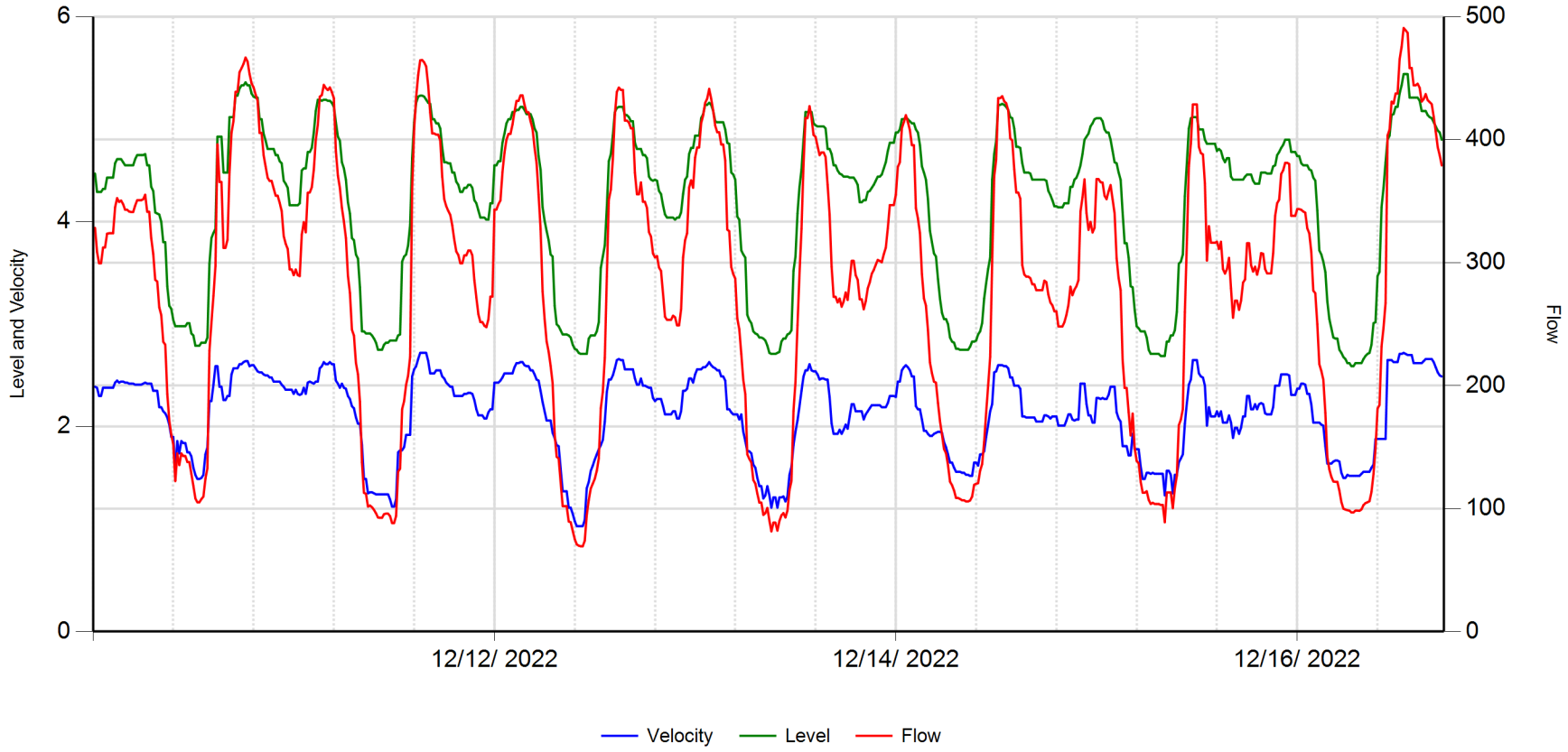
2022.12 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.221	4.056	281.265	**RainFall**	Inches
Maximum	2.630	5.520	484.732		
Minimum	1.110	2.660	73.657		

12/27/2022

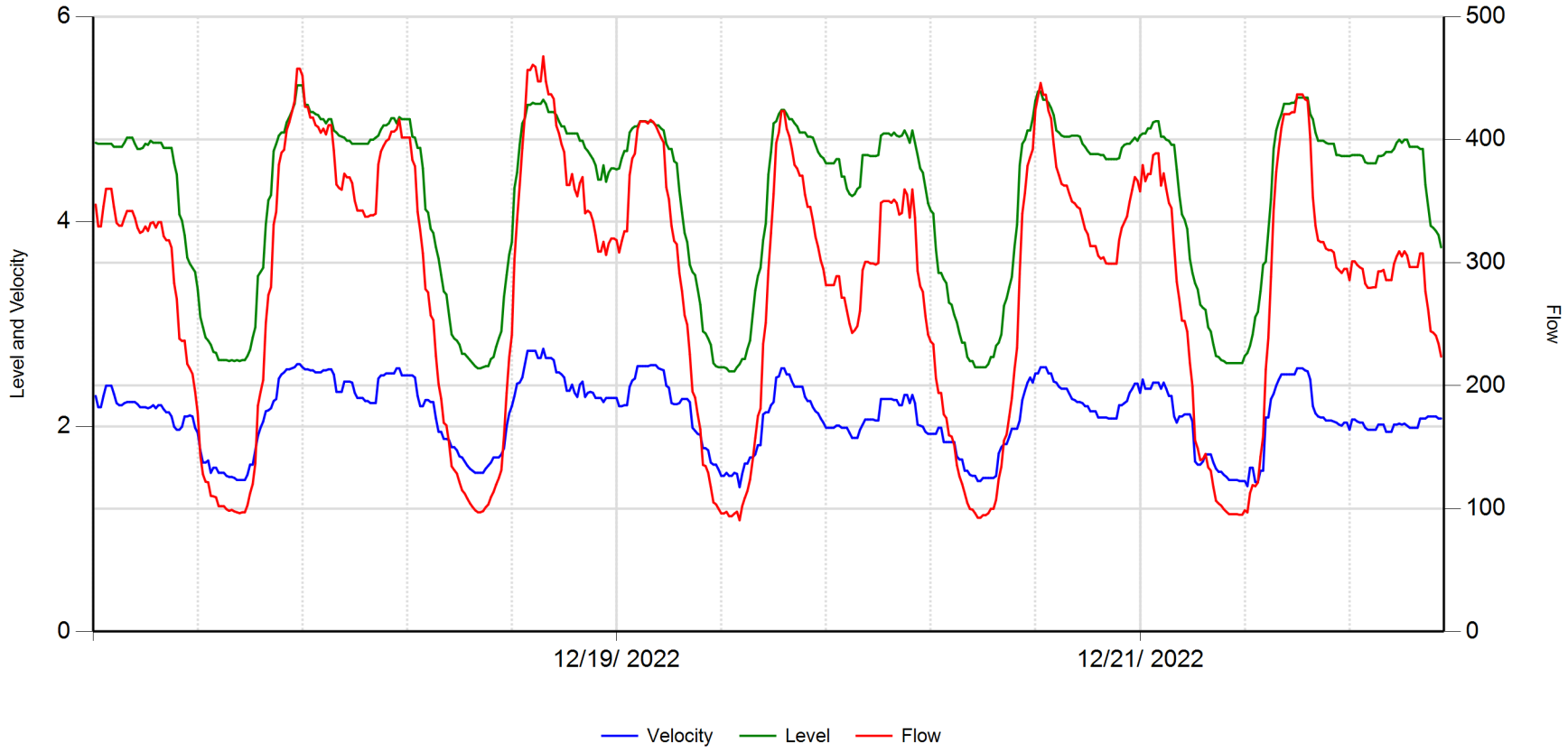
2022.12 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.137	4.175	282.438	**RainFall**	Inches
Maximum	2.720	5.440	490.806		
Minimum	1.030	2.590	69.426		

12/27/2022

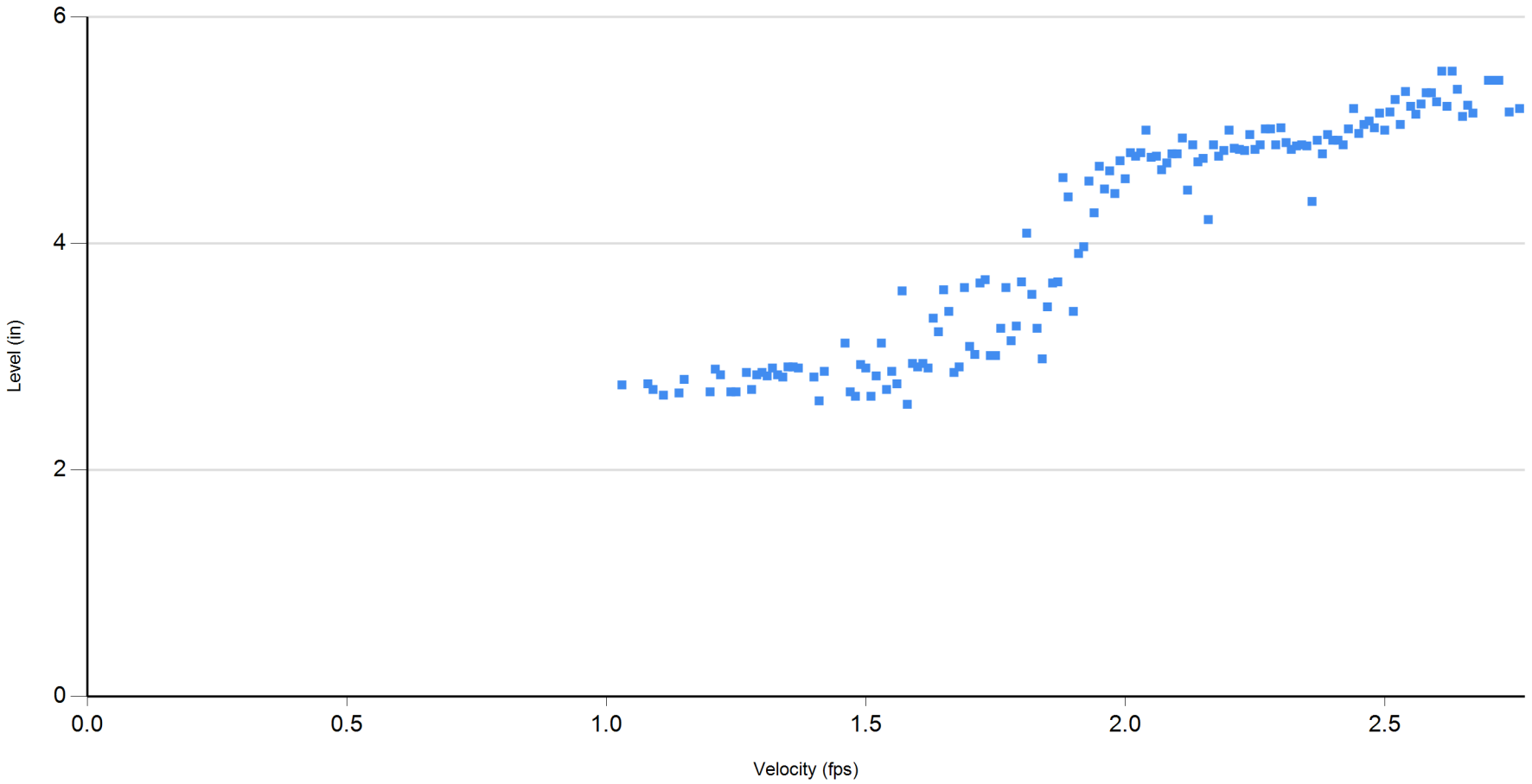
2022.12 Site 3 235th St MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.113	4.224	282.360	**RainFall**	Inches
Maximum	2.760	5.330	467.759		
Minimum	1.410	2.540	90.614		

12/27/2022

2022.12 Site 3 235th St MH



12/8/2022 thru 12/23/2022

12/27/2022 11:52:48 AM

Site Report 12/27/2022

Confidential Proprietary Information

Hunsaker & Associates

~2755 Lomita Blvd
Torrance, CA 90505
MH # unknown

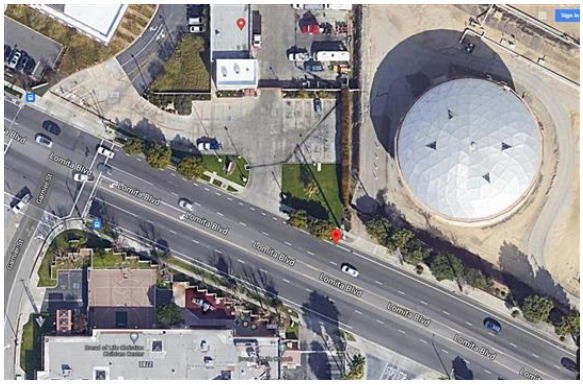
2022.12 Site 4 Lomita MH

Access:
MH in curb lane, south of address

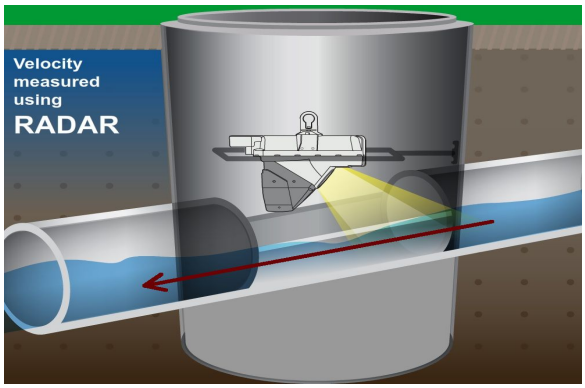
System Type:
Sanitary [X] Storm [ ]

Install Date: 12/08/2022

Map



Technology



Site



Flow Meter			
Meter Depth: 320"			
MH Coordinates: 33.809563, -118.336242			
Moderate open channel hydraulics with some turbulence at confluence of flows.			
Avg Velocity	Avg Measured Level		Multiplier
1.9 fps	4.5"		1.28
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Inlets from north & west; monitored the upstream N line to get total flow from the original MH.			
Traffic Safety			
Used arrow board, cones & signs in accord w/approved TCP per site-specific CATTCH requirements.			
Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	347"
Monitored Pipe Size	18"
Inner Pipe Size (In/Out)	18"/18"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete
Silt	None observed
Velocity Profile Data	Passed
Velocity Profile Taken	0.4 2-D
Sensor Offset	27.1"
Sensor Dist. to Crown	9.1"
Sensor Direction	Upstream
Flow Heading	East

Meter Site Document

2022.12 Site 4 Lomita MH

~2755 Lomita Blvd

Torrance, CA 90505

Site



Manhole Before Install



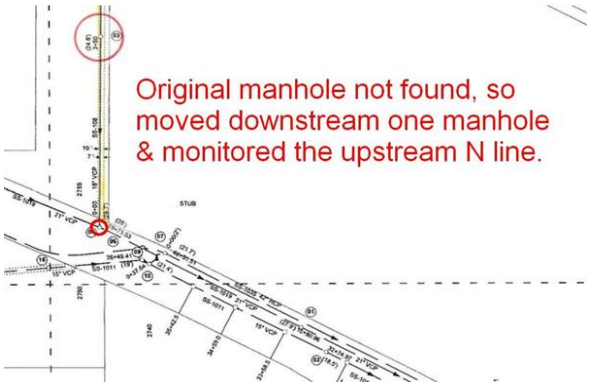
Installation Process



Installed



Moved DS One MH



Original MH Inaccessible



Temporary Flow Study

Hunsaker & Associates

2022.12 Site 4 Lomita MH

Meter Start Date		From	12/8/2022
Meter Stop Date		To	12/23/2022
Velocity (fps)		Level (in)	Flow (mgd)
Average	1.852	4.522	0.439
Maximum	2.620	7.830	1.129
Minimum	0.760	3.050	0.101
Pipe Size		18.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

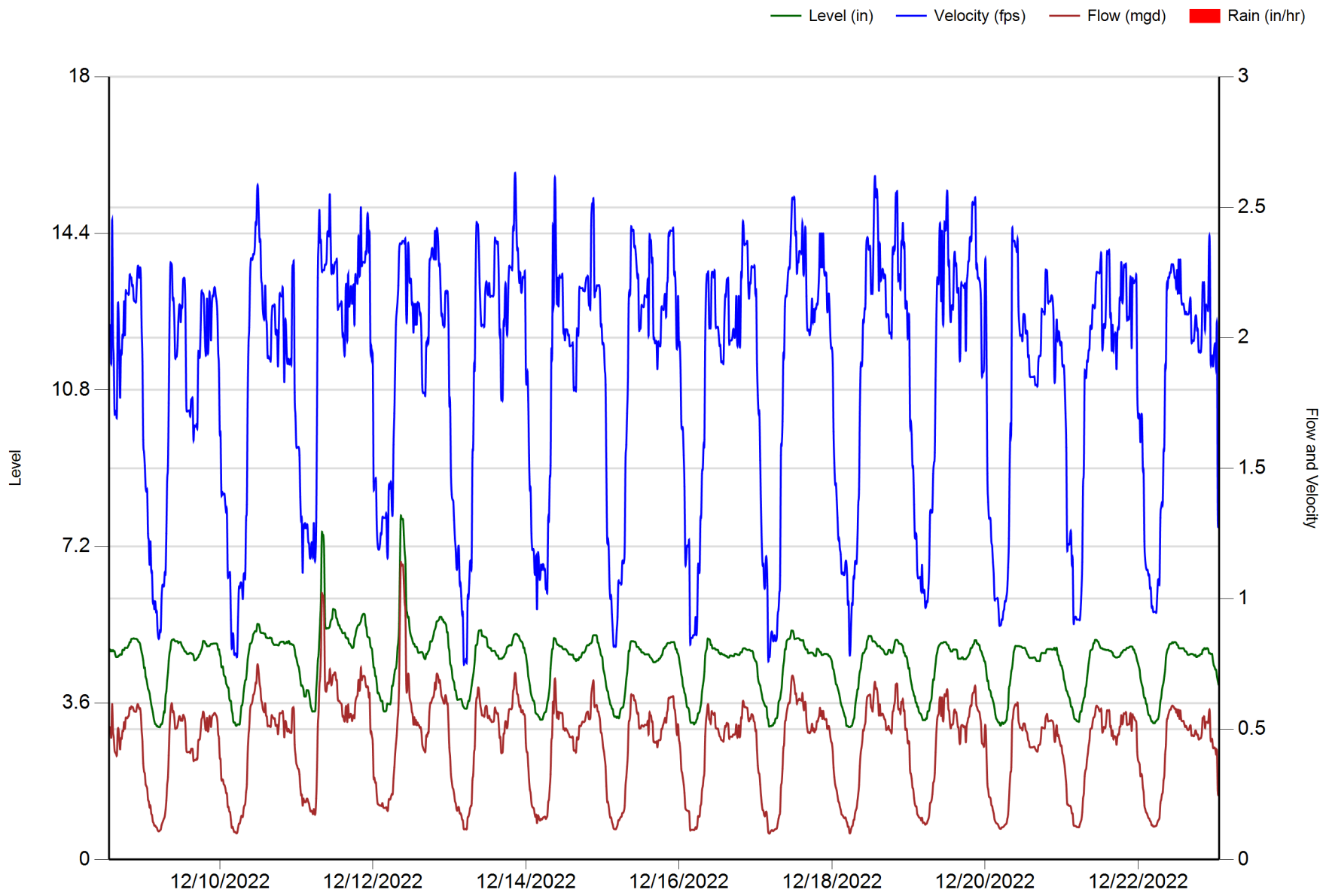
Utility Systems, Science and Software

1300 Hill St
El Cajon, CA 92020

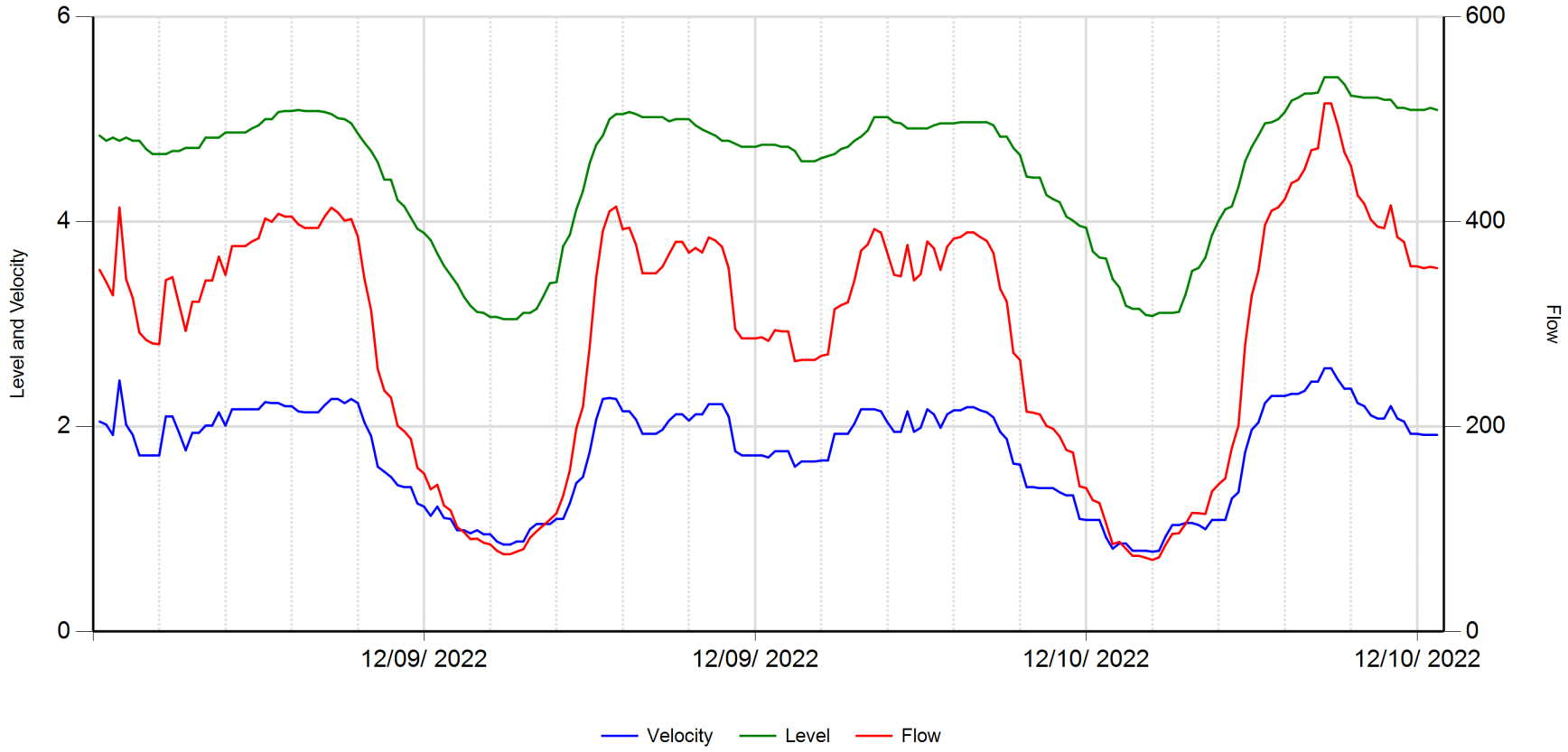
601 N. Parkcenter Dr, Suite 209
Santa Ana, CA 92705

Report Date: 12/27/2022
Customer: Hunsaker & Associates
Group: Del Amo Project
Site: 2022.12 Site 4 Lomita MH

2022.12 Site 4 Lomita MH:
12/08/2022 thru 12/23/2022



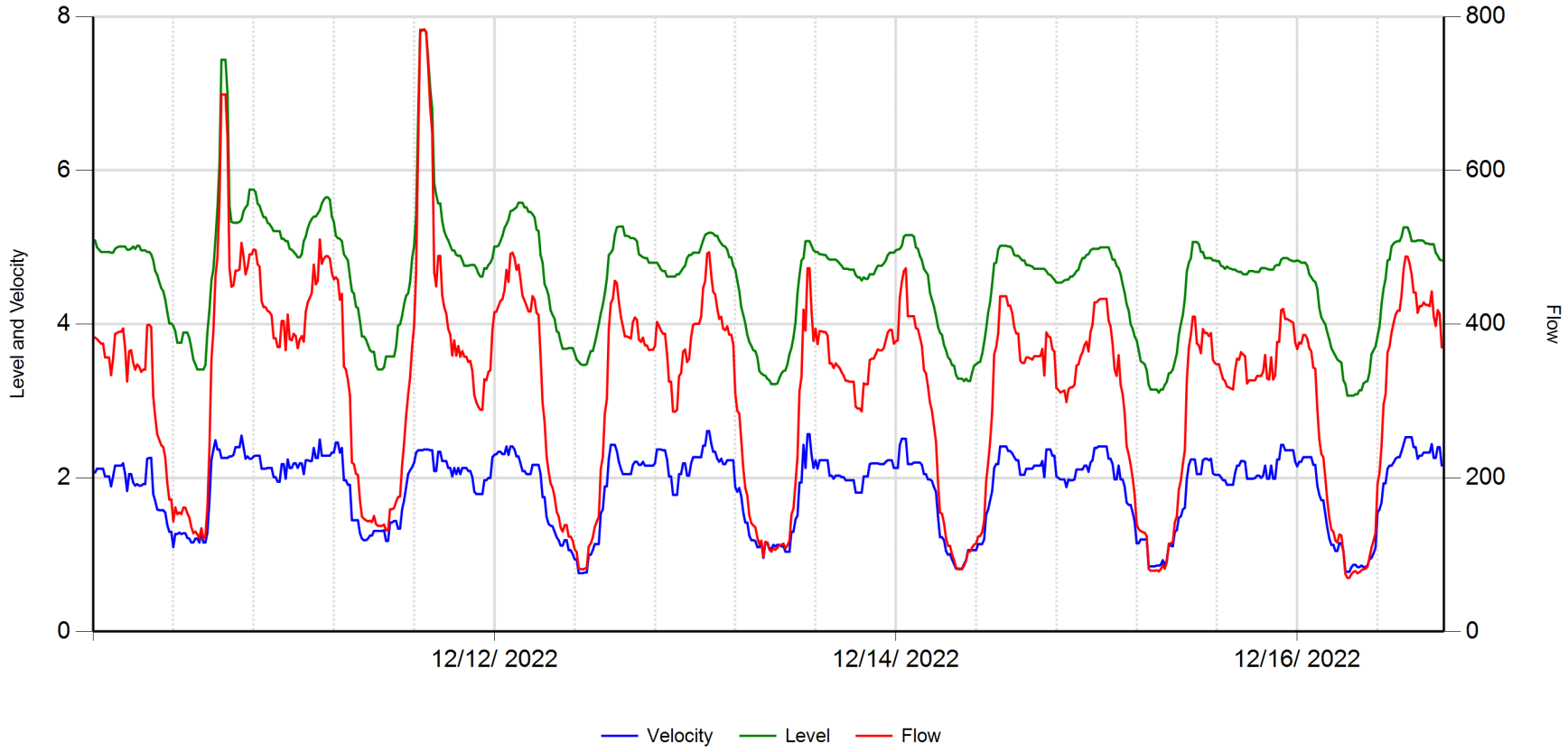
2022.12 Site 4 Lomita MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.755	4.517	289.796	**RainFall**	Inches
Maximum	2.570	5.410	515.346		
Minimum	0.780	3.050	70.000		

12/27/2022

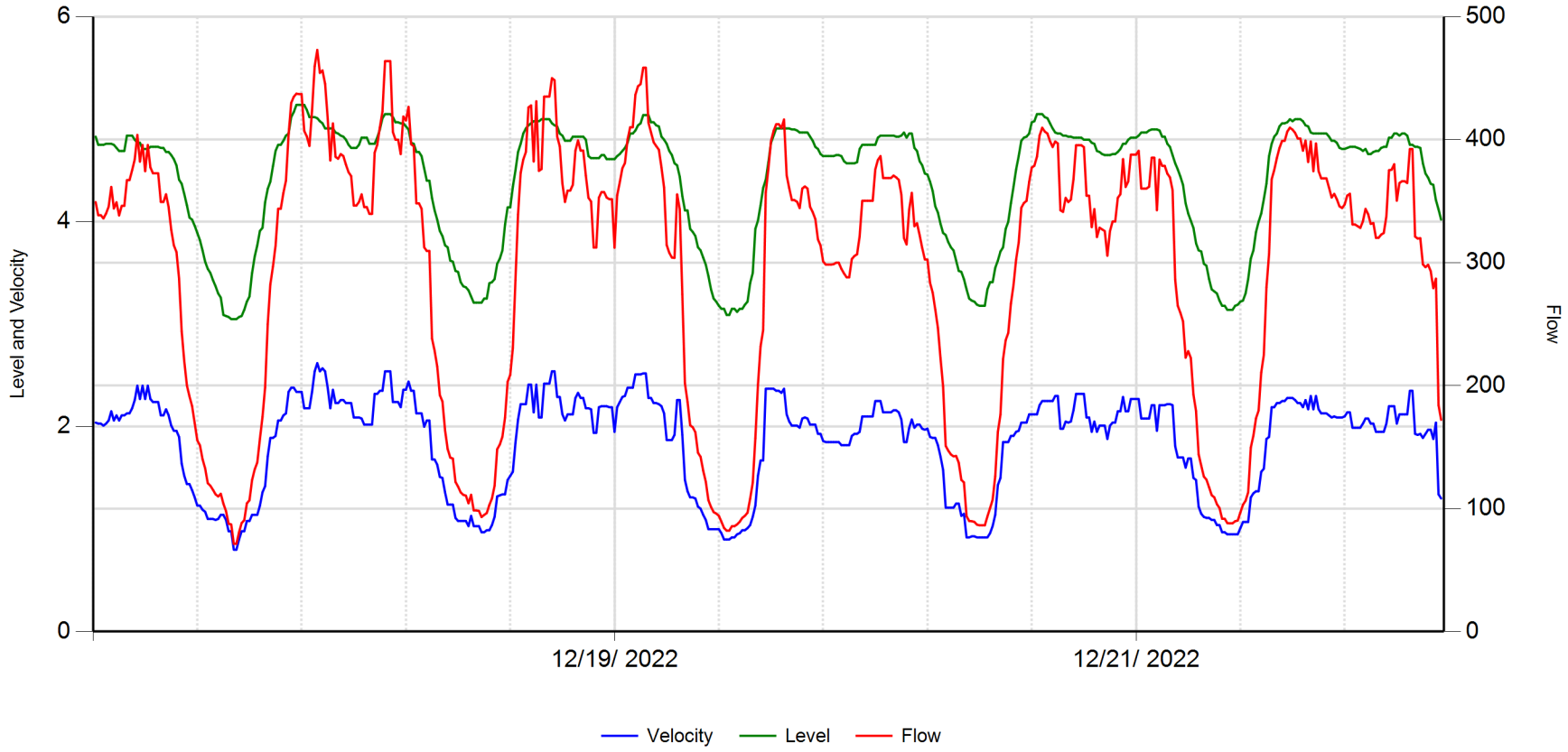
2022.12 Site 4 Lomita MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.878	4.607	317.944	**RainFall**	Inches
Maximum	2.610	7.830	783.748		
Minimum	0.760	3.070	69.930		

12/27/2022

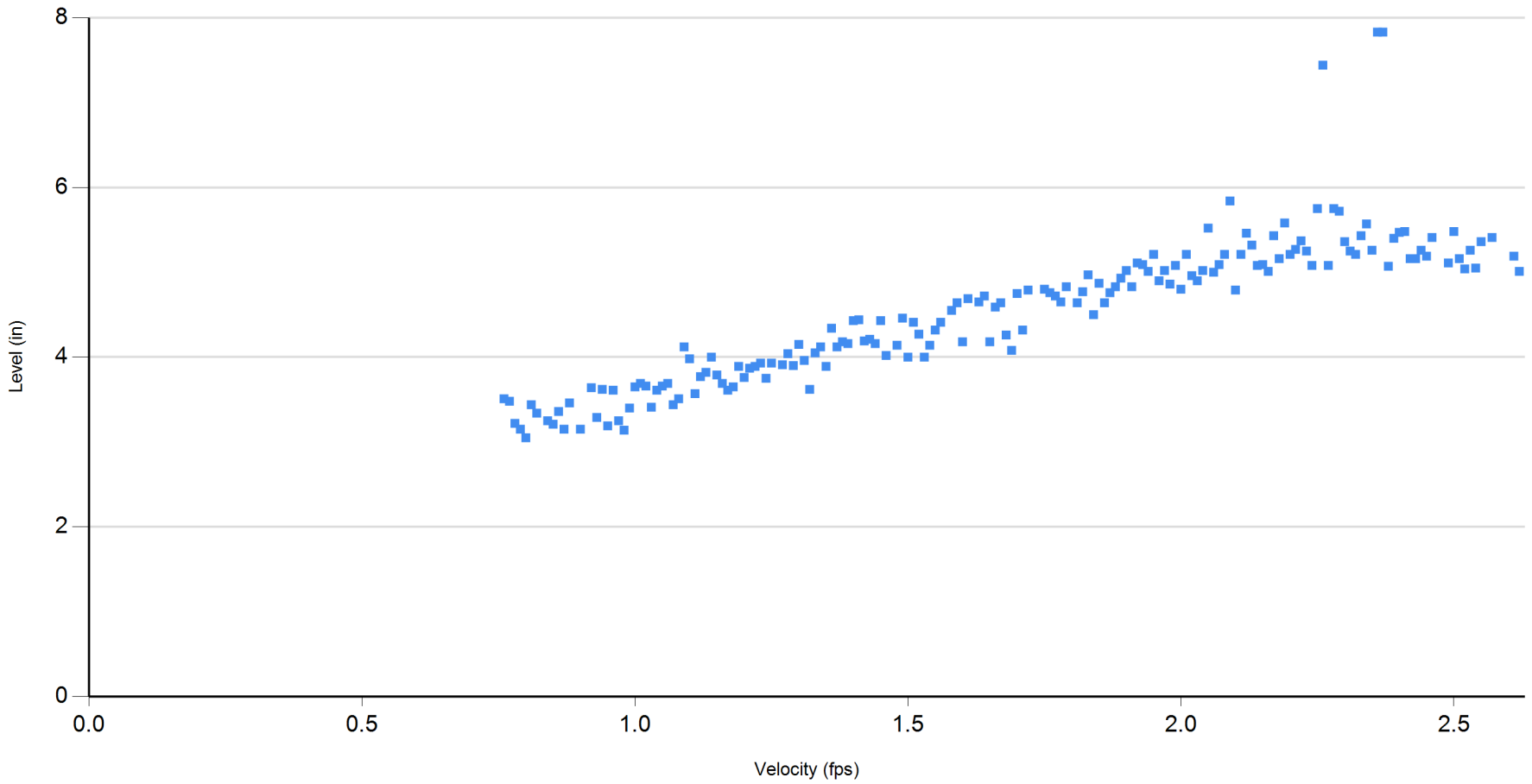
2022.12 Site 4 Lomita MH



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.854	4.409	293.718	**RainFall**	Inches
Maximum	2.620	5.140	472.985		
Minimum	0.800	3.050	71.389		

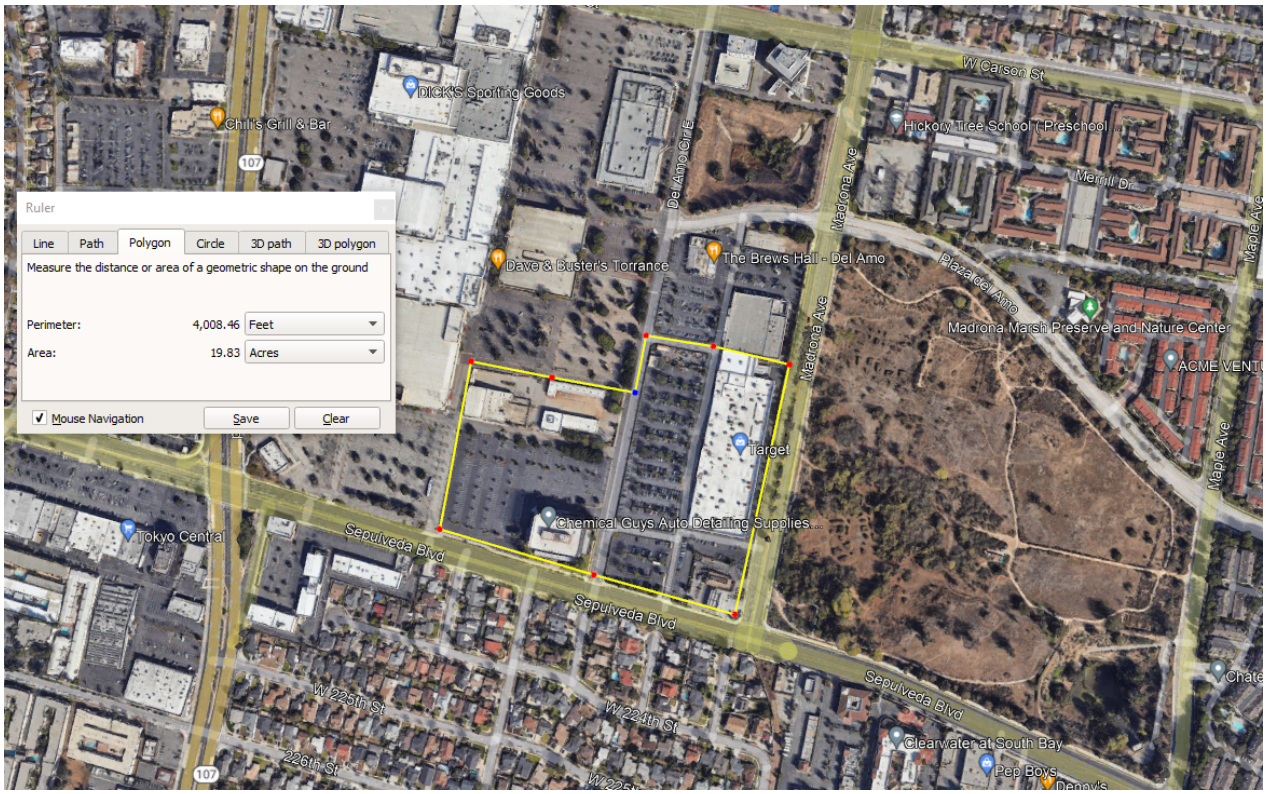
12/27/2022

2022.12 Site 4 Lomita MH



12/8/2022 thru 12/23/2022

12/27/2022 11:53:31 AM


Ruler
Line
Path
Polygon
Circle
3D path
3D polygon
Measure the distance or area of a geometric shape on the ground
Perimeter:
4,008.46
Feet
Area:
19.83
Acres
Mouse Navigation
Save
Clear
DICK'S Sporting Goods
Chili's Grill & Bar
Dave & Buster's Torrance
The Brews Hall - Del Amo
Target
Chemical Guys Auto Detailing Supplies...
Tokyo Central
Sepulveda Blvd
W Carson St
Hickory Tree School - Preschool...
Merrill Dr
Madrona Ave
Del Amo Cir E
Plaza del Amo
Madrona Marsh Preserve and Nature Center
ACME VENT
Maple Ave
W 225th St
W 224th St
226th St
Clearwater at South Bay
Pep Boys
107

□□MM□R□□□□□□R□□□□R□□□□□□R□□□□□□□□□□□□□D□□□□□ □R□M□□□

The location and dimensions of sanitary sewer easements shall be sufficient to provide present and future sewer service to abutting areas and adequate access for maintenance as determined by the county engineer.

C. Until the required easements have been properly executed and recorded:

1. No plans shall be approved by the county engineer for sewer facilities to be constructed by any person across the property of others;

2. No sewer facilities shall be accepted for public use, nor placed in use by any person.

(Ord. 10020 § 3 (part), 1970: Ord. 8690 § 11, 1964: Ord. 6130 Part 5 Ch. 6 § 5605.1, 1952.)

20.32.440 Main-line sewers—Size specifications.

A. The size of main-line sewer pipe shall be determined by standards of design and the coefficients listed below, but in no case shall it be less than eight inches inside diameter.

For zoning in the following categories for residential areas:	Coefficient cu. ft. per sec. per acre
R-1	0.004
R-2	0.008
R-3	0.012
R-4	0.016*
For commercial areas:	
C-I through C-4	0.015*
For heavy industrial areas:	
M-I through M-4	0.021*

** Individual building, commercial or industrial plant capacities shall be the determining factor when they exceed the coefficients shown.*

B. The coefficient to be used for any zoned area not listed will be determined by the county engineer based upon the intended development and use.

C. The county engineer shall determine which of the coefficients or combination of coefficients shall be used for design, as determined by the established or proposed zoning in the study area. Any modifications to these coefficients due to topography, development or hazard areas shall be approved by the county engineer.

(Ord. 8690 § 12 (part), 1964: Ord. 6130 Part 5 Ch. 6 § 5606, 1952.)

20.32.450 Main-line sewers—Minimum velocity.

A mainline sewer shall be designed to provide a minimum velocity of two feet per second for pipes flowing one-half full, except that the county engineer may approve a gradient that will develop a lower velocity if he finds that a gradient that will develop a velocity of two feet per second is unobtainable.

Tentative Tract 83498
Offsite Sewer System
FlowMaster Calculations

Project Description	
Worksheet:	existing Site 2
Flow Element:	Circular Pipe
Friction Method:	Manning Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0018	ft/ft
Diameter	12	in
Discharge	0.37	cfs

Results		
Normal Depth	4.00	in
Flow Area	0.20	ft²
Wetted Perimeter	1.20	ft
Top Width	0.95	ft
Critical Depth	3.00	in
Percent Full (**d/D)**	33.70	%
Critical Slope	0.00600	ft/ft
Velocity	1.59	ft/s
Velocity Head	0.04	ft
Specific Energy	0.38	ft
Froude Number	0.57	
Maximum Discharge	1.63	cfs
Discharge Full	1.51	cfs
Slope Full	0.00000	ft/ft
Flow Type	Subcritical	

Project Description	
Worksheet:	existing + project Site 2
Flow Element:	Circular Pipe
Friction Method:	Manning Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0018	ft/ft
Diameter	12	in
Discharge	0.76	cfs

Results		
Normal Depth	6.00	in
Flow Area	0.40	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	4.40	in
Percent Full (**d/D**)	50.00	%
Critical Slope	0.00600	ft/ft
Velocity	1.92	ft/s
Velocity Head	0.06	ft
Specific Energy	0.56	ft
Froude Number	0.54	
Maximum Discharge	1.63	cfs
Discharge Full	1.51	cfs
Slope Full	0.00000	ft/ft
Flow Type	Subcritical	

PRELIMINARY LOW IMPACT DEVELOPMENT PLAN

"DEL AMO"

Project Address:
Southwest of Madrona Avenue and Fashion Way
Torrance, California

Prepared for:

LENNAR

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Irvine, CA 92618
(949) 249-8000

Prepared by:

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Preparation Date:
March 10, 2022

W.O. 3916-68

W.O. 3916-68

PRELIMINARY LOW IMPACT DEVELOPMENT PLAN

"DEL AMO" – SOUTHWEST OF MADRONA AVENUE AND FASHION WAY

City of Torrance, CA

PRELIMINARY
LOW IMPACT DEVELOPMENT (LID) PLAN

"DEL AMO"

SOUTHWEST OF MADRONA AVENUE AND FASHION WAY
CITY OF TORRANCE, COUNTY OF LOS ANGELES

PREPARED FOR:

LENNAR

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SUBMITTED TO:

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PREPARED:

MARCH 10, 2022

Engineer's Certification
Low Impact Development (LID) Plan

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I HEREBY CERTIFY THAT THIS LOW IMPACT DEVELOPMENT (LID) PLAN IS IN COMPLIANCE WITH THE REQUIREMENTS SET FORTH IN ORDER NO. R4-2012-0175/NPDES NO. CAS004001 OF THE LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD.

I certify under penalty of law that this document and all attachments were prepared under my jurisdiction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations

Preparer Signature		Date	
Place Stamp Here			

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LID NOTES:

1. Determine and provide the pre- and post- development pervious and impervious areas created by the proposed development. The areas below include the entire project boundary consistent with the Site Plan.

POST DEVELOPMENT					
Impervious Area	14.08	Acres	Percent Impervious	86	%
Pervious Area	2.29	Acres	Percent Pervious	14	%
PRE DEVELOPMENT					
Impervious Area	15.72	Acres	Percent Impervious	96	%
Pervious Area	0.65	Acres	Percent Pervious	4	%

2. Any modifications to the approved Low Impact Development (LID) report must be resubmitted to the City for approval.
3. A copy of the approved Low Impact Development (LID) report must be in the possession of a responsible person and available at the site at all times.
4. All structural BMP's shall be accessible for inspection and maintenance.
5. Prior to commencement of any work for connection to City or County maintained storm drain, an encroachment permit from the appropriate party shall be obtained.

I. LID Requirements and Project Description

A. LID Background

In 1987, The Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA] was amended to provide that the discharge of pollutants to waters of the United States from stormwater is effectively prohibited, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit. The 1987 amendments to the CWA added Section 402 (p), which established a framework for regulating municipal, industrial and construction stormwater discharges under the NPDES program. In California, these permits are issued through the State Water Resources Control Board – (SWRCB) and the nine Regional Water Quality Control Boards.

On November 8, 2012, the Regional Water Quality Control Board, Los Angeles Region (RWQCB), adopted Order No. R4-2012-0175. This Order is the NPDES Permit (NPDES No. CAS004001) for municipal stormwater and urban runoff discharges within the County of Los Angeles.

As adopted in November 2012, the requirements of Order No. R4-2012-0175 (the "Permit') cover 84 cities and the unincorporated areas of Los Angeles County. The County of Los Angeles and the 84 incorporated cities are designated as Permittees.

In compliance with the Permit, the Permittees have implemented a stormwater quality management program (SQMP) with the ultimate goal of accomplishing the requirements of the Permit and reducing the amount of pollutants in stormwater and urban runoff wherein new development/redevelopment projects are required to prepare a Low Impact Development (LID) report.

As a Permittee of the County of Los Angeles, Best Management Practices (BMPs) are enforceable by the City of Torrance.

B. Designated Project Categories

Table 1, Designated Project Categories, identifies the Project as **Category 1**, thereby requiring development of this Low Impact Development (LID) report.

Table 1 – Designated Project Categories

Category	Description
1	All development projects equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area.
2	Industrial parks with 10,000 square feet or more of surface area.
3	Commercial malls with 10,000 square feet or more of surface area.
4	Retail gasoline outlets with 5,000 square feet or more of surface area.
5	Restaurants (Standard Industrial Classification [SIC] of 5812) with 5,000 square feet or more of surface area.
6	Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces.
7	Automotive service facilities (SIC Codes: 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) with 5,000 square feet or more of surface area.

Table 1 – Designated Project Categories	
Category	Description
8	Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will: • Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and • Create 2,500 square feet or more of impervious surface area.
9	Redevelopment projects, which are developments that result in creation or addition or replacement of either: 5,000 square feet or more of impervious surface on a site that was previously developed as described in the above bullets; or (2) 10,000 square feet or more of impervious surface area on a site that was previously developed as a single family home. • Where 50 percent or more of the impervious surface of a previously developed site is proposed to be altered and the previous development project was not subject to post-construction stormwater quality control measures, the entire development site (e.g., both the existing development and the proposed alternation) must meet the requirements of the LID Standards Manual. • Where less than 50% of the impervious surface of a previously developed site is proposed to be altered and the previous development project was not subject to post-construction stormwater quality control measures, only the proposed alteration must meet the requirements of the LID Standards Manual. • Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

C. Site Description

The approximately 16.37-acre project site is located just southwest of the intersection of Madrona Avenue and Fashion Way, in the City of Torrance. The property's associated assessor's parcel numbers (APN) are 7366-019-183, 7366-019-182, 7366-019-123. Specifically, the site is bound to the north by Fashion Way and an existing business plaza beyond; to the east by Madrona Avenue and existing residential homes beyond; to the south by Carson Street and an existing business plaza beyond; and to the west by Del Amo Circle and Del Amo Fashion Plaza beyond.

Surrounding land use includes business, commercial and residential uses. Existing general planland use for the project site commercial (C-CTR), with zoning designation of H-DA1 (Del Amo Business Sub-District 1). The site resides within the central portion of the Hawthorne Boulevard Corridor Specific Plan (HBCSP)

There are no known Significant Ecological Area (SEA) located within project limits or directly adjacent to the project site, nor does the project discharge directly to any areas identified as an SEA.

D. Project Description

Lennar proposes "Del Amo" for a 288-unit, 16.37-acre residential condominium project with common landscaping areas, private drives, curb, gutter, sidewalk and storm drain improvements, wet and dry utilities and related infrastructure improvements and open space areas.

Proposed residential units is anticipated to consist of one- to three-bedroom, three and four-story units with living area ranging from 733 square feet to 2,413 square feet.

Parking for the project will include 606 garage spaces (covered), 234 designated off-drive spaces (uncovered) and 14 driveway spaces (uncovered) for a total of 854 spaces.

Proposed landscaping will consist of private homeowner association (HOA) maintained common areas located along project walkways and parkways; and designated open space areas. Total landscaping is anticipated to consist of approximately 14% of the project site, or 2.29 acres of the development area.

Paved and other impervious areas of the site include the project's private drives, parking areas, curb, walkways and gutter improvements, the building footprint of each residential complex as well as other paved improvements located throughout the project site. Total impervious surface is anticipated to consist of 86% of the total project site, or 14.08 acres.

Activities typical of residential developments can be anticipated for the residential the project. These are anticipated to include day to day activities such as recreation, commuting, gardening and other typical residential activities.

There are no infrastructure improvements within the project site that will be transferred to public agencies. All onsite infrastructure improvements are considered private improvements, to be privately maintained by the future homeowners' association (HOA). Offsite wet and dry utility improvements required for connection to existing infrastructure improvements (e.g. storm drain connection to the existing City system located southwest of project site) shall be owned and maintained by the City.

E. Geotechnical Conditions

Topography – The topography of the project site is gently sloping to the south, with the majority of the site paved, with scattered landscaping throughout. The northeastern and southeastern portions of the site are occupied by building structures, while the reaming portions of the site consist of parking lots.

Soil Type and Geology – Based on the County of Los Angeles soils information, soils within the development area consist primarily of Oakley Fine Sand (County Soil Type 010 – OS), categorized as a Hydrologic Soil Group A soil with very high infiltration rate when thoroughly wet. However, based on the results of the preliminary infiltration tests conducted onsite in 2021 by LGC Geotechnical, which yielded un-factored rates of 0.6 in/hr and 0.1 in/hr, onsite infiltration is not feasible for the project.

Groundwater – Groundwater was not encountered in any of the subsurface evaluations to a maximum depth of 50' below existing surface. Based on available

data from the California Department of Water Resources, groundwater in the project's vicinity is estimated at greater than 80' below existing surface.

Other Geotechnical Issues – Based on the project's preliminary geotechnical investigations, infiltration is not feasible onsite due to the compacted nature of the underlying soils resulting in very low infiltration rates.

F. Watershed Area and Drainage Conditions

The project is located within the Dominguez Watershed Management Area (WMA) in the Los Angeles Basin, corresponding roughly to Hydrologic Unit 405.12 of the Los Angeles-San Gabriel Hydrologic Unit. This area includes the north-facing slopes of the Palos Verdes Peninsula and the portions of the Basin that drain into the Dominguez storm drain channel, and ultimately to Los Angeles Harbor. The watershed is completely urbanized, characterized by industrial, commercial and residential land uses, impervious surfaces, underground storm drains and engineered concrete-lined channels; it encompasses an area of approximately 133 square miles, including the incorporated cities of Rolling Hills Estates, Torrance, Lomita, Carson, Gardena, Hawthorne, Manhattan Beach, Inglewood, and portions of Los Angeles and Long Beach.

Existing Drainage – The topography of the project site is relatively flat and the project site consists of vacant buildings and parking lots. The onsite surface water generally flows from northwest to southeast direction. Runoff is conveyed as sheet flow to onsite gutters prior to discharging to the existing storm drain system that traverses the site in a northwest to southeast direction. Runoff entering the storm drain is conveyed southerly under Carson Street and the existing commercial property prior to discharging to the Del Amo Sump (Retention Basin).

In addition to the project's onsite areas, the onsite storm drain system also receives offsite flows from Madrona Avenue to the east and an existing 54" storm drain (Improvement Plan SD-3030) in Del Amo Circle East (to the west) that conveys flows from Del Amo Plaza to the west and Fashion Way and surrounding improvements to the north and northwest.

Although the project resides within the Dominguez WMA, all runoff discharged from the site is retained in the Del Amo Basin to the south.

Proposed Drainage – In the developed condition, stormwater and surface water onsite will be conveyed as surface flow to the project's backbone storm drain system and conveyed south to the existing 54" storm drain system at the project's southern boundary and Carson Street. Runoff is then conveyed to the Del Amo Sump, as in pre-project conditions. Run-on from existing areas to the west (Del Amo Plaza), north (Fashion Way and surrounding improvements) and east (Madrona Avenue) will also be conveyed to the project's backbone storm drain system and discharged southerly offsite.

G. Other Site Considerations

Managing Offsite Drainage – As previously discussed, offsite run-on will be conveyed through the project site prior to discharging to the existing storm drain line at Carson Street and conveyed southerly to the Del Amo Sump.

Existing Utilities – Based on project site assessment, the locations of existing utilities onsite and offsite would not pose any issues to the project's proposed BMPs.

H. Receiving Water Impairments

When designated beneficial uses of a particular water body are compromised by water quality, Section 303(d) of the Clean Water Act requires identifying and listing that water body as "impaired". Once a water body has been deemed impaired, a Total Maximum Daily Load ("TMDL") must be developed for each water quality constituent that compromises a beneficial use. A TMDL is an estimate of the total load of pollutants, from point, non-point, and natural sources, that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). For point sources, including stormwater, the load allocation is referred to as a "Waste Load Allocation" (WLA) whereas for nonpoint sources, the allocation is referred to simply as a "Load Allocation".

Impairments to the project's downstream waters are as follows[1]:

Receiving Water	303(d)	TMDL Status
Los Angeles/ Long Beach Inner Harbor	Benthic Community Effects, Benzo(a)pyrene, Chrysene, Copper, DDT, PCBs, Sediment Toxicity, Zinc	All 303(d) listed impairments are addressed by TMDL
Los Angeles/ Long Beach Outer Harbor	DDT, PCBs, Toxicity	All 303(d) listed impairments are addressed by TMDL

I. Pollutants of Concern

Urban storm water run-off in both the dry and rainy season contains pollutants that can be carried through the storm drain networks to lakes, streams and beaches. The anticipated pollutants of concern for this Project are as follows:

Bacteria and Viruses. Potential sources of bacteria for the Project include landscaping areas, pet wastes, food wastes and naturally occurring sources.

Nutrients. Potential sources of nutrients in storm water consist of the macro-nutrients nitrogen and phosphorous, which are typically found in fertilizers from landscaping areas, decaying vegetation from preservation/natural areas and trash and debris.

Pesticides. Potential sources of pesticides include common landscaping areas and homeowner-owned landscaping areas.

Sediment/Suspended Solids. Potential sources of sediment and suspended solids include landscaping areas.

Trash & Debris. Potential sources include misplacement or overfill of food wastes, wrappers, and other trash materials.

Metals. Potential sources include vehicles and vehicular fluids.

Oil and Grease. Potential sources of oil and grease include automotive vehicles and fluids and maintenance equipment.

Toxic Organic Compounds. Potential sources include pesticides, solvents and hydrocarbons.

[1] *Del Amo Sump is a retention basin.*

II. BEST MANAGEMENT PRACTICES (BMP's)

BMPs are natural or constructed devices, procedures, rules or methods, which when implemented and followed, should reduce and/or eliminate the specific source of pollution of which the BMP is targeted.

A. Site Design Principles

The intention of site design principles is to reduce runoff peak flows and volumes resulting from land development. As required by the MS4 Permit and the County of Los Angeles Low Impact Development Manual, the following site design principles must be considered for use on all projects:

Site Planning – Project proponents must implement a holistic approach to site design in order to develop a more hydraulically-functional site, help maximize the effectiveness of on-site retention and integrate storm water management throughout the project site.

Based on the project's geotechnical report, focused infiltration of runoff is not feasible. However, the project's landscaping areas will provide some retention of runoff via absorption from vegetation and underlying soils.

Protect and Restore Natural Areas – Conservation of natural areas, soils and vegetation helps to retain numerous functions of pre-development hydrology, including rainfall interception, infiltration, and evapotranspiration. Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Sensitive areas, such as streams and their buffers, floodplains, wetlands, steep slopes, and highly-permeable soils, should be protected and/or restored. Slopes can be a major source of sediment and should be properly protected and stabilized. Locating development in less sensitive areas of a project site and conserving naturally vegetated areas can minimize environmental impacts from storm water runoff.

The pre-project site consists entirely of developed/paved surfaces with minimal vegetation and no natural areas to preserve. Project proposes the use of drought tolerant landscaping within common landscape areas.

Minimize Land Disturbance – The purpose of this site design principle is to protect water quality by preserving the natural hydrologic function of the project site to the maximum extent practicable. By designing a project site layout to preserve natural hydrology and drainage ways at the project site, it reduces the need for grading and disturbance of native vegetation and soils. Siting buildings and impervious surfaces away from steep slopes, drainage ways, and floodplains limits the amount of grading and clearing necessary and reduces the hydrologic impact. This site design principle is most applicable in Greenfield settings, but opportunities to implement this principle may exist in redevelopment projects.

The pre-project site consists of commercial facilities with no natural hydrologic function. Therefore, this site design principle has not been incorporated into project design.

Minimize Impervious Area – The potential for discharge of pollutants in storm water runoff from a project site increases as the percentage of impervious area within the project site increases because impervious areas increase the volume and rate of storm water runoff. Pollutants deposited on impervious areas are easily mobilized and

transported by storm water runoff. Minimizing impervious area through site design is an important method to reducing the pollutant load in storm water runoff.

The Project proposes to minimize impervious area via the use of multi-level units, minimum-width roadway and sidewalk sections wherever feasible and open common landscaping areas.

B. Source Control Measures

Source control measures are designed to prevent pollutants from contacting storm water runoff or preventing discharge of contaminated storm water runoff to the storm drain system and/or receiving water.

This section describes structural-type, source control measures that must be considered for implementation, in conjunction with appropriate non-structural source control measures, such as good housekeeping and employee training, to optimize pollution prevention.

Structural Controls

Storm Drain Message and Signage (S-1) – Storm drain stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets. The stencil contains a brief statement that prohibits the dumping of improper materials into the storm water conveyance system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna, are effective supplements to the anti-dumping message.

- All storm drain inlets and catch basins within the project area must be stenciled with prohibitive language (such as: "NO DUMPING – DRAINS TO OCEAN") and/or graphical icons to discourage illegal dumping.
- Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area.
- Legibility of stencils and signs must be maintained.

All onsite catch basin will be stenciled with the language, "NO DUMPING – DRAINS TO OCEAN" or equivalent phrase. The stencils shall be maintained by the HOA.

Outdoor Material Storage Areas (S-2) – None proposed.

Outdoor Trash Storage/Waste Handling Areas (S-3) – No designated trash enclosures proposed for the project. All trash will be stored within private areas of each residential home and moved curbside on a weekly basis for disposal by the contracting local waste hauler. Trash from the park will be kept in receptacles and removed for disposal by park staff as needed.

Outdoor Loading/Unloading Dock Area (S-4) – None proposed.

Outdoor Vehicle/Equipment Repair/Maintenance Area (S-5) – None proposed.

Outdoor Vehicle/Equipment/Accessory Wash Area (S-6) – None proposed.

Fuel and Maintenance Area (S-7) – None proposed.

Landscape Irrigation Practices (S-8) – Irrigation runoff provides a pathway for pollutants (i.e., nutrients, bacteria, organics, sediment) to enter the storm drain

system. By controlling irrigation, runoff and the potential for pollutant transport is minimized.

Landscape and irrigation areas shall meet the following requirements:

- Minimize use of fertilizer, pesticides, and herbicides.
- Plan sites with sufficient landscaped area and dispersal capacity.
- Consult a landscape professional regarding appropriate plants, fertilizer, mulching applications and irrigation requirements to ensure healthy flora.
- Choose plants that minimize need for fertilizer and pesticides.
- Use native and/or drought tolerant plant species. Group plantings with similar water requirements.
- Employ use of mulch.
- Install rain sensors and pressure sensors to shut off irrigation system during, after rain storms and pressure drops/leaks.
- Implement integrated Pest Management Practices.

Building Materials Selection (S-9) – Building materials can potentially contribute pollutants of concern to storm water runoff through leaching. The use of alternative building materials can reduce pollutants in storm water by eliminating compounds that can leach into storm water runoff. This BMP shall be considered during any work conducted onsite by the property owner.

Alternative materials include the following:

- Replace use of pressure treated wood with cement-fiber or vinyl.
- Minimize the use of copper and galvanized metals on buildings and fencing.

Animal Care and Handling Facilities (S-10) – None proposed.

Outdoor Horticulture Areas (S-11) – None proposed.

Non-Structural Controls

Education of Property Owners, Tenants and Occupants – Educational materials will be provided to homeowners at close of escrow by the owner and periodically thereafter by the HOA to inform them of their potential impacts to downstream water quality. Materials include those described in Attachment F of this report.

Activity Restrictions – Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the project's Covenant, Conditions and Restrictions (CC&Rs).

Common Area Landscape Management – Maintenance activities for landscape areas shall be consistent with City and manufacturer guidelines for fertilizer and pesticide. Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled. Application of materials shall be limited to the minimum required amounts and restricted within 48 hours prior to rain events.

Common Area Litter Control – Litter control onsite will include the use of HOA, violation reporting and clean up during landscaping maintenance activities and as needed to ensure good housekeeping of the project's common areas.

Street Sweeping Private Streets – The project's private drives shall be swept on a bi-weekly schedule, per the City's sweeping schedule.

C. Storm Water Quality Design Volume (SWQDv)

The design storm, from which the SWQDv is calculated, is defined as the greater of:

- The 0.75-inch, 24-hour rain event; or
- The 85th percentile, 24-hour rain event as determined from the Los Angeles County 85th percentile precipitation isoheytal map.

A summary of the SWQDv values determined using the HydroCalc Program is provide in the following table.

Each DMA includes the onsite developable areas within the DMA as well as any offsite tributary areas (DMA 3.2 consists of offsite areas to the north and east).

Drainage Management Area (DMA)	Acres	% Imp.	C_D	D_{85} (in)	T_C (min)	Q_{BMP} (cfs)	SWQDv (cu-ft)
DMA 1	7.77	86	0.788	0.85	57	0.989	18,736.4
DMA 2	4.29	86	0.788	0.85	42	0.660	10,826.9
DMA 3.1	2.80	86	0.788	0.85	42	0.412	6,751.7
DMA 3.2	13.08	96	0.844	0.85	35	2.243	33,781.5

D. Storm Water Quality Control Measures

Storm water quality control measures function to augment site design principles and source control measures to reduce storm water runoff volume and potential pollutant loads in runoff to the maximum extent practicable.

Selection of the project's treatment BMPs was based on MS4 Permit requirements, which requires that all designated projects retain the SWQDv on-site using retention based measures, unless retention based measures are determined to be infeasible. Consideration was also given to site constraints, effectiveness in addressing the project's anticipated pollutants of concern; as well as compliance with receiving water impairments and discharge limitations.

Per the project's preliminary infiltration results (LGC, 2021), infiltration is assumed to be infeasible due to the low infiltration rates onsite. Therefore, the project proposes the use of three (3) hydrodynamic separators (CDS units) to pre-treat project runoff (and any offsite run-on tributary to each DMA and BMP) to pre-treat runoff prior to discharging to the existing retention basin offsite (Del Amo Sump). The offsite basin will be employed as a regional retention BMP to satisfy the project's LID BMP requirements.

The corresponding sizing summary of the proposed CDS units is provided in the following table. Supporting calculations are provided in Attachment C of this report.

DMA	Area (AC)	Q_{BMP} (cfs)	BMP Type	BMP Size/ Capacity (cfs)
DMA 1	7.77	0.989	CDS Unit	TBD
DMA 2	4.29	0.660		
DMA 3.1 & 3.2	15.88	2.655		

The project's CDS units will also meet zero trash discharge requirements of the Basin Plan to remove trash/litter, debris and sediment from runoff entering the project's storm drain system.

E. Hydromodification Requirements

The project is exempt from the hydromodification requirements of the MS4 Permit, as the project will discharge through a fully improved storm drain system that discharges to a retention basin.

III. Storm Water Quality Control Measure Maintenance

1. Maintenance and inspection activities for the identified BMPs will be performed as indicated on the enclosed BMP Inspection and Maintenance Responsibility/Frequency Matrix in Attachment D.

2. The project owner and proponent, LENNAR shall employ self-inspections and record keeping for BMPs, as applicable. The owner shall retain all maintenance records for the lifetime of the Project. The records shall be made readily available for review by all government agencies. Depending on the type of BMP, minimum frequency of inspections may range from weekly, to once a month, quarterly, or yearly.

3. The contact information for the owner is as follows:

Property Owner:	LENNAR
Contact:	Gary Jones
Address:	15131 Alton Parkway, Suite 362 Irvine, CA 92618
Phone:	(949) 349-8000

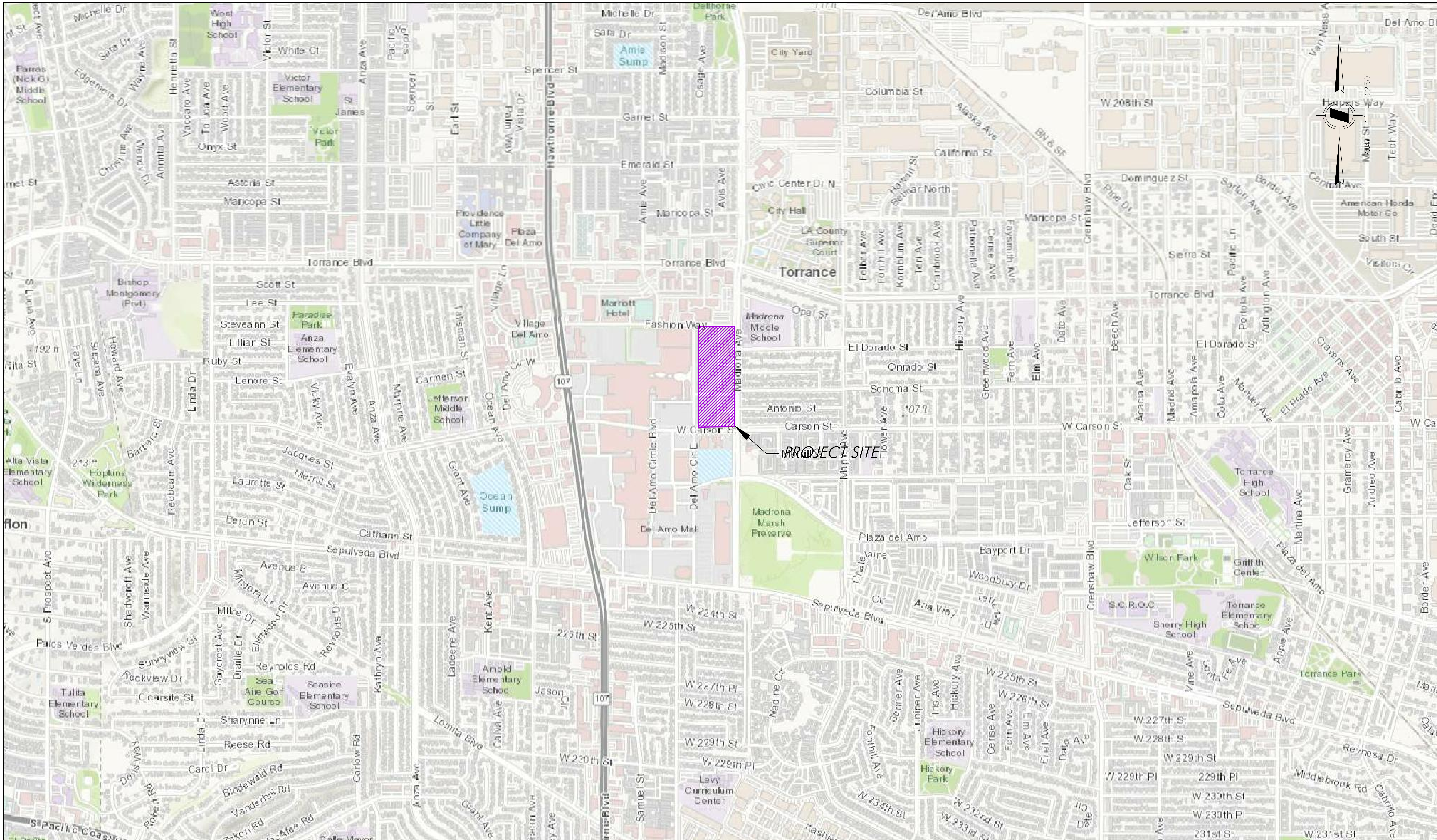
   LENNAR shall be responsible for the management of the residential portion of the project site and implementation and maintenance of the requirements of this LID Report until such time, the property has not been turned over to the HOA for ownership and maintenance.

4. A copy of the project's on-site BMP maintenance covenant to be recorded at the County of Los Angeles shall be inserted in Attachment F. This maintenance covenant has been devised by the County of Los Angeles to legally assign responsibilities for maintenance of proposed BMP facilities such that they run with the land. In order to comply with item A of the LID Report (provide proof of ongoing BMP maintenance), responsibilities have been listed as an encumbrance on the property (per the maintenance covenant), and shall be signed by the owners, and shall be recorded in the Los Angeles County Recorder's Office.

5. Should a transfer of ownership occur, appropriate notification shall be filed with the County of Los Angeles confirming the change in responsibility and continued implementation of stormwater management requirements.

ATTACHMENTS

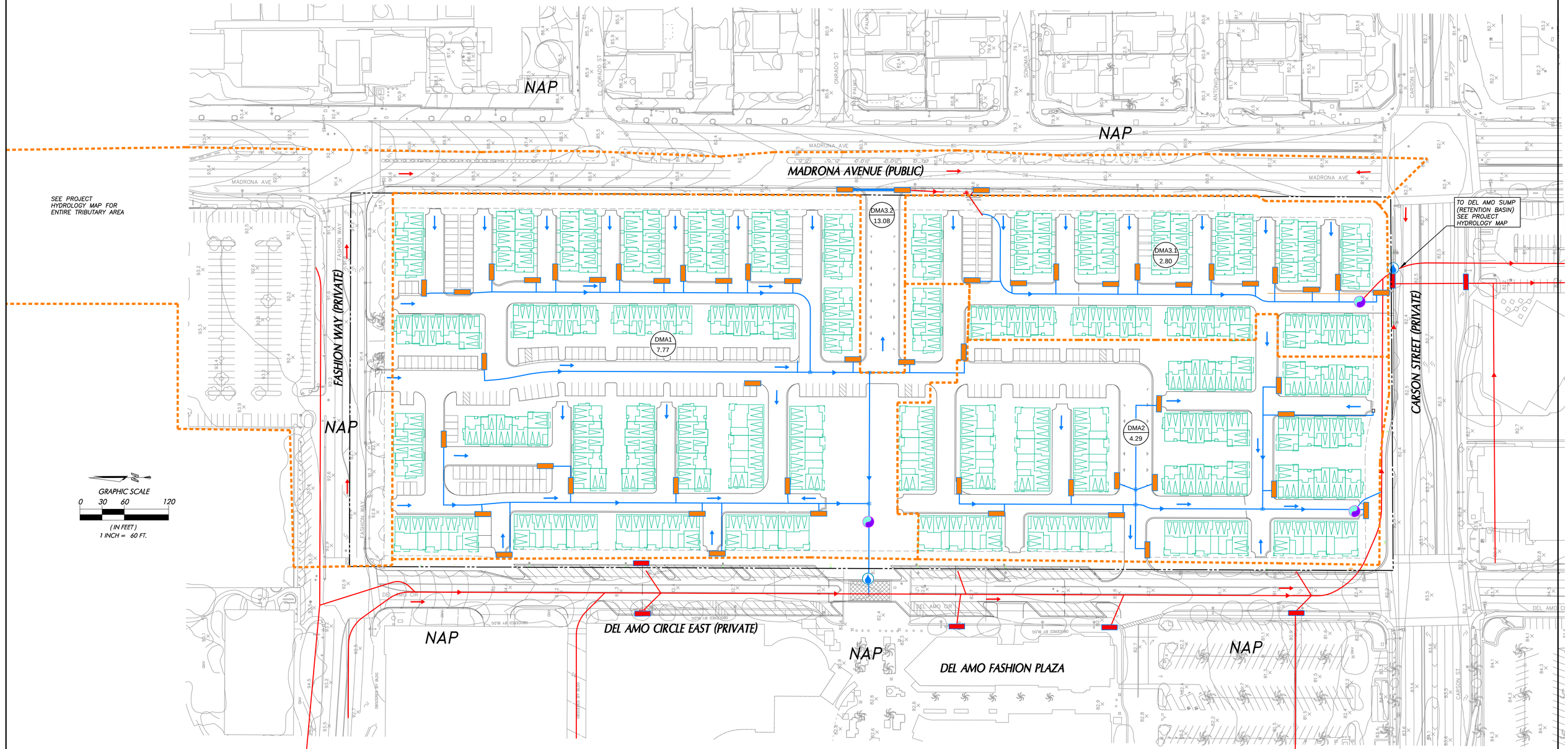
ATTACHMENT A VICINITY MAP



DRAWN BY: TIH	PREPARED BY:	PREPARED FOR:	"DEL AMO"	SWPPP VICINITY MAP
DATE: 03/09/2022	HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING ▪ ENGINEERING ▪ SURVEYING Three Hughes, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759	LENNAR 15131 ALTON PARKWAY, SUITE 365 IRVINE, CA 92618 (949) 349-8000	SOUTHWEST OF MADRONA AVENUE AND FASHION WAY CITY OF TORRANCE, CALIFORNIA	
W.O.: 3916-68				

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ATTACHMENT B LID SITE PLAN & ARCHITECTURAL SITE PLAN



LEGEND

- NAP — PROJECT LIMITS
- NAP — NOT A PART
- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- DMA / ACRE — DMA DESIGNATION AND ACREAGE
- SURFACE FLOW (ONSITE)
- SURFACE FLOW (OFFSITE)
- EXISTING DRAINAGE SYSTEM
- PROPOSED DRAINAGE SYSTEM
- EXISTING CATCH BASIN
- PROJECT CATCH BASIN WITH BMP STORM DRAIN STENCILING
- BMP T-6 VORTEX SEPARATOR (CDS UNIT)
- DISCHARGE POINT

DMA SUMMARY

Drainage Management Area (DMA)	Acres	% Imp.	C_D	D_{85} (in)	T_C (min)	Q_{BMP} (cfs)	SWQDv (cu-ft)
DMA 1	7.77	86	0.788	0.85	57	0.989	18,736.4
DMA 2	4.29	86	0.788	0.85	42	0.660	10,826.9
DMA 3.1	2.80	86	0.788	0.85	42	0.412	6,751.7
DMA 3.2	13.08	96	0.844	0.85	35	2.243	33,781.5

LOW IMPACT DEVELOPMENT (LID) PLAN
BMP SITE PLAN

APPLICANT:
LENNAR
15131 ALTON PARKWAY, SUITE 365
IRVINE, CA 92618
(949) 349-8000

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes Irvine, CA 92618 PH: (949) 583-1010 FX: (949) 583-0759

"DEL AMO"
SOUTHWEST OF MADRONA AVENUE
AND FASHION WAY
CITY OF TORRANCE, LOS ANGELES COUNTY, CALIFONIA

DRAFTED BY: TIH | DATE: 04/20/2022 | W.O. NO: 3916-68 | SHEET NO: 1 OF 1

DATE: Apr. 20, 2022 10:08:26 AM FILE: F:\1180\Planning\SY_WQ\LID\Exhibits\LID_SP Del Amo.dwg

Parking Summary			
Parking Required	No. Units	Spaces Required	Spaces/Unit
1 and 2 bed units	72	144	2.0
3+ bed units	216	648	3.0
Guest Parking	288	58	0.2
Total Residential Parking		850	3.0
Parking Provided		Spaces Provided	Spaces/Unit
Garage Spaces		606	
On Site Spaces		234	
Private Driveways		14	
Total On-Site Residential Parking		854	3.0
Del Amo Circle Parking		89	
Residential Accessible Parking Required		Spaces Required	Ratio
Resident Open Spaces	176	4	2.0%
Guest Spaces	58	3	5.0%
Total Accessible Spaces		7	

Plan Summary						
Plan	Beds	Unit Area	Quantity	%	Total Net S.F.	Avg. Net S.F.
Back to Back TH Plan 1	1	733	10	3.5%		
Back to Back TH Plan 2	1	930	10	3.5%		
Back to Back TH Plan 3	2	1320	20	6.9%		
Back to Back TH Plan 4	3	1530	30	10.4%		
Back to back subtotal			70	24.3%		
3 Story TH Plan 1	2	1182	16	5.6%		
3 Story TH Plan 2	2	1215	16	5.6%		
3 Story TH Plan 3	2	1265	0	0.0%		
3 Story TH Plan 4	3	1504	0	0.0%		
3 Story TH Plan 5 (3 car tandem)	3	1616	50	17.4%		
3 Story TH Plan 6	4	1675	52	18.1%		
3 story townhome subtotal			134	46.5%		
4 story TH Plan 1	3	1401	14	4.9%		
4 story TH Plan 2	3	1453	14	4.9%		
4 story TH Plan 3	4	1998	14	4.9%		
4 story TH Plan 4	3	2183	14	4.9%		
4 story TH Plan 5	3	2220	14	4.9%		
4 story TH Plan 6	3	2413	14	4.9%		
4 story subtotal			84	29.2%		
Total			288	100%	458,534	1,592

Site Summary		
Gross Site Area	16.37	AC
Dwelling Units	288	DU
Density	18	DU/AC
Type	No. Units	Mix
1 Bedroom Total	20	6.9%
2 Bedroom Total	52	18.1%
3 Bedroom Total	150	52.1%
4 Bedroom Total	66	22.9%
Total	288	100.0%



ktgy

Architecture + Planning
888.456.5849
ktgy.com

LENNAR HOMES
15131 Alton Parkway, Suite 365
Irvine, CA 92618

DEL AMO
TORRANCE, CA # 2020-0686

CONCEPT DESIGN
AUGUST 12, 2021

0 25 50 100

SITE PLAN
Alt 20

A1.0

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

TORRANCE BLVD

L=3,215'
S=0.0106

114.0 EL.

L=1,500'
S=0.0147

AMIE AVE (PREVIOUSLY DELORES WAY)

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

1A
24.00
TC25=15 MIN
TC50=14 MIN

7B
13.07
TC25=26 MIN
TC50=23 MIN

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

92.0 EL.

FASHION WAY

105.0 EL.

ΣQ_{25} =38.2cfs
ΣQ_{50} =45.0cfs
ΣA=24.0ac
79.0 FL.

EX. 48" RCP
PER SD-3068

PIPE FLOW
L=415', S=0.021

91.3 EL.

MADRONA AVENUE

2A
20.40
TC25=18 MIN
TC50=16 MIN

82.0 EL.

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

ΣQ_{25} =67.8cfs
ΣQ_{50} =80.8cfs
ΣA=44.4ac
70.3 FL.

EX. 54" RCP
PER SD-3068

L=1,855'
S=0.0124

PIPE FLOW
L=405', S=0.004

83.2 EL.

L=1,200'
S=0.005

3A
7.76
TC25=16 MIN
TC50=15 MIN

PROPOSED SD

82.5 EL.

CDS UNIT #1
FOR PRE-TREATMENT

EX. CATCH BASIN

ONRADO STREET

98.0 EL.

JOIN EX. 54" RCP
PER SD-3068

ΣQ_{25} =78.7cfs
ΣQ_{50} =93.7cfs
ΣA=52.2ac
69.2 FL.

L=185'
S=0.0065

86.0 EL.

Q_{25} =11.3cfs
Q_{50} =13.4cfs

JOIN EX. 24" RCP
PER SD-314

ΣQ_{25} =16.0cfs
ΣQ_{50} =19.4cfs
ΣA=13.1ac

80.0 EL.

EX. CATCH BASIN

82.5 EL.

4A
0.70
TC25=5 MIN
TC50=5 MIN

SONOMA STREET

ΣQ_{25} =79.3cfs
ΣQ_{50} =94.4cfs
ΣA=52.9ac
68.5 FL.

L=755'
S=0.005

PIPE FLOW
L=700', S=0.005

L=740'
S=0.005

L=1,500'
S=0.0113

DEL AMO CIRCLE EAST

PROJECT BOUNDARY

5A
18.48
TC25=16 MIN
TC50=14 MIN

EX. 54" RCP
PER SD-3068

6A
4.30
TC25=12 MIN
TC50=11 MIN

8B
2.79
TC25=12 MIN
TC50=11 MIN

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

PIPE FLOW
L=465', S=0.004

81.0 EL.

Q_{25} =7.2cfs
Q_{50} =8.6cfs

CDS UNIT #3
FOR PRE-TREATMENT

ΣQ_{25} =20.0cfs
ΣQ_{50} =24.2cfs
ΣA=15.9ac

CDS UNIT #2
FOR PRE-TREATMENT

82.5 EL.

ΣQ_{25} =106.3cfs
ΣQ_{50} =126.7cfs
ΣA=71.4ac
66.7 FL.

82.1 EL.

ΣQ_{25} =112.5cfs
ΣQ_{50} =134.2cfs
ΣA=75.7ac

CARSON STREET

EX. 54" RCP
PER SD-3068

EX. CATCH BASIN

JOIN EX. 54" RCP
PER SD-3068

EX. 39" RCP
PER SD-3015

ΣQ_{25} =132.2cfs
ΣQ_{50} =157.6cfs
ΣA=91.6ac

EX. 54" RCP
PER SD-3030

DEL AMO RETENTION BASIN

PLAZA DE AMO

EL DORADO STREET

PROJECT BOUNDARY

ANTONIO STREET

HYDROLOGIC INFORMATION

7	DPA ZONE
010	SOIL GROUP
5.7"	50-YEAR 24-HOUR ISOHYET
1	BURN FACTOR
1	BULKING FACTOR
0.85"	85TH PERCENTILE RAINFALL DEPTH
85TH PERCENTILE RAINFALL DEPTH	PROJECT DESIGN STORM (0.75 INCHES OR 85TH PERCENTILE)
96%	AREA AVERAGE % IMPERVIOUSNESS FOR THE STUDIED AREA (RETAIL CENTER FOR AREAS A-1, A-2, A-4, A-5, B-7)
86%	*AREA AVERAGE % IMPERVIOUSNESS FOR THE STUDIED AREA (APARTMENTS AND CONDOMINIUMS FOR ON-SITE AREAS A-3, A-6 AND B-8)*

SCALE: 1"=80'

0 40 80 160 240 320

SCALE: 1" = 80'



VICINITY MAP
N.T.S.

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 1A / 1.0 — AREA DESIGNATION FOR AREA "A" AREA ACREAGE (IN ACRES)
- SURFACE FLOW LINE
- Q_{25} =30.0cfs / A=10.0ac — PEAK 25-YR FLOW RATE DRAINAGE AREA IN ACRES
- PROJECT BOUNDARY
- EXISTING STORM DRAIN
- CDS UNIT FOR PRE-TREATMENT
- PROPOSED STORM DRAIN

PREPARED FOR:

LENNAR

25 ENTERPRISE, SUITE 400
ALISO VIEJO, CA 92656
(949) 349-8100

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH:(949) 583-1010 • FX:(949) 583-0759

EXHIBIT 2
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR PROPOSED CONDITION HYDROLOGY MAP
DEL AMO
CITY OF TORRANCE, COUNTY OF LOS ANGELES

W.O.3916-68 DEL AMO PROPOSEDHYDROLOGY MAP

PLOTTED BY: Gary Guan DATE: Apr. 20, 2022 09:44:30 AM FILE: F:\1180\Engineering\SY_Hydrology\Proposed Hydrology Map.dwg

ATTACHMENT C BMP CALCULATIONS AND DETAILS

BMP Calculations

Peak Flow Hydrologic Analysis

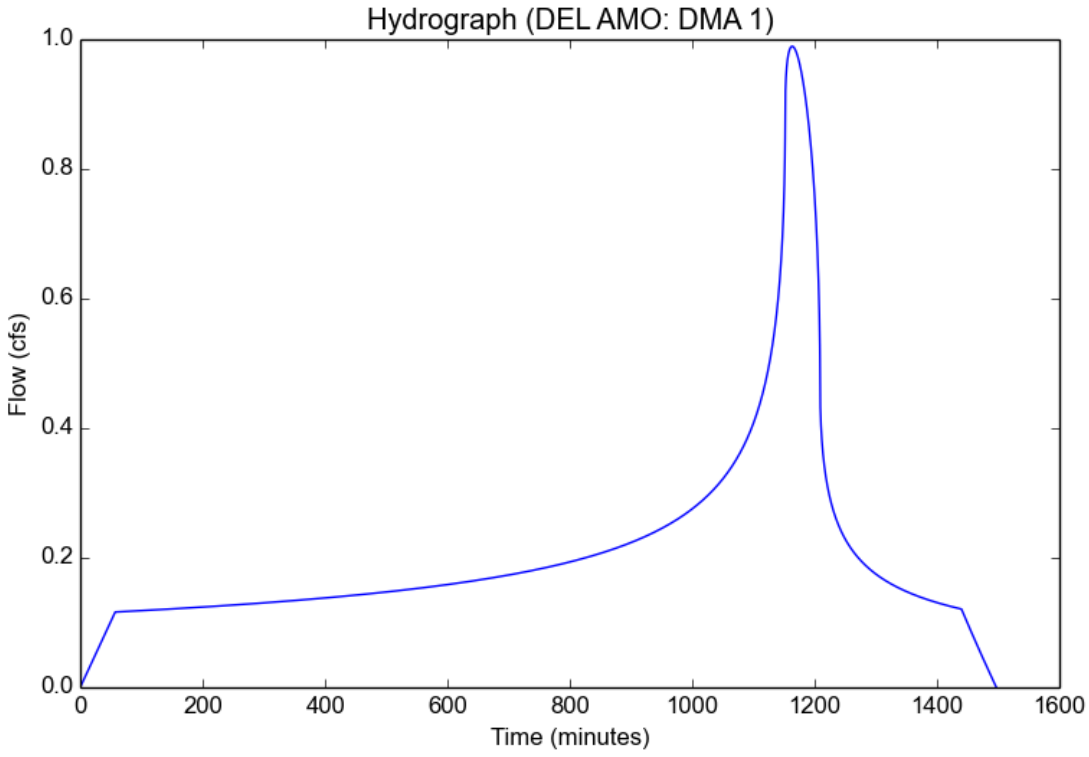
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Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	DEL AMO
Subarea ID	DMA 1
Area (ac)	7.77
Flow Path Length (ft)	1200.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1616
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	57.0
Clear Peak Flow Rate (cfs)	0.9893
Burned Peak Flow Rate (cfs)	0.9893
24-Hr Clear Runoff Volume (ac-ft)	0.4301
24-Hr Clear Runoff Volume (cu-ft)	18736.4361



Peak Flow Hydrologic Analysis

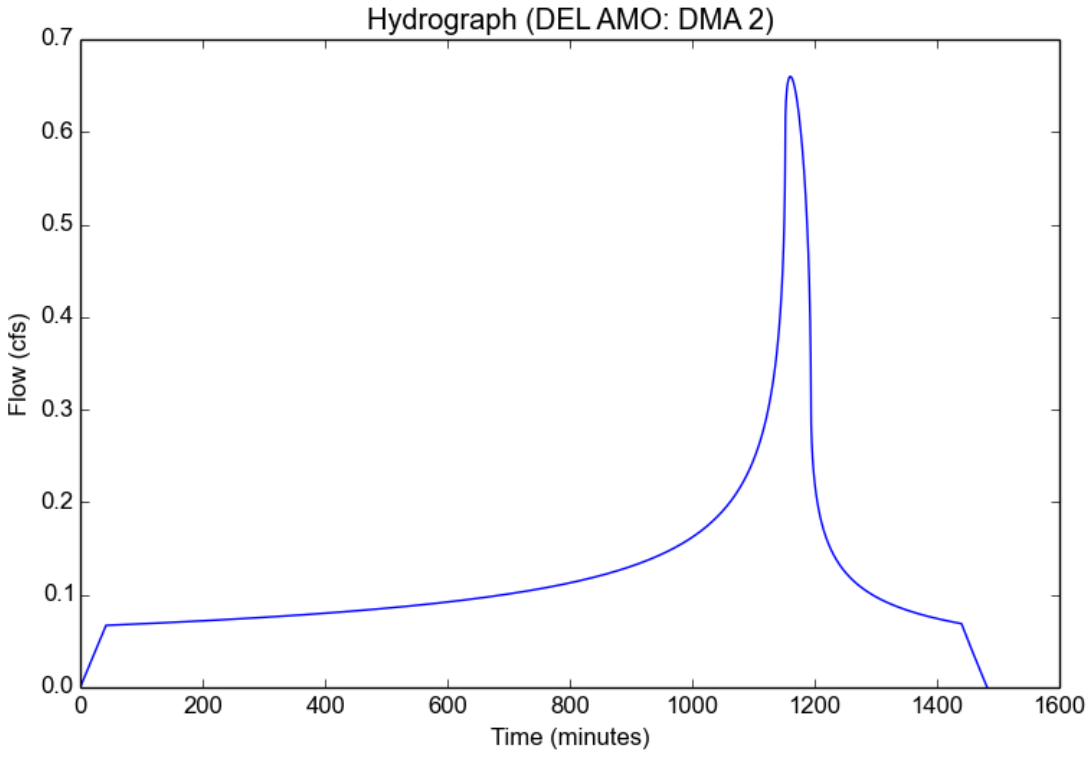
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Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	DEL AMO
Subarea ID	DMA 2
Area (ac)	4.49
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1865
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	42.0
Clear Peak Flow Rate (cfs)	0.6599
Burned Peak Flow Rate (cfs)	0.6599
24-Hr Clear Runoff Volume (ac-ft)	0.2486
24-Hr Clear Runoff Volume (cu-ft)	10826.8928



Peak Flow Hydrologic Analysis

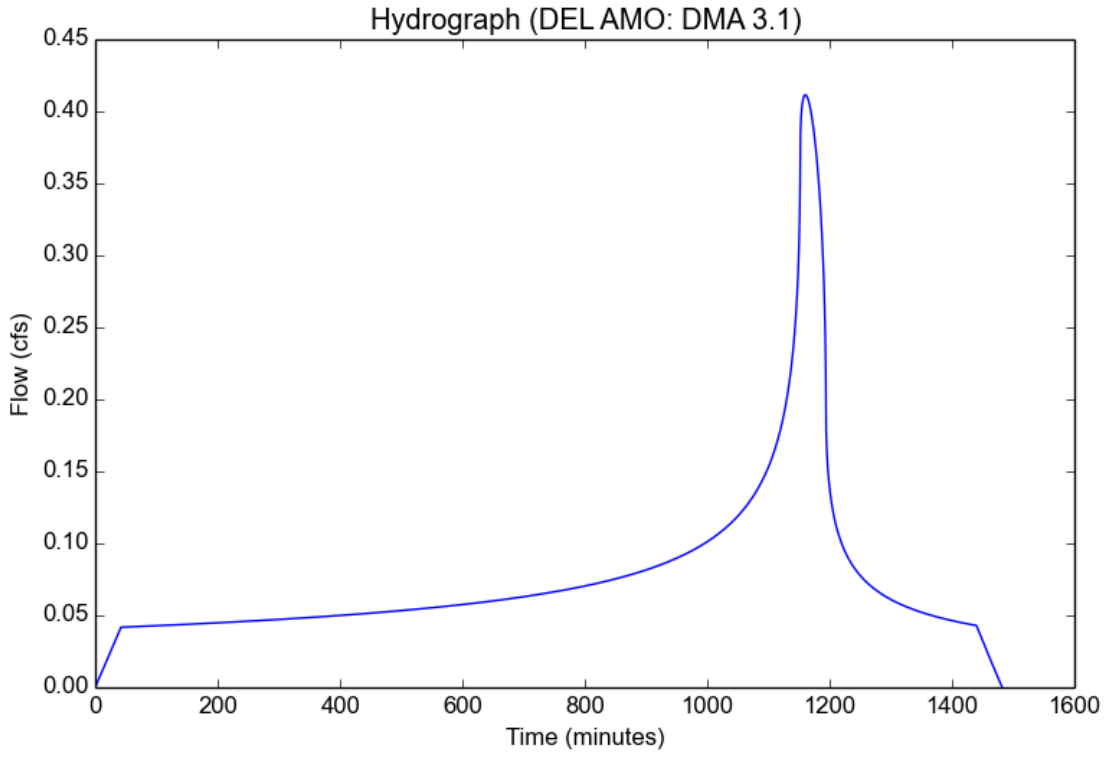
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Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	DEL AMO
Subarea ID	DMA 3.1
Area (ac)	2.8
Flow Path Length (ft)	740.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.1865
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.788
Time of Concentration (min)	42.0
Clear Peak Flow Rate (cfs)	0.4115
Burned Peak Flow Rate (cfs)	0.4115
24-Hr Clear Runoff Volume (ac-ft)	0.155
24-Hr Clear Runoff Volume (cu-ft)	6751.7371



Peak Flow Hydrologic Analysis

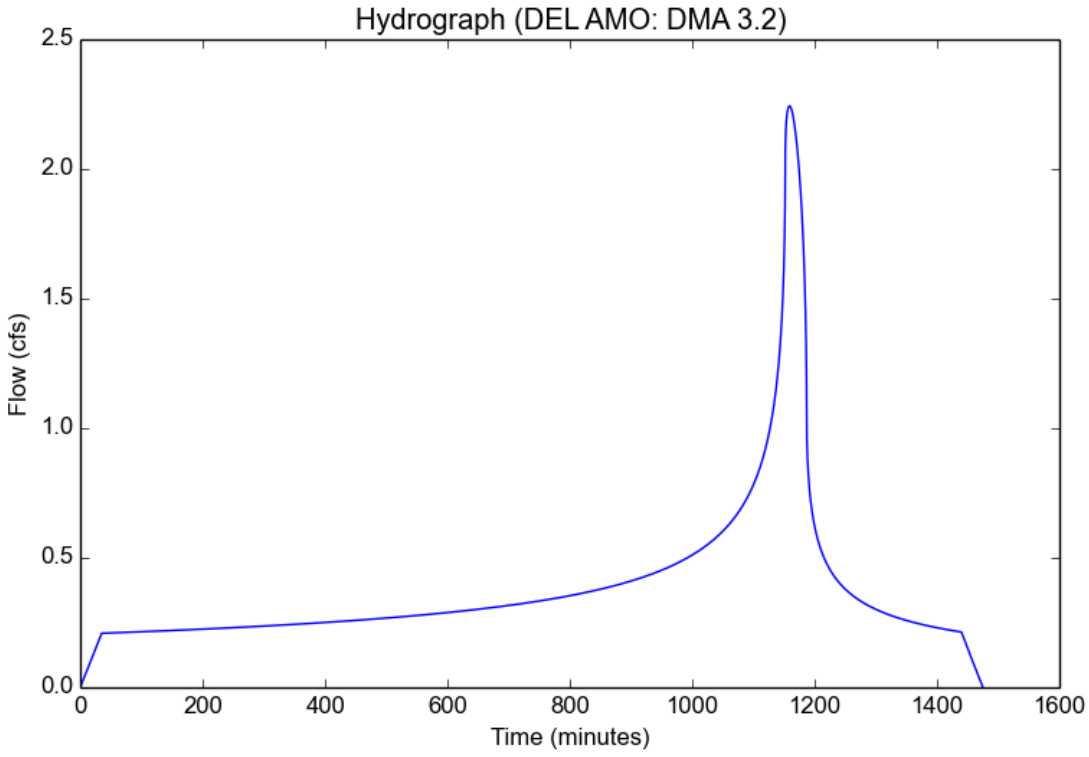
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Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	DEL AMO
Subarea ID	DMA 3.2
Area (ac)	13.08
Flow Path Length (ft)	740.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	0.85
Percent Impervious	0.93
Soil Type	10
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	0.85
Peak Intensity (in/hr)	0.2032
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.844
Time of Concentration (min)	35.0
Clear Peak Flow Rate (cfs)	2.2432
Burned Peak Flow Rate (cfs)	2.2432
24-Hr Clear Runoff Volume (ac-ft)	0.7755
24-Hr Clear Runoff Volume (cu-ft)	33781.4608



BMP Details

CONTECH®
ENGINEERED SOLUTIONS

CDS®
Hydrodynamic Separator



The experts you need to solve your stormwater management challenges



Contech is the leader in stormwater management solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team



STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.



STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.



REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.



SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions



Unique screening technology for stormwater runoff – CDS®

The CDS hydrodynamic separator uses swirl concentration and continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff.

At the heart of the CDS system is a unique screening technology used to capture and retain trash and debris. The screen face is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder. This results in a screen that is self-cleaning and provides 100% removal of floatables and neutrally buoyant material debris 4.7 mm or larger, without blinding.

CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.

CDS® Features and Benefits

FEATURE	BENEFIT
Captures and retains 100% of floatables and neutrally buoyant debris 4.7mm or larger	Superior pollutant removal
Self-cleaning screen	Ease of maintenance
Isolated storage sump eliminates scour potential	Excellent pollutant retention
Internal bypass	Eliminates the need for additional structures
Multiple pipe inlets and 90-180º angles	Design flexibility
Clear access to sump and stored pollutants	Fast, easy maintenance



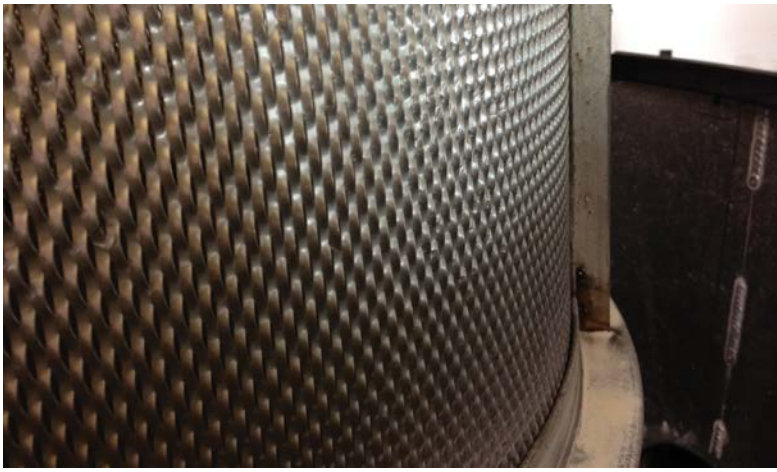
APPLICATION TIPS

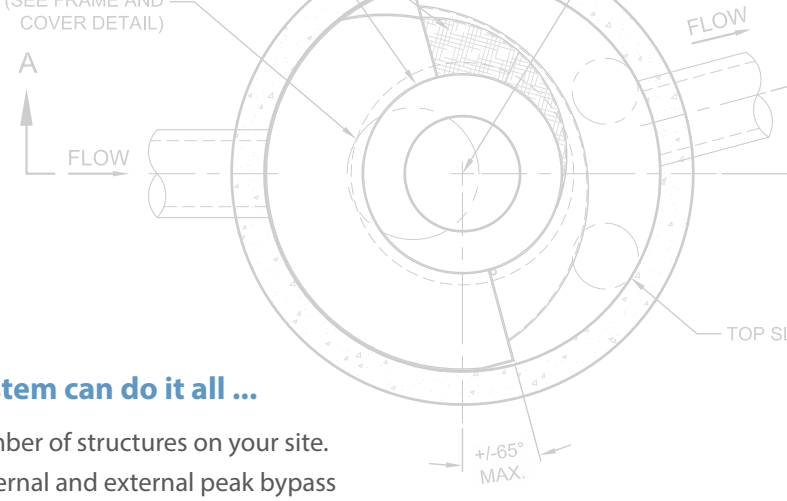
- Because of its internal peak bypass weirs, CDS systems can provide cost savings by eliminating the need for additional structures.
- Pretreating detention, infiltration, and green infrastructure practices with CDS can protect downstream structures and provide for easy maintenance.
- The CDS an ideal solution for retrofit applications due to its compact footprint and configuration flexibility.

The CDS® Screen

A fundamentally different approach to trash control ...

Traditional approaches to trash control typically involve "direct screening" that can easily become clogged, as trash is pinned to the screen as water passes through. Clogged screens can lead to flooding as water backs up. The design of the CDS screen is fundamentally different. Flow is introduced to the screen face which is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder.

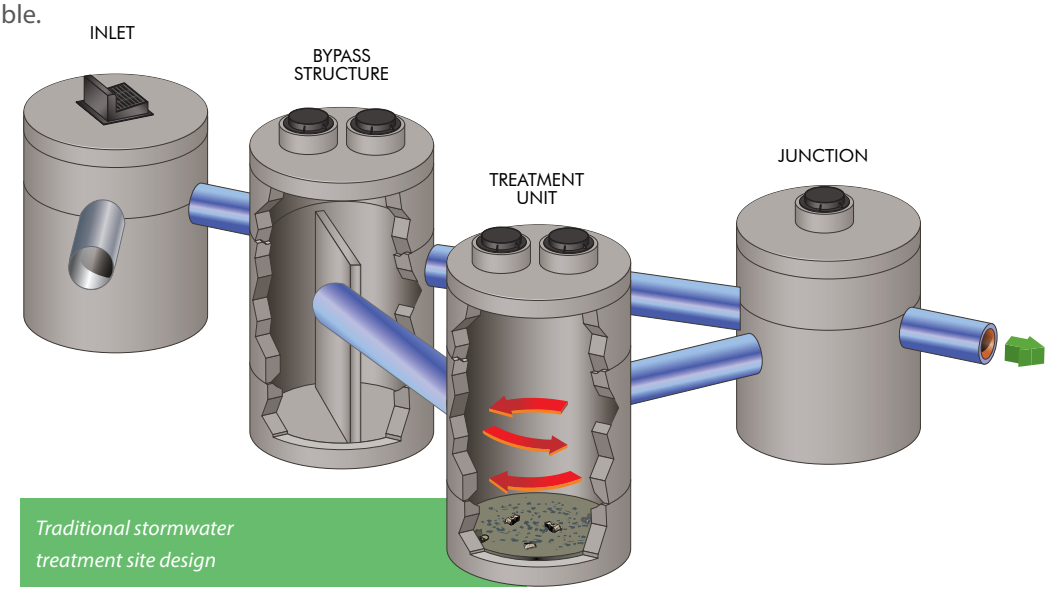




CDS® Design Configuration

Why use traditional stormwater design when ONE system can do it all ...

The CDS effectively treats stormwater runoff while reducing the number of structures on your site. Inline, offline, grate inlet, and drop inlet configurations available. Internal and external peak bypass options also available.

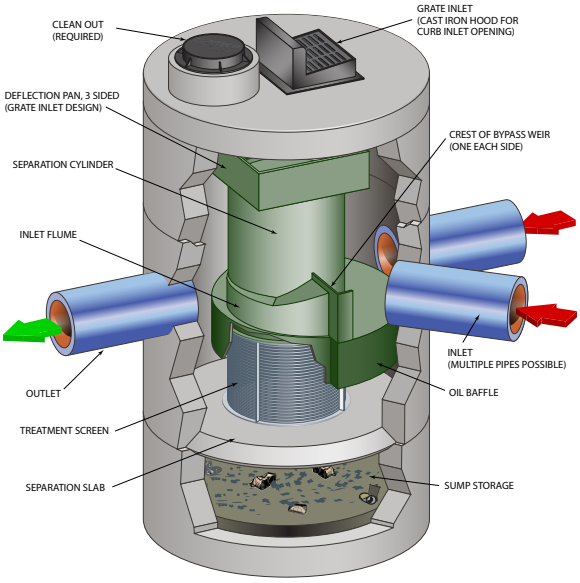


Traditional stormwater treatment site design

A Traditional Stormwater Treatment Site Design would require several structures on your site. With CDS, one system can do it all!

CDS® Advantages

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 4.7 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada



Learn More:
www.ContechES.com/cds

CDS® Applications

CDS is commonly used in the following stormwater applications:

- Stormwater quality control – trash, debris, sediment, and hydrocarbon removal
- Urban retrofit and redevelopment
- Inlet and outlet protection
- Pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and Low Impact Development designs



CDS® provides trash control



CDS® pretreats a bioswale

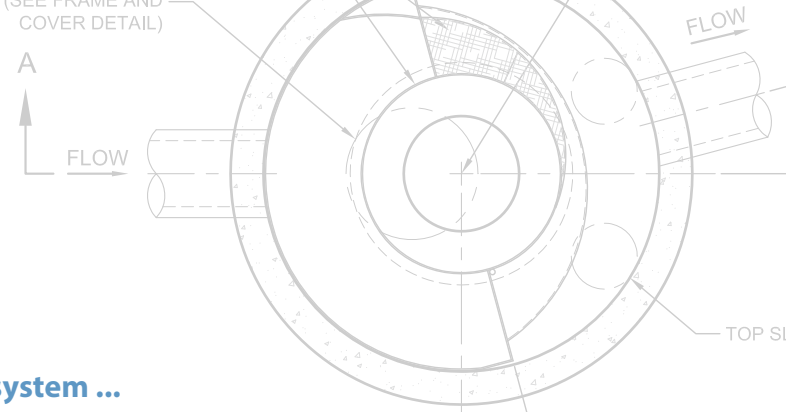
Select CDS® Certifications and Verifications

CDS has been verified by some of the most stringent stormwater technology evaluation organizations in North America, including:

- Washington State Department of Ecology (GULD) - Pretreatment
- New Jersey Department of Environmental Protection (NJDEP)
- Canadian Environmental Technology Verification (ETV)
- California Statewide Trash Amendments Full Capture System Certified*

**The CDS System has been certified by the California State Water Resources Control Board as a Full Capture System provided that it is sized to treat the peak flow rate from the region specific 1-year, 1-hour design storm, or the peak flow capacity of the corresponding storm drain, whichever is less.*

Save time, space and money with CDS



CDS® Maintenance

Select a cost-effective and easy-to-access treatment system ...

Systems vary in their maintenance needs, and the selection of a cost-effective and easy-to-access treatment system can mean a huge difference in maintenance expenses for years to come.

A CDS unit is designed to minimize maintenance and make it as easy and inexpensive as possible to keep our systems working properly.

INSPECTION

Inspection is the key to effective maintenance. Pollutant deposition and transport may vary from year to year and site to site. Semi-annual inspections will help ensure that the system is cleaned out at the appropriate time. Inspections should be performed more frequently where site conditions may cause rapid accumulation of pollutants.



Most CDS® units can easily be cleaned within thirty minutes.

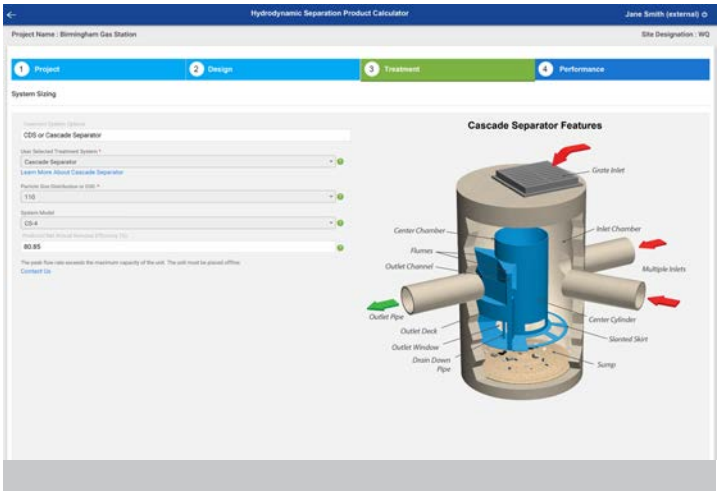
RECOMMENDATIONS FOR CDS MAINTENANCE

The recommended cleanout of solids within the CDS unit's sump should occur at 75% of the sump capacity. Access to the CDS unit is typically achieved through two manhole access covers – one allows inspection and cleanout of the separation chamber and sump, and another allows inspection and cleanout of sediment captured and retained behind the screen. A vacuum truck is recommended for cleanout of the CDS unit and can be easily accomplished in less than 30 minutes for most installations.

Design Your Own Hydrodynamic Separator (DYOHDS™)

Quickly prepare designs for estimates and project meetings ...

- Multiple sizing methods available.
- Site-specific questions ensure the selected unit will comply with site constraints.
- Multiple treatment options may be available based on regulations and site parameters.
- Follow up reports contain a site-specific design, sizing summary, standard detail, and specification.



Learn More:
www.ContechES.com/dyohds

A partner you can rely on



STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

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CONTECH® ENGINEERED SOLUTIONS

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Revision 10/19

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ATTACHMENT D OPERATION & MAINTENANCE PLAN

O&M Plan Structural BMP Inspection and Maintenance Responsibility/Frequency Matrix

BMP Inspection and Maintenance Responsibility/Frequency Matrix			
BMP	RESPONSIBILITY	INSPECTION/MAINTENANCE ACTIVITIES	MINIMUM FREQUENCY
Structural BMPs			
Storm Drain Message and Signage (S-1)	HOA	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually
Landscape Irrigation Practices (S-8)	HOA	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Weekly
Building Materials Selection (S-9)	HOA	In conjunction with routine maintenance activities, alternative building materials that pose minimal potential for pollutant leaching should be considered for use in maintenance and replacement projects for homeowners and park facilities	Ongoing
Non-Structural BMPs			
Education of Property Owners, Tenants and Occupants	HOA	Educational materials will be provided to homeowners at close of escrow by the owner and thereafter on an annual basis by the HOA. Materials shall include those provided in Attachment A of this Plan and any updated materials.	Close of escrow and annually.

BMP Inspection and Maintenance Responsibility/Frequency Matrix			
BMP	RESPONSIBILITY	INSPECTION/MAINTENANCE ACTIVITIES	MINIMUM FREQUENCY
Activity Restrictions	HOA	The Owner will prescribe activity restrictions to protect surface water quality, through a Covenant, Conditions and Restrictions (CC&Rs) agreement, lease agreements, facility use agreement (for park facility), or other equally effective measure, for the project. Upon takeover of site responsibilities by long term responsible parties, each party shall be responsible for ensuring residents' or park users' compliance and prescribe and implement activity restrictions required of its contractors.	Ongoing
Common Area Landscape Management	HOA	Maintenance shall be consistent with City requirements, plus fertilizer and/or pesticide usages shall be consistent with County guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets. Application of landscaping materials shall be limited to minimal amounts required and not within 48 hours prior to predicted rain events.	Weekly
Common Area Litter Control	HOA	Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with maintenance activities. Litter collection and removal shall be performed on a weekly basis.	Ongoing patrols. Weekly (minimum) pick up and removal.
Street Sweeping Private Streets and Parking Lots	HOA	Streets and parking lots shall be swept every other week, consistent with the City's current sweeping schedule	Bi-Weekly

BMP Inspection and Maintenance Responsibility/Frequency Matrix			
BMP	RESPONSIBILITY	INSPECTION/MAINTENANCE ACTIVITIES	MINIMUM FREQUENCY
Storm Water Quality Control Measures			
Proprietary Treatment Control Measures (T-6) – Vortex Separators, Gross Solids Removal Devices	HOA	Inspect prior to and after traditional rainy season. Inspect for accumulated debris, trash and oil/grease accumulation; remove (vactor truck) accumulated debris when system reaches 75% of capacity and as needed based on site activities (e.g. spills, leaks, etc.).	Semi-annual (Spring and Fall)

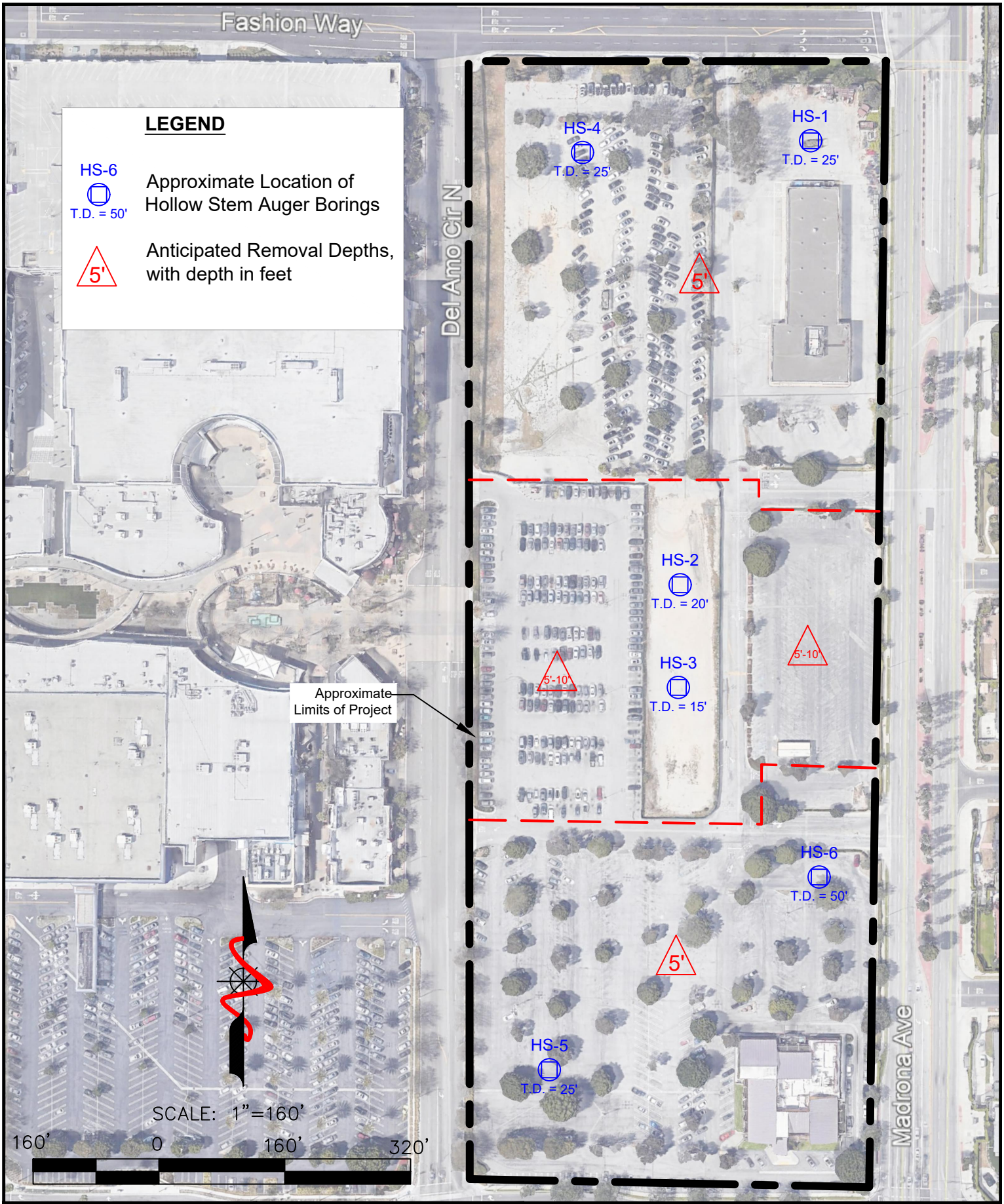
ATTACHMENT E BMP INSPECTION MAINTENANCE RECORDS

(FOR FINAL LID PLAN)

ATTACHMENT F EDUCATIONAL MATERIALS

(FOR FINAL LID PLAN)

ATTACHMENT G GEOTECHNICAL REFERENCE



LGC Geotechnical, Inc.

FIGURE 1
Proposed Boring Location Map

PROJECT NAME	Lennar - Del Amo
PROJECT NO.	20245-01
ENG. / GEOL.	DJB
SCALE	1" = 160'
DATE	December 2020

From:	Selwyn Harsono
To:	Dennis Boratynec; Gary Jones
Cc:	Vivian Vo; Brian Bencz; Johnna Dalby; Andrew Han; Katie Maes; Kamal Karam
Subject:	RE: anything for Hunsaker on Del Amo - checking on timing
Date:	Thursday, December 17, 2020 5:31:37 PM
Attachments:	image004.png image005.png image006.png image008.jpg image010.jpg image012.jpg image014.jpg image016.jpg image018.jpg Boring Location Map.pdf January 2005.jpg December 2005.jpg April 2007.jpg July 2007.jpg

---

Team,

Update on the field exploration and infiltration findings…

Six small diameter borings (HS-1 to HS-6) was drilled to depths ranging from approximately 15 to 50 feet below existing grade (see attached – Boring Location Map). Two of the borings (HS-2 and HS-3) were used as infiltration test.

The site soils are predominantly sands and silty sands with a layer of clayey silts and clayey sands near the middle of the site at approximately 10 to 15 feet below existing grade. Groundwater was not encountered to a maximum depth of approximately 50 feet below existing grade. Historic high groundwater is approximately 10 feet below existing grade.

The two shallow infiltration tests, HS-2 & HS-3, were performed at depths of approximately 20 and 15 feet below existing grade, respectively. Raw measured infiltration rates (without reduction factors) were both somewhat low:

- I-1 = **0.6 inch/hour**
- I-2 = **0.1 inch/hour**

Appropriate Los Angeles County safety factors/reduction factors should be applied for infiltration rates. Minimum reduction factor will likely be 3 (may be higher when including the Long Term Siltation, Plugging & Maintenance Reduction Factor from Civil Engineer).

Per the requirements of the Los Angeles County testing guidelines (2017), subsurface materials shall have a design infiltration rate equal to or greater than 0.3 inches per hour.

Here are a few preliminary comments/recommendations regarding grading and infiltration:

1. Contamination and environmental suitability of the site was not evaluated by us and should be evaluated by others. We only addressed the geotechnical issues associated with onsite soils and stormwater infiltration.

2. The site is not located within an area mapped as having liquefaction potential. Based on our field exploration, the potential for liquefaction is low due to the dense nature of the onsite soils and lack of groundwater.
3. Due to the coarse-grained nature of the onsite soils, we do not anticipate expansive soils to be an issue. Preliminary laboratory testing are currently being perform.
4. Remedial grading (temporary removal and recompaction) is expected to be approximately 5 feet below existing grade in the northern and southern portion of the site. (see attached map)
5. Based on historic aerials, the middle of the site used to be occupied by structural buildings and has since been demolished and is currently being used as a parking lot. (see attached images) We expect remedial grading to range from approximately 5 to 10 feet below existing grade. (see attached map)
6. Due to the relatively low infiltration rates of the onsite soils in the upper 20 feet, other methods of stormwater infiltration (i.e. drywells) should be considered. Laboratory testing for onsite soils are being perform for the feasibility of stormwater infiltration at depths greater than 30 feet. If these lab tests are favorable, future field testing for dry wells may be warranted.
7. County guidelines for infiltration system setback from building structures and property lines should be reviewed.

Selwyn Harsono, PE
Senior Staff Engineer

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www.lgcgeotechnical.com

From: Dennis Boratynec <dennisb@lgcgeotechnical.com>
Sent: Monday, December 14, 2020 7:40 AM
To: Gary Jones <gary.jones@lennar.com>
Cc: Vivian Vo <ViVo@hunsaker.com>; Bryan Sevy <bsevy@ktgy.com>; Brian Bencz <brian.bencz@lennar.com>; Johnna Dalby <johnna.dalby@lennar.com>; Robert Lovdahl <rLovdahl@leightongroup.com>; Andrew Han <Andrew.Han@lennar.com>; Ralph Spargo (rwspargo@msn.com) <rwspargo@msn.com>; Selwyn Harsono <sharsono@lgcgeotechnical.com>
Subject: RE: anything for Hunsaker on Del Amo - checking on timing

Hi Gary,

Correct, we did field work on Thursday and Friday last week. We'll have a geotechnical update for the team by the end of this week.

Dennis

Dennis Boratynec, PE, GE
Vice President

Description: cid:500060022@16092011-0744

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San Clemente, CA 92672
office (949) 369-6141
cell (949) 291-2106
dennisb@lgcgeotechnical.com
www.lgcgeotechnical.com

From: Gary Jones <gary.jones@lennar.com>
Sent: Sunday, December 13, 2020 4:43 PM
To: Dennis Boratynec <dennisb@lgcgeotechnical.com>
Cc: Vivian Vo <ViVo@hunsaker.com>; Bryan Sevy <bsevy@ktgy.com>; Brian Bencz <brian.bencz@lennar.com>; Johnna Dalby <johnna.dalby@lennar.com>; Robert Lovdahl <rLovdahl@leightongroup.com>; Andrew Han <Andrew.Han@lennar.com>; Ralph Spargo (rwspargo@msn.com) <rwspargo@msn.com>
Subject: anything for Hunsaker on Del Amo - checking on timing

Please advise if you know anything or on timing. I know it was only Thursday that you were out there

thanks

Gary Jones
Vice President Land Acquisition
Cell Phone: 949-433-9815
15131 Alton Parkway, Suite 365
Irvine, CA, 92618

Email: Gary.Jones@lennar.com

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DRAINAGE CONCEPT/HYDROLOGY REPORT

FOR

DEL AMO

MADRONA AVE & FASHION WAY

City of Torrance

County of Los Angeles, California

March 7, 2022

Prepared for:

LENNAR
25 Enterprise, Suite 400
Aliso Viejo, CA 92656
(949)349-8100

Prepared by:

Hunsaker & Associate Irvine, Inc.
3 Hughes
Irvine, CA 92618
(949)583-1010

DRAINAGE CONCEPT/HYDROLOGY REPORT

FOR

DEL AMO

MADRONA AVE & FASHION WAY

CITY OF TORRANCE

COUNTY OF LOS ANGELES

Prepared Date: 03/07/2022



PREPARED UNDER THE SUPERVISION OF:

3/07/2022

Jianhua "Gary" Guan, R.C.E. 64519, Exp. 06/30/23 Date:

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SECTION 1

INTRODUCTION & DISCUSSION

A. INTRODUCTION

The proposed residential development for Del Amo is located at just southwest corner of the intersection of Madrona Avenue and Fashion Way, in the City of Torrance, County of Los Angeles. Specifically, the site is bound to the north by Fashion Way; to the east by Madrona Avenue; to the south Carson Street; and to the west by Del Amo Circle East. The general location can be found from the vicinity map attached.



VICINITY MAP

N.T.S.

The site presently encompasses commercial/retail buildings with the majority of the site being parking lots. The overall property is approximately +/-16.3 gross acres and is generally a Rectangular-shaped parcel. The project site is vacated and not in use. The proposed project would demolish all asphalt and paved areas, buildings, structures and landscaping.

Surrounding land uses include primarily residential and commercial/retail land uses.

The project site in located within Flood Zone “X” per FIRM Map 06037C1928F dated September 26, 2008. Zone “X” is designated as “Areas determined to be outside the 500-year floodplain”.

The overall property is approximately +/-16.3 gross acres and Lennar Homes proposes Del Amo project for multi-family residential developments with common landscaping areas, private drives, curb, gutter, sidewalk and storm drain improvements, wet and dry utilities and related infrastructure improvements and open space areas.

B. STUDY PURPOSE

The purpose of this study is to analyze pre-project and post-project hydrology of the project development to determine the peak flow rates of storm runoff and to analyze the negative impacts, if any, due to the project developments.

C. DRAINAGE PATTERNS

The overall property is approximately +/-16.0 gross acres in size and the overall studied tributary areas (including off-site areas) is approximately 91.6 acres. The Stormwater and surface water onsite generally flow from northwest to southeast direction. The majority of the onsite storm runoffs discharge into the existing storm drain on-site, there are existing storm drain systems in the surrounding streets of the project; refer to the detailed descriptions in the Existing Drainage Section below.

During the proposed condition, the project site will be proposed to follow the existing condition drainage pattern and discharge into the same existing storm drain systems with the proposed onsite storm drains. The proposed CDS Units are provided for the pre-treatment of the water quality flows before discharging into the downstream storm drain systems.

The project site discharges into Del Amo Retention Basin which is located just south of the project (south of Carson Street). The Del Amo Retention Basin watershed is completely urbanized, characterized by industrial, commercial and residential land uses, impervious surfaces and underground storm drains. The flows from the Retention Basin discharge into Pacific Ocean which is located approximately 2.5 miles west of the project site.

Existing Drainage

The topography of the project site is relatively flat and the project site consists of vacant buildings and parking lots. The onsite surface water generally flows from northwest to southeast direction.

There is an existing 54” storm drain (Improvement Plan SD-3030) within the project site. There are two existing catch basins along Madrona Avenue for the stormwater along Torrance Blvd and Madrona Avenue and the storm drains from the catch basins - 24” storm drain (Improvement Plan SD-314), are discharging into the existing on-site 54” storm drain.

There are existing storm drain systems along Del Amo Circle East (Improvement Plan SD-3068) with the pipe sizes vary from 48" to 54". The 54" pipe continues east along Carson Street and join the on-site 54" RCP and then discharge southerly into the Del Amo Retention Basin. The storm drain system improvement plans can be found in Reference Section 6.

There are off-site areas draining into above mentioned storm drains. The off-site areas were taken from the Sub Basin Map and data sheets provided by City of Torrance. The Sub Basin Map and data sheets can be found in Reference Section 6.

The existing condition hydrology study was prepared to follow the Sub Basin Map with modifications due to the updated existing storm drain systems and topo information.

Proposed Drainage

In the developed condition, stormwater and surface water onsite will be conveyed as surface flow to the project's backbone storm drain system. The off-site 24" storm drain along Madrona Avenue is proposed to join the on-site backbone storm drain systems and to the existing 54" storm drain at the southeast corner of the project. There are two other connections to the existing 54" storm drains - one at the middle of Del Amo Circle East and one at the southwest corner of the project.

The proposed CDS Units are provided for the pre-treatment of the water quality flow before discharging into the Del Amo Retention Basin.

D. HYDROLOGIC INFORMATION

The 25-year and 50-year storm were analyzed for the project site. The project site encompasses No. 010 soil group. The 50-year 24-hour isohyet is approximately 5.7 inches. The project falls into DPA zone 7. The 85th Percentile, 24-hr Rainfall is approximately 0.85 inches. The reference Los Angeles County Hydrology Map GIS information can be found in this Section.

The area averaged of 96% of impervious percentage (Retail Center) was applied for the existing condition for off-site and onsite areas. A combination of 96% of impervious percentage (Retail Center for off-site areas) and 86% (Apartments and condominiums for onsite areas) was applied for the proposed condition hydrology study.

E. METHODOLOGY

The overall hydrology study include only one major watershed area for analysis purposes, which including offsite areas, cover a total of approximately 91.6± acres. The Modified Rational Methods included in the Los Angeles County 2006 Hydrology Manual was the hydrologic method used.

The time of concentration (Tc) for each subarea was computed using the Los Angeles County approved HydroCalc calculator. The calculator evaluates several hydrologic parameters such as soil type, land use, imperviousness, storm frequency, length and slope of each reach to calculate a time of concentration. This data was used with the Los Angeles County approved LAR04 software application to determine peak flow rates for 25-year and 50-year storm events.

Using the times of concentrations for each subarea, the Modified Rational Method was then used to calculate the 25-Year and 50-year, 24-Hour peak runoff flow for each subarea. The unburned conditions were applied for this hydrology study as there are all fully developed without any natural tributary areas.

The project's land use and imperviousness were determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual.

F. HYDROLOGY CALCULATION RESULTS

The summary of the hydrology study results for 25-year and 50-year flows and the comparisons between the existing and proposed conditions can be found in the following Hydrology Summary Table. The existing condition hydrology calculations can be found in Section 2, the proposed condition hydrology calculations can be found in Section 3 and hydrology maps can be found in Section 4.

Hydrology Summary Table
Del Amo
City of Torrance, County Of Los Angeles

Drainage Area	Existing Condition (1)			Proposed Condition (2)				Differences (3)=(2)-(1)		
	Area	25-yr Storm	50-yr Storm	Drainage Area	Area	25-yr Storm	50-yr Storm	Area	25-yr Storm	50-yr Storm
	(acre)	(cfs)	(cfs)		(acre)	(cfs)	(cfs)	(acre)	(cfs)	(cfs)
Overall	91.6	132.9	159.0	Overall	91.6	132.2	157.6	0.0	-0.7	-1.4
Total	91.60	132.90	159.00	Total	91.60	132.20	157.60	0.00	-0.70	-1.40

As indicated from the summary table and expected due to the project site land use changes from Retail to residential, the overall flows decreases due to the project development. The overall flow rate decreases 0.7 cfs for 25-year storm and 1.4 cfs for 50-year storm. Overall, it is concluded that there will have no

adverse impacts to the downstream drainage systems due to the project developments.

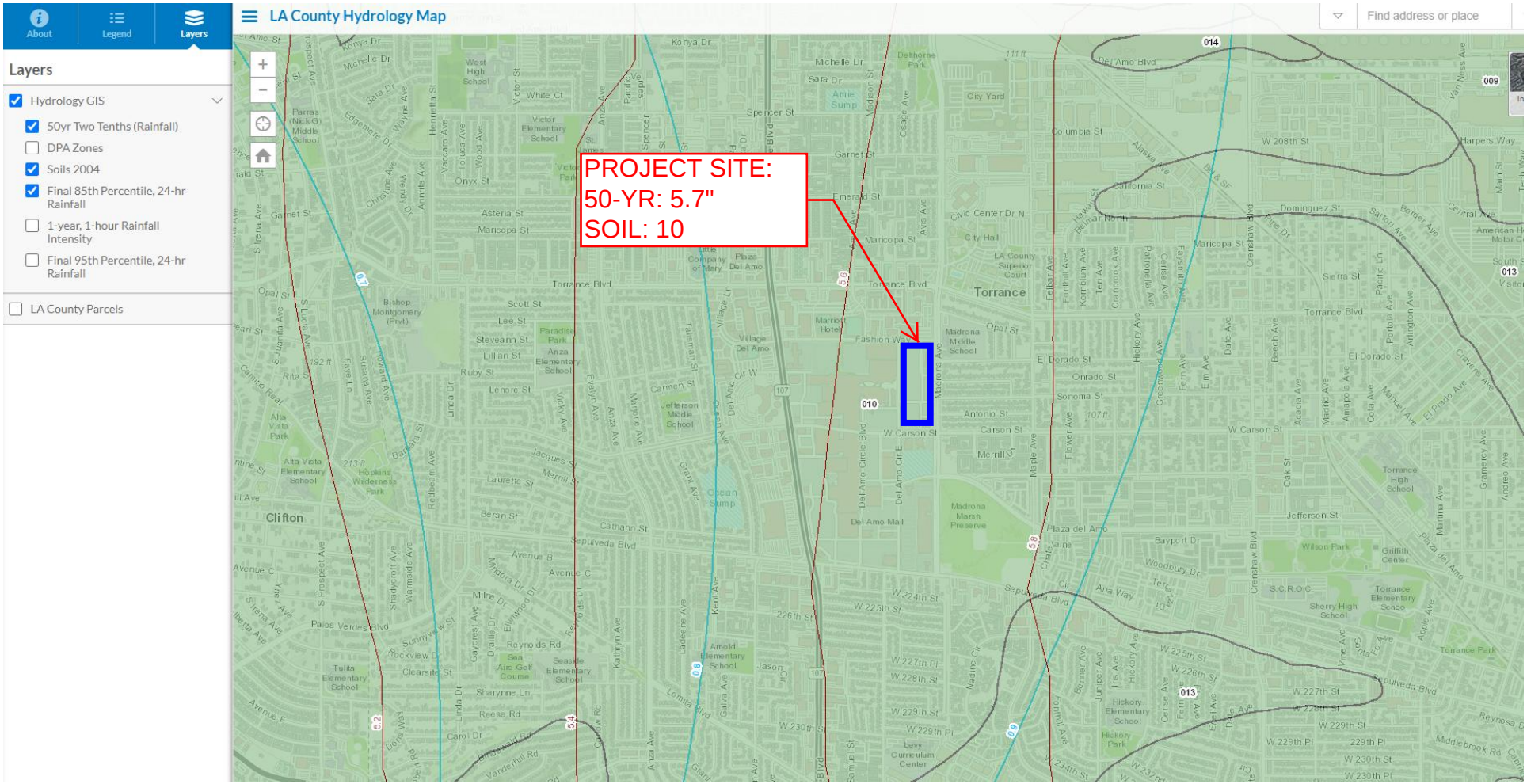
G. PRELIMINARY HYDRAULIC UPDATES FOR EX. 54" RCP (SD-3068)

There are two new connections to the existing storm drain systems (54" RCP – SD-3068) along Del Amo Circle East and Carson Street at the southwest corner of the project. It is anticipated that there are hydraulic impacts to the existing storm drain systems.

The existing 54" RCP capacity calculations were performed by applying FlowMaster program. It is indicated that the existing 54" storm drain can convey the proposed 50-year storms. Detailed hydraulic calculations and exhibit can be found in Section 5.

H. LID/WATER QUALITY

The detailed Low Impact Development (LID) can be found from the separate LID report.


About
Legend
Layers
LA County Hydrology Map
Find address or place
Layers
Hydrology GIS
50yr Two Tenths (Rainfall)
DPA Zones
Soils 2004
Final 85th Percentile, 24-hr Rainfall
1-year, 1-hour Rainfall Intensity
Final 95th Percentile, 24-hr Rainfall
LA County Parcels
PROJECT SITE:
50-YR: 5.7"
SOIL: 10
Torrance
Clifton

SECTION 2

EXISTING CONDITION HYDROLOGY CALCULATIONS

A. TC CALCULATIONS (25-STORM)

Peak Flow Hydrologic Analysis

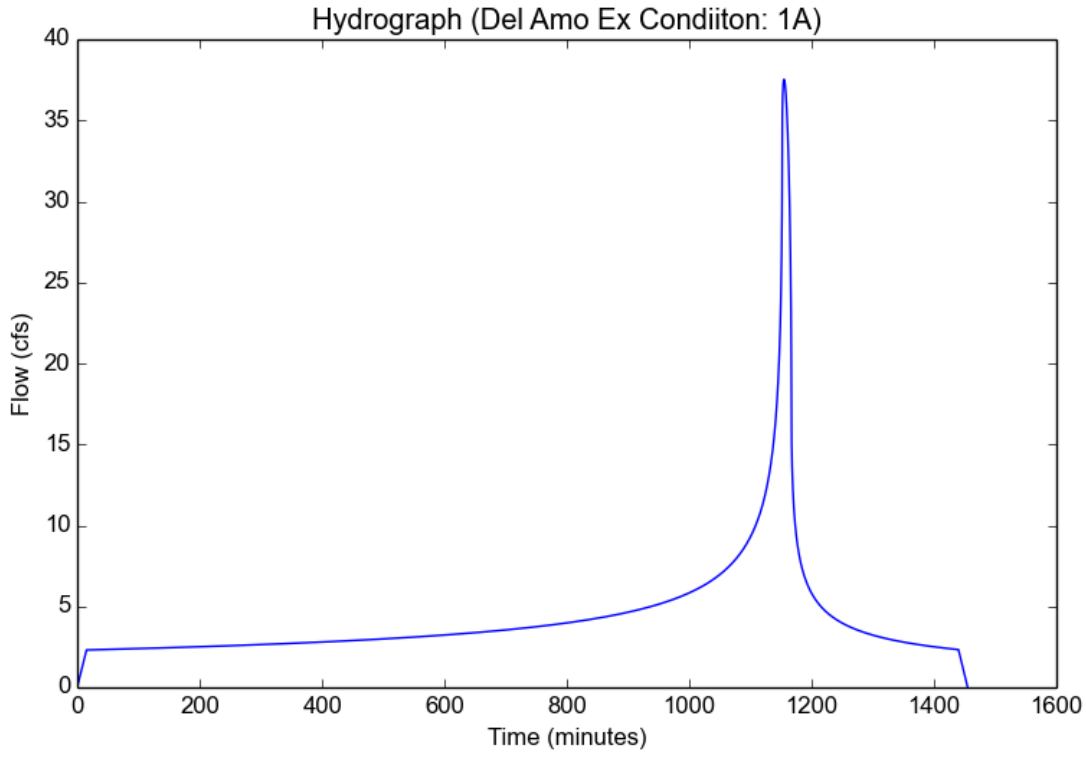
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	1A
Area (ac)	24.0
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.014666667
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.7817
Undeveloped Runoff Coefficient (Cu)	0.3464
Developed Runoff Coefficient (Cd)	0.8779
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	37.537
Burned Peak Flow Rate (cfs)	37.537
24-Hr Clear Runoff Volume (ac-ft)	8.6238
24-Hr Clear Runoff Volume (cu-ft)	375652.4601



Peak Flow Hydrologic Analysis

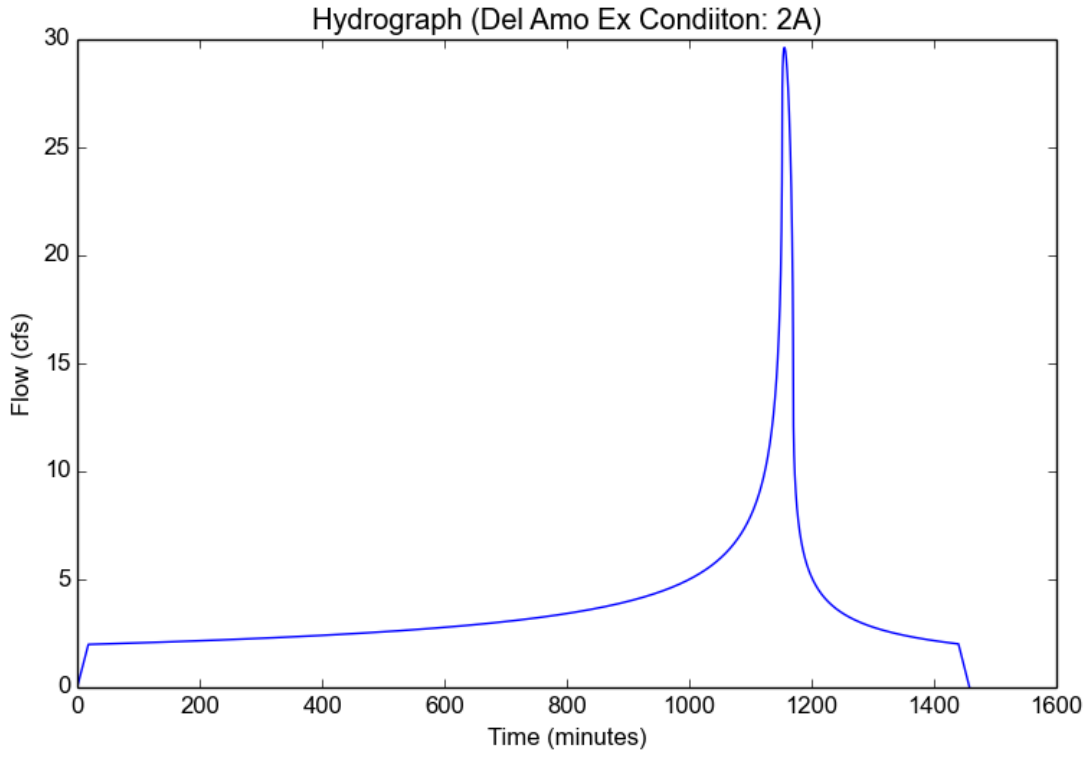
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	2A
Area (ac)	20.66
Flow Path Length (ft)	1855.0
Flow Path Slope (vft/hft)	0.012398922
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.6353
Undeveloped Runoff Coefficient (Cu)	0.3186
Developed Runoff Coefficient (Cd)	0.8767
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	29.6219
Burned Peak Flow Rate (cfs)	29.6219
24-Hr Clear Runoff Volume (ac-ft)	7.4232
24-Hr Clear Runoff Volume (cu-ft)	323354.6142



Peak Flow Hydrologic Analysis

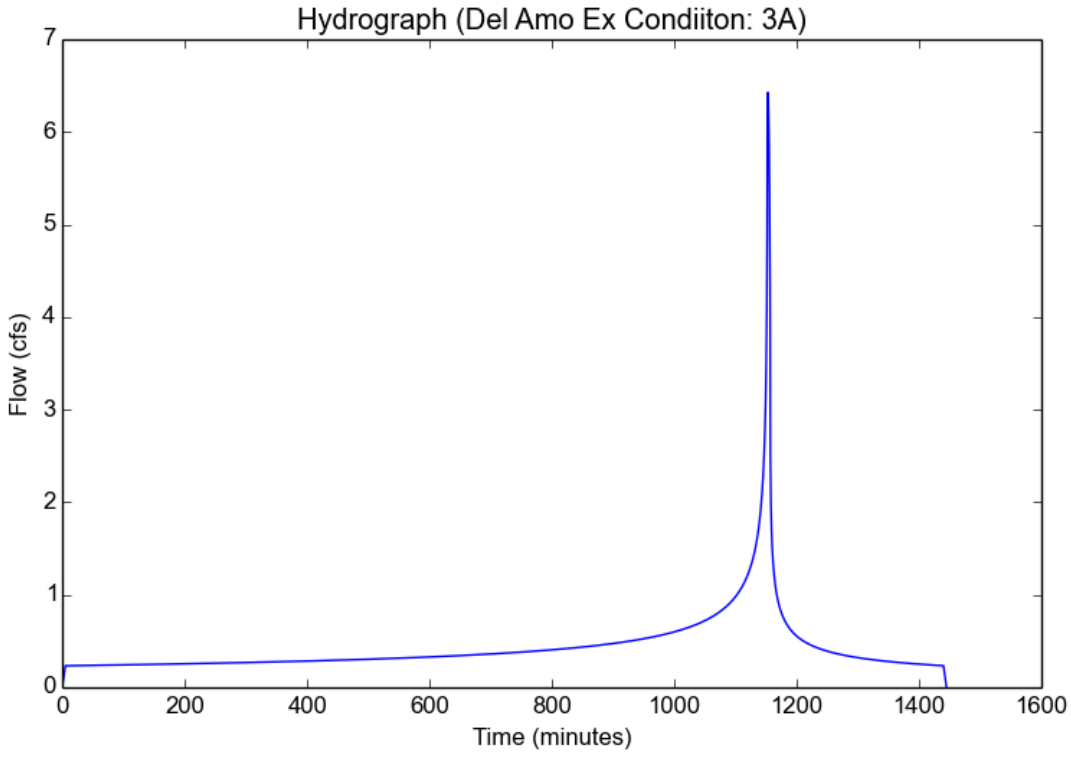
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	3A
Area (ac)	2.43
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.0129
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	2.9859
Undeveloped Runoff Coefficient (Cu)	0.5485
Developed Runoff Coefficient (Cd)	0.8859
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.4281
Burned Peak Flow Rate (cfs)	6.4281
24-Hr Clear Runoff Volume (ac-ft)	0.8734
24-Hr Clear Runoff Volume (cu-ft)	38045.5071



Peak Flow Hydrologic Analysis

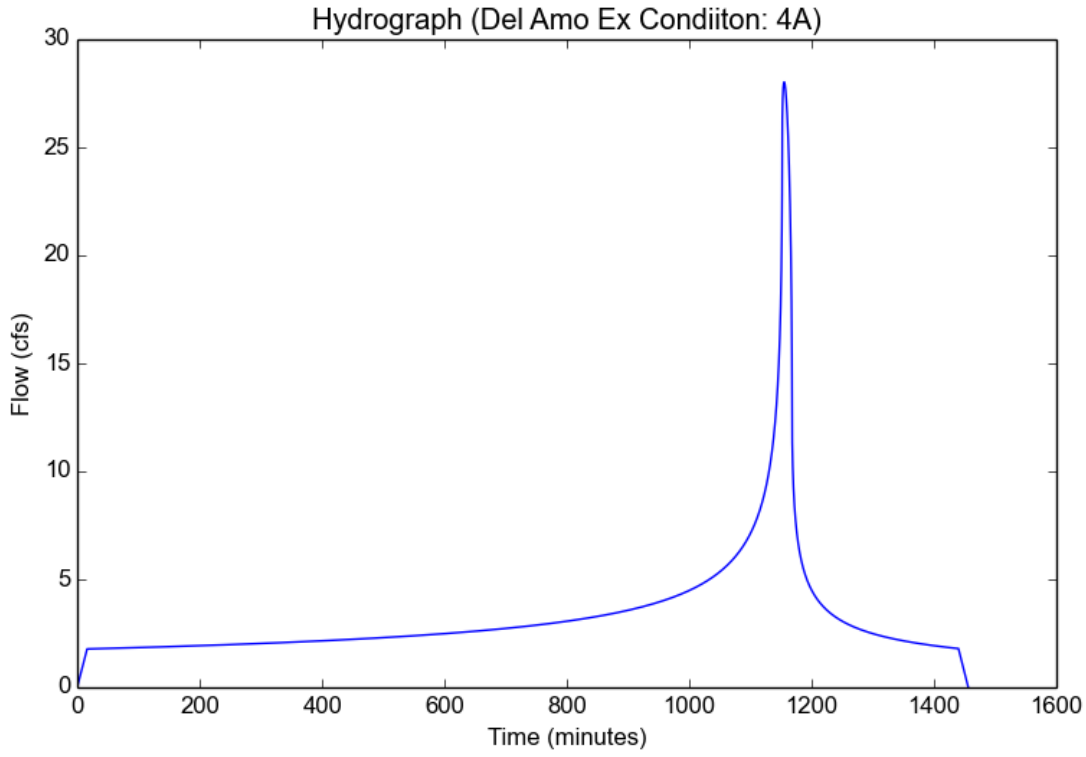
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	4A
Area (ac)	18.48
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.0113
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.7284
Undeveloped Runoff Coefficient (Cu)	0.3363
Developed Runoff Coefficient (Cd)	0.8775
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	28.027
Burned Peak Flow Rate (cfs)	28.027
24-Hr Clear Runoff Volume (ac-ft)	6.6402
24-Hr Clear Runoff Volume (cu-ft)	289246.4231



Peak Flow Hydrologic Analysis

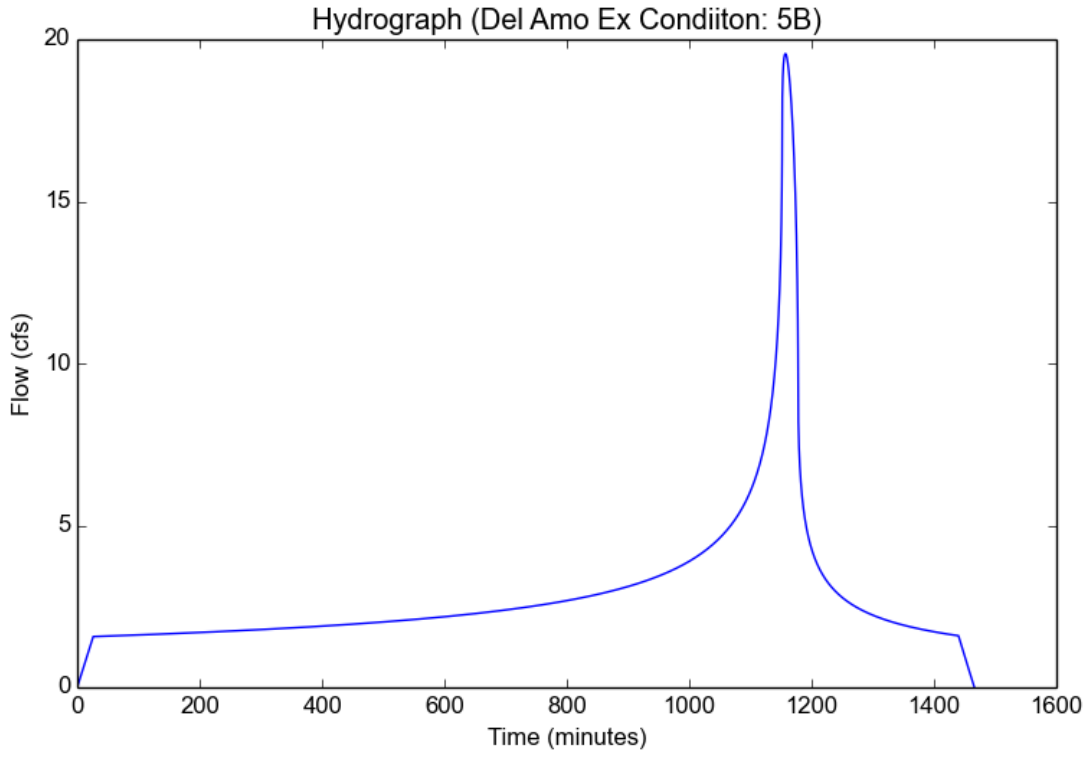
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	5B
Area (ac)	16.26
Flow Path Length (ft)	3215.0
Flow Path Slope (vft/hft)	0.010575428
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.3758
Undeveloped Runoff Coefficient (Cu)	0.2577
Developed Runoff Coefficient (Cd)	0.8743
Time of Concentration (min)	26.0
Clear Peak Flow Rate (cfs)	19.5585
Burned Peak Flow Rate (cfs)	19.5585
24-Hr Clear Runoff Volume (ac-ft)	5.8412
24-Hr Clear Runoff Volume (cu-ft)	254444.0707



Peak Flow Hydrologic Analysis

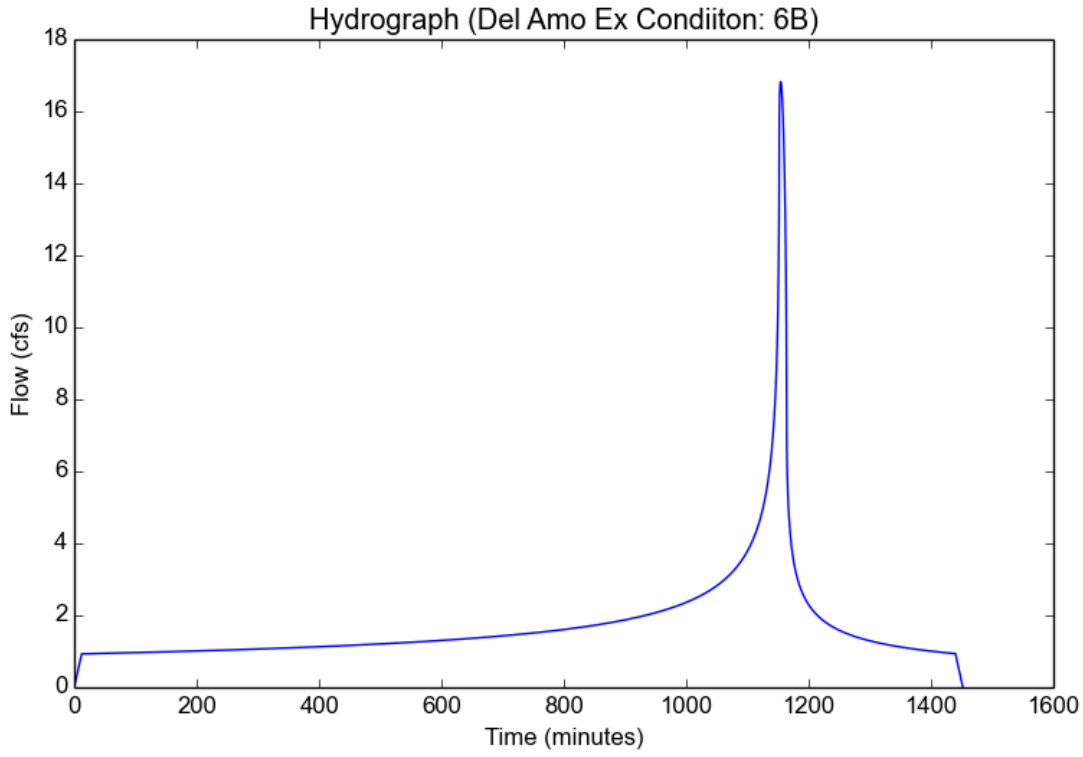
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	6B
Area (ac)	9.67
Flow Path Length (ft)	1320.0
Flow Path Slope (vft/hft)	0.028
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.9787
Undeveloped Runoff Coefficient (Cu)	0.3838
Developed Runoff Coefficient (Cd)	0.8794
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	16.8253
Burned Peak Flow Rate (cfs)	16.8253
24-Hr Clear Runoff Volume (ac-ft)	3.4749
24-Hr Clear Runoff Volume (cu-ft)	151366.8281



A. LAR04 PROGRAM CALCULATIONS (25-YEAR STORM)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 25-YEAR STORM STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	38.23	24.0	38.23	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.7	30.14	44.7	68.27	4	405.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	2.4	6.48	47.1	70.35	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	4A	18.5	28.52	65.6	97.87	4	480.	.00500	4.00	.00	0.	10	16	A29	.96
5	5B	16.3	19.94	16.3	19.94	4	540.	.01000	2.00	.00	0.	10	26	A29	.96
5	6B	9.7	17.10	26.0	36.46	4	160.	.01000	2.50	.00	0.	10	12	A29	.96

CONFLUENCE Q'S

5 7A TA 1160 QA 97.46 QAB 132.76 QB 35.31 5 7B TB 1157 QB 36.37 QBA 129.36 QA 92.99
5 7AB TAB 1159 QAB 132.88 QA 97.10 QB 35.78

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	36.37	91.6	132.88	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 25-YEAR STORM STORM DAY 3

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	13.21	24.0	13.21	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.7	10.44	44.7	23.61	4	405.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	2.4	2.23	47.1	24.49	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	4A	18.5	9.86	65.6	33.89	4	480.	.00500	4.00	.00	0.	10	16	A29	.96
5	5B	16.3	6.92	16.3	6.92	4	540.	.01000	2.00	.00	0.	10	26	A29	.96
5	6B	9.7	5.90	26.0	12.57	4	160.	.01000	2.50	.00	0.	10	12	A29	.96

CONFLUENCE Q'S

5 7A TA 1160 QA 33.74 QAB 45.98 QB 12.24 5 7B TB 1157 QB 12.56 QBA 43.86 QA 31.30
5 7AB TAB 1160 QAB 45.98 QA 33.74 QB 12.24

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	12.56	91.6	45.98	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 25-YEAR STORM STORM DAY 2

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	15.10	24.0	15.10	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.7	11.93	44.7	26.98	4	405.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	2.4	2.55	47.1	28.01	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	4A	18.5	11.27	65.6	38.82	4	480.	.00500	4.00	.00	0.	10	16	A29	.96
5	5B	16.3	7.91	16.3	7.91	4	540.	.01000	2.00	.00	0.	10	26	A29	.96
5	6B	9.7	6.74	26.0	14.39	4	160.	.01000	2.50	.00	0.	10	12	A29	.96

****

CONFLUENCE Q'S

5 7A TA 1160 QA 38.64 QAB 52.63 QB 13.99 5 7B TB 1157 QB 14.37 QBA 50.51 QA 36.14

5 7AB TAB 1160 QAB 52.63 QA 38.64 QB 13.99

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	14.37	91.6	52.63	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 25-YEAR STORM STORM DAY 1

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	3.78	24.0	3.78	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.7	2.98	44.7	6.73	4	405.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	2.4	.63	47.1	6.85	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	4A	18.5	2.82	65.6	9.44	4	480.	.00500	4.00	.00	0.	10	16	A29	.96
5	5B	16.3	1.98	16.3	1.98	4	540.	.01000	2.00	.00	0.	10	26	A29	.96
5	6B	9.7	1.69	26.0	3.55	4	160.	.01000	2.50	.00	0.	10	12	A29	.96

CONFLUENCE Q'S

5 7A TA 1163 QA 9.37 QAB 12.43 QB 3.07 5 7B TB 1158 QB 3.54 QBA 11.87 QA 8.33
5 7AB TAB 1161 QAB 12.66 QA 9.26 QB 3.41

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	3.54	91.6	12.66	0	0.	.00000	.00	.00	0.	10	0	A29	.00

B. TC CALCULATIONS (50-STORM)

Peak Flow Hydrologic Analysis

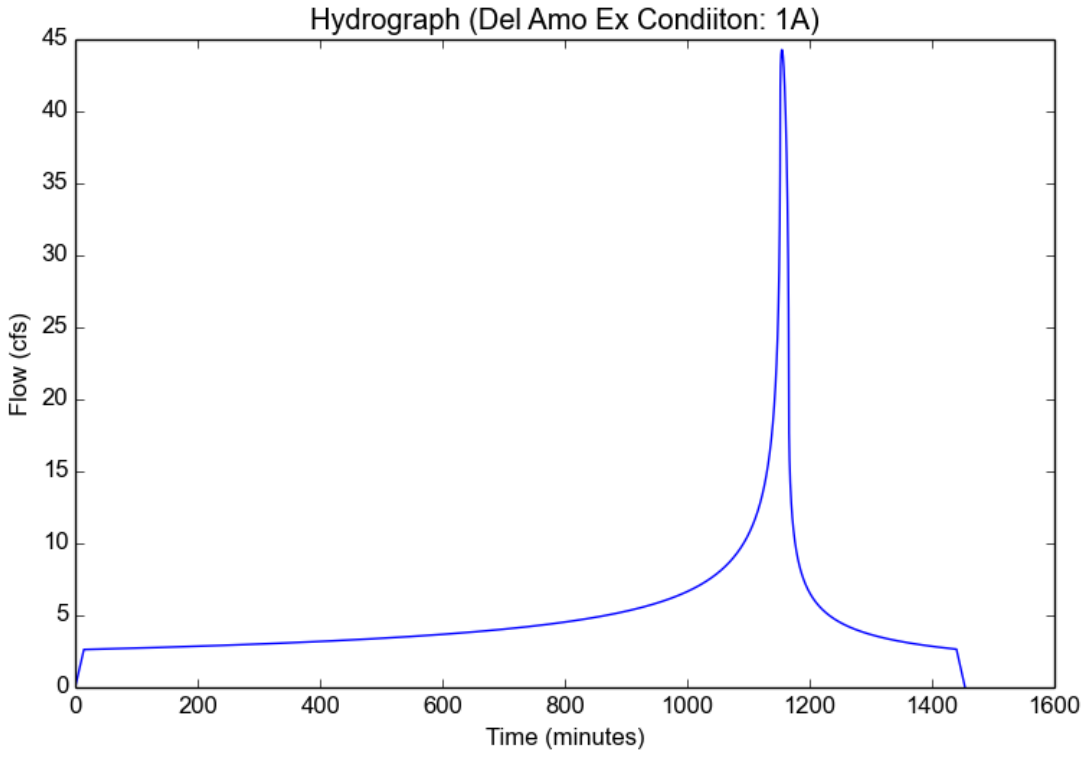
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	1A
Area (ac)	24.0
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.014666667
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.0961
Undeveloped Runoff Coefficient (Cu)	0.4061
Developed Runoff Coefficient (Cd)	0.8802
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	44.2821
Burned Peak Flow Rate (cfs)	44.2821
24-Hr Clear Runoff Volume (ac-ft)	9.8246
24-Hr Clear Runoff Volume (cu-ft)	427961.032



Peak Flow Hydrologic Analysis

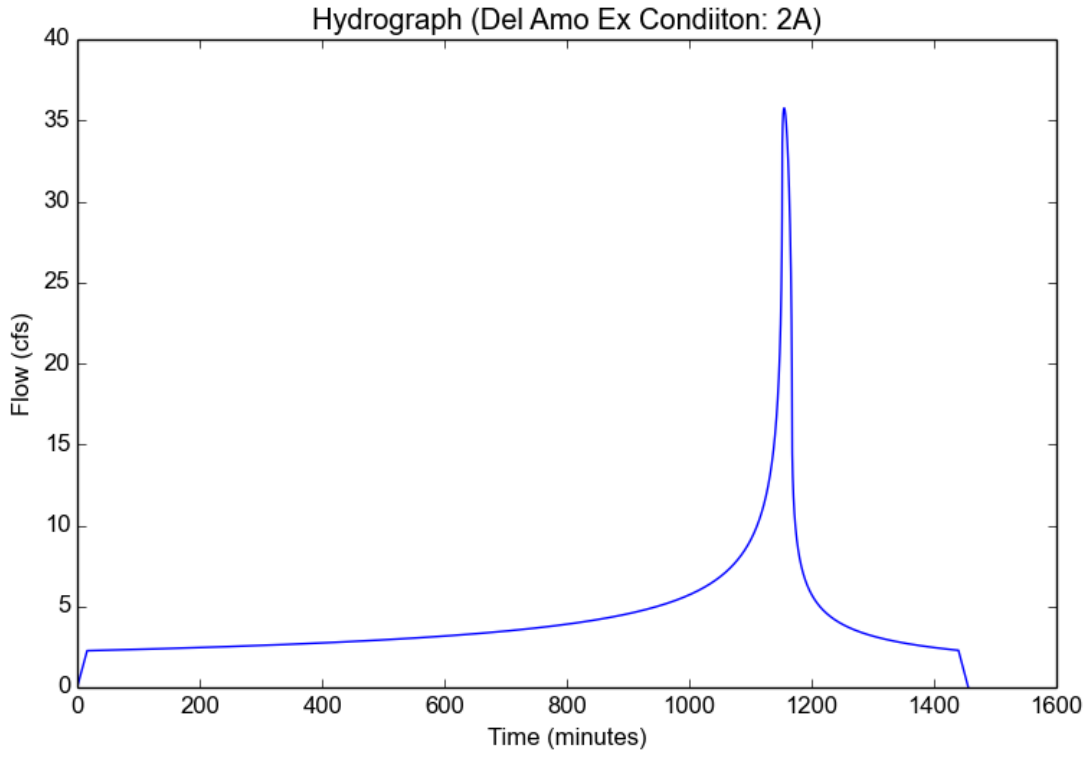
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	2A
Area (ac)	20.66
Flow Path Length (ft)	1855.0
Flow Path Slope (vft/hft)	0.012398922
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	1.9686
Undeveloped Runoff Coefficient (Cu)	0.3819
Developed Runoff Coefficient (Cd)	0.8793
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	35.7613
Burned Peak Flow Rate (cfs)	35.7613
24-Hr Clear Runoff Volume (ac-ft)	8.457
24-Hr Clear Runoff Volume (cu-ft)	368386.817



Peak Flow Hydrologic Analysis

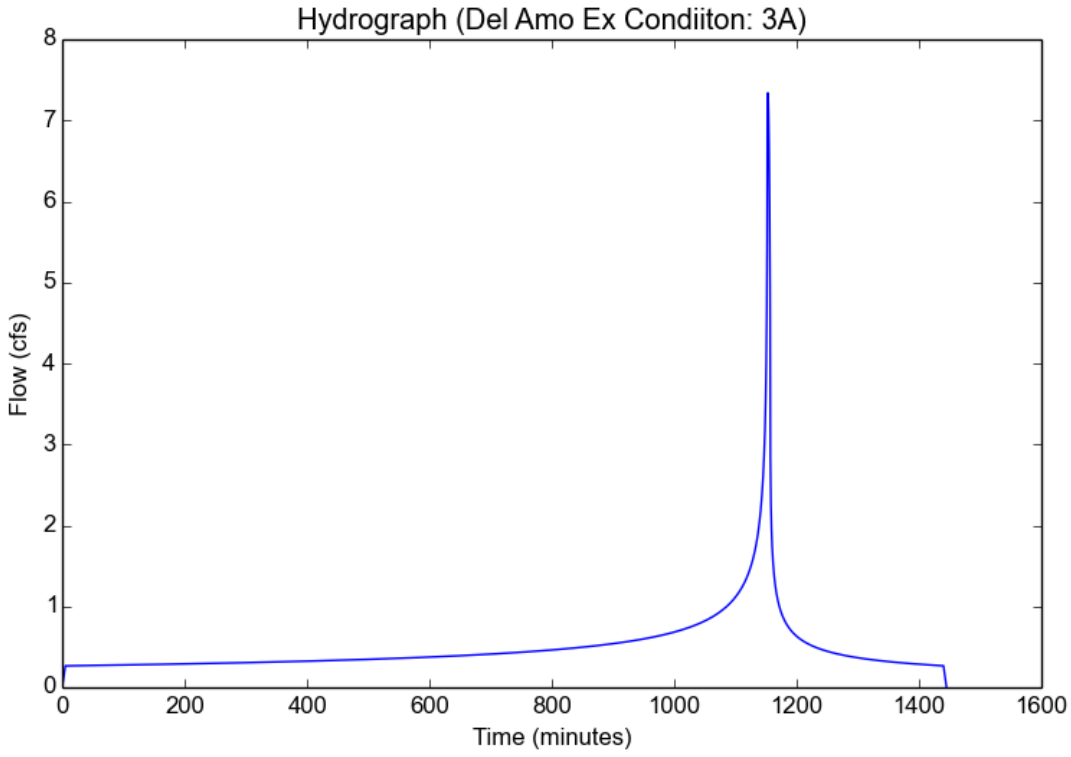
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	3A
Area (ac)	2.43
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.0129
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	3.4008
Undeveloped Runoff Coefficient (Cu)	0.6046
Developed Runoff Coefficient (Cd)	0.8882
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.3399
Burned Peak Flow Rate (cfs)	7.3399
24-Hr Clear Runoff Volume (ac-ft)	0.995
24-Hr Clear Runoff Volume (cu-ft)	43342.4033



Peak Flow Hydrologic Analysis

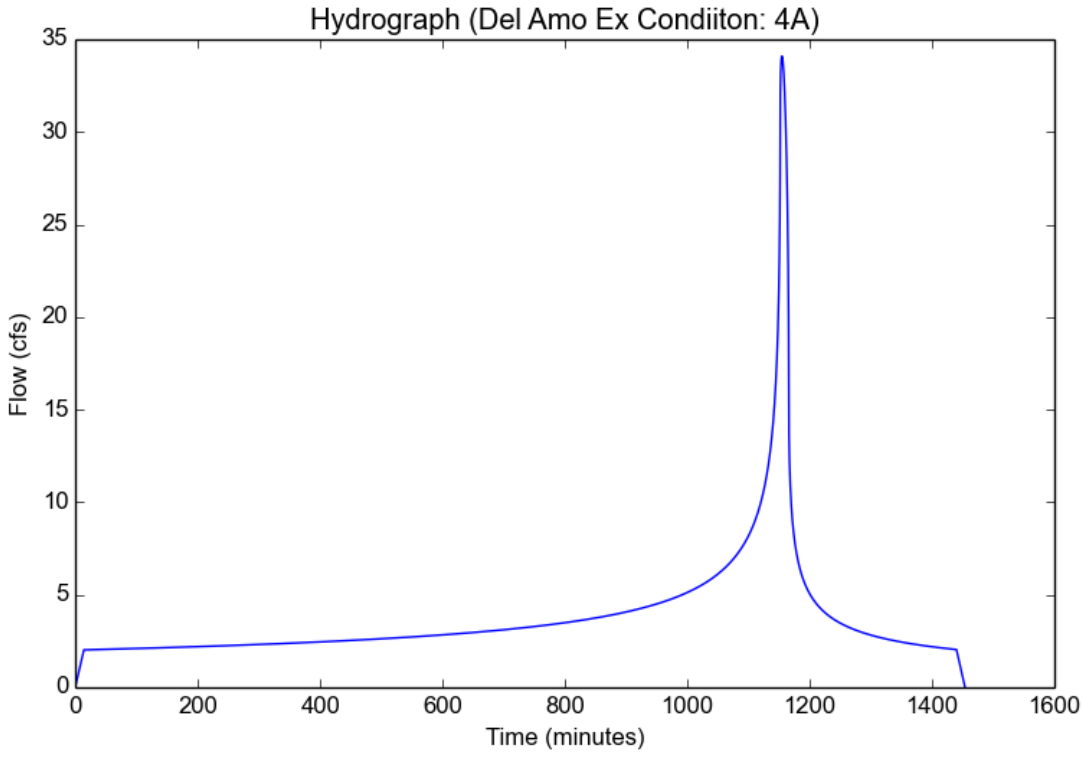
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	4A
Area (ac)	18.48
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.0113
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.0961
Undeveloped Runoff Coefficient (Cu)	0.4061
Developed Runoff Coefficient (Cd)	0.8802
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	34.0972
Burned Peak Flow Rate (cfs)	34.0972
24-Hr Clear Runoff Volume (ac-ft)	7.565
24-Hr Clear Runoff Volume (cu-ft)	329529.9947



Peak Flow Hydrologic Analysis

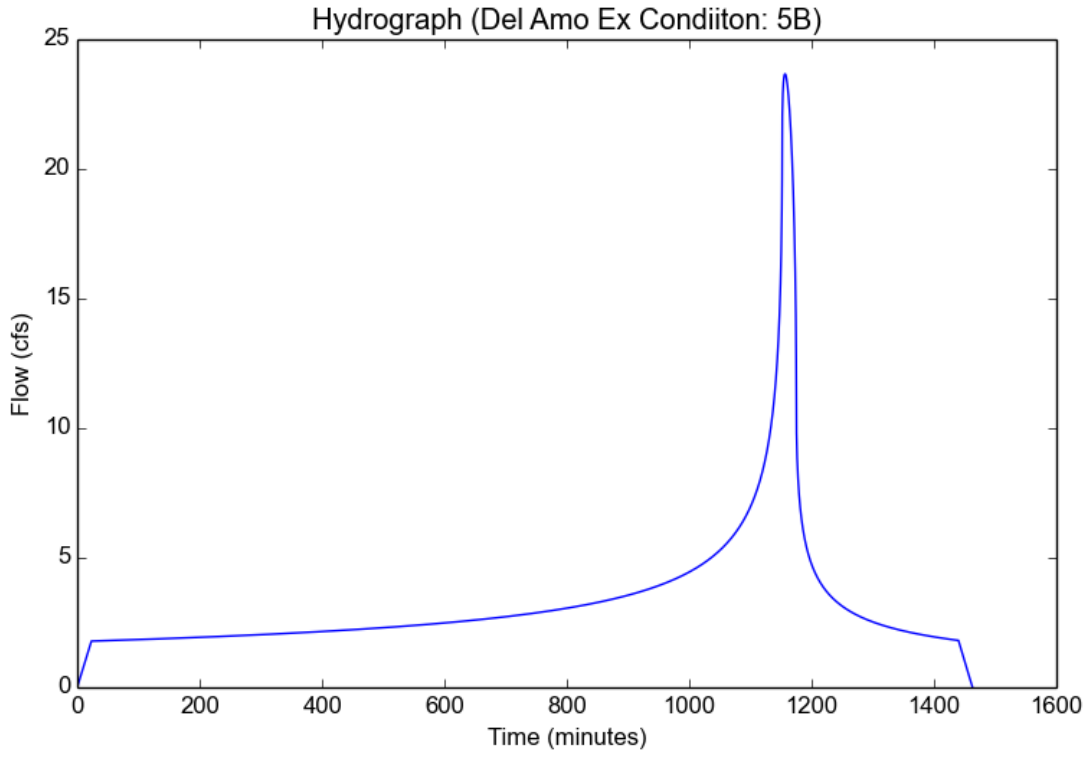
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	5B
Area (ac)	16.26
Flow Path Length (ft)	3215.0
Flow Path Slope (vft/hft)	0.010575428
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	1.6599
Undeveloped Runoff Coefficient (Cu)	0.3233
Developed Runoff Coefficient (Cd)	0.8769
Time of Concentration (min)	23.0
Clear Peak Flow Rate (cfs)	23.6683
Burned Peak Flow Rate (cfs)	23.6683
24-Hr Clear Runoff Volume (ac-ft)	6.655
24-Hr Clear Runoff Volume (cu-ft)	289892.9968



Peak Flow Hydrologic Analysis

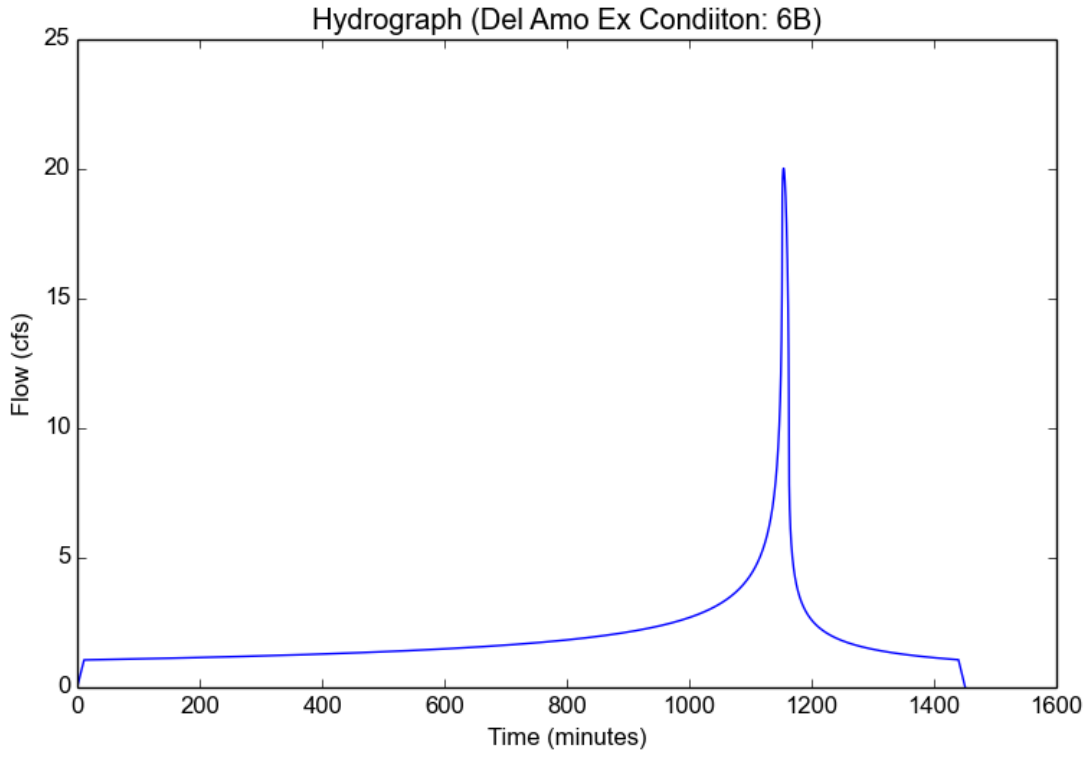
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Ex Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	6B
Area (ac)	9.67
Flow Path Length (ft)	1320.0
Flow Path Slope (vft/hft)	0.028
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.3477
Undeveloped Runoff Coefficient (Cu)	0.4539
Developed Runoff Coefficient (Cd)	0.8822
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	20.0268
Burned Peak Flow Rate (cfs)	20.0268
24-Hr Clear Runoff Volume (ac-ft)	3.9588
24-Hr Clear Runoff Volume (cu-ft)	172446.1317



B. LAR04 PROGRAM CALCULATIONS (50-YEAR STORM)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 50-YEAR STORM STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	44.96	24.0	44.96	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.7	36.43	44.7	81.32	4	405.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	2.4	7.40	47.1	83.94	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	4A	18.5	34.66	65.6	117.16	4	480.	.00500	4.25	.00	0.	10	14	A29	.96
5	5B	16.3	24.11	16.3	24.11	4	540.	.01000	2.00	.00	0.	10	23	A29	.96
5	6B	9.7	20.36	26.0	43.42	4	160.	.01000	2.50	.00	0.	10	11	A29	.96

CONFLUENCE Q'S

5 7A TA 1160 QA 116.42 QAB 157.83 QB 41.41 5 7B TB 1157 QB 43.33 QBA 155.15 QA 111.82
5 7AB TAB 1159 QAB 159.01 QA 116.36 QB 42.65

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	43.33	91.6	159.01	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 50-YEAR STORM STORM DAY 3

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	15.50	24.0	15.50	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.7	12.57	44.7	28.05	4	405.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	2.4	2.54	47.1	29.09	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	4A	18.5	11.95	65.6	40.47	4	480.	.00500	4.25	.00	0.	10	14	A29	.96
5	5B	16.3	8.35	16.3	8.35	4	540.	.01000	2.00	.00	0.	10	23	A29	.96
5	6B	9.7	7.01	26.0	15.05	4	160.	.01000	2.50	.00	0.	10	11	A29	.96

****

CONFLUENCE Q'S

5 7A TA 1160 QA 40.18 QAB 54.46 QB 14.28 5 7B TB 1157 QB 15.01 QBA 52.77 QA 37.76

5 7AB TAB 1159 QAB 54.80 QA 40.06 QB 14.74

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	15.01	91.6	54.80	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 50-YEAR STORM STORM DAY 2

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	17.73	24.0	17.73	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.7	14.37	44.7	32.06	4	405.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	2.4	2.91	47.1	33.31	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	4A	18.5	13.66	65.6	46.34	4	480.	.00500	4.25	.00	0.	10	14	A29	.96
5	5B	16.3	9.54	16.3	9.54	4	540.	.01000	2.00	.00	0.	10	23	A29	.96
5	6B	9.7	8.03	26.0	17.23	4	160.	.01000	2.50	.00	0.	10	11	A29	.96

CONFLUENCE Q'S

5 7A TA 1160 QA 45.99 QAB 62.31 QB 16.32 5 7B TB 1157 QB 17.18 QBA 60.75 QA 43.57
5 7AB TAB 1159 QAB 62.82 QA 45.96 QB 16.86

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	17.18	91.6	62.82	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO EXISTING CONDITION - 50-YEAR STORM STORM DAY 1

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	4.43	24.0	4.43	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.7	3.59	44.7	8.00	4	405.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	2.4	.72	47.1	8.14	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	4A	18.5	3.41	65.6	11.19	4	480.	.00500	4.25	.00	0.	10	14	A29	.96
5	5B	16.3	2.38	16.3	2.38	4	540.	.01000	2.00	.00	0.	10	23	A29	.96
5	6B	9.7	2.00	26.0	4.23	4	160.	.01000	2.50	.00	0.	10	11	A29	.96

****

CONFLUENCE Q'S

5 7A TA 1162 QA 11.12 QAB 14.81 QB 3.69 5 7B TB 1158 QB 4.22 QBA 14.30 QA 10.08

5 7AB TAB 1160 QAB 15.00 QA 10.90 QB 4.10

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	7AB	26.0	4.22	91.6	15.00	0	0.	.00000	.00	.00	0.	10	0	A29	.00

SECTION 3

PROPOSED CONDITION
HYDROLOGY CALCULATIONS

A. TC CALCULATIONS (25-STORM)

Peak Flow Hydrologic Analysis

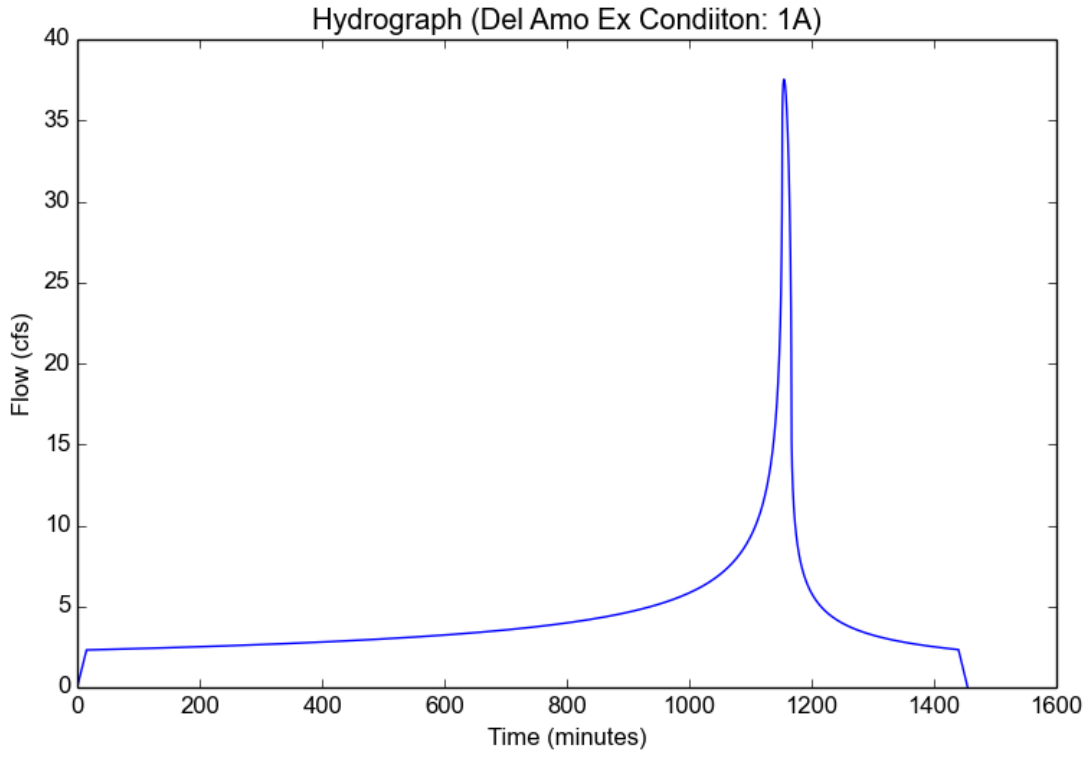
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	1A
Area (ac)	24.0
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.014666667
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.7817
Undeveloped Runoff Coefficient (Cu)	0.3464
Developed Runoff Coefficient (Cd)	0.8779
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	37.537
Burned Peak Flow Rate (cfs)	37.537
24-Hr Clear Runoff Volume (ac-ft)	8.6238
24-Hr Clear Runoff Volume (cu-ft)	375652.4601



Peak Flow Hydrologic Analysis

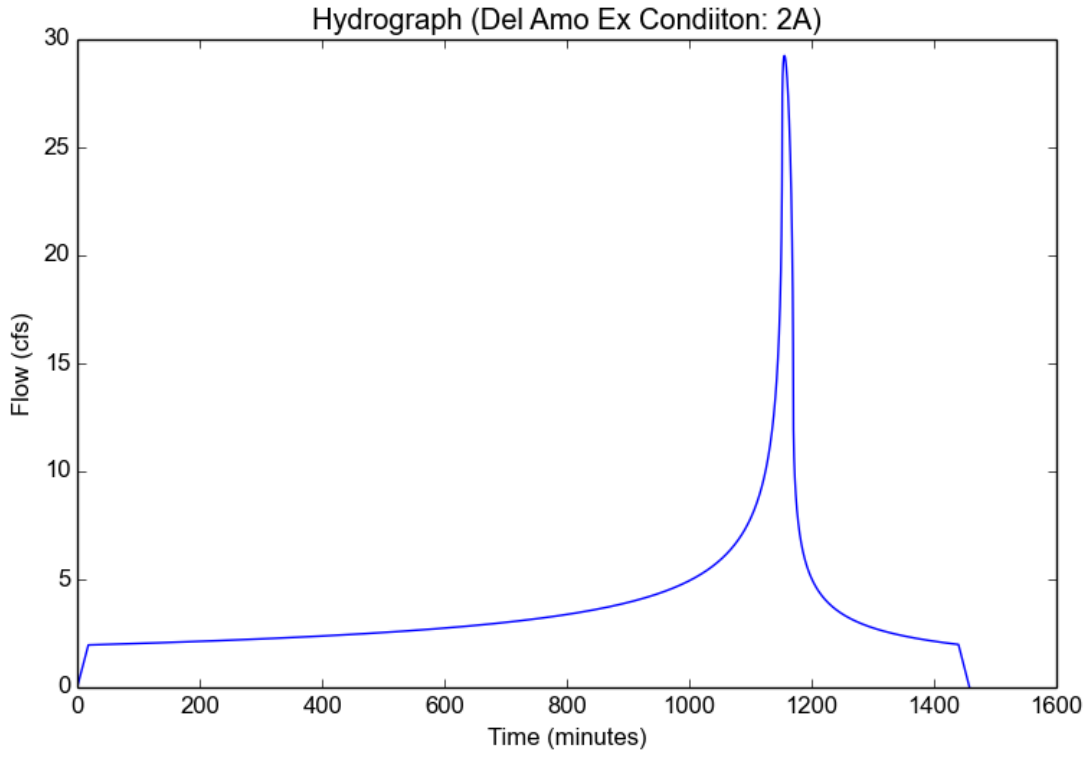
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	2A
Area (ac)	20.4
Flow Path Length (ft)	1855.0
Flow Path Slope (vft/hft)	0.012398922
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.6353
Undeveloped Runoff Coefficient (Cu)	0.3186
Developed Runoff Coefficient (Cd)	0.8767
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	29.2492
Burned Peak Flow Rate (cfs)	29.2492
24-Hr Clear Runoff Volume (ac-ft)	7.3298
24-Hr Clear Runoff Volume (cu-ft)	319285.2918



Peak Flow Hydrologic Analysis

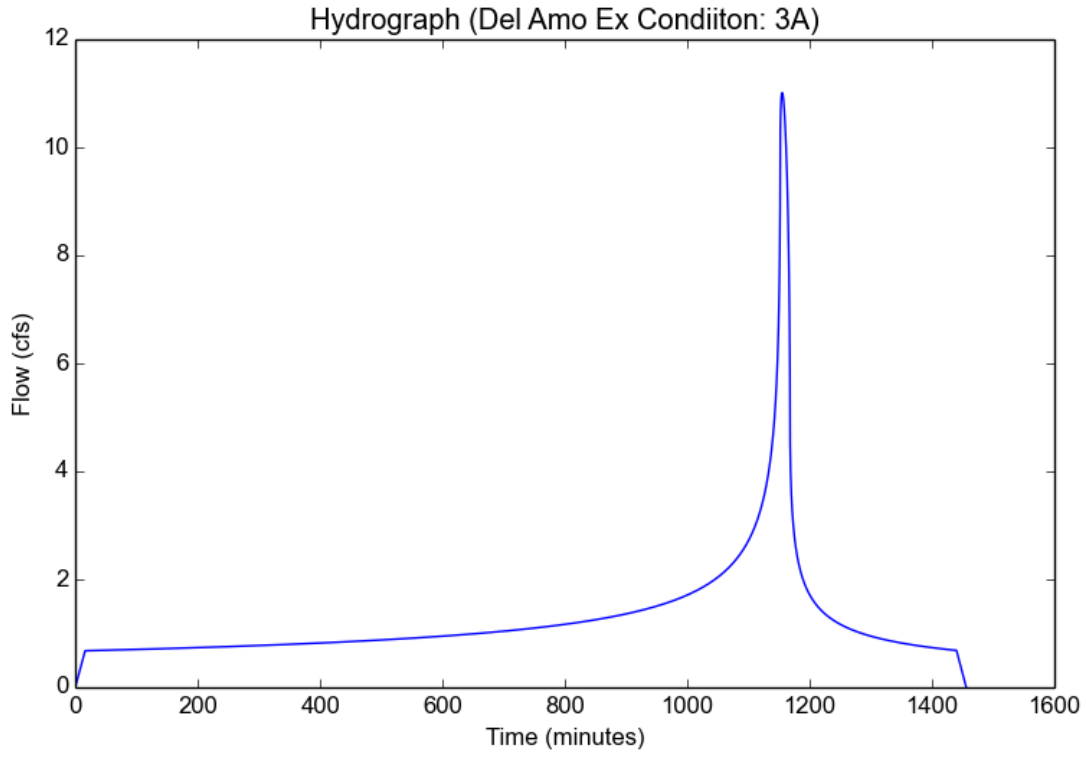
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	3A
Area (ac)	7.76
Flow Path Length (ft)	1200.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.7284
Undeveloped Runoff Coefficient (Cu)	0.3363
Developed Runoff Coefficient (Cd)	0.8211
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	11.0128
Burned Peak Flow Rate (cfs)	11.0128
24-Hr Clear Runoff Volume (ac-ft)	2.5375
24-Hr Clear Runoff Volume (cu-ft)	110534.436



Peak Flow Hydrologic Analysis

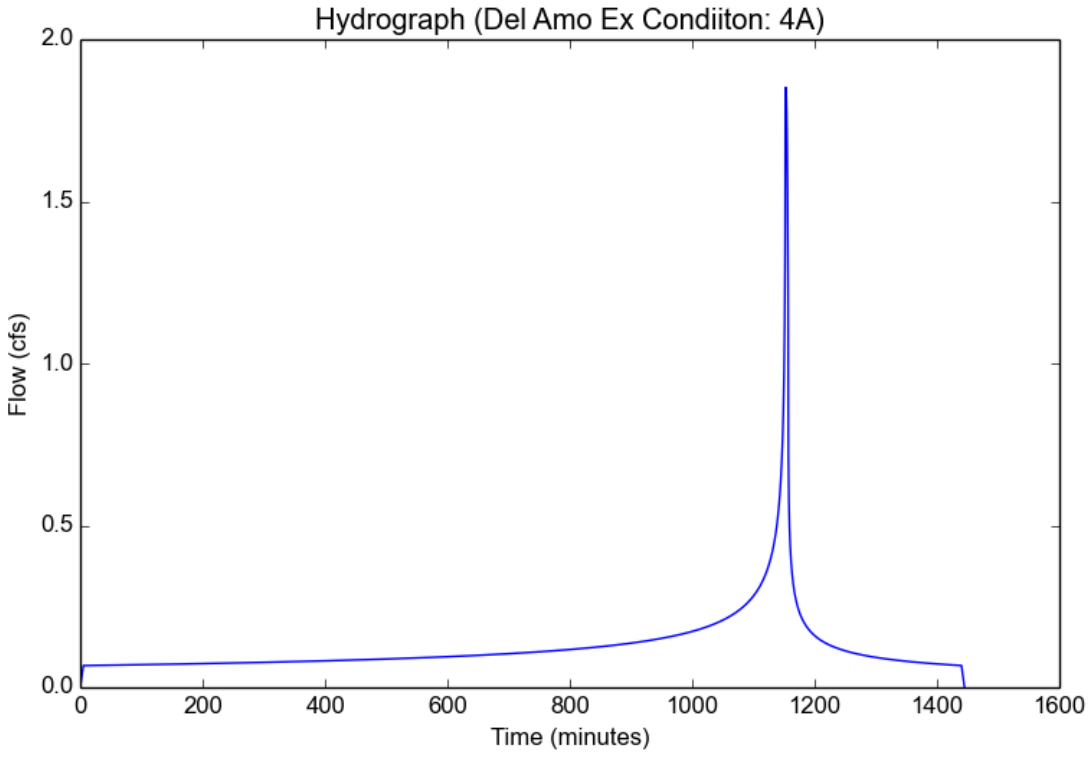
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	4A
Area (ac)	0.7
Flow Path Length (ft)	185.0
Flow Path Slope (vft/hft)	0.006486486
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	2.9859
Undeveloped Runoff Coefficient (Cu)	0.5485
Developed Runoff Coefficient (Cd)	0.8859
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8517
Burned Peak Flow Rate (cfs)	1.8517
24-Hr Clear Runoff Volume (ac-ft)	0.2516
24-Hr Clear Runoff Volume (cu-ft)	10959.6111



Peak Flow Hydrologic Analysis

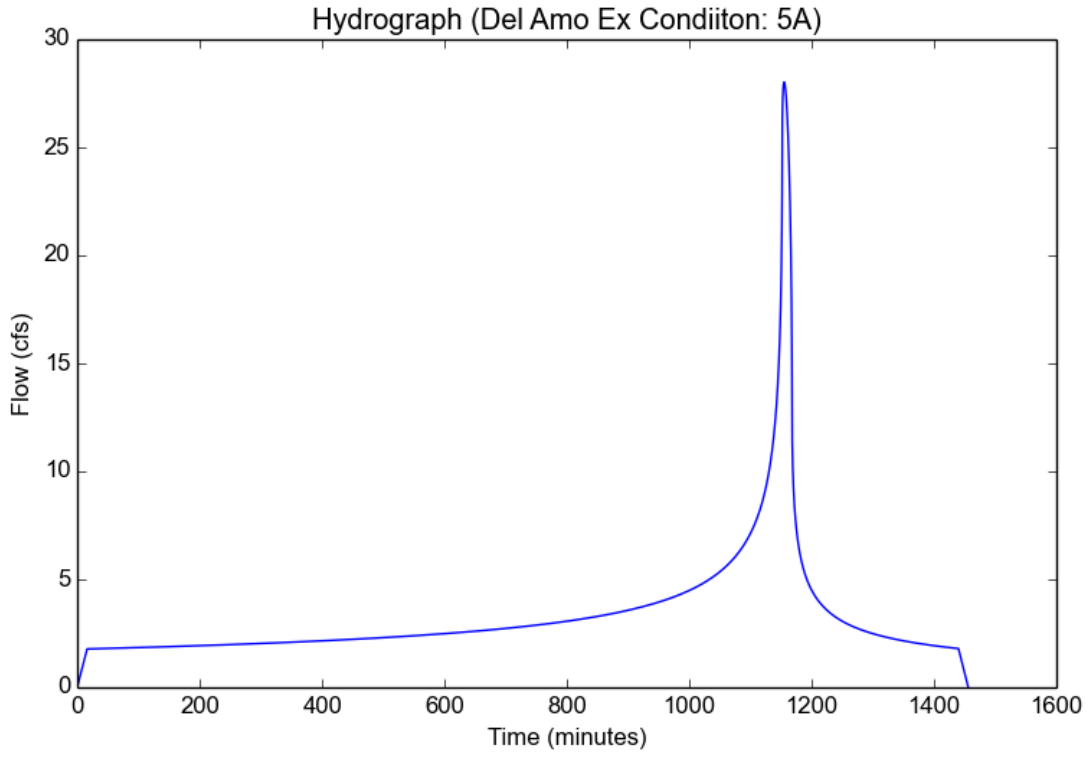
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	5A
Area (ac)	18.48
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.011333333
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.7284
Undeveloped Runoff Coefficient (Cu)	0.3363
Developed Runoff Coefficient (Cd)	0.8775
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	28.027
Burned Peak Flow Rate (cfs)	28.027
24-Hr Clear Runoff Volume (ac-ft)	6.6402
24-Hr Clear Runoff Volume (cu-ft)	289246.4231



Peak Flow Hydrologic Analysis

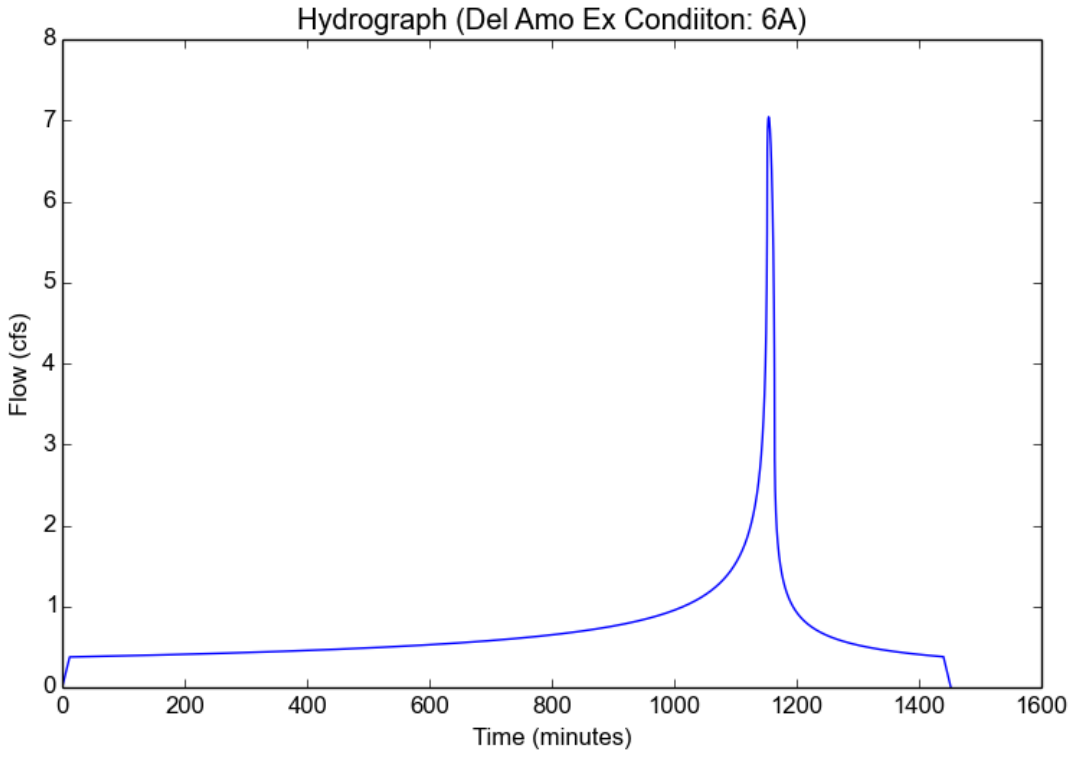
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report - 25yr.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	6A
Area (ac)	4.3
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.005165563
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.9787
Undeveloped Runoff Coefficient (Cu)	0.3838
Developed Runoff Coefficient (Cd)	0.8277
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	7.0426
Burned Peak Flow Rate (cfs)	7.0426
24-Hr Clear Runoff Volume (ac-ft)	1.4066
24-Hr Clear Runoff Volume (cu-ft)	61270.7234



Peak Flow Hydrologic Analysis

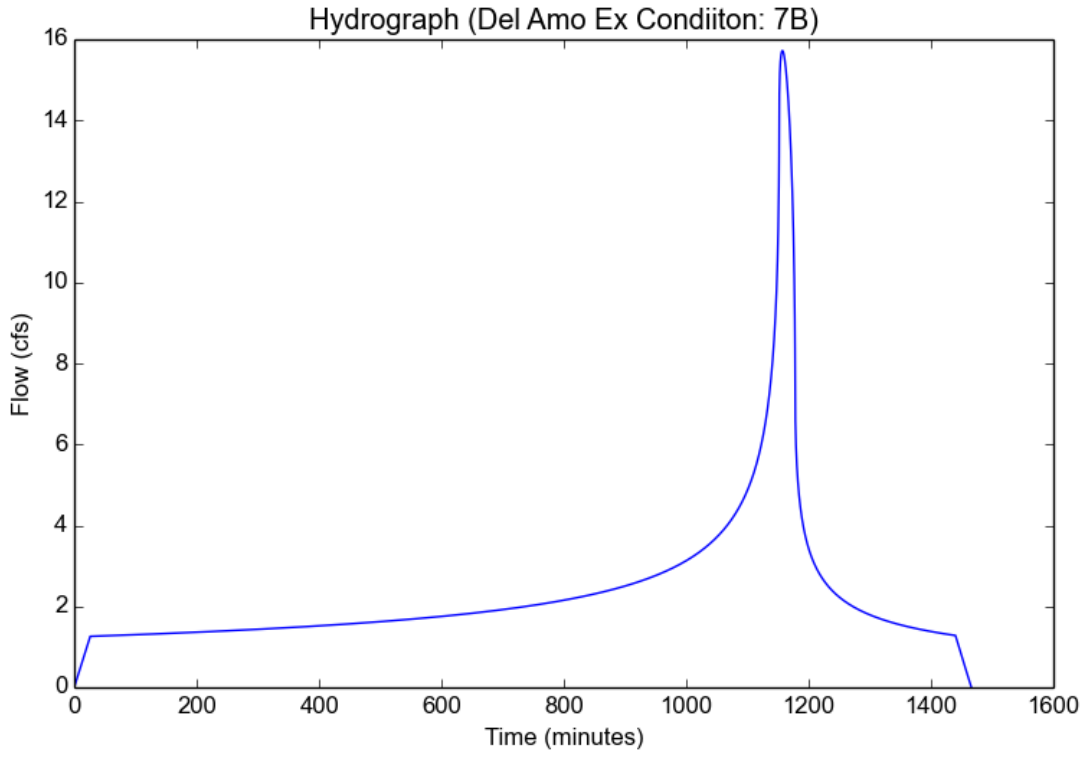
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	7B
Area (ac)	13.07
Flow Path Length (ft)	3215.0
Flow Path Slope (vft/hft)	0.010575428
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.3758
Undeveloped Runoff Coefficient (Cu)	0.2577
Developed Runoff Coefficient (Cd)	0.8743
Time of Concentration (min)	26.0
Clear Peak Flow Rate (cfs)	15.7214
Burned Peak Flow Rate (cfs)	15.7214
24-Hr Clear Runoff Volume (ac-ft)	4.6953
24-Hr Clear Runoff Volume (cu-ft)	204525.4615



Peak Flow Hydrologic Analysis

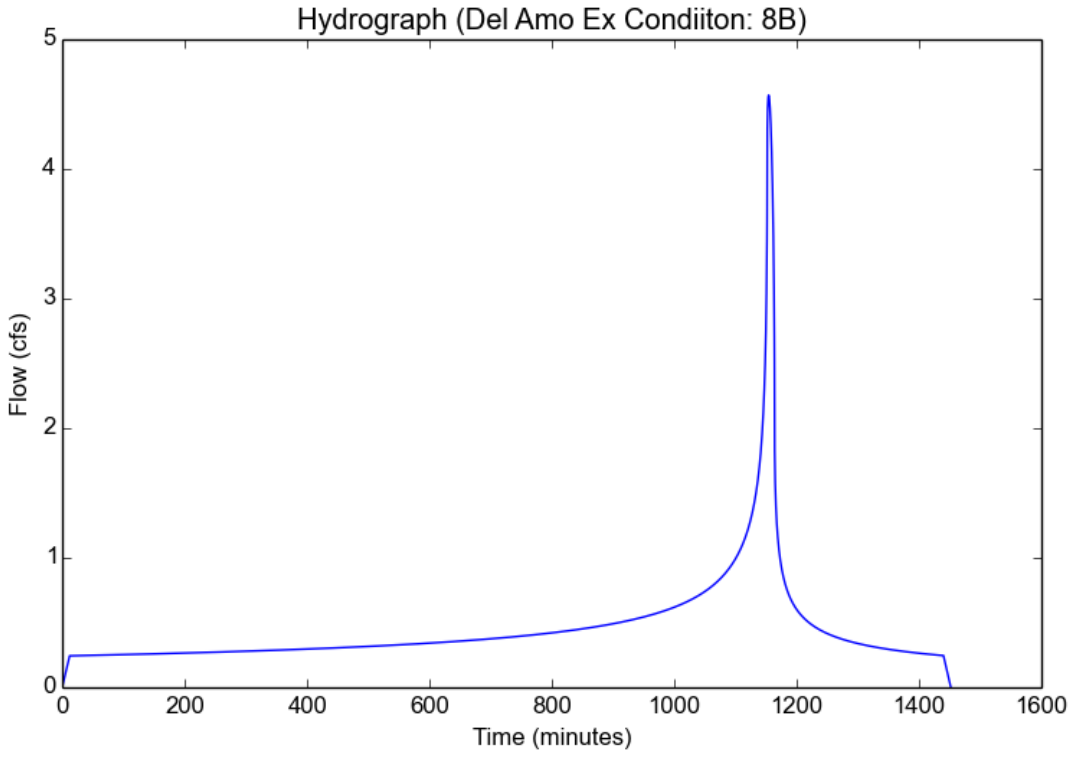
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Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	8B
Area (ac)	2.79
Flow Path Length (ft)	740.0
Flow Path Slope (vft/hft)	0.005405405
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	5.0046
Peak Intensity (in/hr)	1.9787
Undeveloped Runoff Coefficient (Cu)	0.3838
Developed Runoff Coefficient (Cd)	0.8277
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	4.5695
Burned Peak Flow Rate (cfs)	4.5695
24-Hr Clear Runoff Volume (ac-ft)	0.9126
24-Hr Clear Runoff Volume (cu-ft)	39754.7252



A. LAR04 PROGRAM CALCULATIONS (25-YEAR STORM)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 25-YEAR STORM STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	38.23	24.0	38.23	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.4	29.71	44.4	67.83	4	275.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	7.8	11.29	52.2	78.68	4	130.	.00400	3.75	.00	0.	10	16	A29	.86
5	4A	.7	1.89	52.9	79.29	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	5A	18.5	28.52	71.4	106.30	4	185.	.00500	4.00	.00	0.	10	16	A29	.96
5	6A	4.3	7.16	75.7	112.47	4	295.	.00500	4.25	.00	0.	10	12	A29	.86
5	7B	13.1	16.03	13.1	16.03	4	700.	.00500	2.00	.00	0.	10	26	A29	.96
5	8B	2.8	4.66	15.9	19.95	4	100.	.00500	2.25	.00	0.	10	12	A29	.86

CONFLUENCE Q'S

5 9A TA 1160 QA 112.26 QAB 132.21 QB 19.94 5 9B TB 1160 QB 19.94 QBA 132.21 QA 112.26

5 9AB TAB 1160 QAB 132.21 QA 112.26 QB 19.94

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	19.94	91.6	132.21	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 25-YEAR STORM STORM DAY 3

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	13.21	24.0	13.21	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.4	10.28	44.4	23.46	4	275.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	7.8	3.78	52.2	27.15	4	130.	.00400	3.75	.00	0.	10	16	A29	.86
5	4A	.7	.65	52.9	27.38	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	5A	18.5	9.86	71.4	36.76	4	185.	.00500	4.00	.00	0.	10	16	A29	.96
5	6A	4.3	2.37	75.7	38.84	4	295.	.00500	4.25	.00	0.	10	12	A29	.86
5	7B	13.1	5.56	13.1	5.56	4	700.	.00500	2.00	.00	0.	10	26	A29	.96
5	8B	2.8	1.55	15.9	6.86	4	100.	.00500	2.25	.00	0.	10	12	A29	.86

****

CONFLUENCE Q'S

5 9A TA 1160 QA 38.75 QAB 45.61 QB 6.86 5 9B TB 1160 QB 6.86 QBA 45.61 QA 38.75

5 9AB TAB 1160 QAB 45.61 QA 38.75 QB 6.86

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	6.86	91.6	45.61	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 25-YEAR STORM STORM DAY 2

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	15.10	24.0	15.10	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.4	11.75	44.4	26.81	4	275.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	7.8	4.31	52.2	31.03	4	130.	.00400	3.75	.00	0.	10	16	A29	.86
5	4A	.7	.74	52.9	31.32	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	5A	18.5	11.27	71.4	42.04	4	185.	.00500	4.00	.00	0.	10	16	A29	.96
5	6A	4.3	2.71	75.7	44.45	4	295.	.00500	4.25	.00	0.	10	12	A29	.86
5	7B	13.1	6.36	13.1	6.36	4	700.	.00500	2.00	.00	0.	10	26	A29	.96
5	8B	2.8	1.77	15.9	7.85	4	100.	.00500	2.25	.00	0.	10	12	A29	.86

****

CONFLUENCE Q'S

5 9A TA 1160 QA 44.35 QAB 52.20 QB 7.85 5 9B TB 1160 QB 7.85 QBA 52.20 QA 44.35

5 9AB TAB 1160 QAB 52.20 QA 44.35 QB 7.85

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	7.85	91.6	52.20	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 25-YEAR STORM STORM DAY 1

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	3.78	24.0	3.78	4	415.	.02100	2.25	.00	0.	10	15	A29	.96
5	2A	20.4	2.94	44.4	6.69	4	275.	.00400	3.50	.00	0.	10	18	A29	.96
5	3A	7.8	1.08	52.2	7.72	4	130.	.00400	3.75	.00	0.	10	16	A29	.86
5	4A	.7	.19	52.9	7.76	4	465.	.00400	3.75	.00	0.	10	5	A29	.96
5	5A	18.5	2.82	71.4	10.29	4	185.	.00500	4.00	.00	0.	10	16	A29	.96
5	6A	4.3	.68	75.7	10.80	4	295.	.00500	4.25	.00	0.	10	12	A29	.86
5	7B	13.1	1.59	13.1	1.59	4	700.	.00500	2.00	.00	0.	10	26	A29	.96
5	8B	2.8	.44	15.9	1.91	4	100.	.00500	2.25	.00	0.	10	12	A29	.86

CONFLUENCE Q'S

5 9A TA 1162 QA 10.76 QAB 12.64 QB 1.88 5 9B TB 1161 QB 1.90 QBA 12.57 QA 10.66

5 9AB TAB 1162 QAB 12.64 QA 10.76 QB 1.88

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	1.90	91.6	12.64	0	0.	.00000	.00	.00	0.	10	0	A29	.00

B. TC CALCULATIONS (50-STORM)

Peak Flow Hydrologic Analysis

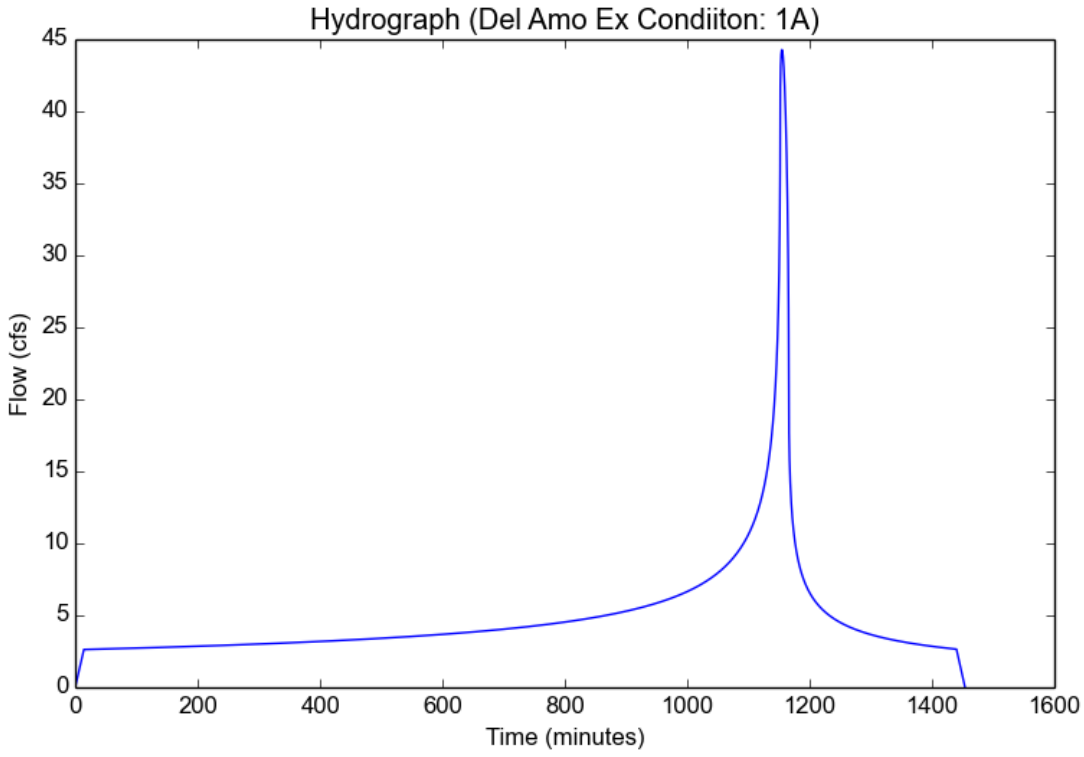
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	1A
Area (ac)	24.0
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.014666667
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.0961
Undeveloped Runoff Coefficient (Cu)	0.4061
Developed Runoff Coefficient (Cd)	0.8802
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	44.2821
Burned Peak Flow Rate (cfs)	44.2821
24-Hr Clear Runoff Volume (ac-ft)	9.8246
24-Hr Clear Runoff Volume (cu-ft)	427961.032



Peak Flow Hydrologic Analysis

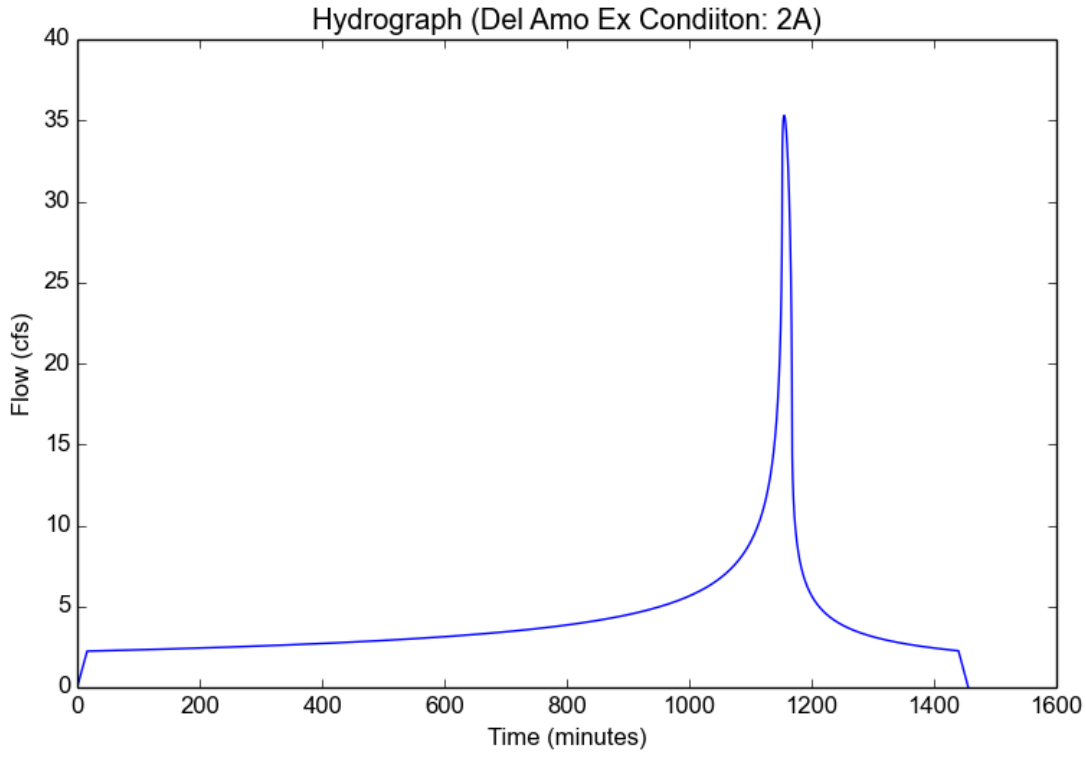
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	2A
Area (ac)	20.4
Flow Path Length (ft)	1855.0
Flow Path Slope (vft/hft)	0.012398922
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	1.9686
Undeveloped Runoff Coefficient (Cu)	0.3819
Developed Runoff Coefficient (Cd)	0.8793
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	35.3112
Burned Peak Flow Rate (cfs)	35.3112
24-Hr Clear Runoff Volume (ac-ft)	8.3506
24-Hr Clear Runoff Volume (cu-ft)	363750.7777



Peak Flow Hydrologic Analysis

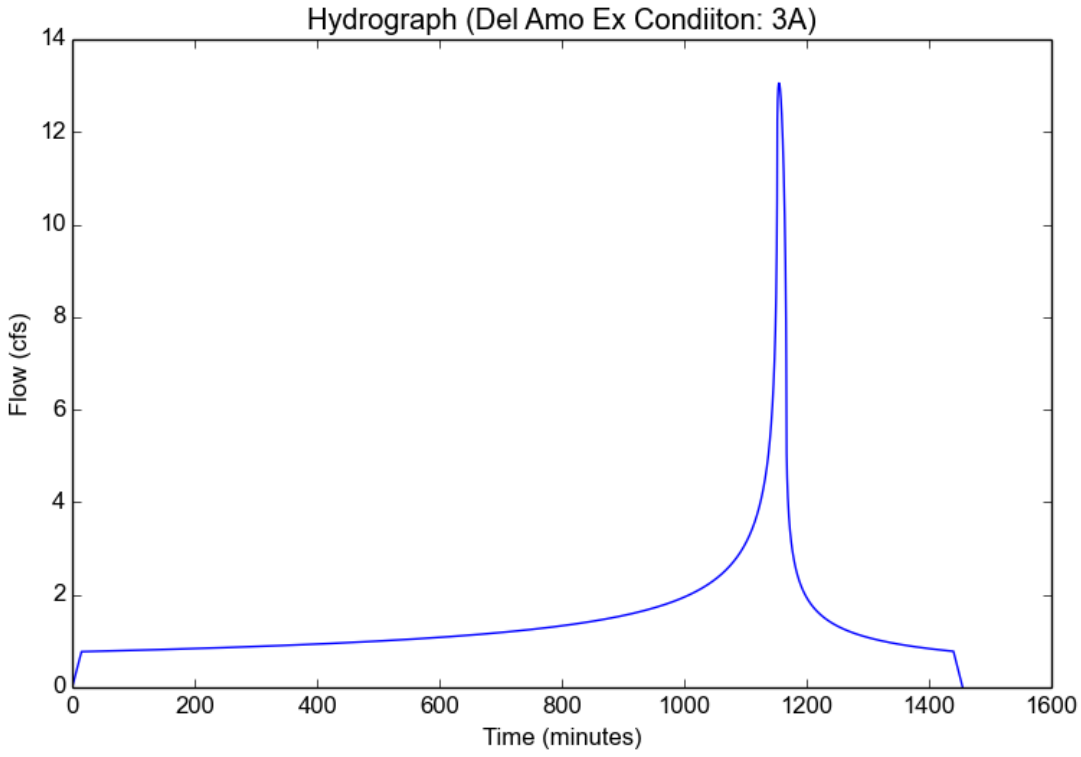
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	3A
Area (ac)	7.76
Flow Path Length (ft)	1200.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.0292
Undeveloped Runoff Coefficient (Cu)	0.3934
Developed Runoff Coefficient (Cd)	0.8291
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	13.0553
Burned Peak Flow Rate (cfs)	13.0553
24-Hr Clear Runoff Volume (ac-ft)	2.893
24-Hr Clear Runoff Volume (cu-ft)	126018.0012



Peak Flow Hydrologic Analysis

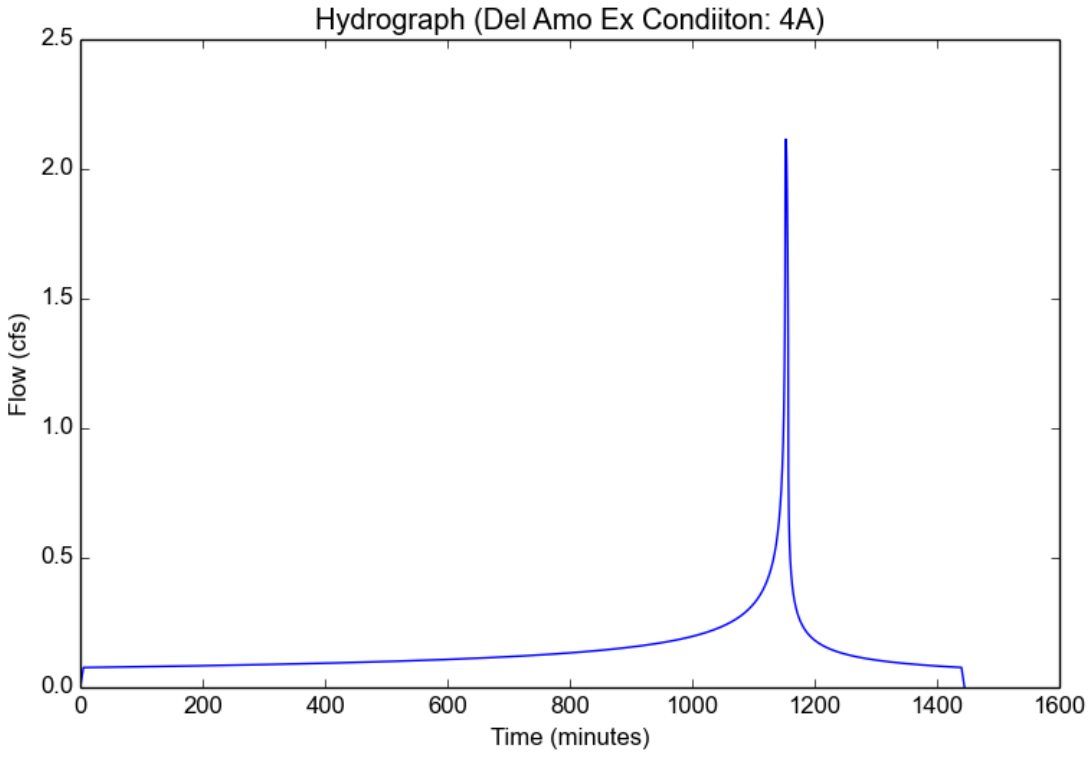
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	4A
Area (ac)	0.7
Flow Path Length (ft)	185.0
Flow Path Slope (vft/hft)	0.006486486
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	3.4008
Undeveloped Runoff Coefficient (Cu)	0.6046
Developed Runoff Coefficient (Cd)	0.8882
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.1144
Burned Peak Flow Rate (cfs)	2.1144
24-Hr Clear Runoff Volume (ac-ft)	0.2866
24-Hr Clear Runoff Volume (cu-ft)	12485.466



Peak Flow Hydrologic Analysis

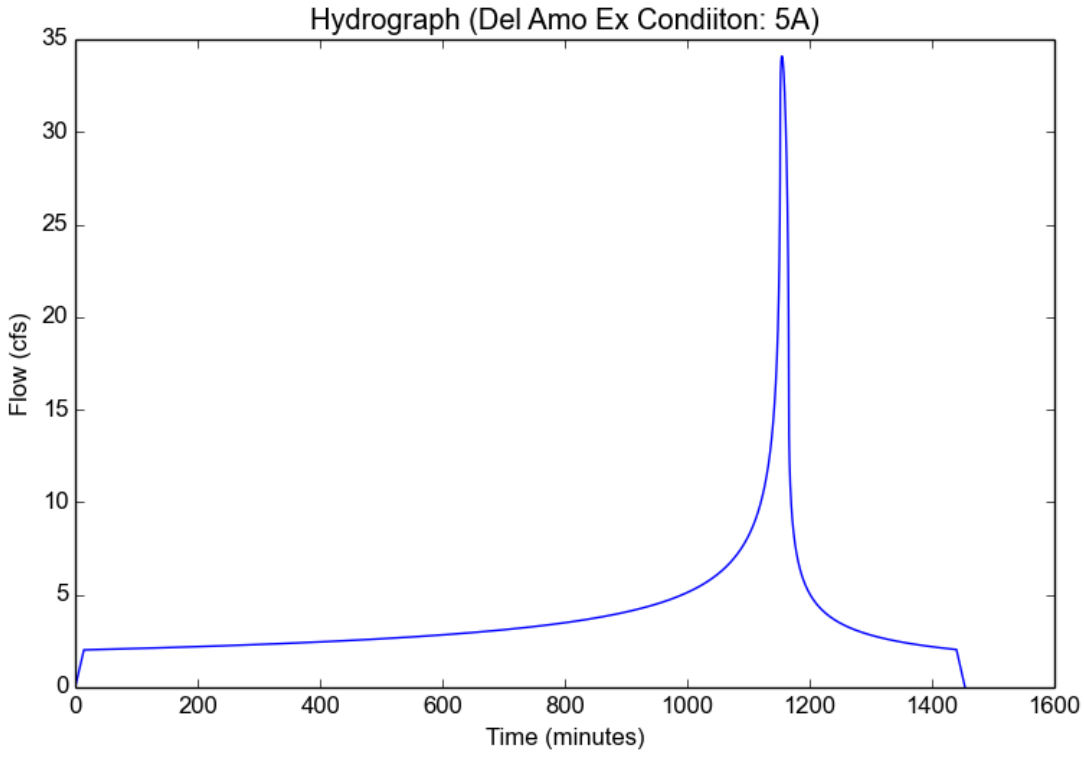
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	5A
Area (ac)	18.48
Flow Path Length (ft)	1500.0
Flow Path Slope (vft/hft)	0.011333333
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.0961
Undeveloped Runoff Coefficient (Cu)	0.4061
Developed Runoff Coefficient (Cd)	0.8802
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	34.0972
Burned Peak Flow Rate (cfs)	34.0972
24-Hr Clear Runoff Volume (ac-ft)	7.565
24-Hr Clear Runoff Volume (cu-ft)	329529.9947



Peak Flow Hydrologic Analysis

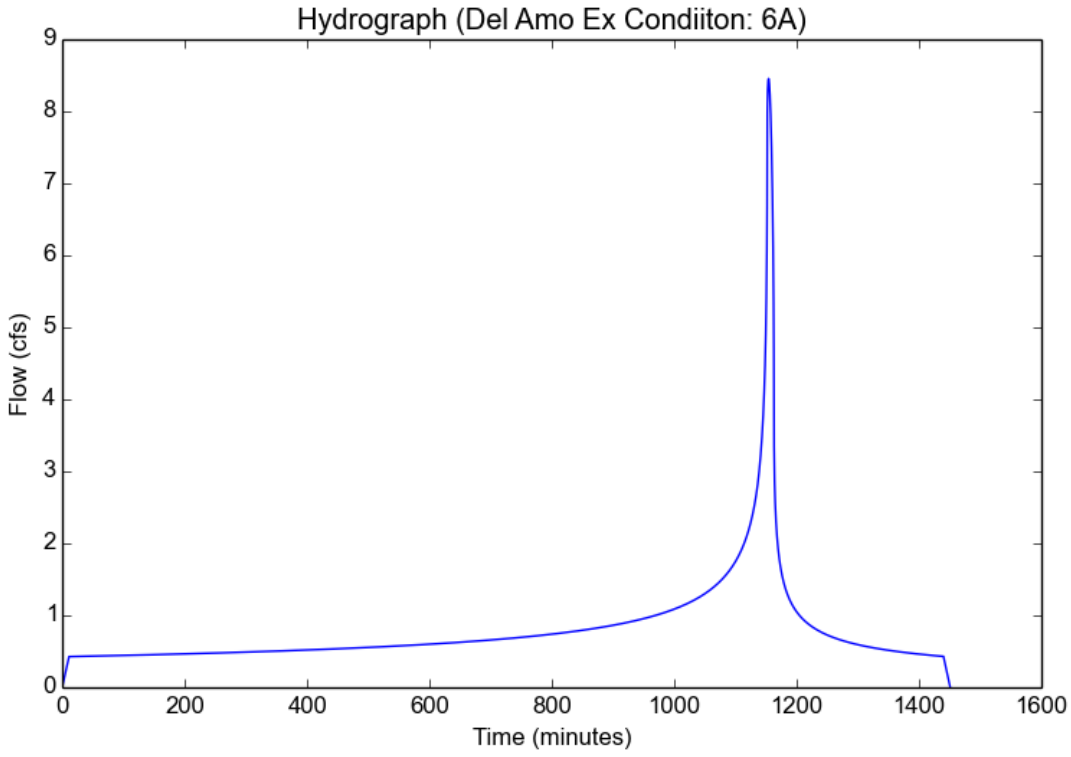
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	6A
Area (ac)	4.3
Flow Path Length (ft)	755.0
Flow Path Slope (vft/hft)	0.005165563
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.3477
Undeveloped Runoff Coefficient (Cu)	0.4539
Developed Runoff Coefficient (Cd)	0.8375
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	8.4551
Burned Peak Flow Rate (cfs)	8.4551
24-Hr Clear Runoff Volume (ac-ft)	1.6037
24-Hr Clear Runoff Volume (cu-ft)	69856.9374



Peak Flow Hydrologic Analysis

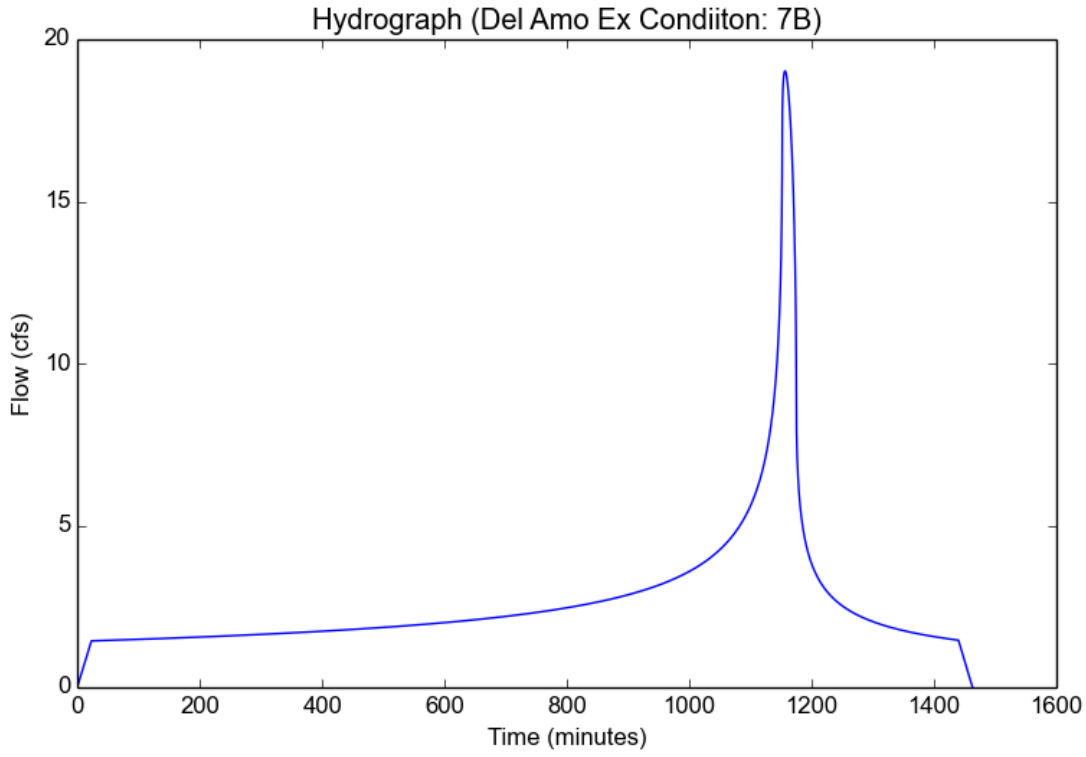
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	7B
Area (ac)	13.07
Flow Path Length (ft)	3215.0
Flow Path Slope (vft/hft)	0.010575428
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.96
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	1.6599
Undeveloped Runoff Coefficient (Cu)	0.3233
Developed Runoff Coefficient (Cd)	0.8769
Time of Concentration (min)	23.0
Clear Peak Flow Rate (cfs)	19.0249
Burned Peak Flow Rate (cfs)	19.0249
24-Hr Clear Runoff Volume (ac-ft)	5.3494
24-Hr Clear Runoff Volume (cu-ft)	233019.7705



Peak Flow Hydrologic Analysis

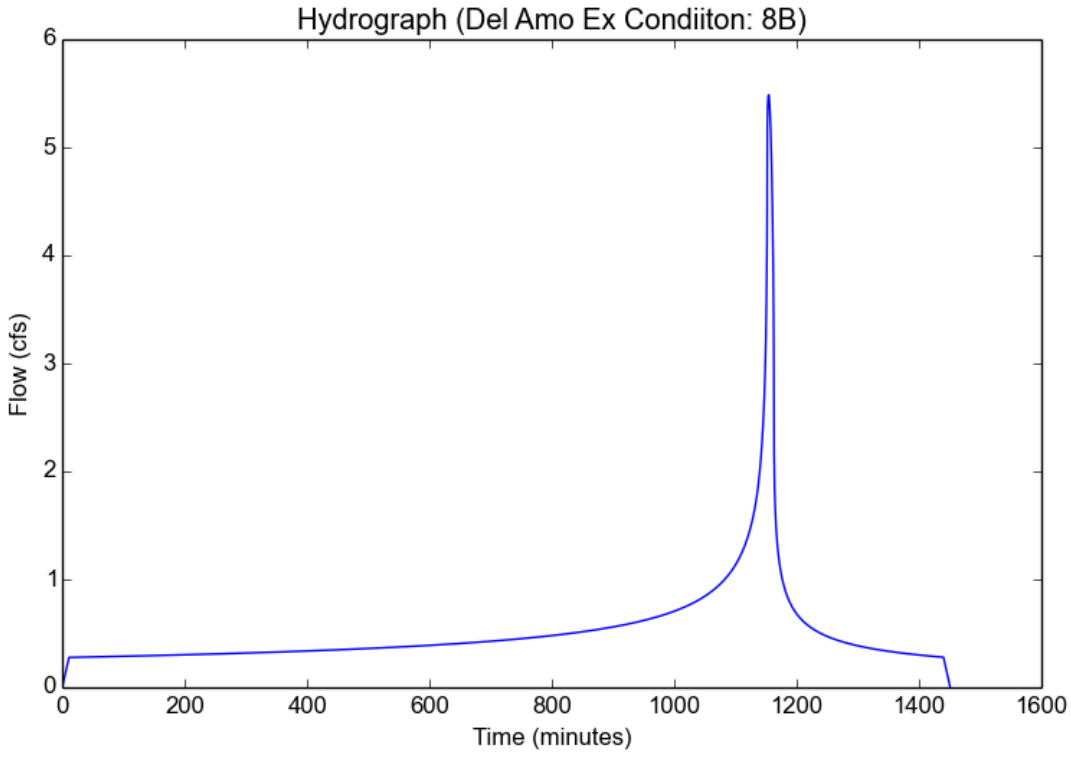
File location: F:/1180/Engineering/SY_Hydrology/Del Amo Proposed Condiiton Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Del Amo Ex Condiiton
Subarea ID	8B
Area (ac)	2.79
Flow Path Length (ft)	740.0
Flow Path Slope (vft/hft)	0.005405405
50-yr Rainfall Depth (in)	5.7
Percent Impervious	0.86
Soil Type	10
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.7
Peak Intensity (in/hr)	2.3477
Undeveloped Runoff Coefficient (Cu)	0.4539
Developed Runoff Coefficient (Cd)	0.8375
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	5.486
Burned Peak Flow Rate (cfs)	5.486
24-Hr Clear Runoff Volume (ac-ft)	1.0405
24-Hr Clear Runoff Volume (cu-ft)	45325.7803



B. LAR04 PROGRAM CALCULATIONS (50-YEAR STORM)

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 50-YEAR STORM STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	44.96	24.0	44.96	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.4	35.90	44.4	80.80	4	275.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	7.8	13.41	52.2	93.68	4	130.	.00400	4.00	.00	0.	10	15	A29	.86
5	4A	.7	2.16	52.9	94.43	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	5A	18.5	34.66	71.4	126.71	4	185.	.00500	4.25	.00	0.	10	14	A29	.96
5	6A	4.3	8.59	75.7	134.20	4	295.	.00500	4.50	.00	0.	10	11	A29	.86
5	7B	13.1	19.38	13.1	19.38	4	700.	.00500	2.25	.00	0.	10	23	A29	.96
5	8B	2.8	5.59	15.9	24.18	4	100.	.00500	2.50	.00	0.	10	11	A29	.86

****

CONFLUENCE Q'S

5 9A TA 1160 QA 133.71 QAB 157.60 QB 23.88 5 9B TB 1159 QB 24.18 QBA 157.35 QA 133.17

5 9AB TAB 1160 QAB 157.60 QA 133.71 QB 23.88

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	24.18	91.6	157.60	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 50-YEAR STORM STORM DAY 3

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	15.50	24.0	15.50	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.4	12.39	44.4	27.86	4	275.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	7.8	4.44	52.2	32.17	4	130.	.00400	4.00	.00	0.	10	15	A29	.86
5	4A	.7	.74	52.9	32.48	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	5A	18.5	11.95	71.4	43.72	4	185.	.00500	4.25	.00	0.	10	14	A29	.96
5	6A	4.3	2.82	75.7	46.18	4	295.	.00500	4.50	.00	0.	10	11	A29	.86
5	7B	13.1	6.71	13.1	6.71	4	700.	.00500	2.25	.00	0.	10	23	A29	.96
5	8B	2.8	1.84	15.9	8.25	4	100.	.00500	2.50	.00	0.	10	11	A29	.86

CONFLUENCE Q'S

5 9A TA 1160 QA 45.99 QAB 54.17 QB 8.17

5 9B TB 1159 QB 8.23 QBA 54.05 QA 45.83

5 9AB TAB 1160 QAB 54.17 QA 45.99 QB 8.17

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	8.23	91.6	54.17	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 50-YEAR STORM STORM DAY 2

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	17.73	24.0	17.73	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.4	14.16	44.4	31.85	4	275.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	7.8	5.08	52.2	36.78	4	130.	.00400	4.00	.00	0.	10	15	A29	.86
5	4A	.7	.85	52.9	37.15	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	5A	18.5	13.66	71.4	50.04	4	185.	.00500	4.25	.00	0.	10	14	A29	.96
5	6A	4.3	3.26	75.7	52.83	4	295.	.00500	4.50	.00	0.	10	11	A29	.86
5	7B	13.1	7.66	13.1	7.66	4	700.	.00500	2.25	.00	0.	10	23	A29	.96
5	8B	2.8	2.12	15.9	9.45	4	100.	.00500	2.50	.00	0.	10	11	A29	.86

****

CONFLUENCE Q'S

5 9A TA 1160 QA 52.62 QAB 61.98 QB 9.35 5 9B TB 1159 QB 9.43 QBA 61.98 QA 52.55

5 9AB TAB 1159 QAB 61.98 QA 52.55 QB 9.43

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	9.43	91.6	61.98	0	0.	.00000	.00	.00	0.	10	0	A29	.00

Version 11.3, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\LAR04\cst_soilx_83.dat
DEL AMO PROPOSED CONDITION - 50-YEAR STORM STORM DAY 1

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	1A	24.0	4.43	24.0	4.43	4	415.	.02100	2.25	.00	0.	10	14	A29	.96
5	2A	20.4	3.54	44.4	7.95	4	275.	.00400	3.75	.00	0.	10	16	A29	.96
5	3A	7.8	1.27	52.2	9.14	4	130.	.00400	4.00	.00	0.	10	15	A29	.86
5	4A	.7	.21	52.9	9.19	4	465.	.00400	4.00	.00	0.	10	5	A29	.96
5	5A	18.5	3.41	71.4	12.20	4	185.	.00500	4.25	.00	0.	10	14	A29	.96
5	6A	4.3	.81	75.7	12.77	4	295.	.00500	4.50	.00	0.	10	11	A29	.86
5	7B	13.1	1.92	13.1	1.92	4	700.	.00500	2.25	.00	0.	10	23	A29	.96
5	8B	2.8	.52	15.9	2.29	4	100.	.00500	2.50	.00	0.	10	11	A29	.86

CONFLUENCE Q'S

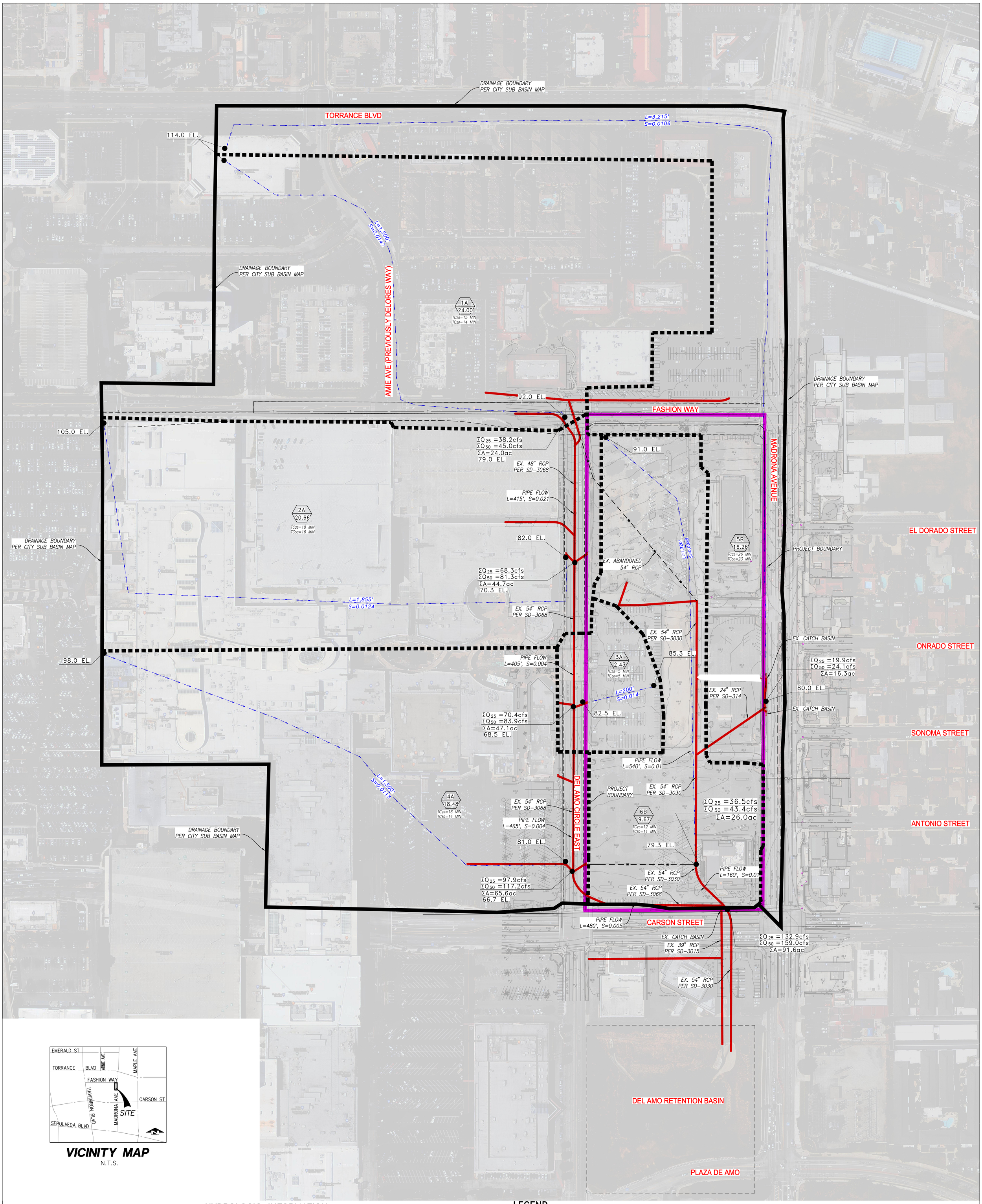
5 9A TA 1162 QA 12.71 QAB 14.93 QB 2.22 5 9B TB 1160 QB 2.28 QBA 14.79 QA 12.51
5 9AB TAB 1161 QAB 14.95 QA 12.70 QB 2.26

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
5	9AB	15.9	2.28	91.6	14.95	0	0.	.00000	.00	.00	0.	10	0	A29	.00

SECTION 4

HYDROLOGY MAPS

A. EXISTING CONDITION HYDROLOGY MAP



VICINITY MAP
N.T.S.

SCALE: 1"=80'

0 40 80 160 240 320

SCALE: 1" = 80'

HYDROLOGIC INFORMATION

7	DPA ZONE
010	SOIL GROUP
5.7"	50-YEAR 24-HOUR ISOHYET
96%	AREA AVERAGE % IMPERVIOUSNESS (RETAIL CENTER)
1	BURN FACTOR
1	BULKING FACTOR
0.85"	85TH PERCENTILE RAINFALL DEPTH
85TH PERCENTILE RAINFALL DEPTH	PROJECT DESIGN STORM (0.75 INCHES OR 85TH PERCENTILE)

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 1A / 1.0 — AREA DESIGNATION FOR AREA "A" AREA ACREAGE (IN ACRES)
- SURFACE FLOW LINE
- Q_{25} =30.0cfs / A=10.0ac — PEAK 25-YR FLOW RATE DRAINAGE AREA IN ACRES
- PROJECT BOUNDARY
- EXISTING STORM DRAIN

PREPARED FOR:

LENNAR

25 ENTERPRISE, SUITE 400
ALISO VIEJO, CA 92656
(949) 349-8100

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH:(949) 583-1010 • FX:(949) 583-0759

EXHIBIT 1
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR EXISTING CONDITION HYDROLOGY MAP
DEL AMO
CITY OF TORRANCE, COUNTY OF LOS ANGELES

W.O.3916-68 DEL AMO EX. HYDROLOGY MAP

PLOTTED BY: Gary Guan DATE: Mar. 05, 2022 03:00:56 PM FILE: F:\1180\Engineering\SY_Hydrology\Existing Hydrology Map.dwg

B. PROPOSED CONDITION HYDROLOGY MAP

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

TORRANCE BLVD

L=3,215'
S=0.0106

114.0 EL.

L=1,500'
S=0.0147

AMIE AVE (PREVIOUSLY DELORES WAY)

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

1A
24.00
TC25=15 MIN
TC50=14 MIN

7B
13.07
TC25=26 MIN
TC50=23 MIN

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

92.0 EL.

FASHION WAY

105.0 EL.

ΣQ_{25} =38.2cfs
ΣQ_{50} =45.0cfs
ΣA=24.0ac
79.0 FL.

EX. 48" RCP
PER SD-3068

PIPE FLOW
L=415', S=0.021

91.3 EL.

MADRONA AVENUE

2A
20.40
TC25=18 MIN
TC50=16 MIN

82.0 EL.

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

ΣQ_{25} =67.8cfs
ΣQ_{50} =80.8cfs
ΣA=44.4ac
70.3 FL.

EX. 54" RCP
PER SD-3068

L=1,855'
S=0.0124

PIPE FLOW
L=405', S=0.004

83.2 EL.

L=1,200'
S=0.005

3A
7.76
TC25=16 MIN
TC50=15 MIN

PROPOSED SD

82.5 EL.

CDS UNIT #1
FOR PRE-TREATMENT

EX. CATCH BASIN

ONRADO STREET

98.0 EL.

JOIN EX. 54" RCP
PER SD-3068

ΣQ_{25} =78.7cfs
ΣQ_{50} =93.7cfs
ΣA=52.2ac
69.2 FL.

L=185'
S=0.0065

86.0 EL.

Q_{25} =11.3cfs
Q_{50} =13.4cfs

JOIN EX. 24" RCP
PER SD-314

ΣQ_{25} =16.0cfs
ΣQ_{50} =19.4cfs
ΣA=13.1ac

80.0 EL.

EX. CATCH BASIN

82.5 EL.

4A
0.70
TC25=5 MIN
TC50=5 MIN

SONOMA STREET

ΣQ_{25} =79.3cfs
ΣQ_{50} =94.4cfs
ΣA=52.9ac
68.5 FL.

L=755'
S=0.005

PIPE FLOW
L=700', S=0.005

L=740'
S=0.005

L=1,500'
S=0.0113

DEL AMO CIRCLE EAST

PROJECT BOUNDARY

5A
18.48
TC25=16 MIN
TC50=14 MIN

EX. 54" RCP
PER SD-3068

6A
4.30
TC25=12 MIN
TC50=11 MIN

8B
2.79
TC25=12 MIN
TC50=11 MIN

DRAINAGE BOUNDARY PER CITY SUB BASIN MAP

PIPE FLOW
L=465', S=0.004

81.0 EL.

Q_{25} =7.2cfs
Q_{50} =8.6cfs

CDS UNIT #3
FOR PRE-TREATMENT

ΣQ_{25} =20.0cfs
ΣQ_{50} =24.2cfs
ΣA=15.9ac

CDS UNIT #2
FOR PRE-TREATMENT

82.5 EL.

ΣQ_{25} =106.3cfs
ΣQ_{50} =126.7cfs
ΣA=71.4ac
66.7 FL.

82.1 EL.

ΣQ_{25} =112.5cfs
ΣQ_{50} =134.2cfs
ΣA=75.7ac

CARSON STREET

EX. 54" RCP
PER SD-3068

EX. CATCH BASIN

JOIN EX. 54" RCP
PER SD-3068

EX. 39" RCP
PER SD-3015

ΣQ_{25} =132.2cfs
ΣQ_{50} =157.6cfs
ΣA=91.6ac

EX. 54" RCP
PER SD-3030

DEL AMO RETENTION BASIN

PLAZA DE AMO

EL DORADO STREET

PROJECT BOUNDARY

ANTONIO STREET

HYDROLOGIC INFORMATION

7	DPA ZONE
010	SOIL GROUP
5.7"	50-YEAR 24-HOUR ISOHYET
1	BURN FACTOR
1	BULKING FACTOR
0.85"	85TH PERCENTILE RAINFALL DEPTH
85TH PERCENTILE RAINFALL DEPTH	PROJECT DESIGN STORM (0.75 INCHES OR 85TH PERCENTILE)
96%	AREA AVERAGE % IMPERVIOUSNESS FOR THE STUDIED AREA (RETAIL CENTER FOR AREAS A-1, A-2, A-4, A-5, B-7)
86%	*AREA AVERAGE % IMPERVIOUSNESS FOR THE STUDIED AREA (APARTMENTS AND CONDOMINIUMS FOR ON-SITE AREAS A-3, A-6 AND B-8)*

SCALE: 1"=80'

0 40 80 160 240 320

SCALE: 1" = 80'



VICINITY MAP
N.T.S.

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 1A / 1.0 — AREA DESIGNATION FOR AREA "A" AREA ACREAGE (IN ACRES)
- SURFACE FLOW LINE
- Q_{25} =30.0cfs / A=10.0ac — PEAK 25-YR FLOW RATE DRAINAGE AREA IN ACRES
- PROJECT BOUNDARY
- EXISTING STORM DRAIN
- CDS UNIT FOR PRE-TREATMENT
- PROPOSED STORM DRAIN

PREPARED FOR:

LENNAR

25 ENTERPRISE, SUITE 400
ALISO VIEJO, CA 92656
(949) 349-8100

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH:(949) 583-1010 • FX:(949) 583-0759

EXHIBIT 2
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR PROPOSED CONDITION HYDROLOGY MAP
DEL AMO
CITY OF TORRANCE, COUNTY OF LOS ANGELES

W.O.3916-68 DEL AMO PROPOSEDHYDROLOGY MAP

PLOTTED BY: Gary Guan DATE: Apr. 20, 2022 09:44:30 AM FILE: F:\1180\Engineering\SY_Hydrology\Proposed Hydrology Map.dwg

SECTION 5

PRELIMINARY HYDRAULIC ANALYSIS FOR EX. 54” STORM DRAIN (SD-3068)

Del Amo - Ex. 54" Pipe Cacity - Reach 1

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00380	ft/ft
Normal Depth	4.50	ft
Diameter	4.50	ft
Discharge	121.22	ft³/s

Results

Discharge	121.22	ft³/s
Normal Depth	4.50	ft
Flow Area	15.90	ft²
Wetted Perimeter	14.14	ft
Hydraulic Radius	1.13	ft
Top Width	0.00	ft
Critical Depth	3.24	ft
Percent Full	100.0	%
Critical Slope	0.00504	ft/ft
Velocity	7.62	ft/s
Velocity Head	0.90	ft
Specific Energy	5.40	ft
Froude Number	0.00	
Maximum Discharge	130.39	ft³/s
Discharge Full	121.22	ft³/s
Slope Full	0.00380	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Del Amo - Ex. 54" Pipe Cacity - Reach 1

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.50	ft
Critical Depth	3.24	ft
Channel Slope	0.00380	ft/ft
Critical Slope	0.00504	ft/ft

Del Amo - Ex. 54" Pipe Cacity - Reach 2

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00490	ft/ft
Normal Depth	4.50	ft
Diameter	4.50	ft
Discharge	137.65	ft³/s

Results

Discharge	137.65	ft³/s
Normal Depth	4.50	ft
Flow Area	15.90	ft²
Wetted Perimeter	14.14	ft
Hydraulic Radius	1.13	ft
Top Width	0.00	ft
Critical Depth	3.45	ft
Percent Full	100.0	%
Critical Slope	0.00560	ft/ft
Velocity	8.65	ft/s
Velocity Head	1.16	ft
Specific Energy	5.66	ft
Froude Number	0.00	
Maximum Discharge	148.07	ft³/s
Discharge Full	137.65	ft³/s
Slope Full	0.00490	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Del Amo - Ex. 54" Pipe Cacity - Reach 2

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.50	ft
Critical Depth	3.45	ft
Channel Slope	0.00490	ft/ft
Critical Slope	0.00560	ft/ft

FASHION WAY

EL DORADO STREET

MADRONA AVENUE

ONRADO STREET

SONOMA STREET

ANTONIO STREET

CARSON STREET

DEL AMO CIRCLE EAST

EX. 54" RCP
PER SD-3068

PROPOSED STORM DRAIN

JOIN EX. 54" RCP
PER SD-3068

REACH 1
EX. 54" RCP, MIN. S=0.0038
PIPE CAPACITY=121.2 CFS
Q50=94.4 CFS

EX. 54" RCP
PER SD-3068

PROPOSED STORM DRAIN

JOIN EX. 54" RCP
PER SD-3068

EX. 54" RCP
PER SD-3068

EX. CATCH BASIN

EX. 39" RCP
PER SD-3015

REACH 2
EX. 54" RCP, S=0.0049
PIPE CAPACITY=137.7 CFS
Q50=134.2 CFS

EX. 54" RCP PER SD-3030
THE PROPOSED FLOWS ARE LESS THAN
THE EXISTING CONDITION,
THERE ARE NO NEED FOR PIPE CAPACITY CALC'S

OBSCURED BY BLDG

SCALE: 1"=40'

0 20 40 80 120 160

SCALE: 1" = 40'

LEGEND

- EXISTING STORM DRAIN
- CDS UNIT FOR PRE-TREATMENT
- PROPOSED STORM DRAIN

EMERALD ST
TORRANCE BLVD
ARNE AVE
MAPLE AVE
FASHION WAY
HAWTHORN BLVD
MADRONA AVE
CARSON ST
SITE
SEPULVEDA BLVD

VICINITY MAP

N.T.S.

PREPARED FOR:

LENNAR

25 ENTERPRISE, SUITE 400
ALISO VIEJO, CA 92656
(949) 349-8100

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

EXHIBIT 3
DRAINAGE CONCEPT/HYDROLOGY STUDY FOR EX. STORM DRAIN CAPACITY
DEL AMO
CITY OF TORRANCE, COUNTY OF LOS ANGELES

W.O.3916-68 DEL AMO SD CAPACITY

PLOTTED BY: Gary Guan DATE: Apr. 20, 2022 09:51:42 AM FILE: F:\1180\Engineering\SY_Hydrology\Pipe Capacity Exhibit.dwg

SECTION 6

REFERENCES

C. EXISTING 54” RCP (SD-3068) STORM DRAIN PLANS

PLAN AND PROFILE
OF
STORM DRAIN IMPROVEMENTS (PRIVATE)
IN
DEL AMO CIRCLE EAST
FROM
FASHION WAY
TO
THE PRIVATE SUMP

STORM DRAIN GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION AND SUPPLEMENTS THERETO, AS WRITTEN AND PROMULGATED BY PUBLIC WORKS STANDARDS, INC., HEREINAFTER REFERRED TO AS THE STANDARD SPECIFICATIONS, THE TORRANCE STANDARDS, AND TO THE SATISFACTION OF THE COMMUNITY DEVELOPMENT / PUBLIC WORKS DIRECTOR.

2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE, VERIFY DEPTH AND PROTECT ALL STRUCTURES, INCLUDING SUBSTRUCTURES, SHOWN ON THE PLAN. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF REPAIRING OR REPLACING ANY OF SAID STRUCTURES DAMAGED BY HIM/HER DURING PROSECUTION OF THE WORK. ALL REPAIRS AND REPLACEMENTS SHALL BE DONE IN THE PRESENCE OF THE INSPECTOR. ALL LOCATIONS SHOWN ON THE PLAN FOR UTILITY LINES HAVE BEEN TAKEN FROM AVAILABLE RECORDS AND THEIR COMPLETENESS AND CORRECTNESS ARE IN NO WAY GUARANTEED.

3. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA) AT 1-800-227-2600 AND ALL PUBLIC UTILITY COMPANIES AND OWNERS OF PRIVATE FACILITIES WITHIN THE AREA OF CONSTRUCTION AT LEAST 2 WORKING DAYS IN ADVANCE OF PERFORMING ANY WORK WITHIN SAID AREA.

4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY BEFORE COMMENCING WORK. TRAFFIC CONTROL WITHIN PUBLIC STREET RIGHTS OF WAY SHALL BE IN CONFORMANCE WITH THE "CONSTRUCTION TRAFFIC CONTROL PROCEDURES ON CITY STREETS," LATEST EDITION AVAILABLE AT THE CITY OF TORRANCE COMMUNITY DEVELOPMENT DEPARTMENT. THE CONTRACTOR SHALL PROVIDE A 24 HOUR TELEPHONE NUMBER FOR EMERGENCY REPAIRS TO TRAFFIC CONTROL AND PAVEMENT MARKINGS.

5. CAUTION: REVIEW APPROVED CONSTRUCTION PLAN. IF CONSTRUCTION REQUIRES WORKERS AND/OR EQUIPMENT TO BE WITHIN 6 FEET OR CRANES OR HOISTING DEVICES TO BE WITHIN 10 FEET OF OVERHEAD ELECTRIC LINES, CALL SOUTHERN CALIFORNIA EDISON CO. AT 310-783-9335

6. PRIOR TO COMMENCEMENT OF WORK, ALL SURVEY MONUMENTS IN THE PROJECT AREA SHALL BE LOCATED AND TIED OUT. ALL CENTERLINE MONUMENTS OR TIES LOST OR DESTROYED BY THIS WORK SHALL BE REPLACED EITHER BY A LICENSED SURVEYOR OR A CIVIL ENGINEER REGISTERED PRIOR TO JANUARY 1, 1982 AND NEW TIE SHEETS PROVIDED. METHOD OF ESTABLISHMENT SHALL BE STATED ON THE TIE SHEET.

7. GRADE SHEETS PREPARED AND STAMPED BY A LICENSED ENGINEER OR SURVEYOR SHALL BE DELIVERED TO THE INSPECTOR PRIOR TO COMMENCEMENT OF WORK.

8. THE CONTRACTOR SHALL NOTIFY THE CITY STREETSCAPE DIVISION OF THE PUBLIC WORKS DEPARTMENT AT 310-781-6900 PRIOR TO TRIMMING, REMOVING OR RELOCATING ANY EXISTING TREES.

9. UNLESS OTHERWISE SHOWN, ALL TRAFFIC SIGNS SHALL BE RELOCATED OR REMOVED BY THE CITY. THE CONTRACTOR SHALL NOTIFY THE TRAFFIC AND LIGHTING DIVISION OF THE PUBLIC WORKS DEPARTMENT AT 310 - 781-6900 AT LEAST 2 WORKING DAYS IN ADVANCE TO ARRANGE THE WORK.

10. STORM DRAIN CONNECTIONS TO THE L.A. COUNTY STORM DRAIN SYSTEM REQUIRE A PERMIT FROM L.A. COUNTY (1-626-458-3129) BEFORE ISSUANCE OF A CITY PERMIT.

11. IN CASE OF CONFLICT BETWEEN A CONNECTOR PIPE AND AN EXISTING UNDERGROUND LINE, THE CONNECTOR PIPE MAY BE REALIGNED OVER OR UNDER THE CONFLICTING LINE. CONNECTOR PIPE GRADE LINE AND WHERE GRADE BREAKS EXCEED FIVE DEGREES A CONCRETE COLLAR PER A.P.W.A. STD. DRAWING 380 SHALL BE CONSTRUCTED. APPROVAL FOR REALIGNMENT SHALL BE OBTAINED FROM THE COMMUNITY DEVELOPMENT / PUBLIC WORKS DIRECTOR PRIOR TO COMMENCEMENT OF WORK

12. TRENCHES CUT INTO AN EXISTING ROADWAY WITHIN THE PUBLIC RIGHT OF WAY SHALL BE BACKFILLED AND PAVED AS PER TORRANCE STANDARD T116.

13. TRENCH RESURFACING SHALL BE OF THE SAME TYPE AS THE EXISTING PAVEMENT, EXCEPT IF EXISTING PAVEMENT IS A.C. OVER P.C.C., RESURFACING MAY BE FULL - DEPTH A.C.

14. FOR ASPHALT CONCRETE SECTION 4" THICK OR GREATER, UNLESS OTHERWISE SHOWN, THE CONTRACTOR SHALL CONSTRUCT A MINIMUM 2" THICK FINISH COURSE USING CLASS C2-AR-4000 OVER A BASE COURSE OF CLASS B-AR-4000 PER SECTION 203-6 OF THE STANDARD SPECIFICATIONS. CLASS D2-AR-4000 ASPHALT CONCRETE SHALL BE USED IF FINISH COURSE IS LESS THAN 2" THICK. FOR SECTION LESS THAN 4" THICK, ASPHALT CONCRETE SHALL BE CLASS C2-AR-4000 UNLESS OTHERWISE SPECIFIED. THE MAXIMUM THICKNESS OF EACH LIFT SHALL BE 4".

15. MANHOLE AND CATCH BASIN COVERS SHALL BE CAST WITH THE WORDS "TORRANCE DRAIN" FOR CITY MAINTAINED LINES AND "PRIVATE DRAIN" FOR PRIVATELY MAINTAINED LINES.

16. DURING NON-CONSTRUCTION HOURS, ALL EXCAVATIONS MUST BE PLATED OR BACKFILLED EXCEPT BORE PITS WHICH SHALL BE SECURED WITH K-RAIL AND 6' HIGH CHAIN LINK FENCE PANELS SECURED IN PLACE TO THE SATISFACTION OF THE PUBLIC WORKS INSPECTOR. PLATES SHALL BE TACK WELDED, PINNED AND/OR SECURED IN PLACE BY ANOTHER METHOD APPROVED BY THE INSPECTOR.

17. THE CONTRACTOR SHALL MAKE AVAILABLE FOR THE INSPECTOR'S REVIEW, ON A DAILY BASIS, AS-BUILT DRAWINGS FOR WORK PERFORMED UP TO AND INCLUDING THE PREVIOUS DAY'S ACTIVITIES. WORK SHALL NOT BE CONSIDERED AS COMPLETE UNTIL AS BUILT DRAWINGS ARE SUBMITTED TO AND ACCEPTED BY THE ENGINEERING DIVISION OF COMMUNITY DEVELOPMENT DEPARTMENT.

⚠ 18. GENERAL NOTES TO CONFORM WITH LATEST REVISION OF CITY OF TORRANCE STD T-500

BENCHMARK

TORR. 223 REPLACED BY TBM # 1

*TBM #1. SET L & "PK" 10' SO. OF SO. CURB FACE ON CARSON ST. ON 7.0' WIDE C.B. @ E. END OF C.B. 88.3' W. OF BCR OF S.W. CURB RETURN CARSON ST. AND MADRONA AVE. EL.= 79.37

Underground Service Alert
Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

NOTE TO CONTRACTOR

THE CONTRACTOR TO VERIFY VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING (WET, DRY) UTILITIES PRIOR TO CONSTRUCTION

STANDARD DRAWINGS

CITY OF TORRANCE

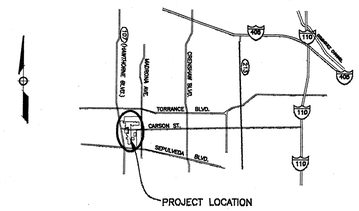
TYPICAL TRENCH SECTION	T116
BEDDING FOR STORM DRAIN PIPE	T302

APWA

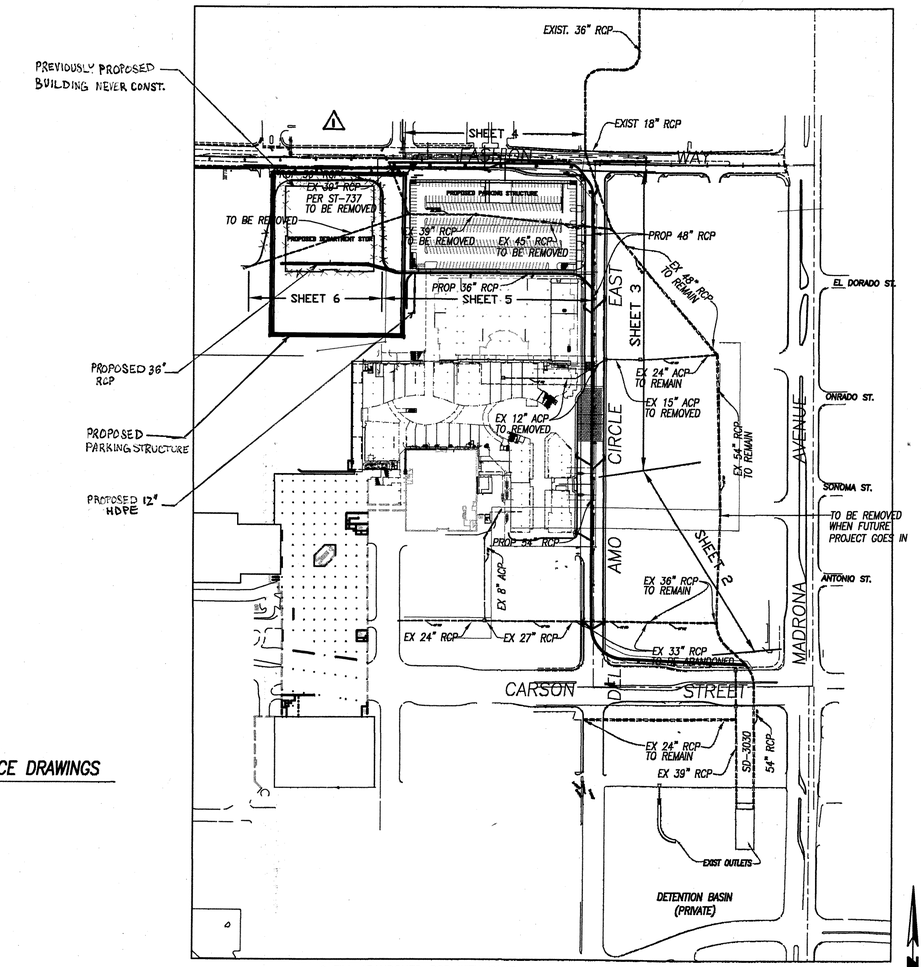
MANHOLE PIPE TO PIPE MAIN LINE ID= 36" OR LARGER	320
MANHOLE PIPE TO PIPE (MAIN LINE ID SMALLER THAN 33")	321
MANHOLE PIPE TO PIPE (LARGE SIDE INLET)	322
JUNCTION STRUCTURE PIPE TO PIPE ID ≥ 24" OR OD > 1/2 MAINLINE ID	331
JUNCTION STRUCTURE PIPE TO PIPE (ID ≤ 24")	332
TRANSITION STRUCTURE PIPE TO PIPE	340
CURB OPENING CATCH BASIN	300
COLLAR	380

REFERENCE DRAWINGS

SD – 3015
SD – 3030



VICINITY MAP
NOT TO SCALE



* FILL ABANDONED RCP WITH SAND

INDEX MAP

SCALE: 1"= 200'

RECORD DRAWING; PERMIT NO. CON14-00313 INSP. B. FERNANDEZ 10-02-15

REV.	DATE	DESCRIPTION	BY	CHECKED
–	03.08.07	AS BUILT PLANS	TAIT	TGS
⚠	04.28.14	REVISED INDEX MAP AND GEN. NOTES	PVT. ENG	TGS

PREPARED UNDER THE SUPERVISION OF: ⚠
TAIT & ASSOCIATES INC.
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705
T: (714) 560-8200

MICHAEL P. SILVEY RCE 57651 — 4/28/14 DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No. C 058651 Exp. (12-31-14) CIVIL STATE OF CALIFORNIA
STAMP

TAIT & ASSOCIATES, INC.
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. TODD SCHMIEDER RCE#37167 — 3-19-07 DATE

SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT D. HURDLE NO.17062 EXP.06-30-05 CIVIL STATE OF CALIFORNIA
ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

REGISTERED PROFESSIONAL ENGINEER COUG FARMER No. 49041 Exp. 9-30-07 CIVIL STATE OF CALIFORNIA

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Ted Schmieder
APPROVED: 4/17/07
TONIC J. SEMAAN
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

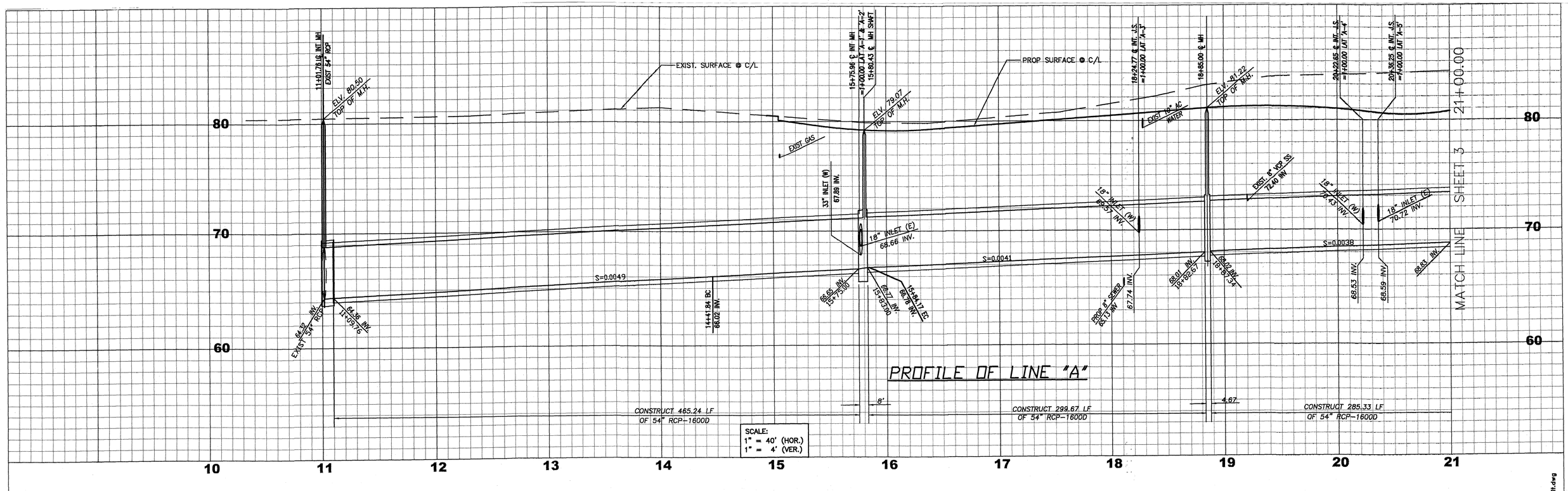
RECOMMENDED: 17 April 07
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

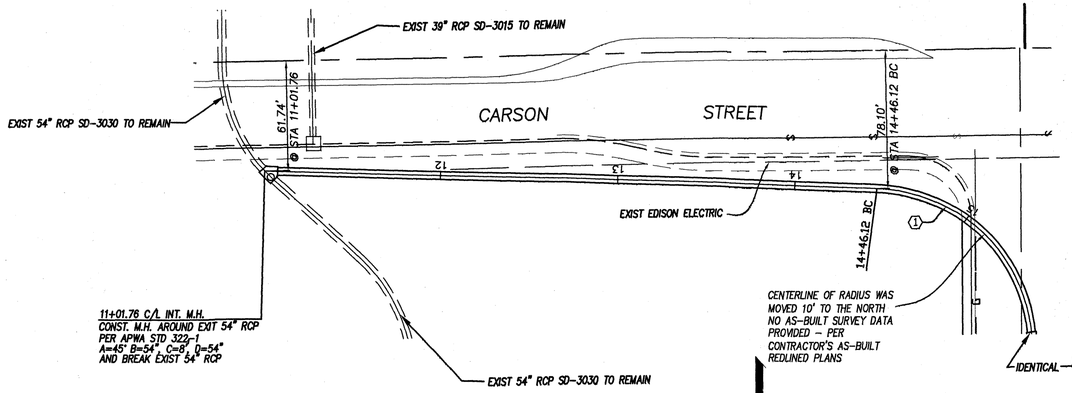
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PLAN NO. **SD- 3068**

C24.06

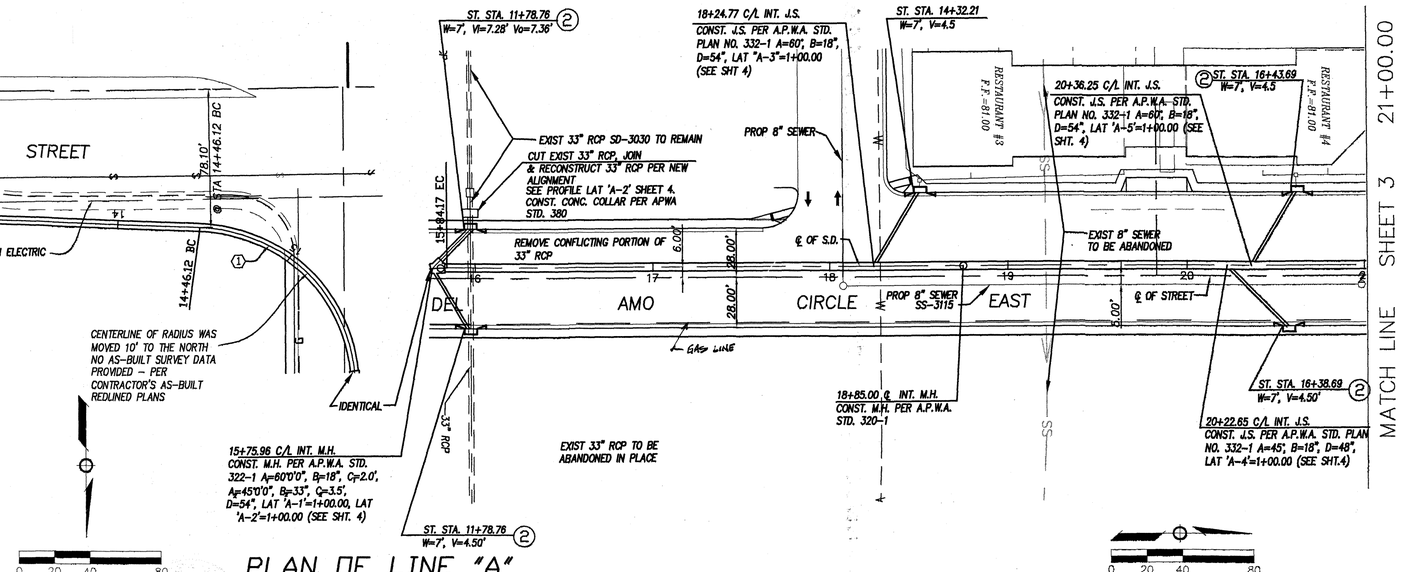
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CURVE DATA				
	DELTA	RADIUS	LENGTH	TANGENT
1	87°53'06"	90.00'	138.05'	86.74'

PRIVATE STORM DRAIN NOT TO BE MAINTAINED BY THE CITY OF TORRANCE



PLAN OF LINE "A"

SCALE: 1"= 40'

CUNSTRUCTION NOTE:

② CONSTRUCT CURB OPENING CATCH BASIN PER APWA STD. PLAN 300-2. 2" LOCAL DEPRESSION PER APWA STD. 313-1, CASE E.

REGISTERED PROFESSIONAL ENGINEER DOUG FARMER No. 49041 Exp. 9-30-08 CIVIL STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION	BY	CHECKED
–	03.08.07	AS BUILT PLANS	TAIT	TS

TAIT & ASSOCIATES
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. TODD SCHMIEDER RCE #37167 — DATE 3-19-07

REGISTERED PROFESSIONAL ENGINEER D. TODD SCHMIEDER No. 37167 Exp. 06-30-2008 CIVIL STATE OF CALIFORNIA
SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT D. HURDLE NO.17062 EXP.06-30-05 CIVIL STATE OF CALIFORNIA
ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER — DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Ted Schmieder
APPROVED: 4/12/07
TOUFIC J. SEMAAN
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

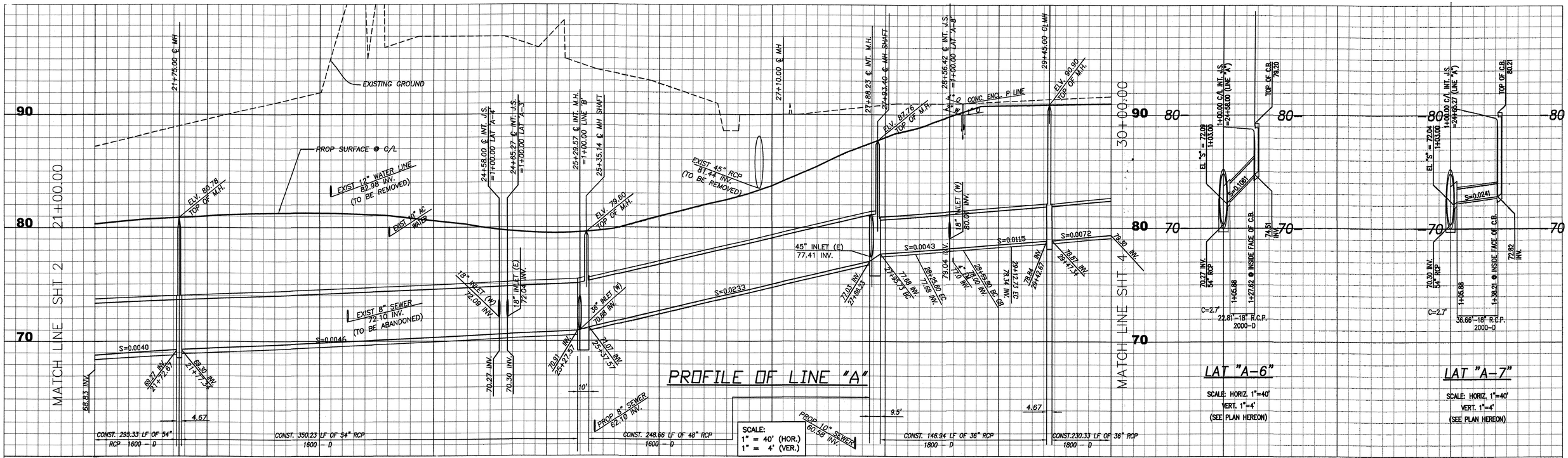
RECOMMENDED: 17 April 07
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

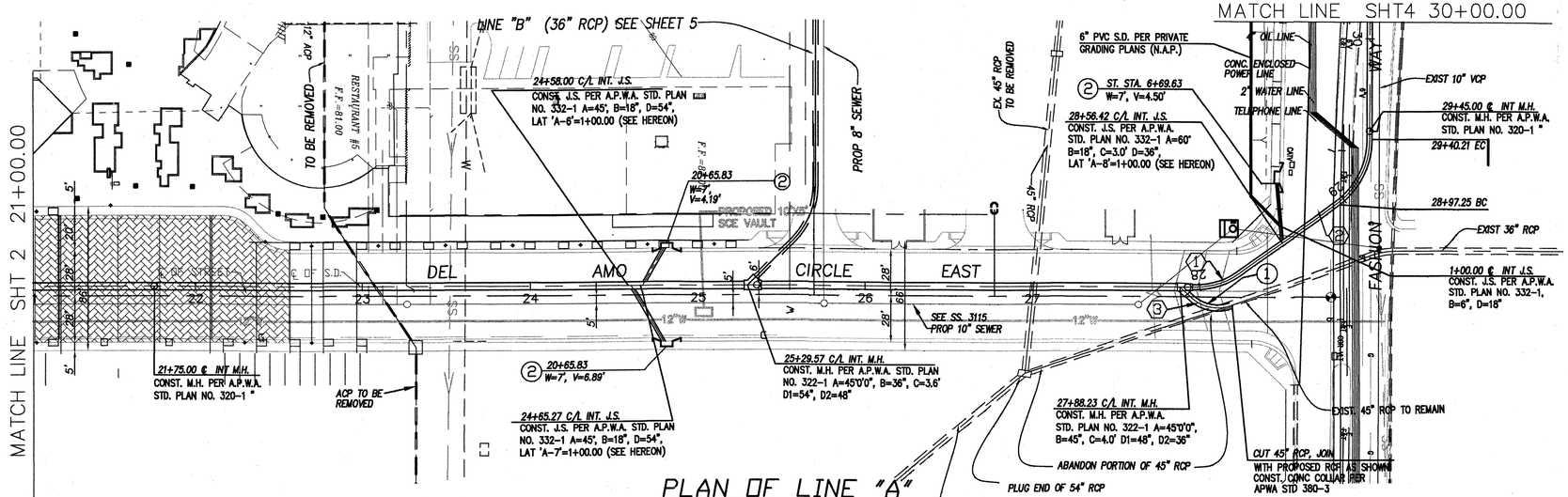
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PLAN NO. SD- 3068

C24.07

Mar 09, 2007 – 8:57am by jadams K:\Drawings\SP\SP60765\PHASE 1\REVISED STORM DRAIN PLANS\SD-SHEET2alt.dwg
X:\Sikand\U050-502\178\Engineering\Storm\dwg\SD-SHEET2alt-dwg, Layout2, 04/03/05 13:32:21 by





PLAN OF LINE "A"
SCALE: 1"= 40'

0 20 40 80

① CONST. 30 LF 45" RCP (1400-D) @ S=0.1630 (CONTRACTOR TO VERIFY JOIN LOCATION AND ELEVATION = 81.21+)

② CONSTRUCT CURB OPENING CATCH BASIN PER APWA STD. PLAN 300-2. 2" LOCAL DEPRESSION PER APWA STD. 313-1, CASE E.

PRIVATE STORM DRAIN NOT TO BE MAINTAINED BY THE CITY OF TORRANCE

CURVE DATA				
⬡	DELTA	RADIUS	LENGTH	TANGENT
1	35°14'20"	45.00'	27.68'	14.29'
2	54°34'35"	45.00'	42.86'	23.21'
3	64°50'06"	22.50'	25.46'	14.29'

REGISTERED PROFESSIONAL ENGINEER DOUG FARMER No. 49041 Exp. 9-30-07 CIVIL STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION	BY	CHECKED
--	03.08.07	AS BUILT PLANS	TAIT	TGS

TAIT & ASSOCIATES, INC.
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. TODD SCHMIEDER RCE#37167 DATE 3-19-07

SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT D. HURDLE NO.17062 EXP.06-30-05 CIVIL STATE OF CALIFORNIA

ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Ted Sikand
APPROVED:
TOUFIC J. SEMAAN 4/17/07
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

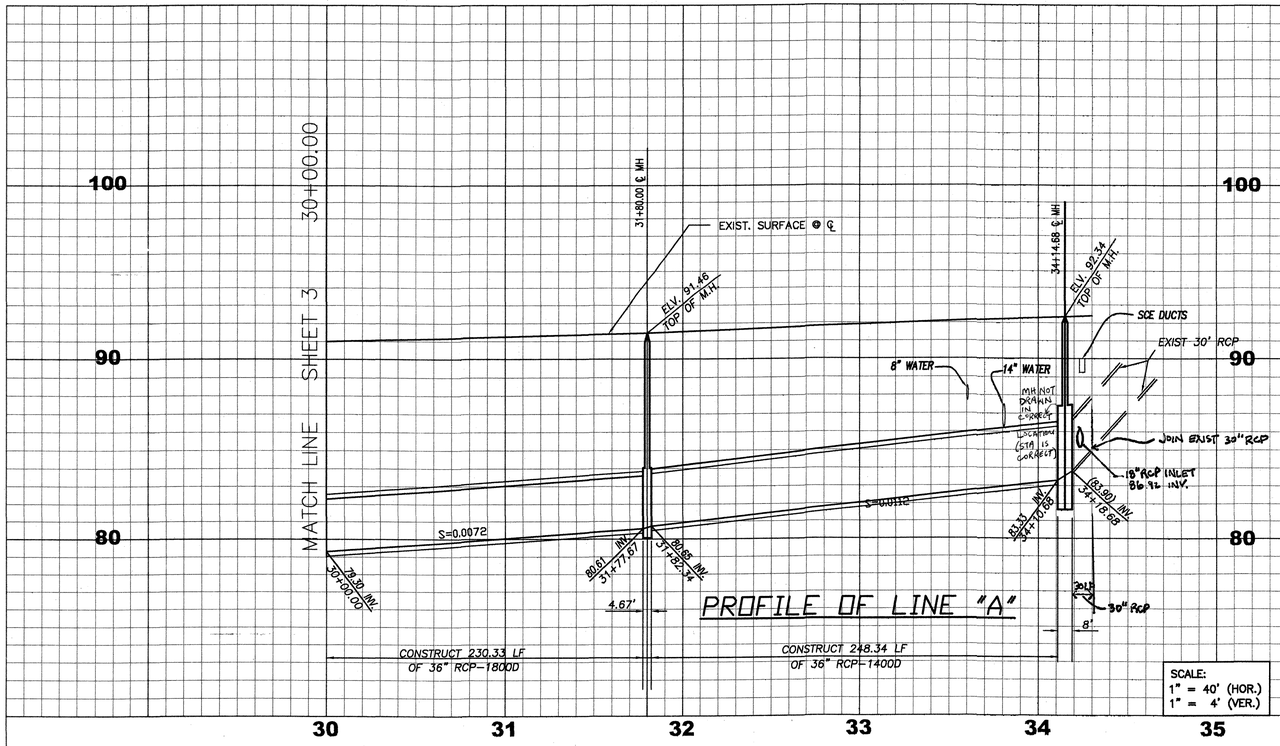
RECOMMENDED:
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

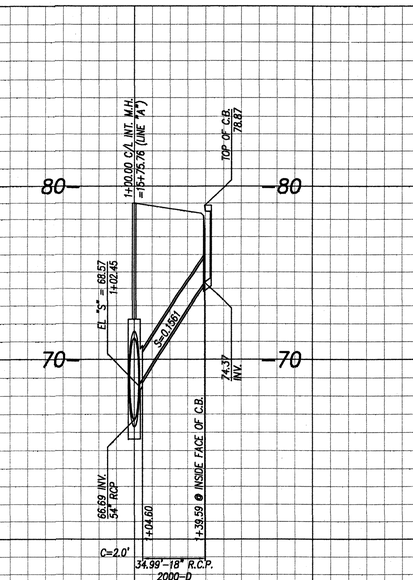
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PLAN NO. SD- 3068

C24.08

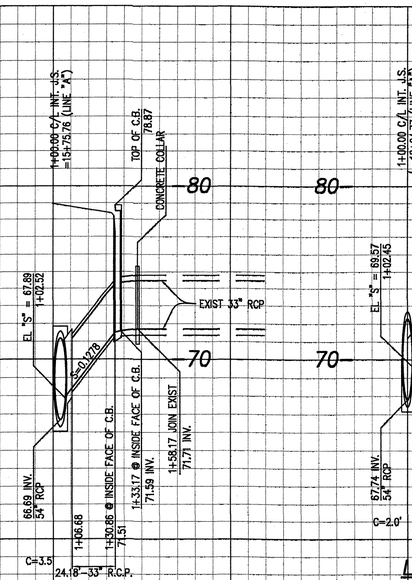
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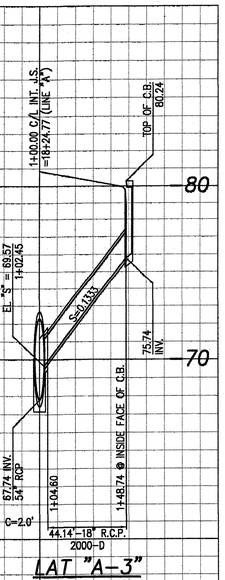
LAT "A-1"

SCALE: HORIZ. 1"=40'
VERT. 1"=4'
(SEE PLAN ON SHEET 2)



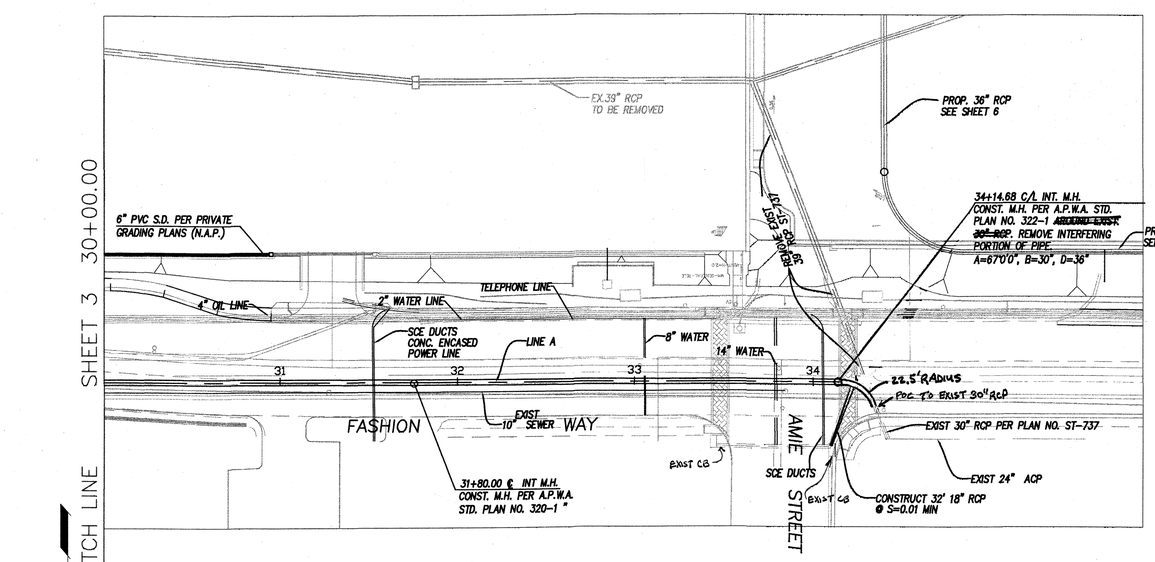
LAT "A-2"

SCALE: HORIZ. 1"=40'
VERT. 1"=4'
(SEE PLAN ON SHEET 2)



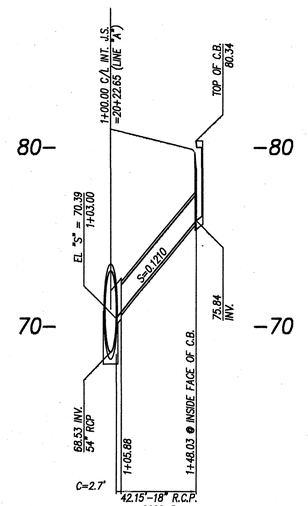
LAT "A-3"

SCALE: HORIZ. 1"=40'
VERT. 1"=4'
(SEE PLAN ON SHEET 2)



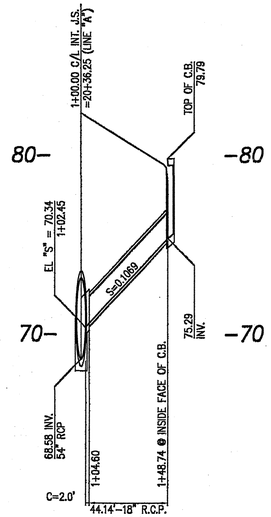
PLAN OF LINE "A"

SCALE: 1"= 40'



LAT "A-4"

SCALE: HORIZ. 1"=40'
VERT. 1"=4'
(SEE PLAN ON SHEET 2)



LAT "A-5"

SCALE: HORIZ. 1"=40'
VERT. 1"=4'
(SEE PLAN ON SHEET 2)

PRIVATE STORM DRAIN NOT TO BE MAINTAINED BY THE CITY OF TORRANCE

REGISTERED PROFESSIONAL ENGINEER DOUG FARMER No. 49041 Exp. 7-30-08 CIVIL STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION	BY	CHECKED
–	03.08.07	AS BUILT PLANS	TAIT	TCS

TAIT & ASSOCIATES
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. Todd Schmieder 3-15-07
D. TODD SCHMIEDER RCE #37167 DATE

REGISTERED PROFESSIONAL ENGINEER D. TODD SCHMIEDER No. 37167 Exp. 06-30-2008 CIVIL STATE OF CALIFORNIA
SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT D. HURDLE NO.17062 Exp. 06-30-05 CIVIL STATE OF CALIFORNIA

ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Ted Symons
APPROVED:
Toufic Semaan 4/17/07
TOUFIC J. SEMAAN
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

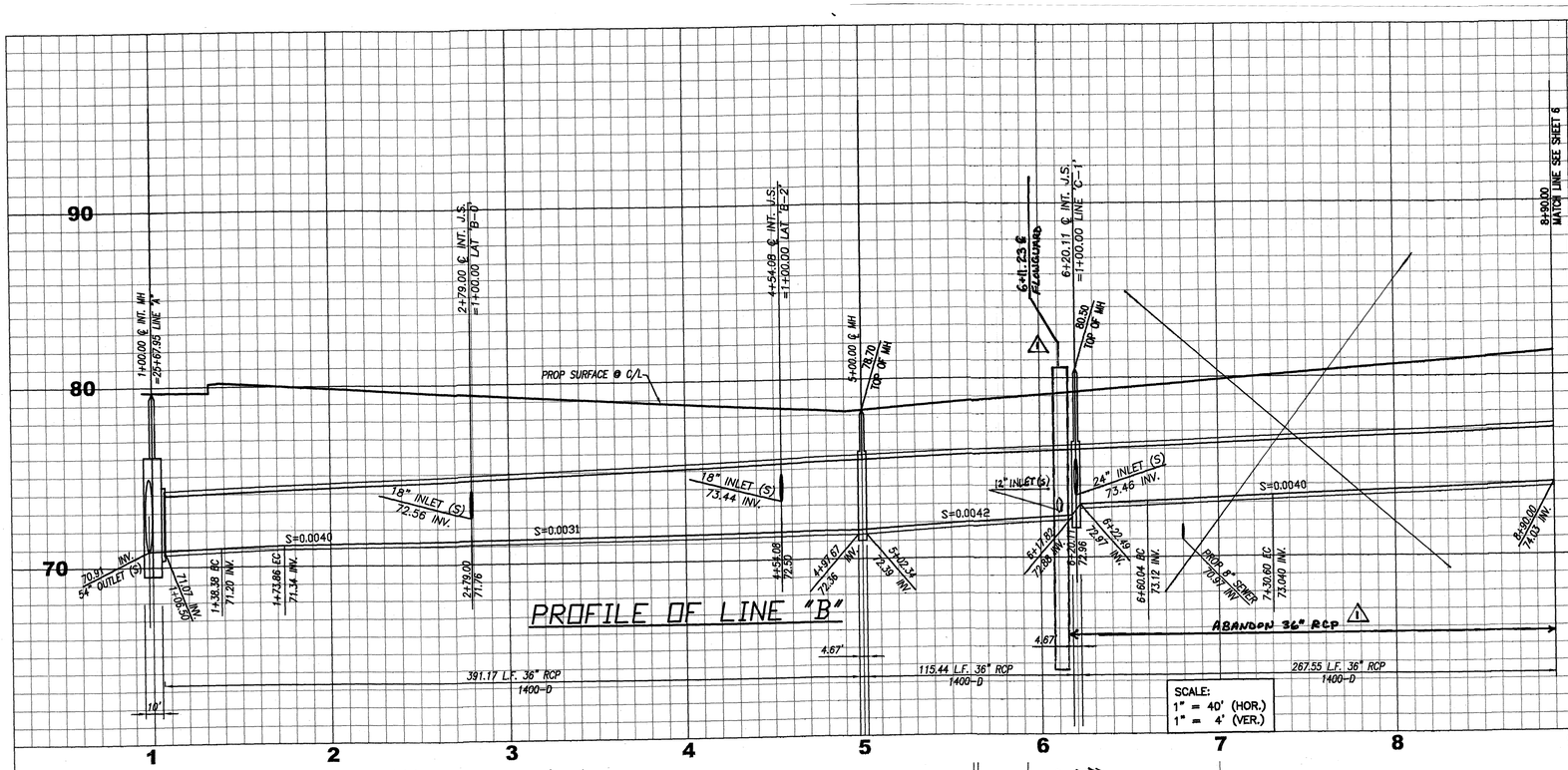
RECOMMENDED:
Jeffery Gibson 17 April 07
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

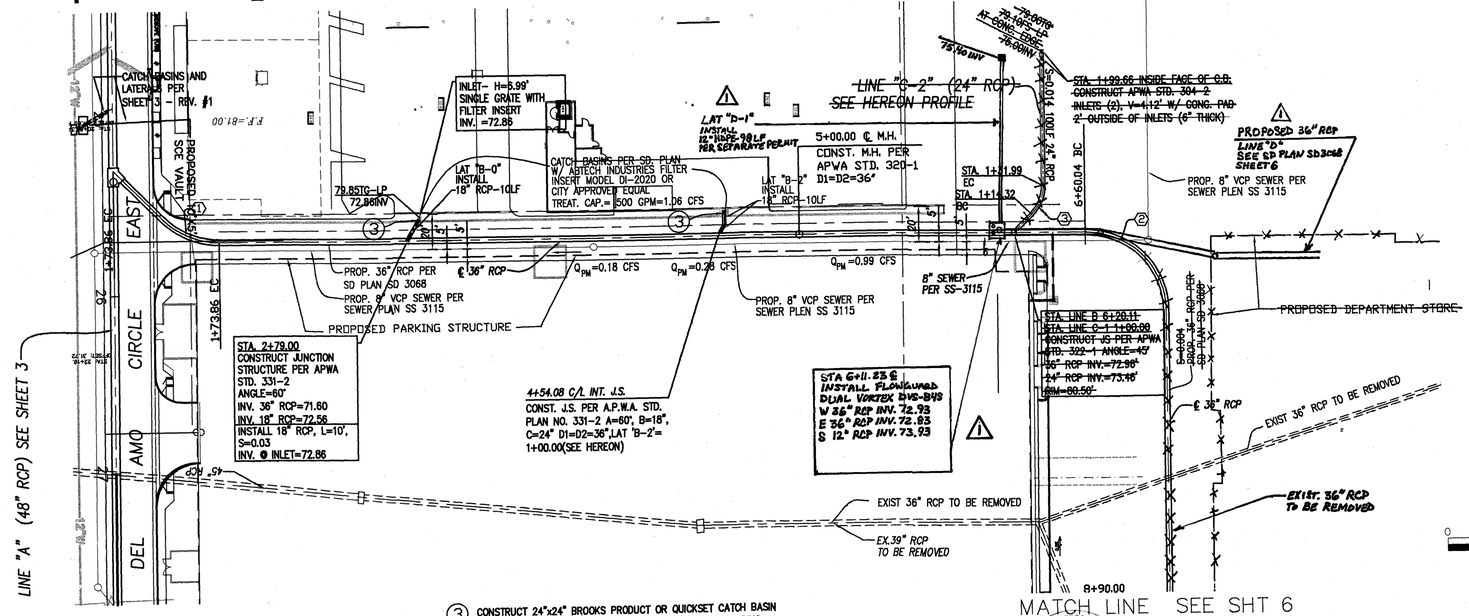
SCALE: AS SHOWN SHEET 4 OF 6

PLAN NO. **SD- 3068**

C24.09

Mar 14, 2007 - 10:47am by jadams K:\Drawings\SP\SP6076S\PHASE 1\REVISED STORM DRAIN PLANS\SD-SHEET4.dwg
X:\sikand\1059-502\178\Engineering\Storm\dwg\SD-SHEET4.dwg, Layout4, 06/09/05 14:35:58 by





PRIVATE STORM DRAIN NOT TO BE MAINTAINED BY THE CITY OF TORRANCE

CURVE DATA				
⬡	DELTA	RADIUS	LENGTH	TANGENT
1	45°10'33"	45.00'	35.48'	18.72'
2	89°50'27"	45.00'	70.56'	44.88'
3	45°00'00"	22.50'	17.67'	9.32'

REV.	DATE	DESCRIPTION	BY	CHECKED
–	03.08.07	AS BUILT PLANS	TAIT	TJS
⚠1	04.29.14	CONST. 89 LF 12" HDPE AT STA. 6+11.23		
		ABANDON LINE "C-2", ABANDON LINE "B"		
		FROM STA. 6+11.23 TO STA. 8+90	PVT. ENG.	TJS

TAIT & ASSOCIATES
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. Todd Schmieder 3-19-07
D. TODD SCHMIEDER RCE #37167 DATE

REGISTERED PROFESSIONAL ENGINEER D. TODD SCHMIEDER No. 37167 Exp. 06-30-2008 CIVIL STATE OF CALIFORNIA
SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT D. HURDLE NO.17062 EXP.06-30-08 CIVIL STATE OF CALIFORNIA
ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

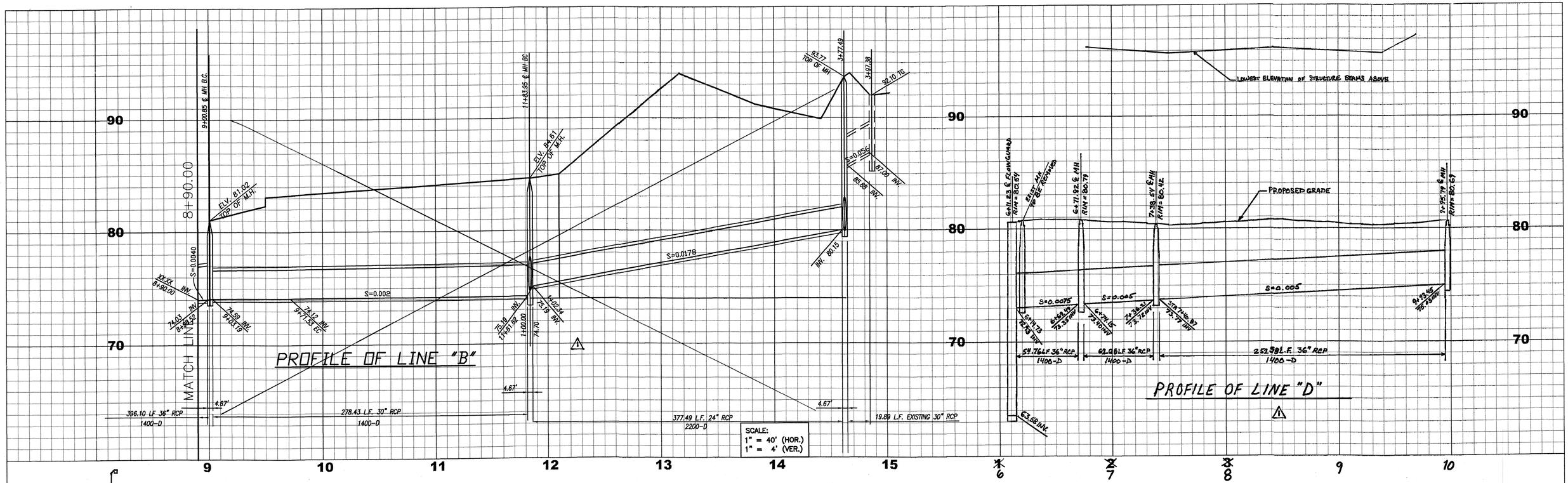
CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

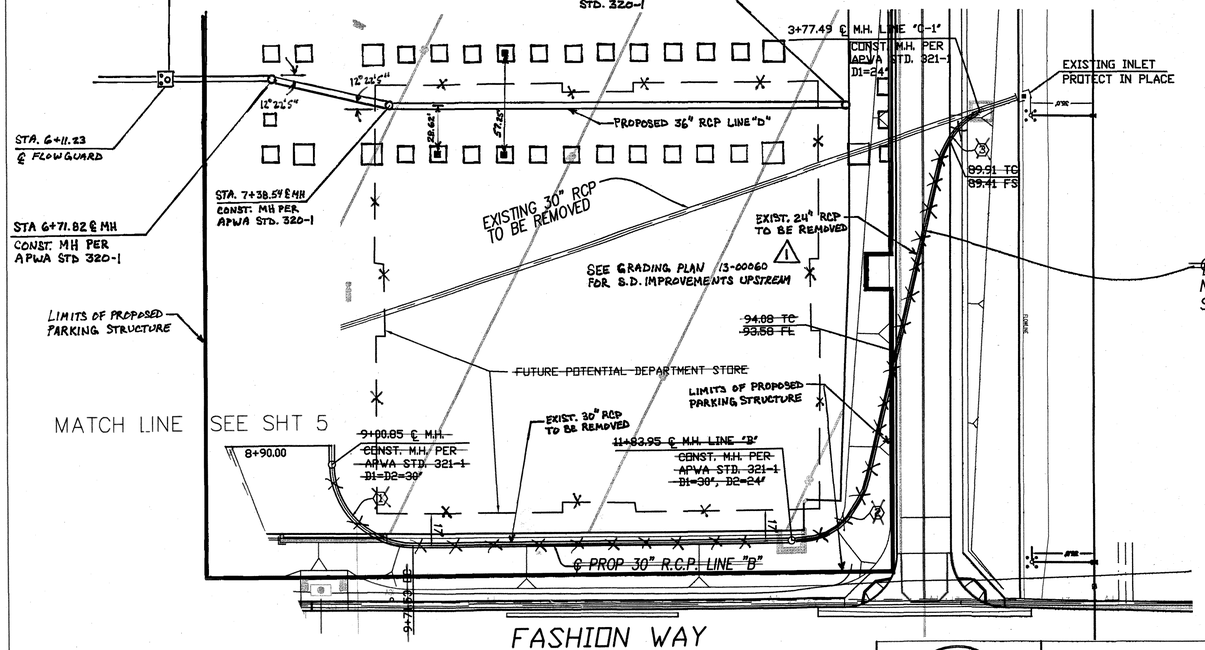
DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Todd Schmieder
APPROVED: 4/12/07
TOUFIC J. SEMAAN
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

RECOMMENDED: 17April07
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

SCALE: AS SHOWN SHEET 5 OF 6
PLAN NO. **SD- 3068**

C24.10





CURVE DATA				
⬡	DELTA	RADIUS	LENGTH	TANGENT
1	89°59'39"	45.00'	70.68'	45.00'
2	79°24'14"	38.81'	53.78'	32.22'
3	45°15'58"	45.00'	35.55'	18.76'

RECORD DRAWING PERMIT NO. CON14-00313 INSP. B. FERNANDEZ 10-02-15

PRIVATE STORM DRAIN NOT TO BE MAINTAINED BY THE CITY OF TORRANCE

PREPARED UNDER THE SUPERVISION OF:
TAIT & ASSOCIATES, INC.
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705
T: (714) 560-8200

MICHAEL P. SILVEY RCE 58651 — 4/29/14 DATE

REGISTERED PROFESSIONAL ENGINEER MICHAEL P. SILVEY No. C 058651 Exp. 12-31-14 CIVIL STATE OF CALIFORNIA — STAMP

REV.	DATE	DESCRIPTION	BY	CHECKED
–	03.08.07	AS BUILT PLANS	TAIT	TGS
⚠	04.28.14	CONST. 36" RCP LINE "D", REMOVE LINE "B" FROM STA. 8+90 TO STA. 3+77.49 (14+62.67)	PUT. ENG.	TGS

TAIT & ASSOCIATES
701 N. PARKCENTER DRIVE
SANTA ANA, CA 92705

RESPONSIBLE FOR AS BUILT REVISIONS ONLY

RESPONSIBLE ENGINEER
D. Todd Schmieder 3-19-07
D. TODD SCHMIEDER RCE #37167 DATE

REGISTERED PROFESSIONAL ENGINEER D. TODD SCHMIEDER No. 37167 Exp. 06-30-2008 CIVIL STATE OF CALIFORNIA — SEAL

PLAN OF LINE "B"
SCALE: 1"= 40'

REGISTERED PROFESSIONAL ENGINEER DOUG FARMER No. 49041 Exp. 9-30-07 CIVIL STATE OF CALIFORNIA

REGISTERED CIVIL ENGINEER ROBERT D. HURDLE NO. 17062 EXP. 06-30-05 CIVIL STATE OF CALIFORNIA

ORIGINAL SIGNED BY ROBERT D. HURDLE
PROJECT ENGINEER DATE

SIKAND ENGINEERING ASSOCIATES
CONSULTING ENGINEERS
15230 BURBANK BLVD.,
VAN NUYS, CALIFORNIA 91411 (818) 787-8550

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
PROJECT ENGINEER: Todd Schmieder
APPROVED: Doyle Semaan 4/18/07
TOUFIC J. SEMAAN
ENGINEERING DIVISION MANAGER
R.C.E. #59226 EXP: 6-30-2007

RECOMMENDED: Jeffery W. Gibson 17 April 07
JEFFERY GIBSON DATE
COMMUNITY DEVELOPMENT DIRECTOR

SCALE: AS SHOWN SHEET 6 OF 6
PLAN NO. **SD- 3068**

C24.11

Mar 09, 2007 - 3:08pm by jadams K:\Drawings\SP\SP80785\PHASE 1\REVISED STORM DRAIN PLANS\SD-SHEET6-revised-120606.dwg

D. EXISTING 54” RCP (SD-3030) STORM DRAIN PLANS

SD-3030 | 1-
DEL AMO STORM CONTR.

50-3030

DEL ALMO CIRCLE EAST

BUILDING NO LONGER HERE

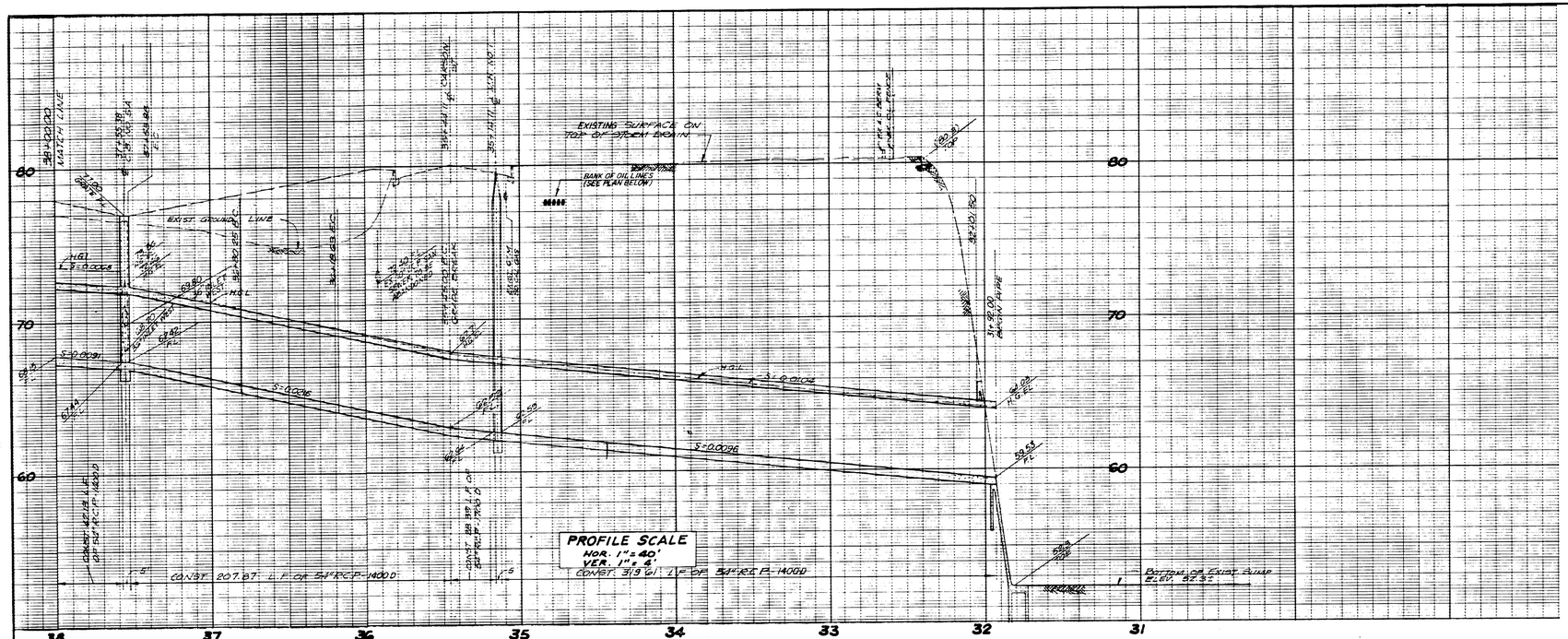
MADRONA

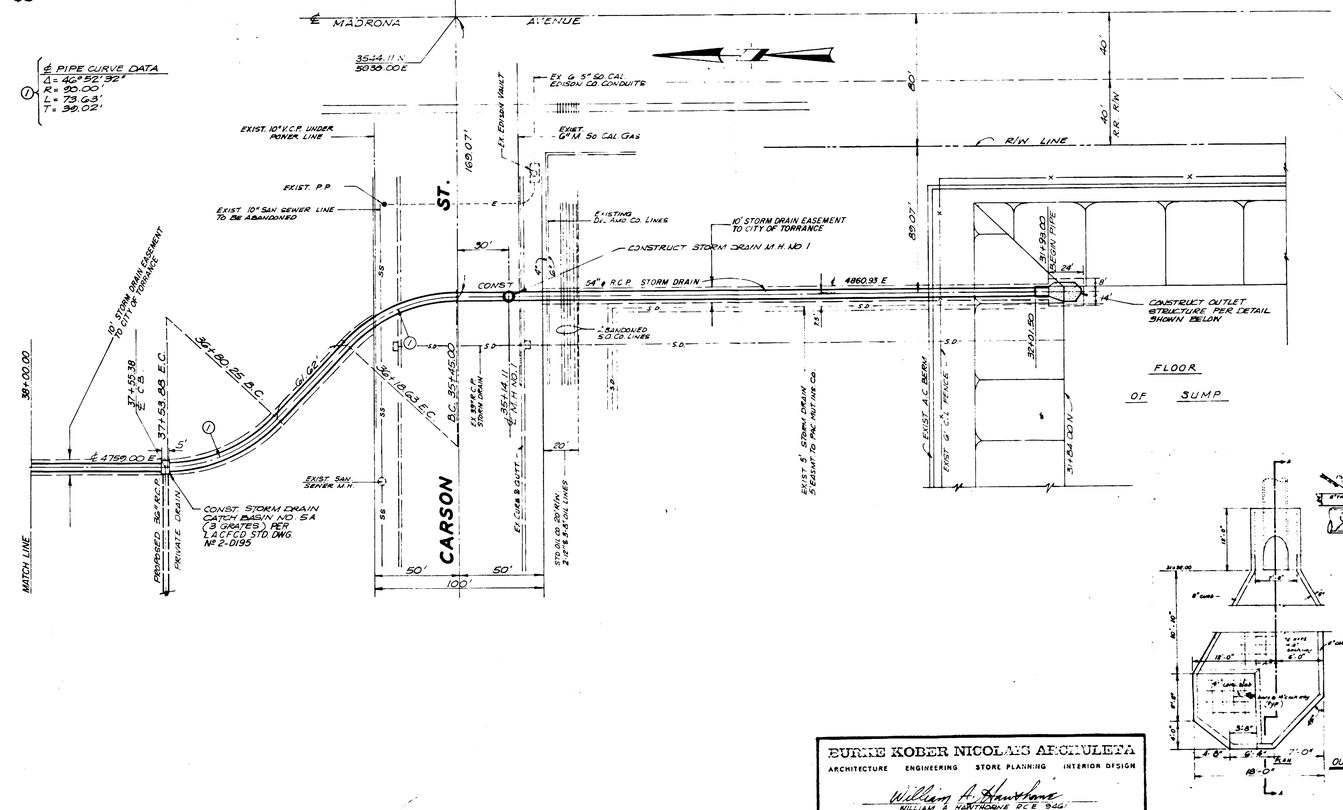
MADRONA AVENUE

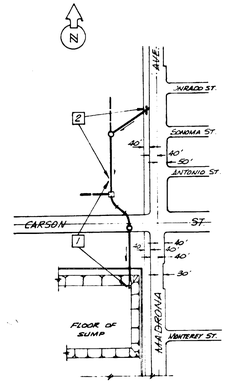
HURKE KOBER NICOLAIS ARCHULETA
ARCHITECTURE ENGINEERING STORE PLANNING INTERIOR DESIGN
CHARLES KOBER A.I.A.
HAROLD O. NICOLAIS A.I.A.
ARCHULETA A.I.A.

delamo shopping center

PLAN AND PROFILE
OF
STORM DRAIN
IN
EASEMENT WESTERLY OF MADRONA AVENUE
FROM
SUMP AT 368 FT.± S'LY. OF CARSON ST. TO 656 FT. ± N'LY. OF CARSON STREET







VICINITY MAP
SCALE 1" = 400'

GENERAL NOTES :

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", 1970 EDITION AS WRITTEN AND PROMULGATED BY THE SOUTHERN CALIFORNIA CHAPTERS OF THE A.P.W.A., AG.C.A, JOIN COOPERATION COMMITTEE, AND TO THE SATISFACTION OF THE CITY ENGINEER.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND PROTECT ALL STRUCTURES, INCLUDING SUBSTRUCTURES SHOWN HEREON. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF REPAIRING OR REPLACING ANY OF SAID STRUCTURES DAMAGED BY HIM DURING PROSECUTION OF THE WORK. ALL LOCATIONS SHOWN HEREON FOR UTILITY LINES HAVE BEEN TAKEN FROM AVAILABLE RECORDS AND THEIR COMPLETENESS OR CORRECTNESS IS IN NO WAY GUARANTEED.
3. THE CONTRACTOR SHALL NOTIFY ALL PUBLIC UTILITY COMPANIES AND OWNERS OF PRIVATE FACILITIES WITHIN THE AREA OF CONSTRUCTION AT LEAST TWO (2) WORKING DAYS IN ADVANCE OF PERFORMING ANY WORK WITHIN SAID AREA.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY ENGINEER BEFORE COMMENCING WORK.
5. ASBESTOS CEMENT PIPE MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE PER L.A.C.F.C.D. STANDARD DRAWING 2-D431 AND L.A.C.F.C.D. SPECIFICATIONS. ALL R.C.P. AND A.C. STORM DRAIN PIPE SHALL BE BEDDED IN ACCORDANCE WITH L.A.C.F.C.D. STANDARD DRAWING 2-D177, CASE III
6. TRENCH RESURFACING SHALL BE 4" A.C. ON 12" A.B.
7. MANHOLE AND CATCH BASIN COVERS SHALL BE MODIFIED IN THAT "TORRANCE DRAIN" SHALL APPEAR IN LIEU OF "L.A.C.F.C.D."
8. IN CASE OF CONFLICT BETWEEN A CONNECTOR PIPE AND AN EXISTING UNDERGROUND LINE, THE CONNECTOR PIPE MAY BE REALIGNED OVER OR UNDER THE CONFLICTING LINE. CONNECTOR PIPE GRADES SHALL DRAIN POSITIVELY TOWARD THE MAIN LINE, AND WHERE GRADE BREAKS EXCEEDS FIVE DEGREES, A CONCRETE COLLAR PER L.A.C.F.C.D. STANDARD DRAWING 2-D383 SHALL BE CONSTRUCTED. "D" LOAD STRENGTH OF THE REALIGNED PIPE SHALL CONFORM TO L.A.C.F.C.D. STANDARD DRAWINGS 2-D218.1 AND/OR 2-D431.

STANDARD DRAWINGS L.A.C.F.C.D.

MANHOLE NO. 1	DWG NO. 2-D 192
CATCH BASIN NO 2	DWG NO. 2-D 182
MANHOLE NO. 2	DWG. NO. 2-D 184
CATCH BASIN NO 6A	DWG. NO. 2-D 195
A.C.P.	DWG NO. 2-D 431
PIPE BEDDING	DWG. NO. 2-D 177

BENCH MARK

TORR. 58A
CHIS "D" IN N. CURB OF TORRANCE BLVD. AT B.C.R. ON N.W. COR. AMIE AVE.
1960 ADJ. ELEV. 110.40

Note: Final Plans were never received
This is best info available.
AMN 1-19-71

REVISION	DATE	DESCRIPTION	BY	CHECKED

CITY OF TORRANCE
ENGINEERING DEPARTMENT

DRAWN: PRIVATE ENGINEER	APPROVED:
DESIGNED: PRIVATE ENGINEER	DATE CITY ENGINEER R.C.E. NO. 8455
REVIEWED:	SCALE 1" = 40' SHEET 1 OF 2
RECOMMENDED:	PLAN NO. ~~59-307~~
DATE ASSISTANT CITY ENGINEER	

BURNE KOBER NICOLAIS ARCHULETA
ARCHITECTURE ENGINEERING STORE PLANNING INTERIOR DESIGN
William A. Hawthorne
WILLIAM A. HAWTHORNE R.C.E. 9465
2001 WILSHIRE BOULEVARD, LOS ANGELES, CALIFORNIA 90057 / 386-7534
278 POST STREET, SAN FRANCISCO, CALIFORNIA 94108 / 391-1000

BASF PILE CORP. IRVINE, CA
SD-3030
CARSON ST. 1.2

2D-307

EAST FILE CORP. IRVINE, CA. EFH 24

SD-3036

SEARS

2-2

PROFILE SCALE
HORIZONTAL 1"=40'
VERTICAL 1"=4'

MADRONA AVE

32" WIDE

451.68.89 SEWER MH NO.1 TYPE D PER STD. 274 W/ ACP APRON

LOCATE FROM PROP. CENTERLINE OF MADRONA AVE.

PROPOSED 8" SEWER

PROPOSED 8" S.S.

PROPOSED 54" R.C.P.

PROPOSED PRIVATE DRAIN

PROPOSED SURFACE ON TOP OF STORM DRAIN

EXIST. GROUND LINE

H.G.L. S=0.0021

H.G.L. S=0.0006

S=0.0040

S=0.0009

BANK OF OIL LINES (SEE PLAN BELOW)

SEE SD-315

CONST. 256.26 L.F. OF 24" R.C.P. - 1.25% D

CONST. 264.87' L.F. OF 54" R.C.P. - 1.00% D

MATCH LINE 38+00.00

MATCH LINE 38+00.00 SEE SHEET NO.1

45 44 43 42 41 40 39 38

90 80 70

CARSON ST.

EXIST. 15" PIPELINE EASEMENT TO PETROLEUM TANKS GLAZIER CO.

EXIST. 11" PVC VAC. LINE N 4036.50

EXIST. 2" CIBA OIL LINE N 4035.50

55°18'51"

40+67.38

PROPOSED 54" R.C.P.

PRIVATE DRAIN

CONST. 54" ϕ R.C.P. STORM DRAIN

± 4759.00 E

CONST. STORM DRAIN MANHOLE N°2 PER L.A.C.F.C.D. (DWG. N°2-D102)

CONST. SANITARY SEWER MANHOLE

IDENTICAL

MATCH LINE 38+00.00 SEE SHEET NO.1

CONST. INLET #1 PER L.A.C.F.C.D. CASE 4A WITH CONNECTOR PIPE FOR 18" R.C.P. STORM DRAIN

GRADE, ADD SECTION AND CAP AS REQUIRED TO CONFORM TO NEW CURB FACE

RECONSTRUCT A.C. DIKE TO DRAIN

FUTURE C.B. #2 PER L.A.C.F.C.D. (DWG. NO. 2-D135) N=7.00

EXIST. 10"ϕ FUEL OIL PIPE LINE (EDISON CO.) 5'± COVER

EXIST. 42"x 54" C.M. BRIDGE 3.5' W/ I.E.

EXIST. 4'ϕ C.M. WATER 3.5' W/ I.E.

MADRONA AVE.

285.69'

43+62.50

10' STORM DRAIN EASEMENT TO CITY OF TORRANCE

CONST. 24" STORM DRAIN

C.M.P.

EXISTING 6" A.C.P. & 8" C.I.P.

EXIST. A.C. PVMT.

228.52'

EXIST. 6" V.C.P. SEWER

PROP. CURB

EXIST. 6" C.I. FORCE MAIN

EXIST. R.R. TRACKS

RELOCATED TRACKS

EX. 6" FUEL OIL LINE (CEASED)

EX. 8" FUEL OIL LINE

EX. 8" PRODUCTS LINE

EX. 8" PRODUCTS LINE

EX. 12" BUNKER F OIL LINE

EX. 2" CIBA GAS LINE

EX. 3" STEEL VAC.

EX. 3" CIBA OIL

5" IRON LINE

Note: this line has been redesigned as SD-315 SD-3015

314

STORM DRAIN PLAN

REVISION	DATE	DESCRIPTION	BY	CHECKED

CITY OF TORRANCE
ENGINEERING DEPARTMENT

BURKE KOBER NICOLAIS ARCHULETA
ARCHITECTURE ENGINEERING STORE PLANNING INTERIOR DESIGN
William A. Hawthorne
WILLIAM A. HAWTHORNE R.C.E. 9461
2001 WILSHIRE BOULEVARD, LOS ANGELES, CALIFORNIA 90057 / 380 7.34
278 POST STREET, SAN FRANCISCO, CALIFORNIA 94108 / 391-1960

DRAWN: PRIVATE ENGINEER
DESIGNED: PRIVATE ENGINEER
REVIEWED:
RECOMMENDED:
DATE ASSISTANT CITY ENGINEER

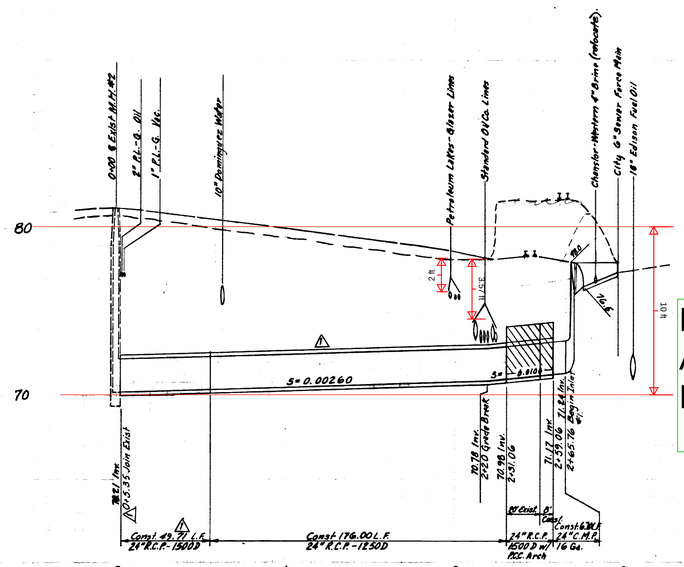
APPROVED:
DATE CITY ENGINEER R.C.E. NO. 8415
SCALE: 1"=40' SHEET 2 OF 2
PLAN NO. ~~SD-307~~

SD-102

E. EXISTING 24” RCP (SD-314) STORM DRAIN PLANS

SD-314

STORM DRAIN FROM MADRONA AVE. TO PRIVATE DRAIN (N/o CARSON ST.)



DATUM ELEVATION ADJUSTEMENT: RAISE ELEV. BY 2.1'

PROFILE SCALE
VERT. 1"= 4'
HORIZ. 1"= 40'

GENERAL NOTES

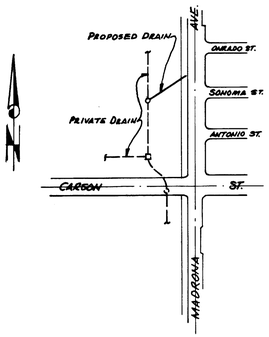
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", 1970 EDITION, AS WRITTEN & PROMULGATED BY THE SOUTHERN CALIF. CHAPTERS OF THE A.P.W.A., A.G.C.A. JOINT COOPERATIVE COMMITTEE & TO THE SATISFACTION OF THE CITY ENGINEER.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE & PROTECT ALL STRUCTURES, INCLUDING SUBSTRUCTURES SHOWN HEREON. THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF REPAIRING OR REPLACING ANY OF SAID STRUCTURES DAMAGED BY HIM DURING PROSECUTION OF THE WORK. ALL LOCATIONS SHOWN HEREON FOR UTILITY LINES HAVE BEEN TAKEN FROM AVAILABLE RECORDS & THEIR COMPLETENESS OR CORRECTNESS IS IN NO WAY GUARANTEED.
3. THE CONTRACTOR SHALL NOTIFY ALL PUBLIC UTILITY COMPANIES & OWNERS OF PRIVATE FACILITIES WITHIN THE AREA OF CONSTRUCTION ATLEAST 2 WORKING DAYS IN ADVANCE OF PERFORMING ANY WORK WITHIN SAID AREA.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY ENGINEER BEFORE COMMENCING WORK.
5. ASBESTOS CEMENT PIPE MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE PER L.A.C.F.C.D. STANDARD DRAWING 2-D431 & L.A.C.F.C.D. SPECIFICATIONS. ALL RCP & A.C. STORM DRAIN PIPE SHALL BE BEDDED IN ACCORDANCE WITH L.A.C.F.C.D. STANDARD DRAWING 2-D177 CASE III.

STANDARD DRAWING LIST

2D-265 INLET #1
2D-177 BEDDING
2D-213.1 D-LOAD TABLE
2D-431 D-LOADS-ASB. CEM. PIPE

LEGEND

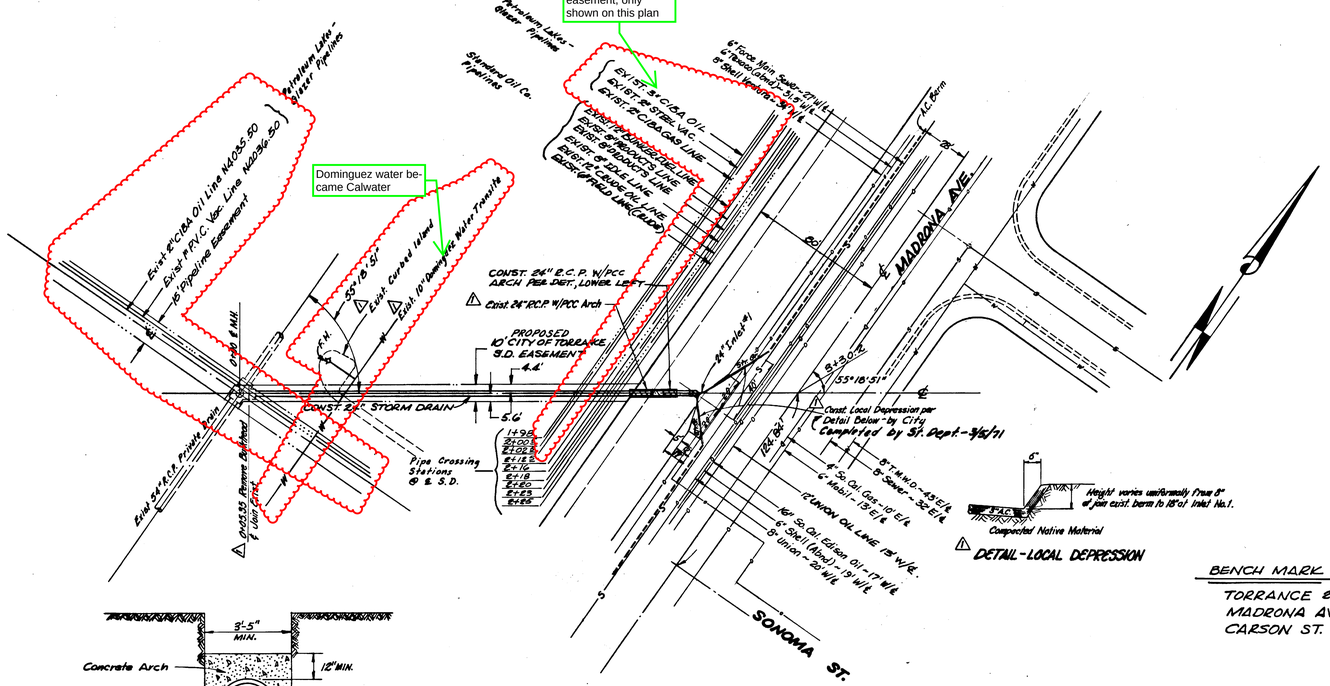
------ EXISTING
AREA OF CONST.
CONSTRUCTION



VICINITY MAP
SCALE 1"=400'

lines are outside of easement, only shown on this plan

Dominguez water became Calwater



DETAIL-CONCRETE ARCH

DETAIL-LOCAL DEPRESSION

BENCH MARK

TORRANCE 223 - CHIS. "□ IN E. CURB MADRONA AVE. @ B.C.R. ON N.E. CORN. CARSON ST. 1960 ADJ. ELEV. = 78.71

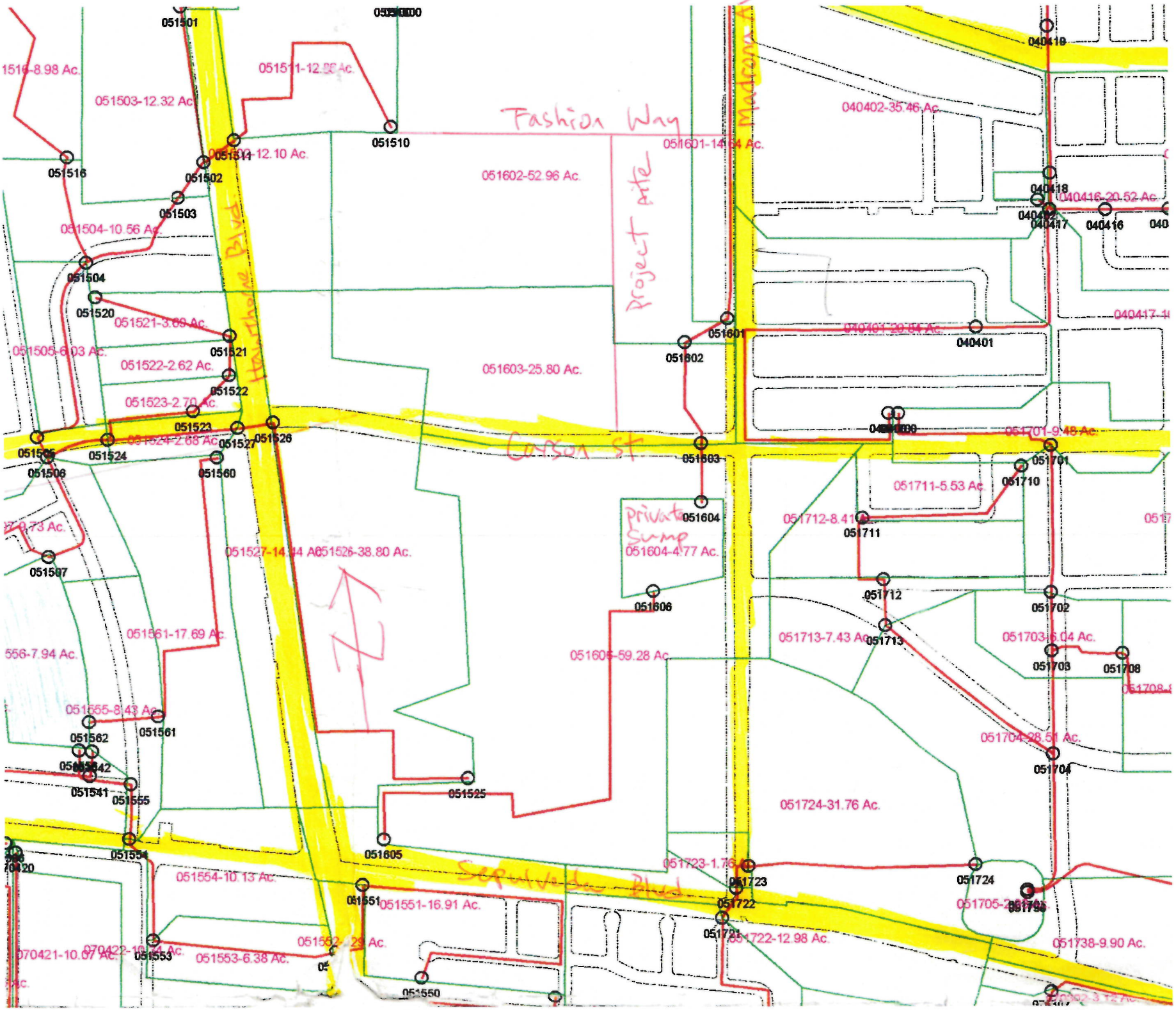
REVISION	DATE	DESCRIPTION	BY	CHECKED
2	3-3-71	As Built per Inspector Lidak	AMN	
1	1-8-71	Revised const. limits, added local depression detail, island, water line	EP AMN	myjr

CITY OF TORRANCE
ENGINEERING DEPARTMENT

DRAWN: SEEBERG	APPROVED: Dec. 15, 1970 (DATE) M. Blum Scrawer (CITY ENGINEER R.C.E. NO. 14016)
DESIGNED: NEVLING	
REVIEWED: E.E. Bourbonnais	SCALE: AS SHOWN SHEET 1 OF 1
RECOMMENDED: (DATE) (ASSISTANT CITY ENGINEER)	PLAN NO. SD-314

SD-314
1-1
Madrona Ave ~ N/o Carson (Private)
SAN FELIPE COUNTY DRAINAGE DIST.
SD-314

F. SUB BASIN MAP AND DATA SHEETS FROM CITY OF TORRANCE


Fashion Way
Project site
Hawthorne Blvd
Carson St
Private Sump
051501
051510
051516
051502
051503
051504
051520
051521
051522
051523
051524
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040401
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051724
051723
051722
051721
051738

040321-7.27 Ac.
040322-25.76 Ac
040232-4.85 Ac.
040221-3.59 Ac.
040221-48.57 Ac.
040205-33.44 Ac.
Del Amo Blvd
040308-6.20 Ac.
040323-28.88 Ac.
040302-2.78 Ac.
040332-11.08 Ac.
040307-8.96 Ac.
040306-3.85 Ac.
040331-18.73 Ac.
040311-37.30 Ac.
040441-15.59 Ac.
051351-7.11 Ac.
040347-31.30 Ac.
040356-5.18 Ac.
040357-1.69 Ac.
040352-15.32 Ac.
040422-24.63 Ac.
040346-4.91 Ac.
040342-33.55 Ac.
040420-51.35 Ac.
040351-42.47 Ac.
040345-17.51 Ac.
040341-9.70 Ac.
Torrance Blvd
051501-6.57 Ac.
040419-45.01 Ac.
051516-8.98 Ac.
051511-12.96 Ac.
Hawthorne Blvd
Madrona Ave.
051335
040321
040322
040232
040231
040230
040302
040303
040301
051345
051320
040323
040308
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040309
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051391
040340
051390
040310
051516
051501
040419

NODE_ID	USNODE	DSNODE	AREA	Expr1	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAHTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
040433-040434	40433	40434	176429.7	04	04	59.47	56.71	562	0.0049	9.25	7	0	0	1197	1368	1607	39.71	37.72	56	79	159.3	600.9	600.9	679.9	760.1	596	688	847	847	50-Yr	847	10.00	1448	12.00	0	12.00	0
040434-040435	40434	40435	526096.3	04	04	56.71	38.14	865	0.0215	10.5	6	0	0	1202	1375	1612	37.72	34.66	56	165.2	333.1	568.2	568.2	733.4	901.3	634	642	711	711	50-Yr	711	9.50	1279	11.50	0	12.50	0
			1483105.4		04 Total																																
040435-040127	40435	40127	395009.9	04	01	38.14	50	187	-0.0633	10.5	6	0	0	1206	1379	1616	34.66	34	0	0	0	568.2	568.2	568.2	568.2	638	811	1048	1048	50-Yr	1048	11.00	1616	12.50	0	12.50	0
			395009.9		01 Total																																
040601-040602	40601	40602	1638640	04	06	61.79	59	701	0.004	0	0	0	0	69	79	96	55.88	52.24	30	61.8	107.6	0	0	61.8	107.6	69	17	0	69	10-Yr	69	3.75	69	3.75	0	3.75	0
040602-040603	40602	40603	633177.4	04	06	59	56.5	1264	0.002	4	1	0	0	96	106	130	52.24	45.68	33	45.6	80.5	96.2	96.2	141.8	176.7				0								
040603-040604	40603	40604	826877.7	04	06	56.5	53	1099	0.0032	4.5	1	0	0	123	136	164	45.68	39.97	33	57.9	102.2	131.7	131.7	189.6	233.8				0								
040611-040612	40611	40612	441125.8	04	06	59.62	57.59	442	0.0046	2	1	0	0	37	43	45	48.59	44.15	44	76.4	142.5	21	21	97.4	163.5	16	0	0	16	10-Yr	16	2.00	37	2.50	0	2.50	0
040612-040613	40612	40613	521307.8	04	06	57.59	55.58	222	0.0091	2.25	1	0	0	67	74	85	44.15	41.93	0	0	0	28.8	28.8	28.8	28.8	38	45	56	56	50-Yr	56	3.00	85	3.50	0	3.50	0
040613-040604	40613	40604	04		06	55.58	53	195	0.0132	2.5	1	0	0	66	73	84	41.93	39.97	0	0	0	38.1	38.1	38.1	38.1	28	35	46	46	50-Yr	46	2.75	84	3.50	0	3.50	0
040604-040605	40604	40605	521701.6	04	06	53	52.21	351	0.0022	4.5	1	0	0	187	209	247	39.97	38.15	33	48.7	85.8	131.7	131.7	180.3	217.5	55	29	30	55	10-Yr	55	3.50	187	5.25	0	5.25	0
			4582830.3		06 Total																																
040605-040127	40605	40127	468753.7	04	01	52.21	50	799	0.0028	4.5	1	0	0	209	233	276	38.15	34	33	54	95.2	131.7	131.7	185.7	226.9	77	47	49	77	10-Yr	77	3.75	209	5.50	0	5.50	0
			468753.7		01 Total																																
			152330415.4	04 Total																																	
051701-051702	51701	51702	413466.3	05	17	80.66	80.83	702	-0.0002	3	1	0	0	17	19	23	78.58	77.17	0	0	0	27.7	27.7	27.7	27.7				0								
051702-051703	51702	51703	1149458	05	17	80.83	80.35	284	0.0017	4	1	0	0	45	51	60	77.17	76.6	55	27.7	67.2	59.7	59.7	87.3	126.8				0								
051707-051708	51707	51708	124111.8	05	17	87.94	83.23	603	0.0078	2	1	0	0	10	12	13	84.24	79.45	0	0	0	18.8	18.8	18.8	18.8				0								
051708-051703	51708	51703	352185.5	05	17	83.23	80.35	357	0.0081	2	1	0	0	26	29	34	79.45	76.6	0	0	0	18.8	18.8	18.8	18.8	7	10	15	15	50-Yr	15	2.00	34	2.50	0	2.50	0
051703-051704	51703	51704	262865.4	05	17	80.35	79.41	496	0.0019	4.5	1	0	0	76	86	101	76.6	75.61	55	29.3	71.2	81.7	81.7	111	152.9				0								
051711-051712	51711	51712	241180.05		17	78.99	79.62	426	-0.0015	2	1	0	0	16	19	21	77.78	76.92	0	0	0	9.4	9.4	9.4	9.4	7	10	12	12	50-Yr	12	2.25	21	2.75	0	2.75	0
051712-051713	51712	51713	365744.1	05	17	79.62	79.6	222	0.0001	2.5	1	0	0	33	39	44	76.92	76.48	0	0	0	17	17	17	17	16	22	27	27	50-Yr	27	3.00	44	3.75	0	3.75	0
051713-051704	51713	51704	323653.5	05	17	79.6	79.41	1014	0.0002	3.5	1	0	0	43	50	58	76.48	74.45	42	10	21.2	41.8	41.8	51.7	62.9	1	0	0	1	10-Yr	1	1.00	43	3.75	0	3.75	0
051704-051705	51704	51705	1241609	05	17	79.41	79.18	745	0.0003	4.5	1	0	0	121	137	163	75.61	74.12	55	11.8	28.7	81.7	81.7	93.5	110.4	39	44	53	53	50-Yr	53	4.00	134	5.50	0	5.50	0
051721-051722	51721	51722	1597423	05	17	81.98	78.39	167	0.0214	2.25	1	0	0	40	45	53	77.78	77.05	24	89.8	168	19.1	19.1	108.9	187.1	21	0	0	21	10-Yr	21	2.50	40	3.00	0	3.00	0
051722-051723	51722	51723	564982.6	05	17	78.39	77.31	168	0.0064	2.75	1	0	0	63	71	83	77.05	76.31	24	49.2	92	32.6	32.6	81.8	124.5	30	0	0	30	10-Yr	30	2.75	63	3.75	0	3.75	0
051723-051724	51723	51724	76825.81	05	17	77.31	80.63	1094	-0.003	0	0	0	0	68	76	90	76.31	74.12	0	0	0	0	0	0	0	68	76	90	90	50-Yr	90	4.75	90	4.75	0	4.75	0
051731-051732	51731	51732	369250.8	05	17	82.69	81.11	444	0.0036	3.25	1	0	0	18	21	24	81.17	80.11	0	0	0	37.6	37.6	37.6	37.6				0								
051732-051733	51732	51733	194832	05	17	81.11	83.31	468	-0.0047	3.75	1	0	0	28	32	37	80.11	79.17	0	0	0	50.2	50.2	50.2	50.2				0								
051733-051734	51733	51734	489761.1	05	17	83.31	85.91	599	-0.0043	4.25	1	0	0	49	55	64	79.17	77.98	0	0	0	70.1	70.1	70.1	70.1				0								
051734-051735	51734	51735	369564.3	05	17	85.91	86.64	532	-0.0014	5	1	0	0	61	69	80	77.98	76.91	0	0	0	108.2	108.2	108.2	108.2				0								
051735-051736	51735	51736	301692.6	05	17	86.64	85.68	357	0.0027	5.25	1	0	0	69	76	83	76.91	76.2	0	0	0	123.2	123.2	123.2	123.2				0								
051736-051737	51736	51737	236979.4	05	17	85.68	84.23	574	0.0025	5.75	1	0	0	71	79	93	76.2	75.05	0	0	0	157	157	157	157				0								
051737-051738	51737	51738	402860.8	05	17	84.23	79.17	929	0.0054	6	1	0	0	84	97	113	75.05	73.19	0	0	0	175.9	175.9	175.9	175.9				0								
			9078446.01		17 Total																																
051601-051602	51601	51602	638043.2	05	16	79.33	80.89	235	-0.0066	2	1	0	0	37	41	46	78.33	77.85	0	0	0	9.4	9.4	9.4	9.4	28	32	37	37	50-Yr	37	3.50	46	3.75	0	3.75	0
051602-051603	51602	51603	2306771	05	16	80.89	79.21	508	0.0033	4.5	1	0	0	110	123	139	77.85	76.82	0	0	0	81.7	81.7	81.7	81.7	28	41	57	57	50-Yr	57	4.00	139	5.50	0	5.50	0
051603-051604	51603	51604	1124110	05	16	79.21	79.53	283	-0.0011	4.5	1	0	0	156	174	199	76.82	76.25	0	0	0	81.7	81.7	81.7	81.7	74	92	117	117	50-Yr	117	5.25	199	6.50	0	6.50	0
			4068924.2		16 Total																																
051501-051502	51501	51502	285621.5	05	15	103.51	93.44	755	0.0133	2	1	0	0	26	29	31	93.59	86	42	83.9	178.5	21.1	21.1	105	199.6	5	0	0	5	10-Yr	5	1.25	26	2.25	0	2.25	0
051511-051502	51511	51502	560247.8	05	15	96.76	93.44	180	0.0185	2	1	0	0	37	41	45	87.11	86	0	0	0	16.5	16.5	16.5	16.5	20	24	28	28	50-Yr	28	2.50	45	3.00	0	3.00	0
051502-051503	51502	51503	525972.1	05	15	93.44	88.83	213	0.0217	2.5	1	0	0	92	104	117	86	84.68	0	0	0	30	30	30	30	62	74	87	87	50-Yr	87	3.75	117	4.25	0	4.25	0
051503-051504	51503	51504	537613.5	05	15	88.83	82.03	588	0.0116	2.5	1	0	0	125	141	160	84.68	81.03	0	0	0	30	30	30	30	95	111	130	130	50-Yr	130	4.50	160	4.75	0	4.75	0
051516-051504	51516	51504	391065.2	05	15	91.33	82.03	521	0.0178	2.5	1	0	0	30	34	40	88.47	81.03	0	0	0	45.6	45.6	45.6	45.6				0								
051504-051505	51504	51505	460027.3	05	15	82.03	78.31	1022	0.0036	4.5	1	0	0	178	201	230	81.03	77.22	72	19.7	46.7	111.1	111.1	130.8	157.8	67	70	72	72	50-Yr	72	4.00	183	5.50	0	5.50	0
051505-051506	51505	51506	262912.9	05	15	78.31	77.82	107	0.0046	5	1	0	0	174	195	224	77.22	76.82	30	45.9	89	147.1	147.1	193	236.1	27	2	0	27	10-Yr	27	2.75	174	5.50	0	5.50	0
051521-051522	51521	51522	160754.6	05	15	84.75	82.95	189	0.0095	1.5	1	0	0	15	17	18	78.24	77.82	0	0	0	4.6	4.6	4.6	4.6	10	12	13	13	50-Yr	13	2.25	18	2.75	0	2.75	0
051522-051523	51522	51523	114465.8	05	15	82.95	78.29	246	0.019	2	1	0	0	25	28	31	77.82	77.29	0	0	0	9.9	9.9	9.9	9.9	15	18	21	21	50-Yr	21	2.75	31	3.25	0	3.25	0
051523-051524	51523	51524	117989.1	05	15	78.29	77.58	503	0.0014	2.5	1	0	0	35	38	43	77.29	76.28	0	0	0	17	17	17	17	18	21	26	26	50-Yr	26	3.00	43	3.75	0	3.75	0
051526-051527	51526	51527	1690241	05	15	81.9	81.12	172	0.0045	3	1	0	0	60	67	81	78.4	78.01	72	22	52.2	29.7	29.7	51.7	81.9	30	15	0	30	10-Yr	30	3.25	60	4.00	0	4.00	0
051527-051524	51527	51524	627782.1	05	15	81.12	77.58	625	0.0057	3.5	1	0	0	96	107	127	78.01	76.58	72	24.6	58.2	44.8	44.8	69.4	103.1	51	38	24	51	10-Yr	51	3.75	96	4.75	0	4.75	0
051524-051506	51524	51506	116922.9	05	15	77.58	77.82	304	-0.0008	3.5	1	0	0	123	138	169	76.58	75.97	0	0	0	41.8	41.8	41.8	41.8	81	96	127	127	50-Yr	127	5.50	169	6.00	0	6.00	0
051506-051507	51506	51507	3721157	05	15	77.82	86.27	620	-0.0136	5	1	0	0	388	434	511	76.82	75.58	0	0	0	108.2	108.2	108.2	108.2	280	326	403	403	50-Yr	403	8.50	511	9.00	0	9.00	0
051531-051532	51531	51532	2325765	05	15	82.23	81.23	144	0.0069	2.25	1	0	0	65	75	94	81.23	80.23	0	0	0	23.9	23.9	23.9	23.9	41	51	70	70	50-Yr	70	3.50	94	4.00	0	4.00	0
051536-051532	51536	51532	3741150	05	15	82.1	81.23	113	0.0077	2.75	1	0	0	97	109	126	81.1	80.23	0	0	0	43.1	43.1	43.1	43.1	54	66	83	83	50-Yr	83	3.75	126	4.25	0	4.25	0
051532-051533	51532	51533		05	15	81.23	79.94	526	0.0025	3.75	1	0	0	161	183	219	80.23	78.94	72	16.2	38.3	56.2	56.2	72.3	94.5	105	111	125	125	50-Yr	125	5.25	181	6.00	0	6.00	0
051533-051534	51533	51534	652126	05	15	79.94	79.61	359	0.0009	3.75	1	0	0	190	215	259	78.94	78.22	134	19.8	44.5	50.2	50.2	70	94.7	140	145	164	164	50-Yr	164	6.00	215	6.50	0	6.50	0
051534-051507	51534	51507	391203.2	05	15	79.61	86.27	1069	-0.0062	4	1	0	0	193	223	265	78.22	76.08	0	0	0	59.7	59.7	59.7	59.7	133	163	205	205	50-Yr	205	6.50	265	7.00	0	7.00	0
051541-051542	51541	51542	1294935	05	15	77.43	78.42	116	-0.0085	2	1	0	0	54	60	74	76.43	76.2	0	0	0	9.4	9.4	9.4	9.4	45	51	65	65	50-Yr	65	4.25	74	4.50	0	4.50	0
051551-051552	51551	51552	735419.6	05	15	84.39	81.07	446	0.0074	2	1	0	0	42	52	57	78.89	77.96	0	0	0	9.6	9.6	9.6	9.6	32	42	47	47	50-Yr	47	3.75	57	4.00	0	4.00	0
051552-051553	51552	51553	100599.4	05	15	81.07	77.11	887	0.0045	2.5	1	0	0	48	57	64	77.96	76.11	0	0	0	17.5	17.5	17.5	17.5	31	40	47	47	50-Yr	47	3.75	64	4.25	0	4.25	0
051553-051554	51553	51554	277635.5	05	15	77.11	79.68	540	-0.0048	2.25	1	0	0	51	61	70	76.11	75.03	0	0	0	12.9	12.9	12.9	12.9	38	48	57	57	50-Yr	57	4.00	70	4.25	0	4.25	0
051554-051555	51554	51555	441388.1	05	15	79.68	77.37	261	0.0088	2.25	1	0	0	71	78	95	75.03	74.51	30	63.8	123.9	12.9	12.9	76.7	136.8	58	1	0	58	10-Yr	58	4.00	71	4.50	0	4.50	0
051555-051556	51555	51556	367518.5	05	15	77.37	78.72	375	-0.0036	2.25	1	0	0	94	105	125	74.51	73.76	0	0	0	12.9	12.9	12.9	12.9	81	92	112	112	50-Yr	112	5.25	125	5.50	0	5.50	0
051561-051562	51561	51562	770134	05	15	80.47	79.81	329	0.002	2	1	0	0	47	53	63	75.66	75	0	0	0	9.4	9.4	9.4	9.4	38	44	54	54	50-Yr	54	4.00	83	4.25	0	4.25	0
			20670647.1		15 Total																																
1401-051402	51401	51402	649355.9	05	14	99.51	98.14	153	0.009	2.5	1	0	0	35	39	47	93.65	92.79	0	0	0	28.5	28.5	28.5	28.5	7	11	19	19	50-Yr	19	2.25	47	3.25	0	3.25	0
1402-051403	51402	51403	791975.8	05	14	98.14	91.7	1207	0.0053	2.5	1	0	0	73	82	99	92.79	86.05	0	0	0	28.5	28.5	28.5	28.5	45	54	71	71	50-Yr	71	3.75	99	4.00	0	4.00	0
1403-051404	51403	51404	1484308	05	14	91.7	93.59	153	-0.0124	2.5	1	0	0	110	125	152	86.05	85.2	0	0	0	28.5	28.5	28.5	28.5	82	97	124	124	50-Yr	124	4.50	152	4.75	0	4.75	0