Appendix G-1

Pacific Coast Commons Existing and Proposed Utility Report

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PACIFIC COAST COMMONS EXISTING AND PROPOSED UTILITY REPORT

Pacific Coast Commons Mixed-Use Development
El Segundo, CA
KPFF Job # 1900156

December 18, 2020

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1.0 Purpose and Description

The purpose of this report is to study the feasibility of the proposed development outlined in the master site plan provided by Withee Malcolm Architects on July 8, 2019. The report is based on record research from the following sources:

- ALTA survey and topographic survey dated May 5, 2019 provided by KPFF Consulting Engineers
- City of El Segundo Record Plans
- Caltrans Record Plans
- Withee Malcolm Architects Master Site Plan provided on July 8, 2019.
- Albus-Keefe and Associates Geotechnical Due-Diligence Evaluation Report provided on August 15, 2019.

All record research documents may be referenced in Appendix B.

The Pacific Coast Commons project consists of new retail and residential buildings and multi-story parking structures to complement the several adjacent existing retail spaces and hotels. The project is located in the city of El Segundo, CA and is bounded by the Pacific Coast Highway to the east, Holly Avenue to the south, Indiana Street to the west, and Palm Avenue to the north. The site is located approximately 0.5-mile south of the Los Angeles International Airport (LAX) and approximately 1.5-miles west of the I-405 freeway. Based upon review of public records, existing utilities in the public right-of-way are owned and maintained by the City of El Segundo and Caltrans.

The project will be divided into three (3) different sites known as “North Site” “Fairfield Parking,” and “South Site.” North Site is approximately 1.83-acres and is the northernmost site located between Mariposa Avenue and Palm Avenue. Fairfield Parking and South Site are approximately 0.76-acre and 1.30-acres respectively and are located between Mariposa Avenue and Holly Avenue. Fairfield Parking is located in between the two other sites at the existing Hacienda Hotel building, with South Site being the southernmost site. Refer to Exhibit A for clarification.

2.0 General Design Criteria

2.1 Codes

Comply with applicable sections of national, state and local codes, laws, ordinances, rules and regulations of authorities having jurisdiction, including:

a. Los Angeles County Hydrology Manual, 2006 Edition.
b. State Water Resources Control Board (SSWRC).
c. Standard Specifications for Public Works Construction (SSPWC).
d. American’s with Disability Act (ADA).
e. American Water Works Association (AWWA).
f. American Society of Testing and Materials (ASTM).
g. State of California Building Code, current edition
h. State of California Fire Code, current edition.
j. Uniform Plumbing Code, current edition.

3.0 Storm Drainage

3.1 Storm Drainage – Existing Condition

There are two existing storm drains near this project that are owned by Caltrans and the City of El Segundo.

The existing Caltrans storm drain is located below the Pacific Coast Highway. The storm drain is reinforced concrete pipe (RCP) and varies in size from 18-inches to 24-inches. It is located 66.5-feet east of the centerline in the portion that is south of Pine Avenue and is located approximately 23-feet east of centerline in the portion that is north of Pine Avenue, although this location varies. The pipe flows from north to south. The depth of the pipe invert varies from approximately from 4-feet to 6-feet below grade.

The City of El Segundo storm drain is an existing 24-inch, RCP storm drain that runs through Indiana Street, and flows from north to south. It conveys stormwater from a catch basin on the west side of Indiana Street and is located 11-feet east from the project's property line. This storm drain runs south and ties in to another storm drain on Holly Street that runs west before ultimately discharging into a basin located approximately 0.5-miles southwest of the project, on the intersection of Center Street and Grand Avenue. The catch basin is located approximately 230-feet north of Holly Street.

The peak flow for each site in its existing condition was calculated using the LA County approved and provided Hydrocalc software, based on the 25-year storm event. Refer to Exhibit C for existing drainage patterns and a breakdown of the portions of site that flow to each storm drain system.

3.2 Storm Drainage – Proposed Condition

Proposed drainage for this project will include stormwater treatment features on one or multiple sites, in accordance with the City of El Segundo Low Impact Development (LID) requirements. These treatment features are designed to treat the 85th percentile storm event, while overflow drainage features will be designed based on the 25-year storm event. The flows and volumes associated with the 85th percentile storm and 25-year storm are calculated using the Los Angeles County approved and provided Hydrocalc software, which is based on the Rational Method outlined by the Los Angeles County Public Works Hydrology Manual. The runoff equation for the Rational Method is as follows:

$$Q = CIA$$

Where : C = Runoff coefficient
Q = Peak runoff rate (CFS)
I = Average rainfall intensity (in/hr)
A = Drainage area (acres)

Based on the geotechnical report provided by Albus-Keefe and Associates, infiltration is feasible for stormwater treatment. It appears that one drywell at each site will be able to capture the required volume and will be able to treat that volume as quickly as it enters the drywell system. From the geotechnical report, the infiltration rate for the site is 0.00186 feet per second (ft/s). A drywell with a diameter of 4-feet and an infiltration depth of 22-feet will provide a disposal rate of 0.514 cubic feet per second (CFS) and will dispose of 88,819-cubic feet (CF) in 48 hours. Drywells are proposed below structure or on grade, with 20-feet of separation between the bottom of the sublevel or grade and infiltration zone. The groundwater historic high is 160-feet below grade. Refer to Exhibit D for the complete calculations of this drywell. The flow rates and volumes generated by the proposed project and the drywell are summarized in Table 1 below. The same drywell design will be used at each site.

Table 1. Peak Flow Rate and Volume Generated by the 85th Percentile Storm

	Proposed Peak Flow Rate (CFS)	Drywell Disposal Rate (CFS)	Generated Volume (CF)	Volume Disposed by Drywell in 48-hr (CF)
North Site	0.3797		4,882	
Fairfield Parking	0.2200	0.514 (typ.)	2,225	88,819 (typ.)
South Site	0.3126		3,784	

The drywells will include overflow piping that will be sized based on the 25-year storm event. Overflow features will convey water to Indiana Street or Mariposa Avenue and into the City of El Segundo catch basin on Indiana Street. Thus, stormwater in the proposed condition will flow only to the City of El Segundo storm drain. Table 2 below summarizes the clear peak flow rate values in the proposed condition based on the 25-year storm event. The proposed peak flow rate that will be used to design the overflow piping is the reduced peak flow rate generated after infiltration. Because the peak flow rate will be reduced in the proposed condition, it is assumed that the City of El Segundo storm drain will have more than enough capacity to handle the flow rate generated by the proposed project. Refer to Exhibit D for detailed calculations for overflow drainage.

Table 2. Peak Flow Rates Generated by the 25-Year Storm Event

	Size (ac)	Existing Peak Flow Rate (CFS)	Proposed Peak Flow Rate (CFS)	Proposed Peak Flow Rate After Infiltration	Peak Flow (CFS) Δ (P) - (E) - (Infil.)
North Site	1.83	3.729	3.139	2.625	-1.104
Fairfield Parking	0.76	1.804	1.800	1.286	-0.518
South Site	1.30	2.580	2.375	1.861	-0.719

4.0 <u>Sanitary Sewer</u>

4.1 Sanitary Sewer – Existing Condition

All existing sanitary sewer lines in the streets surrounding the project site are owned by the City of El Segundo.

An 8-inch vitrified clay pipe (VCP) gravity line is located west of the site under the centerline of Indiana Street, with a depth varying from 2-feet to 9-feet below grade to the pipe invert. The sewer begins at a manhole located approximately 98-feet south of Mariposa Avenue, before sloping south at 4.0% then to 0.3% and connects to a 12-inch sewer line that continues south on Indiana Street. In Indiana Street, there is also a 10-inch ductile iron pressure sewer located 6-ft east of the street centerline.

In Pacific Coast Highway (formerly Sepulveda Boulevard), there is an existing 12-inch VCP gravity line located 26-feet west of the street centerline. The pipe slopes from north to south at 0.3% and varies in depth from 6-feet to 18-feet. At the intersection with Holly Street, the pipe connects to a 12-inch sewer running west on Holly Street.

To the north of North Site is an existing 8-inch VCP gravity line located under the street centerline of Palm Avenue. This sewer has a high point elevation at a manhole located approximately 390-feet west of Pacific Coast Highway. The pipe slopes to drain out to both mainlines on both sides of the manhole. On the east end, it connects to the 12-inch sewer on the Pacific Coast Highway. The west portion of the main slopes downward towards the west at 5.4%, while the east portion of the main slopes downward towards the east at 3.5%.

There are two existing sewer lines on Mariposa Avenue, west of Indiana Street. One is an 8-inch VCP gravity line located on the street centerline. It slopes from east to west at 1.5% and connects to an 8-inch sewer line on Illinois Court. The other sewer line on Mariposa Avenue is a 10-inch pressure sewer located 5-feet north of the street centerline.

4.2 Sanitary Sewer – Proposed Condition

New sewer laterals are proposed for buildings on all three sites. The number and specific locations of the laterals have not yet been determined, but it is assumed they will connect to several of the existing gravity lines surrounding the project. The proposed project does not currently impact the existing pressure lines. No connections to sewer force mains (pressure sewers) will be allowed. The sewer laterals will be designed to slope at a minimum of 2% and maintain a minimum self-cleaning velocity of 2-feet per second. All sewer laterals will require a Sewer Connection Permit from the City of El Segundo. Prior to issuance of a Certificate of Occupancy, the sewer connection fee for this project will be paid to the City of El Segundo Public Works Department. The City of El Segundo will review a Sewer Study for the project and after the Sewer Study is approved, the City will issue a will-serve letter conditional on the completion of any sewer improvements required with the approval of the Sewer Study. Any unused sanitary sewer laterals shall be abandoned and properly capped at the City main. The Contractor is to obtain necessary permits and licenses and provide traffic control plans and shoring plans.

4.3 Sanitary Sewer Study

The purpose of this sewer study is to analyze the impact of the proposed development on the existing sewer system and to determine if the system has sufficient capacity to handle the additional sanitary loads generated by the new project. This study was completed using the guidelines from the 2014 City of El Segundo System Evaluation and Capacity Assurance Plan and Rehabilitation and Replacement Program (SECAP & RRP) report. The peak wet weather flow (PWWF) that will be generated after the project is completed is calculated and used to determine the system capacity. The PWWF is obtained by multiplying the average dry weather flow (ADWF) by a peaking factor to obtain the peak dry weather flow (PDWF), and then multiplying the PDWF by another peaking factor provided in the report.

Both the existing and proposed project sewer flows are considered for the ADWF. To obtain the existing demands, sewer flow monitoring was conducted by Utility Systems Science & Software (US3) from April 28, 2020 to May 13, 2020. Table 3 below lists the two existing manholes that were required to be observed by the City and summarizes the results of the flow monitoring. Flow readings were taken at 5-minute intervals in accordance with the City's sewer study requirements. The locations of the manholes, complete flow monitoring data, graphical representations of the data, and descriptions of US3's equipment and methods used during the flow monitoring are included in Appendix C.

Table 3. Flow Monitoring Results

Manhole ID Number	Location	Pipe Size (in.)	Level (in.)	d/D Ratio	Avg. Flow (MGD)	Avg. Velocity (FPS)
4-15	Southbound roadway of Pacific Coast Highway, approximately 250 feet north of Holly Avenue	12	0.830	0.069	0.0123	0.756
4-39	Intersection of Holly Avenue and Washington Street	12	1.997	0.166	0.104	1.753

For the proposed developments, the flows were estimated using Table 1 (Loadings for Each Class of Land Use) from LA County Sanitation District for commercial uses, as well as Table 4-1 (Residential Unit Flow Factors) from the SECAP & RRP report for residential uses. To be conservative and because the uses for each commercial space have not yet been determined, it was assumed that all commercial spaces would consist of restaurants, which generates the highest flow compared to other commercial uses. For the purposes of the sewer study, the total flow from all three developments will be considered in evaluating the project's impact to the sewer system. Table 4 below summarizes the proposed sewer demands from each of the developments. The total flow from the project is estimated to be 40,330 GPD or 0.0403 MGD.

Table 4. Proposed Sewer Demands.

	Unit Type	Unit	Unit Count	Flow per Unit (GPD)	Total Flow (GPD)	Total Flow at Site (GPD)
North Site	Multi-Family Residential	Dwelling	143	110	15,730	18,030
	Commercial - Restaurant	Per 1,000 SF	2.3	1,000	2,300	
Fairfield Parking	Commercial - Restaurant	Per 1,000 SF	3.3	1,000	3,300	3,300
South Site	Multi-Family Residential	Dwelling	120	110	13,200	19,000
	Commercial - Restaurant	Per 1,000 SF	5.8	1,000	5,800	
Total Project Flow = 40,330 GPD = 0.0403 MGD						

The ADWF values, which consists of the flow observed from the sewer monitoring and the additional flows from the project, are calculated at each manhole in Table 5 below. The PDWF is calculated using the ADWF values and peaking formula provided in Section 4 of the SECAP & RRP Report. Because the project area falls within Drainage Area 4 (refer to Appendix C, Exhibit 1), the peaking formula for Pump Station 4 Drainage Area and future systems is selected as written below. The PWWF can then be calculated by multiplying the PDWF by 1.25, as stated in the SECAP & RRP report. These calculations are summarized in Table 5.

$$PDWF = 2.43 \times ADWF^{0.92}$$

Table 5. PWWF Calculations

Manhole ID Number	(E) ADWF[1] (MGD)	(P) ADWF[2] (MGD)	(E) PDWF[3] (MGD)	(P) PDWF[3] (MGD)	Total PDWF[4] (MGD)	PWWF[5] (MGD)
4-15	0.0123	0.0403	0.0425	0.127	0.170	0.213
4-39	0.104	0.0403	0.303	0.127	0.430	0.538

[1] Existing ADWF values were obtained from flow monitoring results (see Table 3)
[2] Proposed ADWF values were obtained from sewer demand estimates (see Table 4)
[3] PDWF = 2.43 x $ADWF^{0.92}$
[4] Total PDWF = (E) PDWF + (P) PDWF
[5] PWWF = Total PDWF x 1.25

The City's criteria to determine that a sewer system has enough capacity for the proposed development is that the pipe must be able to flow with a d/D ratio of less than 0.5 for pipes less than 18-inches in diameter. In other words, the pipe must be able to flow half-full at a maximum. The d/D ratio of the pipe at each manhole was analyzed using the software Bentley Flowmaster, which uses Manning's Equation to calculate the normal depth of a pipe. Parameters for slope and material of the pipe were obtained from sewer record drawings provided by the City of El Segundo. Table 6 lists the Flowmaster inputs as well as the capacity results, and the complete Flowmaster calculations can be found in Appendix C.

Table 6. Sewer Capacity Analysis

Manhole ID Number	PWWF (MGD)	Slope	Material	Size (in.)	Normal Depth (in.)	d/D Ratio	d/D < 0.5?
4-15	0.213	0.3%	VCP	12	3.47	0.289	Yes
4-39	0.538	1.0%	VCP	12	4.10	0.342	Yes

Based on this study, it appears that all sewer systems analyzed will still flow less than 50% full, with the additional flows from the project and that the sewer systems have capacity to serve the new developments.

5.0 Water Service

5.1 Water Service – Existing Condition

There is an existing City of El Segundo 10-inch asbestos-cement water line located 11-feet west of the centerline of Indiana Street, which is scheduled to be replaced with a new 10-inch ductile iron water main in FY 2020-2021. There are also two existing water lines in the Pacific Coast Highway. One is a City of El Segundo 10-inch ductile iron pipe located 32-feet west of the street centerline. The other is a 10-inch pipe located 33-feet east of the street centerline, also owned by the City of El Segundo. In Palm Avenue north of North Site, there is a City of El Segundo 10-inch asbestos-cement pipe located 6-feet north of the street centerline. In Holly Avenue south of South Site, there is a City of El Segundo 10-inch asbestos-cement pipe located 13-feet south of the street centerline. There is also an existing City of El Segundo 10-inch ductile iron water line in Mariposa Avenue, located 6-feet south of the street centerline.

There are no existing reclaimed water mains in the streets adjacent to the project. The West Basin Municipal Water District record drawings shown in Exhibit 5 of Appendix B indicate that their closest reclaimed water main is located in Washington Avenue, approximately 500-feet from the intersection of Palm Avenue and Indiana Street.

Existing fire hydrants owned by the City of El Segundo are located along the Pacific Coast Highway, Holly Avenue, and Indiana Street. Refer to Exhibit B for the locations of these existing fire hydrants.

5.2 Water Service – Proposed Condition

The water service connection for domestic water and fire protection shall be made to one or more of the existing City of El Segundo water lines. The specific location of these connections and pipe sizing has yet to be determined, but will need to be approved by the City of El Segundo. The system shall provide adequate water supply for operation of the building's domestic requirements, automatic fire sprinkler systems and on-site fire hydrants (if required by the State or City Fire Marshal). The City of El Segundo will review a Water Study for the project and after the Water Study is approved, the City will issue a will-serve letter conditional on the completion of any water improvements required with the approval of the Water Study.

Because this project is still in the early planning phase and plumbing features within the building interior have not yet been designed, it is premature to determine the plumbing fixture units at each building. Instead, a similar type project was used as a reference to determine if the existing public water system will likely have the capacity to accommodate the water demands generated by this new project.

This similar type project, known as "100 West Walnut" and located in Pasadena, used Table 610.3 of the 2019 California Plumbing Code and Hunter's Curve methodology to calculate building domestic water demands. There is a total of 394 dwelling units in the proposed 100 West Walnut project and a total of 7,722 fixture units, as tabulated by the project plumbing engineer. Per Appendix A of the 2019 California Plumbing Code and using Hunter's Curve, this fixture unit count was converted to a peak demand of 940 GPM for the 394 units. Hunter's Curve is an industry standard methodology to convert fixture units to a peak flow demand and is considered conservative. The peaking factor used for the 100 West Walnut project was provided by the plumbing engineer as 4.0, greater than the City of El Segundo's 2.4x peaking factor. There was an average of 19.6 plumbing fixture units per dwelling unit, which equates to 2.4 GPM per dwelling unit. Using this peak demand to estimate the residential domestic water demands for the new Pacific Coast Commons development would yield the following results: 343 GPM at North Site and 288 GPM at South Site.

There is a total of 11,252 square-feet (SF) of commercial area proposed as part of the Pacific Coast Commons project: 5,759 SF at South Site, 3,273 SF at Fairfield Parking, and 2,223 SF at North Site. Of the proposed commercial space, a maximum of 50% can be restaurant use, per project entitlements. For the purposes of this analysis, it is assumed that 50% of the commercial area at each site will be for restaurant use, and the other 50% will be for retail use. For the commercial-retail domestic water demand, 100 West Walnut generated a flow of 350 GPM for 204,444 SF of retail space, as calculated by counting proposed fixture units for the project and converting it to a proposed flow, using the California Plumbing Code and Hunter's Curve. This equates to 1.7 GPM per 1,000 SF of retail space. The plumbing engineer for the Walnut project determined the peaking factor to be 2.0x, less than the City of El Segundo's standard 2.4x peaking factor. An additional 2.4x peaking factor has been applied to proposed Pacific Coast Commons commercial-retail uses. With this peaking factor, the peak demand is 4.1 GPM per 1,000 SF of retail space. Using this peak demand to estimate the commercial-retail domestic water demands for the new development yields the following results: 4.5 GPM at North Site, 6.5 GPM at Fairfield Parking, and 11.9 GPM at South Site. For restaurant use, the Walnut project generated 45 GPM for 9,678 SF of restaurant space, which is equivalent to 4.6 GPM per 1,000 SF of restaurant space. This was calculated using the California Plumbing Code fixture unit method and conversion to flow using Hunter's Curve. The plumbing engineer for the Walnut project determined the peaking factor to be 2.0x, less than the City of El Segundo's standard 2.4x peaking factor. An additional 2.4x peaking factor has been applied to proposed Pacific Coast Commons commercial-restaurant demands. This results in a peak demand of 11.1 GPM per 1,000 SF of restaurant space. Applying this peak demand to the proposed restaurant use floor area in the Pacific Coast Commons project results in the following: 12.2 GPM at North Site, 17.8 GPM at Fairfield Parking, and 32.2 GPM at South Site.

See Table 7 below for a summary of the domestic water demands. These demands are the peak domestic water flow rates generated by the project and do not represent total water usage. It is reasonable to assume that the total water usage for the project will be equal to 120% of the sewer demands in Table 4. Note that for the purposes of the water study, higher demands for both residential and commercial domestic water services were modeled (refer to Section 5.3 for additional information).

Table 7. Domestic Water Demand Flow Estimates

	Unit Type	Unit	Unit Count	Flow per Unit (GPM)	Total Peak Flow (GPM)	Total Peak Flow at Site (GPM)
North Site	Multi-Family Residential	Dwelling	143	2.4	343	343 (Residential) 16.7 (Commercial)
	Commercial – Retail	Per 1,000 SF	1.1	4.1	4.5	
	Commercial – Restaurant	Per 1,000 SF	1.1	11.1	12.2	
Fairfield Parking	Commercial – Retail	Per 1,000 SF	1.6	4.1	6.5	24.3 (Commercial)
	Commercial – Restaurant	Per 1,000 SF	1.6	11.1	17.8	
South Site	Multi-Family Residential	Dwelling	120	2.4	288	288 (Residential) 44.1 (Commercial)
	Commercial – Retail	Per 1,000 SF	2.9	4.1	11.9	
	Commercial – Restaurant	Per 1,000 SF	2.9	11.1	32.2	

Based on the requirements outlined by the El Segundo Fire Department in Regulation H-2-a for Fire Hydrant and Private Fire Main System Installation, it appears that additional fire hydrants may need to be installed in order to provide coverage for portions of the proposed buildings that are in excess of 150-feet from a public fire hydrant. Coordination with the Fire Prevention Division of the El Segundo Fire Department is required to determine whether the additional fire hydrants will be located in the public street and/or within the development.

Calculations for required fire flow for the proposed development were performed based on the requirements listed in the 2016 California Fire Code and Los Angeles County Fire Code. Values for required fire flow and duration are taken from Table B105.1(2) in the California Fire Code. Refer to Exhibit B for the complete fire flow calculations. Table 8 below summarizes the required fire flow rates for each site.

Table 8. Fire Flow Requirements.

	Building	Construction Type	Calculation Area (SF)	Required Fire Flow (GPM)	Flow Duration (HR)
North Site	Residential/Commercial	III-A	168,126	1,500*	3
	Parking Structure	I-A	16,798	1,500	2
Fairfield Parking	Commercial	III-A	4,004	1,500	2
	Parking Structure	I-A	24,209	1,750	2
South Site	Residential/Commercial	III-A	141,136	1,500*	2
	Parking Structure	I-A	19,545	1,500	2

* A reduction has been applied to the required fire flow value, in accordance with Table B105.2 from the Los Angeles County Fire Code, which states that buildings with sprinkler systems shall be 25% of the values listed in Table B105.1(2). The reduced fire-flow must be a minimum of 1,500 GPM.

The minimum number of fire hydrants required was calculated using Table C102.1 from the California Fire Code. The spacing between fire hydrants for all three sites will be 300-feet for public fire hydrants, as stated in the City of El Segundo Fire Prevention Division "Regulation H-2-a Fire Hydrant and Private Fire Main System Installation" document. See Table 9 for the hydrant and number spacing requirements.

Table 9. Required Number and Spacing of Fire Hydrants.

	Minimum Number of Hydrants	Spacing Between Hydrants
North Site	3	300 ft (typ.)
Fairfield Parking	1	
South Site	3	

Per requirements set forth by the City of El Segundo, any existing water meters, potable water service connections, fire backflow devices and potable water backflow devices must be upgraded to current City Water Division standards. These devices shall be placed or relocated onto private property. Plans for water system upgrades will be submitted to the City of El Segundo Public Works Department for review and approval. Any unused water laterals shall be abandoned and properly capped at the City main. The Contractor is to obtain necessary permits and licenses and provide traffic control plans and shoring plans.

5.3 Water Study

A study was performed to analyze the impact of the proposed developments on the existing City-owned water mains. This study analyzes the impact of the proposed domestic water and fire water demands. Using the Bentley WaterCAD software, hydraulic models of the existing water mains and the proposed domestic water and fire water services for each of the sites were created. The study was performed in accordance with the guidelines from the "City of El Segundo Water Master Plan" dated September 2005 and the document "Using a Pump Curve to Approximate a Connection to an Existing System" by Bentley, which was provided by the City's consultant. According to the Water Master Plan, this project is located in the high-pressure zone of the City.

Prior to the creation of the hydraulic models and analysis of the results, domestic water model criteria were reviewed and approved by the City's consultant. This criteria was obtained from the "City of El Segundo Water Master Plan" and is as follows:

- Minimum Static Pressure = 50 pounds per square inch (PSI)
- Minimum Residual Pressure = 45 PSI
- Maximum Static Pressure = 80 PSI
- Velocity shall be between 1 FPS and 3 FPS, with a maximum value of 5 FPS
- Domestic water demands in the hydraulic model shall use the peak hour demand (2.4 peaking factor multiplied by the average daily demand)
- Hydraulic model shall use existing hydrant flow data to create a pump curve to approximate a connection to the existing system using WaterCAD software.

Flow tests were performed for three fire hydrants in the project vicinity by Utility Systems Science & Software (US3) on June 10, 2020. This flow test data was used to model the existing water mains in the hydraulic model. A summary of these flow tests is provided in Table 10 below and the complete flow test results are provided in Appendix D. Per the guidelines in the Bentley document provided by the City's consultant, these hydrants were modeled as pumps and the flow test data was entered as a pump curve. This document also explains that "modeling more than one connection between the proposed expansion and the existing system is not a valid approach" (refer to Appendix D for the complete document). Thus, a hydraulic model was developed for each fire hydrant to analyze the impact of the new developments from each individual connection to the existing system. The pump curves and calculations for the pump curves can be found in Appendix D.

Table 10. Fire Hydrant Flow Test Data

Fire Hydrant ID Number	Location	Static Pressure (PSI)	Residual Pressure (PSI)	Flow at 20 PSI (GPM)
403	Intersection of Indiana Street and Holly Avenue	71	66	4,842.5
1718	Intersection of Mariposa Avenue and Indiana Street	66	64	7,515.3
1890	Intersection of Pacific Coast Highway and Holly Avenue	76	71	4,595.3

The following City-owned existing water mains were included in each hydraulic model: a 10-inch ductile iron main located in Mariposa Avenue, a 10-inch ductile iron water main located in Indiana Street, and a 10-inch ductile iron main in Holly Avenue. At each site, new residential and commercial domestic water services, including a meter and backflow preventer at each service, were modeled.

As stated in Section 5.2, this project is still in the early planning phase and plumbing features within the building interior have not yet been designed, so it is premature to determine the plumbing fixture units at each site. Instead, the 100 West Walnut project in Pasadena was used as a reference to determine building demands and analyze if the existing public water system will likely have the capacity to accommodate the water demands generated by this new project. Refer to Table 7 for a summary of the Pacific Coast Commons domestic water demands, which were estimated based on the 100 West Walnut project. The potable residential water demand at North Site and South

Site was modeled at 700 GPM, which is much higher than the estimated 343 GPM and 288 GPM. The potable commercial water demand at North Site, Fairfield Parking, and South Site was modeled at 140 GPM, which is much higher than the estimated 16.7 GPM, 24.3 GPM, and 44.1 GPM. The modeled flows are assumed to be the peak hourly demand. The sizes of each proposed service have been assumed for the purposes of this study and will need to be confirmed by a plumbing engineer during the project design phase. Table 11 summarizes the demands and sizes of each proposed service.

Table 11. Proposed Domestic Water Services

	Type	Peak Hourly Demand (GPM)	Service Size[1] (in.)
North Site	Residential	700	6
	Commercial	140	3
Fairfield Parking	Commercial	140	3
South Site	Residential	700	6
	Commercial	140	3

[1] Sizes are also applicable to the backflow preventer at each service

Fire water services were also included in each hydraulic model. It was assumed that two services including a backflow preventer would be required at each site: one for the residential and commercial space, and another for the parking garage. The fire water demands from Table 8 were used for the model. A summary of the demands and the size of the services is summarized in Table 12 below.

Table 12. Proposed Fire Water Services

	Type	Fire Water Demand (GPM)	Service Size[1] (in.)
North Site	Residential/Commercial	1,500	8
	Parking Structure	1,500	8
Fairfield Parking	Commercial	1,500	8
	Parking Structure	1,750	8
South Site	Residential/Commercial	1,500	8
	Parking Structure	1,500	8

[1] Sizes are also applicable to the backflow preventer at each service

A total of six hydraulic models were created and analyzed for various scenarios. Three models were created to analyze the impact of the total proposed domestic water demands at each fire hydrant. Another three models were created to analyze the impact of the proposed fire water demands at each site. The domestic water and fire water analyses were separated in order to mimic more realistic scenarios. Refer to Appendix D for exhibits of the hydraulic models, which are described in Table 13 below.

Table 13. WaterCAD Model Summary

	Exhibit Name	Description
1	Domestic Water | Hydrant 403	Analyzes impact of domestic water demands from all three sites with the fire hydrant specified in the title; no fire water demands analyzed
2	Domestic Water | Hydrant 1718	
3	Domestic Water | Hydrant 1890	
4	Fire Water | South Site (FH 403)	Analyzes impact of fire water demands from only South Site
5	Fire Water | Fairfield Parking (FH 1718)	Analyzes impact of fire water demands from only Fairfield Parking

6	Fire Water | North Site (FH 1718)	Analyzes impact of fire water demands from only North Site

The results for the 10-inch City main of the WaterCAD model analysis are summarized in Table 14 below. The model exhibits and complete results from the WaterCAD models can be found in Appendix D. For all the domestic and fire water models, the pressures in the public 10-inch main are within the required pressure range of 50 PSI to 80 PSI, as provided by the criteria in the "City of El Segundo Water Master Plan." It should be noted that some pipe segments in the fire water models show 0 FPS velocities, because the sites are analyzed independently and demands were only entered at one site for each model (the site being analyzed). The WaterCAD results show that in general, the City's 10-inch main is operating within the desired flow velocities between 1 FPS and 5 FPS. The models do appear to indicate a few scenarios under 1 FPS and exceeding 5 FPS, which is outside the range of the City' Water Master Plan criteria. For the domestic water models, instances exceeding 5 FPS appear to be located immediately downstream of the modeled pump. For the fire models, it is assumed these peak velocities are short term, emergency conditions only and will not negatively impact the City main. This model is extremely conservative and it is not anticipated that the project will impact the City main to an extent that would require upsizing. Because the modeled flows are much higher than the estimated flows (per Table 7) and the results of the analysis for the higher modeled flows prove that the City main does not need to be upsized, it can be concluded that the City main will have more than enough capacity for the lower estimated flows and will not need to be upsized.

Table 14. WaterCAD Model Results

	WaterCAD Model	Min. Pressure (PSI)	Max. Pressure (PSI)	Max. Velocity (FPS)	Min. Flow (GPM)	Max Flow (GPM)
1	Domestic Water | Hydrant 403	64	77	4	140	980
2	Domestic Water | Hydrant 1718	68	78	7.43	140	1,820
3	Domestic Water | Hydrant 1890	66	78	7.43	140	1,820
4	Fire Water | South Site (FH 403)	53	64	6.13	0	1,500
5	Fire Water | Fairfield Parking (FH 1718)	60	69	13.28	0	3,250
6	Fire Water | North Site (FH 1718)	62	73	12.25	0	3,000

6.0 <u>Gas Service</u>

Existing SoCal Gas utilities are located in the following streets adjacent to the project site: Pacific Coast Highway, Palm Avenue, Mariposa Avenue, Indiana Street, and Holly Avenue. SoCal Gas has indicated in a letter that they have available service in the area to serve the project. See Exhibit 7 in Appendix B for the will-serve letter.

7.0 <u>Power and Telecom Service</u>

SoCal Edison has indicated that they have existing underground electrical utilities in the streets adjacent to the project site, including Pacific Coast Highway and Mariposa Avenue. Atlas maps showing the locations of these utilities have been provided by SoCal Edison and are included in Exhibit 8 of Appendix B. In order for SoCal Edison to provide a will-serve letter, the electrical demands generated by the proposed project will need to be provided to them for their review.

Existing telecom utilities are located in Pacific Coast Highway, Palm Avenue, and Mariposa Avenue. Verizon, CenturyLink, and Charter Communications have confirmed that they have existing services in the area. Charter Communications has indicated in a letter that they may provide service to the project, but will need to perform an investigation of the area to confirm it is feasible. Refer to Exhibit 9 of Appendix B for maps showing the locations of these utilities, as well as the letter from Charter Communications.

8.0 Materials

Concrete Pavement	f'c = 2,500 psi slab on grade Sidewalks: paving, base course and sub-grade thicknesses as recommended by the Project Geotechnical Engineer.
Storm Drain	PVC SDR 35, HDPE, and RCP
Sanitary Sewer	PVC sewer pipe and fittings, ASTM D 3034, SDR 35
Domestic and Fire Service	Schedule 40, PVC C900, and Copper Type K

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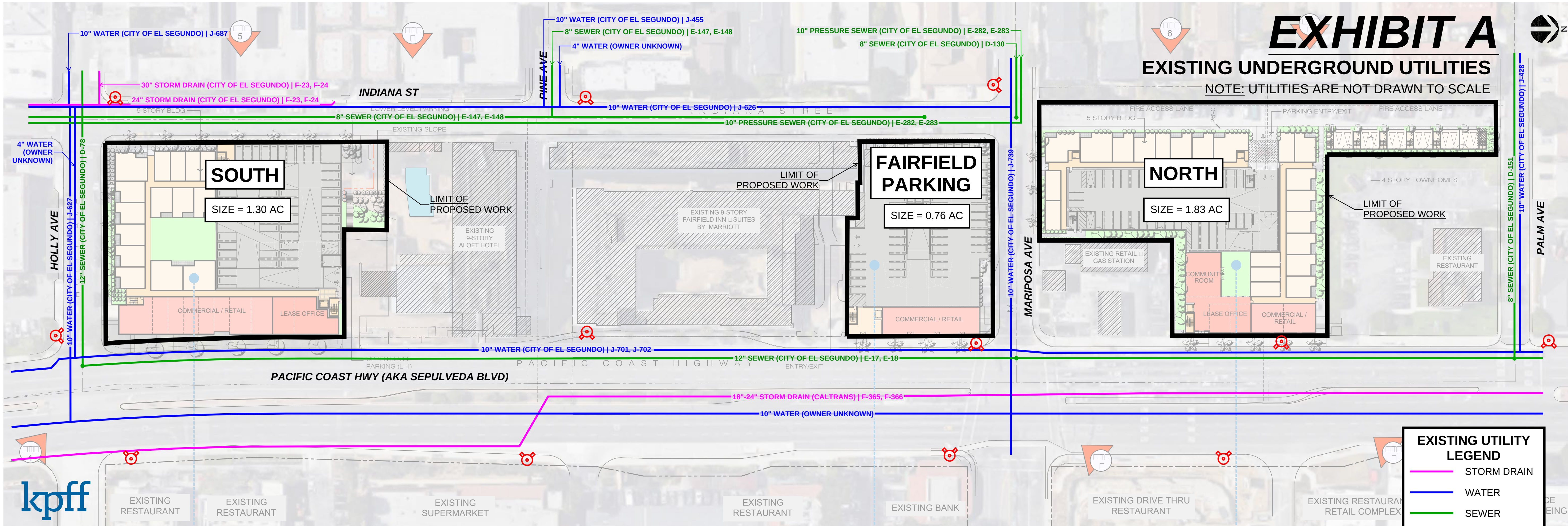
APPENDIX A

KPFF EXHIBITS

EXHIBIT A – EXISTING UTILITIES
EXHIBIT B – FIRE WATER REQUIREMENTS
EXHIBIT C – EXISTING DRAINAGE
EXHIBIT D – PROPOSED DRAINAGE



PACIFIC COAST COMMONS - SOUTH

PROJECT INFORMATION

DESCRIPTION	5 STORIES TYPE III-A (SPRINKLERED) RESIDENTIAL (R-2) WITH COMMERCIAL (M) ON GROUND FLOOR WRAP AROUND 6-STORIES TYPE I-A PARKING STRUCTURE (S-2)
ADDRESS	PACIFIC COAST HWY AND HOLLY AVENUE EL SEGUNDO, CA
ZONING	PROPOSED MIXED USE

SITE SUMMARY

LAND AREA	1.27 AC	55,509 SF
DENSITY		120 UNITS
FAR		2.54
GROSS BUILDING AREA	(Includes hallways stairs, elevators. Does not include garage area)	141,136 SF
BUILDING FOOTPRINT		48,279 SF
BUILDING HEIGHT	(From grade to top of roof)	66'-0"
NUMBER OF FLOORS		6
COMMERCIAL AREA		6,200 SF

RESIDENTIAL UNIT SUMMARY

PLAN	DESCRIPTION	QNTY.	UNIT MIX	UNIT FLR AREA	AVG AREA
S-1	STUDIO	24	37%	485	548
S-2	STUDIO	20		623	
A-1	1 BEDROOM	40	43%	668	700
A-2	1 BEDROOM	12		805	
B-1	2 BEDROOM	10	20%	982	995
B-3	2 BEDROOM	10		982	
B-4	2 BEDROOM	4		1,057	
		120			

PARKING SUMMARY

HOTEL PARKING REPLACEMENT			126
RESIDENTIAL PARKING REQUIREMENT			
STUDIO	44	1.0/Unit	44
1 BEDR(	52	1.5/Unit	78
2 BEDR(	24	2.0/Unit	48
			170
GUEST PARKING		1.0/ 3 Unit	40
RETAIL PARKING REQUIREMENT (WILL BE SHARED WITH HOTEL GUEST PARKING)			SHARED
TOTAL PARKING REQUIREMENT			336

TOTAL PARKING PROVIDED INSIDE PARKING STRUCTURE

LEVEL L-6	36
LEVEL L-5	47
LEVEL L-4	47
LEVEL L-3	47
LEVEL L-2	47
LEVEL L-1	36
BASEMENT B-1	46
BASEMENT B-2	30
	336

PACIFIC COAST COMMONS - FAIRFIELD PARKING

PROJECT INFORMATION

DESCRIPTION	4 STORIES TYPE I-A PARKING STRUCTURE (S-2) WITH COMMERCIAL (M) ON GROUND FLOOR
ADDRESS	PACIFIC COAST HWY AND MARIPOSA AVENUE EL SEGUNDO, CA
ZONING	PROPOSED MIXED USE

SITE SUMMARY

LAND AREA	0.72 AC	31,523 SF
FAR		0.13
GROSS BUILDING AREA	(Includes hallways stairs, elevators. Does not include garage area)	4,004 SF
BUILDING FOOTPRINT		28,985 SF
BUILDING HEIGHT	(From grade to top of roof)	43'-0"
NUMBER OF FLOORS		5
COMMERCIAL AREA		2,800 SF

PARKING SUMMARY

HOTEL PARKING REPLACEMENT	180
RETAIL PARKING REQUIREMENT	SHARED
TOTAL PARKING REQUIREMENT	180

TOTAL PARKING PROVIDED INSIDE PARKING STRUCTURE

LEVEL L-5	20
LEVEL L-4	42
LEVEL L-3	42
LEVEL L-2	42
LEVEL L-1	34
	180

PACIFIC COAST COMMONS - NORTH

PROJECT INFORMATION

DESCRIPTION	5 STORIES TYPE III-A (SPRINKLERED) RESIDENTIAL (R-2) WITH COMMERCIAL (M) ON GROUND FLOOR WRAP AROUND 6-STORIES TYPE I-A PARKING STRUCTURE (S-2)
ADDRESS	PACIFIC COAST HWY AND PALM AVENUE EL SEGUNDO, CA
ZONING	PROPOSED MIXED USE

SITE SUMMARY

LAND AREA	1.85 AC	80,705 SF
DENSITY		143 UNITS
FAR		2.08
GROSS BUILDING AREA	(Includes hallways stairs, elevators. Does not include garage area)	168,126 SF
BUILDING FOOTPRINT		47,423 SF
BUILDING HEIGHT	(From grade to top of roof)	66'-0"
NUMBER OF FLOORS		6
COMMERCIAL AREA		2,000 SF

RESIDENTIAL UNIT SUMMARY

PLAN	DESCRIPTION	QNTY.	UNIT MIX	UNIT FLR AREA	AVERA
S-1	STUDIO	15	34%	541	597
S-5	STUDIO	32		623	
A-1	1 BEDROOM	63	49%	668	668
A-2	1 BEDROOM	4		668	
B-1	2 BEDROOM	13	17%	1,033	1,011
B-4	2 BEDROOM	10		982	
		137			
TH-1	TOWNHOUSE	5		1,324	
TH-2	TOWNHOUSE	1		1,487	
		6			
	TOTAL UNITS	143			

PARKING SUMMARY

RESIDENTIAL PARKING REQUIREMENT			
STUDIO	47	1.0/Unit	47
1 BEDROOM	67	1.5/Unit	101
2 BEDROOM	23	2.0/Unit	46
			194
GUEST PARKING		1.0/ 3 Unit	46
RETAIL PARKING REQUIREMENT (WILL BE SHARED WITH RESIDENTIAL PARKING)			SHARED
TOTAL PARKING REQUIREMENT			240

TOTAL PARKING PROVIDED INSIDE PARKING STRUCTURE

LEVEL L-6	42
LEVEL L-5	39
LEVEL L-4	39
LEVEL L-3	39
LEVEL L-2	39
LEVEL L-1	42
	240

MASTER SITE PLAN

BRE HOTELS & RESORTS

CONTINENTAL DEVELOPMENT CORPORATION

Mar Ventures, Inc.

Pacific Coast Commons

1" = 50'-0"
0 50 100 150

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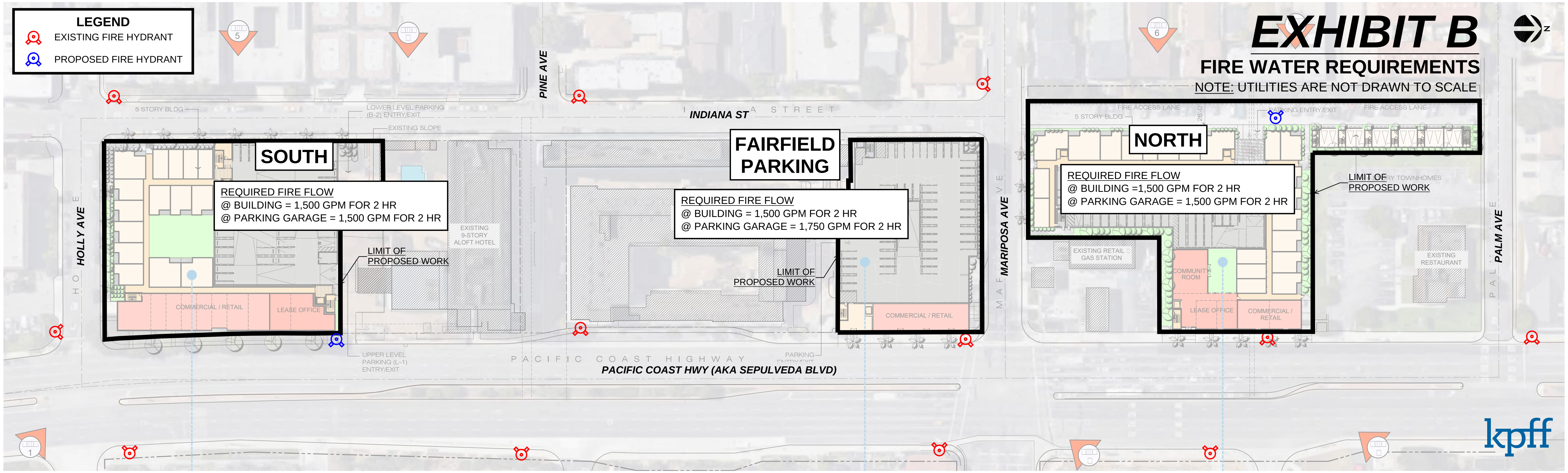

FIRE FLOW CALCULATIONS

SOUTH

RESIDENTIAL/COMMERCIAL BUILDING:

Gross Area = 141,136 sf
Type III-A, Sprinklered
Residential (R-2) and Commercial (M)

According to Table B105.2 from LA County Fire Code, the minimum required fire flow is 25% of the value listed in Table B105.1(2) from the California Fire Code and the required flow duration is the duration listed in Table B105.1(2) at the reduced flow rate. However, the reduced fire-flow shall not be less than 1,500 gpm.

Required Fire Flow w/o Reduction = 5,500 gpm
Required Fire Flow w/ Reduction = **1,500 gpm**
Flow Duration = **2 hours**

PARKING GARAGE:

Area of One Floor = 19,545 sf
Type I-A (S-2)

According to Section B104.3 for Type IA and IB construction, in the CFC, "fire-flow calculation area for open parking garages shall be determined by the area of the largest floor."

Required Fire Flow = **1,500 gpm**
Flow Duration = **2 hours**

FAIRFIELD PARKING

COMMERCIAL BUILDING:

Gross Area = 4,004 sf
Type III-A (Assumed)
Commercial (M)

Required Fire Flow = **1,500 gpm**
Flow Duration = **2 hours**

PARKING GARAGE:

Area of One Floor = 24,209 sf
Type I-A (S-2)

According to Section B104.3 for Type IA and IB construction, in the California Fire Code, "fire-flow calculation area for open parking garages shall be determined by the area of the largest floor."

Required Fire Flow = **1,750 gpm**
Flow Duration = **2 hours**

NORTH

RESIDENTIAL/ COMMERCIAL BUILDING:

Gross Area = 168,126 sf
Type III-A, Sprinklered
Residential (R-2) and Commercial (M)

According to Table B105.2 from LA County Fire Code, the minimum required fire flow is 50% of the value listed in Table B105.1(2) from the CFC and the required flow duration is the duration listed in Table B105.1(2) at the reduced flow rate. However, the reduced fire-flow shall not be less than 1,500 gpm.

Required Fire Flow w/o Reduction = 6,000 gpm
Required Fire Flow w/ Reduction = **1,500 gpm**
Flow Duration = **2 hours**

PARKING GARAGE:

Area of One Floor = 16,798 sf
Type I-A (S-2)

According to Section B104.3 for Type IA and IB construction, in the California Fire Code, "fire-flow calculation area for open parking garages shall be determined by the area of the largest floor."

Required Fire Flow = **1,500 gpm**
Flow Duration = **2 hours**

The required number of hydrants were calculated using Table C102.1 from the California Fire Code. Required spacing for public fire hydrants is 300 ft, as stated in the El Segundo Fire Department "Regulation H-2-a Fire Hydrant and Private Fire Main system Installation" document.

REQUIRED NUMBER OF AND SPACING BETWEEN FIRE HYDRANTS

	MIN. NUMBER	SPACING
NORTH SITE	3	300 ft
FAIRFIELD PARKING	1	
SOUTH SITE	3	

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1" = 50'-0"
0 50 100 150

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EXHIBIT C
EXISTING DRAINAGE
SOUTH SITE

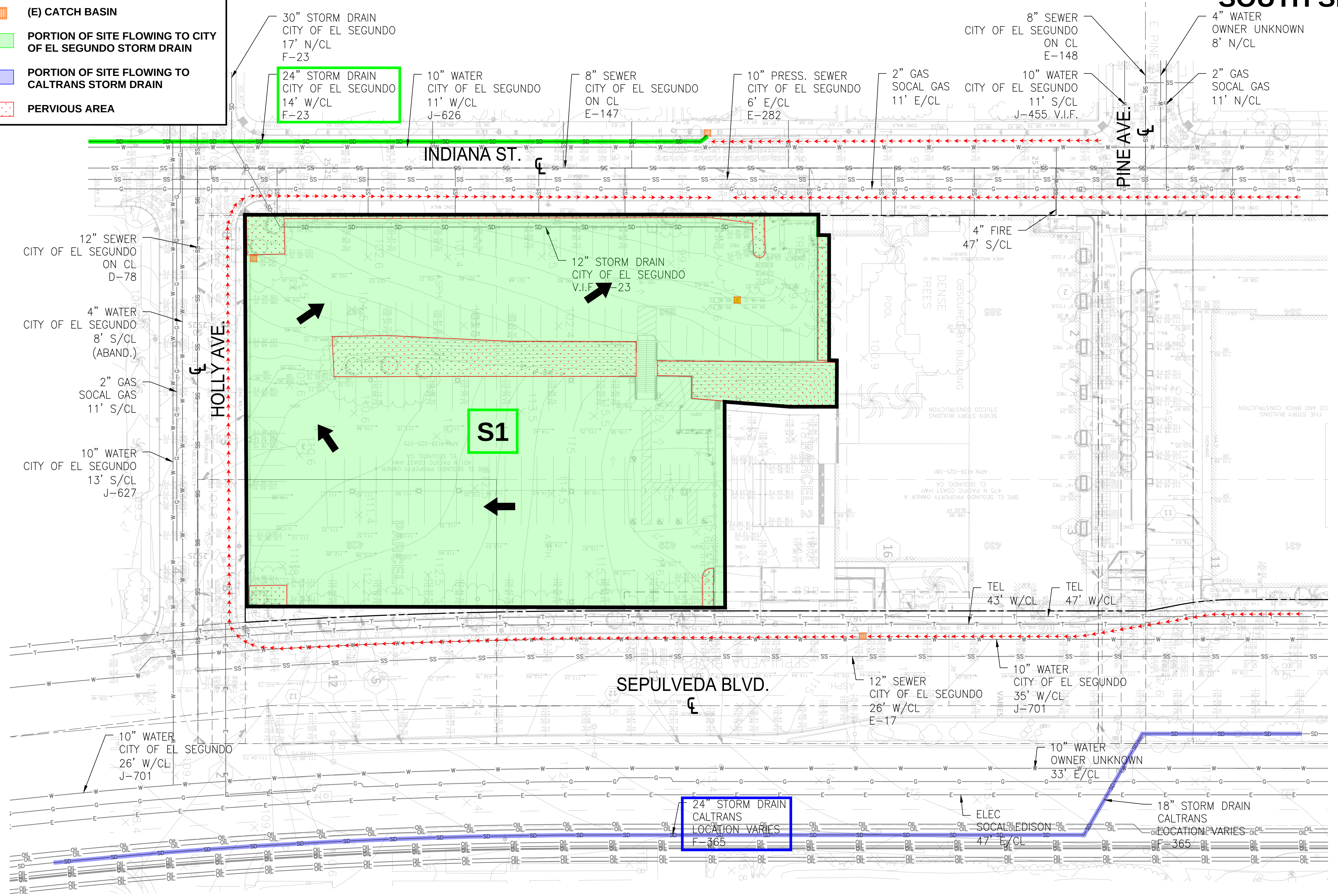
LEGEND

- DIRECTION OF FLOW ONSITE
- DIRECTION OF FLOW OFFSITE
- (E) CATCH BASIN
- PORTION OF SITE FLOWING TO CITY OF EL SEGUNDO STORM DRAIN
- PORTION OF SITE FLOWING TO CALTRANS STORM DRAIN
- PERVIOUS AREA

PEAK FLOW RATE OF 25-YEAR STORM

AREA	EXISTING	PROPOSED
S1	2.580 cfs	1.861 cfs

(ALL STORMWATER OVERFLOW IN THE PROPOSED CONDITION WILL BE CONVEYED INTO THE CITY OF EL SEGUNDO STORM DRAIN. THE PROPOSED PEAK FLOW RATE IS THE REDUCED RATE GENERATED AFTER INFILTRATION.)



NOTE: EXHIBIT SHOWS DRAINAGE PATTERNS IN THE EXISTING CONDITION ONLY

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CONSULTANTS

STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	XX.XX.XX
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION
ALOFT MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE
PACIFIC COAST COMMONS - SOUTH EXHIBIT

SHEET NUMBER (EXHIBIT NUMBER)
EXHB-01

EXHIBIT C

EXISTING DRAINAGE

FAIRFIELD PARKING

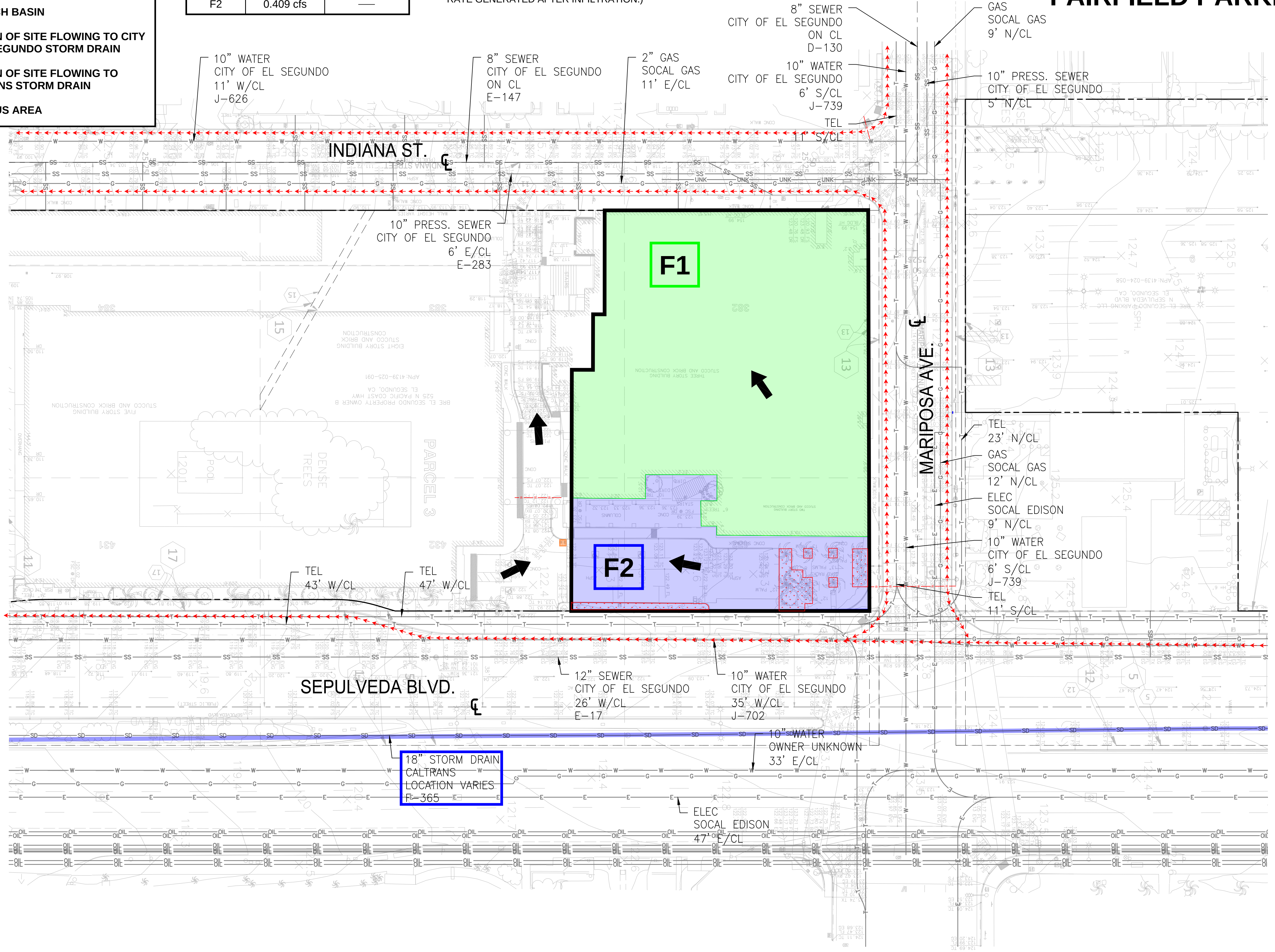
LEGEND

- DIRECTION OF FLOW ONSITE
- DIRECTION OF FLOW OFFSITE
- (E) CATCH BASIN
- PORTION OF SITE FLOWING TO CITY OF EL SEGUNDO STORM DRAIN
- PORTION OF SITE FLOWING TO CALTRANS STORM DRAIN
- PERVIOUS AREA

PEAK FLOW RATE OF 25-YEAR STORM

AREA	EXISTING	PROPOSED
F1	1.395 cfs	1.286 cfs
F2	0.409 cfs	—

(ALL STORMWATER OVERFLOW IN THE PROPOSED CONDITION WILL BE CONVEYED INTO THE CITY OF EL SEGUNDO STORM DRAIN. THE PROPOSED PEAK FLOW RATE IS THE REDUCED RATE GENERATED AFTER INFILTRATION.)



NOTE: EXHIBIT SHOWS DRAINAGE PATTERNS IN THE EXISTING CONDITION ONLY

SCALE: 1"=20'

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STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	XX.XX.XX
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION
ALOFT MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE
PACIFIC COAST COMMONS - FAIRFIELD PARKING EXHIBIT

SHEET NUMBER (EXHIBIT NUMBER)
EXHB-0

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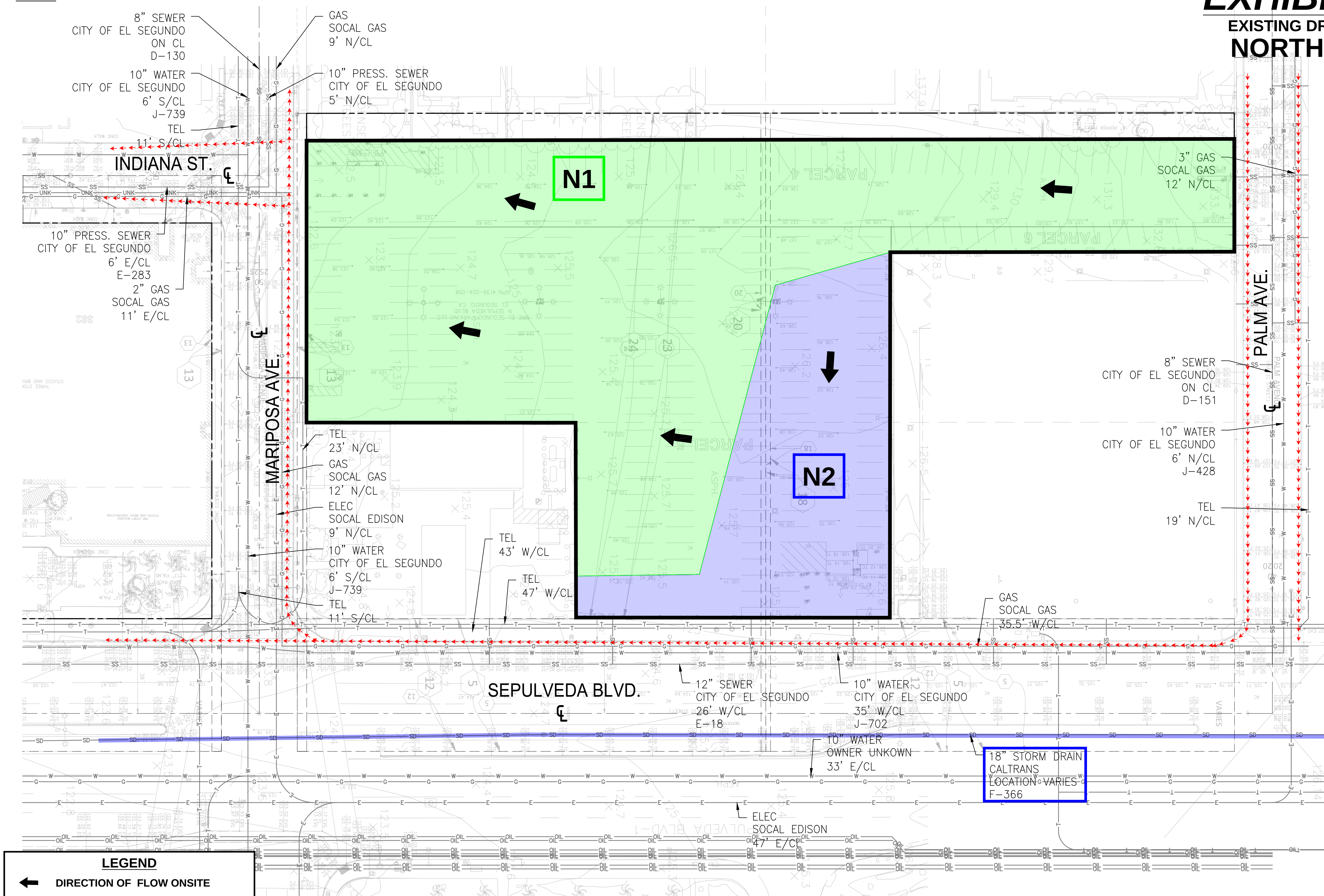
NOTE: EXHIBIT SHOWS DRAINAGE PATTERNS IN THE EXISTING CONDITION ONLY

EXHIBIT C

EXISTING DRAINAGE
NORTH SITE



LEGEND

- DIRECTION OF FLOW ONSITE
- DIRECTION OF FLOW OFFSITE
- (E) CATCH BASIN
- PORTION OF SITE FLOWING TO CITY OF EL SEGUNDO STORM DRAIN
- PORTION OF SITE FLOWING TO CALTRANS STORM DRAIN
- PERVIOUS AREA

PEAK FLOW RATE OF 25-YEAR STORM		
AREA	EXISTING	PROPOSED
N1	2.815 cfs	2.625 cfs
N2	0.914 cfs	—

(ALL STORMWATER OVERFLOW IN THE PROPOSED CONDITION WILL BE CONVEYED INTO THE CITY OF EL SEGUNDO STORM DRAIN. THE PROPOSED PEAK FLOW RATE IS THE REDUCED RATE GENERATED AFTER INFILTRATION.)

0 10' 20'
SCALE: 1"=20'

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STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	XX.XX.XX
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION
ALOFT MIXED-USE DEVELOPMENT
XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE
PACIFIC COAST COMMONS - NORTH EXHIBIT

SHEET NUMBER (EXHIBIT NUMBER)
EXHB-0

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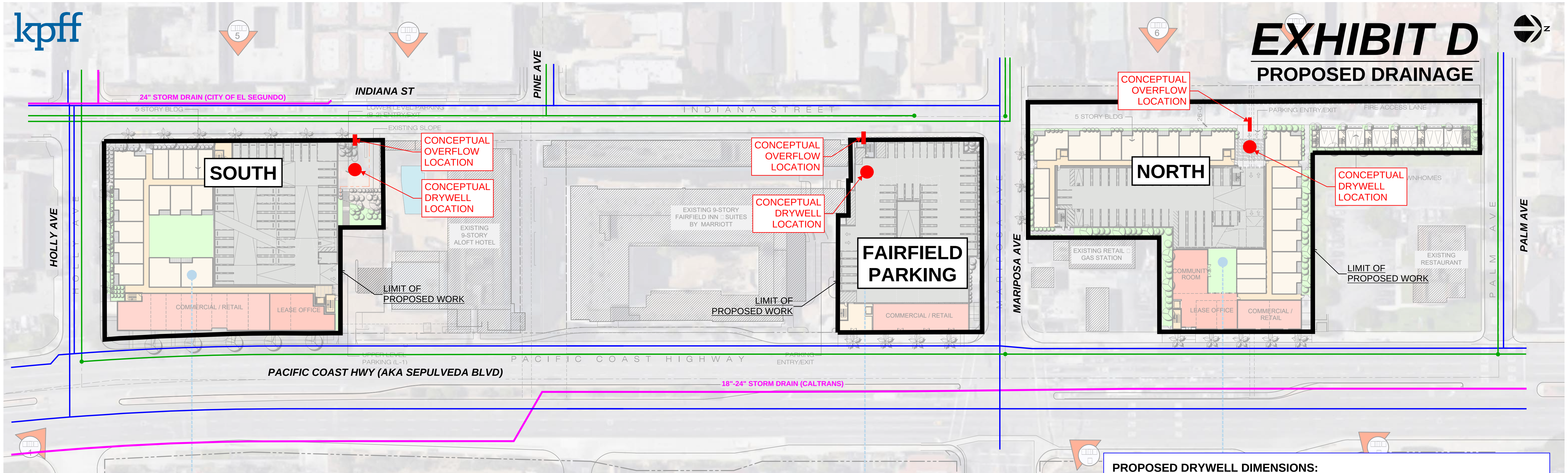

PROPOSED DRYWELL DIMENSIONS:
DIAMETER = 4 ft
INFILTRATION DEPTH = 22 ft (INFILTRATION ZONE BETWEEN 30 ft AND 52 ft)

STORMWATER TREATMENT: DRYWELL CALCULATIONS

Calculations were performed using the report "Geotechnical Due-Diligence Evaluation, Proposed Retail & Residential Development, ALOFT Development, Sepulveda Blvd. and Mariposa Ave., City of El Segundo, California" provided by Albus-Keefe and Associates, Inc.

DRYWELL DISPOSAL RATE
The infiltration rate for the site is 0.00186 ft/s.

Infiltration will begin 20 ft below the subterranean level or below grade. Assuming that the drywell will have a 4-ft diameter, each foot of depth will provide 12.56 sf of surface area. A 40-ft drywell (with an infiltration depth of 22 ft) will provide 276 sf of infiltration zone.

(0.00186 ft/s) x (276 sf) = 0.514 cfs

The disposal rate of one drywell is 0.514 cfs.

PEAK FLOW RATE
The disposal rate of one drywell is 0.514 cfs.

SITE PEAK FLOW RATES GENERATED BY 85TH PERCENTILE STORM:
South Site = 0.3126 cfs
Fairfield Parking = 0.2200 cfs
North Site = 0.3797 cfs

One drywell at each site is adequate to handle the peak flow rate generated by the 85th percentile storm with no additional volume required.

VOLUME
In 48 hours, one drywell will dispose of 88,819 cf.

SITE DESIGN VOLUMES GENERATED BY 85TH PERCENTILE STORM:
South Site = 3,784 cf
Fairfield Parking = 2,225 cf
North Site = 4,882 cf

One drywell at each site is adequate to draw down the volumes generated by the 85th percentile storm in 48 hours, based on LA County jurisdictions.

OVERFLOW CALCULATIONS

SOUTH SITE - PEAK FLOW RATE (Q_{25})

	EXISTING			PROPOSED		
	SIZE	% IMP	Q_{25}	SIZE	% IMP	Q_{25}
CITY OF EL SEGUNDO MAIN	1.30 ac	88.6%	2.580 cfs	1.30 ac	86.3%	1.861 cfs
CALTRANS MAIN	—	—	—	—	—	—

FAIRFIELD PARKING - PEAK FLOW RATE (Q_{25})

	EXISTING			PROPOSED		
	SIZE	% IMP	Q_{25}	SIZE	% IMP	Q_{25}
CITY OF EL SEGUNDO MAIN	0.58 ac	100%	1.395 cfs	0.76 ac	96.3%	1.286 cfs
CALTRANS MAIN	0.18 ac	88.7%	0.409 cfs	—	—	—

NORTH SITE - PEAK FLOW RATE (Q_{25})

	EXISTING			PROPOSED		
	SIZE	% IMP	Q_{25}	SIZE	% IMP	Q_{25}
CITY OF EL SEGUNDO MAIN	1.46 ac	100%	2.815 cfs	1.83 ac	89.4%	2.625 cfs
CALTRANS MAIN	0.37 ac	100%	0.914 cfs	—	—	—

NOTE: THE Q_{25} IN THE PROPOSED CONDITION FOR ALL THREE SITES IS THE REDUCED FLOW RATE GENERATED AFTER INFILTRATION

SINCE THE PEAK FLOW RATE IS REDUCED IN THE PROPOSED CONDITION FOR ALL THREE SITES, IT IS ASSUMED THAT THE EXISTING CITY OF EL SEGUNDO STORM DRAIN HAS MORE THAN ENOUGH CAPACITY TO HANDLE THE FLOWS GENERATED BY THE PROPOSED PROJECT.

BRE HOTELS & RESORTS
CONTINENTAL DEVELOPMENT CORPORATION
Mar Ventures, Inc.
Pacific Coast Commons

1" = 50'-0"
0 50 100 150

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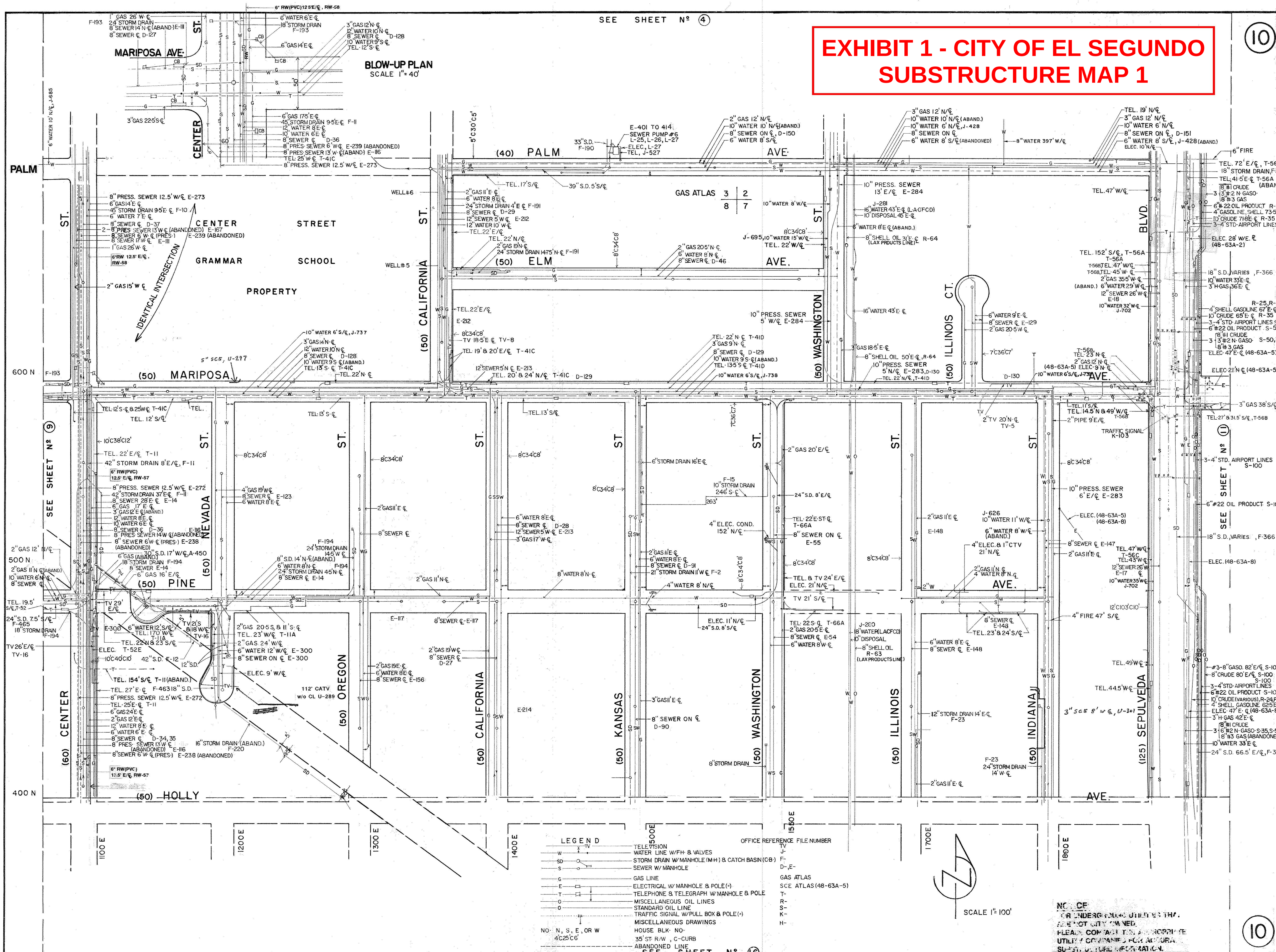
APPENDIX B

RECORD RESEARCH

EXHIBIT 1 – CITY OF EL SEGUNDO SUBSTRUCTURE MAPS
EXHIBIT 2 – STORM DRAIN RECORD PLANS
EXHIBIT 3 – SEWER RECORD PLANS
EXHIBIT 4 – WATER RECORD PLANS
EXHIBIT 5 – WEST BASIN MUNICIPAL WATER DISTRICT RECORD PLANS
EXHIBIT 6 – GEOTECHNICAL REPORT
EXHIBIT 7 – SOCAL GAS WILL-SERVE LETTER
EXHIBIT 8 – SOCAL EDISON ATLAS MAPS
EXHIBIT 9 – TELECOM SERVICE MAPS

EXHIBIT 1 - CITY OF EL SEGUNDO SUBSTRUCTURE MAP 1



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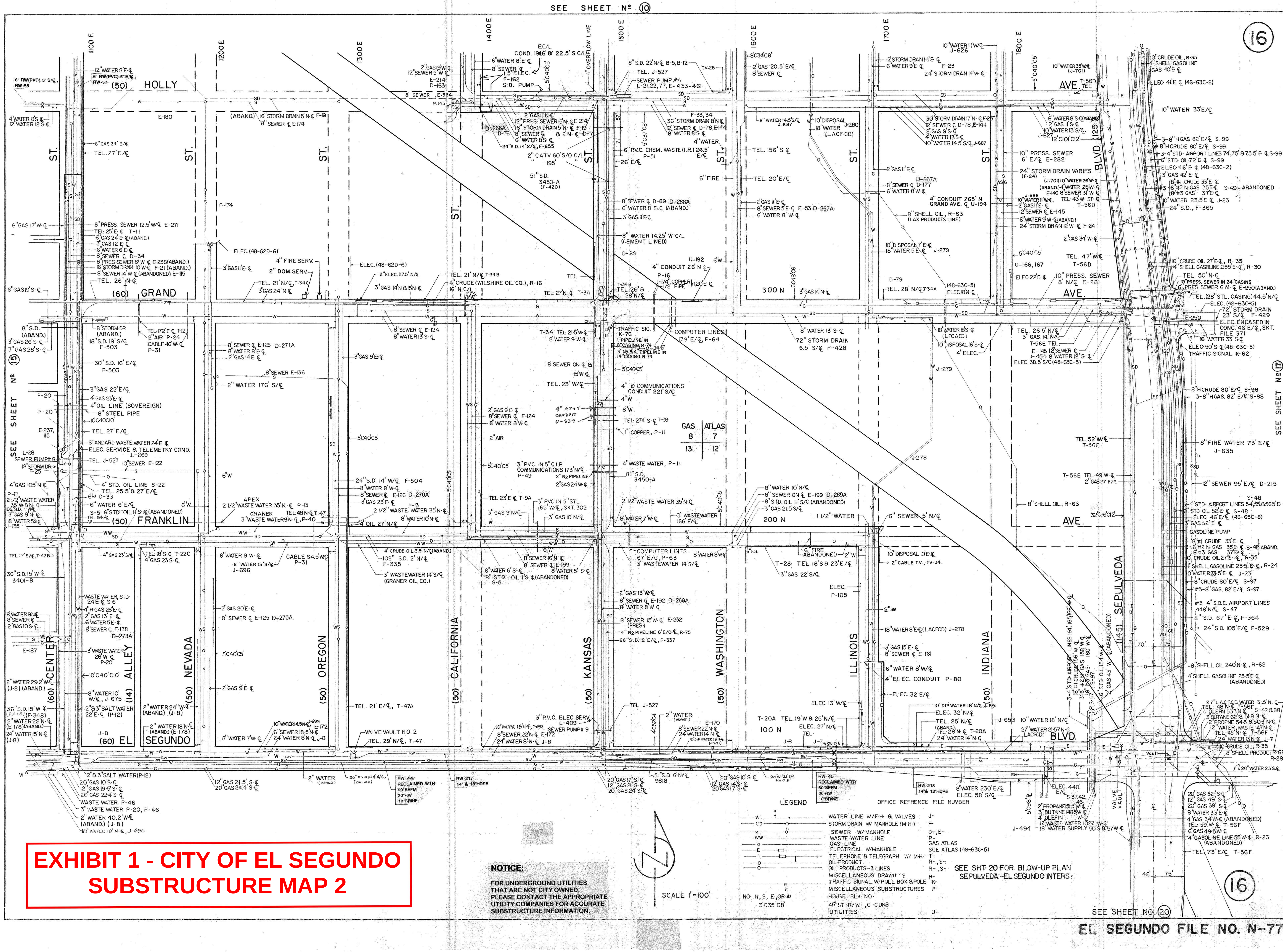
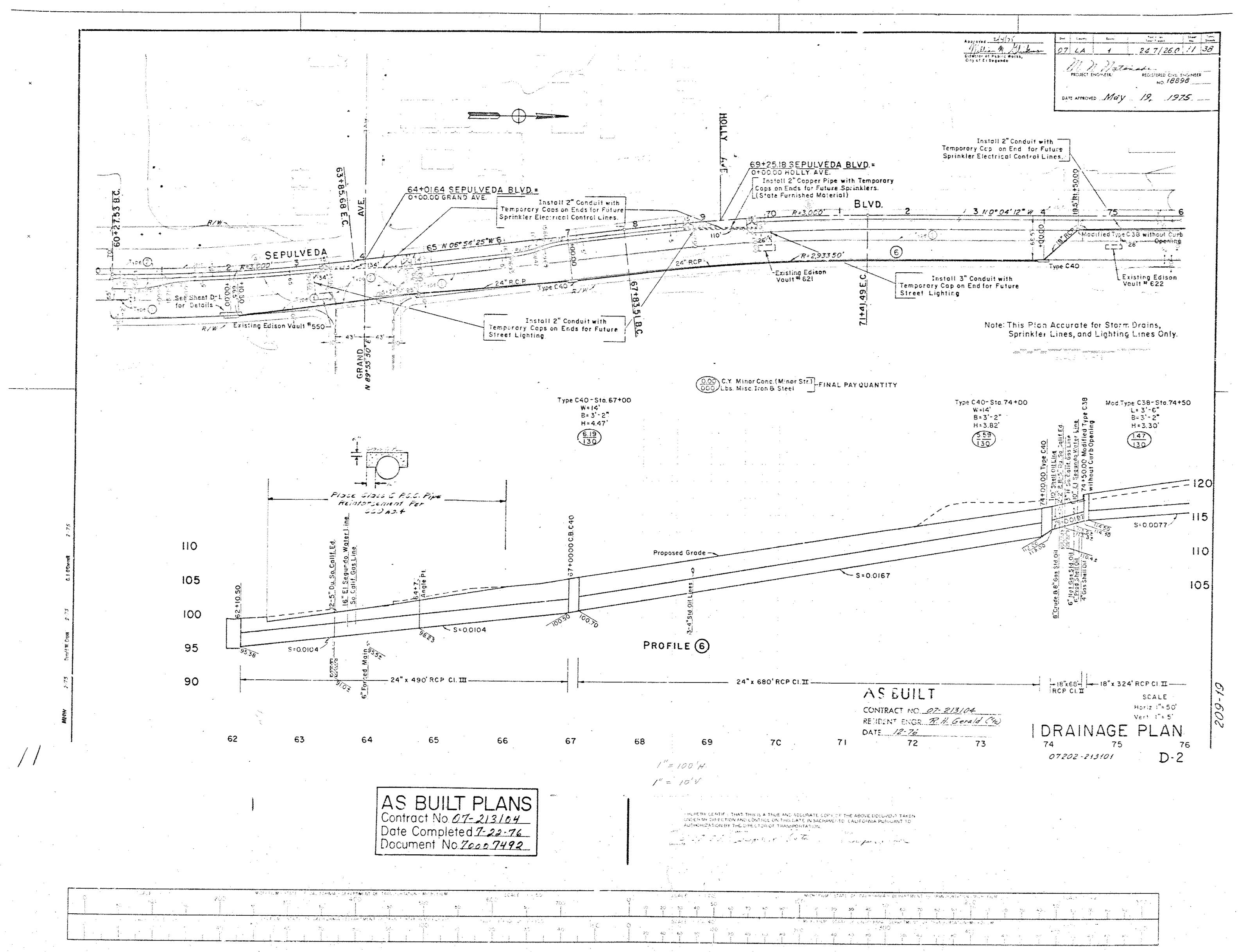


EXHIBIT 1 - CITY OF EL SEGUNDO SUBSTRUCTURE MAP 2

EXHIBIT 2 - STORM DRAIN RECORD PLANS

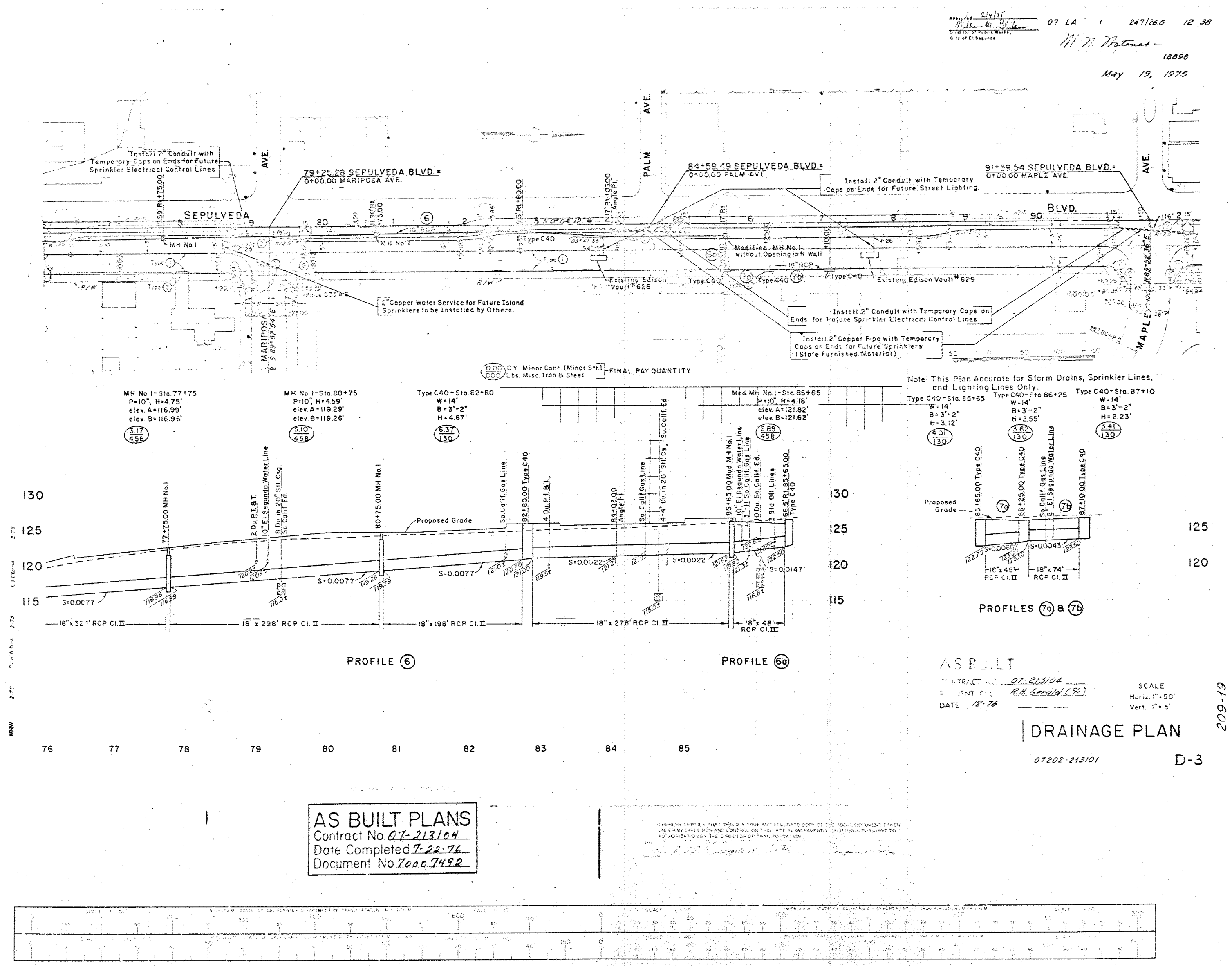
CALTRANS | F-365



F-365

EXHIBIT 2 - STORM DRAIN RECORD PLANS

CALTRANS | F-366

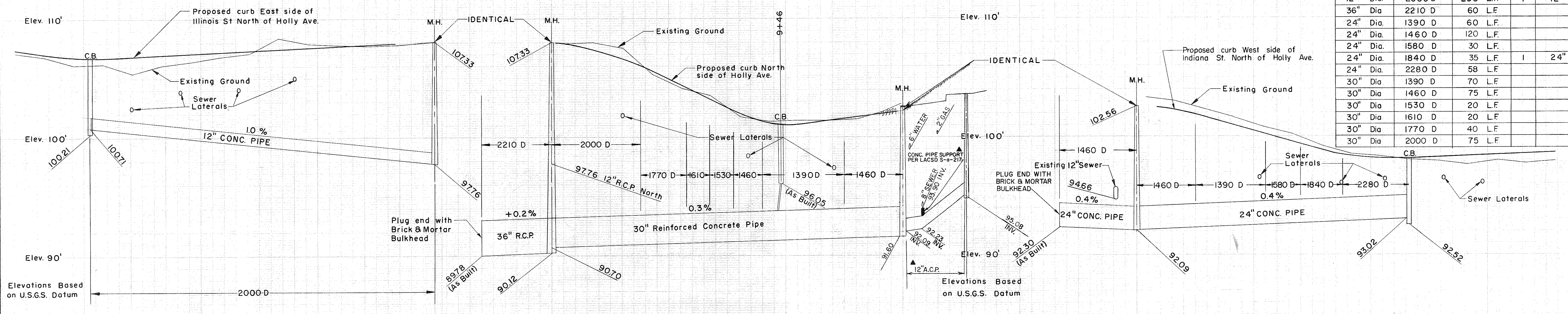


F-366

EXHIBIT 2 - STORM DRAIN RECORD PLANS

CITY OF EL SEGUNDO | F-23

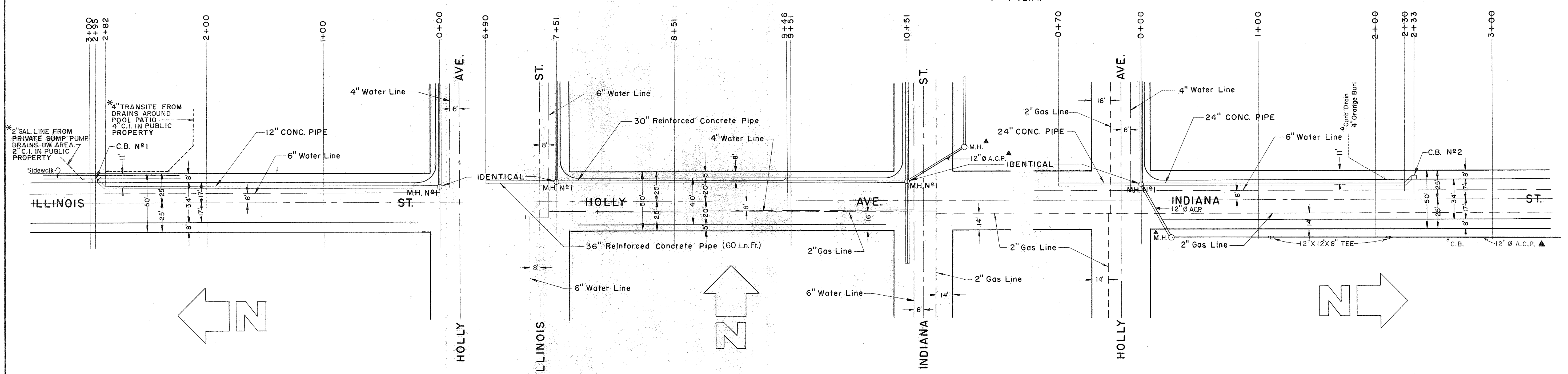
BILL OF MATERIAL				
D-LOAD SCHEDULE			45° BENDS	
PIPE SIZE	D-LOAD	LENGTH	Nº	SIZE
12" Dia.	2000 D	295 L.F.	1	12"
36" Dia	2210 D	60 L.F.		
24" Dia.	1390 D	60 L.F.		
24" Dia.	1460 D	120 L.F.		
24" Dia.	1580 D	30 L.F.		
24" Dia.	1840 D	35 L.F.	1	24"
24" Dia.	2280 D	58 L.F.		
30" Dia	1390 D	70 L.F.		
30" Dia	1460 D	75 L.F.		
30" Dia	1530 D	20 L.F.		
30" Dia	1610 D	20 L.F.		
30" Dia	1770 D	40 L.F.		
30" Dia	2000 D	75 L.F.		



STATION	2+95	2+50	2+00	1+50	1+00	0+50	0+00	6+91.5	7+51	8+00	8+50	9+00	9+46	10+00	10+51
GROUND ELEV.	106.71	106.87	107.11	107.35	107.59	107.83	108.07	113.69	108.07	107.00	104.87	102.50	101.12	101.56	102.51
INVERT ELEV.	100.71	100.26	99.76	99.26	98.76	98.26	97.76	90.00	90.70	90.85	91.00	91.15	91.29	91.45	91.60
CUT	6.00	6.61	7.35	8.09	8.83	9.57	10.31	23.69	17.37	16.15	13.87	11.35	9.83	10.11	10.91

STATION	0+66	0+00	0+50	1+00	1+50	2+00	2+33
GROUND ELEV.	102.49	102.51	101.88	100.41	99.03	98.15	98.09
INVERT ELEV.	92.37	92.09	92.29	92.49	92.69	92.89	93.02
CUT	10.12	10.42	9.59	8.92	6.34	5.36	5.07

SCALE
1" = 40' HOR.
1" = 4' VERT.



NOTE:

Nearest U.S.G.S. B.M. top of hydrant at N.E. Corner of Kansas & Holly Elev. 96.355

Structure numbers refer to Los Angeles County Flood Control District Standard Drawings of Jan. 1957, copies of which are on file in the office of the City Engineer.

REVISIONS		
NO.	DATE	BY
1	7-18-58 R.C.N.	AS BUILT
✳	6·23·64	H.L.M.
△	9·29·64	H.L.M.
▲	3·2·79	R.B.

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DEPARTMENT

STORM DRAIN
INDIANA, ILLINOIS, & HOLLY

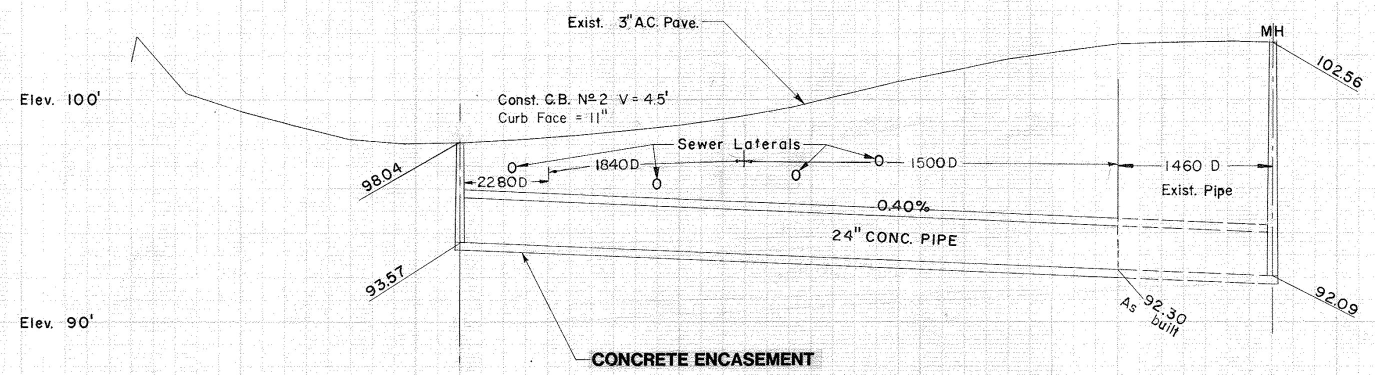
SURVEY City DATE 10-9-57
DESIGN J.C. DATE 10-16-57
PLANS R.C.N. DATE 12-16-57
CHECK JHA DATE 12-26-57

APPROVED DATE DEC 31 57
CITY ENGINEER R. E. 6998

SHEET 5 OF 6
JOB NO. 57-5

FILE NO. F - 23

EXHIBIT 2 - STORM DRAIN RECORD PLANS
CITY OF EL SEGUNDO | F-24



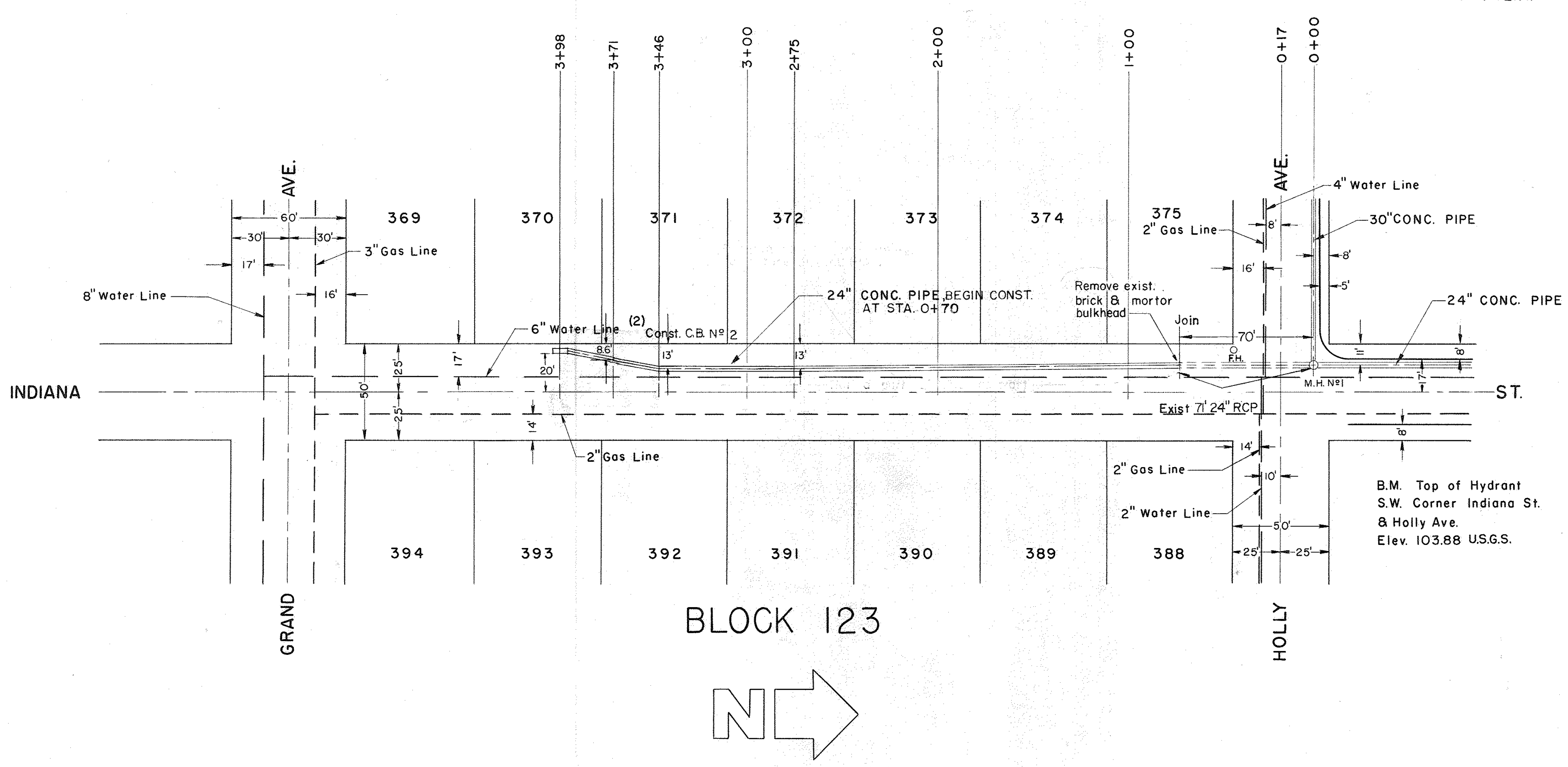
Elevations based on
U.S.G.S. Datum

Note:
Nearest U.S.G.S. B.M. top of hydrant
at N.E. corner of Kansas & Holly
Elev. 96.355

STATION	3+71	3+00	2+50	2+00	1+50	1+00	0+50	0+00
GROUND ELEVATION	98.04	98.65	99.12	100.10	101.21	102.10	102.55	102.56
INVERT ELEVATION	93.57	93.29	93.09	92.89	92.69	92.49	92.29	92.09
CUT	4.47	5.36	6.03	7.21	8.52	9.61	10.26	10.47

SCALE
1" = 40' HOR.
1" = 4' VERT.

Field Book 93 Pgs. 60 & 61



REVISIONS		
NO.	DATE	BY
1	8-18-58	M.D.
2	11-26-58	J.H.A. G.J.B.

Show as built 24" pipe location STA 3+98

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DEPARTMENT

STORM DRAIN
INDIANA, ILLINOIS, & HOLLY

SURVEY CITY DATE 10-9-57
DESIGN J.C. DATE 10-16-57
PLANS R.C.N. DATE 12-16-57
CHECK J.H.A. DATE 8-25-58

APPROVED DATE DEC 31 '57
CITY ENGINEER R. E. 6998

SHEET 2 OF 3
JOB NO. 58-14

FILE NO. F-24

EXHIBIT 3 - SEWER RECORD PLANS
D-78

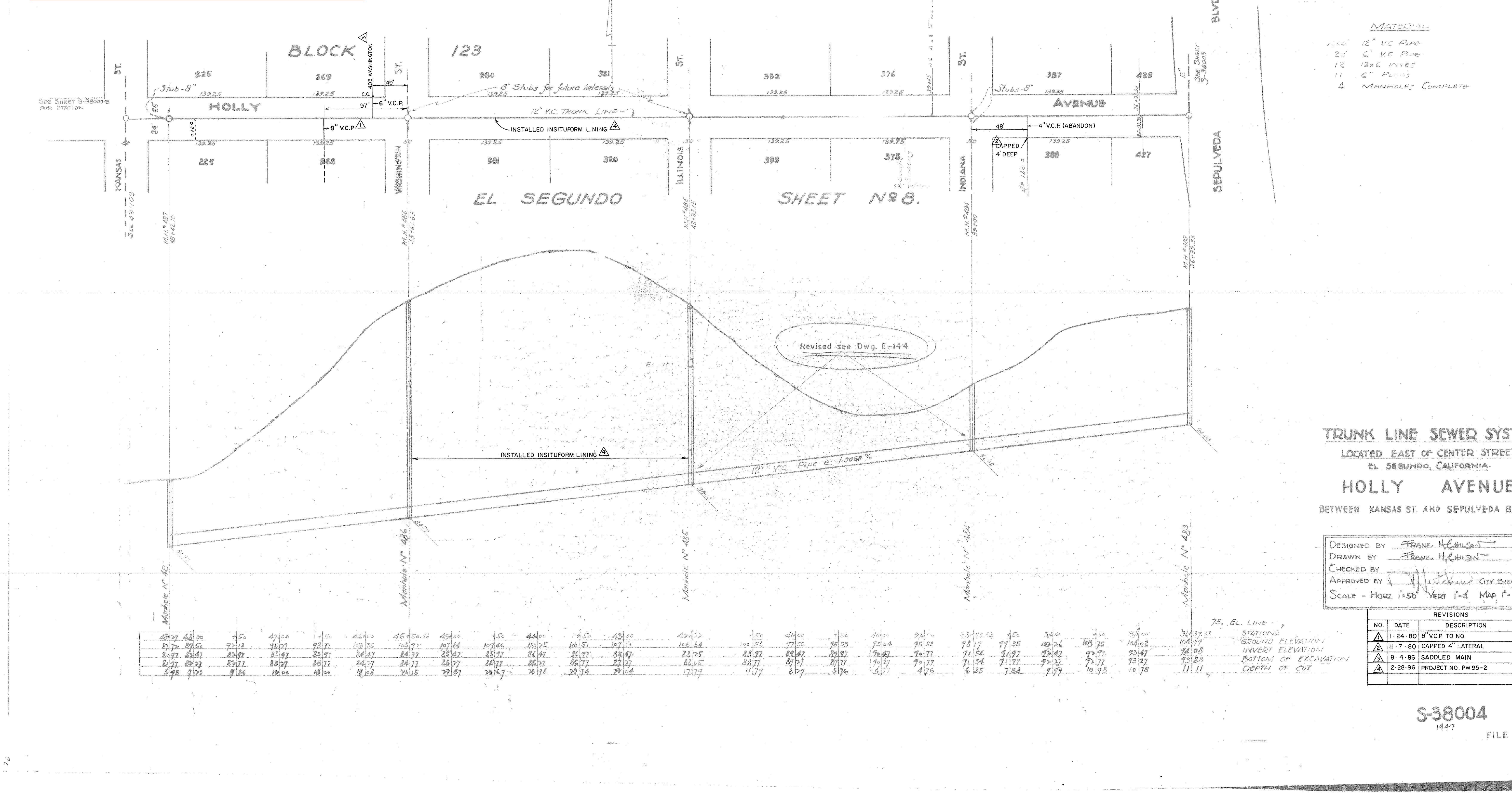
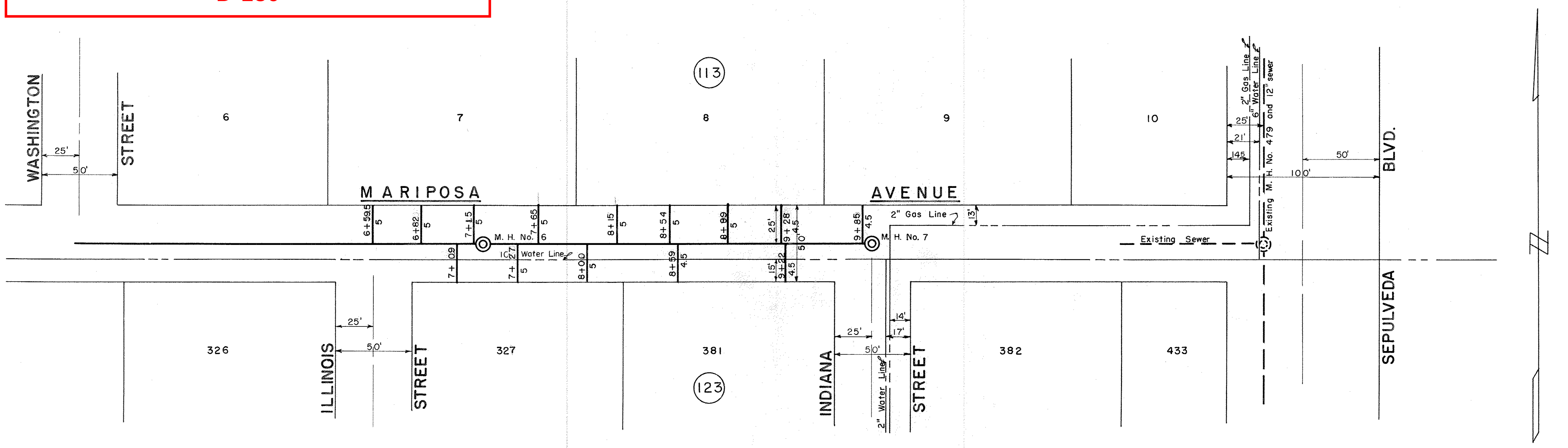
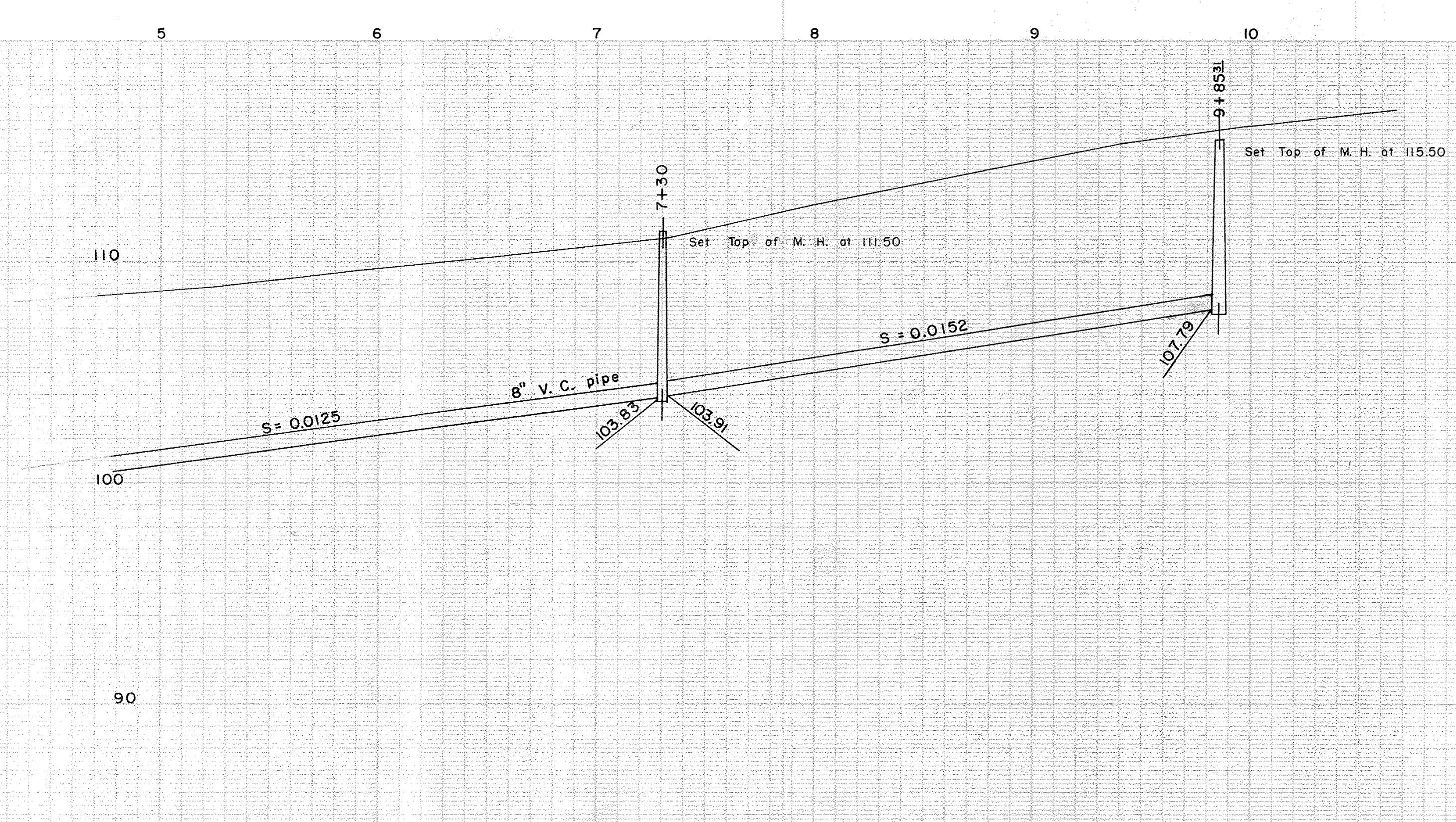


EXHIBIT 3 - SEWER RECORD PLANS
D-130





F.B. 82 pp. 62-64

SCALE
Hor. 1" = 40'
Vert. 1" = 4'

Designed by W.J.S. 4-17-52
Drawned by T.S.S. 1-23-52
Checked by D.R.S. 1-26-53

Approved by Donald C. Abbott
City Engineer

Approval date Jan. 26, 1953

Adopted by the City Council of the City of El Segundo, California on January 28th, 1953.

Neva M. Elsey
City Clerk

Dwg. No. 520320

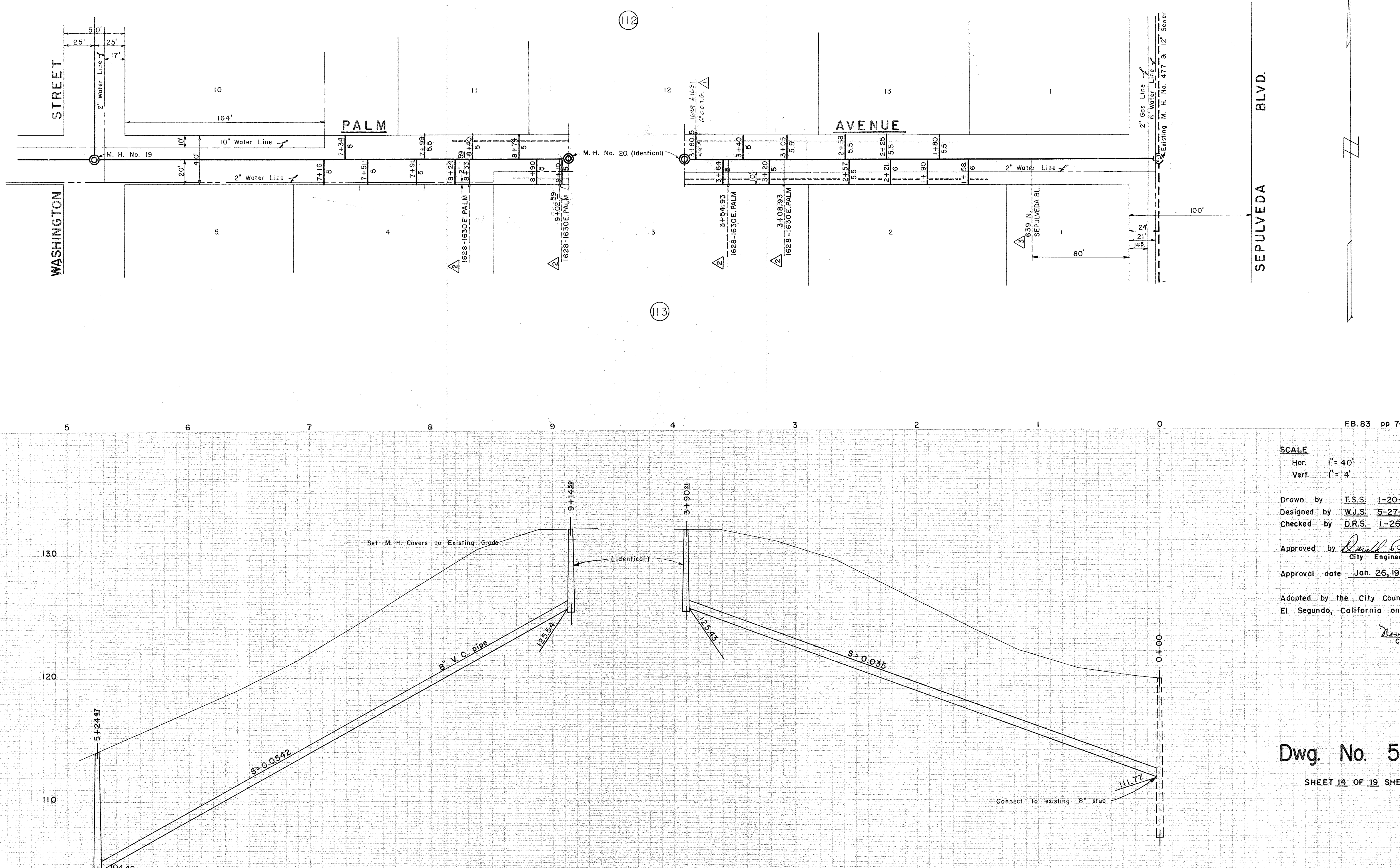
SHEET 10 OF 19 SHEETS

Station	5+00	5+50	6+00	6+50	7+00	7+50	8+00	8+50	9+00	9+50	10+00
Ground Elev.	108.7	109.1	109.7	110.2	110.7	111.4	112.6	113.6	114.6	115.5	116.2
Invert Elev.	100.95	101.58	102.20	102.83	103.45	104.21	104.97	105.73	106.49	107.25	
Cut	7.7	7.5	7.5	7.4	7.2	7.2	7.6	7.9	8.1	8.2	

MARIPOSA AVENUE SEWER LATERAL

FILE NO. D-130

EXHIBIT 3 - SEWER RECORD PLANS
D-151



Station	5+50	6+00	6+50	7+00	7+50	8+00	8+50	9+00	3+50	3+00	2+50	2+00	1+50	1+00	0+50	0+00
Ground Elev.	115.1	117.3	119.5	122.0	125.0	128.1	130.8	132.0	131.7	130.5	128.6	126.1	123.7	121.6	120.4	119.8
Invert Elev.	105.78	108.49	111.20	113.91	116.62	119.33	122.04	124.75	124.02	122.27	120.52	118.77	117.02	115.27	113.52	111.77
Cut	9.3	8.8	8.3	8.1	8.4	8.8	8.8	7.2	7.7	8.2	8.1	7.3	6.7	6.3	6.9	8.0

F.B. 83 pp 7-8

SCALE
Hor. 1" = 40'
Vert. 1" = 4'

Drawn by T.S.S. 1-20-53
Designed by W.J.S. 5-27-52
Checked by D.R.S. 1-26-53

Approved by Donald C. Short
City Engineer

Approval date Jan. 26, 1953

Adopted by the City Council of the City of El Segundo, California on JANUARY 28TH, 1953.

Neva M. Elsey
City Clerk

Dwg. No. 520320

SHEET 14 OF 19 SHEETS

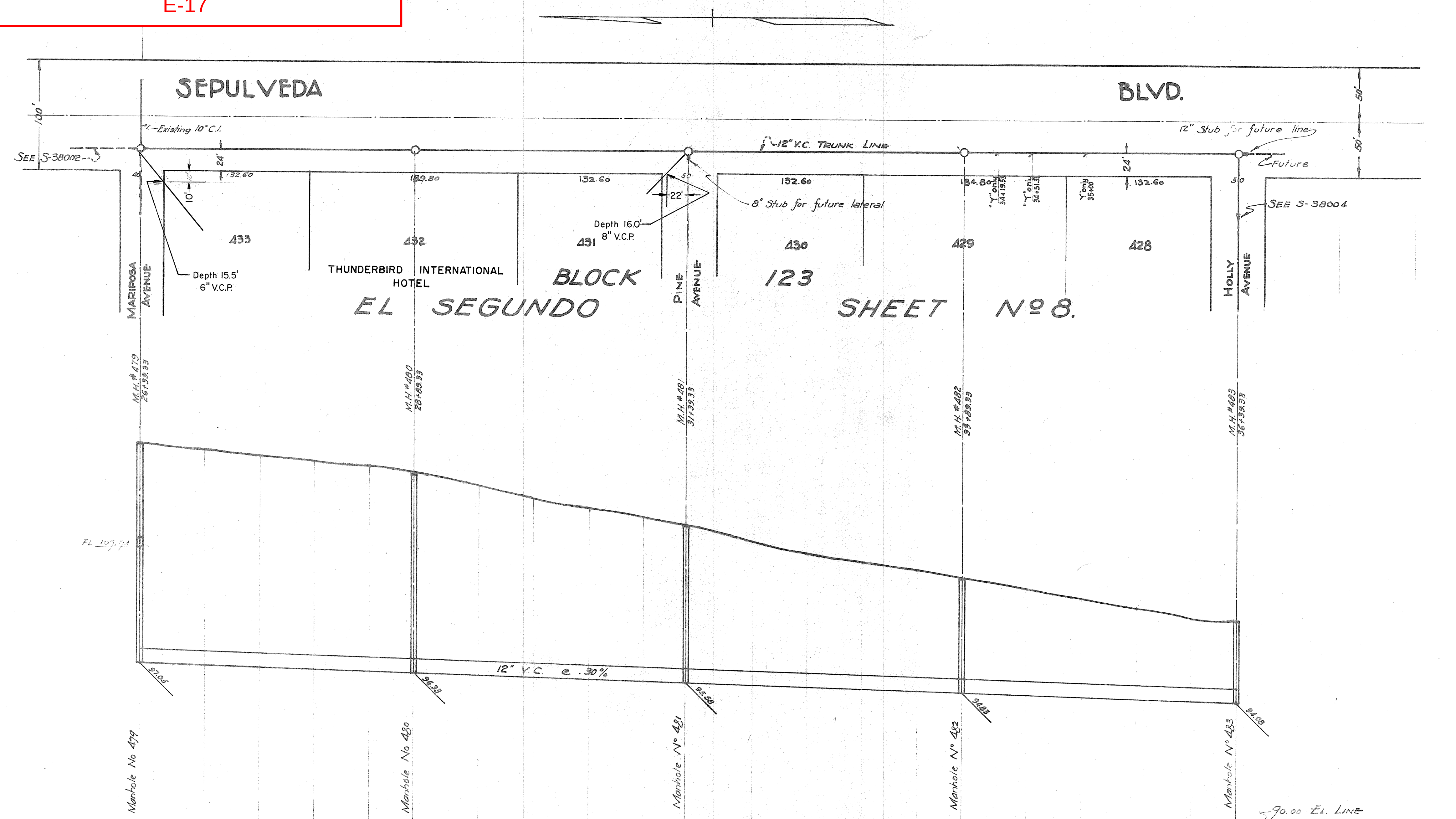
3	11-24-97	G.M.
2	9-6-94	G.E.G.
1	10-22-91	C.B.W.

PALM AVENUE SEWER LATERAL

FILE NO. D-151

EXHIBIT 3 - SEWER RECORD PLANS

E-17



26+39.33	27+00	+50	28+00	+50	+89.33	+50	30+00	+50	31+00	31+39.33	32+00	+50	33+00	+50	+89.33	+50	35+00	+50	36+00	36+39.33	STATIONS
117 65	117 57	117 13	116 71	116 24	115 67	114 72	113 81	112 99	112 23	111 58	110 55	109 78	109 19	108 53	108 00	107 20	106 61	105 88	105 06	104 99	SURFACE ELEVATIONS
97 05	96 90	96 75	96 60	96 45	96 33	96 15	96 00	95 85	95 70	95 58	95 40	95 25	95 10	94 95	94 83	94 65	94 50	94 35	94 20	94 08	INVERT ELEVATIONS
96 85	96 70	96 55	96 40	96 25	96 13	95 95	95 80	95 65	95 50	95 38	95 20	95 05	94 90	94 75	94 63	94 45	94 30	94 15	94 00	93 88	BOTTOM OF EXCAVATION
21 25	20 97	20 66	20 45	20 18	19 41	19 00	18 23	17 5[illegible]	16 79	16 64	15 59	14 96	14 47	13 99	13 37	12 94	12 40	11 81	11 15	11 11	DEPTH OF CUT

TRUNK LINE

1000	12" V.C. PIPE	
4	MANHOLES	COMPLETE
2	12x6 WYES	
2	6" STOPPERS	

TRUNK LINE SEWER SYSTEM

LOCATED EAST OF CENTER STREET

EL SEGUNDO, CALIFORNIA.

SEPULVEDA BOULEVARD.

BETWEEN MARIPOSA AVE. & HOLLY AVE.

DESIGNED BY Frank H. Chilson

DRAWN BY Frank H. Chilson

CHECKED BY

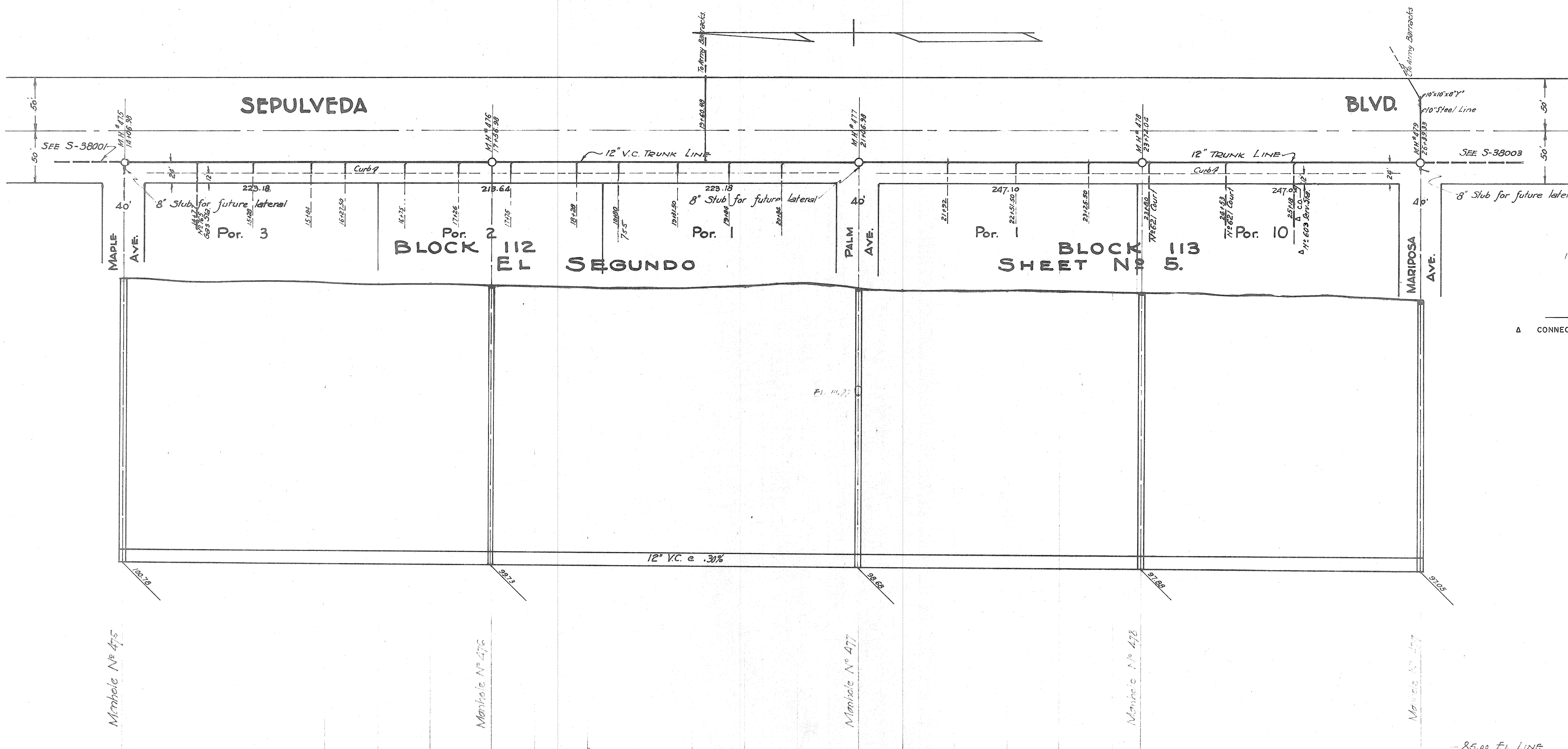
APPROVED BY [signature] CITY ENGINEER

SCALE - HORZ 1"=50' VERT 1"=4' MAP 1"=50'

S-38003

FILE NO. E-17

EXHIBIT 3 - SEWER RECORD PLANS
E-18



14+06.98	+50	15+00	+50	16+00	+50	17+00	17+56.98	18+00	+50	19+00	+50	20+00	+50	21+06.98	+50	22+00	+50	23+00	+50	23+74.04	+50	25+00	+50	26+00	26+39.33	STATIONS
121.84	121.75	121.63	121.46	121.27	121.10	120.91	121.66	120.46	120.25	120.15	119.98	119.80	119.68	119.54	119.32	119.05	118.87	118.82	118.62	118.	118.21	118.06	117.93	117.75	117.65	SURFACE ELEVATIONS
100.78	100.65	100.50	100.35	100.20	100.05	99.90	99.73	99.60	99.45	99.30	99.15	99.00	98.85	98.68	98.55	98.40	98.25	98.10	97.95	97.88	97.65	97.50	97.35	97.20	97.05	INVERT ELEVATIONS
100.58	100.45	100.30	100.13	100.00	99.85	99.70	99.53	99.40	99.25	99.10	98.95	98.80	98.65	98.48	98.35	98.20	98.05	97.90	97.75	97.	97.45	97.30	97.15	97.00	96.85	BOTTOM OF EXCAVATION
22.94	21.46	21.43	21.44	21.47	21.46	21.45	21.35	21.24	21.19	21.18	21.26	21.21	22.27	21.22	21.17	21.08	21.13	21.13	21.11	21.13	21.08	21.07	21.09	21.16	21.07	DEPTH OF CUT

TRUNK LINE

1235' 12" V.C. Pipe
4 Manholes Complete

REVISIONS

Δ CONNECTION 1-5-67 W.B.B.

TRUNK LINE SEWER SYSTEM

LOCATED EAST OF CENTER STREET
EL SEGUNDO, CALIFORNIA

SEPULVEDA BOULEVARD

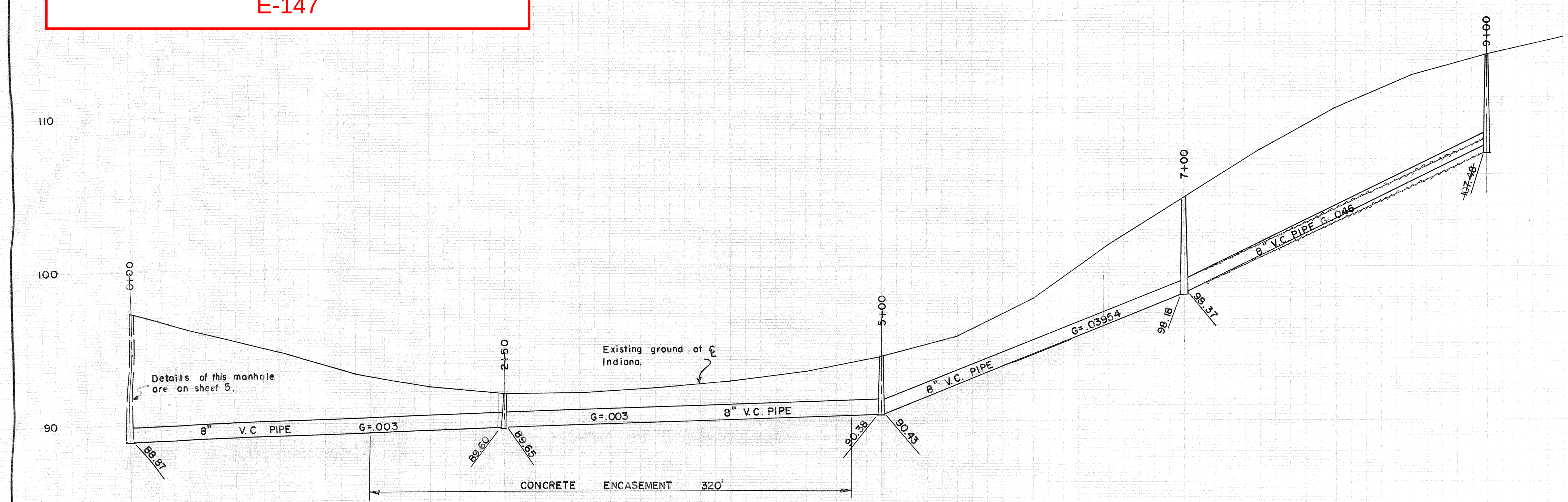
BETWEEN MAPLE AVENUE AND MARIPOSA AVENUE.

Designed by Frank H. Chasson
Drawn by Frank H. Chasson
Checked by
Approved by [signature] City Engineer
Scale - Horz 1"=50' Vert 1"=4'

S 38002

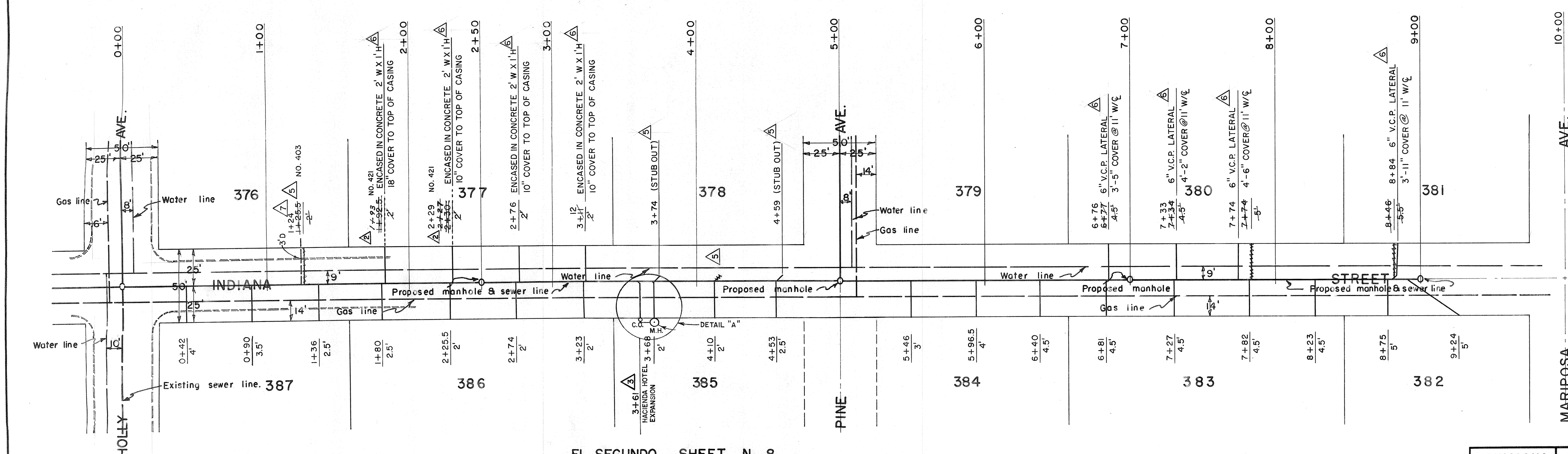
FILE NO E

EXHIBIT 3 - SEWER RECORD PLANS
E-147



STATION	0+00	0+50	1+00	1+50	2+00	2+50	3+00	3+50	4+00	4+50	5+00	5+50	6+00	6+50	7+00	7+50	8+00	8+50	9+00
GROUND ELEV.	97 10	95 80	94 60	93 20	92 30	91 80	91 80	92 20	92 60	93 20	94 20	95 40	97 90	101 40	104 50	107 60	110 30	112 40	113 80
INVERT ELEV.	88 87	89 01	89 16	89 31	89 46	89 60	89 79	89 94	90 09	90 24	90 40	92 33	94 31	96 29	98 27	100 60	102 92	105 24	107 48
CUT	8 23	6 79	5 44	3 89	2 84	2 20	2 01	2 26	2 51	2 96	3 80	3 07	3 59	5 11	6 23	7 00	7 38	7 16	6 32

SCALE
HOR. 1" = 40'
VER. 1" = 4'

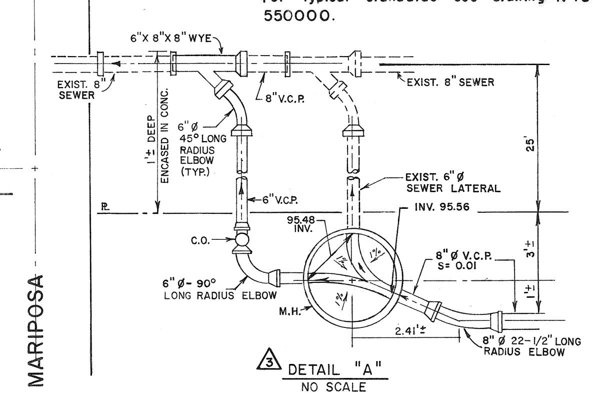


NOTE

Adopted by the City Council of the City of El Segundo, California on July 9th 1956

City Clerk

For typical standards see drawing Nº. ST-550000.



DETAIL "A"
NO SCALE

EL SEGUNDO SHEET No. 8
M.B. 22—106 & 107
BLOCK 123

REVISIONS			
	NO.	DATE	BY
SEWER CONNECTION	1	6-21-56	J.H.A.
	2	5/5/64	H.L.M.
HACIENDA HOTEL EXPANSION	3	3·2·79	R.B.
ADD MARIPOSA AVE.	4	12·15·80	M.D.
TV	5	3·3·81	P.S.M.
POTHOLED	6	3·10·81	R.B.
INSTALLED 10'-6" D.I.P. ACROSS 10" WATER LINE	7	5·7·82	R.B.

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DEPARTMENT

INDIANA STREET 8" SEWER LINE
HOLLY AVE. TO 400' FEET NORTH OF PINE AVE.

SURVEY T.L.B. DATE 12/1/55
DESIGN J.H.A. DATE 3/28/56
PLANS R.L.W. DATE 4/4/56
CHECK J.H.A. DATE 4/20/56

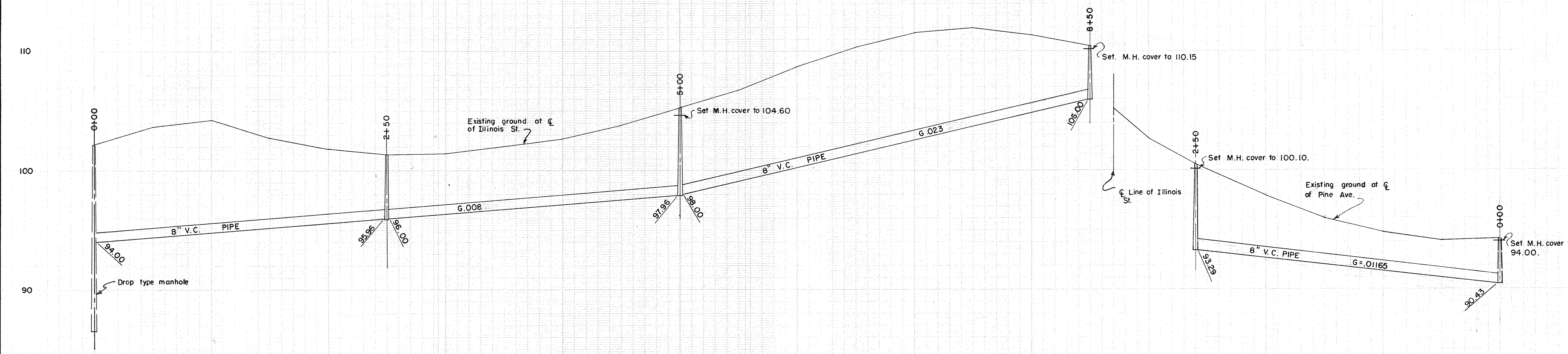
APPROVED DATE June 11 '56
CITY ENGINEER R.E. 6993

SHEET 8 OF 9
JOB NO. 560324

FILE NO. E-147

EXHIBIT 3 - SEWER RECORD PLANS

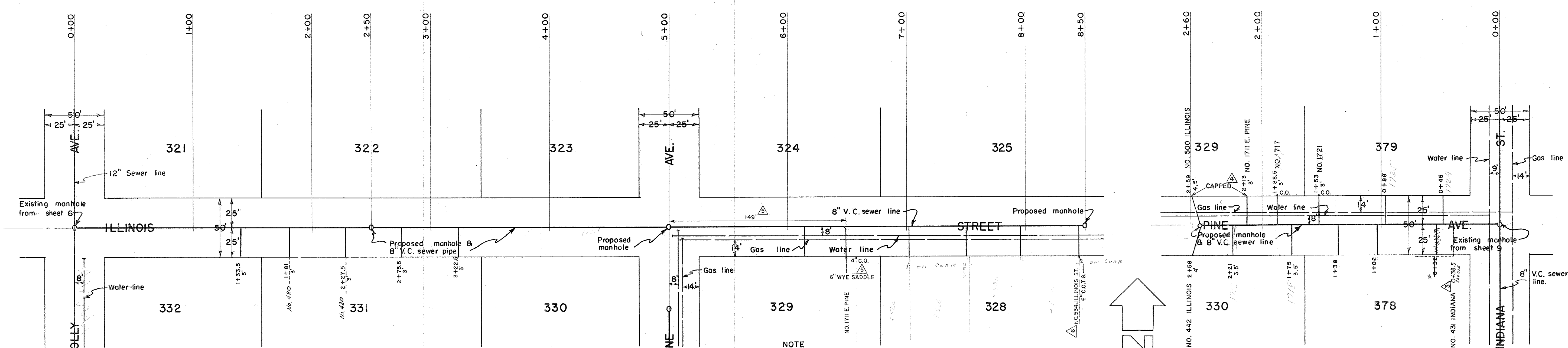
E-148



STATION	0+00	0+50	1+00	1+50	2+00	2+50	3+00	3+50	4+00	4+50	5+00	5+50	6+00	6+50	7+00	7+50	8+00	8+50
GROUND ELEV.	102.10	103.60	104.20	102.70	101.80	101.30	101.40	102.00	102.60	103.80	105.20	106.70	108.60	110.30	111.50	111.90	111.30	110.40
INVERT ELEV.	94.00	94.38	94.78	95.18	95.58	95.98	96.38	96.78	97.18	97.58	97.98	99.10	100.25	101.40	102.55	103.70	104.85	106.00
CUT	8.10	9.22	9.42	7.52	6.22	5.32	5.02	5.22	5.42	6.22	7.22	7.60	8.35	8.90	8.95	8.20	6.45	4.40

STATION	2+50	2+00	1+50	1+00	0+50	0+00
GROUND ELEV.	99.90	97.80	95.90	94.70	94.00	94.20
INVERT ELEV.	93.29	92.73	92.15	91.57	90.99	90.43
CUT	6.61	5.07	3.75	3.13	3.01	3.77

SCALE
HOR. 1" = 40'
VER. 1" = 4'



EL SEGUNDO SHEET No. 8
M.B. 22-106 & 107
BLOCK 123

NOTE

Adopted by the City Council of the City of El Segundo, California on JULY 9TH 1956

Neva M. Elsey
City Clerk

For typical standards see drawing Nº. ST-550000.

Add lateral stationing as per bldg. dept. plans.

REVISIONS		
NO.	DATE	BY
1	6-21-56	J.H.A.
2	9-28-62	H.L.M.
*	10-13-65	H.L.M.
4	3-26-81	R.B.
5	8-27-82	R.B.
6	5-29-90	C.E.W.

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DEPARTMENT

ILLINOIS STREET SEWER LINE
HOLLY AVE. TO 350 FT. NORTH OF PINE AVE.
PINE AVENUE 8" SEWER LINE
INDIANA STREET TO 260 FT. WEST

SURVEY T.L.B. DATE 12/1/55
DESIGN J.H.A. DATE 3/28/56
PLANS R.L.W. DATE 4/4/56
CHECK J.H.A. DATE 4/20/56

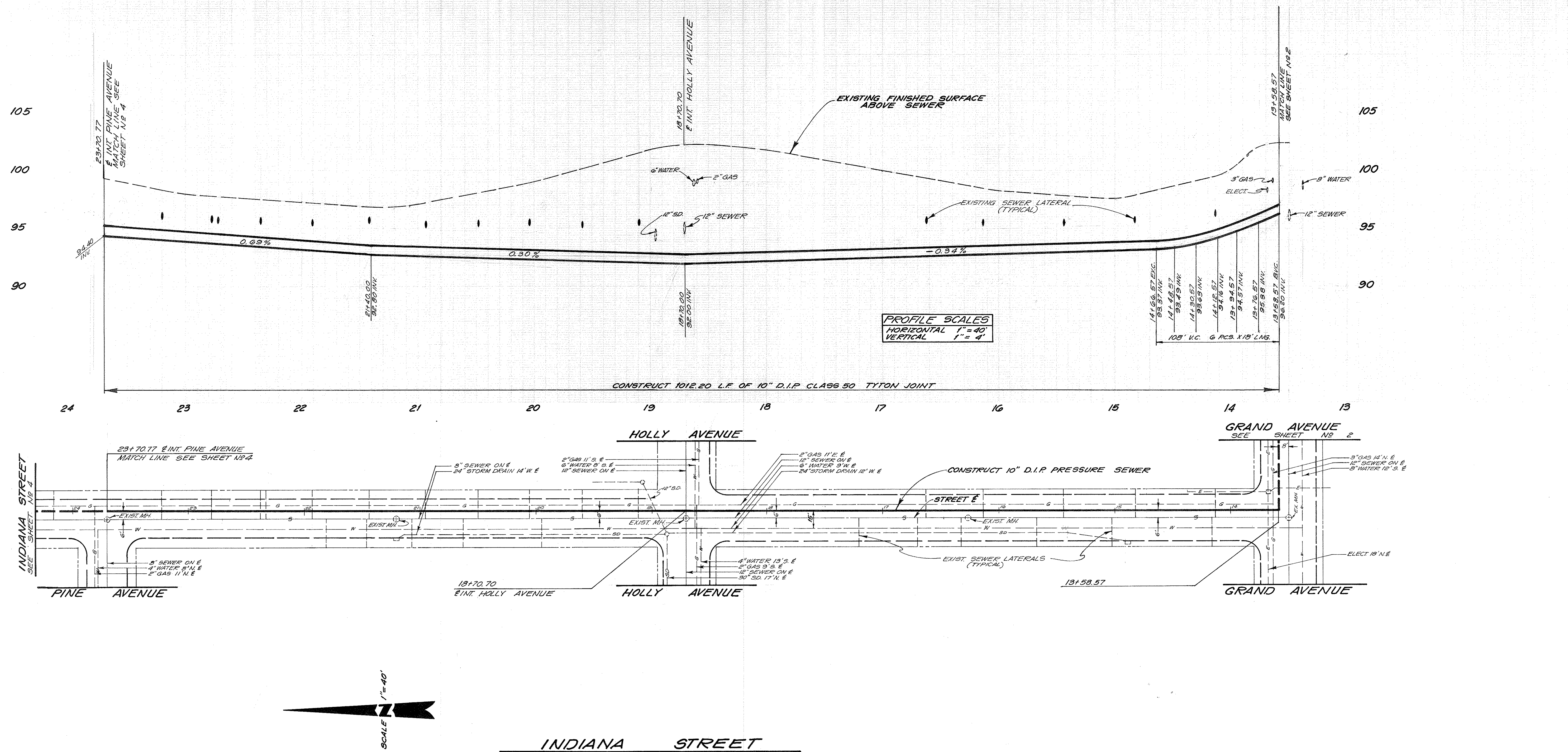
APPROVED DATE June 11 '56
Robert Lewell J.
CITY ENGINEER R. E. 6998

SHEET 9 OF 9

JOB NO. 560324

FILE NO. E-148

EXHIBIT 3 - SEWER RECORD PLANS
E-282



INDIANA STREET

AS BUILT

JUNE 10, 1981

PLANS PREPARED BY	REVISIONS			
Genge — GENGE CONSULTANTS, 17500 RED HILL AVENUE, IRVINE, CA 92714, (714) 754-6222	NO.	DATE	BY	
ENGINEERING • SURVEYING • PLANNING				
W. David Wagner — W. DAVID WAGNER — R.C.E. NO. 14379 DATE 7/31/79				

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DEPARTMENT

INDIANA STREET

STA. 13+58.57 TO STA. 23+70.77

SURVEY ____ DATE ____
DESIGN ____ DATE ____
PLANS ____ DATE ____
CHECK ____ DATE ____

APPROVED DATE 8/31/79
William M. Glickman
CITY ENGINEER R.E. 12187

SHEET 3 OF 6
JOB NO. 77-8

FILE NO. E-282

EXHIBIT 3 - SEWER RECORD PLANS

E-283

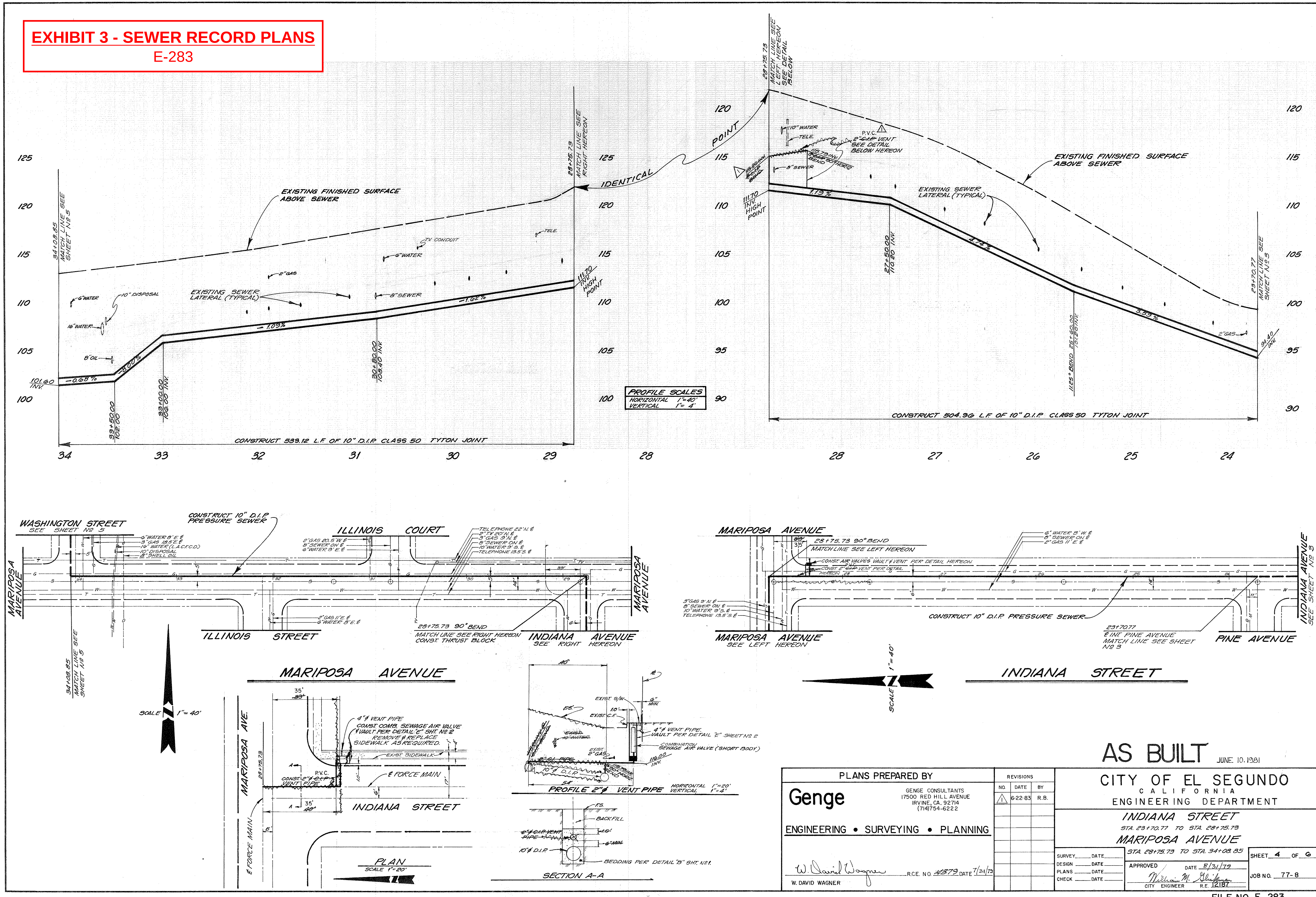
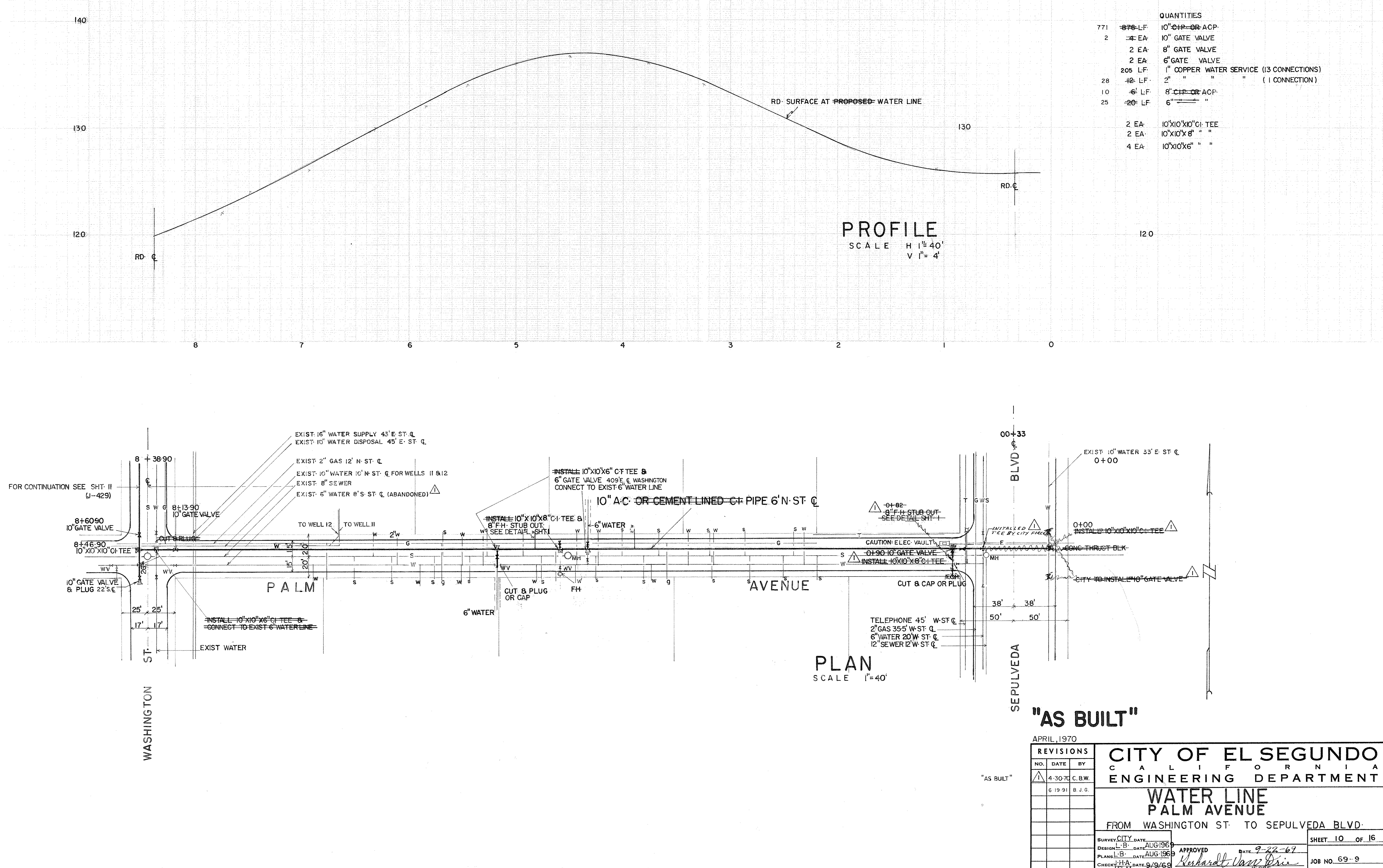


EXHIBIT 4 - WATER RECORD PLANS

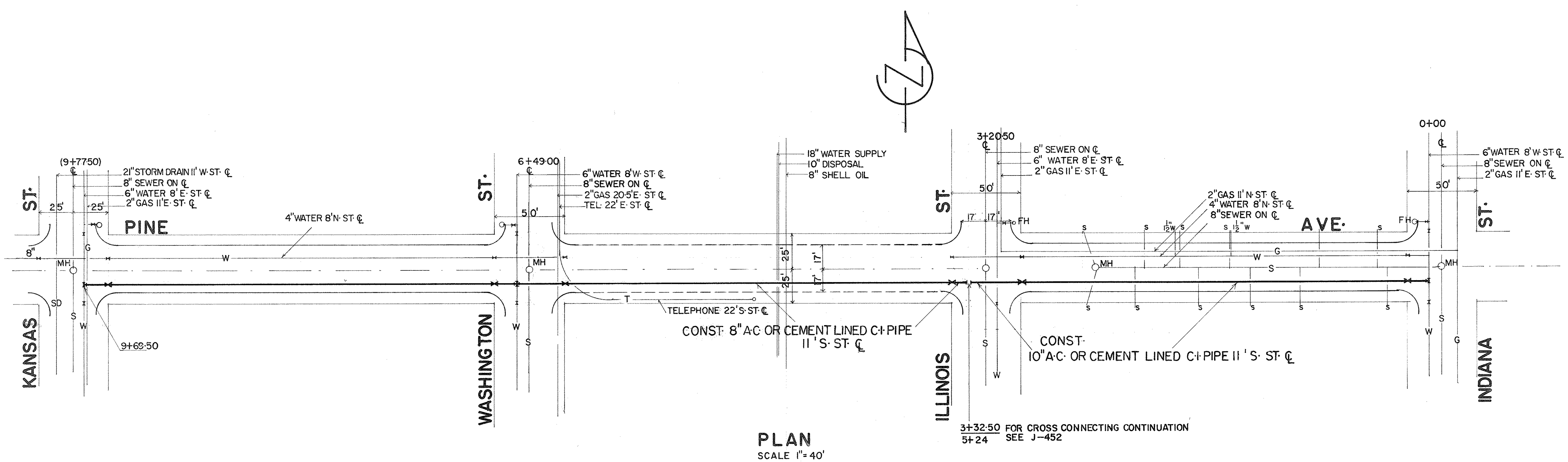
J-428



FILE NO. J-428

EXHIBIT 4 - WATER RECORD PLANS

J-455



REVISIONS		
NO.	DATE	BY

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DIVISION

WATER LINE
PINE AVENUE
FR. INDIANA ST. TO KANSAS ST.

SURVEY CITY DATE
DESIGN L.B. DATE NOV. 1969
PLANS L.B. DATE NOV. 1969
CHECK J.H.A. DATE NOV. 1969

APPROVED DATE

CITY ENGINEER R. E.

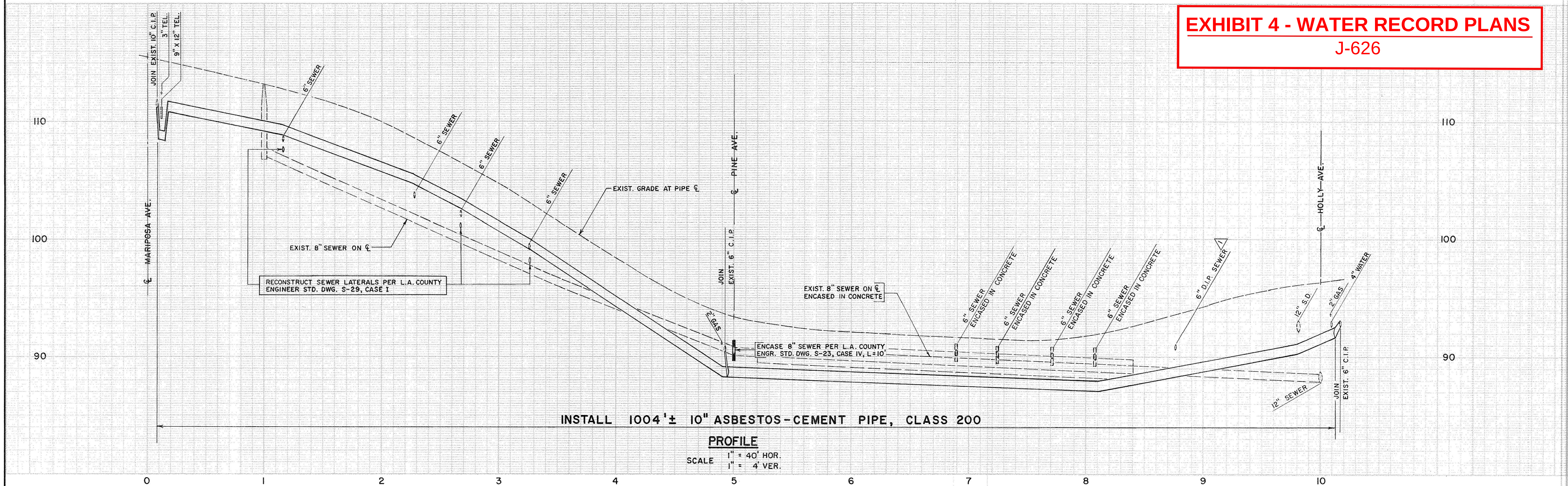
SHEET 10 OF

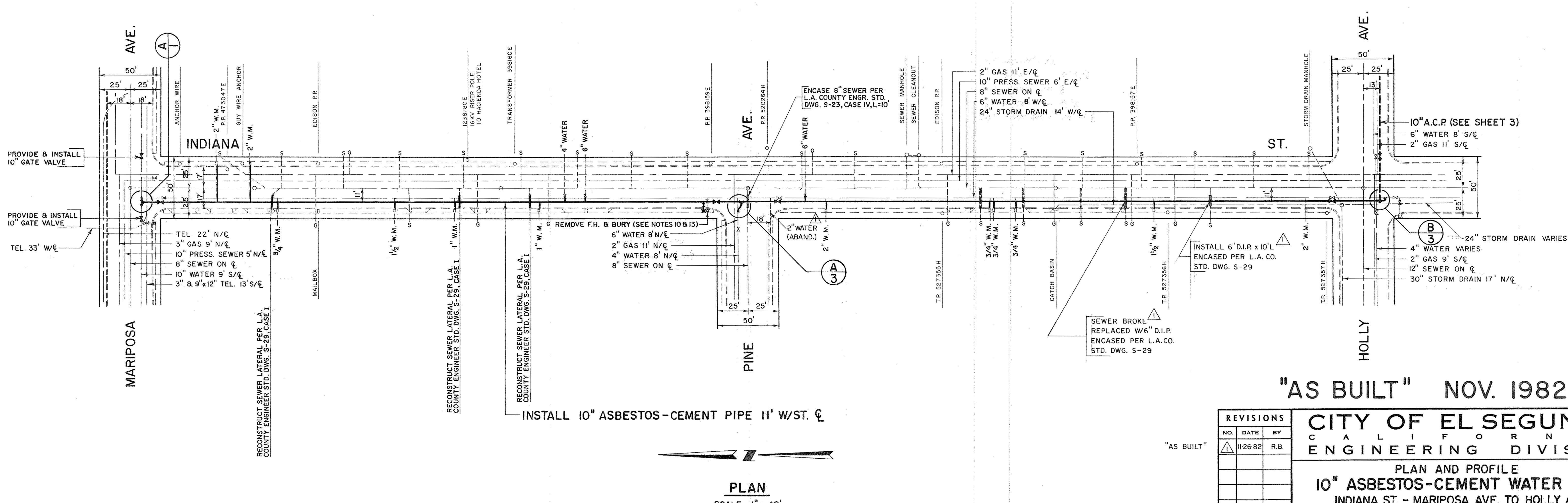
JOB NO.

FILE NO. J-455

EXHIBIT 4 - WATER RECORD PLANS

J-626





"AS BUILT" NOV. 1982

REVISIONS		
NO.	DATE	BY
1	11-26-82	R.B.

"AS BUILT"

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DIVISION

PLAN AND PROFILE
10" ASBESTOS-CEMENT WATER LINE
INDIANA ST. - MARIPOSA AVE. TO HOLLY AVE.

SURVEY City DATE 12-80
DESIGN R.B. DATE 3-11-81
PLANS M.D. R.B. DATE 3-16-81
CHECK H.E.T. J.H.A. DATE 3-24-81

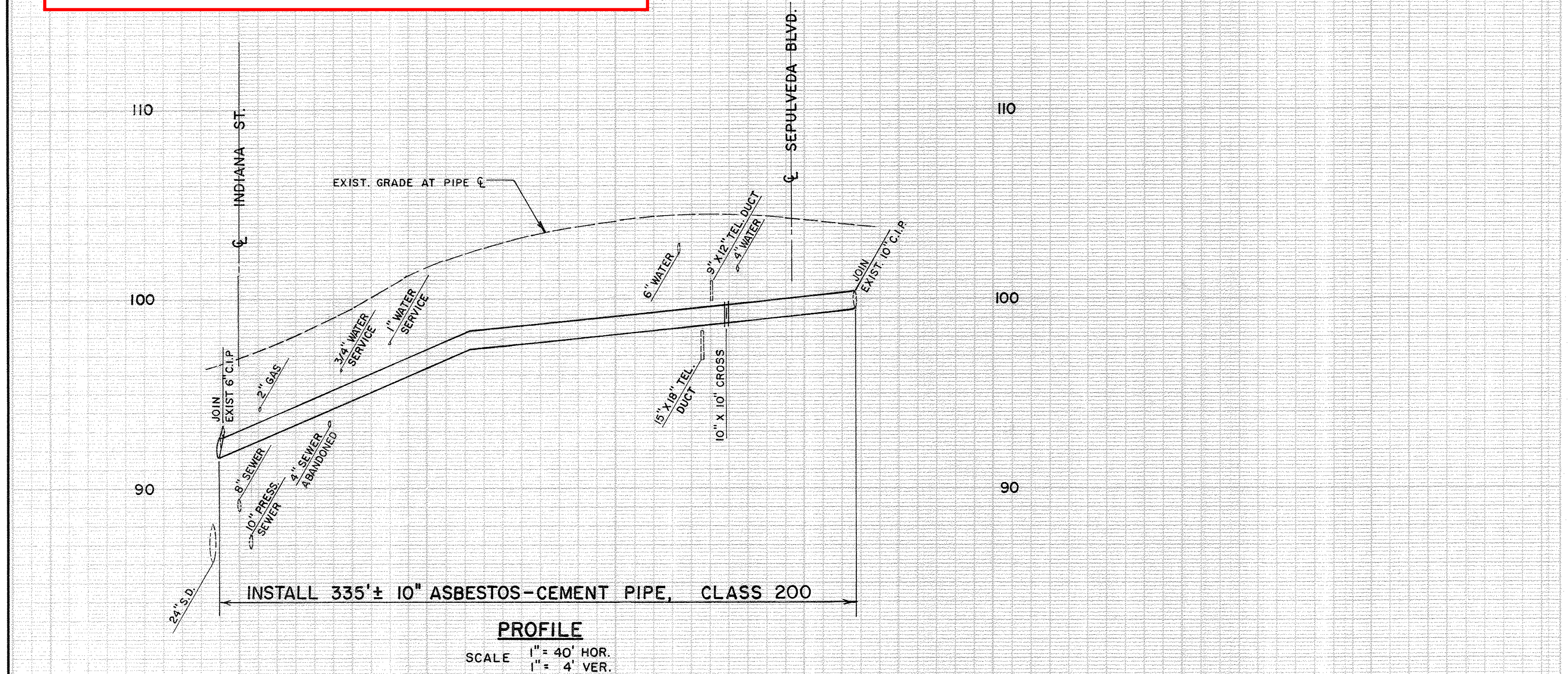
APPROVED DATE 1/19/82
William M. Glickman
CITY ENGINEER R.E. 12187

SHEET 2 OF 3
JOB NO. 80-16

FILE NO. J-626

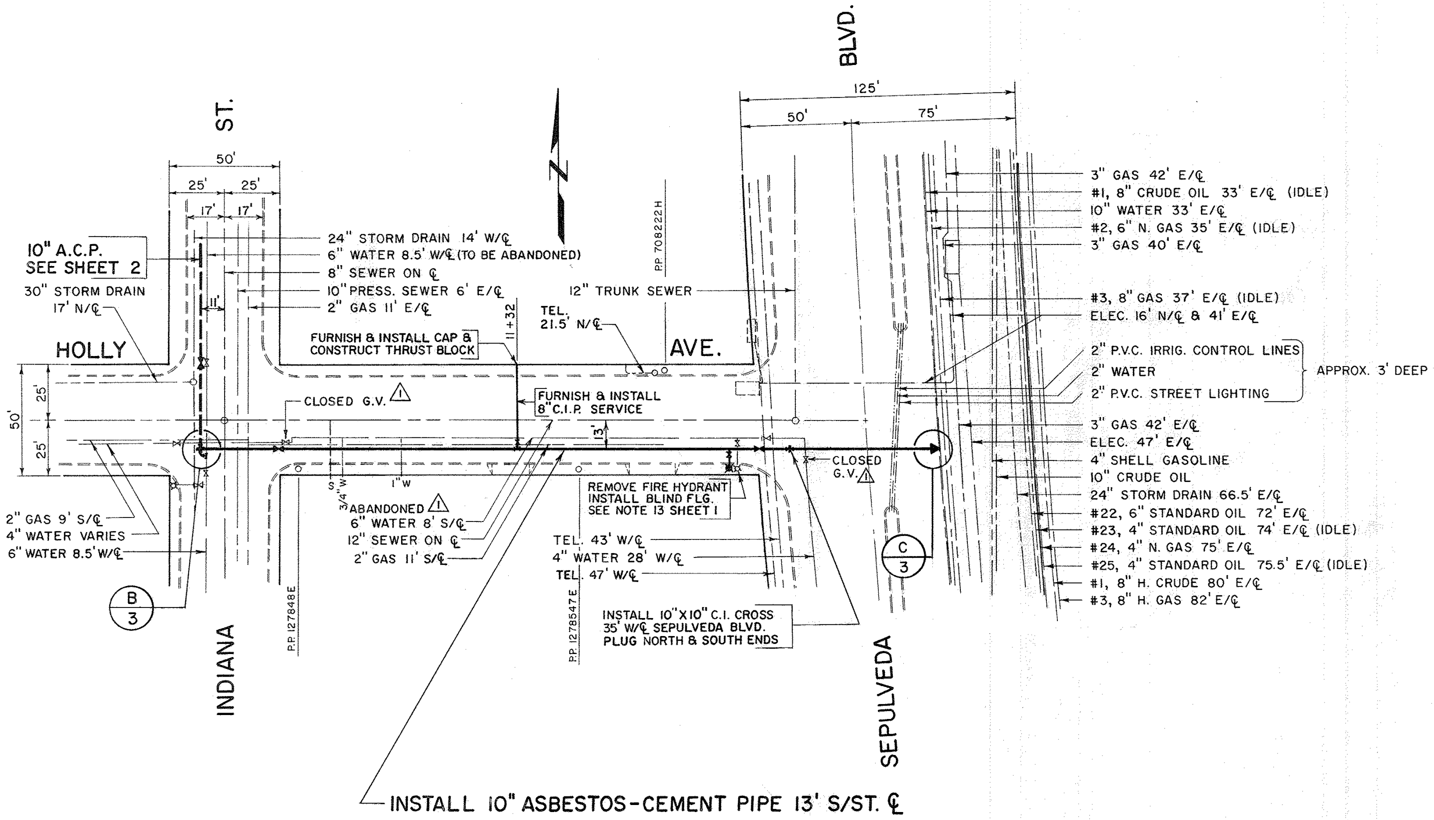
EXHIBIT 4 - WATER RECORD PLANS

J-627



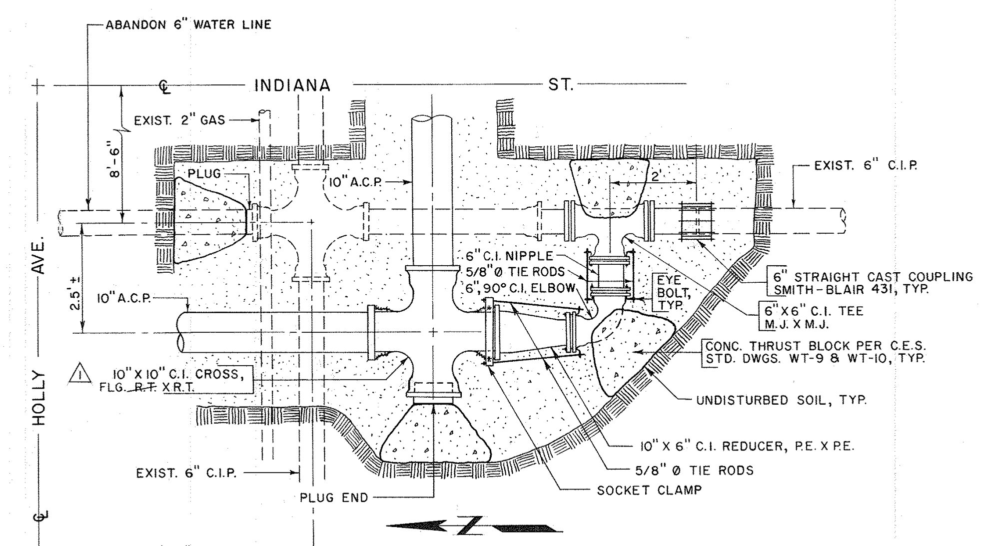
PROFILE

SCALE 1" = 40' HOR. 1" = 4' VER.



PLAN

SCALE 1" = 40"

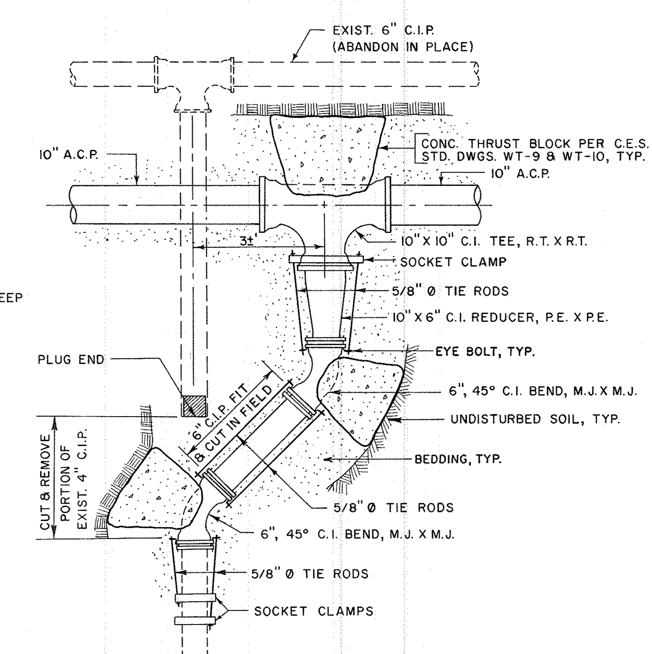


PLAN

SCALE 1/2" = 1'-0"

CONNECTION DETAIL (B/3)

TO 6" WATER LINE AT HOLLY AVENUE

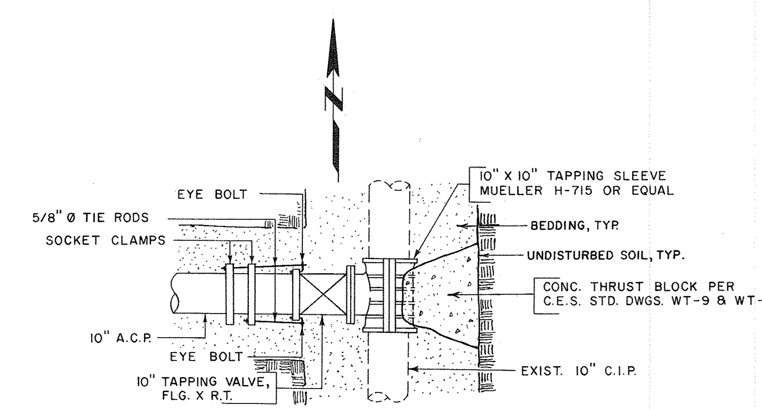


PLAN

SCALE 1/2" = 1'-0"

CONNECTION DETAIL (A/3)

TO 6" WATER LINE AT PINE AVENUE



PLAN

SCALE 1/2" = 1'-0"

CONNECTION DETAIL (C/3)

AT SEPULVEDA BLVD.

"AS BUILT" NOV. 1982

REVISIONS			
NO.	DATE	BY	
"AS BUILT"	11-26-82	R.B.	

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DIVISION

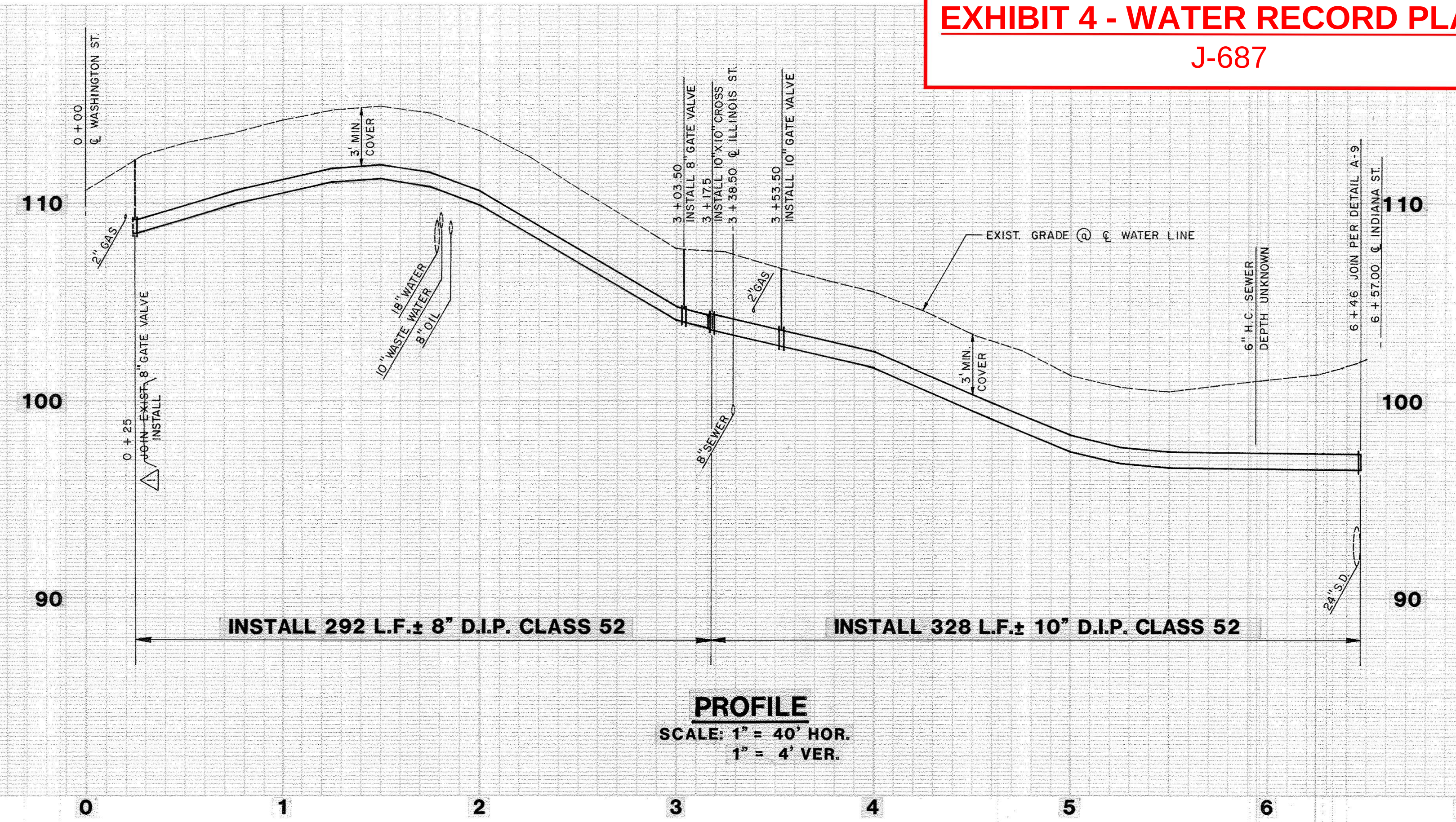
PLAN AND PROFILE
10" ASBESTOS-CEMENT WATER LINE
HOLLY AVE. - INDIANA ST. TO SEPULVEDA BLVD.

SURVEY City	DATE 12-80	APPROVED William M. Glickman DATE 1/19/82	SHEET 3 OF 3
DESIGN R.B.	DATE 3-11-81	CITY ENGINEER R.E. 12187	JOB NO. 80-16
PLANS M.D. R.B.	DATE 3-16-81		
CHECK H.E.T. J.H.A.	DATE 3-24-81		

FILE NO. J-627

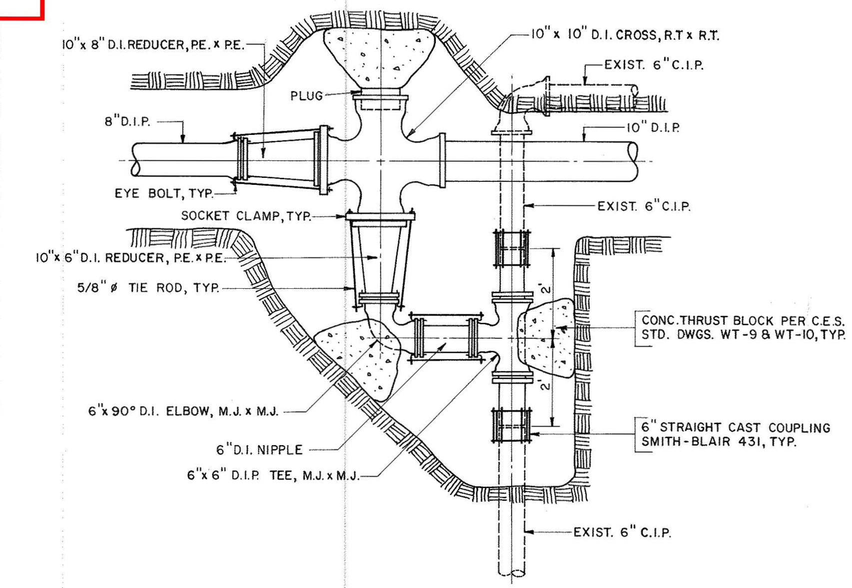
EXHIBIT 4 - WATER RECORD PLANS

J-687



PROFILE

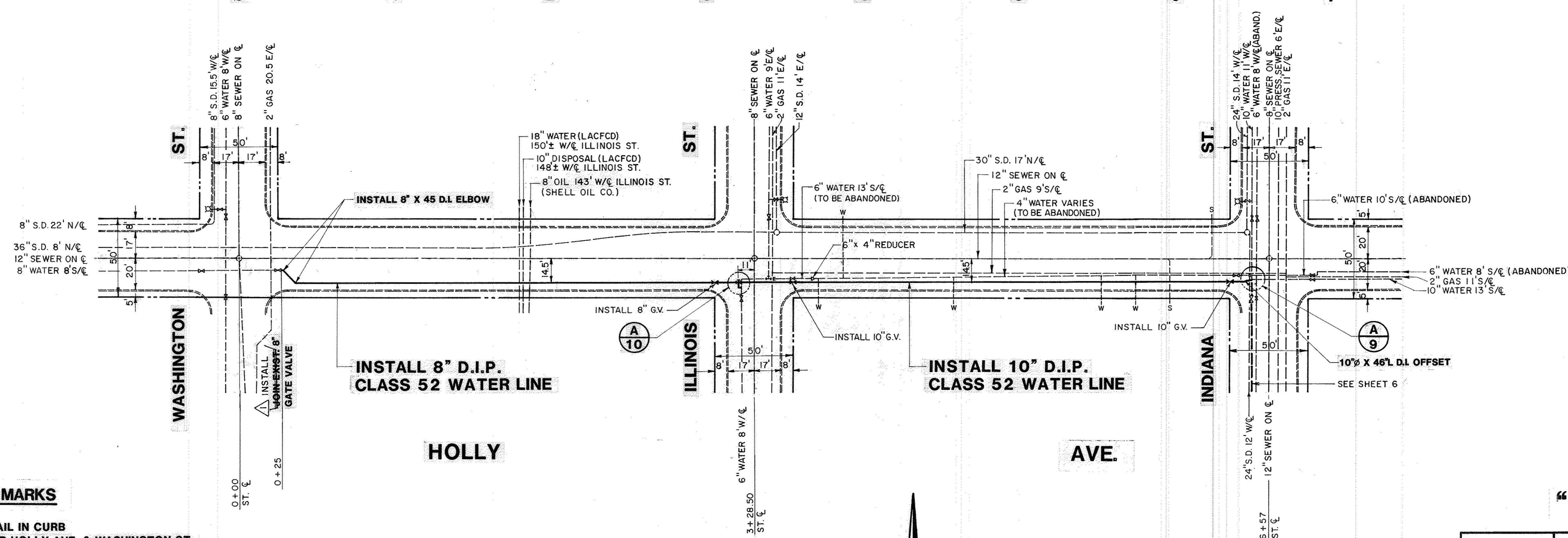
SCALE: 1" = 40' HOR.
1" = 4' VER.



PLAN

SCALE: 1/2" = 1'-0"

CONNECTION DETAIL A/10
TO 6" WATER LINE
AT ILLINOIS ST.



PLAN

SCALE: 1" = 40'

BENCH MARKS

LEAD & NAIL IN CURB
NE CORNER HOLLY AVE. & WASHINGTON ST.
5 FT. EAST OF EAST END OF CURB RETURN
ELEV. 112.32 USGS

LEAD & NAIL IN CURB
NW CORNER HOLLY AVE. & ILLINOIS ST.
5 FT. WEST OF WEST END OF CURB RETURN
ELEV. 108.91 USGS

LEAD & NAIL IN CURB
NW CORNER HOLLY AVE. & INDIANA ST.
5 FT. WEST OF WEST END OF CURB RETURN
ELEV. 101.48 USGS

"AS BUILT" JULY 1990

REVISIONS		
NO.	DATE	BY
"AS BUILT" 1	7-10-90	P & J

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DIVISION

PLAN & PROFILE
8" & 10" D.I.P. WATER LINE
HOLLY AVE. - WASHINGTON ST. TO INDIANA ST.

SURVEY ____ DATE ____
DESIGN R.B. DATE 9-10-89
PLANS Y.B/R.B. DATE 10-24-89
CHECK ____ DATE ____

APPROVED ____ DATE ____
CITY ENGINEER R.E. 23809

SHEET 7 OF 7
JOB NO. PW 89-2

FILE NO. J-687

EXHIBIT 4 - WATER RECORD PLANS

J-701

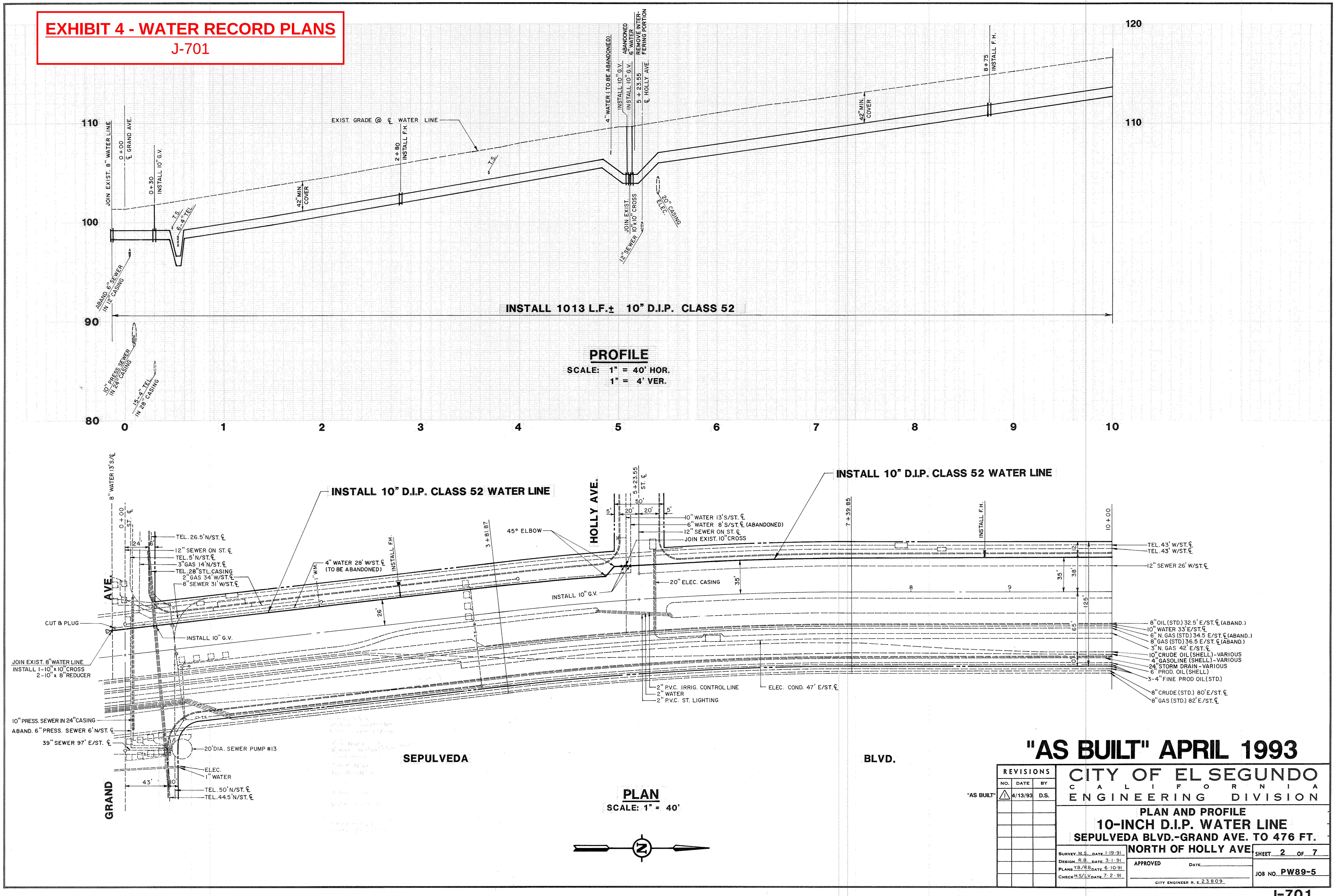


EXHIBIT 4 - WATER RECORD PLANS

J-702

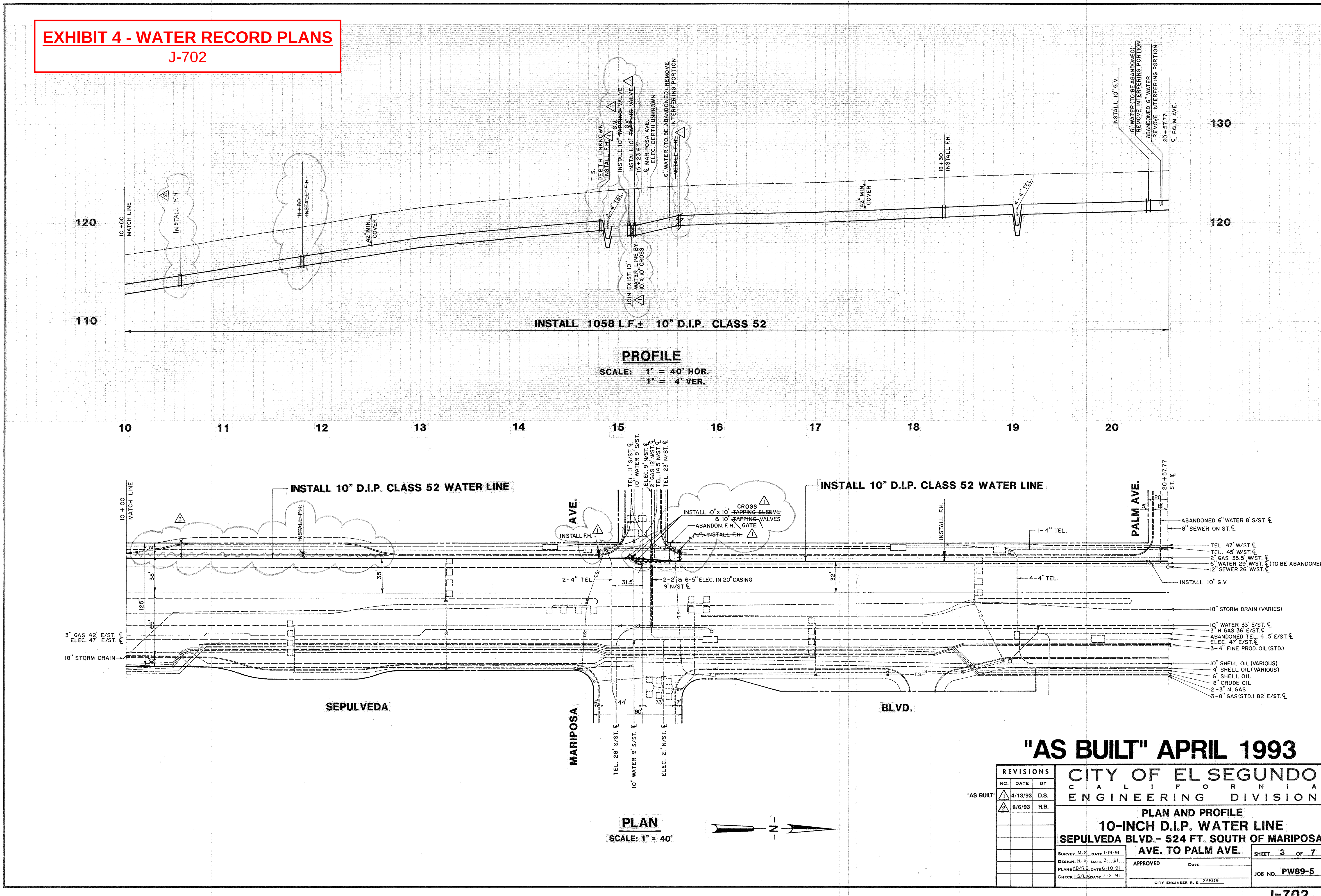
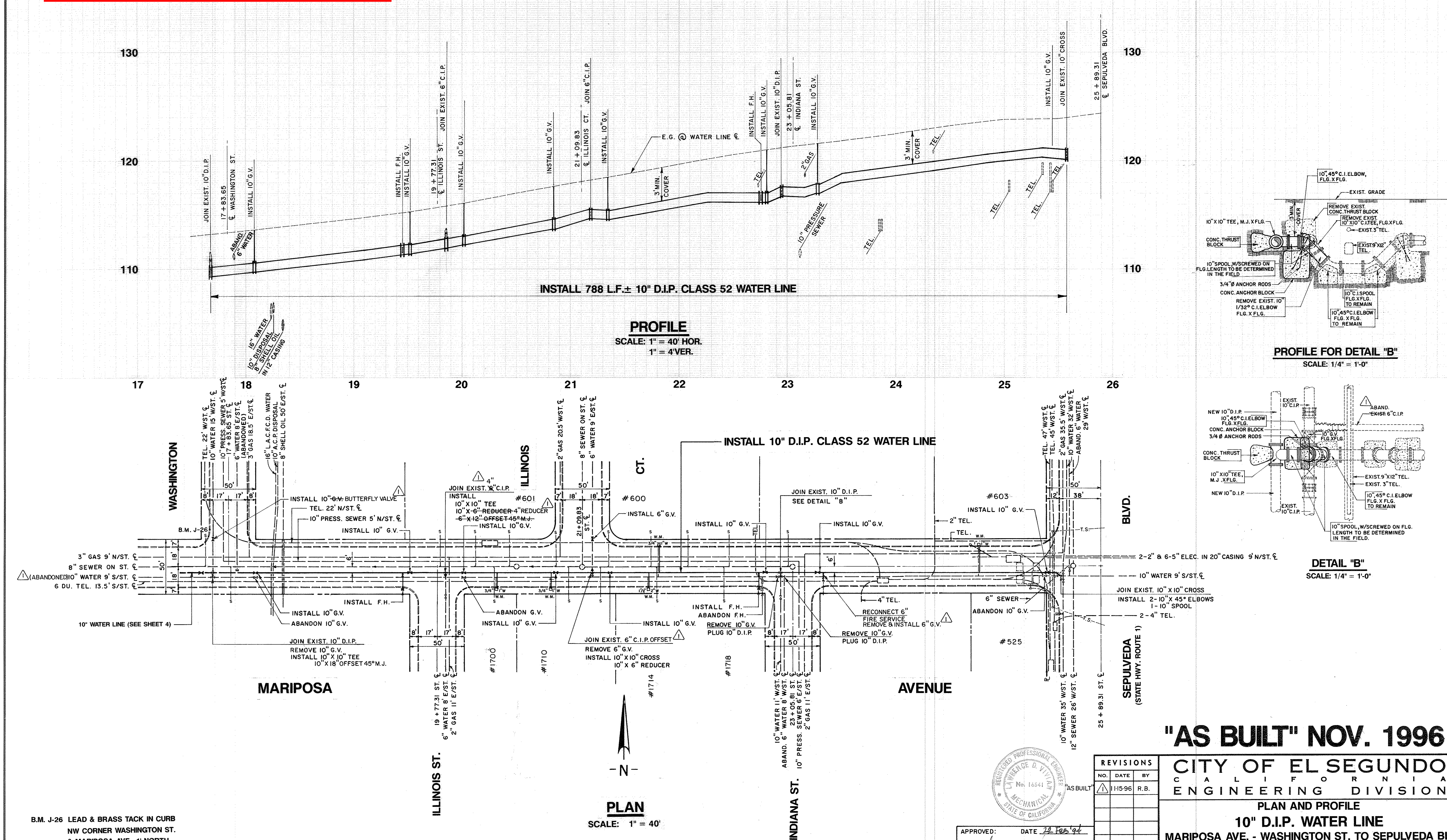


EXHIBIT 4 - WATER RECORD PLANS

J-739



B.M. J-26 LEAD & BRASS TACK IN CURB NW CORNER WASHINGTON ST. & MARIPOSA AVE., 1' NORTH OF NORTH END OF CURB RETURN. ELEV. 115.33 USGS

"AS BUILT" NOV. 1996

REVISIONS		
NO.	DATE	BY
1	11-15-96	R.B.

"AS BUILT"

APPROVED: DATE 22 Feb '94

UTILITIES MANAGER R.E. 16541

CITY OF EL SEGUNDO
CALIFORNIA
ENGINEERING DIVISION

PLAN AND PROFILE
10" D.I.P. WATER LINE
MARIPOSA AVE. - WASHINGTON ST. TO SEPULVEDA BL.

SURVEY M.S.	DATE 12-13-93	
DESIGN R.B.	DATE 1-5-94	
PLANS D.B.	DATE 1-17-94	
CHECK H.S.	DATE 2-9-94	

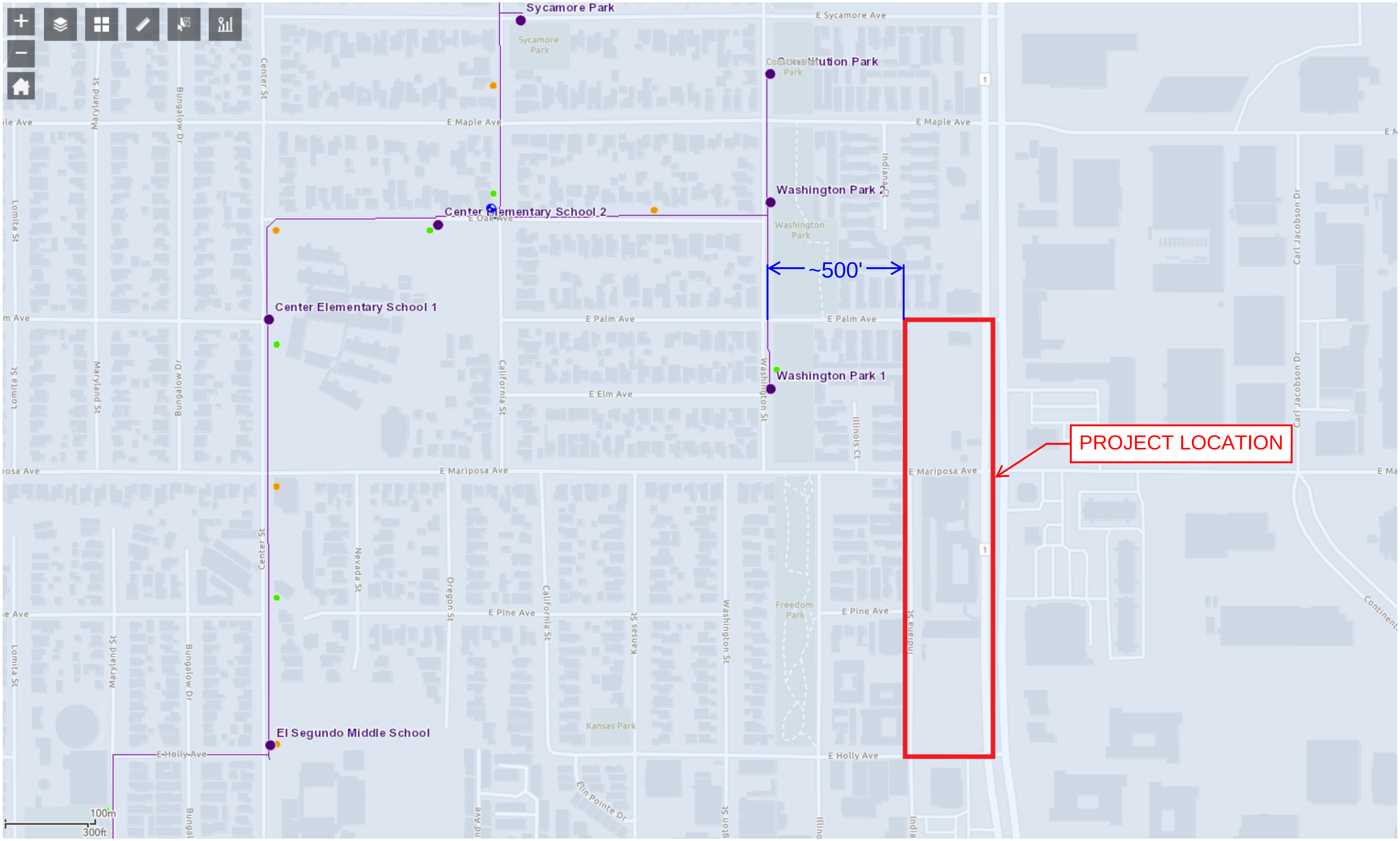
APPROVED DATE 2-23-94
CITY ENGINEER R.E. 23809

SHEET 5 OF 5

JOB NO. PW 95-13

FILE NO. J-739

EXHIBIT 5 - WEST BASIN MUNICIPAL WATER DISTRICT RECORD PLANS (N.T.S)



ALBUS-KEEFE & ASSOCIATES, INC
GEOTECHNICAL CONSULTANTS

August 15, 2019
J.N.: 2808.00

Nick Browne
BRE EL SEGUNDO HOLDCO LLC
525 Pacific Coast Highway
El Segundo, CA 90245

Subject: **Geotechnical Due-Diligence Evaluation, Proposed Retail & Residential Development, ALOFT Development, Sepulveda Blvd. and Mariposa Ave., City of El Segundo, California.**

Dear Mr. Browne,

Albus-Keefe & Associates, Inc. is pleased to present to you our geotechnical due-diligence report for the proposed mixed-purpose development at the subject site. This report presents the results of our review of historical photos, review of previous geotechnical studies for nearby sites contained in our library and at the city of El Segundo, and engineering analyses. Conclusions relevant to the feasibility of the proposed site development are also presented in this report based on the findings of our work.

We appreciate this opportunity to be of service to you. If you have any questions regarding the contents of this report, please do not hesitate to call.

Sincerely,

ALBUS-KEEFE & ASSOCIATES, INC.

David E. Albus
Principal Engineer

EXHIBIT 6 - GEOTECH REPORT

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of our work was to evaluate the feasibility of proposed site development in order to assist you in your land acquisition evaluation and due-diligence review. The scope of our work for this investigation was focused primarily on the geotechnical issues that we expect to have significant fiscal impacts on future site development. *While this report is comprehensive for the intended purpose, it is not intended for final design purposes. As such, additional geotechnical studies may be warranted based on our review of future rough grading plans and foundation plans.* The scope of our geotechnical due-diligence work included the following:

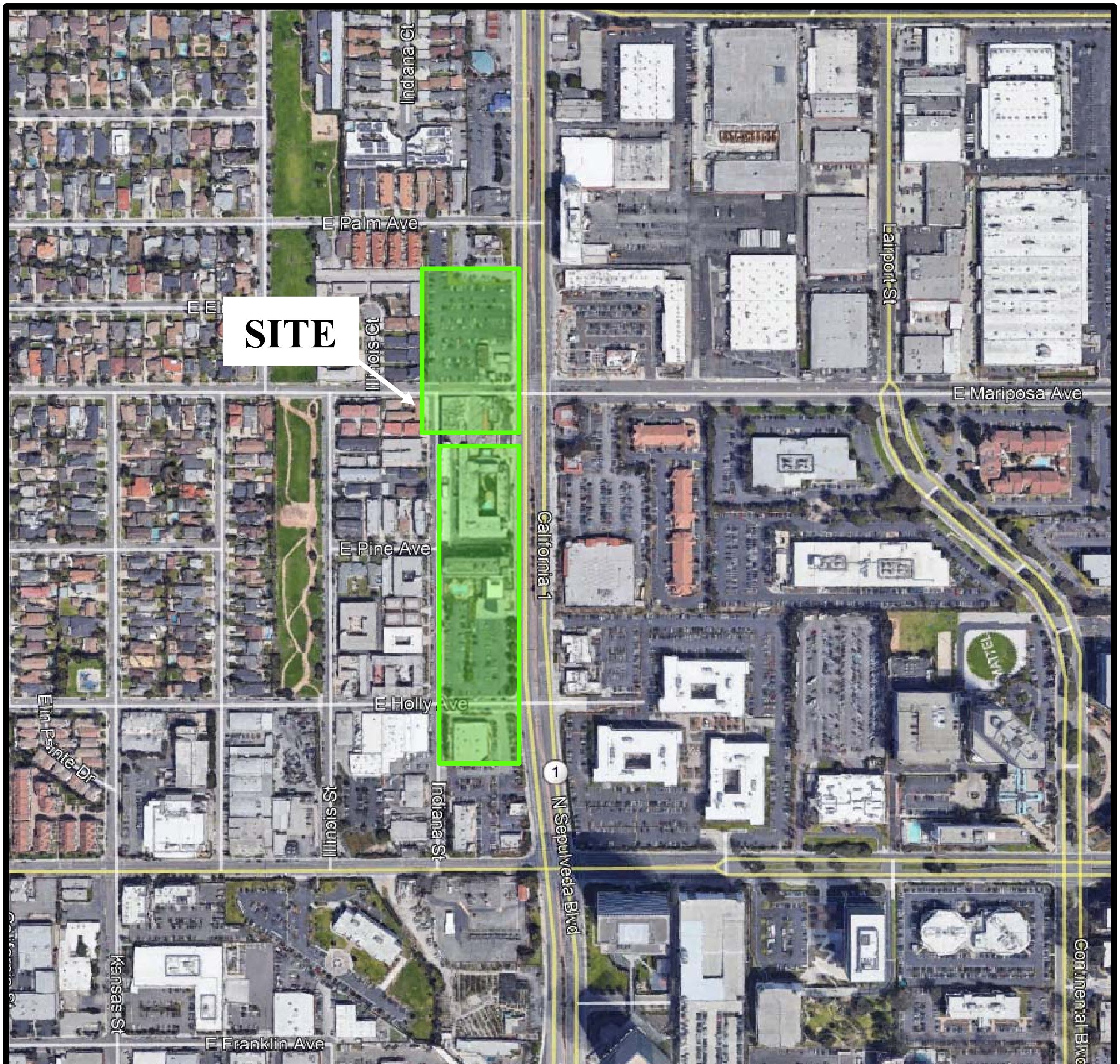
- Review of available geologic publications, aerial photographs, reports, and maps for the site and nearby vicinity that are contained in our in-house library.
- Engineering analyses of data obtained from previous exploration and laboratory testing
- Evaluation of site seismicity, liquefaction potential, and settlement potential of foundations.
- Preparation of this report

1.2 SITE LOCATION AND DESCRIPTION

The site is comprised of ten parcels of land in the city of El Segundo, California as summarized below.

APN	Site Address
4139-024-055	639 N Selpulveda Boulevard
4139-024-057	Not Available
4139-024-058	Not Available
4139-024-011	601 N Sepulveda Boulevard
4139-025-091	525 N Sepulveda Boulevard
4139-025-081	475 N Sepulveda Boulevard
4139-025-073	Not Available
4139-025-074	Not Available
4139-025-075	Not Available
4139-025-076	Not Available

Descriptions of the site location and its improvements have been prepared below. For the purposes of describing the subject site, the site was divided into the north and south portions in relations to East Mariposa Avenue. The location of the site and its relationship to the surrounding areas are shown on Figure 1, Site Location Map.



N

SITE LOCATION MAP
BRE El Segundo HoldCo, LLC
Proposed Retail & Residential Development
Sepulveda Blvd. and Mariposa Ave.
El Segundo, California

NOT TO SCALE

FIGURE 1

APN: 4139-024-055, 4139-024-057, 4139-024-058, & 4139-024-011

This portion of the project site is located at the northwest corner of Pacific Coast Highway (PCH) and East Mariposa Avenue. This portion is bordered by East Palm to the north, PCH to the east, East Mariposa Avenue to the south, and a residential development to the west. This portion is rectangular in shape and encompasses approximately 2.9 acres of land. Currently, a restaurant is located at the north portion of this site, a gas station is located to the southeast, and the remainder of this site consist of an asphalt-paved parking lot. The asphalt is in good condition with a trace of asphalt cracking. A retaining wall approximately 3 to 10 feet in height is located along the west property line.

Topography within this portion is relatively flat with elevations of approximately 116 to 127 feet above mean sea level (MSL), based on GoogleEarth. Drainage is generally directed toward the east toward PCH and south toward Mariposa Avenue. Vegetation at the site consists of grass and medium-sized trees within landscape areas of the restaurant.

APN: 4139-025-091, 4139-025-081, 4139-025-073, 4139-025-074, 4139-025-075, & 4139-025-076

This portion of the project site is located at the southwest corner of PCH and East Mariposa Avenue. This portion is bordered by East Mariposa to the north, PCH to the east, East Holly Avenue to the south, and Indiana Street to the west. This portion is rectangular in shape and encompasses approximately 4.7 acres of land. Currently, a commercial structure is located at the northeast corner of this site, two hotels are located at the northern and central portions, and the southern portion consist of an asphalt-paved parking lot in good condition.

The commercial structure at the north end of this parcel consists of a one- to two-story structure with an associated asphalt paved parking lot. This parcel is also developed with two hotels comprised of three 5- to 9-story buildings. The buildings contain a partial subterranean level where they are located along PCH. A couple of retaining walls approximately 10 feet high are located along the central portion of the site. Additionally, a couple of slopes that are up to 18 feet in height and gradients of 2:1 (H:V) are also located within the central portion of the site.

Topography within this portion grades down to the southwest. Elevations range from approximately 97 to 116 feet above mean sea level (MSL), based on GoogleEarth. Drainage is generally directed to the southwest towards Indiana Street and East Holly Avenue. Indiana Avenue is situated at a lower elevation than PCH. East Holly Avenue is situated at a lower elevation than East Mariposa Avenue. Vegetation is present within the southern parking lot and consist of grass and medium-sized trees.

1.3 PROPOSED DEVELOPMENT

We understand that the proposed site development will consist of structures up to five stories high with one subterranean level. The structures will provide retail, residential, and parking garages. Other associated improvements will include drive alleys, landscaping, and underground utilities.

No grading or structural plans were available in preparing of this report. However, we anticipate that some rough grading of the site will be required to achieve future surface configurations. We understand that the retaining walls and the associated grades along the west and east property lines may be modified. Proposed site development is anticipated to be comprised of steel and wood framing and masonry block construction with concrete slabs on grade supported by conventional foundations. Future foundation loads are expected to range from relatively light to moderate.

2.0 INVESTIGATION

2.1 RESEARCH

We have reviewed the referenced geologic publications, maps, and historical aerial photos of the vicinity. Data from these sources were utilized to the development of some of our findings and conclusions presented in this report.

Review of the referenced predevelopment aerial photos from 1953 indicate the southern portion of the site was predominantly undeveloped and several structures are present at the northwest and southwest corner of present day PCH and East Mariposa Avenue. A rectangular excavation is present across the site that spans from Indiana St. to PCH, and from the projection of E. Pine Ave. and for a distance of about 140 feet southerly of E. Pine. The excavation is estimated to be about 18 feet deep with the bottom near the elevation of Indiana St. Sometime in 1979, the southern excavation is occupied by a structure. Between 1953 and 1963, a storage yard is present at the southwest corner. The existing hotel and commercial area to the north are also constructed. Between 1963 and 1972, the structures at the northwest corner of PCH and East Mariposa Avenue are demolished and the existing parking lot and gas station is constructed. By 1980, the central hotel and southern parking lot have been constructed. Between 1994 and 2003, the restaurant the at the northwest portion of the site is constructed. The site does not appear to have been significantly altered since 2003.

Several sites within the vicinity of the subject site was previously investigated by this firm at 1222 East Mariposa Avenue, 888 North PCH and 1700 Grand Avenue (Albus-Keefe January 2013, Albus-Keefe July 2013, & Albus-Keefe June 2013, respectively). Subsurface investigation consisted of numerous soil borings to depths of 11 to 51 feet. Pertinent exploration and associated laboratory testing of soil samples from these prior investigations were utilized in our work and included in Appendix A.

3.0 SUBSURFACE CONDITIONS

3.1 SOIL CONDITIONS

Review of Geologic Map of California, Long Beach Sheet (CDMG 1962), indicates the site is underlain by quaternary Dune Sand deposits. Based on the referenced site explorations by our firm, the site is likely to be underlain by similar subsurface materials with a thin cap of artificial fill. The underlying soils are likely to be comprised of sand with varying amount of silt and clay materials that should be slightly moist to moist and loose to very dense. Density is anticipated to increase with depth. Artificial fill will most likely be present within the site due to the previous and recent developments.

3.2 GROUNDWATER

A review of the CDMG Seismic Hazard Zone Report 036 indicates that historical high groundwater levels for the general area have been interpreted at 160 feet below the ground surface in the vicinity of the site. Groundwater was not observed to the maximum depth of 51.0 feet below the existing surface in our exploratory borings in the vicinity of the site.

3.3 FAULTING

Evidence of active faulting within and adjacent the site was not readily observed during the site visit. The site does not lie within an "Earthquake Fault Zone" as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. A summary of known active faults within 10 miles of the project are summarized in Table 3.1.

TABLE 3.1
Summary of Nearby Faults

Name	Distance (miles)	Slip Rate (mm/yr.)	Preferred Dip (degrees)	Slip Sense	Rupture Top (km)	Fault Length (km)
Newport-Inglewood, alt 1	3.64	1	88	strike slip	0	65
Newport Inglewood Connected alt 1	3.64	1.3	89	strike slip	0	208
Newport Inglewood Connected alt 2	4.37	1.3	90	strike slip	0	208
Palos Verdes Connected	4.73	3	90	strike slip	0	285
Palos Verdes	4.73	3	90	strike slip	0	99
Puente Hills (LA)	8.24	0.7	27	thrust	2.1	22
Santa Monica Connected alt 2	8.39	2.4	44	strike slip	0.8	93
Santa Monica Connected alt 1	8.91	2.6	51	strike slip	0	79
Santa Monica, alt 1	8.91	1	75	strike slip	0	14

4.0 ANALYSES

4.1 SEISMICITY

We have performed probabilistic seismic analyses utilizing the U.S. Seismic Design Maps web application by OSHPD, conforming with ASCE7-10. From our analyses, we obtain a PGA of 0.598 in accordance with Figure 22-7 of ASCE 7-10. The site amplification factor, F_{PGA}, for Site Class D at this range of PGA is 1.0. Therefore, site modified peak ground acceleration, PGA_M = 1.0 x 0.598 =

0.60g. The mean event associated with a probability of exceedance equal to 2% over 50 years has a moment magnitude of 6.80 and the mean distance to the seismic source is 7.4 miles.

4.2 SETTLEMENT

Analyses were performed to evaluate potential for static settlement using subsurface information from one of our earlier projects less than 200 feet west of the project site (Job Number 2088.00; referenced report of January 16, 2013). Our analyses used sampler penetration resistance (blow count) from hollow stem boring logs to estimate the elastic modulus of soil strata. For this feasibility-level evaluation, no loads or foundation configurations are available. Therefore, assumptions were made about the likely loading and configurations. Results of our analyses are summarized in Table 3.2 below.

TABLE 3.2
Summary of Settlement Analyses

Condition	Load	Bearing Pressure (psf)	Total Settlement (in.)
Pad at PCH grade	650 kip Column	4500	1.0
Pad at 8 feet below PCH Grade	720 kip Column	5000	0.9
Pad at PCH grade	10 kip/ft Wall	5000	0.5
Pad at 8 feet below PCH Grade	10 kip/ft Wall	5000	0.3

4.3 LIQUEFACTION

Engineering research of soil liquefaction potential (Youd, et al., 2001) indicates that generally three basic factors must exist concurrently in order for liquefaction to occur. These factors include:

- A source of ground shaking, such as an earthquake, capable of generating soil mass distortions.
- A relatively loose silty and/or sandy soil.
- A relative shallow groundwater table (within approximately 50 feet below ground surface) or completely saturated soil conditions that will allow positive pore pressure generation.

The liquefaction susceptibility of the onsite soils was evaluated by analyzing the potential concurrent occurrence of the above-mentioned three basic factors. The liquefaction evaluation for the site was completed under the guidance of Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDMG, 2008).

Historical high groundwater is anticipated at a depth of at least 50 feet below the site. Therefore, the potential for liquefaction to occur beneath the site is considered to be very low. Furthermore, the site is not located within a mapped California Geologic Survey liquefaction hazard zone.

5.0 CONCLUSIONS

5.1 FEASIBILITY OF PROPOSED DEVELOPMENT

From a geotechnical point of view, the proposed site development is considered feasible provided appropriate geotechnical recommendations are incorporated into the design and construction of the project. Key issues that could have significant fiscal impacts on the geotechnical aspects of the proposed site development are discussed in the following sections of this report.

5.2 GEOLOGIC HAZARD

5.2.1 Ground Rupture

No active faults are known to project through the site nor does the site lie within the bounds of an "Earthquake Fault Zone" as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. As such, the potential for ground rupture due to fault displacement beneath the site is considered very low.

5.2.2 Ground Shaking

The site is situated in a seismically active area that has historically been affected by generally moderate to occasionally high levels of ground motion. The site lies in relative close proximity to several seismically active faults; therefore, during the life of the proposed structures, the property will probably experience similar moderate to occasionally high ground shaking from these fault zones, as well as some background shaking from other seismically active areas of the Southern California region. Potential ground accelerations have been estimated for the site and are presented in Section 4.1 of this report. Design and construction in accordance with the current California Building Code (C.B.C.) requirements is anticipated to adequately address potential ground shaking.

5.2.3 Liquefaction

The depth to historic high groundwater reported by the CGS in the site vicinity is greater than 50 feet below the ground surface (Seismic Hazard Zone Report 036). As such the potential for liquefaction at the site is considered very low. Furthermore, the site is not located within a mapped California Geologic Survey liquefaction hazard zone.

5.2.4 Landsliding

The site is not located within an area identified by the California Geologic Survey (CGS) as having potential for seismic slope instability. Geologic hazards associated with landsliding are not anticipated at the site.

5.3 STATIC SETTLEMENT

Previous data suggests that some soils at the site may exhibit collapsible potential upon wetting. If such materials are left unmitigated, this condition could result in excessive settlement of structures and site improvements due to the weight of new foundations and the introduction of water from rain or irrigation. Excessive settlement from such materials can be mitigated if they are removed and recompacted. Materials anticipated to exhibit this condition consist of the artificial fill soils and upper 2 to 3 feet of the Dune Deposits.

Soils below the collapsible soil zone are anticipated to exhibit low compressibility characteristics in their current state. We have performed analyses to estimate the potential settlement of foundation supported by these materials as further discussed in Section 4.2. From our analyses, we conclude that total settlement of foundations will be less than about 1 inch provided column and wall loads do not exceed about 700 kips and 10 kips/ft., respectively, and bearing pressure is limited to about 4,500 to 5,000 psf. Associated differential settlement should be less than ½ inch over 30 feet. Such settlement is anticipated to be tolerable for proposed site development.

5.4 EXCAVATION AND MATERIAL CHARACTERISTICS

Existing artificial fill and the upper 2 to 3 feet of the Dune Sands are anticipated to be unsuitable to support proposed site development in their current condition. This condition can be mitigated by removing and recompacting these materials. We anticipate these materials will generally extend to depths of about 3 to 6 feet. Once these materials are removed, they are anticipated to be suitable for reuse as compacted fill.

Within materials located within the upper 10 feet from the grade at PCH, temporary construction slopes and trench excavations can likely be cut vertically up to a height of 4 feet within the onsite materials provided that no surcharging of the excavations is present. Temporary excavations greater than 4 feet in height will likely require side laybacks to 1:1 (H:V) or flatter to mitigate the potential for sloughing. Portions of the site below a depth of 10 feet from PCH grade may encounter friable sands that will tend to slough or run. Cuts in these materials will likely require a layback of 1.5:1 (H:V) at any height.

Demolition of the existing site improvements will generate a considerable amount of concrete and asphaltic concrete debris. Significant portions of concrete and asphaltic concrete debris can likely be reduced in size to less than 4 inches and incorporated within fill soils during earthwork operations.

Onsite disposal systems, clarifiers, and other underground improvements may be present on site. If encountered during future rough grading, these improvements will require proper abandonment or removal.

Off-site improvements, streets, and right-of-ways exist near and along the property lines. The presence of the existing offsite improvements will limit removals of unsuitable materials adjacent the property lines. Special grading techniques, such as slot cutting, will be required adjacent to the property lines were offsite structures are nearby. Construction of perimeter site walls will likely require deepened footings or caissons and grade beams where removals are restricted by property boundaries. Shoring may be required for excavation for the subterranean level.

Subsurface soils are anticipated to be relatively easy to excavate with conventional heavy earthmoving equipment. Removal and recompaction of the site materials will result in some moderate shrinkage and subsidence. Design of site grading will require consideration of this loss when evaluating earthwork balance issues.

The existing near surface soils are typically below optimum moisture content. As such, moisturizing of site materials will likely be required prior to placement as compacted fill

5.5 SHRINKAGE AND SUBSIDENCE

Volumetric changes in earth quantities will occur when excavated onsite soil materials are replaced as properly compacted fill. We estimate the existing artificial fills and upper collapsible Dune Sand deposits will shrink approximately 10 to 20 percent. Reprocessing of removal bottoms are anticipated to result in negligible subsidence. The estimates of shrinkage and subsidence are intended as an aid for project engineers in determining earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during the grading process.

5.6 SOIL EXPANSION

Based on our previous laboratory test results within the adjacent sites, the near-surface soils are generally anticipated to possess a **Very Low** to **Low** expansion potential. Testing for soil expansion will be required subsequent to rough grading and prior to construction of foundations and other concrete work to confirm these conditions. Expansive soils can undergo volume changes when they become wetted or dried. These changes can affect the overlying structures and other surface improvements. Given the expansion potential anticipated at the site, only nominal steps will be needed to mitigate adverse effects such as minor steel reinforcing of foundations and slabs, and moisture preparation and jointing details for flatwork.

5.7 SEISMIC DESIGN PARAMETERS

For design of the project in accordance with Chapter 16 of the 2016 California Building Code (CBC), the following table presents the seismic design factors:

5.8 FOUNDATIONS

The following design parameters are provided as feasibility-level parameters. These design parameters are based on typical site materials encountered during subsurface exploration at nearby sites and are provided for preliminary design and estimating purposes. Theses parameters should be verified by site-specific geotechnical investigation. Furthermore, the project geotechnical consultant should provide final design parameters following observation and testing of site materials during grading. Depending on actual materials encountered during site grading and actual foundation loads, the design parameters presented herein may require modification.

TABLE 5.1
2016 CBC Seismic Design Parameters

Parameter	Value
Site Class	D
Mapped MCE Spectral Response Acceleration, short periods, S_S	1.632
Mapped MCE Spectral Response Acceleration, at 1-sec. period, S_1	0.603
Site Coefficient, Fa	1.0
Site Coefficient, Fv	1.5
Adjusted MCE Spectral Response Acceleration, short periods, S_{MS}	1.632
Adjusted MCE Spectral Response Acceleration, at 1-sec. period, S_{M1}	0.904
Design Spectral Response Acceleration, short periods, S_{DS}	1.088
Design Spectral Response Acceleration, at 1-sec. period, S_{D1}	0.603

MCE = Maximum Considered Earthquake

5.8.1 Allowable Bearing Value

A bearing value of 1,800 pounds per square foot (psf) may be used for continuous footings and pad footings supported by compacted fill or competent Dune Sand deposits and having a minimum width of 12 inches and founded at minimum of 12 inches below the lowest adjacent grade. This value may be increased by 400 psf and 900 psf for each additional foot in width and depth, respectively, up to a maximum value of 5,000 psf. Recommended allowable bearing values include both dead and live loads, and may be increased by one-third for wind and seismic forces.

5.8.2 Lateral Resistance

A passive earth pressure of 200 pounds per square foot per foot of depth (pcf) up to a maximum value of 1000 pounds per square foot (psf) may be used to determine lateral bearing for footings. A coefficient of friction of 0.37 times the dead load forces may also be used between concrete and the supporting soils to determine lateral sliding resistance. The passive pressure may be increased by 1/3 for wind and seismic loading. However, no increase should be applied to the friction factor. The passive pressure should be reduced by 50% for footings facing ascending slope.

The above values are based on footings placed directly against compacted fill or competent native soil. In the case where footing edges are formed, all backfill against the footings should be compacted to at least 90 percent of the laboratory standard.

5.8.3 Footings and Slabs on Grade

Exterior and interior building footings may be founded at the minimum depths indicated in the California Building Code. All continuous footings should be reinforced with a minimum of two No. 4 bars, one top and one bottom. The structural engineer may require different reinforcement and should dictate if greater than the recommendations provided herein.

Interior isolated pad footings should be a minimum of 24 inches square and founded at minimum depths of 12 inches below the lowest adjacent final grade. Exterior isolated pad footings intended for support of patio covers and similar construction should be a minimum of 24 inches square and founded at a minimum depth of 12 inches below the lowest adjacent final grade.

Interior concrete slabs constructed on grade should be a minimum 4 inches thick. If such slabs will be used for garage parking, they should have a minimum thickness of 5 inches. Slabs should be reinforced with 6-inch by 6-inch, W2.9 X W2.9 (No. 6 by No. 6) reinforcing wire mesh or No. 3 bars spaced 30 inches each way. Care should be taken to ensure the placement of reinforcement at mid-slab height. The structural engineer may recommend a greater slab thickness and reinforcement based on proposed use and loading conditions and such recommendations should govern if greater than the recommendations presented herein.

Concrete floor slabs in areas to receive carpet, tile, or other moisture sensitive coverings should be underlain with a moisture vapor retarder 10-mil Visqueen, or equal. The membrane should be properly lapped, sealed, and protected with at least 2 inches of sand having a sand equivalent (SE) of 30 or greater. One inch of this sand can be placed above the membrane. This vapor retarder system is anticipated to be suitable for most flooring finishes that can accommodate some vapor emissions. However, this system may emit more than 4 pounds of water per 1000 sq. ft. and therefore, may not be suitable for all flooring finishes. Additional steps should be taken if such vapor emission levels are too high for anticipated flooring finishes.

Special consideration should be given to slabs in areas to receive ceramic tile or other rigid, crack-sensitive floor coverings. Design and construction of such areas should mitigate hairline cracking as recommended by the structural engineer.

Block-outs should be provided around interior columns to permit relative movement and mitigate distress to the floor slabs due to differential settlement that will occur between column footings and adjacent floor subgrade soils as loads are applied.

Prior to placing concrete, subgrade soils below slab-on-grade areas should be thoroughly moistened to provide a moisture content that is equal to or greater than 100% of the optimum moisture content to a depth of 12 inches.

5.9 RETAINING WALLS

5.9.1 Allowable Bearing Value and Lateral Resistance

Design of retaining and screen walls may utilize the bearing and lateral resistance values provided in Section 5.8.1 and 5.8.2.

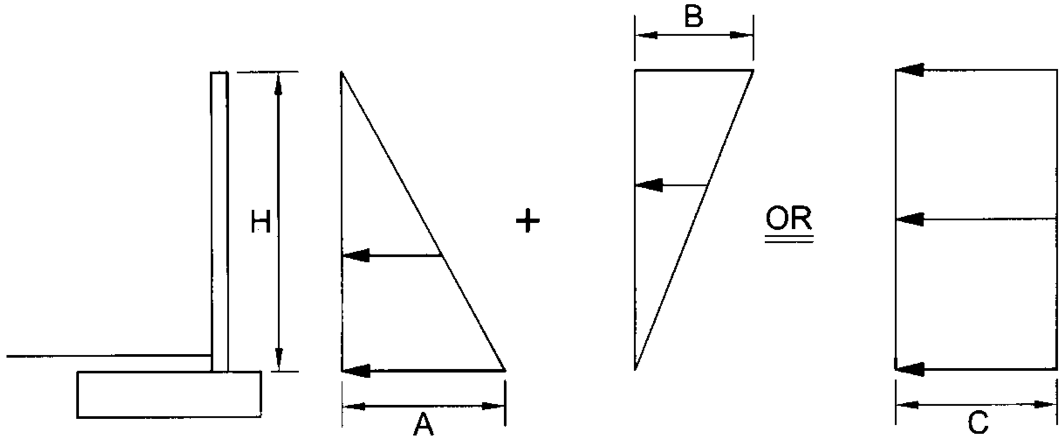
5.9.2 Earth Pressures

Conventional retaining walls should be designed for the static earth pressures as indicated in Table 5.2 below. These values are active (unrestrained) and at-rest (restrained) conditions based on backfill material parameters from projects in the vicinity of this project site. All values are for drained backfill conditions and do not consider hydrostatic pressures. All walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls, footings or traffic loads, and hydraulic pressures in addition to the earth pressures provided below.

In Table 5.2, H is the vertical height of the retained portion of the wall in feet and the resulting pressure is in pounds per square foot (psf). 2016 CBC requires inclusion of seismic pressure for retaining heights greater than 6 feet. Seismic earth pressures provided herein use a peak ground acceleration (PGA) of 0.39g, corresponding to probability of exceedance of 10 percent in 50 years. Seismic earth pressures are based on the method provided by Seed and Whitman (1970) for active condition, and Wood (1973) for at-rest condition.

As indicated in the diagram below, in Table 5.2, static earth pressure has an upright triangular distribution, with its value at base shown by "A". Seismic earth pressure has an inverted triangular distribution whose base value is represented by "B". Value "C" represents a combination of these two values, in the form of a uniform pressure distribution.

TABLE 5.2
EARTH PRESSURE DIAGRAMS



Pressure Values
Walls Supporting Engineered Backfill

Value	Un-restrained (Active) Condition		Restrained (At-rest) Condition
	Active Level Backfill	Active 2:1 Backfill	At-rest Level Backfill
A	39H	68H	65H
B	13H	13H	22H
C	26H	41H	44H

Note:
H is in feet and resulting pressure is in psf. Design may utilize either the sum of the static component and the seismic component force diagrams or the total force diagram above. SEAOSC has suggested using a load factor of 1.7 for the static component and 1.0 for the seismic component. The actual load factors should be determined by the structural engineer.

5.10 CONCRETE MIX DESIGN

Laboratory testing of soils from nearby sites indicates **Negligible** soluble sulfate content. Concrete designed to follow the procedures provided in ACI 318, Section 4.3, Table 4.3.1 for negligible sulfate exposure are anticipated to be adequate for mitigation of sulfate attack on concrete. Upon completion of rough grading, an evaluation of as-graded conditions and further laboratory testing will be required for the site to confirm or modify the conclusions provided in this section.

5.11 PAVEMENT SECTIONS

Based on the anticipated soil conditions present at the site and a range of assumed traffic indices, preliminary pavement sections are provided in the table below. A preliminary "R-value" of 25 was used for the near-surface soil in this preliminary pavement design. The sections provided below are feasibility-level section and should be re-evaluated subsequent to site investigation, detailed estimates of traffic index, and should be finalized upon site grading. Final pavement sections should be based on actual R-value testing of in-place soils and analysis of anticipated traffic.

TABLE 5.3
PRELIMINARY PAVEMENT DESIGN

Location	Traffic Index	AC (inches)	Concrete Paver	PCC (inches)	AB (inches)
All Entries And Interior Driveways	5.0	3.0 4.0	--	--	7.0 4.0
		--	8 cm		8.0
		--	--	6.0	--
	5.5	3.0 4.0	--	--	9.0 6.0
		--	8 cm		10.0
		--	--	6.5	--
	6.0	4.0 5.0			8.0 6.0
		--	8 cm		11.0
		--	--	7.0	--
Parking Stalls	--	3.0	--	--	4.0

AC - Asphaltic Concrete, AB - Aggregate Base, PCC – Portland Cement Concrete

Portland Cement Concrete (PCC) paving should be provided with cold joints or score lines spaced no more than 10 feet in each direction. Cold joints should be provided with dowels consisting of No. 4 bars spaced at 18 inches center to center. Edges of concrete paving for which traffic loads will traverse directly across should be thickened by at least 1.5 inches over a taper distance of 5 feet.

5.12 EXTERIOR FLATWORK

Exterior flatwork should be a minimum 4 inches thick. Cold joints or saw cuts should be provided at least every 7 feet in each direction. Cold joints should be keyed or provided with dowels spaced 18 inches on center. Special jointing detail should be provided in areas of block-outs, notches, or other irregularities to avoid cracking at points of high stress. Where flatwork is more than 7 feet wide in minimum dimension, the slab should be reinforced with No. 3 bars spaced 18 inches center to center each way.

Subgrade soils below flatwork should be thoroughly moistened to a moisture content to slightly above the optimum to a depth of 12 inches. Moistening should be accomplished by lightly spraying the area over a period of a few days just prior to pouring concrete.

Drainage from flatwork areas should be directed to local area drains and/or other appropriate collection devices designed to carry runoff water to the street or other approved drainage structures. The concrete flatwork should also be sloped at a minimum gradient of 0.5% away from building foundations and masonry walls.

The geotechnical consultant should observe and verify the density and moisture content of subgrade soils prior to pouring concrete to ensure that the required compaction and pre-moistening recommendations have been met.

5.13 UTILITY TRENCHES

Trench excavations should conform to the recommendations provided in Section 5.4. The project geologist or soil engineer should observe all trench excavations to provide specific recommendations. All trench excavations should conform to the requirements of CAL OSHA.

All utility trench backfill within the property should be compacted to at least 90 percent of the laboratory standard. Soils placed within the pipe zone (6 inches below and 12 inches above the pipe) should consist of particles no greater than ¾ inches and have an Sand Equivalent (SE) of at least 30. The materials within the pipe zone should be consolidated by compaction. Above the pipe zone (>1 foot above pipe), the backfill may consist of general fill materials. Trench backfill should be brought to uniform moisture, slightly over optimum, placed in lifts no greater than 12 inches in thickness, and then mechanically compacted with appropriate equipment to at least 90 percent of the laboratory standard. For trenches with sloped walls, backfill material should be placed in lifts no greater than 8 inches in loose thickness, and then compacted by rolling with a sheepsfoot tamper or similar equipment. The project geotechnical consultant should perform density testing along with probing to verify that adequate compaction has been achieved.

Within shallow trenches (less than 18 inches deep) where pipes may be damaged by heavy compaction equipment, imported clean sand having a SE of 30 or greater may be utilized. The sand should be placed in the trench then compacted with hand equipment if possible.

Where utility trenches are proposed parallel to any building footing (interior and/or exterior trenches), the bottom of the trench should not be located below a 1:1 (H:V) plane projecting downward from the outside edge of the adjacent footing base. For utility trenches located below a 1:1 (H:V) plane projecting downward from the outside edge of the adjacent footing base or crossing footing trenches, concrete or slurry should be used as trench backfill.

5.14 STORMWATER INFILTRATION CHARACTERISTICS

Based on our review of previous data, we anticipate the site will be feasible for infiltration of storm water for WQMP purposes. Due to the limited space anticipated to be available for infiltration and the likelihood of subterranean structures, we recommend the use of dry wells for infiltration. For preliminary design purposes, the following parameters may be assumed for design of dry wells at the site. Specific design parameters will require onsite testing and analyses.

TABLE 5.4
Preliminary Dry Well Design Parameters

Design Factor	Value
Total Depth	30’
Chamber Depth	18’
Shaft Diameter	0’-20’: 6’OD, 20’-30’: 4’ OD
Assumed Invert Depth	7’
Peak Flow Rate	0.28 cfs
Draw Down Time	45 min.
Setbacks from Structures	10’ for on-grade, 20’ for 1 subterranean level

6.0 LIMITATIONS

This report is based on the proposed development and geotechnical data as described herein. The materials described herein and in other literature are believed representative of the total project area, and the conclusions contained in this report are presented on that basis. However, soil materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions and recommendations contained herein. As such, observation and testing by a geotechnical consultant prior to and during the grading and construction phases of the project are essential to confirming the basis of this report.

This report summarizes several geotechnical topics that should be beneficial for project planning and budgetary evaluations. *The information presented herein is intended only for a preliminary feasibility evaluation and* ***is not*** *intended to satisfy the requirements of a site specific and detailed geotechnical investigation required for further planning and permitting.*

This report has been prepared consistent with that level of care being provided by other professionals providing similar services at the same locale and time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein.

This report has been prepared for the exclusive use of **BRE El Segundo HoldCo, LLC** to assist the project consultants in determining the feasibility of the proposed development. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

Respectfully submitted,

ALBUS-KEEFE & ASSOCIATES, INC

Mark Principe
Staff Engineer

David E. Albus
Principal Engineer
GE 2455

EXHIBIT 7 - SOCAL GAS

[illegible] N [illegible]ulli[illegible] Rd
Co[illegible]pton[illegible]C[illegible] [illegible]

SoCalGas
A Sempra Energy utility

June 20, 2019

KPFF
700 South Flower Street, Suite 2100
Los Angeles, CA 90017
Attn: Jennifer Reynoso

Subject: Will Serve - 525 N PCH El Sugundo, CA 90245

Thank you for inquiring about the availability of natural gas service for your project. We are pleased to inform you that Southern California Gas Company (SoCalGas) has facilities in the area where the above named project is being proposed. The service would be in accordance with SoCalGas' policies and extension rules on file with the California Public Utilities Commission (CPUC) at the time contractual arrangements are made.

This letter should not be considered a contractual commitment to serve the proposed project, and is only provided for informational purposes only. The availability of natural gas service is based upon natural gas supply conditions and is subject to changes in law or regulation. As a public utility, SoCalGas is under the jurisdiction of the Commission and certain federal regulatory agencies, and gas service will be provided in accordance with the rules and regulations in effect at the time service is provided. Natural gas service is also subject to environmental regulations, which could affect the construction of a main or service line extension (for example, if hazardous wastes were encountered in the process of installing the line). Applicable regulations will be determined once a contract with SoCalGas is executed.

If you need assistance choosing the appropriate gas equipment for your project, or would like to discuss the most effective applications of energy efficiency techniques, please contact our area Service Center at 800-427-2200.

Thank you again for choosing clean, reliable, and safe natural gas, your best energy value.

Sincerely,

William Perez

William Perez
Pipeline Planning Assistant
SoCalGas-Compton HQ

EXHIBIT 8 - SOCAL EDISON

SOUTHERN CALIFORNIA
EDISON
An *EDISON INTERNATIONAL* Company

August 8, 2019

Attn: Jennifer Reynoso
KPFF Consulting Engineers
700 S Flower St Ste 2100
Los Angeles, CA 90017

RE: MARIPOSA & PCH

Enclosed are copies of the existing Southern California Edison overhead and/or underground facilities inventory maps covering the area of your proposed project.

Southern California Edison Company believes this information is correct for purposes intended by the Company and assumes no liability for its accuracy.

Should you need to contact an SCE service planner please contact:

SCE PLANNING SUPERVISOR
505 Maple Ave
Torrance, CA 90503
(310) 783-9302

When contacting the SCE service planner, please include copies of the facilities inventory maps that are being provided to you. **SENDING YOUR PLANS TO ANY ADDRESS OTHER THAN THE ONE LISTED WILL CAUSE A DELAYED RESPONSE.**

Thank you, and if you have any further questions, please call me at (714) 796-9932.

Kim Gurule
Facilities Mapping
Power Distribution

Enclosures

Bldg D
P.O. Box 11982
Santa Ana, Ca 92711-1982

EXHIBIT 8 - SOCAL EDISON

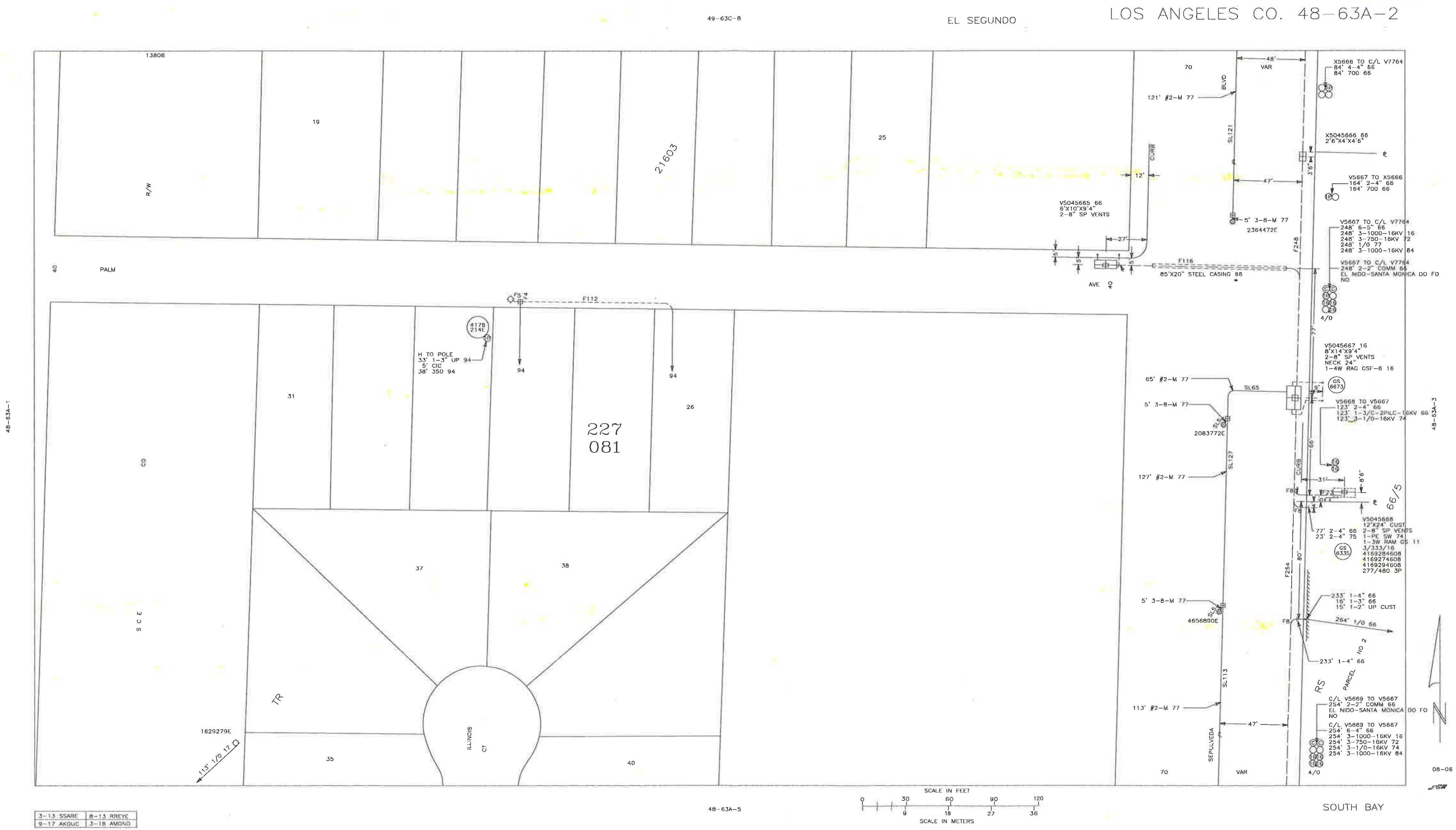


EXHIBIT 8 - SOCAL EDISON

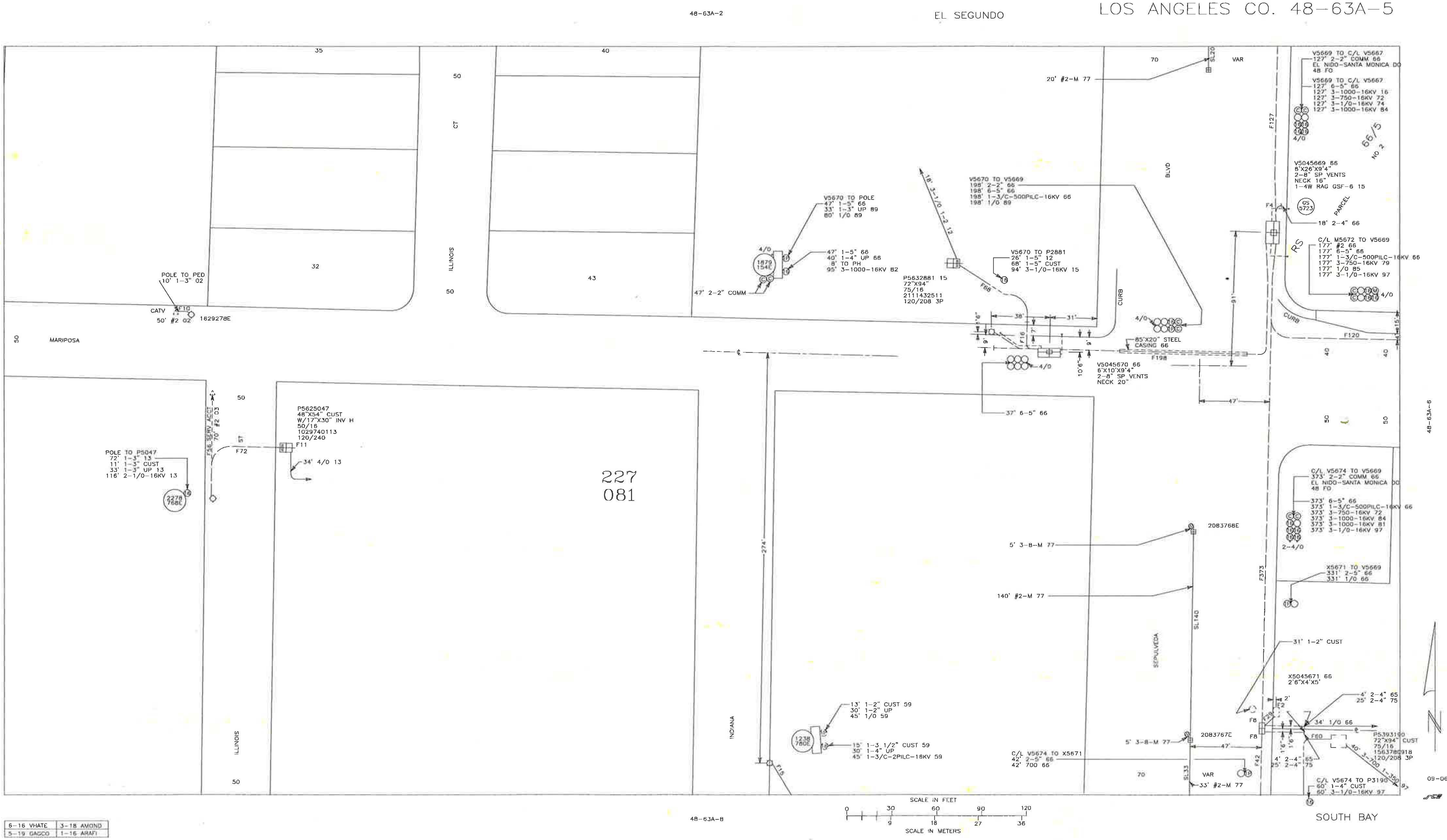


EXHIBIT 8 - SOCAL EDISON

CONFIDENTIAL: CRITICAL ENERGY INFRASTRUCTURE

This diagram contains information relating to Southern California Edison Company's electric transmission/distribution system. It is classified as Critical Energy Infrastructure Information as defined in 18 code of Federal Regulations section 388.113(c)(1).

FOR REFERENCE ONLY This map has been created to SCE standards to be used by SCE personnel only and is not intended to be a legal representation of real property. Please don't forget to call Dig Alert: 1-800-227-2600

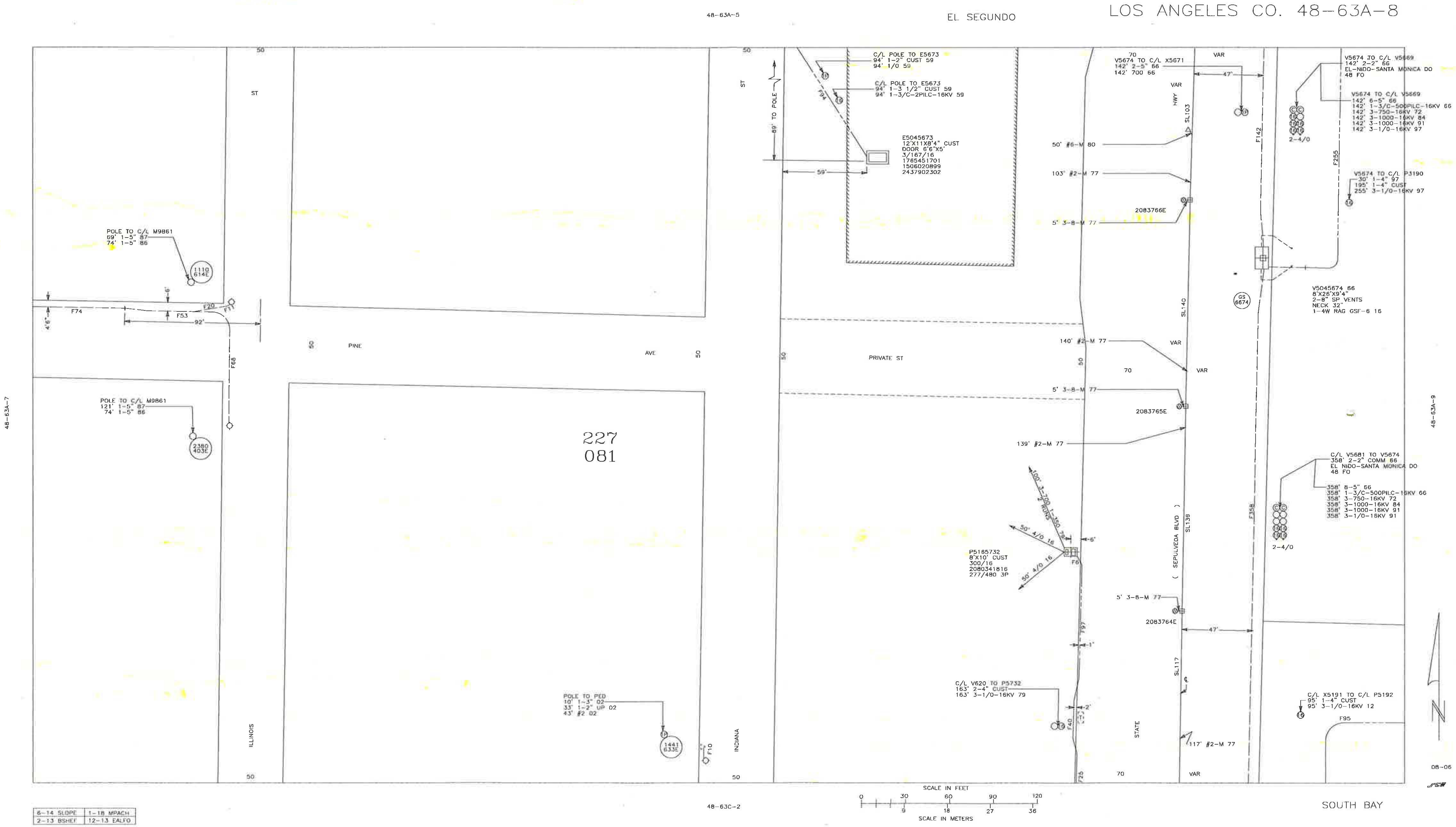


EXHIBIT 8 - SOCAL EDISON

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48-63A-8 EL SEGUNDO LOS ANGELES CO. 48-63C-2

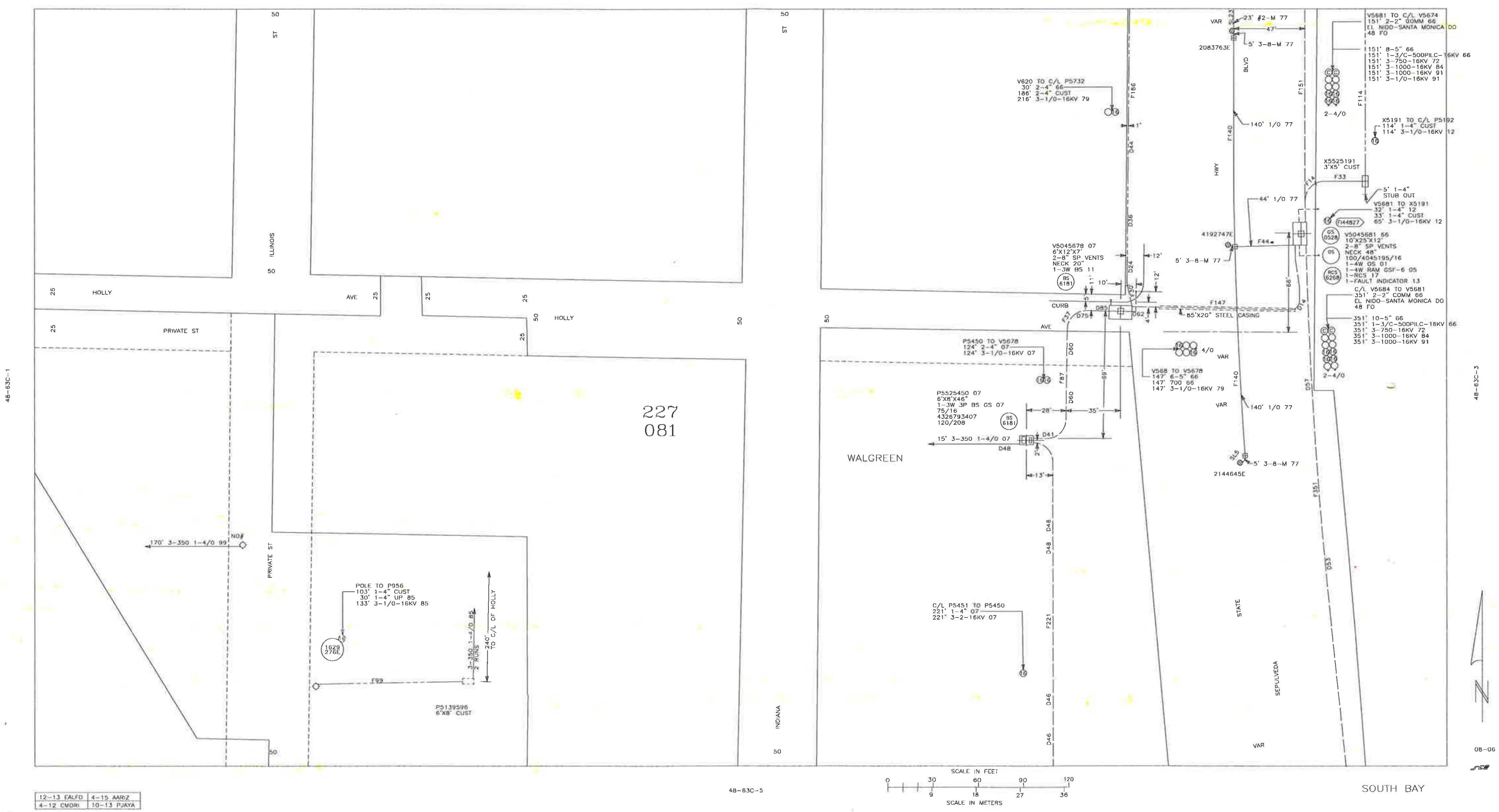


EXHIBIT 9 - TELECOM (CHARTER)

Charter
COMMUNICATIONS

Will Serve Letter

9/5/2019

Breggie Tuazon
KPFF Consulting Engineers
700 South Flower Street, Suite 2100
Los Angeles, CA 90017

Project Name:	WSL - 525 Pacific Coast Highway El Segundo CA 90245
LOCATION:	525 Pacific Coast Highway El Segundo CA 90245

Re: May Serve Letter by Charter Communications or an affiliate authorized to provide service ("Charter")

Thank you for your interest in receiving Charter service. The purpose of this letter is to confirm that the Property is within an area that Charter may lawfully serve. However, it is not a commitment to provide service to the Property. Prior to any determination as to whether service can or will be provided to the Property, Charter will conduct a survey of the Property and will need the following information from you:

- Exact site address and legal description
- Is this an existing building or new construction?
- Site plans, blue prints, plat maps or any similar data
- The location of any existing utilities or utility easements
- ______________________________

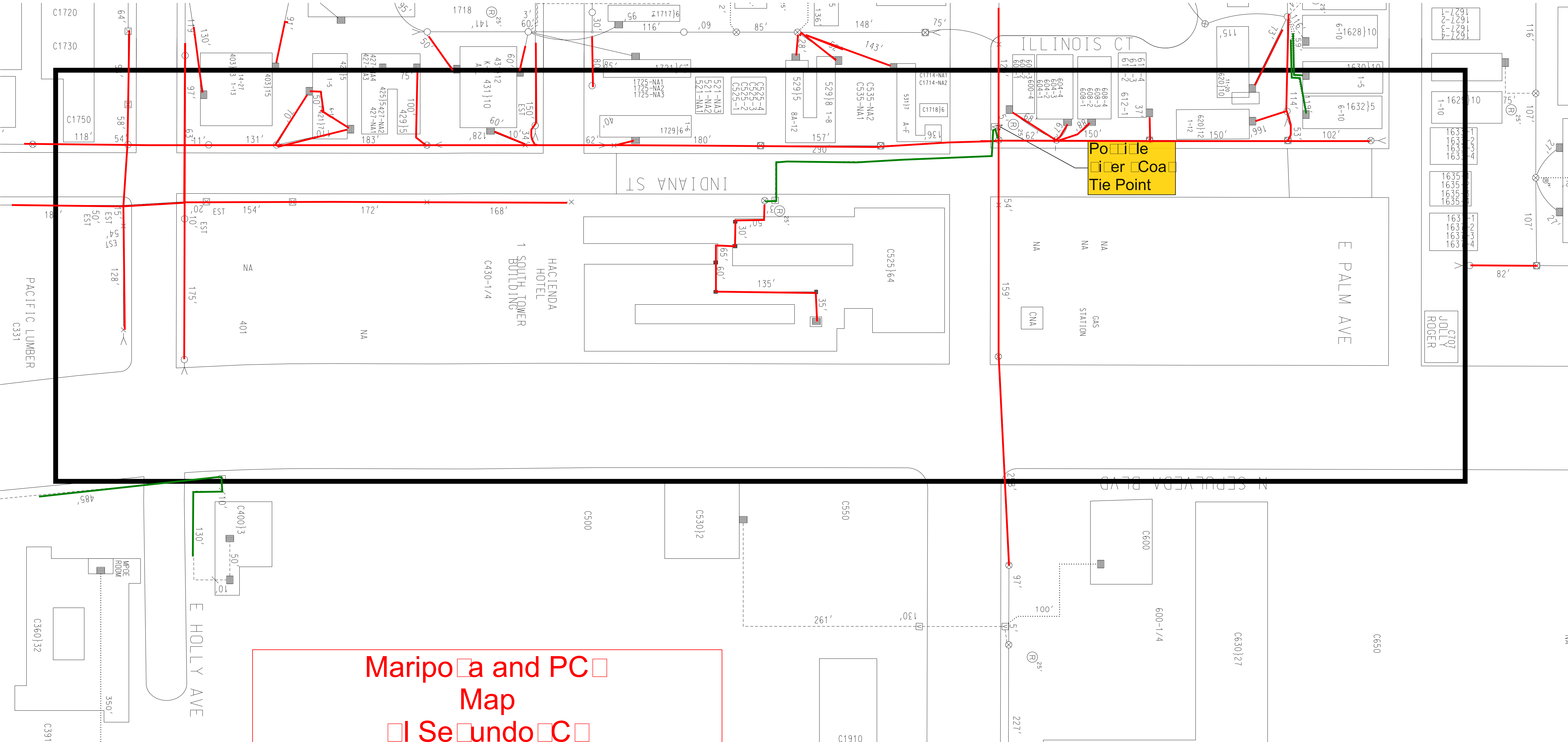
Please forward this information to the construction manager listed below. Upon receipt, a Charter representative will be assigned to you to work through the process. Ultimately, a mutually acceptable service agreement for the Property will be required and your cooperation in the process is appreciated.

Construction Manager Contact:
Bowers, Judy
Manager, Enterprise Service Delivery
17777 Center Court Drive North, 8th Floor
Cerritos CA 90703
562-677-0259
judy.bowers@charter.com

Sincerely,

Judith Bowers (Sep 5, 2019)

EXHIBIT 9 - TELECOM (CHARTER)

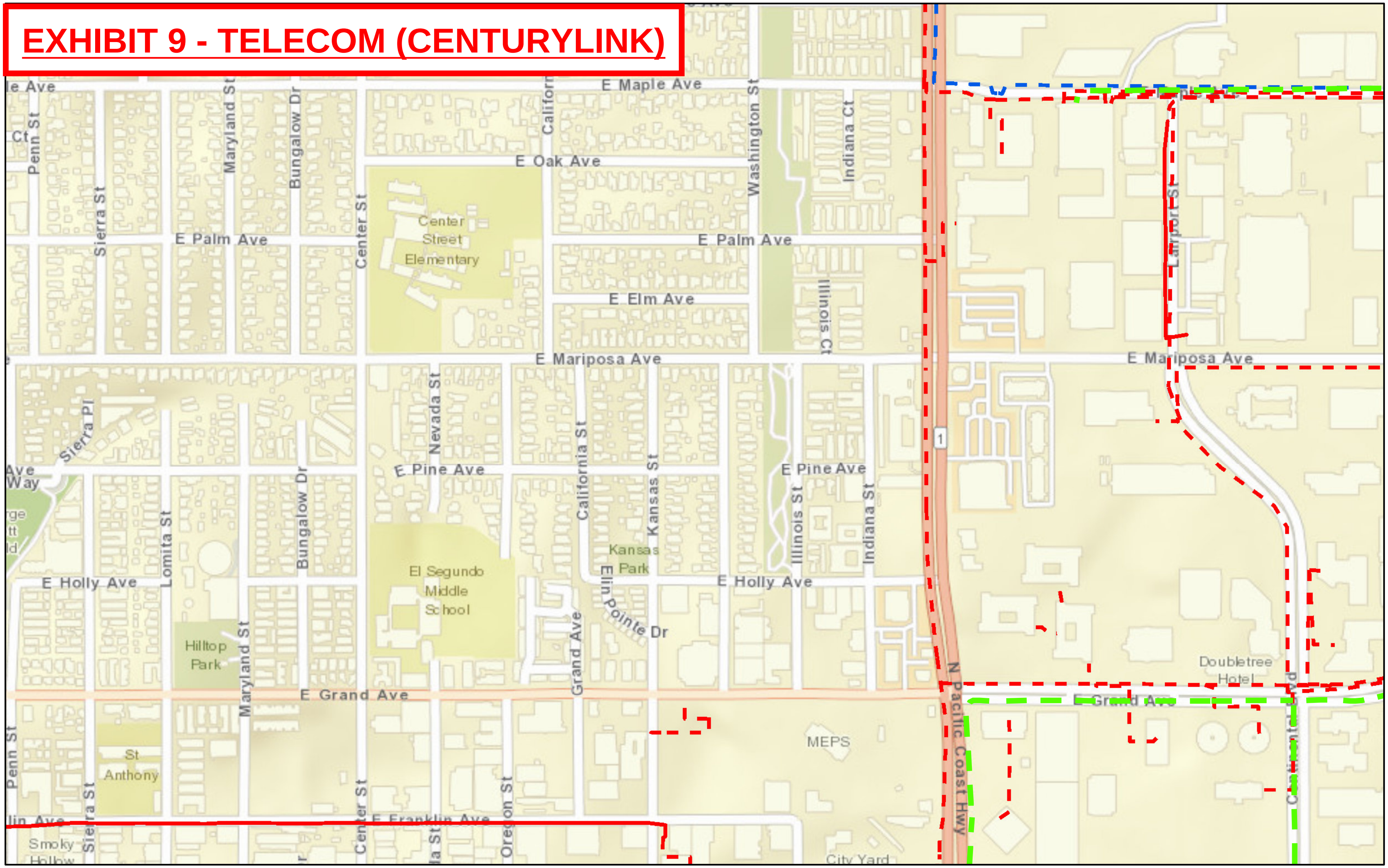


Mariposa and PCH
Map
El Segundo, CA

Red - existing Charter aerial facilities within project limits

Green - existing Charter underground facilities within project limits

CenturyLink and Level 3 Network



July 15, 2019

1:9,028

0 0.075 0.15 0.3 mi

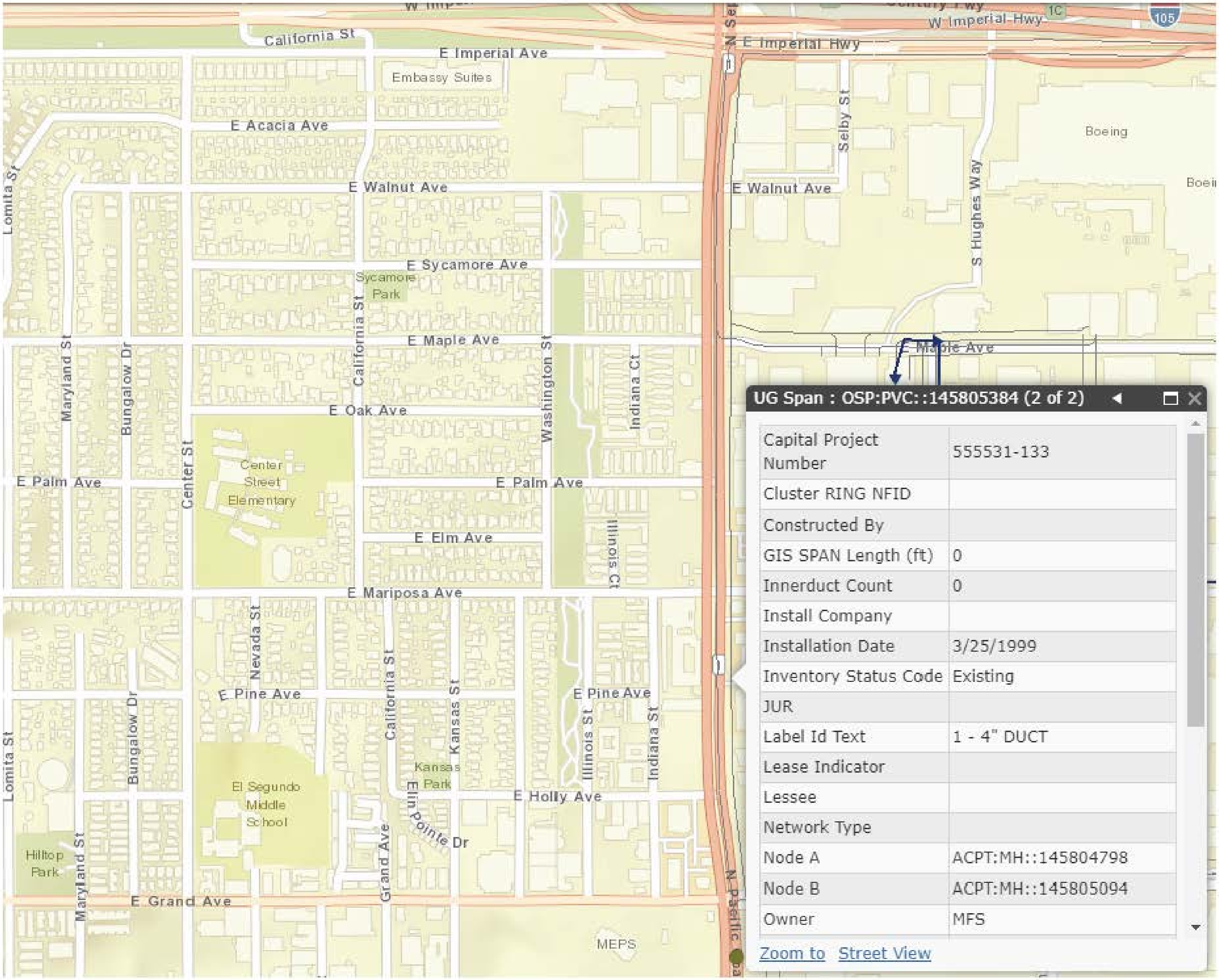
0 0.1 0.2 0.4 km

CTL National Underground - All	Level 3 Facilities	Non Level 3 Facilities	twtc CLA
Owned	Aerial	Aerial	Aerial
	Underground	Underground	Underground

Centurylink Data is Highly Confidential and Proprietary.
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan,

Persons working in the area covered by this data must contact the statewide Call-Before-You-Dig System to ascertain the location of underground facilities prior to performing any excavation. CenturyLink and Level 3 Data is Highly Confidential and Proprietary
CenturyLink and Level 3 Communications Data is Confidential

EXHIBIT 9 - TELECOM (VERIZON)



700 South Flower Street, Suite 2100 Los Angeles, CA 90017 213.418.0201 kpff.com

APPENDIX C

SEWER STUDY

EXHIBIT 1 – DRAINAGE AREA MAP AND MANHOLE LOCATIONS
EXHIBIT 2 – FLOW MONITORING DATA
EXHIBIT 3 – FLOWMASTER ANALYSIS
EXHIBIT 4 – US3 PROJECT, EQUIPMENT, AND COMPANY INFORMATION

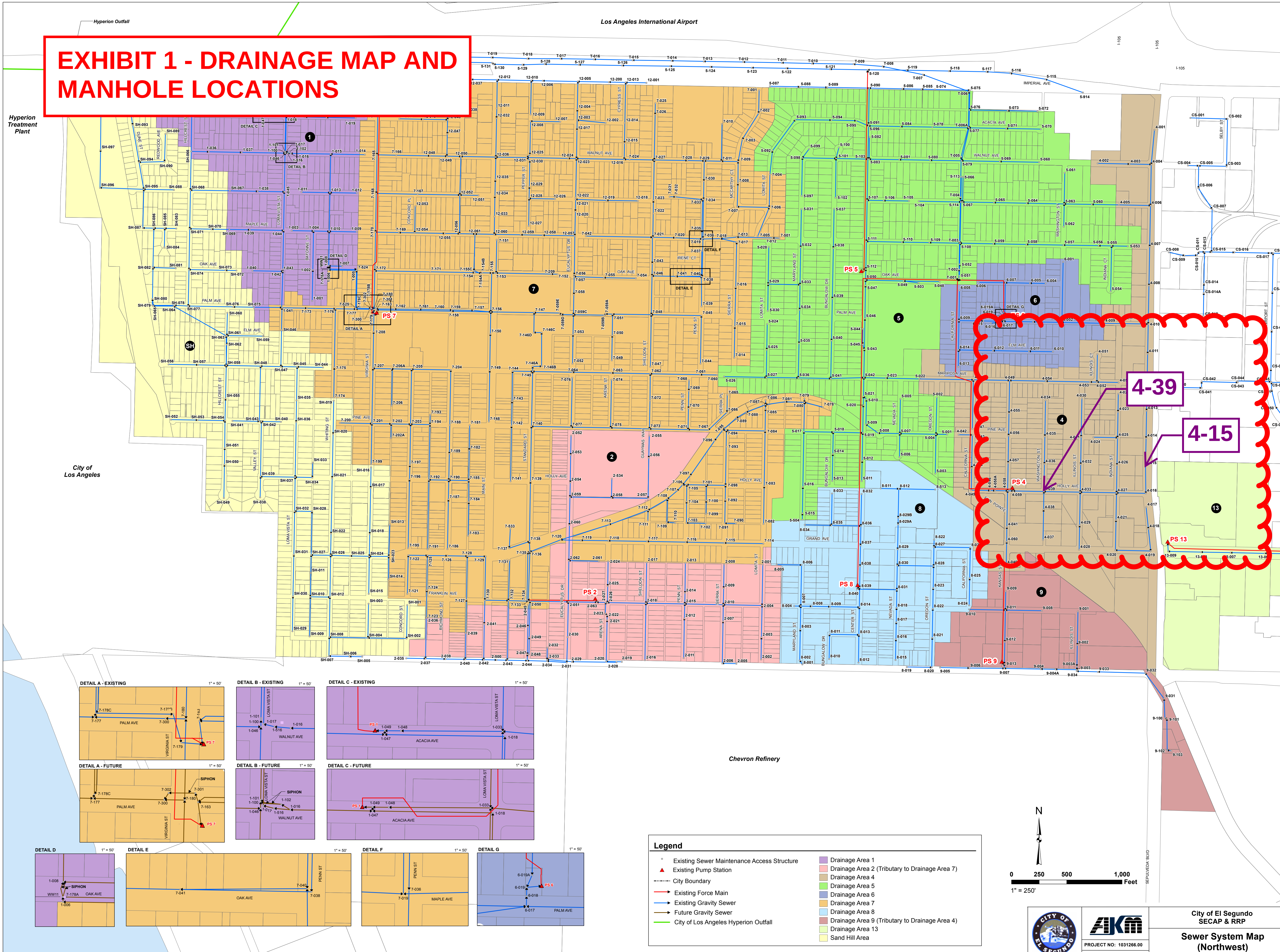


EXHIBIT 1 - DRAINAGE MAP AND MANHOLE LOCATIONS
Los Angeles International Airport
Hyperion Outfall
Hyperion Treatment Plant
City of Los Angeles
Chevron Refinery
4-39
4-15
PS 2
PS 4
PS 5
PS 7
PS 8
PS 9
PS 13
DETAIL A - EXISTING
DETAIL A - FUTURE
DETAIL B - EXISTING
DETAIL B - FUTURE
DETAIL C - EXISTING
DETAIL C - FUTURE
DETAIL D
DETAIL E
DETAIL F
DETAIL G
Legend
Existing Sewer Maintenance Access Structure
Existing Pump Station
City Boundary
Existing Force Main
Existing Gravity Sewer
Future Gravity Sewer
City of Los Angeles Hyperion Outfall
Drainage Area 1
Drainage Area 2 (Tributary to Drainage Area 7)
Drainage Area 4
Drainage Area 5
Drainage Area 6
Drainage Area 7
Drainage Area 8
Drainage Area 9 (Tributary to Drainage Area 4)
Drainage Area 13
Sand Hill Area
N
0 250 500 1,000 Feet
1" = 250'
PROJECT NO: 1031266.00
DATE: December 2014
City of El Segundo
SECAP & RRP
Sewer System Map
(Northwest)

EXHIBIT 2 - FLOW MONITORING DATA (4-15)

Site Report 5/14/2020

Confidential Proprietary Information

KPFF

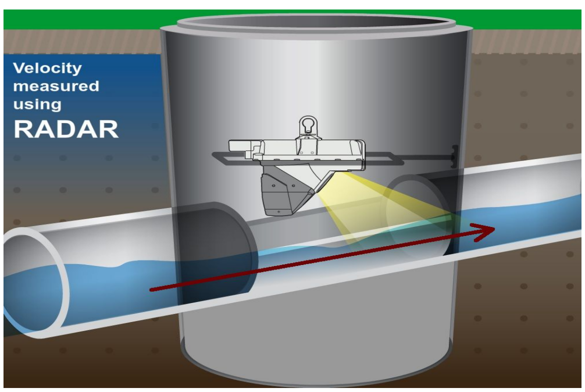
MH at ~475 CA-1
El Segundo, CA 90245
MH # 4-015

2020.04 PCH MH 4-15

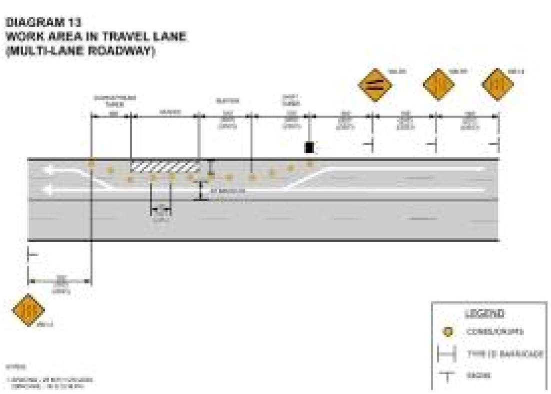
Access:	System Type:	Install Date: 4/27/2020
MH at edge of SB lane, S□ of address	Sanitary [X] Storm [ ]	

Map

Technology



Traffic Plan



Flow Meter			
Meter Depth: 134"			
MH Coordinates: 33.921576, -118.396415			
Slow to moderate open channel hydraulics			
Avg Velocity	Avg Measured Level		Multiplier
0.75 fps	0.75"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0

Notes

Three inlets from N & W (1+drop inlet); west line plugged & no observed flow from drop inlet; monitored US line as it provided best hydraulics.

Traffic Safety

Used cones & signs in accord w/approved WATCH Diagram 13.

Land Use

Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth	157"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Brick
Silt	0"
Velocity Profile Data	*
Velocity Profile Taken	0.4 2-D
Sensor Offset	22.90"
Sensor Dist. to Crown	10.90"
Sensor Direction	Downstream
Flow Heading	South

EXHIBIT 2 - FLOW MONITORING DATA (4-15)

Meter Site Document

2020.04 PCH MH 4-15

MH at ~475 CA-1

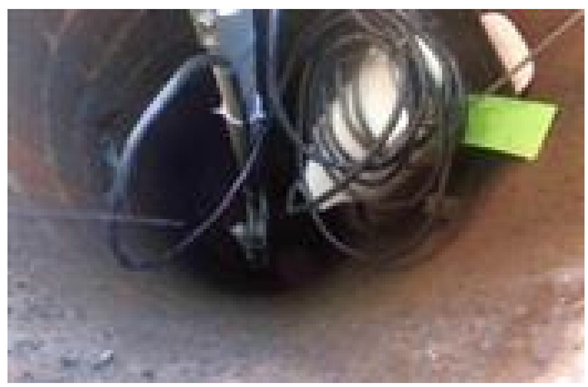
El Segundo, CA 90245

Site

Manhole Before Install

Installation Process

Installed



Upstream

Monitored Pipe Size

EXHIBIT 2 - FLOW MONITORING DATA (4-15)

Temporary Flow Study

KPFF

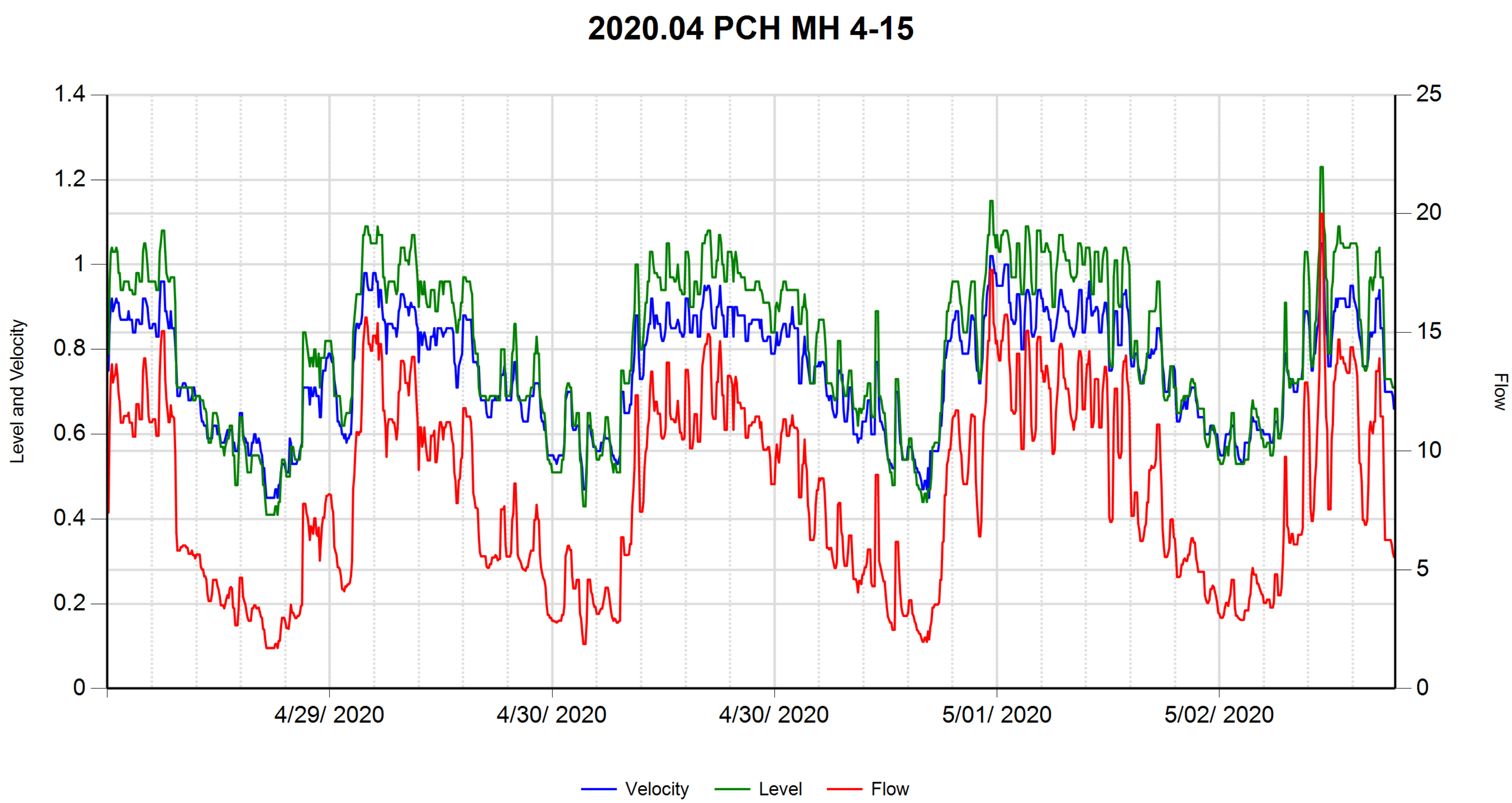
2020.04 PCH MH 4-15

Meter Start Date		From	4/28/2020
Meter Stop Date		To	5/13/2020
Velocity (fps)		Level (in)	Flow (mgd)
Average	0.756	0.830	0.012
Maximum	1.120	1.300	0.033
Minimum	0.450	0.410	0.002
Pipe Size		12.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

9314 Bond Ave, Suite A
El Cajon, CA 92021

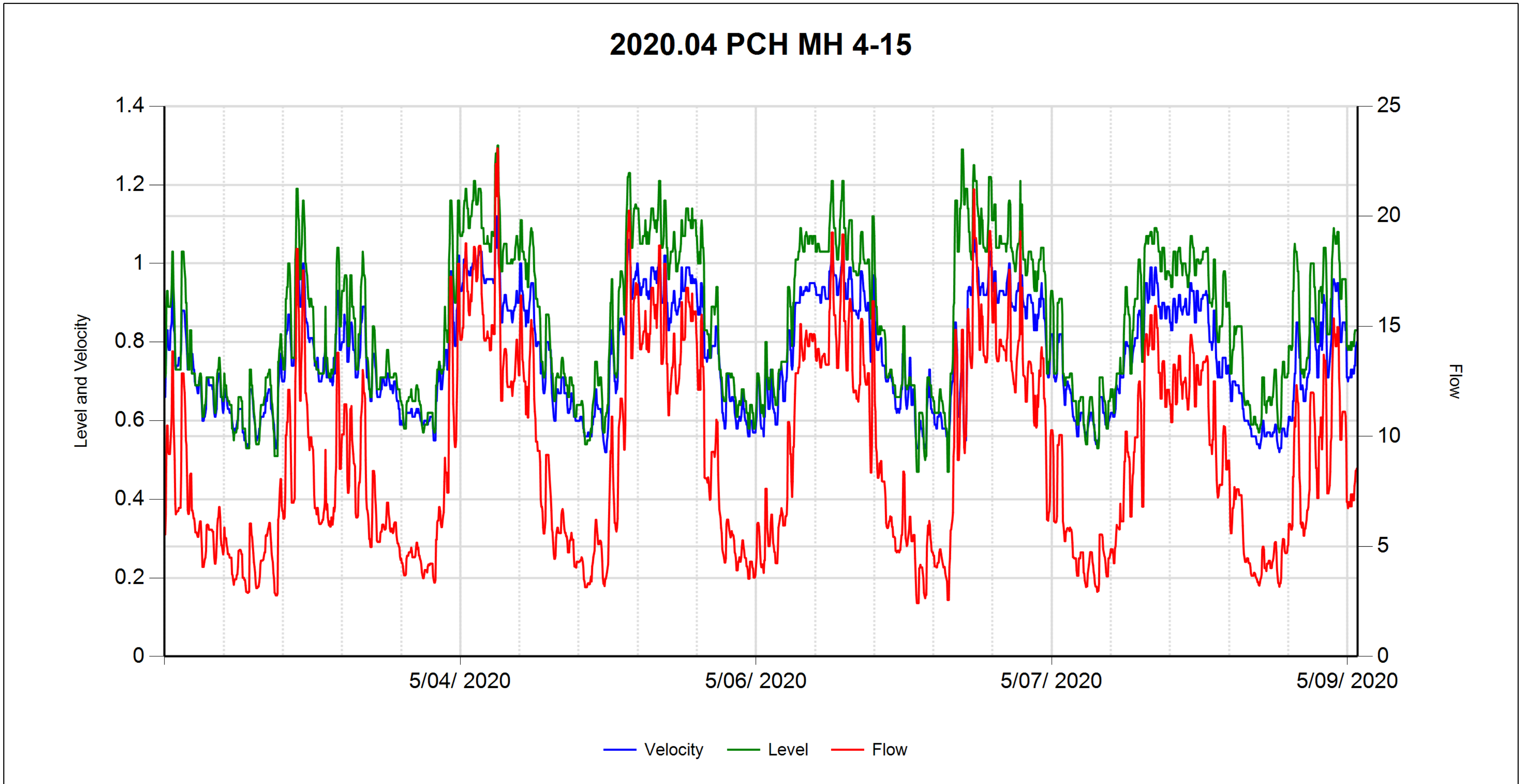
601 N. Parkcenter Drive Suite 209
Santa Ana, CA 92705



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.749	0.808	8.266	**RainFall**	Inches
Maximum	1.050	1.230	20.000		
Minimum	0.450	0.410	1.710		

5/14/2020

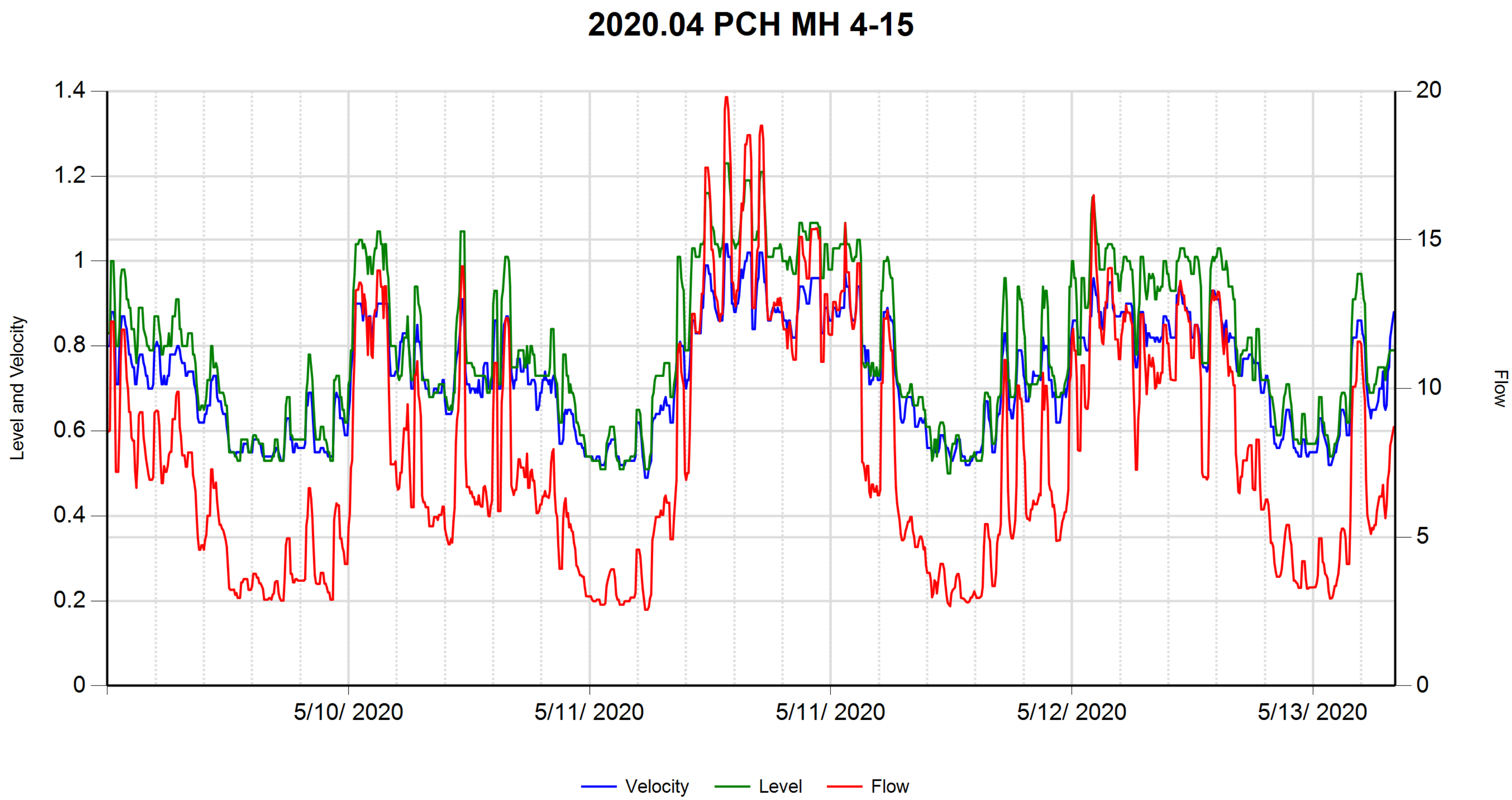
EXHIBIT 2 - FLOW MONITORING DATA (4-15)



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.769	0.852	9.145	**RainFall**	Inches
Maximum	1.120	1.300	23.090		
Minimum	0.520	0.470	2.430		

5/14/2020

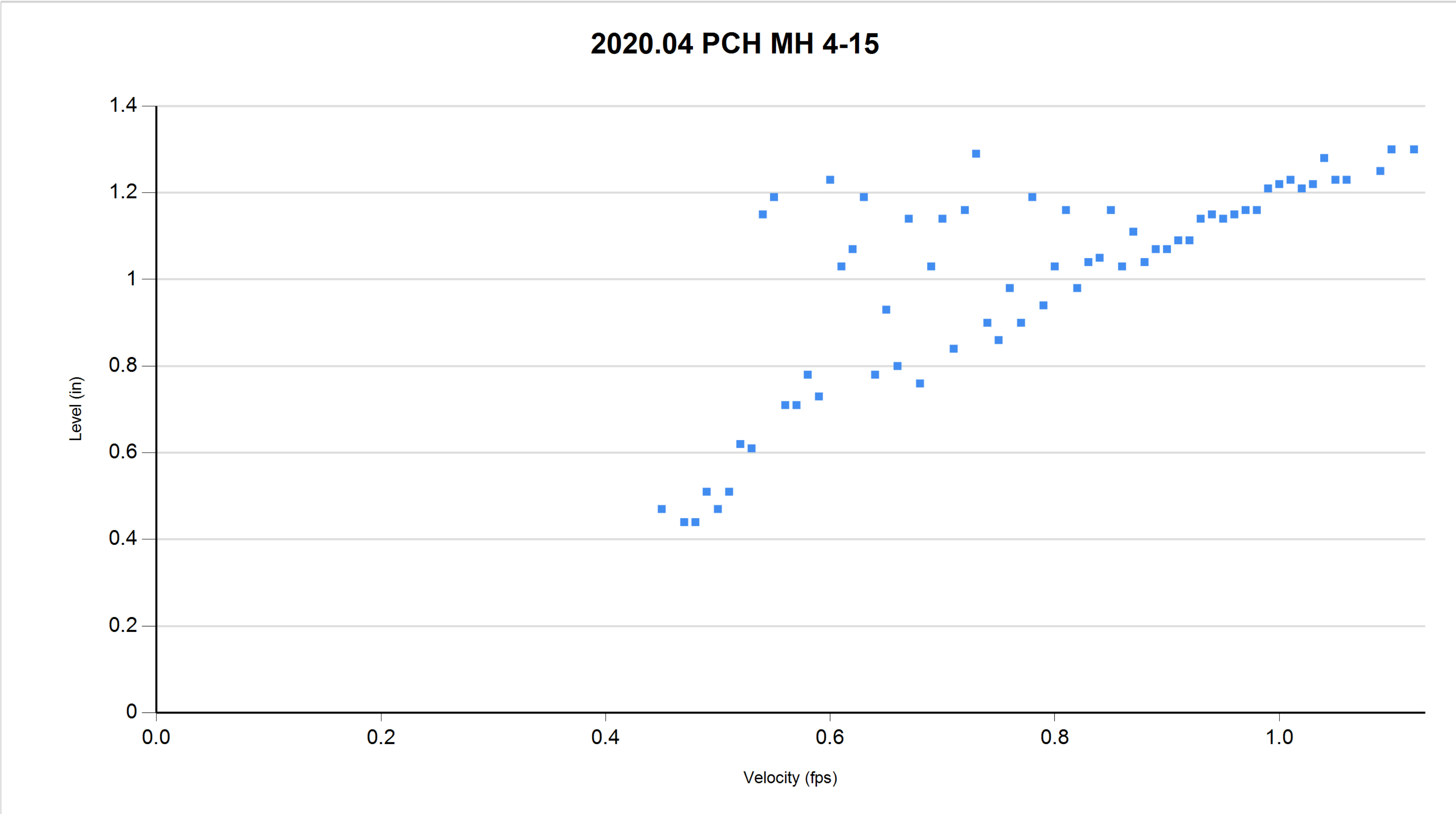
EXHIBIT 2 - FLOW MONITORING DATA (4-15)



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	0.729	0.796	7.854	**RainFall**	Inches
Maximum	1.040	1.230	19.800		
Minimum	0.490	0.500	2.560		

5/14/2020

EXHIBIT 2 - FLOW MONITORING DATA (4-15)



4/28/2020 thru 5/13/2020

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EXHIBIT 2 - FLOW MONITORING DATA (4-15)

EXHIBIT 2 - FLOW MONITORING DATA (4-15)

Utility Systems Science and Software

Report Date: 05/14/2020
Customer: KPFF
Group: El Segundo
Site: 2020.04 PCH MH 4-15

Statistics for 2020.04 PCH MH 4-15: 04/28/2020 thru 05/13/2020

	Flow (GPM)			Flow (MGD)			Velocity (FPS)			Level (inches)				
Date	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Total Gal	Rain
4/28/20	9.96	15.05	4.58	0.01	0.02	0.01	0.82	0.96	0.62	0.89	1.08	0.65	14,345	
4/29/20	7.35	15.63	1.71	0.01	0.02	0.00	0.72	0.98	0.45	0.76	1.09	0.41	10,581	
4/30/20	8.40	14.93	1.88	0.01	0.02	0.00	0.75	0.95	0.47	0.82	1.08	0.43	12,092	
5/1/20	9.19	17.63	1.97	0.01	0.03	0.00	0.78	1.02	0.45	0.85	1.15	0.44	13,239	
5/2/20	7.36	20.00	2.89	0.01	0.03	0.00	0.73	1.05	0.53	0.77	1.23	0.53	10,594	
5/3/20	7.18	18.52	2.78	0.01	0.03	0.00	0.72	1.02	0.53	0.76	1.19	0.51	10,346	
Week:	**8.24**	**20.00**	**1.71**	**0.01**	**0.03**	**0.00**	**0.75**	**1.05**	**0.45**	**0.81**	**1.23**	**0.41**	**71,196**	
5/4/20	10.36	23.09	3.36	0.01	0.03	0.00	0.81	1.12	0.55	0.89	1.30	0.57	14,914	
5/5/20	10.21	20.26	3.15	0.01	0.03	0.00	0.80	1.06	0.52	0.89	1.23	0.54	14,706	
5/6/20	9.75	19.26	3.54	0.01	0.03	0.01	0.79	1.04	0.56	0.87	1.21	0.58	14,046	
5/7/20	10.08	21.22	2.43	0.01	0.03	0.00	0.79	1.09	0.53	0.90	1.29	0.47	14,522	
5/8/20	9.04	15.93	2.94	0.01	0.02	0.00	0.77	0.99	0.54	0.85	1.09	0.53	13,017	
5/9/20	7.57	15.36	3.17	0.01	0.02	0.00	0.71	0.96	0.52	0.81	1.09	0.57	10,905	
5/10/20	6.57	14.11	2.87	0.01	0.02	0.00	0.69	0.91	0.53	0.74	1.07	0.53	9,459	
Week:	**9.08**	**23.09**	**2.43**	**0.01**	**0.03**	**0.00**	**0.77**	**1.12**	**0.52**	**0.85**	**1.30**	**0.47**	**91,567**	
5/11/20	9.63	19.80	2.56	0.01	0.03	0.00	0.77	1.04	0.49	0.87	1.23	0.51	13,860	
5/12/20	8.26	16.50	2.68	0.01	0.02	0.00	0.75	0.96	0.52	0.82	1.15	0.50	11,900	
5/13/20	5.52	11.58	2.94	0.01	0.02	0.00	0.65	0.88	0.52	0.69	0.97	0.54	7,950	
Week:	**7.80**	**19.80**	**2.56**	**0.01**	**0.03**	**0.00**	**0.72**	**1.04**	**0.49**	**0.79**	**1.23**	**0.50**	**33,710**	
Totals:	**8.53**	**23.09**	**1.71**	**0.01**	**0.03**	**0.00**	**0.75**	**1.12**	**0.45**	**0.82**	**1.30**	**0.41**	**196,474**	

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

Site Report 5/14/2020

Confidential Proprietary Information

KPFF

2020.04 Holly MH 4-39

MH at ~1501 E. Holly Av
El Segundo, CA 90245
MH # 4-039

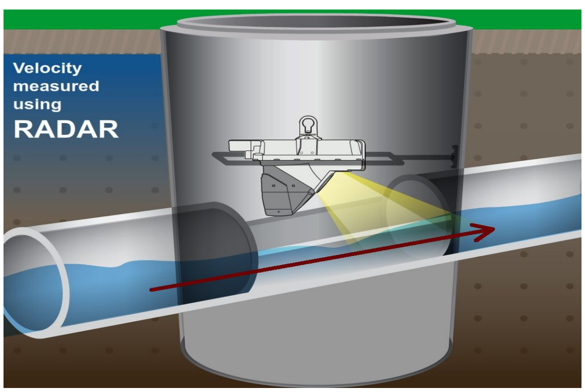
Access:
MH in middle of Holly Av and Washington St intersection

System Type:
Sanitary [X] Storm [ ]

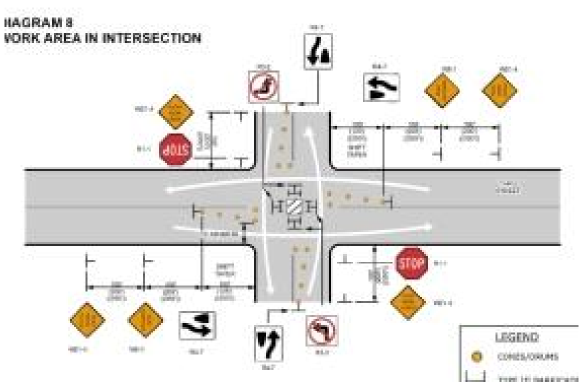
Install Date: 4/27/2020

Map

Technology



Traffic Plan



Flow Meter			
Meter Depth: 227"			
MH Coordinates: 33.920885, -118.399426			
Moderate open channel hydraulics with some turbulence due to inflow from laterals			
Avg Velocity	Avg Measured Level		Multiplier
1.75 fps	2.0"		1.0
Gas			
O2	H2S	CO	LEL
20.9	0	0	0
Notes			
Four inlets from N (1+drop inlet), E & S; no observed flow from drop inlet; monitored downstream line to get total flow.			
Traffic Safety			
Used cones & signs in accord w/approved WATCH Diagram 8.			
Land Use			
Residential	Commercial	Industrial	Trunk
X			

Manhole Depth	244"
Monitored Pipe Size	12"
Inner Pipe Size (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Brick
Silt	0"
Velocity Profile Data	*
Velocity Profile Taken	0.4 2-D
Sensor Offset	16.86"
Sensor Dist. to Crown	4.86"
Sensor Direction	Downstream
Flow Heading	West

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

Meter Site Document

2020.04 Holly MH 4-39

MH at ~1501 E. Holly Av

El Segundo, CA 90245

Site

Manhole Before Install

Installation Process

Installed

Monitored Pipe Size

Downstream

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

Temporary Flow Study

KPFF

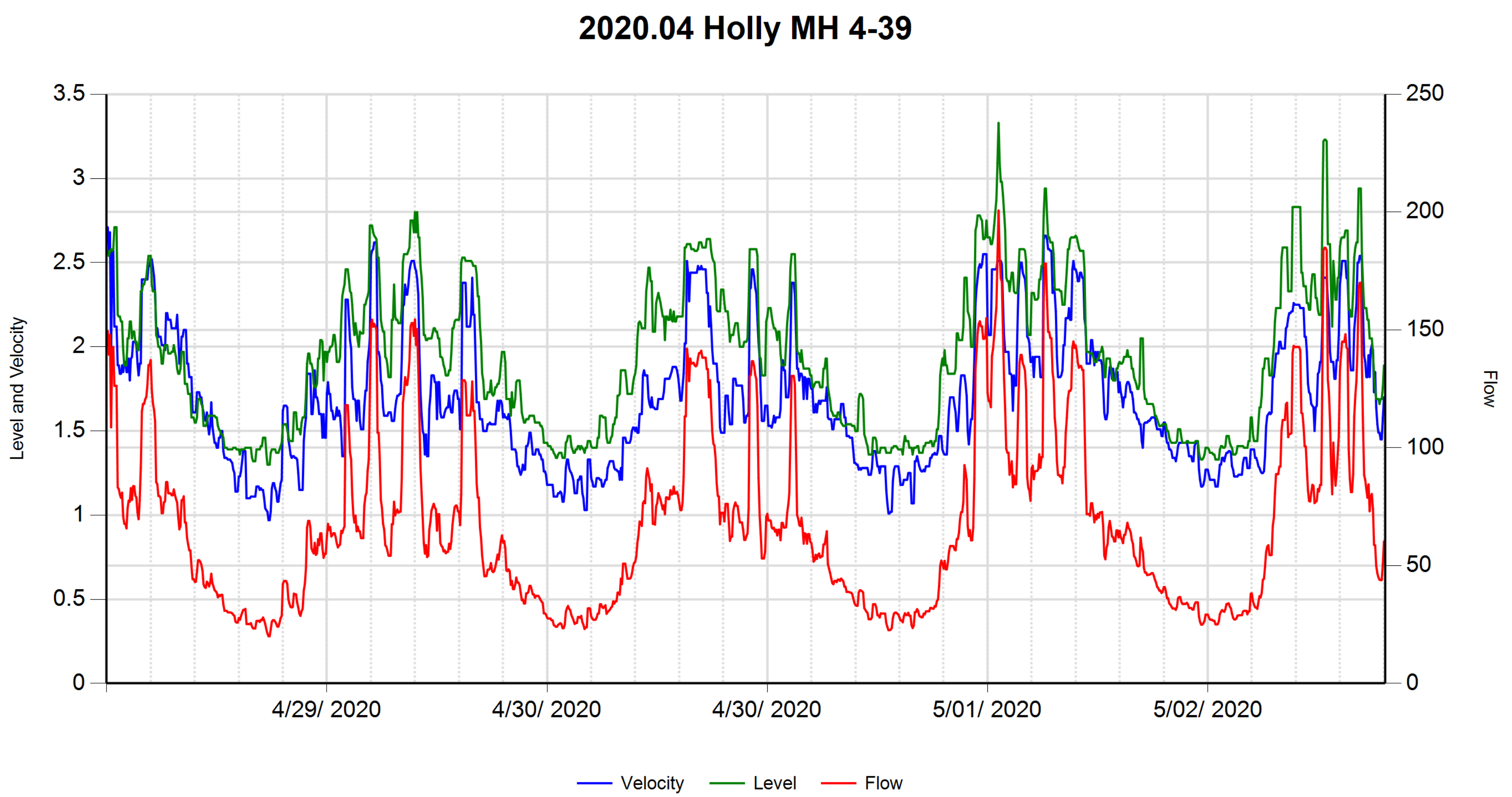
2020.04 Holly MH 4-39

Meter Start Date		From	4/28/2020
Meter Stop Date		To	5/13/2020
Velocity (fps)		Level (in)	Flow (mgd)
Average	1.753	1.997	0.106
Maximum	3.030	3.330	0.336
Minimum	0.830	1.300	0.025
Pipe Size		12.000	
Estimated Capacity (mgd)		Not Calculated	
Capacity Used		Not Calculated	
Sensor Type		Hach - Flodar	

Utility Systems, Science and Software

9314 Bond Ave, Suite A
El Cajon, CA 92021

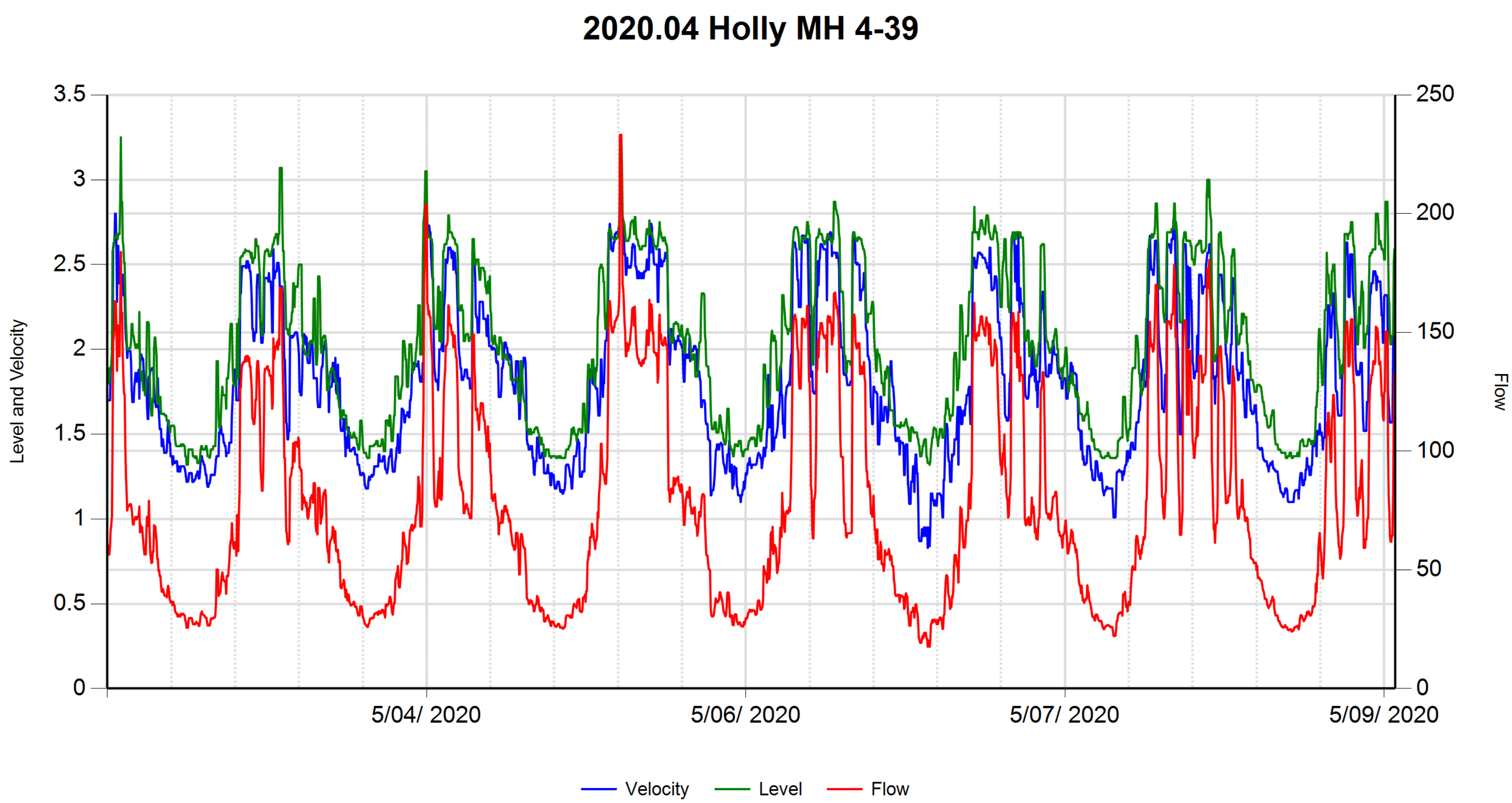
601 N. Parkcenter Drive Suite 209
Santa Ana, CA 92705



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.699	1.948	68.502	**RainFall**	Inches
Maximum	2.710	3.330	200.690		
Minimum	0.970	1.300	20.030		

5/14/2020

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

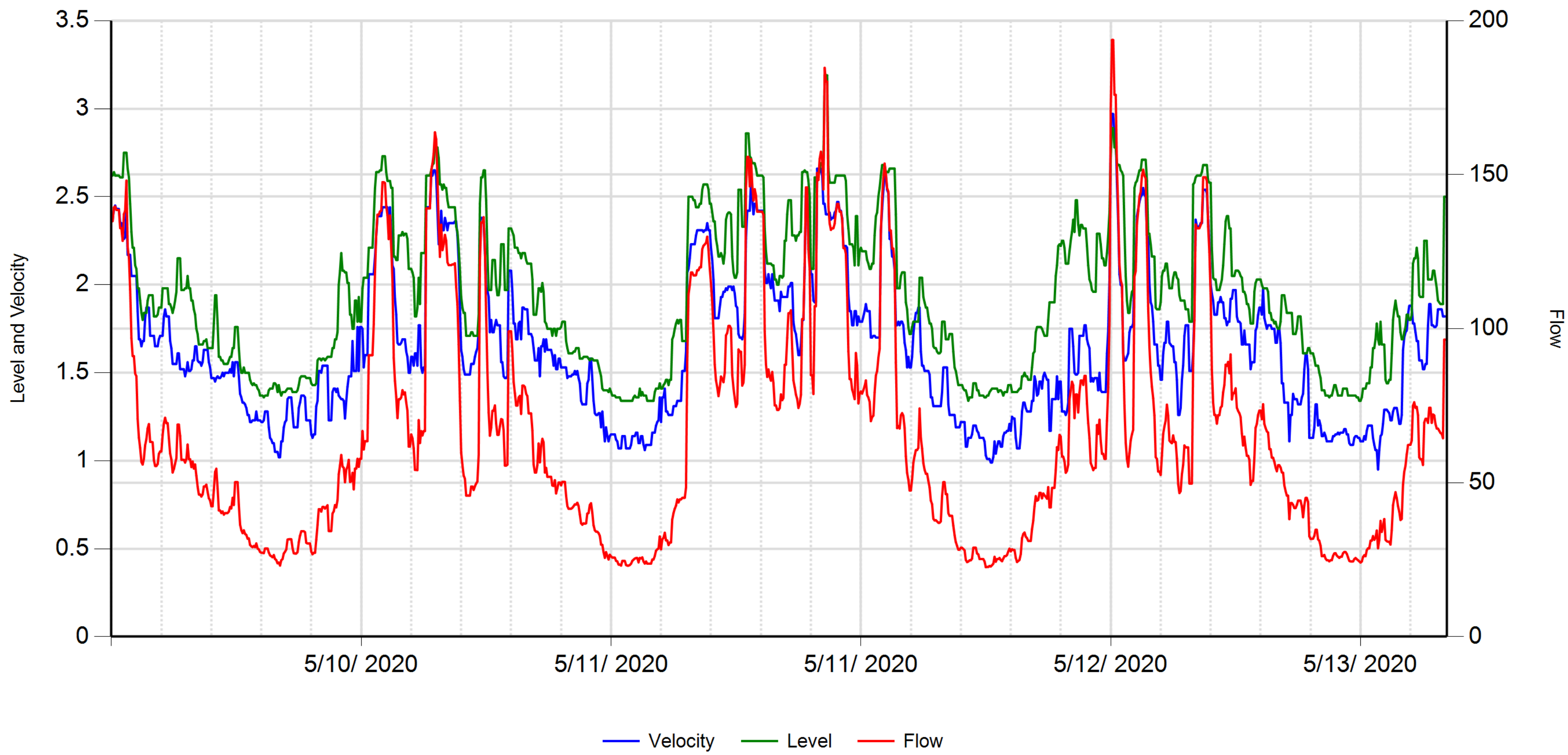


	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.815	2.031	78.623	**RainFall**	Inches
Maximum	3.030	3.250	233.200		
Minimum	0.830	1.320	17.650		

5/14/2020

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

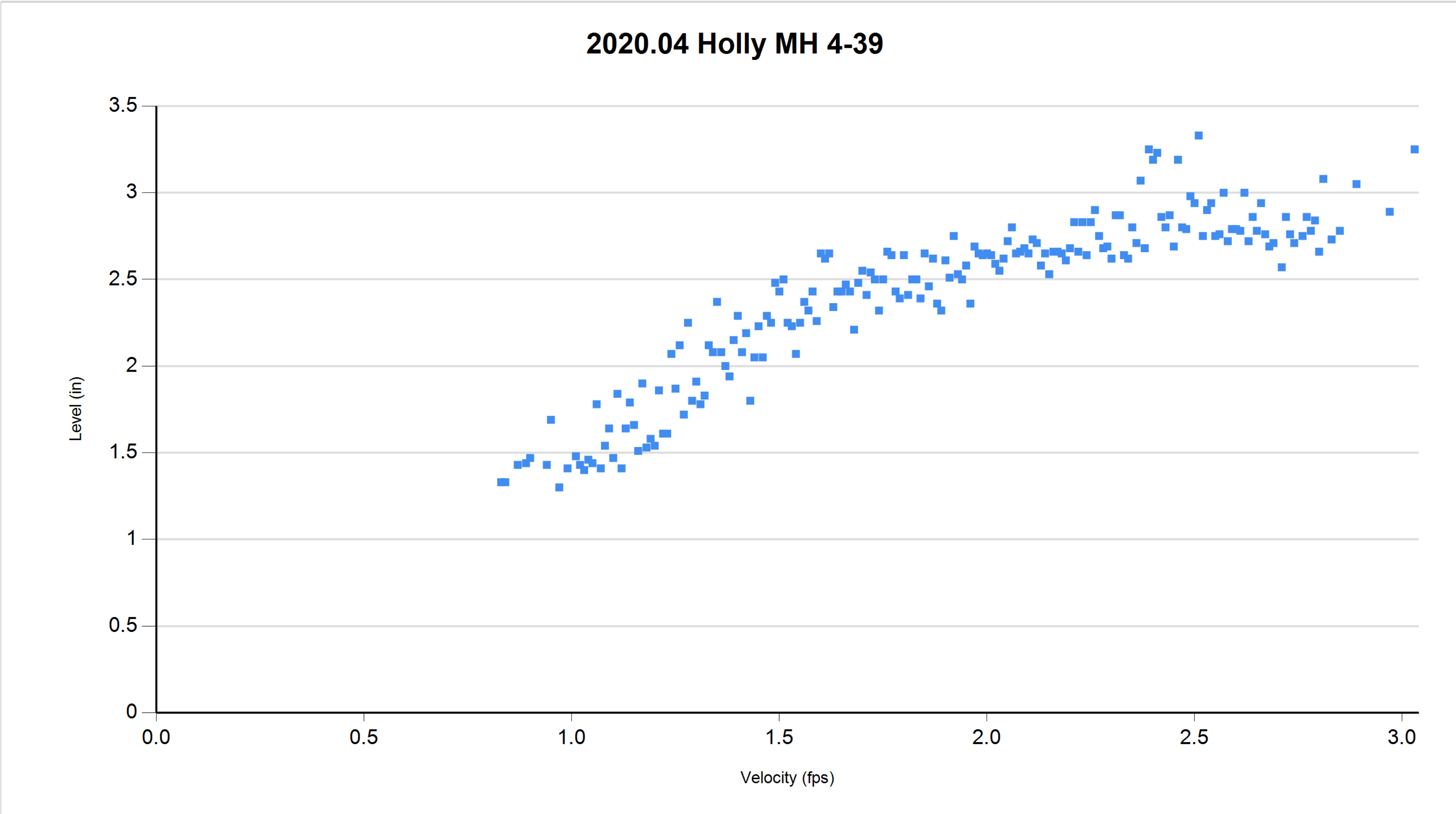
2020.04 Holly MH 4-39



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	1.650	1.948	66.500	**RainFall**	Inches
Maximum	2.970	3.190	193.760		
Minimum	0.950	1.340	22.570		

5/14/2020

EXHIBIT 2 - FLOW MONITORING DATA (4-39)



4/28/2020 thru 5/13/2020

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EXHIBIT 2 - FLOW MONITORING DATA (4-39)

EXHIBIT 2 - FLOW MONITORING DATA (4-39)

Utility Systems Science and Software

Report Date: 05/14/2020
Customer: KPFF
Group: El Segundo
Site: 2020.04 Holly MH 4-39

Statistics for 2020.04 Holly MH 4-39: 04/28/2020 thru 05/13/2020

	Flow (GPM)			Flow (MGD)			Velocity (FPS)			Level (inches)				
Date	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Total Gal**	**Rain**
4/28/20	83.21	149.54	40.56	0.12	0.22	0.06	2.03	2.71	1.53	2.04	2.71	1.53	119,818	
4/29/20	62.43	154.46	20.03	0.09	0.22	0.03	1.61	2.62	0.97	1.91	2.80	1.30	89,899	
4/30/20	64.39	142.06	23.11	0.09	0.20	0.03	1.64	2.51	1.03	1.93	2.64	1.34	92,727	
5/1/20	73.71	200.69	22.60	0.11	0.29	0.03	1.75	2.66	1.01	1.99	3.33	1.36	106,144	
5/2/20	73.73	184.83	24.96	0.11	0.27	0.04	1.77	2.80	1.17	1.98	3.25	1.33	106,169	
5/3/20	72.71	168.77	25.67	0.10	0.24	0.04	1.77	2.59	1.19	1.97	3.07	1.32	104,696	
Week:	**71.70**	**200.69**	**20.03**	**0.10**	**0.29**	**0.03**	**1.76**	**2.80**	**0.97**	**1.97**	**3.33**	**1.30**	**619,453**	
5/4/20	75.36	203.80	26.03	0.11	0.29	0.04	1.82	2.89	1.18	1.99	3.05	1.36	108,513	
5/5/20	86.19	233.20	25.29	0.12	0.34	0.04	1.91	3.03	1.14	2.07	3.25	1.36	124,119	
5/6/20	81.33	166.83	26.21	0.12	0.24	0.04	1.84	2.69	1.10	2.05	2.87	1.37	117,109	
5/7/20	76.08	162.41	17.65	0.11	0.23	0.03	1.76	2.68	0.83	2.03	2.84	1.32	109,558	
5/8/20	82.25	180.53	22.13	0.12	0.26	0.03	1.82	2.77	1.01	2.09	3.00	1.36	118,437	
5/9/20	72.80	155.53	24.11	0.10	0.22	0.03	1.73	2.63	1.10	2.00	2.87	1.36	104,837	
5/10/20	64.67	163.79	23.11	0.09	0.24	0.03	1.65	2.65	1.02	1.92	2.78	1.36	93,131	
Week:	**76.95**	**233.20**	**17.65**	**0.11**	**0.34**	**0.03**	**1.79**	**3.03**	**0.83**	**2.02**	**3.25**	**1.32**	**775,704**	
5/11/20	79.06	184.72	23.09	0.11	0.27	0.03	1.78	2.66	1.06	2.07	3.19	1.34	113,849	
5/12/20	64.00	193.76	22.57	0.09	0.28	0.03	1.60	2.97	0.99	1.95	2.89	1.34	92,160	
5/13/20	42.21	96.46	24.08	0.06	0.14	0.03	1.36	1.89	0.95	1.67	2.50	1.34	60,775	
Week:	**61.76**	**193.76**	**22.57**	**0.09**	**0.28**	**0.03**	**1.58**	**2.97**	**0.95**	**1.90**	**3.19**	**1.34**	**266,784**	
Totals:	**72.13**	**233.20**	**17.65**	**0.10**	**0.34**	**0.03**	**1.74**	**3.03**	**0.83**	**1.98**	**3.33**	**1.30**	**1,661,941**	

EXHIBIT 3 - FLOW MASTER ANALYSIS

4-15

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	0.30000	%
Diameter	12.00	in
Discharge	0.213	mgd

Results

Normal Depth	3.47	in
Flow Area	0.19	ft²
Wetted Perimeter	1.13	ft
Hydraulic Radius	1.99	in
Top Width	0.91	ft
Critical Depth	0.24	ft
Percent Full	28.9	%
Critical Slope	0.00655	ft/ft
Velocity	1.75	ft/s
Velocity Head	0.05	ft
Specific Energy	0.34	ft
Froude Number	0.68	
Maximum Discharge	1.95	ft³/s
Discharge Full	1.81	ft³/s
Slope Full	0.00010	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	28.89	%
Downstream Velocity	Infinity	ft/s

4-15

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.47	in
Critical Depth	0.24	ft
Channel Slope	0.30000	%
Critical Slope	0.00655	ft/ft

EXHIBIT 3 - FLOW MASTER ANALYSIS

4-39

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	1.00000	%
Diameter	12.00	in
Discharge	0.538	mgd

Results

Normal Depth	4.10	in
Flow Area	0.24	ft^2
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.28	in
Top Width	0.95	ft
Critical Depth	0.38	ft
Percent Full	34.2	%
Critical Slope	0.00662	ft/ft
Velocity	3.51	ft/s
Velocity Head	0.19	ft
Specific Energy	0.53	ft
Froude Number	1.24	
Maximum Discharge	3.56	ft^3/s
Discharge Full	3.31	ft^3/s
Slope Full	0.00063	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	34.20	%
Downstream Velocity	Infinity	ft/s

4-39

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.10	in
Critical Depth	0.38	ft
Channel Slope	1.00000	%
Critical Slope	0.00662	ft/ft

Methods & Procedures & Equipment

EXHIBIT 4

Methods and Procedures

Utility Systems Science & Software provided KPFF with an off the shelf, non-proprietary flow monitoring solution that included three state of the art Hach Flo-Dar® AV Sensor systems. The project course of action is listed below. The US³ team:

- Assessed permitting and traffic control at the sites on E. Holly Av, Illinois St and N. Pacific Coast Hwy in El Segundo, CA.
- Validated the sites for suitability for sewer flow monitoring for the Pacific Coast Commons Mixed Use Development Project.
- Submitted the appropriate traffic control diagrams from the Work Area Traffic Control Handbook (WATCH) and obtained a City Encroachment Permit.
- Coordinated with the City Wastewater Division for installation of equipment.
- Installed and removed traffic control in accord with site-specific WATCH diagrams for the installation, maintenance visit and removal of equipment.
- Installed the flow monitoring equipment per manufacturer recommendations on 4/27/20. Confirmed calibration and reset collection interval at all sites on 4/28/20.
- Removed the equipment, validated the data and prepared the data reports.
    - The data supports the conclusion that there is capacity available in the monitored sewer lines since the depth for the peak flows observed during this study did not exceed the d/D limit of 0.50 at any of the sites at any time.
    - The maximum d/D observed during this study was ~0.28 at Holly MH 4-39.

Equipment

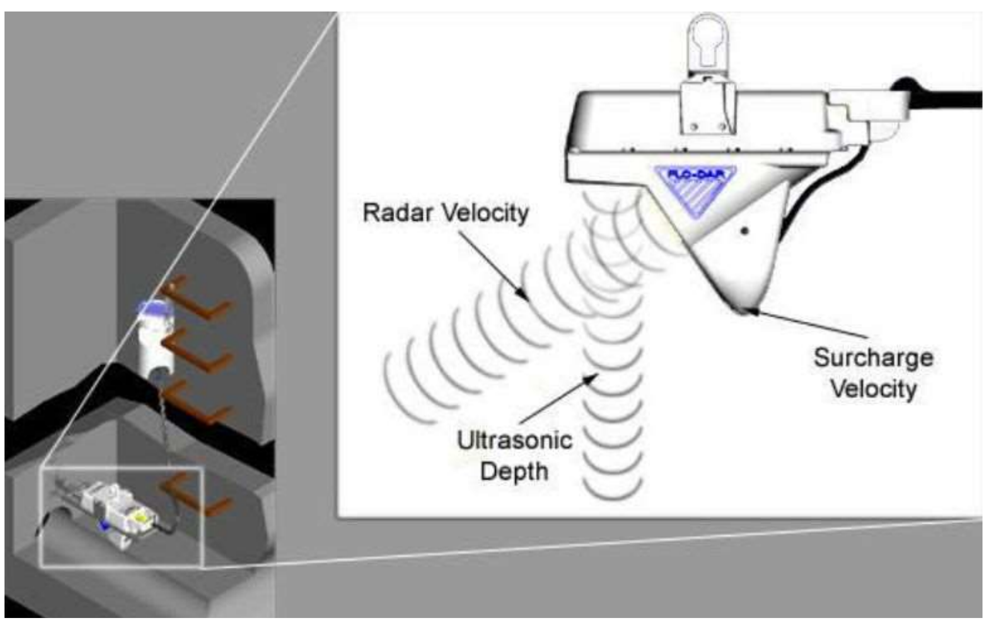


Figure: Equipment installed for the Sewer Flow Monitoring Study

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

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.**

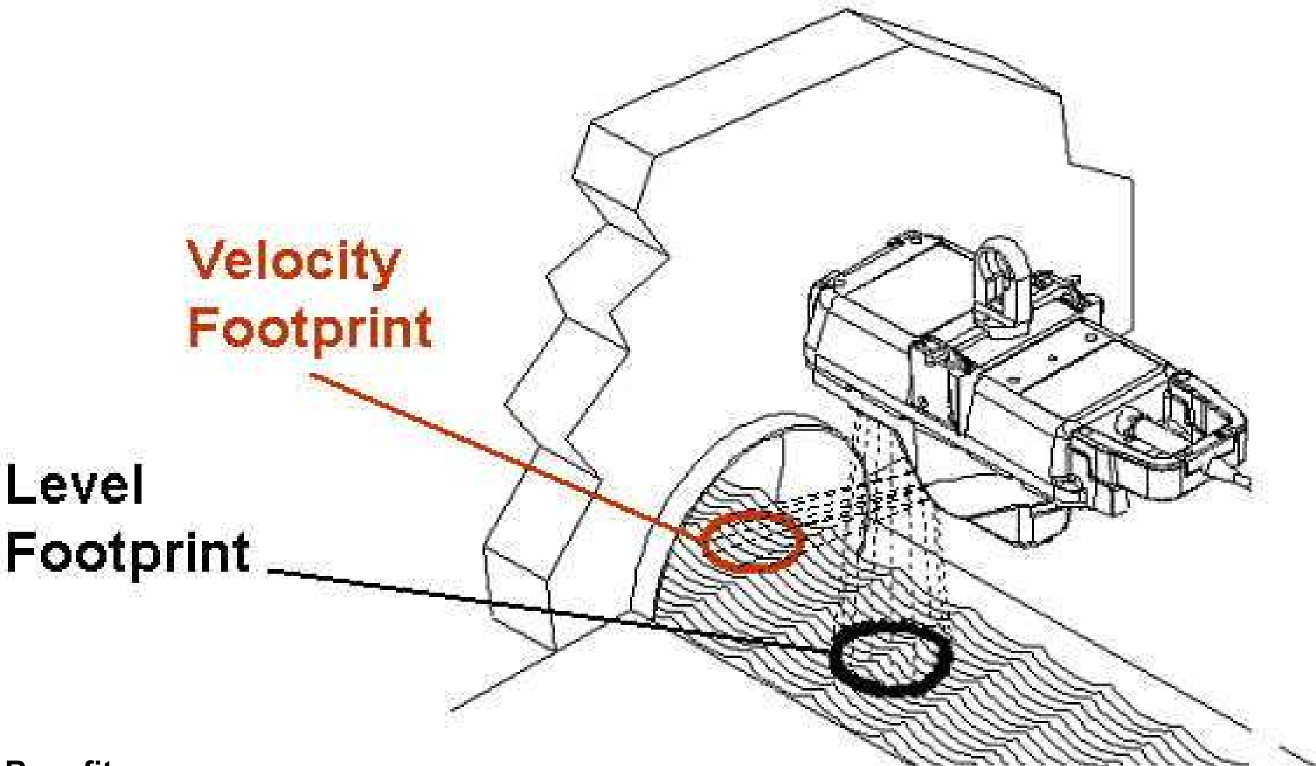
VELOCITY (Optional Surcharge Velocity Sensor)

- **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.

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.

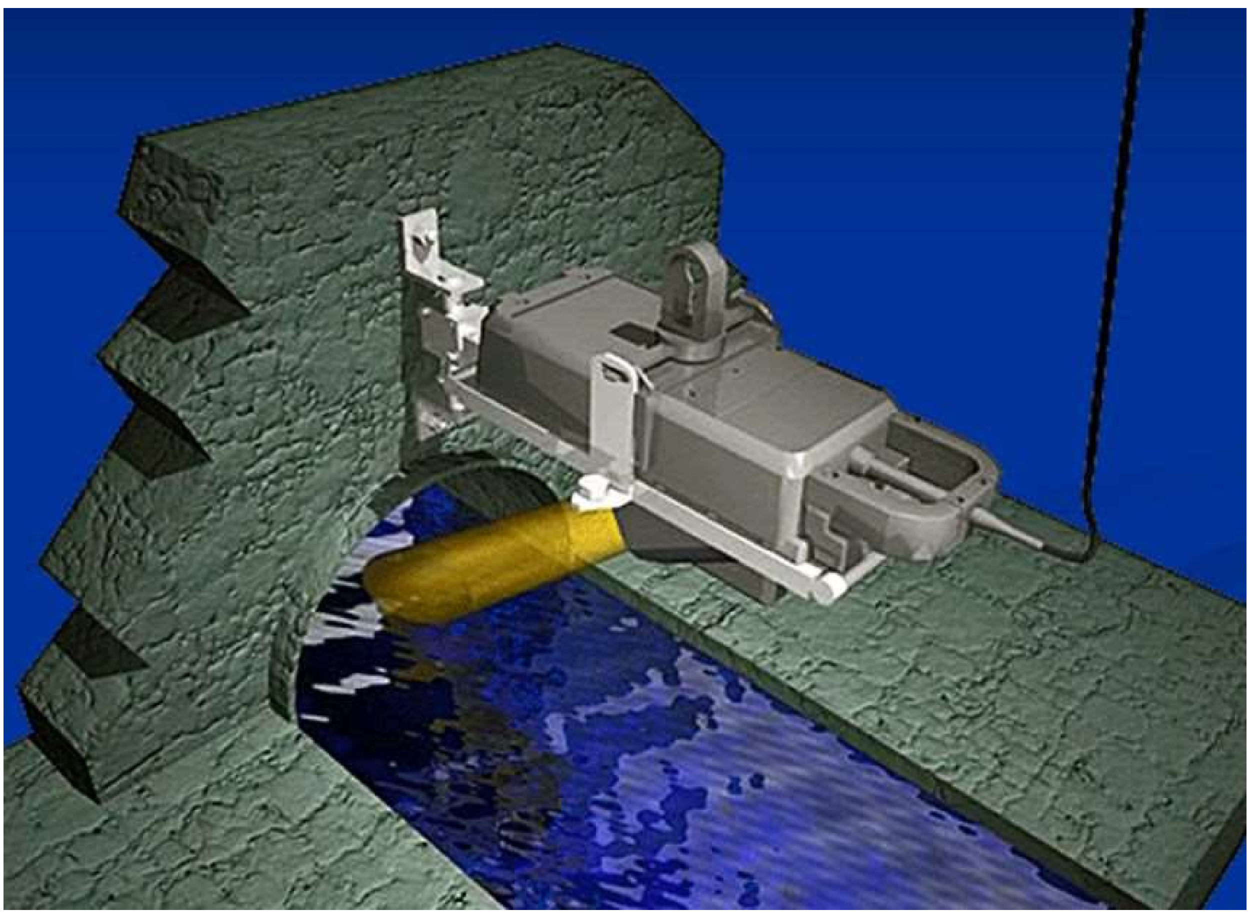


Figure: US³ utilizes exclusively Hach March-McBirney Flo-Dar® Meters

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: All technicians are certified for Confined Space Entry.

Name, Title, Address and Telephone numbers of persons to contact concerning this report.

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APPENDIX D

WATER STUDY

EXHIBIT 1 – US3 FIRE HYDRANT FLOW TEST RESULTS
EXHIBIT 2 – BENTLEY DOCUMENT “USING A PUMP CURVE TO APPROXIMATE A CONNECTION TO AN EXISTING SYSTEM”
EXHIBIT 3 – WATERCAD MODEL AND RESULTS
EXHIBIT 4 – PUMP CURVE CALCULATIONS

EXHIBIT 1 - FIRE FLOW DATA

Fire Hydrant Flow Test

□or

kpff

Pacific Coast Commons Project

In

El Segundo, CA

June 10, 2020

US3

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Santa Ana, CA 92705

Phone: 714-542-1004

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Table of Contents

Section 1: Executive Summary

All fire hydrants are required to be tested and inspected at least annually and flow tested every five years by the NFPA25, Inspection and Maintenance of Water-Based Fire Protection Systems.

Methods and Procedures

US3 has followed standard Fire Hydrant Methods & Procedures that includes at a minimum the following:

- Installation inspection and Field Testing of Fire Hydrants (AWWA M17)
- Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems (NFPA 25)
- Validation of Fire Flow Testing and Marking of Hydrants (NFPA 291)
- AWWA Standard for Dry-Barrel Hydrants (C502-94)

Dynamics of Water

When performing any sort of flow test or exercising of hydrants, there are several important concepts that US3 follows to avoid causing damage to the hydrants and to the water system in general.

Water Hammer

Water hammer is caused by an abrupt change in the velocity of flowing water. It is most often the result of shutting down a valve too quickly.

Water is incompressible. It will not absorb ANY of the energy it gives off by being forced to suddenly decelerate. Therefore, the system, pipes, hydrants, and ground have to absorb all of the energy. If a valve is shut down too quickly, the weak link in the system will fail first. The weak links are almost always at the flanges, or pipe joints.

Brown Water

Brown water is the common complaint the Water and Sewerage Division receives when people turn on their faucet and see less than clear water coming out. This may be caused by several things. One thing that will usually cause brown water is a sudden change in the amount of flow in a water main, such as when operating a fire hydrant.

During normal conditions, water flows through the center portion of a water main. Due to the friction between the water and the wall of the pipe it is easier for the center portion to flow than the outer portion. As the average velocity increases, so too will the velocity of the water close to the wall of the pipe. As this water moves faster, it begins to kick up sediment that usually stays at the bottom of the pipe. This sediment gets stirred up and does not settle back down until the velocity slows. Once the sediment has been dislodged, it becomes in the main stream of flow.

Validation of Uses of Fire Hydrants

Fire Suppression

Although fire hydrants are often used for other purposes, their primary function is to supply water for fire protection. Any other use is considered of secondary importance and rigorously controlled for the protection of the water distribution system.

Line Flushing

The fire hydrants ease of operation and high flow capability make it a natural choice for use in flushing main distribution system lines. When line flushing is done in conjunction with systematic hydrant inspection, the primary function of the fire hydrant is kept in proper perspective.

System Testing

The County often uses fire hydrants to test the hydraulic capabilities of the distribution system. These tests, like line flushing, has been conducted in conjunction with tests to evaluate distribution system flow capacities in accordance with fire flow requirements as well as customer flow and pressure needs.

Other Uses

Fire hydrants are also commonly used as a water source for street cleaning, sewer cleaning, commercial construction, street construction, and as a water source for other commercial applications.

Wet Barrel Hydrants

The City and County uses wet barrel hydrants. Wet barrel hydrants have mechanical parts that are above ground, with a main valve to prevent any debris from entering the hydrant. Easy-to-access outlet valves and nozzles work independently so that firefighters can add more discharge lines without causing the hydrant to shut down.

Dry vs Wet Barrel Hydrants.

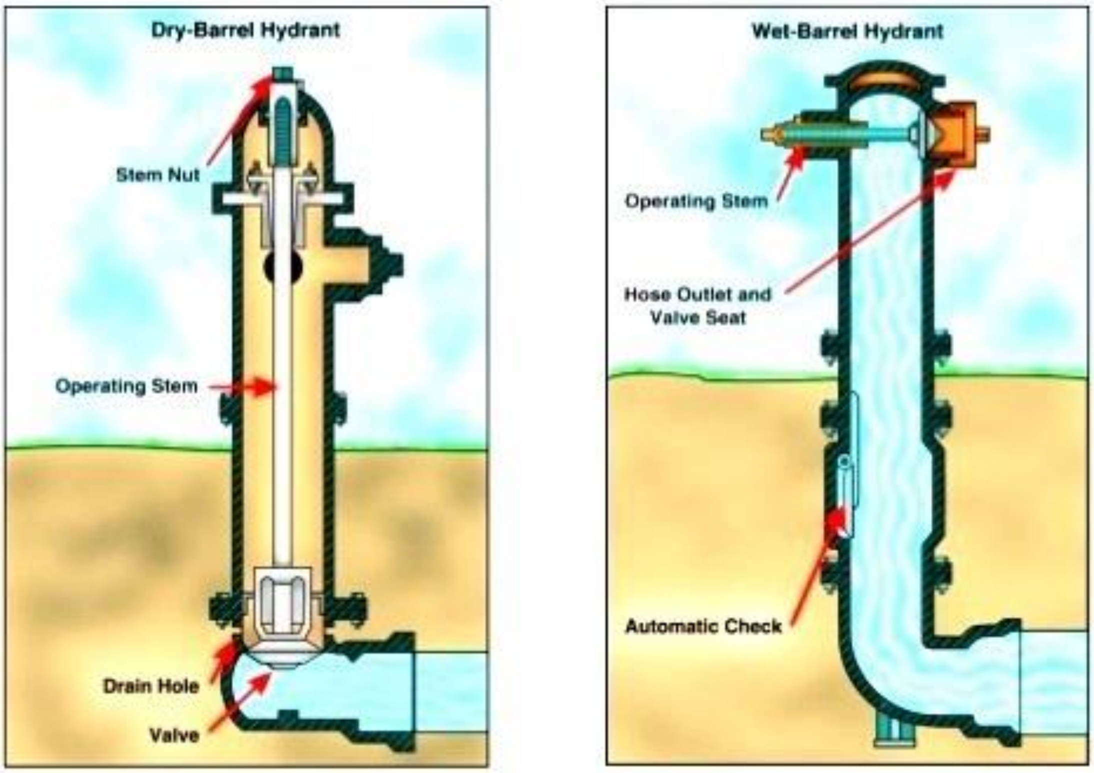
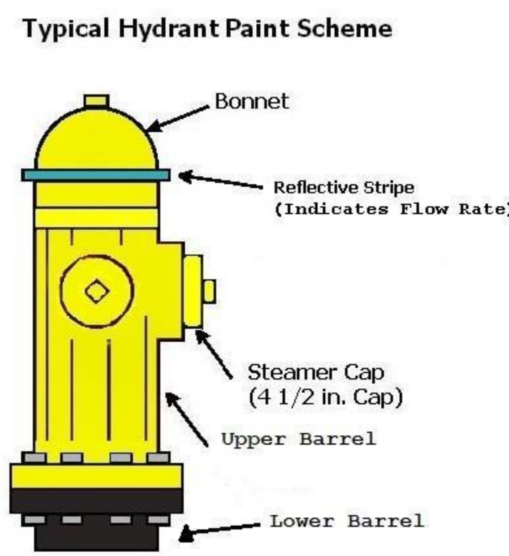


Figure 1: LA Fire Department utilizing standard Fire Hydrant

Validation of Painting and Color-Coding Fire Hydrants

The appearance of fire hydrants has a direct impact on the public's confidence in the quality of the drinking water and Fire Divisions' ability to protect their homes and businesses. Therefore, it is necessary to maintain the appearance of the hydrants.

Fire hydrants are also color coded to indicate various system conditions including flow, type or size of water main, type of distribution system (potable, non-potable, or private) and system pressure.



City & County Hydrant Colors

All fire hydrants for the City and County are painted Sherwin Williams Mueller yellow F75YH1 for the main color. This color makes hydrants more visible and separates them from surrounding landscaping and structures. The bonnet of privately owned hydrants shall be painted white to match Sherwin Williams Mueller White F75W478.

Fire Flow Color Codes

All fire hydrants are also color coded, as set forth in NFPA Standards, to indicate the expected fire flows from the hydrant during normal operation. In most cases the bonnet is marked with a reflective strip to correspond with the following colors to indicate available flow:

Flow		
GPM at 20psig*	(l/sec at 140 kPa)*	Color
Greater than 1,500	(60)	Light Blue
1,000-1,499	(60)	Green
500-999	(30-60)	Orange
Less than 500	(30)	Red

*This is the calculated flow at a calculated residual of 20 psi (140kPa) and with the actual residual on an adjacent non-flowing hydrant being 40 psi (280 kPa) or greater. When the actual observed residual on the adjacent non-flowing hydrant is less than 40 psi (280 kPa), the color scheme has been based on one half of the observed flow.

Private hydrants are distinguished by the addition of white paint to the bonnet. Some existing private hydrants may not match the City and County color scheme. As these hydrants are identified, the owners will be required to re-paint them yellow with white bonnets to conform to City and County specifications.

Section 2: Fire Flow Test Procedures

Fire flow tests are conducted on installed fire protection systems to ensure the adequate pressure and available flow of extinguishing agents.

Flow tests have been completed in the City of El Segundo to test the flow of water (gallons per minute) discharged in a df/dt.

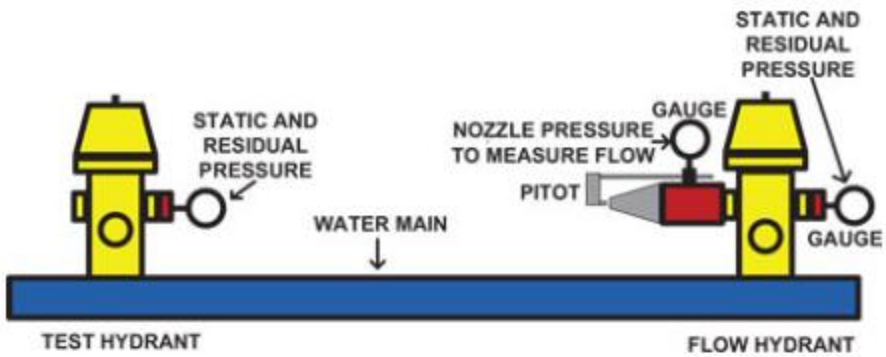


Figure 2: NFPA 291, Recommended Practice for Fire Flow Testing

Flow tests in the City of El Segundo test the flow of water (gallons per minute) discharged in df/dt.

Fire Flow Testing

Fire flow tests are conducted to determine pressure and flow-producing capabilities at any location within the distribution system. The primary function of fire flow tests is to determine how much water is available for fighting fires, but they also serve as a means of determining the general condition of the distribution system. Heavily tuberculated water mains or those with heavy wall deposits can reduce flow-carrying capacities of pipelines; this reduced capacity can be detected by means of a flow test. Flow tests can also help detect closed valves in the system. The results of flow tests are used by insurance underwriters as a factor in setting rates for insurance premiums and by designers of fire-sprinkler systems.

Hydrants have been opened and closed one at a time to minimize the effect on the distribution system. Dry-barrel hydrants must be opened fully because the drain-valve mechanism operates with the main valve. A partially opened hydrant could force water through the drain outlets under pressure, eroding the thrust support from behind the hydrant.

After the test, the hydrant barrel is drained before tightening the outlet-nozzle cap.

Gauge measurement will be taken only when the water is running clear because sediment could damage the instruments.

Procedure

US3 used the procedure outlined in the American Water Works Association (AWWA) Manual M17, Installation, Field Testing, and Maintenance of Fire Hydrants.

Hydrant Flow Test Procedures Main Capacity Test – Field Procedures

1. Installation of Traffic Control to minimize disruptions
2. Setup provisions for Drainage of Water
3. Residual Hydrant
    a. Flush the Hydrant
    b. Install Nozzle / Gauge
    c. Vent Air; Open Main Valve Fully
    d. Read Static Pressure
4. Flow Hydrant
    a. Measure / Record I.D. of Nozzle
    b. Determine Outlet Nozzle Coefficient

Section 3: Fire Hydrant Flow Data Results

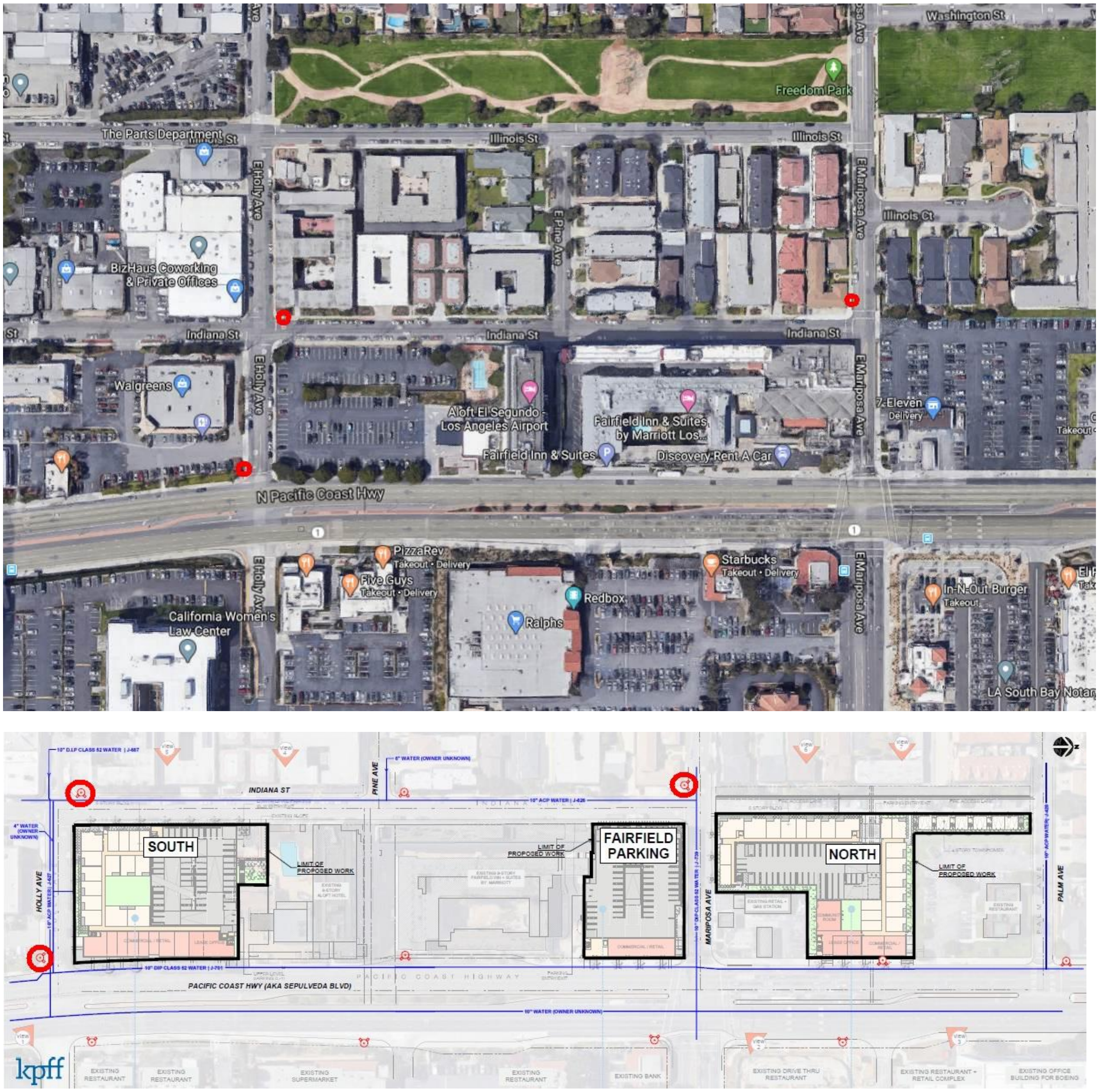


Figure 3: Aerial View and Flow Diagram of Locations for Fire Hydrant Flow Testing

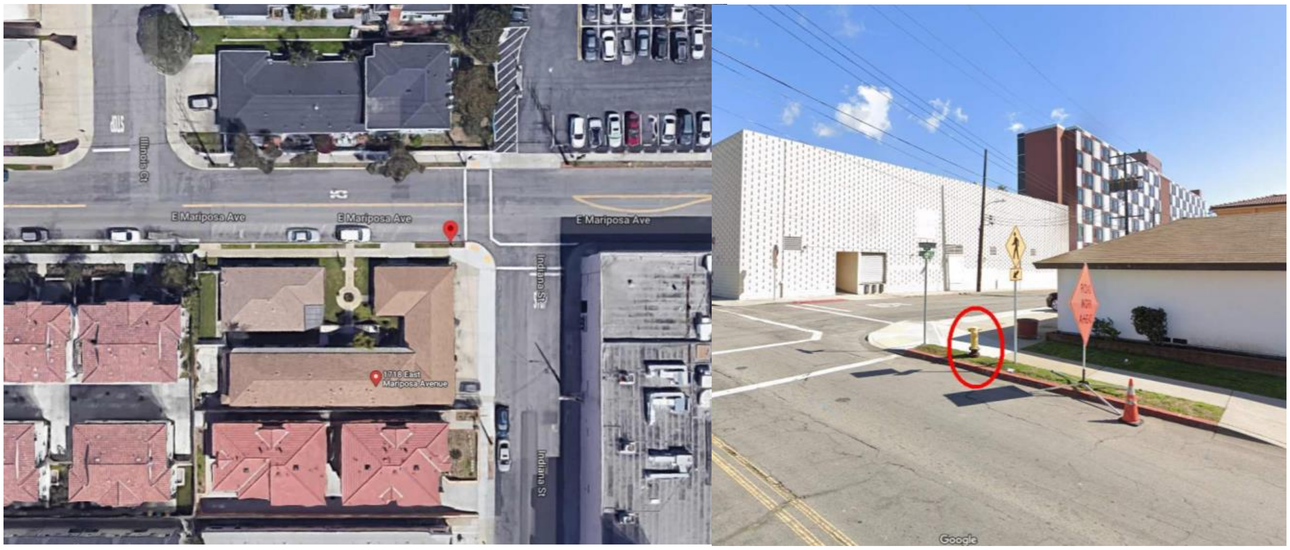


Figure 4: Location of Mariposa Ave Hydrant

Figures 5 & 6: Mariposa Ave Fire Flow Test

FIRE HYDRANT FLOW TEST REPORT FOR 1718 MARIPOSA AVE

Test Date	Test Time
6/10/2020	9:45 AM

Location	Tested By
1718 Mariposa Ave	Utility Systems Science and Software
El Segundo, CA 90245	Advance Fire Protection Co. Inc.
33.923581, -118.397397	1451 Lambert Rd
	La Habra, CA 90631
	Lic. #259936

Hydrant Readings
66 PSI Static Pressure
64 PSI Residual Pressure
0 Ft Hydrant Elevation

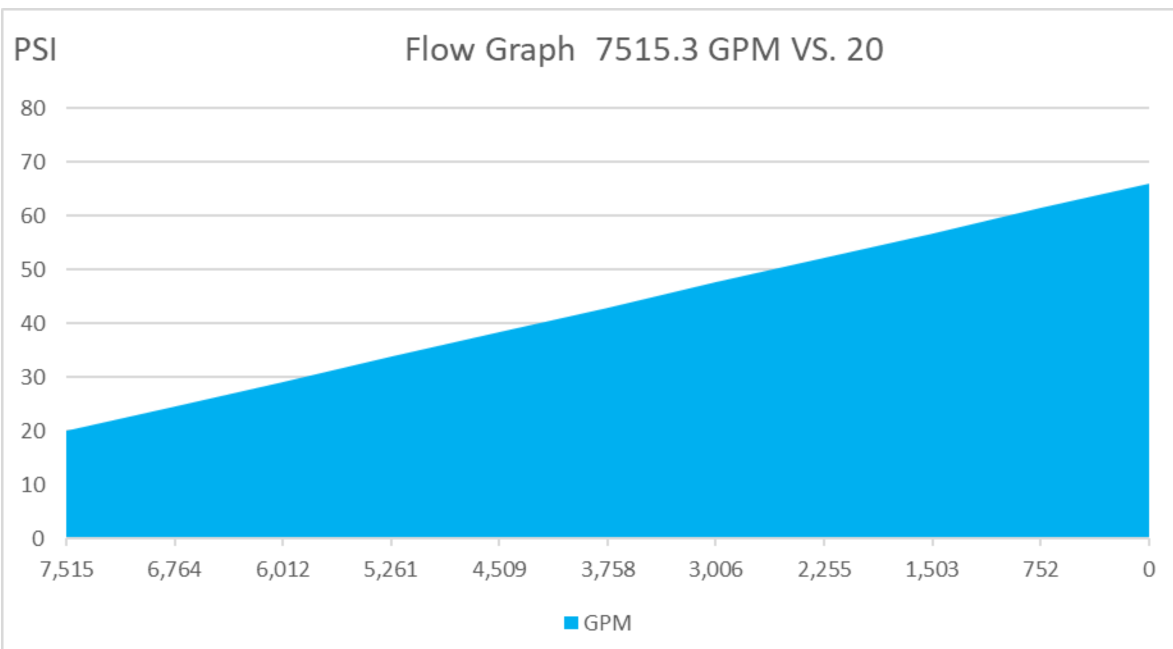


Figure 7: Flow test results for 1718 Mariposa Ave

Notes:

Static and residual psi read at FH 1718 Mariposa Flowed 2.5" outlet using a declorine Diffuser pito 55 flow 1380gpm.

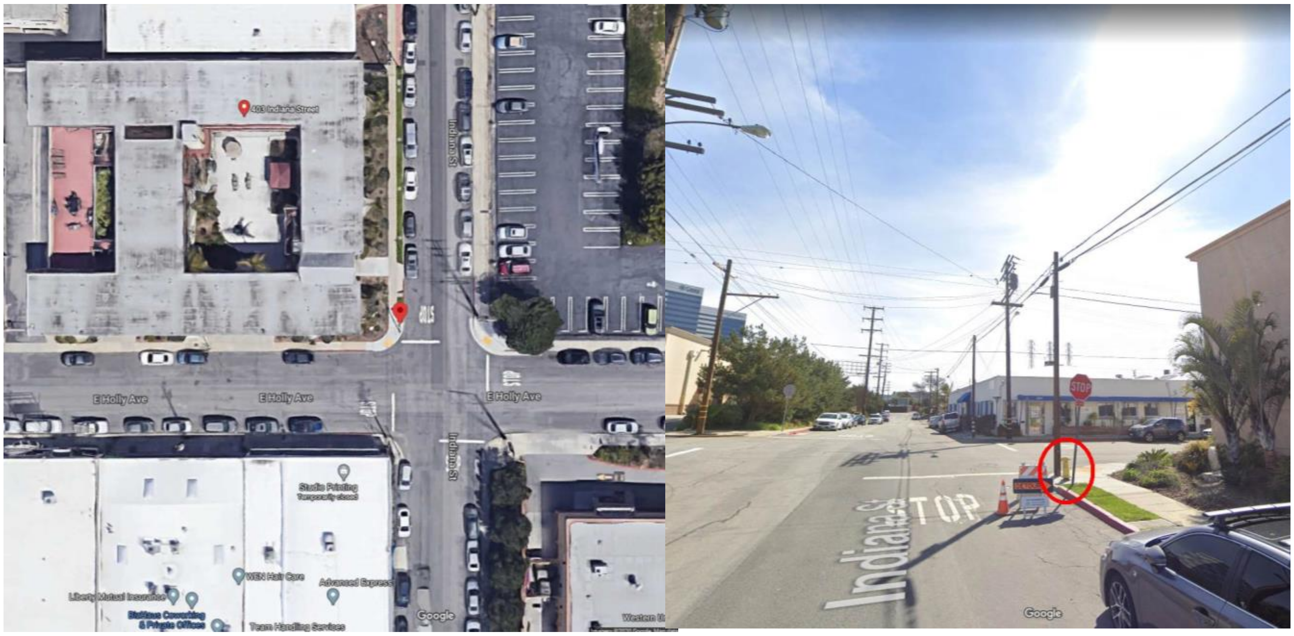


Figure 8: Location of Indiana St Hydrant

Figures 9 & 10: Indiana St Fire Flow Test

FIRE HYDRANT FLOW TEST REPORT FOR 403 INDIANA ST

Test Date	Test Time
6/10/2020	9:20 AM

Location	Tested By
403 Indiana St.	Utility Systems Science and Software
El Segundo, CA 90245	Advance Fire Protection Co. Inc.
33.920975, -118.397326	1451 Lambert Rd
	La Habra, CA 90631
	Lic. #259936

Hydrant Readings
71 psi static pressure
66 psi residual pressure
0 Ft Hydrant Elevation

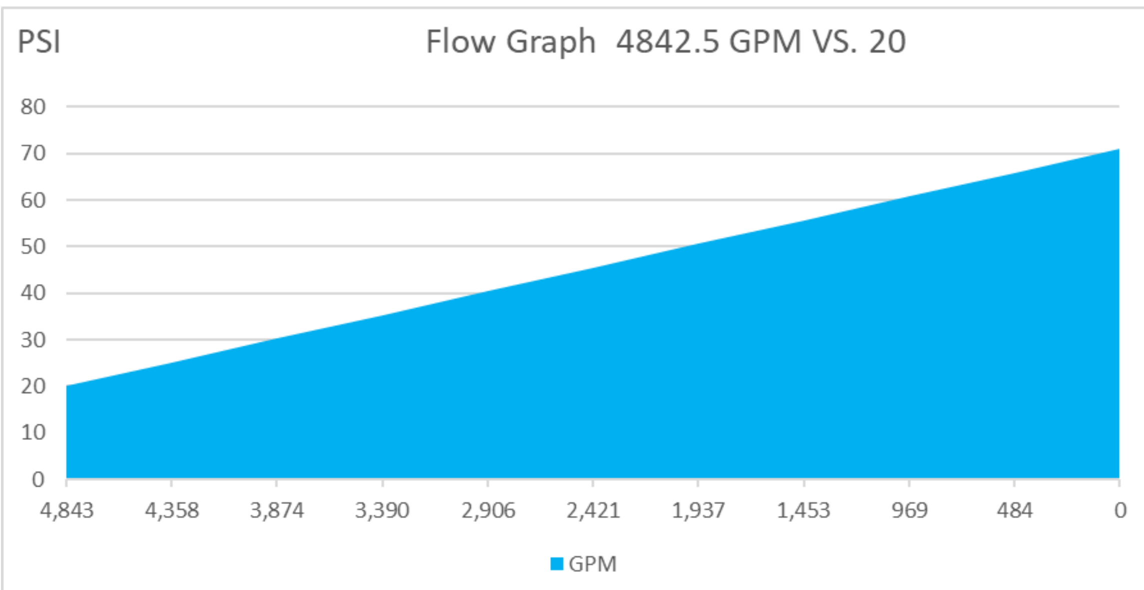


Figure 11: Flow test results for 403 Indiana St

Notes:
Static and residual read at FH 403 Indiana Static Residual 66.

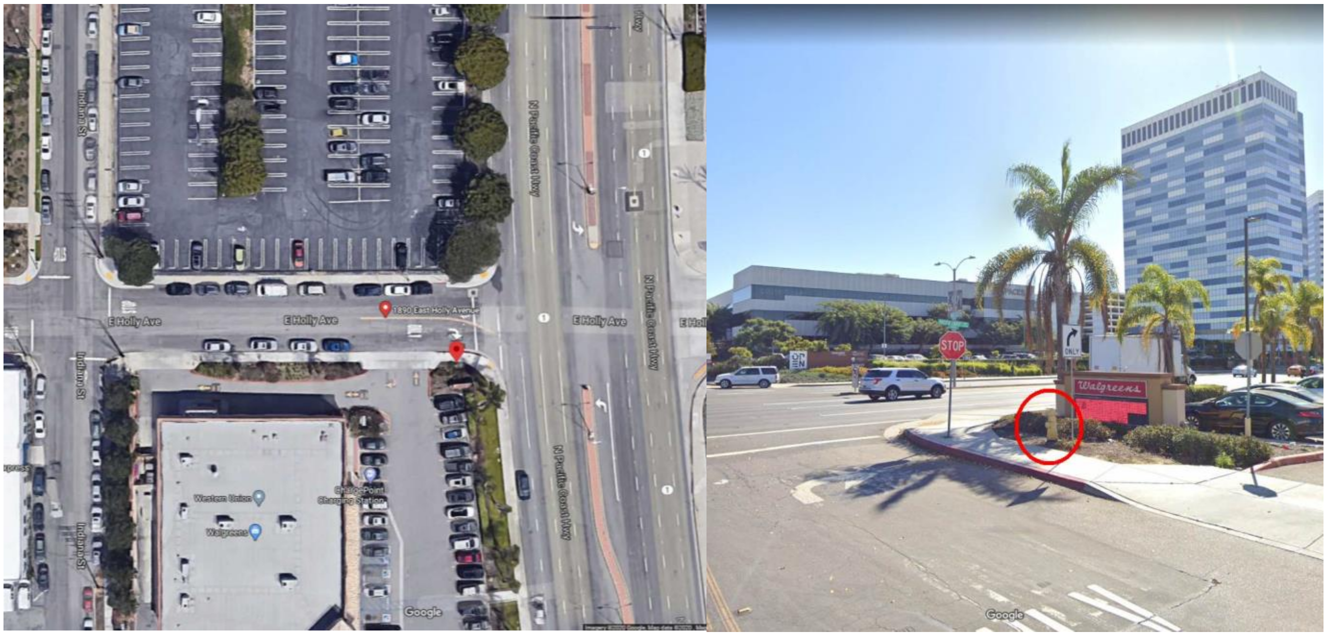


Figure 12: Location of Holly Ave Hydrant

Figures 13 & 14: Holly Ave Fire Flow Test

FIRE HYDRANT FLOW TEST REPORT FOR 1890 HOLLY AVE

Test Date	Test Time
6/10/2020	9:20 AM

Location	Tested By
1890 Holly Ave	Utility Systems Science and Software
El Segundo, CA 90245	Advance Fire Protection Co. Inc.
33.920812, -118.396514	1451 Lambert Rd
	La Habra, CA 90631
	Lic. #259936

Hydrant Readings
76 PSI Static Pressure
71 PSI Residual Pressure
0 Ft Hydrant Elevation

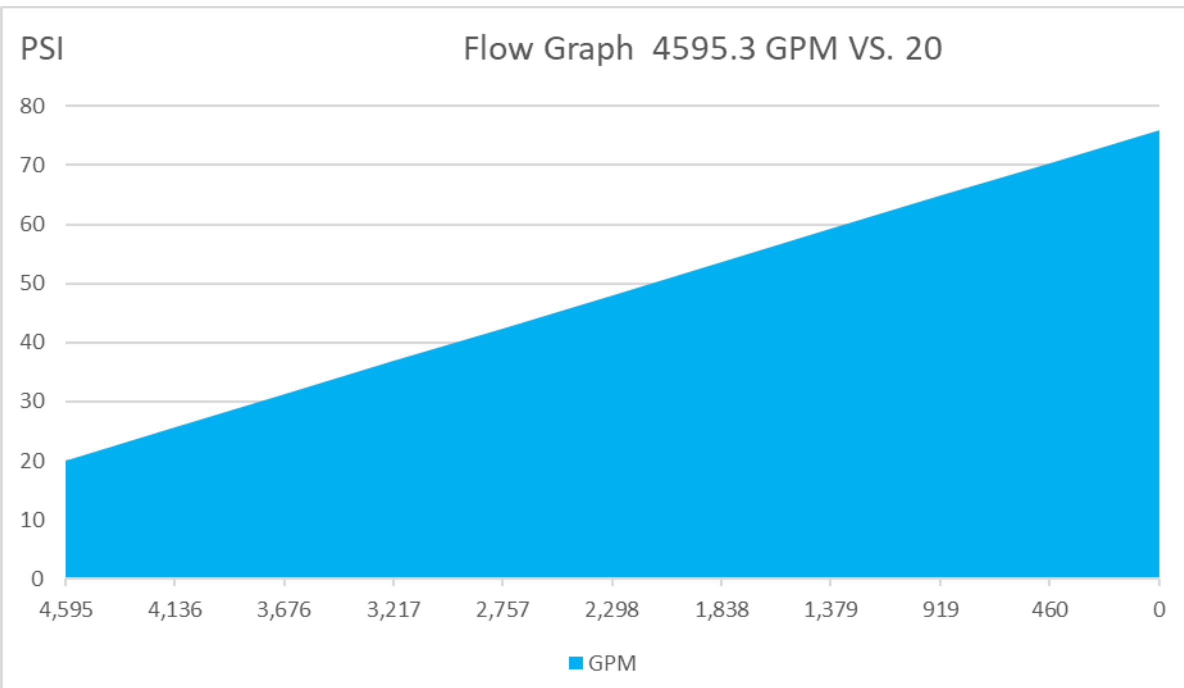


Figure 15: Flow test results for 1890 Holly Ave

Notes:

Static and residual psi read at FH 1890 Holly Ave Flowed 2.5’’ outlet using a declorine Diffuser pito 55 flow 1245gpm.

EXHIBIT 2 - BENTLEY DOCUMENT

Using a Pump Curve to Approximate a Connection to an Existing Water Distribution System

Overview

One of the most common water distribution system design problems is laying out and analyzing a proposed extension to an existing system. This article describes one method of using fire hydrant test data to model an approximation of a connection to an existing water main in Bentley WaterCAD or WaterGEMS.

It is important to note that significant limitations exist on the applicability and accuracy of this approach. The engineer must have a good understanding of the underlying assumptions used in this method and whether these assumptions are appropriate for the particular situation being modeled. Additional information is provided in the "Assumptions and Limitations" section of this article.

Background

A connection to an existing system is typically required when modeling a proposed expansion (such as a new subdivision, industrial park, school, shopping mall, etc.) Frequently, the engineer will not have complete information on the system to which they are connecting, and must decide on an appropriate approach for modeling this connection.

The most reliable method for representing the existing system is to include a least a skeletonized representation of the significant system components that affect the project area. Typically, this representation would include tanks, pumps, control valves, and significant demands in the same pressure zone. This necessary information can usually be obtained through water utility mapping and modeling personnel.

Another method for modeling a connection to an existing system is to represent the connection point as a constant head elevation using a reservoir element. This is a very simplified approach, and usually a very unreliable one, since it doesn't account for any fluctuation in head due to changing system conditions (e.g., pump status, tank level) or demands.

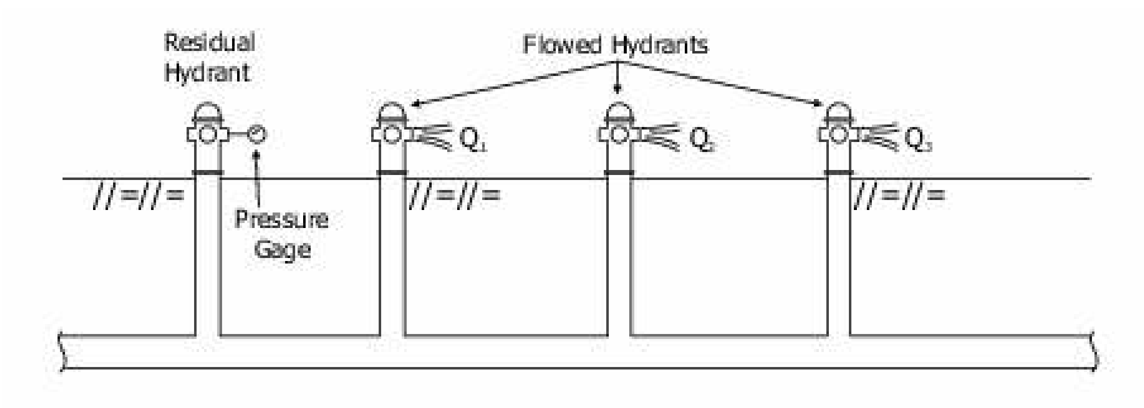
The reliability of the method described in this article lies somewhere between the two just described. It consists of representing the connection to the existing system as a reservoir and a fictitious pump with a 3-point characteristic curve based on static and residual pressure obtained during a two-hydrant flow test near the connection point. The fictitious pump will simulate the pressure drops and the available flow from the existing water system.

Unlike the first approach described, this third method does not allow the engineer to capture the changes at the connection point due to, for instance, fluctuating tank levels and pump status changes in the supply system. However, it does allow for consideration of change in head due to variation in the demand at the connection point. When combined with a good general understanding of how the larger system performs under a range of conditions and knowledge of system conditions (e.g., tank and pump status) at the time flow tests were performed, it can be an acceptable approach in many instances**.** It is usually most appropriate for "fill in" development where most of the customers and infrastructure are already in place as opposed to large expanses of undeveloped land at the fringe of an existing system. If model results obtained using this method are near the borderline of being unacceptable, the engineer should revert to the more rigorous first approach.

Preparation

In order to simulate the range of pressures at the connection point for a range of flows, you must first obtain two-hydrant flow test data. To represent zero flow, you'll need the static pressure. To represent the highest flow possible through the connection, you'll need the residual pressure and flow. To convert the pressures to hydraulic grade, you will need to know the exact elevation of the residual pressure gage. This data is obtained from field tests.

For more information on how to perform a field hydrant test, you may refer to section 5.2 of *Advanced Water Distribution Modeling and Management* (see "Reference" at end of article).



Note: The flows you obtain from the hydrant test must be in actual flow units such as gallons per minute, not pitot gage pressures. Equation 5.1 in *Advanced Water Distribution Modeling and Management* provides a conversion.

Developing the Pump Curve

We must now develop a 3-point pump curve to use with our pump element, based on our static and residual hydrant tests. This way, a range of demands and/or tank levels in the proposed system can be simulated. The following example hydrant test data will be used to illustrate how this is done:

Static pressure = **90psi**
Residual pressure = **22psi**
Residual Flow = **800gpm**

1) The first ordinate on the pump curve is called the Shutoff point, defining the head provided by the pump at zero flow. This should be set as your static pressure, because it represents the energy grade with the proposed system demand is zero. So, in our example case, the first point is **0 gpm and 207.9 ft** (90 psi* 2.31 ft/psi).

2) The third ordinate on the pump curve is called the Maximum Operating point, representing the theoretical maximum flow and its corresponding head. This is your residual pressure/flow, with the hydrant(s) fully open. So, in our example case, the third point is **800 gpm and 50.82 ft** (22psi * 2.31).

3) The middle ordinate of the pump curve is usually called the Design point, representing the theoretical normal operating point for the pump. Since we only have the two extreme points (from the static and residual hydrant tests), the engineer must choose a middle pressure, and the flow corresponding to it is calculated using the formula below. The value for Q should lie somewhere between the data collected from the hydrant test.

Alternately, a third pump curve point could be developed using actual test data if flow tests are performed for two different flow rates.\

$$Q_0 = Q_t\left(\frac{P_s - P_0}{P_s - P_t}\right)^{0.54}$$

Q_0 = Flow available at the chosen pressure (gpm, cu. m/s)
Q_t = Residual flow during hydrant test (gpm, cu. m/s)
P_s = Static pressure during hydrant test (psi, kPa)
P_0 = Chosen pressure, at which Q0 is to be calculated (psi, kPa)
P_t = Residual pressure during hydrant test (psi, kPa)

In our example case, let's say that the chosen pressure is **55 psi**:

Q = ?
H = 55 psi or 127.05 ft (chosen value)

Formula:

$Q_0 = Q_t * [((P_s - P_0) / (P_s - P_t))^{0.54}]$
$Q_0 = 800 * [((90 - 55) / (90 - 22))^{0.54}]$
Q_0 = **558**

So, the second point in our example case is 558 gpm and 127.05 ft. (55psi * 2.31). Here is the full pump characteristic curve that we will use:

Q (gpm)	**H (ft)**
0	207.9
558	127.05
800	50.82

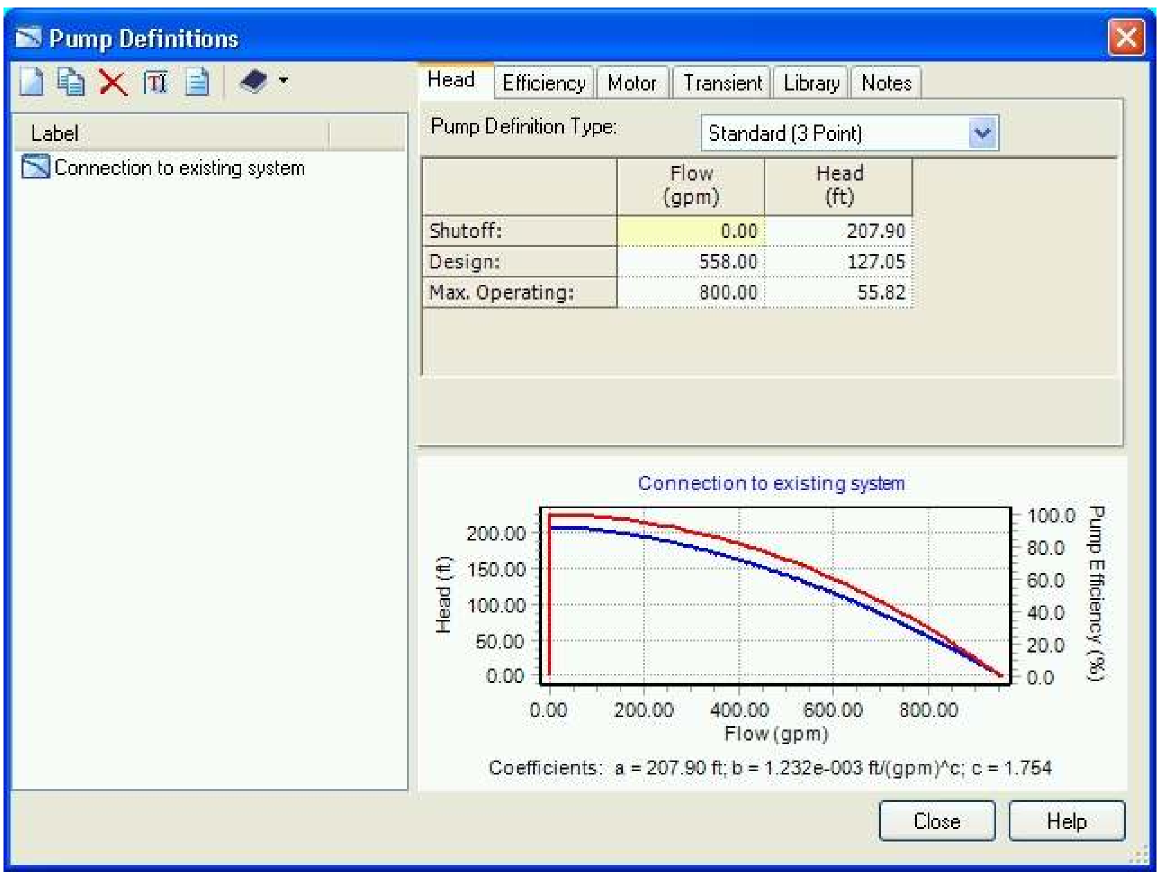
Setting up the Model

To set up the model, you will enter the pump curve just developed, lay out the model elements, and enter their attributes within your project area.

1. Open your model in WaterCAD/WaterGEMS (or open the existing model if you have already laid out the elements for the new system) and go to Components > Pump Definitions.

2. In the Pump Definitions Manager, click the "New" button and name your pump definition appropriately (such as "Connection").

3. Keep the default Pump Definition Type of "Standard (3 point)" and enter your data in the table:



4. Click the "Close" button to accept the curve, which we will use further below.

5. To lay out the elements to represent the connection, first click the pipe tool on your layout toolbar.

6. Right click in your drawing pane, select "Reservoir," and left click to lay out the reservoir, at the location of the hydrant where the pressure is being read.

7. Right click, choose "Pump," and left click in the drawing next to the reservoir to lay out the pump. Notice that a pipe is automatically connected between the elements.

8. Right click, choose "Junction," and left click in the drawing next to the pump to lay out a junction. The location of this junction is the tie-in point where the proposed system begins. So, if you already have your new system's elements laid out, you can directly connect them.

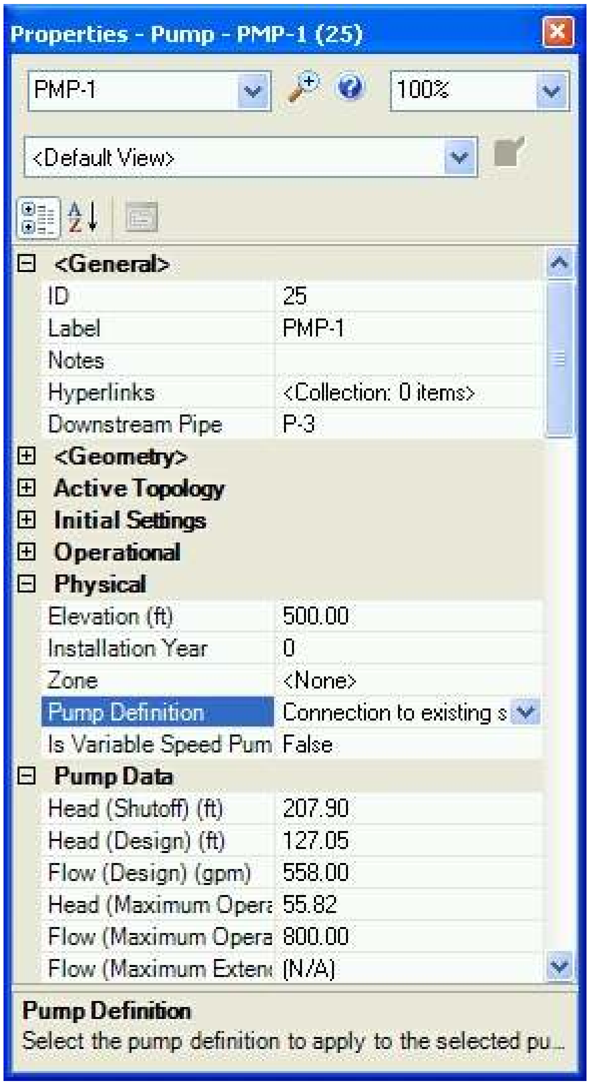
9. At this point, your model should look similar to this:

10. To adjust the attributes of these elements, first double click the reservoir node to open the properties grid. For the "Elevation" attribute, enter the elevation of the pressure gauge used at the hydrant.

11. Click each pipe (P-2 and P-3 in the above illustration) and adjust the roughness, diameter and length so that the hydraulic impact is negligible. For example, a Roughness of 140, length of 1 foot, and diameter of 48 inches are appropriate numbers.

12. Click the junction (J-1 in the above illustration). This point represents where the proposed system begins, so enter the elevation of the connection point.

13. Click the pump element and enter the pressure gauge elevation as the "Elevation" attribute (same as the reservoir). Select the pump definition you created earlier from the "Pump Definition" dropdown.



14. If you have not yet entered the elements, demands, etc. for the new system, you should do this, and then run the model. The pump should react according to the proposed system demands to provide an approximation of head at the connection point.

Assumptions and Limitations

- To reiterate: this approach is an approximation, the accuracy of which depends on a number of factors. It is better to model all the way back to the source, at least by obtaining skeletonized data on the existing system. The skeletal model must begin at the real water source(s), such as the pump or tank, which will serve as the primary water source(s) for the new extension pipes. It should be calibrated using the results of fire hydrant flow tests, especially the tests conducted near the location where the new extension will tie in. You may need to call the municipality to obtain basic information on the existing system.

- Using the pump approximation method can present problems because this approximation of the existing system only accounts for the exact boundary conditions and demands that existed at the time that the test was run (for example, the afternoon on an average day with one pump on at the source). Basically, the simulated connection is only valid for the conditions present during the hydrant tests. Therefore, determining the effect of changing any of the demands or boundary conditions is difficult. An extended period simulation (EPS) that is performed using the pump approximation method will be less accurate and may not provide reliable data regarding projected changes in consumption. The pump approximation approach only works well if the existing system is fairly built-out near the connection point and the demand and operation conditions are expected to remain essentially the same in the long run. The hydrant flow test is useful for predicting changes in pressure when downstream demands change, but not for evaluating other types of system changes such as the addition of new pipes, or operational alternatives such as fire pumps starting up.

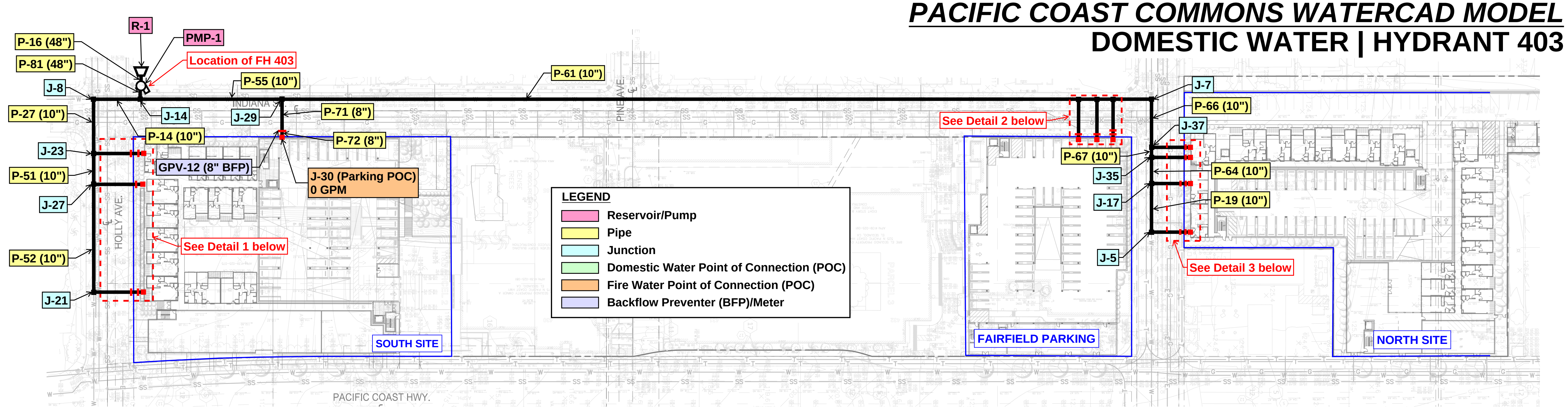
- **Modeling more than one connection between the proposed expansion and the existing system is not a valid approach.** Some reasons for this are, first, the hydrant tests were most likely done at different times, yet the model will allow water to be taken from both sources at the same time. This is not accurate because in reality, both sources will not be able to provide the full observed residual pressure when open at the same time. In other words, if hydrants or connections were really opened at both connection points simultaneously, the combined flow would result in a much reduced residual pressure at both locations versus what was observed during the independent tests. Secondly, in some cases, depending on the hydraulic grades, it may be possible for flow to enter at one connection point and exit at another. However, the pump element only allows water in the forward direction, so the pump approximation method would not work in this case (and may provide a message about one of the pumps not being able to deliver head). The situation is too complex to model using a method other that a skeletonized representation of the larger system.

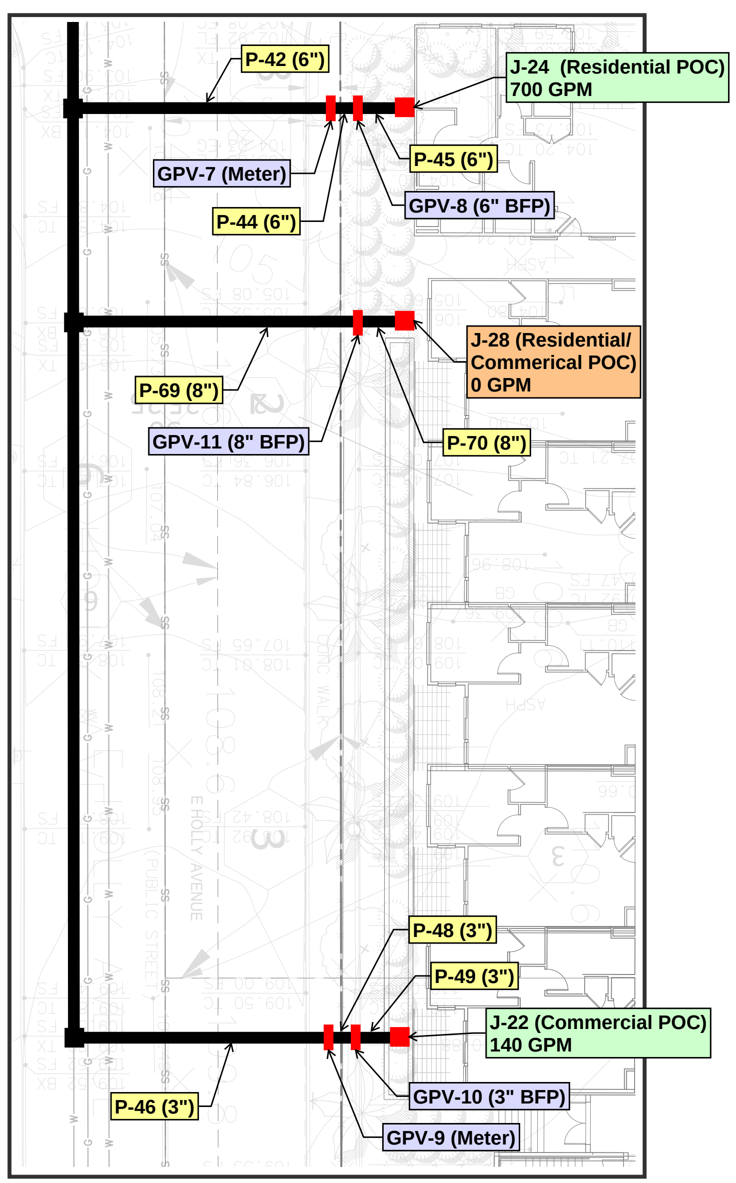
- Attempting to compute the 'static' (no demand) conditions of the new model with the pump approximation in place will most likely result in an unbalanced simulation. In this case, you may need to model the connection simply as a reservoir with an elevation equal to the pressure gauge elevation and static pressure head (i.e., the static HGL), or simply manually compute the static pressure at each node by taking the difference between the static HGL and the node physical elevation.

Reference

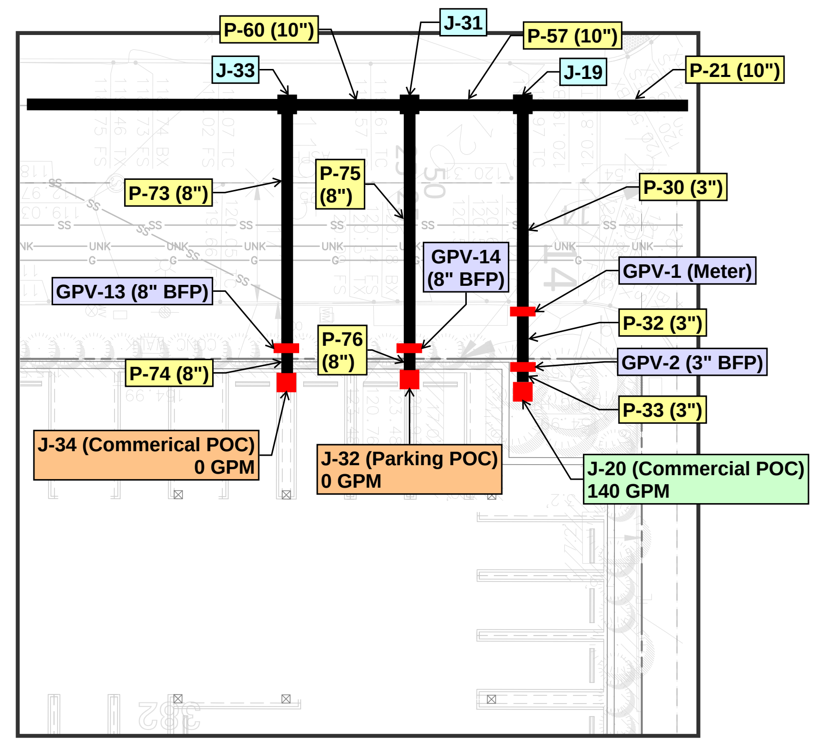
Walski, Thomas M. (2007). *Advanced Water Distribution Modeling and Management.* Bentley Institute Press. Exton, Pennsylvania.

PACIFIC COAST COMMONS WATERCAD MODEL
DOMESTIC WATER | HYDRANT 403

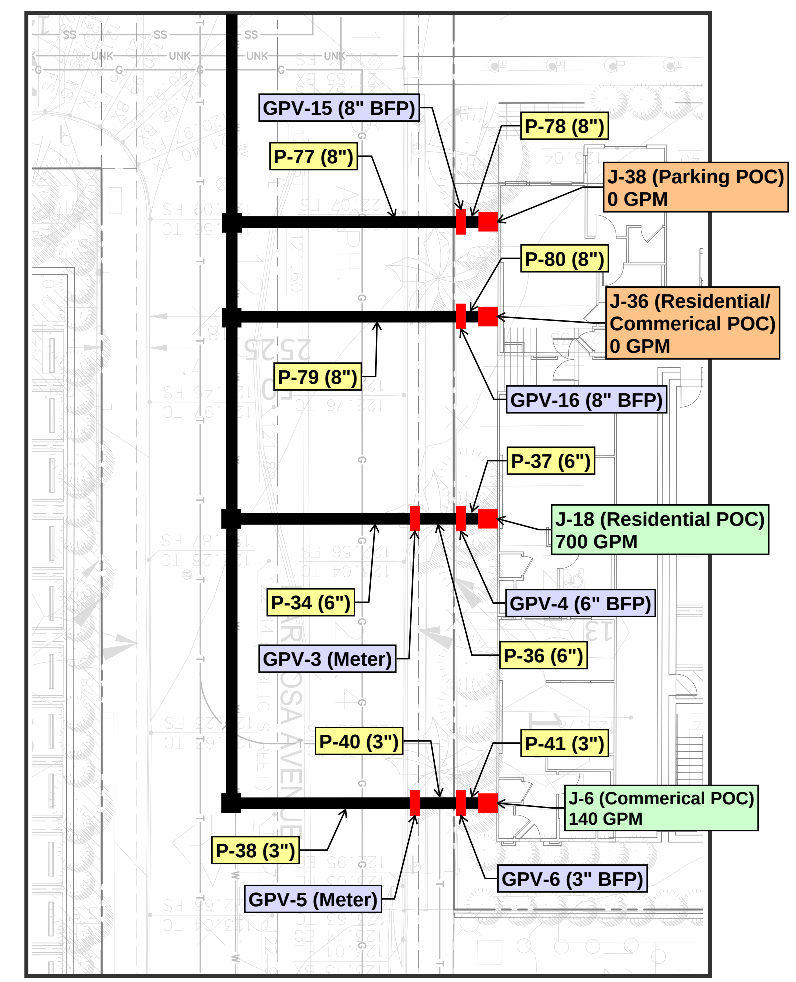




DETAIL 1 - SOUTH SITE



DETAIL 2 - FAIRFIELD PARKING



DETAIL 3 - NORTH SITE

kpff
700 South Flower Street
Suite 2100
Los Angeles, CA 90017
O: 213.418.0201
F: 213.266.5294
www.kpff.com

CONSULTANTS

STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION

PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE

PACIFIC COAST COMMONS - SOUTH EXHIBIT

EXHIBIT 3

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DOMESTIC WATER - FH 403
JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-5	119.9	0	268.72	64
J-6	120.63	140	227.5	46
J-7	118.08	0	269.32	65
J-8	98.85	0	274.45	76
J-14	98.5	0	274.78	76
J-17	119	0	268.73	65
J-18	120.06	700	232.19	49
J-19	116.91	0	269.52	66
J-20	118.12	140	229.03	48
J-21	106.52	0	274.08	72
J-22	106.8	140	231.74	54
J-23	101.13	0	274.1	75
J-24	101.38	700	237.22	59
J-27	102.95	0	274.09	74
J-28	102.58	0	266.84	71
J-29	95.43	0	273.89	77
J-30	96.22	0	266.64	74
J-31	116.57	0	269.7	66
J-32	117.64	0	262.45	63
J-33	116.02	0	269.88	67
J-34	117.16	0	262.63	63
J-35	118.53	0	268.89	65
J-36	119.75	0	261.64	61
J-37	118.35	0	268.99	65
J-38	119.57	0	261.74	62

EXHIBIT 3

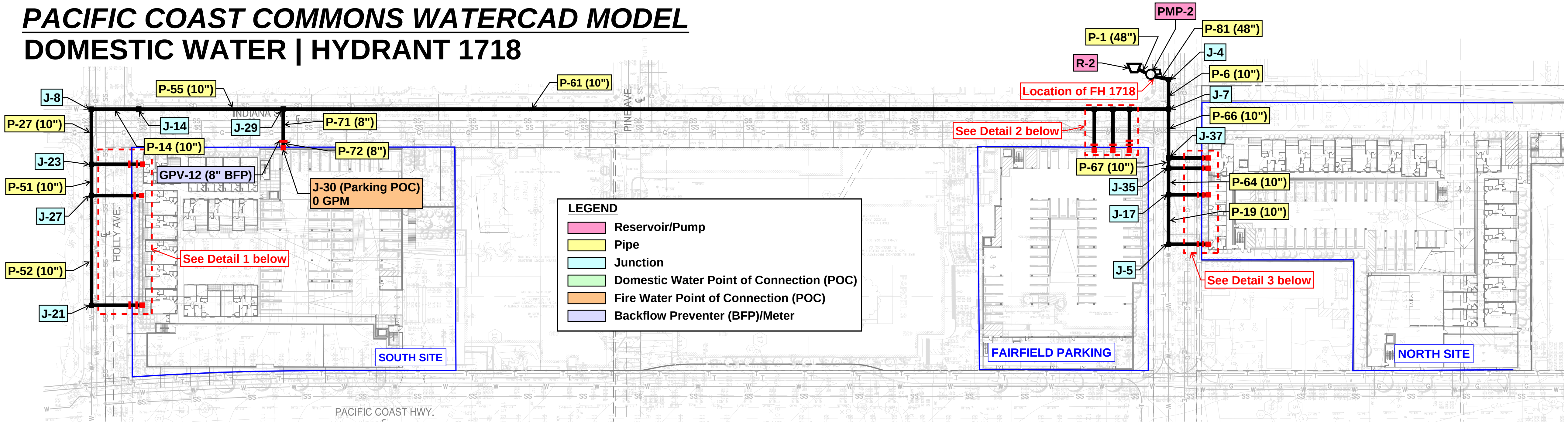
DOMESTIC WATER - FH 403 PIPE TABLE

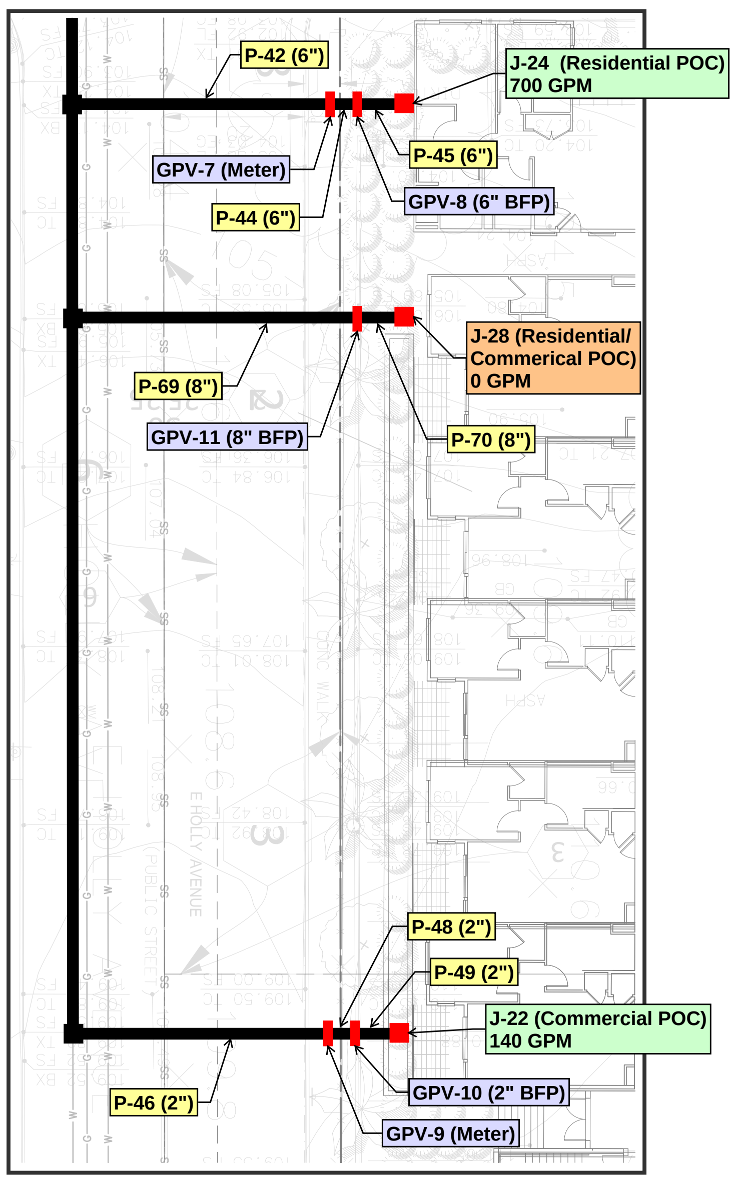
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0.8**	**840**	**3.43**	**76**	**76**
P-16	5	R-1	PMP-1	48	Ductile Iron	140	0	1820	0.32	0	2
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**65**	**64**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**0.35**	**-840**	**3.43**	**65**	**66**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.8**	**840**	**3.43**	**76**	**75**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	140	6.35	66	65
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	140	6.35	60	59
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	140	6.35	48	48
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	700	7.94	65	63
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	700	7.94	58	58
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	700	7.94	49	49
P-38	25	J-5	GPV-5	3	Ductile Iron	140	0.8	140	6.35	64	63
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	140	6.35	58	58
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	140	6.35	47	46
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	700	7.94	75	74
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	700	7.94	69	68
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	700	7.94	59	59
P-46	36	J-21	GPV-9	3	Ductile Iron	140	0.8	140	6.35	72	71
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	140	6.35	66	66
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	140	6.35	55	54
P-51	**30**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**75**	**74**
P-52	**101**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**74**	**72**
P-55	**133**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.8**	**-980**	**4**	**77**	**76**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**66**	**66**
P-60	**18**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**66**	**67**
P-61	**759**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**67**	**77**
P-64	**25**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**65**	**65**
P-66	**46**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.8**	**840**	**3.43**	**65**	**65**
P-67	**12**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**65**	**65**
P-69	42	J-27	GPV-11	8	Ductile Iron	140	1.28	0	0	74	74
P-70	9	GPV-11	J-28	8	Ductile Iron	140	0	0	0	71	71
P-71	31	J-29	GPV-12	8	Ductile Iron	140	1.28	0	0	77	77
P-72	6	GPV-12	J-30	8	Ductile Iron	140	0	0	0	74	74
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	0	0	67	66
P-74	5	GPV-13	J-34	8	Ductile Iron	140	0	0	0	63	63
P-75	31	J-31	GPV-14	8	Ductile Iron	140	1.28	0	0	66	66
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	0	0	63	63
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	0	0	65	65
P-78	6	GPV-15	J-38	8	Ductile Iron	140	0	0	0	62	62
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	0	0	65	65
P-80	6	GPV-16	J-36	8	Ductile Iron	140	0	0	0	61	61
P-81	13	PMP-1	J-14	48	Ductile Iron	140	0	1820	0.32	65	76

Note: Information and results for the 10" public main are in **bold red text.**

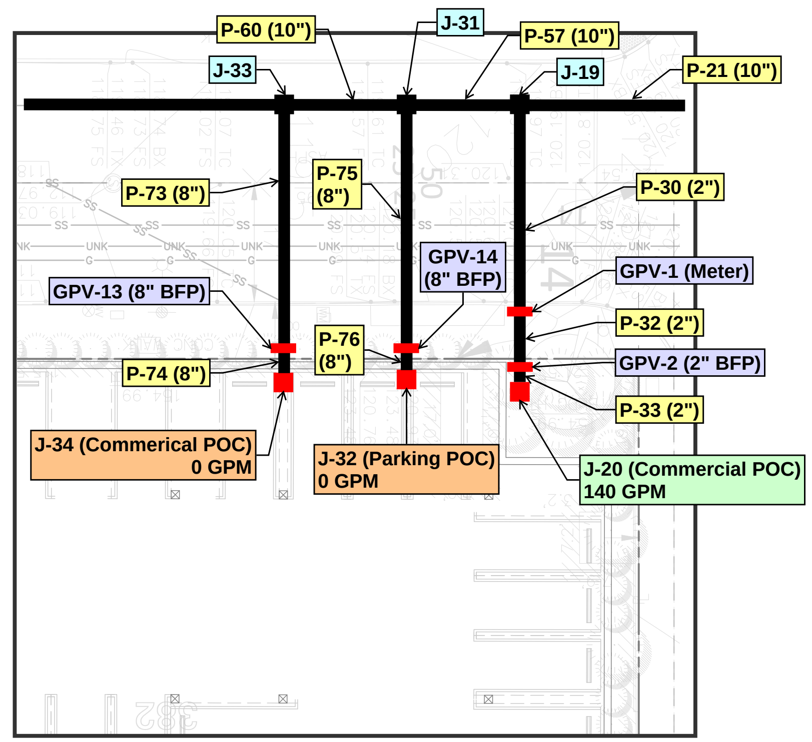
EXHIBIT 3

PACIFIC COAST COMMONS WATERCAD MODEL
DOMESTIC WATER | HYDRANT 1718

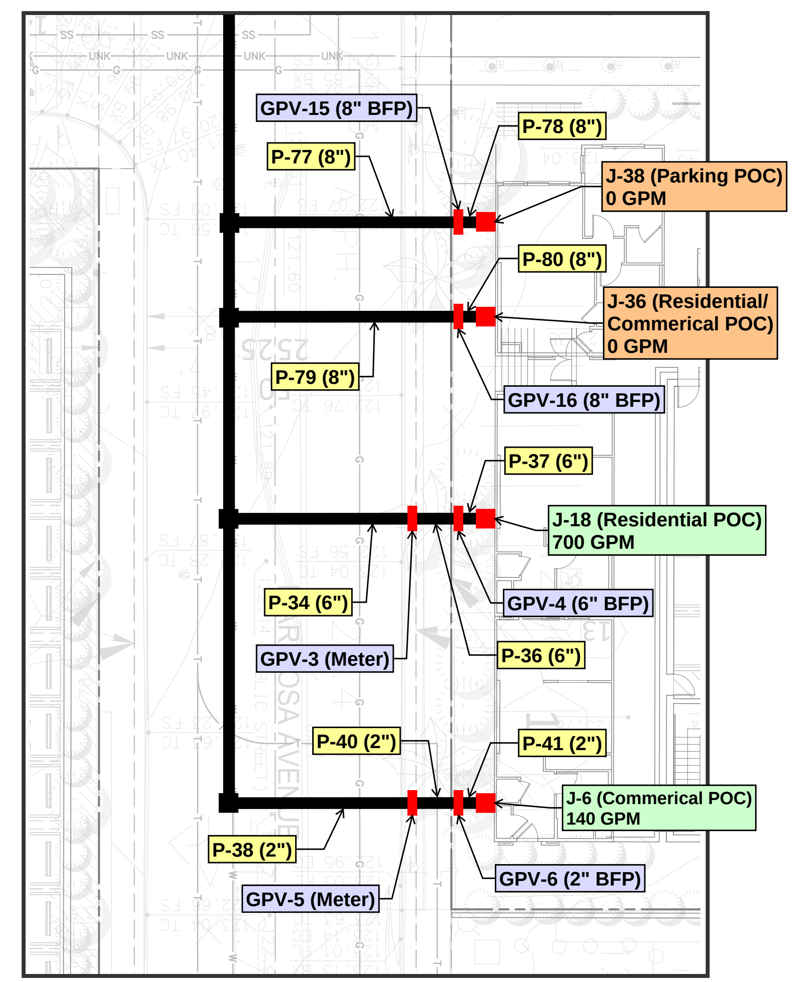




DETAIL 1 - SOUTH SITE



DETAIL 2 - FAIRFIELD PARKING



DETAIL 3 - NORTH SITE

P:\2019\1900156 Abt Mixed Use Development\5 CAD\Sheets\Exhibit\1900156-C-WTRCAD.dwg, Jul 08, 2020 - 6:00pm

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700 South Flower Street
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CONSULTANTS

STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION
PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE
PACIFIC COAST COMMONS - SOUTH EXHIBIT

EXHIBIT 3

DOMESTIC WATER - FH 1718
JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-4	117.8	0	279.76	70
J-5	119.9	0	278.11	68
J-6	120.63	140	236.89	50
J-7	118.08	0	278.63	69
J-8	98.85	0	274.1	76
J-14	98.5	0	274.27	76
J-17	119	0	278.12	69
J-18	120.06	700	241.58	53
J-19	116.91	0	278.14	70
J-20	118.12	140	237.65	52
J-21	106.52	0	273.72	72
J-22	106.8	140	231.38	54
J-23	101.13	0	273.74	75
J-24	101.38	700	236.87	59
J-27	102.95	0	273.74	74
J-28	102.58	0	266.49	71
J-29	95.43	0	274.86	78
J-30	96.22	0	267.61	74
J-31	116.57	0	278	70
J-32	117.64	0	270.75	66
J-33	116.02	0	277.87	70
J-34	117.16	0	270.62	66
J-35	118.53	0	278.28	69
J-36	119.75	0	271.03	65
J-37	118.35	0	278.39	69
J-38	119.57	0	271.14	66

EXHIBIT 3

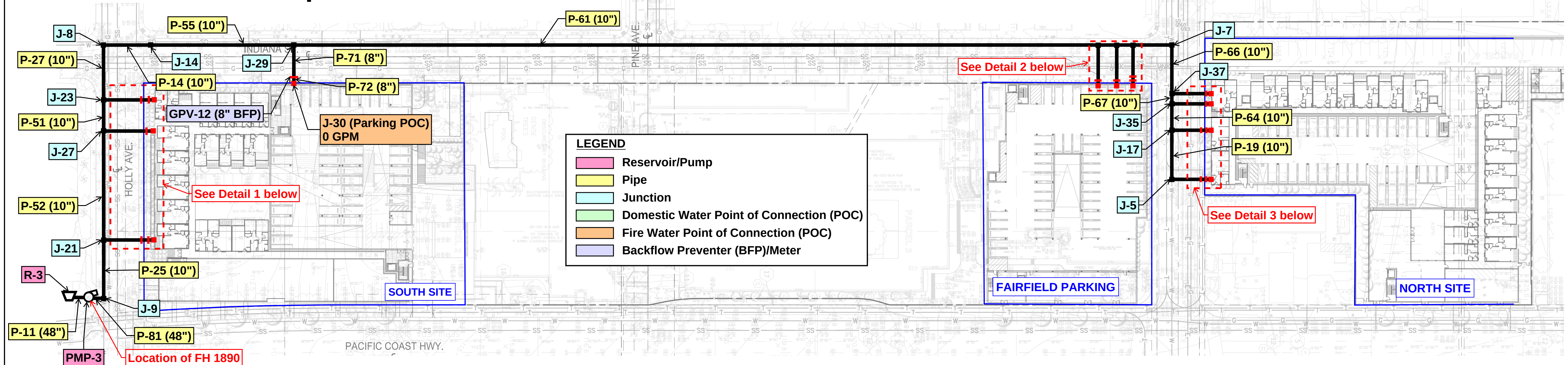
DOMESTIC WATER - FH 1718 PIPE TABLE

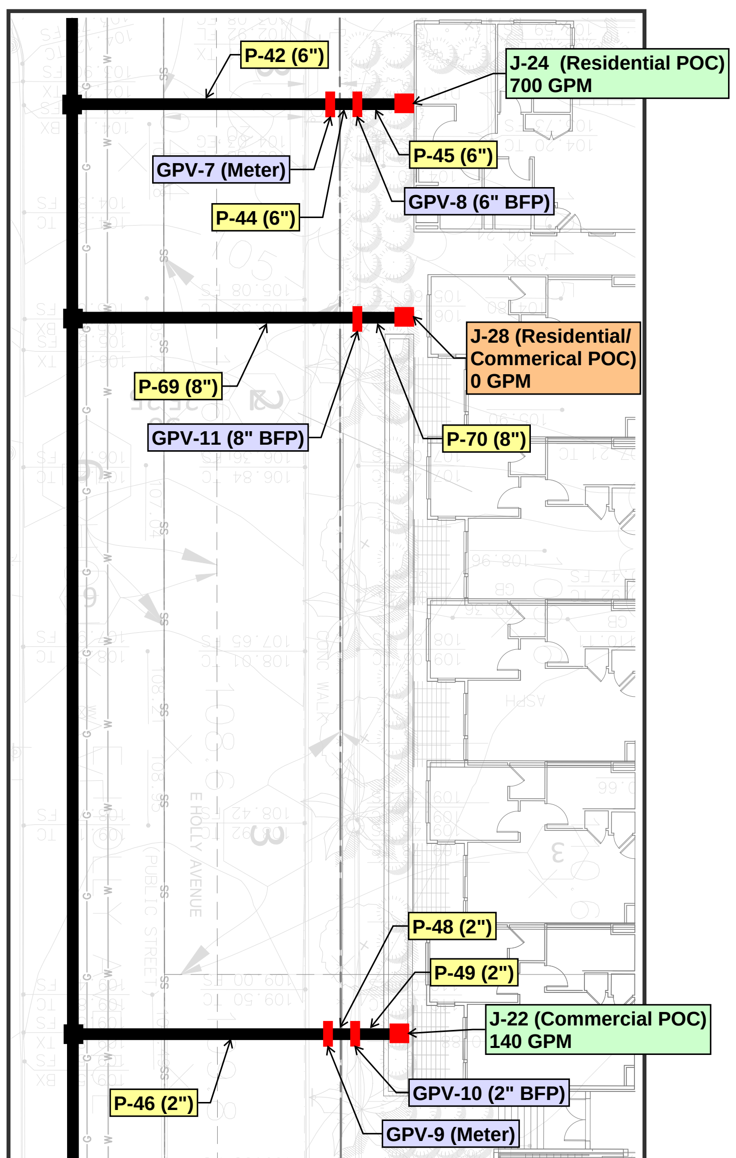
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-1	7	R-2	PMP-2	48	Ductile Iron	140	0	1820	0.32	0	4
P-6	**28**	**J-4**	**J-7**	**10**	**Ductile Iron**	**140**	**0.8**	**1820**	**7.43**	**70**	**69**
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0**	**840**	**3.43**	**76**	**76**
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**69**	**68**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**1.28**	**980**	**4**	**69**	**70**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.8**	**840**	**3.43**	**76**	**75**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	140	6.35	70	68
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	140	6.35	63	63
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	140	6.35	52	52
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	700	7.94	69	67
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	700	7.94	62	62
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	700	7.94	53	53
P-38	25	J-5	GPV-5	3	Ductile Iron	140	0.8	140	6.35	68	67
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	140	6.35	62	62
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	140	6.35	51	50
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	700	7.94	75	74
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	700	7.94	69	68
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	700	7.94	59	59
P-46	36	J-21	GPV-9	3	Ductile Iron	140	0.8	140	6.35	72	71
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	140	6.35	66	66
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	140	6.35	54	54
P-51	**28**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**75**	**74**
P-52	**103**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**74**	**72**
P-55	**134**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**78**	**76**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**70**	**70**
P-60	**17**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**70**	**70**
P-61	**760**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**70**	**78**
P-64	**26**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**69**	**69**
P-66	**45**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**69**	**69**
P-67	**11**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**69**	**69**
P-69	40	J-27	GPV-11	8	Ductile Iron	140	1.28	0	0	74	74
P-70	9	GPV-11	J-28	8	Ductile Iron	140	0	0	0	71	71
P-71	30	J-29	GPV-12	8	Ductile Iron	140	1.28	0	0	78	77
P-72	5	GPV-12	J-30	8	Ductile Iron	140	0	0	0	74	74
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	0	0	70	70
P-74	5	GPV-13	J-34	8	Ductile Iron	140	0	0	0	66	66
P-75	30	J-31	GPV-14	8	Ductile Iron	140	1.28	0	0	70	69
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	0	0	66	66
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	0	0	69	69
P-78	7	GPV-15	J-38	8	Ductile Iron	140	0	0	0	66	66
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	0	0	69	69
P-80	7	GPV-16	J-36	8	Ductile Iron	140	0	0	0	65	65
P-81	7	PMP-2	J-4	48	Ductile Iron	140	0	1820	0.32	67	70

Note: Information and results for the 10" public main are in **bold red text.**

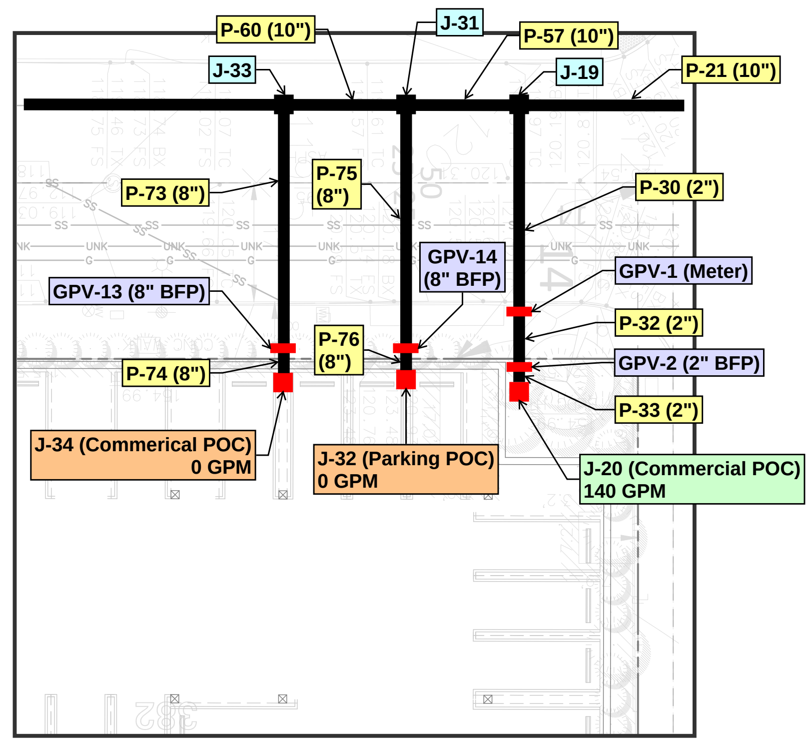
EXHIBIT 3

PACIFIC COAST COMMONS WATERCAD MODEL
DOMESTIC WATER | HYDRANT 1890

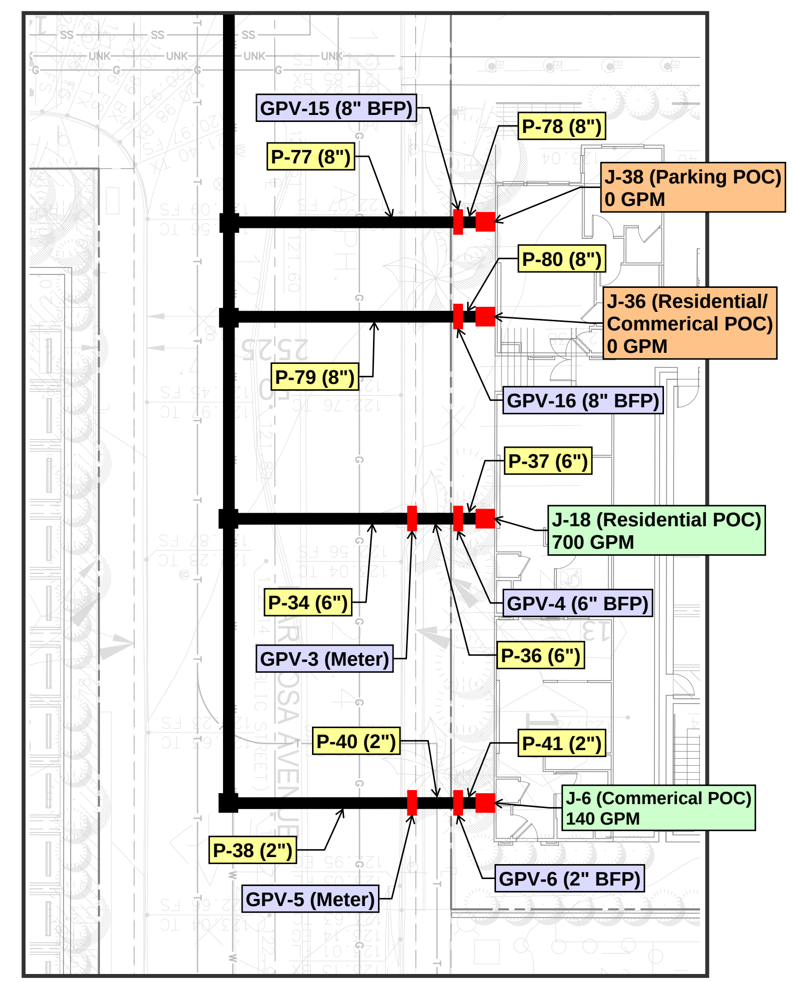




DETAIL 1 - SOUTH SITE



DETAIL 2 - FAIRFIELD PARKING



DETAIL 3 - NORTH SITE

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CONSULTANTS

STAMP

REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION

PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE

PACIFIC COAST COMMONS - SOUTH EXHIBIT

EXHIBIT 3

DOMESTIC WATER - FH 1890
JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-5	119.9	0	271.51	66
J-6	120.63	140	229.99	47
J-7	118.08	0	272.11	67
J-8	98.85	0	278	78
J-9	106.85	0	282.28	76
J-14	98.5	0	277.57	77
J-17	119	0	271.52	66
J-18	120.06	700	234.98	50
J-19	116.91	0	272.31	67
J-20	118.12	140	231.82	49
J-21	106.52	0	280.72	75
J-22	106.8	140	238.07	57
J-23	101.13	0	278.36	77
J-24	101.38	700	241.49	61
J-27	102.95	0	279.03	76
J-28	102.58	0	271.78	73
J-29	95.43	0	276.68	78
J-30	96.22	0	269.43	75
J-31	116.57	0	272.49	67
J-32	117.64	0	265.24	64
J-33	116.02	0	272.67	68
J-34	117.16	0	265.42	64
J-35	118.53	0	271.68	66
J-36	119.75	0	264.43	63
J-37	118.35	0	271.79	66
J-38	119.57	0	264.54	63

EXHIBIT 3

DOMESTIC WATER - FH 1890 PIPE TABLE

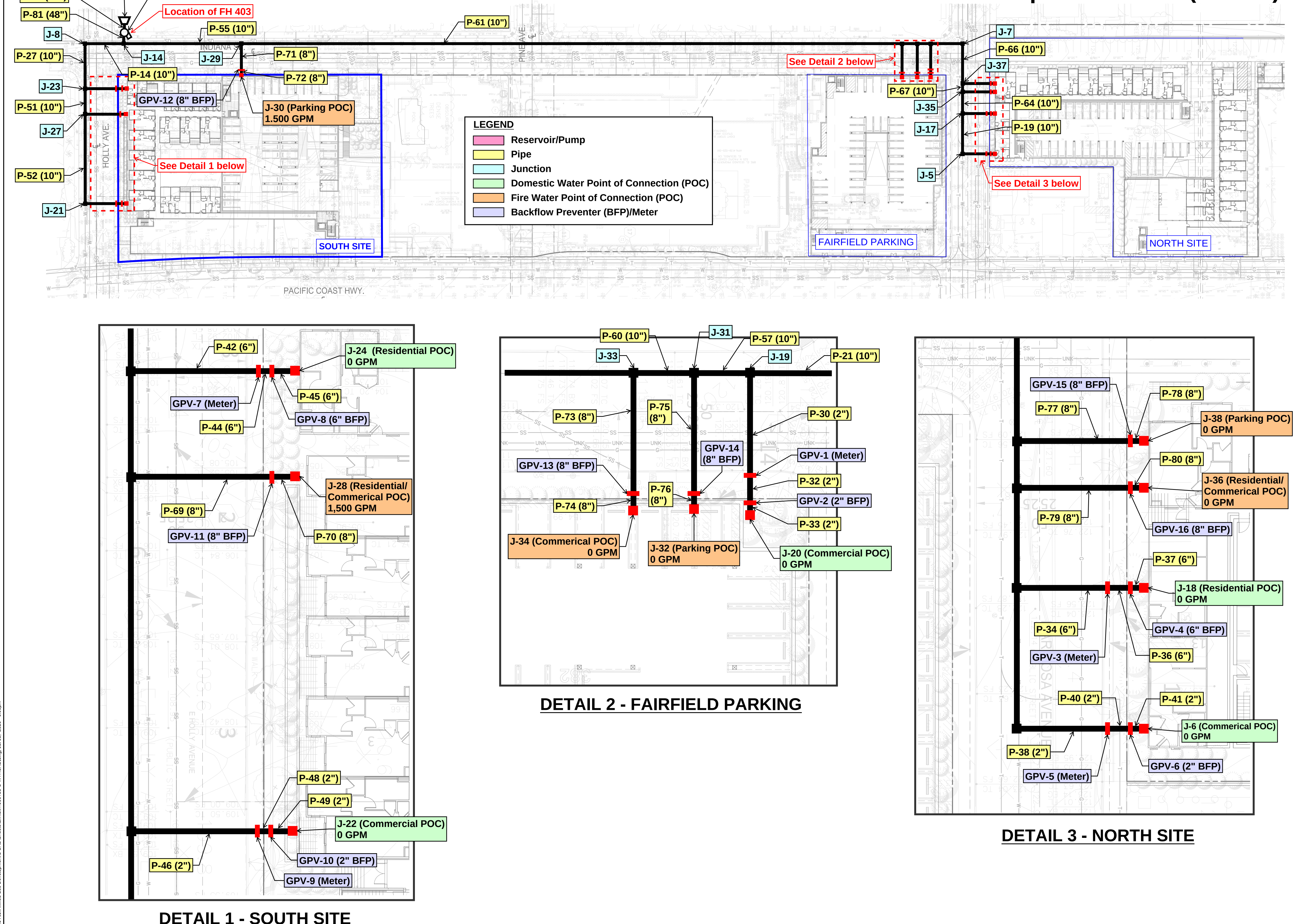
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-11	8	PMP-3	R-3	48	Ductile Iron	140	0	-1820	0.32	2	0
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0.8**	**-980**	**4**	**77**	**78**
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**140**	**0.57**	**66**	**66**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**0.35**	**-840**	**3.43**	**67**	**67**
P-25	**54**	**J-21**	**J-9**	**10**	**Ductile Iron**	**140**	**0.8**	**-1820**	**7.43**	**75**	**76**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**78**	**77**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	140	6.35	67	66
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	140	6.35	61	61
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	140	6.35	49	49
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	700	7.94	66	65
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	700	7.94	60	59
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	700	7.94	50	50
P-38	25	J-5	GPV-5	3	Ductile Iron	140	1.28	140	6.35	66	64
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	140	6.35	59	59
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	140	6.35	48	47
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	700	7.94	77	76
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	700	7.94	71	70
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	700	7.94	61	61
P-46	36	J-21	GPV-9	3	Ductile Iron	140	1.28	140	6.35	75	74
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	140	6.35	69	69
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	140	6.35	57	57
P-51	**29**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**-1680**	**6.86**	**77**	**76**
P-52	**102**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**-1680**	**6.86**	**76**	**75**
P-55	**133**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.8**	**-980**	**4**	**78**	**77**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**67**	**67**
P-60	**18**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**67**	**68**
P-61	**759**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**-980**	**4**	**68**	**78**
P-64	**25**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**66**	**66**
P-66	**46**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.8**	**840**	**3.43**	**67**	**66**
P-67	**11**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**840**	**3.43**	**66**	**66**
P-69	42	J-27	GPV-11	8	Ductile Iron	140	1.28	0	0	76	76
P-70	7	GPV-11	J-28	8	Ductile Iron	140	0	0	0	73	73
P-71	30	J-29	GPV-12	8	Ductile Iron	140	1.28	0	0	78	78
P-72	5	GPV-12	J-30	8	Ductile Iron	140	0	0	0	75	75
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	0	0	68	67
P-74	6	GPV-13	J-34	8	Ductile Iron	140	0	0	0	64	64
P-75	31	J-31	GPV-14	8	Ductile Iron	140	1.28	0	0	67	67
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	0	0	64	64
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	0	0	66	66
P-78	7	GPV-15	J-38	8	Ductile Iron	140	0	0	0	63	63
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	0	0	66	66
P-80	7	GPV-16	J-36	8	Ductile Iron	140	0	0	0	63	63
P-81	10	PMP-3	J-9	48	Ductile Iron	140	0	1820	0.32	68	76

Note: Information and results for the 10" public main are in **bold red text.**

EXHIBIT 3

PACIFIC COAST COMMONS WATERCAD MODEL

FIRE WATER | SOUTH SITE (FH 403)



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REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION

PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE

PACIFIC COAST COMMONS - SOUTH EXHIBIT

SHEET NUMBER (EXHIBIT NUMBER)

EXHIBIT 3

FIRE WATER - SOUTH SITE (FH 403)
JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-5	119.9	0	243.5	53
J-6	120.63	0	253.55	58
J-7	118.08	0	243.5	54
J-8	98.85	0	244.5	63
J-14	98.5	0	245.48	64
J-17	119	0	243.5	54
J-18	120.06	0	210.24	39
J-19	116.91	0	243.5	55
J-20	118.12	0	253.55	59
J-21	106.52	0	242.88	59
J-22	106.8	0	252.93	63
J-23	101.13	0	243.43	62
J-24	101.38	0	210.16	47
J-27	102.95	0	242.88	61
J-28	102.58	1500	224.58	53
J-29	95.43	0	243.5	64
J-30	96.22	1500	225.66	56
J-31	116.57	0	243.5	55
J-32	117.64	0	236.25	51
J-33	116.02	0	243.5	55
J-34	117.16	0	236.25	52
J-35	118.53	0	243.5	54
J-36	119.75	0	236.25	50
J-37	118.35	0	243.5	54
J-38	119.57	0	236.25	50

EXHIBIT 3

FIRE WATER - SOUTH SITE (FH 403) PIPE TABLE

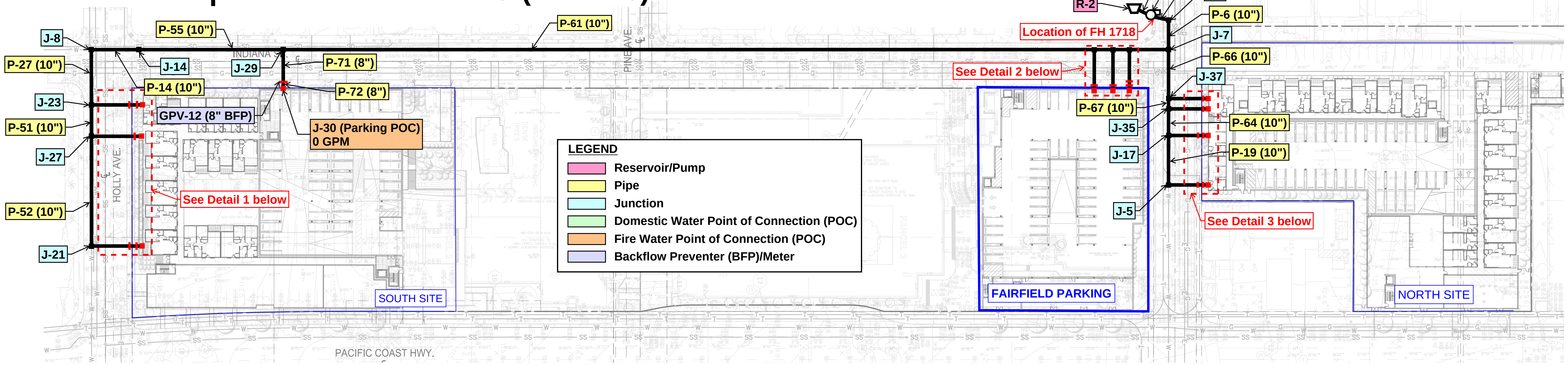
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0.8**	**1500**	**6.13**	**64**	**63**
P-16	5	R-1	PMP-1	48	Ductile Iron	140	0	3000	0.53	0	2
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**54**	**53**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**54**	**55**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.8**	**1500**	**6.13**	**63**	**62**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	0	0	55	54
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	0	0	49	49
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	0	0	59	59
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	0	0	54	53
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	0	0	48	48
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	0	0	39	39
P-38	25	J-5	GPV-5	3	Ductile Iron	140	0.8	0	0	53	53
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	0	0	48	48
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	0	0	58	58
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	0	0	62	61
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	0	0	56	56
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	0	0	47	47
P-46	36	J-21	GPV-9	3	Ductile Iron	140	0.8	0	0	59	59
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	0	0	54	54
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	0	0	63	63
P-51	**30**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**1500**	**6.13**	**62**	**61**
P-52	**101**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**61**	**59**
P-55	**133**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.8**	**-1500**	**6.13**	**64**	**64**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**55**	**55**
P-60	**18**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**55**	**55**
P-61	**759**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**55**	**64**
P-64	**25**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**54**	**54**
P-66	**46**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.8**	**0**	**0**	**54**	**54**
P-67	**12**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**54**	**54**
P-69	42	J-27	GPV-11	8	Ductile Iron	140	1.28	1500	9.57	61	59
P-70	9	GPV-11	J-28	8	Ductile Iron	140	0	1500	9.57	53	53
P-71	31	J-29	GPV-12	8	Ductile Iron	140	1.28	1500	9.57	64	62
P-72	6	GPV-12	J-30	8	Ductile Iron	140	0	1500	9.57	56	56
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	0	0	55	55
P-74	5	GPV-13	J-34	8	Ductile Iron	140	0	0	0	52	52
P-75	31	J-31	GPV-14	8	Ductile Iron	140	1.28	0	0	55	54
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	0	0	51	51
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	0	0	54	54
P-78	6	GPV-15	J-38	8	Ductile Iron	140	0	0	0	50	50
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	0	0	54	54
P-80	6	GPV-16	J-36	8	Ductile Iron	140	0	0	0	50	50
P-81	13	PMP-1	J-14	48	Ductile Iron	140	0	3000	0.53	52	64

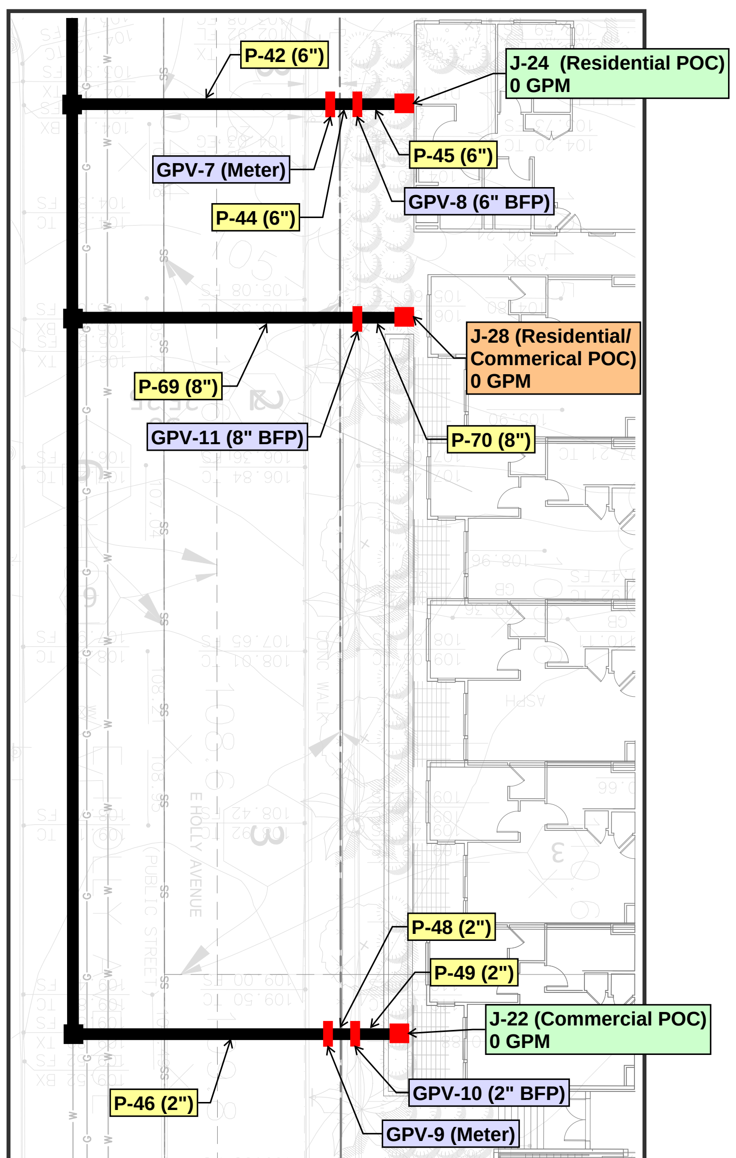
Note: Information and results for the 10" public main are in **bold red text.**

EXHIBIT 3

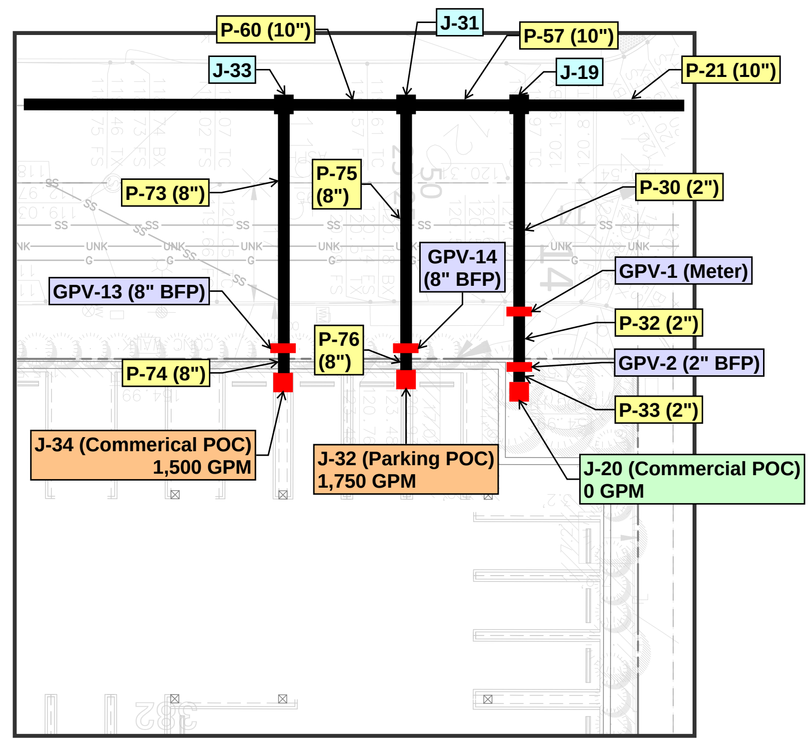
PACIFIC COAST COMMONS WATERCAD MODEL

FIRE WATER | FAIRFIELD PARKING (FH 1718)

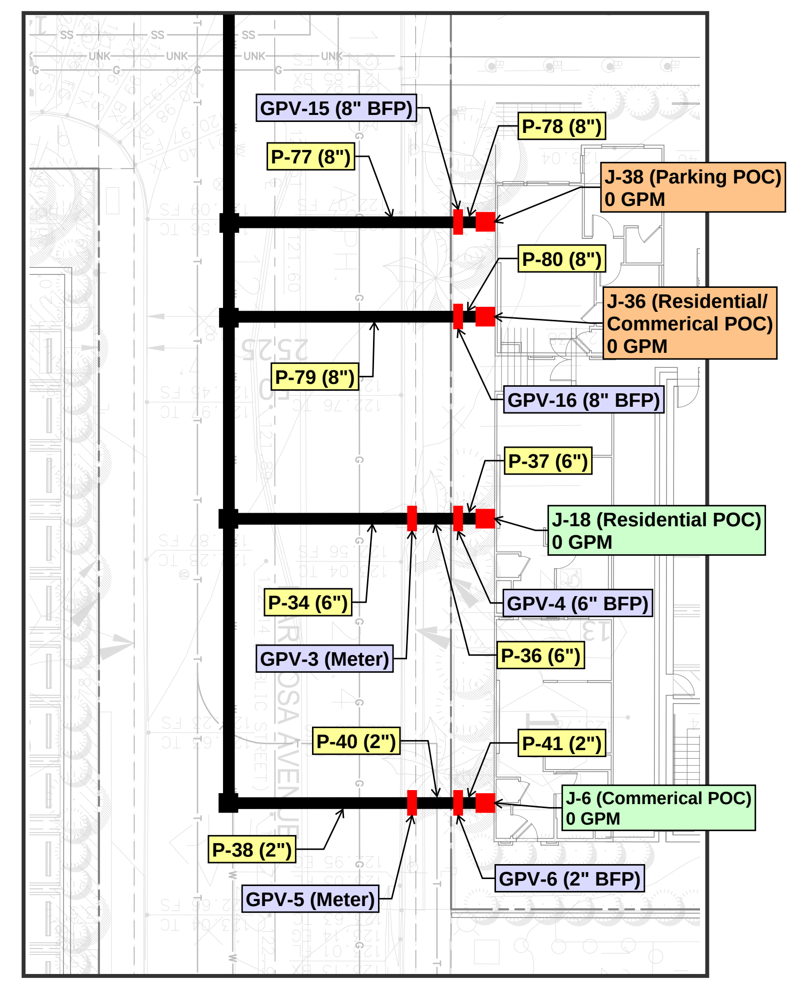




DETAIL 1 - SOUTH SITE



DETAIL 2 - FAIRFIELD PARKING



DETAIL 3 - NORTH SITE

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REVISIONS		
DATE	–	ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION
PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE
PACIFIC COAST COMMONS - SOUTH EXHIBIT

EXHIBIT 3

FIRE WATER - FAIRFIELD PARKING (FH 1718) JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-4	117.8	0	264.95	64
J-5	119.9	0	261.45	61
J-6	120.63	0	271.5	65
J-7	118.08	0	261.45	62
J-8	98.85	0	254.13	67
J-14	98.5	0	254.13	67
J-17	119	0	261.45	62
J-18	120.06	0	228.18	47
J-19	116.91	0	256.33	60
J-20	118.12	0	266.39	64
J-21	106.52	0	254.13	64
J-22	106.8	0	264.18	68
J-23	101.13	0	254.13	66
J-24	101.38	0	220.87	52
J-27	102.95	0	254.13	65
J-28	102.58	0	246.88	62
J-29	95.43	0	254.13	69
J-30	96.22	0	246.88	65
J-31	116.57	0	254.53	60
J-32	117.64	1750	234.33	50
J-33	116.02	0	254.13	60
J-34	117.16	1500	236.3	52
J-35	118.53	0	261.45	62
J-36	119.75	0	254.19	58
J-37	118.35	0	261.45	62
J-38	119.57	0	254.19	58

EXHIBIT 3

FIRE WATER - FAIRFIELD PARKING (FH 1718) PIPE TABLE

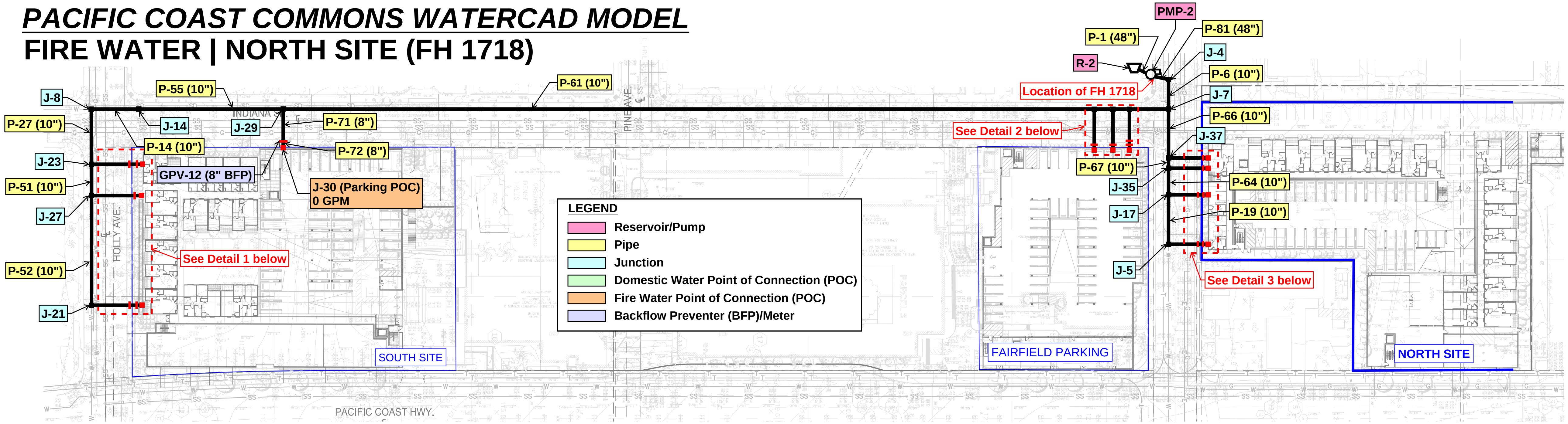
Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-1	7	R-2	PMP-2	48	Ductile Iron	140	0	3250	0.58	0	4
P-6	**28**	**J-4**	**J-7**	**10**	**Ductile Iron**	**140**	**0.8**	**3250**	**13.28**	**64**	**62**
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0**	**0**	**0**	**67**	**67**
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**61**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**1.28**	**3250**	**13.28**	**62**	**60**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.8**	**0**	**0**	**67**	**66**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	0	0	60	60
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	0	0	55	55
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	0	0	64	64
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	0	0	62	61
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	0	0	56	56
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	0	0	47	47
P-38	25	J-5	GPV-5	3	Ductile Iron	140	0.8	0	0	61	61
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	0	0	56	56
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	0	0	65	65
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	0	0	66	66
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	0	0	61	61
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	0	0	52	52
P-46	36	J-21	GPV-9	3	Ductile Iron	140	0.8	0	0	64	64
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	0	0	59	59
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	0	0	68	68
P-51	**28**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**66**	**65**
P-52	**103**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**65**	**64**
P-55	**134**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**69**	**67**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**3250**	**13.28**	**60**	**60**
P-60	**17**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**1500**	**6.13**	**60**	**60**
P-61	**760**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**60**	**69**
P-64	**26**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**62**
P-66	**45**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**62**
P-67	**11**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**62**
P-69	40	J-27	GPV-11	8	Ductile Iron	140	1.28	0	0	65	66
P-70	9	GPV-11	J-28	8	Ductile Iron	140	0	0	0	62	62
P-71	30	J-29	GPV-12	8	Ductile Iron	140	1.28	0	0	69	68
P-72	5	GPV-12	J-30	8	Ductile Iron	140	0	0	0	65	65
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	1500	9.57	60	58
P-74	5	GPV-13	J-34	8	Ductile Iron	140	0	1500	9.57	52	52
P-75	30	J-31	GPV-14	8	Ductile Iron	140	1.28	1750	11.17	60	58
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	1750	11.17	51	50
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	0	0	62	61
P-78	7	GPV-15	J-38	8	Ductile Iron	140	0	0	0	58	58
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	0	0	62	61
P-80	7	GPV-16	J-36	8	Ductile Iron	140	0	0	0	58	58
P-81	7	PMP-2	J-4	48	Ductile Iron	140	0	3250	0.58	61	64

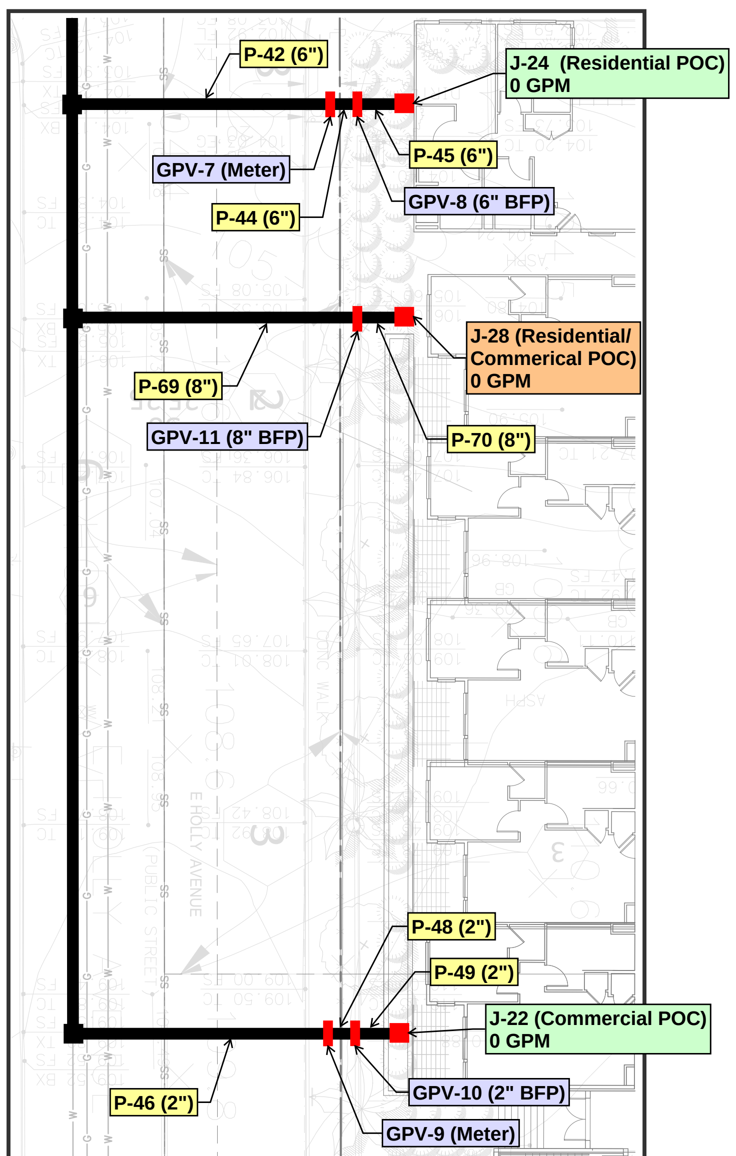
Note: Information and results for the 10" public main are in **bold red text.**

EXHIBIT 3

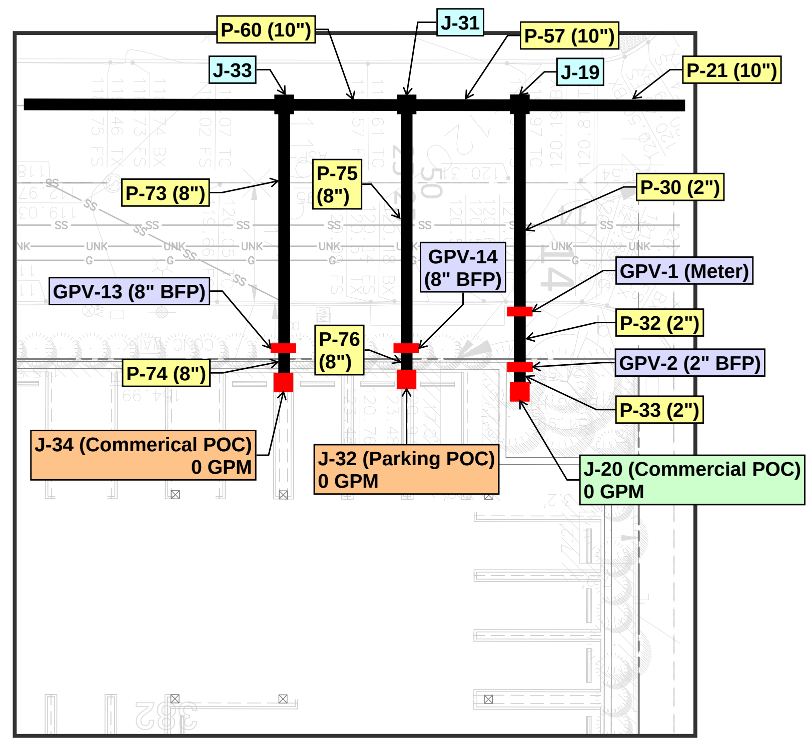
PACIFIC COAST COMMONS WATERCAD MODEL

FIRE WATER | NORTH SITE (FH 1718)

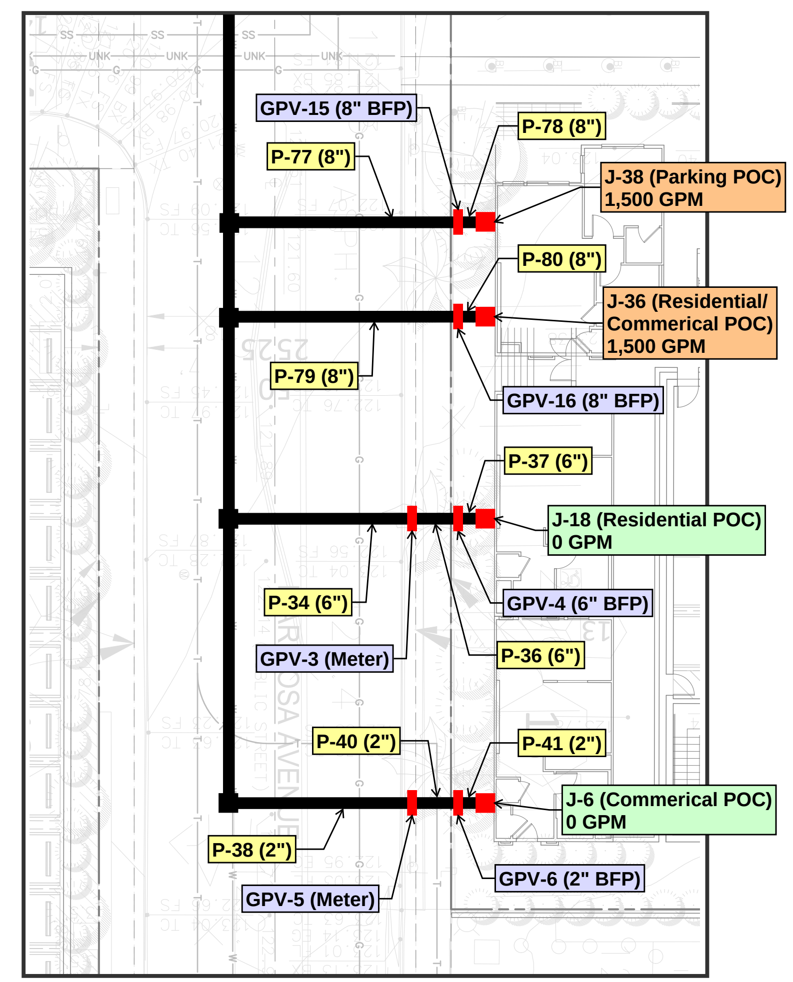




DETAIL 1 - SOUTH SITE



DETAIL 2 - FAIRFIELD PARKING



DETAIL 3 - NORTH SITE

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REVISIONS

DATE		ISSUED FOR
XX/XX/XX	1	DESCRIPTION

DATE	11.05.19
PROJECT NUMBER	1900156
DESIGNED BY	BT
DRAWN BY	DM
CHECKED BY	KE
SCALE	AS SPECIFIED

KEY MAP

PROJECT DESCRIPTION

PACIFIC COAST COMMONS MIXED-USE DEVELOPMENT

XXXX LOS ANGELES AVENUE
LOS ANGELES, CA 9XXXX

DRAWING TITLE

PACIFIC COAST COMMONS - SOUTH EXHIBIT

EXHIBIT 3

FIRE WATER - NORTH SITE (FH 1718) JUNCTION TABLE

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-4	117.8	0	268.05	65
J-5	119.9	0	262.05	62
J-6	120.63	0	228.9	47
J-7	118.08	0	265.05	64
J-8	98.85	0	265.05	72
J-14	98.5	0	265.05	72
J-17	119	0	262.05	62
J-18	120.06	0	228.79	47
J-19	116.91	0	265.05	64
J-20	118.12	0	231.9	49
J-21	106.52	0	265.05	69
J-22	106.8	0	231.9	54
J-23	101.13	0	265.05	71
J-24	101.38	0	231.79	56
J-27	102.95	0	265.05	70
J-28	102.58	0	257.8	67
J-29	95.43	0	265.05	73
J-30	96.22	0	257.8	70
J-31	116.57	0	265.05	64
J-32	117.64	0	257.8	61
J-33	116.02	0	265.05	64
J-34	117.16	0	257.8	61
J-35	118.53	0	262.05	62
J-36	119.75	1500	244.15	54
J-37	118.35	0	262.38	62
J-38	119.57	1500	244.48	54

EXHIBIT 3

FIRE WATER - NORTH SITE (FH 1718) PIPE TABLE

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)	Pressure (Start) (psi)	Pressure (Stop) (psi)
P-1	7	R-2	PMP-2	48	Ductile Iron	140	0	3000	0.53	0	4
P-6	**28**	**J-4**	**J-7**	**10**	**Ductile Iron**	**140**	**0.8**	**3000**	**12.25**	**65**	**64**
P-14	**45**	**J-14**	**J-8**	**10**	**Ductile Iron**	**140**	**0**	**0**	**0**	**72**	**72**
P-19	**43**	**J-17**	**J-5**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**62**
P-21	**34**	**J-7**	**J-19**	**10**	**Ductile Iron**	**140**	**1.28**	**0**	**0**	**64**	**64**
P-27	**53**	**J-8**	**J-23**	**10**	**Ductile Iron**	**140**	**0.8**	**0**	**0**	**72**	**71**
P-30	29	J-19	GPV-1	3	Ductile Iron	140	1.28	0	0	64	64
P-32	3	GPV-1	GPV-2	3	Ductile Iron	140	0	0	0	59	59
P-33	4	GPV-2	J-20	3	Ductile Iron	140	0	0	0	49	49
P-34	27	J-17	GPV-3	6	Ductile Iron	140	1.28	0	0	62	61
P-36	5	GPV-3	GPV-4	6	Ductile Iron	140	1.28	0	0	56	56
P-37	6	GPV-4	J-18	6	Ductile Iron	140	1.28	0	0	47	47
P-38	25	J-5	GPV-5	3	Ductile Iron	140	0.8	0	0	62	61
P-40	6	GPV-5	GPV-6	3	Ductile Iron	140	0.8	0	0	56	56
P-41	6	GPV-6	J-6	3	Ductile Iron	140	0.8	0	0	47	47
P-42	35	J-23	GPV-7	6	Ductile Iron	140	1.28	0	0	71	71
P-44	7	GPV-7	GPV-8	6	Ductile Iron	140	1.28	0	0	66	66
P-45	6	GPV-8	J-24	6	Ductile Iron	140	1.28	0	0	56	56
P-46	36	J-21	GPV-9	3	Ductile Iron	140	0.8	0	0	69	68
P-48	6	GPV-9	GPV-10	3	Ductile Iron	140	1.28	0	0	63	63
P-49	6	GPV-10	J-22	3	Ductile Iron	140	1.28	0	0	54	54
P-51	**28**	**J-23**	**J-27**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**71**	**70**
P-52	**103**	**J-27**	**J-21**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**70**	**69**
P-55	**134**	**J-29**	**J-14**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**73**	**72**
P-57	**18**	**J-19**	**J-31**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**64**	**64**
P-60	**17**	**J-31**	**J-33**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**64**	**64**
P-61	**760**	**J-33**	**J-29**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**64**	**73**
P-64	**26**	**J-35**	**J-17**	**10**	**Ductile Iron**	**140**	**0.35**	**0**	**0**	**62**	**62**
P-66	**45**	**J-7**	**J-37**	**10**	**Ductile Iron**	**140**	**0.35**	**3000**	**12.25**	**64**	**62**
P-67	**11**	**J-37**	**J-35**	**10**	**Ductile Iron**	**140**	**0.35**	**1500**	**6.13**	**62**	**62**
P-69	40	J-27	GPV-11	8	Ductile Iron	140	1.28	0	0	70	70
P-70	9	GPV-11	J-28	8	Ductile Iron	140	0	0	0	67	67
P-71	30	J-29	GPV-12	8	Ductile Iron	140	1.28	0	0	73	73
P-72	5	GPV-12	J-30	8	Ductile Iron	140	0	0	0	70	70
P-73	31	J-33	GPV-13	8	Ductile Iron	140	1.28	0	0	64	64
P-74	5	GPV-13	J-34	8	Ductile Iron	140	0	0	0	61	61
P-75	30	J-31	GPV-14	8	Ductile Iron	140	1.28	0	0	64	64
P-76	5	GPV-14	J-32	8	Ductile Iron	140	0	0	0	61	61
P-77	31	J-37	GPV-15	8	Ductile Iron	140	1.28	1500	9.57	62	61
P-78	7	GPV-15	J-38	8	Ductile Iron	140	0	1500	9.57	54	54
P-79	31	J-35	GPV-16	8	Ductile Iron	140	1.28	1500	9.57	62	60
P-80	7	GPV-16	J-36	8	Ductile Iron	140	0	1500	9.57	54	54
P-81	7	PMP-2	J-4	48	Ductile Iron	140	0	3000	0.53	62	65

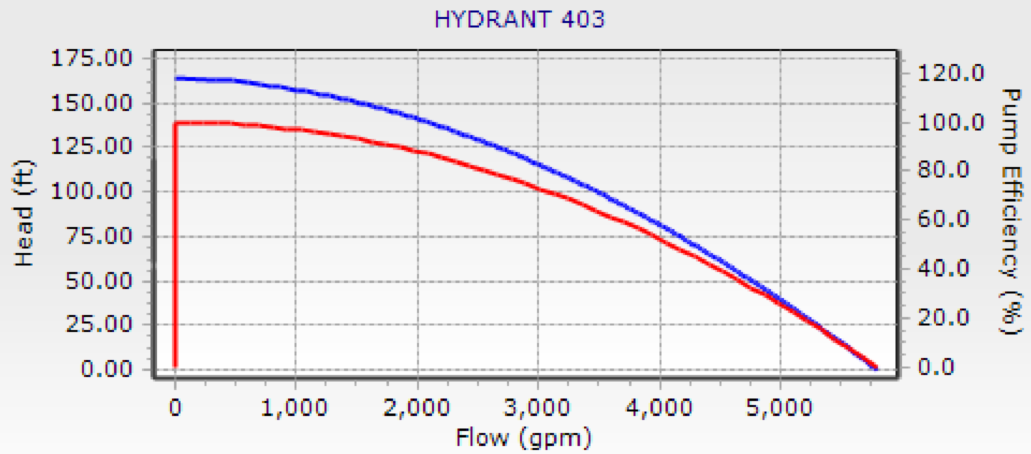
Note: Information and results for the 10" public main are in **bold red text.**

EXHIBIT 3

HYDRANT 403 - PUMP CURVE

Pump Definition Type: Standard (3 Point)

	Flow (gpm)	Head (ft)
Shutoff:	0	164.01
Design:	2,590	127.05
Max. Operating:	4,843	46.20



Coefficients: a = 164.01 ft; b = 1.766e-005 ft/(gpm)^c; c = 1.852

DESIGN POINT CALCULATION

Chosen Pressure (P_O) = 55 psi

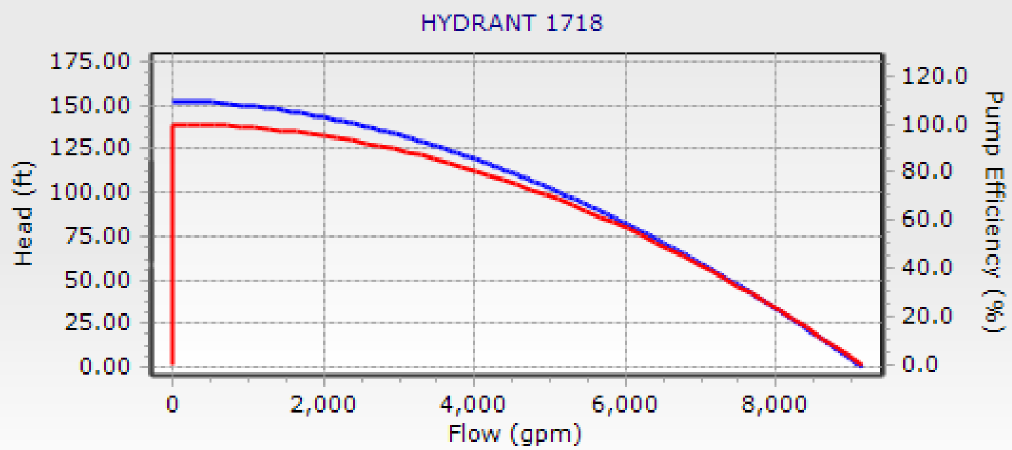
Q_O = 4,843 * [(71 - 55)/(71-20)]$^{0.54}$ = 2,590 gpm

EXHIBIT 4 - PUMP CURVE CALCULATIONS

HYDRANT 1718 - PUMP CURVE

Pump Definition Type: Standard (3 Point)

	Flow (gpm)	Head (ft)
Shutoff:	0	152.46
Design:	3,470	127.05
Max. Operating:	7,515	46.20



Coefficients: a = 152.46 ft; b = 7.099e-006 ft/(gpm)^c; c = 1.851

DESIGN POINT CALCULATION

Chosen Pressure (P_O) = 55 psi

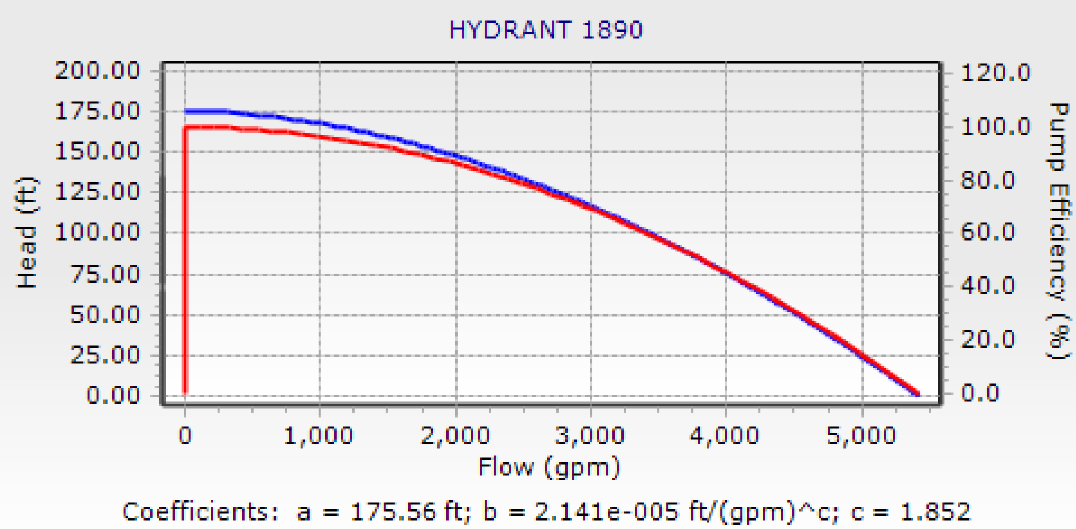
$Q_o = 7{,}515 * [(66 - 55)/(66-20)]^{0.54} = 3{,}470$ gpm

EXHIBIT 4 - PUMP CURVE CALCULATIONS

HYDRANT 1718 - PUMP CURVE

Pump Definition Type: Standard (3 Point)

	Flow (gpm)	Head (ft)
Shutoff:	0	175.56
Design:	2,706	127.05
Max. Operating:	4,595	46.20



DESIGN POINT CALCULATION

Chosen Pressure (P_O) = 55 psi

Q_O = 4,595 * [(76 - 55)/(76-20)]$^{0.54}$ = 2,706 gpm