PRELIMINARY HYDROLOGY STUDY
4665 Lampson Avenue
LOS ALAMITOS, CA
TTM No. 19263

Project Address:

4665 Lampson Avenue
Los Alamitos, California 90720

Prepared For:

MJW Investments, LLC
27702 Crown Valley Parkway
Suite D-4-197
Ladera Ranch, Ca 92694

Prepared By:

C&V Consulting Inc.
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Prepared: October 2022
Revised: March 2024

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Preliminary Hydrology Study
For
4665 Lampson Avenue
TR 19263, Los Alamitos

This Preliminary Hydrology Study was prepared by C&V Consulting, Inc. under the supervision of Philip Malcomson, P.E.

_____ _____

Philip Malcomson, R.C.E. 67819 Date
Principal, C&V Consulting, Inc.

1.0 SITE DESCRIPTION:

The proposed development encompasses one parcel consisting of approximately 12.37 acres (APN: 130-012-35). The project is bounded by Lampson Avenue to the south, a golf course to the east, the Joint Forces Training Base – Los Alamitos to the west, and a park to the north. There are 2 existing driveways that provide access to the site from Lampson Avenue. Approximately 1/3 of the existing site consists of a paved parking lot. Along the west and northern property lines, there is an existing drive aisle and parking that serves the park to the north. The rest of the site consists of a two-story office building, associated concrete sidewalks, and a large grassy/ brush filled open space. Per the City of Los Alamitos General Plan, the site is located within the Limited Multiple Family Residential designation. According to the city of Los Alamitos Zoning Map the site is located within the Multi-Family Residential (R-3) zone.

2.0 PURPOSE OF STUDY:

The purpose of this report is to provide quantitative information to verify the design of the storm drain infrastructure and hydrologic methodology of the project site. This report demonstrates that the subject site is designed and planned in accordance with the Orange County Hydrology Manual, the City of Los Alamitos drainage requirements, and the City of Seal Beach drainage requirements.

3.0 EXISTING CONDITIONS:

Per the existing topography, the site elevations range from approximately 21 feet to 26 feet. The existing site generally flows in a north to south direction into an existing westerly flowing concrete channel along the site's southerly property line. The westerly flowing channel outlets to an 18-inch diameter corrugated metal pipe (CMP) with headwall that flows under the offsite driveway to Arbor Park and discharges into an offsite earthen channel on the west side of the park driveway. Stormwater runoff flows within this earthen channel converge with runoff flows from portions of Arbor Park and JFTB and are then collected by an existing 24-inch CMP that flows westerly through the Joint Forces Training Base (JFTB), then discharge into a westerly flowing earthen channel within the JFTB, and then drain to the Old Ranch Country Club to the south. Stormwater runoff is ultimately conveyed downstream into the San Gabriel River.

Per C&V Consulting conducted field observations, the existing concrete channel along the site's southerly property line currently ponds back to the existing driveway and may overflow onto Lampson Avenue. Based on conversations with City of Seal Beach staff, historical stormwater flows in Lampson Avenue exceed the top of curb elevation during large storm events. Based on the existing topography of the site, in the event the outlet pipe were to become clogged, the existing overflows from the property would flow onto Lampson Avenue at the low point at the southwest corner of the site.

Per Orange County Flood Protection Goals: Figure 3-1 enclosed in Appendix A:

1. flooding is allowed over the curb and to the right of way for the 100-year flood level as long as a 1-foot minimum freeboard from the building pad to the water surface elevation is provided and
2. flooding is allowed to the top of the curb for 25-year flood level street flows as long as a 12-ft wide travel lane is provided for emergency vehicles.

As shown in the existing street flow calculations enclosed in Appendix C.3, the 25-year flood level street flows in Lampson Avenue along the project frontage are contained below the top of curb with a 12-ft wide travel lane provided for emergency vehicles in accordance with Orange County Flood Protection requirements.

Refer to the Existing Conditions Hydrology Map located within Appendix A.1 of this report for additional information.

4.0 PROPOSED CONDITIONS:

The proposed development will consist of 169 for sale single family residential units (55 detached condos and 114 attached townhome units) and 77 for rent units (3 apartment buildings); for a total of 246 dwelling units. Proposed associated drive aisles, parking and flatwork will increase the impervious area compared to the existing condition of the site.

The proposed site's stormwater runoff will be conveyed by roof downspouts or street surface flow to proposed gutters and collected by thru-curb inlet bio-filtration devices or catch basin inlets for water quality treatment. The bio-filtration devices include internal overflow bypass that direct flows via on-site underground storm drain system to an underground detention system located under parking areas at the southwest portion of the site. From the detention system, a stormwater sump pump located in the southwest corner of the site will outlet flows into the existing 18" storm drain pipe at the southwest corner of the site to outlet to the JFTB. The detention system and pump will be sized so that the outlet flows from the developed site will be equal to, or less than, existing flows. In the event the stormwater pump fails or the outlet pipe becomes clogged, the emergency overflow for the site will flow onto Lampson Avenue matching historical drainage patterns.

Proposed pad elevations for the onsite buildings shall be set 1-ft minimum above the Q100 water surface elevation in accordance with Orange County Flood Protection requirements.

A 10-ft dedication along the northern the property line to the adjacent park is proposed. This 10-ft dedication area is outside the proposed residential development and will not be tributary to the site's proposed storm drain system.

Alternative Drainage System Outlets to Lampson Avenue:

There is no current cross lot drainage agreement between the JFTB and the subject property allowing for the proposed development's flows to outlet onto the JFTB. The JFTB controls all improvements on their property. If, for whatever reason, proposed flows from the project are not allowed to outlet to the JFTB, then an alternate design is proposed to outlet surface flows onto Lampson Avenue gutter via a parkway culvert.

Due to existing flooding concerns on Lampson Avenue, the onsite detention and pump system will be designed to allow for low flows to enter Lampson Avenue up until the time that the flows begin to exceed the allowable Q25 on Lampson. Once the peak storm event flows have subsided and flows are no longer above the allowed Q25, it will resume pumping to Lampson Avenue.

Approaches to Drainage System Outlets Deemed Infeasible:

As part of our hydrology analysis, we reviewed the following drainage designs with different outlet locations each of which were found to be infeasible upon closer review:

1. Construct storm drain pipe under Lampson Avenue to west:

The proposed installation of approximately 2,400 LF of 30-inch underground gravity storm drain pipe in Lampson Ave to directly connect to closest downstream existing 36-inch storm drain pipe (north of Guava Avenue extended) was found to be infeasible due to conflicts with existing utilities; including existing 16-inch water, 8-inch sewer, and 34" gas main. Installing 2,400 LF of force main, as opposed to gravity main, may also create long-term maintenance concerns. In addition, the installation of 2,400 LF of force main is not desirable due to head losses created by such a long length of pipe.
Refer to the exhibits in Appendix D.3.

2. Construct storm drain pipe under Heather Street, Hazelnut Avenue, and Guava Avenue to south and west:
   Since there is no existing underground storm drain to connect to within Heather Street or Hazelnut Avenue, a new storm drain pipe would need to be extended 3,000 LF through these streets to connect to the existing 36-inch storm drain pipe in Guava Ave. The existing storm drain system is undersized according to the City of Seal Beach Master Plan of Drainage Update dated August 2008. Future City of Seal Beach capital improvements to the downstream storm drain system are recommended in the Master Plan of Drainage Update at this location (CPE 1A and CPE 1B as shown on Figure 1-3 in Appendix D.2), but there is no current timeline to install any capital improvements. Without the capital improvements in place, redirecting stormwater runoff flows from the site to the currently undersized storm drain system in Guava Ave is infeasible since it would exacerbate the existing flooding condition at this location adjacent to single family homes.
   Refer to the exhibits in Appendix D.2 and D.3.
3. Outlet Runoff to Arbor Park to North:
   Arbor Park is within the JFTB and drains south to the same earthen channel outlet as the project site. If the proposed flows from the project are not allowed to outlet to the JFTB at the southwest corner of the site, proposed flows from the project would not be allowed to outlet to the JFTB to the north of the site either since they are essentially the same outlet location.
4. Outlet Runoff to Golf Course to East:
   The golf course to the east is within the JFTB and drains east ultimately outletting to the Bolsa Chica Channel. Outletting to the east does not match the historical drainage pattern and the Bolsa Chica Channel was not designed to accommodate flows from the site.
5. Construct storm drain pipe under Lampson Avenue to East:
   Outletting to the east does not match the historical drainage pattern and the Bolsa Chica Channel was not designed to accommodate flows from the site. Additionally, installation of underground storm drain pipe within Lampson Avenue is infeasible for same reasons as noted in #1 above.

Refer to the Proposed Conditions Hydrology Map located in Appendix A.2.

5.0 METHODOLOGY:

The existing/proposed subarea was analyzed for acreage, land-use, soil type, peak flow rate, and time of concentration according to the Rational Method.

Recommended perviousness values are based on existing and proposed land use.

Proposed conditions are analyzed with rational method to determine the detention volume.

Rational Method Analysis identify offsite 25-year storm event flow allowed to prevent flooding of one travel lane of the half-street per Orange County Public Works Flood Local Drainage Manual.

6.0 RESULTS:

Existing Conditions

DA	AREA (AC)	PERVIOUS AREA (AC)	IMPERVIOUS AREA (SF)	PERCENT IMPERVIOUS	Q10 (CFS)	Q25 (CFS)	Q100 (CFS)	100-YR TC (MIN)
X1	0.20	0.20	0	0%	0.45	0.55	0.72	9.09
X2	3.05	3.05	0	0%	4.57	5.83	7.94	14.51
X3	8.87	0.89	7.98	90%	14.11	17.40	22.85	17.43
TOTAL	12.12	4.14	7.98	66%	19.12	23.78	31.51	-

Existing Offsite Drainage Area Conditions

DA	AREA (AC)	Q2 (CFS)	Q25 (CFS)	25-YR TC (MIN)	Q100 (CFS)	100-YR TC (MIN)
X4	0.44	0.68	1.48	7.69	1.90	7.69
X5	2.51	0.87	2.36	40.00	3.13	38.01
TOTAL	2.95	1.55	3.84	-	5.03	-

Proposed Conditions

DA	AREA (AC)	Q10 (CFS) [unmitigated]	Q25 (CFS) [unmitigated]	Q100 (CFS) [unmitigated]	100-YR TC (MIN)	Q10 (CFS) [mitigated]	Q100 (CFS) [mitigated]
1	0.73	2.08	2.50	3.22	7.2	-	-
2	6.07	13.29	16.30	21.45	10.0	-	-
3	3.16	6.30	7.76	10.23	10.6	-	-
4	0.64	1.82	2.18	2.81	7.2	-	-
5	1.52	3.21	3.94	5.21	9.5	-	-
TOTAL	12.12	26.15	32.06	42.15	11.3	19.12	31.51

Catch Basin Sizing

Catch basin Sizing will be analyzed for the 100-year storm event peak flow and provided during final engineering.

Pipe Sizing

Onsite underground storm drain pipe will be analyzed for the 100-year storm event peak flow rate utilizing WSPG software and provided during final engineering.

100-Year Water Surface Ponding Exhibit/ Calculations

Water surface elevations for the 100-year storm event peak flow rates will verify that the proposed building pad elevations are a minimum 1-foot above the water surface elevation. A ponding exhibit will be prepared based on the 100-year water surface elevation tributary to each subarea during final engineering.

Onsite Detention Calculations

Due to increased peak runoff flows created from the proposed change in land use and increased impervious coverage of the proposed development, stormwater will need to be detained and mitigated onsite to match existing conditions. A small unit area hydrograph was analyzed to determine the amount of increased volume runoff that needs to be mitigated based on existing vs. proposed flows. However, the existing outlet pipe with headwall limits flow from the site similar to an orifice. Based on the maximum flows conveyed by the outlet pipe based on analyzing the pipe as an orifice, it appears the existing flows may overflow into Lampson Ave (Refer to Appendix C.2 for orifice calculations). To prevent overflow into Lampson Ave, the detention system shall be sized to match the maximum flows conveyed by the outlet pipe.

By matching the maximum flows conveyed by the outlet pipe and providing a 20% factor of safety for preliminary sizing, approximately 10,000 cf (cubic feet) is required to be detained onsite based on the existing 100-year storm event.

7.0 CONCLUSION:

The results from this hydrology study demonstrate that the proposed condition of the project site will generate a higher peak runoff flowrate than the existing condition of the site due to an increase in impervious area and change in land use. The proposed detention facilities will be designed to detain at the flows and times indicated by the produced hydrographs in Appendix C.1. Detained volumes will be discharged from the site via a pump system at flow rates that do not exceed the existing condition flow rates. Downstream facilities will not be hydrologically impacted by the proposed project site improvements.

8.0 DESIGN PARAMETERS:

1. The onsite drainage area was analyzed for a 10, 25, 100-Year storm event using Rational Method Analysis per the County of Orange Hydrology Manual. The offsite drainage was analyzed for a 25-Year storm event.

2. The drainage area is classified as Soil Group A (See Appendix E of this report). According to the Geotechnical Investigation report prepared by LGC Geotechnical, Inc. (dated December 21, 2021), the site is underlain by alluvial fan deposits to the maximum depth of 46.5 feet below existing grade. It consists of clay, clayey sand, silty clay, and silty sand. The soil is to be very moist to wet with depth and soft to stiff and medium dense to dense.

3. Assumed commercial and undeveloped cover for existing land use. A manning's "n" value of 0.040 is applied to undeveloped cover flow path and a value of 0.015 is applied to the concrete gutter.

4. Assumed apartments and condominium for proposed land use.

5. Time of concentration Tc were calculated by using the County of Orange Hydrology Manual to calculate flow rates and volume amounts.

6. There is no offsite run-on tributary to the site.

9.0 REFERENCES:

1. Orange County Hydrology Manual. Orange County Environmental Management Agency. dated October 1986.

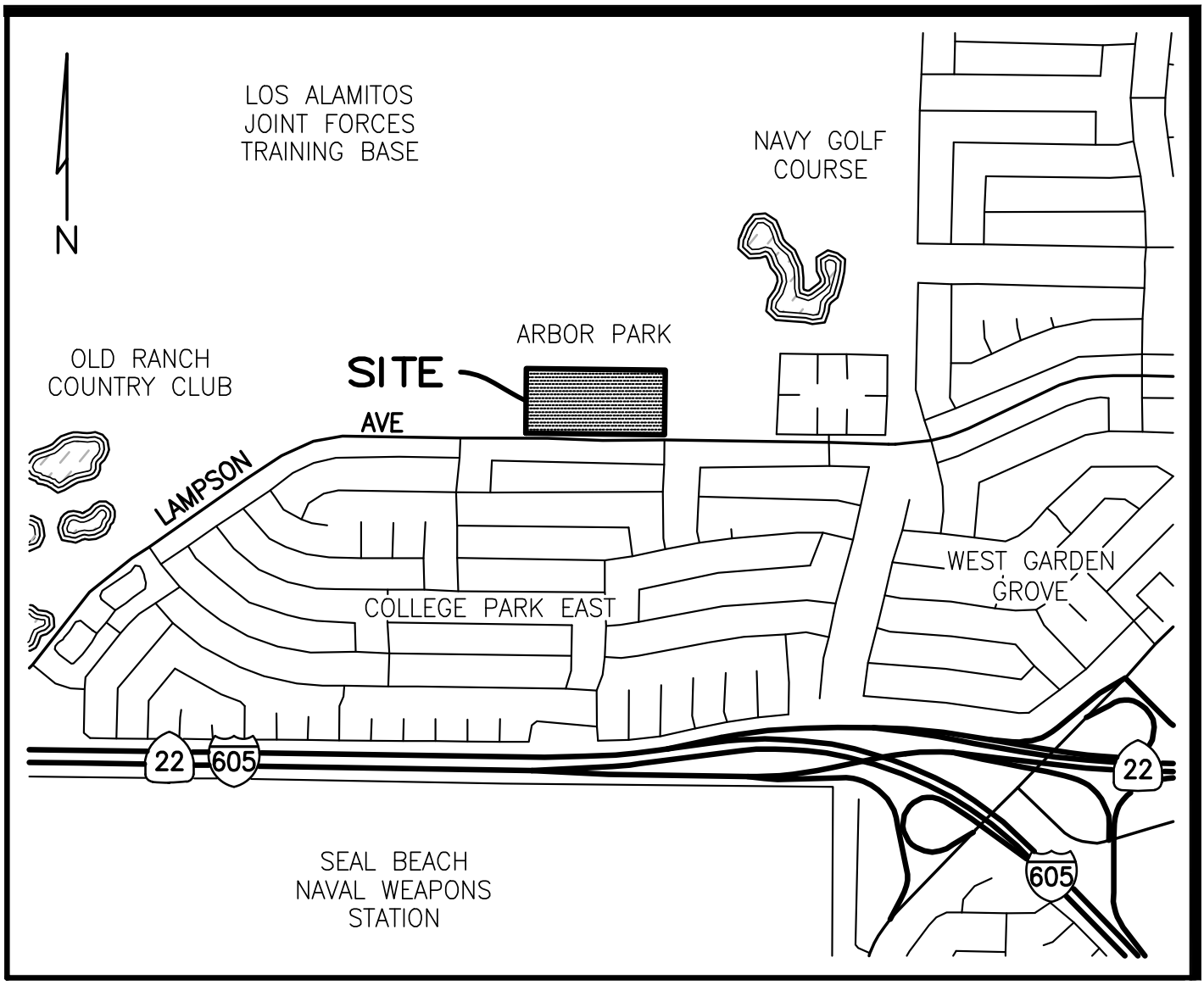
2. Orange County Flood Control District Design Manual. County of Orange Public Facilities and Resources Department. November 2000.

3. Hydraflow Express Extension. Autodesk AutoCAD Civil 3D

4. Existing Storm Drain As-Built Plans.

5. Orange County Technical Guidance Document.

APPENDIX A
HYDROLOGY MAPS



VICINITY MAP

N.T.S.

National Flood Hazard Layer FIRMette

FEMA

118°3'12"W 33°47'7"N

118°2'34"W 33°46'38"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/18/2022 at 12:30 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

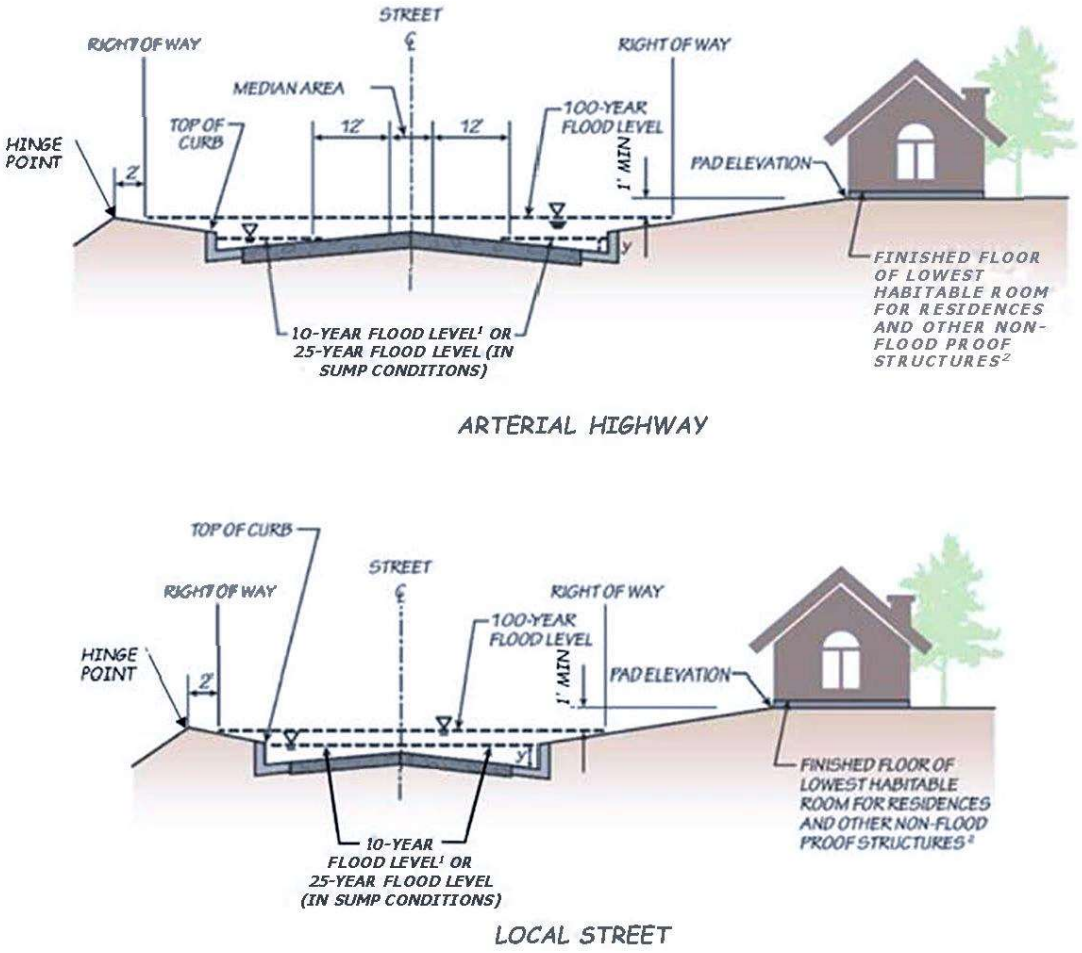
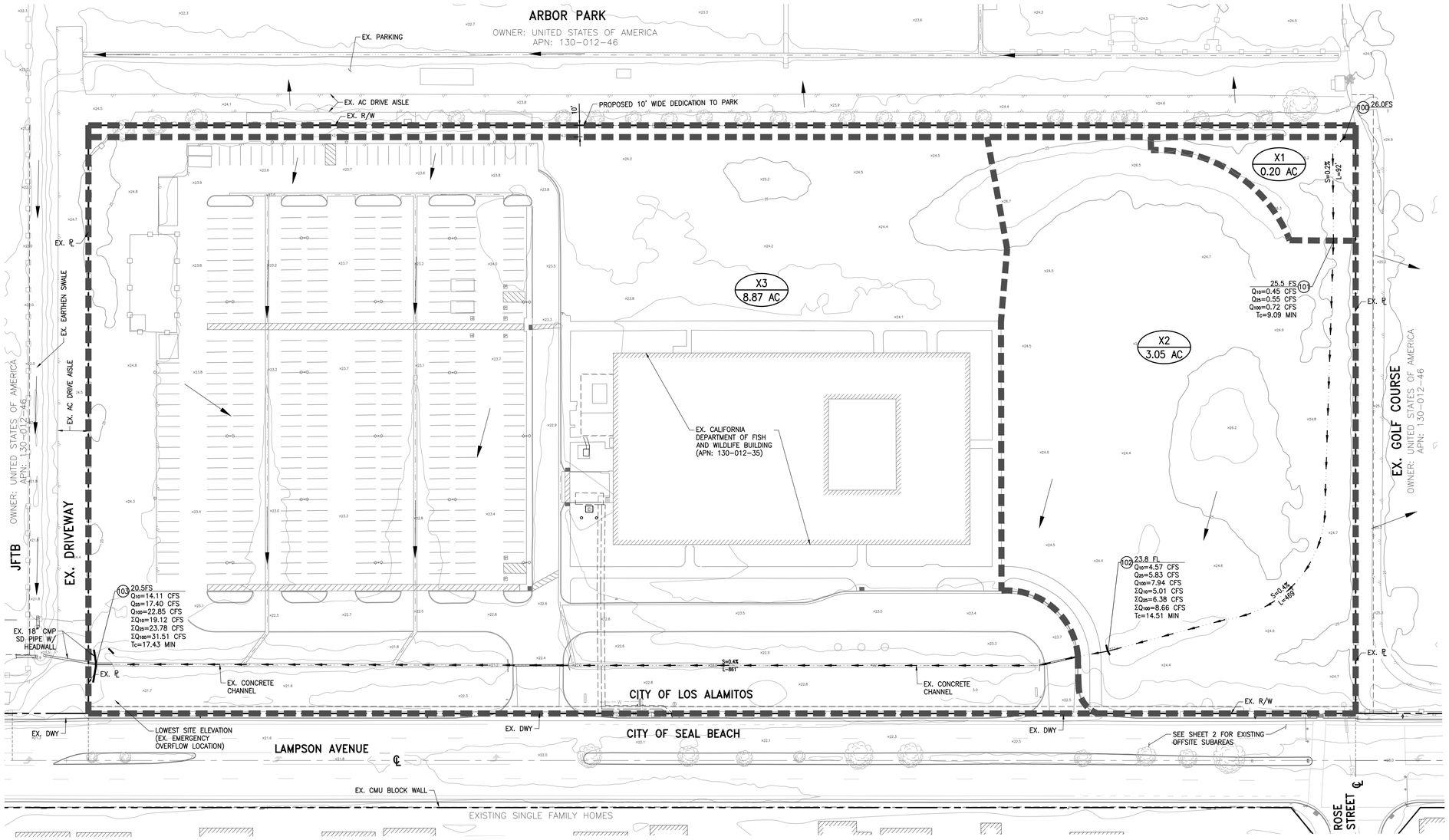
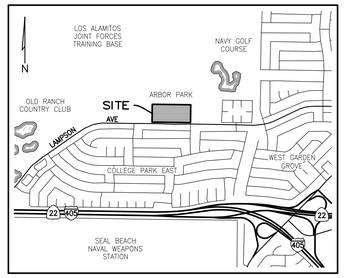


Figure 3-1: Flood Protection Goals

A.1 - Existing Conditions Hydrology Map

ONSITE EXISTING CONDITIONS HYDROLOGY MAP
TENTATIVE TRACT MAP NO. 19263
4665 LAMPSON AVENUE
CITY OF LOS ALAMITOS, COUNTY OF ORANGE, STATE OF CALIFORNIA





VICINITY MAP
NTS

LEGEND

- EXISTING RIGHT-OF-WAY/ BOUNDARY
- DRAINAGE MANAGEMENT AREA (DMA)
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- DRAINAGE FLOW ARROWS
- PROPOSED MWS BIOFILTRATION VAULT
- PROPOSED CATCH BASIN
- DMA X / X.XX AC — DRAINAGE MANAGEMENT AREA (DMA) / ACREAGE

EXISTING DRAINAGE AREA SUMMARY (ONSITE)

DA	AREA (SF)	AREA (AC)	PERVIOUS AREA (AC)	IMPERVIOUS AREA (AC)	PERCENT IMPERVIOUS	Q10 (CFS)	Q25 (CFS)	Q100 (CFS)	100-yr Tc (MIN)
X1	8,627	0.20	0.20	0	0%	0.45	0.55	0.72	9.09
X2	133,051	3.05	3.05	0	0%	4.57	5.83	7.94	4.51
X3	386,268	8.87	0.89	7.98	90%	14.11	17.40	22.85	17.43
TOTAL	527,946	12.12	4.14	7.98	66%	19.12	23.78	31.51	

SCALE: 1" = 40'

0 20 40 80

REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APPROVED	INSTALLED

PLANS PREPARED BY:

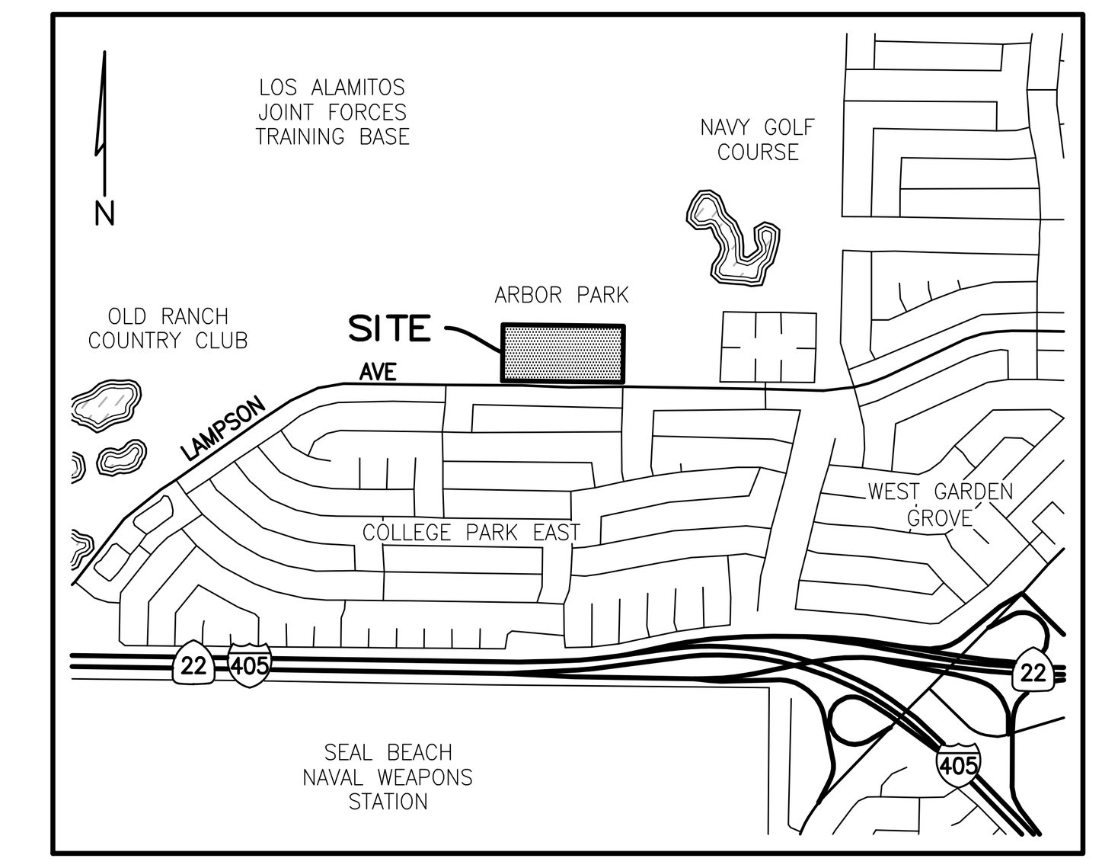
C&V CONSULTING, INC.
CIVIL ENGINEERING
LAND PLANNING & SURVEYING
9430 IRVINE CENTER DRIVE
IRVINE, CALIFORNIA 92618
(949) 581-8300
INFO@CVC-INC.NET
WWW.CVC-INC.NET

VESTING TENTATIVE TRACT MAP NO. 19263
EXISTING CONDITIONS HYDROLOGY MAP
4665 LAMPSON AVENUE

PUBLIC WORKS AGENCY
CITY OF LOS ALAMITOS

OFFSITE EXISTING CONDITIONS HYDROLOGY MAP
TENTATIVE TRACT MAP NO. 19263
4665 LAMPSON AVENUE

CITY OF LOS ALAMITOS, COUNTY OF ORANGE, STATE OF CALIFORNIA



VICINITY MAP

NTS

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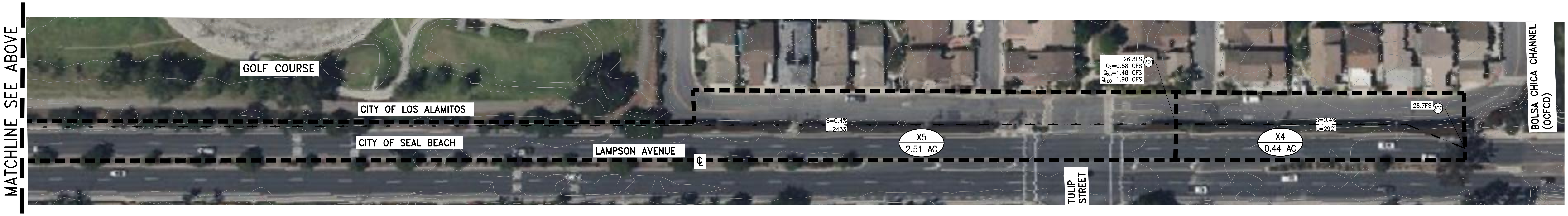
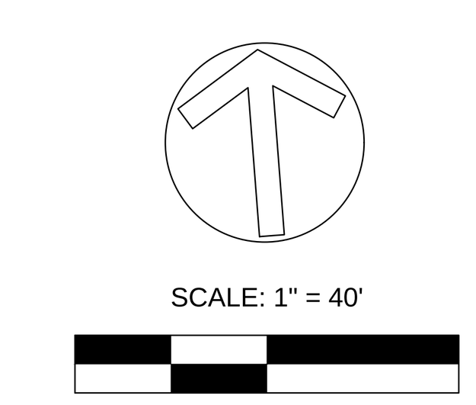


EXISTING DRAINAGE AREA SUMMARY (OFFSITE)

DA	AREA (SF)	AREA (AC)	Q25 (CFS)	25-yr Tc (MIN)	Q100 (CFS)	100-yr Tc (MIN)
X4	19,130	0.44	1.48	7.7	1.90	7.7
X5	109,210	2.51	2.36	40.0	3.13	38.0
TOTAL	128,340	2.95	3.84		5.03	



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VESTING TENTATIVE TRACT MAP NO. 19263
EXISTING CONDITIONS HYDROLOGY MAP
4665 LAMPSON AVENUE

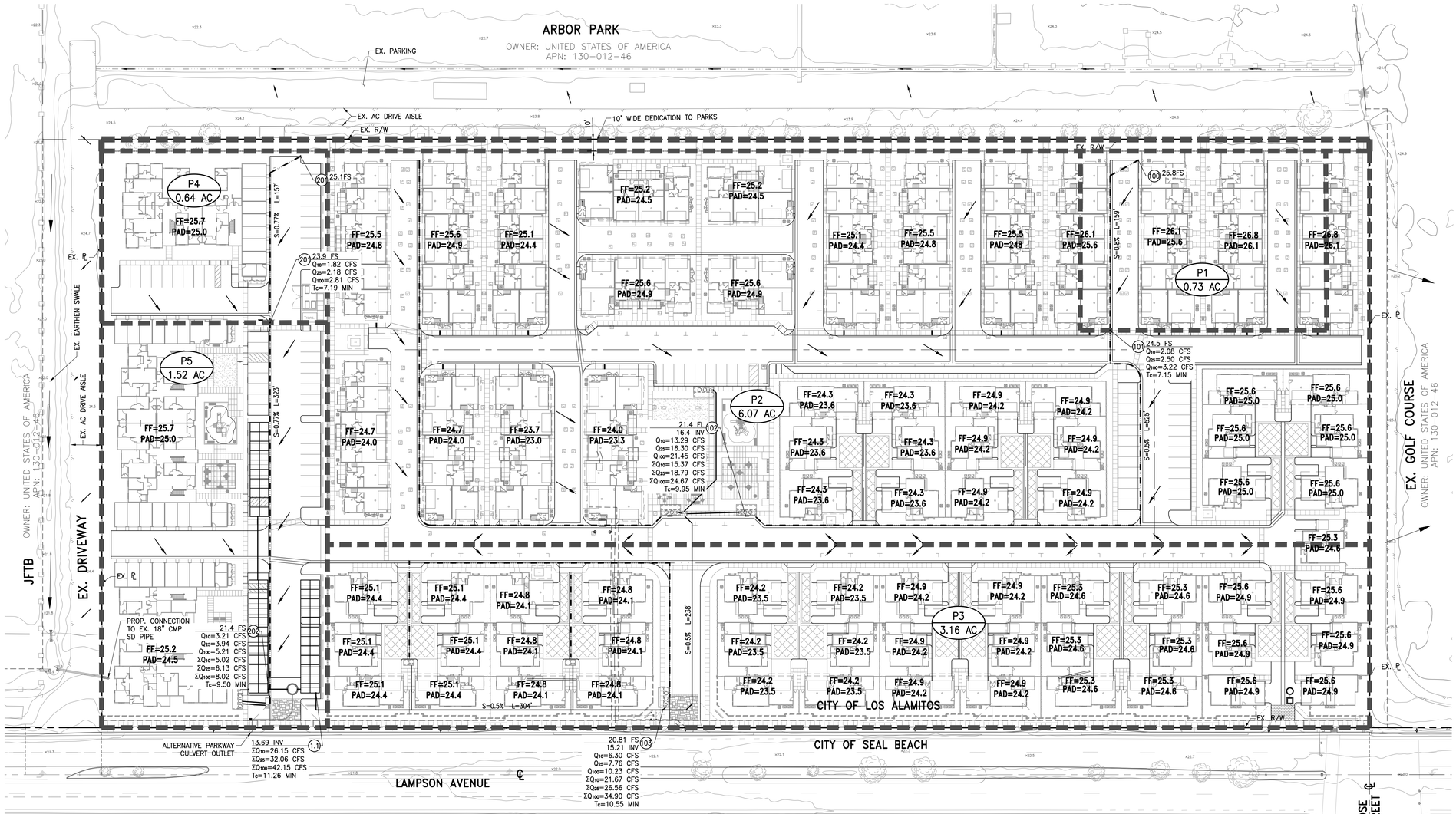
PUBLIC WORKS AGENCY
CITY OF LOS ALAMITOS

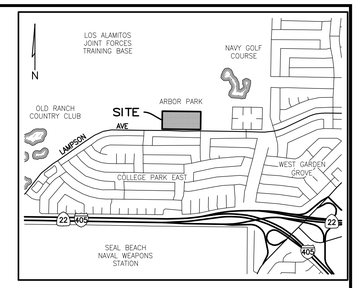
SHEET 2 OF 2

PROJ: KBHO-007

A.2 - Proposed Conditions Hydrology Map

ONSITE PROPOSED CONDITIONS HYDROLOGY MAP
TENTATIVE TRACT MAP NO. 19263
4665 LAMPSON AVENUE
CITY OF LOS ALAMITOS, COUNTY OF ORANGE, STATE OF CALIFORNIA





VICINITY MAP
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- PROPOSED STORM DRAIN
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- PROPOSED MWS BIOFILTRATION VAULT
- PROPOSED CATCH BASIN
- DMA X / X.XX AC — DRAINAGE MANAGEMENT AREA (DMA) / ACREAGE

PROPOSED DRAINAGE AREA SUMMARY

DA	AREA (SF)	AREA (AC)	Q10 (CFS) [unmitigated]	Q25 (CFS) [unmitigated]	Q100 (CFS) [unmitigated]	100-yr Tc (MIN)	Q10 (CFS) [mitigated]	Q100 (CFS) [mitigated]
1	31,826	0.73	2.08	2.50	3.22	7.2	–	–
2	264,358	6.07	13.29	16.30	21.45	10.0	–	–
3	137,683	3.16	6.30	7.76	10.23	10.6	–	–
4	28,039	0.64	1.82	2.18	2.81	7.2	–	–
5	66,043	1.52	3.21	3.94	5.21	9.5	–	–
TOTAL	527,949	12.12	26.15	32.06	42.15	11.3	19.12	31.51

SCALE: 1" = 40'
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VESTING TENTATIVE TRACT MAP NO. 19263
PROPOSED CONDITIONS HYDROLOGY MAP
4665 LAMPSON AVENUE

PUBLIC WORKS AGENCY
CITY OF LOS ALAMITOS

SHEET 1 OF 1

APPENDIX B
HYDROLOGY CALCULATIONS

B.1 - Existing Conditions Hydrology Calculations (10, 25, 100-year Storm Event)

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07x10.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q10

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.400(In/Hr)
Initial subarea data:
Initial area flow distance = 92.000(Ft.)
Top (of initial area) elevation = 26.000(Ft.)
Bottom (of initial area) elevation = 25.500(Ft.)
Difference in elevation = 0.500(Ft.)
Slope = 0.00543 s(%)= 0.54
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.092 min.
Rainfall intensity = 2.882(In/Hr) for a 10.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.775
Subarea runoff =      0.447(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    25.500(Ft.)
Downstream point elevation =    23.800(Ft.)
Channel length thru subarea  =   469.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =      2.778(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.400(Ft.)
Flow(q) thru subarea =      2.778(CFS)
Depth of flow =   0.464(Ft.), Average velocity =   1.197(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =    1.20(Ft/s)
Travel time  =    6.53 min.
Time of concentration =   15.62 min.
Critical depth =      0.213(Ft.)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 1.0000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.400(In/Hr)
Rainfall intensity =      2.113(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.730
Subarea runoff =      4.565(CFS) for    3.050(Ac.)
Total runoff =      5.012(CFS)  Total area =        3.25(Ac.)
Area averaged Fm value =    0.400(In/Hr)
Depth of flow =   0.680(Ft.), Average velocity =   1.474(Ft/s)
Critical depth =      0.316(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    23.800(Ft.)
Downstream point elevation =    20.500(Ft.)
```

```
Channel length thru subarea  =   861.000(Ft.)
Channel base width      =    3.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =     12.039(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =     12.039(CFS)
Depth of flow =   0.942(Ft.), Average velocity =   4.259(Ft/s)
Channel flow top width =    3.000(Ft.)
Flow Velocity =    4.26(Ft/s)
Travel time  =    3.37 min.
Time of concentration =   18.99 min.
Critical depth =      0.797(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      1.890(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.835
Subarea runoff =     14.111(CFS) for    8.870(Ac.)
Total runoff =     19.123(CFS)  Total area =       12.12(Ac.)
Area averaged Fm value =    0.137(In/Hr)
Depth of flow =   1.317(Ft.), Average velocity =   4.841(Ft/s)
Critical depth =      1.078(Ft.)
End of computations, total study area =           12.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.341
Area averaged SCS curve number (AMC 2) =  41.4
```

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07x25.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q25

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.400(In/Hr)
Initial subarea data:
Initial area flow distance = 92.000(Ft.)
Top (of initial area) elevation = 26.000(Ft.)
Bottom (of initial area) elevation = 25.500(Ft.)
Difference in elevation = 0.500(Ft.)
Slope = 0.00543 s(%)= 0.54
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.092 min.
Rainfall intensity = 3.439(In/Hr) for a 25.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.795
Subarea runoff =      0.547(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    25.500(Ft.)
Downstream point elevation =    23.800(Ft.)
Channel length thru subarea  =   469.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =      3.490(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.400(Ft.)
Flow(q) thru subarea =      3.490(CFS)
Depth of flow =   0.537(Ft.), Average velocity =   1.299(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =    1.30(Ft/s)
Travel time  =    6.02 min.
Time of concentration =   15.11 min.
Critical depth =      0.246(Ft.)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 1.0000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.400(In/Hr)
Rainfall intensity =      2.579(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.760
Subarea runoff =      5.828(CFS) for    3.050(Ac.)
Total runoff =      6.375(CFS)  Total area =        3.25(Ac.)
Area averaged Fm value =    0.400(In/Hr)
Depth of flow =   0.797(Ft.), Average velocity =   1.599(Ft/s)
Critical depth =      0.367(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    23.800(Ft.)
Downstream point elevation =    20.500(Ft.)
```

```
Channel length thru subarea  =   861.000(Ft.)
Channel base width      =    3.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =     15.074(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =     15.074(CFS)
Depth of flow =   1.107(Ft.), Average velocity =   4.540(Ft/s)
Channel flow top width =    3.000(Ft.)
Flow Velocity =    4.54(Ft/s)
Travel time  =    3.16 min.
Time of concentration =   18.27 min.
Critical depth =      0.922(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      2.316(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.847
Subarea runoff =     17.404(CFS) for    8.870(Ac.)
Total runoff =     23.779(CFS)  Total area =       12.12(Ac.)
Area averaged Fm value =    0.137(In/Hr)
Depth of flow =   1.539(Ft.), Average velocity =   5.150(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      1.250(Ft.)
End of computations, total study area =           12.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.341
Area averaged SCS curve number (AMC 2) =  41.4
```

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07x100.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q100

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 67.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.400(In/Hr)
Initial subarea data:
Initial area flow distance = 92.000(Ft.)
Top (of initial area) elevation = 26.000(Ft.)
Bottom (of initial area) elevation = 25.500(Ft.)
Difference in elevation = 0.500(Ft.)
Slope = 0.00543 s(%)= 0.54
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.092 min.
Rainfall intensity = 4.392(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.818
Subarea runoff =      0.719(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    25.500(Ft.)
Downstream point elevation =    23.800(Ft.)
Channel length thru subarea  =   469.000(Ft.)
Channel base width      =    5.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =      4.723(CFS)
Manning's 'N'    = 0.040
Maximum depth of channel  =    1.400(Ft.)
Flow(q) thru subarea =      4.723(CFS)
Depth of flow =   0.654(Ft.), Average velocity =   1.444(Ft/s)
Channel flow top width =    5.000(Ft.)
Flow Velocity =    1.44(Ft/s)
Travel time  =    5.41 min.
Time of concentration =   14.51 min.
Critical depth =      0.301(Ft.)
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 67.00
Pervious ratio(Ap) = 1.0000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.400(In/Hr)
Rainfall intensity =      3.361(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.793
Subarea runoff =      7.942(CFS) for    3.050(Ac.)
Total runoff =      8.660(CFS)  Total area =        3.25(Ac.)
Area averaged Fm value =    0.400(In/Hr)
Depth of flow =   0.979(Ft.), Average velocity =   1.769(Ft/s)
Critical depth =      0.453(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =    23.800(Ft.)
Downstream point elevation =    20.500(Ft.)
```

```
Channel length thru subarea  =   861.000(Ft.)
Channel base width      =    3.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =     20.110(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    1.500(Ft.)
Flow(q) thru subarea =     20.110(CFS)
Depth of flow =   1.367(Ft.), Average velocity =   4.905(Ft/s)
Channel flow top width =    3.000(Ft.)
Flow Velocity =    4.90(Ft/s)
Travel time  =    2.93 min.
Time of concentration =   17.43 min.
Critical depth =      1.117(Ft.)
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      3.025(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.859
Subarea runoff =     22.847(CFS) for    8.870(Ac.)
Total runoff =     31.507(CFS)  Total area =       12.12(Ac.)
Area averaged Fm value =    0.137(In/Hr)
Depth of flow =   1.822(Ft.), Average velocity =   5.764(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth =      1.500(Ft.)
End of computations, total study area =           12.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.341
Area averaged SCS curve number (AMC 2) =  41.4
```

B.2 - Offsite Existing Conditions Hydrology Calculations For Lampson Avenue (2, 25, 100-year Storm Event)

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07xo2.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q2
OFFSITE - LAMPSON AVE

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.040(In/Hr)
Initial subarea data:
Initial area flow distance = 292.000(Ft.)
Top (of initial area) elevation = 28.700(Ft.)
Bottom (of initial area) elevation = 26.300(Ft.)
Difference in elevation = 2.400(Ft.)
Slope = 0.00822 s(%)= 0.82
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.692 min.
Rainfall intensity = 1.768(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.880

```
Subarea runoff =      0.684(CFS)
Total initial stream area =        0.440(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    26.300(Ft.)
End of street segment elevation =    21.500(Ft.)
Length of street segment  =  2400.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  36.000(Ft.)
Distance from crown to crossfall grade break  =  34.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.151(CFS)
Depth of flow =   0.328(Ft.), Average velocity =   1.013(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.043(Ft.)
Flow velocity =   1.01(Ft/s)
Travel time =   39.47 min.     TC =   47.17  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      0.624(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.842
Subarea runoff =      0.867(CFS) for    2.510(Ac.)
Total runoff =      1.551(CFS)  Total area =        2.95(Ac.)
Area averaged Fm value =    0.040(In/Hr)
Street flow at end of street =      1.551(CFS)
Half street flow at end of street =      1.551(CFS)
Depth of flow =   0.355(Ft.), Average velocity =   1.086(Ft/s)
Flow width (from curb towards crown)=  11.410(Ft.)
End of computations, total study area =            2.95 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) = 32.0

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07xo25.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q25
OFFSITE - LAMPSON AVE

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.040(In/Hr)
Initial subarea data:
Initial area flow distance = 292.000(Ft.)
Top (of initial area) elevation = 28.700(Ft.)
Bottom (of initial area) elevation = 26.300(Ft.)
Difference in elevation = 2.400(Ft.)
Slope = 0.00822 s(%)= 0.82
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.692 min.
Rainfall intensity = 3.780(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890

```
Subarea runoff =      1.481(CFS)
Total initial stream area =        0.440(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    26.300(Ft.)
End of street segment elevation =    21.500(Ft.)
Length of street segment  =  2400.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  36.000(Ft.)
Distance from crown to crossfall grade break  =  34.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      2.697(CFS)
Depth of flow =   0.413(Ft.), Average velocity =   1.238(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.323(Ft.)
Flow velocity =   1.24(Ft/s)
Travel time =   32.31 min.     TC =   40.00  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      1.487(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.876
Subarea runoff =      2.360(CFS) for    2.510(Ac.)
Total runoff =      3.841(CFS)  Total area =        2.95(Ac.)
Area averaged Fm value =    0.040(In/Hr)
Street flow at end of street =      3.841(CFS)
Half street flow at end of street =      3.841(CFS)
Depth of flow =   0.457(Ft.), Average velocity =   1.348(Ft/s)
Flow width (from curb towards crown)=  16.498(Ft.)
End of computations, total study area =            2.95 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) = 32.0

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07xo100.roc

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LOS ALAMITOS
TTM 19263
EXISTING Q100
OFFSITE - LAMPSON AVE

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.040(In/Hr)
Initial subarea data:
Initial area flow distance = 292.000(Ft.)
Top (of initial area) elevation = 28.700(Ft.)
Bottom (of initial area) elevation = 26.300(Ft.)
Difference in elevation = 2.400(Ft.)
Slope = 0.00822 s(%)= 0.82
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.692 min.
Rainfall intensity = 4.834(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893

```
Subarea runoff =      1.898(CFS)
Total initial stream area =        0.440(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    26.300(Ft.)
End of street segment elevation =    21.500(Ft.)
Length of street segment  =  2400.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  36.000(Ft.)
Distance from crown to crossfall grade break  =  34.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.510(CFS)
Depth of flow =   0.445(Ft.), Average velocity =   1.319(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  15.919(Ft.)
Flow velocity =   1.32(Ft/s)
Travel time =   30.32 min.     TC =   38.01  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.040(In/Hr)
Rainfall intensity =      1.935(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.881
Subarea runoff =      3.133(CFS) for    2.510(Ac.)
Total runoff =      5.032(CFS)  Total area =        2.95(Ac.)
Area averaged Fm value =    0.040(In/Hr)
Street flow at end of street =      5.032(CFS)
Half street flow at end of street =      5.032(CFS)
Depth of flow =   0.494(Ft.), Average velocity =   1.440(Ft/s)
Flow width (from curb towards crown)=  18.350(Ft.)
End of computations, total study area =            2.95 (Ac.)
```

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) = 32.0

B.3 - Proposed Conditions Hydrology Calculations (10, 25, 100-year Storm Event)

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07p10.roc

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LOS ALAMITOS
TTM 19263
PROPOSED Q10

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.140(In/Hr)
Initial subarea data:
Initial area flow distance = 159.000(Ft.)
Top (of initial area) elevation = 25.800(Ft.)
Bottom (of initial area) elevation = 24.500(Ft.)
Difference in elevation = 1.300(Ft.)
Slope = 0.00818 s(%)= 0.82
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.151 min.
Rainfall intensity = 3.307(In/Hr) for a 10.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.862
Subarea runoff =      2.081(CFS)
Total initial stream area =        0.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    24.500(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   525.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.766(CFS)
Depth of flow =   0.425(Ft.), Average velocity =   2.597(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   2.60(Ft/s)
Travel time =    3.37 min.     TC =   10.52  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      2.651(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.852
Subarea runoff =     13.286(CFS) for    6.070(Ac.)
Total runoff =     15.366(CFS)  Total area =        6.80(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =     15.366(CFS)
Half street flow at end of street =     15.366(CFS)
Depth of flow =   0.511(Ft.), Average velocity =   3.206(Ft/s)
```

```
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    0.53(Ft.)
Flow width (from curb towards crown)=  16.500(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.400(Ft.)
Downstream point/station elevation =    15.210(Ft.)
Pipe length  =   238.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.366(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.366(CFS)
Normal flow depth in pipe =   18.87(In.)
Flow top width inside pipe =   19.68(In.)
Critical Depth =   16.97(In.)
Pipe flow velocity =      5.80(Ft/s)
Travel time through pipe =    0.68 min.
Time of concentration (TC) =    11.20 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Time of concentration =    11.20 min.
Rainfall intensity =      2.557(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.851
Subarea runoff =      6.298(CFS) for    3.160(Ac.)
Total runoff =     21.665(CFS)  Total area =        9.96(Ac.)
Area averaged Fm value =    0.140(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.210(Ft.)
```

```
Downstream point/station elevation =    13.690(Ft.)
Pipe length  =   304.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.665(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    21.665(CFS)
Normal flow depth in pipe =   21.87(In.)
Flow top width inside pipe =   21.18(In.)
Critical Depth =   19.55(In.)
Pipe flow velocity =      6.28(Ft/s)
Travel time through pipe =    0.81 min.
Time of concentration (TC) =    12.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      9.960(Ac.)
Runoff from this stream =     21.665(CFS)
Time of concentration =   12.01 min.
Rainfall intensity =     2.457(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Initial subarea data:
Initial area flow distance =   157.000(Ft.)
Top (of initial area) elevation =    25.120(Ft.)
Bottom (of initial area) elevation =    23.900(Ft.)
Difference in elevation =     1.220(Ft.)
Slope =    0.00777  s(%)=       0.78
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.187 min.
Rainfall intensity =      3.297(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.862
Subarea runoff =      1.819(CFS)
Total initial stream area =        0.640(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    23.900(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   323.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.460(CFS)
Depth of flow =   0.328(Ft.), Average velocity =   1.947(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   1.95(Ft/s)
Travel time =    2.77 min.     TC =    9.95  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      2.736(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.854
Subarea runoff =      3.205(CFS) for    1.510(Ac.)
Total runoff =      5.024(CFS)  Total area =        2.15(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =      5.024(CFS)
Half street flow at end of street =      5.024(CFS)
Depth of flow =   0.355(Ft.), Average velocity =   2.258(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  16.500(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.150(Ac.)
Runoff from this stream =      5.024(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     2.736(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500
Summary of stream data:

Stream  Area  Flow rate      TC     Fm       Rainfall Intensity
 No.    (Ac.)   (CFS)       (min) (In/Hr)     (In/Hr)


1      9.96    21.665     12.01    0.140      2.457
2      2.15     5.024      9.95    0.140      2.736
Qmax(1) =
           1.000 *    1.000 *    21.665) +
           0.892 *    1.000 *     5.024) + =      26.148
Qmax(2) =
           1.121 *    0.829 *    21.665) +
           1.000 *    1.000 *     5.024) + =      25.141

Total of 2 streams to confluence:
Flow rates before confluence point:
      21.665       5.024
Maximum flow rates at confluence using above data:
       26.148       25.141
Area of streams before confluence:
        9.960        2.150
Effective area values after confluence:
       12.110       10.403
Results of confluence:
Total flow rate =     26.148(CFS)
Time of concentration =    12.010 min.
Effective stream area after confluence =     12.110(Ac.)
Study area average Pervious fraction(Ap) =  0.350
Study area average soil loss rate(Fm) =    0.140(In/Hr)
Study area total (this main stream) =      12.11(Ac.)
End of computations, total study area =           12.11 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.350
```

Area averaged SCS curve number (AMC 2) = 32.0

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07p25.roc

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LOS ALAMITOS
TTM 19263
PROPOSED Q25

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.140(In/Hr)
Initial subarea data:
Initial area flow distance = 159.000(Ft.)
Top (of initial area) elevation = 25.800(Ft.)
Bottom (of initial area) elevation = 24.500(Ft.)
Difference in elevation = 1.300(Ft.)
Slope = 0.00818 s(%)= 0.82
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.151 min.
Rainfall intensity = 3.939(In/Hr) for a 25.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.868
Subarea runoff =      2.496(CFS)
Total initial stream area =        0.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    24.500(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   525.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     10.691(CFS)
Depth of flow =   0.451(Ft.), Average velocity =   2.810(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   2.81(Ft/s)
Travel time =    3.11 min.     TC =   10.26  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      3.211(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.861
Subarea runoff =     16.296(CFS) for    6.070(Ac.)
Total runoff =     18.792(CFS)  Total area =        6.80(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =     18.792(CFS)
Half street flow at end of street =     18.792(CFS)
Depth of flow =   0.560(Ft.), Average velocity =   3.295(Ft/s)
```

```
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    3.02(Ft.)
Flow width (from curb towards crown)=  16.500(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.400(Ft.)
Downstream point/station elevation =    15.210(Ft.)
Pipe length  =   238.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.792(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.792(CFS)
Normal flow depth in pipe =   19.26(In.)
Flow top width inside pipe =   24.41(In.)
Critical Depth =   18.20(In.)
Pipe flow velocity =      6.19(Ft/s)
Travel time through pipe =    0.64 min.
Time of concentration (TC) =    10.90 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Time of concentration =    10.90 min.
Rainfall intensity =      3.102(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.859
Subarea runoff =      7.763(CFS) for    3.160(Ac.)
Total runoff =     26.556(CFS)  Total area =        9.96(Ac.)
Area averaged Fm value =    0.140(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.210(Ft.)
```

```
Downstream point/station elevation =    13.690(Ft.)
Pipe length  =   304.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.556(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    26.556(CFS)
Normal flow depth in pipe =   22.58(In.)
Flow top width inside pipe =   25.89(In.)
Critical Depth =   21.07(In.)
Pipe flow velocity =      6.70(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =    11.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      9.960(Ac.)
Runoff from this stream =     26.556(CFS)
Time of concentration =   11.66 min.
Rainfall intensity =     2.987(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Initial subarea data:
Initial area flow distance =   157.000(Ft.)
Top (of initial area) elevation =    25.120(Ft.)
Bottom (of initial area) elevation =    23.900(Ft.)
Difference in elevation =     1.220(Ft.)
Slope =    0.00777  s(%)=       0.78
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.187 min.
Rainfall intensity =      3.928(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.868
Subarea runoff =      2.182(CFS)
Total initial stream area =        0.640(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    23.900(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   323.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.197(CFS)
Depth of flow =   0.341(Ft.), Average velocity =   2.102(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   2.10(Ft/s)
Travel time =    2.56 min.     TC =    9.75  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      3.306(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.862
Subarea runoff =      3.944(CFS) for    1.510(Ac.)
Total runoff =      6.126(CFS)  Total area =        2.15(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =      6.126(CFS)
Half street flow at end of street =      6.126(CFS)
Depth of flow =   0.372(Ft.), Average velocity =   2.444(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  16.500(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.150(Ac.)
Runoff from this stream =      6.126(CFS)
Time of concentration =    9.75 min.
Rainfall intensity =     3.306(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500
Summary of stream data:

Stream  Area  Flow rate      TC     Fm       Rainfall Intensity
 No.    (Ac.)   (CFS)       (min) (In/Hr)     (In/Hr)


1      9.96    26.556     11.66    0.140      2.987
2      2.15     6.126      9.75    0.140      3.306
Qmax(1) =
           1.000 *    1.000 *    26.556) +
           0.899 *    1.000 *     6.126) + =      32.064
Qmax(2) =
           1.112 *    0.836 *    26.556) +
           1.000 *    1.000 *     6.126) + =      30.811

Total of 2 streams to confluence:
Flow rates before confluence point:
      26.556       6.126
Maximum flow rates at confluence using above data:
       32.064       30.811
Area of streams before confluence:
        9.960        2.150
Effective area values after confluence:
       12.110       10.476
Results of confluence:
Total flow rate =     32.064(CFS)
Time of concentration =    11.661 min.
Effective stream area after confluence =     12.110(Ac.)
Study area average Pervious fraction(Ap) =  0.350
Study area average soil loss rate(Fm) =    0.140(In/Hr)
Study area total (this main stream) =      12.11(Ac.)
End of computations, total study area =           12.11 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.350
```

Area averaged SCS curve number (AMC 2) = 32.0

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2018 Version 9.0
Rational Hydrology Study, Date: 03/12/24 File Name: kb07p100.roc

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LOS ALAMITOS
TTM 19263
PROPOSED Q100

Program License Serial Number 6618

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 32.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.400(In/Hr)
Max Catchment Loss (Fm) = 0.140(In/Hr)
Initial subarea data:
Initial area flow distance = 159.000(Ft.)
Top (of initial area) elevation = 25.800(Ft.)
Bottom (of initial area) elevation = 24.500(Ft.)
Difference in elevation = 1.300(Ft.)
Slope = 0.00818 s(%)= 0.82
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.151 min.
Rainfall intensity = 5.040(In/Hr) for a 100.0 year storm

```
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff =      3.220(CFS)
Total initial stream area =        0.730(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    24.500(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   525.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     13.972(CFS)
Depth of flow =   0.491(Ft.), Average velocity =   3.125(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   3.13(Ft/s)
Travel time =    2.80 min.     TC =    9.95  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      4.171(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.870
Subarea runoff =     21.450(CFS) for    6.070(Ac.)
Total runoff =     24.670(CFS)  Total area =        6.80(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =     24.670(CFS)
Half street flow at end of street =     24.670(CFS)
Depth of flow =   0.629(Ft.), Average velocity =   3.450(Ft/s)
```

```
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    6.43(Ft.)
Flow width (from curb towards crown)=  16.500(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    16.400(Ft.)
Downstream point/station elevation =    15.210(Ft.)
Pipe length  =   238.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.670(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    24.670(CFS)
Normal flow depth in pipe =   21.26(In.)
Flow top width inside pipe =   27.26(In.)
Critical Depth =   20.32(In.)
Pipe flow velocity =      6.63(Ft/s)
Travel time through pipe =    0.60 min.
Time of concentration (TC) =    10.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Time of concentration =    10.55 min.
Rainfall intensity =      4.034(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.869
Subarea runoff =     10.234(CFS) for    3.160(Ac.)
Total runoff =     34.904(CFS)  Total area =        9.96(Ac.)
Area averaged Fm value =    0.140(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =    15.210(Ft.)
```

```
Downstream point/station elevation =    13.690(Ft.)
Pipe length  =   304.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    34.904(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    34.904(CFS)
Normal flow depth in pipe =   25.26(In.)
Flow top width inside pipe =   27.96(In.)
Critical Depth =   23.59(In.)
Pipe flow velocity =      7.15(Ft/s)
Travel time through pipe =    0.71 min.
Time of concentration (TC) =    11.26 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      9.960(Ac.)
Runoff from this stream =     34.904(CFS)
Time of concentration =   11.26 min.
Rainfall intensity =     3.886(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Initial subarea data:
Initial area flow distance =   157.000(Ft.)
Top (of initial area) elevation =    25.120(Ft.)
Bottom (of initial area) elevation =    23.900(Ft.)
Difference in elevation =     1.220(Ft.)
Slope =    0.00777  s(%)=       0.78
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.187 min.
Rainfall intensity =      5.026(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.875
Subarea runoff =      2.814(CFS)
Total initial stream area =        0.640(Ac.)
```

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Process from Point/Station      201.000 to Point/Station      202.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =    23.900(Ft.)
End of street segment elevation =    21.400(Ft.)
Length of street segment  =   323.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  16.500(Ft.)
Distance from crown to crossfall grade break  =  14.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.010
Slope from grade break to crown (v/hz)  =   0.010
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.443(CFS)
Depth of flow =   0.362(Ft.), Average velocity =   2.332(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.500(Ft.)
Flow velocity =   2.33(Ft/s)
Travel time =    2.31 min.     TC =    9.50  min.
 Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 32.00
Pervious ratio(Ap) = 0.3500  Max loss rate(Fp)=     0.400(In/Hr)
Max Catchment Loss (Fm) =     0.140(In/Hr)
Rainfall intensity =      4.284(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.871
Subarea runoff =      5.205(CFS) for    1.510(Ac.)
Total runoff =      8.019(CFS)  Total area =        2.15(Ac.)
Area averaged Fm value =    0.140(In/Hr)
Street flow at end of street =      8.019(CFS)
Half street flow at end of street =      8.019(CFS)
Depth of flow =   0.399(Ft.), Average velocity =   2.720(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  16.500(Ft.)
```
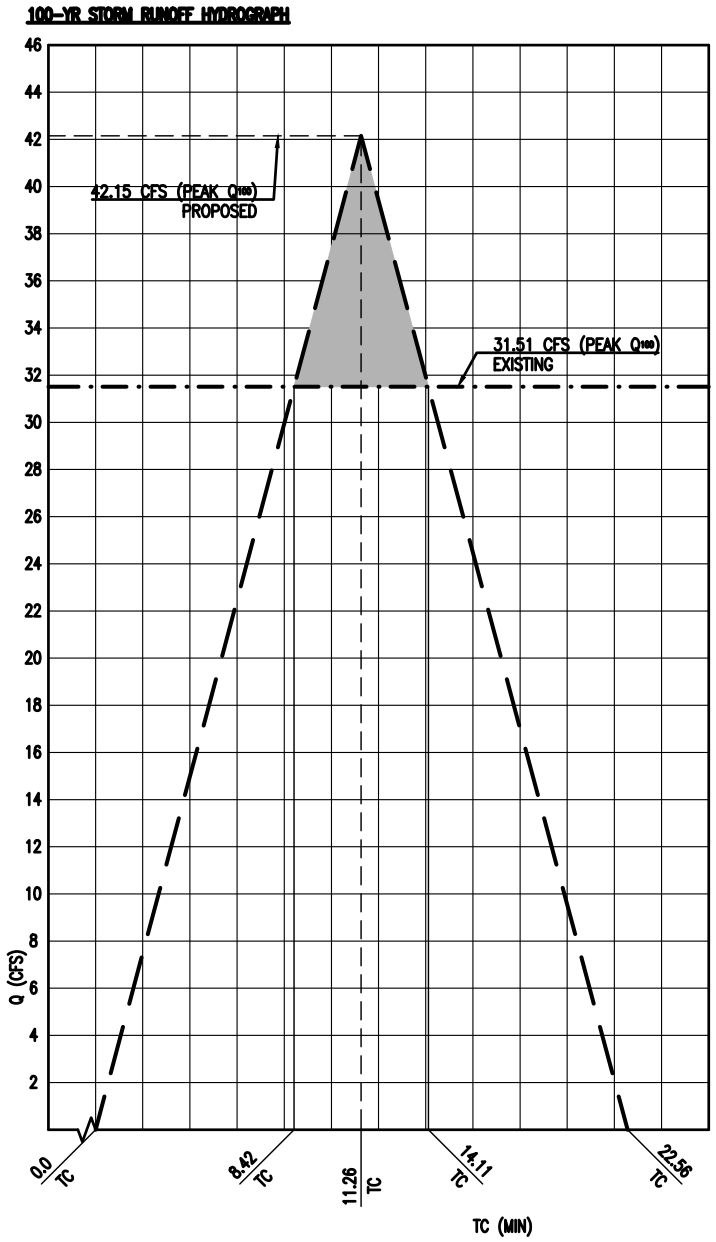

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station        1.100
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.150(Ac.)
Runoff from this stream =      8.019(CFS)
Time of concentration =    9.50 min.
Rainfall intensity =     4.284(In/Hr)
Area averaged loss rate (Fm) =    0.1400(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3500
Summary of stream data:

Stream  Area  Flow rate      TC     Fm       Rainfall Intensity
 No.    (Ac.)   (CFS)       (min) (In/Hr)     (In/Hr)


1      9.96    34.904     11.26    0.140      3.886
2      2.15     8.019      9.50    0.140      4.284
Qmax(1) =
           1.000 *    1.000 *    34.904) +
           0.904 *    1.000 *     8.019) + =      42.153
Qmax(2) =
           1.106 *    0.844 *    34.904) +
           1.000 *    1.000 *     8.019) + =      40.591

Total of 2 streams to confluence:
Flow rates before confluence point:
      34.904       8.019
Maximum flow rates at confluence using above data:
       42.153       40.591
Area of streams before confluence:
        9.960        2.150
Effective area values after confluence:
       12.110       10.552
Results of confluence:
Total flow rate =     42.153(CFS)
Time of concentration =    11.257 min.
Effective stream area after confluence =     12.110(Ac.)
Study area average Pervious fraction(Ap) =  0.350
Study area average soil loss rate(Fm) =    0.140(In/Hr)
Study area total (this main stream) =      12.11(Ac.)
End of computations, total study area =           12.11 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.350
```

Area averaged SCS curve number (AMC 2) = 32.0

APPENDIX C
HYDRAULIC CALCULATIONS

C.1 - Detention Calculations



CALCULATIONS:

V = VOLUME IN EXCESS OF Q ALLOWABLE OVER 24-HRS

V = 1/2 (dQ)(dTIME)

dTime = 14.11-8.42 = 5.69 min X 60 sec/min = 341.4 sec

dcfs = 42.15-31.51 = 10.64 cfs

VOLUME=1/2 (341.4) (10.64) = 1,816.25 CF

LEGEND:

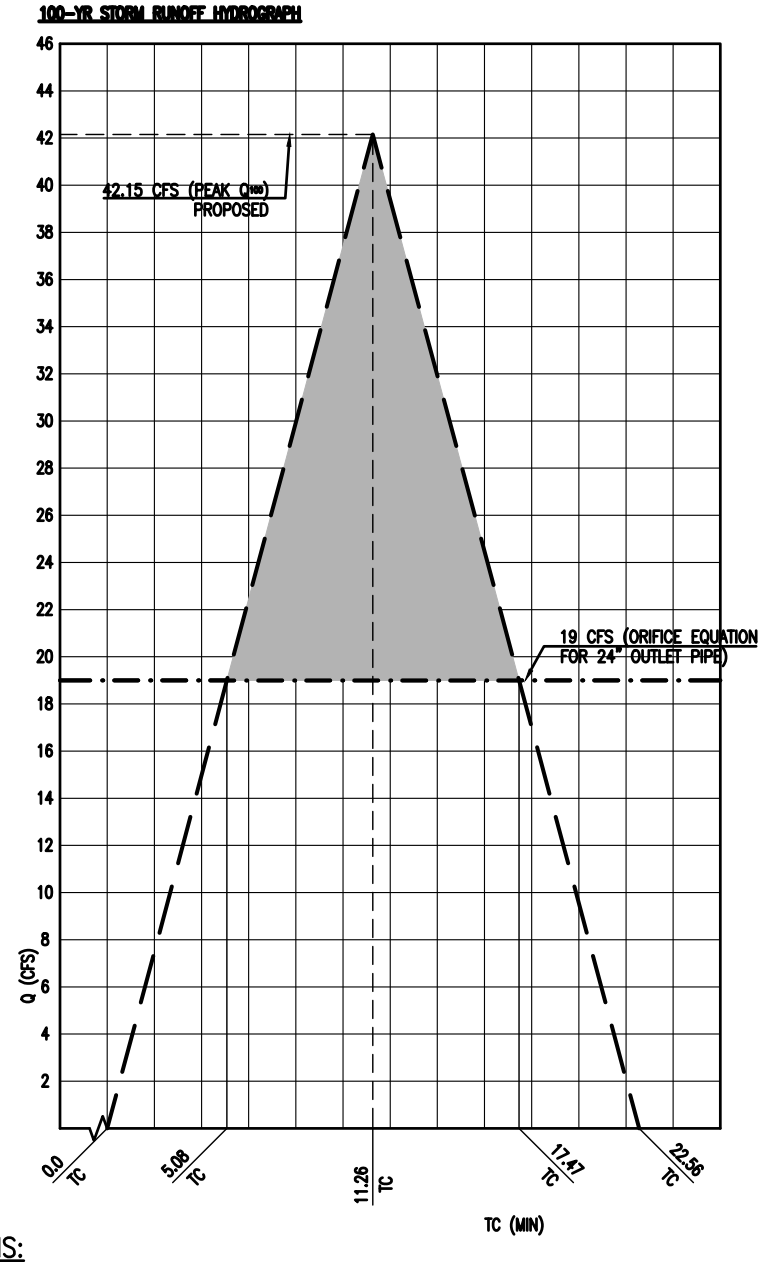
TC-TIME OF CONCENTRATION

d-RATE OF CHANGE

NOTE:

TC-BASED ON (100 YR STORM EVENT)

HYDROGRAPH BASED ON ORANGE COUNTY HYDROLOGY MANUAL, SECTION J



CALCULATIONS:

V = VOLUME IN EXCESS OF Q ALLOWABLE OVER 24-HRS

V = 1/2 (dQ)(dTIME)

dTime = 17.47-5.08 = 12.39 min X 60 sec/min = 743.4 sec

dcfs = 42.15-19.0 = 23.15 cfs

VOLUME=1/2 (743.4) (23.15) = 8,604.86 CF

STATIC DETENTION PROVIDED BY

UNDERGROUND DETENTION = 10,000 CF > 8,604.86 CF OK

LEGEND:

TC-TIME OF CONCENTRATION

d-RATE OF CHANGE

NOTE:

TC-BASED ON (100 YR STORM EVENT)

HYDROGRAPH BASED ON ORANGE COUNTY HYDROLOGY MANUAL, SECTION J

C.2 - Outlet Pipe Orifice Calculations

Submerged Outlet Pipe Analyzed as Orifice

Orifice 1 diameter =	24 IN
Invert elevation of orifice =	19.7 FT
Tailwater EGL =	21.7 FT

Q = flow [CFS] = KA(2gh)^0.5

K = orifice flow coefficient =	0.62
A = cross sectional area of orifice [SF] = 3.14 * r^2	3.140 SF
g = gravitational constant =	32.2 [FT/S^2]

h = hydraulic head [FT] = Headwater elev - Tailwater water surface elevation

Total System Outflow Table

Headwater Surface Elevation [FT]	Orifice Outflow [CFS]
21.7	0.00
22.2	11.05
22.7	15.62
23.2	19.13

C.3 – Existing Lampson Ave Street Flow

Channel Report

Q2 Street Flow Depth on North Side of Lampson Ave (Per X4+X5) Section A-A

User-defined

Invert Elev (ft)	= 20.61
Slope (%)	= 0.20
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.55

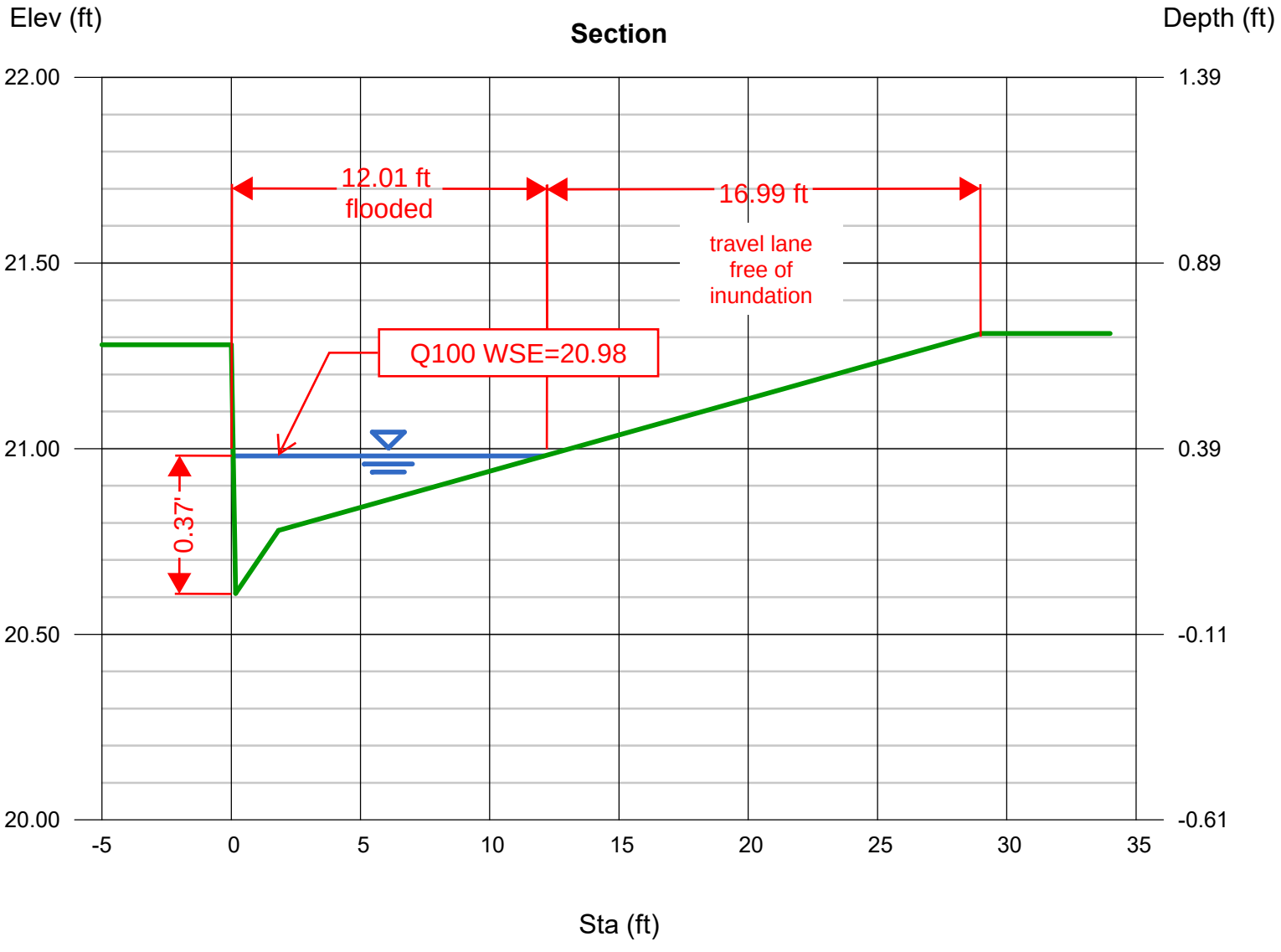
(Sta, El, n)-(Sta, El, n)...

(0.00, 21.28)-(0.17, 20.61, 0.015)-(1.83, 20.78, 0.015)-(29.00, 21.31, 0.015)

Highlighted

Depth (ft)	= 0.37
Q (cfs)	= 1.550
Area (sqft)	= 1.52
Velocity (ft/s)	= 1.02
Wetted Perim (ft)	= 12.31
Crit Depth, Yc (ft)	= 0.31
Top Width (ft)	= 12.01
EGL (ft)	= 0.39

Per DMA X4 + X5 contributing flows, street flooded 12.01 ft, leaving 16.99 ft travel lane free of flooding.



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Mar 12 2024

Q25 Street Flow Depth on North Side of Lampson Ave (Per X4+X5) Section A-A

User-defined

Invert Elev (ft)	= 20.61
Slope (%)	= 0.20
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.84

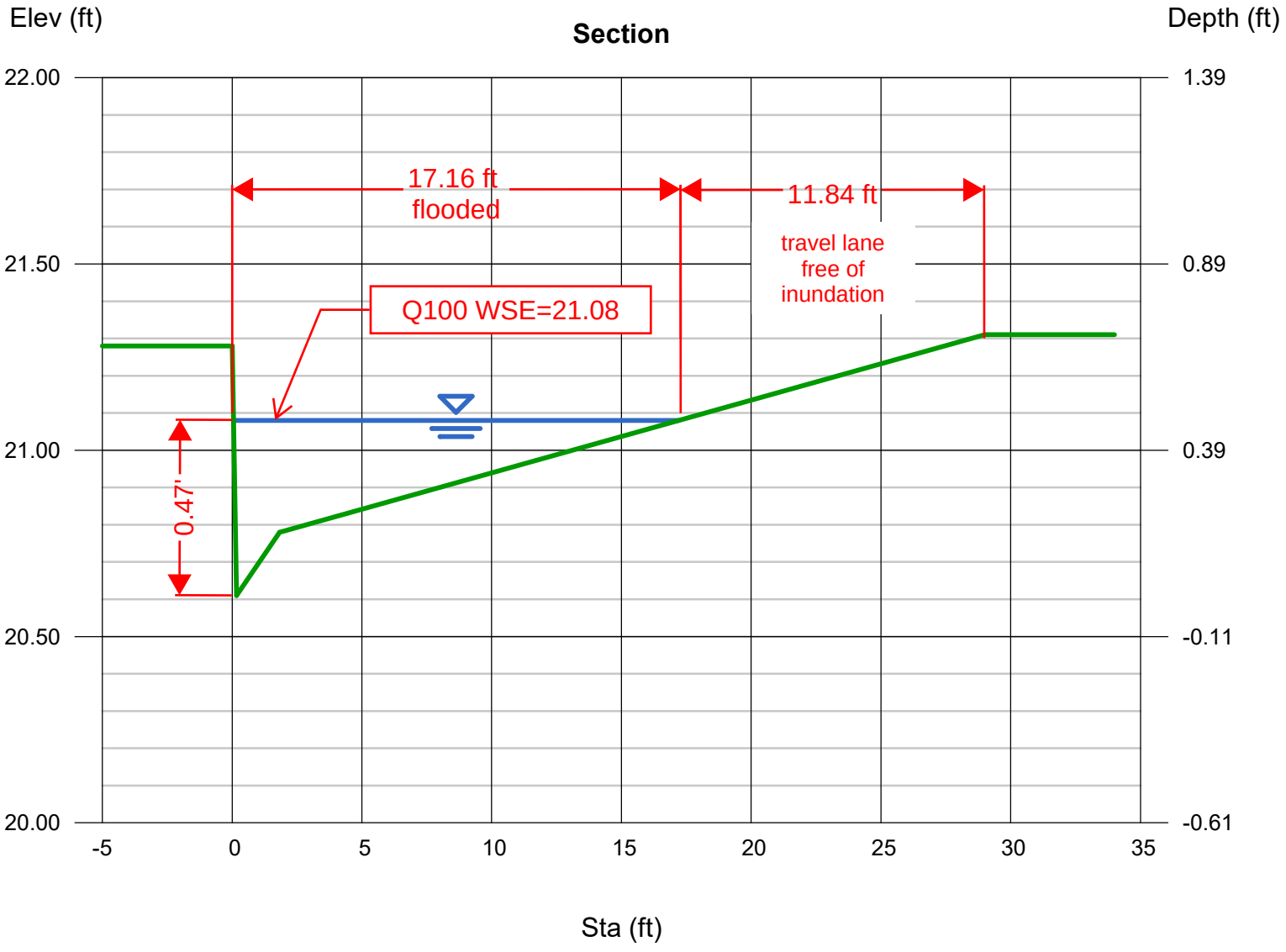
(Sta, El, n)-(Sta, El, n)...

(0.00, 21.28)-(0.17, 20.61, 0.015)-(1.83, 20.78, 0.015)-(29.00, 21.31, 0.015)

Highlighted

Depth (ft)	= 0.47
Q (cfs)	= 3.840
Area (sqft)	= 2.97
Velocity (ft/s)	= 1.29
Wetted Perim (ft)	= 17.54
Crit Depth, Yc (ft)	= 0.40
Top Width (ft)	= 17.16
EGL (ft)	= 0.50

Per DMA X4 + X5 contributing flows, street flooded 17.16 ft, leaving 11.84 ft travel lane free of flooding.



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Mar 12 2024

Q100 Street Flow Depth on North Side of Lampson Ave (Per X4+X5) Section A-A

User-defined

Invert Elev (ft)	= 20.61
Slope (%)	= 0.20
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.03

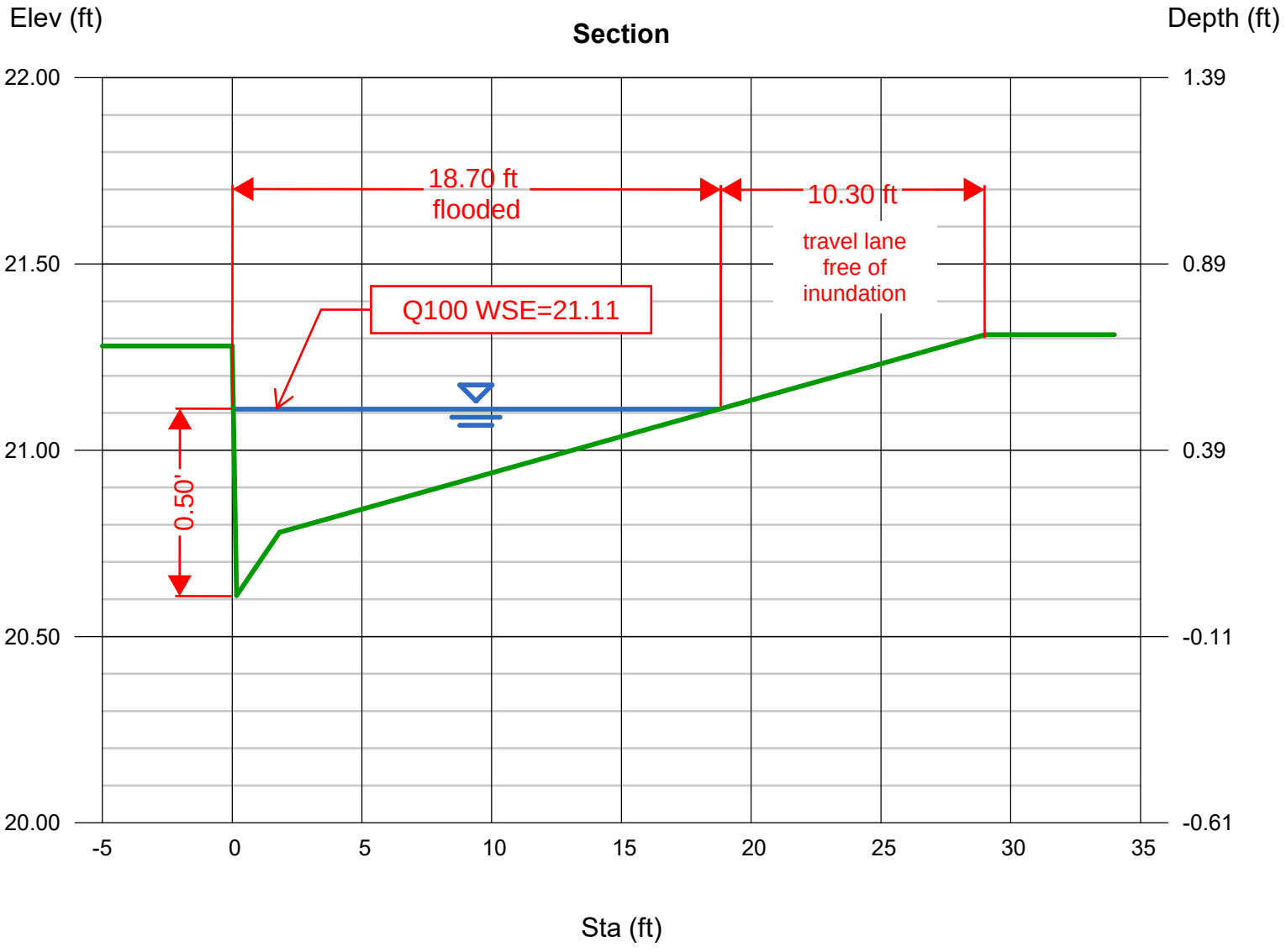
(Sta, El, n)-(Sta, El, n)...

(0.00, 21.28)-(0.17, 20.61, 0.015)-(1.83, 20.78, 0.015)-(29.00, 21.31, 0.015)

Highlighted

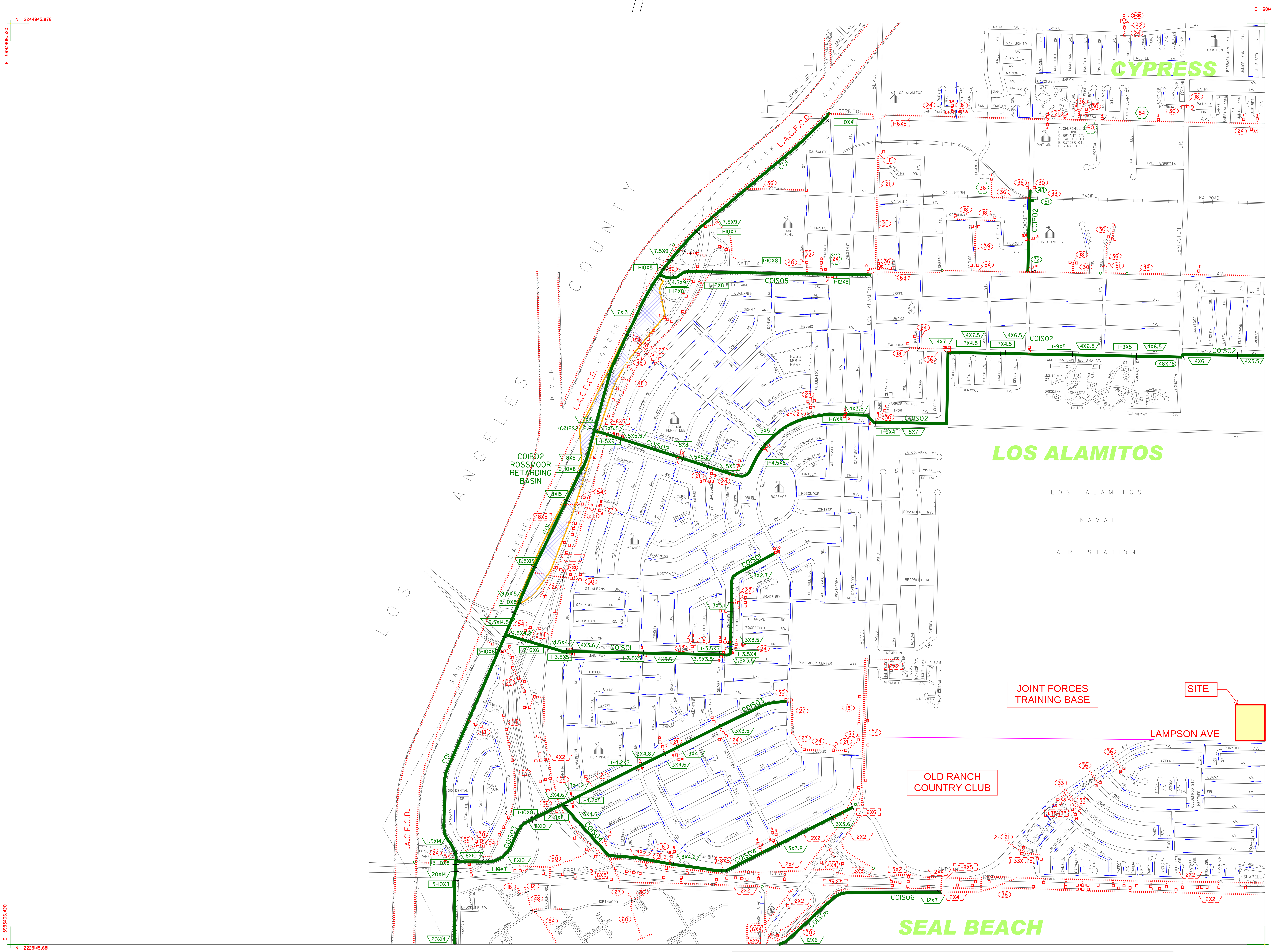
Depth (ft)	= 0.50
Q (cfs)	= 5.030
Area (sqft)	= 3.51
Velocity (ft/s)	= 1.43
Wetted Perim (ft)	= 19.10
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 18.70
EGL (ft)	= 0.53

Per DMA X4 + X5 contributing flows, street flooded 18.70 ft, leaving 10.30 ft travel lane free of flooding.

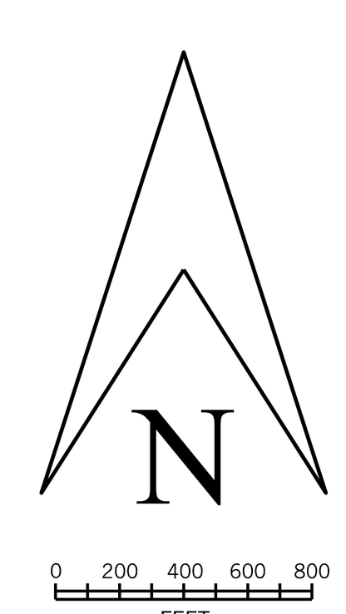


APPENDIX D
REFERENCE MATERIALS

D.1 - Orange County Drainage Facilities Maps



18



NOTICE

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Additional information may be obtained from public plans and recorded deeds. Facility designations included with this information are for convenience only and are not controlling or intended to imply ownership by the County or the Orange County Flood Control District (OCFCD). The information is being provided as a courtesy and neither the County of Orange nor OCFCD assume any liabilities for inaccuracy of the information.

To notify OC Public Works Flood Control Section of additions or corrections, please contact Sal Gutierrez at (714) 834–5396 or by email at sal.gutierrez@ocpw.ocgov.com

ORANGE COUNTY FLOOD CONTROL DISTRICT

BASE MAP OF DRAINAGE FACILITIES IN ORANGE COUNTY

REVISION	DATE	SHEET NO.	DWG. NO.
S. GUTIERREZ	JUN 9, 2008	18	MAPS–113–3

Channel Drainage Area Boundary
Major Sub–Area Drainage Boundary
Minor Sub–Area Drainage Boundary
Existing O.C.F.C.D. Facility
Existing Local Facility
Existing Retarding Basin or Reservoir
Natural Watercourse
City Limits
G G Greenbelt
P.S. P.S. Pump Station
Catch Basin (length in feet)
Drop Inlet or Other Entry
OCFCD Basins or Reservoirs

Ownership (If other than City or County): Private = P State = S Federal = F

EXISTING FACILITIES

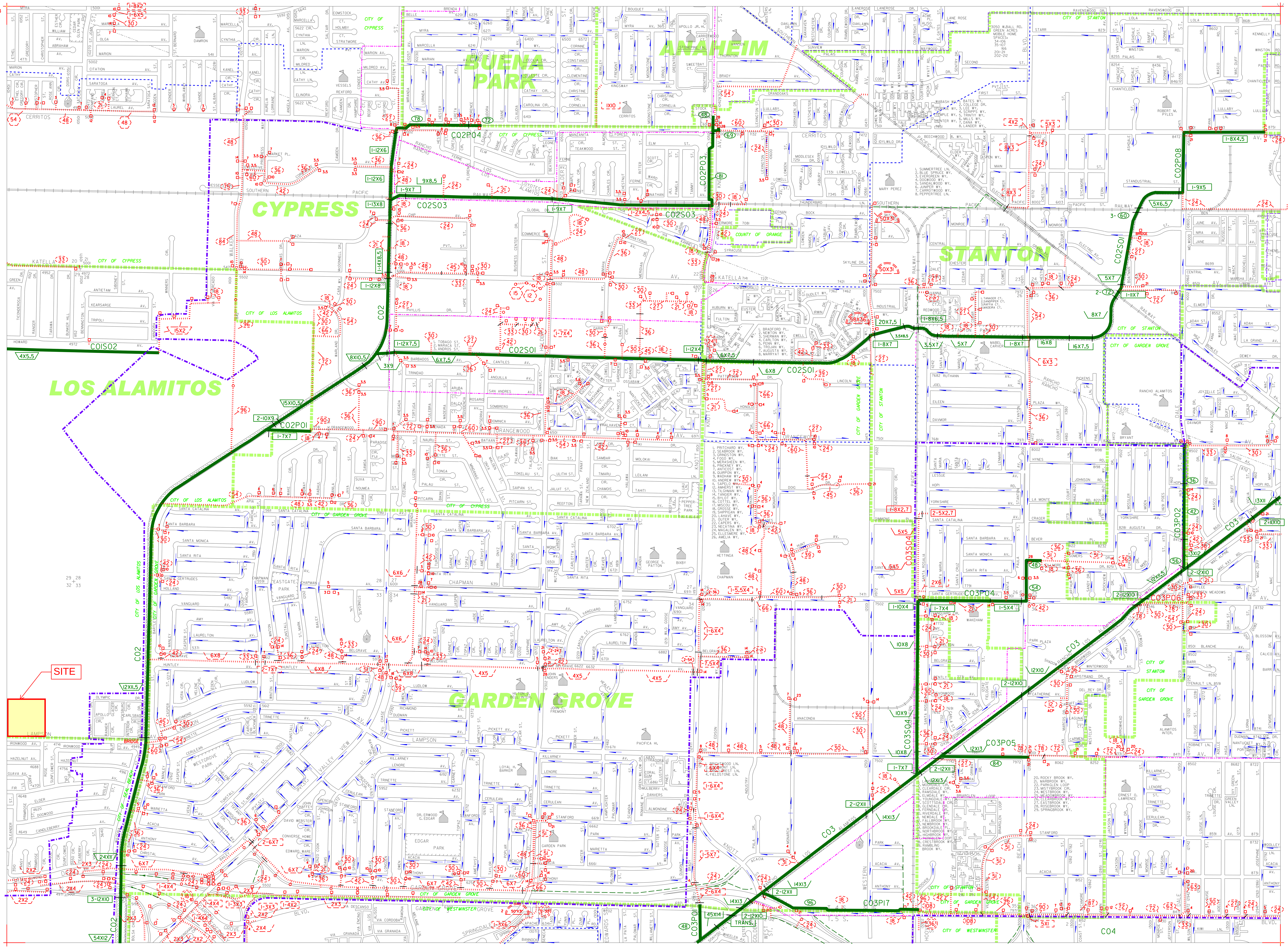
O.C.F.C.D. LOCAL

Earth Trapezoidal Channel (base width by height in feet)
Reinforced Concrete Trapezoidal Channel (base width by height in feet)
Reinforced Concrete Rectangular Channel (base width by height in feet)
Reinforced Concrete Box (RCB) (number of barrels–span by height in feet)
Reinforced Concrete Pipe (RCP) (diameter in inches)
Metal Sheet Channel (MSC) (Base width by pile height in feet/Sheet pile total length)
Corrugated Metal Pipe (CMP) (diameter in inches)
Concrete Pipe (diameter in inches)
Concrete Oval Pipe (width by height in inches)
Steel Pipe (diameter in inches)
Reinforced Concrete Arch (base span by height in inches)
Corrugated Metal Arch (base span by height in inches)

18

18

20



27

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To notify OC Public Works Flood Control Section of additions or corrections, please contact Sal Gutierrez at (714) 647–3992 or by email at sal.gutierrez@ocpw.ocgov.com

ORANGE COUNTY FLOOD CONTROL DISTRICT

BASE MAP OF DRAINAGE FACILITIES IN ORANGE COUNTY

REVISION	DATE	SHEET NO.	DWG. NO.
S. GUTIERREZ	JAN 23,2012	19	MAPS–113–3

- Channel Drainage Area Boundary
- Major Sub–Area Drainage Boundary
- Minor Sub–Area Drainage Boundary
- Existing O.C.F.C.D. Facility
- Existing Local Facility
- Existing Retarding Basin or Reservoir
- Natural Watercourse
- City Limits
- G G Greenbelt
- P.S. P.S. Pump Station
- Catch Basin (length in feet)
- Drop Inlet or Other Entry
- OCFCD Basins or Reservoirs

Ownership (If other than City or County): Private = P State = S Federal = F

EXISTING FACILITIES

O.C.F.C.D. LOCAL

- Earth Trapezoidal Channel (base width by height in feet)
- Reinforced Concrete Trapezoidal Channel (base width by height in feet)
- Reinforced Concrete Rectangular Channel (base width by height in feet)
- Reinforced Concrete Box (RCB) (number of barrels–span by height in feet)
- Reinforced Concrete Pipe (RCP) (diameter in inches)
- Metal Sheet Channel (MSC) (Base width by pile height in feet/Sheet pile total length)
- Corrugated Metal Pipe (CMP) (diameter in inches)
- Concrete Pipe (diameter in inches)
- Concrete Oval Pipe (width by height in inches)
- Steel Pipe (diameter in inches)
- Reinforced Concrete Arch (base span by height in inches)
- Corrugated Metal Arch (base span by height in inches)

19

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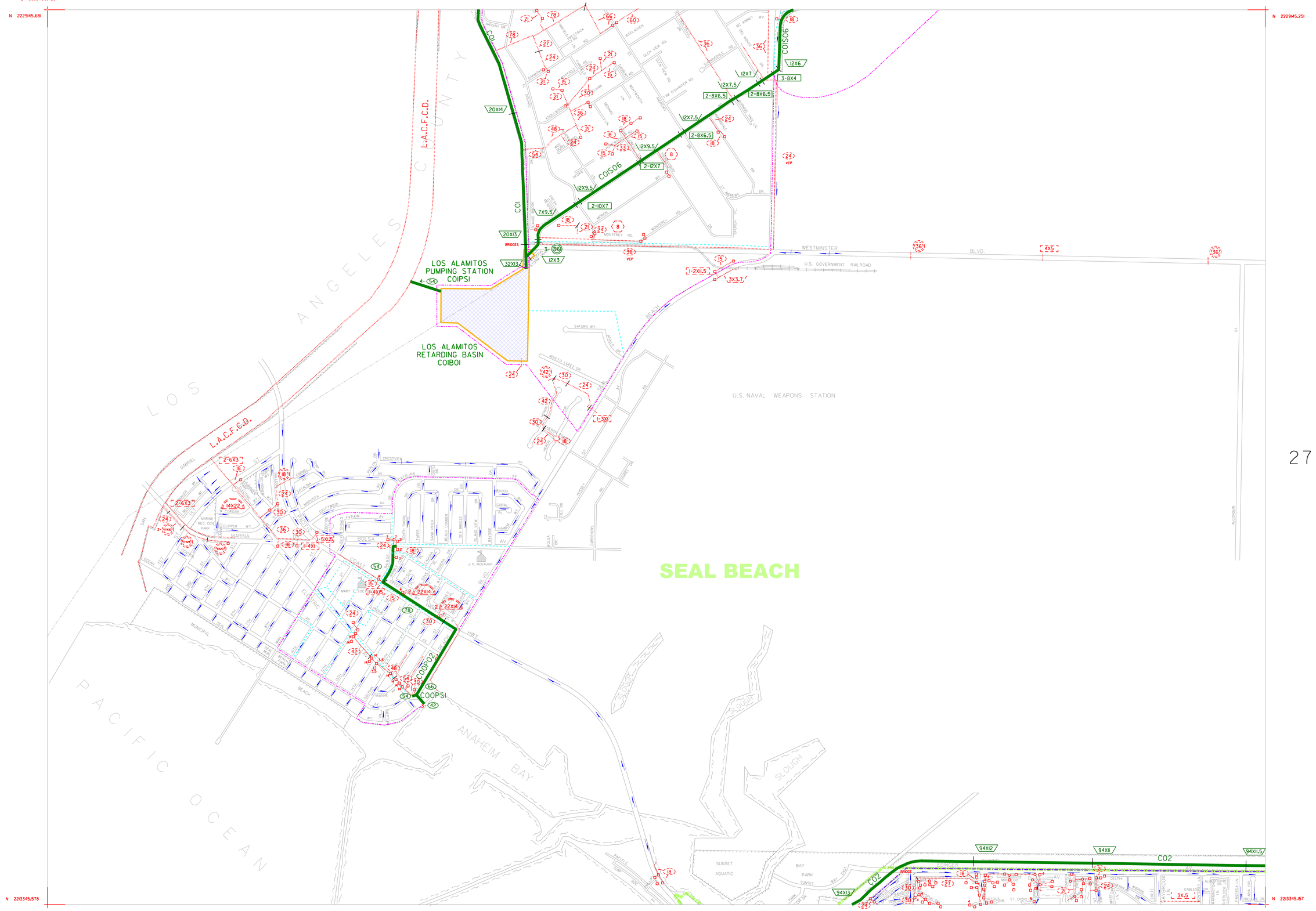
N 2229145.251



N

0 200 400 600 800
FEET

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To notify the Resources & Development Management Department (RDMD) of additions or corrections, please contact Sal Gutierrez at (714) 834-5396 or by email at sal.gutierrez@rdmd.ocgov.com

ORANGE COUNTY FLOOD CONTROL DISTRICT

BASE MAP
OF DRAINAGE FACILITIES
IN ORANGE COUNTY

REVISION	DATE	SHEET NO.	DWG. NO.
S. GUTIERREZ	MAR. 7, 2007	26	MAPS-113-3

- Channel Drainage Area Boundary
- Major Sub-Area Drainage Boundary
- Minor Sub-Area Drainage Boundary
- Existing O.C.F.C.D. Facility
- Existing Local Facility
- Existing Retarding Basin or Reservoir
- Natural Watercourse
- City Limits
- G G Greenbelt
- P.S. P.S. Pump Station
- Catch Basin (length in feet)
- Drop Inlet or Other Entry
- OCFCD Basins or Reservoirs

Ownership (If other than City or County): Private = P State = S Federal = F

EXISTING FACILITIES

O.C.F.C.D.	LOCAL	
		Earth Trapezoidal Channel (base width by height in feet)
		Reinforced Concrete Trapezoidal Channel (base width by height in feet)
		Reinforced Concrete Rectangular Channel (base width by height in feet)
		Reinforced Concrete Box (RCB) (number of barrels-span by height in feet)
		Reinforced Concrete Pipe (RCP) (diameter in inches)
		Metal Sheet Channel (MSC) (Base width by pile height in feet /Sheet pile total length)
		Corrugated Metal Pipe (CMP) (diameter in inches)
		Concrete Pipe (diameter in inches)
		Concrete Oval Pipe (width by height in inches)
		Steel Pipe (diameter in inches)
		Reinforced Concrete Arch (base span by height in inches)
		Corrugated Metal Arch (base span by height in inches)

26

D.2 - City of Seal Beach Master Plan of Drainage Update: Figure 1-3

High Priority Improvement Projects

High Priority Rank	Storm Drain	Downstream Location	Upstream Location	Size	Length	Total Cost	Total Project Cost
5	CPE 1A Alt 1	Westerly extension of Guava Avenue and Old Ranch Golf Course	Lampson Avenue Crossing, near Guava Avenue	Double 6'(W) x 3'(H) RCB	120	339,733	531,378
		Lampson Avenue Crossing, near Guava Avenue	Guava Avenue and Ironwood Avenue R/W (N)	6'(W) x 3'(H) RCB	120	191,644	
6	CPE 2A Alt 1	Westerly extension of Elder Avenue and Old Ranch Golf Course	Lampson Avenue Crossing	Double 6'(W) x 3'(H) RCB	120	339,733	531,378
		Lampson Avenue Crsossing	Elder Avenue and Ironwood Avenue R/W (N)	6'(W) x 3'(H) RCB	120	191,644	
7	CPE 4A Alt 1	Westerly extension of Basswood Avenue and Old Ranch Golf Course	West of Lampson Avenue	9'(W) x 2'9"(H) RCB	31	61,885	1,109,941
		West of Lampson Avenue	Lampson Avenue Crossing, near Basswood Street	9'(W) x 2'9"(H) RCB	95	189,648	
		Lampson Avenue Crossing, near Basswood Street	Basswood Avenue and Aster Street	9'(W) x 2'9"(H) RCB	430	858,407	
8	BC 1A	Bolsa Chica Channel 250' north of freeway	Wisteria Street	6'(W) x 3'(H) RCB	103	164,495	589,148
		Wisteria Street	Violet Street north of Almond Avenue	42" RCP	314	424,654	
9	BC 2A	Bolsa Chica Channel and easterly extension of Fir Avenue	Wisteria Street and Fir Avenue	48" RCP	130	200,928	200,928
		High Priority Totals			**1,583**	**2,962,773**	**2,962,773**

Medium Priority Improvement Projects

Priority	Storm Drain	Downstream Location	Upstream Location	Size	Length	Total Cost	Total Project Cost
Medium	BC 1-1	Wisteria Lane 250' north of freeway	Wisteria Lane and Candleberry Avenue	30" RCP	485	509,250	509,250
Medium	BC 1B	Violet Street north of Almond Avenue	Almond Avenue, east at Teaberry Circle	36" RCP	300	347,760	526,260
		Almond Avenue, east at Teaberry Circle	Almond Avenue east of Sunflower Circle	30" RCP	170	178,500	
Medium	BC 2B	Wisteria Street and Fir Avenue	Wisteria Street at Hazelnut Avenue	3'(W) x2'(H) RCB	250	254,074	471,852
		Wisteria Street at Hazelnut Avenue	Wisteria Street and Ironwood Avenue	2'6"(W) x 1'6"(H) RCB	250	217,778	
Medium	CPE 1B Alt 1	Guava Avenue and Ironwood Avenue R/W (N)	Guava Avenue and Hazelnut Avenue	Double 6'(W) x 2'3"(H) RCB	370	987,078	4,428,511
		Hazelnut Avenue and Guava Avenue	Hazelnut Avenue and Heather Street	Double 6'(W) x 2'3"(H) RCB	1,290	3,441,433	
Medium	CPE 2B Alt 1	Elder Avenue and Ironwood Avenue R/W (N)	Elder Avenue and Fuchsia Street	Double 6'(W) x 2'3"(H) RCB	1,550	4,135,056	4,135,056
Medium	CPE 3-1B Alt 1	Candleberry Avenue and Aster Street	Candleberry Avenue and Fuschia Street	10'8"(W) x 3'(H) RCB	1,800	4,095,093	4,095,093
Medium	CPE 3-4B Alt 1	Birchwood and Aster Street	Birchwood Avenue and Bluebell Street	7'(W) x 2'3"(H) RCB	200	326,667	2,484,481
		Birchwood Avenue and Bluebell Street	Birchwood Avenue and Daisy Circle	6'(W) x 2'3"(H) RCB	1,450	2,157,815	
Medium	CPE 5 Alt 1	Cal Trans Open Channel	Lampson Avenue	24" RCP	75	63,000	63,000
		Medium Priority Totals			**8,190**	**16,713,503**	**16,713,503**

Low Priority Improvement Projects

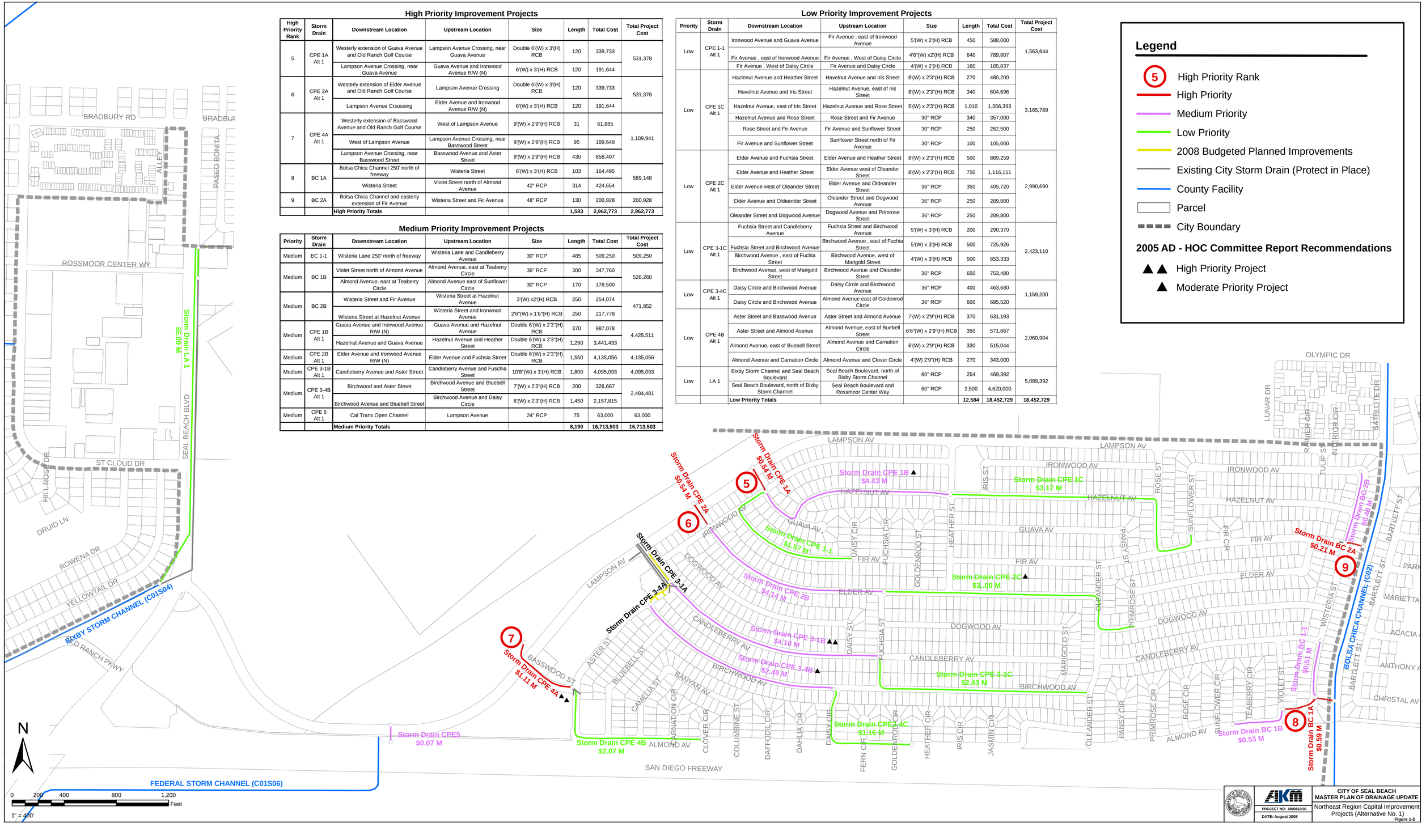
Priority	Storm Drain	Downstream Location	Upstream Location	Size	Length	Total Cost	Total Project Cost
Low	CPE 1-1 Alt 1	Ironwood Avenue and Guava Avenue	Fir Avenue , east of Ironwood Avenue	5'(W) x 2'(H) RCB	450	588,000	1,563,644
		Fir Avenue , east of Ironwood Avenue	Fir Avenue , West of Daisy Circle	4'6"(W) x2'(H) RCB	640	789,807	
		Fir Avenue , West of Daisy Circle	Fir Avenue and Daisy Circle	4'(W) x 2'(H) RCB	160	185,837	
Low	CPE 1C Alt 1	Hazlenut Avenue and Heather Street	Havelnut Avenue and Iris Street	8'(W) x 2'3"(H) RCB	270	480,200	3,165,789
		Havelnut Avenue and Iris Street	Hazelnut Avenue, east of Iris Street	8'(W) x 2'3"(H) RCB	340	604,696	
		Hazelnut Avenue, east of Iris Street	Hazelnut Avenue and Rose Street	5'(W) x 2'3"(H) RCB	1,010	1,356,393	
		Hazelnut Avenue and Rose Street	Rose Street and Fir Avenue	30" RCP	340	357,000	
		Rose Street and Fir Avenue	Fir Avenue and Sunflower Street	30" RCP	250	262,500	
		Fir Avenue and Sunflower Street	Sunflower Street north of Fir Avenue	30" RCP	100	105,000	
Low	CPE 2C Alt 1	Elder Avenue and Fuchsia Street	Elder Avenue and Heather Street	8'(W) x 2'3"(H) RCB	500	889,259	2,990,690
		Elder Avenue and Heather Street	Elder Avenue west of Oleander Street	8'(W) x 2'3"(H) RCB	750	1,116,111	
		Elder Avenue west of Oleander Street	Elder Avenue and Oldeander Street	36" RCP	350	405,720	
		Elder Avenue and Oldeander Street	Oleander Street and Dogwood Avenue	36" RCP	250	289,800	
		Oleander Street and Dogwood Avenue	Dogwood Avenue and Primrose Street	36" RCP	250	289,800	
Low	CPE 3-1C Alt 1	Fuchsia Street and Candleberry Avenue	Fuchsia Street and Birchwood Avenue	5'(W) x 3'(H) RCB	200	290,370	2,423,110
		Fuchsia Street and Birchwood Avenue	Birchwood Avenue , east of Fuchia Street	5'(W) x 3'(H) RCB	500	725,926	
		Birchwood Avenue , east of Fuchia Street	Birchwood Avenue, west of Marigold Street	4'(W) x 3'(H) RCB	500	653,333	
		Birchwood Avenue, west of Marigold Street	Birchwood Avenue and Oleander Street	36" RCP	650	753,480	
Low	CPE 3-4C Alt 1	Daisy Circle and Birchwood Avenue	Daisy Circle and Birchwood Avenue	36" RCP	400	463,680	1,159,200
		Daisy Circle and Birchwood Avenue	Almond Avenue east of Goldenrod Circle	36" RCP	600	695,520	
Low	CPE 4B Alt 1	Aster Street and Basswood Avenue	Aster Street and Almond Avenue	7'(W) x 2'9"(H) RCB	370	631,193	2,060,904
		Aster Street and Almond Avenue	Almond Avenue, east of Buebell Street	6'6"(W) x 2'9"(H) RCB	350	571,667	
		Almond Avenue, east of Buebell Street	Almond Avenue and Carnation Circle	6'(W) x 2'9"(H) RCB	330	515,044	
		Almond Avenue and Carnation Circle	Almond Avenue and Clover Circle	4'(W) 2'9"(H) RCB	270	343,000	
Low	LA 1	Bixby Storm Channel and Seal Beach Boulevard	Seal Beach Boulevard, north of Bixby Storm Channel	60" RCP	254	469,392	5,089,392
		Seal Beach Boulevard, north of Bixby Storm Channel	Seal Beach Boulevard and Rossmoor Center Way	60" RCP	2,500	4,620,000	
		Low Priority Totals			**12,584**	**18,452,729**	**18,452,729**

Legend

- 5 — High Priority Rank
- High Priority
- Medium Priority
- Low Priority
- 2008 Budgeted Planned Improvements
- Existing City Storm Drain (Protect in Place)
- County Facility
- Parcel
- City Boundary

2005 AD - HOC Committee Report Recommendations

- ▲▲ High Priority Project
- ▲ Moderate Priority Project

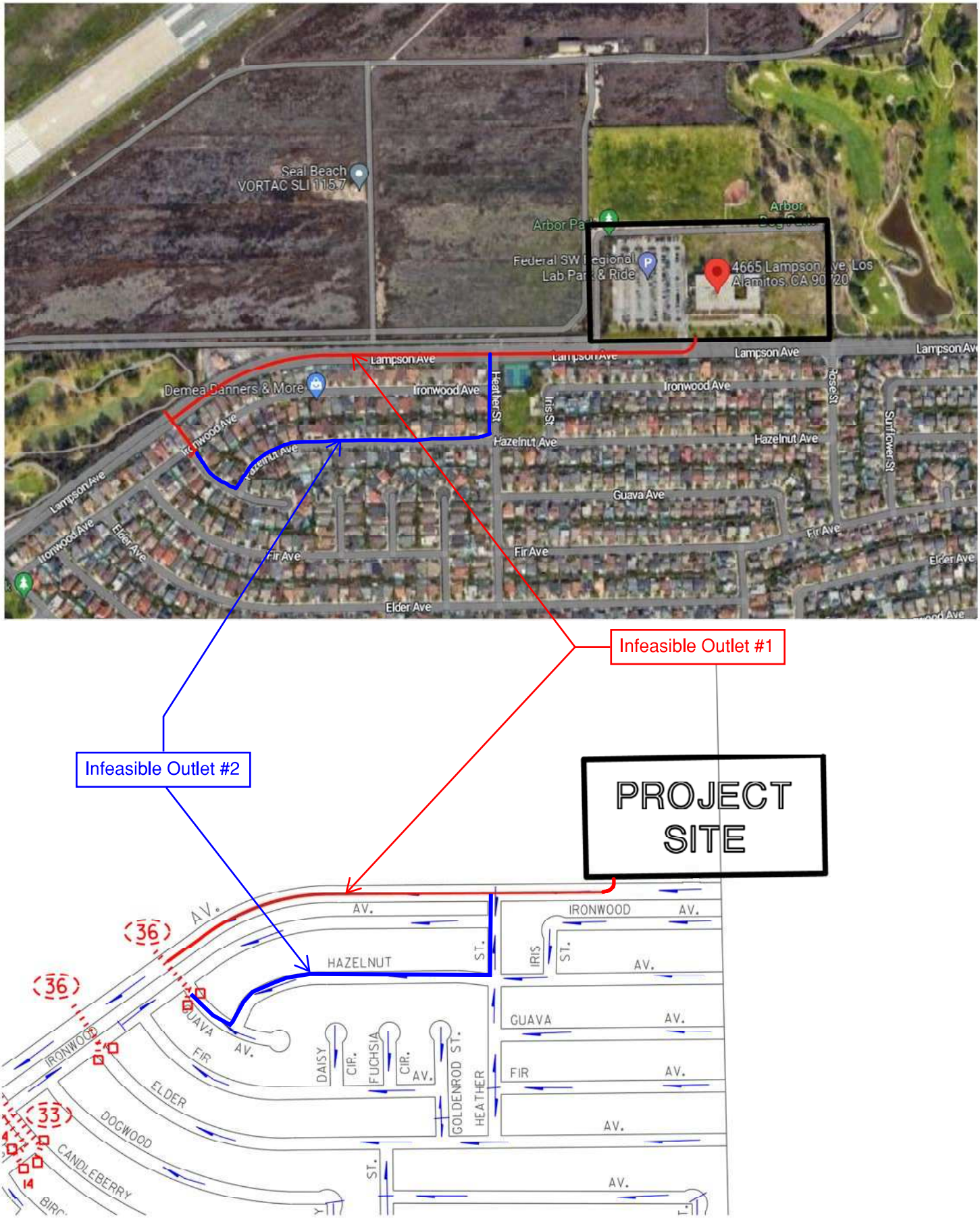


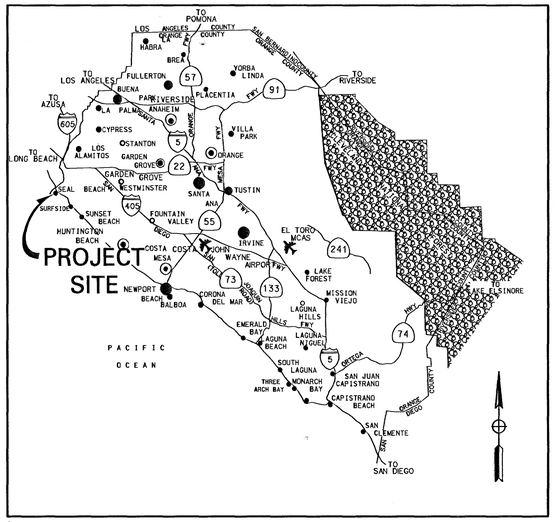
CITY OF SEAL BEACH
MASTER PLAN OF DRAINAGE UPDATE
Northeast Region Capital Improvement Projects (Alternative No. 1)
Figure 1-3

AKM
PROJECT NO: 0800810.00
DATE: August 2008

D.3 - Infeasible Drainage System Outlets 1 and 2 Exhibits

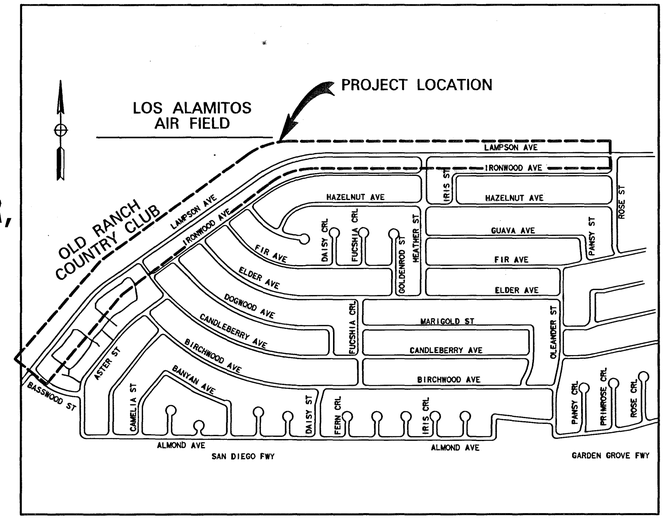
Infeasible Drainage System Outlets #1 and #2





VICINITY MAP
N.T.S.

THE CITY OF
SEAL BEACH, CALIFORNIA
PUBLIC WORKS DEPARTMENT
PLANS FOR THE CONSTRUCTION OF
LAMPSON AVENUE WELL, PHASE II–
WATER TRANSMISSION MAIN AND GRAVITY SEWER, PROJECT NO. WT0903



LOCATION MAP
N.T.S.

CITY OF SEAL BEACH INCORPORATED OCTOBER 22, 1915 ORANGE COUNTY CALIFORNIA

INDEX OF SHEETS

DESIGNED BY: J.T. LEE
DRAWN BY: CADD
CHECKED BY: J. A. LOAGUE
DATE: JULY 2009

REGISTERED PROFESSIONAL ENGINEER JARED T. LEE No. C71422 Exp. 12/31/09 CIVIL STATE OF CALIFORNIA

APPROVED BY: JARED T. LEE RCE NO. C71422 8/3/2009 DATE

AKM Consulting Engineers
553 Wald
Irvine, Ca. 92618
(949) 753-7333

REVISIONS

DATE	BY	
		AS BUILT

FIELD BOOK REF.

CITY OF SEAL BEACH
LAMPSON AVENUE WELL, PHASE II– WATER TRANSMISSION MAIN AND GRAVITY SEWER, PROJECT NO. WT0903

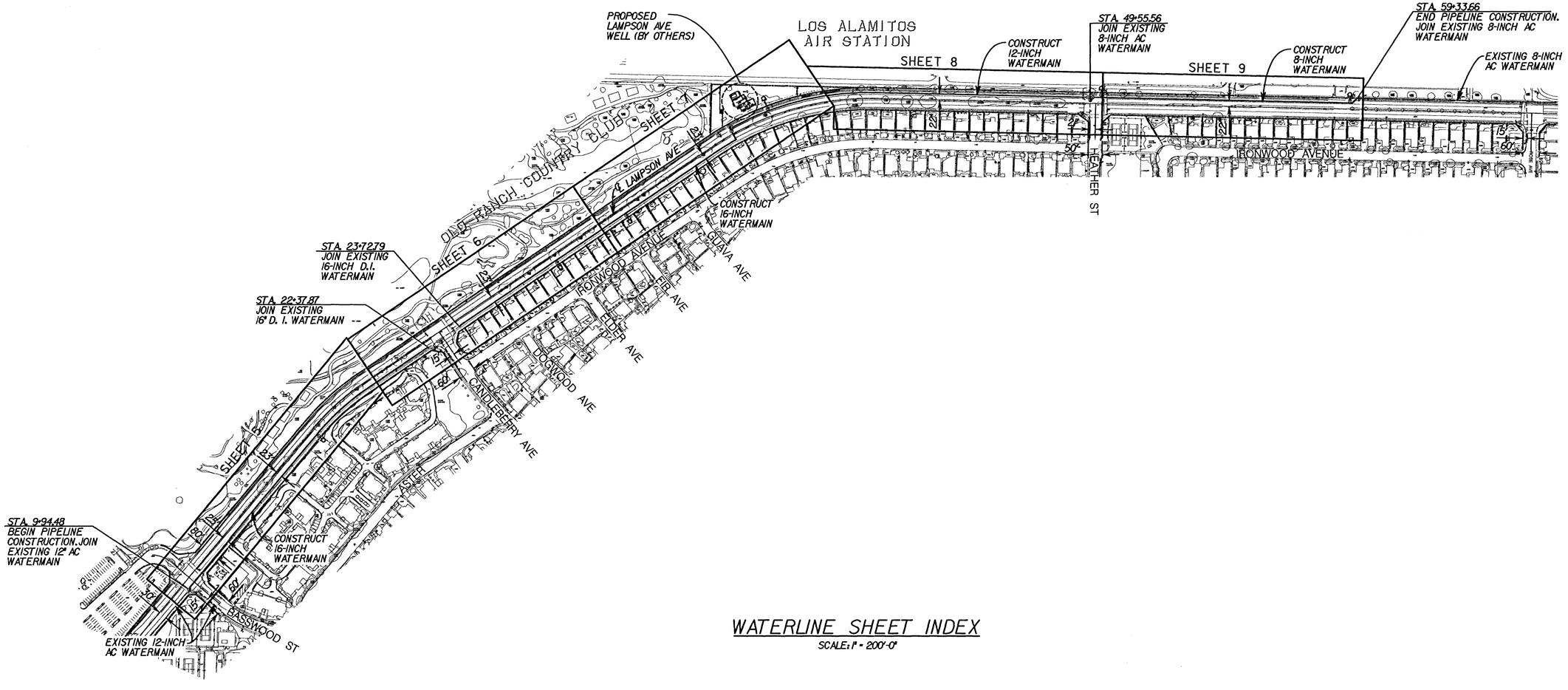
CITY OF SEAL BEACH INCORPORATED OCTOBER 22, 1915 ORANGE COUNTY CALIFORNIA

TITLE: **TITLE SHEET**

Approved: MICHAEL HO, CITY ENGINEER RCE NO.70299 8/6/09 DATE
Recommended: DAVID L. SPITZ, ASSOCIATE ENGINEER RCE NO. 69800 8/6/09 DATE

PROJECT NO.
DRAWING NO. G-1
Drawn By: _____ Checked By: _____
SHEET 1 OF 15

N:\0800 Seal Beach\700 Lampson Avenue Well_Offsite Package\01_G-1_title_sht.dgn 8/3/2009



WATERLINE SHEET INDEX

SCALE: 1" = 200'-0"

N

200 100 0 200 400

SCALE IN FEET
1 inch = 200ft.

DESIGNED BY:	J.T. LEE
DRAWN BY:	CADD
CHECKED BY:	J. A. LOAGUE
DATE:	JULY 2009

REGISTERED PROFESSIONAL ENGINEER — JARED T. LEE — No. C71422 — Exp. 12/31/09 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: JARED T. LEE RCE NO. C71422 DATE 8/3/2009

AKM Consulting Engineers
553 Wald
Irvine, Ca. 92618
(949) 753-7333

REVISIONS		
DATE	BY	
		AS BUILT

FIELD BOOK REF.

CITY OF SEAL BEACH
LAMPSON AVENUE WELL, PHASE II– WATER TRANSMISSION MAIN AND GRAVITY SEWER, PROJECT NO. WT0903

CITY OF SEAL BEACH INCORPORATED ORANGE COUNTY, CALIFORNIA

TITLE: **WATERLINE SHEET INDEX**

Approved: SEE COVER SHEET
MICHAEL HO, CITY ENGINEER RCE NO.70299 DATE

Recommended: SEE COVER SHEET
DAVID L. SPITZ, ASSOCIATE ENGINEER RCE NO. 69800 DATE

PROJECT NO.

DRAWING NO. G-3

Drawn By: _____ Checked By: _____

SHEET 3 OF 15

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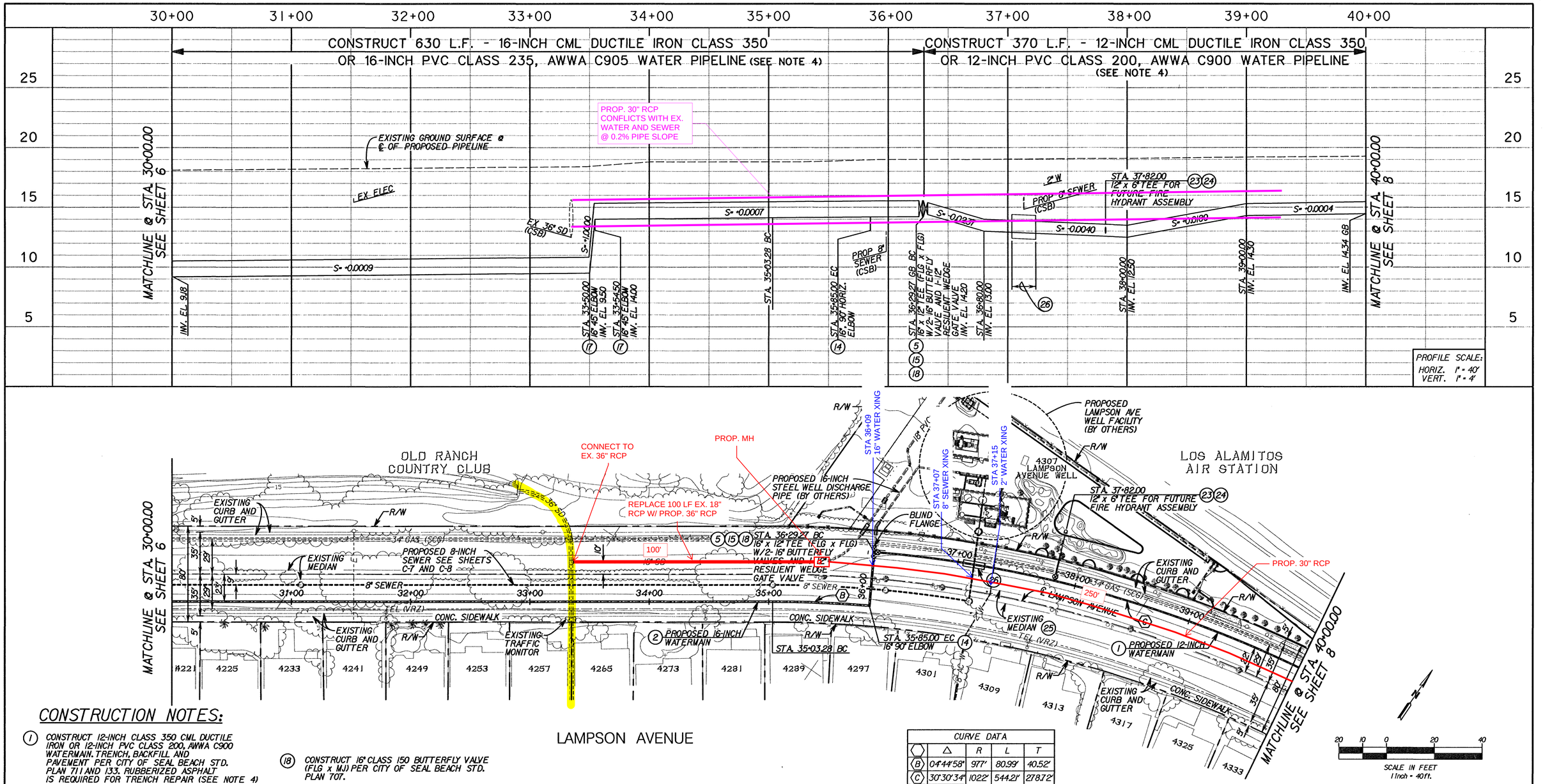


CONSTRUCTION NOTES:

(1) CONSTRUCT 12-INCH CLASS 350 CML DUCTILE IRON OR 12-INCH PVC CLASS 200, AWWA C900 WATERMAIN. TRENCH, BACKFILL AND PAVEMENT PER CITY OF SEAL BEACH STD. PLAN 711 AND 133. RUBBERIZED ASPHALT IS REQUIRED FOR TRENCH REPAIR (SEE NOTE 4)

(2) CONSTRUCT 16-INCH CLASS 350 CML DUCTILE IRON OR 16-INCH PVC CLASS 200, AWWA C900 WATERMAIN. TRENCH, BACKFILL AND PAVEMENT PER CITY OF SEAL BEACH STD. PLAN 711 AND 133. RUBBERIZED ASPHALT IS REQUIRED FOR TRENCH REPAIR (SEE NOTE 4)

(5) CONSTRUCT 12" RESILIENT WEDGE GATE VALVE (FLG x FLG) PER CITY OF SEAL BEACH STD. PLAN 706.

(10) CONSTRUCT FIRE HYDRANT ASSEMBLY PER CITY OF SEAL BEACH STD. PLAN 705.

(14) CONSTRUCT 16" 90° ELBOW AND THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(15) CONSTRUCT 16" x 12" DUCTILE IRON TEE (FLG x FLG) WITH THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(17) CONSTRUCT 16" 45° ELBOW (PO x PO) WITH THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(18) CONSTRUCT 16" CLASS 150 BUTTERFLY VALVE (FLG x MJ) PER CITY OF SEAL BEACH STD. PLAN 707.

(23) CONSTRUCT 12" x 6" TEE (PO x FLG) WITH 6-INCH (FLG x PO) RESILIENT WEDGE GATE VALVE, FOR FUTURE FIRE HYDRANT ASSEMBLY. INSTALL THRUST BLOCKS PER CITY OF SEAL BEACH STD. PLANS 712.

(24) CONSTRUCT 6-INCH PVC CLASS 200, AWWA C900 STUB OUT PER CITY OF SEAL BEACH STD. PLAN 711. INSTALL END CAP AND THRUST BLOCK 5-FEET BEYOND RIGHT-OF-WAY ON WELL SITE. REPAIR PAVEMENT PER CITY STD. PLAN 133.

(25) REMOVE AND REPLACE EXISTING MEDIAN CURB TO NEAREST JOINT AS REQUIRED FOR CONSTRUCTION. REPLACE EXISTING LANDSCAPING AND IRRIGATION SYSTEM IN KIND.

(26) CONSTRUCT 20 L.F. OF 24-INCH x ½" WALL STEEL CASING PER CITY OF SEAL BEACH STD. DWG. S-12 FILL CASING ANNULAR SPACE WITH LOW DENSITY GROUT. CENTER CASING UNDER SEWER.

SHEET NOTES:

1. CONTRACTOR SHALL POTHOLE TO VERIFY DEPTH, AND LOCATION OF ALL CONNECTION POINTS AND CROSSING UTILITIES PRIOR TO SUBMISSION OF SHOP DRAWINGS.
2. WORK IN LAMPSON AVE. REQUIRES A NO FEE ENCROACHMENT PERMIT FROM THE CITY OF SEAL BEACH. THE CONTRACTOR SHALL BE REQUIRED TO PREPARE AND SUBMIT A TRAFFIC CONTROL PLAN SIGNED AND SEALED BY A REGISTERED TRAFFIC CONTROL ENGINEER TO THE CITY OF SEAL BEACH FOR REVIEW AND APPROVAL.
3. THE CONTRACTOR SHALL EMPLOY HAND EXCAVATION ONLY WITHIN 3-FEET OF SCG FACILITIES. A REPRESENTATIVE OF THE GAS COMPANY MUST INSPECT ALL EXCAVATIONS NEAR EXISTING SCG FACILITIES. CONTRACTOR SHALL CONTACT SCG 2 WORKING DAYS PRIOR TO EXCAVATION TO COORDINATE INSPECTION.
4. CONTRACTOR BASE BID SHALL BE FOR FURNISHING AND INSTALLING DUCTILE IRON PIPE. PVC PIPE SHALL ONLY BE PROPOSED AS A BID ALTERNATIVE AND MAY BE IMPLEMENTED AT THE SOLE DISCRETION OF THE CITY.

CURVE DATA				
	Δ	R	L	T
(B)	04°44'58"	977'	80.99'	40.52'
(C)	30°30'34"	1022'	544.21'	278.72'

DESIGNED BY: J. T. LEE
DRAWN BY: CADD
CHECKED BY: J. A. LOAGUE
DATE: JULY 2009

REGISTERED PROFESSIONAL ENGINEER — JARED T. LEE — No. C71422 — Exp. 12/31/09 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: JARED T. LEE RCE NO. C71422 — 8/31/09 DATE

PUBLIC WORKS DEPARTMENT

REVISIONS

DATE	BY	
		AS BUILT

FIELD BOOK REF.

AKM Consulting Engineers
553 Wald
Irvine, Ca. 92618
(949) 753-7333

PROJECT: **CITY OF SEAL BEACH**
LAMPSON AVENUE WELL, PHASE II– WATER TRANSMISSION MAIN AND GRAVITY SEWER, PROJECT NO. WT0903

CITY OF SEAL BEACH INCORPORATED MARCH 22, 1915 ORANGE COUNTY, CALIFORNIA

TITLE: **12–INCH AND 16–INCH WATERMAIN PLAN AND PROFILE STA. 30+00.00 TO STA. 40+00.00**

Approved: SEE COVER SHEET
MICHAEL HO, CITY ENGINEER RCE NO.70299 DATE

Recommended: SEE COVER SHEET
DAVID L. SPITZ, ASSOCIATE ENGINEER RCE NO. 69800 DATE

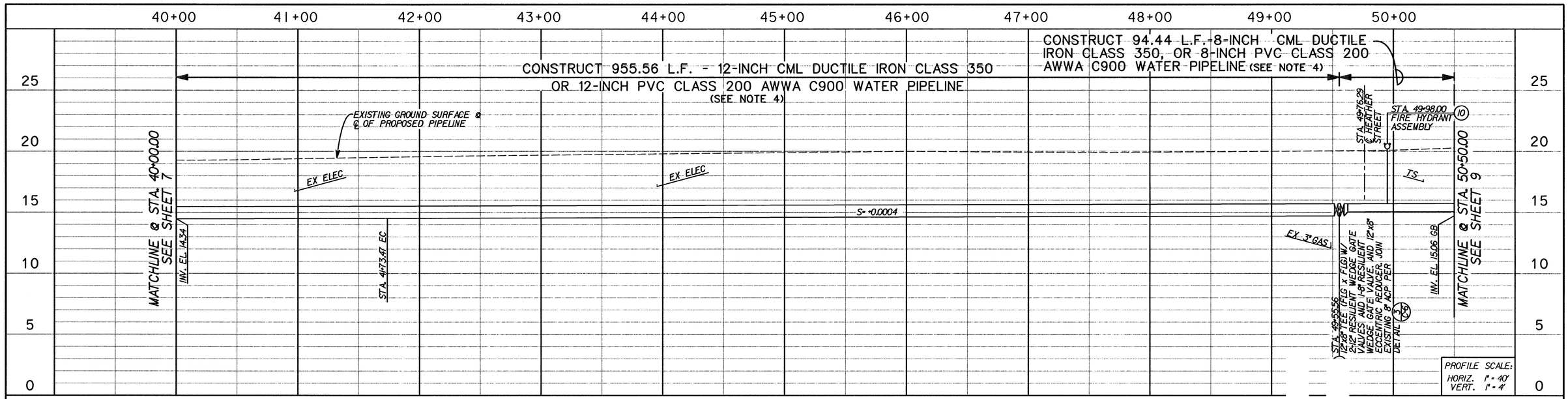
PROJECT NO.

DRAWING NO. C-3

Drawn By: _____ Checked By: _____

SHEET 7 OF 15

N:\0800 Seal Beach\700 Lampson Avenue Well_Offsite Package\07_C-3_pnpsht_wtr_03.dgn 8/3/2009



LAMPSON AVENUE

HEATHER STREET

CONSTRUCTION NOTES:

(1) CONSTRUCT 12" CLASS 350 CML DUCTILE IRON OR 12" PVC CLASS 200 AWWA C900 WATERMAIN. TRENCH, BACKFILL AND PAVEMENT PER CITY OF SEAL BEACH STD. PLAN 711 AND 133. RUBBERIZED ASPHALT IS REQUIRED FOR TRENCH REPAIR. (SEE NOTE 4)

(5) CONSTRUCT 12" RESILIENT WEDGE GATE VALVE (FLG x FLG) PER CITY OF SEAL BEACH STD. PLAN 706.

(9) REMOVE AND SALVAGE FIRE HYDRANT. REMOVE HYDRANT BURY, VALVE BOX AND COVER, AND BACKFILL AND REPLACE IN KIND.

(10) CONSTRUCT FIRE HYDRANT ASSEMBLY PER CITY OF SEAL BEACH STD. PLAN 705.

(13) CAP AND SEAL EXISTING WATERLINE. INSTALL THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(21) CONSTRUCT 8" RESILIENT WEDGE GATE VALVE (FLG x FLG) PER CITY OF SEAL BEACH STD. PLAN 706.

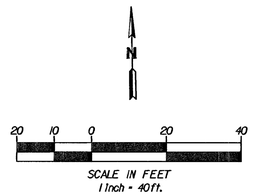
(22) CONSTRUCT 12" x 8" DUCTILE IRON TEE (FLG x FLG) WITH THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(25) CONSTRUCT 8" CLASS 350 CML DUCTILE IRON OR 8" PVC CLASS 200 AWWA C900 WATERMAIN. TRENCH, BACKFILL AND PAVEMENT PER CITY OF SEAL BEACH STD. 711 AND 133. RUBBERIZED ASPHALT IS REQUIRED FOR TRENCH REPAIR. (SEE NOTE 4)

CURVE DATA				
	Δ	R	L	T
(C)	30°30'34"	1022'	544.21'	278.72'

SHEET NOTES:

1. CONTRACTOR SHALL POTHOLE TO VERIFY DEPTH, AND LOCATION OF ALL CONNECTION POINTS AND CROSSING UTILITIES PRIOR TO SUBMISSION OF SHOP DRAWINGS.
2. WORK IN LAMPSON AVE. REQUIRES A NO FEE ENCROACHMENT PERMIT FROM THE CITY OF SEAL BEACH. THE CONTRACTOR SHALL BE REQUIRED TO PREPARE AND SUBMIT A TRAFFIC CONTROL PLAN SIGNED AND SEALED BY A REGISTERED TRAFFIC CONTROL ENGINEER TO THE CITY OF SEAL BEACH FOR REVIEW AND APPROVAL.
3. THE CONTRACTOR SHALL EMPLOY HAND EXCAVATION ONLY WITHIN 3-FEET OF SCG FACILITIES. A REPRESENTATIVE OF THE GAS COMPANY MUST INSPECT ALL EXCAVATIONS NEAR EXISTING SCG FACILITIES. CONTRACTOR SHALL CONTACT SCG 2 WORKING DAYS PRIOR TO EXCAVATION TO COORDINATE INSPECTION.
4. CONTRACTOR BASE BID SHALL BE FOR FURNISHING AND INSTALLING DUCTILE IRON PIPE. PVC PIPE SHALL ONLY BE PROPOSED AS A BID ALTERNATIVE AND MAY BE IMPLEMENTED AT THE SOLE DISCRETION OF THE CITY.



DESIGNED BY: J. T. LEE
DRAWN BY: CADD
CHECKED BY: J. A. LOAGUE
DATE: JULY 2009

REGISTERED PROFESSIONAL ENGINEER — JARED T. LEE — No. C71422 — Exp. 12/31/09 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: JARED T. LEE RCE NO. C71422 8/3/2009 DATE

PUBLIC WORKS DEPARTMENT

REVISIONS		
DATE	BY	
		AS BUILT

FIELD BOOK REF.

AKM Consulting Engineers
553 Wald
Irvine, Ca. 92618
(949) 753-7333

PROJECT: CITY OF SEAL BEACH
LAMPSON AVENUE WELL, PHASE II–
WATER TRANSMISSION MAIN
AND GRAVITY SEWER,
PROJECT NO. WT0903

TITLE: 12-INCH AND 8-INCH WATERMAIN
PLAN AND PROFILE
STA. 40+00.00 TO STA. 50+50.00

Approved: SEE COVER SHEET
MICHAEL HO, CITY ENGINEER RCE NO.70299 DATE

Recommended: SEE COVER SHEET
DAVID L. SPITZ, ASSOCIATE ENGINEER RCE NO. 69800 DATE

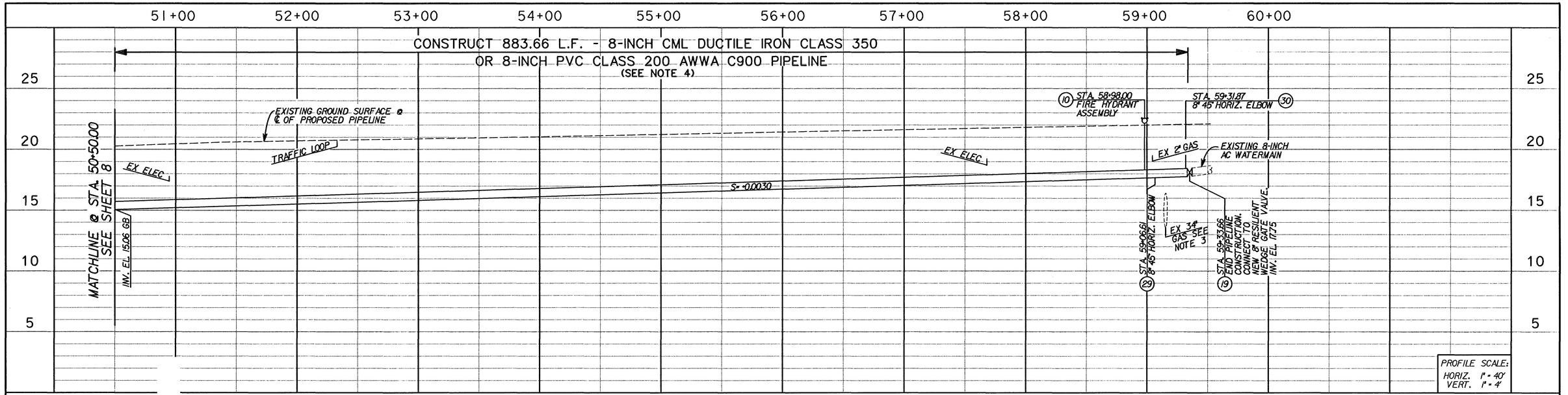
PROJECT NO.

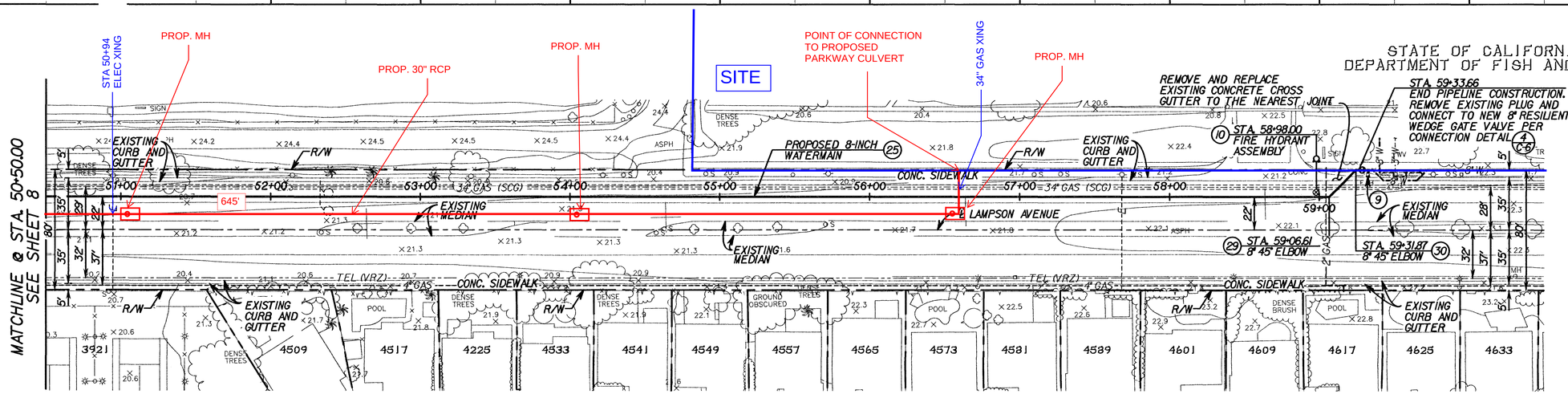
DRAWING NO. C-4

Drawn By: _____ Checked By: _____

SHEET 8 OF 15

N:\0800 Seal Beach\700 Lampson Avenue Well\...\Bid Package\08_C-4_pipshf_wtr_04.dgn 8/3/2009





LAMPSON AVENUE

SHEET NOTES:

1. CONTRACTOR SHALL POTHOLE TO VERIFY DEPTH, AND LOCATION OF ALL CONNECTION POINTS AND CROSSING UTILITIES PRIOR TO SUBMISSION OF SHOP DRAWINGS.
2. WORK IN LAMPSON AVE. REQUIRES A NO FEE ENCROACHMENT PERMIT FROM THE CITY OF SEAL BEACH. THE CONTRACTOR SHALL BE REQUIRED TO PREPARE AND SUBMIT A TRAFFIC CONTROL PLAN SIGNED AND SEALED BY A REGISTERED TRAFFIC CONTROL ENGINEER TO THE CITY OF SEAL BEACH FOR REVIEW AND APPROVAL.
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4. CONTRACTOR BASE BID SHALL BE FOR FURNISHING AND INSTALLING DUCTILE IRON PIPE. PVC PIPE SHALL ONLY BE PROPOSED AS A BID ALTERNATIVE AND MAY BE IMPLEMENTED AT THE SOLE DISCRETION OF THE CITY.

CONSTRUCTION NOTES:

(9) REMOVE AND SALVAGE FIRE HYDRANT. REMOVE HYDRANT BURY, VALVE BOX AND COVER, AND BACKFILL AND REPLACE IN KIND.

(10) CONSTRUCT FIRE HYDRANT ASSEMBLY PER CITY OF SEAL BEACH STD. PLAN 705.

(19) CONSTRUCT 8" RESILIENT WEDGE GATE VALVE (FLG x FLG) PER CITY OF SEAL BEACH STD. PLAN 706.

(25) CONSTRUCT 8" CLASS 350 CML DUCTILE IRON OR 8" PVC CLASS 200 AWWA C900 WATERMAIN. TRENCH, BACKFILL AND PAVEMENT PER CITY OF SEAL BEACH STD. 711 AND 133. RUBBERIZED ASPHALT IS REQUIRED FOR TRENCH REPAIR. (SEE NOTE 4)

(29) CONSTRUCT 8" 45° ELBOW (PO x PO) WITH THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

(30) CONSTRUCT 8" 45° ELBOW (FLG x PO) WITH THRUST BLOCK PER CITY OF SEAL BEACH STD. PLAN 712.

N

20 10 0 20 40

SCALE IN FEET
1 Inch = 40ft.

DESIGNED BY: J. T. LEE
DRAWN BY: CADD
CHECKED BY: J. A. LOAGUE
DATE: JULY 2009

REGISTERED PROFESSIONAL ENGINEER — JARED T. LEE — No. C71422 — Exp. 12/31/09 — CIVIL — STATE OF CALIFORNIA

APPROVED BY: Jared Lee 8/31/2009
JARED T. LEE RCE NO. C71422 DATE

AKM Consulting Engineers
553 Wald
Irvine, Ca. 92618
(949) 753-7333

PUBLIC WORKS DEPARTMENT

REVISIONS

DATE	BY	
		AS BUILT

FIELD BOOK REF.

PROJECT: CITY OF SEAL BEACH
LAMPSON AVENUE WELL, PHASE II-
WATER TRANSMISSION MAIN
AND GRAVITY SEWER,
PROJECT NO. WT0903

TITLE: 8-INCH WATERMAIN PLAN AND PROFILE
STA. 50+50.00 TO STA. 59+33.66

Approved: SEE COVER SHEET
MICHAEL HO, CITY ENGINEER RCE NO.70299 DATE

Recommended: SEE COVER SHEET
DAVID L. SPITZ, ASSOCIATE ENGINEER RCE NO. 69800 DATE

PROJECT NO.

DRAWING NO. C-5

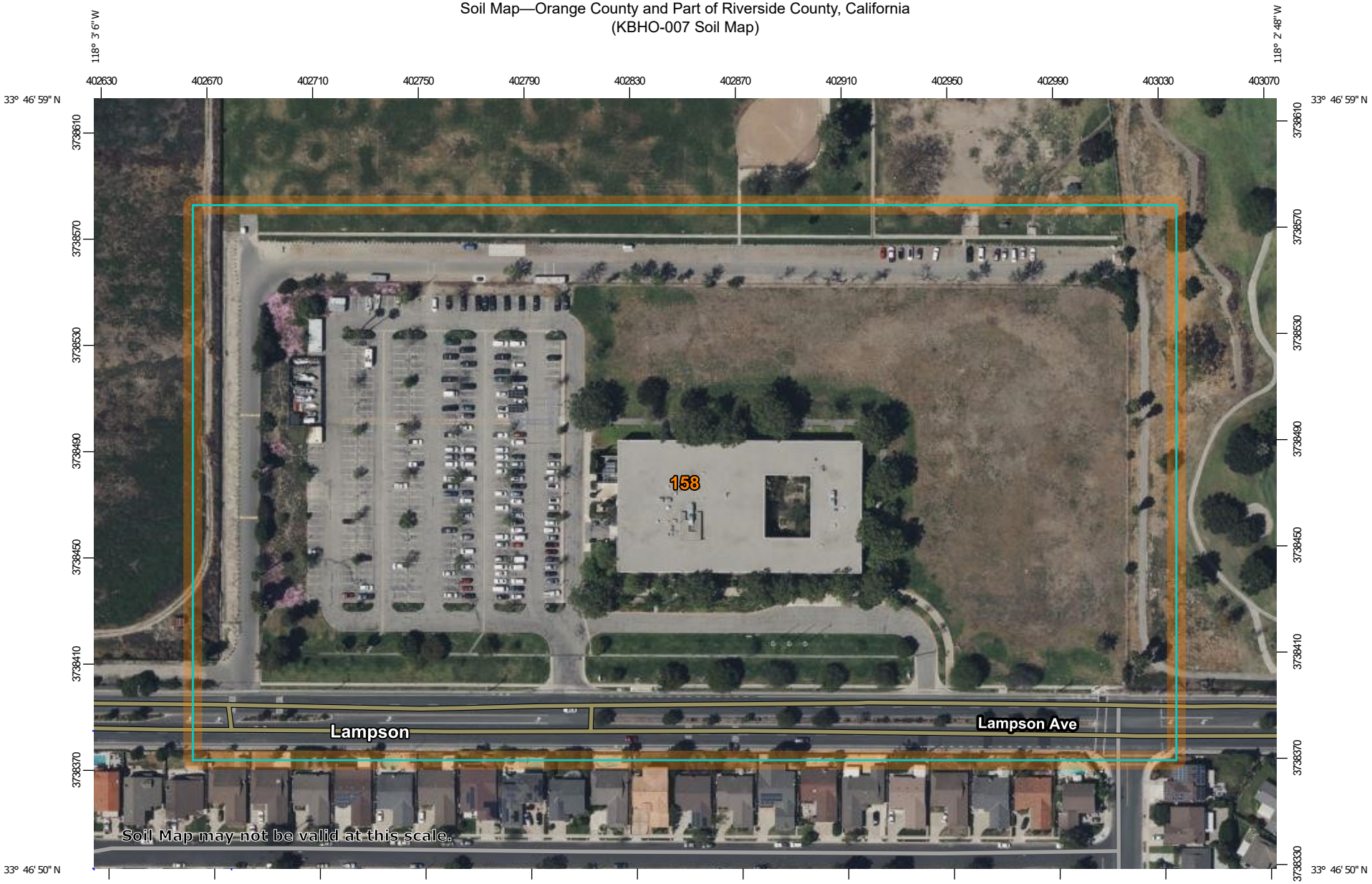
Drawn By: _____ Checked By: _____

SHEET 9 OF 15

N:\0800 Seal Beach\700 Lampson Avenue Well_Offsite Package\09_C-5_prpsht_wtr_05.dgn 8/3/2009

APPENDIX E
SOILS MAP

Soil Map—Orange County and Part of Riverside County, California
(KBHO-007 Soil Map)



Map Scale: 1:2,050 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 17, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2022—Apr 23, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
158	Hueneme fine sandy loam, drained	19.3	100.0%
Totals for Area of Interest		**19.3**	**100.0%**

Orange County and Part of Riverside County, California

158—Hueneme fine sandy loam, drained

Map Unit Setting

National map unit symbol: hcn3
Elevation: 0 to 430 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 300 to 350 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Hueneme and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hueneme

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Stratified alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 27 inches: fine sandy loam
H2 - 27 to 60 inches: stratified sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A

Ecological site: R019XG911CA - Loamy Fan
Hydric soil rating: Yes

Minor Components

San emigdio, fine sandy loam
Percent of map unit: 5 percent
Hydric soil rating: No

Hueneme, fine sandy loam
Percent of map unit: 5 percent
Hydric soil rating: No

Bolsa, silt loam, drained
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 17, Aug 30, 2023