

**PRELIMINARY HYDROLOGY STUDY
TTM 19392
2375 North Tustin Street
ORANGE, CALIFORNIA, 92685**

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Tentative Tract Map No. 19392

**Preliminary Hydrology Study
For
TTM 19392
2375 North Tustin Street
Orange, CA 92685**

ACKNOWLEDGEMENT AND SIGNATURE PAGE

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

Dane McDougall, PE 80705
C&V Consulting, Inc.

Date

1.0 SITE DESCRIPTION:

The proposed site is located at 2375 N. Tustin Street in the City of Orange. The existing site at 4.322 gross acres is currently occupied by a commercial building situated in the more easterly portion of the site with associated parking throughout the rest of the site. There are small landscaped medians throughout the parking area. The site is bounded by a multi family residential development to the north, an existing mobile home park to the south, the 55 Freeway to the east, and a multi family residential development and commercial development to the west. The site has block wall along the north and south property lines and a wall and fencing along the eastern property line. North Tustin Street is along the western property line of the site. The site is accessed via one signalized intersection from N. Tustin Avenue.

Per the City of Orange Zoning Map, the site is identified as being within the Limited Business Tustin Redevelopment Project Area (C-TR) zone. Per the City of Orange Land Use Map, the site is identified as General Commercial land use. The primary purpose of areas designated General Commercial is to provide for a wide range of retail and service commercial uses and professional services. The maximum intensity of General Commercial land use is 1.0 Floor-to-Area Ratio.

2.0 PURPOSE OF STUDY:

The study will estimate the amount of stormwater run-off generated from the project in the existing pre-developed and post-developed conditions. Furthermore, streets and the onsite drainage system have been designed to accommodate the design storm per the Orange County Hydrology Manual. Building finished floors have also been designed to maintain a minimum 1-foot clearance above the 100-year storm.

3.0 EXISTING CONDITIONS:

Elevations on site range from 271 to 258 above mean sea level. The site primarily slopes in the westerly direction toward N. Tustin Street. Existing stormwater runoff is collected in valley gutters throughout the site. East of the existing building, runoff is conveyed overland into a valley gutter and into an existing storm drain inlet. To the west of the building, runoff is conveyed overland into existing valley gutters that route runoff into two existing storm drain catch basins in the easterly portion of the main entrance drive aisle. Runoff in the main entrance drive aisle is routed via curb and gutter into two existing catch basins located just east of the public right-of-way of N. Tustin Street. The site does experience offsite runoff at the southeast corner from the triangular shaped parcel to the east. Due to the nature of the proposed design this runoff will be comingled with onsite flows and therefore accounted for in the hydraulic analysis.

This site is located within the Santa Ana River Watershed per the Orange County Flood Control District (OCFCD) Drainage System Map No. 15. Surface runoff from the site continues in the southerly direction in N. Tustin Street where it is conveyed into an existing catch basin and enters the existing underground storm drain system and continues to the Buckeye Storm Channel just south of Meats Avenue. Runoff converges with the Collins Storm Channel, Santa Ana River, and ultimately discharging to the Pacific Ocean.

4.0 PROPOSED CONDITIONS:

The project proposes to construct 71 residential units which consists of 30 duplex residential condominium units and 12 single family detached condominium units. There will be a triangular shaped dedication (approximately 0.007ac) to the city along the frontage of the property on N. Tustin Street. The existing main access of the site (approximately 0.285 ac) will remain as is and is not being quantified in the hydraulic analysis as it will remain undisturbed. The site does experience offsite run-on from the parcel to the east (approximately 0.47 ac). This flow will be accounted for in hydrologic calculations as comingling of offsite and onsite flows cannot be avoided. The development proposes open space areas, parking areas, walkways, and driveways. Each residential unit will have two garage parking spaces and additional uncovered parking. The site has one (1) entrance/ exit on N. Tustin Street and one (1) secondary access for emergency vehicles only.

Runoff will be captured by five (5) sump curb inlet catch basins, one (1) proposed grate inlet and an onsite area drain system. Runoff will be routed into proposed Biofiltration Vault treatment devices prior to discharge to the existing stormwater sump pump system. The sump pump system will discharge runoff into N. Tustin Street through a parkway drain. After entering North Tustin Street runoff will follow historic drainage patterns.

5.0 METHODOLOGY:

All drainage areas were analyzed using the County of Orange Local Drainage and Hydrology Manual and nomographs. The site is small and is comprised of two sub-areas to satisfy the Orange County Hydrology Manual. The sub-areas were analyzed for acreage, land-use, volume, and time of concentration according to the Rational Method. The percentage of pervious was calculated for the pre- and post-construction conditions and the development type with the percentage pervious closest to the percentage calculated was used over matching development type in the hydrology calculations. In accordance with the Orange County Hydrology Manual all habitable structures have a finished floor elevation to allow one foot of freeboard during the 100-year storm event, the onsite conveyance pipes have been sized to convey runoff from the 25-year storm event. The onsite catch basins and parkway culvert have been sized to convey runoff from the 100-year storm event. Calculations supporting these sizes are located in Appendix C of this report.

The existing and proposed drainage areas were analyzed by utilizing the latest Orange County Hydrology Manual, Civil Design Software, and Hydraflow Express Extension for Autodesk AutoCAD Civil 3D.

6.0 RESULTS:

The results from this hydrology and hydraulic analysis demonstrate the following:

- The drainage design for this site meets or exceeds the requirements as described in the Orange County Hydrology Manual.
- Flow rates have decreased in the proposed developed condition.

Existing & Proposed Hydrologic Summary Table:

Subarea	Area	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)	Tc (min)
X1	0.47 ac	0.855	1.044	1.359	13.775
X2	3.94 ac	7.18	8.684	11.167	15.76
Total	4.41 ac	8.04	9.728	12.526	15.76
P1	0.47 ac	0.855	1.044	1.359	13.775
P2	2.60 ac	4.558	5.231	6.767	17.15
P3	1.33 ac	2.026	2.748	3.550	17.15
Total	4.40 ac	7.439	9.023	11.676	17.15
% Decrease		7.5%	7.2%	6.8%	

* T_c values are based on the results of the 100-year storm event.

Catch Basin Sizing

Catch basin sizing has been analyzed for the 25-year storm event based on a sump design. Refer to Attachment C for calculations.

Parkway Drain Sizing

Parkway Drain sizing has been analyzed for the 100-year storm even. Refer to Attachment C for calculations.

100-Year Water Surface Elevation

Proposed finished floors will be set at least 1' above the 100-year water surface elevation in the proposed drive aisles. Depth of flow calculations to be provided prior to final approval.

7.0 CONCLUSION:

The results from this hydrology and hydraulics study utilizing methods provided by Orange County demonstrate that the proposed condition of the site generates a decrease in site peak runoff compared to the existing condition of the site.

Runoff will be conveyed by concrete v-gutters, captured by five (5) sump curb inlet catch basins, one (1) proposed grate inlet and an onsite area drain system. Runoff will be routed into proposed Biofiltration Vault treatment devices prior to discharge to the existing stormwater sump pump system. The flows in excess of the 25 -year storm event will enter the stormwater sump pump which

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2075 N. Tustin Street

outlets onto N. Tustin Street through a parkway drain. Stormwater runoff discharged from the site will match the existing historic drainage pattern. Therefore, no significant impacts are anticipated due to this proposed development on the existing downstream drainage facilities.

8.0 DESIGN PARAMETERS:

1. The property is in the City of Orange, in Orange County.
2. The onsite drainage area was analyzed for a 10-, 25- and 100-year storm event using Rational Method Analysis per the County of Orange Hydrology Manual.
3. The project area is located in Soil Group C according to Figure XVI-2a of the Orange County Technical Guidance Document and the NRCS Web Soil Survey.
4. The existing site analysis utilized “Commercial” per the CivilDesign software.
5. The proposed site analysis utilized “Condominium” per the CivilDesign software.
6. 100-year storm event flood level protection analysis required for habitable structures per the requirements of the Orange County Hydrology Manual.

9.0 REFERENCES

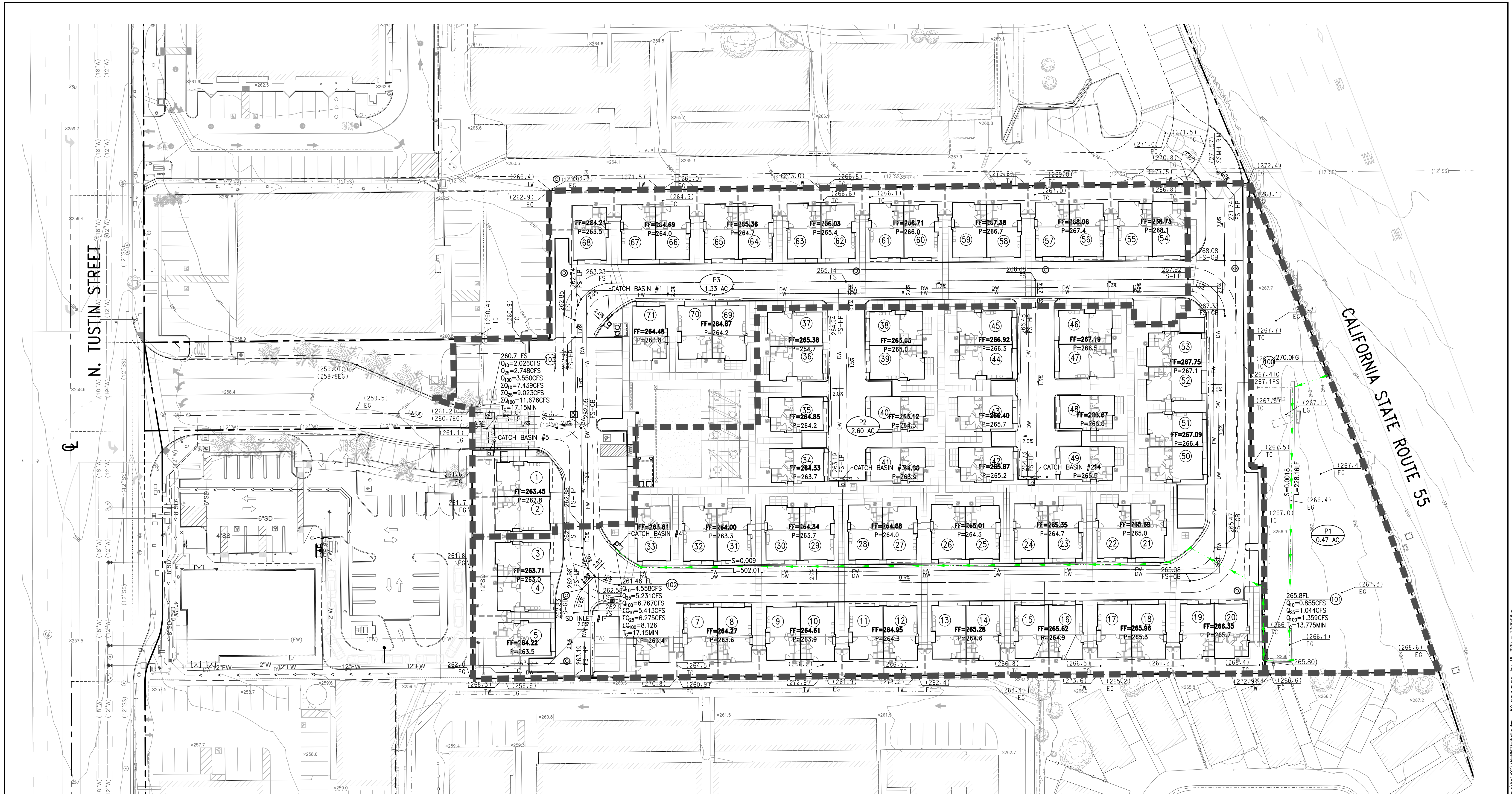
1. Orange County Hydrology Manual dated October 1986
2. Hydraflow Express Extension for Autodesk AutoCAD Civil 3D
3. Orange County Flood Control District Design Manual 2000
4. Orange County Technical Guidance Document (TGD), 2013
5. Orange County Technical Guidance Document Figure XVI-2a, NRCS Hydrologic Soils Groups
6. Tentative Tract Map No. 19392 prepared by C&V Consulting, Inc. dated April 2025
7. OCFCD Base Map of Drainage Facilities
8. Civildesign Engineering Software, 1989-2018 Version 9.0

Appendix A

Hydrology Maps

Existing Conditions Hydrology Map

Proposed Conditions Hydrology Map



LEGEND

- EXISTING RIGHT-OF-WAY/ BOUNDARY
- PROPOSED PROPERTY LINE
- DRAINAGE MANAGEMENT AREA (DMA)
- PROPOSED STORM DRAIN
- DRAINAGE FLOW ARROWS
- SURFACE FLOW PATH
- PIPE FLOW PATH
- PROPOSED CATCH BASIN
- DRAINAGE MANAGEMENT AREA (DMA) X.XX AC
- INITIAL SUBAREA NODE
- SPOT ELEVATION
- PEAK RUNOFF IN CUBIC FEET PER SECOND (CFS)
- TIME OF CONCENTRATION IN MINUTES (MIN) PROVIDED FOR 100-YR STORM EVENT

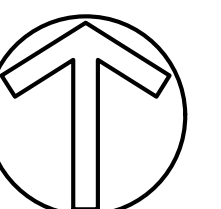
PROPOSED CONDITIONS PEAK FLOW RATES

SUBAREA	AREA (AC)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)	Tc (MIN)
P1	0.47	0.855	1.044	1.359	13.775
P2	2.60	4.558	5.231	6.767	17.15
P3	1.33	2.026	2.748	3.550	17.15
TOTAL	4.40	7.439	9.023	11.676	17.15

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PROPOSED CONDITIONS HYDROLOGY MAP

TTM 19392
2375 N. TUSTIN STREET,
CITY OF ORANGE



SCALE: 1" = 30'



SHEET 1 OF 1
CONTRACT
ACCOUNT
DWG. NO.

DATE: 5/15/25
DWG: P19392-HYD-019.dwg
SHEET: 1 OF 1
DATE: 5/15/25

Appendix B

Hydrology Calculations

Existing 10-, 25-, & 100-Year Hydrology Calculations

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: 04/03/25 File Name: MEL19X10.roc

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ORANGE
PRELIMINARY
EXISTING Q10

Program License Serial Number 6677

***** 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 (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 2.271(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.801$
Subarea runoff = 0.855(CFS)
Total initial stream area = 0.470(Ac.)

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+++++
Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 265.800(Ft.)
Downstream point elevation = 260.600(Ft.)
Channel length thru subarea = 650.770(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 = 4.439(CFS)
Manning's 'N' = 0.013
Maximum depth of channel = 0.130(Ft.)
Flow(q) thru subarea = 4.439(CFS)
Depth of flow = 0.324(Ft.), Average velocity = 4.563(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 3.000(Ft.)
Flow Velocity = 4.56(Ft/s)
Travel time = 2.38 min.
Time of concentration = 16.15 min.
Critical depth = 0.406(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.025(In/Hr)
Rainfall intensity = 2.073(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.879$
Subarea runoff = 7.180(CFS) for 3.940(Ac.)
Total runoff = 8.035(CFS) Total area = 4.41(Ac.)
Area averaged Fm value = 0.049(In/Hr)
Depth of flow = 0.463(Ft.), Average velocity = 5.785(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth = 0.609(Ft.)
End of computations, total study area = 4.41 (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(A_p) = 0.196

Area averaged SCS curve number (AMC 2) = 70.1

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: 04/03/25 File Name: MEL19X25.roc

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EXISTING Q25

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***** 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 (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 2.718(In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.817$
Subarea runoff = 1.044(CFS)
Total initial stream area = 0.470(Ac.)

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Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 265.800(Ft.)
Downstream point elevation = 260.600(Ft.)
Channel length thru subarea = 650.770(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 = 5.420(CFS)
Manning's 'N' = 0.013
Maximum depth of channel = 0.130(Ft.)
Flow(q) thru subarea = 5.420(CFS)
Depth of flow = 0.366(Ft.), Average velocity = 4.942(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 3.000(Ft.)
Flow Velocity = 4.94(Ft/s)
Travel time = 2.19 min.
Time of concentration = 15.97 min.
Critical depth = 0.469(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.025(In/Hr)
Rainfall intensity = 2.500(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.882$
Subarea runoff = 8.684(CFS) for 3.940(Ac.)
Total runoff = 9.728(CFS) Total area = 4.41(Ac.)
Area averaged Fm value = 0.049(In/Hr)
Depth of flow = 0.519(Ft.), Average velocity = 6.245(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth = 0.688(Ft.)
End of computations, total study area = 4.41 (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(A_p) = 0.196

Area averaged SCS curve number (AMC 2) = 70.1

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: 04/03/25 File Name: MEL19X100.roc

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EXISTING Q100

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***** 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



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

UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 3.462(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.835$
Subarea runoff = 1.359(CFS)
Total initial stream area = 0.470(Ac.)

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Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 265.800(Ft.)
Downstream point elevation = 260.600(Ft.)
Channel length thru subarea = 650.770(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 = 6.971(CFS)
Manning's 'N' = 0.013
Maximum depth of channel = 0.130(Ft.)
Flow(q) thru subarea = 6.971(CFS)
Depth of flow = 0.425(Ft.), Average velocity = 5.466(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 3.000(Ft.)
Flow Velocity = 5.47(Ft/s)
Travel time = 1.98 min.
Time of concentration = 15.76 min.
Critical depth = 0.555(Ft.)
ERROR - Channel depth exceeds maximum allowable depth
Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.025(In/Hr)
Rainfall intensity = 3.205(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.886$
Subarea runoff = 11.167(CFS) for 3.940(Ac.)
Total runoff = 12.526(CFS) Total area = 4.41(Ac.)
Area averaged Fm value = 0.049(In/Hr)
Depth of flow = 0.604(Ft.), Average velocity = 6.910(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR - Channel depth exceeds maximum allowable depth
Critical depth = 0.813(Ft.)
End of computations, total study area = 4.41 (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(A_p) = 0.196

Area averaged SCS curve number (AMC 2) = 70.1

Proposed 10-, 25-, & 100-Year Hydrology Calculations

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: 04/09/25 File Name: MEL19P10.roc

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PRELIMINARY
PROPOSED Q10

Program License Serial Number 6677

***** 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 (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 2.271(In/Hr) for a 10.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.801$
Subarea runoff = 0.855(CFS)
Total initial stream area = 0.470(Ac.)

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+++++
Process from Point/Station 101.000 to Point/Station 102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 265.800(Ft.)
End of street segment elevation = 261.460(Ft.)
Length of street segment = 502.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 25.000(Ft.)
Distance from crown to crossfall grade break = 23.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.083
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 = 2.000(Ft.)
Slope from curb to property line (v/hz) = 0.025
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 0.080(In.)
Manning's N in gutter = 0.0130
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 = 3.164(CFS)
Depth of flow = 0.207(Ft.), Average velocity = 2.236(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 12.034(Ft.)
Flow velocity = 2.24(Ft/s)
Travel time = 3.74 min. TC = 17.52 min.
Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.087(In/Hr)
Rainfall intensity = 1.979(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.849$
Subarea runoff = 4.558(CFS) for 2.750(Ac.)
Total runoff = 5.413(CFS) Total area = 3.22(Ac.)
Area averaged Fm value = 0.111(In/Hr)
Street flow at end of street = 5.413(CFS)
Half street flow at end of street = 5.413(CFS)
Depth of flow = 0.260(Ft.), Average velocity = 2.555(Ft/s)

Flow width (from curb towards crown)= 14.671(Ft.)



+++++
Process from Point/Station 102.000 to Point/Station 103.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(A_p) = 0.3500 Max loss rate(F_p)= 0.250(In/Hr)
Max Catchment Loss (F_m) = 0.087(In/Hr)
Time of concentration = 17.52 min.
Rainfall intensity = 1.979(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 = 2.026(CFS) for 1.190(Ac.)
Total runoff = 7.439(CFS) Total area = 4.41(Ac.)
Area averaged F_m value = 0.105(In/Hr)
End of computations, total study area = 4.41 (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(A_p) = 0.419
Area averaged SCS curve number (AMC 2) = 70.1

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: 04/16/25 File Name: mel19p25.roc

TTM 19392
ORANGE
PRELIMINARY
PROPOSED Q25

Program License Serial Number 6677

***** 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 (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 2.718(In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.817$
Subarea runoff = 1.044(CFS)
Total initial stream area = 0.470(Ac.)

↑

+++++
Process from Point/Station 101.000 to Point/Station 102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 265.800(Ft.)
End of street segment elevation = 261.460(Ft.)
Length of street segment = 502.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 25.000(Ft.)
Distance from crown to crossfall grade break = 23.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.083
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 = 2.000(Ft.)
Slope from curb to property line (v/hz) = 0.025
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 0.080(In.)
Manning's N in gutter = 0.0130
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 = 3.695(CFS)
Depth of flow = 0.221(Ft.), Average velocity = 2.324(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 12.742(Ft.)
Flow velocity = 2.32(Ft/s)
Travel time = 3.60 min. TC = 17.38 min.
Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.087(In/Hr)
Rainfall intensity = 2.383(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.858$
Subarea runoff = 5.231(CFS) for 2.600(Ac.)
Total runoff = 6.275(CFS) Total area = 3.07(Ac.)
Area averaged Fm value = 0.112(In/Hr)
Street flow at end of street = 6.275(CFS)
Half street flow at end of street = 6.275(CFS)
Depth of flow = 0.277(Ft.), Average velocity = 2.650(Ft/s)

Flow width (from curb towards crown)= 15.497(Ft.)



+++++
Process from Point/Station 102.000 to Point/Station 103.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(A_p) = 0.3500 Max loss rate(F_p)= 0.250(In/Hr)
Max Catchment Loss (F_m) = 0.087(In/Hr)
Time of concentration = 17.38 min.
Rainfall intensity = 2.383(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)($Q=KCIA$) is $C = 0.860$
Subarea runoff = 2.748(CFS) for 1.330(Ac.)
Total runoff = 9.023(CFS) Total area = 4.40(Ac.)
Area averaged F_m value = 0.105(In/Hr)
End of computations, total study area = 4.40 (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(A_p) = 0.419
Area averaged SCS curve number (AMC 2) = 70.1

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: 04/16/25 File Name: mel19p100.roc

TTM 19392
ORANGE
PRELIMINARY
PROPOSED Q100

Program License Serial Number 6677

***** 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 (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 79.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.250(In/Hr)
Initial subarea data:
Initial area flow distance = 228.160(Ft.)
Top (of initial area) elevation = 270.000(Ft.)
Bottom (of initial area) elevation = 265.800(Ft.)
Difference in elevation = 4.200(Ft.)
Slope = 0.01841 s(%)= 1.84
TC = $k(0.706)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 13.775 min.
Rainfall intensity = 3.462(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is $C = 0.835$
Subarea runoff = 1.359(CFS)
Total initial stream area = 0.470(Ac.)

↑

+++++
Process from Point/Station 101.000 to Point/Station 102.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 265.800(Ft.)
End of street segment elevation = 261.460(Ft.)
Length of street segment = 502.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 25.000(Ft.)
Distance from crown to crossfall grade break = 23.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.083
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 = 2.000(Ft.)
Slope from curb to property line (v/hz) = 0.025
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 0.080(In.)
Manning's N in gutter = 0.0130
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 = 4.791(CFS)
Depth of flow = 0.247(Ft.), Average velocity = 2.478(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 14.023(Ft.)
Flow velocity = 2.48(Ft/s)
Travel time = 3.38 min. TC = 17.15 min.
Adding area flow to street
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fp)= 0.250(In/Hr)
Max Catchment Loss (Fm) = 0.087(In/Hr)
Rainfall intensity = 3.053(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is $C = 0.867$
Subarea runoff = 6.767(CFS) for 2.600(Ac.)
Total runoff = 8.126(CFS) Total area = 3.07(Ac.)
Area averaged Fm value = 0.112(In/Hr)
Street flow at end of street = 8.126(CFS)
Half street flow at end of street = 8.126(CFS)
Depth of flow = 0.308(Ft.), Average velocity = 2.825(Ft/s)

Flow width (from curb towards crown)= 17.058(Ft.)



+++++
Process from Point/Station 102.000 to Point/Station 103.000
**** SUBAREA FLOW ADDITION ****

CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(A_p) = 0.3500 Max loss rate(F_p)= 0.250(In/Hr)
Max Catchment Loss (F_m) = 0.087(In/Hr)
Time of concentration = 17.15 min.
Rainfall intensity = 3.053(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 = 3.550(CFS) for 1.330(Ac.)
Total runoff = 11.676(CFS) Total area = 4.40(Ac.)
Area averaged F_m value = 0.105(In/Hr)
End of computations, total study area = 4.40 (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(A_p) = 0.419
Area averaged SCS curve number (AMC 2) = 70.1

Appendix C

Hydraulic Calculations

Catch Basin Sizing

Inlet Report

Catch Basin 1 Q25

Curb Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 2.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

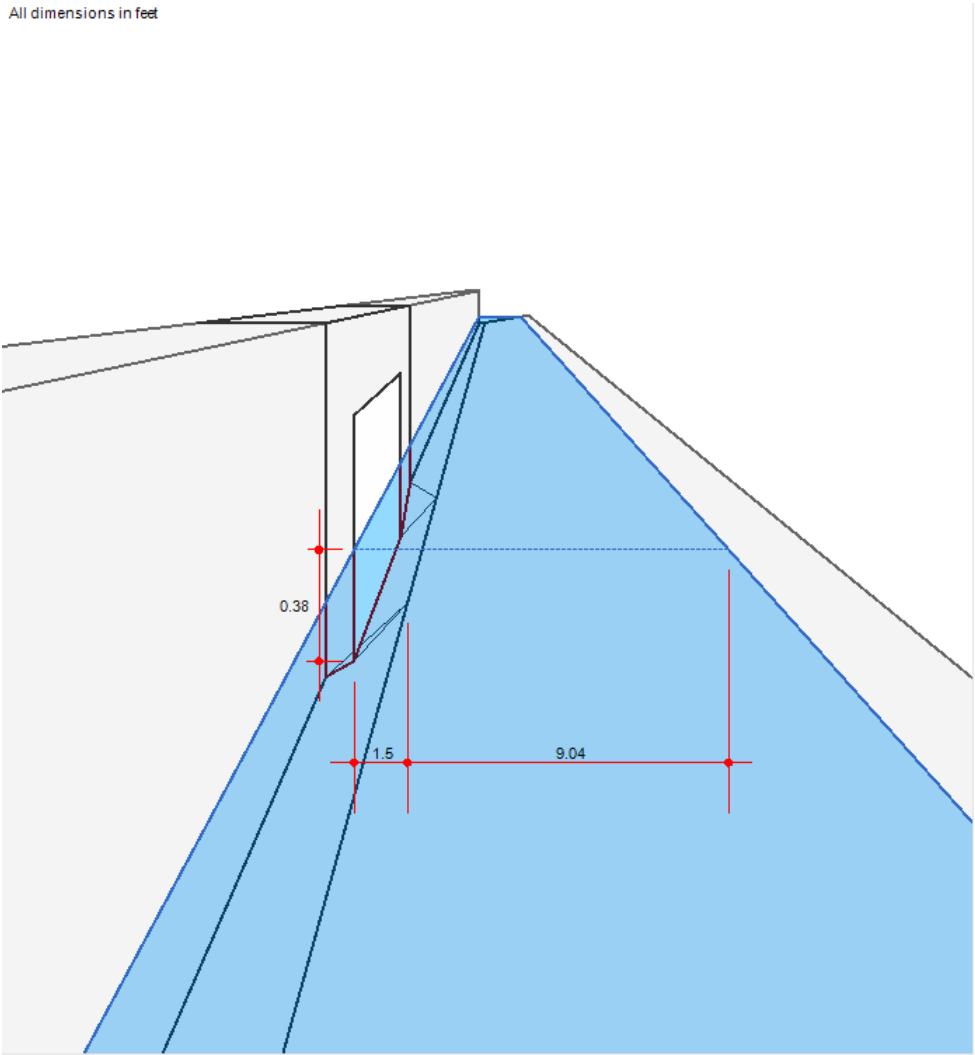
Calculations

Compute by:	Known Q
Q (cfs)	= 1.27

Highlighted

Q Total (cfs)	= 1.27
Q Capt (cfs)	= 1.27
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 4.53
Efficiency (%)	= 100
Gutter Spread (ft)	= 10.54
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

Catch Basin 2 Q25

Curb Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 2.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

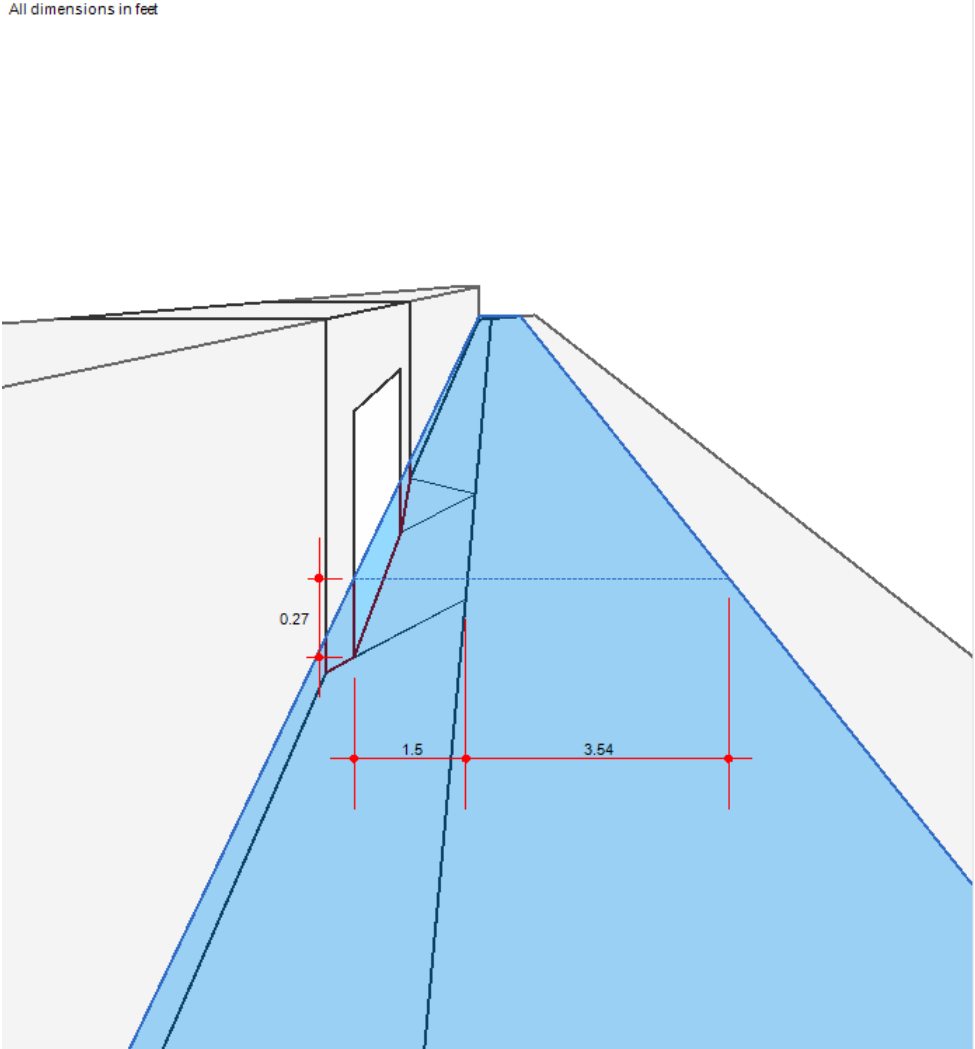
Calculations

Compute by:	Known Q
Q (cfs)	= 0.42

Highlighted

Q Total (cfs)	= 0.42
Q Capt (cfs)	= 0.42
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.21
Efficiency (%)	= 100
Gutter Spread (ft)	= 5.04
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

Catch Basin 3 Q25

Curb Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 2.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

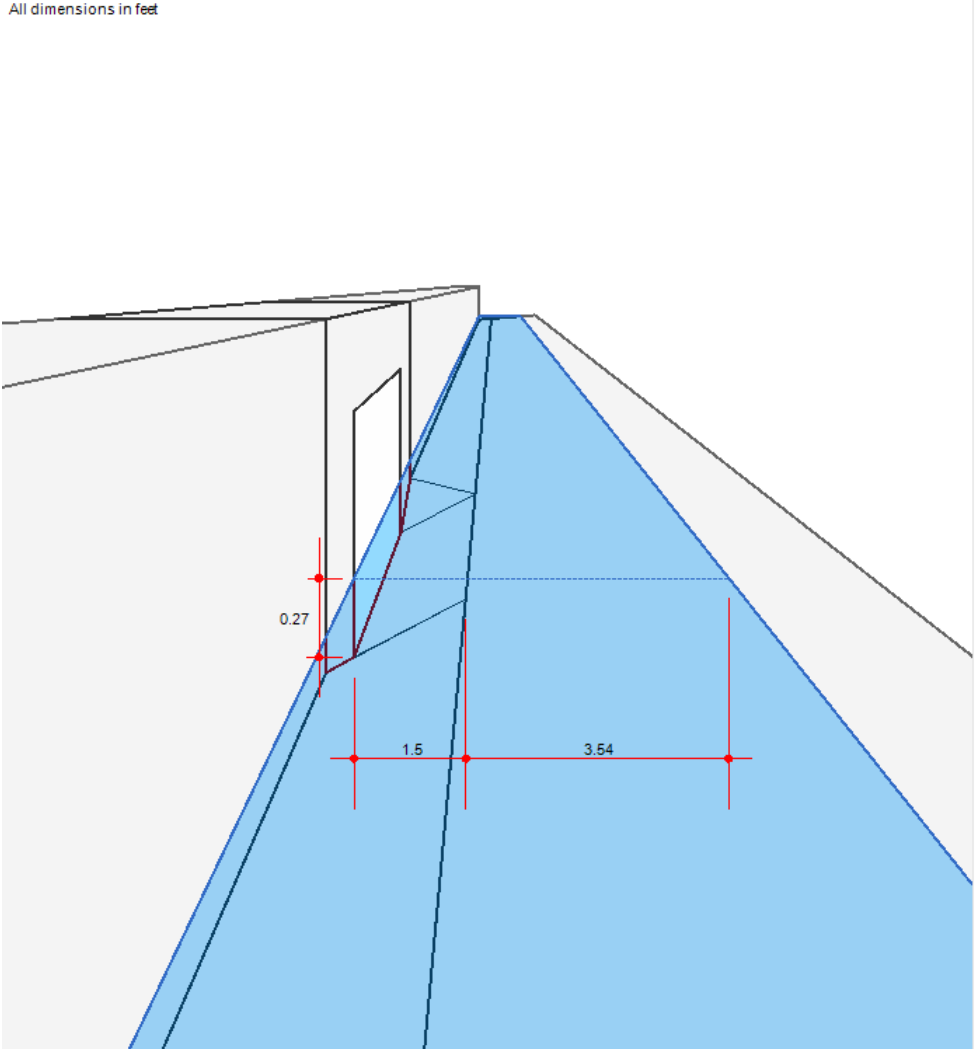
Calculations

Compute by:	Known Q
Q (cfs)	= 0.42

Highlighted

Q Total (cfs)	= 0.42
Q Capt (cfs)	= 0.42
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.21
Efficiency (%)	= 100
Gutter Spread (ft)	= 5.04
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

Catch Basin 4 Q25

Curb Inlet

Location	= Sag
Curb Length (ft)	= 5.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 2.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

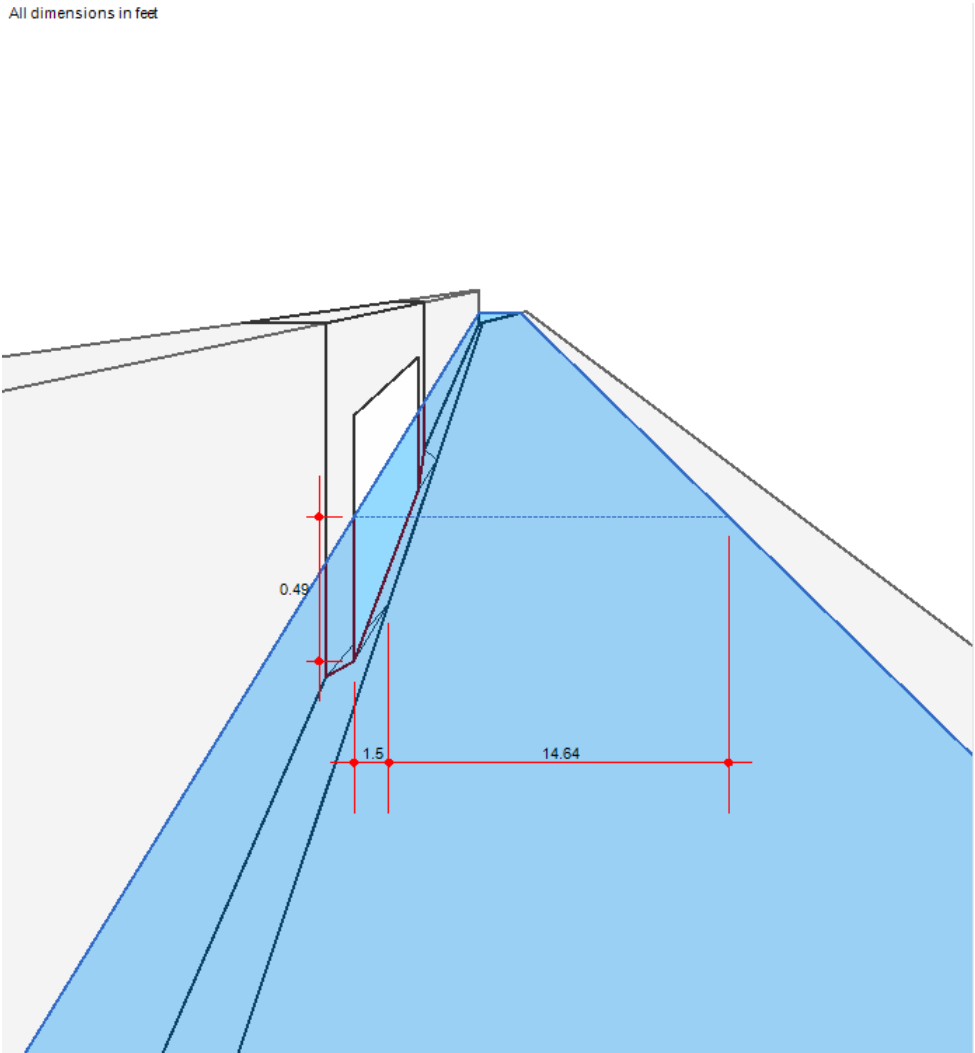
Calculations

Compute by:	Known Q
Q (cfs)	= 3.25

Highlighted

Q Total (cfs)	= 3.25
Q Capt (cfs)	= 3.25
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 5.87
Efficiency (%)	= 100
Gutter Spread (ft)	= 16.14
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

Catch Basin 5 Q25

Curb Inlet

Location	= Sag
Curb Length (ft)	= 3.00
Throat Height (in)	= 6.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 2.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

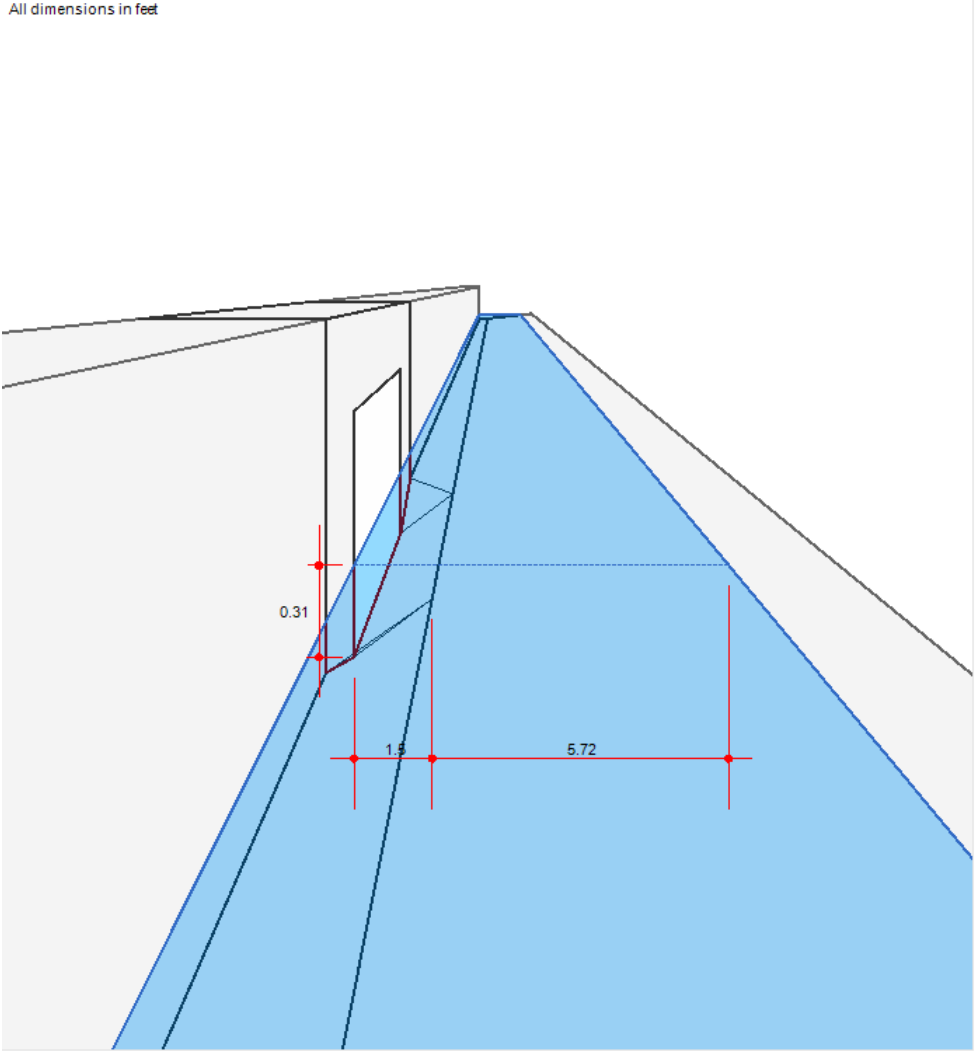
Calculations

Compute by:	Known Q
Q (cfs)	= 0.72

Highlighted

Q Total (cfs)	= 0.72
Q Capt (cfs)	= 0.72
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.73
Efficiency (%)	= 100
Gutter Spread (ft)	= 7.22
Gutter Vel (ft/s)	= -0-
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



CALCULATION SHEET

Prepared by: Sarah McMasters

Project No. MELA-019

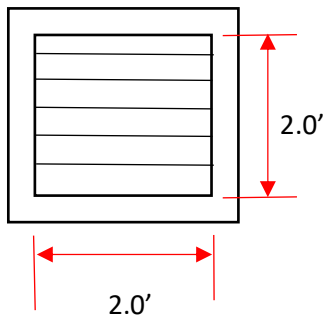
2075 N. Tustin Street

Orange, California

4/9/2025

GRATE INLET CAPACITY CALCULATIONS

Drain Inlet #1 – Refer to Proposed Conditions Hydrology Map for Drain Inlet location.



~REFER TO THE URBAN DRAINAGE DESIGN MANUAL,
UNITED STATES DEPARTMENT OF TRANSPORTATION

Ponding Depth, $H = 0.50'$ (6")

Perimeter, $P = 6'$ (flows enter from three sides)

$$Q/P = 3.0 H^{3/2}$$

$$Q = 3.0 H^{3/2} P$$

$$Q = 3.0(0.50)^{3/2}(6)$$

$$Q = 6.36 \text{ cfs}$$

$$50\% \text{ Clogging Factor} = 0.5(6.36) = \mathbf{3.18 \text{ cfs}}$$

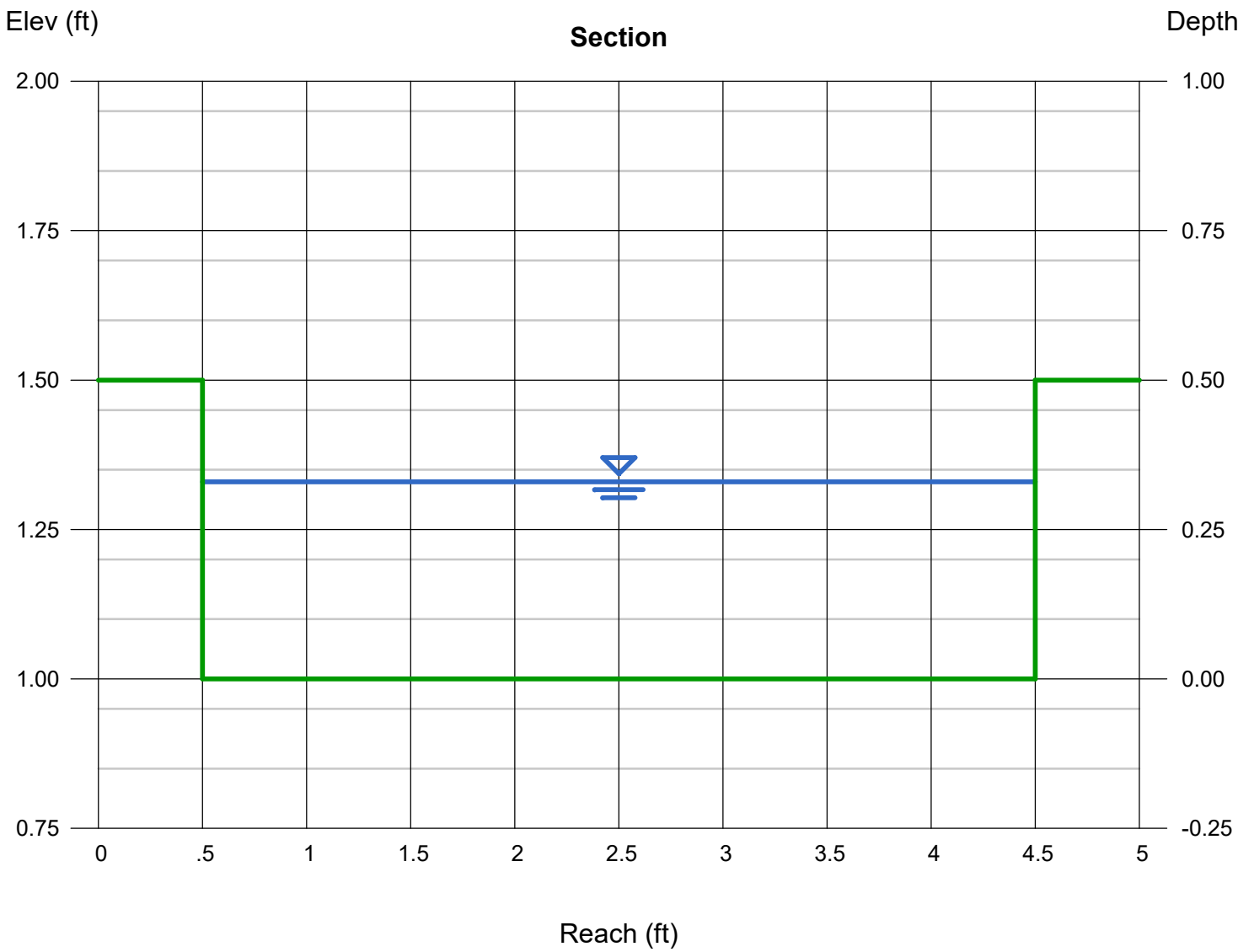
$$\text{CB \#1_Q25} = \mathbf{0.19 \text{ cfs} < 3.18 \text{ cfs}} \checkmark$$

Parkway Drain Sizing

Channel Report

Parkway Drain Q100

Rectangular		Highlighted	
Bottom Width (ft)	= 4.00	Depth (ft)	= 0.33
Total Depth (ft)	= 0.50	Q (cfs)	= 11.68
		Area (sqft)	= 1.32
Invert Elev (ft)	= 1.00	Velocity (ft/s)	= 8.85
Slope (%)	= 0.02	Wetted Perim (ft)	= 4.66
N-Value	= 0.001	Crit Depth, Yc (ft)	= 0.50
		Top Width (ft)	= 4.00
		EGL (ft)	= 1.55
Calculations			
Compute by:	Known Q		
Known Q (cfs)	= 11.68		



100-Year Water Surface Elevation

PRELIMINARY HYDROLOGY STUDY

TTM 19392

2075 N. Tustin Street

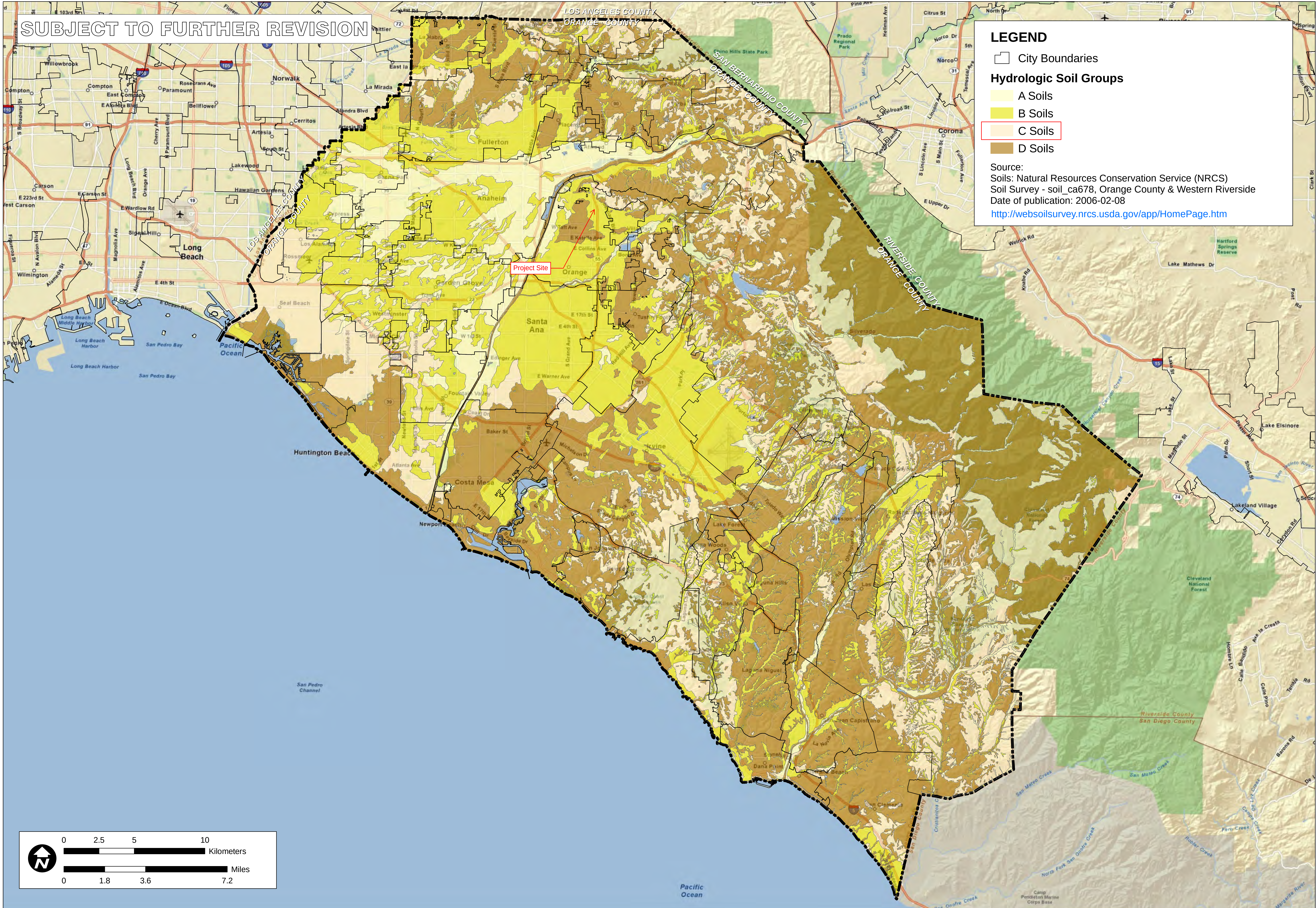
To be provided prior to final approval.

Appendix D

Reference Material

NRCS Hydrologic Soil Groups (TGD)

P:\9526E\GIS\Mxds\Reports\InfiltrationFeasibility_20110215\9526E_FigureXVI-2a_HydroSoils_20110215.mxd



ORANGE COUNTY INfiltration STUDY

ORANGE CO.

CA

NRCS HYDROLOGIC SOILS GROUPS

ORANGE COUNTY INfiltration STUDY

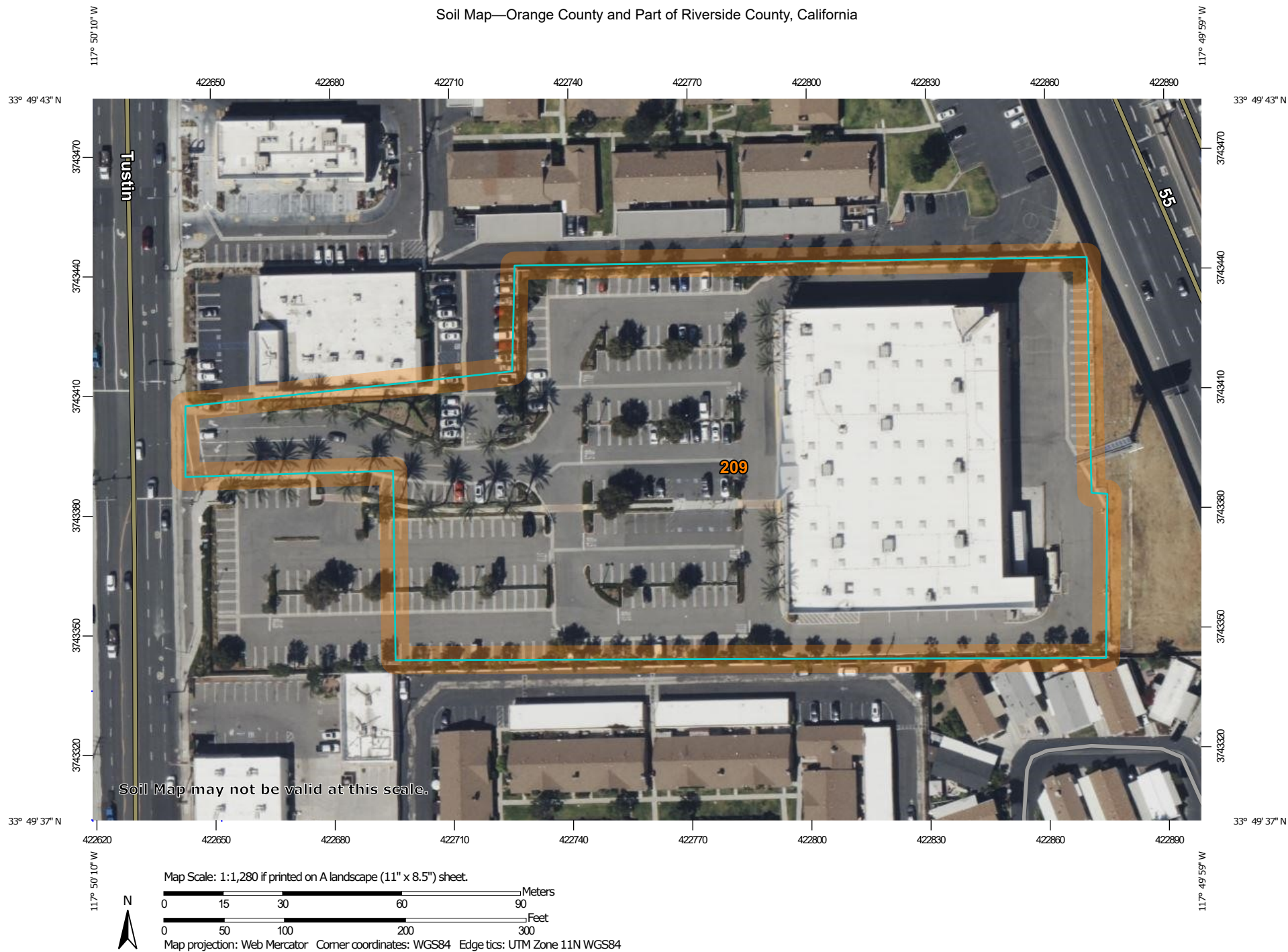
ORANGE CO.

CA

**PACE**
Advanced Water Engineering

FIGURE XVI-2a

Soil Map—Orange County and Part of Riverside County, California



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/18/2025
Page 1 of 3

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 18, Aug 30, 2024

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 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
209	Sorrento clay loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	4.4	100.0%
Totals for Area of Interest		4.4	100.0%

Orange County and Part of Riverside County, California

209—Sorrento clay loam, 2 to 9 percent slopes, warm MAAT, MLRA 19

Map Unit Setting

National map unit symbol: 2tz07

Elevation: 20 to 2,040 feet

Mean annual precipitation: 12 to 18 inches

Mean annual air temperature: 62 to 66 degrees F

Frost-free period: 320 to 365 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Sorrento and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sorrento

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

Ap1 - 0 to 6 inches: clay loam

Ap2 - 6 to 12 inches: clay loam

AB1 - 12 to 21 inches: silty clay loam

AB2 - 21 to 27 inches: silty clay loam

AB3 - 27 to 37 inches: silty clay loam

Bk1 - 37 to 49 inches: silty clay loam

Bk2 - 49 to 62 inches: silty clay loam

2C - 62 to 72 inches: stratified loamy fine sand to silt loam

Properties and qualities

Slope: 2 to 9 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R019XD001CA - CLAYEY

Hydric soil rating: No

Minor Components

Mocho

Percent of map unit: 10 percent

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R019XD029CA - LOAMY

Hydric soil rating: No

Sorrento, loam

Percent of map unit: 10 percent

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R019XD029CA - LOAMY

Hydric soil rating: No

Botella

Percent of map unit: 5 percent

Landform: Alluvial fans

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R019XD001CA - CLAYEY

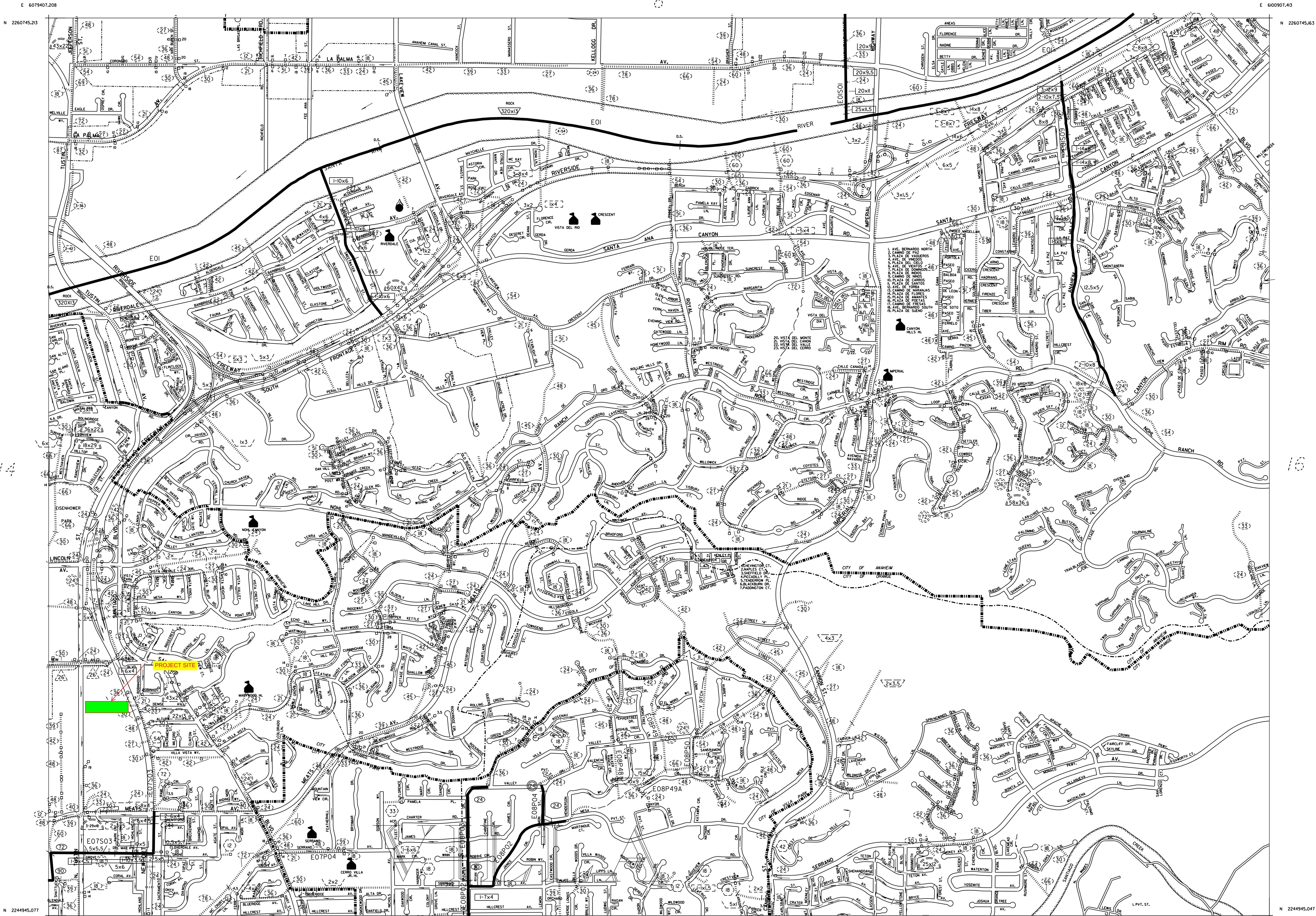
Hydric soil rating: No

Data Source Information

Soil Survey Area: Orange County and Part of Riverside County, California

Survey Area Data: Version 18, Aug 30, 2024

OCFCD Facilities Maps



NOTICE

This drainage map has been prepared for information purposes only. The location and ownership of facilities have been determined from available information provided by public agencies, but may not be exact. The user of this map is responsible for verifying exact location, ownership and regional versus local character of drainage facilities.

Additional information may be obtained from public plans and recorded deeds. Character designations shown on this map are for convenience only and are not controlling. Neither the County of Orange nor the Orange County Flood Control District (OCFCD) assumes any liabilities for inaccuracies of this map.

To notify the Resources & Development Management Department (RDMD) of additions or corrections, please call Sal Gutierrez at (714) 834-5398 or by email at sal.gutierrez@rdmd.ocgov.com.

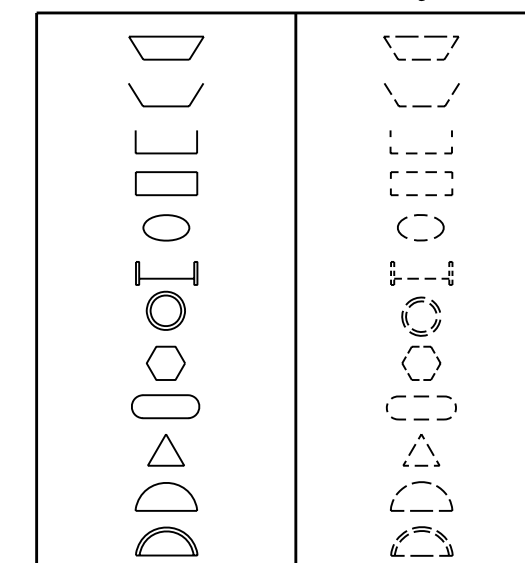
ORANGE COUNTY FLOOD CONTROL DISTRICT

**BASEMAP
OF DRAINAGE FACILITIES
IN ORANGE COUNTY**

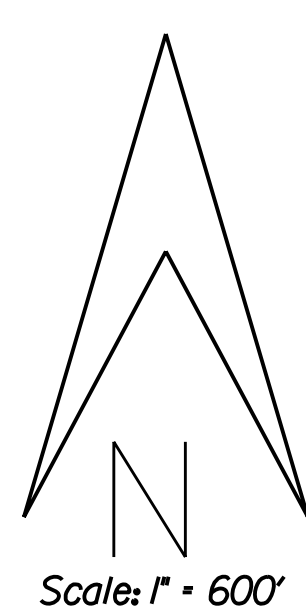
REVISION DATE SHEET NO. DRL NO.
APRIL JAN. 12, 2000 15 MAPS-113-3

Channel Drainage Area Boundary
Major Sub-Area Drainage Boundary
Minor Sub-Area Drainage Boundary
Existing O.C.F.D. Facility
Existing Local Facility
Existing Retarding Basin or Reservoir
Natural Watercourse
City Limits
Greenbelt
Pump Station
Catch Basin (length in feet)
Drop Inlet or Other Entry
Ownership (if other than City or County)
Private
State
Federal

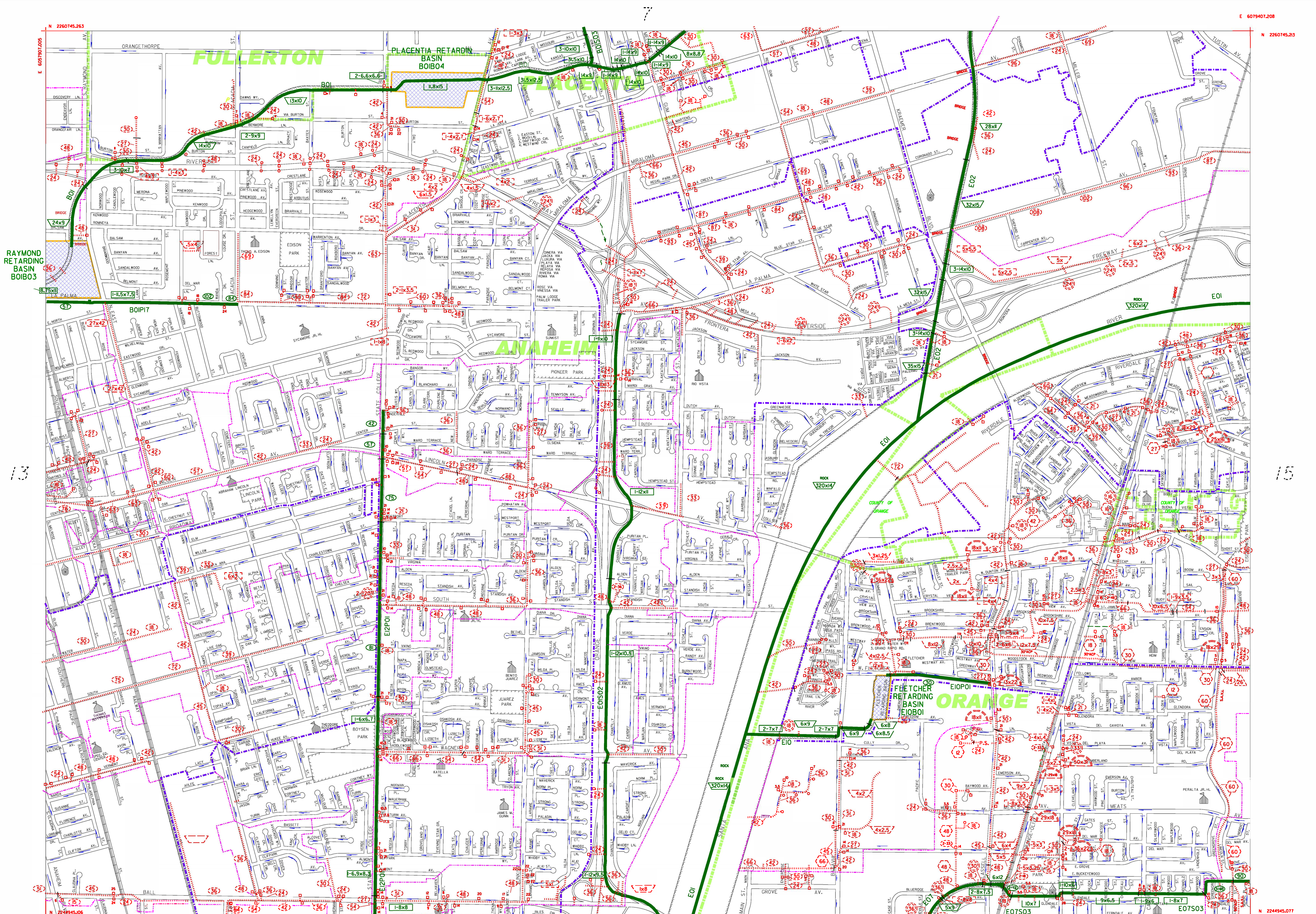
Existing O.C.F.D. Existing LOCAL



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/pile length in feet)
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)



Scales: 1" = 600'



14

0 200 400 600 800
FEET

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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@occpw.gov

ORANGE COUNTY FLOOD CONTROL DISTRICT

**BASE MAP
OF DRAINAGE FACILITIES
IN ORANGE COUNTY**

REVISION	DATE	SHEET NO.	DWG. NO.
S. GUTIERREZ	APR 27, 2020	14	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

Greenbelt

Pump Station

Catch Basin (length in feet)

Drop Inlet or Other Entry

OCFCD Basins or Reservoirs

Ownership: P (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 bays-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)

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Concrete Oval Pipe (width by height in inches)

Steel Pipe (diameter in inches)

Reinforced Concrete Arch (base span by height in inches)

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Tentative Tract Map No. 19392