



# HYDROLOGY REPORT

777 N. Front Street

Burbank, California

Prepared For:

*SJ4 Burbank, LLC*

Prepared By:

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Job Number: 1319.005.02





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BURBANK, CA

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# I. Introduction

## Location

The project site is located in the vicinity of the south-bound on-ramp of the I-5 freeway at Burbank Boulevard, between North Front Street and (Old) Front Street. The I-5 on-ramp and Old Front Street bound the easterly portion of the property. Burbank Boulevard bounds the northwest portion of the property. North Front Street bounds the westerly portion of the property. Magnolia Boulevard bridge is to the southeast of the site. The Metrolink rail system runs along the westerly side of North Front Street. A Vicinity Map is shown below as Figure 1.

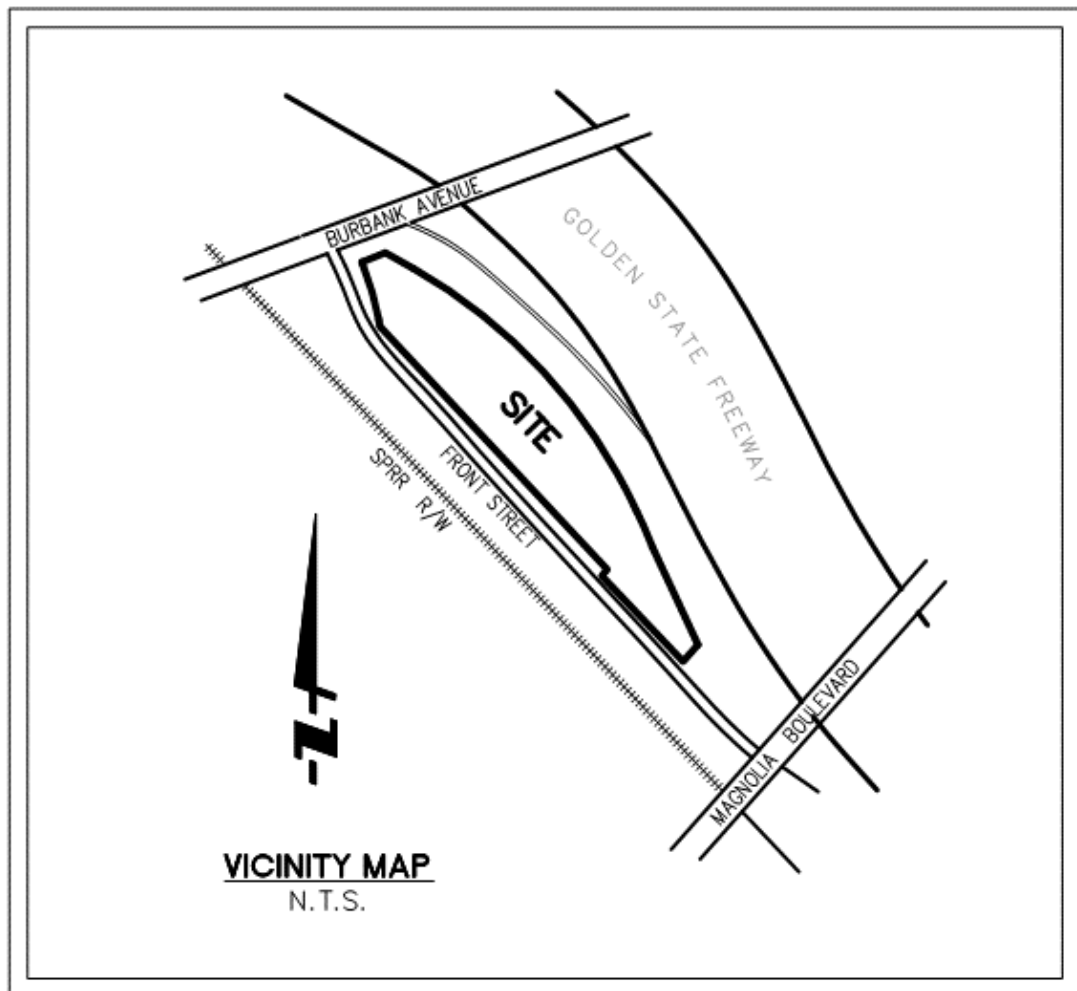


Figure 1



## Project Description

The existing site consists of a series of concrete slabs which step down from a high elevation of approximately 590' at the north portion of the property (near Burbank Boulevard), to a low elevation of approximately 580' at the south portion of the property (near Magnolia Boulevard bridge). The drainage of the site currently sheet-flows in a north-to-south direction, toward North Front Street and Magnolia Boulevard underpass, where it is collected by existing catch basins and conveyed, via pipe-flow, into the Burbank Western Channel. From there, the drainage is conveyed southerly to the Los Angeles River, located approximately 2 miles downstream, and ultimately into the Pacific Ocean.

Site access is via North Front Street, mid-block between Burbank Boulevard and Magnolia Boulevard underpass. It appears that the site receives no off-site surface run-on.

There is currently ongoing construction to widen the Caltrans I-5 freeway, to the east of the property. There are stockpiles of earthwork currently on the site, which appear to be associated with the I-5 freeway construction.

The proposed project would consist of approximately 500 apartment units, along with a hotel, to replace the existing vacant lot.

## II. Methodology

### Hydrology

The study was prepared in conformance with the Los Angeles County Hydrology Manual, along with the County's HydroCalc software. A 25-year storm frequency was used to analyze existing, offsite, and proposed hydrologic project conditions. In addition, the 85<sup>th</sup> percentile hydrology was calculated.

The soil type and rainfall information were obtained from Los Angeles Isohyet Map. A copy of this map is included in Appendix 1 of this report. Also included in Appendix 1 are Los Angeles County Impervious Area Table and 85<sup>th</sup> Percentile Precipitation 24-Hour Rainfall Map.

For the proposed conditions, the drainage will be conveyed, via onsite area drains, to an existing 42-inch RCP storm drain, which currently runs through the property within the old Cypress Street, and discharges into the Burbank Western Channel, which runs along the west side of the Metrolink tracks, and eventually discharges into the Los Angeles River, an engineered channel, located approximately 2 miles downstream of the project site.

The hydrologic calculations and map exhibits are included in the appendices of this report, as follows:

Appendix 2 – Existing Condition Hydrology Calculations & Map

Appendix 3 – Proposed Condition Hydrology Calculations & Map

Appendix 4 – Offsite Hydrology Calculations & Map

### Hydraulics

Flowmaster hydraulic software was used to determine the capacities of the existing and proposed storm drain systems. Although a 42"-diameter storm drain is shown to run through the property, as-built plans of the existing system could not be located. Therefore, a minimum slope of 0.5% was assumed for the capacity calculation. The Flowmaster hydraulic calculations and rating tables are included in Appendix 5 of this report.

### III. Storm Drain Facilities

#### Existing Storm Drain and Drainage

There is an existing City-owned storm drain within the project site. The storm drain runs along the (former/vacated) extension of Cypress Avenue. As noted above, City reference plans indicate the RCP is a 42" diameter. Field verification will be required to confirm size and type of facility, along with slope. The existing storm drain system ultimately discharges into Los Angeles County Flood Control District (LACFCD) Burbank Western Channel.

The onsite drainage currently discharges, via sheet flow, to North Front Street. From there, the drainage is conveyed southeasterly in the roadway a few hundred feet until it is intercepted by existing catch basins below the Magnolia Boulevard bridge, where the drainage is conveyed via pipe-flow to the Burbank Western Channel. The drainage is then transported to the Los Angeles River, approximately 2 miles southerly, until discharging into the Los Angeles River. The drainage is ultimately discharged into the Pacific Ocean.

#### Proposed Storm Drain

An onsite storm drain system is proposed, which will connect to the existing City-owned storm drain that currently runs through the southerly portion of the site. Based on Conceptual Grading and Drainage Plan, the onsite storm drain main will run along the northwesterly side of the site, and connect to the existing 42" storm drain.

The drainage design of the site is expected to include onsite grate inlets and area drain system, which will intercept the at-grade drainage and pipe it to the proposed storm drain along the northwesterly side of the site. In addition, it is anticipated that roof drains will provide the drainage design for the proposed buildings, and the roof drainage would be conveyed, via lateral pipes to the proposed onsite storm drain.

It is expected that a small portion of the onsite runoff, adjacent to North Front Street, would continue to leave the project site as surface sheet flow following construction of the proposed project. The amount of this runoff will be quantified during final design.

#### Impervious Surface Area

The impervious surface area of the existing site is estimated to be approximately 91%, which is associated with existing warehouse land use. The impervious surface area of the proposed project is estimated to be approximately 88%, which is often associated with condominiums, apartments, and retail. The existing impervious area for the 6.77-acre site is 6.16 acres. The proposed impervious area is

5.96 acres. The calculated net change in impervious surface area is  $5.96 - 6.16$ , or  $-0.2$  acre. Therefore, the proposed project will result in a net decrease in impervious surface area of 0.2 acre.

## Low Impact Development

Low Impact Development (LID) is a stormwater strategy that is used to mitigate the impacts of runoff and stormwater pollution. Urban runoff discharged from municipal storm drain systems is one of the principal causes of water quality impacts in most urban areas.

LID encompasses a set of site design approaches and best management practices (BMP's) that are intended to address runoff and pollution at the source. These BMP's can effectively remove nutrients, bacteria, and metals while reducing the volume and intensity of stormwater flows.

Although infiltration is typically the first priority type of BMP improvement, as it provides for percolation and infiltration of the stormwater into the ground, which can also contribute to groundwater recharge; it is our understanding that the soil qualities of the site may not be favorable to infiltration techniques. Therefore, a biofiltration system, such as Modular Wetland is anticipated to be used as the post-construction BMP for this development.

## IV. Results and Conclusions

The following tables present the results of the HydroCalc hydrology calculations:

### EXISTING CONDITION

Area (AC)	Q <sub>25</sub> (cfs)	V <sub>25</sub> (cu-ft)	Q <sub>85th</sub> (cfs)	V <sub>85th</sub> (cu-ft)
6.77	15.2	128,824	1.4	22,199

### PROPOSED CONDITION

Area (AC)	Q <sub>25</sub> (cfs)	V <sub>25</sub> (cu-ft)	Q <sub>85th</sub> (cfs)	V <sub>85th</sub> (cu-ft)
6.77	14.1	125,539	1.2	21,556

### OFFSITE (TO EXISTING 42" RCP THROUGH SITE)

Area (AC)	Q <sub>25</sub> (cfs)	V <sub>25</sub> (cu-ft)	Q <sub>85th</sub> (cfs)	V <sub>85th</sub> (cu-ft)
25	56.1	497,509	5.2	85,142

### COMBINED PROPOSED & OFFSITE (TO EXISTING 42" RCP THROUGH SITE)

Area (AC)	Q <sub>25</sub> (cfs)	V <sub>25</sub> (cu-ft)	Q <sub>85th</sub> (cfs)	V <sub>85th</sub> (cu-ft)
(6.77 + 25) = 31.77	(14.1 + 56.1) = 70.2	(125,539 + 497,509) = 623,048	(1.2 + 5.2) = 6.4	(21,556 + 85,142) = 106,698

Peak discharge rates and volumes are primarily based on impervious surface area for each site condition. Since the proposed conditions are estimated to reduce the surface area from that of the existing conditions, the proposed peak discharge rates and volumes will be reduced as compared to the existing conditions.

Based on Flowmaster pipe capacity calculations, and using a minimum pipe slope of 0.5%, the capacity of the existing 42" RCP through the site is 71 cfs. Since the combined offsite and proposed flows of Q<sub>25</sub> = 70.2 cfs, the existing 42" RCP will have

enough capacity to accept proposed storm flows from this project. The Flowmaster pipe flow calculations and hydraulic rating tables are included in Appendix 5 of this report.

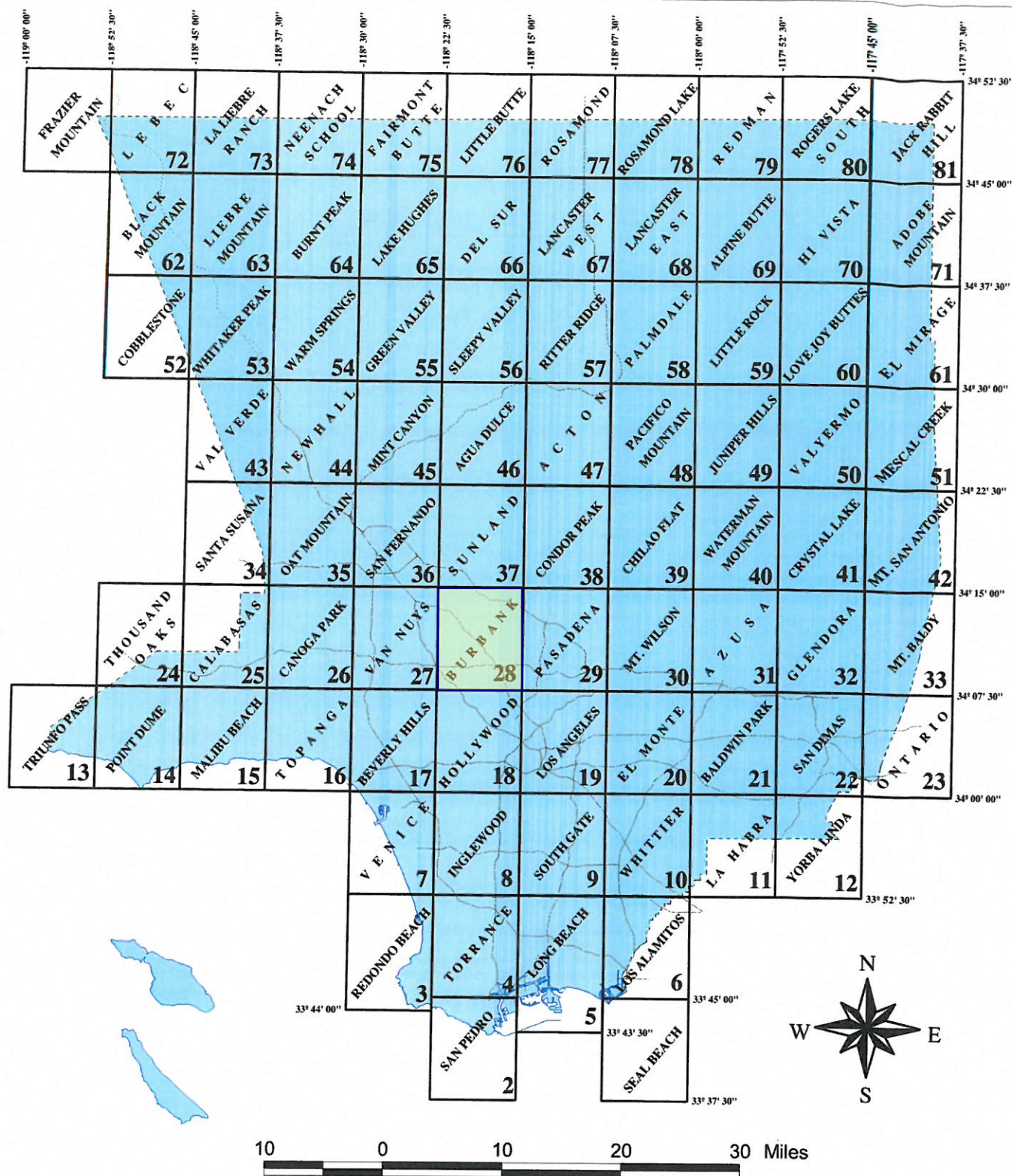
## **V. Appendices**

- Appendix 1 – Reference Material
- Appendix 2 – Existing Condition Hydrology Calculations & Map
- Appendix 3 – Proposed Condition Hydrology Calculations & Map
- Appendix 4 – Offsite Hydrology Calculations & Map
- Appendix 5 – Hydraulic Calculation

## APPENDIX 1

### Reference Material

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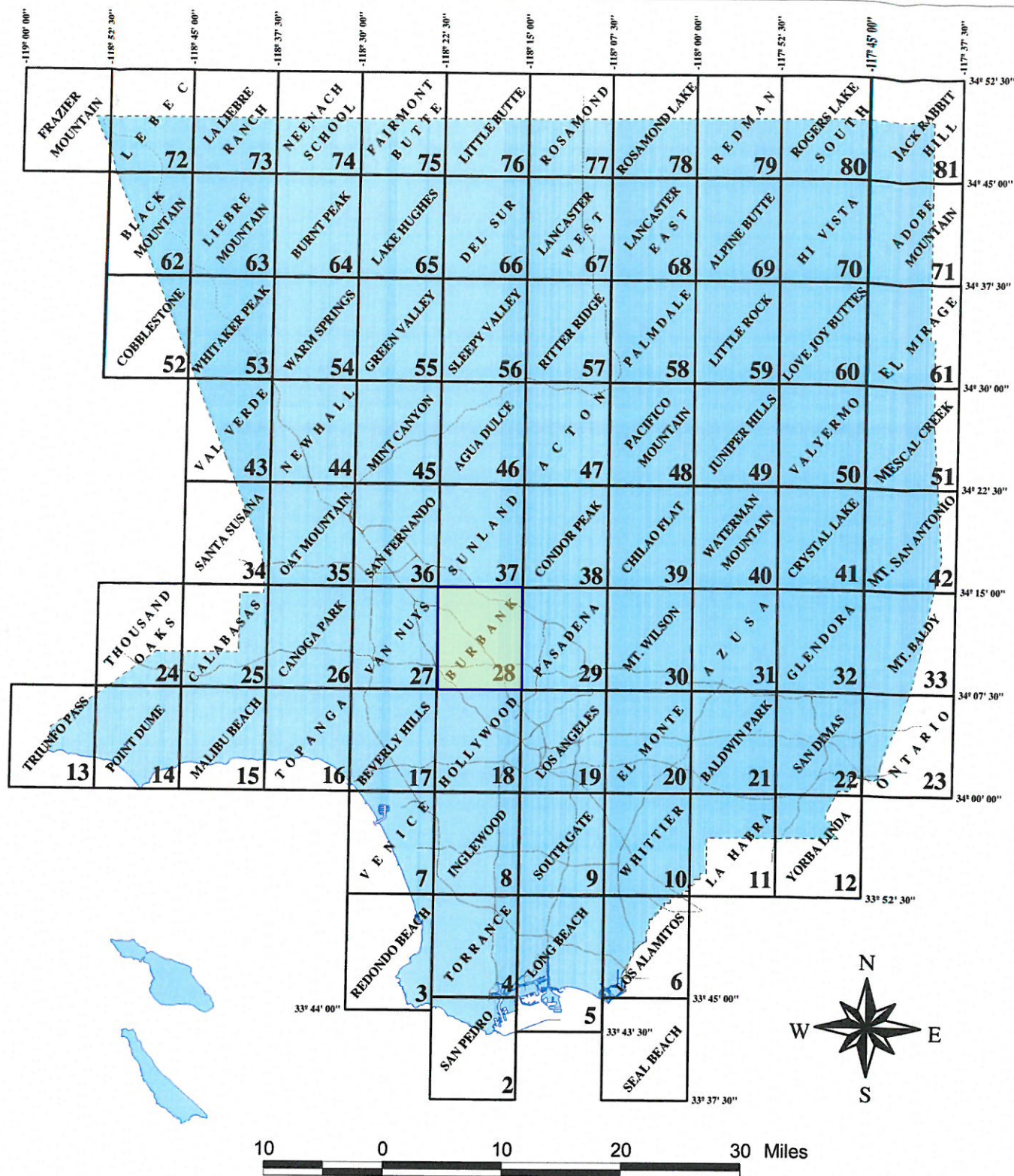
# INDEX ISOHYETAL MAP

## 50-YEAR 24-HOUR ISOHYET

BASED ON USGS QUADRANGLE







# HYDROLOGIC MAP INDEX

## SOIL CLASSIFICATION AREA

BASED ON USGS QUADRANGLE





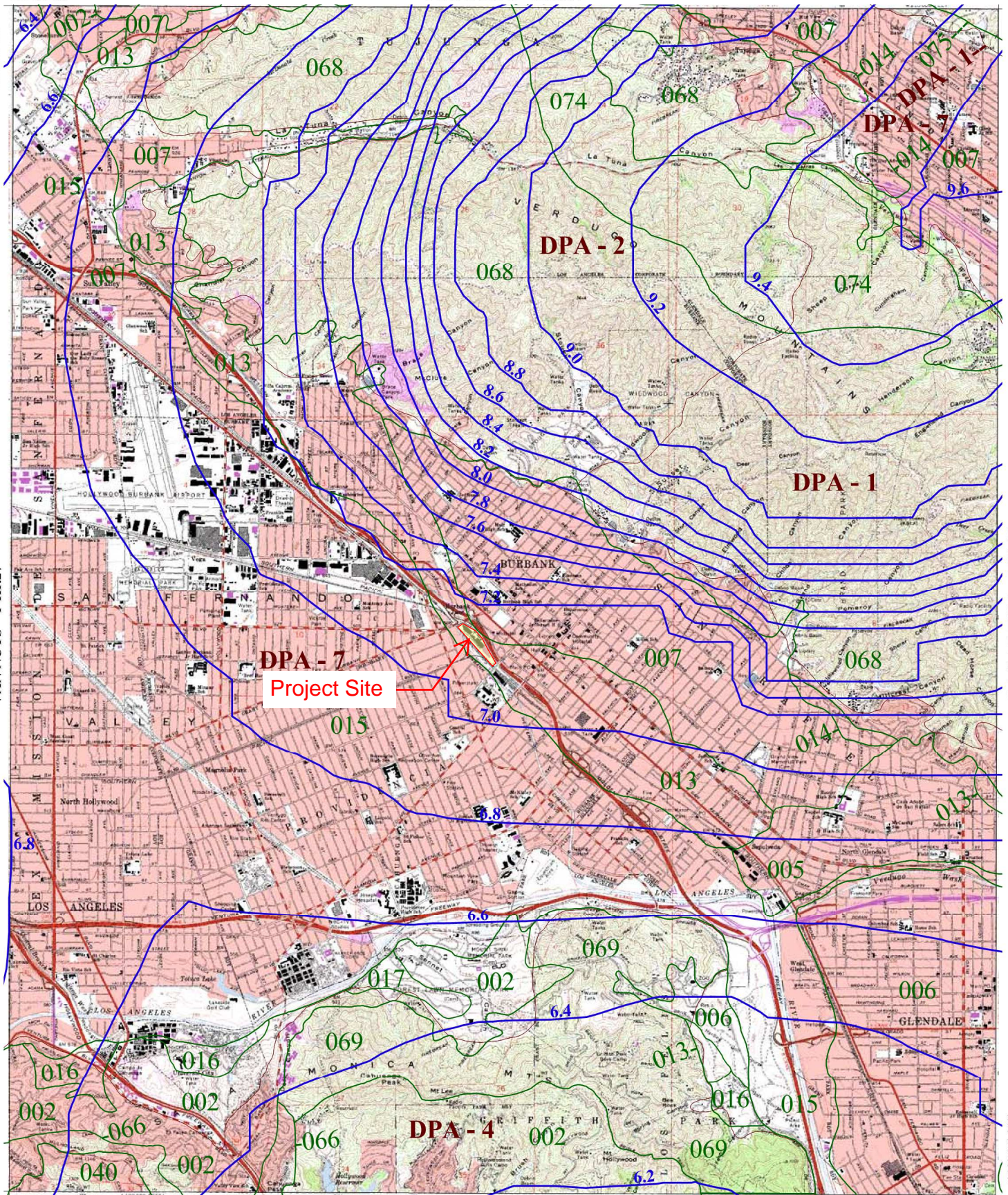
34° 15' 00"

SUNLAND 1-H1.37

-118° 22' 30"

VAN NUYS 1-H1.27

PASADENA 1-H1.29



-118° 15' 00"

HOLLYWOOD 1-H1.18

34° 07' 30"



016

SOIL CLASSIFICATION AREA

7.2

INCHES OF RAINFALL

DPA - 6

DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878  
 10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

# B U R B A N K 50-YEAR 24-HOUR ISOHYET

1-H1.28





# APPENDIX D

Proportion Impervious Data

## Proportion Impervious Data

Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

<b>Code</b>	<b>Land Use Description</b>	<b>% Impervious</b>
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

<b>Code</b>	<b>Land Use Description</b>	<b>% Impervious</b>
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

<b>Code</b>	<b>Land Use Description</b>	<b>% Impervious</b>
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100

## Hydrology Map

A GIS viewer application to view the data for the hydrology manual.

### LAYERS

- ☐ 50yr Two Tenths (Rainfall)
- ☐ DPA Zones
- ☐ Soils 2004
- ☒ Final 85th Percentile, 24-hr Rainfall
- ☐ Final 95th Percentile, 24-hr Rainfall
- ☐ 1-year, 1-hour Rainfall Intensity

### SEARCH

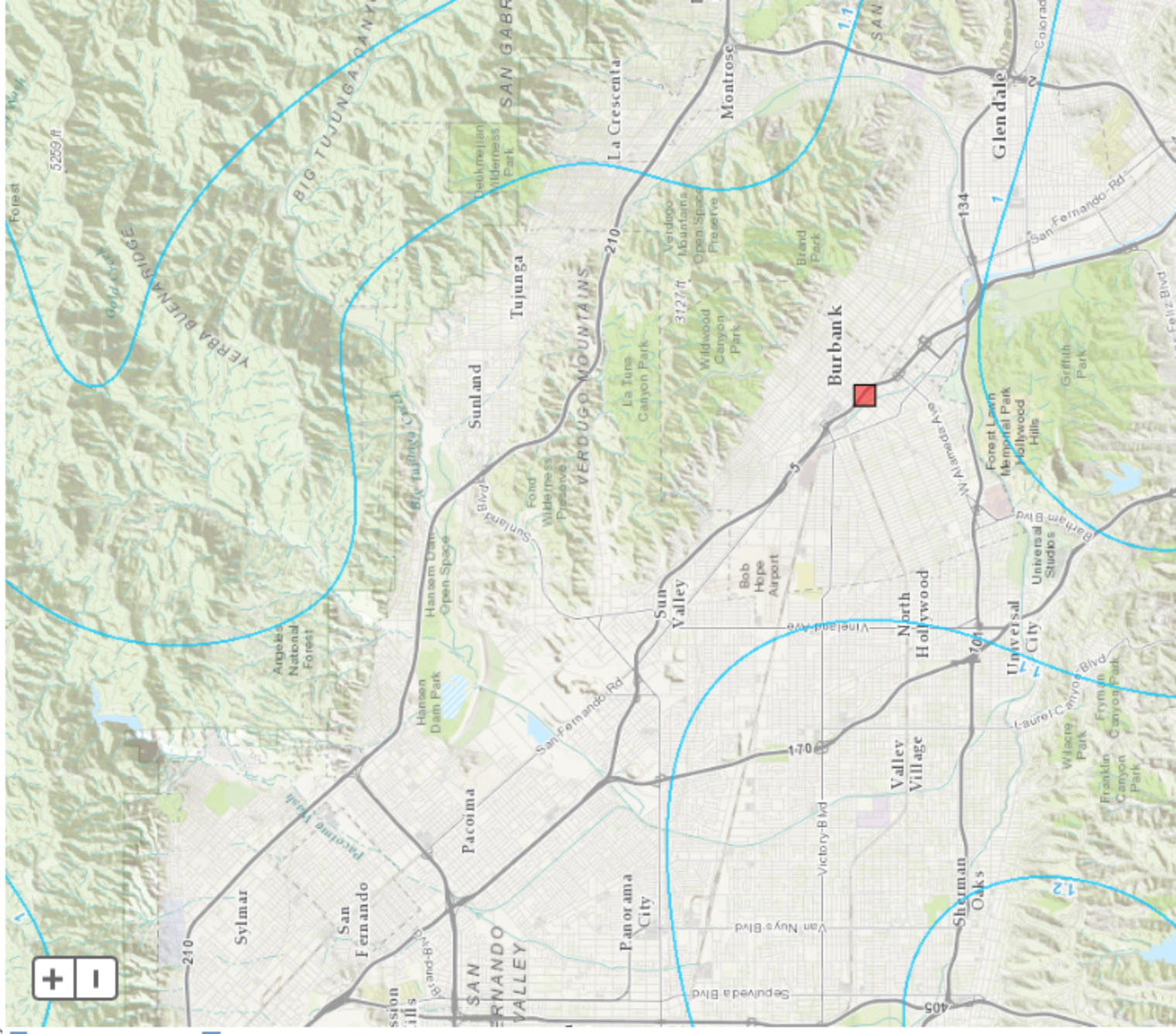
Enter Address, Cross Street, or Parcel No. :  
Example: 900 S. Fremont Ave., Fremont@Valley, 5342005904)

Front Street, Burbank

Search

Address Search Results:

Front Street Burbank





## APPENDIX 2

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### Existing Condition Hydrology Calculations and Map

## Peak Flow Hydrologic Analysis

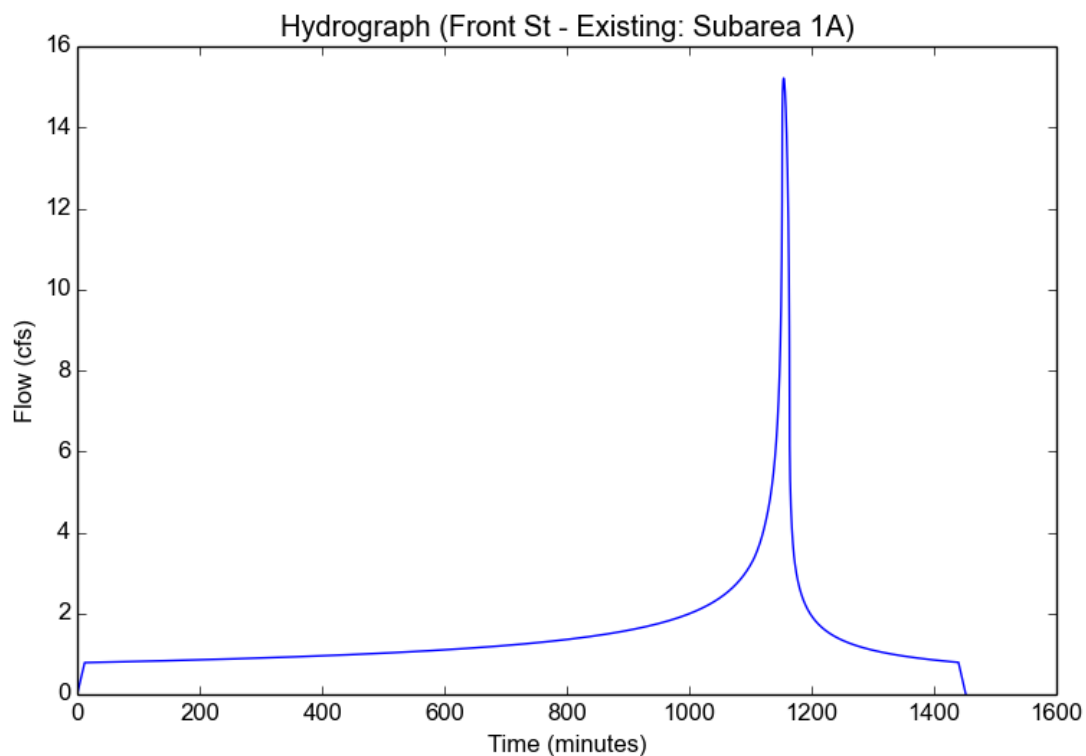
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Version: HydroCalc 1.0.2

### Input Parameters

Project Name	Front St - Existing
Subarea ID	Subarea 1A
Area (ac)	6.77
Flow Path Length (ft)	1619.0
Flow Path Slope (vft/hft)	0.025
50-yr Rainfall Depth (in)	7.2
Percent Impervious	0.91
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

### Output Results

Modeled (25-yr) Rainfall Depth (in)	6.3216
Peak Intensity (in/hr)	2.4994
Undeveloped Runoff Coefficient (Cu)	0.8908
Developed Runoff Coefficient (Cd)	0.8992
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	15.2147
Burned Peak Flow Rate (cfs)	15.2147
24-Hr Clear Runoff Volume (ac-ft)	2.9574
24-Hr Clear Runoff Volume (cu-ft)	128824.3563



## Peak Flow Hydrologic Analysis

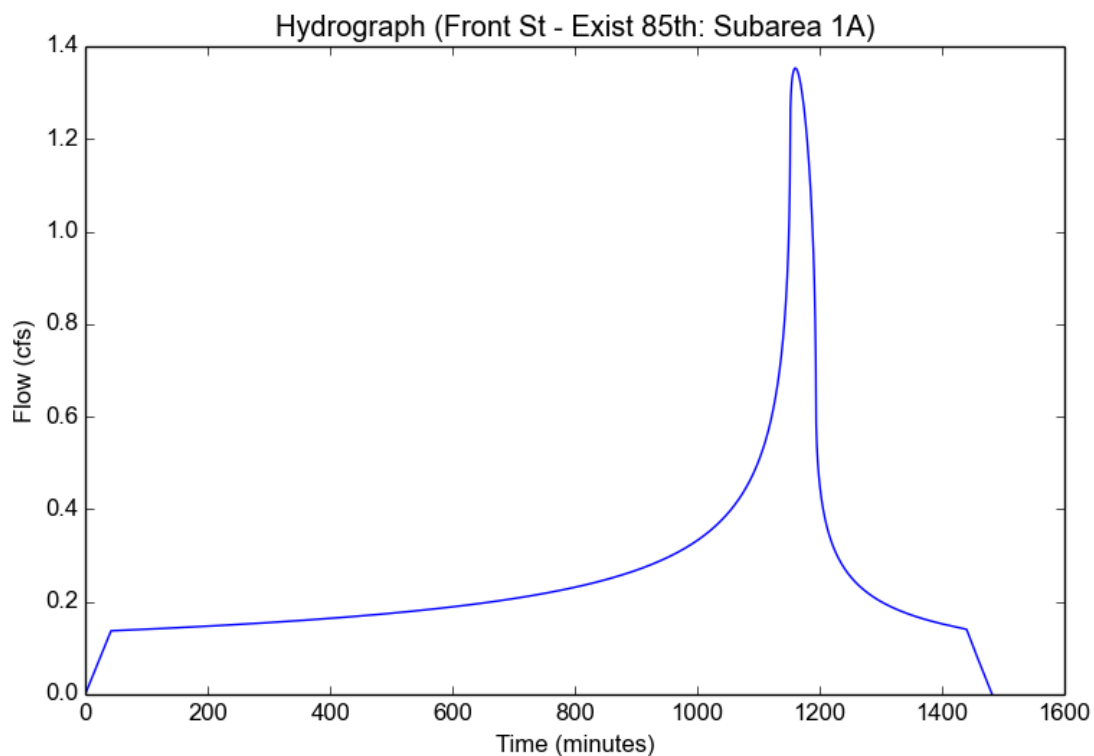
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Version: HydroCalc 1.0.2

### Input Parameters

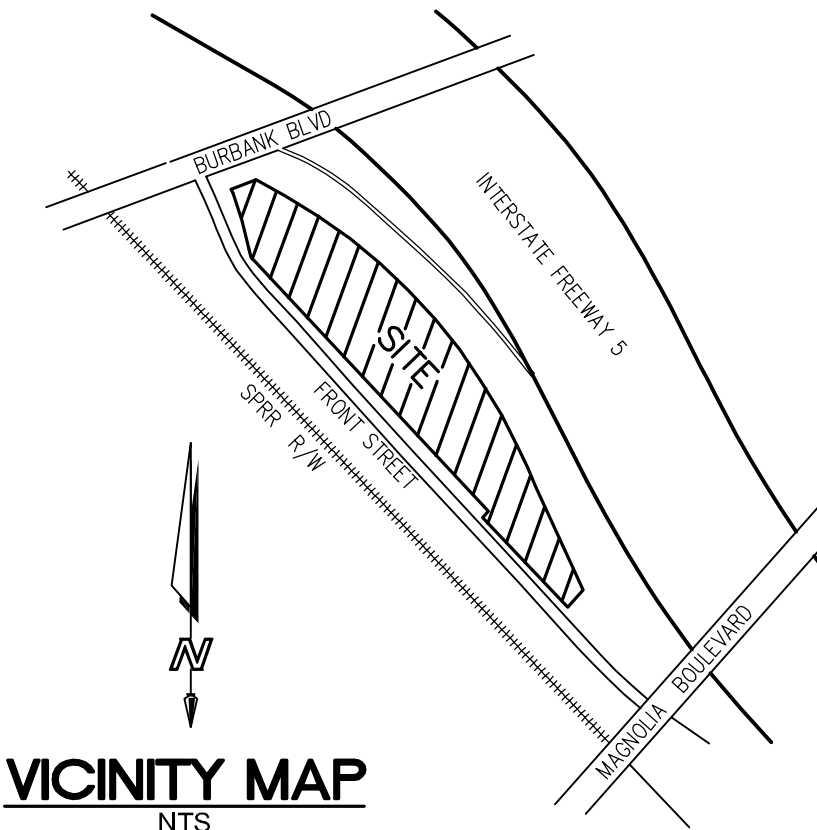
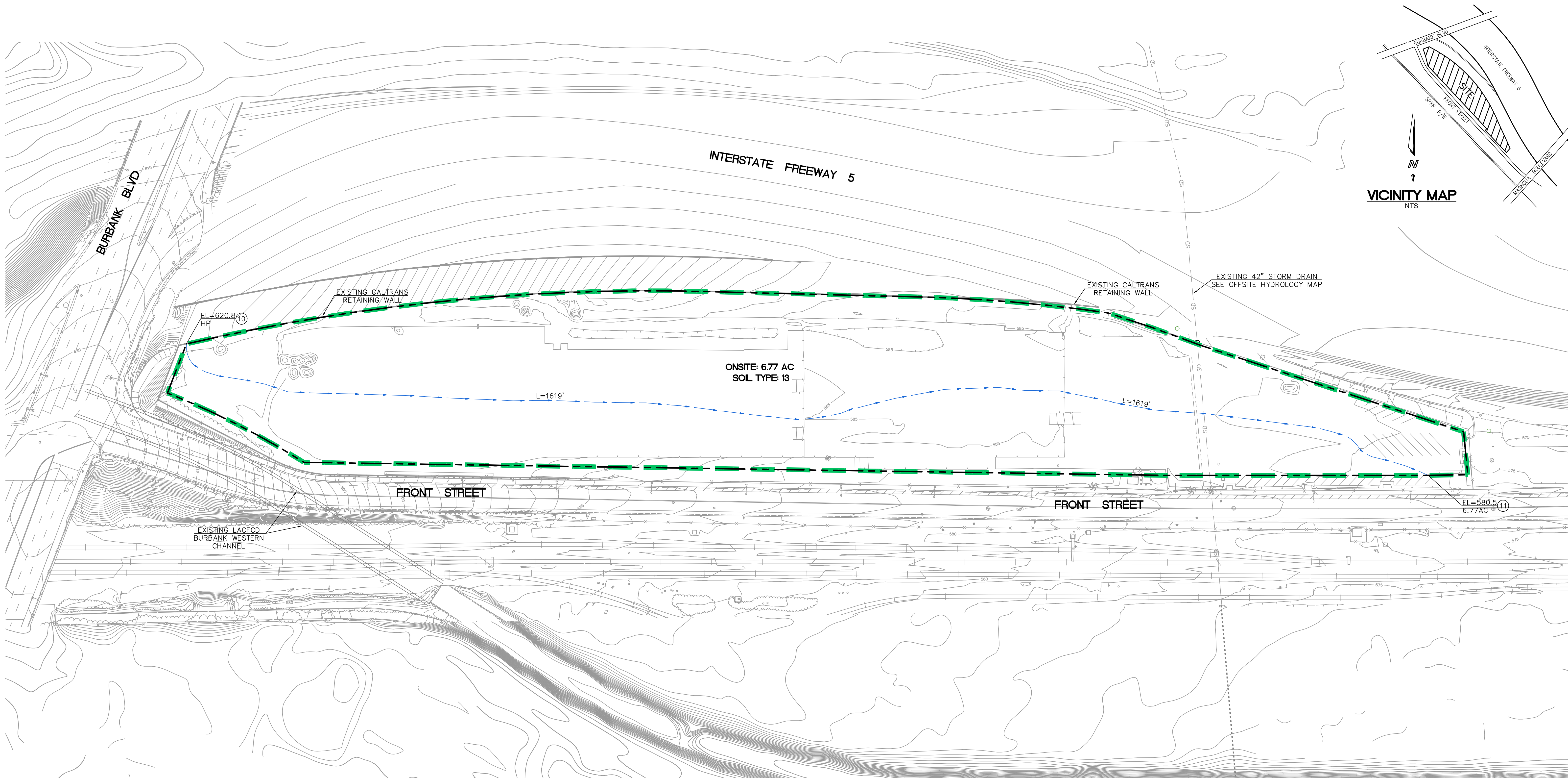
Project Name	Front St - Exist 85th
Subarea ID	Subarea 1A
Area (ac)	6.77
Flow Path Length (ft)	1619.0
Flow Path Slope (vft/hft)	0.025
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

### Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.2414
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.828
Time of Concentration (min)	42.0
Clear Peak Flow Rate (cfs)	1.353
Burned Peak Flow Rate (cfs)	1.353
24-Hr Clear Runoff Volume (ac-ft)	0.5096
24-Hr Clear Runoff Volume (cu-ft)	22198.5211







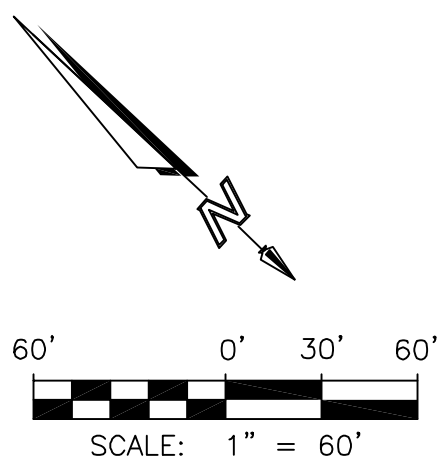
LEGEND

- PROPERTY LINE
- HYDROLOGIC FLOWPATH/DIRECTION OF FLOW
- PROJECT BOUNDARY
- EXISTING STORM DRAIN
- HYDROLOGIC NODE

SOIL TYPE 13 FOR ENTIRETY OF PROJECT SITE

EXISTING CONDITION SUMMARY TABLE

SUB AREA	Q25 (CFS)	85th % (CFS)	AREA (ACRES)
TOTAL	15.2	1.4	6.77



EXISTING HYDROLOGY

No.	ITEM	DATE

CASE FILE NUMBERS:

11.03.17

Front Street Apartments - EXISTING HYDROLOGY MAP

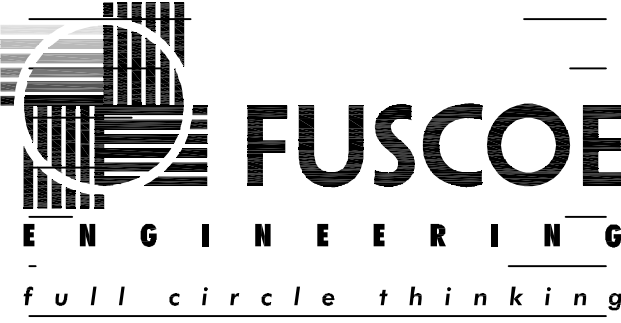
SJ4 BURBANK, LLC

1880 CENTURY PARK EAST, SUITE 600, LOS ANGELES, CA 90067

BURBANK, CA

FUSCOE ENGINEERING

16795 VON KARMAN SUITE #100, IRVINE, CA 92606





## APPENDIX 3

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### Proposed Condition Hydrology Calculations and Map

## Peak Flow Hydrologic Analysis

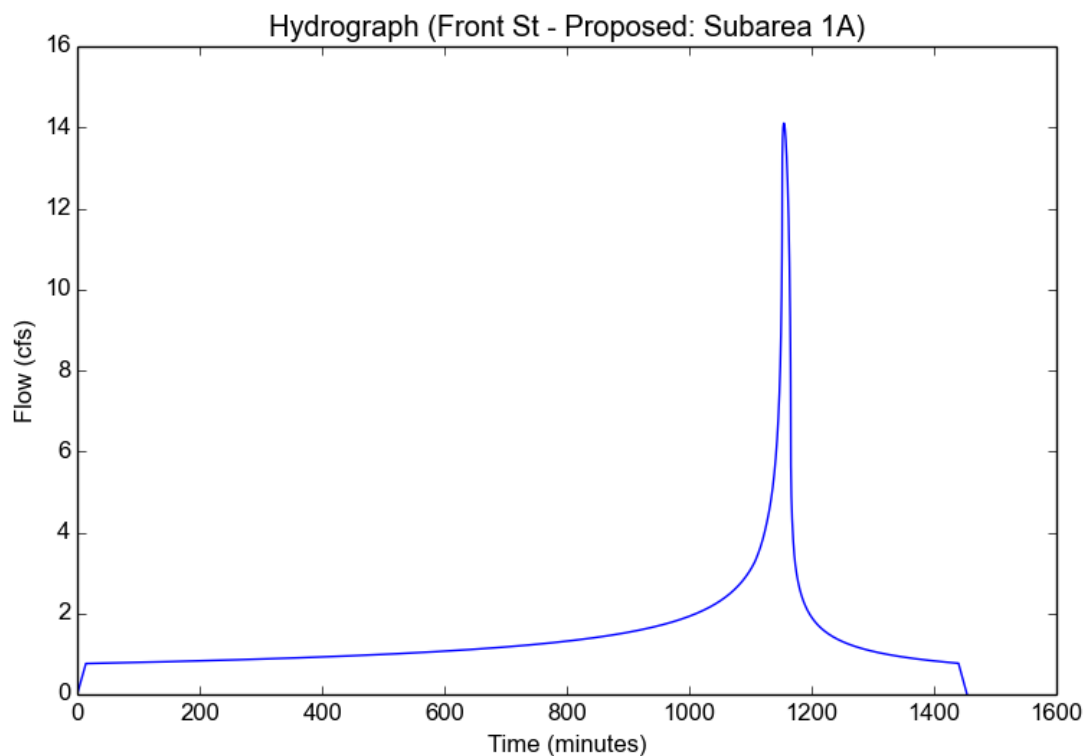
File location: F:/Projects/1319/005/\_Support Files/Reports/Hydrology/2017-11-27 Calculations/Front St - Proposed - Subarea 1A.pdf  
Version: HydroCalc 1.0.2

### Input Parameters

Project Name	Front St - Proposed
Subarea ID	Subarea 1A
Area (ac)	6.77
Flow Path Length (ft)	1444.0
Flow Path Slope (vft/hft)	0.0062
50-yr Rainfall Depth (in)	7.2
Percent Impervious	0.88
Soil Type	13
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

### Output Results

Modeled (25-yr) Rainfall Depth (in)	6.3216
Peak Intensity (in/hr)	2.3247
Undeveloped Runoff Coefficient (Cu)	0.8679
Developed Runoff Coefficient (Cd)	0.8961
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	14.1037
Burned Peak Flow Rate (cfs)	14.1037
24-Hr Clear Runoff Volume (ac-ft)	2.882
24-Hr Clear Runoff Volume (cu-ft)	125539.222



## Peak Flow Hydrologic Analysis

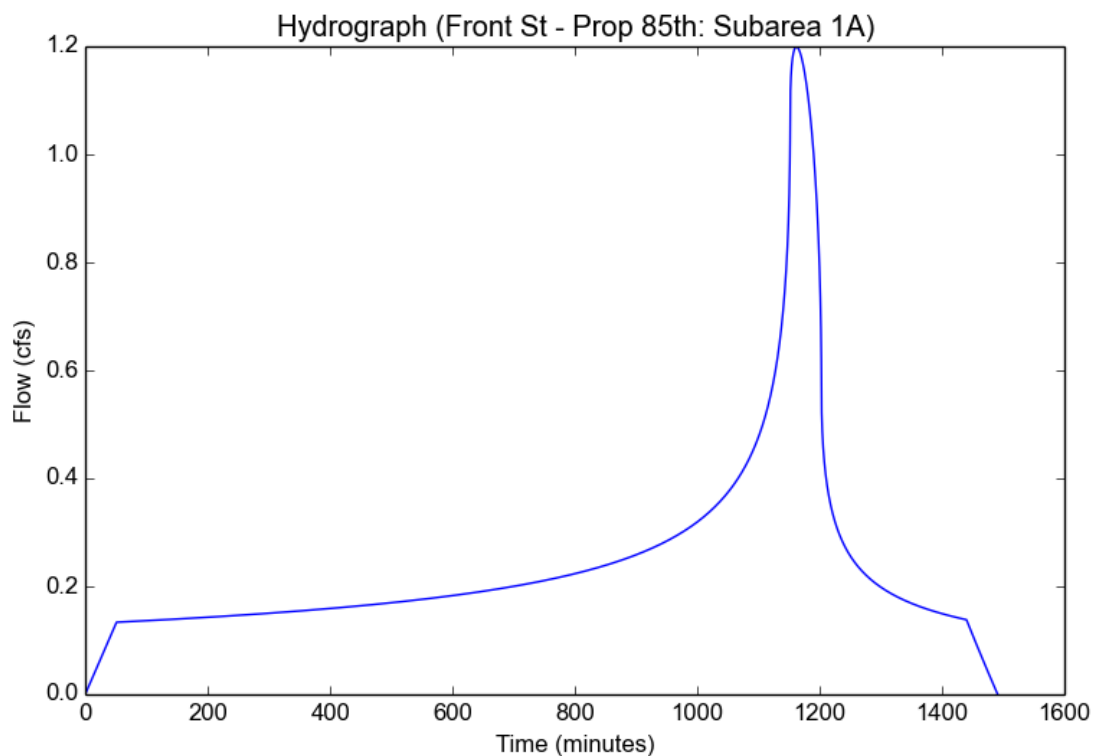
File location: F:/Projects/1319/005/\_Support Files/Reports/Hydrology/2017-11-27 Calculations/Front St - Prop 85th - Subarea 1A.pdf  
Version: HydroCalc 1.0.2

### Input Parameters

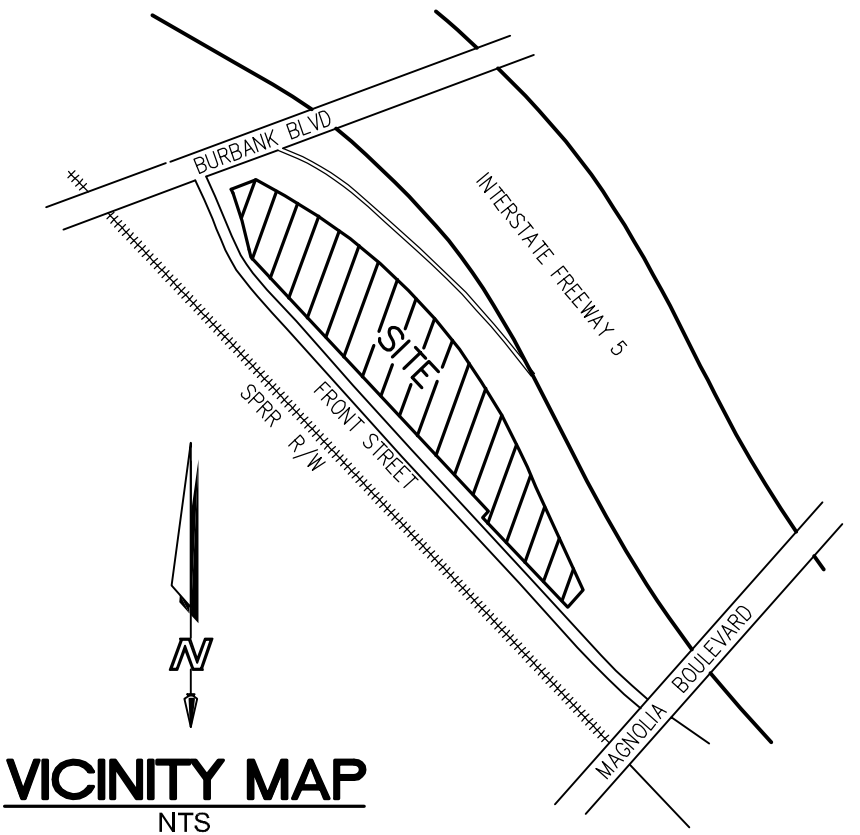
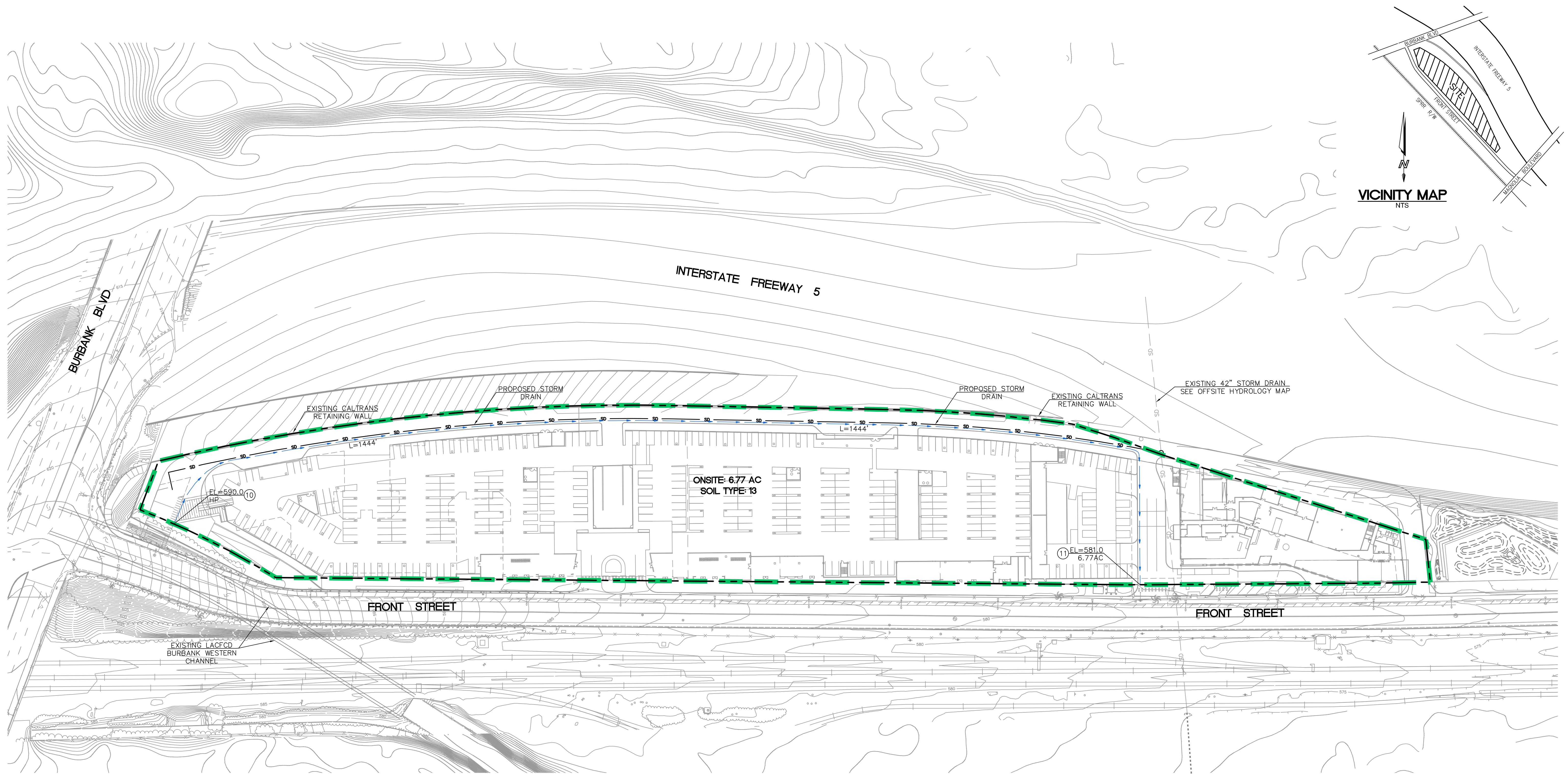
Project Name	Front St - Prop 85th
Subarea ID	Subarea 1A
Area (ac)	6.77
Flow Path Length (ft)	1444.0
Flow Path Slope (vft/hft)	0.0062
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.88
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

### Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.2203
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.804
Time of Concentration (min)	51.0
Clear Peak Flow Rate (cfs)	1.1992
Burned Peak Flow Rate (cfs)	1.1992
24-Hr Clear Runoff Volume (ac-ft)	0.4948
24-Hr Clear Runoff Volume (cu-ft)	21555.3219





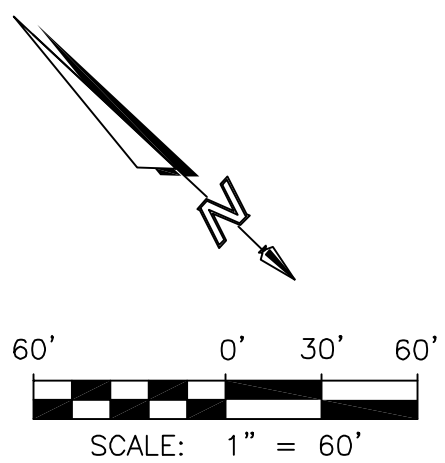


**LEGEND**

- PROPERTY LINE
- HYDROLOGIC FLOWPATH/DIRECTION OF FLOW
- PROJECT BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- ⑩ HYDROLOGIC NODE

SOIL TYPE 13 FOR ENTIRETY OF PROJECT SITE

SUMMARY TABLE			
SUB AREA	Q25 (CFS)	Q2 (CFS)	AREA (ACRES)
TOTAL	14.1	1.2	6.77



**PROPOSED HYDROLOGY**

No.	ITEM	DATE
CASE FILE NUMBERS:		

11.03.17

*Front Street Apartments - PROPOSED CONDITION HYDROLOGY MAP*

**SJ4 BURBANK, LLC**  
1880 CENTURY PARK EAST, SUITE 600, LOS ANGELES, CA 90067

**BURBANK, CA**

**FUSCOE ENGINEERING**  
16795 VON KARMAN SUITE #100, IRVINE, CA 92606

1319-005 November 2017



## APPENDIX 4

### Offsite Hydrology Calculations and Map

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## Peak Flow Hydrologic Analysis

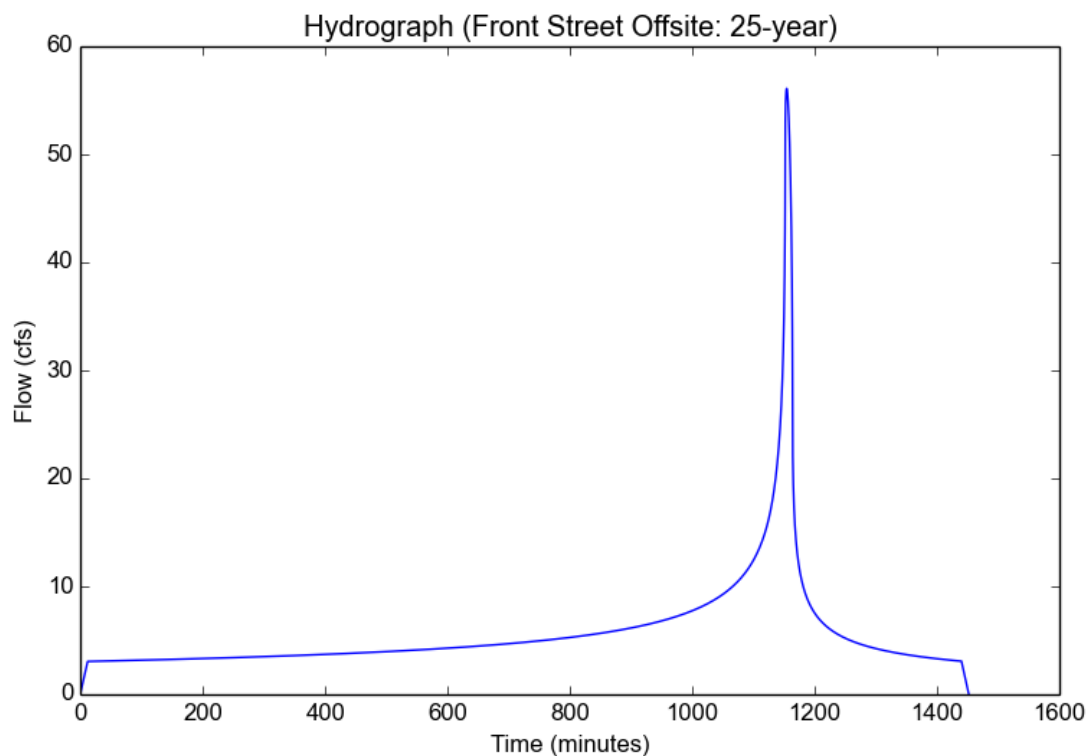
File location: C:/Users/Susan Williams/Desktop/Front Street Offsite - 25-year.pdf  
Version: HydroCalc 1.0.2

### Input Parameters

Project Name	Front Street Offsite
Subarea ID	25-year
Area (ac)	25.0
Flow Path Length (ft)	1854.0
Flow Path Slope (vft/hft)	0.039
50-yr Rainfall Depth (in)	7.3
Percent Impervious	0.95
Soil Type	7
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

### Output Results

Modeled (25-yr) Rainfall Depth (in)	6.4094
Peak Intensity (in/hr)	2.5341
Undeveloped Runoff Coefficient (Cu)	0.611
Developed Runoff Coefficient (Cd)	0.8856
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	56.1015
Burned Peak Flow Rate (cfs)	56.1015
24-Hr Clear Runoff Volume (ac-ft)	11.4212
24-Hr Clear Runoff Volume (cu-ft)	497509.2843



## Peak Flow Hydrologic Analysis

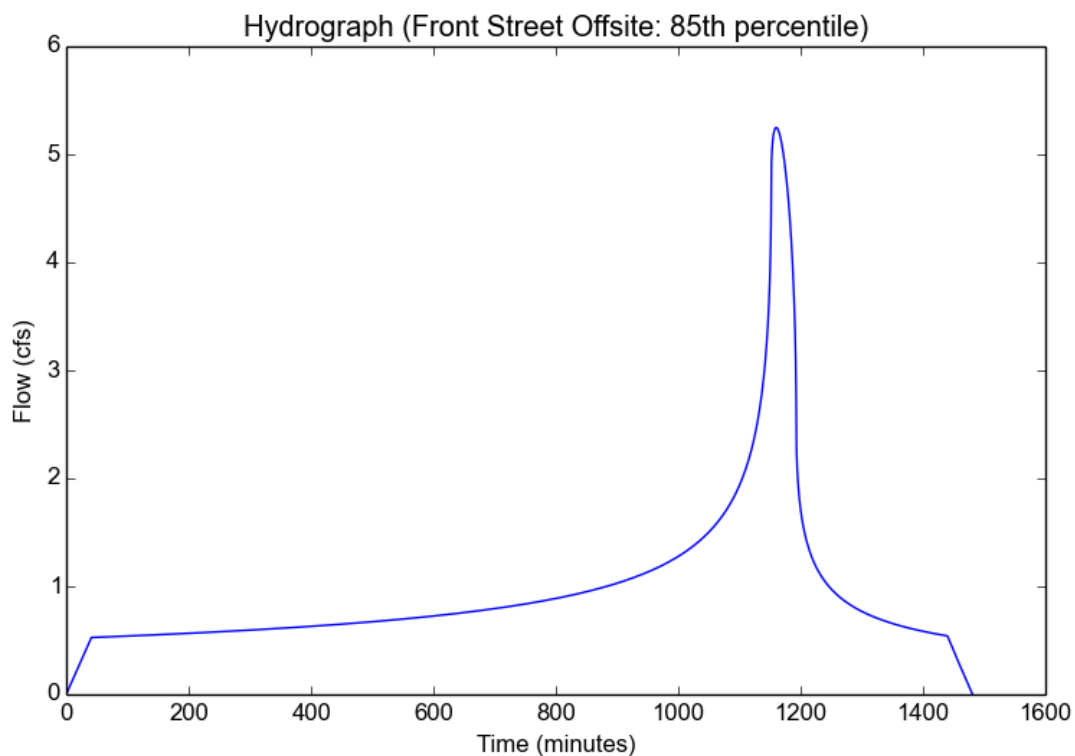
File location: C:/Users/Susan Williams/Desktop/Front Street Offsite - 85th percentile.pdf  
Version: HydroCalc 1.0.2

### Input Parameters

Project Name	Front Street Offsite
Subarea ID	85th percentile
Area (ac)	25.0
Flow Path Length (ft)	1854.0
Flow Path Slope (vft/hft)	0.039
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.95
Soil Type	7
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

### Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.2441
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	41.0
Clear Peak Flow Rate (cfs)	5.2486
Burned Peak Flow Rate (cfs)	5.2486
24-Hr Clear Runoff Volume (ac-ft)	1.9546
24-Hr Clear Runoff Volume (cu-ft)	85141.839







**LEGEND**

- PROPERTY LINE
- HYDROLOGIC FLOWPATH/DIRECTION OF FLOW
- PROJECT BOUNDARY
- TRIBUTARY OFFSITE BOUNDARY
- SD EXISTING STORM DRAIN
- (10) HYDROLOGIC NODE

SOIL TYPE 7 FOR ENTIRETY OF OFFSITE BOUNDARY

SUMMARY TABLE			
SUB AREA	Q25 (CFS)	85th % (CFS)	AREA (ACRES)
TOTAL	56.1	5.2	25

Front Street Apartments - HYDROLOGY MAP (OFFSITE)

SJ4 BURBANK, LLC

1880 CENTURY PARK EAST, SUITE 600, LOS ANGELES, CA 90067

BURBANK, CA

FUSCOE ENGINEERING

16795 VON KARMAN SUITE #100, IRVINE, CA 92606

1319-005 November 2017

100' 0' 50' 100'

SCALE: 1" = 100'

FUSCOE ENGINEERING

full circle thinking

OFFSITE HYDROLOGY

No.	ITEM	DATE

CASE FILE NUMBERS:

11.03.17



## APPENDIX 5

### Hydraulic Calculations

---

## Worksheet for Existing 42-inch RCP - CAPACITY

### Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

### Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Normal Depth	3.50	ft
Diameter	42.0	in
Discharge	71	ft <sup>3</sup> /s

### Results

Discharge	71	ft <sup>3</sup> /s
Normal Depth	3.50	ft
Flow Area	9.62	ft <sup>2</sup>
Wetted Perimeter	11.00	ft
Hydraulic Radius	0.88	ft
Top Width	0.00	ft
Critical Depth	2.64	ft
Percent Full	100.0	%
Critical Slope	0.00592	ft/ft
Velocity	7.39	ft/s
Velocity Head	0.85	ft
Specific Energy	4.35	ft
Froude Number	0.00	
Maximum Discharge	76.52	ft <sup>3</sup> /s
Discharge Full	71.14	ft <sup>3</sup> /s
Slope Full	0.00500	ft/ft
Flow Type	SubCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

---

## Worksheet for Existing 42-inch RCP - CAPACITY

---

### GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	3.50	ft
Critical Depth	2.64	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00592	ft/ft

## Rating Table for Proposed Area Drain Systems 6-8-10-12

### Project Description

Friction Method                      Manning Formula  
Solve For                              Full Flow Capacity

### Input Data

Roughness Coefficient                      0.013  
Channel Slope                              0.00500    ft/ft  
Normal Depth                              1.00    ft  
Diameter                              12.0    in  
Discharge                              2.5    ft<sup>3</sup>/s

Diameter (in)	Normal Depth (ft)	Discharge (ft <sup>3</sup> /s)	Velocity (ft/s)	Flow Area (ft <sup>2</sup> )	Wetted Perimeter (ft)	Top Width (ft)
6.0	0.50	0.4	2.02	0.20	1.57	0.00
8.0	0.67	0.9	2.45	0.35	2.09	0.00
10.0	0.83	1.5	2.84	0.55	2.62	0.00
12.0	1.00	2.5	3.21	0.79	3.14	0.00



## Rating Table for Copy of Proposed Area Drain Systems 15-18-21-24

### Project Description

Friction Method                      Manning Formula  
Solve For                                Full Flow Capacity

### Input Data

Roughness Coefficient                      0.013  
Channel Slope                                0.00500    ft/ft  
Normal Depth                                2.00    ft  
Diameter                                        24.0    in  
Discharge                                        16.0    ft<sup>3</sup>/s

Diameter (in)	Normal Depth (ft)	Discharge (ft <sup>3</sup> /s)	Velocity (ft/s)	Flow Area (ft <sup>2</sup> )	Wetted Perimeter (ft)	Top Width (ft)
18.0	1.50	7.4	4.20	1.77	4.71	0.00
21.0	1.75	11.2	4.66	2.41	5.50	0.00
24.0	2.00	16.0	5.09	3.14	6.28	0.00