

**HYDROLOGY REPORT
FOR**

**HYDROLOGY REPORT
3303 & 3355 VIA LIDO, NEWPORT BEACH, CA**

**Prepared For:
Shubin + Donaldson Architects, Inc.
403 E. Montecito Street #2A
Santa Barbara, CA. 93101
(805) 682-7000
Contact: Sieglinde Pukke**

C&V Consulting
27156 Burbank
Foothill Ranch, CA 92610
(949) 916-3800

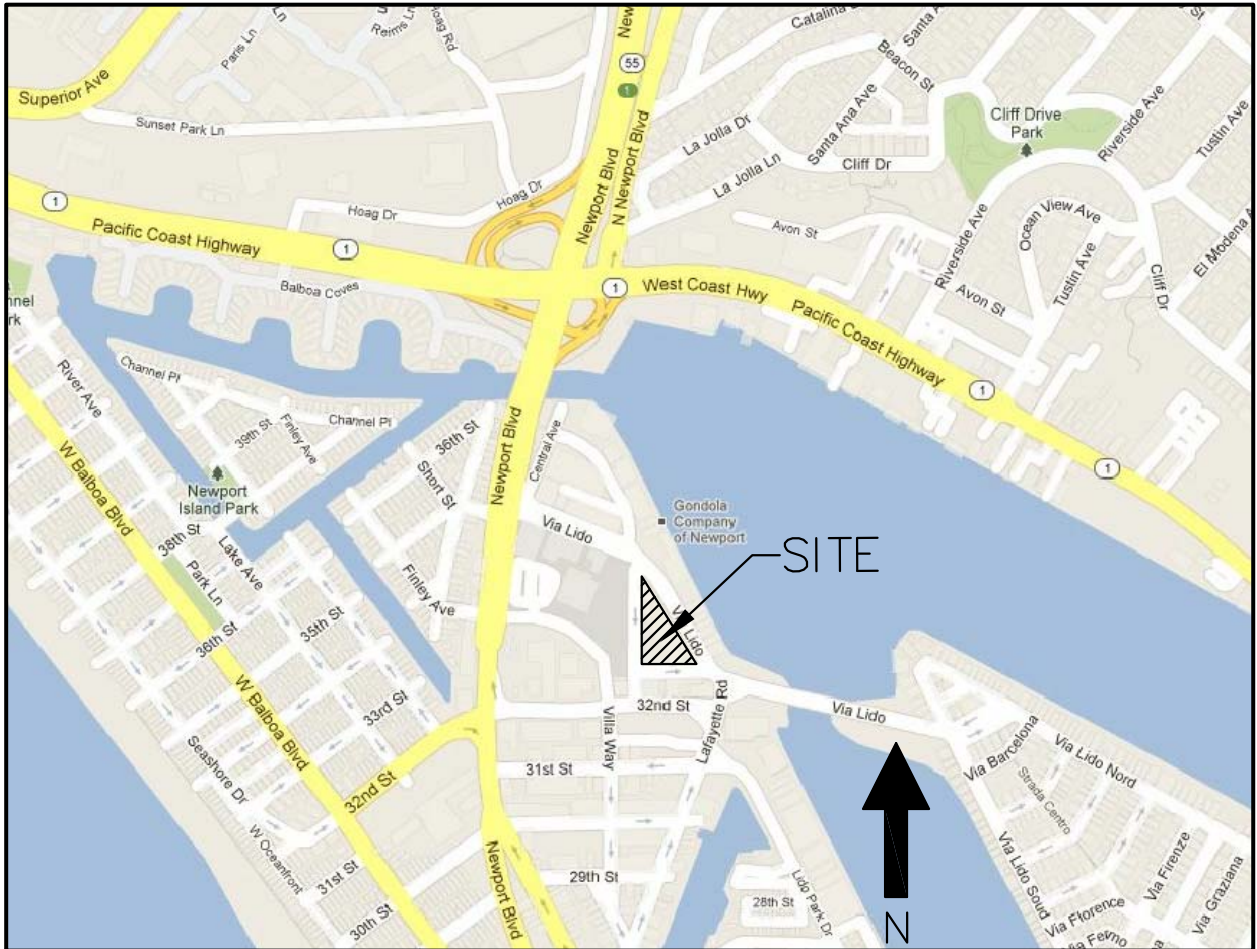


March 5, 2013

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I. VICINITY MAP



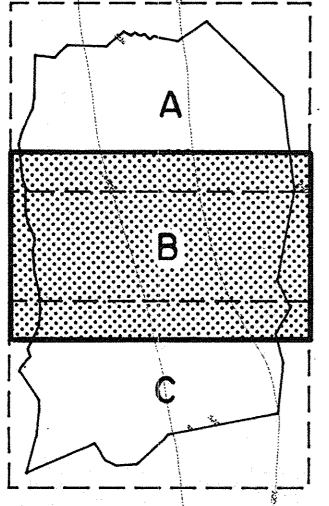
THOMAS BROTHERS GUIDE PAGE 888 GRID H7

VICINITY MAP

N.T.S.

II. SOILS AND RAIN FALL INTENSITY MAPS

From Orange County Hydrology Manual
Soil Type: Type "A"



KEY

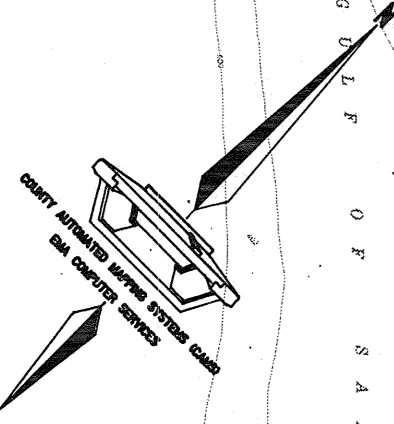
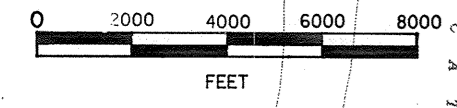
LEGEND

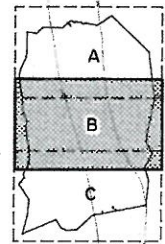
A	B	C	D	HYDROLOGIC SOIL GROUPS
				HYDROLOGIC SOIL GROUP BOUNDARY
				COUNTY BOUNDARY

ORANGE COUNTY - HYDROLOGY MANUAL

SOURCES:
 BASE MAP - QUADRANGLE MAPS, GEOLOGICAL SURVEY, U.S. DEPT. OF THE INTERIOR, 1980 PHOTO UPDATE
 SOIL GROUPS - SOIL SURVEY OF ORANGE COUNTY AND WESTERN PART OF RIVERSIDE COUNTY, CALIFORNIA, USDA, SOIL CONSERVATION SERVICE 1978.

HYDROLOGIC CLASSIFICATION OF SOILS
 ORANGE COUNTY, CALIFORNIA
 MAY 1986
 PLATE B





KEY

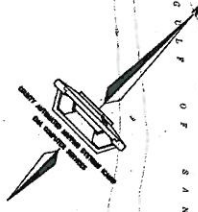
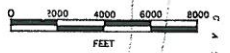
LEGEND

A	B	C	D	HYDROLOGIC SOIL GROUPS
				HYDROLOGIC SOIL GROUP BOUNDARY
				COUNTY BOUNDARY

ORANGE COUNTY - HYDROLOGY MANUAL

SOURCES:
 BASE MAP - QUADRANGLE MAPS, GEOLOGICAL SURVEY,
 U.S. DEPT. OF THE INTERIOR, 1980 PHOTO UPDATE
 SOIL GROUPS - SOIL SURVEY OF ORANGE COUNTY AND WESTERN
 PART OF RIVERSIDE COUNTY, CALIFORNIA, USDA,
 SOIL CONSERVATION SERVICE 1978.

HYDROLOGIC CLASSIFICATION OF SOILS
 ORANGE COUNTY, CALIFORNIA
 MAY 1986 PLATE B



III. DISCUSSION

III. DISCUSSION

Introduction

The purpose of the attached analysis is to determine the existing and proposed storm water discharge flow for the project. 3303 Via Lido is located in the City of Newport Beach, CA west of Newport Bay. The proposed development is located on the Balboa Peninsula, in the City of Newport Beach. The Pacific Ocean is located about 2,000 feet to the west of the site, and the Newport Bay is located about 170 feet to the east of the site. The subject project is bound by Via Lido to the northeast, Via Oporto to the West and Via Malaga to the south. The project is situated southeast of the intersection of Newport Blvd and the Pacific Coast highway.

The site is approximately 1.2 acres and the topography of the site slopes gently in a northwest direction, at a rate of no more than a third of a percent.

Underground storm drain facilities do not exist adjacent to the site. Storm water runoff presently surface flows off the site to the adjacent public streets (Via Lido, Via Oporto and Via Malaga) where they are collecting in surface gutters and conveyed to the north. From there flows are collecting in an off-site catch basin where they empty into the adjacent Newport Bay.

The property is designated in FEMA Flood Zone "X" shaded, areas considered to be outside of the 100-year floodplain, but inside the 500-year floodplain.

Typical to the Balboa Peninsula area, groundwater was found at shallow depths (up to five feet from the surface).

This hydrology report will calculate the 2, 5, 25, and 100-year storm water runoff for this location

Existing Conditions

The current project site consists of commercial buildings and a parking lot with minimal landscaping. There are no onsite or offsite storm drain systems in the vicinity of the project.

The site is approximately 1.2 acres and the topography of the site slopes gently in a northwest direction, at a rate of no more than a third of a percent.

Storm water from the site surface flows to the streets and is directed to the curb and gutter system within the streets.

Project Description

The proposed project includes the removal of the buildings and parking lot on site. The project proposes the construction of 24 residential units and a drive aisle along with the associated site improvements and utilities. The project will include the addition of landscaping within the site area, hence imperviousness within the site will reduce from over 96% to 89%. The proposed condition will utilize similar overall drainage patterns. The improvements promote further percolation into the ground.

Hydrology and Calculation Methodology

The hydrology study was prepared in accordance with the requirements of the Orange County Hydrology Manual. The 100-year storm event was used in the study. Values for the 2-year, 5-year, and 25-year storms.

Conclusion

Due to the fact that the proposed and existing flow patterns are similar, the flows generated from the site are 6% less than the existing conditions. Pervious area is also increased due to introduction of landscaping within the site. A table of pre- and post-construction flows can be seen in the table below:

Condition	2-YR Flow (cfs)	5-YR Flow (cfs)	25-YR Flow (cfs)	100-YR Flow (cfs)
Existing Condition	2.16	3.05	4.64	5.96
Proposed Condition	1.98	2.83	4.33	5.56

IV. 2, 5, 25, & 100-YEAR HYDROLOGY CALCULATIONS –EXISTING CONDITION

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
(c) Copyright 1983-2010 Advanced Engineering Software (aes)
Ver. 17.0 Release Date: 07/01/2010 License ID 1580

Analysis prepared by:

C&V Consulting

***** DESCRIPTION OF STUDY *****

- * VIA LIDO *
 - * EXISTING CONDITION *
 - * 2 YEAR STORM *
- *****

FILE NAME: SB01E2.DAT
TIME/DATE OF STUDY: 15:16 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
 DATA BANK RAINFALL USED
 ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
 WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
 NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 210.00
ELEVATION DATA: UPSTREAM(FEET) = 9.40 DOWNSTREAM(FEET) = 8.58

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 7.824$
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.751
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.48 0.40 0.100 32 7.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 0.74
TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 0.74

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 115.00
ELEVATION DATA: UPSTREAM(FEET) = 10.20 DOWNSTREAM(FEET) = 9.20

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 5.240$
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.204
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.34 0.40 0.100 32 5.24
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 0.66
TOTAL AREA(ACRES) = 0.34 PEAK FLOW RATE(CFS) = 0.66

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
ELEVATION DATA: UPSTREAM(FEET) = 27.74 DOWNSTREAM(FEET) = 26.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 5.000$
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.38 0.40 0.100 32 5.00

SB01E2.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 0.76

TOTAL AREA(ACRES) = 0.38 PEAK FLOW RATE(CFS) = 0.76

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.38 AREA-AVERAGED F_m (INCH/HR)= 0.04

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.100

PEAK FLOW RATE(CFS) = 0.76

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END OF RATIONAL METHOD ANALYSIS

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Analysis prepared by:

C&V Consulting

***** DESCRIPTION OF STUDY *****
* VIA LIDO *
* EXISTING CONDITION *
* 5 YEAR STORM *

FILE NAME: SB01E5.DAT
TIME/DATE OF STUDY: 15:17 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 210.00
ELEVATION DATA: UPSTREAM(FEET) = 9.40 DOWNSTREAM(FEET) = 8.58

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 7.824$
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.48 0.40 0.100 32 7.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 1.05
TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 1.05

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 115.00
ELEVATION DATA: UPSTREAM(FEET) = 10.20 DOWNSTREAM(FEET) = 9.20

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 5.240$
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.103
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.34 0.40 0.100 32 5.24
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
SUBAREA RUNOFF(CFS) = 0.93
TOTAL AREA(ACRES) = 0.34 PEAK FLOW RATE(CFS) = 0.93

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
ELEVATION DATA: UPSTREAM(FEET) = 27.74 DOWNSTREAM(FEET) = 26.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 5.000$
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.185
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.38 0.40 0.100 32 5.00

SB01E5.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 1.07

TOTAL AREA(ACRES) = 0.38 PEAK FLOW RATE(CFS) = 1.07

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.38 AREA-AVERAGED F_m (INCH/HR)= 0.04

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.100

PEAK FLOW RATE(CFS) = 1.07

=====

END OF RATIONAL METHOD ANALYSIS

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Ver. 17.0 Release Date: 07/01/2010 License ID 1580

Analysis prepared by:

C&V Consulting

***** DESCRIPTION OF STUDY *****

- * VIA LIDO *
- * EXISTING CONDITION *
- * 25 YEAR STORM *

FILE NAME: SB01E25.DAT
TIME/DATE OF STUDY: 15:17 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 210.00
ELEVATION DATA: UPSTREAM(FEET) = 9.40 DOWNSTREAM(FEET) = 8.58

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.824
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.744
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.48 0.40 0.100 32 7.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.60
TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 1.60

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 115.00
ELEVATION DATA: UPSTREAM(FEET) = 10.20 DOWNSTREAM(FEET) = 9.20

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.240
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.698
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.34 0.40 0.100 32 5.24
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.41
TOTAL AREA(ACRES) = 0.34 PEAK FLOW RATE(CFS) = 1.41

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
ELEVATION DATA: UPSTREAM(FEET) = 27.74 DOWNSTREAM(FEET) = 26.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.38 0.40 0.100 32 5.00

SB01E25.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 1.63

TOTAL AREA(ACRES) = 0.38 PEAK FLOW RATE(CFS) = 1.63

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.38 AREA-AVERAGED F_m (INCH/HR)= 0.04

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.100

PEAK FLOW RATE(CFS) = 1.63

=====

END OF RATIONAL METHOD ANALYSIS

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Ver. 17.0 Release Date: 07/01/2010 License ID 1580

Analysis prepared by:
C&V Consulting

***** DESCRIPTION OF STUDY *****
* VIA LIDO *
* EXISTING CONDITION *
* 100 YEAR STORM *

FILE NAME: SB01E100.DAT
TIME/DATE OF STUDY: 15:18 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL *
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

==== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 - 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 210.00
ELEVATION DATA: UPSTREAM(FEET) = 9.40 DOWNSTREAM(FEET) = 8.58

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 7.824
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.787
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.48 0.40 0.100 32 7.82
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 2.05
TOTAL AREA(ACRES) = 0.48 PEAK FLOW RATE(CFS) = 2.05

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 115.00
ELEVATION DATA: UPSTREAM(FEET) = 10.20 DOWNSTREAM(FEET) = 9.20

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.240
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.024
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.34 0.40 0.100 32 5.24
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100
SUBAREA RUNOFF(CFS) = 1.81
TOTAL AREA(ACRES) = 0.34 PEAK FLOW RATE(CFS) = 1.81

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
ELEVATION DATA: UPSTREAM(FEET) = 27.74 DOWNSTREAM(FEET) = 26.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.187
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL A 0.38 0.40 0.100 32 5.00

SB01E100.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.100

SUBAREA RUNOFF(CFS) = 2.10

TOTAL AREA(ACRES) = 0.38 PEAK FLOW RATE(CFS) = 2.10

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.4 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.38 AREA-AVERAGED F_m (INCH/HR)= 0.04

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.100

PEAK FLOW RATE(CFS) = 2.10

=====

END OF RATIONAL METHOD ANALYSIS

♀

V. 2, 5, 25, & 100-YEAR HYDROLOGY CALCULATIONS – PROPOSED CONDITION

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Ver. 17.0 Release Date: 07/01/2010 License ID 1580

Analysis prepared by:

C&V Consulting

***** DESCRIPTION OF STUDY *****

* VIA LIDO *
* DEVELOPED CONDITION *
* 2 YEAR STORM *

FILE NAME: SB01D2.DAT
TIME/DATE OF STUDY: 15:11 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

====

1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
---	------	------	-------------------	------	------	--------	-------	--------

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 130.00
ELEVATION DATA: UPSTREAM(FEET) = 9.91 DOWNSTREAM(FEET) = 8.95

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.060
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.027
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.24 0.40 0.200 32 6.06
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 0.42
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 0.42

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
ELEVATION DATA: UPSTREAM(FEET) = 9.90 DOWNSTREAM(FEET) = 8.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.783
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.756
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.70 0.40 0.200 32 7.78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 1.06
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 1.06

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 45.00
ELEVATION DATA: UPSTREAM(FEET) = 10.00 DOWNSTREAM(FEET) = 9.45

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.25 0.40 0.200 32 5.00

SB01D2.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(\text{INCH/HR}) = 0.40$

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.200$

SUBAREA RUNOFF(CFS) = 0.50

TOTAL AREA(ACRES) = 0.25 PEAK FLOW RATE(CFS) = 0.50

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.25 AREA-AVERAGED $F_m(\text{INCH/HR}) = 0.08$

AREA-AVERAGED $F_p(\text{INCH/HR}) = 0.40$ AREA-AVERAGED $A_p = 0.200$

PEAK FLOW RATE(CFS) = 0.50

=====

END OF RATIONAL METHOD ANALYSIS

♀

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Analysis prepared by:

C&V Consulting

***** DESCRIPTION OF STUDY *****

- * VIA LIDO *
- * DEVELOPED CONDITION *
- * 5 YEAR STORM *

FILE NAME: SB01D5.DAT
TIME/DATE OF STUDY: 15:11 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 130.00
ELEVATION DATA: UPSTREAM(FEET) = 9.91 DOWNSTREAM(FEET) = 8.95

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.060
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.859
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.24 0.40 0.200 32 6.06
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 0.60
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 0.60

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
ELEVATION DATA: UPSTREAM(FEET) = 9.90 DOWNSTREAM(FEET) = 8.90

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.783
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.484
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.70 0.40 0.200 32 7.78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 1.52
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 1.52

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 45.00
ELEVATION DATA: UPSTREAM(FEET) = 10.00 DOWNSTREAM(FEET) = 9.45

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 3.185
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.25 0.40 0.200 32 5.00

SB01D5.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.200

SUBAREA RUNOFF(CFS) = 0.71

TOTAL AREA(ACRES) = 0.25 PEAK FLOW RATE(CFS) = 0.71

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.25 AREA-AVERAGED F_m (INCH/HR)= 0.08

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.200

PEAK FLOW RATE(CFS) = 0.71

=====

END OF RATIONAL METHOD ANALYSIS

♀

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Analysis prepared by:
C&V Consulting

***** DESCRIPTION OF STUDY *****
* VIA LIDO *
* DEVELOPED CONDITION *
* 25 YEAR STORM *

FILE NAME: SB01D25.DAT
TIME/DATE OF STUDY: 15:12 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 - 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 130.00
ELEVATION DATA: UPSTREAM(FEET) = 9.91 DOWNSTREAM(FEET) = 8.95

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 6.060$
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.326
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.24 0.40 0.200 32 6.06
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.200$
SUBAREA RUNOFF(CFS) = 0.91
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 0.91

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
ELEVATION DATA: UPSTREAM(FEET) = 9.90 DOWNSTREAM(FEET) = 8.90

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 7.783$
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.755
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.70 0.40 0.200 32 7.78
SUBAREA AVERAGE PERVIOUS LOSS RATE, $F_p(INCH/HR) = 0.40$
SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.200$
SUBAREA RUNOFF(CFS) = 2.33
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 2.33

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 45.00
ELEVATION DATA: UPSTREAM(FEET) = 10.00 DOWNSTREAM(FEET) = 9.45

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM $T_c(MIN.) = 5.000$
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.824
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.25 0.40 0.200 32 5.00

SB01D25.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.200

SUBAREA RUNOFF(CFS) = 1.09

TOTAL AREA(ACRES) = 0.25 PEAK FLOW RATE(CFS) = 1.09

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.25 AREA-AVERAGED F_m (INCH/HR)= 0.08

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.200

PEAK FLOW RATE(CFS) = 1.09

=====

END OF RATIONAL METHOD ANALYSIS

♀

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Analysis prepared by:
C&V Consulting

***** DESCRIPTION OF STUDY *****
* VIA LIDO *
* DEVELOPED CONDITION *
* 100 YEAR STORM *

FILE NAME: SB01D100.DAT
TIME/DATE OF STUDY: 15:15 03/06/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
DATA BANK RAINFALL USED
ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING
WIDTH CROSSFALL IN- /OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)
==== =====
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 100.00 TO NODE 150.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

SB01D100.RES

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 130.00
ELEVATION DATA: UPSTREAM(FEET) = 9.91 DOWNSTREAM(FEET) = 8.95

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 6.060
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.542
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.24 0.40 0.200 32 6.06
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.200
SUBAREA RUNOFF(CFS) = 1.17
TOTAL AREA(ACRES) = 0.24 PEAK FLOW RATE(CFS) = 1.17

FLOW PROCESS FROM NODE 200.00 TO NODE 250.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 200.00
ELEVATION DATA: UPSTREAM(FEET) = 9.90 DOWNSTREAM(FEET) = 8.90

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 7.783
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.801
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.70 0.40 0.200 32 7.78
SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40
SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.200
SUBAREA RUNOFF(CFS) = 2.99
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 2.99

FLOW PROCESS FROM NODE 300.00 TO NODE 350.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 45.00
ELEVATION DATA: UPSTREAM(FEET) = 10.00 DOWNSTREAM(FEET) = 9.45

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.187
SUBAREA T_c AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA F_p A_p SCS T_c
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
APARTMENTS A 0.25 0.40 0.200 32 5.00

SB01D100.RES

SUBAREA AVERAGE PERVIOUS LOSS RATE, F_p (INCH/HR) = 0.40

SUBAREA AVERAGE PERVIOUS AREA FRACTION, A_p = 0.200

SUBAREA RUNOFF(CFS) = 1.40

TOTAL AREA(ACRES) = 0.25 PEAK FLOW RATE(CFS) = 1.40

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.3 TC(MIN.) = 5.00

EFFECTIVE AREA(ACRES) = 0.25 AREA-AVERAGED F_m (INCH/HR)= 0.08

AREA-AVERAGED F_p (INCH/HR) = 0.40 AREA-AVERAGED A_p = 0.200

PEAK FLOW RATE(CFS) = 1.40

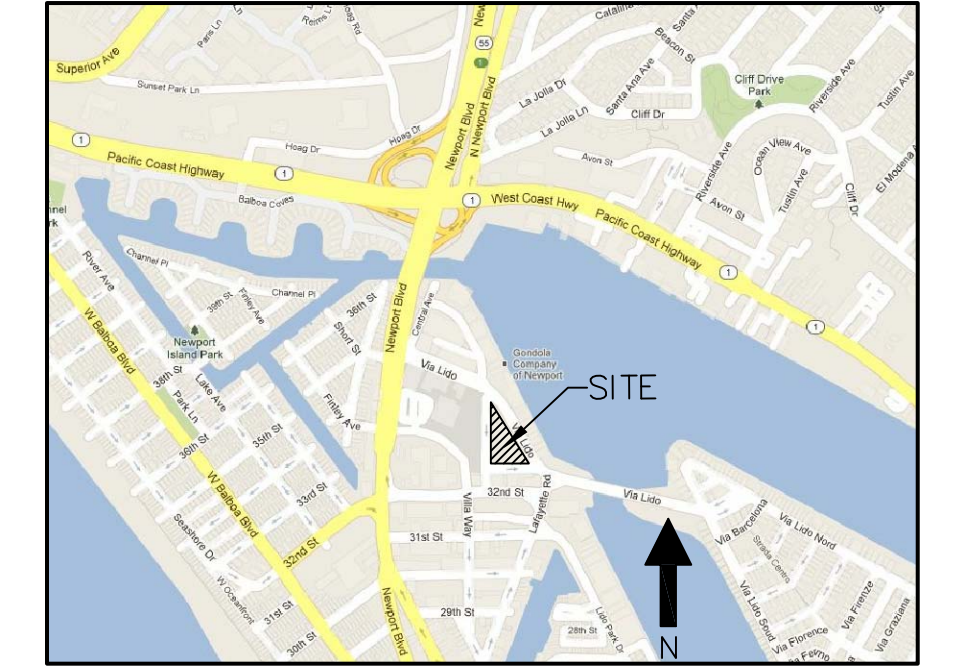
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END OF RATIONAL METHOD ANALYSIS

♀

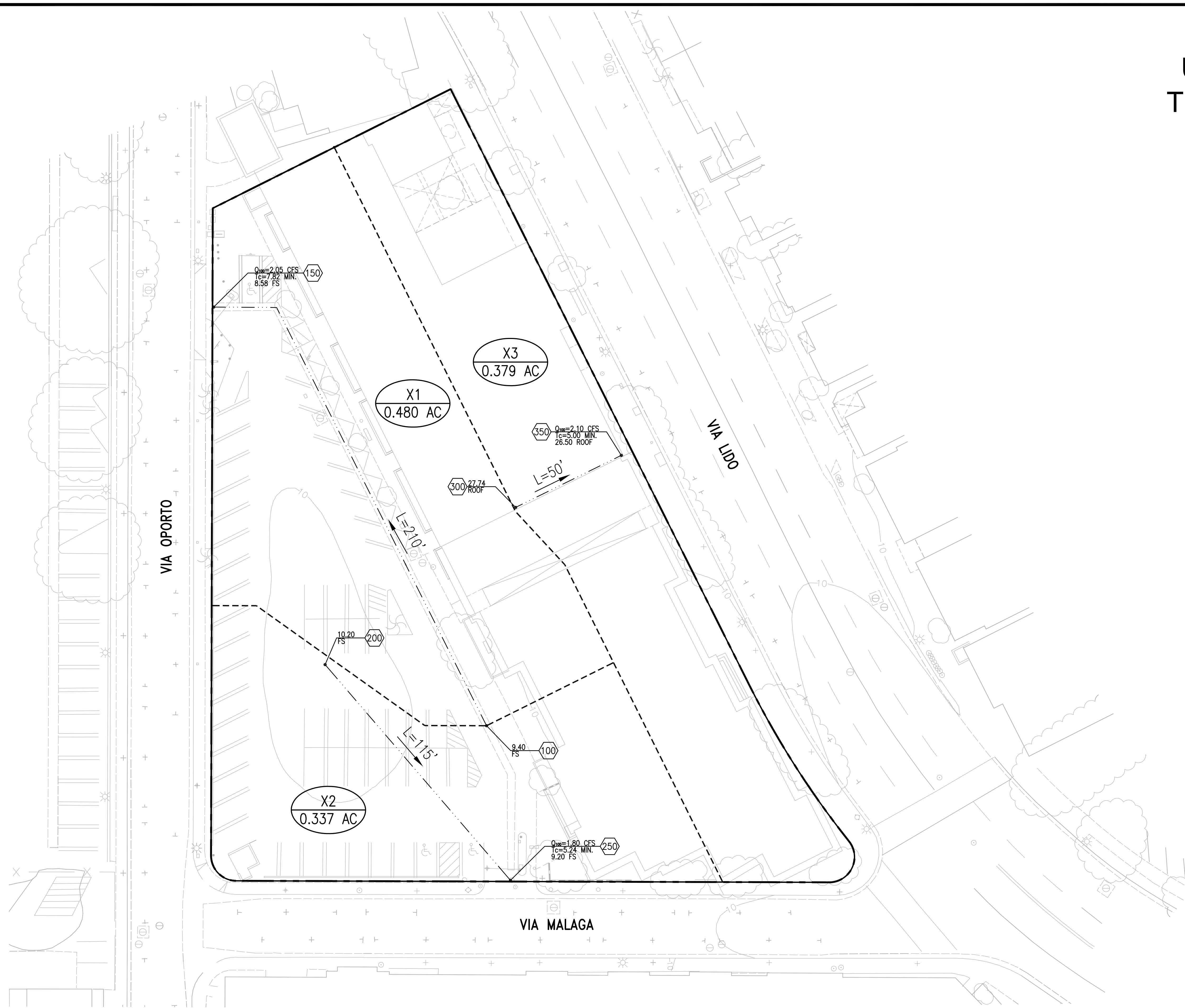
VI. HYDROLOGY MAP-EXISTING AND DEVELOPED CONDITIONS

HYDROLOGY MAP UNDEVELOPED CONDITIONS TENTATIVE TRACT MAP 17555



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VICINITY MAP
N.T.S.

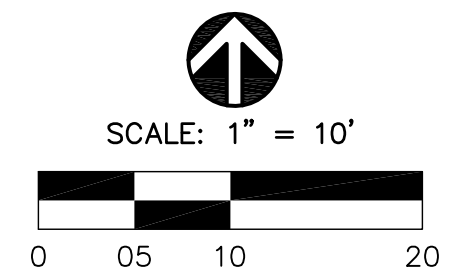


LEGEND:

- X12 (0.30 AC) — SUB-AREA NUMBER
- 0.30 AC — ACREAGE
- MAJOR-AREA BOUNDARY
- - - SUB-AREA BOUNDARY
- - - FLOW PATH
- (10) — NODE

PRE DEVELOPMENT:

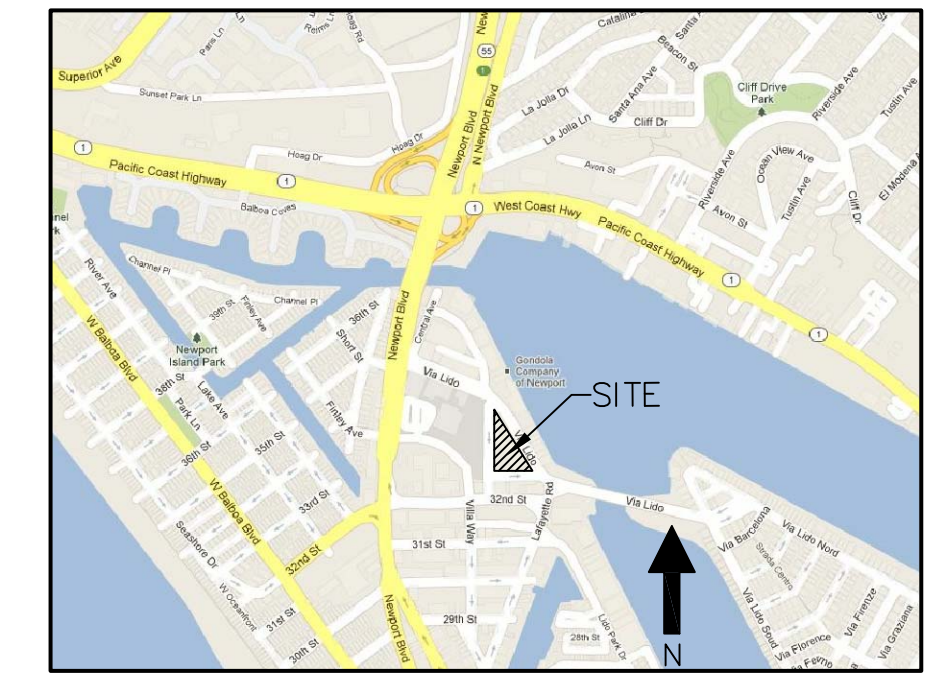
PERVIOUS AREA	=	0.03 AC. (3%)
IMPERVIOUS AREA	=	1.17 AC. (97%)
Q_{2m-24H}	=	2.16 CFS
$Q_{10m-24H}$	=	3.05 CFS
$Q_{20m-24H}$	=	4.64 CFS
$Q_{100m-24H}$	=	5.96 CFS



	<p>PLAN PREPARED BY:</p> <p>C&V CONSULTING, INC. 27156 BURBANK FOOTHILL RANCH, CA 92610 T. 949.918.3800 F. 949.918.3805 CIVIL ENGINEERING LAND PLANNING & SURVEYING CVC-INC.NET</p>	<p>CITY OF NEWPORT BEACH</p> <p>HYDROLOGY MAP EXISTING-UNDEVELOPED CONDITIONS 3303 VIA LIDO, NEWPORT BEACH, CA 92660</p>	<p>SHEET</p> <p>1 OF 1</p>
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 PROJ: SHUB-001

HYDROLOGY MAP DEVELOPED CONDITIONS TENTATIVE TRACT MAP 17555



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VICINITY MAP
N.T.S.

POST DEVELOPMENT:

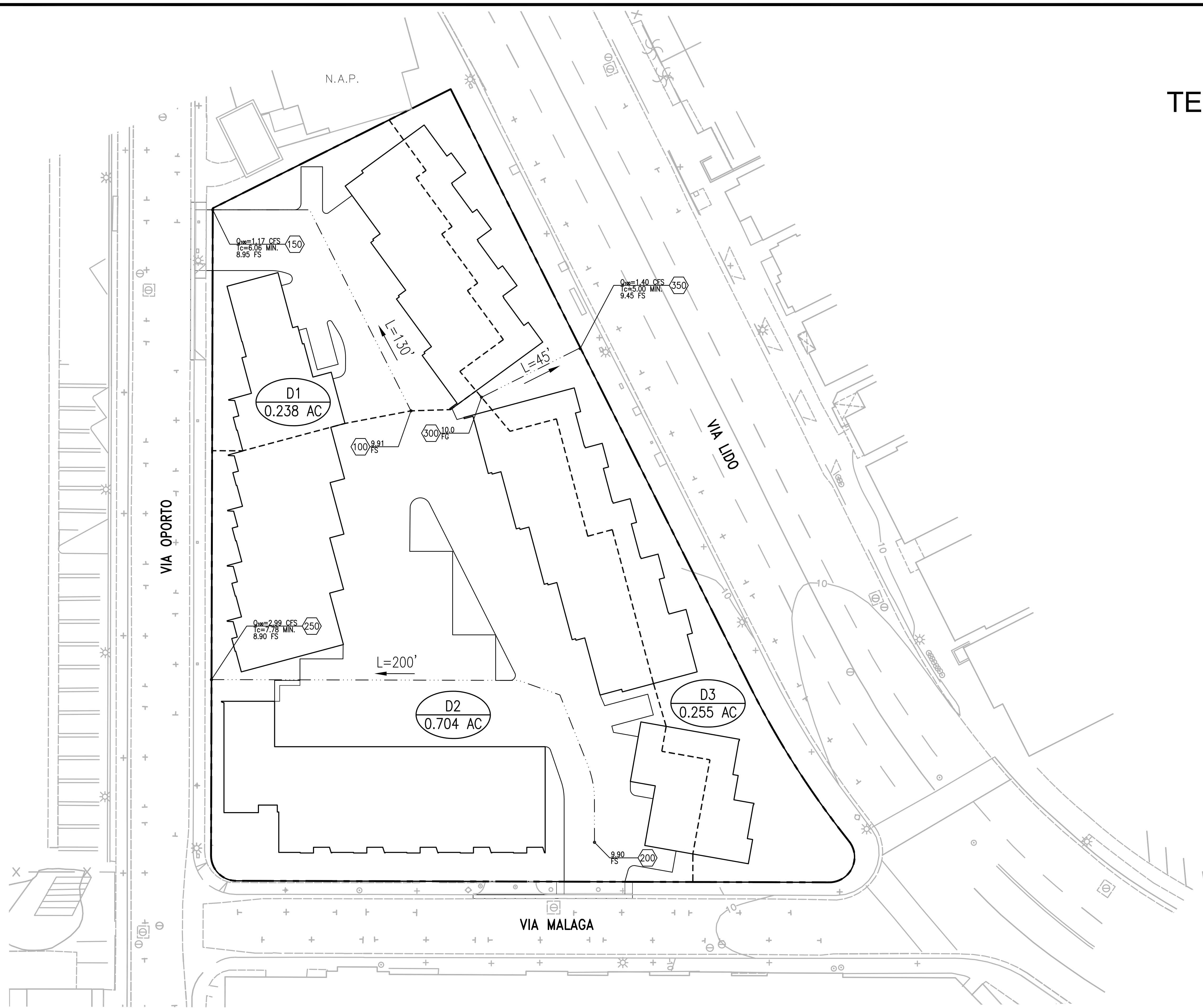
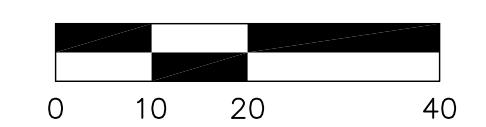
PERVIOUS AREA	=	0.13 AC. (11%)
IMPERVIOUS AREA	=	1.06 AC. (89%)
Q _{2m-2hr}	=	1.98 CFS
Q _{5m-2hr}	=	2.83 CFS
Q _{10m-2hr}	=	4.33 CFS
Q _{24m-2hr}	=	5.56 CFS

LEGEND:

- X12 SUB-AREA NUMBER
- 0.30 AC ACREAGE
- MAJOR-AREA BOUNDARY
- SUB-AREA BOUNDARY
- FLOW PATH
- 100 NODE



SCALE: 1" = 20'



	PLAN PREPARED BY: C&V CONSULTING, INC. 27156 BURBANK FOOTBALL RANCH, CA 92610 T. 949.918.3800 F. 949.918.3805 CIVIL ENGINEERING LAND PLANNING & SURVEYING CVC-INC.NET	CITY OF NEWPORT BEACH HYDROLOGY MAP PROPOSED-DEVELOPED CONDITIONS 3303 VIA LIDO, NEWPORT BEACH, CA 92660	SHEET 1 OF 1
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