HYDROLOGY STUDY

For:

TORRANCE WAREHOUSE

Project Site Location/Address:
2555 W. 190th Street
Torrance, CA 90504

Prepared For:
St. Paul Fire and Marine Insurance Co.,
A Connecticut Corporation
385 Washington Street
St. Paul, MN 55102

Lead Agency:
City of Torrance
3031 Torrance Blvd.
Torrance, CA 90503

Prepared by:
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Matthew Hellesen, P.E.

July 29, 2020

Project No. 19-040

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Introduction

The proposed project is located at 2555 W. 190th Street in the City of Torrance, California.

The project is 14.2 acres, with approximately 291,000 square feet in building area. The proposed building will be a manufacturing warehouse and surrounded by paved parking and landscape. An existing building and parking will be demolished and regrading of the site will occur.

This report has been prepared to calculate the post-construction hydrologic conditions for peak storm runoff rates and demonstrate the overall impact to the existing drainage infrastructure as well as demonstrate that the proposed project will not exceed the existing condition.

Project Description

Existing Site Conditions:

The project site is 14.23 acres. At its existing state, approximately 1.26 acres is building, 11.38 acres is impervious pavement, and 1.59 acres is landscaping (11.1% pervious).

Per the existing hydrology map, 8.65 acres (DA-1) is sheet flowing southwesterly towards and out of the corner of the property, eventually draining to the street catch basin at the northeast corner of 190th Street and Crenshaw Place. 5.58 acres (DA-2) of runoff flows towards individual inlets throughout the area and collects into an underground storm drain network. The laterals eventually collect into a 27-inch storm drain main that runs from north to south, connecting to a county storm drain RCB at 190th Street.

As part of the study, approximately 2.69 acres of off-site area (DA-0) located north of project site is included due to its drainage runoff contributing to the 27-inch storm drain.

Reference Table 1.1 and Section 3.0 for Existing Hydrology Map

Proposed Site Conditions:

The proposed site will see the demolition of the existing building, pavement, and landscaping and the development of 291,000 square feet (6.68 acres) of a manufacturing warehouse, 6.21 acres of parking/sidewalk (impervious), and 1.34 acres of landscaping.

Per the proposed hydrology map, all 14.32 acres of development will flow towards individual inlets and eventually collects into underground piping and outlets into the existing 6'-9" x 8' LACFCD RCB.

As part of the study, approximately 2.69 acres of off-site area (DA-0) located north of project site is included due to its drainage runoff contributing to the existing 27-inch storm drain, which will be upsized and relocated easterly due to the location of the proposed warehouse.

Reference Tables 1.2 and 1.3 and Section 4.0 for Proposed Hydrology Map

Hydrology Methodology

Methodology

For both existing and proposed conditions, the peak storm discharge for the drainage sub-areas was calculated based on the Los Angeles County Department of Public Works (LADPW) Hydrology Manual. LA County Hydrocalc spreadsheets (see Section 3.0 for existing and Section 4.0 for proposed) were used to calculate the 10-year and 50-year storm events. Per the LA County Hydrology Map, the soil on-site is type 09 and the 50-year isohyet is 5.8 (see Section 2.0). Due to the peak runoff for each of the above storm events for the proposed conditions exceeding the peak runoff of the existing conditions, hydromodification is required.

The Hydrocalc spreadsheets were also used to calculate the unit hydrographs for the 10-year and 50-year storm events both existing and proposed. The peak runoff from each event in the proposed condition was then input into the Hydraflow Hydrograph program (an extension of Civil 3D) to design the outlet control and detention storage.

The hydrology analysis was done for the property as well as the off-site property to the north. Note: Drainage areas DA-0 and DA-3 in the proposed condition will not be included as part of the unit hydrology analysis and detention design/outlet control (i.e., only DA-1 and DA-2 of the proposed condition will be used).

Existing Condition:

The existing project site peak runoff rates are determined using the LA County Hydrocalc spreadsheets. Refer to Section 3.0, the Existing Condition Hydrology Calculations of this report for data used in the calculations. The following table illustrates the runoff rate calculation results for the existing conditions. These values are used as the benchmark for flow reduction in the post-developed (proposed) condition for the on-site areas.

Table 1.1: EXISTING DRAINAGE SUMMARY TABLE

Drainage Area	Area (ac.)	% Impervious	FLOWRATE: 10-YR STORM (cfs)	FLOWRATE: 50-YR STORM (cfs)
DA-0	2.69	90	5.94	8.38
DA-1	8.65	98	12.22	18.57
DA-2	5.58	74	12.17	17.38
TOTAL	**16.92**		**30.33**	**44.33**

Proposed Condition:

Reference Tables 1.2 and 1.3 and Section 4.0 for Proposed Hydrology Map

The proposed site ultimately discharges to an existing 6'-9"x8' LACFCD RCB. With a fully developed site, the total peak flow rates from each storm event exceeds the existing peak flow rate, as shown in Table 1.2. To maintain or be less than the existing total outflow, underground detention systems are placed at drainage areas DA-1 and DA-2. Per Table 1.3, comparing the flows to that of the existing condition, the post-developed total on-site runoff rates are lower

due to the utilization of the underground detention systems. In addition, prior to flowing off-site, site storm water runoff will be treated by a combination of biofiltration basins and other proprietary water quality systems so as to remove, to acceptable levels, the pollutants of concern generated by the project and the pollutants of concerns for the downstream watercourses.

Table 1.2: PROPOSED DRAINAGE SUMMARY TABLE

Drainage Area	Area (ac.)	% Impervious	FLOWRATE: 10-YR STORM (cfs)	FLOWRATE: 50-YR STORM (cfs)
DA-0	2.69	90	5.94	8.38
DA-1	6.38	86	14.04	21.96
DA-2	7.05	95	15.62	19.87
DA-3	0.8	89	1.76	2.49
TOTAL	**16.92**		**37.36**	**52.70**

Table 1.3: PROPOSED DRAINAGE SUMMARY TABLE W/ DET. SYSTEM (DA-1 & DA-2 ONLY)

Drainage Area	Area (ac.)	% Impervious	FLOWRATE: 10-YR STORM (cfs)	FLOWRATE: 50-YR STORM (cfs)	
DA-0	2.69	90	5.94	8.38	
DA-1	6.38	86	8.54	16.53	DETENTION A
DA-2	7.05	95	7.91	15.90	DETENTION B
DA-3	0.8	89	1.76	2.49	
TOTAL	**16.92**		**24.15**	**43.30**	

Summary and Conclusions

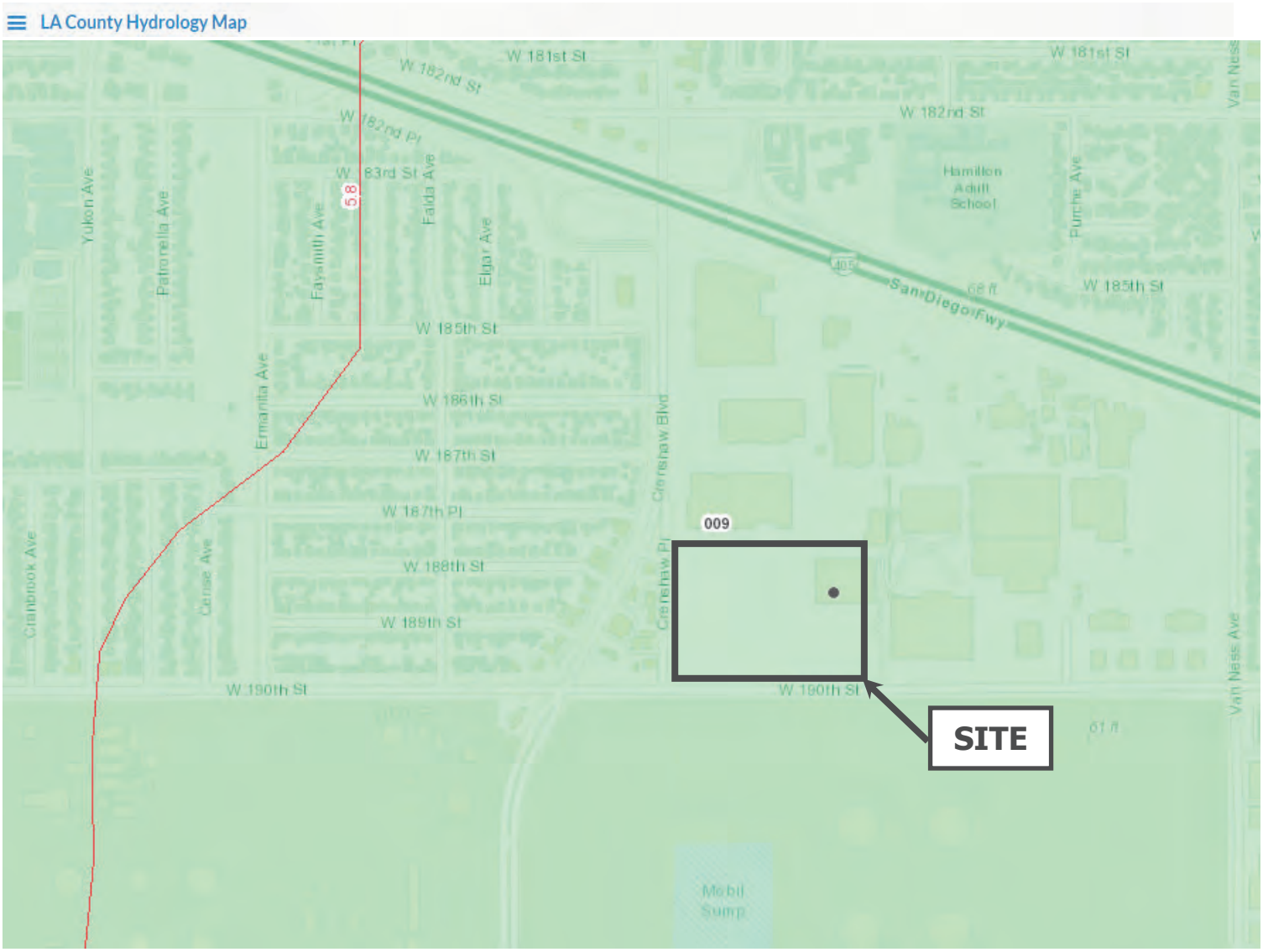
Refer to sections 3 & 4 for the proposed and existing hydrology maps depicting the drainage areas of concern. Analyzing the effective area, its computed that the total existing site flowrate in the 10-year and 50-year is **30.33 cfs** and **44.33 cfs**, respectively, and the proposed site flowrate is **24.15 cfs** and **43.30 cfs** when detention systems are in place.

Through the implementation of the detention systems and outlet controls, the peak discharges for the 10-year and 50-year storm events were dropped to below existing condition levels.

SECTION 2.0

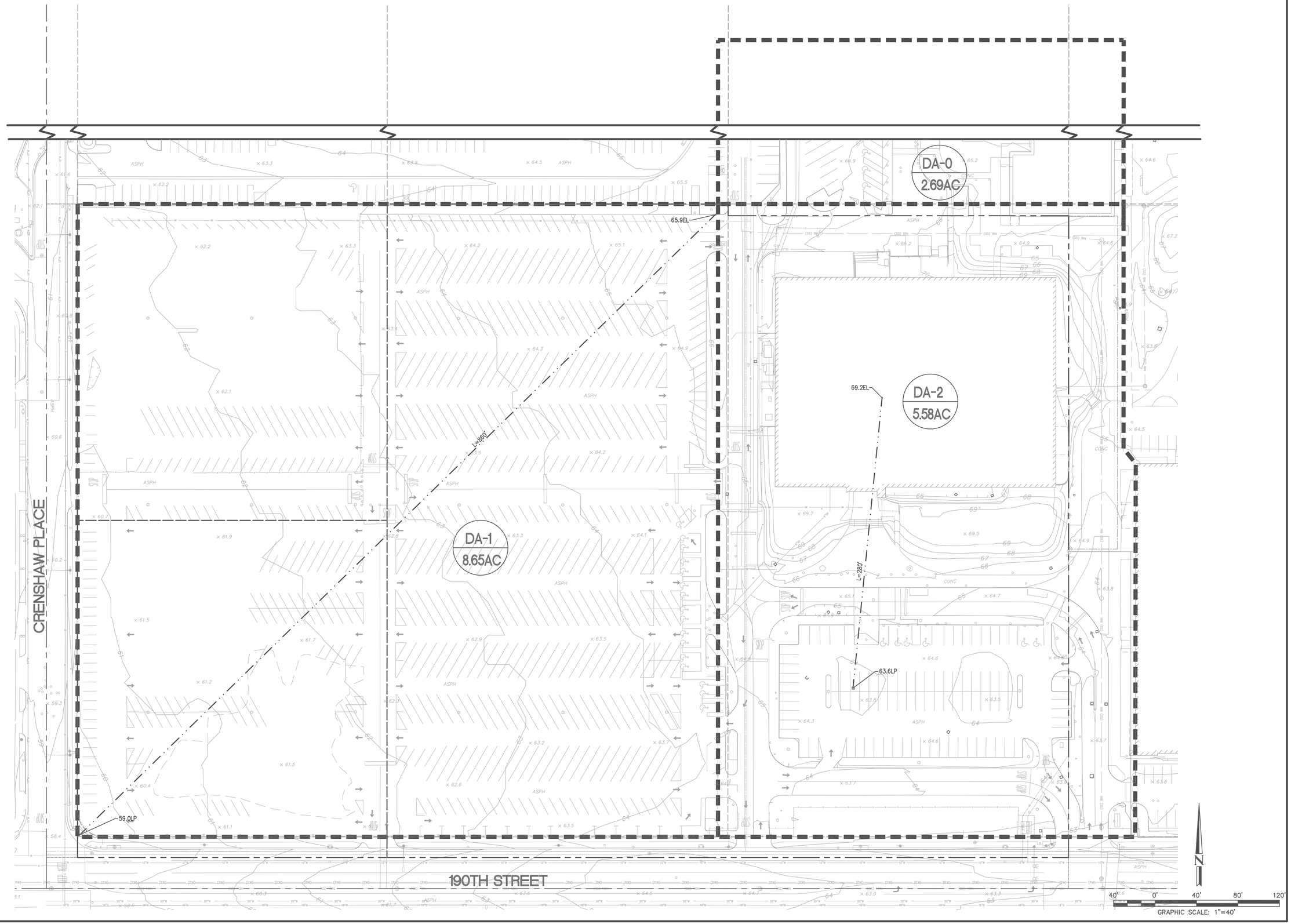
VICINITY MAP
(NOT TO SCALE)

LA COUNTY HYDROLOGY MAP
(NOT TO SCALE)



SECTION 3.0

Existing Hydrology Map
Existing 10-year Storm Calculations
Existing 50-year Storm Calculations



NOT FOR CONSTRUCTION

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DRC Engineering, Inc.
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160 S. Old Springs Road
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714-685-6860

NO.: REVISION:

DATE:

PROJECT: COMSTOCK TORRANCE
2555 W. 190TH STREET
TORRANCE, CALIFORNIA

DRAWING NAME: EXISTING HYDROLOGY MAP

ISSUE:	HYDROLOGY
DATE:	2020-07-20
CHECKED: MH	DRAWN: HM
DRAWING FILE:	
PROJECT NO.:	19-040
SHEET NUMBER:	1
OF	2 SHEETS
SCALE:	AS SHOWN

FILENAME: M:\2019\19-040 Comstock Torrance\dwg\19040_exhm.dwg, LAST SAVED ON: Jul 20 2020 8:03pm PLOTTED BY: HOMER, ON: Jul 20 2020 8:04pm, CFG:

Peak Flow Hydrologic Analysis

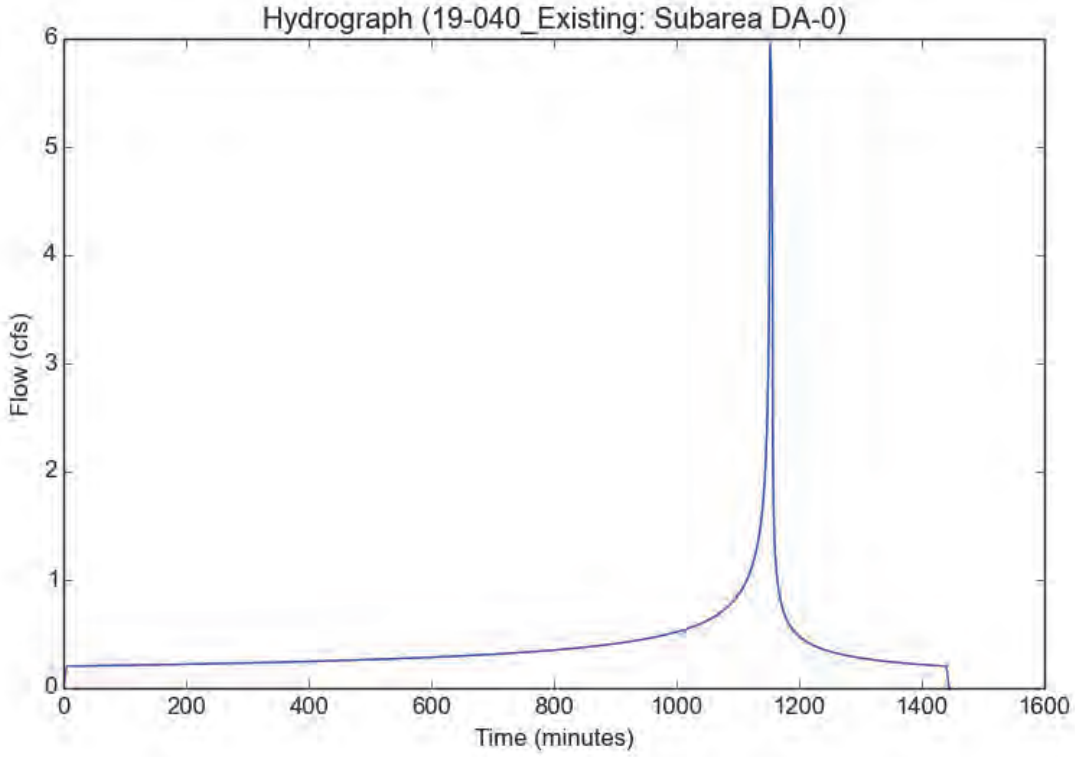
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19-040_Existing - Subarea DA-0_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19-040_Existing
Subarea ID	Subarea DA-0
Area (ac)	2.69
Flow Path Length (ft)	150.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.9
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	2.4708
Undeveloped Runoff Coefficient (Cu)	0.8343
Developed Runoff Coefficient (Cd)	0.8934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.938
Burned Peak Flow Rate (cfs)	5.938
24-Hr Clear Runoff Volume (ac-ft)	0.7617
24-Hr Clear Runoff Volume (cu-ft)	33177.4748



Peak Flow Hydrologic Analysis

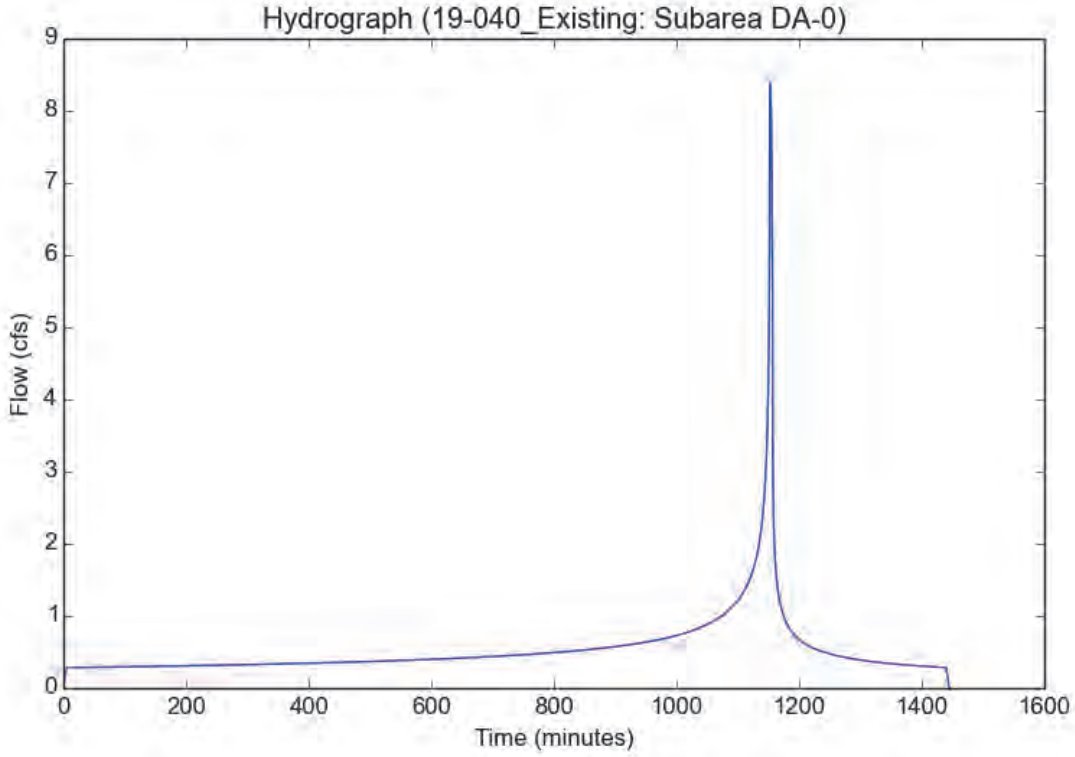
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Existing - Subarea DA-0_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19-040_Existing
Subarea ID	Subarea DA-0
Area (ac)	2.69
Flow Path Length (ft)	150.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.9
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.9013
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.3777
Burned Peak Flow Rate (cfs)	8.3777
24-Hr Clear Runoff Volume (ac-ft)	1.0712
24-Hr Clear Runoff Volume (cu-ft)	46661.3509



Peak Flow Hydrologic Analysis

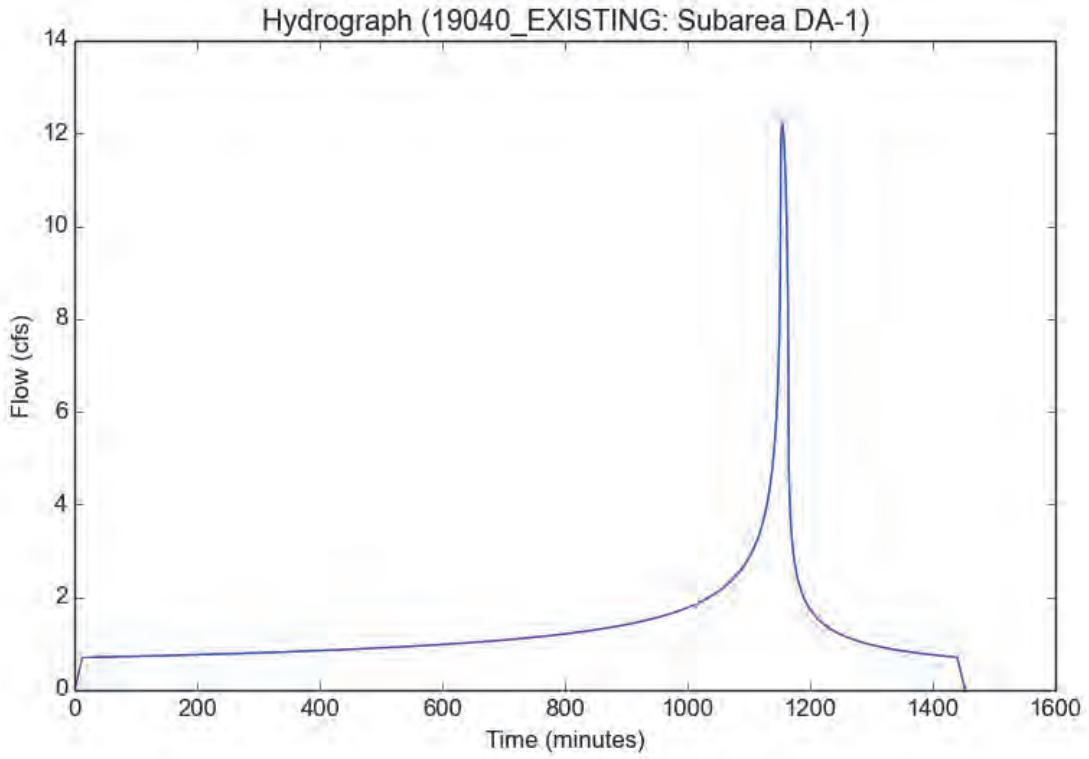
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Existing - Subarea DA-1_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_EXISTING
Subarea ID	Subarea DA-1
Area (ac)	8.65
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.98
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	1.5769
Undeveloped Runoff Coefficient (Cu)	0.6878
Developed Runoff Coefficient (Cd)	0.8958
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	12.2179
Burned Peak Flow Rate (cfs)	12.2179
24-Hr Clear Runoff Volume (ac-ft)	2.6212
24-Hr Clear Runoff Volume (cu-ft)	114178.1321



Peak Flow Hydrologic Analysis

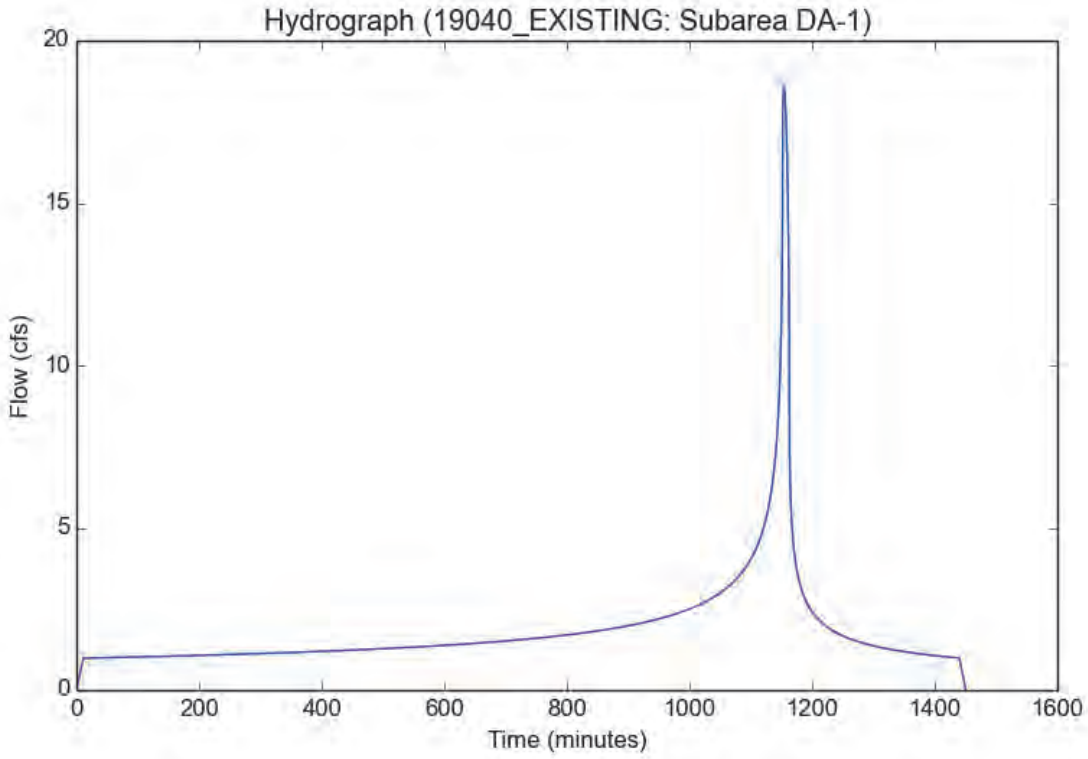
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Existing - Subarea DA-1_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_EXISTING
Subarea ID	Subarea DA-1
Area (ac)	8.65
Flow Path Length (ft)	860.0
Flow Path Slope (vft/hft)	0.007
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.98
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.8226
Developed Runoff Coefficient (Cd)	0.8985
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	18.5654
Burned Peak Flow Rate (cfs)	18.5654
24-Hr Clear Runoff Volume (ac-ft)	3.6741
24-Hr Clear Runoff Volume (cu-ft)	160045.7527



Peak Flow Hydrologic Analysis

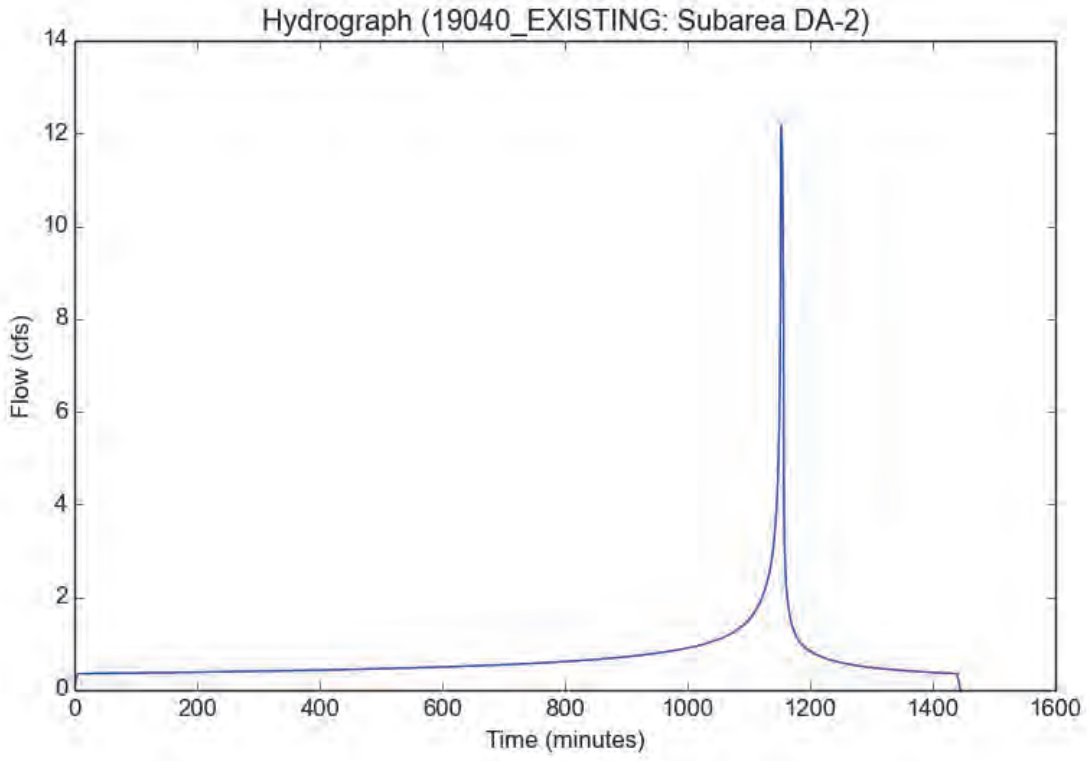
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Existing - Subarea DA-2_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_EXISTING
Subarea ID	Subarea DA-2
Area (ac)	5.58
Flow Path Length (ft)	280.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.74
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	2.4708
Undeveloped Runoff Coefficient (Cu)	0.8343
Developed Runoff Coefficient (Cd)	0.8829
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	12.1725
Burned Peak Flow Rate (cfs)	12.1725
24-Hr Clear Runoff Volume (ac-ft)	1.3578
24-Hr Clear Runoff Volume (cu-ft)	59144.9883



Peak Flow Hydrologic Analysis

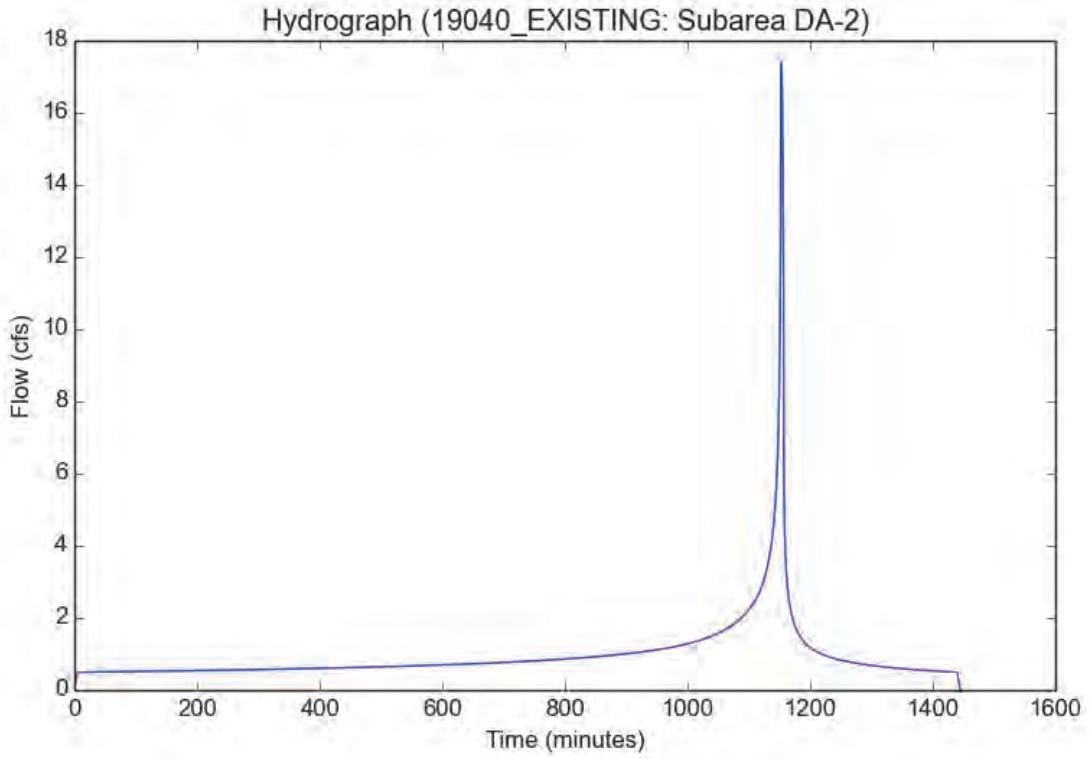
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Existing - Subarea DA-2_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_EXISTING
Subarea ID	Subarea DA-2
Area (ac)	5.58
Flow Path Length (ft)	280.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.74
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

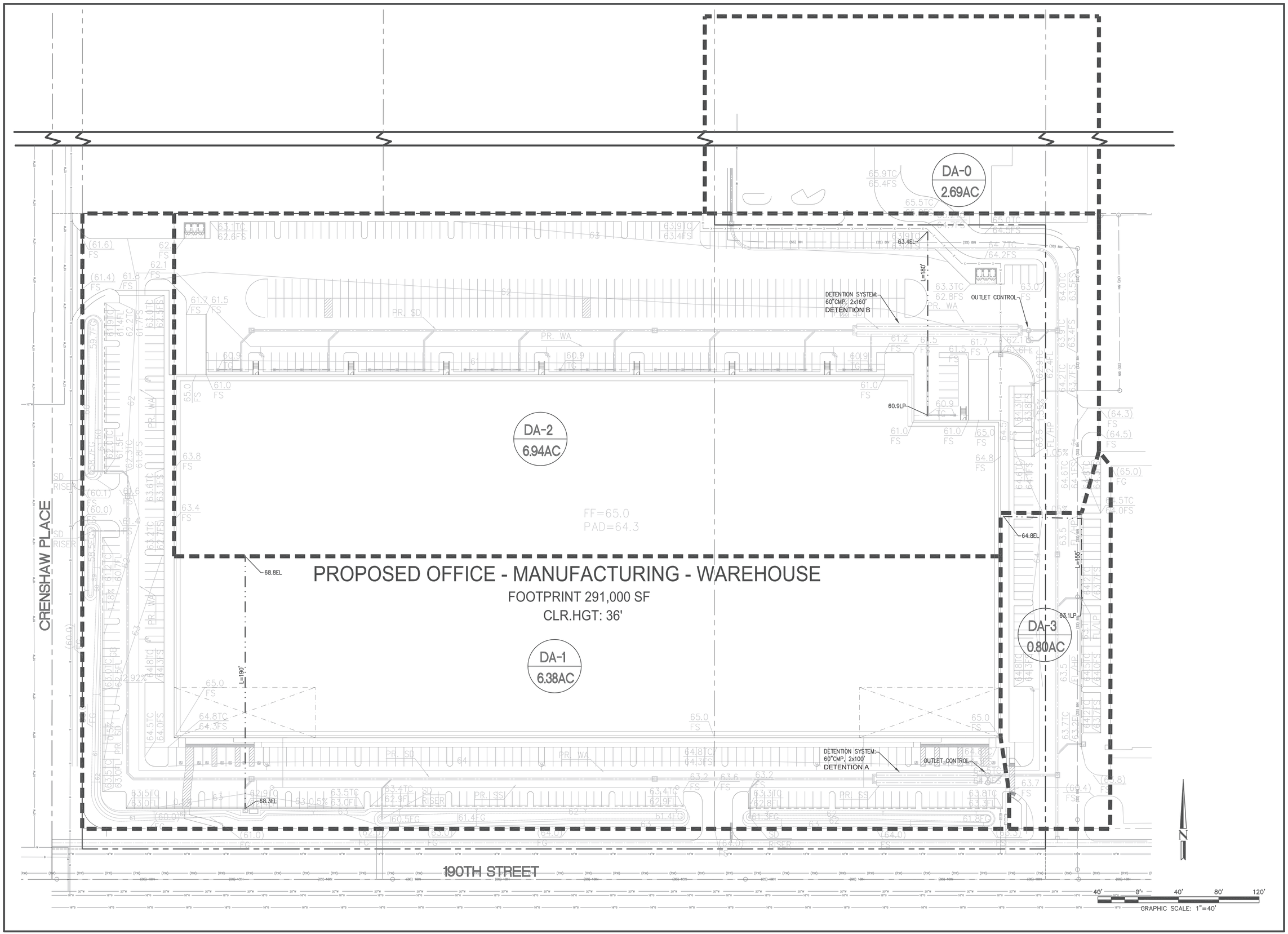
Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.9013
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	17.3783
Burned Peak Flow Rate (cfs)	17.3783
24-Hr Clear Runoff Volume (ac-ft)	1.9257
24-Hr Clear Runoff Volume (cu-ft)	83884.0343



SECTION 4.0

Proposed Hydrology Map
Proposed 10-year Storm Calculations
Proposed 50-year Storm Calculations
Detention System and Outlet Control Calculations



NOT FOR CONSTRUCTION

PREPARED BY:
DRC Engineering, Inc.
160 S. Old Springs Road
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714-685-6860
Civil Engineering/Land Surveying/Land Planning

DATE:

NO.: REVISION:

PROJECT: COMSTOCK TORRANCE
2555 W. 190TH STREET
TORRANCE, CALIFORNIA

DRAWING NAME: PROPOSED HYDROLOGY MAP

ISSUE:	HYDROLOGY
DATE:	2020-07-20
CHECKED: MH	DRAWN: HM
DRAWING FILE:	
PROJECT NO.:	19-040
SHEET NUMBER:	2
OF	2 SHEETS
SCALE:	AS SHOWN

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Peak Flow Hydrologic Analysis

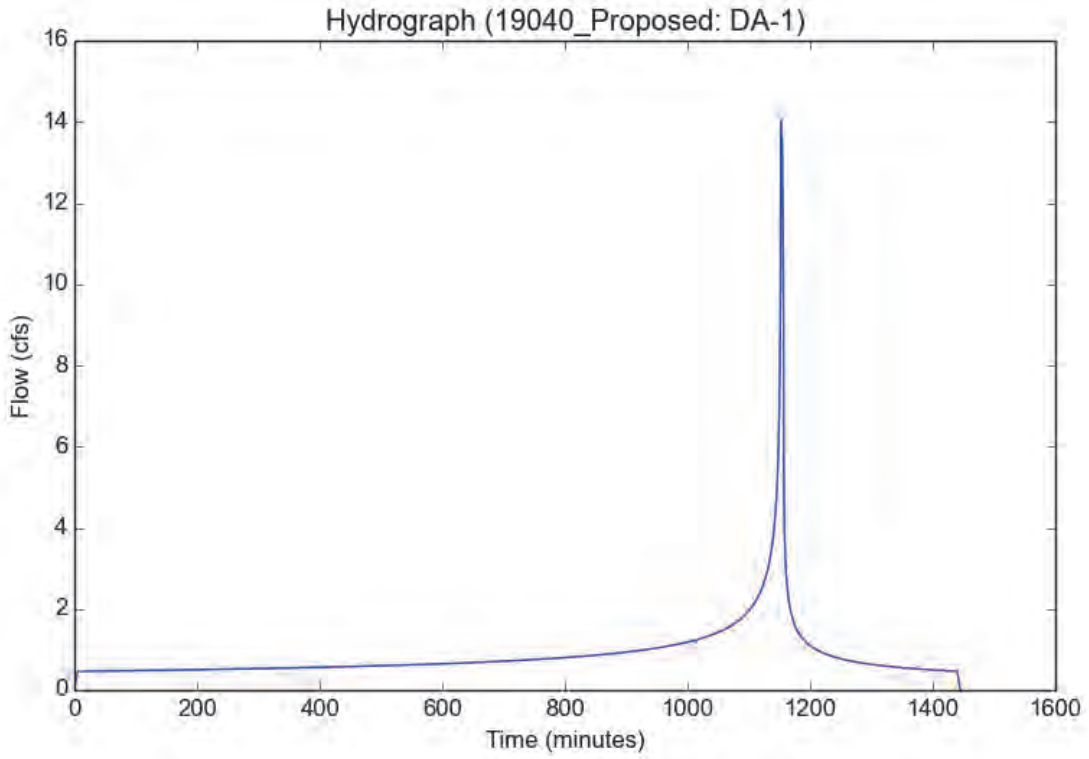
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-1_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-1
Area (ac)	6.38
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.86
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	2.4708
Undeveloped Runoff Coefficient (Cu)	0.8343
Developed Runoff Coefficient (Cd)	0.8908
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	14.042
Burned Peak Flow Rate (cfs)	14.042
24-Hr Clear Runoff Volume (ac-ft)	1.7429
24-Hr Clear Runoff Volume (cu-ft)	75922.5767



Peak Flow Hydrologic Analysis

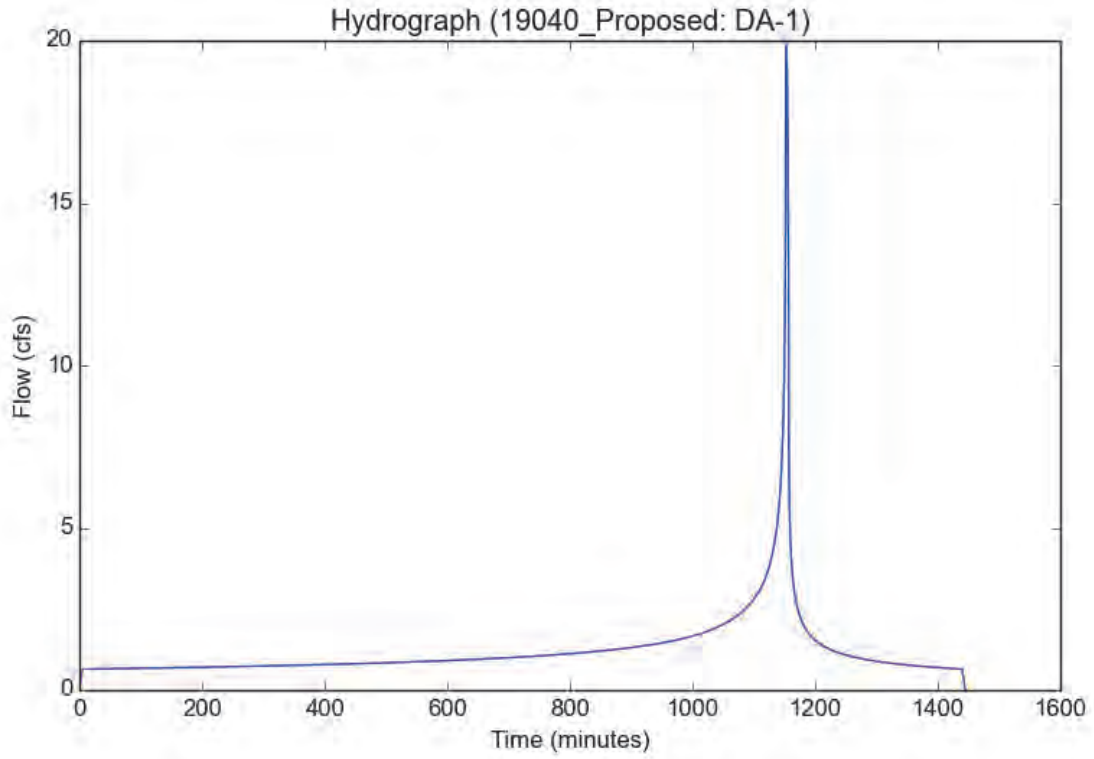
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-1_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-1
Area (ac)	6.38
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.86
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.9013
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	19.8698
Burned Peak Flow Rate (cfs)	19.8698
24-Hr Clear Runoff Volume (ac-ft)	2.4559
24-Hr Clear Runoff Volume (cu-ft)	106979.3015



Peak Flow Hydrologic Analysis

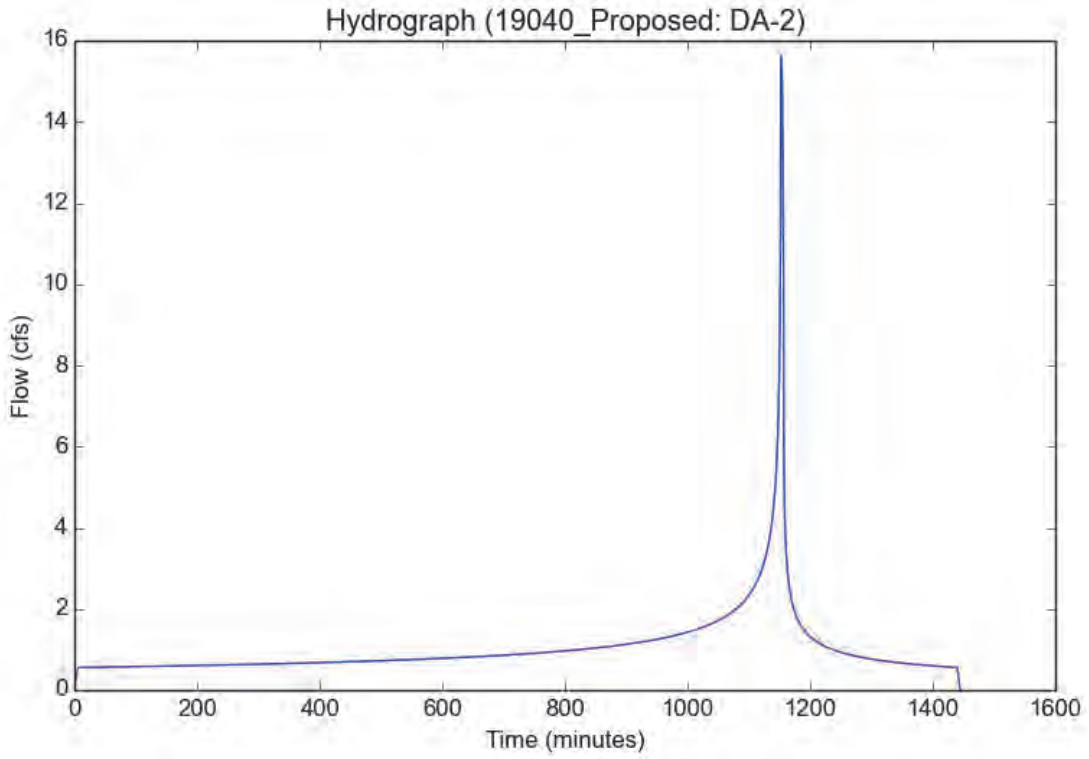
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-2_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-2
Area (ac)	7.05
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.014
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.95
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	2.4708
Undeveloped Runoff Coefficient (Cu)	0.8343
Developed Runoff Coefficient (Cd)	0.8967
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	15.6197
Burned Peak Flow Rate (cfs)	15.6197
24-Hr Clear Runoff Volume (ac-ft)	2.0839
24-Hr Clear Runoff Volume (cu-ft)	90772.7191



Peak Flow Hydrologic Analysis

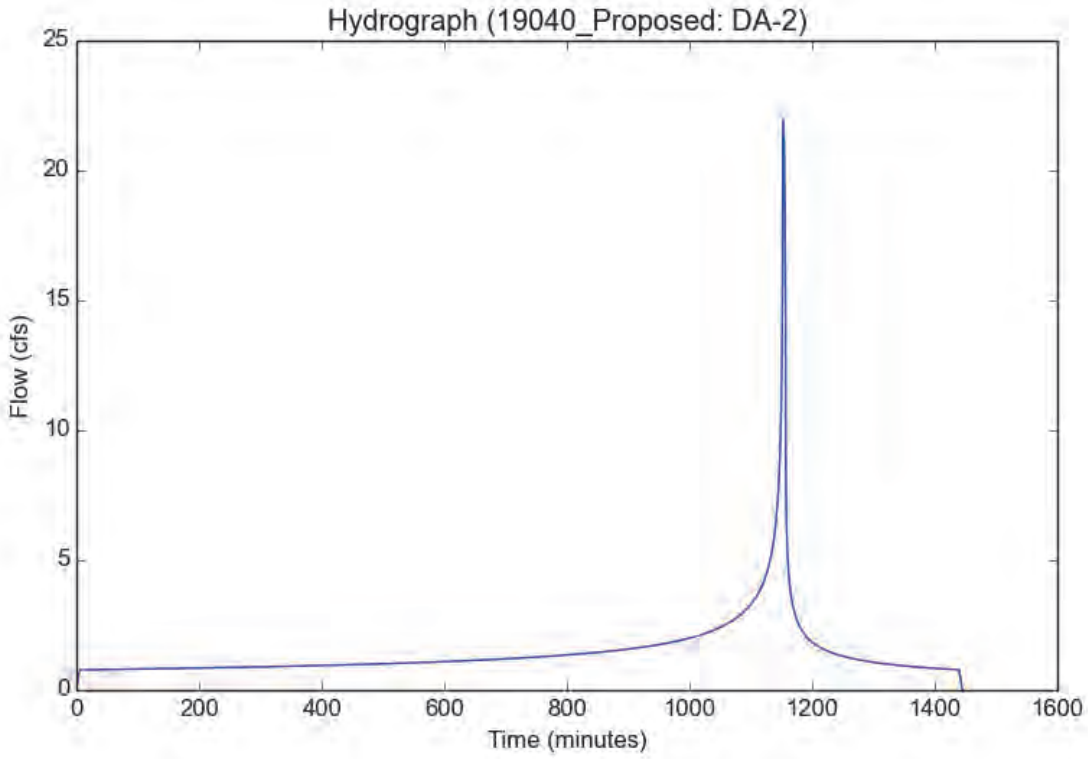
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-2_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-2
Area (ac)	7.05
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.014
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.95
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.9013
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	21.9565
Burned Peak Flow Rate (cfs)	21.9565
24-Hr Clear Runoff Volume (ac-ft)	2.9244
24-Hr Clear Runoff Volume (cu-ft)	127387.2713



Peak Flow Hydrologic Analysis

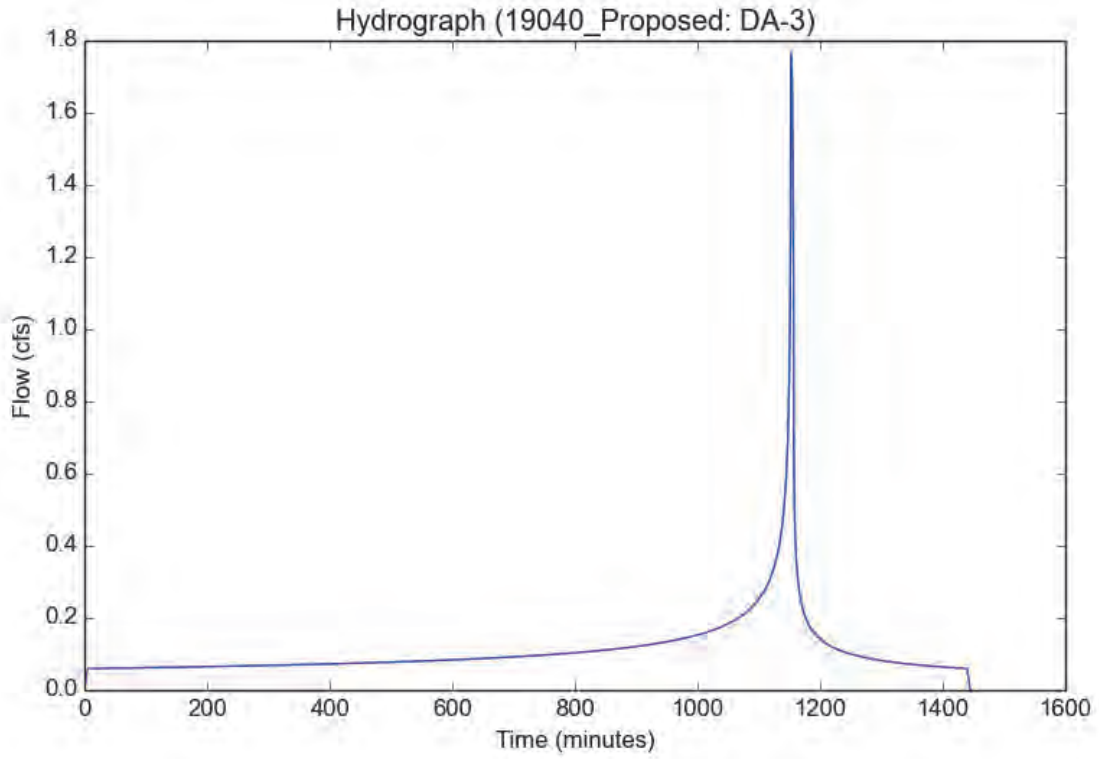
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-3_10yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-3
Area (ac)	0.8
Flow Path Length (ft)	155.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.89
Soil Type	9
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	4.1412
Peak Intensity (in/hr)	2.4708
Undeveloped Runoff Coefficient (Cu)	0.8343
Developed Runoff Coefficient (Cd)	0.8928
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7647
Burned Peak Flow Rate (cfs)	1.7647
24-Hr Clear Runoff Volume (ac-ft)	0.2245
24-Hr Clear Runoff Volume (cu-ft)	9780.1983



Peak Flow Hydrologic Analysis

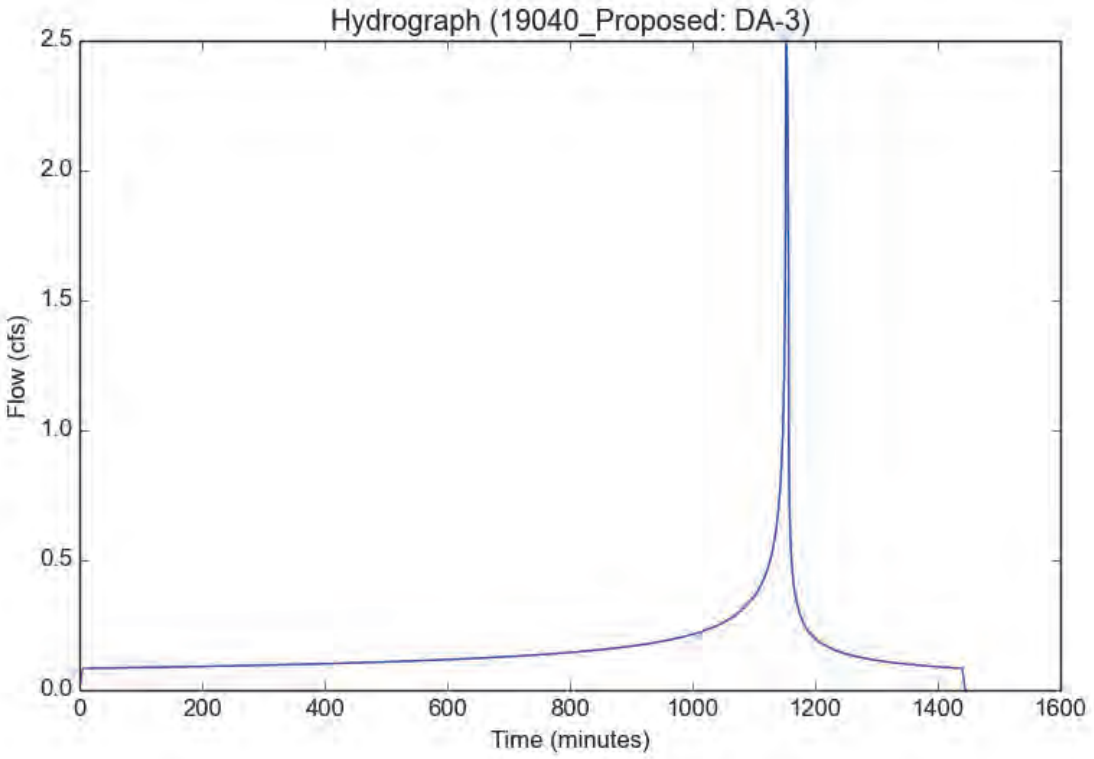
File location: M:/2019/19-040 Comstock Torrance/hm/hydrocalc/19040_Proposed - DA-3_50yr.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	19040_Proposed
Subarea ID	DA-3
Area (ac)	0.8
Flow Path Length (ft)	155.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.89
Soil Type	9
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.9013
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.4915
Burned Peak Flow Rate (cfs)	2.4915
24-Hr Clear Runoff Volume (ac-ft)	0.3159
24-Hr Clear Runoff Volume (cu-ft)	13761.3194



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	14.04	5	1160	76,302	------	------	------	Prop DA-1_10yr
2	Reservoir	8.537	5	1165	76,300	1	52.00	3,269	Detention A
4	Manual	15.62	5	1160	91,200	------	------	------	Prop DA-2_10yr
5	Reservoir	7.909	5	1165	91,197	4	54.20	5,103	Detention B
7	Manual	1.760	5	1160	9,816	------	------	------	Prop DA-3_10yr
10	Manual	0.000	5	n/a	0	------	------	------	Prop DA-1_50yr
11	Reservoir	0.000	5	n/a	0	10	46.90	0.000	Detention A
13	Manual	0.000	5	n/a	0	------	------	------	Prop DA-2_50yr
14	Reservoir	0.000	5	n/a	0	13	49.81	0.000	Detention B
16	Manual	0.000	5	n/a	0	------	------	------	Prop DA-3_50yr

10-year

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	0.000	5	n/a	0	------	------	------	Prop DA-1_10yr
2	Reservoir	0.000	5	n/a	0	1	46.90	0.000	Detention A
4	Manual	0.000	5	n/a	0	------	------	------	Prop DA-2_10yr
5	Reservoir	0.000	5	n/a	0	4	49.81	0.000	Detention B
7	Manual	0.000	5	n/a	0	------	------	------	Prop DA-3_10yr
10	Manual	19.87	5	1160	107,514	------	------	------	Prop DA-1_50yr
11	Reservoir	16.53	5	1160	107,512	10	52.00	3,663	Detention A
13	Manual	21.96	5	1160	127,965	------	------	------	Prop DA-2_50yr
14	Reservoir	15.90	5	1160	127,962	13	54.97	5,788	Detention B
16	Manual	2.490	5	1160	13,830	------	------	------	Prop DA-3_50yr

50-year

Pond Report

Pond No. 1 - Detention A

Pond Data

UG Chambers -Invert elev. = 46.90 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 100.00 ft, No. Barrels = 2, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	46.90	n/a	0	0
0.51	47.41	n/a	181	181
1.02	47.92	n/a	355	536
1.53	48.43	n/a	438	974
2.04	48.94	n/a	484	1,458
2.55	49.45	n/a	507	1,964
3.06	49.96	n/a	507	2,471
3.57	50.47	n/a	485	2,956
4.08	50.98	n/a	437	3,392
4.59	51.49	n/a	354	3,747
5.10	52.00	n/a	181	3,928

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 46.90	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 50.60	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	46.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.51	181	47.41	0.26 oc	---	---	---	0.00	---	---	---	---	---	0.261
1.02	536	47.92	0.88 oc	---	---	---	0.00	---	---	---	---	---	0.882
1.53	974	48.43	3.74 oc	---	---	---	0.00	---	---	---	---	---	3.743
2.04	1,458	48.94	4.69 ic	---	---	---	0.00	---	---	---	---	---	4.692
2.55	1,964	49.45	5.41 ic	---	---	---	0.00	---	---	---	---	---	5.414
3.06	2,471	49.96	6.05 ic	---	---	---	0.00	---	---	---	---	---	6.050
3.57	2,956	50.47	6.63 ic	---	---	---	0.00	---	---	---	---	---	6.625
4.08	3,392	50.98	7.15 ic	---	---	---	3.12	---	---	---	---	---	10.27
4.59	3,747	51.49	7.65 ic	---	---	---	11.18	---	---	---	---	---	18.83
5.10	3,928	52.00	8.11 ic	---	---	---	22.06	---	---	---	---	---	30.17

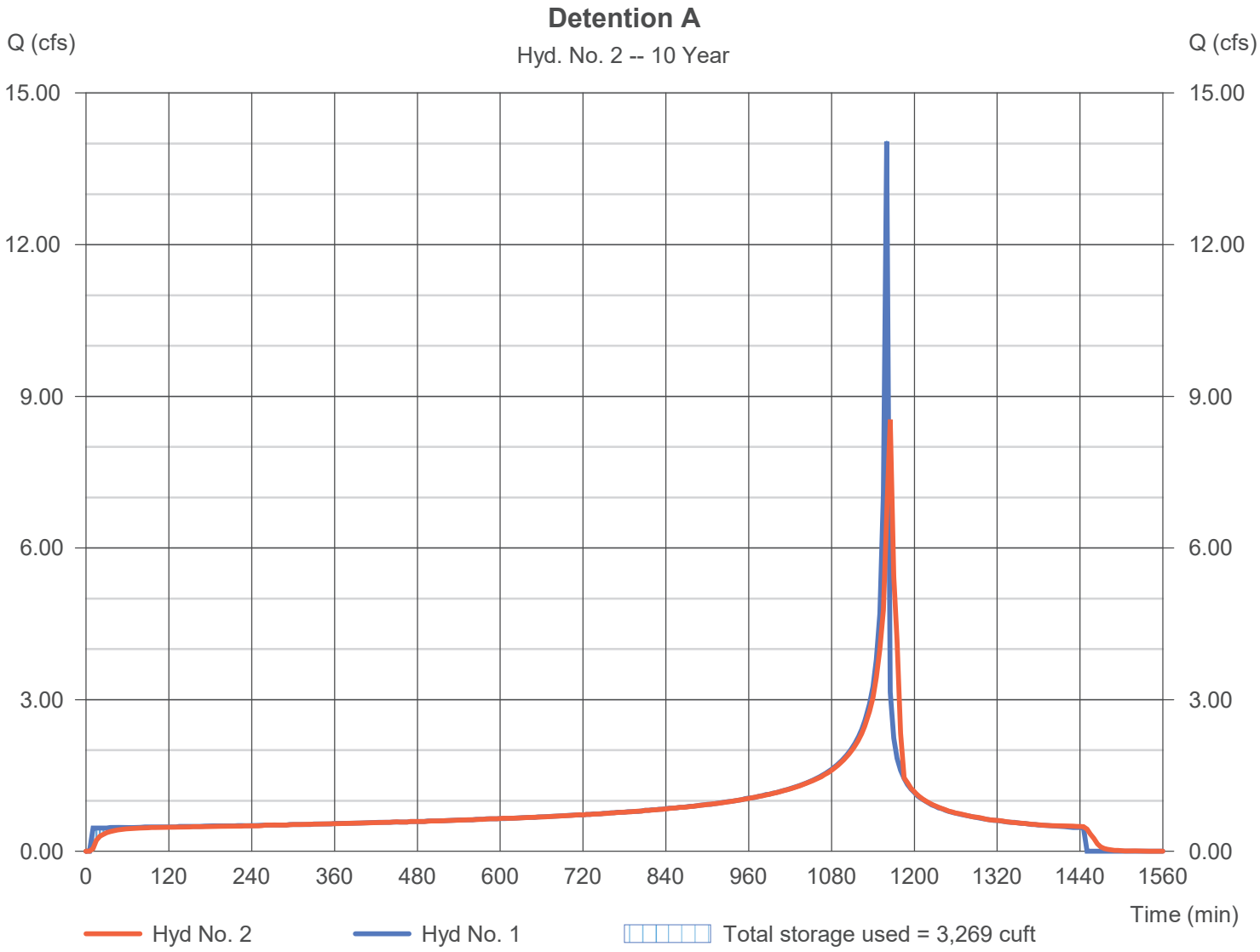
Hydrograph Report

Hyd. No. 2

Detention A

Hydrograph type	=	Reservoir	Peak discharge	=	8.537 cfs
Storm frequency	=	10 yrs	Time to peak	=	1165 min
Time interval	=	5 min	Hyd. volume	=	76,300 cuft
Inflow hyd. No.	=	1 - Prop DA-1_10yr	Max. Elevation	=	52.00 ft
Reservoir name	=	Detention A	Max. Storage	=	3,269 cuft

Storage Indication method used.



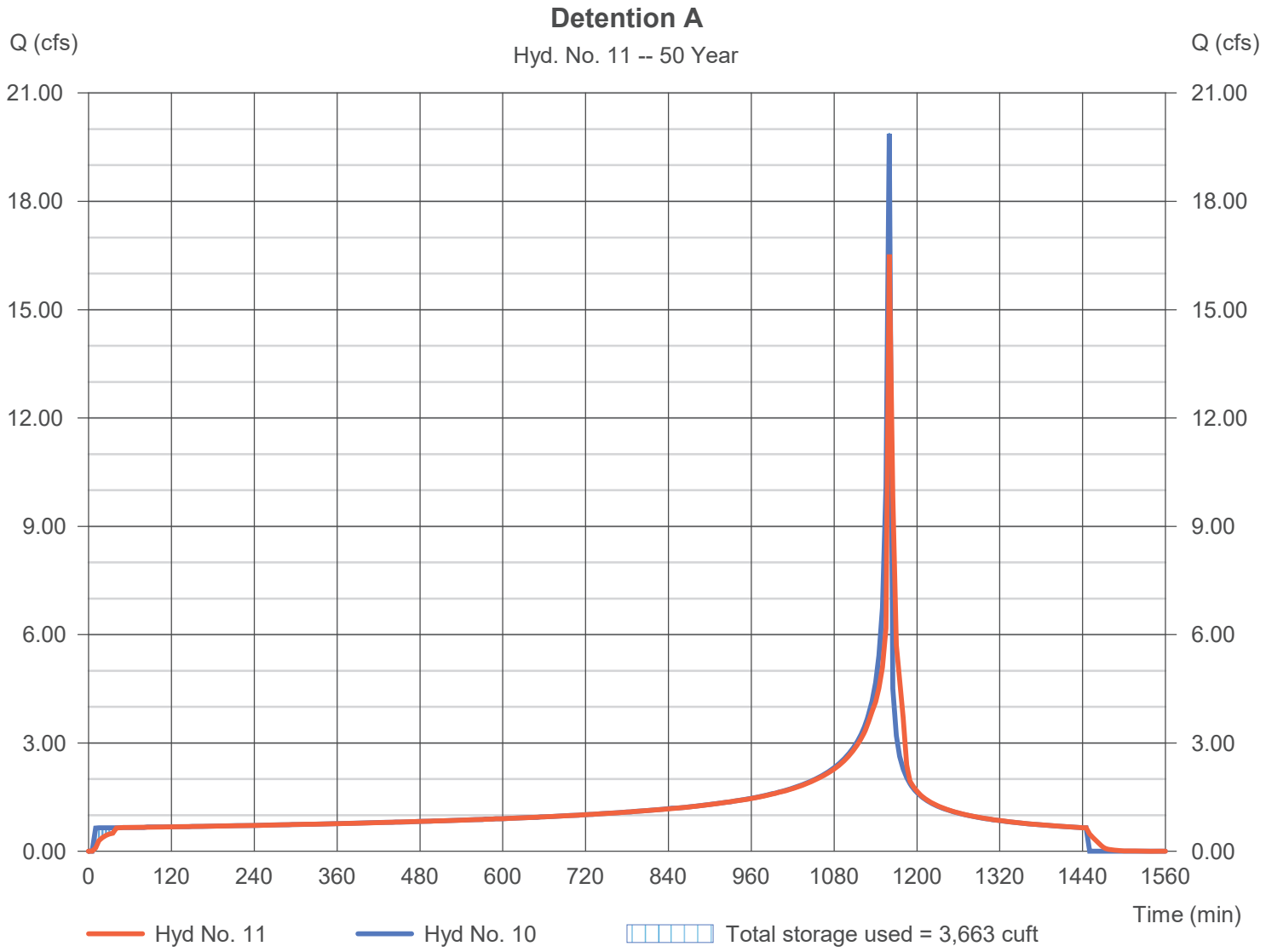
Hydrograph Report

Hyd. No. 11

Detention A

Hydrograph type	=	Reservoir	Peak discharge	=	16.53 cfs
Storm frequency	=	50 yrs	Time to peak	=	1160 min
Time interval	=	5 min	Hyd. volume	=	107,512 cuft
Inflow hyd. No.	=	10 - Prop DA-1_50yr	Max. Elevation	=	52.00 ft
Reservoir name	=	Detention A	Max. Storage	=	3,663 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Detention B

Pond Data

UG Chambers -Invert elev. = 49.81 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 160.00 ft, No. Barrels = 2, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	49.81	n/a	0	0
0.52	50.33	n/a	269	269
1.03	50.84	n/a	566	835
1.55	51.36	n/a	705	1,540
2.06	51.87	n/a	783	2,323
2.58	52.39	n/a	820	3,143
3.10	52.91	n/a	820	3,963
3.61	53.42	n/a	783	4,746
4.13	53.94	n/a	705	5,451
4.64	54.45	n/a	566	6,016
5.16	54.97	n/a	268	6,284

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 49.81	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 53.51	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	49.81	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.52	269	50.33	0.27 oc	---	---	---	0.00	---	---	---	---	---	0.265
1.03	835	50.84	1.04 oc	---	---	---	0.00	---	---	---	---	---	1.044
1.55	1,540	51.36	3.80 oc	---	---	---	0.00	---	---	---	---	---	3.805
2.06	2,323	51.87	4.73 ic	---	---	---	0.00	---	---	---	---	---	4.729
2.58	3,143	52.39	5.45 ic	---	---	---	0.00	---	---	---	---	---	5.453
3.10	3,963	52.91	6.09 ic	---	---	---	0.00	---	---	---	---	---	6.092
3.61	4,746	53.42	6.67 ic	---	---	---	0.00	---	---	---	---	---	6.670
4.13	5,451	53.94	7.20 ic	---	---	---	3.73	---	---	---	---	---	10.93
4.64	6,016	54.45	7.70 ic	---	---	---	12.22	---	---	---	---	---	19.91
5.16	6,284	54.97	8.16 ic	---	---	---	23.50	---	---	---	---	---	31.66

Hydrograph Report

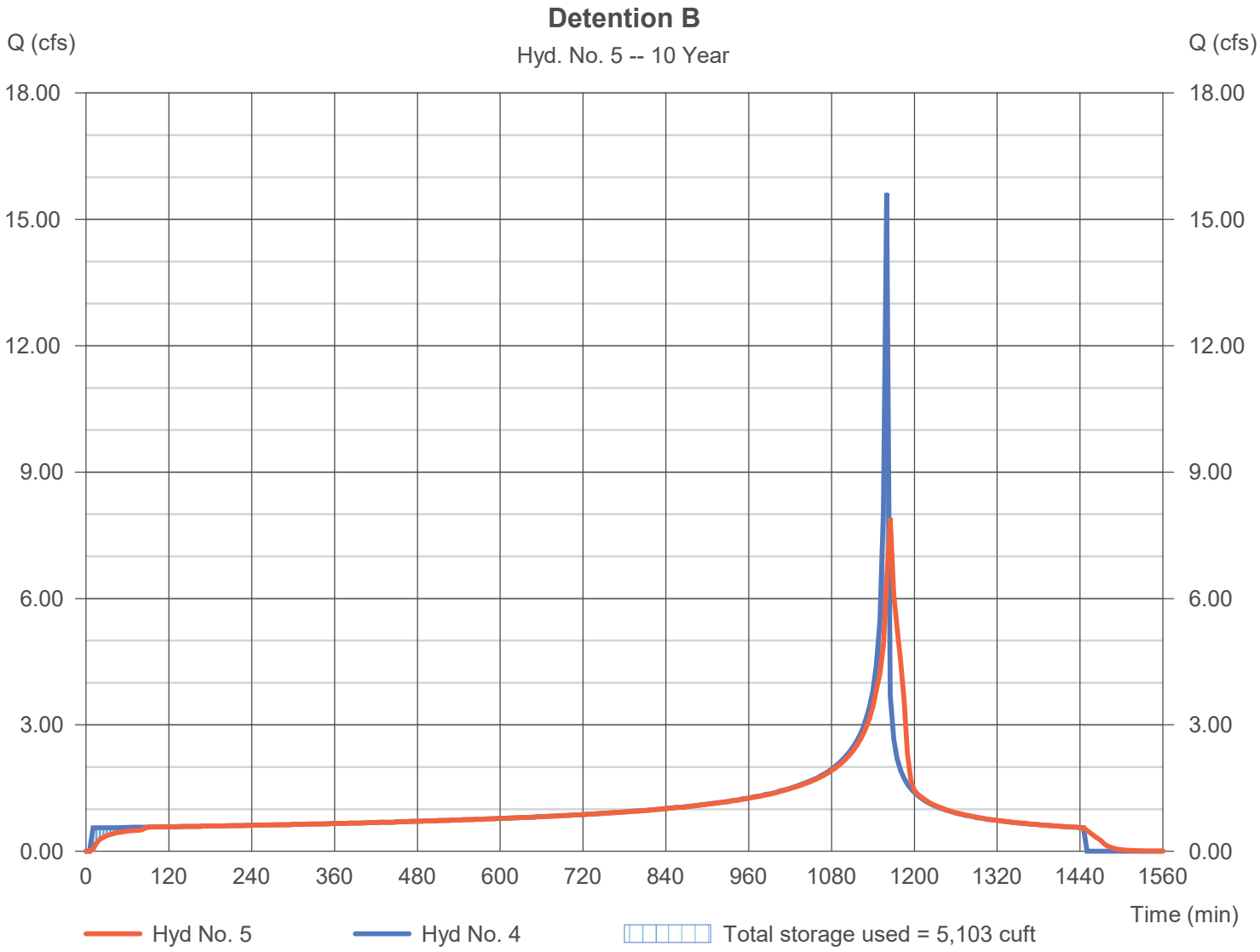
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 07 / 21 / 2020

Hyd. No. 5

Detention B

Hydrograph type	= Reservoir	Peak discharge	= 7.909 cfs
Storm frequency	= 10 yrs	Time to peak	= 1165 min
Time interval	= 5 min	Hyd. volume	= 91,197 cuft
Inflow hyd. No.	= 4 - Prop DA-2_10yr	Max. Elevation	= 54.20 ft
Reservoir name	= Detention B	Max. Storage	= 5,103 cuft

Storage Indication method used.



Hydrograph Report

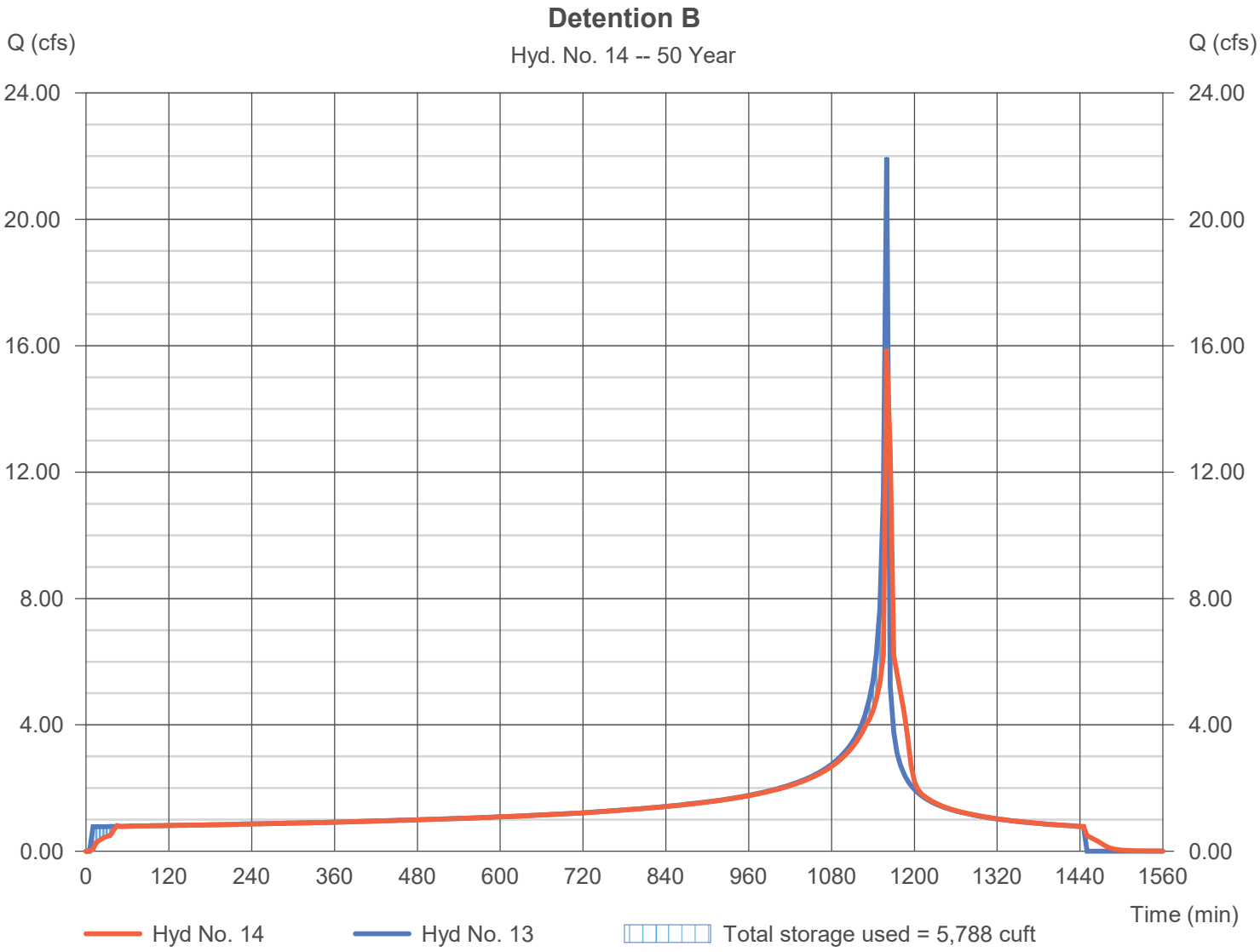
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5 Tuesday, 07 / 21 / 2020

Hyd. No. 14

Detention B

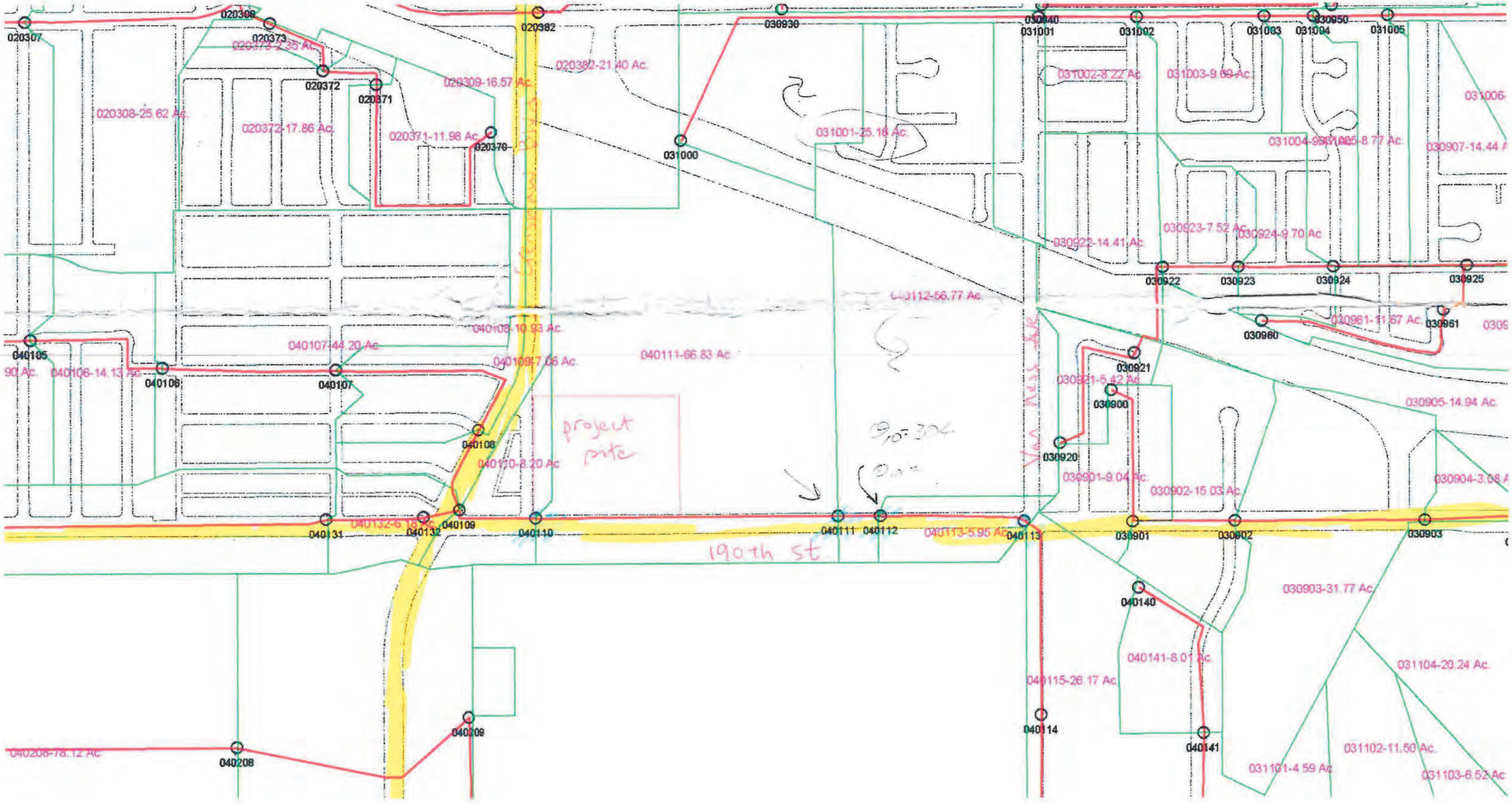
Hydrograph type	=	Reservoir	Peak discharge	=	15.90 cfs
Storm frequency	=	50 yrs	Time to peak	=	1160 min
Time interval	=	5 min	Hyd. volume	=	127,962 cuft
Inflow hyd. No.	=	13 - Prop DA-2_50yr	Max. Elevation	=	54.97 ft
Reservoir name	=	Detention B	Max. Storage	=	5,788 cuft

Storage Indication method used.



SECTION 5.0

Storm Drain Master Plan
Tributary Areas Q and Pipe Capacity Data


020307
020309
020373
020373-2.35 Ac.
020372
020371
020382
020382-21.40 Ac.
030930
030940
031001
031002
031003
030950
031004
031005
031006
020308-25.62 Ac.
020372-17.86 Ac.
020309-16.57 Ac.
020371-11.98 Ac.
020370
031000
031001-25.18 Ac.
031002-8.27 Ac.
031003-9.89 Ac.
031004-9.85
031005-8.77 Ac.
030907-14.44 A
030922-14.41 Ac.
030923-7.52 Ac.
030924-9.70 Ac.
030922
030923
030924
030925
040112-56.77 Ac.
030961-11.67 Ac.
030961
030960
040108-10.93 Ac.
040107-44.20 Ac.
040109-7.06 Ac.
040111-66.83 Ac.
040105
90 Ac.
040106-14.13 Ac.
040106
040107
030921
030921-5.42 Ac.
030900
030905-14.94 Ac.
project site
040108
040110-8.20 Ac
030920
030901-9.04 Ac.
030902-15.03 Ac.
030904-3.08 A
040131
040132-6.18 Ac.
040132
040109
040110
040111
040112
040113-5.95 Ac.
040113
030901
030902
030903
190th st
030903-31.77 Ac.
040140
040141-8.01 Ac.
040115-26.17 Ac.
031104-20.24 Ac.
040114
040141
031102-11.50 Ac.
031101-4.59 Ac
031103-6.52 Ac
040209
040208-78.12 Ac.
040208

NODE_ID	USNODE	DSNODE	AREA	Expn	Expr2	USELEVTOPO	DSELEVTOPO	LENGTHTOP	TOPOSLOPE	DIAMTE	PIPENO_WI	SIDESLOPE	MANNIN	Q10LAF	Q25LAF	Q50LAF	BALHGL_U	BALHGL_D	STWID	QST25	QST50	PIPECAP	Q10TOT	Q25TOT	Q50TOT	Q10DEF	Q25DEF	Q50DEF	MAXDEF	MAXDEFY	PARALLELQ	PARALLELD	REPLQ	REPLDIA	ADVOCDI	RECDIA	RECWIDT
040110-040111	40110	40111	357373	04	01	60	60.5	1573	-0.0003	6	7	0	0	223	254	294	51.78	48.63	0	0	0	358	358	358	358				0							
040111-040112	40111	40112	2910148	04	01	60.5	60	221	0.0023	9	8	0	0	302	346	398	48.63	48.19	80	24.4	52.6	496.8	496.8	521.2	549.5				0							
040112-040113	40112	40113	2473730	04	01	60	59.5	750	0.0007	7.08	9	0	0	370	424	487	48.19	46.69	80	13.2	28.6	413.5	413.5	426.7	442.1	0	0	45	45	50-Yr	45	3.75	456	9.00	6	9.00	0
040113-040114	40113	40114	259013.1	04	01	59.5	59.2	1048	0.0003	7.08	9	0	0	371	426	489	46.69	44.59	52	19.3	37.8	413.5	413.5	432.8	451.3	0	0	38	38	50-Yr	38	3.50	451	9.00	0	9.00	0
040114-040115	40114	40115		04	01	59.2	59	522	0.0004	8.5	1	0	0	368	422	485	44.59	43.55	52	22.3	43.7	445.2	445.2	467.5	488.9				0							
040141-040142	40141	40142	349321.8	04	01	58.41	58.3	460	0.0002	2	1	0	0	27	30	33	53.22	49.67	32	15.7	27.5	18.4	18.4	34.1	45.9	9	0	0	9	10-Yr	9	1.75	27	2.50	0	2.50	0
040142-040115	40142	40115		04	01	58.3	59	792	-0.0009	2	1	0	0	21	24	27	49.67	43.55	0	0	0	18.4	18.4	18.4	18.4	3	6	9	9	50-Yr	9	1.75	27	2.50	0	2.50	0
040115-040116	40115	40116	1140292	04	01	59	58.6	550	0.0007	8.5	1	0	0	384	442	506	43.55	42.45	52	30.7	60.2	445.2	445.2	475.9	505.4	0	0	1	1	50-Yr	1	0.75	446	9.00	0	9.00	0
040116-040117	40116	40117	84118.82	04	01	58.6	58.3	1101	0.0003	8	7	0	0	385	443	506	42.45	40.25	52	18.8	36.9	340	340	358.8	376.9	45	84	129	129	50-Yr	129	5.50	469	9.00	0	9.00	0
040117-040118	40117	40118	11149700	04	01	58.3	57	1118	0.0012	25	9	0	0	640	741	829	40.25	38.01	0	0	0	2224.8	2224.8	2224.8	2224.8				0							
040118-040119	40118	40119		04	01	57	51.16	315	0.0185	35	9	0	0	638	738	827	38.01	37.38	0	0	0	3204	3204	3204	3204				0							
040151-040152	40151	40152	2497093	04	01	70	69	305	0.0033	3.75	1	0	0	78	87	99	69	66.71	65	30.5	66.1	97.3	97.3	127.7	163.3				0							
040152-040153	40152	40153	1700882	04	01	69	68	191	0.0052	3.75	1	0	0	134	150	174	66.71	65.28	65	38.5	83.6	97.3	97.3	135.8	180.8	37	14	0	37	10-Yr	37	2.75	134	4.25	0	4.25	0
040153-040154	40153	40154	689021.8	04	01	68	65	496	0.006	3.75	1	0	0	167	189	217	65.28	61.56	66	41	89.7	97.3	97.3	138.2	187.7	0	51	30	70	10-Yr	70	3.50	167	4.75	0	4.75	0
040154-040155	40154	40155		04	01	65	59	860	0.007	4	1	0	0	166	189	216	61.56	55.12	66	44	96.4	115.5	115.5	159.5	211.9	50	29	4	50	10-Yr	50	3.00	166	4.75	0	4.75	0
040155-040156	40155	40156	404155.2	04	01	59	56	460	0.0065	4	1	0	0	173	197	225	55.12	51.67	66	42.5	93.2	115.5	115.5	158.1	208.7	57	39	16	57	10-Yr	57	3.25	173	4.75	0	4.75	0
040156-040157	40156	40157		04	01	56	53	482	0.0062	4.25	1	0	0	171	196	223	51.67	48.06	66	41.6	91.1	135.8	135.8	177.4	226.9	35	19	0	35	10-Yr	35	2.75	171	4.75	0	4.75	0
040157-040158	40157	40158		04	01	53	50.34	607	0.0044	3.25	1	0	0	171	195	223	48.06	43.51	66	34.9	76.4	66.4	66.4	101.3	142.8	105	94	80	105	10-Yr	105	4.00	171	4.75	0	4.75	0
040158-040119	40158	40119	467480.4	04	01	50.34	51.16	818	-0.001	5	1	0	0	177	202	229	43.51	37.38	0	0	0	209.4	209.4	209.4	209.4	0	0	20	20	50-Yr	20	2.25	229	5.25	0	5.25	0
040119-040120	40119	40120		04	01	51.16	51.93	105	-0.0074	35	9	0	0	790	905	1023	37.38	37.17	0	0	0	3204	3204	3204	3204				0							
040161-040162	40161	40162	219135	04	01	69.48	68.11	847	0.0016	2	1	0	0	22	25	27	66.92	61.73	55	45.5	91.1	16.4	16.4	61.9	107.5	6	0	0	6	10-Yr	6	1.50	22	2.25	0	2.25	0
040162-040163	40162	40163	620491.3	04	01	68.11	67.75	522	0.0007	2.5	1	0	0	40	47	52	61.73	58.54	46	29.8	56.3	29.8	29.8	59.5	86.1	0	0	0	10	10-Yr	10	1.75	40	3.00	0	3.00	0
040163-040164	40163	40164	328036.9	04	01	67.75	67.81	484	-0.0001	2.75	1	0	0	41	56	68	58.54	55.58	0	0	0	38.4	38.4	38.4	38.4	3	18	30	30	50-Yr	30	2.50	68	3.50	0	3.50	0
040176-040177	40176	40177	123251.7	04	01	69	67.92	665	0.0016	2.5	1	0	0	11	13	13	63.98	57.82	46	45.7	86.3	36.7	36.7	82.5	123.1				0							
040177-040164	40177	40164	297627.1	04	01	67.92	67.81	242	0.0005	2.75	1	0	0	28	32	35	57.82	55.58	46	24.2	45.6	47.4	47.4	71.5	93				0							
040164-040165	40164	40165	292057.6	04	01	67.81	65	376	0.0075	3.5	1	0	0	72	95	111	55.58	53.28	0	0	0	73	73	73	73	0	22	38	38	50-Yr	38	2.75	111	4.25	0	4.25	0
040165-040166	40165	40166	158016.5	04	01	65	62.92	840	0.0025	3.5	1	0	0	79	102	120	53.28	48.13	0	0	0	73	73	73	73.6		29	47	47	50-Yr	47	3.00	120	4.25	0	4.25	0
040166-040167	40166	40167	713873.9	04	01	62.92	46.03	1031	0.0164	3.5	1	0	0	108	135	155	48.13	41.82	0	0	0	73	73	73	73.35		62	82	82	50-Yr	82	3.75	155	4.75	0	4.75	0
040167-040168	40167	40168	176192.5	04	01	46.03	53.03	351	-0.02	4.5	1	0	0	109	136	156	41.82	39.68	0	0	0	142.6	142.6	142.6	142.6	0	0	13	13	50-Yr	13	2.00	156	4.75	0	4.75	0
040168-040120	40168	40120	1558008	04	01	53.03	51.93	409	0.0027	5	1	0	0	160	193	223	39.68	37.17	0	0	0	188.9	188.9	188.9	188.9	0	4	34	34	50-Yr	34	2.75	223	5.50	0	5.50	0
040120-040121	40120	40121		04	01	51.93	46.54	752	0.0072	35	9	0	0	920	1062	1209	37.17	35.67	0	0	0	3204	3204	3204	3204				0							
040171-040172	40171	40172	5544397	04	01	45.43	46.94	233	-0.0065	4.5	1	0	0	180	199	229	39.31	37.62	0	0	0	154.9	154.9	154.9	154.9	25	44	74	74	50-Yr	74	3.50	229	5.25	0	5.25	0
040181-040182	40181	40182	189553	04	01	52.02	51.18	434	0.0019	2.5	1	0	0	15	17	19	47.77	45.41	62	24	50.7	28	28	52	78.7				0							
040182-040172	40182	40172	389352.1	04	01	51.18	46.94	1431	0.003	3.5	1	0	0	34	41	45	45.41	37.62	62	29.7	62.7	68.7	68.7	98.3	131.4				0							
040172-040121	40172	40121	631317.2	04	01	46.94	46.54	271	0.0015	3	12	0	0	227	255	292	37.62	35.67	0	0	0	341.7	341.7	341.7	341.7				0							
040121-040122	40121	40122		04	01	46.54	48.67	843	-0.0025	35	9	0	0	1128	1293	1475	35.67	33.98	0	0	0	3204	3204	3204	3204				0							
040191-040192	40191	40192	760760.2	04	01	47.21	48.54	406	-0.0033	2.5	1	0	0	37	41	49	39.49	35.85	0	0	0	36.1	36.1	36.1	36.1	1	5	13	13	50-Yr	13	1.75	49	3.00	0	3.00	0
040192-040122	40192	40122	261926.2	04	01	48.54	48.67	209	-0.0006	4	1	0	0	47	50	63	35.85	33.98	0	0	0	126.5	126.5	126.5	126.5				0							
040122-040123	40122	40123	1453433	04	01	48.67	48.06	1106	0.0006	35	9	0	0	1206	1383	1575	33.98	31.77	0	0	0	3204	3204	3204	3204				0							
040123-040124	40123	40124	2752924	04	01	48.06	47.65	598	0.0007	35	9	0	0	1282	1468	1672	31.77	30.58	0	0	0	3204	3204	3204	3204				0							
040124-040125	40124	40125	840910.9	04	01	47.65	34.77	923	0.0139	35	9	0	0	1290	1479	1683	30.58	28.73	0	0	0	3204	3204	3204	3204				0							
040196-040125	40196	40125	324446.7	04	01	45	34.77	1063	0.0096	2	1	0	0	24	30	32	37.91	28.73	60	54.2	112.7	19.5	19.5	73.7	132.2	5	0	0	5	10-Yr	5	1.25	24	2.25	0	2.25	0
040125-040126	40125	40126	1515313	04	01	34.77	36.67	113	-0.0169	11.5	7	0	0	1338	1533	1743	28.73	28.5	0	0	0	598.8	598.8	598.8	598.8	739	934	1144	1144	50-Yr	1144	12.50	1743	14.50	0	14.50	0
040126-040127	40126	40127	195965.5	04	01	36.67	50	405	-0.0329	11.5	7	0	0	1339	1536	1745	28.5	27.69	0	0	0	598.8	598.8	598.8	598.8	740	937	1146	1146	50-Yr	1146	12.50	1745	14.50	0	14.50	0
			52296202.52		01 Total																																
040301-040302	40301	40302		04	03	94	92	469	0.0043	0	0	0	0	22	25	27	90.61	86.41	36	69.3	124	0	0	69.3	124	22	0	0	22	10-Yr	22	2.25	22	2.25	0	2.25	0
040302-040303	40302	40303	120223.5	04	03	92	91.72	323	0.0009	2	1	0	0	24	26	31	86.41	83.52	64	15.8	34	19.8	19.8	35.6	53.8	4	0	0	4	10-Yr	4	1.25	24	2.25	0	2.25	0
040303-040304	40303	40304	360751.2	04	03	91.72	86.92	509	0.0094	2.25	1	0	0	38	44	50	83.52	78.96	64	52.1	112	27.1	27.1	79.2	139.2	11	0	0	11	10-Yr	11	1.75	38	2.75	0	2.75	0
040304-040305	40304	40305	437712.5	04	03	86.92	86.26	83	0.008	2.5	1	0	0	59	67	77	78.96	78.22	0	0	0	35.9	35.9	35.9	35.9	23	31	41	41	50-Yr	41	2.75	77	3.50	0	3.50	0
040311-040312	40311	40312	1624597	04	03	100.35	98.95	267	0.0053	2	1	0	0	36	42	51	82.68	81.25	0	0	0	15.4	15.4	15.4	15.4	21	27	36	36	50-Yr	36	2.75	51	3.25	0	3.25	0
040312-040313	40312	40313		04	03	98.95	92.58	292	0.0218	2	1	0	0	36	42	51	81.25	79.67	0	0	0	15.4	15.4	15.4	15.4	21	27	36	36	50-Yr	36	2.75	51	3.25	0	3.25	0
040313-040305	40313	40305		04	03	92.58	86.26	269	0.0235	2.5	1	0	0	36	42	51	79.67	78.22	0	0	0	28	28	28	28	8	14	23	23	50-Yr	23	2.50	51	3.25	0	3.25	0
040305-040306	40305	40306		04	03	86.26	77.8	171	0.0494	3.5	1	0	0	93	106	126	78.22	76.69	0	0	0	88.1	88.1	88.1	88.1	5	18	38	38	50-Yr	38	2.75	126	4.25	0	4.25	0
040306-040307	40306	40307	168529.1	04	03	77.8	75.53	242	0.0094	3.75	1	0	0	98	113	133	76.69	74.53	0	0	0	105.9	105.9	105.9	105.9	0	7	27	27	50-Yr	27	2.25	133	4.25	0	4.25	0
040307-040308	40307	40308	390515.5	04	03	75.53	78.75	362	-0.0089	3.75	1	0	0	117	134	158	74.53	73.81	0	0	0	50.2	50.2	50.2	50.2	67	84	108	108	50-Yr	108	5.00	158	6.00	0	6.00	0
040308-040309	40308	40309	270237.5	04	03	78.75	74.47	614	0.007	3.75	1	0	0	123	143	168	73.81	72.58	0	0	0	50.2	50.2	50.2	50.2	73	93	118	118	50-Yr	118	5.25	168	6.00	0	6.00	0
040321-040322	40321	40322	317482.1	04	03	102.11	92.3	1241	0.0079	2.5	1	0	0	25	28	30	97.26	83.74	72	45.6	101.7	39.8	39.8	85.3	141.4				0							
040322-040323	40322	40323	1122603	04	03	92.3	79.07	546	0.0242	2.5	1	0	0	61	67	79	83.74	77.78	0	0	0	39.8	39.8	39.8	39.8	21	27	39	39	50-Yr	39	2.50	79	3.25	0	3.25	0
040323-040309	40323	40309	1256520	04	03	79.07	74.47	477	0.0096	3	1	0	0	105	116	139	77.78	72.58	0	0	0	64.7	64.7	64.7	64.7	40	51	74	74	50-Yr	74	3.25	139	4.00	0	4.00	0
040309-040315	40309	40315	764548.9	04	03	74.47	74.61	40	-0.0035	12.5	8	0	0	252	287	343	72.58	72.5	0	0	0	802.8	802.8	802.8	802.8				0							
040331-040332	40331	40332	815430.3	04	03	99.39	79.87	749	0.026	2	1	0	0	39	43	52	89.54	76.65	0	0	0	27.6	27.6	27.6	27.6	11	15	24	24	50-Yr	24	2.00	52	2.75	0	2.75	0
040332-040333	40332	40333	483305.7	04	03	79.87	73.5	241	0.0264	2.5	1	0	0	68	78	89	76.65	72.5	0	0	0	50	50	50	50	18	28	39	39	50-Yr	39	2.50	89	3.25	0	3.25	0
040341-040342	40341	40342	422581.1	04	03	106.76	98.94	368	0.0213	2	1	0	0	33	37	40	95.88	93.45	0	0	0	17.1	17.1	17.1	17.1	16	20	23	23	50-Yr	23	2.25	40	3.00	0	3.00	0
040342-040343	40342	40343	1460018	04	03	98.94	95.59	279	0.012	2.5	1	0	0	84	94	110	93.45	91.61	0	0	0	30.9	30.9	30.9	30.9	53	63	79	79	50-Yr	79	3.75	110	4.25	0	4.25	0
040343-040344	40343	40344		04	03	95.59	98.41	157	-0.018	3.25	1	0	0	84	93	109	91.61	90.58	0	0	0	62.3	62.3	62.3	62.3	22	31	47	47	50-Yr	47	3.00	109	4.25	0	4.25	0
040344-040345	40344	40345		04	03	98.41	94.86	489	0.0073	4	1	0	0	83	92	108	90.58	87.35	0	0	0	108.4	108.4	108.4	108.4				0							
040345-040346	40345	40346	762707.9	04	03	94.86	97.49	1100	-0.0024	4	1	0	0	119	132	154	87.35	80.09	0	0	0	108.4	108.4	108.4	108.4	11	24	46	46	50-Yr	46	3.00	154	4.75	0	4.75	0
040346-040347	40346	40347	213994.8	04	03	97.49	83.93	692	0.0196	4	1	0	0	116	129	150	80.09	75.52	30	137.1	238.7	108.4	108.4	245.5	347.1	8	0	0	8	10-Yr	8	1.50	116	4.25	0	4.75	0
040351-040352	40351	40352	1850109	04	03	87.77	84.38	606	0.0056	3	1	0	0	58	65	78	86.77	83.38	32	75.7	132.9	46.4	46.4	122	179.3	12	0	0	12	10-Yr	12	2.00	58	3.50	0	3.50	0
040352-040353	40352	40353	669644.9	04	03	84.38	82.29	1026	0.002	4	1	0	0	85	97	114	83.38	78.6	0	0	0	91.4	91.4	91.4	91.4	0	6	23	23	50-Yr	23	2.50	114	4.50	0	4.50	0