COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
HYDROLOGY UNIT

TO: Consulting Civil Engineer
136 N. Grand Ave.
West Covina, CA 91791
ATTN: Stephen Jones

Date: 10/15/15

REVIEW OF HYDROLOGY STUDY

PD/MTD. NO.	**N/A**	**CITY OF**	**N/A**
TR/CUP NO.	**201400037**	**THOMAS GUIDE**	**4375-A/6**
TRANS DATE:	**10/01/15**	**PLAN CHECK NO.**	**4**

We have reviewed your Hydrology Study.

[X] The Hydrology Study has been approved.

[X] Refer to comments below:

COMMENTS:

- As stated in Matthew Dubiel's e-mail to Robert Friedman dated September 21, 2015, a revised site plan is required to address all of our comments on the February 26, 2015 memo. More specifically, the site plan needs to reflect the proposed improvements as shown on the approved hydrology study.

REVIEWED BY Diego Gabriel Rivera
DIEGO G. RIVERA (626) 458-4921

APPROVED BY:

HYDROLOGY STUDY
& LID PLAN for

CUP 201400037

ACTON RETAIL CENTER

A.P.N. 3217-021-022

Sierra Highway and Crown Valley Road
Acton, CA

August 17, 2015
Job No. 14-102

HYDROLOGY STUDY
APPROVED

CHECKED BY: Diego Gabriel Rivera RCE NO. 74937 DATE 10/15/2015

APPROVED BY: _____ DATE 10/15/2015

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

REGISTERED PROFESSIONAL ENGINEER
STEPHEN W. JONES
No. 38302
EXP. 3-31-17
CIVIL
STATE OF CALIFORNIA
8/17/15

Prepared by:

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HYDROLOGY

August 17, 2015
Job No. 14-102

Site: Acton Retail Center
Sierra Highway & Crown Valley Road, Acton, CA
A.P.N. 3217-021-022

Ref: **Los Angeles County Hydrology Manual**
County of Los Angeles LID Manual
Calculations & hydrographs prepared by using:
Los Angeles County program HydroCalc 0.3.1.

Site Data:

Soil 098; 50-Year 24-Hour Isohyet = 4.41 inches; Existing (undeveloped): A=1.95 Ac; IMP=2.0%
Proposed (developed): 1A = 39,360 S.F. (0.90 Ac); IMP=91.0%
1B = 20,800 S.F. (0.48 Ac); IMP=91.0% 2B = 24,782 S.F. (0.57 Ac); IMP=2.0%

Discussion:

Site Description: The project site is currently a vacant lot. The property slopes southwesterly at an average of just under 5% to the south property line. Sierra Highway is directly to the north of the property. The properties directly to the east and west are fully developed and provide no off-site drainage onto the subject property. To the south is an on-ramp to the Antelope Valley Freeway (SR14).
Below are the analysis results for the site in the **undeveloped state**:

		Storm				
Undeveloped site:		2-yr.	5-yr.	10-yr.	25-yr.	50-yr. (from calculation sheets attached)
Qp (cfs):	0.61	1.60	2.23	3.33	3.87	
24-hr Vol (cf):	1790	3166	4217	5729	6990	(undeveloped/existing condition)

Description of Drainage areas:

The developed site has two drainage areas (Area A and B). Area A is the easterly property that has the proposed restaurant. The proposed site is paved with landscaped planters throughout. The building and eastern part of area A drains by surface runoff along the eastern side of the property and enters the pervious pavement area on the south. The western portion of Area A is a parking lot that sheet flows to the south and enters the pervious pavement. The entire area will be maintained free of trash, debris and swept monthly to minimize sediments from entering the infiltration area.

Area B is the westerly property with a retail building. North of the building is paved and landscaped. It is labeled Area 1B. It ultimately drains around the building to a catch basin at the southwest corner of the building. The area behind the retail building (on the south side) is not paved and is proposed to be an open graded area of decomposed granite or a fine grade of rock surface. It is labeled Area 2B. The unpaved area allows infiltration for the entire back portion of the property. Roof drains for the retail building will be directed underground with half draining into the Pervious pavement area and the other half into the junction structure for the Area 1B drain line. This drain line outlets along the south property line from a catch basin with bolted down grate and spills into the area north of the planter walls.

Hydrology, Hydraulics & LID
Sierra Highway & Crown Valley Rd, Acton, CA

Site Infiltration:
As called out in the Infiltration Report (M14-201-1) by Miller Geosciences, the measured infiltration value is 86.46 Gal/cf/day = 5.78 in/hr. A correction factor of 2 (CF=2) will give a **Design Infiltration Rate of 2.89 in/hr.** (f_{design})

While this is a relatively high rate of infiltration in regards to groundwater risk, the site design has several layers of treatment prior to infiltration. Roof drains and catch basins have removable filters, parking lots require regular maintenance for removal of trash, debris and sweeping plus catch basins and drainage structures are designed to settle silt prior to entry of infiltration areas.

ANALYSIS:
The following analysis shows the calculated runoff volume and peak flow rate for the 50-yr storm of each noted drainage area is mitigated with the on-site design features.

Notes of importance:

1) The undeveloped runoff volume was not used to decrease the required mitigation level.
2) The storage and infiltration capacities of the south property line planter areas were not included in the calculations (the planter areas are designed to accept any overflow from the site through the planter wall if needed).

Due to the capability of the site to mitigate the calculated runoff, there was no need to run routing calculations for a retention basin.

Developed site:

Drainage Area 1A: A=0.90 Acres, L=263 ft, S=2.66%, IMP= 91.0%, Soil #98
$V_{d(1A)}$ =**11,975cf** Qp(1A) = 2.12cfs (see 50-yr Hydrologic Analysis)
Pervious pavement area = 2530sf Depth of rock base = 2.0 feet
$V_{provided(rock)}$ =2530sf (2.0ft rock)(0.40) = 2012 cf
Storage above surface: $V_{provided(surf)}$ = 3150 cf
Infiltration in 6 hours: $V_{provided(infilt)}$ = 7284 cf
Total volume provided = 12,446 cf > 11,975 cf reqd storage. **OK.**

Drainage Area 1B: A=0.48 Acres, L=223 ft, S=2.66%, IMP= 91.0%, Soil #98
$V_{d(1B)}$ = **6386cf** Qp(1B) = 1.13cfs (see 50-yr Hydrologic Analysis)
Pervious pavement area = 1342sf Depth of rock base = 2.0 feet
$V_{provided(rock)}$ = 1342sf (2.0ft rock)(0.40) = 1074cf
Infiltration in 7 hours: $V_{provided(infilt)}$ = 4509 cf = [(1342sf)(0.48cf/sf/hr)(7hrs)]
Total volume provided = 5,583 cf 6386cf – 5583cf = 803cf
Additional req'd storage of 803cf is added to area 2B below as any runoff not infiltrated is captured in the west catch basin and delivered to area 2B.

Drainage Area 2B: A=0.57 Acres, L=125 ft, S=6.0%, IMP= 2.0%, Soil #98
$V_{d(2B)}$ = 2044 cf Qp(2B) = 1.25cfs (see 50-yr Hydrologic Analysis)
$V_{d(1B)}$ = 803cf Total required volume = $V_{d(2B)}$ = 2044 + 803 = **2847cf**
Storage above surface: $V_{provided(surf)}$ = 1625 cf
Infiltration in 6 hours: $V_{provided(infilt)}$ = 1764 cf = [(525sf)(0.48cf/sf/hr)(7hrs)]
Total volume provided = 3,389 cf > 2,847 cf reqd storage. **OK.**

Site Drainage Outlet:
The site 1B catch basin contains a filter and is the inlet for any excess runoff from area 1B. It connects (via 6" diameter PVC drain, S=4.28%) to a junction box that will have underground connections from the south side of the retail building roof drains (also filtered). From the junction box, the drain connects (via 6" diameter PVC, S=4.49%) to a catch basin near the south property line. The lid is bolted down to prevent removal by hydraulic forces. This catch basin is to outlet runoff to the infiltration area shown as potential area of inundation.
Capacity of 6" PVC, Qcap = 1.31 cfs > Q50(1B) = 1.13 cfs (max flow without any infiltration) **OK.**

Site Boundary Outlet:
The ultimate runoff outlet from the site is over the south property line. This is currently a drainage ditch along the freeway on-ramp for the Antelope Valley Freeway, SR 14. There currently are open graded ditches with various spillways and culverts for collection of runoff. The property is owned and maintained by the state of California.

The design of both sites does not anticipate runoff over the south property line. However, an outlet design is detailed on the Hydrology Map that will disburse any flow encountered to infiltration and a sheet flow. The outlet PVC pipes, size and quantity and location, will allow less than the undeveloped 50-yr storm would generate in flow rate.

The outlets from the planter areas to the property line are designed the same as the inlets.
Undeveloped calculated runoff: Qp = 3.87cfs for the 50yr storm.
Planter inlets and outlets have a total of 15 – 4" dia. Pipes with an outlet capacity of 0.24cfs each.
Outlet capacity = 15 (0.24 cfs) = 3.60 cfs < 3.87 cfs **OK.**

Conclusion:
The on-site drainage for both drainage areas will be conveyed to the on-site pervious pavement areas via the systems shown on the plans. The drainage system is designed to infiltrate the site storm water runoff on-site. If an overflow were to occur due to poor maintenance or reasons unknown, the south planter walls are designed to inlet the maximum flow of the rate of the current undeveloped site 50yr storm. Each planter area is capable of infiltrating runoff before any need to flow to the property line. The system is designed to spread any runoff entering the planter areas among all the planter areas to achieve the maximum infiltration.

8/7/15

Stephen W. Jones, RCE 38302
FERRIS JONES & CO.

County of Los Angeles

Low Impact Develepment (LID) Plan

August 17, 2015 **Job No. 14-102**

Site:

Acton Retail Center
Sierra Highway & Crown Valley Road
Acton, CA

A.P.N. 3217-021-022

Ref: **Los Angeles County Hydrology Manual**
County of Los Angeles LID Standards Manual
Los Angeles County program HydroCalc 0.3.1.

Site Data:

Entire property drains to southwesterly to the southern most property line
(see attached Drainage Map)
Soil 098; 50-Year 24-Hour Isohyet=4.41 inches
Existing (undeveloped) Site: A=1.95 Ac; IMP=2.0%
1A = 39,360 S.F. (0.90 Ac); IMP=91.0%
1B = 20,800 S.F. (0.48 Ac); IMP=91.0%
2B = 24,782 S.F. (0.57 Ac); IMP=2.0%

Discussion:

The proposed project is a **Designated Project**. The site is greater than 1.0Acre and 10,000SF of parking.

The site is very compatible with infiltration. The water quality system for storm water uses pervious pavement and unpaved areas to infiltrate the storm water runoff. There are infiltration areas located along the south property line for both properties plus an area of pervious pavement north of the retail building on the westerly property. Infiltration tests on the site were prepared by Miller Geosciences, Inc. Their report number M14-201P, dated July-13-2014 was prepared for the on-site sewer system. Report number M14-201, Geotechnical Report, dated March 22, 2014 and M14-201-1, Infiltration Report, dated July 29, 2015 are also a reference for this report. (All noted reports have been submitted with this report and shall be considered a part of this report). As called out in the Infiltration Report (M14-201-1) by Miller Geosciences, the measured infiltration value is 86.46 Gal/c.f./day = 5.78 in/hr. A correction factor of 2 (CF=2) will give a **Design Infiltration Rate of 2.89 in/hr.** (f_{design})

While this is a relatively high rate of infiltration in regards to groundwater risk, the site design has several layers of treatment prior to infiltration. Roof drains and catch basins have removable filters, parking lots require regular maintenance for removal of trash, debris and sweeping plus catch basins and drainage structures are designed to settle silt prior to entry of infiltration areas.

Hydrology, Hydraulics & LID
Sierra Highway & Crown Valley Rd
Acton, CA

Site Description:

The project site is currently a vacant lot. The property slopes southwesterly at an average of approximately 5% to the south property line.

Sierra Highway is directly to the north of the property and is fully improved (no runoff onto this site). The properties directly to the east and west are fully developed and provide no off-site drainage onto the subject property.

Description of Drainage areas:

The developed site has two drainage areas (A and B). Area A is the easterly property that has the proposed restaurant. This portion of the site is paved with landscaped planters thoughout. The building and eastern part of area 1A drains by surface runoff and enters the infiltration area on the south through the pervious pavers. De-silting and debris capture prior to entering the infiltration basin is accomplished with roof drain filters, catch basin filters and de-silting features in catch basins.

Area B is the westerly property with a retail building. North of the building is paved and landscaped and drains to the south. The building and parking area north of the building makes up Area 1B. Behind the retail building (on the south side) is not paved. This is area 2B and will be an open graded area of decomposed granite or a fine grade of rock. This allows infiltration for the entire back portion of the property. Roof drains will be directed underground and outlet into the infiltration area along the south property line. A catch basin located at the southwest corner of the building will capture excess runoff from parking lot north of the building (front of the property, adjacent to Sierra Highway). The catch basin outlets directly into the infiltration area along the south property line.

The following Source Control measures will be implemented on the site:

S-1 Storm Drain signage. Messages will be painted at all catch basins and at the infiltration basins.
S-8 Irrigation and Landscaping. The site irrigation and landscaping is being professional design by a landscape architect to comply with efficient use of water and low water use plants.
S-9 Building materials. Pressure treated wood will not be used for any part of the buildings or site. Materials that are galvanized and made of copper are not a part of the building plans.

Calculations:

The **0.75 inch, 24-hour storm** is greater than the 85th percentile, 24-hour storm (0.68") and will be used as the **LID design storm** for the calculations.

The Los Angeles County program HydroCalc 0.3.1. was used to determine the following data from the LID water quality design storm (0.75 inch, 24-hour storm) for each drainage area. The resulting calculations (volume, flow data) and the hydrographs are attached.

LID ANALYSIS:

LID water quality design storm = 0.75 inch, 24-hour storm

Undeveloped site: A=1.95 Acres, L=374 ft., S=4.28%, IMP= 2.0%, Soil #98
V_u = 611cf Q_u = 0.03cfs (from calculation sheet)

Developed site:

Area 1A: A=0.90 Acres, L=263 ft, S=2.66%, IMP= 91.0%, Soil #98
$V_{d(1A)}$ =2012cf Qd(1A) = 0.19cfs (from calculation sheet)
Pervious pavement area = 2530sf Depth of rock base = 2.0 feet
$V_{provided(1A)}$ =2530sf (2.0ft rock)(0.40)=2012cf = $V_{d(1A)}$ =2012cf **OK.**

Area 1B: A=0.48 Acres, L=223 ft, S=2.66%, IMP= 91.0%, Soil #98
$V_{d(1B)}$ = 1073cfs Qd(1B) = 0.10cfs (from calculation sheet)
Pervious pavement area = 1342sf Depth of rock base = 2.0 feet
$V_{provided(1B)}$ = 1342sf (2.0ft rock)(0.40) = 1074cf = $V_{d(1B)}$ = 1073cfs **OK.**

Area 2B: A=0.57 Acres, L=125 ft, S=6.0%, IMP= 2.0%, Soil #98
$V_{d(2B)}$ = 179 cfs Qd(2B) = 0.01cfs
$V_{provided(1B)}$ = area provided for 1B runoff is entirely unpaved for infiltration. **OK.**

Stormwater quality control measures:

An area of pervious pavement and/or unpaved area will allow infiltration for both drainage areas A and B. Specific locations are shown on the Proposed Hydrology Map plus the Grading and Drainage Plan. Each drainage area will filter sediment, trash and debris prior to flows entering the infiltration areas. Catch basins and roof drains will have filters plus the parking lot will be regularly swept for debris.

Not included in the calculations are the planter areas along the south property line. These are designed to accept overflow from the infiltration areas in the event infiltration areas are overwhelmed. The outlets from the planter areas are designed to allow no more than the peak runoff from the undeveloped site. Qp = 3.87cfs for the 50yr storm. Planter outlets have a total of 15 – 4" dia. Pipes with an outlet capacity of 0.24cfs each. Outlet capacity = 15 (0.24 cfs) = 3.60 cfs < 3.87 cfs **OK.**

09/23/04

Tabular Output for Manning's Equation
for Uniform Flow in a a Circular Pipe

Input Variable Slope
From 1.000000 to 5.000000 increment by 0.500000

Calculated Variable Flow Rate,

Diameter in	Manning's "n"	Slope of Pipe %	Flow Rate cfs	Velocity ft/s	Depth of flow in		Full Cap. cfs	Max Cap. cfs
6.00	0.012	1.00	0.61	0.00	6.00	0.61	0.65	
6.00	0.012	1.50	0.74	0.00	6.00	0.74	0.80	
6.00	0.012	2.00	0.86	0.00	6.00	0.86	0.92	
6.00	0.012	2.50	0.96	0.00	6.00	0.96	1.03	
6.00	0.012	3.00	1.05	0.00	6.00	1.05	1.13	
6.00	0.012	3.50	1.14	0.00	6.00	1.14	1.22	
6.00	0.012	4.00	1.21	0.00	6.00	1.21	1.31	
6.00	0.012	4.50	1.29	0.00	6.00	1.29	1.39	
6.00	0.012	5.00	1.36	0.00	6.00	1.36	1.46	

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

6" ϕ PVC

08/09/12

Tabular Output for Manning's Equation
for Uniform Flow in a a Circular Pipe

Input Variable Slope
From 0.500000 to 2.000000 increment by 0.500000

Calculated Variable Flow Rate,

Diameter in	Manning's "n"	Slope of Pipe %	Flow Rate cfs	Velocity ft/s	Depth of flow in	Full Cap. cfs	Max Cap. cfs
4.00	0.010	0.50	0.17	0.00	4.00	0.17	0.19
4.00	0.010	1.00	0.25	0.00	4.00	0.25	0.27
4.00	0.010	1.50	0.30	0.00	4.00	0.30	0.33
4.00	0.010	2.00	0.35	0.00	4.00	0.35	0.38

HHCalc, Version 7.0s
Eagle Point, 4131 WestMark Drive, Dubuque, IA, 52002, 1-800-678-6565

4" PVC @ 1.0% SLOPE

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

UNDEVELOPED SITE

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

Peak Flow Hydrologic Analysis

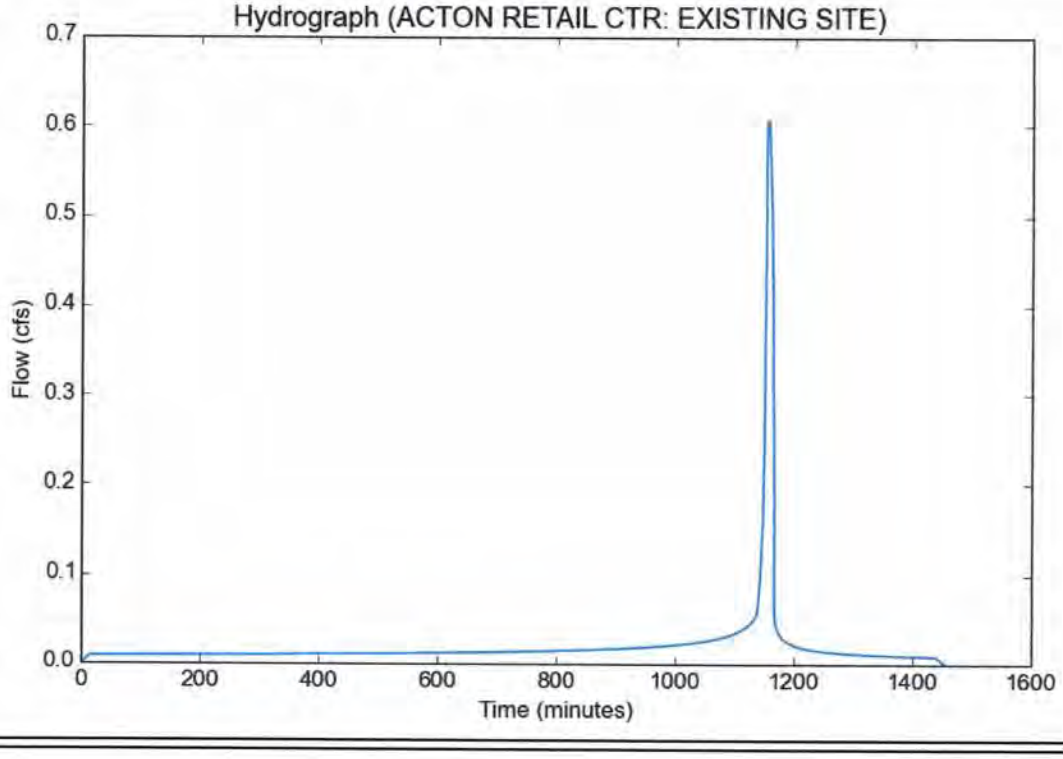
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/hydrologyCALCS/ACTON-RET-CTR-2EX-SITE.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON RETAIL CTR
Subarea ID	EXISTING SITE
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.7067
Peak Intensity (in/hr)	0.6076
Undeveloped Runoff Coefficient (Cu)	0.5052
Developed Runoff Coefficient (Cd)	0.5131
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	0.6079
Burned Peak Flow Rate (cfs)	0.6079
24-Hr Clear Runoff Volume (ac-ft)	0.0411
24-Hr Clear Runoff Volume (cu-ft)	1790.1384



Peak Flow Hydrologic Analysis

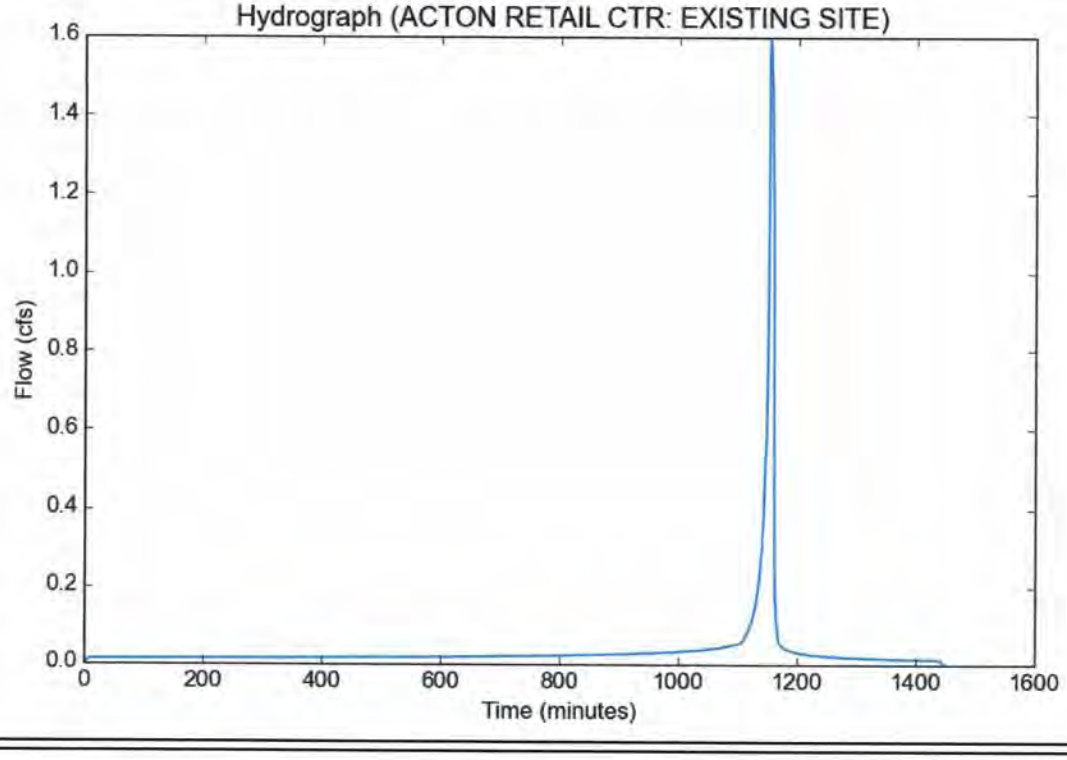
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/hydrologyCALCS/ACTON-RET-CTR-EX-SITE.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON RETAIL CTR
Subarea ID	EXISTING SITE
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	2.5754
Peak Intensity (in/hr)	1.1657
Undeveloped Runoff Coefficient (Cu)	0.6991
Developed Runoff Coefficient (Cd)	0.7031
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.5982
Burned Peak Flow Rate (cfs)	1.5982
24-Hr Clear Runoff Volume (ac-ft)	0.0727
24-Hr Clear Runoff Volume (cu-ft)	3166.4118



Peak Flow Hydrologic Analysis

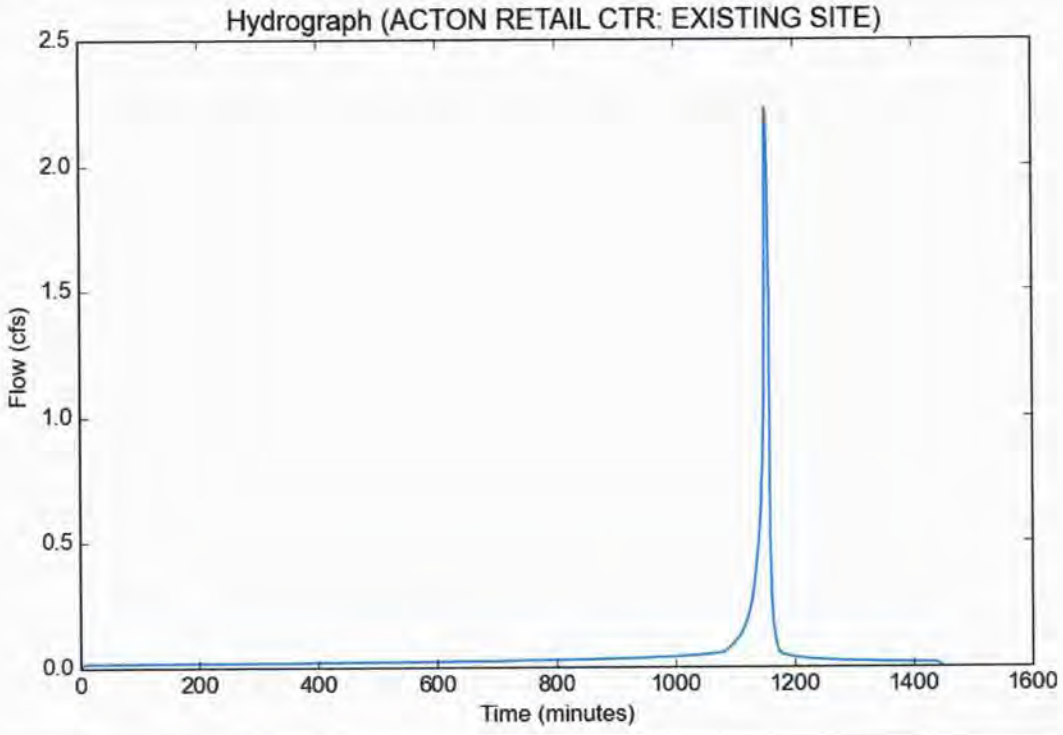
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/hydrologyCALCS/ACTON-RET-CTR-10EX-SITE.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON RETAIL CTR
Subarea ID	EXISTING SITE
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.1487
Peak Intensity (in/hr)	1.5063
Undeveloped Runoff Coefficient (Cu)	0.7556
Developed Runoff Coefficient (Cd)	0.7585
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.2278
Burned Peak Flow Rate (cfs)	2.2278
24-Hr Clear Runoff Volume (ac-ft)	0.0968
24-Hr Clear Runoff Volume (cu-ft)	4216.8856



Peak Flow Hydrologic Analysis

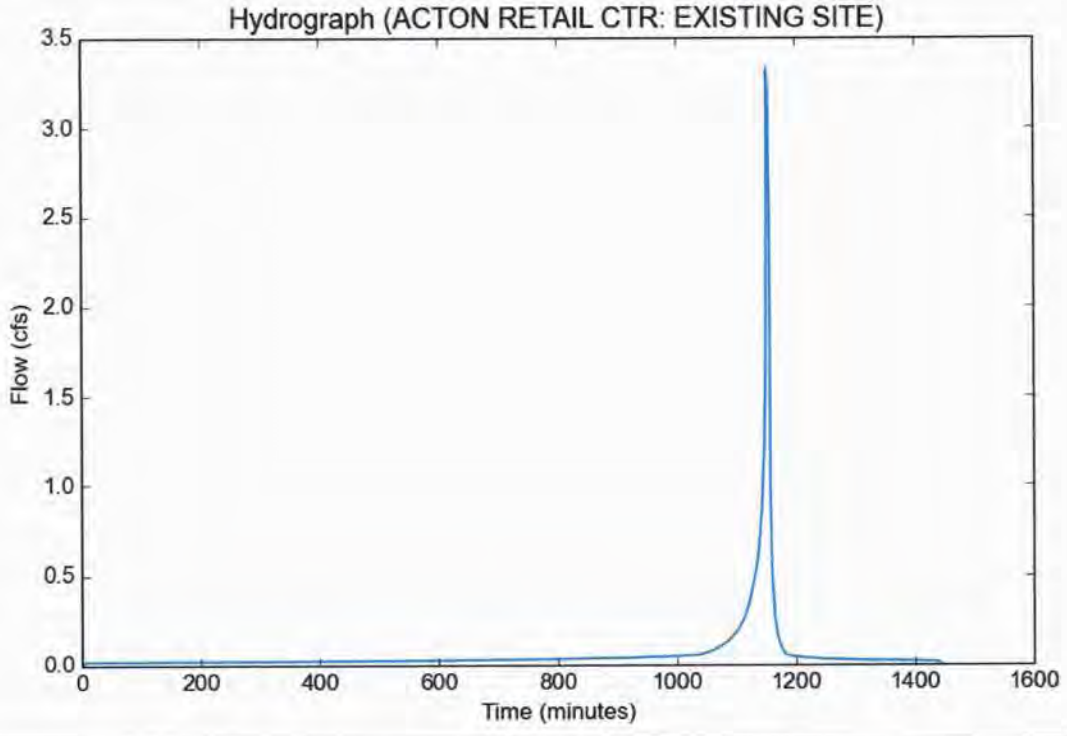
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/hydrologyCALCS/ACTON RETAIL CTR - 25EXISTIN
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON RETAIL CTR
Subarea ID	EXISTING SITE
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	3.872
Peak Intensity (in/hr)	2.1204
Undeveloped Runoff Coefficient (Cu)	0.8047
Developed Runoff Coefficient (Cd)	0.8066
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.3352
Burned Peak Flow Rate (cfs)	3.3352
24-Hr Clear Runoff Volume (ac-ft)	0.1315
24-Hr Clear Runoff Volume (cu-ft)	5728.9347



Peak Flow Hydrologic Analysis

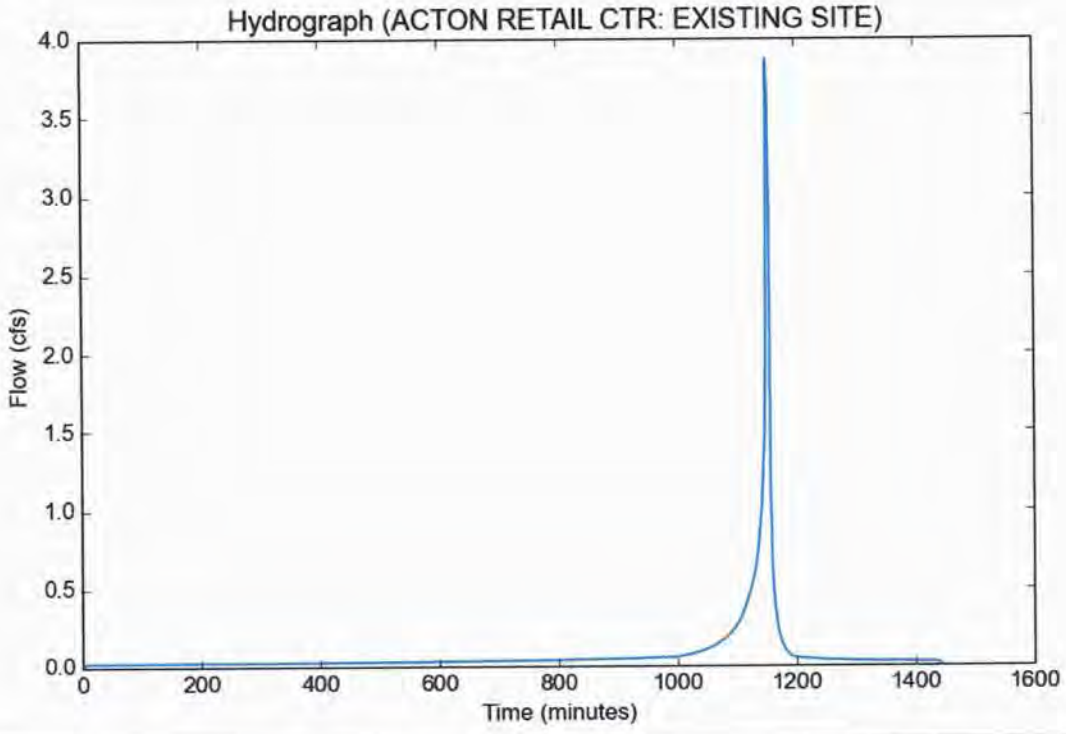
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/hydrologyCALCS/ACTON-RET-CTR_EX-SITE.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON RETAIL CTR
Subarea ID	EXISTING SITE
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	4.41
Peak Intensity (in/hr)	2.4151
Undeveloped Runoff Coefficient (Cu)	0.8204
Developed Runoff Coefficient (Cd)	0.822
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	3.871
Burned Peak Flow Rate (cfs)	3.871
24-Hr Clear Runoff Volume (ac-ft)	0.1605
24-Hr Clear Runoff Volume (cu-ft)	6990.3405



LOW IMPACT DEVELOPMENT (LID)

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

Peak Flow Hydrologic Analysis

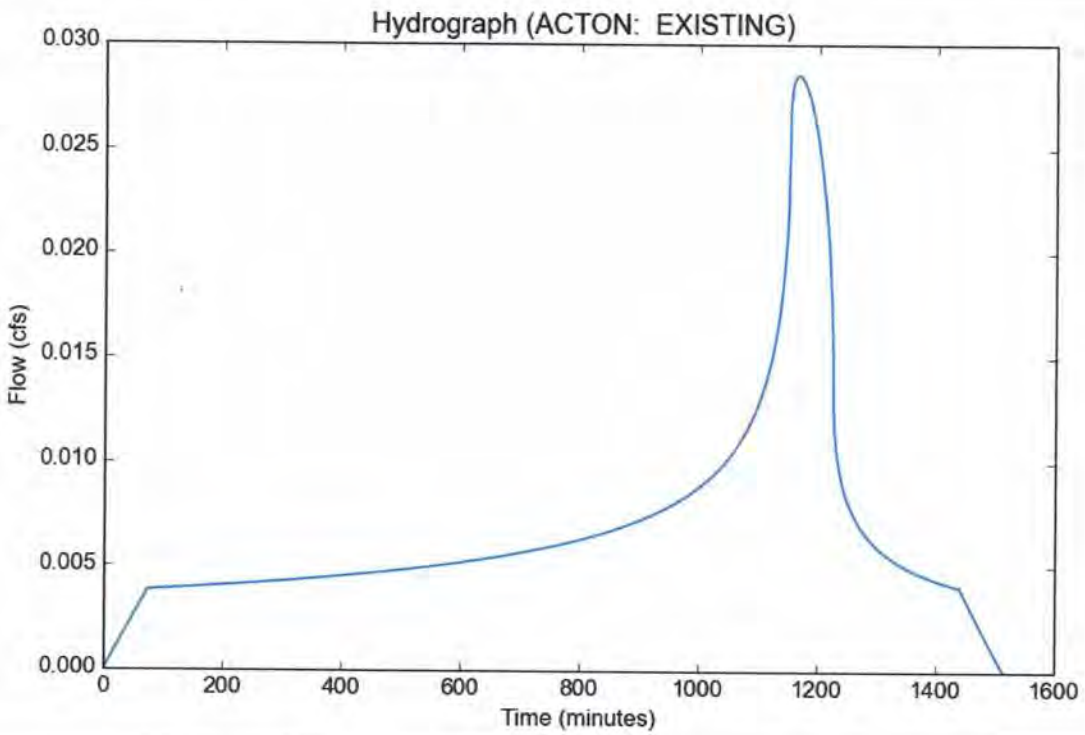
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/LIDcalc/LID-2/ACTON -LID- EXISTING.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON
Subarea ID	EXISTING
Area (ac)	1.95
Flow Path Length (ft)	374.0
Flow Path Slope (vft/hft)	0.0428
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.1261
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.116
Time of Concentration (min)	74.0
Clear Peak Flow Rate (cfs)	0.0285
Burned Peak Flow Rate (cfs)	0.0285
24-Hr Clear Runoff Volume (ac-ft)	0.014
24-Hr Clear Runoff Volume (cu-ft)	610.7839



Peak Flow Hydrologic Analysis

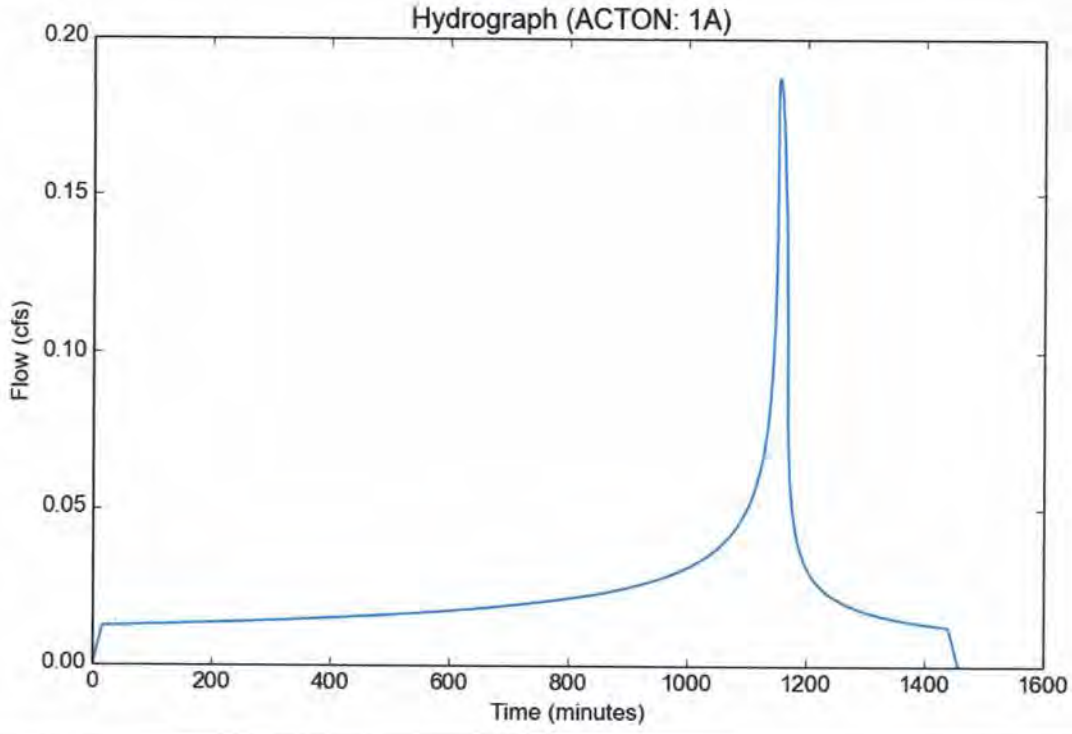
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/LIDcalc/LID-2/ACTON - 1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.2517
Undeveloped Runoff Coefficient (Cu)	0.1024
Developed Runoff Coefficient (Cd)	0.8282
Time of Concentration (min)	17.0
Clear Peak Flow Rate (cfs)	0.1877
Burned Peak Flow Rate (cfs)	0.1877
24-Hr Clear Runoff Volume (ac-ft)	0.0462
24-Hr Clear Runoff Volume (cu-ft)	2012.0536



Peak Flow Hydrologic Analysis

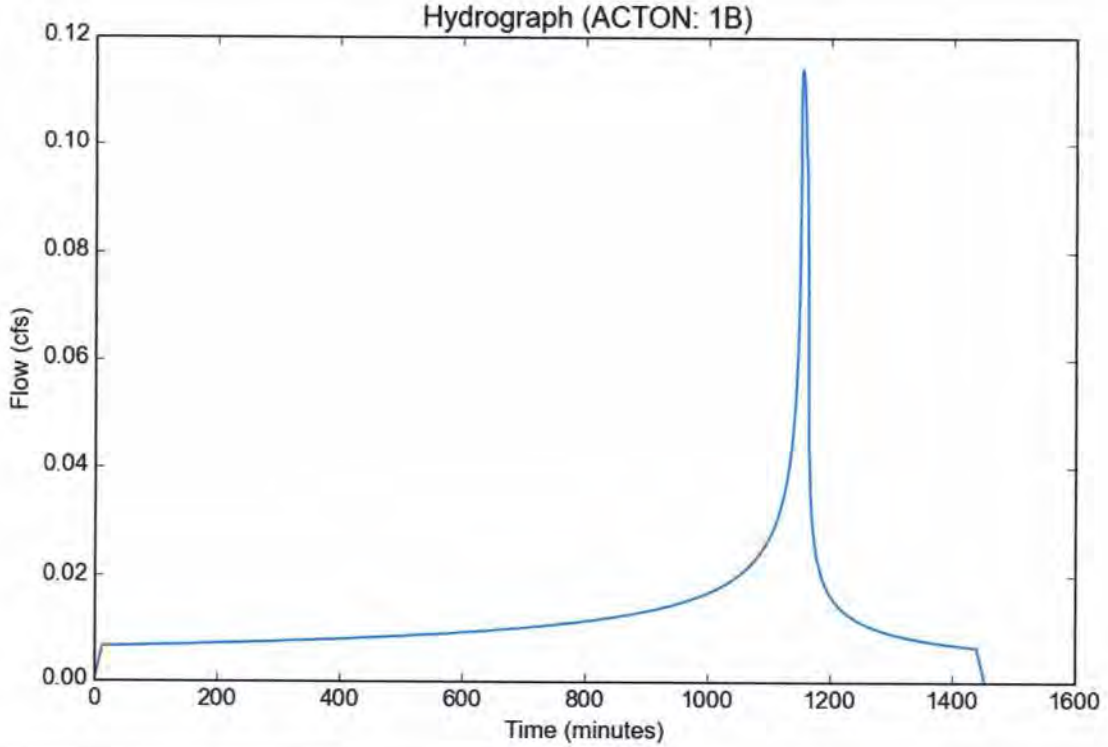
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/LIDcalc/LID-2/ACTON - 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.06
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.2856
Undeveloped Runoff Coefficient (Cu)	0.1485
Developed Runoff Coefficient (Cd)	0.8324
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	0.1141
Burned Peak Flow Rate (cfs)	0.1141
24-Hr Clear Runoff Volume (ac-ft)	0.0246
24-Hr Clear Runoff Volume (cu-ft)	1073.3112



Peak Flow Hydrologic Analysis

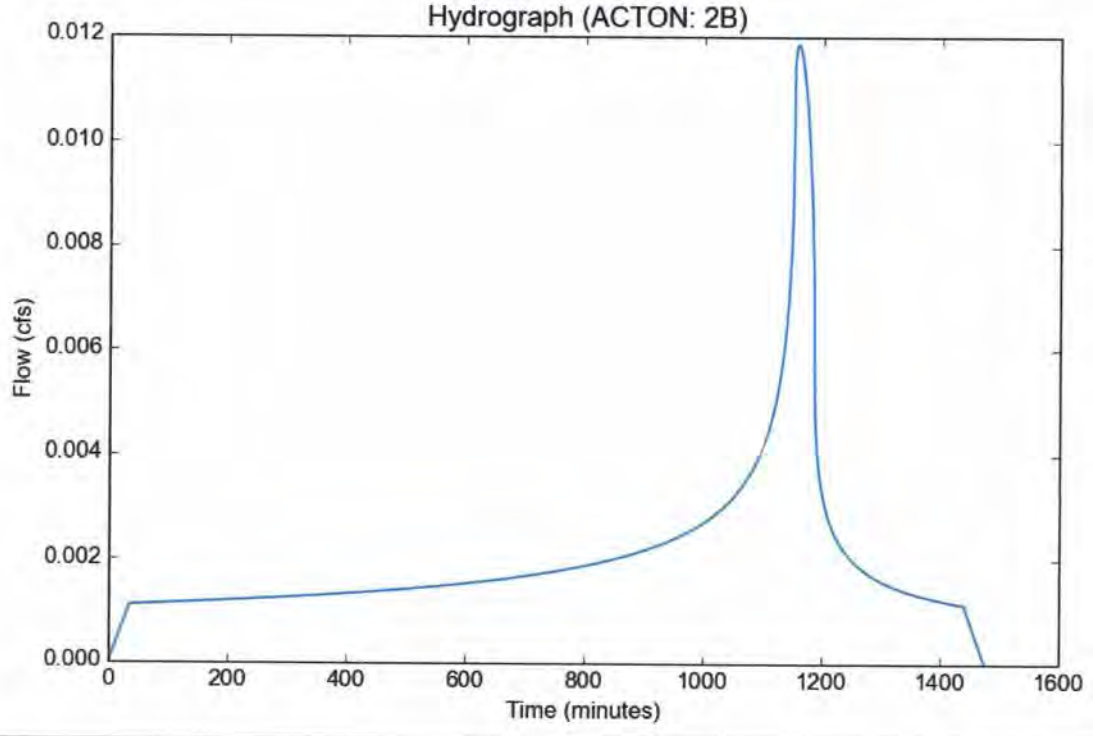
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/LIDcalc/LID-2/ACTON - 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
0.75-inch Rainfall Depth (in)	0.75
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	0.75 inch storm
Fire Factor	0
LID	True

Output Results

Modeled (0.75 inch storm) Rainfall Depth (in)	0.75
Peak Intensity (in/hr)	0.1793
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.116
Time of Concentration (min)	35.0
Clear Peak Flow Rate (cfs)	0.0119
Burned Peak Flow Rate (cfs)	0.0119
24-Hr Clear Runoff Volume (ac-ft)	0.0041
24-Hr Clear Runoff Volume (cu-ft)	178.5268



SUBAREA 1A

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

Peak Flow Hydrologic Analysis

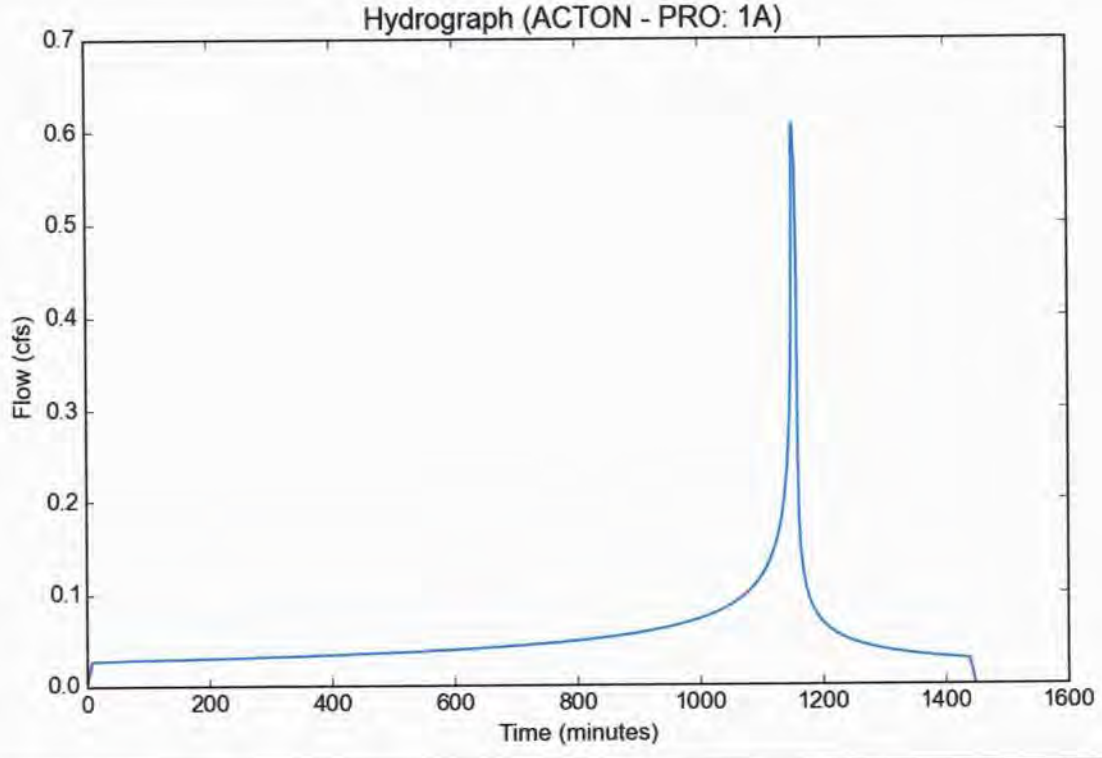
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO - 2yr-1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.7067
Peak Intensity (in/hr)	0.7725
Undeveloped Runoff Coefficient (Cu)	0.5982
Developed Runoff Coefficient (Cd)	0.8728
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	0.6068
Burned Peak Flow Rate (cfs)	0.6068
24-Hr Clear Runoff Volume (ac-ft)	0.1055
24-Hr Clear Runoff Volume (cu-ft)	4596.8281



Peak Flow Hydrologic Analysis

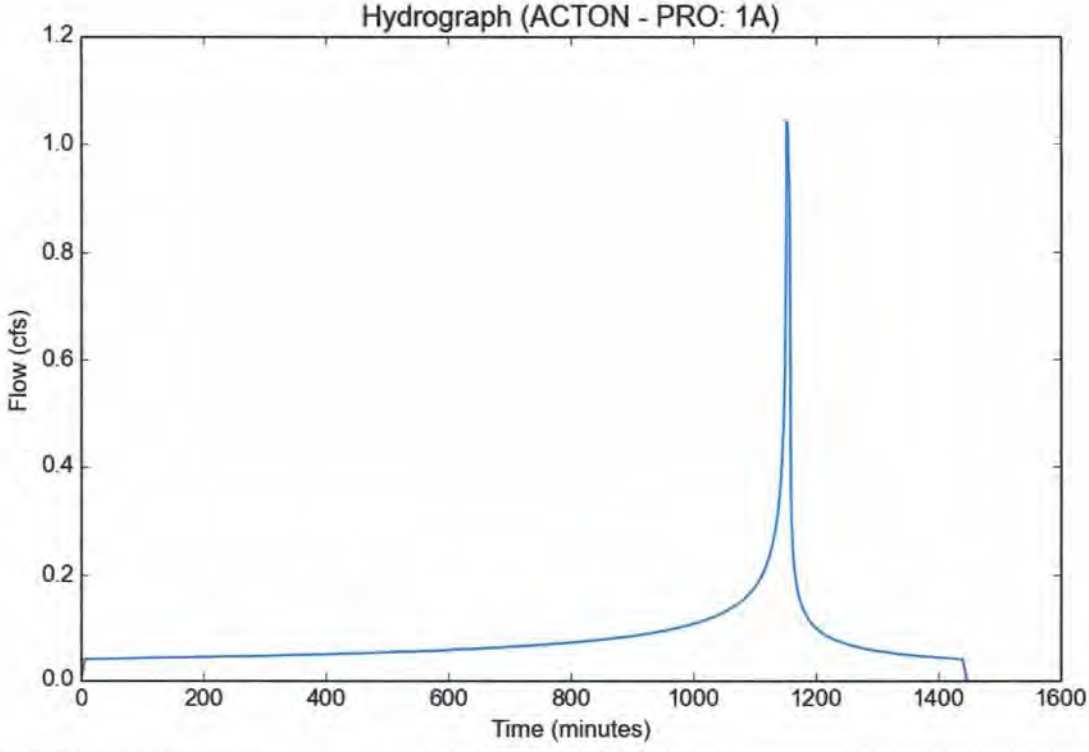
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -5yr- 1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	2.5754
Peak Intensity (in/hr)	1.3118
Undeveloped Runoff Coefficient (Cu)	0.7235
Developed Runoff Coefficient (Cd)	0.8841
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	1.0438
Burned Peak Flow Rate (cfs)	1.0438
24-Hr Clear Runoff Volume (ac-ft)	0.1597
24-Hr Clear Runoff Volume (cu-ft)	6954.6236



Peak Flow Hydrologic Analysis

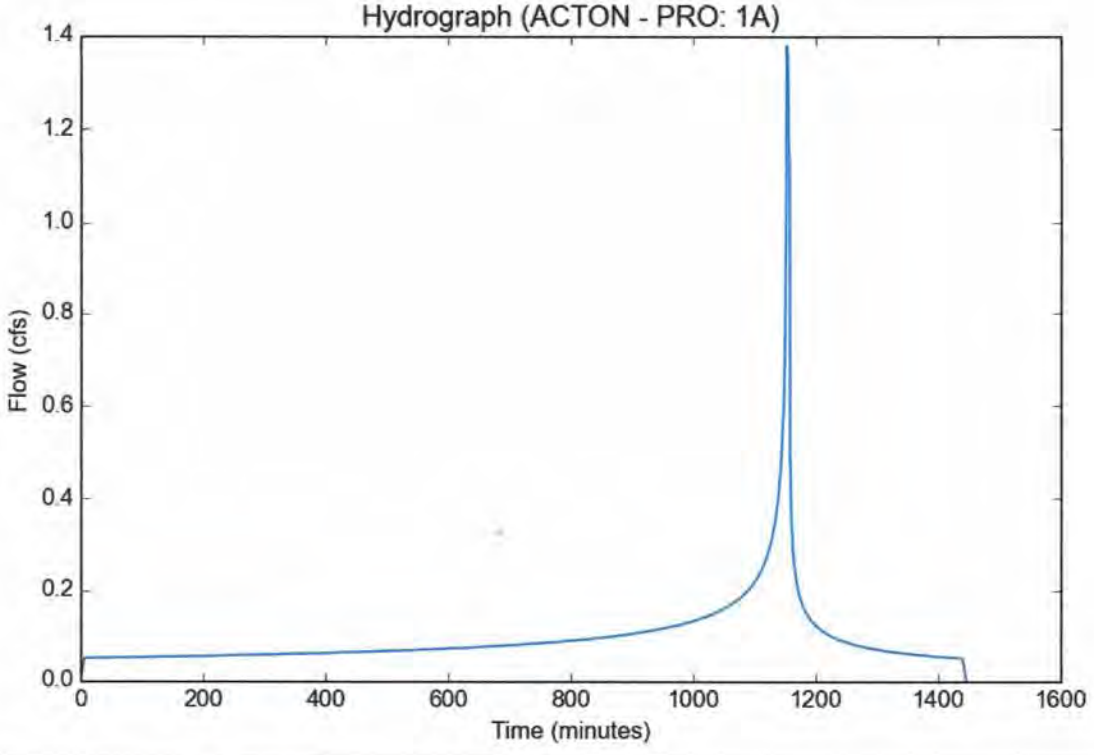
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -10yr- 1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.1487
Peak Intensity (in/hr)	1.7243
Undeveloped Runoff Coefficient (Cu)	0.7745
Developed Runoff Coefficient (Cd)	0.8887
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.3792
Burned Peak Flow Rate (cfs)	1.3792
24-Hr Clear Runoff Volume (ac-ft)	0.1955
24-Hr Clear Runoff Volume (cu-ft)	8517.3535



Peak Flow Hydrologic Analysis

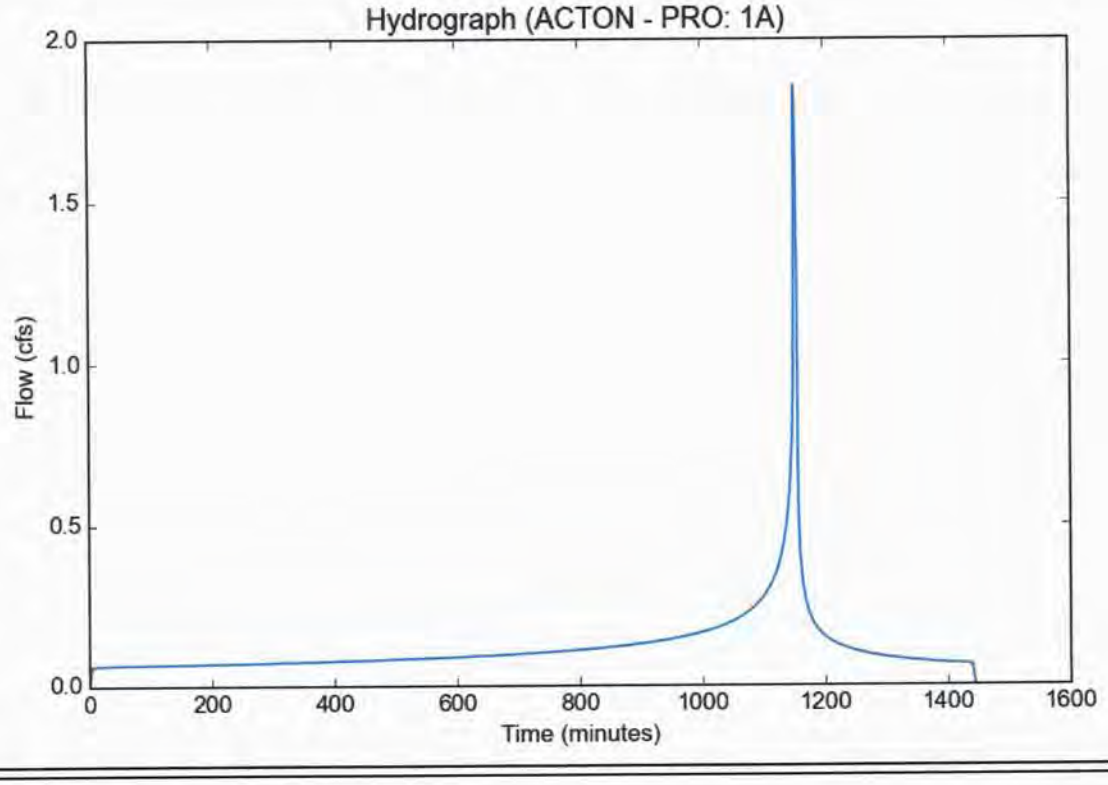
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -25yr- 1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	3.872
Peak Intensity (in/hr)	2.3101
Undeveloped Runoff Coefficient (Cu)	0.8148
Developed Runoff Coefficient (Cd)	0.8923
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.8553
Burned Peak Flow Rate (cfs)	1.8553
24-Hr Clear Runoff Volume (ac-ft)	0.241
24-Hr Clear Runoff Volume (cu-ft)	10496.6532



Peak Flow Hydrologic Analysis

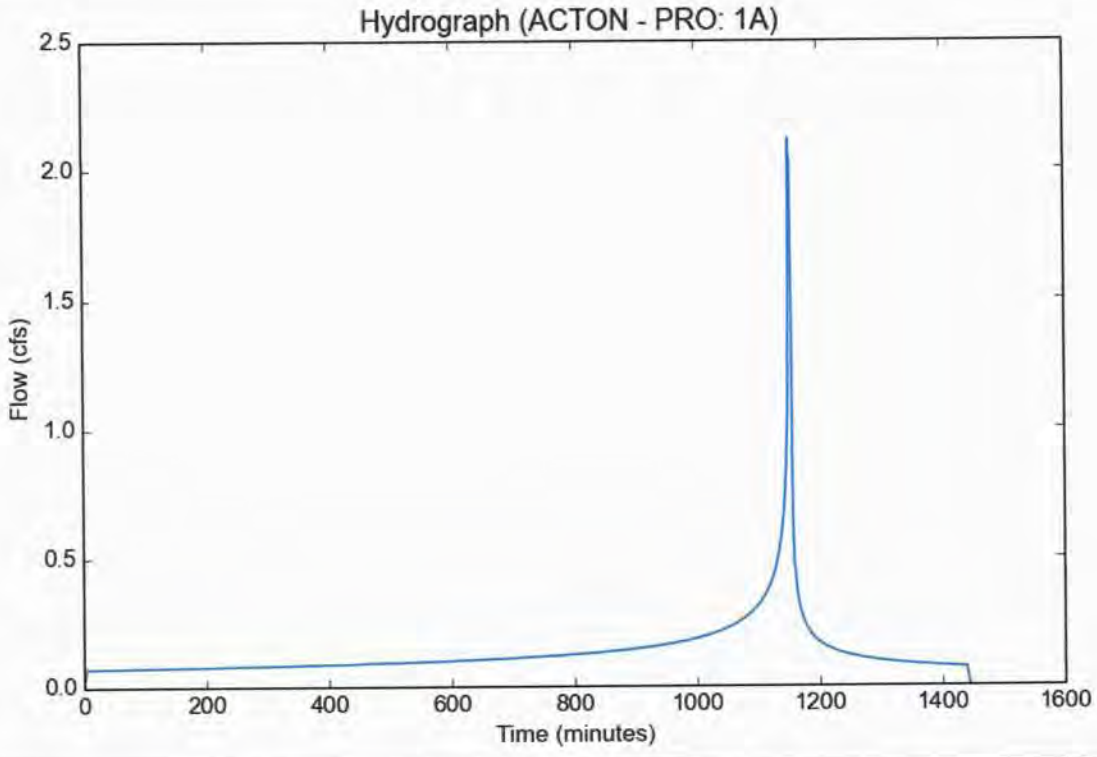
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -50yr- 1A.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1A
Area (ac)	0.9
Flow Path Length (ft)	263.0
Flow Path Slope (vft/hft)	0.0266
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	4.41
Peak Intensity (in/hr)	2.6311
Undeveloped Runoff Coefficient (Cu)	0.829
Developed Runoff Coefficient (Cd)	0.8936
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.1161
Burned Peak Flow Rate (cfs)	2.1161
24-Hr Clear Runoff Volume (ac-ft)	0.2749
24-Hr Clear Runoff Volume (cu-ft)	11974.9219



SUBAREA 1B

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

Peak Flow Hydrologic Analysis

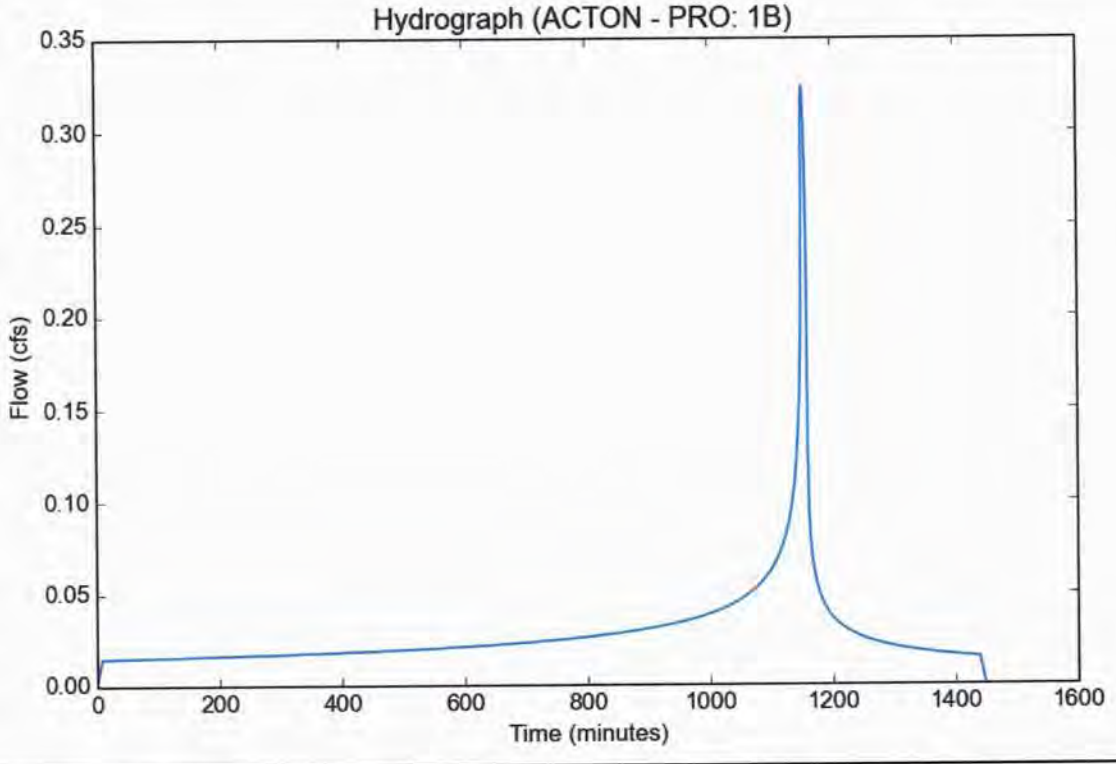
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -2yr- 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.0218
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.7067
Peak Intensity (in/hr)	0.7725
Undeveloped Runoff Coefficient (Cu)	0.5982
Developed Runoff Coefficient (Cd)	0.8728
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	0.3236
Burned Peak Flow Rate (cfs)	0.3236
24-Hr Clear Runoff Volume (ac-ft)	0.0563
24-Hr Clear Runoff Volume (cu-ft)	2451.6416



Peak Flow Hydrologic Analysis

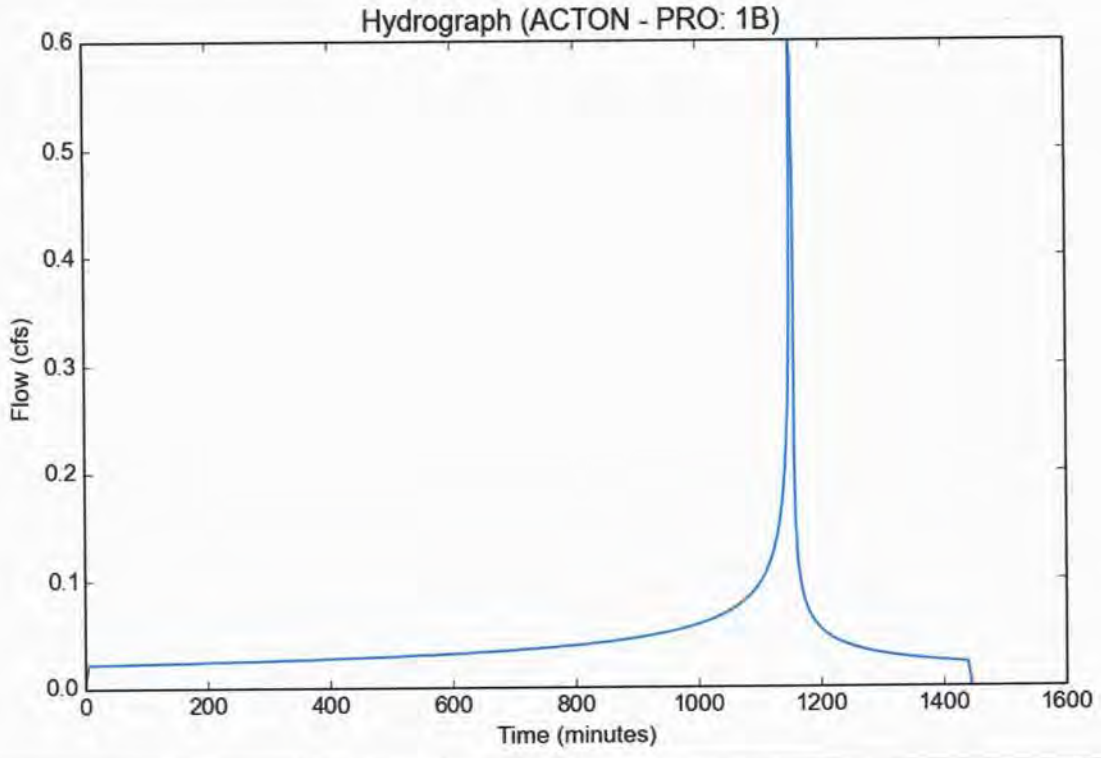
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -5yr- 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.0218
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	2.5754
Peak Intensity (in/hr)	1.4104
Undeveloped Runoff Coefficient (Cu)	0.74
Developed Runoff Coefficient (Cd)	0.8856
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	0.5995
Burned Peak Flow Rate (cfs)	0.5995
24-Hr Clear Runoff Volume (ac-ft)	0.0852
24-Hr Clear Runoff Volume (cu-ft)	3709.1928



Peak Flow Hydrologic Analysis

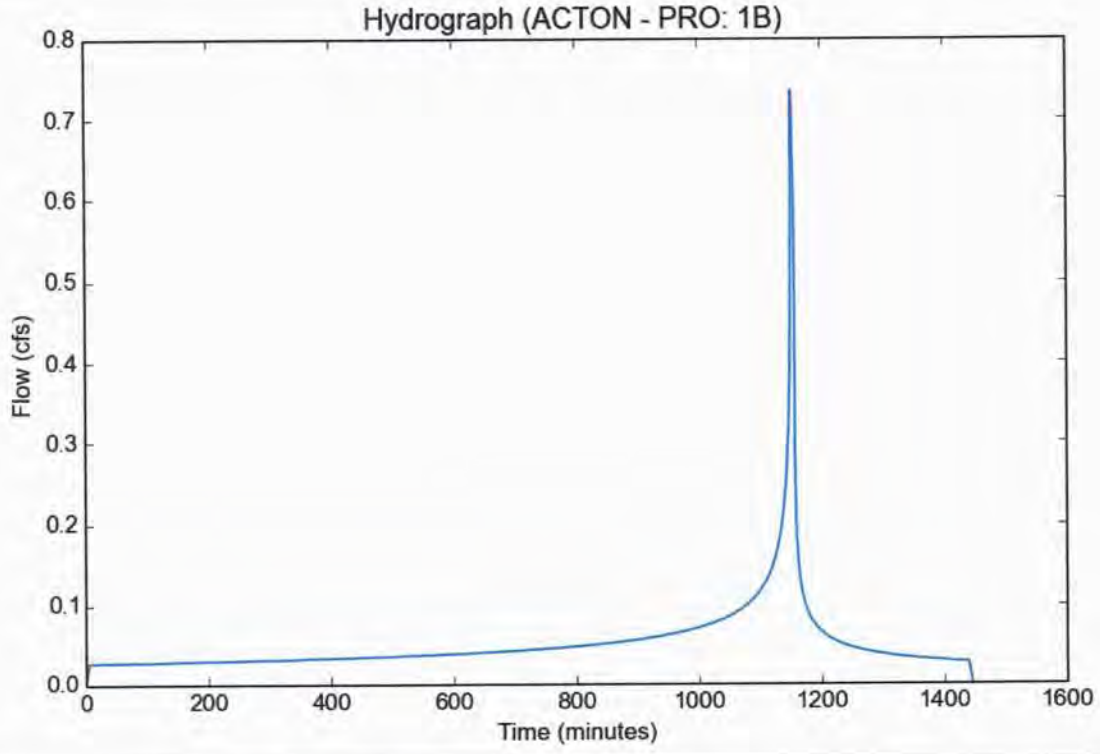
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -10yr- 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.0218
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.1487
Peak Intensity (in/hr)	1.7243
Undeveloped Runoff Coefficient (Cu)	0.7745
Developed Runoff Coefficient (Cd)	0.8887
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	0.7356
Burned Peak Flow Rate (cfs)	0.7356
24-Hr Clear Runoff Volume (ac-ft)	0.1043
24-Hr Clear Runoff Volume (cu-ft)	4542.5885



Peak Flow Hydrologic Analysis

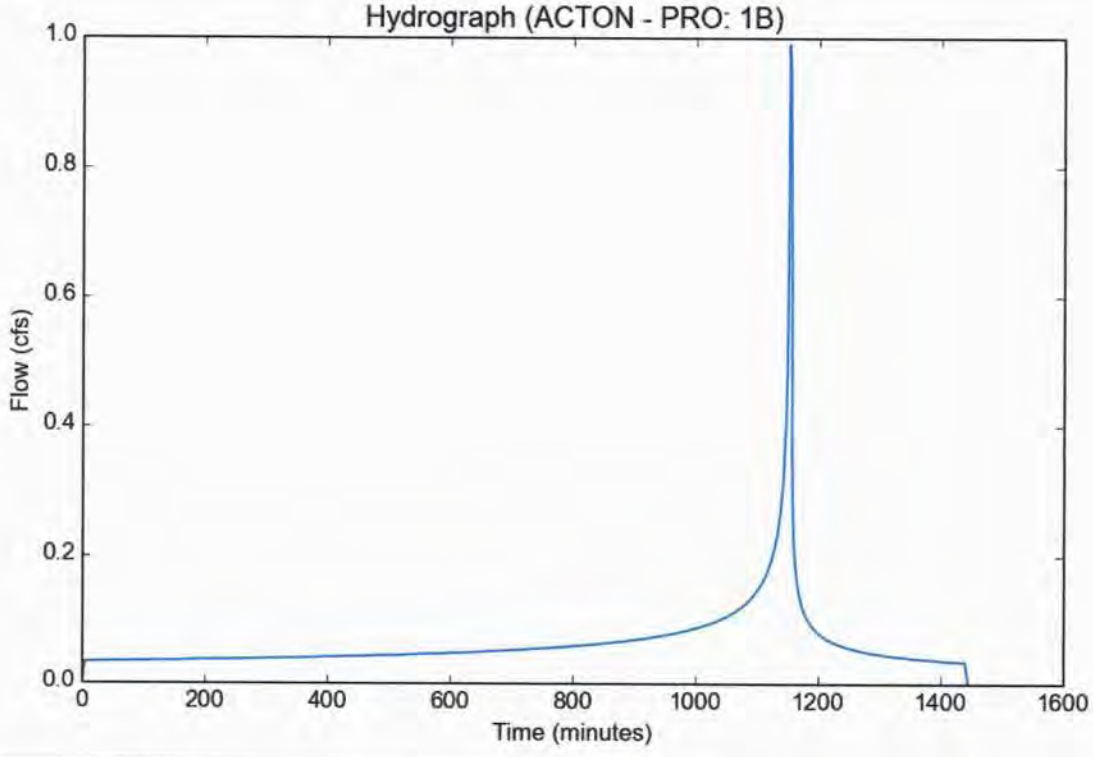
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -25yr- 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.0218
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	3.872
Peak Intensity (in/hr)	2.3101
Undeveloped Runoff Coefficient (Cu)	0.8148
Developed Runoff Coefficient (Cd)	0.8923
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.9895
Burned Peak Flow Rate (cfs)	0.9895
24-Hr Clear Runoff Volume (ac-ft)	0.1285
24-Hr Clear Runoff Volume (cu-ft)	5598.215



Peak Flow Hydrologic Analysis

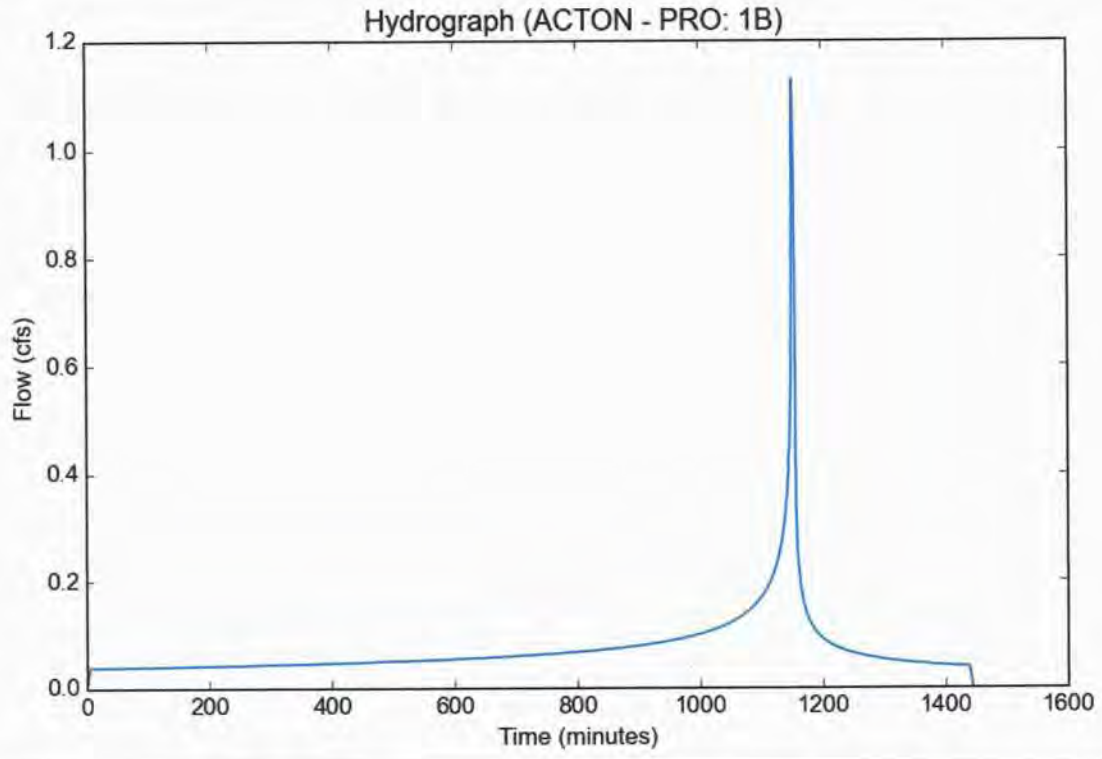
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -50yr- 1B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	1B
Area (ac)	0.48
Flow Path Length (ft)	223.0
Flow Path Slope (vft/hft)	0.0218
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	4.41
Peak Intensity (in/hr)	2.6311
Undeveloped Runoff Coefficient (Cu)	0.829
Developed Runoff Coefficient (Cd)	0.8936
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.1286
Burned Peak Flow Rate (cfs)	1.1286
24-Hr Clear Runoff Volume (ac-ft)	0.1466
24-Hr Clear Runoff Volume (cu-ft)	6386.625



SUBAREA 2B

HYDROLOGIC ANALYSIS

Performed using

Los Angeles County program HydroCALC 0.3.1

Peak Flow Hydrologic Analysis

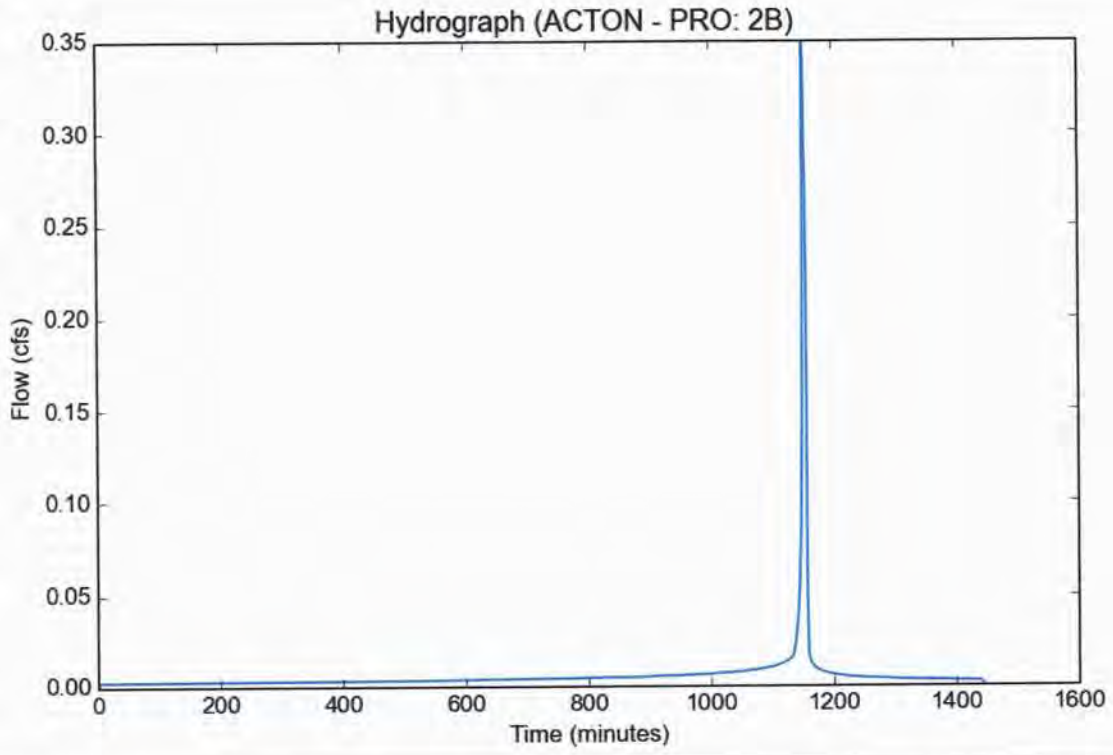
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -2yr- 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	2-yr
Fire Factor	0
LID	False

Output Results

Modeled (2-yr) Rainfall Depth (in)	1.7067
Peak Intensity (in/hr)	0.9346
Undeveloped Runoff Coefficient (Cu)	0.6503
Developed Runoff Coefficient (Cd)	0.6553
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	0.3491
Burned Peak Flow Rate (cfs)	0.3491
24-Hr Clear Runoff Volume (ac-ft)	0.0123
24-Hr Clear Runoff Volume (cu-ft)	535.0544



Peak Flow Hydrologic Analysis

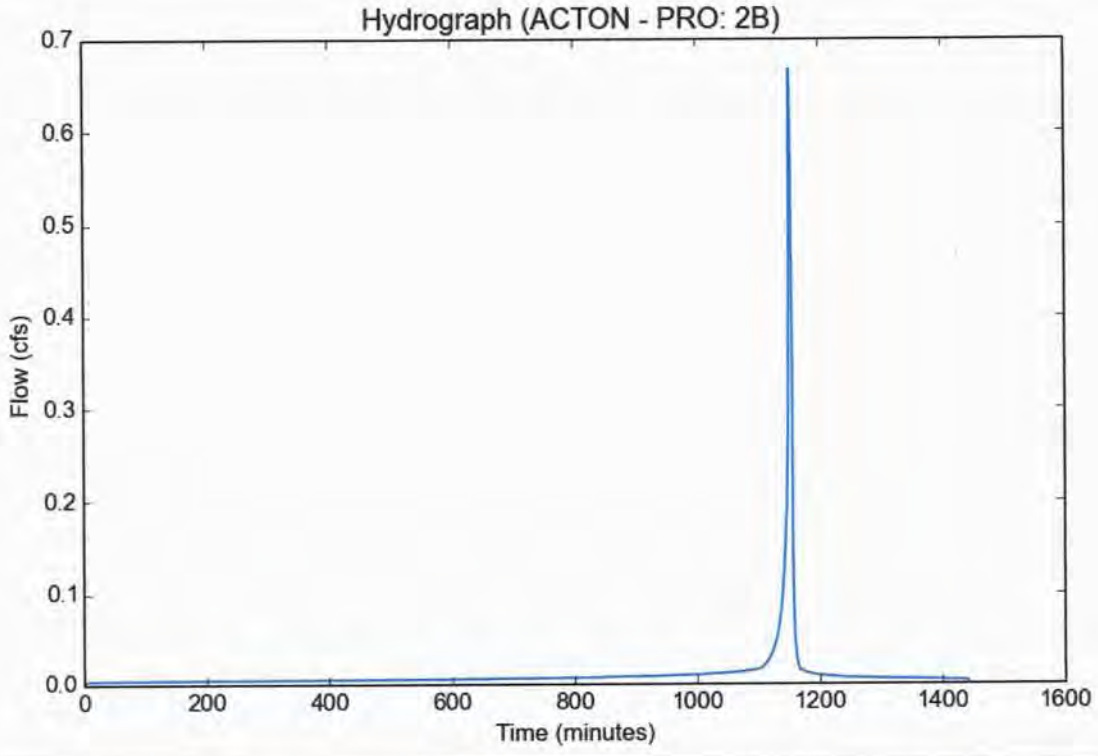
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -5yr- 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	5-yr
Fire Factor	0
LID	False

Output Results

Modeled (5-yr) Rainfall Depth (in)	2.5754
Peak Intensity (in/hr)	1.5366
Undeveloped Runoff Coefficient (Cu)	0.7582
Developed Runoff Coefficient (Cd)	0.761
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6666
Burned Peak Flow Rate (cfs)	0.6666
24-Hr Clear Runoff Volume (ac-ft)	0.0213
24-Hr Clear Runoff Volume (cu-ft)	928.2261



Peak Flow Hydrologic Analysis

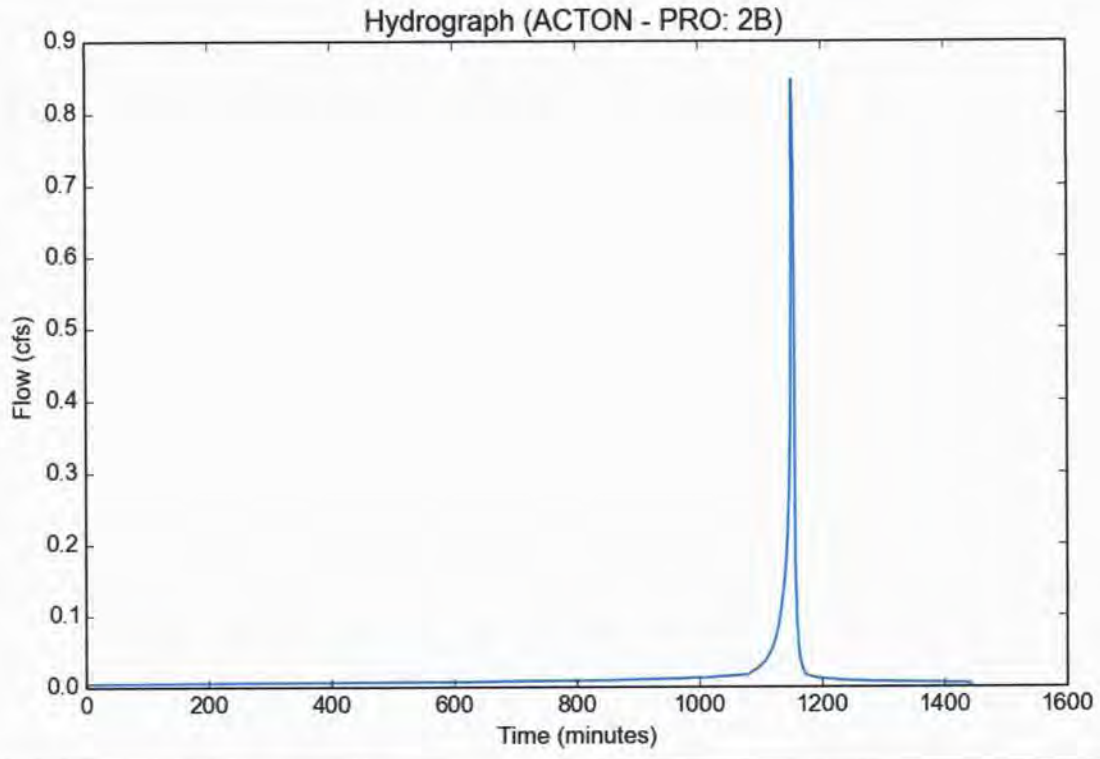
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -10yr- 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.1487
Peak Intensity (in/hr)	1.8786
Undeveloped Runoff Coefficient (Cu)	0.7878
Developed Runoff Coefficient (Cd)	0.7901
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.846
Burned Peak Flow Rate (cfs)	0.846
24-Hr Clear Runoff Volume (ac-ft)	0.0283
24-Hr Clear Runoff Volume (cu-ft)	1233.7749



Peak Flow Hydrologic Analysis

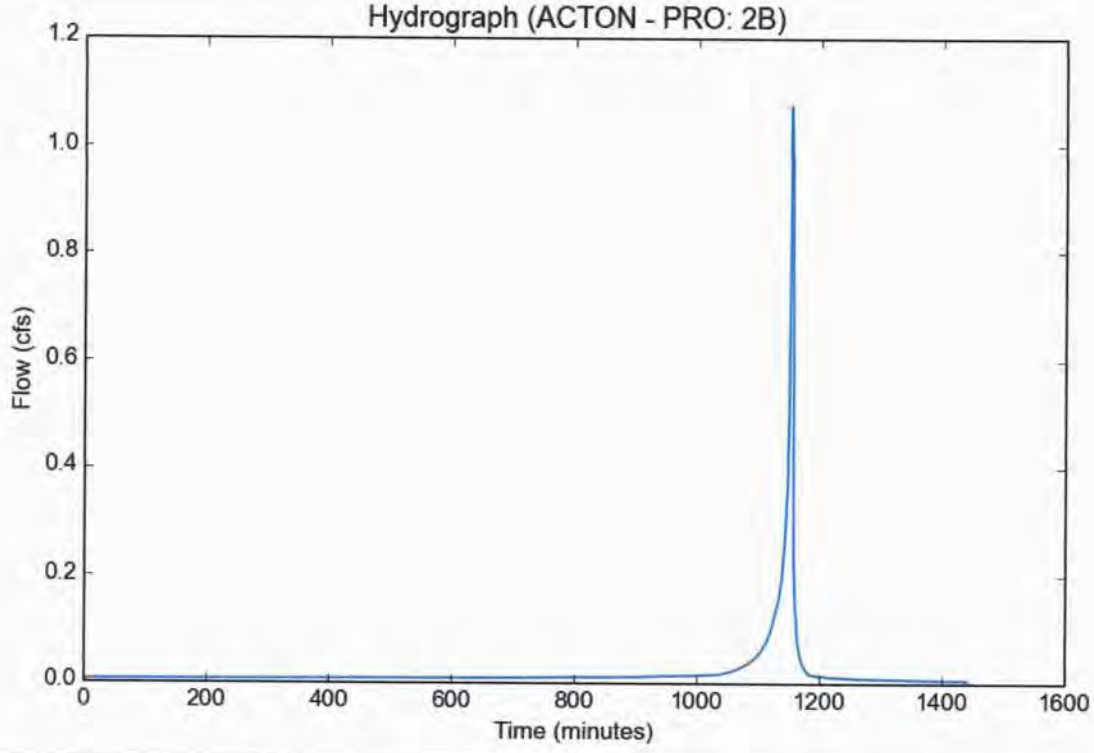
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -25yr- 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	25-yr
Fire Factor	0
LID	False

Output Results

Modeled (25-yr) Rainfall Depth (in)	3.872
Peak Intensity (in/hr)	2.3101
Undeveloped Runoff Coefficient (Cu)	0.8148
Developed Runoff Coefficient (Cd)	0.8165
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.0752
Burned Peak Flow Rate (cfs)	1.0752
24-Hr Clear Runoff Volume (ac-ft)	0.0384
24-Hr Clear Runoff Volume (cu-ft)	1674.8119



Peak Flow Hydrologic Analysis

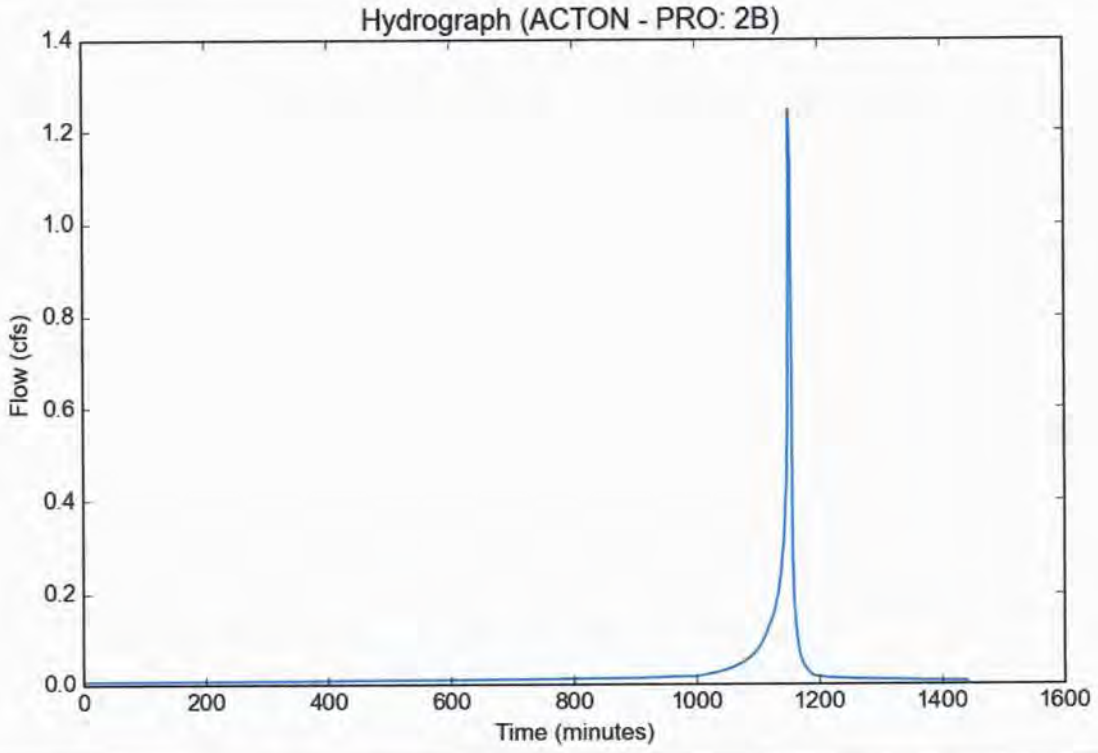
File location: G:/BUSINESS/FJCo/FJC_WorkFiles/ProjectFiles/2014/14-102_Acton/2015/Hydrology/PRO-hydroCALC-2/ACTON - PRO -50yr- 2B.pdf
Version: HydroCalc 0.3.1-beta

Input Parameters

Project Name	ACTON - PRO
Subarea ID	2B
Area (ac)	0.57
Flow Path Length (ft)	125.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	4.41
Percent Impervious	0.02
Soil Type	98
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	4.41
Peak Intensity (in/hr)	2.6311
Undeveloped Runoff Coefficient (Cu)	0.829
Developed Runoff Coefficient (Cd)	0.8304
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2455
Burned Peak Flow Rate (cfs)	1.2455
24-Hr Clear Runoff Volume (ac-ft)	0.0469
24-Hr Clear Runoff Volume (cu-ft)	2043.6362



SIERRA HIGHWAY

N 82°15'38" E 334.93'

N 82°15'38" E 334.54'

N 82°15'38" E 400.00'

19.60'

TOP OF SLOPE

TOE OF SLOPE

TOE OF SLOPE

AC PVMT

AC PVMT

AC DRWY

DIRT

6" CONC CURB
2.0' CONC GUTTER

6" CONC CURB
2.0' CONC GUTTER

LOT CORNER
SET L&LS 6823 TAG
2.00' OFFSET
ON LOT LINE PROD

LOT CORNER
SET L&LS 6823 TAG
2.00' OFFSET
ON LOT LINE PROD

EXISTING COMMERCIAL BUILDING

N 00°49'05" W 279.41'

N 00°22'27" W 221.01'

PATH OF FLOW
A=1.95 Ac, SOIL=98,
L=374', S=0.0428, %IMP=2%
50YR RAINFALL DEPTH=4.41

SITE OUTFLOW
A=1.95 Ac, SOIL=98,
L=374', S=0.0428, %IMP=2%
(SEE ALSO TABLE "EX")

N 81°37'50" E 73.78'

N 70°02'56" E 272.26'

LOT CORNER
FD 1" IP & LS
3130 TAG, FLUSH
PER PM 249/27-28

LOT CORNER
FD 2" IP & RCE
15822, DN 6"
PER PM 249/27-28

LOT CORNER
FD 2" IP & RCE
15822, DN 6"
PER PM 249/27-28

6' CL FENCE

4' WIRE FENCE

AC V-DITCH

CONC HEAD-WALL

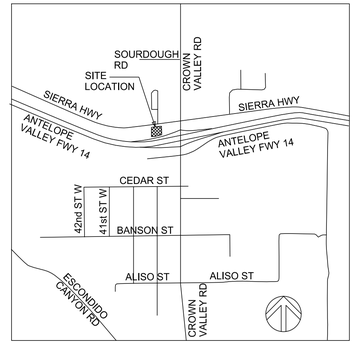
CONC BLOCK WALL

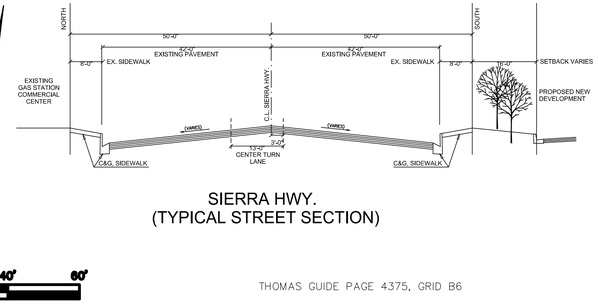
CONC PVMT

TRASH ENCLOSURE

14 FRWY ON RAMP

VICINITY MAP NTS





SIERRA HWY.
(TYPICAL STREET SECTION)

0' 20' 40' 60'

LEGEND (DASHED SYMBOLS/LINES ARE EXISTING)
(SOLID LINES ARE PROPOSED)

- INDICATES CONCRETE STREET LIGHT
- INDICATES FIRE HYDRANT
- INDICATES WATER METER
- INDICATES WATER VALVE
- INDICATES GAS VALVE
- INDICATES TELEPHONE MANHOLE
- INDICATES POWER POLE
- INDICATES GUY WIRE
- INDICATES PULL BOX
- CP INDICATES CONC PVMT
- TW INDICATES TOP OF WALL

THOMAS GUIDE PAGE 4375, GRID B6

A.P.N. 3217-021-022

PARCEL 1 OF PARCEL MAP 21321

STORM	Qp	24hr vol.
50 YR.	3.87 CFS	6,990 CF
25 YR.	3.33 CFS	5,729 CF
10 YR.	2.23 CFS	4,217 CF
5 YR.	1.60 CFS	3,166 CF
2 YR.	0.61 CFS	1,790 CF
TABLE "EX"		

HYDROLOGY STUDY APPROVED

CHECKED BY: _____ RCE NO. 74937 DATE 10/15/2015

APPROVED BY: _____ DATE 10/15/2015

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

STEPHEN W. JONES
CONSULTING CIVIL ENGINEER
136 N. GRAND AVE.
SUITE 154
WEST COVINA, CA 91791
626-332-3368
sjones.rce302@yahoo.com

SIGNATURE

RCE NO. 38302
EXP. 3/31/17

8-7-15
DATE

REGISTERED PROFESSIONAL ENGINEER
STEPHEN W. JONES
NO. 38302
EXP. 3-31-17
CIVIL
STATE OF CALIFORNIA

HYDROLOGY STUDY/ EXISTING SITE
CUP 201400037

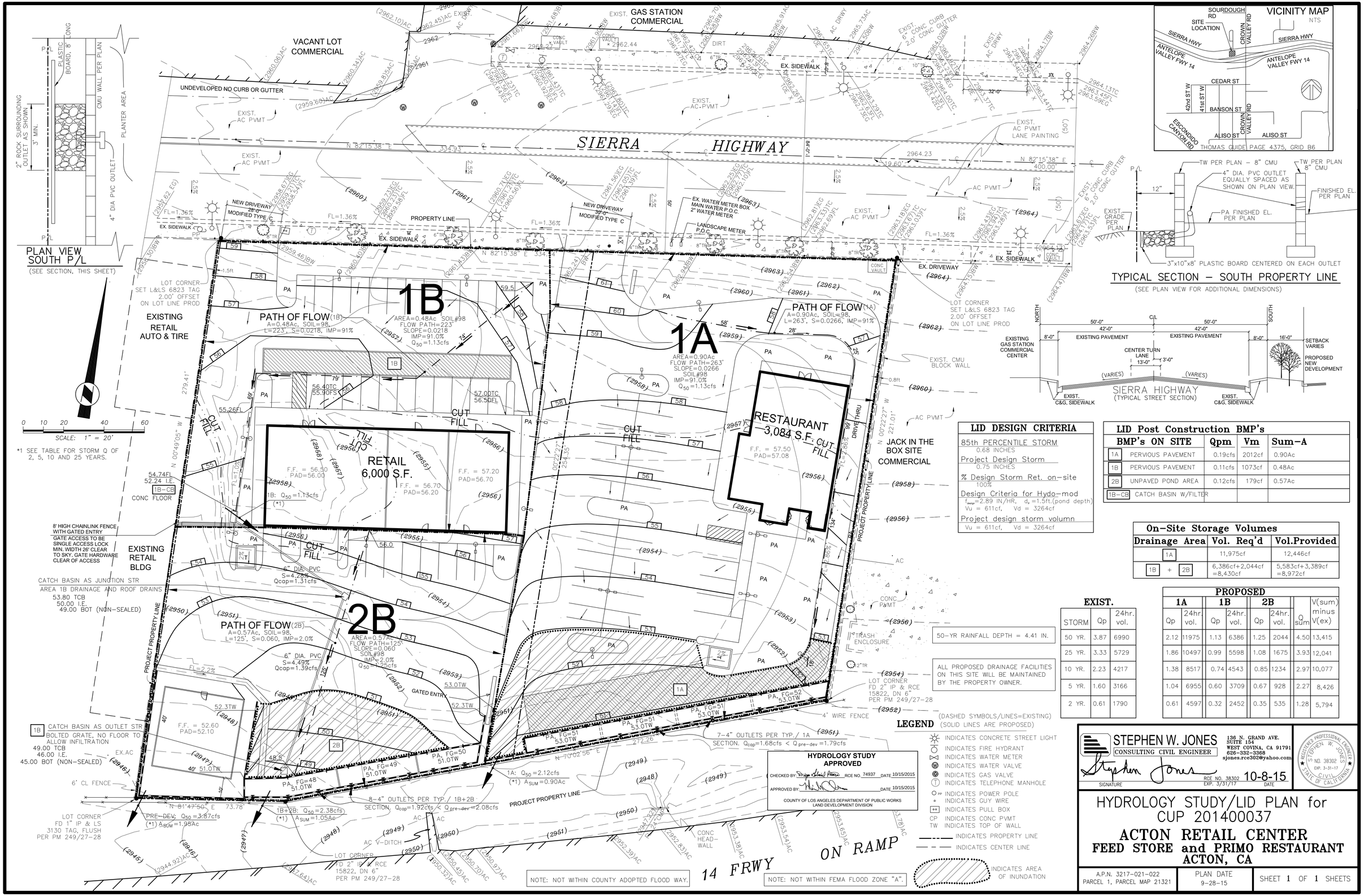
ACTON RETAIL CENTER
FEED STORE and PRIMO RESTAURANT
ACTON, CA

PLAN DATE
8-7-15

SHEET 1 OF 1 SHEETS

PLAN VIEW
SOUTH P/L
(SEE SECTION, THIS SHEET)

*1 SEE TABLE FOR STORM Q OF 2, 5, 10 AND 25 YEARS.



TYPICAL SECTION – SOUTH PROPERTY LINE
(SEE PLAN VIEW FOR ADDITIONAL DIMENSIONS)

LID DESIGN CRITERIA

85th PERCENTILE STORM
0.68 INCHES

Project Design Storm
0.75 INCHES

% Design Storm Ret. on-site
100%

Design Criteria for Hydo-mod
f_{max}=2.89 IN/HR, d_i =1.5ft.(pond depth)
Vu = 611cf, Vd = 3264cf

Project design storm volumn
Vu = 611cf, Vd = 3264cf

LID Post Construction BMP's

BMP's ON SITE		Qpm	Vm	Sum-A
1A	PERVIOUS PAVEMENT	0.19cfs	2012cf	0.90Ac
1B	PERVIOUS PAVEMENT	0.11cfs	1073cf	0.48Ac
2B	UNPAVED POND AREA	0.12cfs	179cf	0.57Ac
1B-CB	CATCH BASIN W/FILTER			

On-Site Storage Volumes

Drainage Area	Vol. Req'd	Vol.Provided
1A	11,975cf	12,446cf
1B + 2B	6,386cf+2,044cf =8,430cf	5,583cf+3,389cf =8,972cf

EXIST.			PROPOSED								
			1A		1B		2B				
STORM	Qp	24hr. vol.	Qp	24hr. vol.	Qp	24hr. vol.	Qp	24hr. vol.	Q sum	V(sum) minus V(ex)
50 YR.	3.87	6990	2.12	11975	1.13	6386	1.25	2044	4.50	13,415
25 YR.	3.33	5729	1.86	10497	0.99	5598	1.08	1675	3.93	12,041
10 YR.	2.23	4217	1.38	8517	0.74	4543	0.85	1234	2.97	10,077
5 YR.	1.60	3166	1.04	6955	0.60	3709	0.67	928	2.27	8,426
2 YR.	0.61	1790	0.61	4597	0.32	2452	0.35	535	1.28	5,794

50-YR RAINFALL DEPTH = 4.41 IN.

ALL PROPOSED DRAINAGE FACILITIES ON THIS SITE WILL BE MAINTAINED BY THE PROPERTY OWNER.

LEGEND (SOLID LINES ARE PROPOSED) (DASHED SYMBOLS/LINES=EXISTING)

- INDICATES CONCRETE STREET LIGHT
- INDICATES FIRE HYDRANT
- INDICATES WATER METER
- INDICATES WATER VALVE
- INDICATES GAS VALVE
- INDICATES TELEPHONE MANHOLE
- INDICATES POWER POLE
- INDICATES GUY WIRE
- INDICATES PULL BOX
- CP INDICATES CONC PVMT
- TW INDICATES TOP OF WALL
- INDICATES PROPERTY LINE
- INDICATES CENTER LINE
- INDICATES AREA OF INUNDATION

STEPHEN W. JONES
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10-8-15
DATE
REGISTERED PROFESSIONAL ENGINEER STEPHEN W. JONES RCE NO. 38302 EXP. 3-31-17 CIVIL STATE OF CALIFORNIA

HYDROLOGY STUDY/LID PLAN for CUP 201400037

ACTON RETAIL CENTER
FEED STORE and PRIMO RESTAURANT
ACTON, CA

A.P.N. 3217-021-022
PARCEL 1, PARCEL MAP 21321

PLAN DATE
9-28-15

SHEET 1 OF 1 SHEETS