

## Appendix C



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# Hydrology and Water Quality Technical Report

Appendix C-1



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Preliminary Water Quality Technical Report

# Preliminary Water Quality Technical Report for

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Westfield North County Mall  
Cinema Project  
200-290 East Via Rancho Parkway  
City of Escondido, California

RASN Project No. 3150292

Date: July 27, 2015

## **Preliminary Water Quality Technical Report**

**(WQTR)**

*FOR*

**Westfield North County Mall  
Cinema Project  
200-290 East Via Rancho Parkway  
City of Escondido, California**

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Preparation Date  
**July 27, 2015**

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**1. INTRODUCTION**

The preliminary water quality technical report (WQTR) is required per the 2010 City of Escondido Standard Urban Storm water Mitigation Plan (SUSMP) under the Regional Water Quality Control Board Order CAS010875. The purpose of this WQTR is to address the water quality impacts from the proposed Cinema project and is intended to address water quality impacts. California Storm Water Quality Association (CASQA) BMPs as well as those outlined in the SUSMP will be used to provide a long-term solution to water quality onsite. This WQTR is subject to revisions per the plan check process. This WQTR is preliminary and as such addresses the Cinema at the preliminary level. To supplement this WQTR, a final WQTR will be required prior to the issuance of any grading or building permits for the project.

This WQTR is intended to address the storm water requirements of the City of Escondido, including all Low Impact Development (LID) requirements. The City of Escondido SUSMP will be used in order to comply with the rules and regulations enforced by the City, under RWQCB permits, issued by the San Diego Regional Water Quality Control Board, to the County of San Diego and co-permittee cities therein.

*1.1. PROJECT DESCRIPTION*

The project proposes to redevelop an existing parking lot to a building pad, and eventual cinema, pedestrian plaza, and associated infrastructure.

This project can be considered a priority development project as the project proposed to replace 5,000 s.f. or more of impervious surfaces.

Yes	No	A	Housing subdivisions of 10 or more dwelling units. Examples: Single-family homes, multifamily homes, condominiums, and apartments.
Yes	No	B	Pollutant-generating projects that disturb 1 acre or more of land. Projects that generate pollutants at levels greater than background levels and disturb 1 acre or more of land are considered priority development projects. In most cases linear pathway projects that are for infrequent vehicle use (such as emergency or maintenance access) or for pedestrian or bicycle use are not considered pollutant generating above background levels if they are built with pervious surfaces, or if they allow runoff to sheet flow to surrounding pervious surfaces.
Yes	No	C	Automotive repair shop. A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532–7534, or 7536–7539.
Yes	No	D	Restaurant. Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except the requirements for structural treatment best management practices and numeric sizing criteria and hydromodification.
Yes	No	E	Hillside development greater than 5,000 square feet. Any development that would create 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development would grade on any natural slope that is 25% or greater.

Yes	No	F	Environmentally sensitive areas. All development located within or directly adjacent to, or discharging directly to, an environmentally sensitive area (ESA) (where discharges from the development or redevelopment would enter receiving waters within the ESA) that would either create 2,500 square feet of impervious surface on a proposed project site or increase the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject
Yes	No	G	Parking lots 5,000 square feet or more or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes	No	I	Retail gasoline outlets that (a) are 5,000 square feet or larger or (b) support projected average daily traffic of 100 or more vehicles per day.
Yes	No	H	Streets, roads, highways, and freeways. Any paved surface that is 5,000 square feet or greater used to transport automobiles, trucks, motorcycles, and other vehicles.

Priority Project Categories	General Pollutant Categories								
	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash and Debris	Oxygen Demanding Substances	Oil and Grease	Bacteria and Viruses	Pesticides
<b>Detached Residential Development</b>	X	X			X	X	X	X	X
<b>Attached Residential Development</b>	X	X			X	P <sup>1</sup>	P <sup>2</sup>	P	X
<b>Commercial Development Greater than 1 Acre</b>	P <sup>1</sup>	P <sup>1</sup>	X	P <sup>2</sup>	X	P <sup>3</sup>	X	P <sup>4</sup>	P <sup>3</sup>
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X <sup>3,5</sup>	X		X		
Restaurants					X	X	X	X	P <sup>1</sup>
Hillside Development Greater than 5,000 Square Feet	X	X			X	X	X		X
Parking Lots	P <sup>1</sup>	P <sup>1</sup>	X		X	P <sup>1</sup>	X		P <sup>1</sup>
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways, and Freeways	X	P <sup>1</sup>	X	X <sup>5</sup>	X	P <sup>3</sup>	X	X	P <sup>1</sup>

Notes:  
X = anticipated  
P = potential  
<sup>1</sup> A potential pollutant if landscaping exists on-site.  
<sup>2</sup> A potential pollutant if the project includes uncovered parking areas.  
<sup>3</sup> Including solvents.  
<sup>4</sup> A potential pollutant if land use involves food or animal waste products.  
<sup>5</sup> Including petroleum hydrocarbons.

1.2. PRESENT CONDITIONS

The existing parking lot, to be removed, was constructed circa 2011.

Land Use	Square Feet
Total Area	82,459
Impervious Area (ped, parking)	23,287
Building Areas	48,000
Pervious Areas	11,172

1.3. PROPOSED LAND USE, BUILDING,

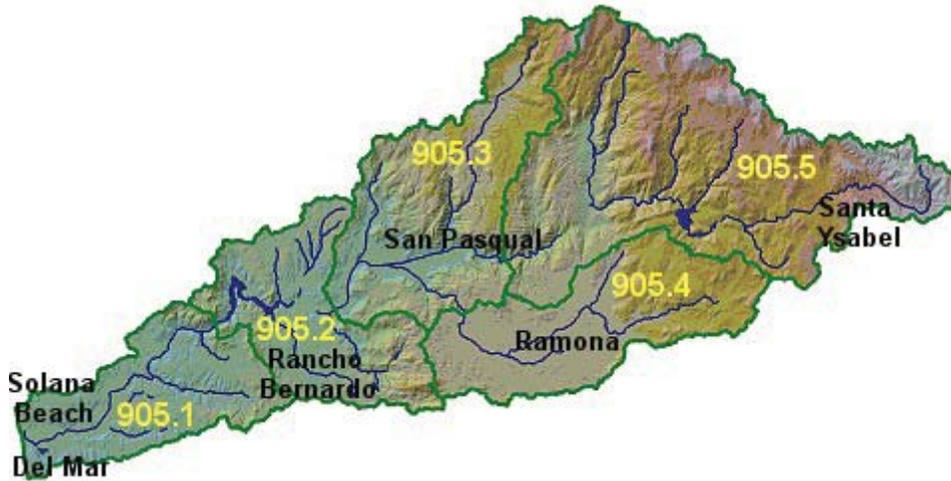
Land Use	Square Feet
Total Area	82,459
Impervious Area (ped, parking)	
Building Areas	

Pervious Areas	
Total Area	

1.4. HYDROLOGIC UNIT CONTRIBUTION

The site lies within the HU 905.2 Hodges Hydrologic Unit, 12-180703040301

San Dieguito Watershed topographical map



According to rojectcleanwater.org

Major Water Bodies: San Dieguito River, San Dieguito Lagoon, and Lake Hodges  
 CWA 303(d) List: Cloverdale Creek: phosphorus, TDS; Felicita Creek: aluminum, TDS; Green Valley Creek: chloride, manganese, pentachlorophenol, sulfates; Lake Hodges: color, manganese, nitrogen, pH, phosphorus, turbidity; Kit Carson Creek: pentachlorophenol, TDS; Pacific Ocean Shoreline (San Dieguito HU): indicator bacteria; Sutherland Reservoir: color, manganese, pH

Major Impacts: Surface water quality degradation, habitat degradation and loss, invasive species, and increased imperviousness

Constituents of Concern: Coliform bacteria, nutrients, sediment, and trace metals

Sources / Activities: urban runoff, agricultural runoff, and domestic animals

The San Dieguito River watershed is a drainage area of approximately 346 square miles in west-central San Diego County. The watershed includes portions of the cities of Del Mar, Escondido, Poway, San Diego, and unincorporated San Diego County. In terms of land area, the majority of the watershed (79.8%) is within the unincorporated jurisdiction. The San Dieguito River watershed is presently divided into vacant/undeveloped (54%), parks/open space (29%), and urban (18%) land uses. Nearly half of the vacant land area is open to future development, most of which is zoned for residential usage. The current watershed population is approximately 125,000 however; this level is projected increase to over 210,000 residents by 2015.

The watershed extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to the outlet at the San Dieguito Lagoon and the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mile long, 80,000 acre San Dieguito River Park, the 150 acre San Dieguito Lagoon, and five water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway.

The Pacific Ocean at the mouth of the San Dieguito River is listed as a 303(d)-impaired water body for elevated coliform bacteria. In the absence of a comprehensive watershed planning effort, large-scale future development may exasperate current water quality problems and create additional beneficial use impairments. The San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion due to restricted or intermittent tidal flushing.

Beneficial water uses within the San Dieguito River Watershed as designated in the State Water Resources Control Board's San Diego Region Basin Plan.

## **2. WATER QUALITY ENVIRONMENT**

### *2.1. BENEFICIAL USES*

2.1.1. *Inland surface and coastal waters*

Beneficial Uses	Inland Surface Water	Coastal Waters	Reservoirs and Lakes	Ground Water
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Wildlife Habitat	X	X	X	
Estuarine Habitat		X		
Biological Habitats of Special Signif.	X	X		
Rare, Threatened, or End.	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Develop.		X		

2.1.2. *303(D) status*

San Dieguito River, Watershed/USGS HUC = 90511000/18070304, impairment: Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity

2.2. *HYDROLOGY – CONDITIONS OF CONCERN*

2.2.1. *Standard element*

Per the City of Escondido SUSMP, priority development projects must be designed so that runoff rates and duration are controlled to maintain or reduce downstream erosion conditions and protect stream habitat

Overall, the site will meet existing hydrologic flow rates.

These calculations are based on the guidelines given in the Drainage Design Standards chapter of the City of Escondido Design Standards and Standard Drawings.

PROPOSED CONDITIONS								
	PAVEMENT AREA (SF)	C	BUILDING AREA (SF)	C	LANDSCAPE AREA (SF)	C	TOTAL AREA (SF)	COMPOSITE C
WEST	3,366	0.90	0	0.90	3,366	0.30	6,732	0.60
NE	1,845	0.90	48,000	0.90	3,591	0.30	53,436	0.86
SOUTH	18,076	0.90	0	0.90	4,215	0.30	22,291	0.79
OVERALL	23,287	0.90	48,000	0.90	11,172	0.30	82,459	0.82

Existing				
Basin	Area	Q2 (CFS)	Q10 (CFS)	Q45(CFS)
OVERALL	82,459			1.56

No Control				
Basin	Area	Q2 (CFS)	Q10 (CFS)	Q45(CFS)
WEST	6,732			0.12
NE	53,436			1.05
SOUTH	22,291			0.42
OVERALL	82,459	0.00	0.00	1.59

Post-BMP				
Basin	Area	Q2 (CFS)	Q10 (CFS)	Q45(CFS)
WEST	6,732			0.09
NE	53,436			1.03
SOUTH	22,291			0.42
OVERALL	82,459	0.00	0.00	1.54

*2.2.2. Low impact development element*

LID features have been added to aid in control of Hydrology and to meet water quality goals. Such features include flow-through planters, vegetated buffers, and bioretention.

See Section 3 for additional information.

*2.2.3. Hydromodification element*

Per the SUSMP and Hydromodification Management Plan, since the project does not

propose an increase to post-construction peak discharge, the site is exempt from hydromodification requirements.

2.3. *POTENTIAL POLLUTANTS*

- Sediment
- Nutrients
- Heavy Metals
- Trash and Debris
- Oxygen Demanding Substances
- Oil and Grease
- Pesticides

2.4. *SOIL CHARACTERISTICS*

**3. POST CONSTRUCTION BMPs**

3.1. *LOW IMPACT DEVELOPMENT DESIGN STRATEGIES*

3.1.1. *Project LID design overview*

The proposed project will utilize biofiltration to manage stormwater quality and hydro modification as needed. The site is classified within Hydrologic Soil Group “C” and thus infiltration is not pursued. This is consistent with prior LID projects on site. Additionally depth to groundwater is a preliminary concern.

3.1.2. *Drainage management areas*

The site is split into 3 hydrologic areas, outlined previously. Each are managed independently with LID biofiltration.

3.2. *SOURCE CONTROL MEASURES*

Table of Permanent and Operational Source Control Measures

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
A. Onsite storm drain inlets	<input type="checkbox"/> Mark all inlets with the words “No Dumping! Flows to Bay” or similar.	<input type="checkbox"/> Maintain and periodically repaint or replace inlet markings. <input type="checkbox"/> Provide storm water pollution prevention information to new site owners, lessees, or operators. <input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a> . <input type="checkbox"/> Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
<input type="checkbox"/> D2. Landscape/ Outdoor Pesticide Use	State that final landscape plans will accomplish all of the following. <ul style="list-style-type: none"> <li><input type="checkbox"/> Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible.</li> <li><input type="checkbox"/> Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution.</li> <li><input type="checkbox"/> Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions.</li> <li><input type="checkbox"/> pest-resistant plants, especially adjacent to hardscape.</li> <li><input type="checkbox"/> To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Maintain landscaping using minimum or no pesticides.</li> <li><input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a>.</li> <li><input type="checkbox"/> Provide IPM information to new owners, lessees and operators.</li> </ul>
<input type="checkbox"/> G. Refuse areas	<ul style="list-style-type: none"> <li><input type="checkbox"/> State how site refuse will be handled and provide supporting detail to what is shown on plans.</li> <li><input type="checkbox"/> State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a>.</li> </ul>
O. Miscellaneous Drain or Wash Water <ul style="list-style-type: none"> <li><input type="checkbox"/> Boiler drain lines</li> <li><input type="checkbox"/> Condensate drain lines</li> <li><input type="checkbox"/> Rooftop equipment</li> <li><input type="checkbox"/> Drainage sumps</li> <li><input type="checkbox"/> Roofing, gutters, and trim</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.</li> <li><input type="checkbox"/> Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.</li> <li><input type="checkbox"/> Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment.</li> <li><input type="checkbox"/> Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water.</li> <li><input type="checkbox"/> Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.</li> </ul>	

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
<input type="checkbox"/> P. Plazas, sidewalks, and parking lots.		<input type="checkbox"/> Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

## **Attachments 1. Sizing Exhibits**

Note to reviewer: the sizing has been provided holistically on a basin-by-basin condition. Therefore, since the plan-view of the proposed planters do not vary by incremental elevation, when a basin's BMP has multiple locations, it is assumed that combined, through dispersed disposal of storm water, that a single-BMP model effectively models the BMPs.

## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

## Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	215	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [(Line 4 + (Line 12 x Line 8))/12] x Line 7	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	215	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [ Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	322.91	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	76.88	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	6,732	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	201.96	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	201.96	sq-ft

**Note:** Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	2,450	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP $[(\text{Line 4} + (\text{Line 12} \times \text{Line 8}))/12] \times \text{Line 7}$	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	2,450	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	3,674.8	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	874.95	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	53,436	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	1,603.08	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	1,603.08	sq-ft

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

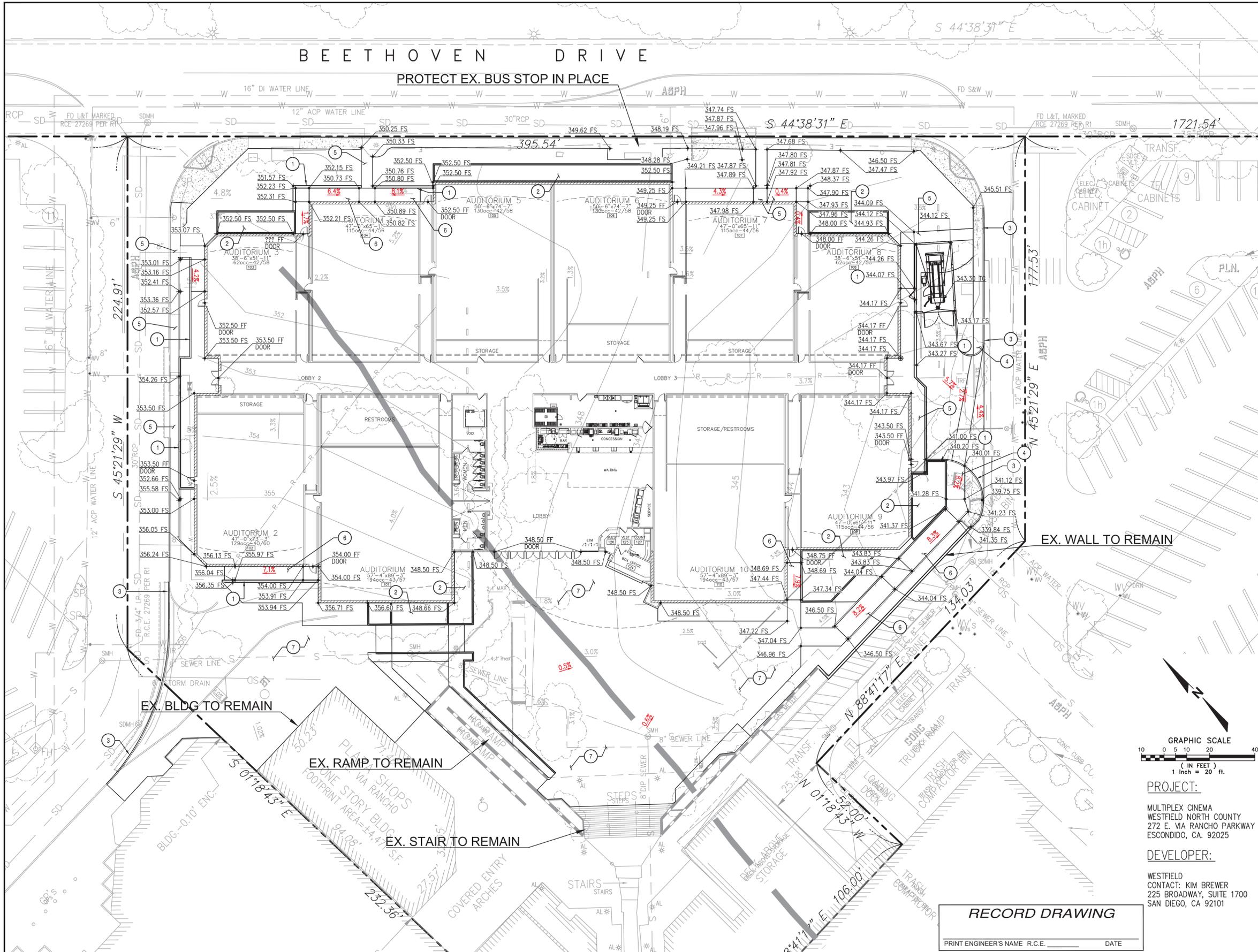
## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

## Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

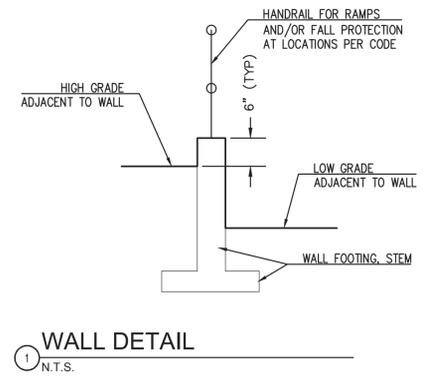
Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	935	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP $[(\text{Line 4} + (\text{Line 12} \times \text{Line 8}))/12] \times \text{Line 7}$	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	935	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [ Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	1,402.4	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	333.91	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	22,291	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	668.73	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	668.73	sq-ft

**Note:** Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

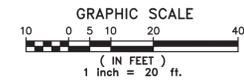
**Attachments 2. Hydrologic Exhibit**



- PROTECT IN PLACE NOTES:**
- A PROTECT EXISTING PAVEMENT
  - B PROTECT EXISTING CURB & GUTTER
  - C PROTECT EXISTING RAIL
  - D PROTECT EXISTING BUILDING, COLUMNS, AND WALLS
  - E PROTECT SLAUSON AVE. ROAD PAVEMENT, CONCRETE, CURB & GUTTER.
- GRADING NOTES:**
- 1 GRADE-SEPARATION WALL, GENERALLY PER SCHEMATIC DETAIL BELOW
  - 2 RAISED PLANTER / STORM WATER BIOFILTRATION PLANTER
  - 3 PROPOSED CURB
  - 4 PROPOSED CURB RAMP
  - 5 PROPOSED SIDEWALK
  - 6 PROPOSED SIDEWALK RAMP
  - 7 PROPOSED PEDESTRIAN PLAZA



**R.A. Smith National**  
 Beyond Surveying and Engineering  
 8881 Research Drive, Irvine, CA 92618  
 949-872-2378, www.rasmithnational.com  
 Appleton, WI Brookfield, WI Pittsburg, PA



**PROJECT:**  
 MULTIPLEX CINEMA  
 WESTFIELD NORTH COUNTY  
 272 E. VIA RANCHO PARKWAY  
 ESCONDIDO, CA. 92025

**DEVELOPER:**  
 WESTFIELD  
 CONTACT: KIM BREWER  
 225 BROADWAY, SUITE 1700  
 SAN DIEGO, CA 92101

THE LOCATIONS OF EXISTING UTILITY INSTALLATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE. THERE MAY BE OTHER UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.  
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WDID NO.: PENDING

**CITY OF ESCONDIDO ENGINEERING DEPARTMENT**  
 APPROVED  
 By \_\_\_\_\_ Date \_\_\_\_\_  
 (for City Engineer)  
 Comments \_\_\_\_\_  
 OBTAIN GRADING PERMIT AT FIELD ENGINEERING OFFICE PRIOR TO GRADING

**DIGALERT**  
  
 CALL BEFORE YOU DIG  
 1-800-227-2600  
 2 WORKING DAY NOTICE REQUIRED

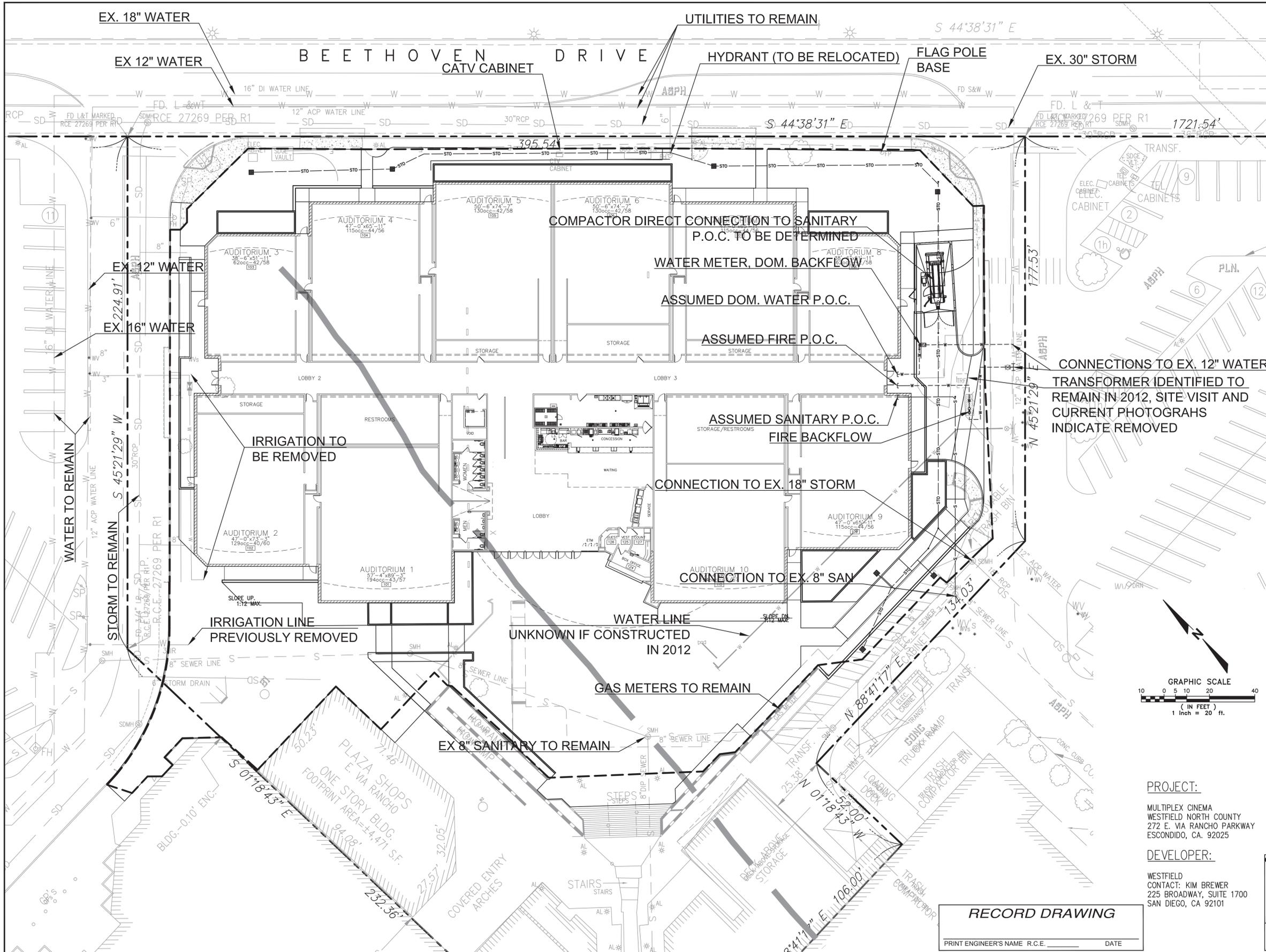
REGISTERED PROFESSIONAL ENGINEER  
 SAMUEL J. JACOBY  
 C74309  
 EXP. 6/30/17  
 CIVIL  
 STATE OF CALIFORNIA  
 DATE 7.27.15  
 PLANNING SUBMITTAL



City Project No.  
**ENG 00-0000**

**RECORD DRAWING**  
 PRINT ENGINEER'S NAME R.C.E. \_\_\_\_\_ DATE \_\_\_\_\_

CONSTRUCTION RECORD	REFERENCES	Date	By	REVISIONS	App'd	Date	BENCH MARK	EARTHWORK QUANTITIES	SCALE	Office	Designed By	Drawn By	Checked By	ENGINEERING SERVICES	Drawing No.
Contractor _____							DESCRIPTION:	CUT: _____ C.Y.	Horizontal		Plans Prepared Under Supervision Of		Date 7.27.15	WESTFIELD NORTH COUNTY - MULTIPLEX CINEMA	C-01
Inspector _____							Bench Mark No. _____	FILL: _____ C.Y.	Vertical		SAMUEL J. JACOBY		R.C.E. No. C74309		
Date Completed _____							Elevation _____	BALANCE: _____ C.Y.							



**LEGEND**

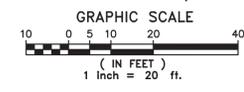
---	EX. WATER
---	PR. WATER
---	EX. SANITARY
---	PR. SANITARY
---	EX. STORM
---	PR. STORM
---	EX. ELECTRIC
---	EX. CATV
---	PROJECT LIMITS

CONNECTIONS TO EX. 12" WATER  
 TRANSFORMER IDENTIFIED TO  
 REMAIN IN 2012, SITE VISIT AND  
 CURRENT PHOTOGRAPHS  
 INDICATE REMOVED

# R.A. Smith National

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and Engineering

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DATE 7.27.15  
 PLANNING SUBMITTAL

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**PROJECT:**

MULTIPLEX CINEMA  
 WESTFIELD NORTH COUNTY  
 272 E. VIA RANCHO PARKWAY  
 ESCONDIDO, CA. 92025

**DEVELOPER:**

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**CITY OF ESCONDIDO ENGINEERING DEPARTMENT**  
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By \_\_\_\_\_ Date \_\_\_\_\_  
 (for City Engineer)

Comments \_\_\_\_\_

OBTAIN GRADING PERMIT  
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 PRIOR TO GRADING

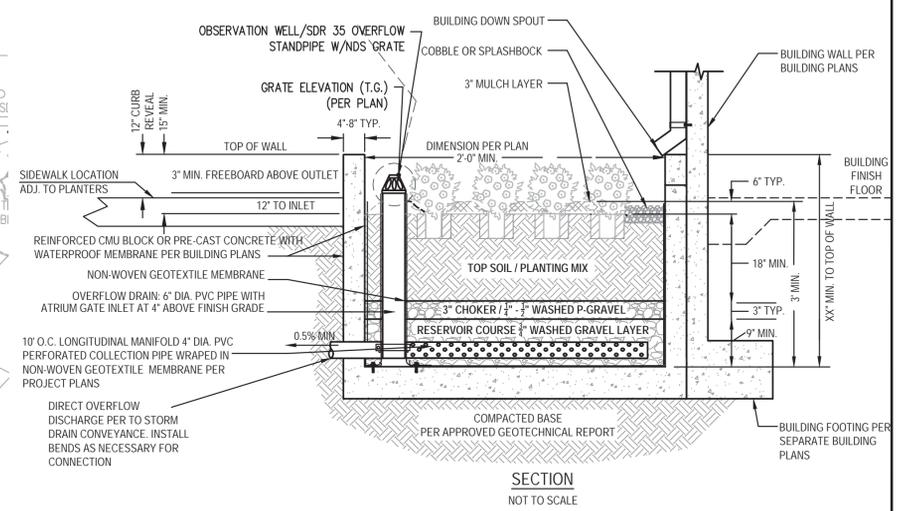
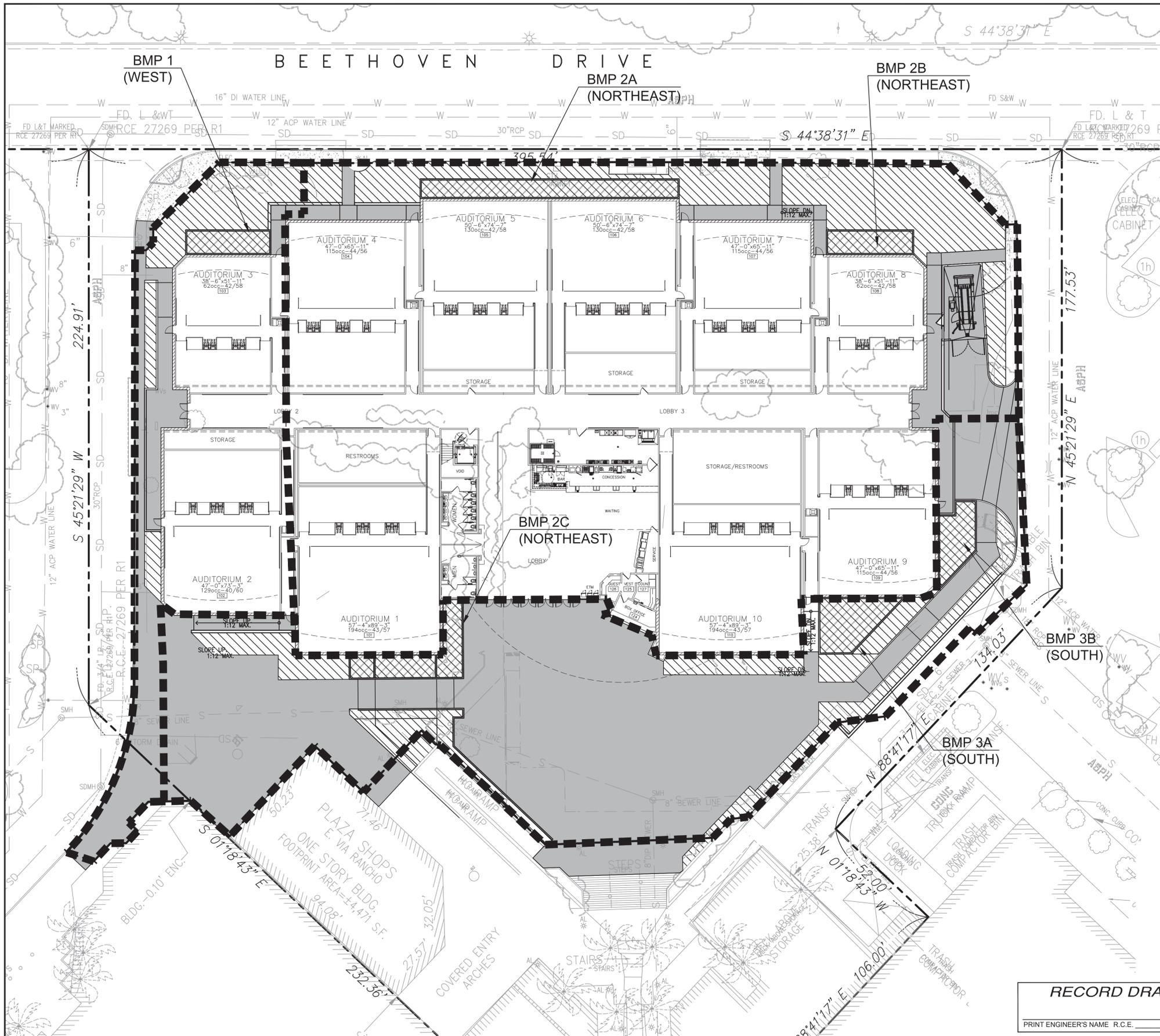


City Project No.  
**ENG 00-0000**

**RECORD DRAWING**

PRINT ENGINEER'S NAME R.C.E. \_\_\_\_\_ DATE \_\_\_\_\_

CONSTRUCTION RECORD	REFERENCES	Date	By	REVISIONS	App'd	Date	BENCH MARK	EARTHWORK QUANTITIES	SCALE	Office	Designed By	Drawn By	Checked By	ENGINEERING SERVICES	Drawing No.
Contractor _____							DESCRIPTION:	CUT: _____ C.Y.	Horizontal	Plans Prepared Under Supervision Of	DATE 7.27.15			WESTFIELD NORTH COUNTY - MULTIPLEX CINEMA	C-02
Inspector _____							Bench Mark No. _____	FILL: _____ C.Y.	Vertical	Filed _____	Date				
Date Completed _____							Elevation _____	BALANCE: _____ C.Y.	Traffic _____	Checked _____	R.C.E. No. C74309				



3 STORMWATER PLANTER TYPICAL DETAIL  
N.T.S.

- LEGEND:**
- PROP. LANDSCAPE
  - PROP. BIOFILTER
  - CATCHMENT BOUNDARY

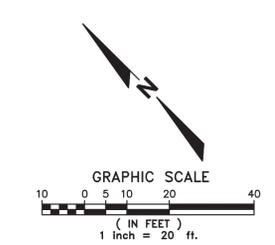
**AREA NOTES:**

	PRE-DEVELOPMENT	POST-DEVELOPMENT
TOTAL:	2.03 ACRES	2.03 ACRES
PERVIOUS:	0.85 ACRES	0.26 ACRES
IMPERVIOUS:	1.18 ACRES	1.77 ACRES
BUILDING:	0.00 ACRES	1.16 ACRES

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DATE 7.27.15  
PLANNING SUBMITTAL

**PROJECT:**  
MULTIPLEX CINEMA  
WESTFIELD NORTH COUNTY  
272 E. VIA RANCHO PARKWAY  
ESCONDIDO, CA. 92025

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**DEVELOPER:**  
WESTFIELD  
CONTACT: KIM BREWER  
225 BROADWAY, SUITE 1700  
SAN DIEGO, CA 92101

WDID NO.: PENDING

**CITY OF ESCONDIDO ENGINEERING DEPARTMENT**  
APPROVED

By \_\_\_\_\_ Date \_\_\_\_\_  
(for City Engineer)

Comments \_\_\_\_\_

OBTAIN GRADING PERMIT AT FIELD ENGINEERING OFFICE PRIOR TO GRADING



City Project No.  
**ENG 00-0000**

**RECORD DRAWING**

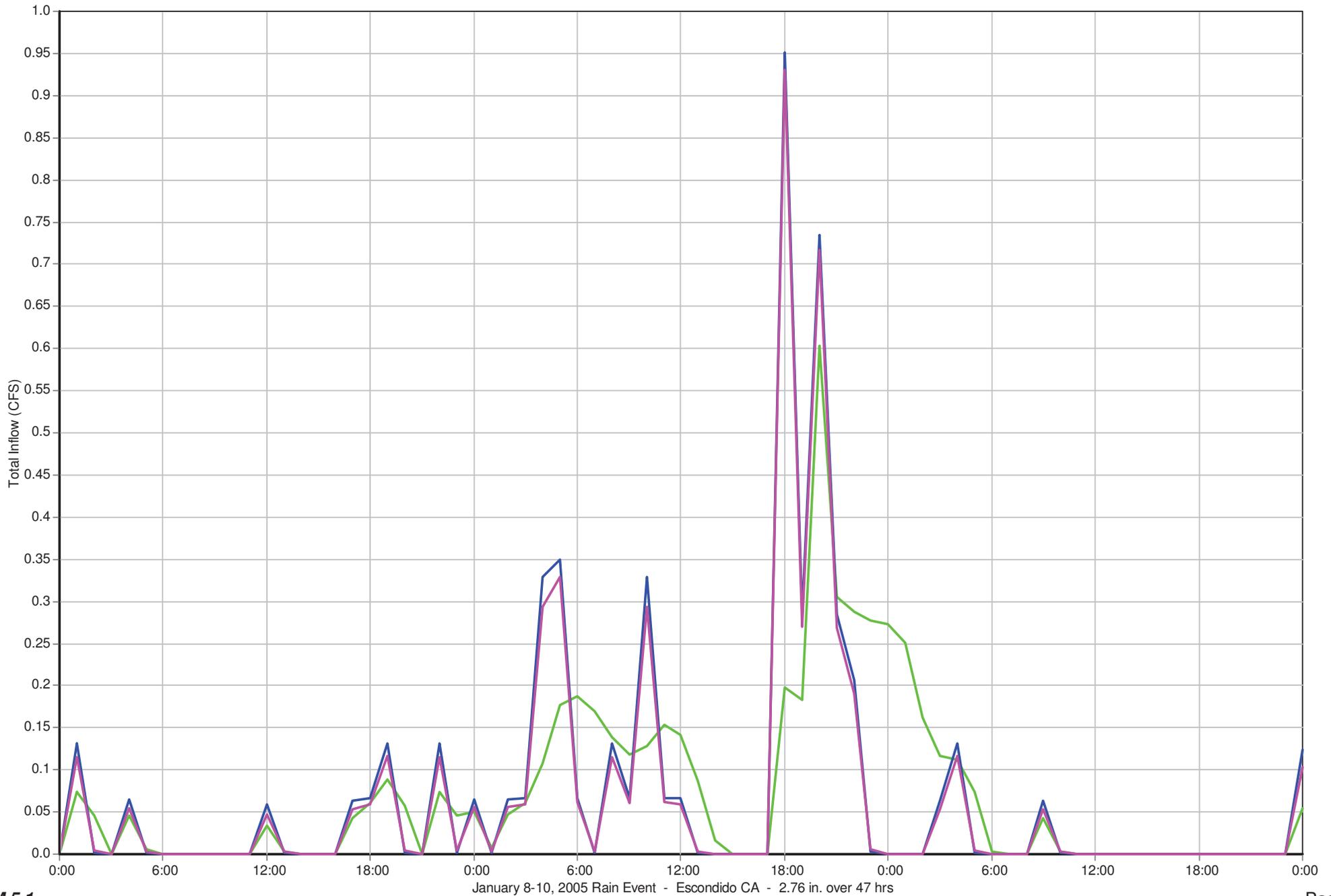
PRINT ENGINEER'S NAME R.C.E. \_\_\_\_\_ DATE \_\_\_\_\_

CONSTRUCTION RECORD	REFERENCES	Date	By	REVISIONS	App'd	Date	BENCH MARK	EARTHWORK QUANTITIES	SCALE	Office	Designed By	Drawn By	Checked By	ENGINEERING SERVICES	Drawing No.
Contractor _____							DESCRIPTION:	CUT: _____ C.Y.	Horizontal		Plans Prepared Under Supervision Of		Date 7.27.15	WESTFIELD NORTH COUNTY - MULTIPLEX CINEMA	
Inspector _____							Bench Mark No. _____	FILL: _____ C.Y.	Vertical		SAMUEL J. JACOBY		R.C.E. No. C74309		Sheet 03
Date Completed _____								BALANCE: _____ C.Y.							

**Attachments 3. EPA SWMM output exhibits**

# Escondido Multiplex Cinema - 2 Year Return Period

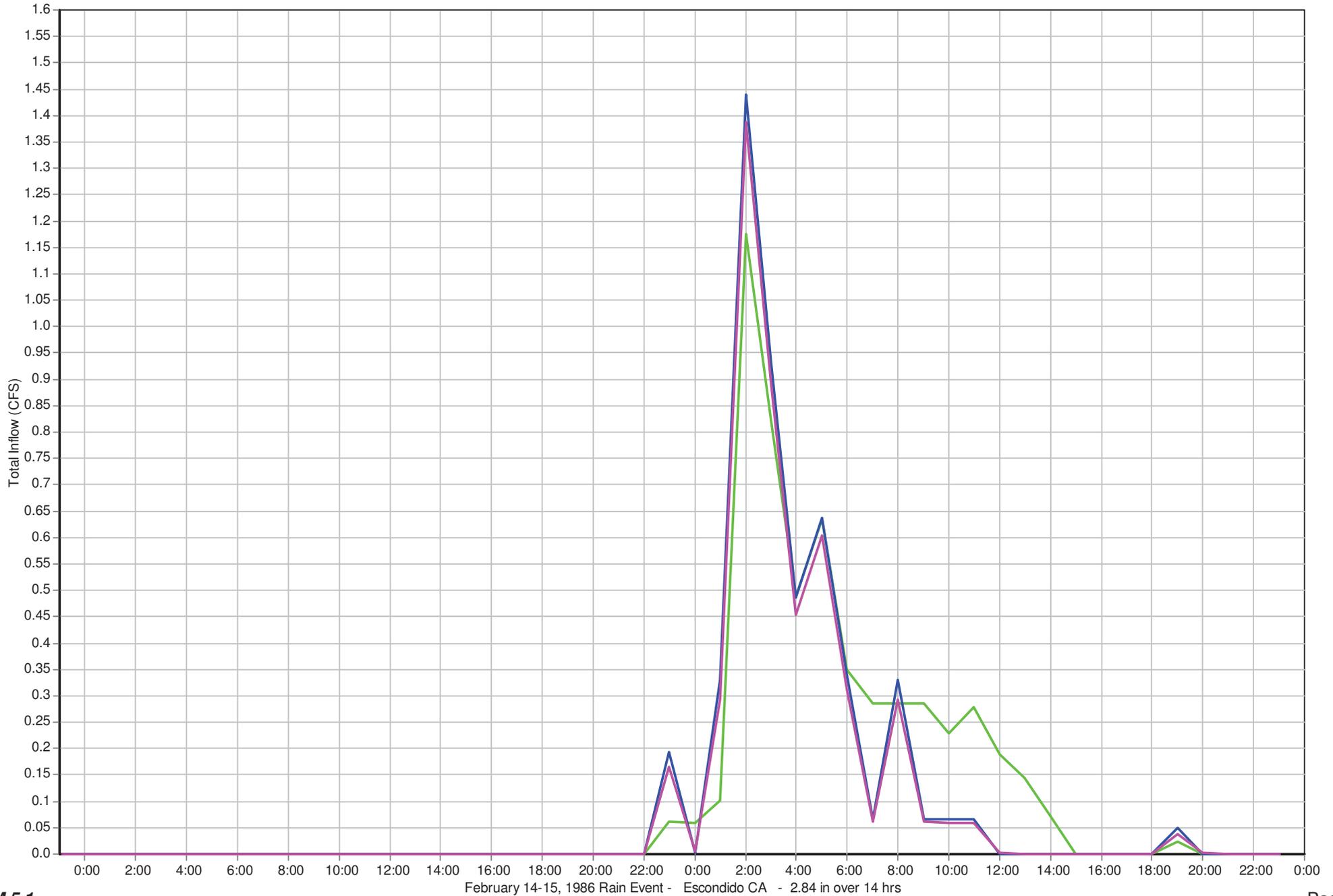
Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node Existing Total Inflow (CFS)



January 8-10, 2005 Rain Event - Escondido CA - 2.76 in. over 47 hrs

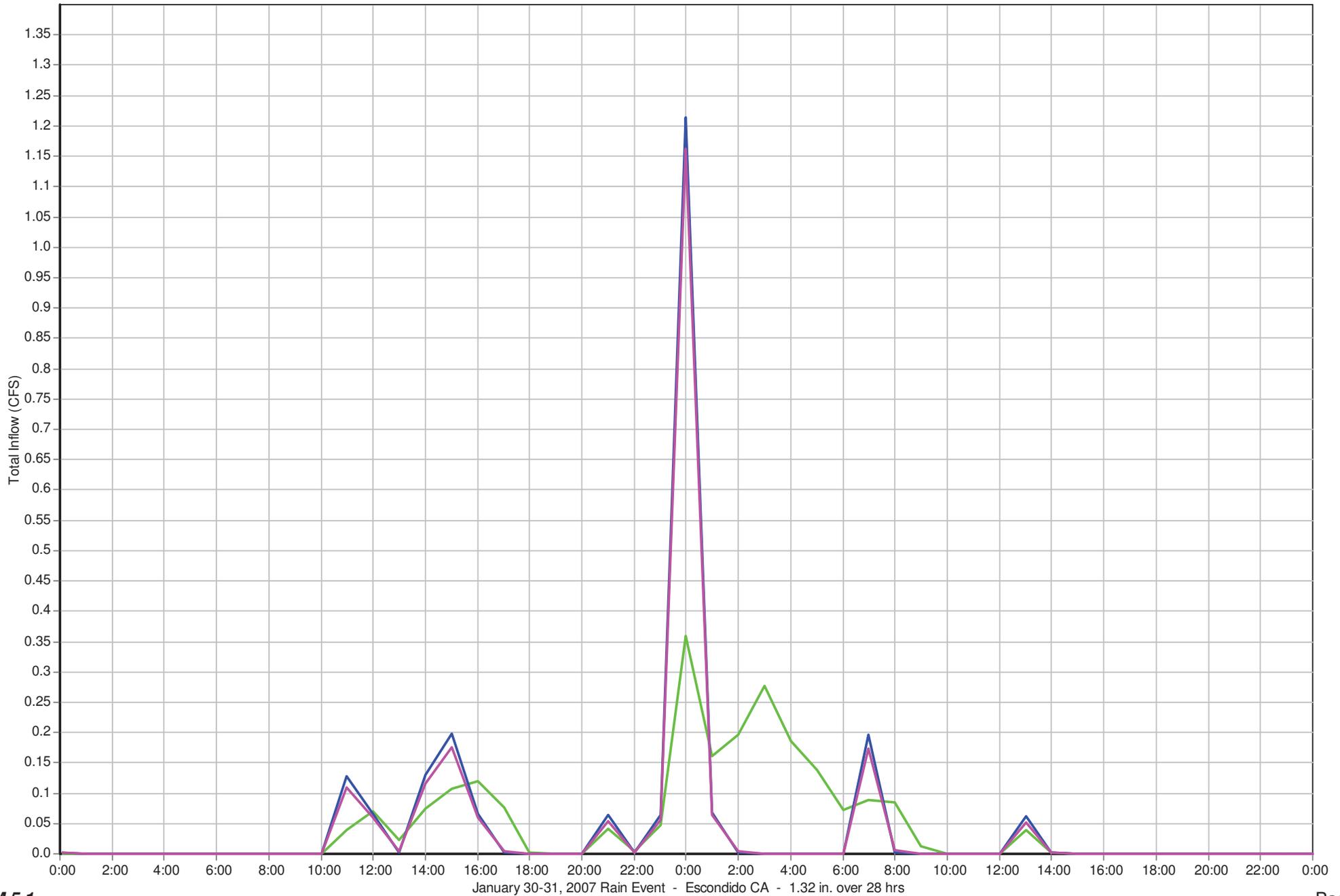
# Escondido Multiplex Cinema - 10 Year Return Period

Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node Existing Total Inflow (CFS)



# Escondido Multiplex Cinema - 5 Year Return Period

Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node Existing Total Inflow (CFS)



January 30-31, 2007 Rain Event - Escondido CA - 1.32 in. over 28 hrs

Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

	Volume acre-feet	Depth inches
Runoff Quantity Continuity	-----	-----
Initial LID Storage	0.009	0.018
Total Precipitation	289.352	611.200
Evaporation Loss	29.086	61.438
Infiltration Loss	45.169	95.410
Surface Runoff	145.311	306.940
LID Drainage	70.246	148.380
Final Storage	0.033	0.069
Continuity Error (%)	-0.167	

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Flow Routing Continuity	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	215.556	70.242
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	215.556	70.242
Flooding Loss	0.000	0.000

	Results.txt	
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.000	0.000
Continuity Error (%) .....	0.000	

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff	Runoff Coeff CFS	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
EX			611.20	0.00	51.64	131.45	428.83
22.04	1.56	0.702					
PR1			611.20	0.00	54.05	279.30	278.32
1.17	0.09	0.455					
PR2			611.20	0.00	80.54	38.49	493.46
16.44	1.03	0.807					
PR3			611.20	0.00	75.20	105.17	431.52
6.00	0.42	0.706					
PR1NC			611.20	0.00	33.47	287.99	290.27
1.22	0.12	0.475					
PR2NC			611.20	0.00	59.17	39.67	513.72
17.12	1.05	0.841					
PR3NC			611.20	0.00	54.27	108.44	449.25
6.25	0.42	0.735					

\*\*\*\*\*  
LID Performance Summary  
\*\*\*\*\*

Drain	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
PR1							
8730.15	1.80	3.62	-0.00	9464.87	723.74	0.00	9.20
PR2							
15985.52	1.80	3.86	-0.00	17130.37	774.99	0.00	367.98
PR3							
13949.09	1.80	3.79	-0.00	14897.37	756.22	0.00	190.21

Results.txt  
Analysis ended on: Thu Jul 16 12:52:28 2015  
Total elapsed time: 00:05:45

WEST-Results.txt

Evaporation Loss ..... 0.000 0.000  
 Exfiltration Loss ..... 0.000 0.000  
 Initial Stored Volume ..... 0.000 0.000  
 Final Stored Volume ..... 0.000 0.000  
 Continuity Error (%) ..... 0.000

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff 10^6 gal	Runoff Coeff CFS	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
PR1 1.17	0.09	0.455	611.20	0.00	54.05	279.30	278.32
PR1NC 1.22	0.12	0.475	611.20	0.00	33.47	287.99	290.27

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
PR1 8730.15	1.80	Typical Stormwater 3.62	PI anter -0.00	9464.87	723.74	0.00	9.20

Analysis begun on: Wed Jul 22 10:52:40 2015  
 Analysis ended on: Wed Jul 22 10:54:39 2015  
 Total elapsed time: 00:01:59

WEST-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

	Volume acre-feet	Depth inches
Initial LID Storage	0.001	0.027
Total Precipitation	15.789	611.200
Evaporation Loss	1.131	43.765
Infiltration Loss	7.327	283.644
Surface Runoff	3.971	153.709
LID Drainage	3.374	130.589
Final Storage	0.002	0.073
Continuity Error (%)	-0.091	

\*\*\*\*\*

Flow Routing Continuity

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	7.344	2.393
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	7.344	2.393
Flooding Loss	0.000	0.000

NE-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

	Volume acre-feet	Depth inches
Initial LID Storage	0.006	0.027
Total Precipitation	124.990	611.200
Evaporation Loss	14.286	69.856
Infiltration Loss	7.992	39.078
Surface Runoff	53.965	263.886
LID Drainage	49.020	239.708
Final Storage	0.019	0.091
Continuity Error (%)	-0.228	

\*\*\*\*\*

Flow Routing Continuity

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	102.985	33.559
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	102.985	33.559
Flooding Loss	0.000	0.000

NE-Results.txt

Evaporation Loss ..... 0.000 0.000  
 Exfiltration Loss ..... 0.000 0.000  
 Initial Stored Volume .... 0.000 0.000  
 Final Stored Volume ..... 0.000 0.000  
 Continuity Error (%) ..... 0.000

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff CFS	Runoff Coeff	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
PR2 16.44	1.03	0.807	611.20	0.00	80.54	38.49	493.46
PR2NC 17.12	1.05	0.841	611.20	0.00	59.17	39.67	513.72

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
PR2 15985.52	1.80	Typical Stormwater 3.86	PI anter -0.00	17130.37	774.99	0.00	367.98

Analysis begun on: Wed Jul 22 10:57:30 2015  
 Analysis ended on: Wed Jul 22 10:59:27 2015  
 Total elapsed time: 00:01:57

SOUTH-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

	Volume acre-feet	Depth inches
Initial LID Storage	0.002	0.027
Total Precipitation	52.156	611.200
Evaporation Loss	5.524	64.734
Infiltration Loss	9.114	106.801
Surface Runoff	19.727	231.178
LID Drainage	17.852	209.203
Final Storage	0.008	0.088
Continuity Error (%)	-0.127	

\*\*\*\*\*

Flow Routing Continuity

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	37.579	12.246
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	37.579	12.246
Flooding Loss	0.000	0.000

SOUTH-Results.txt

Evaporation Loss ..... 0.000 0.000  
 Exfiltration Loss ..... 0.000 0.000  
 Initial Stored Volume .... 0.000 0.000  
 Final Stored Volume ..... 0.000 0.000  
 Continuity Error (%) ..... 0.000

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff CFS	Runoff Coeff	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
6.00	0.42	0.706	611.20	0.00	75.20	105.17	431.52
6.25	0.42	0.735	611.20	0.00	54.27	108.44	449.25

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
13949.09	1.80	3.79	Typical Stormwater -0.00	14897.37	756.22	0.00	190.21

Analysis begun on: Wed Jul 22 11:09:08 2015  
 Analysis ended on: Wed Jul 22 11:11:19 2015  
 Total elapsed time: 00:02:11

**Attachments 4. USDA Soil Group Exhibit**

Hydrologic Soil Group—San Diego County Area, California



Map Scale: 1:7,070 if printed on A landscape (11" x 8.5") sheet.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California  
 Survey Area Data: Version 8, Sep 17, 2014

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — San Diego County Area, California (CA638)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CkA	Chino silt loam, saline, 0 to 2 percent slopes	C	46.8	24.6%
PfC	Placentia sandy loam, thick surface, 2 to 9 percent slopes	D	17.8	9.3%
RaB	Ramona sandy loam, 2 to 5 percent slopes	C	85.1	44.7%
RaC	Ramona sandy loam, 5 to 9 percent slopes	C	32.5	17.1%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	8.4	4.4%
<b>Totals for Area of Interest</b>			<b>190.6</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

**Attachments 5. FIRMette**



Appendix C-2

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Revised Preliminary Water Quality  
Technical Report



# Preliminary Water Quality Technical Report for

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Westfield North County Mall  
Cinema Project  
200-290 East Via Rancho Parkway  
City of Escondido, California

RASN Project No. 3150292

Date: July 27, 2015  
Revised: September 15, 2015

## **Preliminary Water Quality Technical Report**

**(WQTR)**

*FOR*

**Westfield North County Mall  
Cinema Project  
200-290 East Via Rancho Parkway  
City of Escondido, California**

*Prepared for:*

**Westfield, LLC  
San Diego Regional Office  
225 Broadway, Suite 1700  
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*Prepared by:*



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Web: [rasmithnational.com](http://rasmithnational.com)

Preparation Date

**July 08, 2015**

**Revised: September 15, 2015**

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- 3. EPA SWMM output exhibits
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**1. INTRODUCTION**

The preliminary water quality technical report (WQTR) is required per the 2010 City of Escondido Standard Urban Storm water Mitigation Plan (SUSMP) under the Regional Water Quality Control Board Order CAS010875. The purpose of this WQTR is to address the water quality impacts from the proposed Cinema project and is intended to address water quality impacts. California Storm Water Quality Association (CASQA) BMPs as well as those outlined in the SUSMP will be used to provide a long-term solution to water quality onsite. This WQTR is subject to revisions per the plan check process. This WQTR is preliminary and as such addresses the Cinema at the preliminary level. To supplement this WQTR, a final WQTR will be required prior to the issuance of any grading or building permits for the project.

This WQTR is intended to address the storm water requirements of the City of Escondido, including all Low Impact Development (LID) requirements. The City of Escondido SUSMP will be used in order to comply with the rules and regulations enforced by the City, under RWQCB permits, issued by the San Diego Regional Water Quality Control Board, to the County of San Diego and co-permittee cities therein.

*1.1. PROJECT DESCRIPTION*

The project proposes to redevelop an existing parking lot to a building pad, and eventual cinema, pedestrian plaza, and associated infrastructure.

This project can be considered a priority development project as the project proposed to replace 5,000 s.f. or more of impervious surfaces.

Yes	No	A	Housing subdivisions of 10 or more dwelling units. Examples: Single-family homes, multifamily homes, condominiums, and apartments.
Yes	No	B	Pollutant-generating projects that disturb 1 acre or more of land. Projects that generate pollutants at levels greater than background levels and disturb 1 acre or more of land are considered priority development projects. In most cases linear pathway projects that are for infrequent vehicle use (such as emergency or maintenance access) or for pedestrian or bicycle use are not considered pollutant generating above background levels if they are built with pervious surfaces, or if they allow runoff to sheet flow to surrounding pervious surfaces.
Yes	No	C	Automotive repair shop. A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532–7534, or 7536–7539.
Yes	No	D	Restaurant. Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except the requirements for structural treatment best management practices and numeric sizing criteria and hydromodification.
Yes	No	E	Hillside development greater than 5,000 square feet. Any development that would create 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development would grade on any

			natural slope that is 25% or greater.
Yes	No	F	Environmentally sensitive areas. All development located within or directly adjacent to, or discharging directly to, an environmentally sensitive area (ESA) (where discharges from the development or redevelopment would enter receiving waters within the ESA) that would either create 2,500 square feet of impervious surface on a proposed project site or increase the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject
Yes	No	G	Parking lots 5,000 square feet or more or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes	No	I	Retail gasoline outlets that (a) are 5,000 square feet or larger or (b) support projected average daily traffic of 100 or more vehicles per day.
Yes	No	H	Streets, roads, highways, and freeways. Any paved surface that is 5,000 square feet or greater used to transport automobiles, trucks, motorcycles, and other vehicles.

Priority Project Categories	General Pollutant Categories								
	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash and Debris	Oxygen Demanding Substances	Oil and Grease	Bacteria and Viruses	Pesticides
<b>Detached Residential Development</b>	X	X			X	X	X	X	X
<b>Attached Residential Development</b>	X	X			X	P <sup>1</sup>	P <sup>2</sup>	P	X
<b>Commercial Development Greater than 1 Acre</b>	P <sup>1</sup>	P <sup>1</sup>	X	P <sup>2</sup>	X	P <sup>3</sup>	X	P <sup>4</sup>	P <sup>3</sup>
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X <sup>3,5</sup>	X		X		
Restaurants					X	X	X	X	P <sup>1</sup>
Hillside Development Greater than 5,000 Square Feet	X	X			X	X	X		X
Parking Lots	P <sup>1</sup>	P <sup>1</sup>	X		X	P <sup>1</sup>	X		P <sup>1</sup>
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways, and Freeways	X	P <sup>1</sup>	X	X <sup>5</sup>	X	P <sup>3</sup>	X	X	P <sup>1</sup>

Notes:  
X = anticipated  
P = potential  
<sup>1</sup> A potential pollutant if landscaping exists on-site.  
<sup>2</sup> A potential pollutant if the project includes uncovered parking areas.  
<sup>3</sup> Including solvents.  
<sup>4</sup> A potential pollutant if land use involves food or animal waste products.  
<sup>5</sup> Including petroleum hydrocarbons.

1.2. PRESENT CONDITIONS

The existing parking lot, to be removed, was constructed circa 2011. The following data was used in the hydromodification analysis, and is the pre-development information from 2011 – i.e., the pre-parking lot land use.

Land Use	Square Feet
Total Area	82,459
Impervious Area (ped, parking)	45,433
Building Areas	0
Pervious Areas	37,026

Per the hydrology manual, the “pre-development” condition will be utilized as a baseline with all 82,459 sf modeled as pervious. “Existing” conditions will not be utilized.

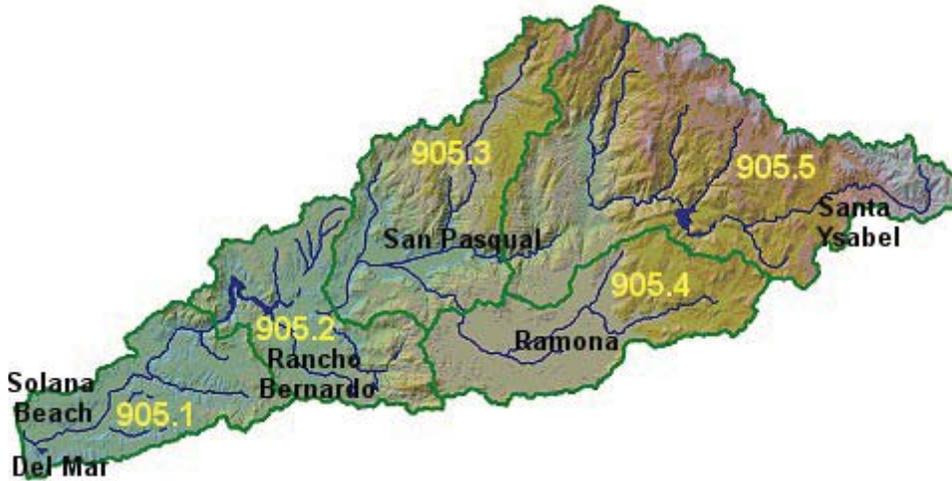
1.3. PROPOSED LAND USE, BUILDING,

Land Use	Square Feet
Total Area	82,459
Impervious Area (ped, parking)	23,287
Building Areas	48,000
Pervious Areas	11,172

1.4. HYDROLOGIC UNIT CONTRIBUTION

The site lies within the HU 905.2 Hodges Hydrologic Unit, 12-180703040301

San Dieguito Watershed topographical map



According to rojectcleanwater.org

Major Water Bodies: San Dieguito River, San Dieguito Lagoon, and Lake Hodges  
 CWA 303(d) List: Cloverdale Creek: phosphorus, TDS; Felicita Creek: aluminum, TDS; Green Valley Creek: chloride, manganese, pentachlorophenol, sulfates; Lake Hodges: color, manganese, nitrogen, pH, phosphorus, turbidity; Kit Carson Creek: pentachlorophenol, TDS; Pacific Ocean Shoreline (San Dieguito HU): indicator bacteria; Sutherland Reservoir: color, manganese, pH

Major Impacts: Surface water quality degradation, habitat degradation and loss, invasive species, and increased imperviousness

Constituents of Concern: Coliform bacteria, nutrients, sediment, and trace metals  
 Sources / Activities: urban runoff, agricultural runoff, and domestic animals

The San Dieguito River watershed is a drainage area of approximately 346 square miles in west-central San Diego County. The watershed includes portions of the cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach, and unincorporated San Diego County. In terms of land area, the majority of the

watershed (79.8%) is within the unincorporated jurisdiction. The San Dieguito River watershed is presently divided into vacant/undeveloped (54%), parks/open space (29%), and urban (18%) land uses. Nearly half of the vacant land area is open to future development, most of which is zoned for residential usage. The current watershed population is approximately 125,000 however; this level is projected increase to over 210,000 residents by 2015.

The watershed extends through a diverse array of habitats from its eastern headwaters in the Volcan Mountains to the outlet at the San Dieguito Lagoon and the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mile long, 80,000 acre San Dieguito River Park, the 150 acre San Dieguito Lagoon, and five water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway.

The Pacific Ocean at the mouth of the San Dieguito River is listed as a 303(d)-impaired water body for elevated coliform bacteria. In the absence of a comprehensive watershed planning effort, large-scale future development may exasperate current water quality problems and create additional beneficial use impairments. The San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion due to restricted or intermittent tidal flushing.

Beneficial water uses within the San Dieguito River Watershed as designated in the State Water Resources Control Board's San Diego Region Basin Plan.

**2. WATER QUALITY ENVIRONMENT**

*2.1. BENEFICIAL USES*

*2.1.1. Inland surface and coastal waters*

Beneficial Uses	Inland Surface Water	Coastal Waters	Reservoirs and Lakes	Ground Water
Municipal and Domestic Supply	X		X	X
Agricultural Supply	X		X	X
Industrial Service Supply	X	X	X	X
Industrial Process Supply	X		X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Wildlife Habitat	X	X	X	
Estuarine Habitat		X		
Biological Habitats of Special Signif.	X	X		
Rare, Threatened, or End.	X	X	X	
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Develop.		X		

*2.1.2. 303(D) status*

San Dieguito River, Watershed/USGS HUC = 90511000/18070304, impairment:  
Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity

*2.2. HYDROLOGY – CONDITIONS OF CONCERN*

*2.2.1. Standard element*

Per the City of Escondido SUSMP, priority development projects must be designed so that runoff rates and duration are controlled to maintain or reduce downstream erosion conditions and protect stream habitat

Overall, the site will meet existing hydrologic flow rates.

These calculations are based on the guidelines given in the Drainage Design Standards chapter of the City of Escondido Design Standards and Standard Drawings.

Additionally, per the BMP Manual,

For flow rates ranging from 10 percent, 30 percent or 50 percent of the pre-development 2-year runoff event ( $0.1Q_2$ ,  $0.3Q_2$ , or  $0.5Q_2$ ) to the pre-development 10-year runoff event ( $Q_{10}$ ), the post-project discharge rates and durations shall not deviate above the pre-development rates and durations by more than 10 percent over and more than 10 percent of

Appendix G: Guidance for Continuous Simulation and Hydromodification Management Sizing Factors

1. For flow rates ranging from 10 percent, 30 percent or 50 percent of the pre-development 2-year runoff event ( $0.1Q_2$ ,  $0.3Q_2$ , or  $0.5Q_2$ ) to the pre-development 10-year runoff event ( $Q_{10}$ ), the post-project discharge rates and durations shall not deviate above the pre-development rates and durations by more than 10 percent over and more than 10 percent of the length of the flow duration curve. The specific lower flow threshold will depend on the erosion susceptibility of the receiving stream for the project site [ $0.1Q_2$  assumed, worst case per Manual]
2. For flow rates ranging from the lower flow threshold to  $Q_5$ , the post-project peak flows shall not exceed pre-development peak flows. For flow rates from  $Q_5$  to  $Q_{10}$ , post-project peak flows may exceed pre-development flows by up to 10 percent.

To demonstrate that a flow control facility meets hydromodification management performance standards, peak flow frequency curves and flow duration summary must be generated and compared for pre-development and post-project conditions.

PROPOSED CONDITIONS								
	PAVEMENT AREA (SF)	C	BUILDING AREA (SF)	C	LANDSCAPE AREA (SF)	C	TOTAL AREA (SF)	COMPOSITE C
WEST	3,366	0.90	0	0.90	3,366	0.30	6,732	0.60
NE	1,845	0.90	48,000	0.90	3,591	0.30	53,436	0.86
SOUTH	18,076	0.90	0	0.90	4,215	0.30	22,291	0.79
OVERALL	23,287	0.90	48,000	0.90	11,172	0.30	82,459	0.82

DCV Calculation per Section B.1 Of the BMP Manual						
	West	NE	South		Overall	
i	0.20	0.20	0.20		0.20	in/r given page, B-3
Q	0.02	0.21	0.08		0.31	cfs Q=CIA per Composite "C"
85th	0.64	0.64	0.64		0.64	in per Figure B.1-1
I/P	1.00	13.88	4.29		6.38	Impervious/Pervious ratio
f	1.00	1.00	1.00		1.00	Impervious Dispersion (Table B.2-1)
TCV	0.00	0.00	0.00		0.00	cf Tree Credit
RCV	0.00	0.00	0.00		0.00	cf Rain Barrel Credit
DCV	215	2,450	935		3,601	cf Remaining DCV

See Attachment 1 for Sizing Exhibits.

Summary Sizes:

West 202 sf  
NE 1,603 sf  
South 669 sf

Flow Analysis						
	PREDEVELOPMENT		POST DEVELOPMENT		DIFFERENCE	
	cfs	Time (hrs)	cfs	Time (hrs)	cfs	
0.1Q2	0.0622	2	0.0515	4	-17.20%	
0.3Q2	0.1866	2	0.1545	5	-17.20%	
0.5Q2	0.311	2	0.2575	7	-17.20%	
Q2	0.622		0.515		-17.20%	
Q5	0.882		0.968		9.75%	
Q10	1.027	2	1.117	11	8.76%	

Note: Time from start of runoff

2.2.2. *Low impact development element*

LID features have been added to aid in control of Hydrology and to meet water quality goals. Such features include flow-through planters, vegetated buffers, and bioretention.

See Section 3 for additional information.

2.2.3. *Hydromodification element*

Per the SUSMP and Hydromodification Management Plan, since the project does not propose an increase to post-construction peak discharge, the site is exempt from hydromodification requirements. It is fully expected, however, that without implementation of the LID/site design features, the project would have resulted in additional peak flow and would have resulted in an absolute requirement for hydromodification.

Additionally, since the parking lot improvements built circa 2011 was subject to hydro modification requirements, the proposed project is as well.

As shown in the hydrologic analysis routed through the proposed BMPs, the site was modeled comparing pre-parking lot project to post-cinema project conditions, and the proposed conditions do not increase peak flow compared to pre-parking lot project

conditions.

Per the June 2015 model BMP Design Manual:

Each [Priority Development Project] shall implement onsite BMPs to manage hydromodification that may be caused by storm water runoff discharged from a project a[such that] Post-project runoff conditions (flow rates and durations) must not exceed pre-development runoff conditions by more than 10 percent (for the range of flows that result in increased potential for erosion, or degraded instream habitat downstream of PDPs).

Further,

Site design/LID, storm water pollutant control, and hydromodification management are separate requirements to be addressed in development project design. Each has its own purpose and each has separate performance standards that must be met. However, effective project planning involves understanding the ways in which these standards are related and how single suites of design features can meet more than one standard.

### *2.3. POTENTIAL POLLUTANTS*

- Sediment
- Nutrients
- Heavy Metals
- Trash and Debris
- Oxygen Demanding Substances
- Oil and Grease
- Pesticides

### *2.4. SOIL CHARACTERISTICS*

## **3. POST CONSTRUCTION BMPS**

### *3.1. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES*

#### *3.1.1. Project LID design overview*

The proposed project will utilize biofiltration to manage stormwater quality and hydro modification as needed. The site is classified within Hydrologic Soil Group "C" and thus infiltration is not pursued. This is consistent with prior LID projects on site. Additionally depth to groundwater is a preliminary concern.

#### *3.1.2. Drainage management areas*

The site is split into 3 hydrologic areas, outlined previously. Each are managed independently with LID biofiltration.

### *3.2. SOURCE CONTROL MEASURES*

Table of Permanent and Operational Source Control Measures

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
<p>A. Onsite storm drain inlets</p>	<p><input type="checkbox"/> Mark all inlets with the words “No Dumping! Flows to Bay” or similar.</p>	<p><input type="checkbox"/> Maintain and periodically repaint or replace inlet markings.  <input type="checkbox"/> Provide storm water pollution prevention information to new site owners, lessees, or operators.  <input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a>.  <input type="checkbox"/> Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”</p>
<p><input type="checkbox"/> D2. Landscape/ Outdoor Pesticide Use</p>	<p>State that final landscape plans will accomplish all of the following.</p> <p><input type="checkbox"/> Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible.</p> <p><input type="checkbox"/> Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution.</p> <p><input type="checkbox"/> Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions.</p> <p><input type="checkbox"/> pest-resistant plants, especially adjacent to hardscape.</p> <p><input type="checkbox"/> To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.</p>	<p><input type="checkbox"/> Maintain landscaping using minimum or no pesticides.  <input type="checkbox"/> See applicable operational BMPs in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a>.  <input type="checkbox"/> Provide IPM information to new owners, lessees and operators.</p>



Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
<input type="checkbox"/> <b>G.</b> Refuse areas	<input type="checkbox"/> State how site refuse will be handled and provide supporting detail to what is shown on plans. <input type="checkbox"/> State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	<input type="checkbox"/> State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a> .
<b>O.</b> Miscellaneous Drain or Wash Water <input type="checkbox"/> Boiler drain lines <input type="checkbox"/> Condensate drain lines <input type="checkbox"/> Rooftop equipment <input type="checkbox"/> Drainage sumps <input type="checkbox"/> Roofing, gutters, and trim	<input type="checkbox"/> Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. <input type="checkbox"/> Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. <input type="checkbox"/> Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. <input type="checkbox"/> Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water. <input type="checkbox"/> Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
<input type="checkbox"/> <b>P.</b> Plazas, sidewalks, and parking lots.		<input type="checkbox"/> Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

**Attachment 1. Sizing Exhibits**

## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

## Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	215	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [(Line 4 + (Line 12 x Line 8))/12] x Line 7	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	215	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [ Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	322.91	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	76.88	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	6,732	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	201.96	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	201.96	sq-ft

**Note:** Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	2,450	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP $[(\text{Line 4} + (\text{Line 12} \times \text{Line 8}))/12] \times \text{Line 7}$	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	2,450	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [ Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	3,674.8	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	874.95	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	53,436	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	1,603.08	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	1,603.08	sq-ft

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

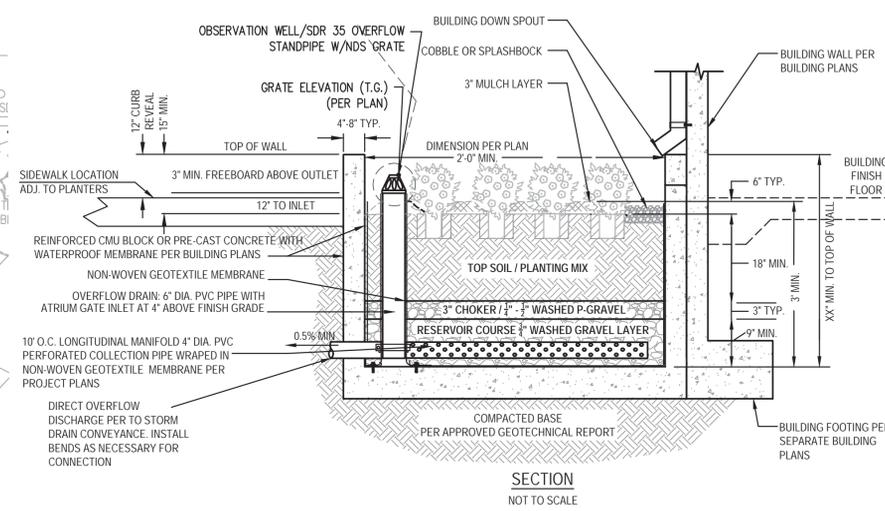
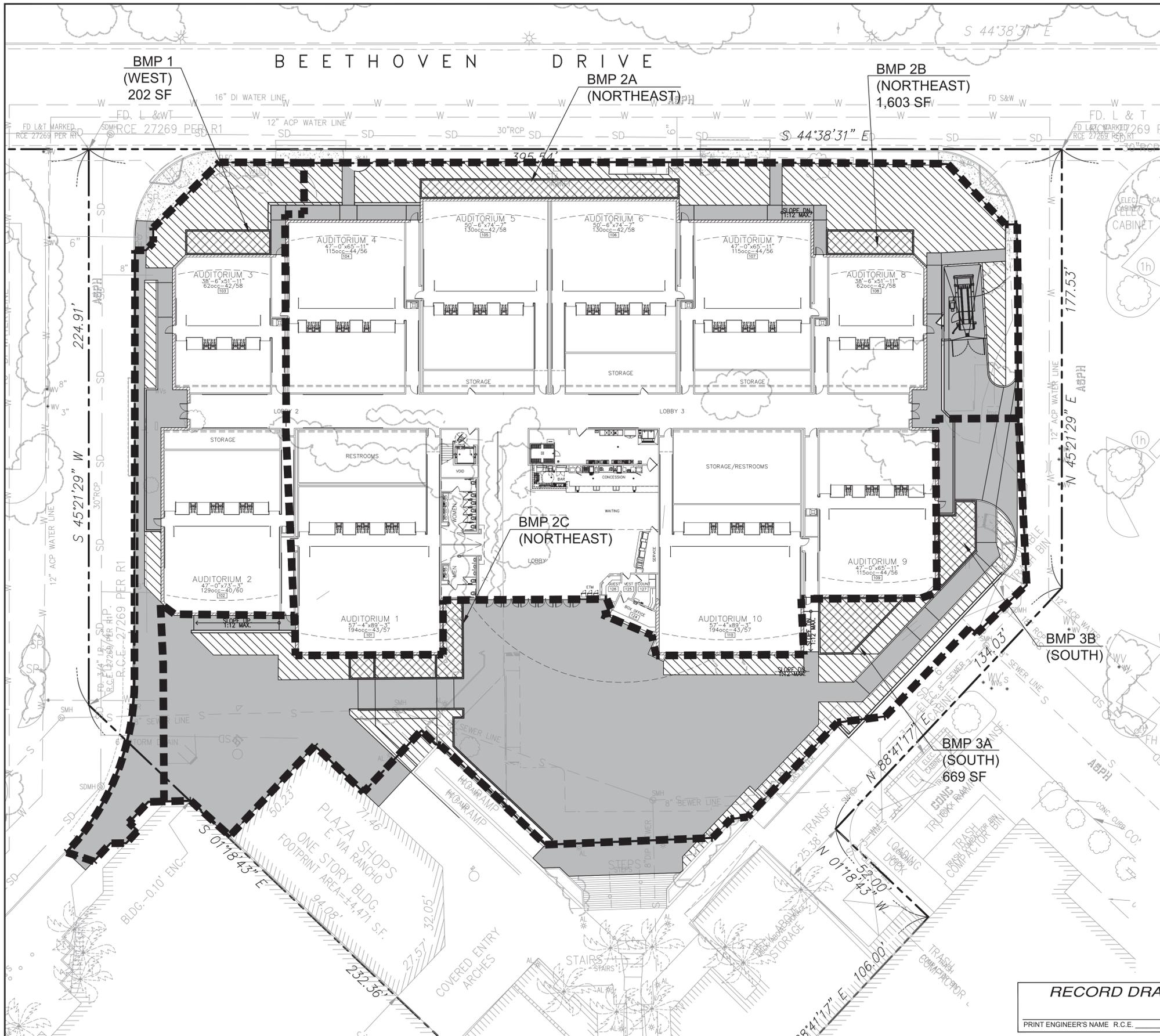
## Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

## Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	935	cubic-feet
<b>Partial Retention</b>			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	0	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP $[(\text{Line 4} + (\text{Line 12} \times \text{Line 8}))/12] \times \text{Line 7}$	0.15	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	935	cubic-feet
<b>BMP Parameters</b>			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum]	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr.
<b>Baseline Calculations</b>			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [ Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	20.4	inches
19	Total Depth Treated [Line 17 + Line 18]	50.4	inches
<b>Option 1 – Biofilter 1.5 times the DCV</b>			
20	Required biofiltered volume [1.5 x Line 10]	1,402.4	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	333.91	sq-ft
<b>Option 2 - Store 0.75 of remaining DCV in pores and ponding</b>			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	9	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	5.29	sq-ft
<b>Footprint of the BMP</b>			
24	Area draining to the BMP	22,291	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	1	
26	Minimum BMP Footprint [Line 24 x Line 25 x 0.03]	668.73	sq-ft
25	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 26)	668.73	sq-ft

**Note:** Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

**Attachment 2. Hydrologic Exhibit**



**3 STORMWATER PLANTER TYPICAL DETAIL**  
N.T.S.

- LEGEND:**
- PROP. LANDSCAPE
  - PROP. BIOFILTER
  - CATCHMENT BOUNDARY

**AREA NOTES:**

	PRE-DEVELOPMENT	POST-DEVELOPMENT
TOTAL:	2.03 ACRES	2.03 ACRES
PERVIOUS:	2.03 ACRES	0.28 ACRES
IMPERVIOUS:	0.00 ACRES	1.77 ACRES
BUILDING:	0.00 ACRES	1.16 ACRES

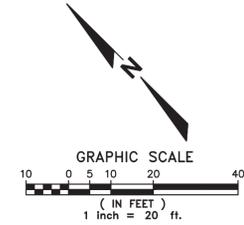
**Flow Summary:**

	PREDEVELOPMENT	POST DEVELOPMENT	DIFFERENCE		
	CFS	TIME (HRS)	CFS		
0.102	0.0622	2	0.0515	4	-17.20%
0.302	0.1866	2	0.1545	5	-17.20%
0.502	0.311	2	0.2575	7	-17.20%
Q2	0.622		0.515		-17.20%
Q5	0.882		0.968		9.75%
Q10	1.027	2	1.117	11	8.76%

NOTE: TIME FROM START OF RUNOFF

**R.A. Smith National**  
Beyond Surveying and Engineering

8881 Research Drive, Irvine, CA 92618  
949-872-2378, www.rasmithnational.com  
Appleton, WI Brookfield, WI Pittsburgh, PA



**PROJECT:**

MULTIPLEX CINEMA  
WESTFIELD NORTH COUNTY  
272 E. VIA RANCHO PARKWAY  
ESCONDIDO, CA. 92025

**DEVELOPER:**

WESTFIELD  
CONTACT: KIM BREWER  
225 BROADWAY, SUITE 1700  
SAN DIEGO, CA 92101

**DIGALERT**

CALL BEFORE YOU DIG  
1-800-227-2600  
2 WORKING DAY NOTICE REQUIRED

DATE 9.15.15  
PLANNING SUBMITTAL

THE LOCATIONS OF EXISTING UTILITY INSTALLATIONS AS SHOWN ON THIS PLAN ARE APPROXIMATE. THERE MAY BE OTHER UNDERGROUND UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

RA SMITH NATIONAL ASSUMES NO RESPONSIBILITY FOR DAMAGES, LIABILITY OR COSTS RESULTING FROM CHANGES OR ALTERATIONS MADE TO THIS PLAN WITHOUT THE EXPRESSED WRITTEN CONSENT OF RA SMITH NATIONAL.

WDID NO.: PENDING

**CITY OF ESCONDIDO ENGINEERING DEPARTMENT**  
APPROVED

By \_\_\_\_\_ Date \_\_\_\_\_  
(for City Engineer)

Comments \_\_\_\_\_

OBTAIN GRADING PERMIT AT FIELD ENGINEERING OFFICE PRIOR TO GRADING



City Project No.  
**ENG 00-0000**

**RECORD DRAWING**

PRINT ENGINEER'S NAME R.C.E. \_\_\_\_\_ DATE \_\_\_\_\_

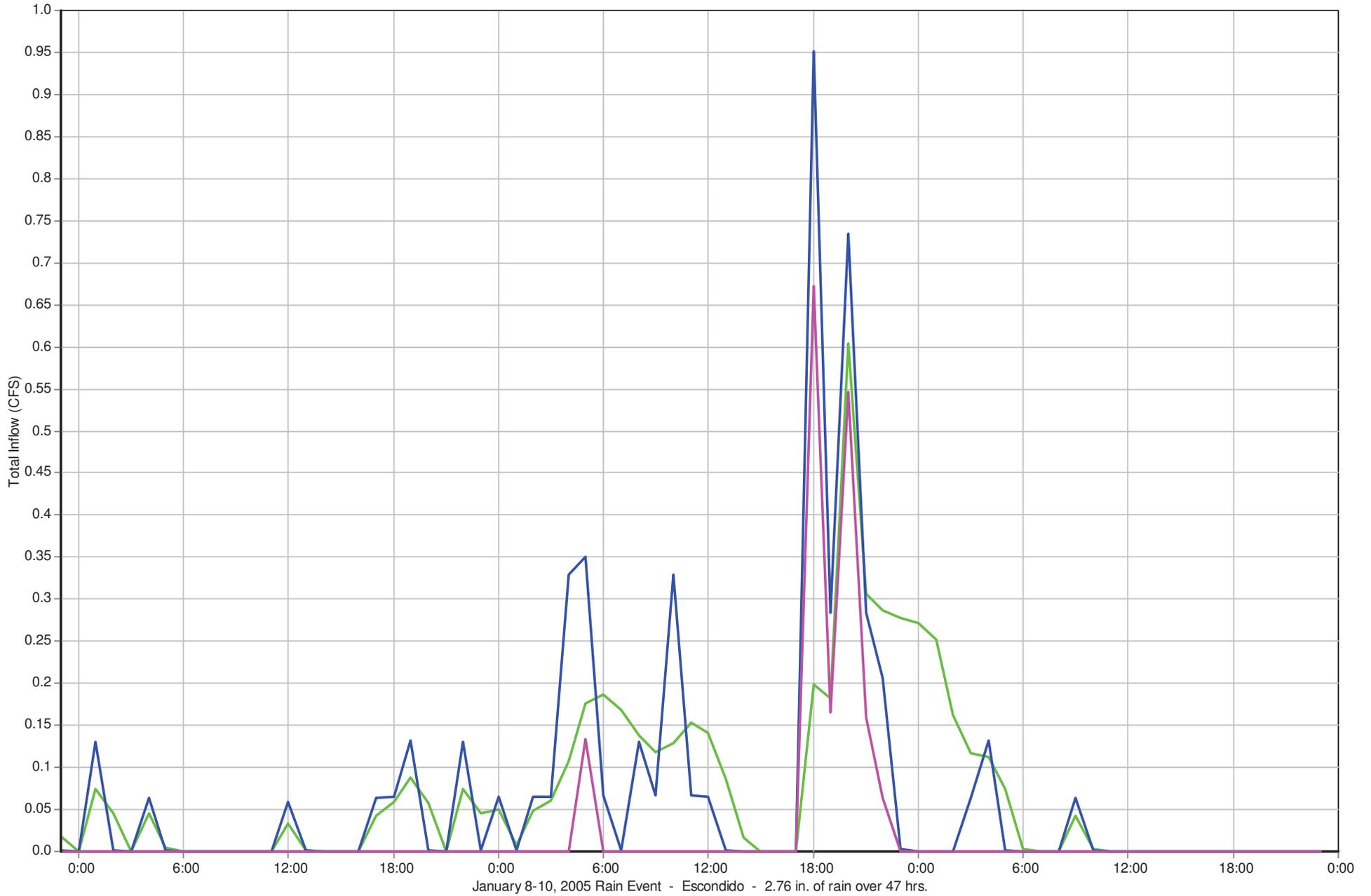
CONSTRUCTION RECORD	REFERENCES	Date	By	REVISIONS	App'd	Date	BENCH MARK	EARTHWORK QUANTITIES	SCALE	Office	Designed By	Drawn By	Checked By	ENGINEERING SERVICES	Drawing No.
Contractor							DESCRIPTION:	CUT: _____ C.Y.	Horizontal		Plans Prepared Under Supervision Of			WESTFIELD NORTH COUNTY - MULTIPLEX CINEMA	
Inspector							Bench Mark No. _____	FILL: _____ C.Y.	Vertical		DATE 9.15.15				
Date Completed							Elevation _____	BALANCE: _____ C.Y.			SAMUEL J. JACOBY				Sheets 03

C:\150232\dwg\10001020.dwg, C-05 HYDROLOGY, 9/15/2015 2:12:50 PM, sj

**Attachmens 3. EPA SWMM output exhibits**

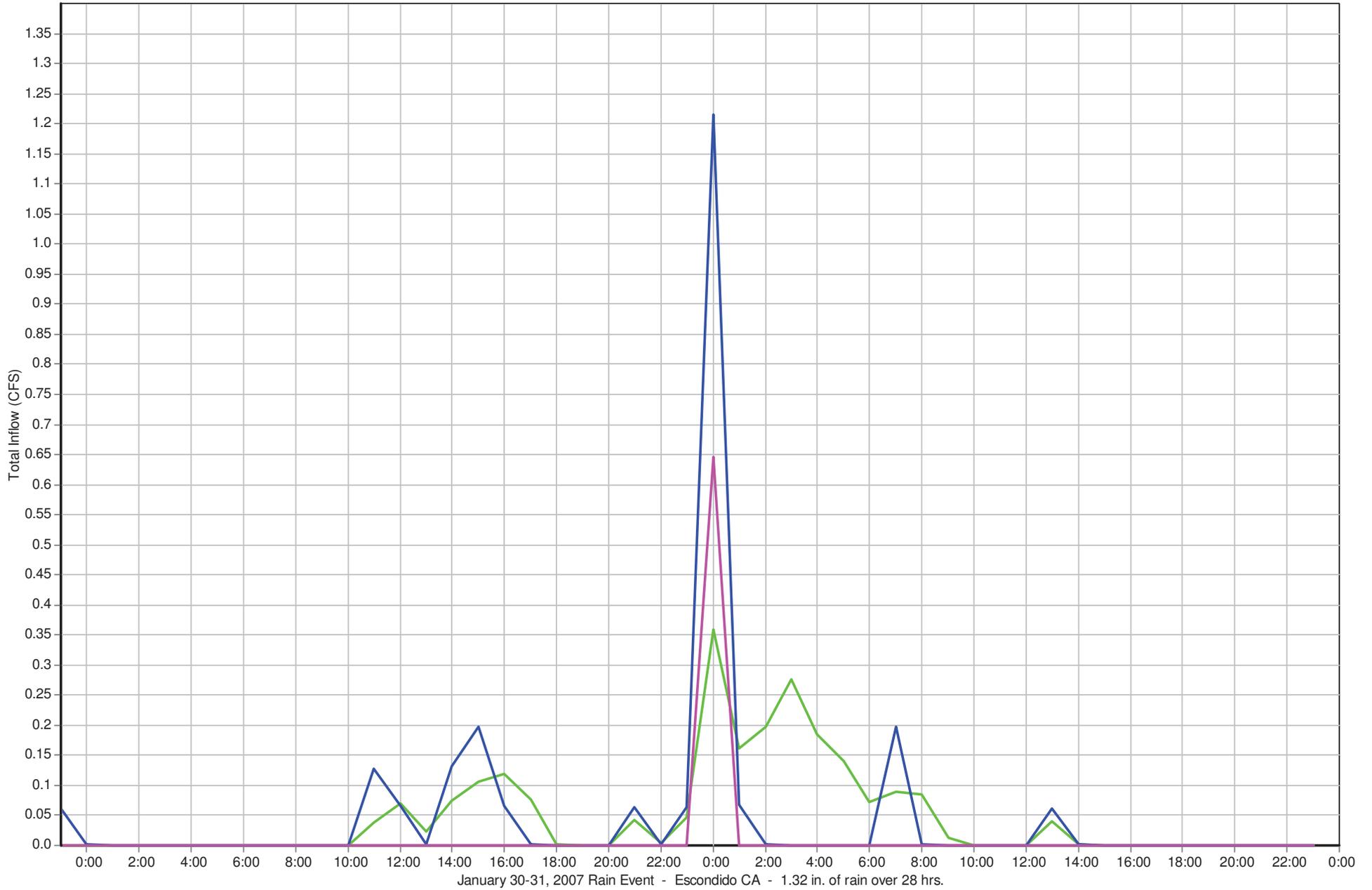
# Escondido Multiplex Cinema - 2 Year Return Period

Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node PreDevelop Total Inflow (CFS)



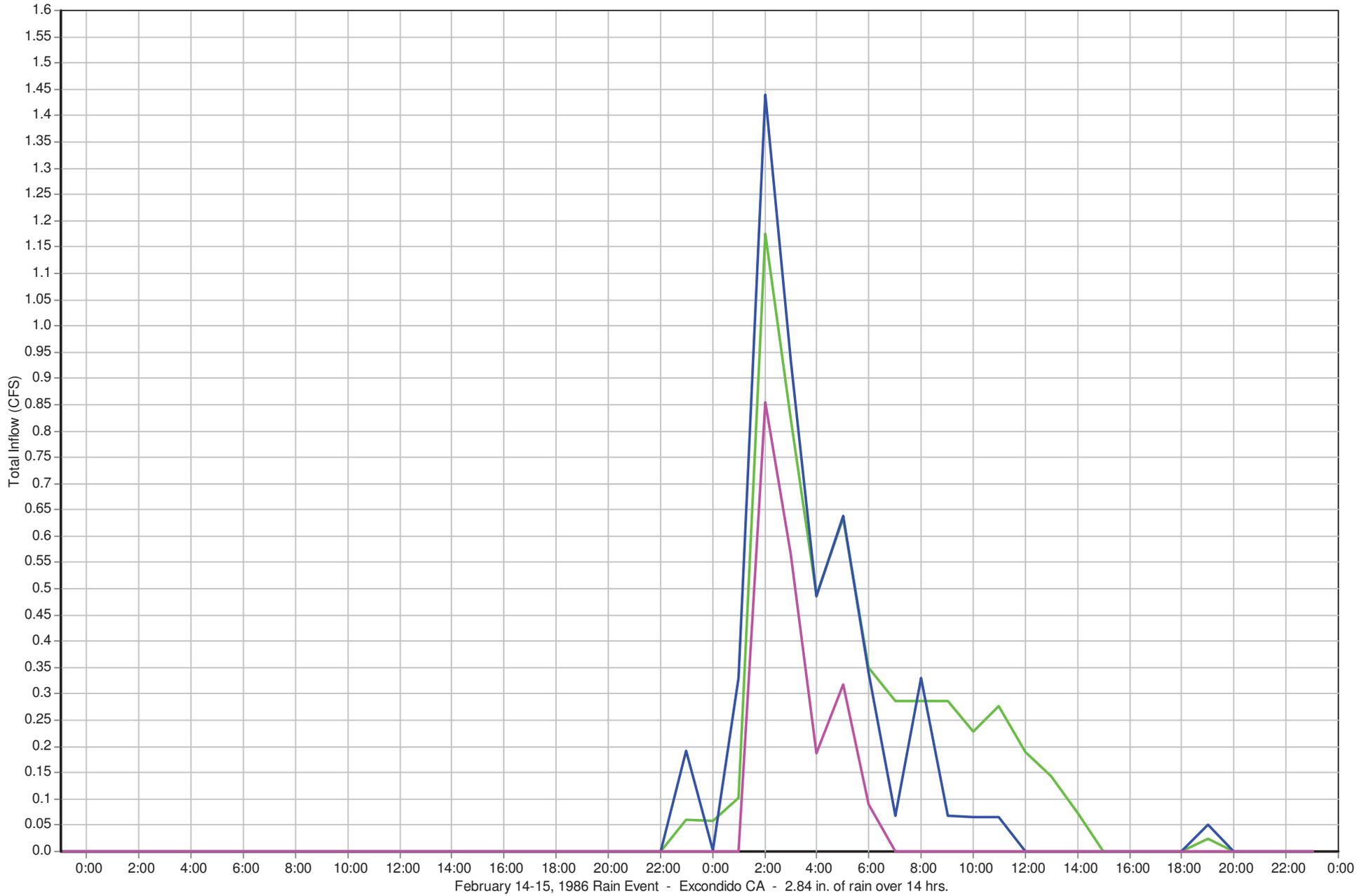
# Escondido Multiplex Cinema - 5 Year Return Period

Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node PreDevelop Total Inflow (CFS)



# Escondido Multiplex Cinema - 10 Year Return Period

Node Proposed Total Inflow (CFS)      Node ProposedNoControls Total Inflow (CFS)      Node PreDevelop Total Inflow (CFS)



\*\*\*\*\*  
 Rainfall File Summary  
 \*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*  
 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
 \*\*\*\*\*

\*\*\*\*\*  
 Analysis Options  
 \*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

	Volume acre-feet	Depth inches
*****		
Runoff Quantity Continuity		
*****		
Initial LID Storage	0.009	0.018
Total Precipitation	289.352	611.200
Evaporation Loss	21.040	44.442
Infiltration Loss	114.769	242.427
Surface Runoff	83.667	176.730
LID Drainage	70.246	148.380
Final Storage	0.028	0.059
Continuity Error (%)	-0.134	

	Volume acre-feet	Volume 10 <sup>6</sup> gal
*****		
Flow Routing Continuity		
*****		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	153.913	50.155
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	153.913	50.155
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Total Runoff	Total Runoff	
Subcatchment		in	in	in	in	in	10^6 gal	CFS
PreDev		611.20	0.00	0.63	572.65	38.06	1.96	
1.39	0.062							
PR1		611.20	0.00	54.05	279.30	278.32	1.17	
0.09	0.455							
PR2		611.20	0.00	80.54	38.49	493.46	16.44	
1.03	0.807							
PR3		611.20	0.00	75.20	105.17	431.52	6.00	
0.42	0.706							
PR1NC		611.20	0.00	33.47	287.99	290.27	1.22	
0.12	0.475							
PR2NC		611.20	0.00	59.17	39.67	513.72	17.12	
1.05	0.841							
PR3NC		611.20	0.00	54.27	108.44	449.25	6.25	
0.42	0.735							

\*\*\*\*\*  
LID Performance Summary  
\*\*\*\*\*

Initial Storage	Final Storage	Continuity	Error	Total Inflow	Evap Loss	Infil Loss	Surface Outflow	Drain Outflow
in	in	LID Control %	%	in	in	in	in	in
PR1		TypicalStormwaterPlanter		9464.87	723.74	0.00	9.20	
8730.15	1.80	3.62	-0.00					
PR2		TypicalStormwaterPlanter		17130.37	774.99	0.00	367.98	
15985.52	1.80	3.86	-0.00					
PR3		TypicalStormwaterPlanter		14897.37	756.22	0.00	190.21	
13949.09	1.80	3.79	-0.00					

Analysis begun on: Thu Sep 10 20:08:27 2015  
Analysis ended on: Thu Sep 10 20:13:38 2015  
Total elapsed time: 00:05:11

WEST-Results.txt

Evaporation Loss ..... 0.000 0.000  
 Exfiltration Loss ..... 0.000 0.000  
 Initial Stored Volume ..... 0.000 0.000  
 Final Stored Volume ..... 0.000 0.000  
 Continuity Error (%) ..... 0.000

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff 10^6 gal	Runoff Coeff CFS	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
PR1 1.17	0.09	0.455	611.20	0.00	54.05	279.30	278.32
PR1NC 1.22	0.12	0.475	611.20	0.00	33.47	287.99	290.27

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

Drain Outflow Subcatchment in	Initial Storage in	Final Storage LID Control in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
PR1 8730.15	1.80	Typical Stormwater 3.62	PI anter -0.00	9464.87	723.74	0.00	9.20

Analysis begun on: Wed Jul 22 10:52:40 2015  
 Analysis ended on: Wed Jul 22 10:54:39 2015  
 Total elapsed time: 00:01:59

WEST-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

	Volume acre-feet	Depth inches
Initial LID Storage	0.001	0.027
Total Precipitation	15.789	611.200
Evaporation Loss	1.131	43.765
Infiltration Loss	7.327	283.644
Surface Runoff	3.971	153.709
LID Drainage	3.374	130.589
Final Storage	0.002	0.073
Continuity Error (%)	-0.091	

\*\*\*\*\*

Flow Routing Continuity

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	7.344	2.393
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	7.344	2.393
Flooding Loss	0.000	0.000

NE-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Initial LID Storage .....	0.006	0.027
Total Precipitation .....	124.990	611.200
Evaporation Loss .....	14.286	69.856
Infiltration Loss .....	7.992	39.078
Surface Runoff .....	53.965	263.886
LID Drainage .....	49.020	239.708
Final Storage .....	0.019	0.091
Continuity Error (%) .....	-0.228	

\*\*\*\*\*

Flow Routing Continuity	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	102.985	33.559
Groundwater Inflow .....	0.000	0.000
RDI Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	102.985	33.559
Flooding Loss .....	0.000	0.000

```

NE-Results.txt
Evaporation Loss ..... 0.000 0.000
Exfiltration Loss ..... 0.000 0.000
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Subcatchment Runoff Summary
*****

```

Total Runoff Subcatchment 10^6 gal	Peak Runoff CFS	Runoff Coeff	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
PR2 16.44	1.03	0.807	611.20	0.00	80.54	38.49	493.46
PR2NC 17.12	1.05	0.841	611.20	0.00	59.17	39.67	513.72

```

*****
LID Performance Summary
*****

```

Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
PR2 15985.52	1.80	Typical Stormwater 3.86	PI anter -0.00	17130.37	774.99	0.00	367.98

```

Analysis begun on: Wed Jul 22 10:57:30 2015
Analysis ended on: Wed Jul 22 10:59:27 2015
Total elapsed time: 00:01:57

```

SOUTH-Results.txt

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.009)

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
STA01	SEP-24-1964	MAY-23-2008	60 min	7025	0	0

\*\*\*\*\*

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDI ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... GREEN\_AMPT  
 Starting Date ..... SEP-24-1964 00:00:00  
 Ending Date ..... MAY-24-2008 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 01:00:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00

\*\*\*\*\*

Runoff Quantity Continuity

\*\*\*\*\*

	Volume acre-feet	Depth inches
Initial LID Storage	0.002	0.027
Total Precipitation	52.156	611.200
Evaporation Loss	5.524	64.734
Infiltration Loss	9.114	106.801
Surface Runoff	19.727	231.178
LID Drainage	17.852	209.203
Final Storage	0.008	0.088
Continuity Error (%)	-0.127	

\*\*\*\*\*

Flow Routing Continuity

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	37.579	12.246
Groundwater Inflow	0.000	0.000
RDI Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	37.579	12.246
Flooding Loss	0.000	0.000

SOUTH-Results.txt

Evaporation Loss ..... 0.000 0.000  
 Exfiltration Loss ..... 0.000 0.000  
 Initial Stored Volume ..... 0.000 0.000  
 Final Stored Volume ..... 0.000 0.000  
 Continuity Error (%) ..... 0.000

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Total Runoff Subcatchment 10^6 gal	Peak Runoff CFS	Runoff Coeff	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in
6.00	0.42	0.706	611.20	0.00	75.20	105.17	431.52
6.25	0.42	0.735	611.20	0.00	54.27	108.44	449.25

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in
13949.09	1.80	3.79	Typical Stormwater -0.00	14897.37	756.22	0.00	190.21

Analysis begun on: Wed Jul 22 11:09:08 2015  
 Analysis ended on: Wed Jul 22 11:11:19 2015  
 Total elapsed time: 00:02:11

**Attachments 4. USDA Soil Group Exhibit**

**Attachment 4. USDA Soil Group Exhibit**

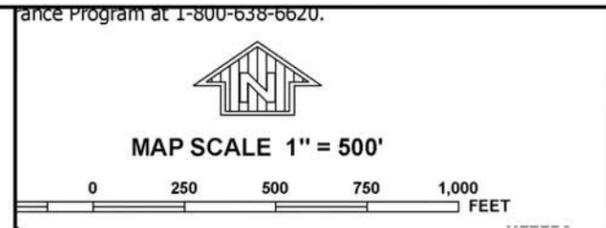
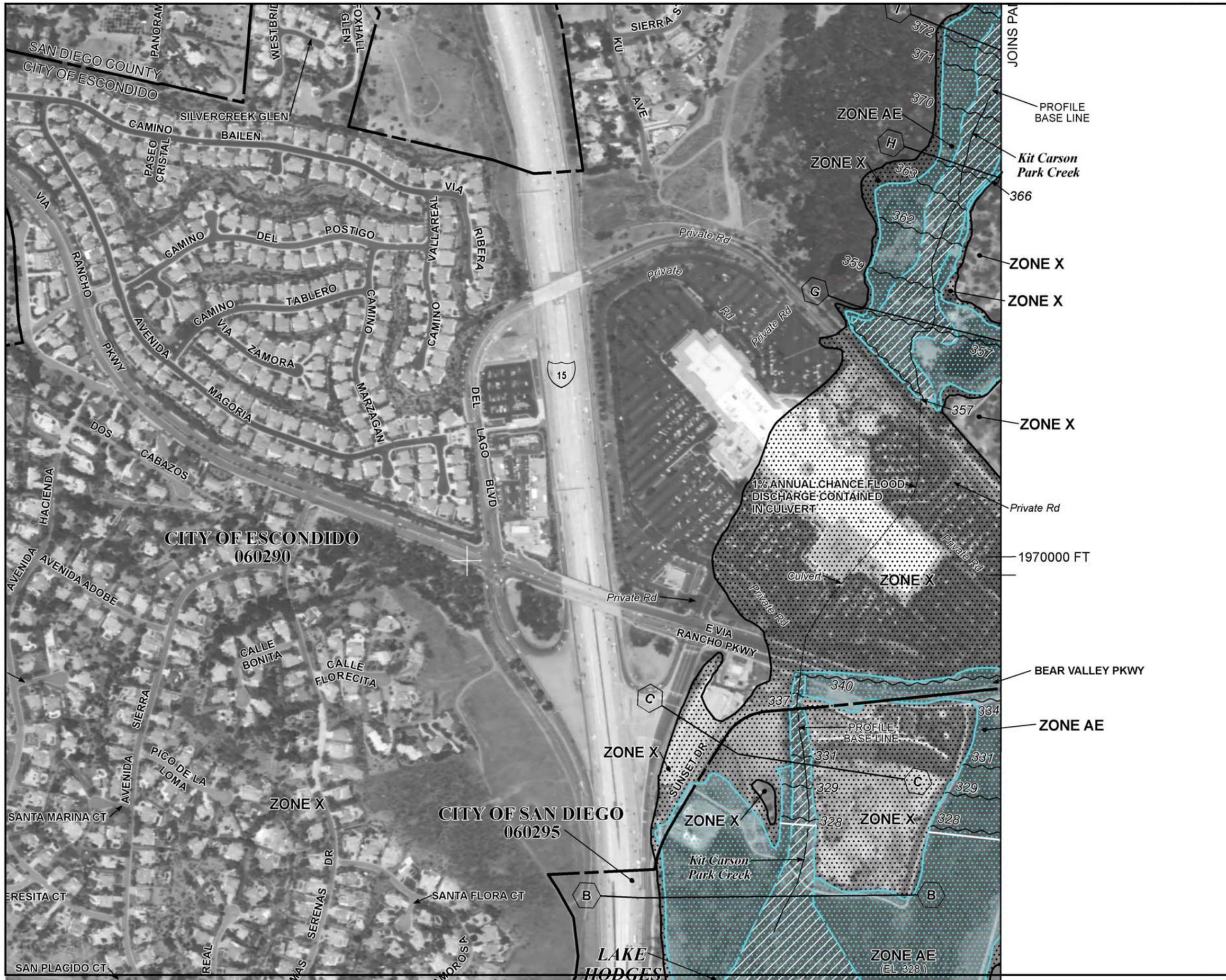
Hydrologic Soil Group—San Diego County Area, California



Map Scale: 1:7,070 if printed on A landscape (11" x 8.5") sheet.



**Attachment 5. FIRMette**



PANEL 1079G

**FIRM**  
FLOOD INSURANCE RATE MAP  
SAN DIEGO COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS

PANEL 1079 OF 2375  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ESCONDIDO, CITY OF	060290	1079	G
SAN DIEGO COUNTY	060284	1079	G
SAN DIEGO, CITY OF	060295	1079	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06073C1079G  
**MAP REVISED**  
MAY 16, 2012

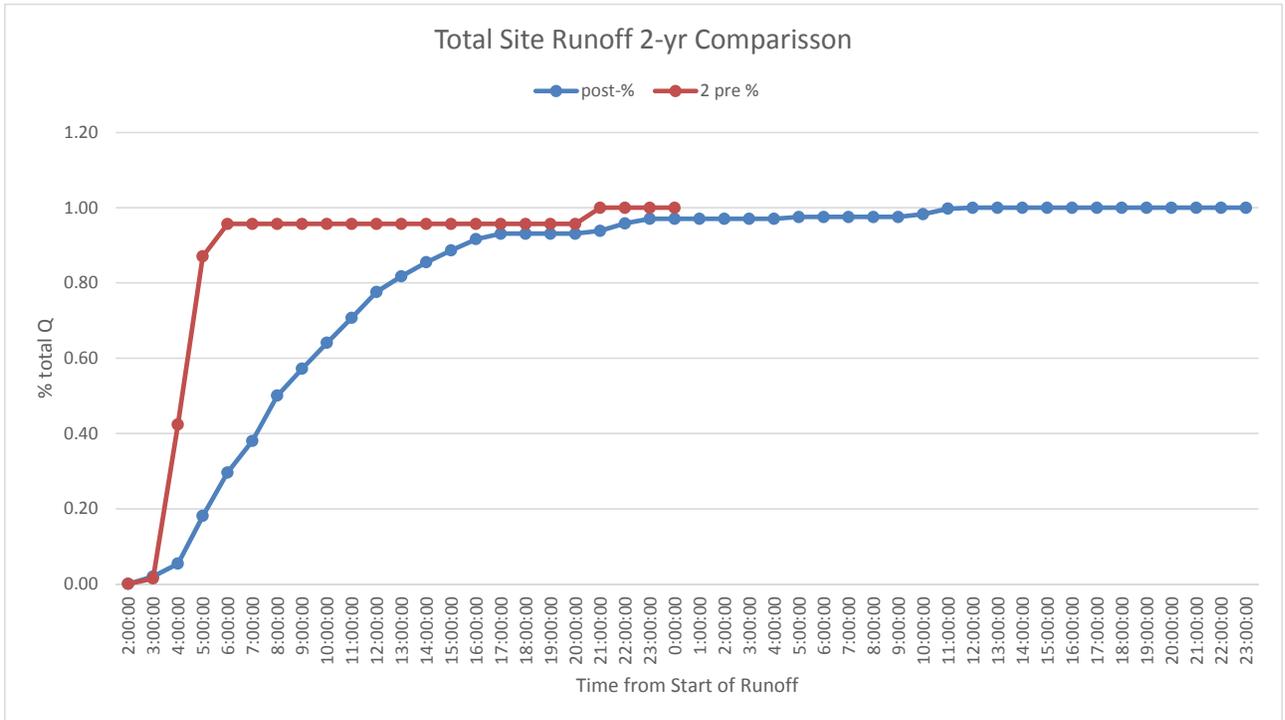
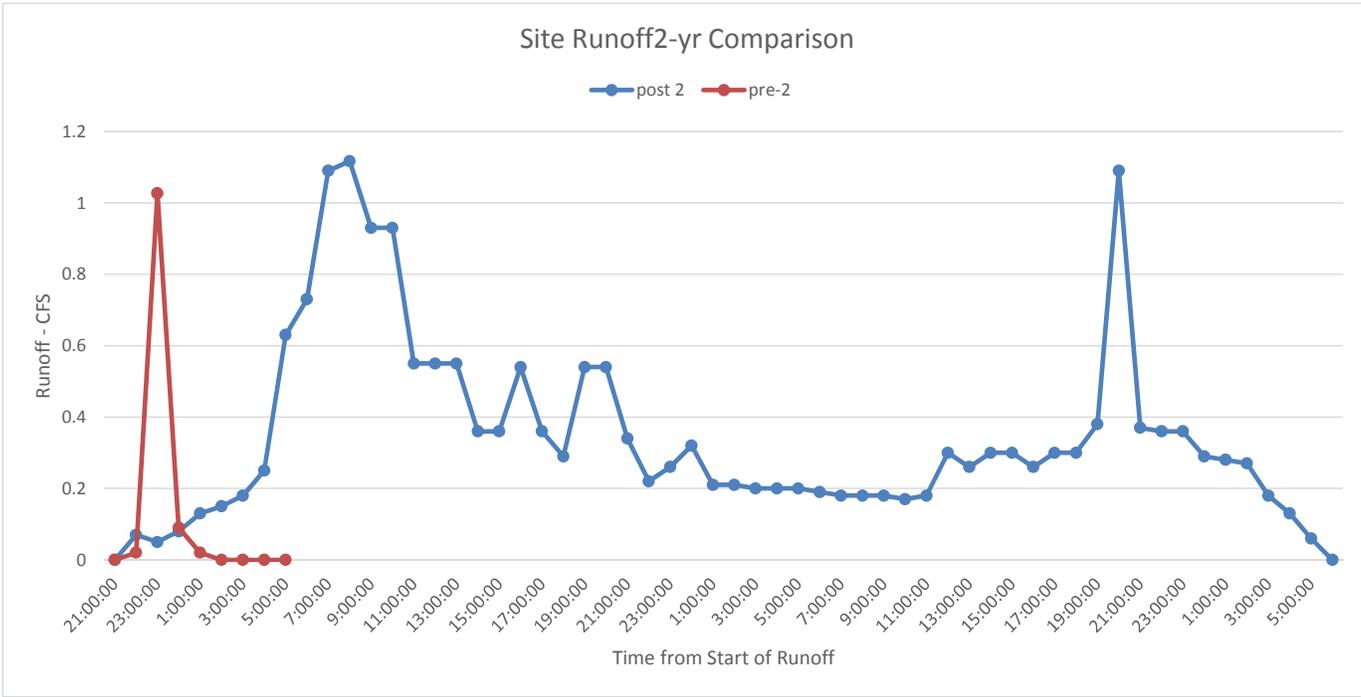
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

**Attachment 6. Runoff Analysis**  
**3**

Post-BMP 1.96 year return Period				
Time	Runoff (cfs)	Rainfall (in)	sum runoff (c)	% total runoff
2:00:00	0	0.16	0	0.00
3:00:00	0.08	0.4	288	0.02
4:00:00	0.14	0.44	792	0.05
5:00:00	0.515	0.28	2646	0.18
6:00:00	0.47	0.2	4338	0.30
7:00:00	0.34	0.28	5562	0.38
8:00:00	0.49	0.12	7326	0.50
9:00:00	0.29	0	8370	0.57
10:00:00	0.28	0	9378	0.64
11:00:00	0.27	0	10350	0.71
12:00:00	0.28	0.04	11358	0.78
13:00:00	0.17	0.04	11970	0.82
14:00:00	0.15	0.08	12510	0.85
15:00:00	0.13	0.04	12978	0.89
16:00:00	0.12	0	13410	0.92
17:00:00	0.06	0	13626	0.93
18:00:00	0	0	13626	0.93
19:00:00	0	0	13626	0.93
20:00:00	0	0.04	13626	0.93
21:00:00	0.03	0.08	13734	0.94
22:00:00	0.08	0	14022	0.96
23:00:00	0.05	0	14202	0.97
0:00:00	0	0	14202	0.97
1:00:00	0	0	14202	0.97
2:00:00	0	0	14202	0.97
3:00:00	0	0	14202	0.97
4:00:00	0	0.04	14202	0.97
5:00:00	0.02	0	14274	0.98
6:00:00	0	0	14274	0.98
7:00:00	0	0	14274	0.98
8:00:00	0	0	14274	0.98
9:00:00	0	0.04	14274	0.98
10:00:00	0.03	0.04	14382	0.98
11:00:00	0.06	0	14598	1.00
12:00:00	0.01	0	14634	1.00
13:00:00	0	0	14634	1.00
14:00:00	0	0	14634	1.00
15:00:00	0	0	14634	1.00
16:00:00	0	0	14634	1.00
17:00:00	0	0	14634	1.00
18:00:00	0	0	14634	1.00
19:00:00	0	0	14634	1.00
20:00:00	0	0	14634	1.00
21:00:00	0	0	14634	1.00
22:00:00	0	0	14634	1.00
23:00:00	0	0	14634	1.00

PreDevelopment 1.96 year return Period				
Time	Runoff (cfs)	Rainfall (in)	sum runoff (c)	% total runoff
2:00:00	0	0.3	0	0.00
3:00:00	0.02	0.5	72	0.01
4:00:00	0.57	0.5	2124	0.42
5:00:00	0.622	0.5	4363.2	0.87
6:00:00	0.12	0	4795.2	0.96
7:00:00	0	0	4795.2	0.96
8:00:00	0	0	4795.2	0.96
9:00:00	0	0	4795.2	0.96
10:00:00	0	0	4795.2	0.96
11:00:00	0	0.1	4795.2	0.96
12:00:00	0	0.2	4795.2	0.96
13:00:00	0	0.1	4795.2	0.96
14:00:00	0	0	4795.2	0.96
15:00:00	0	0	4795.2	0.96
16:00:00	0	0.2	4795.2	0.96
17:00:00	0	0.2	4795.2	0.96
18:00:00	0	0.1	4795.2	0.96
19:00:00	0	0.2	4795.2	0.96
20:00:00	0	0.2	4795.2	0.96
21:00:00	0.06	0	5011.2	1.00
22:00:00	0	0	5011.2	1.00
23:00:00	0	0	5011.2	1.00
0:00:00	0	0	5011.2	1.00



Post-BMP 10 year return Period				
Time	Runoff (cfs)	Rainfall (in)	sum runoff (cfs)	% total runoff
21:00:00	0	0.1	0	0.00
22:00:00	0.07	0	252	0.00
23:00:00	0.05	0.1	432	0.01
0:00:00	0.08	0.2	720	0.01
1:00:00	0.13	0	1188	0.02
2:00:00	0.15	0.3	1728	0.03
3:00:00	0.18	0.4	2376	0.03
4:00:00	0.25	0.4	3276	0.05
5:00:00	0.63	0.4	5544	0.08
6:00:00	0.73	0.6	8172	0.11
7:00:00	1.09	0.6	12096	0.17
8:00:00	1.117	0.5	16117.2	0.22
9:00:00	0.93	0.5	19465.2	0.27
10:00:00	0.93	0.3	22813.2	0.32
11:00:00	0.55	0.3	24793.2	0.34
12:00:00	0.55	0.3	26773.2	0.37
13:00:00	0.55	0.2	28753.2	0.40
14:00:00	0.36	0.2	30049.2	0.42
15:00:00	0.36	0.3	31345.2	0.44
16:00:00	0.54	0.2	33289.2	0.46
17:00:00	0.36	0.1	34585.2	0.48
18:00:00	0.29	0.3	35629.2	0.49
19:00:00	0.54	0.3	37573.2	0.52
20:00:00	0.54	0.2	39517.2	0.55
21:00:00	0.34	0.1	40741.2	0.57
22:00:00	0.22	0.2	41533.2	0.58
23:00:00	0.26	0.2	42469.2	0.59
0:00:00	0.32	0	43621.2	0.61
1:00:00	0.21	0.1	44377.2	0.62
2:00:00	0.21	0.1	45133.2	0.63
3:00:00	0.2	0.1	45853.2	0.64
4:00:00	0.2	0.1	46573.2	0.65
5:00:00	0.2	0	47293.2	0.66
6:00:00	0.19	0.1	47977.2	0.67
7:00:00	0.18	0.1	48625.2	0.68
8:00:00	0.18	0.1	49273.2	0.68
9:00:00	0.18	0.1	49921.2	0.69
10:00:00	0.17	0.2	50533.2	0.70
11:00:00	0.18	0.2	51181.2	0.71
12:00:00	0.3	0.1	52261.2	0.73
13:00:00	0.26	0.2	53197.2	0.74
14:00:00	0.3	0.2	54277.2	0.75
15:00:00	0.3	0.1	55357.2	0.77
16:00:00	0.26	0.2	56293.2	0.78
17:00:00	0.3	0.2	57373.2	0.80
18:00:00	0.3	0.5	58453.2	0.81
19:00:00	0.38	0.6	59821.2	0.83
20:00:00	1.09	0.2	63745.2	0.89
21:00:00	0.37	0.2	65077.2	0.90
22:00:00	0.36	0.2	66373.2	0.92
23:00:00	0.36	0	67669.2	0.94
0:00:00	0.29	0	68713.2	0.95
1:00:00	0.28	0	69721.2	0.97
2:00:00	0.27	0	70693.2	0.98
3:00:00	0.18	0	71341.2	0.99
4:00:00	0.13	0	71809.2	1.00
5:00:00	0.06	0	72025.2	1.00
6:00:00	0	0	72025.2	1.00

PreDevelopment 10 year return Period				
Time	Runoff (cfs)	Rainfall (in)	sum runoff (cfs)	% total runoff
15:00:00	0	0.66	0	0.00
16:00:00	0.02	0.1	72	0.02
17:00:00	1.027	0.09	3769.2	0.90
18:00:00	0.09	0.07	4093.2	0.98
19:00:00	0.02	0.06	4165.2	1.00
20:00:00	0	0.06	4165.2	1.00
21:00:00	0	0.05	4165.2	1.00
22:00:00	0	0.05	4165.2	1.00
23:00:00	0	0.04	4165.2	1.00

