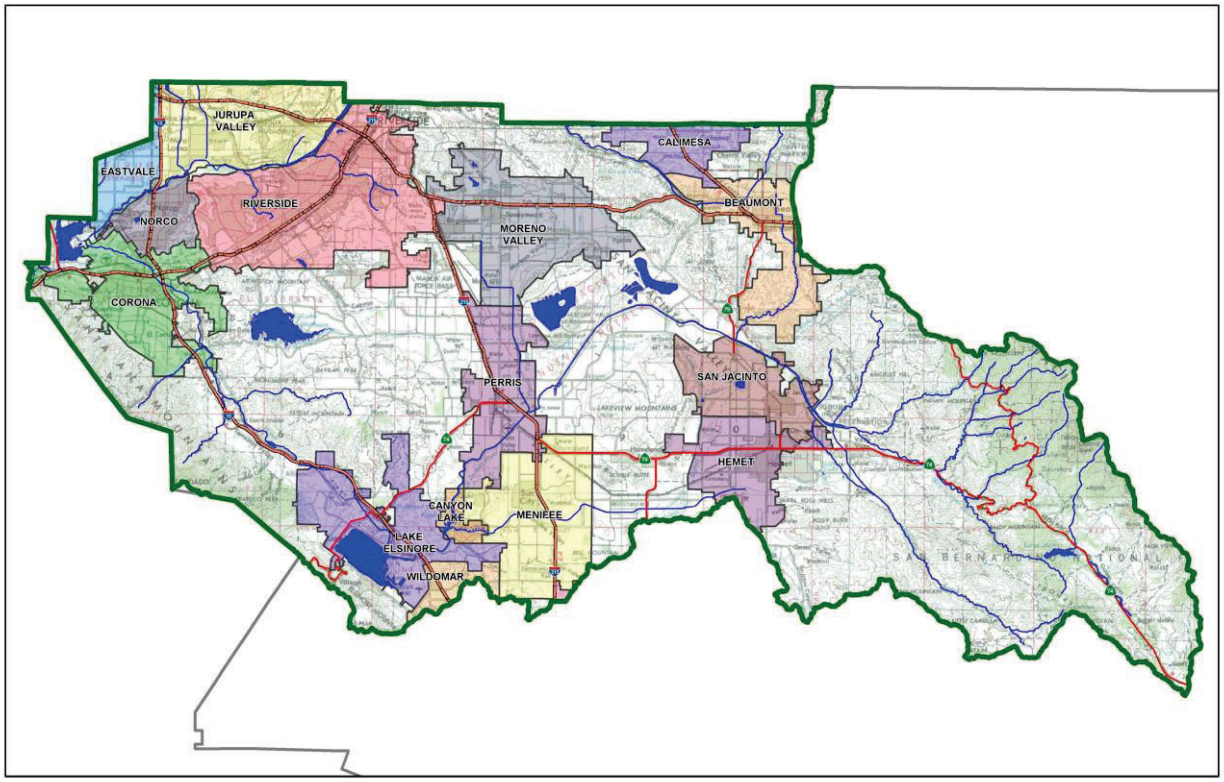
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Loctek Industrial Building

Development No: PR 21-019 (Tentative Parcel Map No. 38631)

Design Review/Case No: APN 456-010-025



☒ **Preliminary**
☐ **Final**

Original Date Prepared: November 28, 2022

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Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

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OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Loctek, Inc. by David Evans and Associates, Inc. for the Loctek Industrial Building project.

This WQMP is intended to comply with the requirements of City of Hemet for Hemet Water Quality Ordinance (Municipal Code Section 14-471 et. seq.) which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under City of Hemet Water Quality Ordinance (Municipal Code Section14-471 et. Seq.).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Jodi Mensen	Project Manager
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: 86476

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial and Industrial
Planning Area:	
Community Name:	Hemet
Development Name:	Loctek Industrial Building

PROJECT LOCATION
Latitude & Longitude (DMS): 33°44'30"; -117°01'03"
Project Watershed and Sub-Watershed: Watershed – Santa Ana River
Sub-Watershed – San Jacinto River
Gross Acres: 61.6
APN(s): 456-010-025
Map Book and Page No.: Map Book 456, Page 01

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Commercial, Industrial
Proposed or Potential SIC Code(s)	2522
Area of Impervious Project Footprint (SF)	2,615,000
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	2,615,000
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	N/A
What is the Water Quality Design Storm Depth for the project?	0.69

Narrative: The Loctek Industrial Building project is a proposed commercial and industrial development which includes 4 separate buildings, impervious parking stalls and sidewalk. The onsite project will be constructed on approximately 60.9 acres of vacant land located at the southwest corner of W. Acacia Avenue and Cawston Avenue. The study area measures 62.8 acres, which includes the half-width of Cawston Avenue. Cawston Avenue will drain into a series of bioretention swales along the frontage of the project and will treat water and infiltrate at the bottom of the gravel layer in the interim condition. Drainage will then surface overflow as gutter flow and drain towards a proposed culvert at the end of the Parkway drain and drain offsite. In the ultimate condition, Cawston Avenue storm water from the bioretention basin will drain to the future storm drain line along Cawston Avenue.

The primary building will be used by Loctek, Inc. for manufacturing and the remaining 3 buildings will be used for commercial purposes. Water quality treatment for the development will be accomplished using a bioretention basin in order to treat the 85th percentile storm. Inlet filters will be placed on the

proposed catch basin throughout the onsite area, which is used to pretreat storm water before entering the proposed bioretention basin. Drainage beyond the 85th percentile wil then drain to an underground infiltration basin and be infiltrated for the purpose of flood control. More information can be found in the projects hydrology study.

A.1 Maps and Site Plans

Appendix 1 includes the following exhibits:

- Vicinity Map, A-1
- Regional Waters Map, A-2
- WQMP Site Plan, A-3

A.2 Identify Receiving Waters

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
City of Hemet Storm Channel	None	None	None
Salt Creek HU# 802.12	None	REC1-REC2-WARM-WILD	Not designated as RARE
Canyon Lake HU# 802.11 & 802.12	Pathogens, Nutrients	MUN-AGR-GWR-REC1-REC2-COMM-WARM-WILD	Not designated as RARE
San Jacinto River, Reach 1 HU# 802.32 & 802.31	None	MUN-AGR-GWR-REC1-REC2-WARM-WILD-RARE	17.5 MILES
Lake Elsinore HU# 802.31	DDT, Nutrients, Organic Enrichment/Low Dissolved Oxygen, Unknown Toxicity, PCBs	REC1-REC2-WARM-WILD-COMM, RARE	22 MILES

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)*	☐ Y	☒ N

Section B: Optimize Site Utilization (LID Principles)

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Existing drainage patterns were honored through grading design as shown on the conceptual grading plan. Surface water generally flows from the east of the site to the west.

Did you identify and protect existing vegetation? If so, how? If not, why?

Existing vegetation consists of eucalyptus trees at the northwest corner of the site. The trees will be removed as they are non-native to the region.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Infiltration is maximized by infiltrating storm events up to the 100-year storm event. This strategyis used for the project to minimize downstream flooding, since the project does not have access to a public storm drain to connect the onsite drainage.

Did you identify and minimize impervious area? If so, how? If not, why?

To the greatest extent possible for the development. Space was designated for an infiltration basin and parking lots were designed with planting areas in-between spaces where possible.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

The site was designed to drain to the proposed infiltration basin.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
A1	Mixed Use	2,652,302	Drains to BMP
A2	Mixed Use	82,286	Drains to BMP

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
N/A			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
N/A							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
A1	Bioretention Basin
A2	Bioretention Basin

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

Geotechnical Report

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?*	X	
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☒The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: Insert Area (acres)

Type of Landscaping (Conservation Design or Active Turf): List Landscaping Type

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (acres)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: EIATIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: Insert Areas (acres)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
Insert Area (acres)	Insert Area (acres)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: Number of daily Toilet Users

Project Type: Enter 'Residential', 'Commercial', 'Industrial' or 'Schools'

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: TUTIA Factor

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: Required number of toilet users

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
Insert Area (acres)	Insert Area (acres)

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: Projected Average Daily Use (gpd)

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: Insert Area (acres)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-4 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-4: Enter Value

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: Minimum use required (gpd)

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the projected average daily use (Step 1) to the minimum required non-potable use (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
Minimum use required (gpd)	Projected Average Daily Use (gpd)

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☐ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A1	☐	☐	☒	☐	☐
A2	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA A1* *DRAINS TO BMP A1*		
	[A]		[B]	[C]	[A] x [C]			
D1 & D3	1,122,137	Concrete or Asphalt	1.00	0.89	998702			
D2	1,124,559	Roofs	1.00	0.89	1000858			
D4	178,397	Ornamental Landscaping	0.1	0.11	19705.4			
D5 (BASIN)	76,915	Mixed Surface Types	0	0.04	3076.6			
D10	150,294	Ornamental Landscaping	0.1	0.11	16601.2			
						Design Storm Depth (in)	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	2,652,302				2,038,943	0.69	117,239	*117,240*

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*DMA2 DRAINS TO BMP A2*		
	[A]		[B]	[C]	[A] x [C]			
D6	*26,335*	*Mixed Surface*	*0*	*0.04*	*1,053*			
D7	*55,951*	*Concrete/Asphalt*	*1.00*	*0.89*	*49,796*			
	82,286				50,850	0.69	2,924	*2,924*

Design Storm Depth (in)

Design Capture Volume, V_{BMP} (cubic feet)

Proposed Volume on Plans (cubic feet)

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft²)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft²)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft²)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☐	☒	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]Cannot Exceed 50%

[2]Obtain corresponding data from Table 3-8 in the WQMP Guidance Document

E.3 Sizing Criteria

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Area x Runoff Factor		*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]				
N/A						*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Contech Catch Basin Filter Inserts (on all inlets per Site Plan)	Trash & Debris, Sediment	85% TSS and 72% TP

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	-	-	-
Volume (Cubic Feet)	-	-	-

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

*HCOC mitigation in Appendix 7.

Section G: Source Control BMPs

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Landscape/Outdoor Pesticide Use	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 stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. Provide IPM information to new owners, lessees, and operators.
Plazas, sidewalks, parking lots, and trash receptacle areas.	Sweep plazas, sidewalks, parking lots, and trash receptacle areas regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not a storm drain pipe or inlet.	Sweep plazas, sidewalks, parking lots, and trash receptacle areas regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not a storm drain pipe or inlet.
Underground Detention Basin	Weekly: Look for erosion, standing water and dead vegetation. After storm event: Inspect areas for ponding. Annually: Inspect outlets to basins, connector pipes and inlets on the site	Weekly: Remove trash and debris. Maintain vegetation (see SC-73, Appendix 10) and remove clippings. Replace damaged grass and/or plants. Repair basin cover as necessary. Clean storm drain pipe inlets and outlets to restore functionality in each storm drain line tributary to the infiltration basin. Clean vegetation from, in and around the storm drain overflows.

Bioretention Basin	• Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover • Keep adjacent landscape areas maintained. Remove clippings fromLandscape maintenance activities. • Remove trash and debris	• Inspect areas for ponding after storm event Inspect/clean inlets and outlets
Onsite Catch Basin	After storm event: Inspect areas for ponding	Repair basin cover as necessary.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
A1	Bioretention Basin	Sheet 2, TTM No. 38631	33°44'35.13"N/117° 1'8.52"W
A2	Bioretention Basin	Sheet 3 and 4, TTM No. 38631	33°44'25.17"N/117° 0'56.27"W

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

Maintenance Mechanism: Property Owner

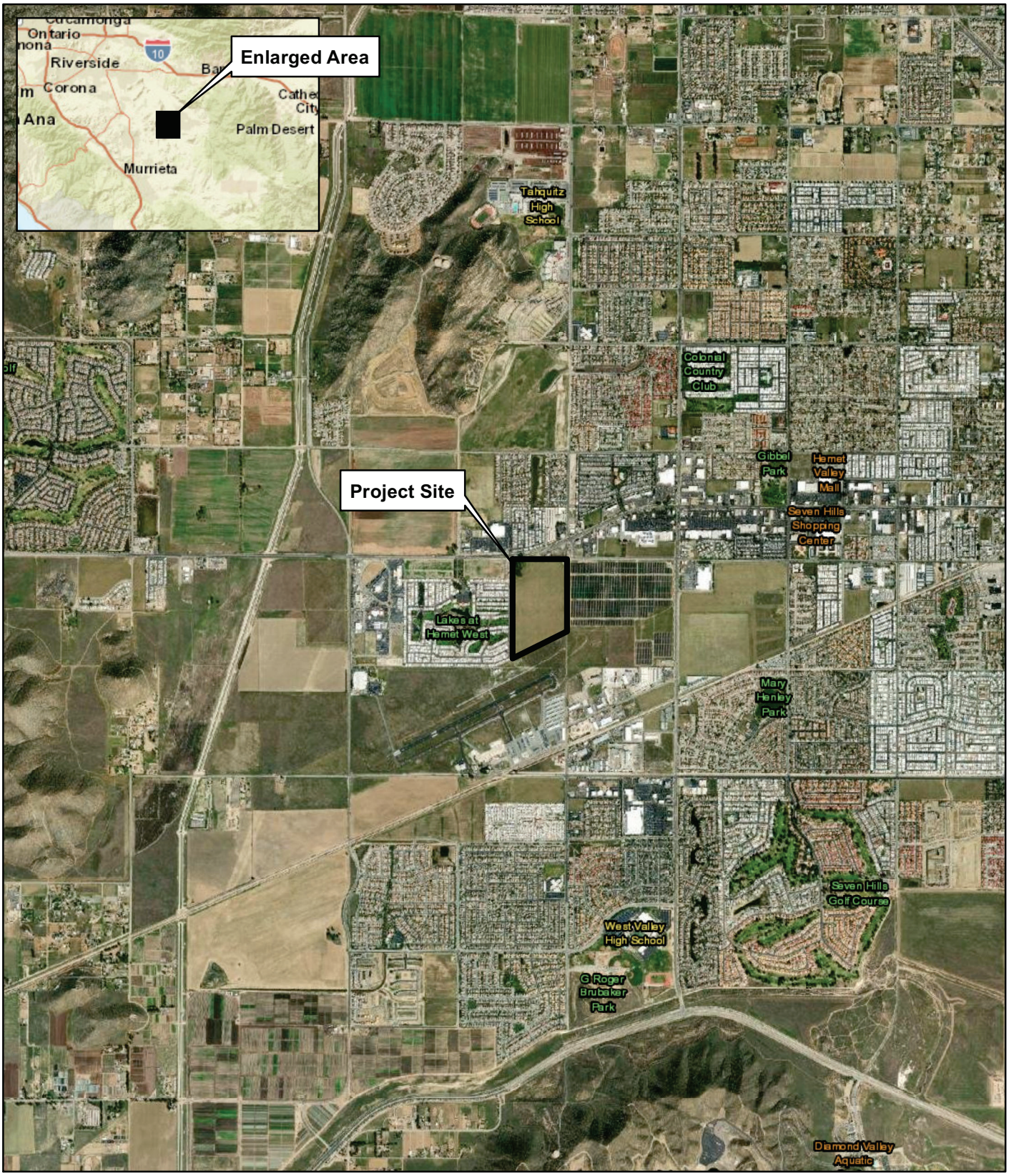
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

See Appendix 9.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



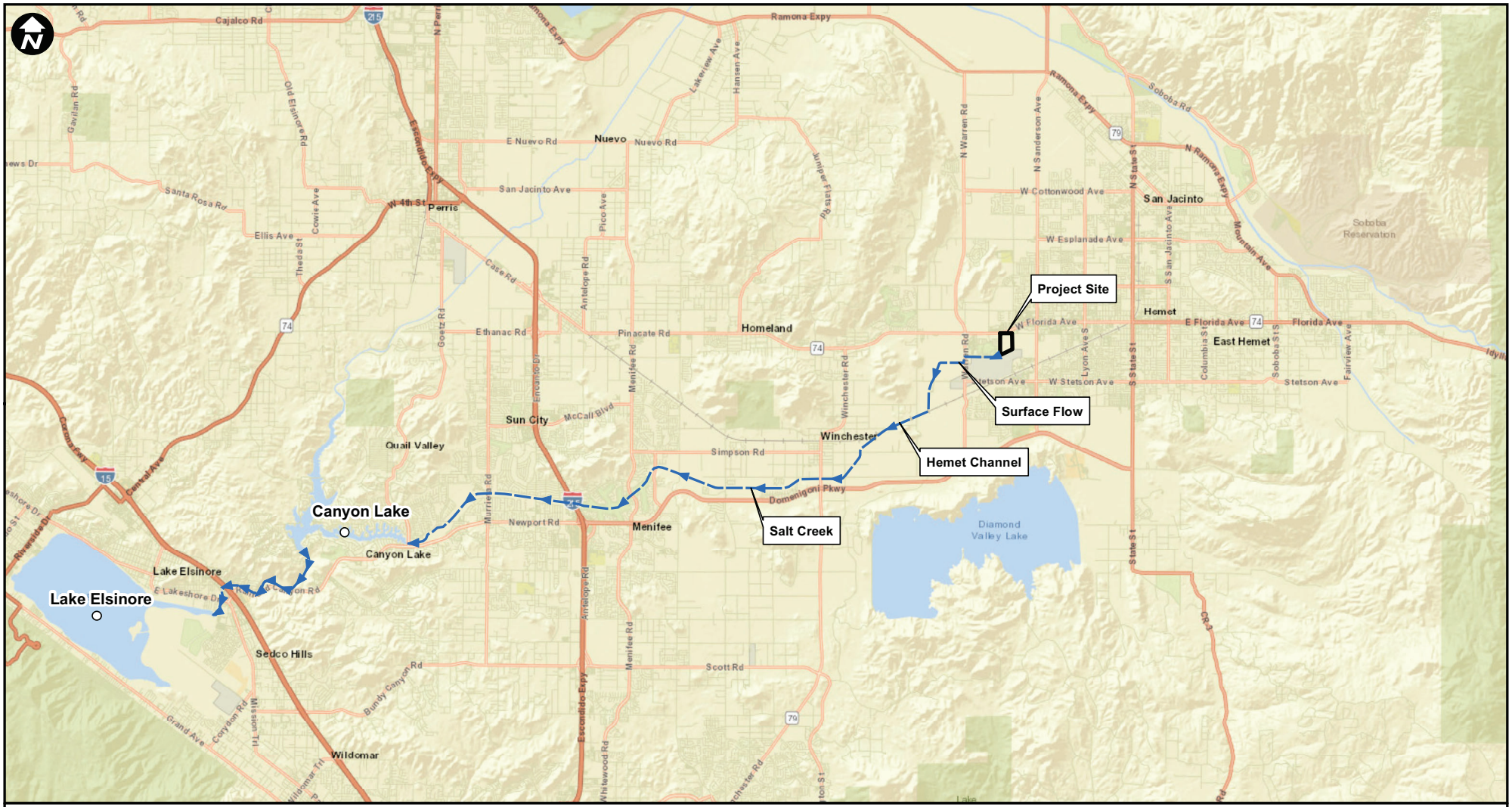
Locktek Industrial Building Project

Exhibit A-1
Vicinity Map

N

0 0.5 1 Miles

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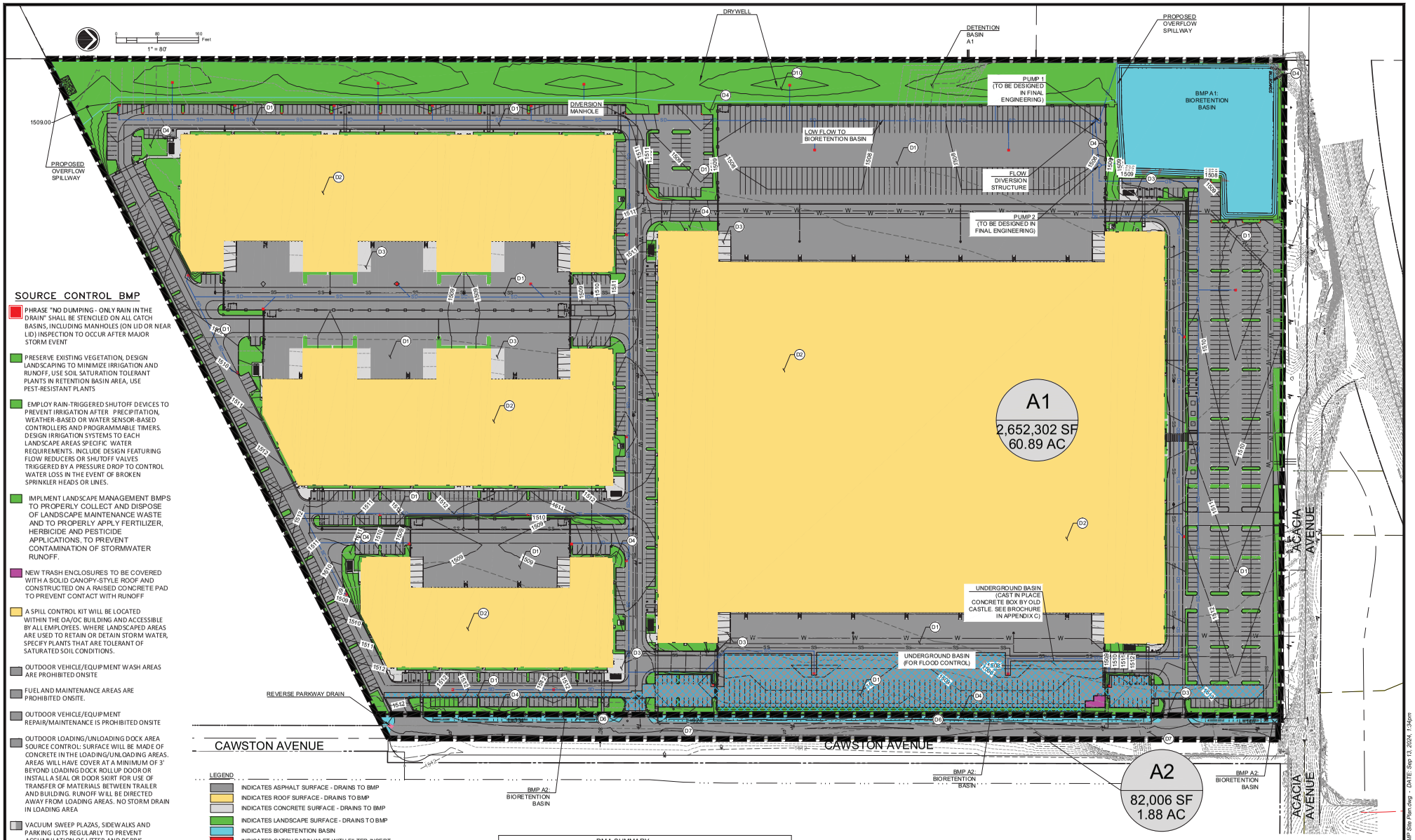


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Exhibit A-2
Regional Waters Map
Locktek Industrial Building Project

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SOURCE CONTROL BMP

- PHRASE "NO DUMPING - ONLY RAIN IN THE DRAIN" SHALL BE STENCILED ON ALL CATCH BASINS, INCLUDING MANHOLES (ON LID OR NEAR LID) INSPECTION TO OCCUR AFTER MAJOR STORM EVENT
- PRESERVE EXISTING VEGETATION, DESIGN LANDSCAPING TO MINIMIZE IRRIGATION AND RUNOFF, USE SOIL SATURATION TOLERANT PLANTS IN RETENTION BASIN AREA, USE PEST-RESISTANT PLANTS
- EMPLOY RAIN-TRIGGERED SHUTOFF DEVICES TO PREVENT IRRIGATION AFTER PRECIPITATION, WEATHER-BASED OR WATER SENSOR-BASED CONTROLLERS AND PROGRAMMABLE TIMERS. DESIGN IRRIGATION SYSTEMS TO EACH LANDSCAPE AREAS SPECIFIC WATER REQUIREMENTS. INCLUDE DESIGN FEATURING FLOW REDUCERS OR SHUTOFF VALVES TRIGGERED BY A PRESSURE DROP TO CONTROL WATER LOSS IN THE EVENT OF BROKEN SPRINKLER HEADS OR LINES.
- IMPLMENT LANDSCAPE MANAGEMENT BMPS TO PROPERLY COLLECT AND DISPOSE OF LANDSCAPE MAINTENANCE WASTE AND TO PROPERLY APPLY FERTILIZER, HERBICIDE AND PESTICIDE APPLICATIONS, TO PREVENT CONTAMINATION OF STORMWATER RUNOFF.
- NEW TRASH ENCLOSURES TO BE COVERED WITH A SOLID CANOPY-STYLE ROOF AND CONSTRUCTED ON A RAISED CONCRETE PAD TO PREVENT CONTACT WITH RUNOFF
- A SPILL CONTROL KIT WILL BE LOCATED WITHIN THE OA/OC BUILDING AND ACCESSIBLE BY ALL EMPLOYEES. WHERE LANDSCAPED AREAS ARE USED TO RETAIN OR DETAIN STORM WATER, SPECIFY PLANTS THAT ARE TOLERANT OF SATURATED SOIL CONDITIONS.
- OUTDOOR VEHICLE/EQUIPMENT WASH AREAS ARE PROHIBITED ONSITE
- FUEL AND MAINTENANCE AREAS ARE PROHIBITED ONSITE.
- OUTDOOR VEHICLE/EQUIPMENT REPAIR/MAINTENANCE IS PROHIBITED ONSITE
- OUTDOOR LOADING/UNLOADING DOCK AREA SOURCE CONTROL: SURFACE WILL BE MADE OF CONCRETE IN THE LOADING/UNLOADING AREAS. AREAS WILL HAVE COVER AT A MINIMUM OF 3' BEYOND LOADING DOCK ROLLUP DOOR OR INSTALL A SEAL OR DOOR SKIRT FOR USE OF TRANSFER OF MATERIALS BETWEEN TRAILER AND BUILDING. RUNOFF WILL BE DIRECTED AWAY FROM LOADING AREAS. NO STORM DRAIN IN LOADING AREA
- VACUUM SWEEP PLAZAS, SIDEWALKS AND PARKING LOTS REGULARLY TO PREVENT ACCUMULATION OF LITTER AND DEBRIS. COLLECT DEBRIS FROM PRESSURE WASHING TO PREVENT ENTRY INTO STORM DRAIN SYSTEM. COLLECT WASH WATER CONTAINING ANY CLEANING AGENT OR DEGREASER AND DISCHARGE TO SANITARY SEWER, NOT STORM DRAIN

LEGEND

- INDICATES ASPHALT SURFACE - DRAINS TO BMP
- INDICATES ROOF SURFACE - DRAINS TO BMP
- INDICATES CONCRETE SURFACE - DRAINS TO BMP
- INDICATES LANDSCAPE SURFACE - DRAINS TO BMP
- INDICATES BIORETENTION BASIN
- INDICATES CATCH BASIN INLET WITH FILTER INSERT
- CATCH BASIN W TRASH SCREEN
- TRASH ENCLOSURE
- PROPOSED DRYWELLS
- INDICATES UNDERGROUND DETENTION BASIN
- DMA BOUNDARY
- REVERSE PARKWAY DRAIN
- UNDERGROUND BASIN (FOR FLOOD CONTROL ONLY)

DMA SUMMARY

IDENTIFIER	AREA (SF)	PROPOSED SURFACE	TREATMENT
D1/D3	1,122,137	ASPHALT/CONCRETE	DRAINS TO BIORETENTION BASIN A1
D2	1,124,559	ROOFS	DRAINS TO BIORETENTION BASIN A1
D4	178,397	LANDSCAPE	DRAINS TO BIORETENTION BASIN A1
D5	76,915	LANDSCAPE	SELF-TREATING/BIORETENTION A1
D6	26,335	LANDSCAPE	SELF-TREATING/BIORETENTION BASIN A2
D7	55,951	ASPHALT/CONCRETE	DRAINS TO BIORETENTION BASIN A2
D10	150,294	LANDSCAPE	DRAINS TO BIORETENTION BASIN A1

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TENTATIVE PARCEL MAP NO. 38631

PRELIMINARY WQMP SITE PLAN

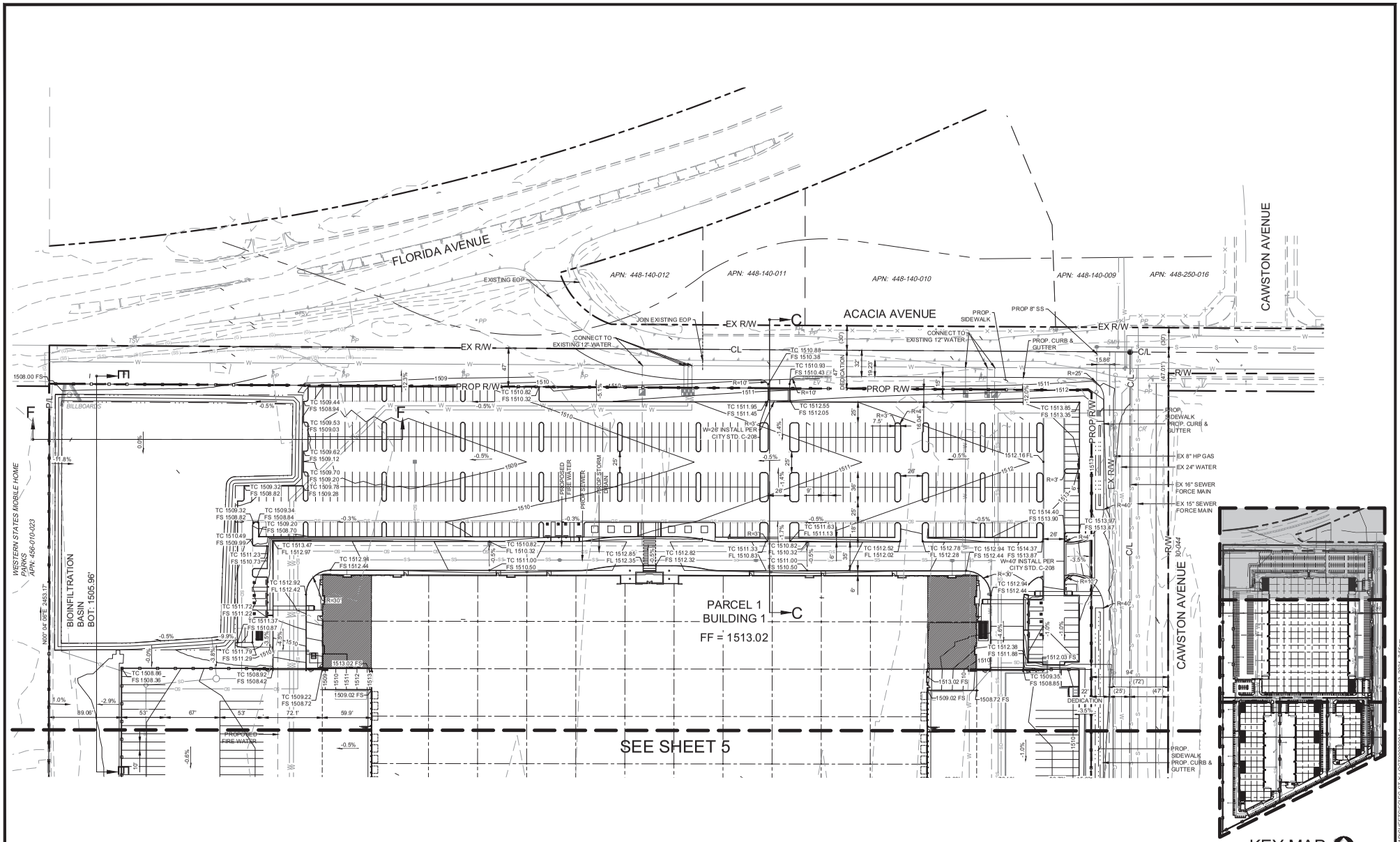
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DATE: 9/13/2024
SHEET: 1 OF 1

PRELIMINARY
SUBJECT TO CHANGE

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Appendix 2: Construction Plans

Grading and Drainage Plans



0 25 50 100

SCALE: 1" = 50'

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TENTATIVE PARCEL MAP NO. 38631

NORTH SITE PLAN

PROJECT NO.: LOCT00000001

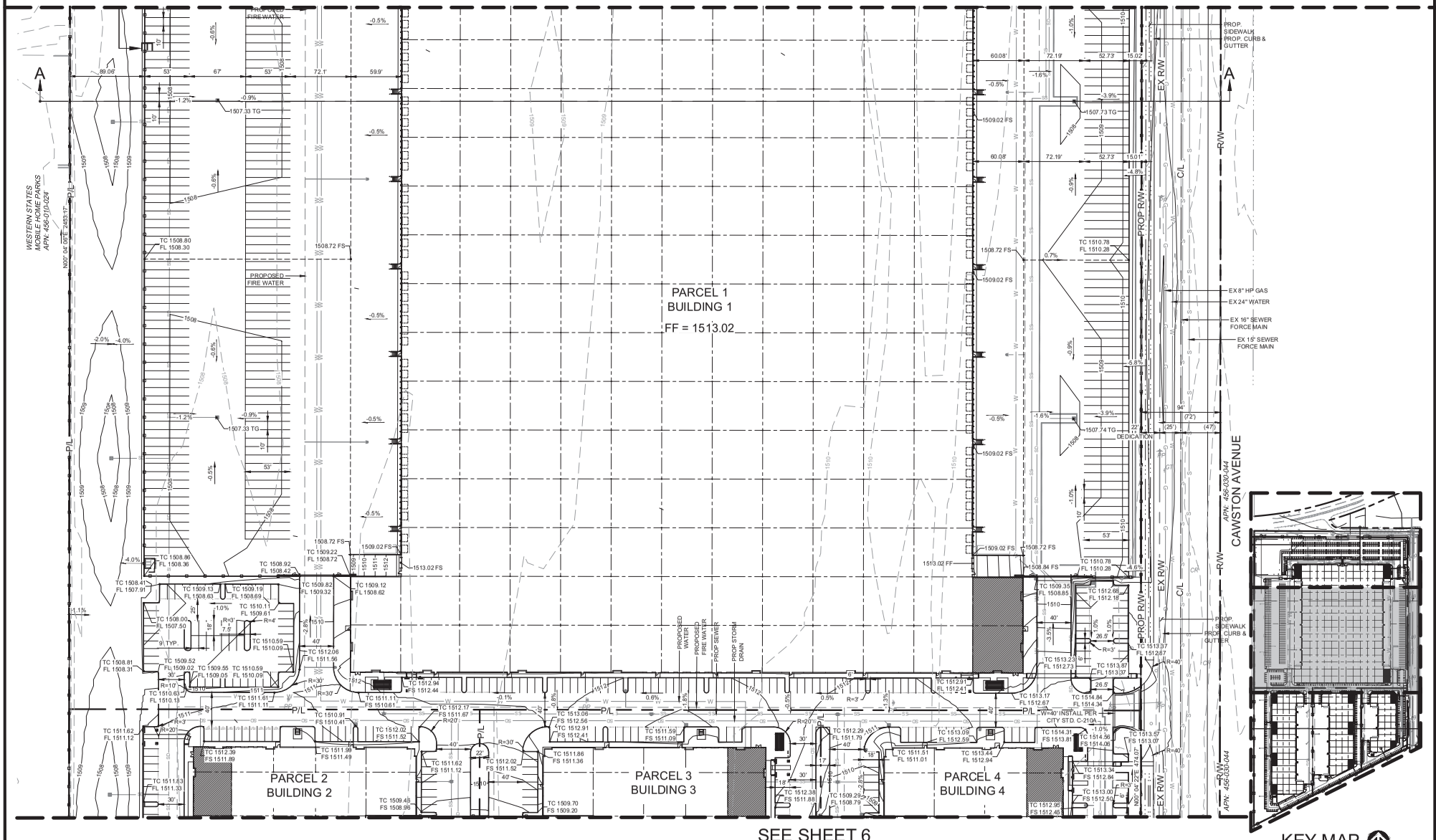
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NOT FOR CONSTRUCTION

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SEE SHEET 4



SEE SHEET 6

KEY MAP

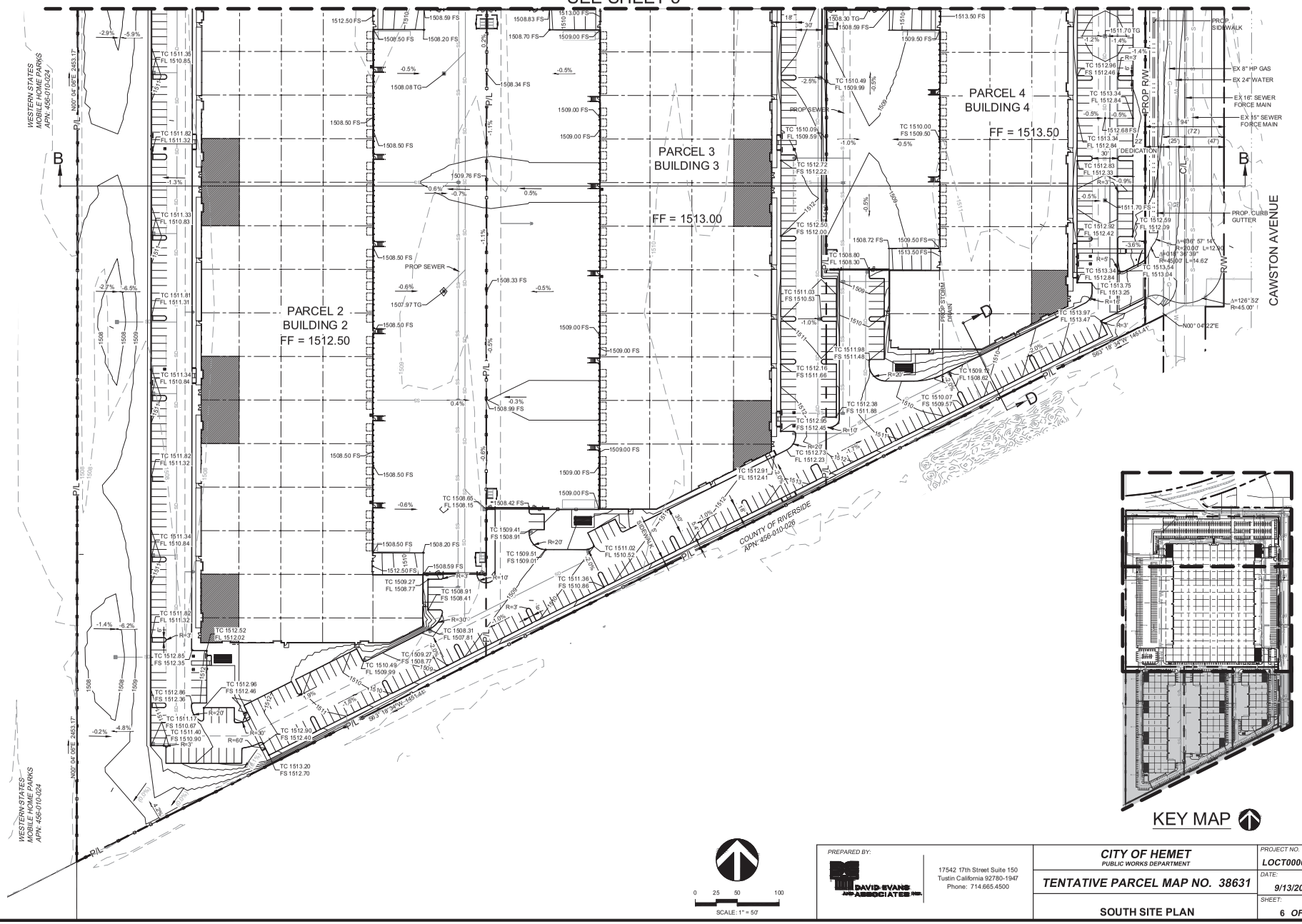
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TENTATIVE PARCEL MAP NO. 38631	DATE: 9/13/2024
CENTRAL SITE PLAN	SHEET: 5 OF 10

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NOT FOR CONSTRUCTION

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TENTATIVE PARCEL MAP NO. 38631

SOUTH SITE PLAN

PROJECT NO.: LOCT00000001

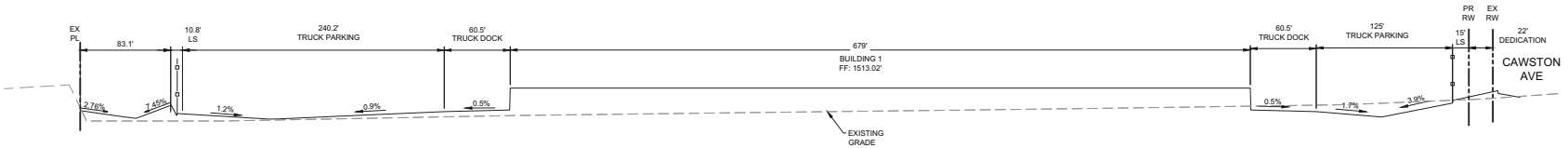
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SHEET: 6 OF 10

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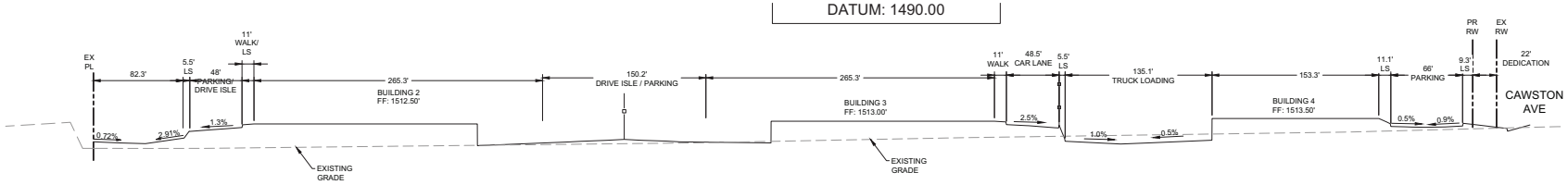
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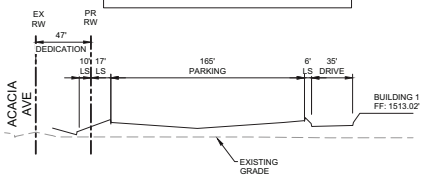
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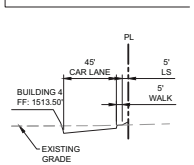
SECTION B-B

PROFILE VIEW: SECTION C-C
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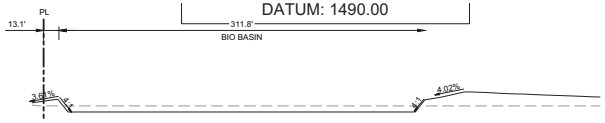


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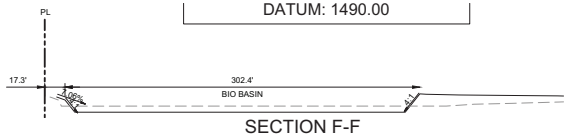
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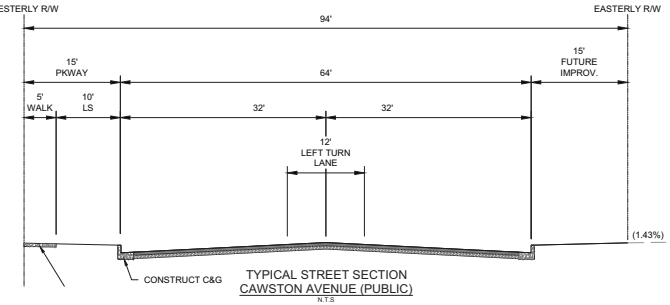
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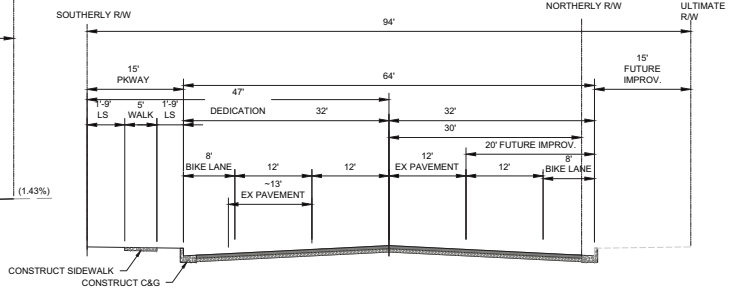
SECTION E-E



SECTION F-F



TYPICAL STREET SECTION
CAWSTON AVENUE (PUBLIC)
N.T.S



TYPICAL STREET SECTION
ACACIA AVENUE (PUBLIC)
N.T.S

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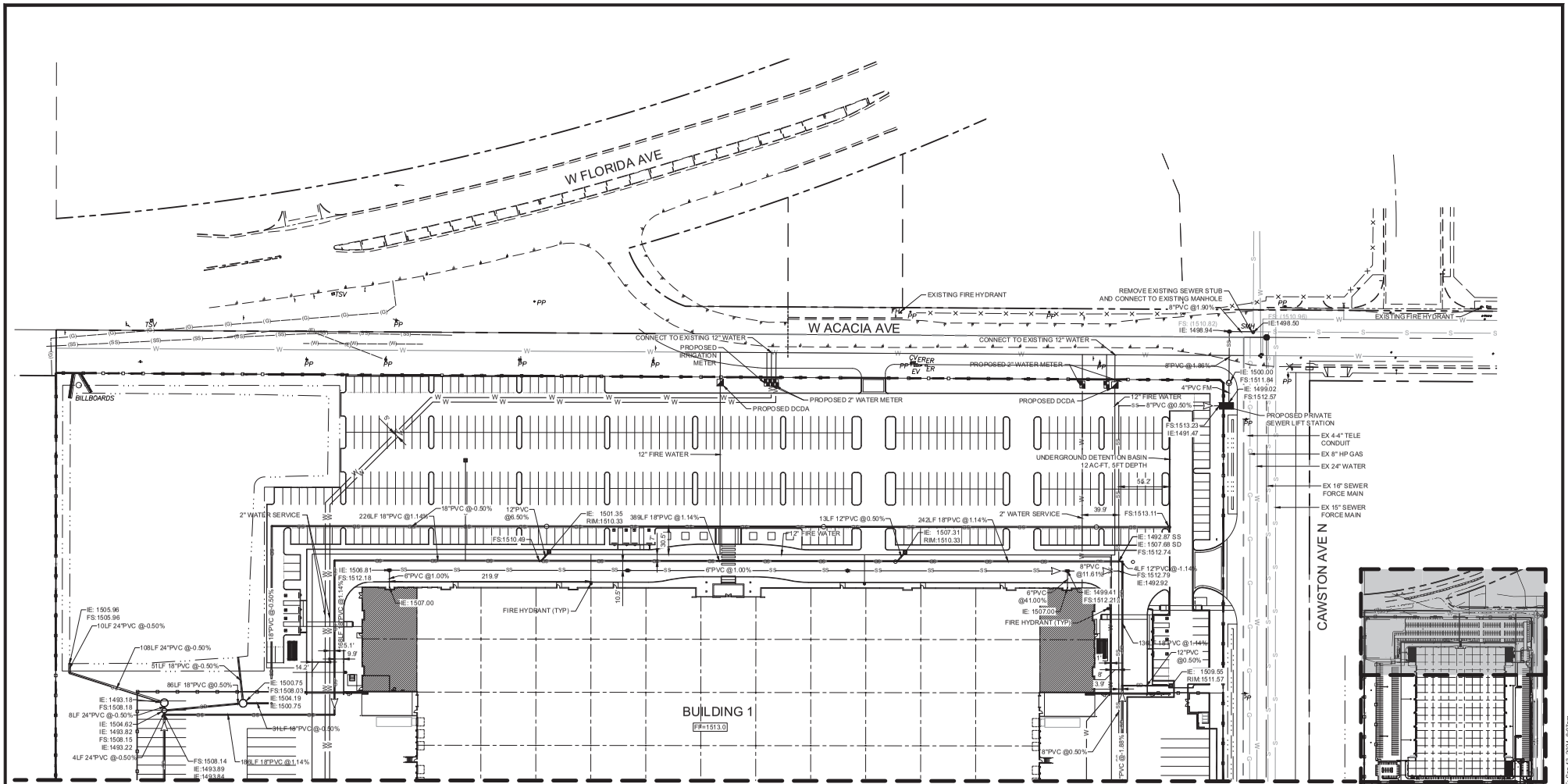
TENTATIVE PARCEL MAP NO. 38631

STREET SECTIONS

PROJECT NO.: LOCT00000001
DATE: 9/13/2024
SHEET: 7 OF 10

PRELIMINARY
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TENTATIVE PARCEL MAP NO. 38631

UTILITY PLAN NORTH

PROJECT NO. LOCT00000001
DATE: 9/13/2024
SHEET: 8 OF 10

PRELIMINARY
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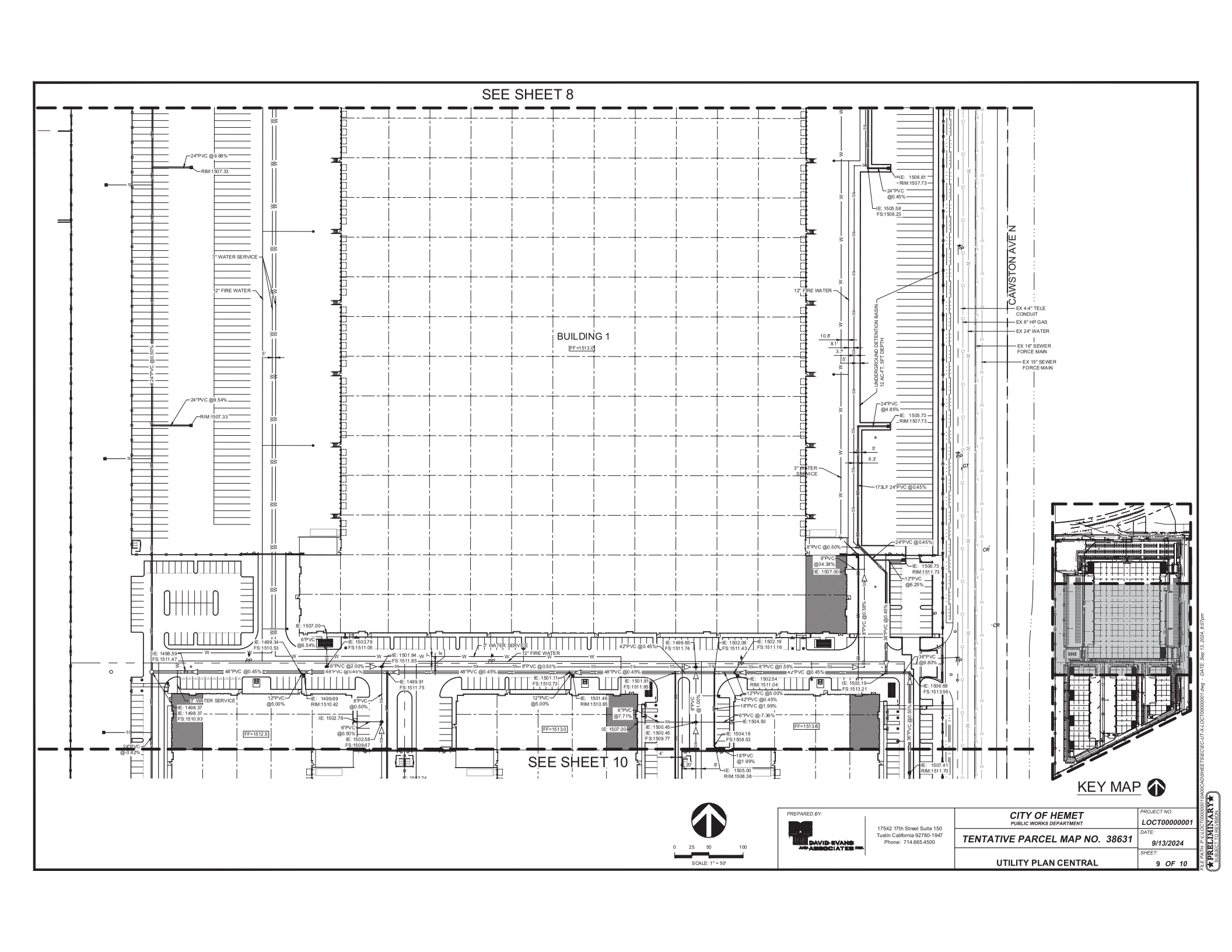
SEE SHEET 8

BUILDING 1
FF=1513.0

CAWSTON AVE N

24"PVC @9.88%
RIM:1507.33
24"PVC @0.50%
24"PVC @9.54%
RIM:1507.33
3" WATER SERVICE
12" FIRE WATER
5'
IE: 1506.81
RIM:1507.73
24"PVC
@0.45%
IE: 1505.58
FS:1508.23
12" FIRE WATER
UNDERGROUND DETENTION BASIN
12 AC-FT; 5FT DEPTH
10.8'
8.1'
3.7'
5'
6.3'
3" WATER SERVICE
173LF 24"PVC @0.45%
24"PVC
@4.85%
IE: 1505.73
RIM:1507.73
EX 4.4" TELE CONDUIT
EX 8" HP GAS
EX 24" WATER
EX 16" SEWER FORCE MAIN
EX 15" SEWER FORCE MAIN
8"PVC @0.50%
24"PVC @0.45%
6"PVC
@34.38%
IE: 1507.00
IE: 1506.73
RIM:1511.73
12"PVC
@6.25%
8"PVC @0.58%
36"PVC @0.45%
36"PVC
@9.80%
IE: 1506.68
FS:1513.66
36"PVC @0.50%
IE: 1507.41
RIM:1511.70
IE: 1507.00
6"PVC
@6.54%
IE: 1503.79
FS:1511.05
IE: 1499.34
FS:1510.53
IE: 1498.59
FS:1511.47
IE: 1501.94
FS:1511.85
3" WATER SERVICE
12" FIRE WATER
42"PVC @0.45%
IE: 1499.65
FS:1511.74
IE: 1502.06
FS:1511.43
IE: 1502.19
FS:1511.16
6"PVC @2.00%
48"PVC @0.45%
8"PVC @0.50%
48"PVC @0.45%
IE: 1499.91
FS:1511.75
IE: 1501.11
FS:1510.73
IE: 1501.81
FS:1511.90
IE: 1502.54
RIM:1511.04
8"PVC @0.55%
42"PVC @0.45%
IE: 1503.19
FS:1513.21
3" WATER SERVICE
IE: 1498.37
IE: 1498.37
FS: 1510.93
12"PVC
@5.00%
IE: 1499.69
RIM:1510.42
8"PVC
@0.50%
IE: 1502.76
6"PVC
@0.50%
IE: 1502.58
FS:1509.67
12"PVC
@5.00%
IE: 1501.40
RIM:1510.62
6"PVC
@7.71%
IE: 1507.00
8"PVC
@1.00%
IE: 1500.45
IE: 1500.45
FS:1509.77
12"PVC @5.00%
42"PVC @0.45%
18"PVC @1.99%
6"PVC @-7.36%
IE:1504.50
IE: 1504.18
FS:1508.53
18"PVC
@1.99%
IE: 1505.00
RIM:1508.38
FF=1512.5
FF=1513.0
FF=1513.6
24"PVC
@-0.62%
SEE SHEET 10

KEY MAP



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CITY OF HEMET
PUBLIC WORKS DEPARTMENT

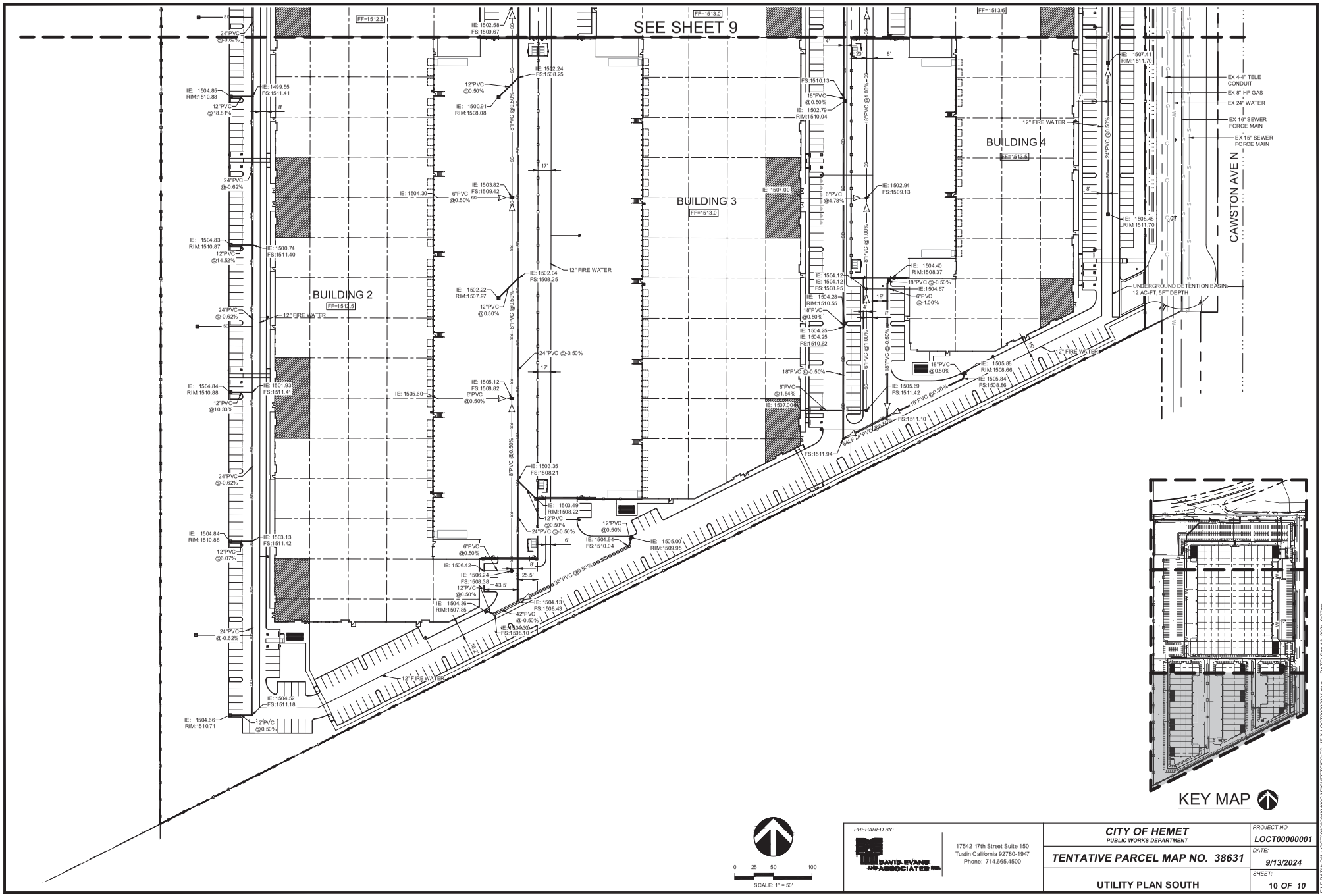
TENTATIVE PARCEL MAP NO. 38631

UTILITY PLAN CENTRAL

PROJECT NO.: LOCT00000001
DATE: 9/13/2024
SHEET: 9 OF 10

PRELIMINARY
NOT FOR CONSTRUCTION

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PREPARED BY: DAVID EVANS AND ASSOCIATES INC.	CITY OF HEMET PUBLIC WORKS DEPARTMENT	PROJECT NO. LOCT00000001
17542 17th Street Suite 150 Tustin California 92780-1947 Phone: 714.665.4500	TENTATIVE PARCEL MAP NO. 38631	DATE: 9/13/2024
	UTILITY PLAN SOUTH	SHEET: 10 OF 10

PRELIMINARY
NOT FOR CONSTRUCTION

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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Leighton and Associates, Inc.
A Leighton Group Company

July 18, 2023

Project No. 13577.002

Lecangs, LLC
6475 Las Positas Road
Livermore, CA 94551

Attention: Ms. Lori Wu

Subject: Results of Onsite Percolation/Infiltration Testing
Proposed Storm Water Dry Well System, Hemet – 63-Acre Site
Southwest Corner of Cawston Avenue and Acadia Avenue
City of Hemet, Riverside County, California

References: Design Handbook for Low Impact Development Best Management Practices, Riverside County Flood Control and Water Conservation District (District), dated September 2018.

Leighton Consulting, Inc, 2022, Geotechnical Exploration, Hemet – 63-Acre Site, Southwest Corner of Cawston Avenue and Acacia Avenue, Hemet, Riverside County, California, 13577.001, dated September 9.

In accordance with your request and authorization, we are pleased to provide this report presenting the results of field percolation testing design of the on-site infiltration system associated with the proposed 63-acre commercial development.

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to evaluate infiltration characteristics of onsite soils with respect to the proposed storm water dry well system for the subject site. Services provided for this study consisted of the following:

- Drilling, sampling and logging of two exploratory borings to a maximum depth of approximately 41.5 feet BGS to collect samples and verify depth to groundwater/ impermeable strata, if any. Borings were excavated by a subcontracted drill rig operator and logged by a member of our staff.
- Performed two percolation/infiltration tests adjacent to the exploratory borings. Infiltration tests were performed at 25 feet BGS, one at each proposed infiltration system location based on the encountered soils in the exploratory borings. Percolation testing generally followed procedures by Riverside County Flood Control for Design of Low Impact Development Best Management Practices.
- Data evaluation and analysis by a Professional Engineer and Certified Engineering Geologist in accordance with the standard of care provided by our industry in this area for this type of project.
- Compilation of this report that presents the results of our field percolation/infiltration testing.

SITE DESCRIPTION

The approximately 63-acre irregularly-shaped site is bounded by East Road to the west, Florida Avenue and Acacia Avenue to the north, Cawston Avenue to the east, and Hemet-Ryan Airport to the south.

The site is currently vacant and appears to have had a small single-family residence at the far northwest corner of the subject site in the past. This interpretation is based on the presence of delineated by mature eucalyptus trees, sections of the original building foundation, and other cultural debris. Dense grass blankets the majority of the site. Old, inactive, concrete storage containers can be observed above-ground along the eastern property line. Topographically the site is relatively flat.

FIELD EXPLORATION

Our field exploration consisted of excavation of two exploratory borings and two percolation test holes on June 29, 2023, with subsequent percolation testing performed on July 10. Exploratory borings and percolation test holes were excavated utilizing a truck mounted CME 75 drill rig equipped with an 8-inch hollow-stem auger. The exploratory borings were logged and sampled to a depth of approximately 41.5 feet below existing surface. Representative samples were collected for further field and laboratory classification. A technical staff from our office logged and observed all excavations. The locations of the exploratory boring and percolation test holes are shown on Figure 2. The log of boring and data sheets of percolation tests are included in Appendix A.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this exploration and review of our previous geotechnical investigation reports (Leighton, 2022), the proposed dry wells are underlain by alluvial materials which is in turn underlain by Sandy Silts and Silty Sands. Additionally, it is our opinion that historic groundwater does not exist within 15 feet below bottom of the proposed dry wells, based on the results of this and previous geotechnical explorations.

SUMMARY OF TEST RESULTS

The percolation/infiltration tests were performed in accordance with the procedures of Section 2.3 of the Riverside County Flood Control and Water Conservation District Design Handbook (RCFC&WCD, 2018). Results reported below are the most conservative readings in inch per hour. The infiltration rates were estimated using the “Porchet Method”. No factor of safety is applied to these rates. Field test data are included in Appendix A.

Summary of Infiltration Test Results

Test Hole #	Depth BGS (ft)	Infiltration Rate (in/hr)	Soil Description
P-1	25	0.72	Silty SAND (SM) / Alluvium
P-2	25	0.40	Silty SAND (SM) / Alluvium

average = 0.56 in/hr

LIMITATIONS

This report was based in part on data obtained from a limited number of observations, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Please notify the engineer if event conditions encountered during construction are different than those described or reflected in this report.

This report was prepared for the sole use of the Client and their design team, for application to preliminary design of the proposed infiltration system, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability, which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton and Associates, Inc.

If you have any questions, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

CERTIFIED ENGINEERING GEOLOGIST
BRENT ADAM
No. 2769
STATE OF CALIFORNIA

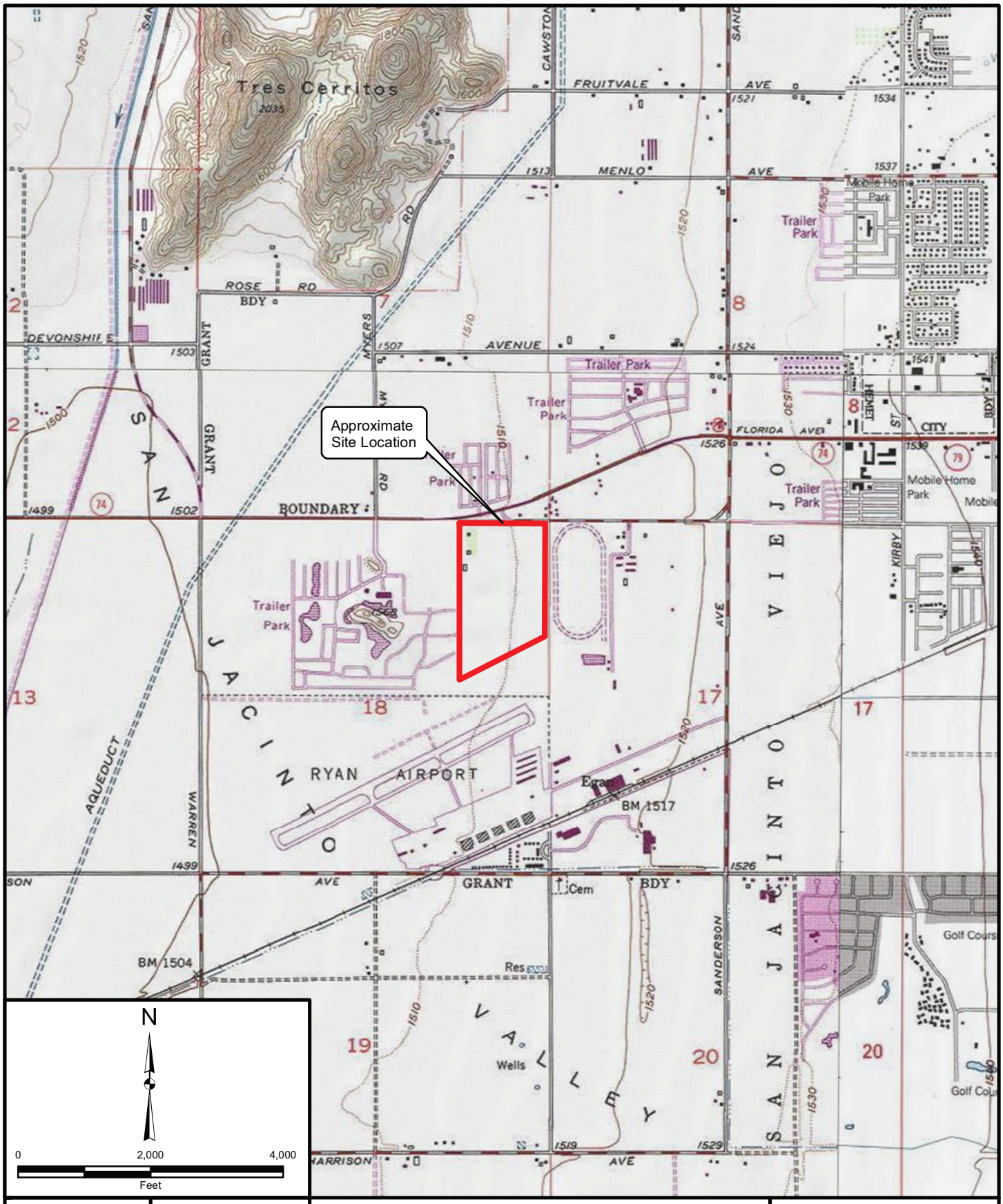
Brent A. Adam, CEG
Project Geologist
Extension 8923, badam@leightongroup.com

LICENSED PROFESSIONAL ENGINEER
BASHIR SAIID
C 93187
CIVIL
STATE OF CALIFORNIA

Bashir S. Saiid, PE
Senior Project Engineer
Extension 8927, bsaiid@leightongroup.com

Attachments: Figure 1 – Site Location Map
Figure 2 – Boring/Perc Test Location Map
Appendix A – Perc Data Test Sheets & Log of Exploratory Borings

Distribution: (1) Addressee (one PDF copy via email)



Project: 13577.002	Eng/Geol: BAA
Scale: 1 " = 2,000 '	Date: July 2023

Reference: Copyright:© 2013 National Geographic Society, i-cubed

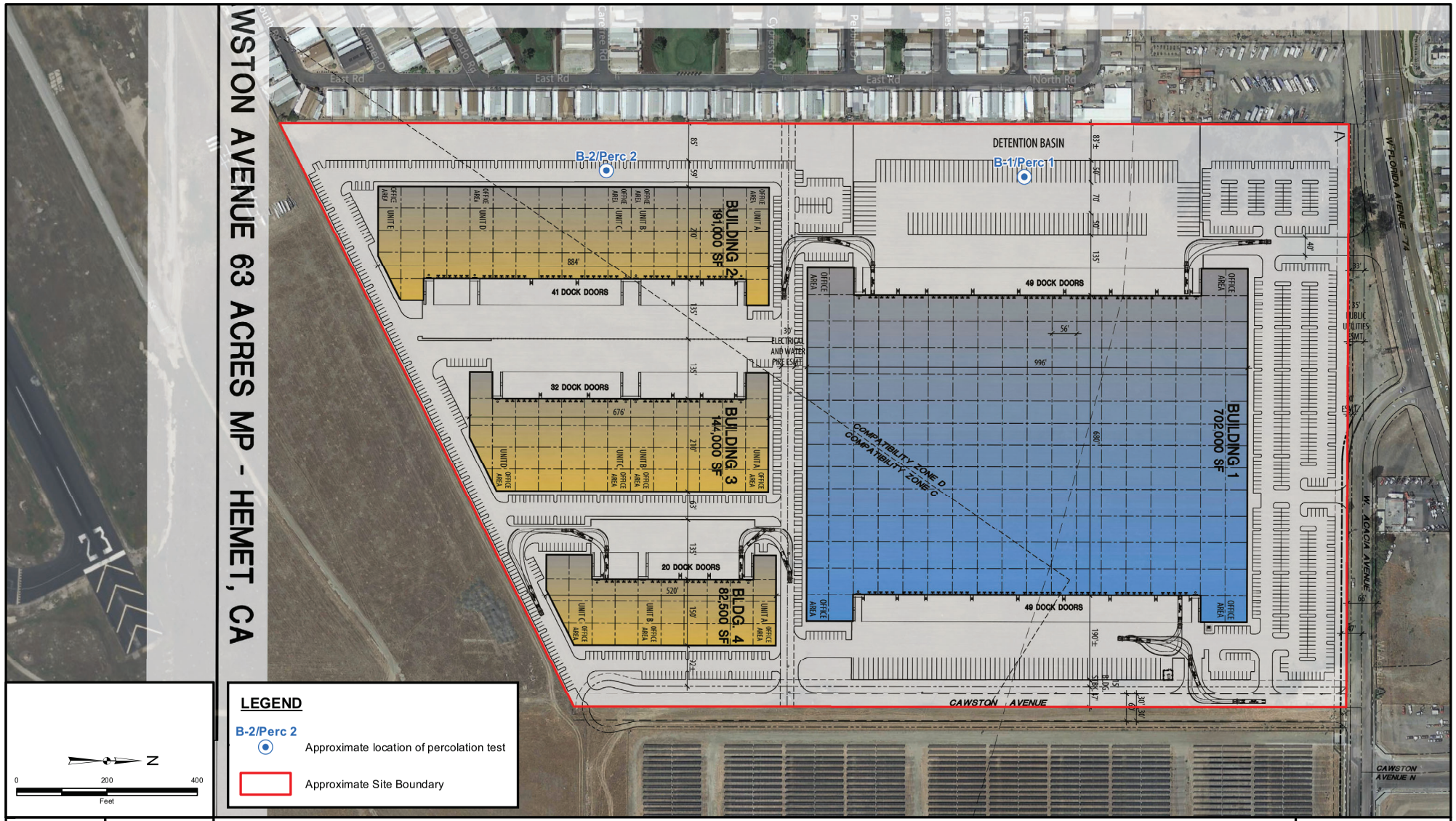
SITE LOCATION MAP

Hemet 63 Percolation Testing
Hemet, California

FIGURE 1

Leighton

Map Saved as J:\Drafting\13577\002\Maps\13577-002_F01_SLM_2023-07-12.mxd on 7/12/2023 1:03:13 PM Author: KVM (btran)



Project: 13577.002	Eng/Geol: BAA
Scale: 1 " = 200 '	Date: July 2023

Reference: Conceptual Site Plan, Sheet A1-0
Dated: 10/21/2022 by Rexford Industrial Realty

PERCOLATION TEST LOCATION MAP

Hemet 63 Percolation Testing
Hemet, California

FIGURE 2

Leighton

Map Saved as J:\Drafting\13577\002\Maps\13577-002_F02_BLM_2023-07-19.mxd on 7/19/2023 9:45:32 AM Author: KVM (btran)

APPENDIX A

PERCOLATION DATA SHEETS
LOG OF EXPLORATORY BORINGS

PERCOALTION TEST DATA - DEEP TEST / DRY WELL

TEST HOLE NO. Perc 1 EXCAVATION DATE: 6/26/2023
DEPTH OF TEST HOLE: 25 Feet TEST HOLE SIZE: 8 inch
SOIL CLASSIFICATION: Silty SAND

PRESOAK PERIOD

	TIME INTERVAL	
START	10:00 AM	6/26/23
STOP	8:14 AM	6/29/23

TEST PERIOD

Time	Time Interval (min)	Total Depth of Hole (feet)	Initial Water Level (feet)	Final Water Level (feet)	Δ in Water Level (feet)	Q= Percolation Rate (gal/ft.^{2} of sidewall per day)	Infiltration Rate (in/hr)
8:14 AM	30	25	3.71	12.42	8.71	6.17	2.54
8:44 AM							
8:47 AM	30	25	3.33	9.42	6.09	3.93	1.62
9:17 AM							
9:20 AM	30	25	3.33	7.42	4.09	2.50	1.03
9:50 AM							
9:53 AM	30	25	3.33	7.00	3.67	2.22	0.92
10:23 AM							
10:25 AM	30	25	3.33	6.83	3.50	2.11	0.87
10:55 AM							
10:57 AM	30	25	3.33	6.67	3.34	2.01	0.83
11:27 AM							
11:29 AM	30	25	3.33	6.58	3.25	1.95	0.80
11:59 AM							
12:03 PM	30	25	3.33	6.58	3.25	1.95	0.80
12:33 PM							
12:35 PM	30	25	3.33	6.50	3.17	1.89	0.78
1:05 AM							
1:07 AM	30	25	3.33	6.33	3.00	1.79	0.74
1:37 AM							
1:39 AM	30	25	3.33	6.25	2.92	1.73	0.72
2:09 AM							
2:12 AM	30	25	3.33	6.25	2.92	1.73	0.72
2:42 AM							

Seal Signature

PERCOALTION TEST DATA - DEEP TEST / DRY WELL

TEST HOLE NO. Perc 2 EXCAVATION DATE: 6/26/2023
DEPTH OF TEST HOLE: 25 Feet TEST HOLE SIZE: 8 inch
SOIL CLASSIFICATION: Silty SAND

PRESOAK PERIOD

	TIME INTERVAL	
START	10:00 AM	6/26/23
STOP	8:14 AM	6/29/23

TEST PERIOD

Time	Time Interval (min)	Total Depth of Hole (feet)	Initial Water Level (feet)	Final Water Level (feet)	Δ in Water Level (feet)	Q= Percolation Rate (gal/ft.^{2} of sidewall per day)	Infiltration Rate (in/hr)
9:29 AM	30	25	3.82	10.50	6.68	4.50	1.85
9:59 AM							
10:05 AM	30	25	3.92	9.49	5.57	3.66	1.51
10:35 AM							
10:40 AM	30	25	3.98	6.38	2.40	1.45	0.60
11:10 AM							
11:13 AM	30	25	3.63	5.83	2.20	1.30	0.54
11:43 AM							
12:17 PM	30	25	3.84	5.78	1.94	1.15	0.48
12:47 PM							
12:49 PM	30	25	3.84	5.61	1.77	1.05	0.43
1:19 PM							
1:21 PM	30	25	3.84	5.60	1.76	1.04	0.43
1:51 PM							
1:53 PM	30	25	3.84	5.60	1.76	1.04	0.43
2:23 PM							
2:25 PM	30	25	3.84	5.54	1.70	1.00	0.41
2:55 PM							
2:58 AM	30	25	3.84	5.53	1.69	1.00	0.41
3:28 PM							
3:30 PM	30	25	3.84	5.51	1.67	0.99	0.41
4:00 PM							
4:02 AM	30	25	3.84	5.49	1.65	0.97	0.40
4:32 PM							

Seal

Signature

GEOTECHNICAL BORING LOG B-1

Project No.	13577.002	**Date Drilled**	6-26-23
Project	Hemet 63 Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	@ Surface: **Quaternary Alluivium (Qal)**; SILTY SAND, dark grayish brown, moist, very fine to medium grained sand	
	5			S-1	5 6 7			ML	SANDY SILT with CLAY, stiff, dark grayish brown, moist, very fine to fine grained sand	
	10			S-2	4 5 6			SM	SILTY SAND, medium dense, dark grayish brown, moist,, fine to medium grained sand	
	15			S-3	1 1 2			CL	Lean CLAY with SAND, soft, dark grayish brown, moist, very fine to fine grained sand	
	20			S-4	4 5 6			SC	CLAYEY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
	25			S-5	4 6 8			SC-SM	SILTY, CLAYEY SAND, medium dense, dark gray, moist, fine to medium grained sand	
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-1

Project No.	13577.002	**Date Drilled**	6-26-23
Project	Hemet 63 Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	30			S-6	4 6 6				SILTY, CLAYEY SAND, medium dense, dark gray, moist, very fine to fine grained sand	
	35			S-7	7 6 7				SILTY, CLAYEY SAND, medium dense, dark gray, moist, very fine to fine grained sand	
	40			S-8	5 5 7			CL	Lean CLAY with SAND, stiff, dark gray, moist, very fine to medium grained sand	
									Total Depth = 41.5' bgs, no groundwater encountered, backfilled with cuttings on 6/26/23, adjacent percolation test set @ 25' bgs	
	45									
	50									
	55									
	60									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-2

Project No.	13577.002	**Date Drilled**	6-26-23
Project	Hemet 63 Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	@ Surface: **Quaternary Alluvium (Qal)**; SILTY SAND, grayish brown, slightly moist, very fine to coarse grained sand	
	5			S-1	6 6 10			SM-ML	SILTY SAND to SANDY SILT, medium dense to stiff, grayish brown, slightly moist, very fine to fine grained sand	
	10			S-2	6 7 9			SM	SILTY SAND, medium dense, dark gray, moist, fine to medium grained sand	
	15			S-3	1 2 2			CL-ML	SILTY CLAY with SAND, medium stiff, light gray, moist, very fine to fine grained sand	
	20			S-4	5 6 7			SM	SILTY SAND, medium dense, dark gray, moist, fine to medim grained sand, trace clay	
	25			S-5	6 8 10				SILTY SAND, medium dense, dark gray, moist, fine to medium grained sand	
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-2

Project No.	13577.002	**Date Drilled**	6-26-23
Project	Hemet 63 Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	'
Location	See Boring Location Map	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	30			S-6	7 8 3			SP-SM	Poorly Graded SAND with SILT, medium dense, light grayish brown, moist, fine to medium grained sand	
								CL	SANDY Lean CLAY, stiff, dark gray, moist, fine to medium grained sand	
	35			S-7	5 7 7			SC	CLAYEY SAND, medium dense, dark gray, moist, fine to medium grained sand	
	40			S-8	6 7 8			SM	SILTY SAND, medium dense, dark gray, moist, fine to medium grained sand	
								CL	SILTY CLAY, stiff, light gray, moist	
									Total Depth = 41.5' bgs, no groundwater encountered, backfilled with cuttings on 6/26/23, adjacent percolation test set @ 25' bgs	
	45									
	50									
	55									
	60									

SAMPLE TYPES:

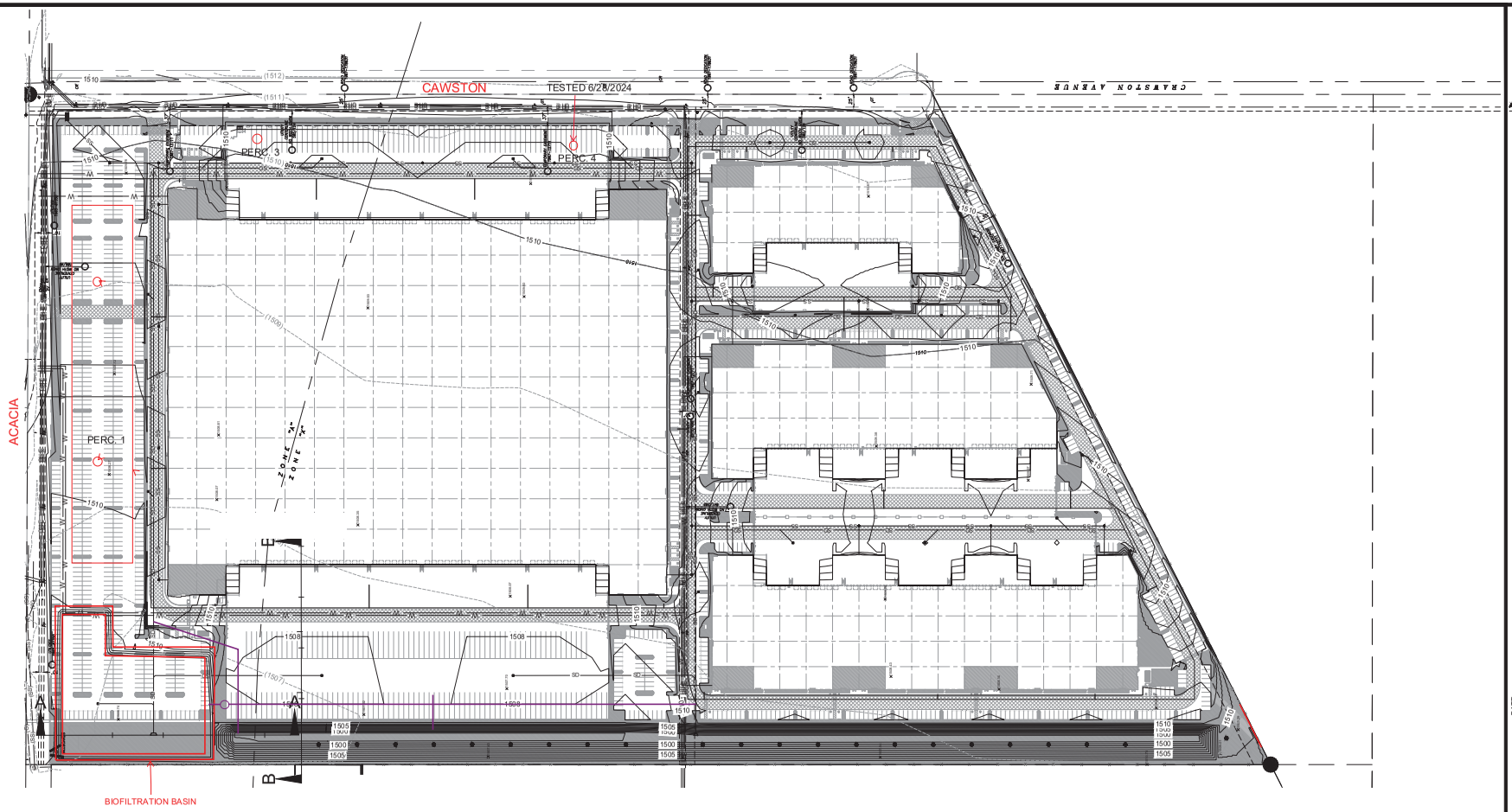
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- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

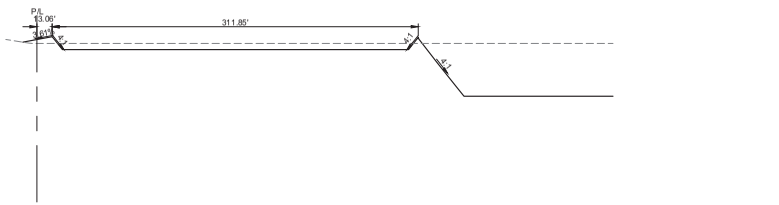
TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

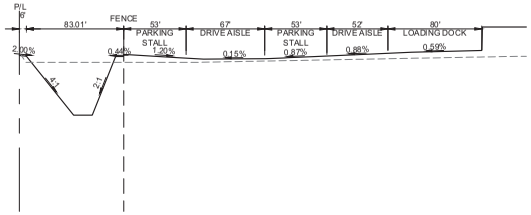
Leighton

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***





SECTION A-A



SECTION B-B

SCALE
100 0 50 100 200
(FEET)
1 INCH = 100 FT.

DAVID EVANS AND ASSOCIATES INC.
XXXXX Street Name
City, State, Zip
Phone: xxx.xxx.xxxx

DATE:
BY CK
REVIEWED BY:
NO. DATE REVISION

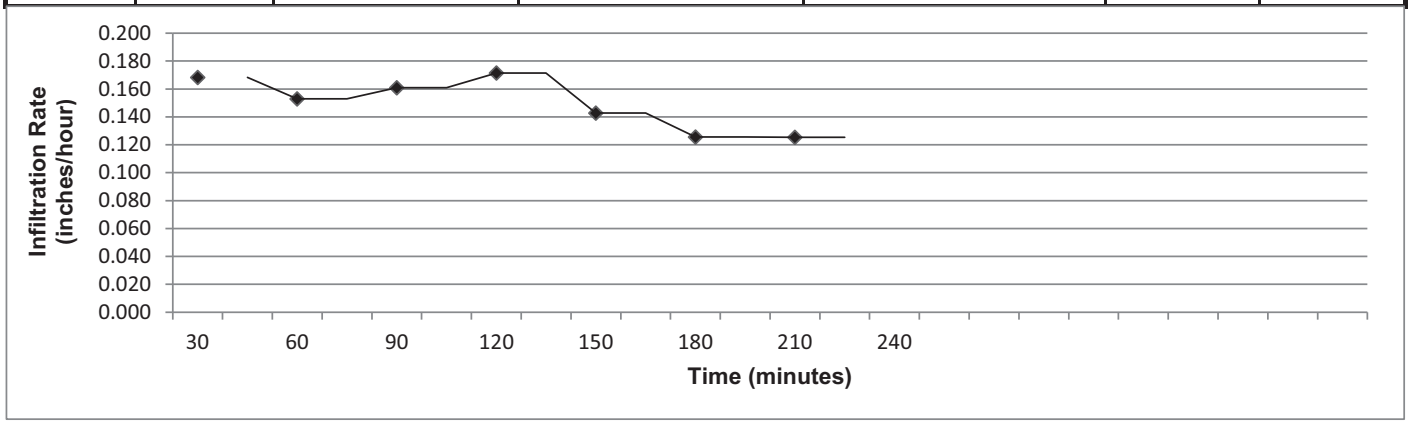
CHECKED BY:
DESIGNED BY:
DRAWN BY:
FIRST SUBMITTAL DATE:
PROJECT NO.
SHEET NO.

Plot Date: 2/8/2024 11:05 AM
Save Date: 2/7/2024 5:50 PM
By: Santiago Castillo
By: Sdp- File: P:\LILOC\T0000000\0104000\ADCH\BRD\SDJ\Drawing1.dwg

Test Hole Number:	**P-1**	**Project:**	Hemet 63
Date Excavated:	6/18/2024	**Project Number:**	24184
Tested by:	JO	**Date Tested:**	6/19/2024
Soil Unit:	Quaternary Alluvium (Qal)	**Test Hole Depth (inches):**	120
USCS Soil Type:	sandy Silt (ML)	**Test Hole Diameter (inches):**	8

Sunny ~81 °

Time	Δt (minutes)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
10:22:00	25.00	2.38	6.50	4.13	0.168	6.061
10:47:00						
10:48:00	30.00	2.00	6.50	4.50	0.153	6.667
11:18:00						
11:19:00	30.00	1.50	6.25	4.75	0.161	6.316
11:49:00						
11:50:00	34.00	0.75	6.50	5.75	0.171	5.913
12:24:00						
12:25:00	30.00	0.75	5.00	4.25	0.143	7.059
12:55:00						
12:55:00	30.00	0.75	4.50	3.75	0.126	8.000
1:25:00						
1:26:00	30.00	0.50	4.25	3.75	0.125	8.000
1:56:00						



*Based on Porchet Method: http://rcflood.org/downloads/NPDES/Documents/LIDManual/Appendix%20A_Infiltration_Testing.pdf

PERCOLATION TEST

P-1

Project Name: Hemet 63
Hemet, CA

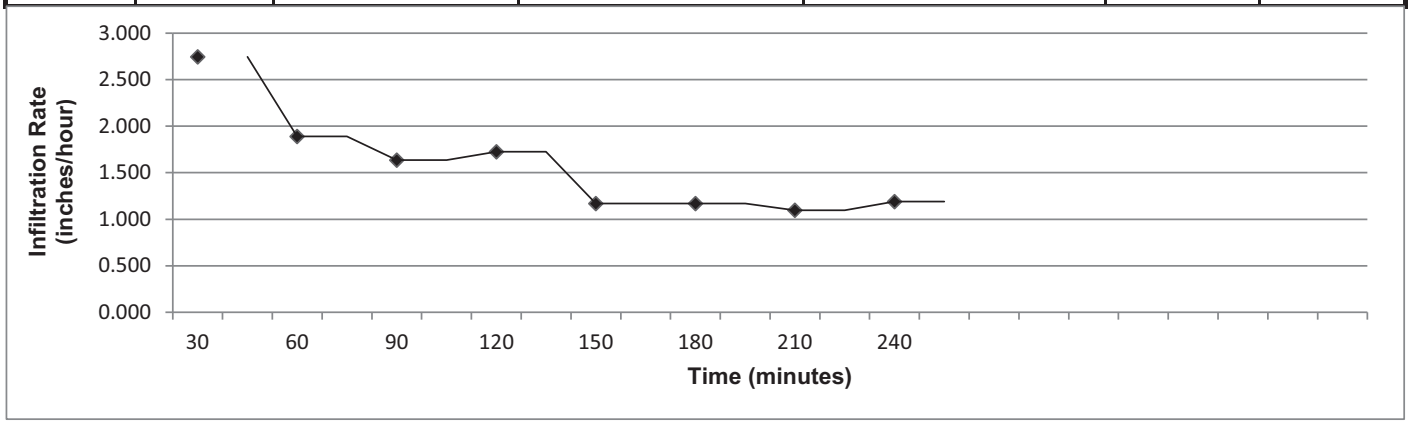
Project No.: 24184

Leighton

Test Hole Number:	**P-3**	**Project:**	Hemet 63
Date Excavated:	6/18/2024	**Project Number:**	24184
Tested by:	JO	**Date Tested:**	6/19/2024
Soil Unit:	Quaternary Alluvium (Qal)	**Test Hole Depth (inches):**	180
USCS Soil Type:	silty Sand (SM)	**Test Hole Diameter (inches):**	8

Sunny ~81 °

Time	Δt (minutes)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
10:32:00	25.00	1.88	82.00	80.13	2.746	0.312
10:57:00						
11:00:00	10.00	2.25	28.50	26.25	1.890	0.381
11:10:00						
11:10:00	12.00	1.75	29.00	27.25	1.635	0.440
11:22:00						
11:23:00	10.00	1.25	25.50	24.25	1.726	0.412
11:33:00						
11:34:00	10.00	1.75	18.50	16.75	1.169	0.597
11:44:00						
11:44:00	10.00	1.50	18.25	16.75	1.168	0.597
11:54:00						
11:55:00	10.00	1.75	17.50	15.75	1.096	0.635
12:05:00						
12:06:00	15.00	1.50	26.50	25.00	1.190	0.600
12:21:00						



*Based on Porchet Method: http://rcflood.org/downloads/NPDES/Documents/LIDManual/Appendix%20A_Infiltration_Testing.pdf

PERCOLATION TEST

P-3

Project Name: Hemet 63
Hemet, CA

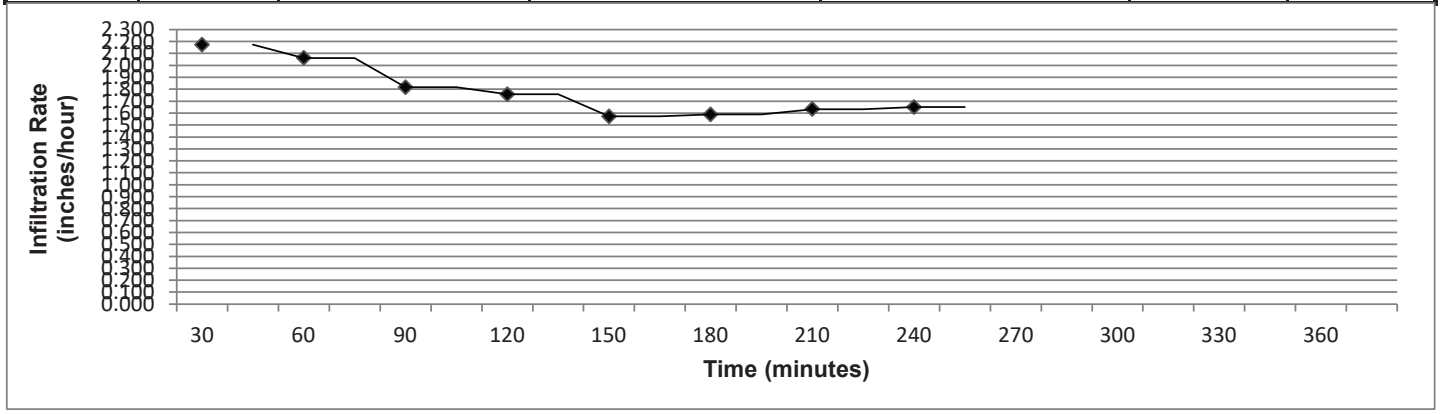
Project No.: 24184

Leighton

Test Hole Number:	**P-4**	**Project:**	Hemet 63 Perc Update
Date Excavated:	6/18/2024	**Project Number:**	24184
Tested by:	JO	**Date Tested:**	6/28/2024
Soil Unit:	Quaternary Alluvium (Qal)	**Test Hole Depth (inches):**	183
USCS Soil Type:	Silty Sand (SM)	**Test Hole Diameter (inches):**	8

Sunny ~81 °

Time	Δt (minutes)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
10:32:00	25.00	17.75	79.50	61.75	2.173	0.405
10:57:00						
10:00:00	10.00	17.50	44.00	26.50	2.062	0.377
10:10:00						
10:11:00	10.00	18.00	41.50	23.50	1.816	0.426
10:21:00						
10:23:00	10.00	18.25	41.00	22.75	1.757	0.440
10:33:00						
10:35:00	10.00	18.25	38.75	20.50	1.572	0.488
10:44:00						
10:45:00	10.00	18.00	38.75	20.75	1.590	0.482
10:55:00						
10:56:00	10.00	18.25	39.50	21.25	1.633	0.471
11:06:00						
11:07:00	10.00	18.00	39.50	21.50	1.651	0.465
11:17:00						



*Based on Porchet Method: http://rcflood.org/downloads/NPDES/Documents/LIDManual/Appendix%20A_Infiltration_Testing.pdf

Project Name: Moreno Valley Pump Track

PERCOLATION TEST

P-4

Leighton

Project No.: 24184

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Not available at this time

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

Not Applicable

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Based on Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	David Evans and Associates Inc	Date	9/3/2024
Designed by	mbec	Case No	
Company Project Number/Name	Hemet 63 Basin		

BMP Identification

BMP NAME / ID: Bioretention Basin A1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.69 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
D1 & D3	1122137	Concrete or Asphalt	1.00	0.89	998702	0.69	57425.36	
D2	1124559	Roofs	1.00	0.89	1000858		57549.31	
D4	178,397	Ornamental Landscaping	0.1	0.11	19705.4		1133.06	
D5 (BASIN)	76915	Mixed Surface Types	0	0.04	3076.6		176.90	
D10	150294	Ornamental Landscaping	0.1	0.11	16601.2		954.57	
	2652302		Total		2038943	0.69	117239	117240

Notes:

Bioretention Facility - Design Procedure	BMP ID: A1	Legend:	Required Entries / Calculated Cells

Company Name: DEA | Date: 9/3/2024

Designed by: mbec | County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 60.89 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 117,239 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 40.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.78 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 65,773 ft^2

Proposed Surface Area — A= 65,773 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 3 %

6" Check Dam Spacing — 10 feet

Describe Vegetation:

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Based on Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	David Evans and Associates Inc	Date	3/27/2024
Designed by	mbec	Case No	
Company Project Number/Name	Hemet 63 - Cawston Avenue BMP		

BMP Identification

BMP NAME / ID: Bioretention Basin A2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.69 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
D6	*26335*	*Mixed Surface Types*	*0.00*	*0.04*	*1053*		*60.57*	
D7	*55951*	*Concrete or Asphalt*	*1.00*	*0.89*	*49796*		*2863.29*	
						0.69		
	82286		***Total***		**50850**	**0.69**	***2924***	***2924***

Notes:

D6 Refers to proposed BMP: Bioretention Basin A2

Bioretention Facility - Design Procedure	BMP ID: A2	Legend:	Required Entries / Calculated Cells

Company Name:	DEA	Date:	4/1/2024
Designed by:	mbec	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	1.88	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	2,924	ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	1.5	ft
Top Width of Bioretention Facility, excluding curb	w_T =	40.0	ft
Total Effective Depth, d_E $d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$	d_E =	1.33	ft
Minimum Surface Area, A_m $A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	2,195	ft^2
Proposed Surface Area	A=	2,638	ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	4	:1
Diameter of Underdrain		6	inches
Longitudinal Slope of Site (3% maximum)		3	%
6" Check Dam Spacing		10	feet
Describe Vegetation:			

Notes: Bioretention to be bottom underdrain to be capped until Cawston Ave storm drain is built.
Bottom of Bioretention basin to be soft bottom and infiltrate to the max extent practical.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 03/28/24 File: hemetuhex2242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6385

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Hemet 63 Acre Development
Existing Condition 2-Year Unit Hydrographs
2-Year Design Storm

Drainage Area = 60.89(Ac.) = 0.095 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 60.89(Ac.) = 0.095 Sq. Mi.
Length along longest watercourse = 2925.00(Ft.)
Length along longest watercourse measured to centroid = 1717.30(Ft.)
Length along longest watercourse = 0.554 Mi.
Length along longest watercourse measured to centroid = 0.325 Mi.
Difference in elevation = 5.10(Ft.)
Slope along watercourse = 9.2062 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.205 Hr.
Lag time = 12.31 Min.
25% of lag time = 3.08 Min.
40% of lag time = 4.92 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
60.89	2.07	126.04

100 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       60.89              5.42                330.02

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.070(In)
Area Averaged 100-Year Rainfall =    5.420(In)

Point rain (area averaged) =    2.070(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.070(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    17.980           85.00          0.000
    42.910           92.00          0.000
 Total Area Entered =     60.89(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
85.0  85.0      0.187     0.000        0.187       0.295      0.055
92.0  92.0      0.104     0.000        0.104       0.705      0.073
                                                  Sum (F) =   0.129
Area averaged mean soil loss (F) (In/Hr) =  0.129
Minimum soil loss rate ((In/Hr)) =  0.064
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                 VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
    1   0.083         40.614          4.457             2.735
    2   0.167         81.228         18.373            11.275
    3   0.250        121.842         27.072            16.613
    4   0.333        162.456         17.143            10.520
    5   0.417        203.070          8.355             5.127
    6   0.500        243.683          5.319             3.264
    7   0.583        284.297          3.989             2.448
    8   0.667        324.911          3.032             1.860
    9   0.750        365.525          2.426             1.489
   10   0.833        406.139          1.905             1.169
   11   0.917        446.753          1.475             0.905
   12   1.000        487.367          1.265             0.776
   13   1.083        527.981          1.142             0.701
   14   1.167        568.595          0.892             0.548
   15   1.250        609.209          0.751             0.461
   16   1.333        649.823          0.617             0.379
   17   1.417        690.436          0.488             0.300
   18   1.500        731.050          0.406             0.249
```

19	1.583	771.664	0.406	0.249
20	1.667	812.278	0.486	0.298
			Sum = 100.000 Sum=	61.366

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.017	(0.228)	0.015	0.002
2	0.17	0.07	0.017	(0.227)	0.015	0.002
3	0.25	0.07	0.017	(0.226)	0.015	0.002
4	0.33	0.10	0.025	(0.225)	0.022	0.002
5	0.42	0.10	0.025	(0.224)	0.022	0.002
6	0.50	0.10	0.025	(0.223)	0.022	0.002
7	0.58	0.10	0.025	(0.223)	0.022	0.002
8	0.67	0.10	0.025	(0.222)	0.022	0.002
9	0.75	0.10	0.025	(0.221)	0.022	0.002
10	0.83	0.13	0.033	(0.220)	0.030	0.003
11	0.92	0.13	0.033	(0.219)	0.030	0.003
12	1.00	0.13	0.033	(0.218)	0.030	0.003
13	1.08	0.10	0.025	(0.217)	0.022	0.002
14	1.17	0.10	0.025	(0.216)	0.022	0.002
15	1.25	0.10	0.025	(0.216)	0.022	0.002
16	1.33	0.10	0.025	(0.215)	0.022	0.002
17	1.42	0.10	0.025	(0.214)	0.022	0.002
18	1.50	0.10	0.025	(0.213)	0.022	0.002
19	1.58	0.10	0.025	(0.212)	0.022	0.002
20	1.67	0.10	0.025	(0.211)	0.022	0.002
21	1.75	0.10	0.025	(0.211)	0.022	0.002
22	1.83	0.13	0.033	(0.210)	0.030	0.003
23	1.92	0.13	0.033	(0.209)	0.030	0.003
24	2.00	0.13	0.033	(0.208)	0.030	0.003
25	2.08	0.13	0.033	(0.207)	0.030	0.003
26	2.17	0.13	0.033	(0.206)	0.030	0.003
27	2.25	0.13	0.033	(0.205)	0.030	0.003
28	2.33	0.13	0.033	(0.205)	0.030	0.003
29	2.42	0.13	0.033	(0.204)	0.030	0.003
30	2.50	0.13	0.033	(0.203)	0.030	0.003
31	2.58	0.17	0.041	(0.202)	0.037	0.004
32	2.67	0.17	0.041	(0.201)	0.037	0.004
33	2.75	0.17	0.041	(0.200)	0.037	0.004
34	2.83	0.17	0.041	(0.200)	0.037	0.004
35	2.92	0.17	0.041	(0.199)	0.037	0.004
36	3.00	0.17	0.041	(0.198)	0.037	0.004
37	3.08	0.17	0.041	(0.197)	0.037	0.004
38	3.17	0.17	0.041	(0.196)	0.037	0.004
39	3.25	0.17	0.041	(0.196)	0.037	0.004
40	3.33	0.17	0.041	(0.195)	0.037	0.004
41	3.42	0.17	0.041	(0.194)	0.037	0.004
42	3.50	0.17	0.041	(0.193)	0.037	0.004
43	3.58	0.17	0.041	(0.192)	0.037	0.004

44	3.67	0.17	0.041	(0.191)	0.037	0.004
45	3.75	0.17	0.041	(0.191)	0.037	0.004
46	3.83	0.20	0.050	(0.190)	0.045	0.005
47	3.92	0.20	0.050	(0.189)	0.045	0.005
48	4.00	0.20	0.050	(0.188)	0.045	0.005
49	4.08	0.20	0.050	(0.187)	0.045	0.005
50	4.17	0.20	0.050	(0.187)	0.045	0.005
51	4.25	0.20	0.050	(0.186)	0.045	0.005
52	4.33	0.23	0.058	(0.185)	0.052	0.006
53	4.42	0.23	0.058	(0.184)	0.052	0.006
54	4.50	0.23	0.058	(0.184)	0.052	0.006
55	4.58	0.23	0.058	(0.183)	0.052	0.006
56	4.67	0.23	0.058	(0.182)	0.052	0.006
57	4.75	0.23	0.058	(0.181)	0.052	0.006
58	4.83	0.27	0.066	(0.180)	0.060	0.007
59	4.92	0.27	0.066	(0.180)	0.060	0.007
60	5.00	0.27	0.066	(0.179)	0.060	0.007
61	5.08	0.20	0.050	(0.178)	0.045	0.005
62	5.17	0.20	0.050	(0.177)	0.045	0.005
63	5.25	0.20	0.050	(0.176)	0.045	0.005
64	5.33	0.23	0.058	(0.176)	0.052	0.006
65	5.42	0.23	0.058	(0.175)	0.052	0.006
66	5.50	0.23	0.058	(0.174)	0.052	0.006
67	5.58	0.27	0.066	(0.173)	0.060	0.007
68	5.67	0.27	0.066	(0.173)	0.060	0.007
69	5.75	0.27	0.066	(0.172)	0.060	0.007
70	5.83	0.27	0.066	(0.171)	0.060	0.007
71	5.92	0.27	0.066	(0.170)	0.060	0.007
72	6.00	0.27	0.066	(0.170)	0.060	0.007
73	6.08	0.30	0.075	(0.169)	0.067	0.007
74	6.17	0.30	0.075	(0.168)	0.067	0.007
75	6.25	0.30	0.075	(0.167)	0.067	0.007
76	6.33	0.30	0.075	(0.167)	0.067	0.007
77	6.42	0.30	0.075	(0.166)	0.067	0.007
78	6.50	0.30	0.075	(0.165)	0.067	0.007
79	6.58	0.33	0.083	(0.164)	0.075	0.008
80	6.67	0.33	0.083	(0.164)	0.075	0.008
81	6.75	0.33	0.083	(0.163)	0.075	0.008
82	6.83	0.33	0.083	(0.162)	0.075	0.008
83	6.92	0.33	0.083	(0.161)	0.075	0.008
84	7.00	0.33	0.083	(0.161)	0.075	0.008
85	7.08	0.33	0.083	(0.160)	0.075	0.008
86	7.17	0.33	0.083	(0.159)	0.075	0.008
87	7.25	0.33	0.083	(0.159)	0.075	0.008
88	7.33	0.37	0.091	(0.158)	0.082	0.009
89	7.42	0.37	0.091	(0.157)	0.082	0.009
90	7.50	0.37	0.091	(0.156)	0.082	0.009
91	7.58	0.40	0.099	(0.156)	0.089	0.010
92	7.67	0.40	0.099	(0.155)	0.089	0.010
93	7.75	0.40	0.099	(0.154)	0.089	0.010
94	7.83	0.43	0.108	(0.154)	0.097	0.011
95	7.92	0.43	0.108	(0.153)	0.097	0.011
96	8.00	0.43	0.108	(0.152)	0.097	0.011
97	8.08	0.50	0.124	(0.151)	0.112	0.012
98	8.17	0.50	0.124	(0.151)	0.112	0.012
99	8.25	0.50	0.124	(0.150)	0.112	0.012

100	8.33	0.50	0.124	(0.149)	0.112	0.012
101	8.42	0.50	0.124	(0.149)	0.112	0.012
102	8.50	0.50	0.124	(0.148)	0.112	0.012
103	8.58	0.53	0.132	(0.147)	0.119	0.013
104	8.67	0.53	0.132	(0.146)	0.119	0.013
105	8.75	0.53	0.132	(0.146)	0.119	0.013
106	8.83	0.57	0.141	(0.145)	0.127	0.014
107	8.92	0.57	0.141	(0.144)	0.127	0.014
108	9.00	0.57	0.141	(0.144)	0.127	0.014
109	9.08	0.63	0.157	(0.143)	0.142	0.016
110	9.17	0.63	0.157	(0.142)	0.142	0.016
111	9.25	0.63	0.157	(0.142)	0.142	0.016
112	9.33	0.67	0.166	0.141	(0.149)	0.025
113	9.42	0.67	0.166	0.140	(0.149)	0.025
114	9.50	0.67	0.166	0.140	(0.149)	0.026
115	9.58	0.70	0.174	0.139	(0.156)	0.035
116	9.67	0.70	0.174	0.138	(0.156)	0.036
117	9.75	0.70	0.174	0.138	(0.156)	0.036
118	9.83	0.73	0.182	0.137	(0.164)	0.045
119	9.92	0.73	0.182	0.136	(0.164)	0.046
120	10.00	0.73	0.182	0.136	(0.164)	0.046
121	10.08	0.50	0.124	(0.135)	0.112	0.012
122	10.17	0.50	0.124	(0.134)	0.112	0.012
123	10.25	0.50	0.124	(0.134)	0.112	0.012
124	10.33	0.50	0.124	(0.133)	0.112	0.012
125	10.42	0.50	0.124	(0.132)	0.112	0.012
126	10.50	0.50	0.124	(0.132)	0.112	0.012
127	10.58	0.67	0.166	0.131	(0.149)	0.034
128	10.67	0.67	0.166	0.131	(0.149)	0.035
129	10.75	0.67	0.166	0.130	(0.149)	0.036
130	10.83	0.67	0.166	0.129	(0.149)	0.036
131	10.92	0.67	0.166	0.129	(0.149)	0.037
132	11.00	0.67	0.166	0.128	(0.149)	0.038
133	11.08	0.63	0.157	0.127	(0.142)	0.030
134	11.17	0.63	0.157	0.127	(0.142)	0.031
135	11.25	0.63	0.157	0.126	(0.142)	0.031
136	11.33	0.63	0.157	0.125	(0.142)	0.032
137	11.42	0.63	0.157	0.125	(0.142)	0.032
138	11.50	0.63	0.157	0.124	(0.142)	0.033
139	11.58	0.57	0.141	0.124	(0.127)	0.017
140	11.67	0.57	0.141	0.123	(0.127)	0.018
141	11.75	0.57	0.141	0.122	(0.127)	0.018
142	11.83	0.60	0.149	0.122	(0.134)	0.027
143	11.92	0.60	0.149	0.121	(0.134)	0.028
144	12.00	0.60	0.149	0.121	(0.134)	0.028
145	12.08	0.83	0.207	0.120	(0.186)	0.087
146	12.17	0.83	0.207	0.119	(0.186)	0.088
147	12.25	0.83	0.207	0.119	(0.186)	0.088
148	12.33	0.87	0.215	0.118	(0.194)	0.097
149	12.42	0.87	0.215	0.118	(0.194)	0.098
150	12.50	0.87	0.215	0.117	(0.194)	0.098
151	12.58	0.93	0.232	0.116	(0.209)	0.115
152	12.67	0.93	0.232	0.116	(0.209)	0.116
153	12.75	0.93	0.232	0.115	(0.209)	0.117
154	12.83	0.97	0.240	0.115	(0.216)	0.125
155	12.92	0.97	0.240	0.114	(0.216)	0.126

156	13.00	0.97	0.240	0.113	(0.216)	0.127
157	13.08	1.13	0.281	0.113	(0.253)	0.169
158	13.17	1.13	0.281	0.112	(0.253)	0.169
159	13.25	1.13	0.281	0.112	(0.253)	0.170
160	13.33	1.13	0.281	0.111	(0.253)	0.170
161	13.42	1.13	0.281	0.111	(0.253)	0.171
162	13.50	1.13	0.281	0.110	(0.253)	0.171
163	13.58	0.77	0.190	0.110	(0.171)	0.081
164	13.67	0.77	0.190	0.109	(0.171)	0.081
165	13.75	0.77	0.190	0.108	(0.171)	0.082
166	13.83	0.77	0.190	0.108	(0.171)	0.083
167	13.92	0.77	0.190	0.107	(0.171)	0.083
168	14.00	0.77	0.190	0.107	(0.171)	0.084
169	14.08	0.90	0.224	0.106	(0.201)	0.117
170	14.17	0.90	0.224	0.106	(0.201)	0.118
171	14.25	0.90	0.224	0.105	(0.201)	0.118
172	14.33	0.87	0.215	0.105	(0.194)	0.111
173	14.42	0.87	0.215	0.104	(0.194)	0.111
174	14.50	0.87	0.215	0.104	(0.194)	0.112
175	14.58	0.87	0.215	0.103	(0.194)	0.112
176	14.67	0.87	0.215	0.102	(0.194)	0.113
177	14.75	0.87	0.215	0.102	(0.194)	0.113
178	14.83	0.83	0.207	0.101	(0.186)	0.106
179	14.92	0.83	0.207	0.101	(0.186)	0.106
180	15.00	0.83	0.207	0.100	(0.186)	0.107
181	15.08	0.80	0.199	0.100	(0.179)	0.099
182	15.17	0.80	0.199	0.099	(0.179)	0.099
183	15.25	0.80	0.199	0.099	(0.179)	0.100
184	15.33	0.77	0.190	0.098	(0.171)	0.092
185	15.42	0.77	0.190	0.098	(0.171)	0.093
186	15.50	0.77	0.190	0.097	(0.171)	0.093
187	15.58	0.63	0.157	0.097	(0.142)	0.060
188	15.67	0.63	0.157	0.096	(0.142)	0.061
189	15.75	0.63	0.157	0.096	(0.142)	0.061
190	15.83	0.63	0.157	0.095	(0.142)	0.062
191	15.92	0.63	0.157	0.095	(0.142)	0.062
192	16.00	0.63	0.157	0.094	(0.142)	0.063
193	16.08	0.13	0.033	(0.094)	0.030	0.003
194	16.17	0.13	0.033	(0.093)	0.030	0.003
195	16.25	0.13	0.033	(0.093)	0.030	0.003
196	16.33	0.13	0.033	(0.092)	0.030	0.003
197	16.42	0.13	0.033	(0.092)	0.030	0.003
198	16.50	0.13	0.033	(0.092)	0.030	0.003
199	16.58	0.10	0.025	(0.091)	0.022	0.002
200	16.67	0.10	0.025	(0.091)	0.022	0.002
201	16.75	0.10	0.025	(0.090)	0.022	0.002
202	16.83	0.10	0.025	(0.090)	0.022	0.002
203	16.92	0.10	0.025	(0.089)	0.022	0.002
204	17.00	0.10	0.025	(0.089)	0.022	0.002
205	17.08	0.17	0.041	(0.088)	0.037	0.004
206	17.17	0.17	0.041	(0.088)	0.037	0.004
207	17.25	0.17	0.041	(0.087)	0.037	0.004
208	17.33	0.17	0.041	(0.087)	0.037	0.004
209	17.42	0.17	0.041	(0.087)	0.037	0.004
210	17.50	0.17	0.041	(0.086)	0.037	0.004
211	17.58	0.17	0.041	(0.086)	0.037	0.004

212	17.67	0.17	0.041	(0.085)	0.037	0.004
213	17.75	0.17	0.041	(0.085)	0.037	0.004
214	17.83	0.13	0.033	(0.084)	0.030	0.003
215	17.92	0.13	0.033	(0.084)	0.030	0.003
216	18.00	0.13	0.033	(0.084)	0.030	0.003
217	18.08	0.13	0.033	(0.083)	0.030	0.003
218	18.17	0.13	0.033	(0.083)	0.030	0.003
219	18.25	0.13	0.033	(0.082)	0.030	0.003
220	18.33	0.13	0.033	(0.082)	0.030	0.003
221	18.42	0.13	0.033	(0.082)	0.030	0.003
222	18.50	0.13	0.033	(0.081)	0.030	0.003
223	18.58	0.10	0.025	(0.081)	0.022	0.002
224	18.67	0.10	0.025	(0.080)	0.022	0.002
225	18.75	0.10	0.025	(0.080)	0.022	0.002
226	18.83	0.07	0.017	(0.080)	0.015	0.002
227	18.92	0.07	0.017	(0.079)	0.015	0.002
228	19.00	0.07	0.017	(0.079)	0.015	0.002
229	19.08	0.10	0.025	(0.078)	0.022	0.002
230	19.17	0.10	0.025	(0.078)	0.022	0.002
231	19.25	0.10	0.025	(0.078)	0.022	0.002
232	19.33	0.13	0.033	(0.077)	0.030	0.003
233	19.42	0.13	0.033	(0.077)	0.030	0.003
234	19.50	0.13	0.033	(0.077)	0.030	0.003
235	19.58	0.10	0.025	(0.076)	0.022	0.002
236	19.67	0.10	0.025	(0.076)	0.022	0.002
237	19.75	0.10	0.025	(0.076)	0.022	0.002
238	19.83	0.07	0.017	(0.075)	0.015	0.002
239	19.92	0.07	0.017	(0.075)	0.015	0.002
240	20.00	0.07	0.017	(0.075)	0.015	0.002
241	20.08	0.10	0.025	(0.074)	0.022	0.002
242	20.17	0.10	0.025	(0.074)	0.022	0.002
243	20.25	0.10	0.025	(0.074)	0.022	0.002
244	20.33	0.10	0.025	(0.073)	0.022	0.002
245	20.42	0.10	0.025	(0.073)	0.022	0.002
246	20.50	0.10	0.025	(0.073)	0.022	0.002
247	20.58	0.10	0.025	(0.072)	0.022	0.002
248	20.67	0.10	0.025	(0.072)	0.022	0.002
249	20.75	0.10	0.025	(0.072)	0.022	0.002
250	20.83	0.07	0.017	(0.072)	0.015	0.002
251	20.92	0.07	0.017	(0.071)	0.015	0.002
252	21.00	0.07	0.017	(0.071)	0.015	0.002
253	21.08	0.10	0.025	(0.071)	0.022	0.002
254	21.17	0.10	0.025	(0.070)	0.022	0.002
255	21.25	0.10	0.025	(0.070)	0.022	0.002
256	21.33	0.07	0.017	(0.070)	0.015	0.002
257	21.42	0.07	0.017	(0.070)	0.015	0.002
258	21.50	0.07	0.017	(0.069)	0.015	0.002
259	21.58	0.10	0.025	(0.069)	0.022	0.002
260	21.67	0.10	0.025	(0.069)	0.022	0.002
261	21.75	0.10	0.025	(0.069)	0.022	0.002
262	21.83	0.07	0.017	(0.068)	0.015	0.002
263	21.92	0.07	0.017	(0.068)	0.015	0.002
264	22.00	0.07	0.017	(0.068)	0.015	0.002
265	22.08	0.10	0.025	(0.068)	0.022	0.002
266	22.17	0.10	0.025	(0.067)	0.022	0.002
267	22.25	0.10	0.025	(0.067)	0.022	0.002

268	22.33	0.07	0.017	(0.067)	0.015	0.002
269	22.42	0.07	0.017	(0.067)	0.015	0.002
270	22.50	0.07	0.017	(0.067)	0.015	0.002
271	22.58	0.07	0.017	(0.066)	0.015	0.002
272	22.67	0.07	0.017	(0.066)	0.015	0.002
273	22.75	0.07	0.017	(0.066)	0.015	0.002
274	22.83	0.07	0.017	(0.066)	0.015	0.002
275	22.92	0.07	0.017	(0.066)	0.015	0.002
276	23.00	0.07	0.017	(0.066)	0.015	0.002
277	23.08	0.07	0.017	(0.065)	0.015	0.002
278	23.17	0.07	0.017	(0.065)	0.015	0.002
279	23.25	0.07	0.017	(0.065)	0.015	0.002
280	23.33	0.07	0.017	(0.065)	0.015	0.002
281	23.42	0.07	0.017	(0.065)	0.015	0.002
282	23.50	0.07	0.017	(0.065)	0.015	0.002
283	23.58	0.07	0.017	(0.065)	0.015	0.002
284	23.67	0.07	0.017	(0.065)	0.015	0.002
285	23.75	0.07	0.017	(0.064)	0.015	0.002
286	23.83	0.07	0.017	(0.064)	0.015	0.002
287	23.92	0.07	0.017	(0.064)	0.015	0.002
288	24.00	0.07	0.017	(0.064)	0.015	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.0

Flood volume = Effective rainfall 0.58(In)
times area 60.9(Ac.)/[(In)/(Ft.)] = 2.9(Ac.Ft)
Total soil loss = 1.49(In)
Total soil loss = 7.554(Ac.Ft)
Total rainfall = 2.07(In)
Flood volume = 128438.5 Cubic Feet
Total soil loss = 329040.7 Cubic Feet

Peak flow rate of this hydrograph = 9.758(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

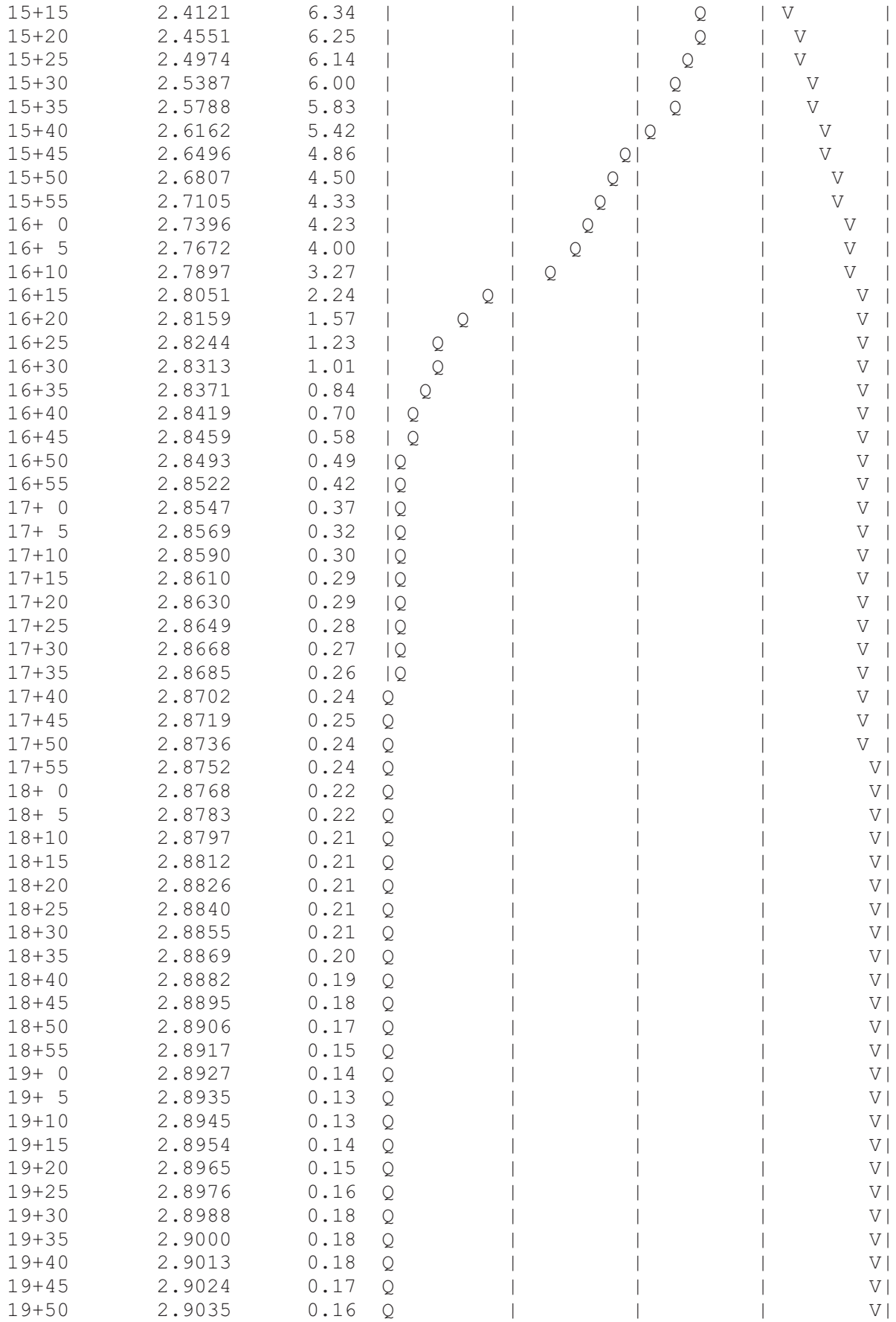
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0002	0.02	Q	|	|	|	|
0+15	0.0005	0.05	Q	|	|	|	|
0+20	0.0010	0.07	Q	|	|	|	|
0+25	0.0016	0.09	Q	|	|	|	|
0+30	0.0024	0.11	Q	|	|	|	|
0+35	0.0032	0.12	Q	|	|	|	|
0+40	0.0041	0.13	Q	|	|	|	|
0+45	0.0050	0.13	Q	|	|	|	|
0+50	0.0059	0.14	Q	|	|	|	|
0+55	0.0070	0.15	Q	|	|	|	|
1+ 0	0.0081	0.17	Q	|	|	|	|
1+ 5	0.0094	0.18	Q	|	|	|	|
1+10	0.0105	0.17	Q	|	|	|	|

1+15	0.0117	0.16	Q	|	|	|	|
1+20	0.0128	0.16	Q	|	|	|	|
1+25	0.0138	0.16	Q	|	|	|	|
1+30	0.0149	0.16	Q	|	|	|	|
1+35	0.0160	0.15	Q	|	|	|	|
1+40	0.0170	0.15	Q	|	|	|	|
1+45	0.0181	0.15	Q	|	|	|	|
1+50	0.0192	0.16	Q	|	|	|	|
1+55	0.0203	0.17	Q	|	|	|	|
2+ 0	0.0215	0.18	Q	|	|	|	|
2+ 5	0.0228	0.19	Q	|	|	|	|
2+10	0.0242	0.19	Q	|	|	|	|
2+15	0.0255	0.19	Q	|	|	|	|
2+20	0.0269	0.20	Q	|	|	|	|
2+25	0.0282	0.20	Q	|	|	|	|
2+30	0.0296	0.20	Q	|	|	|	|
2+35	0.0310	0.20	Q	|	|	|	|
2+40	0.0324	0.21	Q	|	|	|	|
2+45	0.0340	0.23	Q	|	|	|	|
2+50	0.0356	0.24	Q	|	|	|	|
2+55	0.0373	0.24	Q	|	|	|	|
3+ 0	0.0389	0.24	Q	|	|	|	|
3+ 5	0.0406	0.25	Q	|	|	|	|
3+10	0.0423	0.25	Q	|	|	|	|
3+15	0.0440	0.25	Q	|	|	|	|
3+20	0.0458	0.25	Q	|	|	|	|
3+25	0.0475	0.25	VQ	|	|	|	|
3+30	0.0492	0.25	VQ	|	|	|	|
3+35	0.0510	0.25	VQ	|	|	|	|
3+40	0.0527	0.25	VQ	|	|	|	|
3+45	0.0544	0.25	VQ	|	|	|	|
3+50	0.0562	0.26	VQ	|	|	|	|
3+55	0.0580	0.27	VQ	|	|	|	|
4+ 0	0.0599	0.28	VQ	|	|	|	|
4+ 5	0.0619	0.29	VQ	|	|	|	|
4+10	0.0639	0.29	VQ	|	|	|	|
4+15	0.0660	0.30	VQ	|	|	|	|
4+20	0.0680	0.30	VQ	|	|	|	|
4+25	0.0702	0.31	VQ	|	|	|	|
4+30	0.0724	0.33	VQ	|	|	|	|
4+35	0.0747	0.34	|Q	|	|	|	|
4+40	0.0771	0.34	|Q	|	|	|	|
4+45	0.0794	0.34	|Q	|	|	|	|
4+50	0.0818	0.35	|Q	|	|	|	|
4+55	0.0843	0.36	|Q	|	|	|	|
5+ 0	0.0869	0.37	|Q	|	|	|	|
5+ 5	0.0895	0.38	|Q	|	|	|	|
5+10	0.0920	0.37	|Q	|	|	|	|
5+15	0.0944	0.34	|Q	|	|	|	|
5+20	0.0967	0.33	|Q	|	|	|	|
5+25	0.0990	0.33	|Q	|	|	|	|
5+30	0.1013	0.34	|Q	|	|	|	|
5+35	0.1038	0.35	|Q	|	|	|	|
5+40	0.1063	0.36	|Q	|	|	|	|
5+45	0.1089	0.38	|Q	|	|	|	|
5+50	0.1115	0.39	|Q	|	|	|	|

5+55	0.1143	0.39	Q				
6+ 0	0.1170	0.40	Q				
6+ 5	0.1197	0.40	Q				
6+10	0.1226	0.41	Q				
6+15	0.1255	0.43	Q				
6+20	0.1285	0.44	Q				
6+25	0.1316	0.44	Q				
6+30	0.1346	0.44	Q				
6+35	0.1377	0.45	Q				
6+40	0.1409	0.46	Q				
6+45	0.1442	0.48	Q				
6+50	0.1475	0.49	QV				
6+55	0.1509	0.49	QV				
7+ 0	0.1543	0.50	QV				
7+ 5	0.1577	0.50	QV				
7+10	0.1612	0.50	Q				
7+15	0.1646	0.50	Q				
7+20	0.1681	0.51	Q				
7+25	0.1717	0.52	Q				
7+30	0.1753	0.53	Q				
7+35	0.1791	0.54	Q				
7+40	0.1829	0.56	Q				
7+45	0.1869	0.57	Q				
7+50	0.1909	0.59	Q				
7+55	0.1950	0.60	Q				
8+ 0	0.1993	0.62	Q				
8+ 5	0.2037	0.64	Q				
8+10	0.2083	0.66	Q				
8+15	0.2130	0.69	Q				
8+20	0.2180	0.72	Q				
8+25	0.2230	0.73	QV				
8+30	0.2280	0.73	QV				
8+35	0.2331	0.74	QV				
8+40	0.2383	0.76	Q				
8+45	0.2437	0.77	Q				
8+50	0.2491	0.79	Q				
8+55	0.2546	0.80	Q				
9+ 0	0.2603	0.82	Q				
9+ 5	0.2661	0.84	Q				
9+10	0.2720	0.86	Q				
9+15	0.2782	0.90	Q				
9+20	0.2847	0.94	Q				
9+25	0.2920	1.06	VQ				
9+30	0.3004	1.22	Q				
9+35	0.3097	1.36	VQ				
9+40	0.3203	1.53	V Q				
9+45	0.3322	1.73	V Q				
9+50	0.3453	1.90	V Q				
9+55	0.3597	2.09	V Q				
10+ 0	0.3756	2.30	V Q				
10+ 5	0.3919	2.37	V Q				
10+10	0.4062	2.08	V Q				
10+15	0.4170	1.58	VQ				
10+20	0.4258	1.27	Q				
10+25	0.4335	1.13	QV				
10+30	0.4408	1.05	QV				

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10+35       0.4480      1.05  |   Q V   |         |         |         |
10+40       0.4567      1.26  |    QV   |         |         |         |
10+45       0.4676      1.60  |     Q   |         |         |         |
10+50       0.4802      1.82  |     VQ  |         |         |         |
10+55       0.4936      1.94  |     VQ  |         |         |         |
11+ 0       0.5075      2.02  |     V Q |         |         |         |
11+ 5       0.5218      2.07  |      VQ |         |         |         |
11+10       0.5358      2.04  |      VQ |         |         |         |
11+15       0.5493      1.96  |      Q  |         |         |         |
11+20       0.5625      1.92  |      Q  |         |         |         |
11+25       0.5757      1.92  |      Q  |         |         |         |
11+30       0.5891      1.94  |      Q  |         |         |         |
11+35       0.6023      1.92  |      QV |         |         |         |
11+40       0.6144      1.76  |      QV |         |         |         |
11+45       0.6249      1.52  |     Q V |         |         |         |
11+50       0.6345      1.40  |    Q  V |         |         |         |
11+55       0.6445      1.44  |    Q  V |         |         |         |
12+ 0       0.6552      1.56  |     Q V |         |         |         |
12+ 5       0.6677      1.81  |      Q V|         |         |         |
12+10       0.6850      2.51  |        VQ         |         |         |
12+15       0.7092      3.51  |        V|   Q     |         |         |
12+20       0.7379      4.18  |         V     Q   |         |         |
12+25       0.7696      4.60  |         V       Q |         |         |
12+30       0.8038      4.96  |         V        Q|         |         |
12+35       0.8401      5.27  |         |V        |Q        |         |
12+40       0.8790      5.64  |         |V        | Q       |         |
12+45       0.9207      6.06  |         | V       |   Q     |         |
12+50       0.9647      6.39  |         |  V      |    Q    |         |
12+55       1.0106      6.67  |         |  V      |     Q   |         |
13+ 0       1.0585      6.95  |         |   V     |      Q  |         |
13+ 5       1.1086      7.28  |         |    V    |       Q|         |
13+10       1.1630      7.89  |         |    V    |        |Q        |
13+15       1.2229      8.70  |         |     V   |        |   Q     |
13+20       1.2866      9.24  |         |      V  |        |     Q   |
13+25       1.3523      9.54  |         |       V |        |       Q |
13+30       1.4195      9.76  |         |        V|        |        Q|
13+35       1.4862      9.68  |         |         V        |       Q |
13+40       1.5468      8.80  |         |         V        |    Q    |
13+45       1.5978      7.40  |         |         |V       Q|         |
13+50       1.6429      6.54  |         |         | V   Q  |         |
13+55       1.6853      6.16  |         |         | V Q    |         |
14+ 0       1.7262      5.94  |         |         |  Q     |         |
14+ 5       1.7666      5.87  |         |         |  Q     |         |
14+10       1.8089      6.14  |         |         |   Q    |         |
14+15       1.8545      6.61  |         |         |    VQ  |         |
14+20       1.9019      6.88  |         |         |    V Q |         |
14+25       1.9495      6.92  |         |         |     VQ |         |
14+30       1.9968      6.87  |         |         |      Q |         |
14+35       2.0440      6.84  |         |         |      Q |         |
14+40       2.0912      6.86  |         |         |      QV|         |
14+45       2.1385      6.87  |         |         |      Q V|        |
14+50       2.1858      6.86  |         |         |      Q V|        |
14+55       2.2325      6.79  |         |         |      Q  V        |
15+ 0       2.2785      6.67  |         |         |     Q   V        |
15+ 5       2.3239      6.59  |         |         |     Q   |V       |
15+10       2.3684      6.47  |         |         |    Q    | V      |
```



15+15	2.4121	6.34	Q V
15+20	2.4551	6.25	Q V
15+25	2.4974	6.14	Q V
15+30	2.5387	6.00	Q V
15+35	2.5788	5.83	Q V
15+40	2.6162	5.42	Q V
15+45	2.6496	4.86	Q V
15+50	2.6807	4.50	Q V
15+55	2.7105	4.33	Q V
16+ 0	2.7396	4.23	Q V
16+ 5	2.7672	4.00	Q V
16+10	2.7897	3.27	Q V
16+15	2.8051	2.24	Q V
16+20	2.8159	1.57	Q V
16+25	2.8244	1.23	Q V
16+30	2.8313	1.01	Q V
16+35	2.8371	0.84	Q V
16+40	2.8419	0.70	Q V
16+45	2.8459	0.58	Q V
16+50	2.8493	0.49	Q V
16+55	2.8522	0.42	Q V
17+ 0	2.8547	0.37	Q V
17+ 5	2.8569	0.32	Q V
17+10	2.8590	0.30	Q V
17+15	2.8610	0.29	Q V
17+20	2.8630	0.29	Q V
17+25	2.8649	0.28	Q V
17+30	2.8668	0.27	Q V
17+35	2.8685	0.26	Q V
17+40	2.8702	0.24	Q V
17+45	2.8719	0.25	Q V
17+50	2.8736	0.24	Q V
17+55	2.8752	0.24	Q V
18+ 0	2.8768	0.22	Q V
18+ 5	2.8783	0.22	Q V
18+10	2.8797	0.21	Q V
18+15	2.8812	0.21	Q V
18+20	2.8826	0.21	Q V
18+25	2.8840	0.21	Q V
18+30	2.8855	0.21	Q V
18+35	2.8869	0.20	Q V
18+40	2.8882	0.19	Q V
18+45	2.8895	0.18	Q V
18+50	2.8906	0.17	Q V
18+55	2.8917	0.15	Q V
19+ 0	2.8927	0.14	Q V
19+ 5	2.8935	0.13	Q V
19+10	2.8945	0.13	Q V
19+15	2.8954	0.14	Q V
19+20	2.8965	0.15	Q V
19+25	2.8976	0.16	Q V
19+30	2.8988	0.18	Q V
19+35	2.9000	0.18	Q V
19+40	2.9013	0.18	Q V
19+45	2.9024	0.17	Q V
19+50	2.9035	0.16	Q V

19+55	2.9045	0.15	Q	|	|	|	V|
20+ 0	2.9054	0.13	Q	|	|	|	V|
20+ 5	2.9063	0.12	Q	|	|	|	V|
20+10	2.9072	0.13	Q	|	|	|	V|
20+15	2.9081	0.14	Q	|	|	|	V|
20+20	2.9091	0.14	Q	|	|	|	V|
20+25	2.9101	0.15	Q	|	|	|	V|
20+30	2.9111	0.15	Q	|	|	|	V|
20+35	2.9122	0.15	Q	|	|	|	V|
20+40	2.9132	0.15	Q	|	|	|	V|
20+45	2.9142	0.15	Q	|	|	|	V|
20+50	2.9153	0.15	Q	|	|	|	V|
20+55	2.9162	0.14	Q	|	|	|	V|
21+ 0	2.9171	0.13	Q	|	|	|	V|
21+ 5	2.9179	0.12	Q	|	|	|	V|
21+10	2.9188	0.12	Q	|	|	|	V|
21+15	2.9197	0.14	Q	|	|	|	V|
21+20	2.9207	0.14	Q	|	|	|	V|
21+25	2.9216	0.13	Q	|	|	|	V|
21+30	2.9225	0.12	Q	|	|	|	V|
21+35	2.9233	0.12	Q	|	|	|	V|
21+40	2.9241	0.12	Q	|	|	|	V|
21+45	2.9250	0.13	Q	|	|	|	V|
21+50	2.9260	0.14	Q	|	|	|	V|
21+55	2.9269	0.13	Q	|	|	|	V|
22+ 0	2.9277	0.12	Q	|	|	|	V|
22+ 5	2.9285	0.12	Q	|	|	|	V|
22+10	2.9294	0.12	Q	|	|	|	V|
22+15	2.9303	0.13	Q	|	|	|	V|
22+20	2.9313	0.14	Q	|	|	|	V|
22+25	2.9322	0.13	Q	|	|	|	V|
22+30	2.9330	0.12	Q	|	|	|	V|
22+35	2.9338	0.11	Q	|	|	|	V|
22+40	2.9345	0.11	Q	|	|	|	V|
22+45	2.9353	0.11	Q	|	|	|	V|
22+50	2.9360	0.11	Q	|	|	|	V|
22+55	2.9367	0.11	Q	|	|	|	V|
23+ 0	2.9375	0.10	Q	|	|	|	V|
23+ 5	2.9382	0.10	Q	|	|	|	V|
23+10	2.9389	0.10	Q	|	|	|	V|
23+15	2.9396	0.10	Q	|	|	|	V|
23+20	2.9403	0.10	Q	|	|	|	V|
23+25	2.9410	0.10	Q	|	|	|	V|
23+30	2.9417	0.10	Q	|	|	|	V|
23+35	2.9424	0.10	Q	|	|	|	V|
23+40	2.9431	0.10	Q	|	|	|	V|
23+45	2.9438	0.10	Q	|	|	|	V|
23+50	2.9445	0.10	Q	|	|	|	V|
23+55	2.9452	0.10	Q	|	|	|	V|
24+ 0	2.9459	0.10	Q	|	|	|	V|
24+ 5	2.9466	0.10	Q	|	|	|	V|
24+10	2.9472	0.08	Q	|	|	|	V|
24+15	2.9475	0.05	Q	|	|	|	V|
24+20	2.9477	0.03	Q	|	|	|	V|
24+25	2.9479	0.03	Q	|	|	|	V|
24+30	2.9480	0.02	Q	|	|	|	V|

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   24+35       2.9482      0.02  Q          |          |          |         V|
   24+40       2.9482      0.01  Q          |          |          |         V|
   24+45       2.9483      0.01  Q          |          |          |         V|
   24+50       2.9484      0.01  Q          |          |          |         V|
   24+55       2.9484      0.01  Q          |          |          |         V|
   25+ 0       2.9484      0.01  Q          |          |          |         V|
   25+ 5       2.9485      0.00  Q          |          |          |         V|
   25+10       2.9485      0.00  Q          |          |          |         V|
   25+15       2.9485      0.00  Q          |          |          |         V|
   25+20       2.9485      0.00  Q          |          |          |         V|
   25+25       2.9485      0.00  Q          |          |          |         V|
   25+30       2.9485      0.00  Q          |          |          |         V|
   25+35       2.9485      0.00  Q          |          |          |          V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 03/28/24 File: hemetUHpra12242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6385

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Hemet 63 Acre Development
Proposed Condition 2-Year Unit Hydrographs (Area 1)
2-Year Design Storm

Drainage Area = 14.20(Ac.) = 0.022 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.20(Ac.) = 0.022 Sq. Mi.
Length along longest watercourse = 1330.00(Ft.)
Length along longest watercourse measured to centroid = 665.00(Ft.)
Length along longest watercourse = 0.252 Mi.
Length along longest watercourse measured to centroid = 0.126 Mi.
Difference in elevation = 15.00(Ft.)
Slope along watercourse = 59.5489 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.045 Hr.
Lag time = 2.68 Min.
25% of lag time = 0.67 Min.
40% of lag time = 1.07 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.20	2.07	29.39

100 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      14.20              5.42                 76.96

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.070(In)
Area Averaged 100-Year Rainfall =    5.420(In)

Point rain (area averaged) =    2.070(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.070(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    11.620           98.00         0.950
     0.810           56.00         0.000
     1.770           75.00         0.000
 Total Area Entered =     14.20(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
98.0  98.0      0.026     0.950        0.004       0.818      0.003
56.0  56.0      0.511     0.000        0.511       0.057      0.029
75.0  75.0      0.303     0.000        0.303       0.125      0.038
                                                  Sum (F) =   0.070
Area averaged mean soil loss (F) (In/Hr) =  0.070
Minimum soil loss rate ((In/Hr)) =  0.035
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.276
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                 VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083        186.727         41.012              5.869
    2   0.167        373.455         44.304              6.340
    3   0.250        560.182          9.356              1.339
    4   0.333        746.910          3.760              0.538
    5   0.417        933.637          1.568              0.224
                              Sum = 100.000   Sum=      14.311
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated
loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain
value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
```

1	0.08	0.07	0.017	(0.124)	0.005	0.012
2	0.17	0.07	0.017	(0.124)	0.005	0.012
3	0.25	0.07	0.017	(0.123)	0.005	0.012
4	0.33	0.10	0.025	(0.123)	0.007	0.018
5	0.42	0.10	0.025	(0.122)	0.007	0.018
6	0.50	0.10	0.025	(0.122)	0.007	0.018
7	0.58	0.10	0.025	(0.121)	0.007	0.018
8	0.67	0.10	0.025	(0.121)	0.007	0.018
9	0.75	0.10	0.025	(0.120)	0.007	0.018
10	0.83	0.13	0.033	(0.120)	0.009	0.024
11	0.92	0.13	0.033	(0.119)	0.009	0.024
12	1.00	0.13	0.033	(0.119)	0.009	0.024
13	1.08	0.10	0.025	(0.118)	0.007	0.018
14	1.17	0.10	0.025	(0.118)	0.007	0.018
15	1.25	0.10	0.025	(0.117)	0.007	0.018
16	1.33	0.10	0.025	(0.117)	0.007	0.018
17	1.42	0.10	0.025	(0.117)	0.007	0.018
18	1.50	0.10	0.025	(0.116)	0.007	0.018
19	1.58	0.10	0.025	(0.116)	0.007	0.018
20	1.67	0.10	0.025	(0.115)	0.007	0.018
21	1.75	0.10	0.025	(0.115)	0.007	0.018
22	1.83	0.13	0.033	(0.114)	0.009	0.024
23	1.92	0.13	0.033	(0.114)	0.009	0.024
24	2.00	0.13	0.033	(0.113)	0.009	0.024
25	2.08	0.13	0.033	(0.113)	0.009	0.024
26	2.17	0.13	0.033	(0.112)	0.009	0.024
27	2.25	0.13	0.033	(0.112)	0.009	0.024
28	2.33	0.13	0.033	(0.111)	0.009	0.024
29	2.42	0.13	0.033	(0.111)	0.009	0.024
30	2.50	0.13	0.033	(0.111)	0.009	0.024
31	2.58	0.17	0.041	(0.110)	0.011	0.030
32	2.67	0.17	0.041	(0.110)	0.011	0.030
33	2.75	0.17	0.041	(0.109)	0.011	0.030
34	2.83	0.17	0.041	(0.109)	0.011	0.030
35	2.92	0.17	0.041	(0.108)	0.011	0.030
36	3.00	0.17	0.041	(0.108)	0.011	0.030
37	3.08	0.17	0.041	(0.107)	0.011	0.030
38	3.17	0.17	0.041	(0.107)	0.011	0.030
39	3.25	0.17	0.041	(0.107)	0.011	0.030
40	3.33	0.17	0.041	(0.106)	0.011	0.030
41	3.42	0.17	0.041	(0.106)	0.011	0.030
42	3.50	0.17	0.041	(0.105)	0.011	0.030
43	3.58	0.17	0.041	(0.105)	0.011	0.030
44	3.67	0.17	0.041	(0.104)	0.011	0.030
45	3.75	0.17	0.041	(0.104)	0.011	0.030
46	3.83	0.20	0.050	(0.103)	0.014	0.036
47	3.92	0.20	0.050	(0.103)	0.014	0.036
48	4.00	0.20	0.050	(0.103)	0.014	0.036
49	4.08	0.20	0.050	(0.102)	0.014	0.036
50	4.17	0.20	0.050	(0.102)	0.014	0.036
51	4.25	0.20	0.050	(0.101)	0.014	0.036
52	4.33	0.23	0.058	(0.101)	0.016	0.042
53	4.42	0.23	0.058	(0.100)	0.016	0.042
54	4.50	0.23	0.058	(0.100)	0.016	0.042
55	4.58	0.23	0.058	(0.100)	0.016	0.042
56	4.67	0.23	0.058	(0.099)	0.016	0.042

57	4.75	0.23	0.058	(0.099)	0.016	0.042
58	4.83	0.27	0.066	(0.098)	0.018	0.048
59	4.92	0.27	0.066	(0.098)	0.018	0.048
60	5.00	0.27	0.066	(0.097)	0.018	0.048
61	5.08	0.20	0.050	(0.097)	0.014	0.036
62	5.17	0.20	0.050	(0.097)	0.014	0.036
63	5.25	0.20	0.050	(0.096)	0.014	0.036
64	5.33	0.23	0.058	(0.096)	0.016	0.042
65	5.42	0.23	0.058	(0.095)	0.016	0.042
66	5.50	0.23	0.058	(0.095)	0.016	0.042
67	5.58	0.27	0.066	(0.094)	0.018	0.048
68	5.67	0.27	0.066	(0.094)	0.018	0.048
69	5.75	0.27	0.066	(0.094)	0.018	0.048
70	5.83	0.27	0.066	(0.093)	0.018	0.048
71	5.92	0.27	0.066	(0.093)	0.018	0.048
72	6.00	0.27	0.066	(0.092)	0.018	0.048
73	6.08	0.30	0.075	(0.092)	0.021	0.054
74	6.17	0.30	0.075	(0.092)	0.021	0.054
75	6.25	0.30	0.075	(0.091)	0.021	0.054
76	6.33	0.30	0.075	(0.091)	0.021	0.054
77	6.42	0.30	0.075	(0.090)	0.021	0.054
78	6.50	0.30	0.075	(0.090)	0.021	0.054
79	6.58	0.33	0.083	(0.090)	0.023	0.060
80	6.67	0.33	0.083	(0.089)	0.023	0.060
81	6.75	0.33	0.083	(0.089)	0.023	0.060
82	6.83	0.33	0.083	(0.088)	0.023	0.060
83	6.92	0.33	0.083	(0.088)	0.023	0.060
84	7.00	0.33	0.083	(0.088)	0.023	0.060
85	7.08	0.33	0.083	(0.087)	0.023	0.060
86	7.17	0.33	0.083	(0.087)	0.023	0.060
87	7.25	0.33	0.083	(0.086)	0.023	0.060
88	7.33	0.37	0.091	(0.086)	0.025	0.066
89	7.42	0.37	0.091	(0.086)	0.025	0.066
90	7.50	0.37	0.091	(0.085)	0.025	0.066
91	7.58	0.40	0.099	(0.085)	0.027	0.072
92	7.67	0.40	0.099	(0.084)	0.027	0.072
93	7.75	0.40	0.099	(0.084)	0.027	0.072
94	7.83	0.43	0.108	(0.084)	0.030	0.078
95	7.92	0.43	0.108	(0.083)	0.030	0.078
96	8.00	0.43	0.108	(0.083)	0.030	0.078
97	8.08	0.50	0.124	(0.082)	0.034	0.090
98	8.17	0.50	0.124	(0.082)	0.034	0.090
99	8.25	0.50	0.124	(0.082)	0.034	0.090
100	8.33	0.50	0.124	(0.081)	0.034	0.090
101	8.42	0.50	0.124	(0.081)	0.034	0.090
102	8.50	0.50	0.124	(0.081)	0.034	0.090
103	8.58	0.53	0.132	(0.080)	0.037	0.096
104	8.67	0.53	0.132	(0.080)	0.037	0.096
105	8.75	0.53	0.132	(0.079)	0.037	0.096
106	8.83	0.57	0.141	(0.079)	0.039	0.102
107	8.92	0.57	0.141	(0.079)	0.039	0.102
108	9.00	0.57	0.141	(0.078)	0.039	0.102
109	9.08	0.63	0.157	(0.078)	0.043	0.114
110	9.17	0.63	0.157	(0.078)	0.043	0.114
111	9.25	0.63	0.157	(0.077)	0.043	0.114
112	9.33	0.67	0.166	(0.077)	0.046	0.120

113	9.42	0.67	0.166	(0.076)	0.046	0.120
114	9.50	0.67	0.166	(0.076)	0.046	0.120
115	9.58	0.70	0.174	(0.076)	0.048	0.126
116	9.67	0.70	0.174	(0.075)	0.048	0.126
117	9.75	0.70	0.174	(0.075)	0.048	0.126
118	9.83	0.73	0.182	(0.075)	0.050	0.132
119	9.92	0.73	0.182	(0.074)	0.050	0.132
120	10.00	0.73	0.182	(0.074)	0.050	0.132
121	10.08	0.50	0.124	(0.074)	0.034	0.090
122	10.17	0.50	0.124	(0.073)	0.034	0.090
123	10.25	0.50	0.124	(0.073)	0.034	0.090
124	10.33	0.50	0.124	(0.072)	0.034	0.090
125	10.42	0.50	0.124	(0.072)	0.034	0.090
126	10.50	0.50	0.124	(0.072)	0.034	0.090
127	10.58	0.67	0.166	(0.071)	0.046	0.120
128	10.67	0.67	0.166	(0.071)	0.046	0.120
129	10.75	0.67	0.166	(0.071)	0.046	0.120
130	10.83	0.67	0.166	(0.070)	0.046	0.120
131	10.92	0.67	0.166	(0.070)	0.046	0.120
132	11.00	0.67	0.166	(0.070)	0.046	0.120
133	11.08	0.63	0.157	(0.069)	0.043	0.114
134	11.17	0.63	0.157	(0.069)	0.043	0.114
135	11.25	0.63	0.157	(0.069)	0.043	0.114
136	11.33	0.63	0.157	(0.068)	0.043	0.114
137	11.42	0.63	0.157	(0.068)	0.043	0.114
138	11.50	0.63	0.157	(0.068)	0.043	0.114
139	11.58	0.57	0.141	(0.067)	0.039	0.102
140	11.67	0.57	0.141	(0.067)	0.039	0.102
141	11.75	0.57	0.141	(0.067)	0.039	0.102
142	11.83	0.60	0.149	(0.066)	0.041	0.108
143	11.92	0.60	0.149	(0.066)	0.041	0.108
144	12.00	0.60	0.149	(0.066)	0.041	0.108
145	12.08	0.83	0.207	(0.065)	0.057	0.150
146	12.17	0.83	0.207	(0.065)	0.057	0.150
147	12.25	0.83	0.207	(0.065)	0.057	0.150
148	12.33	0.87	0.215	(0.064)	0.059	0.156
149	12.42	0.87	0.215	(0.064)	0.059	0.156
150	12.50	0.87	0.215	(0.064)	0.059	0.156
151	12.58	0.93	0.232	0.063	(0.064)	0.168
152	12.67	0.93	0.232	0.063	(0.064)	0.169
153	12.75	0.93	0.232	0.063	(0.064)	0.169
154	12.83	0.97	0.240	0.062	(0.066)	0.178
155	12.92	0.97	0.240	0.062	(0.066)	0.178
156	13.00	0.97	0.240	0.062	(0.066)	0.178
157	13.08	1.13	0.282	0.061	(0.078)	0.220
158	13.17	1.13	0.282	0.061	(0.078)	0.220
159	13.25	1.13	0.282	0.061	(0.078)	0.221
160	13.33	1.13	0.282	0.061	(0.078)	0.221
161	13.42	1.13	0.282	0.060	(0.078)	0.221
162	13.50	1.13	0.282	0.060	(0.078)	0.222
163	13.58	0.77	0.190	(0.060)	0.053	0.138
164	13.67	0.77	0.190	(0.059)	0.053	0.138
165	13.75	0.77	0.190	(0.059)	0.053	0.138
166	13.83	0.77	0.190	(0.059)	0.053	0.138
167	13.92	0.77	0.190	(0.058)	0.053	0.138
168	14.00	0.77	0.190	(0.058)	0.053	0.138

169	14.08	0.90	0.224	0.058	(0.062)	0.166
170	14.17	0.90	0.224	0.058	(0.062)	0.166
171	14.25	0.90	0.224	0.057	(0.062)	0.166
172	14.33	0.87	0.215	0.057	(0.059)	0.158
173	14.42	0.87	0.215	0.057	(0.059)	0.159
174	14.50	0.87	0.215	0.056	(0.059)	0.159
175	14.58	0.87	0.215	0.056	(0.059)	0.159
176	14.67	0.87	0.215	0.056	(0.059)	0.159
177	14.75	0.87	0.215	0.056	(0.059)	0.160
178	14.83	0.83	0.207	0.055	(0.057)	0.152
179	14.92	0.83	0.207	0.055	(0.057)	0.152
180	15.00	0.83	0.207	0.055	(0.057)	0.152
181	15.08	0.80	0.199	0.054	(0.055)	0.144
182	15.17	0.80	0.199	0.054	(0.055)	0.145
183	15.25	0.80	0.199	0.054	(0.055)	0.145
184	15.33	0.77	0.190	(0.054)	0.053	0.138
185	15.42	0.77	0.190	(0.053)	0.053	0.138
186	15.50	0.77	0.190	(0.053)	0.053	0.138
187	15.58	0.63	0.157	(0.053)	0.043	0.114
188	15.67	0.63	0.157	(0.052)	0.043	0.114
189	15.75	0.63	0.157	(0.052)	0.043	0.114
190	15.83	0.63	0.157	(0.052)	0.043	0.114
191	15.92	0.63	0.157	(0.052)	0.043	0.114
192	16.00	0.63	0.157	(0.051)	0.043	0.114
193	16.08	0.13	0.033	(0.051)	0.009	0.024
194	16.17	0.13	0.033	(0.051)	0.009	0.024
195	16.25	0.13	0.033	(0.051)	0.009	0.024
196	16.33	0.13	0.033	(0.050)	0.009	0.024
197	16.42	0.13	0.033	(0.050)	0.009	0.024
198	16.50	0.13	0.033	(0.050)	0.009	0.024
199	16.58	0.10	0.025	(0.050)	0.007	0.018
200	16.67	0.10	0.025	(0.049)	0.007	0.018
201	16.75	0.10	0.025	(0.049)	0.007	0.018
202	16.83	0.10	0.025	(0.049)	0.007	0.018
203	16.92	0.10	0.025	(0.049)	0.007	0.018
204	17.00	0.10	0.025	(0.048)	0.007	0.018
205	17.08	0.17	0.041	(0.048)	0.011	0.030
206	17.17	0.17	0.041	(0.048)	0.011	0.030
207	17.25	0.17	0.041	(0.048)	0.011	0.030
208	17.33	0.17	0.041	(0.047)	0.011	0.030
209	17.42	0.17	0.041	(0.047)	0.011	0.030
210	17.50	0.17	0.041	(0.047)	0.011	0.030
211	17.58	0.17	0.041	(0.047)	0.011	0.030
212	17.67	0.17	0.041	(0.046)	0.011	0.030
213	17.75	0.17	0.041	(0.046)	0.011	0.030
214	17.83	0.13	0.033	(0.046)	0.009	0.024
215	17.92	0.13	0.033	(0.046)	0.009	0.024
216	18.00	0.13	0.033	(0.046)	0.009	0.024
217	18.08	0.13	0.033	(0.045)	0.009	0.024
218	18.17	0.13	0.033	(0.045)	0.009	0.024
219	18.25	0.13	0.033	(0.045)	0.009	0.024
220	18.33	0.13	0.033	(0.045)	0.009	0.024
221	18.42	0.13	0.033	(0.044)	0.009	0.024
222	18.50	0.13	0.033	(0.044)	0.009	0.024
223	18.58	0.10	0.025	(0.044)	0.007	0.018
224	18.67	0.10	0.025	(0.044)	0.007	0.018

225	18.75	0.10	0.025	(0.044)	0.007	0.018
226	18.83	0.07	0.017	(0.043)	0.005	0.012
227	18.92	0.07	0.017	(0.043)	0.005	0.012
228	19.00	0.07	0.017	(0.043)	0.005	0.012
229	19.08	0.10	0.025	(0.043)	0.007	0.018
230	19.17	0.10	0.025	(0.043)	0.007	0.018
231	19.25	0.10	0.025	(0.042)	0.007	0.018
232	19.33	0.13	0.033	(0.042)	0.009	0.024
233	19.42	0.13	0.033	(0.042)	0.009	0.024
234	19.50	0.13	0.033	(0.042)	0.009	0.024
235	19.58	0.10	0.025	(0.042)	0.007	0.018
236	19.67	0.10	0.025	(0.041)	0.007	0.018
237	19.75	0.10	0.025	(0.041)	0.007	0.018
238	19.83	0.07	0.017	(0.041)	0.005	0.012
239	19.92	0.07	0.017	(0.041)	0.005	0.012
240	20.00	0.07	0.017	(0.041)	0.005	0.012
241	20.08	0.10	0.025	(0.040)	0.007	0.018
242	20.17	0.10	0.025	(0.040)	0.007	0.018
243	20.25	0.10	0.025	(0.040)	0.007	0.018
244	20.33	0.10	0.025	(0.040)	0.007	0.018
245	20.42	0.10	0.025	(0.040)	0.007	0.018
246	20.50	0.10	0.025	(0.040)	0.007	0.018
247	20.58	0.10	0.025	(0.039)	0.007	0.018
248	20.67	0.10	0.025	(0.039)	0.007	0.018
249	20.75	0.10	0.025	(0.039)	0.007	0.018
250	20.83	0.07	0.017	(0.039)	0.005	0.012
251	20.92	0.07	0.017	(0.039)	0.005	0.012
252	21.00	0.07	0.017	(0.039)	0.005	0.012
253	21.08	0.10	0.025	(0.038)	0.007	0.018
254	21.17	0.10	0.025	(0.038)	0.007	0.018
255	21.25	0.10	0.025	(0.038)	0.007	0.018
256	21.33	0.07	0.017	(0.038)	0.005	0.012
257	21.42	0.07	0.017	(0.038)	0.005	0.012
258	21.50	0.07	0.017	(0.038)	0.005	0.012
259	21.58	0.10	0.025	(0.038)	0.007	0.018
260	21.67	0.10	0.025	(0.037)	0.007	0.018
261	21.75	0.10	0.025	(0.037)	0.007	0.018
262	21.83	0.07	0.017	(0.037)	0.005	0.012
263	21.92	0.07	0.017	(0.037)	0.005	0.012
264	22.00	0.07	0.017	(0.037)	0.005	0.012
265	22.08	0.10	0.025	(0.037)	0.007	0.018
266	22.17	0.10	0.025	(0.037)	0.007	0.018
267	22.25	0.10	0.025	(0.037)	0.007	0.018
268	22.33	0.07	0.017	(0.036)	0.005	0.012
269	22.42	0.07	0.017	(0.036)	0.005	0.012
270	22.50	0.07	0.017	(0.036)	0.005	0.012
271	22.58	0.07	0.017	(0.036)	0.005	0.012
272	22.67	0.07	0.017	(0.036)	0.005	0.012
273	22.75	0.07	0.017	(0.036)	0.005	0.012
274	22.83	0.07	0.017	(0.036)	0.005	0.012
275	22.92	0.07	0.017	(0.036)	0.005	0.012
276	23.00	0.07	0.017	(0.036)	0.005	0.012
277	23.08	0.07	0.017	(0.036)	0.005	0.012
278	23.17	0.07	0.017	(0.036)	0.005	0.012
279	23.25	0.07	0.017	(0.035)	0.005	0.012
280	23.33	0.07	0.017	(0.035)	0.005	0.012

281	23.42	0.07	0.017	(0.035)	0.005	0.012
282	23.50	0.07	0.017	(0.035)	0.005	0.012
283	23.58	0.07	0.017	(0.035)	0.005	0.012
284	23.67	0.07	0.017	(0.035)	0.005	0.012
285	23.75	0.07	0.017	(0.035)	0.005	0.012
286	23.83	0.07	0.017	(0.035)	0.005	0.012
287	23.92	0.07	0.017	(0.035)	0.005	0.012
288	24.00	0.07	0.017	(0.035)	0.005	0.012

(Loss Rate Not Used)

Sum = 100.0 Sum = 18.1

Flood volume = Effective rainfall 1.51(In)
times area 14.2(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 0.56(In)
Total soil loss = 0.661(Ac.Ft)
Total rainfall = 2.07(In)
Flood volume = 77924.9 Cubic Feet
Total soil loss = 28772.4 Cubic Feet

Peak flow rate of this hydrograph = 3.169(CFS)

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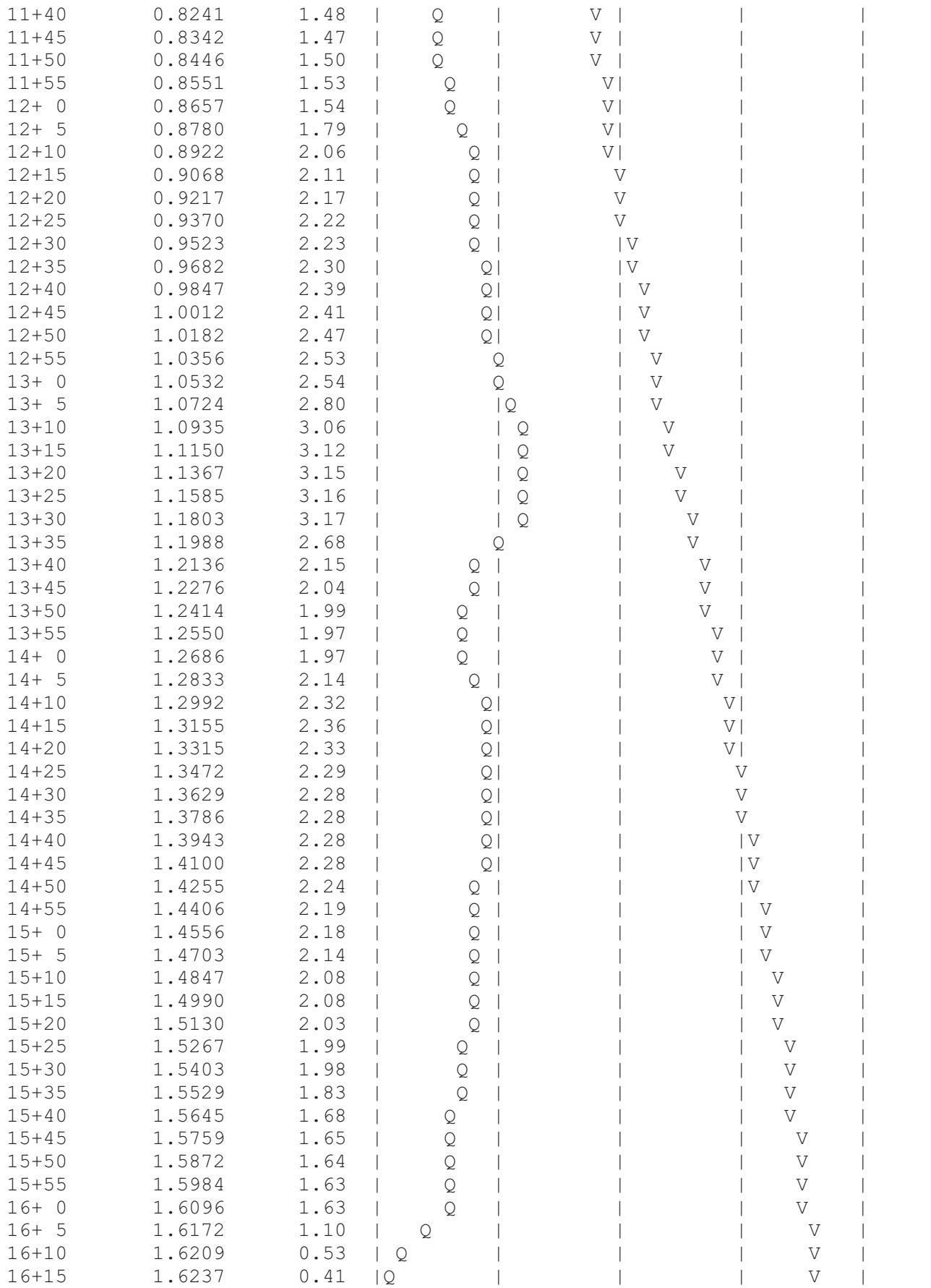
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0005	0.07	Q				
0+10	0.0015	0.15	Q				
0+15	0.0026	0.16	Q				
0+20	0.0040	0.20	Q				
0+25	0.0057	0.24	Q				
0+30	0.0074	0.25	VQ				
0+35	0.0092	0.26	VQ				
0+40	0.0110	0.26	VQ				
0+45	0.0128	0.26	VQ				
0+50	0.0148	0.29	VQ				
0+55	0.0171	0.33	VQ				
1+ 0	0.0194	0.34	VQ				
1+ 5	0.0215	0.31	VQ				
1+10	0.0234	0.27	VQ				
1+15	0.0252	0.26	VQ				
1+20	0.0269	0.26	VQ				
1+25	0.0287	0.26	VQ				
1+30	0.0305	0.26	VQ				
1+35	0.0323	0.26	VQ				
1+40	0.0340	0.26	VQ				
1+45	0.0358	0.26	VQ				
1+50	0.0378	0.29	VQ				
1+55	0.0401	0.33	VQ				
2+ 0	0.0424	0.34	VQ				
2+ 5	0.0448	0.34	|Q				
2+10	0.0472	0.34	|Q				
2+15	0.0495	0.34	|Q				

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2+20       0.0519      0.34  |Q        |         |         |         |
2+25       0.0543      0.34  |Q        |         |         |         |
2+30       0.0566      0.34  |Q        |         |         |         |
2+35       0.0592      0.38  |Q        |         |         |         |
2+40       0.0621      0.42  |Q        |         |         |         |
2+45       0.0650      0.42  |Q        |         |         |         |
2+50       0.0680      0.43  |Q        |         |         |         |
2+55       0.0709      0.43  |Q        |         |         |         |
3+ 0       0.0739      0.43  |Q        |         |         |         |
3+ 5       0.0768      0.43  |Q        |         |         |         |
3+10       0.0798      0.43  |Q        |         |         |         |
3+15       0.0827      0.43  |Q        |         |         |         |
3+20       0.0857      0.43  |Q        |         |         |         |
3+25       0.0887      0.43  |Q        |         |         |         |
3+30       0.0916      0.43  |QV       |         |         |         |
3+35       0.0946      0.43  |QV       |         |         |         |
3+40       0.0975      0.43  |QV       |         |         |         |
3+45       0.1005      0.43  |QV       |         |         |         |
3+50       0.1037      0.46  |QV       |         |         |         |
3+55       0.1071      0.50  | Q       |         |         |         |
4+ 0       0.1106      0.51  | Q       |         |         |         |
4+ 5       0.1142      0.51  | Q       |         |         |         |
4+10       0.1177      0.51  | Q       |         |         |         |
4+15       0.1213      0.51  | Q       |         |         |         |
4+20       0.1251      0.55  | Q       |         |         |         |
4+25       0.1291      0.59  | Q       |         |         |         |
4+30       0.1332      0.60  | Q       |         |         |         |
4+35       0.1374      0.60  | QV      |         |         |         |
4+40       0.1415      0.60  | QV      |         |         |         |
4+45       0.1456      0.60  | QV      |         |         |         |
4+50       0.1500      0.64  | QV      |         |         |         |
4+55       0.1547      0.67  | QV      |         |         |         |
5+ 0       0.1594      0.68  | QV      |         |         |         |
5+ 5       0.1636      0.61  | QV      |         |         |         |
5+10       0.1673      0.54  | QV      |         |         |         |
5+15       0.1709      0.52  | QV      |         |         |         |
5+20       0.1747      0.55  | QV      |         |         |         |
5+25       0.1788      0.59  | QV      |         |         |         |
5+30       0.1829      0.60  | Q V     |         |         |         |
5+35       0.1873      0.63  | Q V     |         |         |         |
5+40       0.1919      0.67  | Q V     |         |         |         |
5+45       0.1966      0.68  | Q V     |         |         |         |
5+50       0.2013      0.69  | Q V     |         |         |         |
5+55       0.2060      0.69  | Q V     |         |         |         |
6+ 0       0.2108      0.69  | Q V     |         |         |         |
6+ 5       0.2157      0.72  | Q V     |         |         |         |
6+10       0.2210      0.76  |  QV     |         |         |         |
6+15       0.2263      0.77  |  Q V    |         |         |         |
6+20       0.2316      0.77  |  Q V    |         |         |         |
6+25       0.2369      0.77  |  Q V    |         |         |         |
6+30       0.2422      0.77  |  Q V    |         |         |         |
6+35       0.2478      0.81  |  Q V    |         |         |         |
6+40       0.2536      0.85  |  Q V    |         |         |         |
6+45       0.2595      0.85  |  Q V    |         |         |         |
6+50       0.2654      0.86  |  Q V    |         |         |         |
6+55       0.2713      0.86  |  Q  V   |         |         |         |
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 7+ 0       0.2772      0.86  |  Q  V   |         |         |         |
 7+ 5       0.2831      0.86  |  Q  V   |         |         |         |
 7+10       0.2890      0.86  |  Q  V   |         |         |         |
 7+15       0.2949      0.86  |  Q  V   |         |         |         |
 7+20       0.3011      0.89  |  Q  V   |         |         |         |
 7+25       0.3075      0.93  |  Q  V   |         |         |         |
 7+30       0.3140      0.94  |  Q   V  |         |         |         |
 7+35       0.3207      0.98  |  Q   V  |         |         |         |
 7+40       0.3277      1.02  |   Q  V  |         |         |         |
 7+45       0.3348      1.03  |   Q  V  |         |         |         |
 7+50       0.3421      1.06  |   Q  V  |         |         |         |
 7+55       0.3497      1.10  |   Q  V  |         |         |         |
 8+ 0       0.3574      1.11  |   Q  V  |         |         |         |
 8+ 5       0.3655      1.18  |   Q   V |         |         |         |
 8+10       0.3742      1.26  |    Q  V |         |         |         |
 8+15       0.3830      1.28  |    Q  V |         |         |         |
 8+20       0.3919      1.28  |    Q  V |         |         |         |
 8+25       0.4007      1.29  |    Q  V |         |         |         |
 8+30       0.4096      1.29  |    Q   V|         |         |         |
 8+35       0.4187      1.32  |    Q   V|         |         |         |
 8+40       0.4281      1.36  |    Q   V|         |         |         |
 8+45       0.4375      1.37  |    Q   V|         |         |         |
 8+50       0.4472      1.41  |    Q   V|         |         |         |
 8+55       0.4572      1.45  |    Q    V         |         |         |
 9+ 0       0.4672      1.45  |    Q    V         |         |         |
 9+ 5       0.4777      1.53  |     Q   V         |         |         |
 9+10       0.4888      1.61  |     Q   V         |         |         |
 9+15       0.4999      1.62  |     Q   |V        |         |         |
 9+20       0.5114      1.66  |     Q   |V        |         |         |
 9+25       0.5231      1.70  |     Q   |V        |         |         |
 9+30       0.5349      1.71  |     Q   |V        |         |         |
 9+35       0.5470      1.75  |      Q  | V       |         |         |
 9+40       0.5593      1.79  |      Q  | V       |         |         |
 9+45       0.5717      1.80  |      Q  | V       |         |         |
 9+50       0.5843      1.84  |      Q  |  V      |         |         |
 9+55       0.5972      1.88  |      Q  |  V      |         |         |
10+ 0       0.6102      1.88  |      Q  |  V      |         |         |
10+ 5       0.6215      1.64  |     Q   |  V      |         |         |
10+10       0.6310      1.38  |    Q    |   V     |         |         |
10+15       0.6401      1.32  |    Q    |   V     |         |         |
10+20       0.6490      1.30  |    Q    |   V     |         |         |
10+25       0.6579      1.29  |    Q    |   V     |         |         |
10+30       0.6667      1.29  |    Q    |   V     |         |         |
10+35       0.6768      1.46  |    Q    |    V    |         |         |
10+40       0.6882      1.65  |     Q   |    V    |         |         |
10+45       0.6999      1.69  |     Q   |    V    |         |         |
10+50       0.7117      1.71  |     Q   |    V    |         |         |
10+55       0.7235      1.72  |     Q   |     V   |         |         |
11+ 0       0.7353      1.72  |     Q   |     V   |         |         |
11+ 5       0.7469      1.68  |     Q   |     V   |         |         |
11+10       0.7582      1.64  |     Q   |     V   |         |         |
11+15       0.7695      1.64  |     Q   |      V  |         |         |
11+20       0.7807      1.63  |     Q   |      V  |         |         |
11+25       0.7919      1.63  |     Q   |      V  |         |         |
11+30       0.8032      1.63  |     Q   |      V  |         |         |
11+35       0.8139      1.56  |     Q   |       V |         |         |
```


11+40 0.8241 1.48
11+45 0.8342 1.47
11+50 0.8446 1.50
11+55 0.8551 1.53
12+ 0 0.8657 1.54
12+ 5 0.8780 1.79
12+10 0.8922 2.06
12+15 0.9068 2.11
12+20 0.9217 2.17
12+25 0.9370 2.22
12+30 0.9523 2.23
12+35 0.9682 2.30
12+40 0.9847 2.39
12+45 1.0012 2.41
12+50 1.0182 2.47
12+55 1.0356 2.53
13+ 0 1.0532 2.54
13+ 5 1.0724 2.80
13+10 1.0935 3.06
13+15 1.1150 3.12
13+20 1.1367 3.15
13+25 1.1585 3.16
13+30 1.1803 3.17
13+35 1.1988 2.68
13+40 1.2136 2.15
13+45 1.2276 2.04
13+50 1.2414 1.99
13+55 1.2550 1.97
14+ 0 1.2686 1.97
14+ 5 1.2833 2.14
14+10 1.2992 2.32
14+15 1.3155 2.36
14+20 1.3315 2.33
14+25 1.3472 2.29
14+30 1.3629 2.28
14+35 1.3786 2.28
14+40 1.3943 2.28
14+45 1.4100 2.28
14+50 1.4255 2.24
14+55 1.4406 2.19
15+ 0 1.4556 2.18
15+ 5 1.4703 2.14
15+10 1.4847 2.08
15+15 1.4990 2.08
15+20 1.5130 2.03
15+25 1.5267 1.99
15+30 1.5403 1.98
15+35 1.5529 1.83
15+40 1.5645 1.68
15+45 1.5759 1.65
15+50 1.5872 1.64
15+55 1.5984 1.63
16+ 0 1.6096 1.63
16+ 5 1.6172 1.10
16+10 1.6209 0.53
16+15 1.6237 0.41

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16+20       1.6262      0.36  |Q        |         |         |     V   |
16+25       1.6286      0.34  |Q        |         |         |     V   |
16+30       1.6309      0.34  |Q        |         |         |     V   |
16+35       1.6331      0.31  |Q        |         |         |     V   |
16+40       1.6349      0.27  |Q        |         |         |     V   |
16+45       1.6367      0.26  |Q        |         |         |     V   |
16+50       1.6385      0.26  |Q        |         |         |     V   |
16+55       1.6403      0.26  |Q        |         |         |     V   |
17+ 0       1.6421      0.26  |Q        |         |         |     V   |
17+ 5       1.6443      0.33  |Q        |         |         |     V   |
17+10       1.6471      0.40  |Q        |         |         |     V   |
17+15       1.6500      0.42  |Q        |         |         |     V   |
17+20       1.6529      0.43  |Q        |         |         |     V   |
17+25       1.6559      0.43  |Q        |         |         |      V  |
17+30       1.6588      0.43  |Q        |         |         |      V  |
17+35       1.6618      0.43  |Q        |         |         |      V  |
17+40       1.6648      0.43  |Q        |         |         |      V  |
17+45       1.6677      0.43  |Q        |         |         |      V  |
17+50       1.6704      0.39  |Q        |         |         |      V  |
17+55       1.6729      0.36  |Q        |         |         |      V  |
18+ 0       1.6753      0.35  |Q        |         |         |      V  |
18+ 5       1.6776      0.34  |Q        |         |         |      V  |
18+10       1.6800      0.34  |Q        |         |         |      V  |
18+15       1.6824      0.34  |Q        |         |         |      V  |
18+20       1.6847      0.34  |Q        |         |         |      V  |
18+25       1.6871      0.34  |Q        |         |         |      V  |
18+30       1.6895      0.34  |Q        |         |         |      V  |
18+35       1.6916      0.31  |Q        |         |         |      V  |
18+40       1.6934      0.27  |Q        |         |         |      V  |
18+45       1.6953      0.26  |Q        |         |         |      V  |
18+50       1.6968      0.22  Q        |         |         |      V  |
18+55       1.6981      0.18  Q        |         |         |      V  |
19+ 0       1.6993      0.18  Q        |         |         |      V  |
19+ 5       1.7007      0.21  Q        |         |         |       V |
19+10       1.7024      0.24  Q        |         |         |       V |
19+15       1.7041      0.25  |Q       |         |         |       V |
19+20       1.7061      0.29  |Q       |         |         |       V |
19+25       1.7084      0.33  |Q       |         |         |       V |
19+30       1.7108      0.34  |Q       |         |         |       V |
19+35       1.7129      0.31  |Q       |         |         |       V |
19+40       1.7147      0.27  |Q       |         |         |       V |
19+45       1.7165      0.26  |Q       |         |         |       V |
19+50       1.7181      0.22  Q        |         |         |       V |
19+55       1.7193      0.18  Q        |         |         |       V |
20+ 0       1.7206      0.18  Q        |         |         |       V |
20+ 5       1.7220      0.21  Q        |         |         |       V |
20+10       1.7237      0.24  Q        |         |         |       V |
20+15       1.7254      0.25  |Q       |         |         |       V |
20+20       1.7272      0.26  |Q       |         |         |       V |
20+25       1.7290      0.26  |Q       |         |         |       V |
20+30       1.7307      0.26  |Q       |         |         |       V |
20+35       1.7325      0.26  |Q       |         |         |       V |
20+40       1.7343      0.26  |Q       |         |         |       V |
20+45       1.7361      0.26  |Q       |         |         |       V |
20+50       1.7376      0.22  Q        |         |         |       V |
20+55       1.7389      0.18  Q        |         |         |       V |
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   21+ 0       1.7401      0.18  Q          |          |          |        V |
   21+ 5       1.7415      0.21  Q          |          |          |        V |
   21+10       1.7432      0.24  Q          |          |          |        V |
   21+15       1.7449      0.25  |Q         |          |          |         V|
   21+20       1.7464      0.22  Q          |          |          |         V|
   21+25       1.7477      0.18  Q          |          |          |         V|
   21+30       1.7489      0.18  Q          |          |          |         V|
   21+35       1.7504      0.21  Q          |          |          |         V|
   21+40       1.7521      0.24  Q          |          |          |         V|
   21+45       1.7538      0.25  |Q         |          |          |         V|
   21+50       1.7553      0.22  Q          |          |          |         V|
   21+55       1.7566      0.18  Q          |          |          |         V|
   22+ 0       1.7578      0.18  Q          |          |          |         V|
   22+ 5       1.7592      0.21  Q          |          |          |         V|
   22+10       1.7609      0.24  Q          |          |          |         V|
   22+15       1.7627      0.25  |Q         |          |          |         V|
   22+20       1.7642      0.22  Q          |          |          |         V|
   22+25       1.7655      0.18  Q          |          |          |         V|
   22+30       1.7667      0.18  Q          |          |          |         V|
   22+35       1.7679      0.17  Q          |          |          |         V|
   22+40       1.7690      0.17  Q          |          |          |         V|
   22+45       1.7702      0.17  Q          |          |          |         V|
   22+50       1.7714      0.17  Q          |          |          |         V|
   22+55       1.7726      0.17  Q          |          |          |         V|
   23+ 0       1.7738      0.17  Q          |          |          |         V|
   23+ 5       1.7750      0.17  Q          |          |          |         V|
   23+10       1.7761      0.17  Q          |          |          |         V|
   23+15       1.7773      0.17  Q          |          |          |         V|
   23+20       1.7785      0.17  Q          |          |          |         V|
   23+25       1.7797      0.17  Q          |          |          |         V|
   23+30       1.7809      0.17  Q          |          |          |         V|
   23+35       1.7820      0.17  Q          |          |          |         V|
   23+40       1.7832      0.17  Q          |          |          |         V|
   23+45       1.7844      0.17  Q          |          |          |         V|
   23+50       1.7856      0.17  Q          |          |          |         V|
   23+55       1.7868      0.17  Q          |          |          |         V|
   24+ 0       1.7880      0.17  Q          |          |          |         V|
   24+ 5       1.7887      0.10  Q          |          |          |         V|
   24+10       1.7888      0.03  Q          |          |          |         V|
   24+15       1.7889      0.01  Q          |          |          |         V|
   24+20       1.7889      0.00  Q          |          |          |          V
-----------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

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Study date 03/28/24 File: hemetuhpra22242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6385

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Hemet 63 Acre Development
Proposed Condition 2-Year Unit Hydrographs (Area 2)
2-Year Design Storm

Drainage Area = 25.58(Ac.) = 0.040 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 25.58(Ac.) = 0.040 Sq. Mi.
Length along longest watercourse = 1653.00(Ft.)
Length along longest watercourse measured to centroid = 827.00(Ft.)
Length along longest watercourse = 0.313 Mi.
Length along longest watercourse measured to centroid = 0.157 Mi.
Difference in elevation = 14.00(Ft.)
Slope along watercourse = 44.7187 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.056 Hr.
Lag time = 3.34 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
25.58	2.07	52.95

100 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
      25.58              5.42                138.64

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.070(In)
Area Averaged 100-Year Rainfall =    5.420(In)

Point rain (area averaged) =    2.070(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.070(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    22.450           98.00         0.950
     1.100           56.00         0.000
     2.030           75.00         0.000
 Total Area Entered =     25.58(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
98.0  98.0      0.026     0.950        0.004       0.878      0.003
56.0  56.0      0.511     0.000        0.511       0.043      0.022
75.0  75.0      0.303     0.000        0.303       0.079      0.024
                                                  Sum (F) =   0.049
Area averaged mean soil loss (F) (In/Hr) =  0.049
Minimum soil loss rate ((In/Hr)) =  0.025
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.236
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                 VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083        149.870         33.144             8.544
    2   0.167        299.740         47.020            12.122
    3   0.250        449.610         11.189             2.885
    4   0.333        599.481          4.887             1.260
    5   0.417        749.351          2.471             0.637
    6   0.500        899.221          1.290             0.333
                              Sum = 100.000   Sum=      25.780
------------------------------------------------------------------------

 The following loss rate calculations reflect use of the minimum calculated
loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain
value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
```

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.017	(	0.087)	0.004	0.013
2	0.17	0.07	0.017	(	0.087)	0.004	0.013
3	0.25	0.07	0.017	(	0.087)	0.004	0.013
4	0.33	0.10	0.025	(	0.086)	0.006	0.019
5	0.42	0.10	0.025	(	0.086)	0.006	0.019
6	0.50	0.10	0.025	(	0.086)	0.006	0.019
7	0.58	0.10	0.025	(	0.085)	0.006	0.019
8	0.67	0.10	0.025	(	0.085)	0.006	0.019
9	0.75	0.10	0.025	(	0.085)	0.006	0.019
10	0.83	0.13	0.033	(	0.084)	0.008	0.025
11	0.92	0.13	0.033	(	0.084)	0.008	0.025
12	1.00	0.13	0.033	(	0.084)	0.008	0.025
13	1.08	0.10	0.025	(	0.083)	0.006	0.019
14	1.17	0.10	0.025	(	0.083)	0.006	0.019
15	1.25	0.10	0.025	(	0.083)	0.006	0.019
16	1.33	0.10	0.025	(	0.082)	0.006	0.019
17	1.42	0.10	0.025	(	0.082)	0.006	0.019
18	1.50	0.10	0.025	(	0.082)	0.006	0.019
19	1.58	0.10	0.025	(	0.081)	0.006	0.019
20	1.67	0.10	0.025	(	0.081)	0.006	0.019
21	1.75	0.10	0.025	(	0.081)	0.006	0.019
22	1.83	0.13	0.033	(	0.080)	0.008	0.025
23	1.92	0.13	0.033	(	0.080)	0.008	0.025
24	2.00	0.13	0.033	(	0.080)	0.008	0.025
25	2.08	0.13	0.033	(	0.079)	0.008	0.025
26	2.17	0.13	0.033	(	0.079)	0.008	0.025
27	2.25	0.13	0.033	(	0.079)	0.008	0.025
28	2.33	0.13	0.033	(	0.079)	0.008	0.025
29	2.42	0.13	0.033	(	0.078)	0.008	0.025
30	2.50	0.13	0.033	(	0.078)	0.008	0.025
31	2.58	0.17	0.041	(	0.078)	0.010	0.032
32	2.67	0.17	0.041	(	0.077)	0.010	0.032
33	2.75	0.17	0.041	(	0.077)	0.010	0.032
34	2.83	0.17	0.041	(	0.077)	0.010	0.032
35	2.92	0.17	0.041	(	0.076)	0.010	0.032
36	3.00	0.17	0.041	(	0.076)	0.010	0.032
37	3.08	0.17	0.041	(	0.076)	0.010	0.032
38	3.17	0.17	0.041	(	0.075)	0.010	0.032
39	3.25	0.17	0.041	(	0.075)	0.010	0.032
40	3.33	0.17	0.041	(	0.075)	0.010	0.032
41	3.42	0.17	0.041	(	0.074)	0.010	0.032
42	3.50	0.17	0.041	(	0.074)	0.010	0.032
43	3.58	0.17	0.041	(	0.074)	0.010	0.032
44	3.67	0.17	0.041	(	0.073)	0.010	0.032
45	3.75	0.17	0.041	(	0.073)	0.010	0.032
46	3.83	0.20	0.050	(	0.073)	0.012	0.038
47	3.92	0.20	0.050	(	0.073)	0.012	0.038
48	4.00	0.20	0.050	(	0.072)	0.012	0.038
49	4.08	0.20	0.050	(	0.072)	0.012	0.038
50	4.17	0.20	0.050	(	0.072)	0.012	0.038
51	4.25	0.20	0.050	(	0.071)	0.012	0.038
52	4.33	0.23	0.058	(	0.071)	0.014	0.044
53	4.42	0.23	0.058	(	0.071)	0.014	0.044
54	4.50	0.23	0.058	(	0.070)	0.014	0.044
55	4.58	0.23	0.058	(	0.070)	0.014	0.044

56	4.67	0.23	0.058	(0.070)	0.014	0.044
57	4.75	0.23	0.058	(0.070)	0.014	0.044
58	4.83	0.27	0.066	(0.069)	0.016	0.051
59	4.92	0.27	0.066	(0.069)	0.016	0.051
60	5.00	0.27	0.066	(0.069)	0.016	0.051
61	5.08	0.20	0.050	(0.068)	0.012	0.038
62	5.17	0.20	0.050	(0.068)	0.012	0.038
63	5.25	0.20	0.050	(0.068)	0.012	0.038
64	5.33	0.23	0.058	(0.067)	0.014	0.044
65	5.42	0.23	0.058	(0.067)	0.014	0.044
66	5.50	0.23	0.058	(0.067)	0.014	0.044
67	5.58	0.27	0.066	(0.067)	0.016	0.051
68	5.67	0.27	0.066	(0.066)	0.016	0.051
69	5.75	0.27	0.066	(0.066)	0.016	0.051
70	5.83	0.27	0.066	(0.066)	0.016	0.051
71	5.92	0.27	0.066	(0.065)	0.016	0.051
72	6.00	0.27	0.066	(0.065)	0.016	0.051
73	6.08	0.30	0.075	(0.065)	0.018	0.057
74	6.17	0.30	0.075	(0.065)	0.018	0.057
75	6.25	0.30	0.075	(0.064)	0.018	0.057
76	6.33	0.30	0.075	(0.064)	0.018	0.057
77	6.42	0.30	0.075	(0.064)	0.018	0.057
78	6.50	0.30	0.075	(0.063)	0.018	0.057
79	6.58	0.33	0.083	(0.063)	0.020	0.063
80	6.67	0.33	0.083	(0.063)	0.020	0.063
81	6.75	0.33	0.083	(0.063)	0.020	0.063
82	6.83	0.33	0.083	(0.062)	0.020	0.063
83	6.92	0.33	0.083	(0.062)	0.020	0.063
84	7.00	0.33	0.083	(0.062)	0.020	0.063
85	7.08	0.33	0.083	(0.061)	0.020	0.063
86	7.17	0.33	0.083	(0.061)	0.020	0.063
87	7.25	0.33	0.083	(0.061)	0.020	0.063
88	7.33	0.37	0.091	(0.061)	0.021	0.070
89	7.42	0.37	0.091	(0.060)	0.021	0.070
90	7.50	0.37	0.091	(0.060)	0.021	0.070
91	7.58	0.40	0.099	(0.060)	0.023	0.076
92	7.67	0.40	0.099	(0.059)	0.023	0.076
93	7.75	0.40	0.099	(0.059)	0.023	0.076
94	7.83	0.43	0.108	(0.059)	0.025	0.082
95	7.92	0.43	0.108	(0.059)	0.025	0.082
96	8.00	0.43	0.108	(0.058)	0.025	0.082
97	8.08	0.50	0.124	(0.058)	0.029	0.095
98	8.17	0.50	0.124	(0.058)	0.029	0.095
99	8.25	0.50	0.124	(0.058)	0.029	0.095
100	8.33	0.50	0.124	(0.057)	0.029	0.095
101	8.42	0.50	0.124	(0.057)	0.029	0.095
102	8.50	0.50	0.124	(0.057)	0.029	0.095
103	8.58	0.53	0.132	(0.056)	0.031	0.101
104	8.67	0.53	0.132	(0.056)	0.031	0.101
105	8.75	0.53	0.132	(0.056)	0.031	0.101
106	8.83	0.57	0.141	(0.056)	0.033	0.108
107	8.92	0.57	0.141	(0.055)	0.033	0.108
108	9.00	0.57	0.141	(0.055)	0.033	0.108
109	9.08	0.63	0.157	(0.055)	0.037	0.120
110	9.17	0.63	0.157	(0.055)	0.037	0.120
111	9.25	0.63	0.157	(0.054)	0.037	0.120

112	9.33	0.67	0.166	(0.054)	0.039	0.127
113	9.42	0.67	0.166	(0.054)	0.039	0.127
114	9.50	0.67	0.166	(0.054)	0.039	0.127
115	9.58	0.70	0.174	(0.053)	0.041	0.133
116	9.67	0.70	0.174	(0.053)	0.041	0.133
117	9.75	0.70	0.174	(0.053)	0.041	0.133
118	9.83	0.73	0.182	(0.053)	0.043	0.139
119	9.92	0.73	0.182	(0.052)	0.043	0.139
120	10.00	0.73	0.182	(0.052)	0.043	0.139
121	10.08	0.50	0.124	(0.052)	0.029	0.095
122	10.17	0.50	0.124	(0.052)	0.029	0.095
123	10.25	0.50	0.124	(0.051)	0.029	0.095
124	10.33	0.50	0.124	(0.051)	0.029	0.095
125	10.42	0.50	0.124	(0.051)	0.029	0.095
126	10.50	0.50	0.124	(0.051)	0.029	0.095
127	10.58	0.67	0.166	(0.050)	0.039	0.127
128	10.67	0.67	0.166	(0.050)	0.039	0.127
129	10.75	0.67	0.166	(0.050)	0.039	0.127
130	10.83	0.67	0.166	(0.050)	0.039	0.127
131	10.92	0.67	0.166	(0.049)	0.039	0.127
132	11.00	0.67	0.166	(0.049)	0.039	0.127
133	11.08	0.63	0.157	(0.049)	0.037	0.120
134	11.17	0.63	0.157	(0.049)	0.037	0.120
135	11.25	0.63	0.157	(0.048)	0.037	0.120
136	11.33	0.63	0.157	(0.048)	0.037	0.120
137	11.42	0.63	0.157	(0.048)	0.037	0.120
138	11.50	0.63	0.157	(0.048)	0.037	0.120
139	11.58	0.57	0.141	(0.047)	0.033	0.108
140	11.67	0.57	0.141	(0.047)	0.033	0.108
141	11.75	0.57	0.141	(0.047)	0.033	0.108
142	11.83	0.60	0.149	(0.047)	0.035	0.114
143	11.92	0.60	0.149	(0.047)	0.035	0.114
144	12.00	0.60	0.149	(0.046)	0.035	0.114
145	12.08	0.83	0.207	0.046	(0.049)	0.161
146	12.17	0.83	0.207	0.046	(0.049)	0.161
147	12.25	0.83	0.207	0.046	(0.049)	0.161
148	12.33	0.87	0.215	0.045	(0.051)	0.170
149	12.42	0.87	0.215	0.045	(0.051)	0.170
150	12.50	0.87	0.215	0.045	(0.051)	0.170
151	12.58	0.93	0.232	0.045	(0.055)	0.187
152	12.67	0.93	0.232	0.044	(0.055)	0.187
153	12.75	0.93	0.232	0.044	(0.055)	0.188
154	12.83	0.97	0.240	0.044	(0.057)	0.196
155	12.92	0.97	0.240	0.044	(0.057)	0.196
156	13.00	0.97	0.240	0.044	(0.057)	0.197
157	13.08	1.13	0.282	0.043	(0.066)	0.238
158	13.17	1.13	0.282	0.043	(0.066)	0.238
159	13.25	1.13	0.282	0.043	(0.066)	0.239
160	13.33	1.13	0.282	0.043	(0.066)	0.239
161	13.42	1.13	0.282	0.042	(0.066)	0.239
162	13.50	1.13	0.282	0.042	(0.066)	0.239
163	13.58	0.77	0.190	0.042	(0.045)	0.148
164	13.67	0.77	0.190	0.042	(0.045)	0.149
165	13.75	0.77	0.190	0.042	(0.045)	0.149
166	13.83	0.77	0.190	0.041	(0.045)	0.149
167	13.92	0.77	0.190	0.041	(0.045)	0.149

168	14.00	0.77	0.190	0.041	(0.045)	0.149
169	14.08	0.90	0.224	0.041	(0.053)	0.183
170	14.17	0.90	0.224	0.041	(0.053)	0.183
171	14.25	0.90	0.224	0.040	(0.053)	0.183
172	14.33	0.87	0.215	0.040	(0.051)	0.175
173	14.42	0.87	0.215	0.040	(0.051)	0.175
174	14.50	0.87	0.215	0.040	(0.051)	0.176
175	14.58	0.87	0.215	0.040	(0.051)	0.176
176	14.67	0.87	0.215	0.039	(0.051)	0.176
177	14.75	0.87	0.215	0.039	(0.051)	0.176
178	14.83	0.83	0.207	0.039	(0.049)	0.168
179	14.92	0.83	0.207	0.039	(0.049)	0.168
180	15.00	0.83	0.207	0.039	(0.049)	0.168
181	15.08	0.80	0.199	0.038	(0.047)	0.160
182	15.17	0.80	0.199	0.038	(0.047)	0.161
183	15.25	0.80	0.199	0.038	(0.047)	0.161
184	15.33	0.77	0.190	0.038	(0.045)	0.153
185	15.42	0.77	0.190	0.038	(0.045)	0.153
186	15.50	0.77	0.190	0.037	(0.045)	0.153
187	15.58	0.63	0.157	(0.037)	0.037	0.120
188	15.67	0.63	0.157	0.037	(0.037)	0.120
189	15.75	0.63	0.157	0.037	(0.037)	0.121
190	15.83	0.63	0.157	0.037	(0.037)	0.121
191	15.92	0.63	0.157	0.036	(0.037)	0.121
192	16.00	0.63	0.157	0.036	(0.037)	0.121
193	16.08	0.13	0.033	(0.036)	0.008	0.025
194	16.17	0.13	0.033	(0.036)	0.008	0.025
195	16.25	0.13	0.033	(0.036)	0.008	0.025
196	16.33	0.13	0.033	(0.035)	0.008	0.025
197	16.42	0.13	0.033	(0.035)	0.008	0.025
198	16.50	0.13	0.033	(0.035)	0.008	0.025
199	16.58	0.10	0.025	(0.035)	0.006	0.019
200	16.67	0.10	0.025	(0.035)	0.006	0.019
201	16.75	0.10	0.025	(0.035)	0.006	0.019
202	16.83	0.10	0.025	(0.034)	0.006	0.019
203	16.92	0.10	0.025	(0.034)	0.006	0.019
204	17.00	0.10	0.025	(0.034)	0.006	0.019
205	17.08	0.17	0.041	(0.034)	0.010	0.032
206	17.17	0.17	0.041	(0.034)	0.010	0.032
207	17.25	0.17	0.041	(0.034)	0.010	0.032
208	17.33	0.17	0.041	(0.033)	0.010	0.032
209	17.42	0.17	0.041	(0.033)	0.010	0.032
210	17.50	0.17	0.041	(0.033)	0.010	0.032
211	17.58	0.17	0.041	(0.033)	0.010	0.032
212	17.67	0.17	0.041	(0.033)	0.010	0.032
213	17.75	0.17	0.041	(0.033)	0.010	0.032
214	17.83	0.13	0.033	(0.032)	0.008	0.025
215	17.92	0.13	0.033	(0.032)	0.008	0.025
216	18.00	0.13	0.033	(0.032)	0.008	0.025
217	18.08	0.13	0.033	(0.032)	0.008	0.025
218	18.17	0.13	0.033	(0.032)	0.008	0.025
219	18.25	0.13	0.033	(0.032)	0.008	0.025
220	18.33	0.13	0.033	(0.031)	0.008	0.025
221	18.42	0.13	0.033	(0.031)	0.008	0.025
222	18.50	0.13	0.033	(0.031)	0.008	0.025
223	18.58	0.10	0.025	(0.031)	0.006	0.019

224	18.67	0.10	0.025	(0.031)	0.006	0.019
225	18.75	0.10	0.025	(0.031)	0.006	0.019
226	18.83	0.07	0.017	(0.031)	0.004	0.013
227	18.92	0.07	0.017	(0.030)	0.004	0.013
228	19.00	0.07	0.017	(0.030)	0.004	0.013
229	19.08	0.10	0.025	(0.030)	0.006	0.019
230	19.17	0.10	0.025	(0.030)	0.006	0.019
231	19.25	0.10	0.025	(0.030)	0.006	0.019
232	19.33	0.13	0.033	(0.030)	0.008	0.025
233	19.42	0.13	0.033	(0.030)	0.008	0.025
234	19.50	0.13	0.033	(0.029)	0.008	0.025
235	19.58	0.10	0.025	(0.029)	0.006	0.019
236	19.67	0.10	0.025	(0.029)	0.006	0.019
237	19.75	0.10	0.025	(0.029)	0.006	0.019
238	19.83	0.07	0.017	(0.029)	0.004	0.013
239	19.92	0.07	0.017	(0.029)	0.004	0.013
240	20.00	0.07	0.017	(0.029)	0.004	0.013
241	20.08	0.10	0.025	(0.029)	0.006	0.019
242	20.17	0.10	0.025	(0.028)	0.006	0.019
243	20.25	0.10	0.025	(0.028)	0.006	0.019
244	20.33	0.10	0.025	(0.028)	0.006	0.019
245	20.42	0.10	0.025	(0.028)	0.006	0.019
246	20.50	0.10	0.025	(0.028)	0.006	0.019
247	20.58	0.10	0.025	(0.028)	0.006	0.019
248	20.67	0.10	0.025	(0.028)	0.006	0.019
249	20.75	0.10	0.025	(0.028)	0.006	0.019
250	20.83	0.07	0.017	(0.027)	0.004	0.013
251	20.92	0.07	0.017	(0.027)	0.004	0.013
252	21.00	0.07	0.017	(0.027)	0.004	0.013
253	21.08	0.10	0.025	(0.027)	0.006	0.019
254	21.17	0.10	0.025	(0.027)	0.006	0.019
255	21.25	0.10	0.025	(0.027)	0.006	0.019
256	21.33	0.07	0.017	(0.027)	0.004	0.013
257	21.42	0.07	0.017	(0.027)	0.004	0.013
258	21.50	0.07	0.017	(0.027)	0.004	0.013
259	21.58	0.10	0.025	(0.027)	0.006	0.019
260	21.67	0.10	0.025	(0.026)	0.006	0.019
261	21.75	0.10	0.025	(0.026)	0.006	0.019
262	21.83	0.07	0.017	(0.026)	0.004	0.013
263	21.92	0.07	0.017	(0.026)	0.004	0.013
264	22.00	0.07	0.017	(0.026)	0.004	0.013
265	22.08	0.10	0.025	(0.026)	0.006	0.019
266	22.17	0.10	0.025	(0.026)	0.006	0.019
267	22.25	0.10	0.025	(0.026)	0.006	0.019
268	22.33	0.07	0.017	(0.026)	0.004	0.013
269	22.42	0.07	0.017	(0.026)	0.004	0.013
270	22.50	0.07	0.017	(0.026)	0.004	0.013
271	22.58	0.07	0.017	(0.025)	0.004	0.013
272	22.67	0.07	0.017	(0.025)	0.004	0.013
273	22.75	0.07	0.017	(0.025)	0.004	0.013
274	22.83	0.07	0.017	(0.025)	0.004	0.013
275	22.92	0.07	0.017	(0.025)	0.004	0.013
276	23.00	0.07	0.017	(0.025)	0.004	0.013
277	23.08	0.07	0.017	(0.025)	0.004	0.013
278	23.17	0.07	0.017	(0.025)	0.004	0.013
279	23.25	0.07	0.017	(0.025)	0.004	0.013

280	23.33	0.07	0.017	(0.025)	0.004	0.013
281	23.42	0.07	0.017	(0.025)	0.004	0.013
282	23.50	0.07	0.017	(0.025)	0.004	0.013
283	23.58	0.07	0.017	(0.025)	0.004	0.013
284	23.67	0.07	0.017	(0.025)	0.004	0.013
285	23.75	0.07	0.017	(0.025)	0.004	0.013
286	23.83	0.07	0.017	(0.025)	0.004	0.013
287	23.92	0.07	0.017	(0.025)	0.004	0.013
288	24.00	0.07	0.017	(0.025)	0.004	0.013

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.4

Flood volume = Effective rainfall 1.62(In)
times area 25.6(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
Total soil loss = 0.45(In)
Total soil loss = 0.963(Ac.Ft)
Total rainfall = 2.07(In)
Flood volume = 150272.9 Cubic Feet
Total soil loss = 41928.2 Cubic Feet

Peak flow rate of this hydrograph = 6.166(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0007	0.11	Q				
0+10	0.0025	0.26	VQ				
0+15	0.0046	0.30	VQ				
0+20	0.0071	0.37	VQ				
0+25	0.0103	0.45	VQ				
0+30	0.0135	0.48	VQ				
0+35	0.0169	0.48	VQ				
0+40	0.0202	0.49	VQ				
0+45	0.0236	0.49	VQ				
0+50	0.0273	0.54	V Q				
0+55	0.0316	0.62	V Q				
1+ 0	0.0360	0.64	V Q				
1+ 5	0.0401	0.59	V Q				
1+10	0.0437	0.52	V Q				
1+15	0.0471	0.50	V Q				
1+20	0.0505	0.50	VQ				
1+25	0.0539	0.49	VQ				
1+30	0.0573	0.49	VQ				
1+35	0.0607	0.49	VQ				
1+40	0.0640	0.49	VQ				
1+45	0.0674	0.49	VQ				
1+50	0.0712	0.54	V Q				
1+55	0.0754	0.62	V Q				
2+ 0	0.0798	0.64	V Q				
2+ 5	0.0843	0.65	V Q				
2+10	0.0888	0.65	|VQ				

2+15	0.0932	0.65	VQ				
2+20	0.0977	0.65	VQ				
2+25	0.1022	0.65	VQ				
2+30	0.1067	0.65	VQ				
2+35	0.1116	0.71	VQ				
2+40	0.1170	0.78	V Q				
2+45	0.1225	0.80	V Q				
2+50	0.1281	0.81	V Q				
2+55	0.1337	0.81	V Q				
3+ 0	0.1393	0.82	V Q				
3+ 5	0.1449	0.82	V Q				
3+10	0.1506	0.82	V Q				
3+15	0.1562	0.82	V Q				
3+20	0.1618	0.82	V Q				
3+25	0.1674	0.82	V Q				
3+30	0.1730	0.82	VQ				
3+35	0.1786	0.82	VQ				
3+40	0.1843	0.82	VQ				
3+45	0.1899	0.82	VQ				
3+50	0.1959	0.87	VQ				
3+55	0.2024	0.95	VQ				
4+ 0	0.2090	0.96	VQ				
4+ 5	0.2157	0.97	VQ				
4+10	0.2225	0.98	VQ				
4+15	0.2292	0.98	VQ				
4+20	0.2363	1.03	V Q				
4+25	0.2440	1.11	V Q				
4+30	0.2517	1.13	V Q				
4+35	0.2596	1.14	VQ				
4+40	0.2674	1.14	VQ				
4+45	0.2753	1.14	VQ				
4+50	0.2835	1.20	VQ				
4+55	0.2923	1.27	V Q				
5+ 0	0.3012	1.29	V Q				
5+ 5	0.3094	1.19	VQ				
5+10	0.3165	1.04	VQ				
5+15	0.3235	1.01	VQ				
5+20	0.3307	1.05	VQ				
5+25	0.3383	1.11	VQ				
5+30	0.3461	1.13	Q				
5+35	0.3543	1.19	Q				
5+40	0.3631	1.27	VQ				
5+45	0.3720	1.29	VQ				
5+50	0.3809	1.30	VQ				
5+55	0.3899	1.30	VQ				
6+ 0	0.3989	1.31	VQ				
6+ 5	0.4082	1.36	VQ				
6+10	0.4181	1.44	VQ				
6+15	0.4281	1.45	VQ				
6+20	0.4382	1.46	Q				
6+25	0.4483	1.47	Q				
6+30	0.4584	1.47	Q				
6+35	0.4689	1.52	VQ				
6+40	0.4799	1.60	VQ				
6+45	0.4911	1.62	VQ				
6+50	0.5023	1.63	VQ				

6+55	0.5135	1.63	VQ				
7+ 0	0.5247	1.63	Q				
7+ 5	0.5359	1.63	Q				
7+10	0.5472	1.63	Q				
7+15	0.5584	1.63	Q				
7+20	0.5700	1.69	Q				
7+25	0.5822	1.76	VQ				
7+30	0.5944	1.78	VQ				
7+35	0.6071	1.84	Q				
7+40	0.6204	1.92	Q				
7+45	0.6338	1.94	Q				
7+50	0.6476	2.01	VQ				
7+55	0.6619	2.09	VQ				
8+ 0	0.6765	2.11	VQ				
8+ 5	0.6918	2.22	Q				
8+10	0.7082	2.38	VQ				
8+15	0.7248	2.42	VQ				
8+20	0.7416	2.44	VQ				
8+25	0.7584	2.44	VQ				
8+30	0.7753	2.45	VQ				
8+35	0.7925	2.50	VQ				
8+40	0.8103	2.58	VQ				
8+45	0.8281	2.60	VQ				
8+50	0.8464	2.66	VQ				
8+55	0.8653	2.74	Q				
9+ 0	0.8843	2.76	VQ				
9+ 5	0.9041	2.88	VQ				
9+10	0.9250	3.03	V Q				
9+15	0.9462	3.07	V Q				
9+20	0.9678	3.14	VQ				
9+25	0.9900	3.23	VQ				
9+30	1.0124	3.25	VQ				
9+35	1.0352	3.31	VQ				
9+40	1.0586	3.39	VQ				
9+45	1.0821	3.41	VQ				
9+50	1.1060	3.47	VQ				
9+55	1.1305	3.55	VQ				
10+ 0	1.1551	3.58	VQ				
10+ 5	1.1772	3.20	QV				
10+10	1.1956	2.67	Q V				
10+15	1.2131	2.55	Q V				
10+20	1.2303	2.49	Q V				
10+25	1.2472	2.46	Q V				
10+30	1.2641	2.45	Q V				
10+35	1.2828	2.72	Q V				
10+40	1.3041	3.10	Q V				
10+45	1.3261	3.19	Q V				
10+50	1.3484	3.23	Q V				
10+55	1.3708	3.25	Q V				
11+ 0	1.3933	3.26	Q V				
11+ 5	1.4154	3.21	Q V				
11+10	1.4369	3.13	Q V				
11+15	1.4584	3.11	Q V				
11+20	1.4798	3.11	Q V				
11+25	1.5011	3.10	Q V				
11+30	1.5225	3.10	Q V				

11+35	1.5431	2.99	|	|Q V |	|	|
11+40	1.5626	2.84	|	|Q V |	|	|
11+45	1.5819	2.80	|	|Q V |	|	|
11+50	1.6015	2.84	|	|Q V |	|	|
11+55	1.6215	2.91	|	|Q V |	|	|
12+ 0	1.6417	2.92	|	|Q V|	|	|
12+ 5	1.6646	3.33	|	| Q V|	|	|
12+10	1.6916	3.91	|	| Q V|	|	|
12+15	1.7195	4.05	|	| Q V|	|	|
12+20	1.7483	4.19	|	| Q V |	|	|
12+25	1.7781	4.32	|	| Q V |	|	|
12+30	1.8082	4.37	|	| Q V |	|	|
12+35	1.8394	4.53	|	| Q |V |	|	|
12+40	1.8720	4.74	|	| Q |V |	|	|
12+45	1.9051	4.80	|	| Q| V |	|	|
12+50	1.9388	4.89	|	| Q| V |	|	|
12+55	1.9733	5.01	|	| Q V |	|	|
13+ 0	2.0080	5.05	|	| Q V |	|	|
13+ 5	2.0453	5.42	|	| |Q V |	|	|
13+10	2.0861	5.93	|	| | QV |	|	|
13+15	2.1279	6.06	|	| | Q |	|	|
13+20	2.1700	6.11	|	| | QV |	|	|
13+25	2.2123	6.15	|	| | QV |	|	|
13+30	2.2548	6.17	|	| | Q V |	|	|
13+35	2.2919	5.39	|	| |Q V |	|	|
13+40	2.3215	4.29	|	| Q | V |	|	|
13+45	2.3493	4.04	|	| Q | V |	|	|
13+50	2.3763	3.93	|	| Q | V |	|	|
13+55	2.4030	3.87	|	| Q | V |	|	|
14+ 0	2.4295	3.85	|	| Q | V |	|	|
14+ 5	2.4580	4.14	|	| Q | V |	|	|
14+10	2.4893	4.55	|	| Q | V |	|	|
14+15	2.5213	4.65	|	| Q | V|	|	|
14+20	2.5531	4.62	|	| Q | V|	|	|
14+25	2.5845	4.55	|	| Q | V|	|	|
14+30	2.6157	4.54	|	| Q | V	|	|
14+35	2.6470	4.54	|	| Q | V	|	|
14+40	2.6782	4.54	|	| Q | |V	|	|
14+45	2.7095	4.54	|	| Q | |V	|	|
14+50	2.7403	4.47	|	| Q | |V	|	|
14+55	2.7704	4.38	|	| Q | | V	|	|
15+ 0	2.8004	4.36	|	| Q | | V	|	|
15+ 5	2.8299	4.28	|	| Q | | V	|	|
15+10	2.8587	4.18	|	| Q | | V	|	|
15+15	2.8874	4.16	|	| Q | | V	|	|
15+20	2.9155	4.08	|	| Q | | V	|	|
15+25	2.9430	3.98	|	| Q | | V	|	|
15+30	2.9702	3.96	|	| Q | | V	|	|
15+35	2.9955	3.67	|	| Q | | V	|	|
15+40	3.0181	3.27	|	| Q | | V	|	|
15+45	3.0400	3.18	|	| Q | | V	|	|
15+50	3.0616	3.14	|	| Q | | V	|	|
15+55	3.0831	3.12	|	| Q | | V	|	|
16+ 0	3.1046	3.12	|	| Q | | V	|	|
16+ 5	3.1205	2.30	|	| Q| | V	|	|
16+10	3.1283	1.14	|	Q | | V	|	|

16+15	3.1343	0.87	| Q	|	|	|	V |
16+20	3.1394	0.75	| Q	|	|	|	V |
16+25	3.1441	0.68	| Q	|	|	|	V |
16+30	3.1486	0.65	| Q	|	|	|	V |
16+35	3.1528	0.60	| Q	|	|	|	V |
16+40	3.1563	0.52	| Q	|	|	|	V |
16+45	3.1598	0.50	| Q	|	|	|	V |
16+50	3.1632	0.50	|Q	|	|	|	V |
16+55	3.1666	0.49	|Q	|	|	|	V |
17+ 0	3.1700	0.49	|Q	|	|	|	V |
17+ 5	3.1741	0.60	| Q	|	|	|	V |
17+10	3.1793	0.75	| Q	|	|	|	V |
17+15	3.1847	0.79	| Q	|	|	|	V |
17+20	3.1902	0.80	| Q	|	|	|	V |
17+25	3.1958	0.81	| Q	|	|	|	V |
17+30	3.2014	0.82	| Q	|	|	|	V |
17+35	3.2071	0.82	| Q	|	|	|	V |
17+40	3.2127	0.82	| Q	|	|	|	V |
17+45	3.2183	0.82	| Q	|	|	|	V |
17+50	3.2235	0.76	| Q	|	|	|	V |
17+55	3.2283	0.68	| Q	|	|	|	V |
18+ 0	3.2328	0.67	| Q	|	|	|	V |
18+ 5	3.2374	0.66	| Q	|	|	|	V |
18+10	3.2419	0.65	| Q	|	|	|	V |
18+15	3.2464	0.65	| Q	|	|	|	V |
18+20	3.2509	0.65	| Q	|	|	|	V |
18+25	3.2554	0.65	| Q	|	|	|	V |
18+30	3.2599	0.65	| Q	|	|	|	V |
18+35	3.2640	0.60	| Q	|	|	|	V |
18+40	3.2676	0.52	| Q	|	|	|	V |
18+45	3.2711	0.50	| Q	|	|	|	V |
18+50	3.2741	0.44	|Q	|	|	|	V |
18+55	3.2766	0.36	|Q	|	|	|	V |
19+ 0	3.2789	0.34	|Q	|	|	|	V |
19+ 5	3.2816	0.39	|Q	|	|	|	V |
19+10	3.2848	0.46	|Q	|	|	|	V |
19+15	3.2880	0.48	|Q	|	|	|	V |
19+20	3.2917	0.54	| Q	|	|	|	V |
19+25	3.2960	0.62	| Q	|	|	|	V |
19+30	3.3004	0.64	| Q	|	|	|	V |
19+35	3.3045	0.59	| Q	|	|	|	V |
19+40	3.3080	0.52	| Q	|	|	|	V |
19+45	3.3115	0.50	| Q	|	|	|	V |
19+50	3.3146	0.44	|Q	|	|	|	V |
19+55	3.3170	0.36	|Q	|	|	|	V |
20+ 0	3.3194	0.34	|Q	|	|	|	V |
20+ 5	3.3220	0.39	|Q	|	|	|	V |
20+10	3.3252	0.46	|Q	|	|	|	V |
20+15	3.3285	0.48	|Q	|	|	|	V |
20+20	3.3318	0.48	|Q	|	|	|	V |
20+25	3.3352	0.49	|Q	|	|	|	V |
20+30	3.3385	0.49	|Q	|	|	|	V |
20+35	3.3419	0.49	|Q	|	|	|	V |
20+40	3.3453	0.49	|Q	|	|	|	V |
20+45	3.3486	0.49	|Q	|	|	|	V |
20+50	3.3516	0.44	|Q	|	|	|	V |

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  20+55       3.3541      0.36  |Q        |         |         |        V |
  21+ 0       3.3565      0.34  |Q        |         |         |        V |
  21+ 5       3.3591      0.39  |Q        |         |         |        V |
  21+10       3.3623      0.46  |Q        |         |         |        V |
  21+15       3.3656      0.48  |Q        |         |         |         V|
  21+20       3.3685      0.43  |Q        |         |         |         V|
  21+25       3.3710      0.36  |Q        |         |         |         V|
  21+30       3.3733      0.34  |Q        |         |         |         V|
  21+35       3.3760      0.39  |Q        |         |         |         V|
  21+40       3.3791      0.46  |Q        |         |         |         V|
  21+45       3.3824      0.48  |Q        |         |         |         V|
  21+50       3.3854      0.43  |Q        |         |         |         V|
  21+55       3.3878      0.36  |Q        |         |         |         V|
  22+ 0       3.3902      0.34  |Q        |         |         |         V|
  22+ 5       3.3928      0.39  |Q        |         |         |         V|
  22+10       3.3960      0.46  |Q        |         |         |         V|
  22+15       3.3993      0.48  |Q        |         |         |         V|
  22+20       3.4022      0.43  |Q        |         |         |         V|
  22+25       3.4047      0.36  |Q        |         |         |         V|
  22+30       3.4070      0.34  |Q        |         |         |         V|
  22+35       3.4093      0.33  |Q        |         |         |         V|
  22+40       3.4116      0.33  |Q        |         |         |         V|
  22+45       3.4138      0.33  |Q        |         |         |         V|
  22+50       3.4161      0.33  |Q        |         |         |         V|
  22+55       3.4183      0.33  |Q        |         |         |         V|
  23+ 0       3.4206      0.33  |Q        |         |         |         V|
  23+ 5       3.4228      0.33  |Q        |         |         |         V|
  23+10       3.4251      0.33  |Q        |         |         |         V|
  23+15       3.4273      0.33  |Q        |         |         |         V|
  23+20       3.4296      0.33  |Q        |         |         |         V|
  23+25       3.4318      0.33  |Q        |         |         |         V|
  23+30       3.4341      0.33  |Q        |         |         |         V|
  23+35       3.4363      0.33  |Q        |         |         |         V|
  23+40       3.4385      0.33  |Q        |         |         |         V|
  23+45       3.4408      0.33  |Q        |         |         |         V|
  23+50       3.4430      0.33  |Q        |         |         |         V|
  23+55       3.4453      0.33  |Q        |         |         |         V|
  24+ 0       3.4475      0.33  |Q        |         |         |         V|
  24+ 5       3.4490      0.22  Q         |         |         |         V|
  24+10       3.4495      0.06  Q         |         |         |         V|
  24+15       3.4497      0.03  Q         |         |         |         V|
  24+20       3.4498      0.01  Q         |         |         |         V|
  24+25       3.4498      0.00  Q         |         |         |         V|
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 03/28/24 File: hemetuhpra32242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6385

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Hemet 63 Acre Development
Proposed Condition 2-Year Unit Hydrographs (Area 3)
2-Year Design Storm

Drainage Area = 21.11(Ac.) = 0.033 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 21.11(Ac.) = 0.033 Sq. Mi.
Length along longest watercourse = 1781.00(Ft.)
Length along longest watercourse measured to centroid = 890.00(Ft.)
Length along longest watercourse = 0.337 Mi.
Length along longest watercourse measured to centroid = 0.169 Mi.
Difference in elevation = 14.20(Ft.)
Slope along watercourse = 42.0977 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.059 Hr.
Lag time = 3.57 Min.
25% of lag time = 0.89 Min.
40% of lag time = 1.43 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
21.11	2.07	43.70

100 YEAR Area rainfall data:

```
Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       21.11              5.42                114.42

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    2.070(In)
Area Averaged 100-Year Rainfall =    5.420(In)

Point rain (area averaged) =    2.070(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    2.070(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    17.640           98.00         0.950
     0.110           56.00         0.000
     3.360           75.00         0.000
 Total Area Entered =     21.11(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-2     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
98.0  98.0      0.026     0.950        0.004       0.836      0.003
56.0  56.0      0.511     0.000        0.511       0.005      0.003
75.0  75.0      0.303     0.000        0.303       0.159      0.048
                                                  Sum (F) =   0.054
Area averaged mean soil loss (F) (In/Hr) =  0.054
Minimum soil loss rate ((In/Hr)) =  0.027
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.268
------------------------------------------------------------------------

            U n i t  H y d r o g r a p h
                 VALLEY S-Curve
------------------------------------------------------------------------
            Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %            (CFS)
------------------------------------------------------------------------
    1   0.083        140.058         30.692             6.530
    2   0.167        280.115         47.703            10.149
    3   0.250        420.173         11.799             2.510
    4   0.333        560.230          5.202             1.107
    5   0.417        700.288          2.770             0.589
    6   0.500        840.345          1.835             0.390
                              Sum = 100.000   Sum=      21.275
------------------------------------------------------------------------


 The following loss rate calculations reflect use of the minimum calculated
loss
 rate subtracted from the Storm Rain to produce the maximum Effective Rain
value

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
```

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.017	(0.096)		0.004	0.012
2	0.17	0.07	0.017	(0.095)		0.004	0.012
3	0.25	0.07	0.017	(0.095)		0.004	0.012
4	0.33	0.10	0.025	(0.095)		0.007	0.018
5	0.42	0.10	0.025	(0.094)		0.007	0.018
6	0.50	0.10	0.025	(0.094)		0.007	0.018
7	0.58	0.10	0.025	(0.094)		0.007	0.018
8	0.67	0.10	0.025	(0.093)		0.007	0.018
9	0.75	0.10	0.025	(0.093)		0.007	0.018
10	0.83	0.13	0.033	(0.092)		0.009	0.024
11	0.92	0.13	0.033	(0.092)		0.009	0.024
12	1.00	0.13	0.033	(0.092)		0.009	0.024
13	1.08	0.10	0.025	(0.091)		0.007	0.018
14	1.17	0.10	0.025	(0.091)		0.007	0.018
15	1.25	0.10	0.025	(0.091)		0.007	0.018
16	1.33	0.10	0.025	(0.090)		0.007	0.018
17	1.42	0.10	0.025	(0.090)		0.007	0.018
18	1.50	0.10	0.025	(0.090)		0.007	0.018
19	1.58	0.10	0.025	(0.089)		0.007	0.018
20	1.67	0.10	0.025	(0.089)		0.007	0.018
21	1.75	0.10	0.025	(0.089)		0.007	0.018
22	1.83	0.13	0.033	(0.088)		0.009	0.024
23	1.92	0.13	0.033	(0.088)		0.009	0.024
24	2.00	0.13	0.033	(0.087)		0.009	0.024
25	2.08	0.13	0.033	(0.087)		0.009	0.024
26	2.17	0.13	0.033	(0.087)		0.009	0.024
27	2.25	0.13	0.033	(0.086)		0.009	0.024
28	2.33	0.13	0.033	(0.086)		0.009	0.024
29	2.42	0.13	0.033	(0.086)		0.009	0.024
30	2.50	0.13	0.033	(0.085)		0.009	0.024
31	2.58	0.17	0.041	(0.085)		0.011	0.030
32	2.67	0.17	0.041	(0.085)		0.011	0.030
33	2.75	0.17	0.041	(0.084)		0.011	0.030
34	2.83	0.17	0.041	(0.084)		0.011	0.030
35	2.92	0.17	0.041	(0.084)		0.011	0.030
36	3.00	0.17	0.041	(0.083)		0.011	0.030
37	3.08	0.17	0.041	(0.083)		0.011	0.030
38	3.17	0.17	0.041	(0.083)		0.011	0.030
39	3.25	0.17	0.041	(0.082)		0.011	0.030
40	3.33	0.17	0.041	(0.082)		0.011	0.030
41	3.42	0.17	0.041	(0.082)		0.011	0.030
42	3.50	0.17	0.041	(0.081)		0.011	0.030
43	3.58	0.17	0.041	(0.081)		0.011	0.030
44	3.67	0.17	0.041	(0.081)		0.011	0.030
45	3.75	0.17	0.041	(0.080)		0.011	0.030
46	3.83	0.20	0.050	(0.080)		0.013	0.036
47	3.92	0.20	0.050	(0.080)		0.013	0.036
48	4.00	0.20	0.050	(0.079)		0.013	0.036
49	4.08	0.20	0.050	(0.079)		0.013	0.036
50	4.17	0.20	0.050	(0.079)		0.013	0.036
51	4.25	0.20	0.050	(0.078)		0.013	0.036
52	4.33	0.23	0.058	(0.078)		0.016	0.042
53	4.42	0.23	0.058	(0.078)		0.016	0.042
54	4.50	0.23	0.058	(0.077)		0.016	0.042
55	4.58	0.23	0.058	(0.077)		0.016	0.042

56	4.67	0.23	0.058	(0.077)	0.016	0.042
57	4.75	0.23	0.058	(0.076)	0.016	0.042
58	4.83	0.27	0.066	(0.076)	0.018	0.048
59	4.92	0.27	0.066	(0.076)	0.018	0.048
60	5.00	0.27	0.066	(0.075)	0.018	0.048
61	5.08	0.20	0.050	(0.075)	0.013	0.036
62	5.17	0.20	0.050	(0.075)	0.013	0.036
63	5.25	0.20	0.050	(0.074)	0.013	0.036
64	5.33	0.23	0.058	(0.074)	0.016	0.042
65	5.42	0.23	0.058	(0.074)	0.016	0.042
66	5.50	0.23	0.058	(0.073)	0.016	0.042
67	5.58	0.27	0.066	(0.073)	0.018	0.048
68	5.67	0.27	0.066	(0.073)	0.018	0.048
69	5.75	0.27	0.066	(0.072)	0.018	0.048
70	5.83	0.27	0.066	(0.072)	0.018	0.048
71	5.92	0.27	0.066	(0.072)	0.018	0.048
72	6.00	0.27	0.066	(0.071)	0.018	0.048
73	6.08	0.30	0.075	(0.071)	0.020	0.055
74	6.17	0.30	0.075	(0.071)	0.020	0.055
75	6.25	0.30	0.075	(0.070)	0.020	0.055
76	6.33	0.30	0.075	(0.070)	0.020	0.055
77	6.42	0.30	0.075	(0.070)	0.020	0.055
78	6.50	0.30	0.075	(0.069)	0.020	0.055
79	6.58	0.33	0.083	(0.069)	0.022	0.061
80	6.67	0.33	0.083	(0.069)	0.022	0.061
81	6.75	0.33	0.083	(0.069)	0.022	0.061
82	6.83	0.33	0.083	(0.068)	0.022	0.061
83	6.92	0.33	0.083	(0.068)	0.022	0.061
84	7.00	0.33	0.083	(0.068)	0.022	0.061
85	7.08	0.33	0.083	(0.067)	0.022	0.061
86	7.17	0.33	0.083	(0.067)	0.022	0.061
87	7.25	0.33	0.083	(0.067)	0.022	0.061
88	7.33	0.37	0.091	(0.066)	0.024	0.067
89	7.42	0.37	0.091	(0.066)	0.024	0.067
90	7.50	0.37	0.091	(0.066)	0.024	0.067
91	7.58	0.40	0.099	(0.065)	0.027	0.073
92	7.67	0.40	0.099	(0.065)	0.027	0.073
93	7.75	0.40	0.099	(0.065)	0.027	0.073
94	7.83	0.43	0.108	(0.065)	0.029	0.079
95	7.92	0.43	0.108	(0.064)	0.029	0.079
96	8.00	0.43	0.108	(0.064)	0.029	0.079
97	8.08	0.50	0.124	(0.064)	0.033	0.091
98	8.17	0.50	0.124	(0.063)	0.033	0.091
99	8.25	0.50	0.124	(0.063)	0.033	0.091
100	8.33	0.50	0.124	(0.063)	0.033	0.091
101	8.42	0.50	0.124	(0.062)	0.033	0.091
102	8.50	0.50	0.124	(0.062)	0.033	0.091
103	8.58	0.53	0.132	(0.062)	0.036	0.097
104	8.67	0.53	0.132	(0.062)	0.036	0.097
105	8.75	0.53	0.132	(0.061)	0.036	0.097
106	8.83	0.57	0.141	(0.061)	0.038	0.103
107	8.92	0.57	0.141	(0.061)	0.038	0.103
108	9.00	0.57	0.141	(0.060)	0.038	0.103
109	9.08	0.63	0.157	(0.060)	0.042	0.115
110	9.17	0.63	0.157	(0.060)	0.042	0.115
111	9.25	0.63	0.157	(0.060)	0.042	0.115

112	9.33	0.67	0.166	(0.059)	0.044	0.121
113	9.42	0.67	0.166	(0.059)	0.044	0.121
114	9.50	0.67	0.166	(0.059)	0.044	0.121
115	9.58	0.70	0.174	(0.058)	0.047	0.127
116	9.67	0.70	0.174	(0.058)	0.047	0.127
117	9.75	0.70	0.174	(0.058)	0.047	0.127
118	9.83	0.73	0.182	(0.058)	0.049	0.133
119	9.92	0.73	0.182	(0.057)	0.049	0.133
120	10.00	0.73	0.182	(0.057)	0.049	0.133
121	10.08	0.50	0.124	(0.057)	0.033	0.091
122	10.17	0.50	0.124	(0.057)	0.033	0.091
123	10.25	0.50	0.124	(0.056)	0.033	0.091
124	10.33	0.50	0.124	(0.056)	0.033	0.091
125	10.42	0.50	0.124	(0.056)	0.033	0.091
126	10.50	0.50	0.124	(0.055)	0.033	0.091
127	10.58	0.67	0.166	(0.055)	0.044	0.121
128	10.67	0.67	0.166	(0.055)	0.044	0.121
129	10.75	0.67	0.166	(0.055)	0.044	0.121
130	10.83	0.67	0.166	(0.054)	0.044	0.121
131	10.92	0.67	0.166	(0.054)	0.044	0.121
132	11.00	0.67	0.166	(0.054)	0.044	0.121
133	11.08	0.63	0.157	(0.054)	0.042	0.115
134	11.17	0.63	0.157	(0.053)	0.042	0.115
135	11.25	0.63	0.157	(0.053)	0.042	0.115
136	11.33	0.63	0.157	(0.053)	0.042	0.115
137	11.42	0.63	0.157	(0.052)	0.042	0.115
138	11.50	0.63	0.157	(0.052)	0.042	0.115
139	11.58	0.57	0.141	(0.052)	0.038	0.103
140	11.67	0.57	0.141	(0.052)	0.038	0.103
141	11.75	0.57	0.141	(0.051)	0.038	0.103
142	11.83	0.60	0.149	(0.051)	0.040	0.109
143	11.92	0.60	0.149	(0.051)	0.040	0.109
144	12.00	0.60	0.149	(0.051)	0.040	0.109
145	12.08	0.83	0.207	0.050	(0.055)	0.157
146	12.17	0.83	0.207	0.050	(0.055)	0.157
147	12.25	0.83	0.207	0.050	(0.055)	0.157
148	12.33	0.87	0.215	0.050	(0.058)	0.166
149	12.42	0.87	0.215	0.049	(0.058)	0.166
150	12.50	0.87	0.215	0.049	(0.058)	0.166
151	12.58	0.93	0.232	0.049	(0.062)	0.183
152	12.67	0.93	0.232	0.049	(0.062)	0.183
153	12.75	0.93	0.232	0.048	(0.062)	0.183
154	12.83	0.97	0.240	0.048	(0.064)	0.192
155	12.92	0.97	0.240	0.048	(0.064)	0.192
156	13.00	0.97	0.240	0.048	(0.064)	0.192
157	13.08	1.13	0.282	0.047	(0.075)	0.234
158	13.17	1.13	0.282	0.047	(0.075)	0.234
159	13.25	1.13	0.282	0.047	(0.075)	0.235
160	13.33	1.13	0.282	0.047	(0.075)	0.235
161	13.42	1.13	0.282	0.047	(0.075)	0.235
162	13.50	1.13	0.282	0.046	(0.075)	0.235
163	13.58	0.77	0.190	0.046	(0.051)	0.144
164	13.67	0.77	0.190	0.046	(0.051)	0.145
165	13.75	0.77	0.190	0.046	(0.051)	0.145
166	13.83	0.77	0.190	0.045	(0.051)	0.145
167	13.92	0.77	0.190	0.045	(0.051)	0.145

168	14.00	0.77	0.190	0.045	(0.051)	0.146
169	14.08	0.90	0.224	0.045	(0.060)	0.179
170	14.17	0.90	0.224	0.044	(0.060)	0.179
171	14.25	0.90	0.224	0.044	(0.060)	0.179
172	14.33	0.87	0.215	0.044	(0.058)	0.171
173	14.42	0.87	0.215	0.044	(0.058)	0.172
174	14.50	0.87	0.215	0.044	(0.058)	0.172
175	14.58	0.87	0.215	0.043	(0.058)	0.172
176	14.67	0.87	0.215	0.043	(0.058)	0.172
177	14.75	0.87	0.215	0.043	(0.058)	0.172
178	14.83	0.83	0.207	0.043	(0.055)	0.164
179	14.92	0.83	0.207	0.042	(0.055)	0.165
180	15.00	0.83	0.207	0.042	(0.055)	0.165
181	15.08	0.80	0.199	0.042	(0.053)	0.157
182	15.17	0.80	0.199	0.042	(0.053)	0.157
183	15.25	0.80	0.199	0.042	(0.053)	0.157
184	15.33	0.77	0.190	0.041	(0.051)	0.149
185	15.42	0.77	0.190	0.041	(0.051)	0.149
186	15.50	0.77	0.190	0.041	(0.051)	0.150
187	15.58	0.63	0.157	0.041	(0.042)	0.117
188	15.67	0.63	0.157	0.041	(0.042)	0.117
189	15.75	0.63	0.157	0.040	(0.042)	0.117
190	15.83	0.63	0.157	0.040	(0.042)	0.117
191	15.92	0.63	0.157	0.040	(0.042)	0.117
192	16.00	0.63	0.157	0.040	(0.042)	0.118
193	16.08	0.13	0.033	(0.039)	0.009	0.024
194	16.17	0.13	0.033	(0.039)	0.009	0.024
195	16.25	0.13	0.033	(0.039)	0.009	0.024
196	16.33	0.13	0.033	(0.039)	0.009	0.024
197	16.42	0.13	0.033	(0.039)	0.009	0.024
198	16.50	0.13	0.033	(0.038)	0.009	0.024
199	16.58	0.10	0.025	(0.038)	0.007	0.018
200	16.67	0.10	0.025	(0.038)	0.007	0.018
201	16.75	0.10	0.025	(0.038)	0.007	0.018
202	16.83	0.10	0.025	(0.038)	0.007	0.018
203	16.92	0.10	0.025	(0.038)	0.007	0.018
204	17.00	0.10	0.025	(0.037)	0.007	0.018
205	17.08	0.17	0.041	(0.037)	0.011	0.030
206	17.17	0.17	0.041	(0.037)	0.011	0.030
207	17.25	0.17	0.041	(0.037)	0.011	0.030
208	17.33	0.17	0.041	(0.037)	0.011	0.030
209	17.42	0.17	0.041	(0.036)	0.011	0.030
210	17.50	0.17	0.041	(0.036)	0.011	0.030
211	17.58	0.17	0.041	(0.036)	0.011	0.030
212	17.67	0.17	0.041	(0.036)	0.011	0.030
213	17.75	0.17	0.041	(0.036)	0.011	0.030
214	17.83	0.13	0.033	(0.035)	0.009	0.024
215	17.92	0.13	0.033	(0.035)	0.009	0.024
216	18.00	0.13	0.033	(0.035)	0.009	0.024
217	18.08	0.13	0.033	(0.035)	0.009	0.024
218	18.17	0.13	0.033	(0.035)	0.009	0.024
219	18.25	0.13	0.033	(0.035)	0.009	0.024
220	18.33	0.13	0.033	(0.034)	0.009	0.024
221	18.42	0.13	0.033	(0.034)	0.009	0.024
222	18.50	0.13	0.033	(0.034)	0.009	0.024
223	18.58	0.10	0.025	(0.034)	0.007	0.018

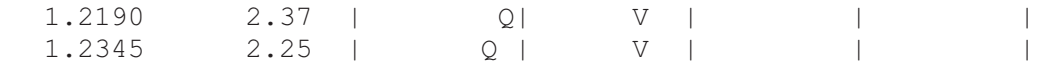
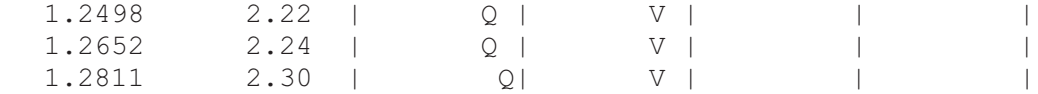
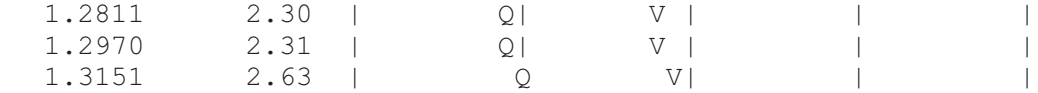
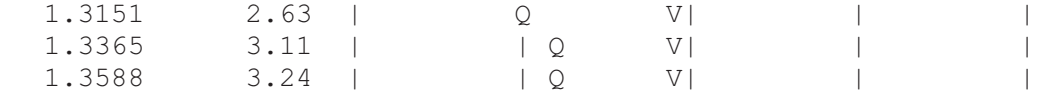
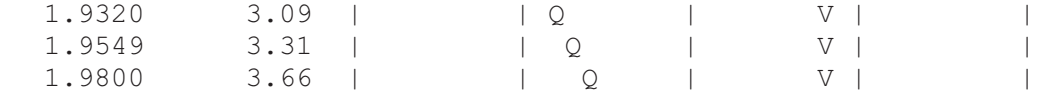
224	18.67	0.10	0.025	(0.034)	0.007	0.018
225	18.75	0.10	0.025	(0.034)	0.007	0.018
226	18.83	0.07	0.017	(0.033)	0.004	0.012
227	18.92	0.07	0.017	(0.033)	0.004	0.012
228	19.00	0.07	0.017	(0.033)	0.004	0.012
229	19.08	0.10	0.025	(0.033)	0.007	0.018
230	19.17	0.10	0.025	(0.033)	0.007	0.018
231	19.25	0.10	0.025	(0.033)	0.007	0.018
232	19.33	0.13	0.033	(0.033)	0.009	0.024
233	19.42	0.13	0.033	(0.032)	0.009	0.024
234	19.50	0.13	0.033	(0.032)	0.009	0.024
235	19.58	0.10	0.025	(0.032)	0.007	0.018
236	19.67	0.10	0.025	(0.032)	0.007	0.018
237	19.75	0.10	0.025	(0.032)	0.007	0.018
238	19.83	0.07	0.017	(0.032)	0.004	0.012
239	19.92	0.07	0.017	(0.032)	0.004	0.012
240	20.00	0.07	0.017	(0.031)	0.004	0.012
241	20.08	0.10	0.025	(0.031)	0.007	0.018
242	20.17	0.10	0.025	(0.031)	0.007	0.018
243	20.25	0.10	0.025	(0.031)	0.007	0.018
244	20.33	0.10	0.025	(0.031)	0.007	0.018
245	20.42	0.10	0.025	(0.031)	0.007	0.018
246	20.50	0.10	0.025	(0.031)	0.007	0.018
247	20.58	0.10	0.025	(0.030)	0.007	0.018
248	20.67	0.10	0.025	(0.030)	0.007	0.018
249	20.75	0.10	0.025	(0.030)	0.007	0.018
250	20.83	0.07	0.017	(0.030)	0.004	0.012
251	20.92	0.07	0.017	(0.030)	0.004	0.012
252	21.00	0.07	0.017	(0.030)	0.004	0.012
253	21.08	0.10	0.025	(0.030)	0.007	0.018
254	21.17	0.10	0.025	(0.030)	0.007	0.018
255	21.25	0.10	0.025	(0.029)	0.007	0.018
256	21.33	0.07	0.017	(0.029)	0.004	0.012
257	21.42	0.07	0.017	(0.029)	0.004	0.012
258	21.50	0.07	0.017	(0.029)	0.004	0.012
259	21.58	0.10	0.025	(0.029)	0.007	0.018
260	21.67	0.10	0.025	(0.029)	0.007	0.018
261	21.75	0.10	0.025	(0.029)	0.007	0.018
262	21.83	0.07	0.017	(0.029)	0.004	0.012
263	21.92	0.07	0.017	(0.029)	0.004	0.012
264	22.00	0.07	0.017	(0.029)	0.004	0.012
265	22.08	0.10	0.025	(0.028)	0.007	0.018
266	22.17	0.10	0.025	(0.028)	0.007	0.018
267	22.25	0.10	0.025	(0.028)	0.007	0.018
268	22.33	0.07	0.017	(0.028)	0.004	0.012
269	22.42	0.07	0.017	(0.028)	0.004	0.012
270	22.50	0.07	0.017	(0.028)	0.004	0.012
271	22.58	0.07	0.017	(0.028)	0.004	0.012
272	22.67	0.07	0.017	(0.028)	0.004	0.012
273	22.75	0.07	0.017	(0.028)	0.004	0.012
274	22.83	0.07	0.017	(0.028)	0.004	0.012
275	22.92	0.07	0.017	(0.028)	0.004	0.012
276	23.00	0.07	0.017	(0.028)	0.004	0.012
277	23.08	0.07	0.017	(0.027)	0.004	0.012
278	23.17	0.07	0.017	(0.027)	0.004	0.012
279	23.25	0.07	0.017	(0.027)	0.004	0.012

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280  23.33     0.07      0.017       (  0.027)       0.004        0.012
281  23.42     0.07      0.017       (  0.027)       0.004        0.012
282  23.50     0.07      0.017       (  0.027)       0.004        0.012
283  23.58     0.07      0.017       (  0.027)       0.004        0.012
284  23.67     0.07      0.017       (  0.027)       0.004        0.012
285  23.75     0.07      0.017       (  0.027)       0.004        0.012
286  23.83     0.07      0.017       (  0.027)       0.004        0.012
287  23.92     0.07      0.017       (  0.027)       0.004        0.012
288  24.00     0.07      0.017       (  0.027)       0.004        0.012
          (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    18.8
     Flood volume = Effective rainfall      1.56(In)
      times area      21.1(Ac.)/[(In)/(Ft.)] =       2.8(Ac.Ft)
     Total soil loss =      0.51(In)
     Total soil loss =     0.891(Ac.Ft)
     Total rainfall =      2.07(In)
     Flood volume =      119823.5 Cubic Feet
     Total soil loss =       38792.6 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      5.002(CFS)
     ---------------------------------------------------------------------
     +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        24 - H O U R    S T O R M
                    R u n o f f      H y d r o g r a p h
     ---------------------------------------------------------------------
                 Hydrograph in   5   Minute intervals ((CFS))

     ---------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------------
   0+ 5       0.0005      0.08  Q         |         |         |         |
   0+10       0.0019      0.20  Q         |         |         |         |
   0+15       0.0035      0.23  Q         |         |         |         |
   0+20       0.0055      0.29  VQ        |         |         |         |
   0+25       0.0079      0.35  VQ        |         |         |         |
   0+30       0.0105      0.37  VQ        |         |         |         |
   0+35       0.0132      0.38  VQ        |         |         |         |
   0+40       0.0158      0.38  VQ        |         |         |         |
   0+45       0.0185      0.39  VQ        |         |         |         |
   0+50       0.0214      0.43  VQ        |         |         |         |
   0+55       0.0248      0.49  VQ        |         |         |         |
   1+ 0       0.0282      0.50  V Q       |         |         |         |
   1+ 5       0.0315      0.47  VQ        |         |         |         |
   1+10       0.0343      0.41  VQ        |         |         |         |
   1+15       0.0371      0.40  VQ        |         |         |         |
   1+20       0.0398      0.39  VQ        |         |         |         |
   1+25       0.0425      0.39  VQ        |         |         |         |
   1+30       0.0451      0.39  VQ        |         |         |         |
   1+35       0.0478      0.39  VQ        |         |         |         |
   1+40       0.0505      0.39  VQ        |         |         |         |
   1+45       0.0531      0.39  VQ        |         |         |         |
   1+50       0.0561      0.43  VQ        |         |         |         |
   1+55       0.0594      0.49  VQ        |         |         |         |
   2+ 0       0.0629      0.50  V Q       |         |         |         |
   2+ 5       0.0664      0.51  V Q       |         |         |         |
   2+10       0.0699      0.51  |VQ       |         |         |         |
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2+15	0.0735	0.52	|VQ	|	|	|	|
2+20	0.0770	0.52	|VQ	|	|	|	|
2+25	0.0806	0.52	|VQ	|	|	|	|
2+30	0.0842	0.52	|VQ	|	|	|	|
2+35	0.0880	0.56	|VQ	|	|	|	|
2+40	0.0922	0.62	|VQ	|	|	|	|
2+45	0.0966	0.63	|VQ	|	|	|	|
2+50	0.1010	0.64	|VQ	|	|	|	|
2+55	0.1054	0.64	|VQ	|	|	|	|
3+ 0	0.1099	0.65	|VQ	|	|	|	|
3+ 5	0.1143	0.65	|VQ	|	|	|	|
3+10	0.1187	0.65	|VQ	|	|	|	|
3+15	0.1232	0.65	|VQ	|	|	|	|
3+20	0.1276	0.65	|VQ	|	|	|	|
3+25	0.1321	0.65	|VQ	|	|	|	|
3+30	0.1365	0.65	|VQ	|	|	|	|
3+35	0.1410	0.65	| Q	|	|	|	|
3+40	0.1454	0.65	| Q	|	|	|	|
3+45	0.1498	0.65	| Q	|	|	|	|
3+50	0.1546	0.68	| Q	|	|	|	|
3+55	0.1597	0.75	| Q	|	|	|	|
4+ 0	0.1649	0.76	| VQ	|	|	|	|
4+ 5	0.1702	0.77	| VQ	|	|	|	|
4+10	0.1755	0.77	| VQ	|	|	|	|
4+15	0.1809	0.77	| VQ	|	|	|	|
4+20	0.1865	0.81	| VQ	|	|	|	|
4+25	0.1925	0.88	| VQ	|	|	|	|
4+30	0.1986	0.89	| VQ	|	|	|	|
4+35	0.2048	0.90	| VQ	|	|	|	|
4+40	0.2110	0.90	| Q	|	|	|	|
4+45	0.2172	0.90	| Q	|	|	|	|
4+50	0.2237	0.94	| Q	|	|	|	|
4+55	0.2306	1.00	| VQ	|	|	|	|
5+ 0	0.2377	1.02	| VQ	|	|	|	|
5+ 5	0.2442	0.95	| Q	|	|	|	|
5+10	0.2499	0.83	| Q	|	|	|	|
5+15	0.2554	0.80	| Q	|	|	|	|
5+20	0.2611	0.83	| Q	|	|	|	|
5+25	0.2671	0.88	| Q	|	|	|	|
5+30	0.2733	0.89	| Q	|	|	|	|
5+35	0.2797	0.94	| QV	|	|	|	|
5+40	0.2866	1.00	| Q	|	|	|	|
5+45	0.2936	1.02	| Q	|	|	|	|
5+50	0.3007	1.03	| Q	|	|	|	|
5+55	0.3078	1.03	| Q	|	|	|	|
6+ 0	0.3149	1.03	| Q	|	|	|	|
6+ 5	0.3223	1.07	| Q	|	|	|	|
6+10	0.3301	1.13	| Q	|	|	|	|
6+15	0.3380	1.15	| Q	|	|	|	|
6+20	0.3460	1.16	| QV	|	|	|	|
6+25	0.3539	1.16	| QV	|	|	|	|
6+30	0.3619	1.16	| QV	|	|	|	|
6+35	0.3702	1.20	| QV	|	|	|	|
6+40	0.3789	1.26	| Q	|	|	|	|
6+45	0.3877	1.28	| Q	|	|	|	|
6+50	0.3965	1.28	| Q	|	|	|	|

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 6+55       0.4054      1.29  |    Q    |         |         |         |
 7+ 0       0.4143      1.29  |    QV   |         |         |         |
 7+ 5       0.4232      1.29  |    QV   |         |         |         |
 7+10       0.4321      1.29  |    QV   |         |         |         |
 7+15       0.4409      1.29  |    QV   |         |         |         |
 7+20       0.4501      1.33  |    QV   |         |         |         |
 7+25       0.4597      1.39  |    QV   |         |         |         |
 7+30       0.4694      1.41  |    QV   |         |         |         |
 7+35       0.4794      1.45  |    QV   |         |         |         |
 7+40       0.4898      1.52  |     QV  |         |         |         |
 7+45       0.5004      1.54  |     QV  |         |         |         |
 7+50       0.5113      1.58  |     QV  |         |         |         |
 7+55       0.5226      1.65  |     QV  |         |         |         |
 8+ 0       0.5341      1.66  |     QV  |         |         |         |
 8+ 5       0.5462      1.75  |      Q  |         |         |         |
 8+10       0.5591      1.88  |      QV |         |         |         |
 8+15       0.5722      1.91  |      QV |         |         |         |
 8+20       0.5855      1.92  |      QV |         |         |         |
 8+25       0.5988      1.93  |      QV |         |         |         |
 8+30       0.6121      1.94  |      QV |         |         |         |
 8+35       0.6257      1.97  |      Q V|         |         |         |
 8+40       0.6397      2.04  |       QV|         |         |         |
 8+45       0.6539      2.05  |       QV|         |         |         |
 8+50       0.6683      2.10  |       QV|         |         |         |
 8+55       0.6832      2.16  |       QV|         |         |         |
 9+ 0       0.6982      2.18  |       Q V         |         |         |
 9+ 5       0.7138      2.27  |        QV         |         |         |
 9+10       0.7303      2.39  |        QV         |         |         |
 9+15       0.7470      2.43  |        QV         |         |         |
 9+20       0.7641      2.48  |        Q|V        |         |         |
 9+25       0.7816      2.55  |         QV        |         |         |
 9+30       0.7993      2.57  |         QV        |         |         |
 9+35       0.8173      2.61  |         QV        |         |         |
 9+40       0.8358      2.68  |         Q V       |         |         |
 9+45       0.8543      2.70  |         Q V       |         |         |
 9+50       0.8732      2.74  |         Q V       |         |         |
 9+55       0.8926      2.81  |         |QV       |         |         |
10+ 0       0.9120      2.83  |         |Q V      |         |         |
10+ 5       0.9296      2.56  |         Q  V      |         |         |
10+10       0.9443      2.13  |       Q |  V      |         |         |
10+15       0.9582      2.02  |       Q |  V      |         |         |
10+20       0.9718      1.98  |      Q  |   V     |         |         |
10+25       0.9853      1.95  |      Q  |   V     |         |         |
10+30       0.9986      1.94  |      Q  |   V     |         |         |
10+35       1.0133      2.13  |       Q |   V     |         |         |
10+40       1.0301      2.44  |        Q|   V     |         |         |
10+45       1.0474      2.52  |         Q    V    |         |         |
10+50       1.0650      2.55  |         Q    V    |         |         |
10+55       1.0827      2.57  |         Q    V    |         |         |
11+ 0       1.1004      2.58  |         Q     V   |         |         |
11+ 5       1.1179      2.54  |         Q     V   |         |         |
11+10       1.1350      2.48  |        Q|     V   |         |         |
11+15       1.1520      2.46  |        Q|     V   |         |         |
11+20       1.1689      2.46  |        Q|     V   |         |         |
11+25       1.1858      2.45  |        Q|      V  |         |         |
11+30       1.2027      2.45  |        Q|      V  |         |         |
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11+35	1.2190	2.37	
11+40	1.2345	2.25	
11+45	1.2498	2.22	
11+50	1.2652	2.24	
11+55	1.2811	2.30	
12+ 0	1.2970	2.31	
12+ 5	1.3151	2.63	
12+10	1.3365	3.11	
12+15	1.3588	3.24	
12+20	1.3819	3.35	
12+25	1.4058	3.47	
12+30	1.4300	3.51	
12+35	1.4550	3.63	
12+40	1.4813	3.81	
12+45	1.5079	3.86	
12+50	1.5350	3.94	
12+55	1.5628	4.04	
13+ 0	1.5909	4.07	
13+ 5	1.6209	4.36	
13+10	1.6539	4.79	
13+15	1.6876	4.90	
13+20	1.7217	4.95	
13+25	1.7560	4.98	
13+30	1.7904	5.00	
13+35	1.8208	4.41	
13+40	1.8449	3.49	
13+45	1.8674	3.27	
13+50	1.8892	3.17	
13+55	1.9107	3.12	
14+ 0	1.9320	3.09	
14+ 5	1.9549	3.31	
14+10	1.9800	3.66	
14+15	2.0058	3.74	
14+20	2.0315	3.73	
14+25	2.0568	3.67	
14+30	2.0821	3.67	
14+35	2.1073	3.66	
14+40	2.1325	3.66	
14+45	2.1578	3.66	
14+50	2.1827	3.62	
14+55	2.2070	3.54	
15+ 0	2.2312	3.52	
15+ 5	2.2551	3.46	
15+10	2.2783	3.38	
15+15	2.3015	3.36	
15+20	2.3242	3.30	
15+25	2.3463	3.21	
15+30	2.3683	3.19	
15+35	2.3888	2.97	
15+40	2.4070	2.64	
15+45	2.4246	2.56	
15+50	2.4419	2.52	
15+55	2.4592	2.51	
16+ 0	2.4764	2.50	
16+ 5	2.4895	1.89	
16+10	2.4960	0.94	

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16+15       2.5009      0.71  | Q       |         |         |      V   |
16+20       2.5050      0.61  | Q       |         |         |      V   |
16+25       2.5088      0.55  | Q       |         |         |      V   |
16+30       2.5124      0.52  | Q       |         |         |      V   |
16+35       2.5157      0.48  |Q        |         |         |      V   |
16+40       2.5185      0.41  |Q        |         |         |      V   |
16+45       2.5213      0.40  |Q        |         |         |      V   |
16+50       2.5240      0.39  |Q        |         |         |      V   |
16+55       2.5267      0.39  |Q        |         |         |      V   |
17+ 0       2.5293      0.39  |Q        |         |         |      V   |
17+ 5       2.5326      0.47  |Q        |         |         |      V   |
17+10       2.5366      0.59  | Q       |         |         |      V   |
17+15       2.5409      0.62  | Q       |         |         |      V   |
17+20       2.5452      0.63  | Q       |         |         |       V  |
17+25       2.5497      0.64  | Q       |         |         |       V  |
17+30       2.5541      0.65  | Q       |         |         |       V  |
17+35       2.5585      0.65  | Q       |         |         |       V  |
17+40       2.5630      0.65  | Q       |         |         |       V  |
17+45       2.5674      0.65  | Q       |         |         |       V  |
17+50       2.5716      0.61  | Q       |         |         |       V  |
17+55       2.5753      0.54  | Q       |         |         |       V  |
18+ 0       2.5790      0.53  | Q       |         |         |       V  |
18+ 5       2.5826      0.52  | Q       |         |         |       V  |
18+10       2.5861      0.52  | Q       |         |         |       V  |
18+15       2.5897      0.52  | Q       |         |         |       V  |
18+20       2.5933      0.52  | Q       |         |         |       V  |
18+25       2.5968      0.52  | Q       |         |         |       V  |
18+30       2.6004      0.52  | Q       |         |         |       V  |
18+35       2.6036      0.48  |Q        |         |         |       V  |
18+40       2.6065      0.41  |Q        |         |         |       V  |
18+45       2.6093      0.40  |Q        |         |         |       V  |
18+50       2.6117      0.35  |Q        |         |         |       V  |
18+55       2.6137      0.29  |Q        |         |         |        V |
19+ 0       2.6155      0.27  |Q        |         |         |        V |
19+ 5       2.6176      0.30  |Q        |         |         |        V |
19+10       2.6201      0.36  |Q        |         |         |        V |
19+15       2.6227      0.37  |Q        |         |         |        V |
19+20       2.6256      0.42  |Q        |         |         |        V |
19+25       2.6289      0.49  |Q        |         |         |        V |
19+30       2.6324      0.50  | Q       |         |         |        V |
19+35       2.6356      0.47  |Q        |         |         |        V |
19+40       2.6385      0.41  |Q        |         |         |        V |
19+45       2.6412      0.40  |Q        |         |         |        V |
19+50       2.6437      0.35  |Q        |         |         |        V |
19+55       2.6457      0.29  |Q        |         |         |        V |
20+ 0       2.6475      0.27  |Q        |         |         |        V |
20+ 5       2.6496      0.30  |Q        |         |         |        V |
20+10       2.6521      0.36  |Q        |         |         |        V |
20+15       2.6547      0.37  |Q        |         |         |        V |
20+20       2.6573      0.38  |Q        |         |         |        V |
20+25       2.6600      0.38  |Q        |         |         |        V |
20+30       2.6626      0.39  |Q        |         |         |        V |
20+35       2.6653      0.39  |Q        |         |         |        V |
20+40       2.6679      0.39  |Q        |         |         |        V |
20+45       2.6706      0.39  |Q        |         |         |        V |
20+50       2.6730      0.35  |Q        |         |         |        V |
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  20+55       2.6750      0.29  |Q        |         |         |        V |
  21+ 0       2.6768      0.27  |Q        |         |         |        V |
  21+ 5       2.6789      0.30  |Q        |         |         |        V |
  21+10       2.6814      0.36  |Q        |         |         |        V |
  21+15       2.6840      0.37  |Q        |         |         |         V|
  21+20       2.6864      0.34  |Q        |         |         |         V|
  21+25       2.6883      0.28  |Q        |         |         |         V|
  21+30       2.6902      0.27  |Q        |         |         |         V|
  21+35       2.6923      0.30  |Q        |         |         |         V|
  21+40       2.6947      0.36  |Q        |         |         |         V|
  21+45       2.6973      0.37  |Q        |         |         |         V|
  21+50       2.6997      0.34  |Q        |         |         |         V|
  21+55       2.7016      0.28  |Q        |         |         |         V|
  22+ 0       2.7035      0.27  |Q        |         |         |         V|
  22+ 5       2.7056      0.30  |Q        |         |         |         V|
  22+10       2.7081      0.36  |Q        |         |         |         V|
  22+15       2.7107      0.37  |Q        |         |         |         V|
  22+20       2.7130      0.34  |Q        |         |         |         V|
  22+25       2.7150      0.28  |Q        |         |         |         V|
  22+30       2.7168      0.27  |Q        |         |         |         V|
  22+35       2.7186      0.26  |Q        |         |         |         V|
  22+40       2.7204      0.26  |Q        |         |         |         V|
  22+45       2.7222      0.26  |Q        |         |         |         V|
  22+50       2.7240      0.26  |Q        |         |         |         V|
  22+55       2.7258      0.26  |Q        |         |         |         V|
  23+ 0       2.7275      0.26  |Q        |         |         |         V|
  23+ 5       2.7293      0.26  |Q        |         |         |         V|
  23+10       2.7311      0.26  |Q        |         |         |         V|
  23+15       2.7329      0.26  |Q        |         |         |         V|
  23+20       2.7346      0.26  |Q        |         |         |         V|
  23+25       2.7364      0.26  |Q        |         |         |         V|
  23+30       2.7382      0.26  |Q        |         |         |         V|
  23+35       2.7400      0.26  |Q        |         |         |         V|
  23+40       2.7418      0.26  |Q        |         |         |         V|
  23+45       2.7435      0.26  |Q        |         |         |         V|
  23+50       2.7453      0.26  |Q        |         |         |         V|
  23+55       2.7471      0.26  |Q        |         |         |         V|
  24+ 0       2.7489      0.26  |Q        |         |         |         V|
  24+ 5       2.7501      0.18  Q         |         |         |         V|
  24+10       2.7505      0.06  Q         |         |         |         V|
  24+15       2.7507      0.03  Q         |         |         |         V|
  24+20       2.7507      0.01  Q         |         |         |         V|
  24+25       2.7508      0.00  Q         |         |         |         V|
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DAVID EVANS AND ASSOCIATES INC.
41951 Remington Ave.
Suite 220 Temecula, CA
92590

Developed Condition: Area A1
Total Area: 14.20 Acres

2 Year	Q (cfs)	Vol (acft)
24 Hr	3.17	1.79

Developed Condition: Area A2
Total Area: 25.58 Acres

2 Year	Q (cfs)	Vol (acft)
24 Hr	6.17	3.45

Developed Condition: Area A3
Total Area: 21.11 Acres

2 Year	Q (cfs)	Vol (acft)
24 Hr	5.00	2.75

Existing Condition: Area A1
Total Area: 60.89 Acres

2 Year	Q (cfs)	Vol (acft)
24 Hr	9.76	2.95

Volume Analysis

2 Year	Total Ex Vol (acft)	Total Prop Vol (acft)
24 Hr	2.95	8.0

CONCLUSION

THE PROJECT PROPOSES AN UNDERGROUND DETENTION BASIN VOLUME OF 12.0 ACFT (104,587 sqft x 5-ft) , WHICH IS LARGER THEN THE TOTAL VOLU CONDITION HYDROGRAPH FOR THE 2-YR 24-HR STORM EVENT (8.0 ACFT). THE FLOW WILL BE LESS THAN EXISTING CONDITION, LEAVING THE SITE. THE DEVELOPED FLOWS ARE MITIGATED.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	**... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☒ **A.** On-site storm drain inlets	☒ Locations of inlets.	☒ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☒ 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."
☐ **B.** Interior floor drains and elevator shaft sump pumps		☐ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.
☐ **C.** Interior parking garages		☐ State that parking garage floor drains will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **D1.** Need for future indoor & structural pest control		☐ Note building design features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees, and operators.
☒ **D2.** Landscape/ Outdoor Pesticide Use	☐ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☐ Show self-retaining landscape areas, if any. ☒ Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)	State that final landscape plans will accomplish all of the following. ☐ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒ 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 stormwater pollution. ☒ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☐ Consider using pest-resistant plants, especially adjacent to hardscape. ☒ To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☐ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☒ Provide IPM information to new owners, lessees and operators.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **E.** Pools, spas, ponds, decorative fountains, and other water features.	☐ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☐ See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ **F.** Food service	☐ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☐ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☐ Describe the location and features of the designated cleaning area. ☐ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☐ See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ Provide this brochure to new site owners, lessees, and operators.
☒ **G.** Refuse areas	☒ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☒ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☐ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☐ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☒ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☒ 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 www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
☒ **H.** Industrial processes.	☒ Show process area.	☒ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	☒ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑Car dealerships and similar may rinse cars with water only.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **L.** Fuel Dispensing Areas	❑ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ **M.** Loading Docks	☒ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ☐ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☒ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☐ Move loaded and unloaded items indoors as soon as possible. ☒ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **N.** Fire Sprinkler Test Water		❑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	❑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim. ❑ Other sources		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ 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. ❑ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Include controls for other sources as specified by local reviewer.	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
☒ **P.** Plazas, sidewalks, and parking lots.			☒ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

OPERATION AND MAINTENANCE PLAN

I. Introduction

The Locktek development project is a proposal to develop approximately 63 acres of vacant land located at the southwest corner of Acacia Avenue and Cawston Avenue into a commercial and industrial center. The proposed project is largely impervious with small landscape areas, all of which will be tributary to a flood control and BMP basin on-site. Water quality mitigation for the impervious surfaces will be accomplished utilizing an infiltration basin and drywells due to the acceptable natural infiltration rate of the soil. Stormwater runoff will be routed through the on-site storm drain systems with the intent that all runoff will be stored on-site. Any overflows from storm events larger than the design events will discharge to South. Those flows will eventually join the Hemet Storm Channel.

II. Responsibility for Maintenance

Initial and ultimate responsibility for maintenance of the infiltration trench BMP will rest with the property owner. Owner information is as follows:

EPD Solutions
2355 Main Street, Suite
100, Irvine, CA 92614
(949) 278-5413
Attn: Andrea Arcilla

Funding for maintenance will be provided by the owner.

III. Summary of Drainage Management Areas and Stormwater BMPs

1. Drainage Areas: The WQMP site map (Exhibit A-3) shows the site areas tributary to the infiltration basin BMP. Pervious and impervious areas are color coded by DMA designation.

2. Structural Post Construction BMPs: An Infiltration basin has been designed to provide for V_{BMP} for the pervious and impervious surfaces. See the project grading plan in Appendix 2. Runoff enters the basin through surface flow and on-site storm drain systems. Flows are not expected to exceed the capacity of the basin and any excess will discharge to the adjacent street to the south.

IV. Stormwater BMP Design Documentation

An infiltration basin was designed to provide for V_{BMP} as specified in the WQMP. The construction drawing for the grading is included in Appendix 2.

V. Maintenance Schedule

MAINTENANCE SCHEDULE

BMP/Source Control	Inspection Interval/Activity	Maintenance Activity/Reference
Landscape (Self-Retaining)	Weekly	Weekly Clean area of debris, mow or trim as applicable. Remove all clippings or trimmings from the planter areas. Replace bark if applicable. See SC-73 in Appendix 10 for detailed protocols.
Parking Lot/Sidewalks	Site Walk Daily	Weekly, or as dictated by the daily visual inspections. Pick up debris and litter. Capture debris before it enters the infiltration trenches during washing. See SC-71 in Appendix 10.
Detention Basin	Weekly: Look for erosion, standing water and dead vegetation. After storm event: Inspect areas for ponding. Annually: Inspect outlets to basins, connector pipes and inlets on the site	Weekly: Remove trash and debris. Maintain vegetation (see SC-73, Appendix 10) and remove clippings. Replace damaged grass and/or plants. Repair basin cover as necessary. Clean storm drain pipe inlets and outlets to restore functionality in each storm drain line tributary to the infiltration basin. Clean vegetation from, in and around the storm drain overflows.
Bioretention Basin	• Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover • Keep adjacent landscape areas maintained. Remove clippings fromLandscape maintenance activities. • Remove trash and debris	• Inspect areas for ponding after storm event Inspect/clean inlets and outlets
Onsite Catch Basin	Basin sump areas shall be vacuumed when sediment or trash becomes 2-inches deep and dispose of properly. The owner shall clean all catch basins whenever debris, trash or sediment accumulates to a level > 25% of debris holding capacity and shall investigate any	Inspect semi-annually(by October 1st and February 1st) and maintain, upon reaching 25% capacity, through maintenance service contract with the vendor or equally qualified contractor.

	suspected illegal dumping into these drains.	
Drywells	Inspect catchment area for an excessive sediment, trash, and/or debris accumulation on surface. Clean up excessive sediment, trash, and/or debris accumulation. Litter leaves and debris should be removed from Drywell to reduce risk of well clogging. Pump stored runoff from an impaired or failed dry well can also be accomplished through the test well.	4 times Annually, and after heavy rain

If drainage in the basin is not achieved within 72 hours, sediment in the basin shall be removed and any dead vegetation removed. A minimum 5.0' filter strip of landscaping shall be maintained between the basin and any hardscape discharge throughout the life of the project.

The employee charged with inspection and the landscape contractor retained to provide maintenance services shall be made familiar with the project specific WQMP. Inspection and maintenance of the source control/BMPs shall start upon completion of the project.

VI. Source Control

1. Landscaping: Landscaping shall be designed to minimize irrigation and runoff. Depressed landscape areas shall include plants that are tolerant of saturated soil conditions. Maintain landscaping using minimum or no pesticides. See CASQA Fact Sheet SC-73 in Appendix 10.

2. Parking Lots/Sidewalks: Sweep parking lots and sidewalks weekly to prevent accumulation of litter and debris. Collect debris from washing/power washing before it discharges to the infiltration trench. See CASQA Fact Sheet SC-71 in Appendix 10.

3. Ensure all trash receptacles and dumpster areas are covered and protected at all times from the elements.

Recorded at the request of:

Loctek Inc, (Attn: Xiang Li)

After recording, return to:

Loctek Inc, (Attn: Xiang Li)
6475 Las Positas Rd.
Livermore, CA 94551

Covenant for Water Quality Management Plan and Urban Runoff Best Management Practices Transfer, Access and Maintenance

Owner: Loctek Inc

Property Address: 6475 Las Positas Rd. Livermore, CA 94551

APN: 456-010-025

WHEREAS, Loctek Inc ("OWNER") owns real property ("Property") in the City of Hemet, County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

WHEREAS, at the time of initial approval of development project known as Tentative Parcel Map No. 38631 within the Property described herein, the City of Hemet ("CITY") required the project to employ Best Management Practices, hereinafter referred to as "BMPs" to minimize pollutants in urban runoff;

WHEREAS, the OWNER has chosen to install and/or implement BMPs for the Property as described in the Water Quality Management Plan, on file with the CITY, hereinafter referred to as "WQMP", to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

WHEREAS, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or

replacement, therefore, are the sole responsibility of the OWNER in accordance with the terms of this Covenant.

WHEREAS, the OWNER is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity is required to remain in compliance with all local, state, or federal laws and regulations, including, but not limited to NPDES storm water permits, and those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, OWNER covenants, promises and agrees as follows:

1. OWNER hereby provides the CITY and/or its designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by CITY, no advance notice, for the purpose of inspection, sampling, testing of the BMPs, and in case of emergency, to undertake all necessary repairs or other preventative measures at OWNER's expense as provided in paragraph 3 below, provided that CITY takes reasonable steps to minimize or avoid interference with OWNER's use of the Property.

2. OWNER shall use its best efforts diligently to maintain all BMPs in accordance with the WQMP. All reasonable precautions shall be exercised by OWNER and OWNER's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the CITY, the OWNER shall provide the CITY with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event OWNER, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Covenant, within ten (10) days of being given written notice by the CITY, the CITY is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the OWNER or OWNER's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4. The CITY may require the OWNER to post security in form and for a time period satisfactory to the CITY to guarantee the performance of the obligations stated herein. Should the OWNER fail to perform the obligations under this Covenant, the CITY may, in the case of a cash bond, act for the OWNER using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Covenant. As an additional remedy, the CITY may withdraw any previous Urban Runoff-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as OWNER repays to CITY its reasonable costs incurred in accordance with paragraph 3 above.

5. This Covenant shall be recorded in the Office of the Recorder of Riverside County, California, at the expense of the OWNER and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the CITY, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. In event of legal action occasioned by any default or action of the OWNER, or its successors or assigns and the CITY prevails in such action, then the OWNER and its successors or assigns agree(s) to pay all costs incurred by the CITY in enforcing the terms of this Covenant, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. OWNER hereby agrees that the burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

8. The obligations herein undertaken shall run with and burden the Property and shall be binding upon the heirs, successors, executors, administrators and assigns of the OWNER. The term "Owner" shall include not only the present OWNER, but also its heirs, successors, executors, administrators, and assigns with respect to the Property. OWNER shall notify any successor to title of all or part of the Property about the existence of this Covenant. OWNER shall provide such notice prior to such successor obtaining an interest in all or part of the Property. OWNER shall provide a copy of such notice to the CITY at the same time such notice is provided to the successor.

9. Time is of the essence in performance of this Covenant.

10. Any notice to a party required or called for in the Covenant shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth

below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IF TO CITY:

Ronald Bradley, Interim City Manager
City of Hemet
445 E. Florida Avenue
Hemet, CA 92543

IF TO OWNER:

Loctek Inc, (Attn: Xiang Li)
6475 Las Positas Rd.
Livermore, CA 94551

11. This Covenant may be enforced by the CITY. The City Manager or his/her designee is authorized to act and administer this Covenant on behalf of the CITY.

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of this _____ day of _____.

[All owner's of record must sign.]

OWNER:

<Owner's Name>
<Title>
<Company>

OWNER: Loctek Inc, (Attn: Xiang Li)
6475 Las Positas Rd.
Livermore, CA 94551

<Owner's Name>
<Title>
<Company>

NOTARIES ON FOLLOWING PAGES

ACKNOWLEDGMENT FOR OWNER

State of California

County of _____Riverside_____

On _____, before me, _____, a notary public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

_____
Signature of Notary

CAPACITY CLAIMED BY SIGNER:

- ☐ Individual(s)
- ☐ Corporate Officer(s)

_____
_____

- ☐ Partner(s)
- ☐ Attorney-in-Fact
- ☐ Trustee(s)
- ☐ Guardian/Conservator
- ☐ Other:

_____
_____
_____

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

_____

EXHIBIT A

Legal Description

TITLE LEGAL DESCRIPTION:

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF HEMET, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

THE EAST HALF OF THE NORTHEAST QUARTER OF SECTION 18, TOWNSHIP 5 SOUTH, RANGE 1 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF:

EXCEPT THAT PORTION INCLUDED IN THE FOLLOWING DESCRIBED PARCEL:

BEGINNING AT THE SOUTHEAST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION THENCE NORTH 89 56' WEST, 1715.91 FEET ON THE SOUTH LINE OF SAID NORTHEAST UARTER THENCE NORTH 63 13' EAST, 1921.83 FEET TO THE EAST LINE OF SAID NORTHEAST QUARTER; THENCE SOUTH 0 01' EAST, 868.01 FEET ON SAID EAST LINE TO THE POINT OF BEGINNING;

EXCEPT THE EASTERLY 25 FEET OF SAID LAND AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED RECORDED JUNE 07, 1923 IN BOOK 381, PAGE 34 OF DEED RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

FOR CONVEYANCING PURPOSES ONLY: APN 456-010-025

THE LAND SHOWN IN THIS SURVEY IS THE SAME AS THAT DESCRIBED IN FIRST AMERICAN TITLE COMPANY'S COMMITMENT NUMBER NCS-1080449-ONT1 WITH AN EFFECTIVE DATE OF JULY 22, 2021 AT 7:30 A.M.

EXHIBIT B

Map/Illustration

To be provided during Final Engineering

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

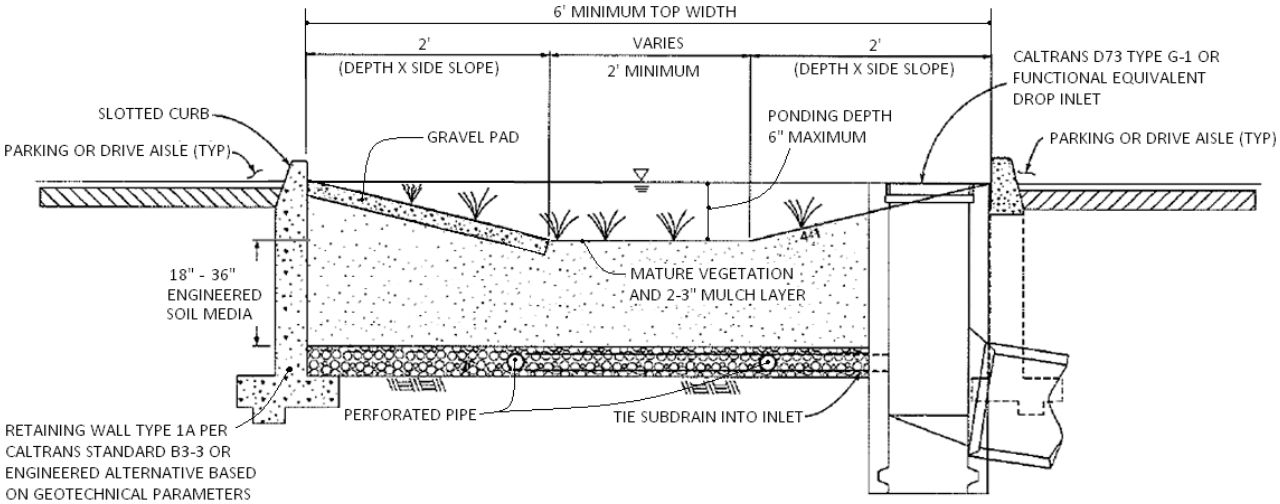
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/



Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

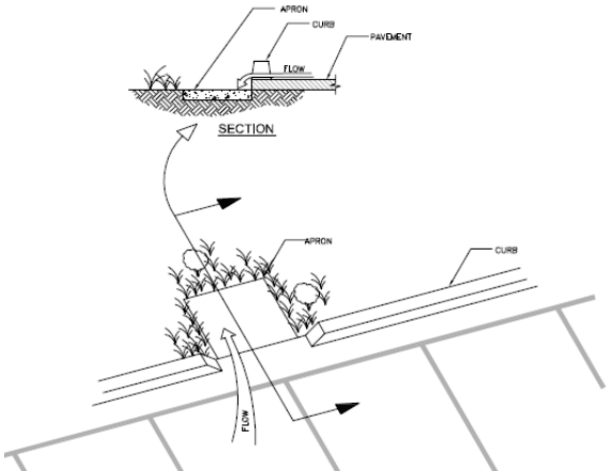


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6" Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

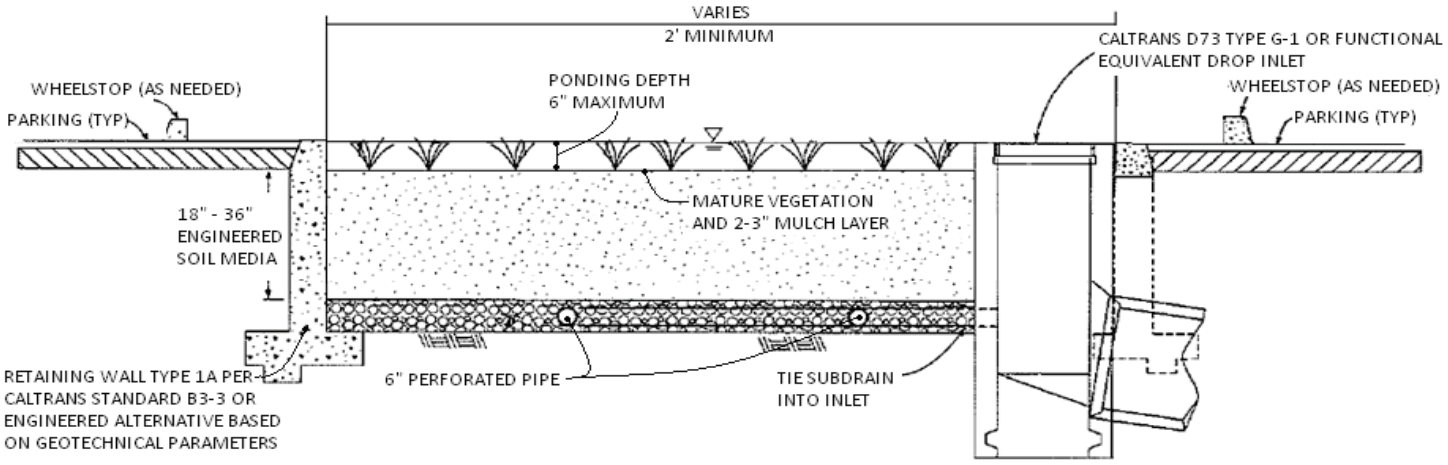
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.



Figure 5: Planter Box
Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes

An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.



Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

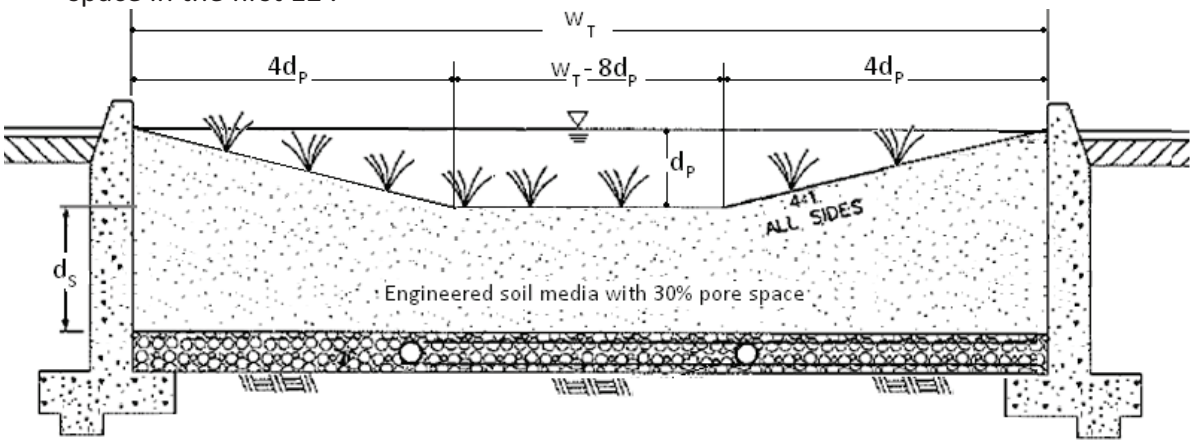
2) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\text{ft}) = \frac{0.3 \times \left[\left(w_T(\text{ft}) \times d_S(\text{ft})\right) + 4\left(d_P(\text{ft})\right)^2\right] + 0.4 \times 1(\text{ft}) + d_P(\text{ft})\left[4d_P(\text{ft}) + \left(w_T(\text{ft}) - 8d_P(\text{ft})\right)\right]}{w_T(\text{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = (0.3 \times d_S(\text{ft}) + 0.4 \text{ x } 1(\text{ft})) - \left(\frac{0.7\ (\text{ft}^2)}{w_T(\text{ft})}\right) + 0.5(\text{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(\text{ft}) = d_P(\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\text{ft}) = 0.5\ (\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times 1(\text{ft})]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(\text{ft}^2) = \frac{V_{BMP}(\text{ft}^3)}{d_E\ (\text{ft})}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

References Used to Develop this Fact Sheet

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Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

Site Design & Landscape Planning SD-10



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “ redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Maintenance Bays & Docks SD-31



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

Appropriate applications include commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.
- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.
- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.
- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.
- Other features may be comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, and abnormal pH. Utilizing the following protocols will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

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Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a waste water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash water runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in he catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement. Ensure that this practice does not kill grass.

Landscaping Activities

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the state.
- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.
- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paint brushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.
- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. In which case you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover with secondary containment during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water; do not put it in the storm drain, pour over landscaped areas.
- Use hand or mechanical weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Follow manufacturers' recommendations and label directions. Pesticides must never be applied if precipitation is occuring or predicted. Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.
- Use less toxic pesticides that will do the job, whenever possible. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Overall costs should be low in comparison to other BMPs.

Maintenance

- Sweep paved areas regularly to collect loose particles, and wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping but it is subject to rusting and results in lower quality water. Initially the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time, typically a year, between flushes and may accumulate iron, manganese, lead, copper, nickel and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASSMA) http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basmaa.org/

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Parking/Storage Area Maintenance SC-43



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The following protocols are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook).
- Keep accurate maintenance logs to evaluate BMP implementation.

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.

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- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel and dispose of litter in the trash.

Surface cleaning

- Use dry cleaning methods (e.g. sweeping or vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- If water is used follow the procedures below:
  - Block the storm drain or contain runoff.
  - Wash water should be collected and pumped to the sanitary sewer or discharged to a pervious surface, do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- When cleaning heavy oily deposits:
  - Use absorbent materials on oily spots prior to sweeping or washing.
  - Dispose of used absorbents appropriately.

Surface Repair

- Pre-heat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff.
- Cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc., where applicable. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of the parking facilities and stormwater conveyance systems associated with them on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, nad implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

Requirements

Costs

Cleaning/sweeping costs can be quite large, construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities on a regular basis to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

SC-43 Parking/Storage Area Maintenance

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Use only as much water as necessary for dust control, to avoid runoff.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality control Board. July 1998 (Revised February 2002 by the California Coastal Commission).

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basma.org

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP)
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Drainage System Maintenance SC-44



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

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- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Plaza and Sidewalk Cleaning SC-71



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. This fact sheet describes good housekeeping practices that can be incorporated into the municipality's existing cleaning and maintenance program.

Approach

Pollution Prevention

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).

Suggested Protocols

Surface Cleaning

- Regularly broom (dry) sweep sidewalk, plaza and parking lot areas to minimize cleaning with water.
- Dry cleanup first (sweep, collect, and dispose of debris and trash) when cleaning sidewalks or plazas, then wash with or without soap.
- Block the storm drain or contain runoff when cleaning with water. Discharge wash water to landscaping or collect water and pump to a tank or discharge to sanitary sewer if allowed. (Permission may be required from local sanitation district.)

- Block the storm drain or contain runoff when washing parking areas, driveways or drive-throughs. Use absorbents to pick up oil; then dry sweep. Clean with or without soap. Collect water and pump to a tank or discharge to sanitary sewer if allowed. Street Repair and Maintenance.

Graffiti Removal

- Avoid graffiti abatement activities during rain events.
- Implement the procedures under Painting and Paint Removal in SC-70 Roads, Streets, and Highway Operation and Maintenance fact sheet when graffiti is removed by painting over.
- Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a dirt or landscaped area after treating with an appropriate filtering device.
- Plug nearby storm drain inlets and vacuum/pump wash water to the sanitary sewer if authorized to do so if a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound). Ensure that a non-hazardous cleaning compound is used or dispose as hazardous waste, as appropriate.

Surface Removal and Repair

- Schedule surface removal activities for dry weather if possible.
- Avoid creating excess dust when breaking asphalt or concrete.
- Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up as much material as possible.
- Designate an area for clean up and proper disposal of excess materials.
- Remove and recycle as much of the broken pavement as possible to avoid contact with rainfall and stormwater runoff.
- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Wash water should be directed to landscaping or collected and pumped to the sanitary sewer if allowed.

Concrete Installation and Repair

- Schedule asphalt and concrete activities for dry weather.

- Take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place san bags around inlets or work areas).
- Limit the amount of fresh concrete or cement mortar mixed, mix only what is needed for the job.
- Store concrete materials under cover, away from drainage areas. Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- Protect applications of fresh concrete from rainfall and runoff until the material has dried.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- Wash concrete trucks off site or in designated areas on site designed to preclude discharge of wash water to drainage system.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.
- Clean parking lots on a regular basis with a street sweeper.

Training

- Provide regular training to field employees and/or contractors regarding surface cleaning and proper operation of equipment.
- Train employee and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include current sweeper technology to remove oil and grease.
- Surface cleaning activities that require discharges to the local sewering agency will require coordination with the agency.
- Arrangements for disposal of the swept material collected must be made, as well as accurate tracking of the areas swept and the frequency of sweeping.

Requirements

Costs

- The largest expenditures for sweeping and cleaning of sidewalks, plazas, and parking lots are in staffing and equipment. Sweeping of these areas should be incorporated into street sweeping programs to reduce costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Community education, such as informing residents about their options for recycling and waste disposal, as well as the consequences of littering, can instill a sense of citizen responsibility and potentially reduce the amount of maintenance required by the municipality.

Additional BMPs that should be considered for parking lot areas include:

- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Structural BMPs such as storm drain inlet filters can be very effective in reducing the amount of pollutants discharged from parking facilities during periods of rain.

References and Resources

Bay Area Stormwater Management Agencies Association (BASMAA). 1996. Pollution From Surface Cleaning Folder http://www.basmaa.org

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. Maintenance Best Management Practices for the Construction Industry. Brochures: Landscaping, Gardening, and Pool; Roadwork and Paving; and Fresh Concrete and Mortar Application. June 2001.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Plan. 2001. Municipal Activities Model Program Guidance. November.

Landscape Maintenance SC-73



Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

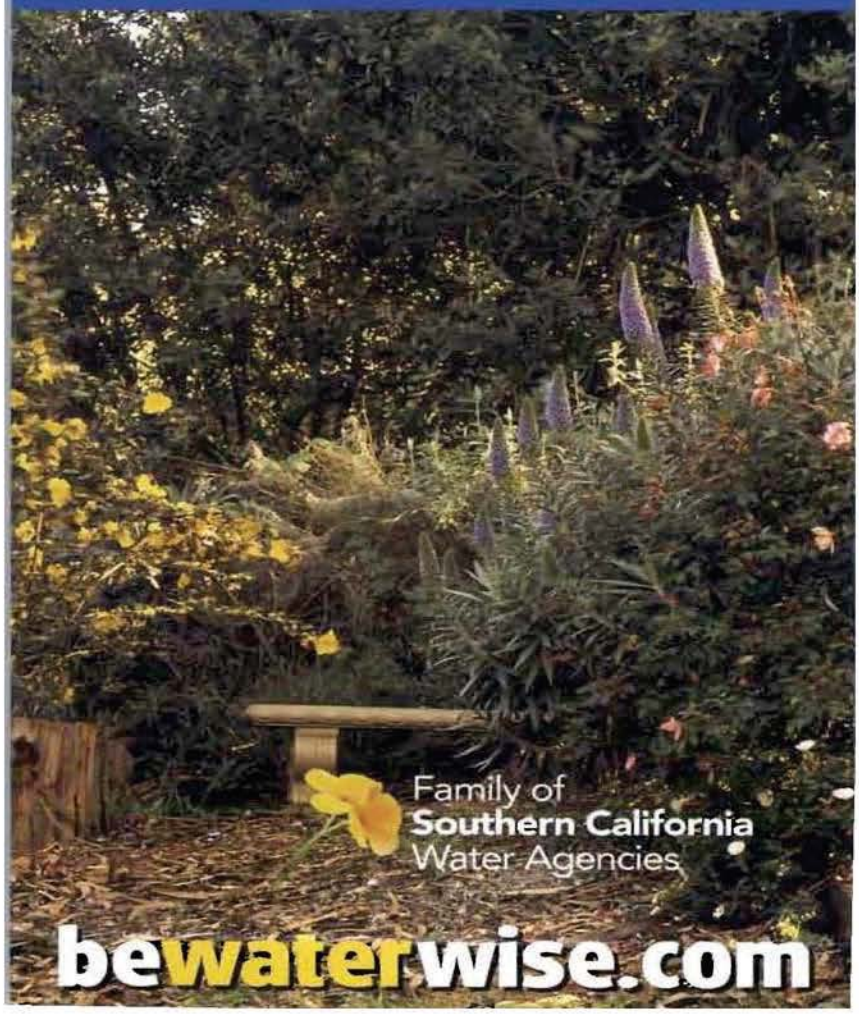
Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm

10 Ways to Save Water Outdoors



TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

After the Storm

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.

- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

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EPA 833-B-03-002

January 2003

A Citizen's Guide to Understanding Stormwater

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

Stormwater Pollution Solutions



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.



Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

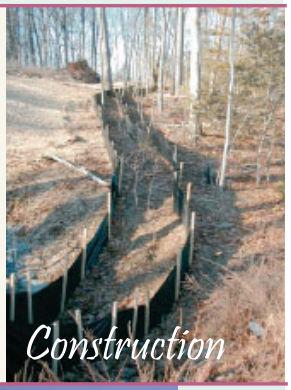
Commercial



Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Agriculture

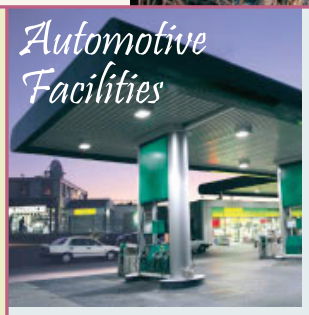


Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators



Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.



- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

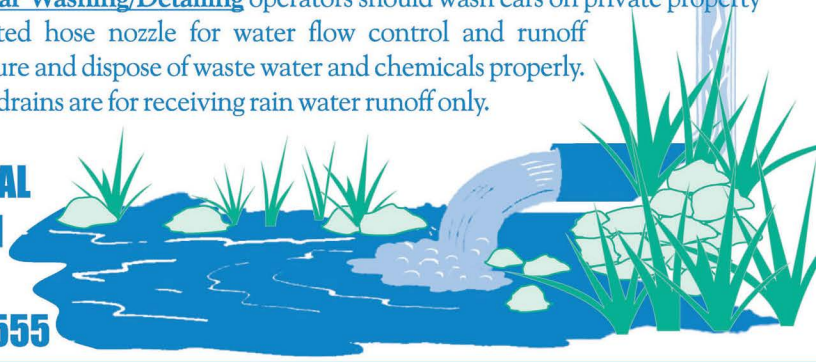
Storm drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.



- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

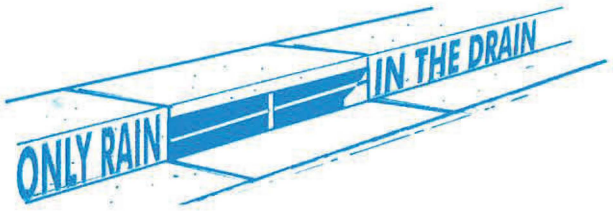
Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...



Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.



A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

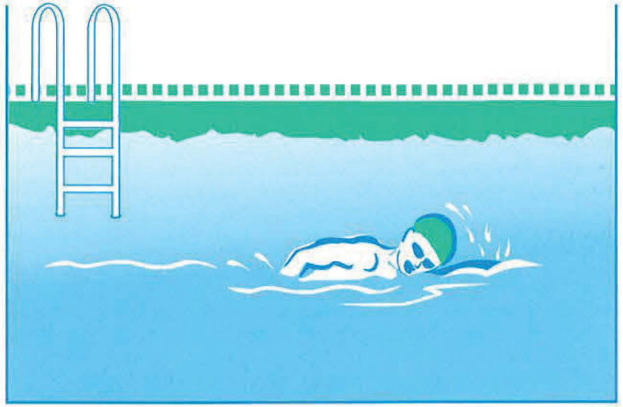
The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.



Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.

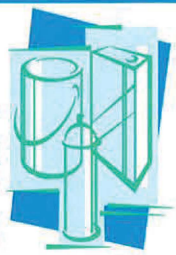


If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.



RIVERSIDE COUNTY
WATERSHED PROTECTION



Riverside's Solution
to Runoff Pollution

What is Runoff?

When water from rain and outdoor water use runs off roofs, driveways, and sidewalks, it brings everything it touches with it. This runoff can include trash, fertilizer, pet waste, home solvents, and other pollutants which ends up in Riverside County's waterways.

Water that goes into Riverside County's storm drains is NOT TREATED

Whether residents or businesses intentionally or accidentally let runoff flow into storm drains, it can harm our creeks, rivers, lakes, and eventually the ocean. While wastewater from toilets, sinks, and showers gets treated, water that flows into the storm drain goes untreated into our waterways.

What Common Pollutants are Found in Runoff?

Here are some common pollutants and actions you can take to prevent them from flowing into Riverside County's storm drains and waterways.

Pollutants and Prevention

Pet Waste

Pet waste has harmful bacteria that can contaminate Riverside County's bodies of water and neighboring ecosystems. This can lead to residents getting sick, algal blooms, and plants and animals dying. Always pick up after your pet on walks and in your yard, especially before it rains.

Trash

Litter like cigarette butts, candy and food wrappers/containers, and straws can harm our waterways and cause drainage issues. Make sure to place all trash in covered trash cans to prevent wind or rain from taking it into the storm drain system.

Automotive Chemicals

Liquids like motor oil, fuels, lubricants, and antifreeze can damage water quality and harm wildlife if they get into our creeks, rivers, and lakes. Make sure to repair leaking vehicles as soon as possible and clean spills with absorbents available at home and auto supply shops. Used engine oil can be recycled at the Murrieta, Beaumont, or Moreno Valley ABOP and PaintCare Facilities or where the oil was purchased.

Yard Clippings

If yard clippings aren't properly disposed of, they can cause erosion, flooding, and prevent stormwater drainage. Collect all clippings after doing yard work and properly dispose of them by composting or placing them in a green waste bin.

Fertilizers and Pesticides

These can enter the storm drain after it rains or when landscaped areas are over irrigated. Limit your pesticide, fertilizer, and herbicide use by using non-chemical methods whenever possible. If they are necessary, follow the manufacturer's instructions and do not apply them 48 hours before predicted rain.

Soapy Car Wash Water

Dirt and debris from your car, along with chemicals in the soap, can harm our creeks, rivers, and lakes if they flow untreated into our waterways. Wash your car over a gravel or grassy area, or take it to a commercial car wash to limit runoff pollution.

Household Chemicals

Paint and other household chemicals like solvents, degreasers, and drain cleaners are hazardous to aquatic life and human health if they get into the storm drain system. Make sure to follow the manufacturer's instructions, clean spills with absorbents, and dispose of unused paints and household chemicals at the Murrieta, Beaumont, or Moreno Valley ABOP and PaintCare Facilities (rcwaste.org/hhw).

For more information about keeping our waterways clean, visit: **rcwatershed.org/about/stormwater-pollution-prevention**.

Who We Are

Riverside County Watershed Protection is a partnership program between Riverside County, the Flood Control & Water Conservation District, Coachella Valley Water District, and 27 cities that manage watershed programs which protect, preserve, and enhance the quality of the water and the natural environment of our watersheds.

What We Do

The partnership uses a combination of public education, best management practices, evaluation, and water quality monitoring to eliminate stormwater pollution in our waterways and comply with all federal, state, and local regulations. Our aim is to empower residents with information about pollution prevention and implement tactics that keep our watersheds healthy.

Contact Us:

To report pollution:

Call **(800) 506-2555**

Visit **rcwatershed.org/get-involved/report-pollution**

For emergencies, dial **911**

RIVERSIDE COUNTY
WATERSHED PROTECTION

Irrigation Runoff Stormwater Fact Sheet



Report Irrigation Runoff or Stormwater Pollution
800.506.2555

Be the Solution.
Prevent Runoff Pollution.

The water that flows into storm drains is not treated before flowing into Riverside County's creeks, rivers, lakes, and eventually the ocean (unlike the sanitary sewer system). It should never contain washwater or pollutants like pesticides, fertilizer, dirt, leaves, and other hazardous substances generated by irrigation runoff. If these pollutants are not properly contained, they can runoff into the storm drain and harm our waterways.

Preventing runoff pollution while maintaining your property protects aquatic life, water quality, and keeps our waterways thriving. To take care of your green spaces, make sure to only use pesticides and fertilizers when absolutely necessary and never before rain, prevent overwatering, and sweep debris regularly.

Irrigation Pollutant Sources

Overwatering

Overwatering can cause dirt, pesticides, fertilizers, pet waste, and organic waste to flow into the storm drain.

Pesticide, Fertilizer, or Herbicide Use

Pesticide, fertilizer, or herbicide use 48 hours before or during rain can lead to these chemicals going untreated into our waterways.

Improper Maintenance Before Rain

Leaving pet waste, leaves, grass clippings, and chemicals on the ground (from property neglect or landscape maintenance) before or during rain can cause them to flow into the storm drain.

Runoff From Commercial Properties

Commercial properties, like golf courses, can cause pesticides, dirt, oil, and other hazardous waste to runoff.

Best Management Practices for Irrigation

Protect our waterways while maintaining your green spaces by implementing these BMPs (best management practices):

For more information about stormwater-safe irrigation practices, visit: **rcwatershed.org/residents/at-home/overwatering/**.

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For emergencies, dial **911**

Prevent Overwatering

- Only give your lawn and garden the amount of water it needs, and use drip irrigation, soaker hoses, or micro-spray systems. Do not water when it is raining and use an irrigation timer to pre-set watering times.
- Conduct a Sprinkler Spruce Up regularly to ensure overwatering and runoff aren't occurring. If you notice a leak in your irrigation system, repair it immediately.
- Redirect your downspout to a rain garden, dry creek bed, rain barrel, or underwatered part of your lawn.

Plant Riverside County-Native Vegetation

- Plant native vegetation like foothill penstemon and red bush monkeyflower to reduce the amount of water, fertilizers, and pesticides needed.
- Plant fast-growing and dense ground covering plants like California fuscia and Angelita daisy to prevent erosion. For landscaping ideas visit: www.bewaterwise.com.

Utilize Business Best Practices

- Wash golf carts and lawn mowers over permeable surfaces.
- Cover storm drains when conducting washing and maintenance activities to prevent washwater from flowing into the storm drain.
- If your golf course handles reportable quantities of hazardous waste, you are required to submit a Hazardous Materials Business Plan through the California Environmental Reporting System. Visit rcwaste.org/business/hw for more info.
- Keep stockpiles at least 50 feet from concentrated flows of stormwater, drainage courses, and inlets.
- Regularly inspect and maintain oil storage tanks, drums, and areas to keep them in good condition.
- Utilize a commercial water broom to wash hard surfaces like tennis courts, patios, parking areas, and sidewalks, and make sure washwater never enters the storm drain system.

GOT TRASH?





Don't abandon your trash on the streets. Help keep our neighborhoods and waterways clean!
rcwatershed.org

RIVERSIDE COUNTY
WATERSHED PROTECTION

WHAT IS CONSIDERED HOUSEHOLD HAZARDOUS WASTE?

- **Gardening products:** pesticides, herbicides, poisons, fertilizers, and garden chemicals
- **Outdoor Products:** BBQ propane tanks, kerosene lamp oil, lighter fluid, and pool chemicals
- **Paint products:** paint, stain, varnish, adhesive, paint thinner, resin, epoxy, caulking, and wood preservatives
- **Household Products:** batteries, cooking oil, fluorescent tubes & bulbs, light ballasts, smoke detectors, and mercury thermostats

All of these products must be properly disposed of at a Household Hazardous Waste Facility OR Antifreeze, Batteries, Oil & Paint Collection Facility.



TIPS FOR HANDLING AND STORING HOUSEHOLD HAZARDOUS WASTE PRODUCTS:

- **NEVER** mix any products together. Mixing products can be very dangerous.
- Keep products in their original containers with labels on.
- Follow storage directions that are provided on the product's label.



PERMANENT HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITIES:

Agua Mansa
1780 Agua Mansa Road
Jurupa Valley
Open: Non-Holiday weekend
Saturdays only
9:00 AM to 2:00 PM

Lake Elsinore
512 N. Langstaff Street
Lake Elsinore
Open: October-May:
9:00 AM to 2:00 PM
June-September:
7:00 AM to 12:00 PM

Palm Springs
1100 Vella Road
Palm Springs
Open: Non-Holiday weekend
Saturdays only
October-May
9:00 AM to 2:00 PM
June-September
7:00 AM to 12:00 PM

ANTIFREEZE, BATTERIES, OIL& PAINT COLLECTION FACILITIES:

Beaumont - Hemet Area
Lamb Canyon Landfill
16411 Lamb Canyon Road
Beaumont
Open: Monday through
Saturday 6:00 AM to 4:30 PM

Moreno Valley Area
Badlands Landfill
31125 Ironwood Ave
Moreno Valley
Open: Monday through
Saturday 6:00 AM to 4:30 PM

Murrieta - Temecula Area
County Road Yard
25315 Jefferson Avenue
Murrieta
Open: Non-Holiday weekend
Saturdays only
9:00 AM to 2:00 PM

RIVERSIDE COUNTY
WATERSHED PROTECTION

TIPS FOR EMPLOYEES ABOUT COMMON HOUSEHOLD HAZARDOUS ITEMS

Help your customers make eco-friendly decisions by offering these helpful tips!

rcwatershed.org



GARDENING PRODUCTS

Gardening products that contain harmful chemicals can pose a threat to our waterways when washed down the storm drain.

Tips for Usage:

- To prevent water contamination, these products shouldn't be used before rainfall or before irrigation.
- When applying pesticides to plants, only spray the spots where the pest is most prevalent.







OVERIRRIGATION

Overirrigation is one of the ways we create runoff at home which can carry pollutants into our waterways.

Tips for Usage:

- Water less frequently
- Fix leaking sprinklers
- Check that your sprinkler heads are not pointing towards the street or sidewalk
- Install smart sprinklers, which have water-saving features like scheduled irrigation and weather awareness

BATTERY PRODUCTS

Batteries must be safely disposed of at Antifreeze, Batteries Oil & Paint Collection Facilities OR Household Hazardous Waste Facilities.

Did you know?

When batteries end up in the landfill, the metals and chemicals can leak into the ground and into our waterways. This applies to ALL batteries, including alkaline, rechargeable, and automotive.

PAINT PRODUCTS



Paint is formulated with many chemicals that require proper disposal at an Antifreeze, Batteries Oil & Paint Collection Facility OR a Household Hazardous Waste Facility.

Tips for Usage:

- Paint products should **NEVER** be poured down the drain.
- Brushes used with water-based paint can be washed in the sink with water.
- Brushes used with oil-based paint should be cleaned using paint thinner. Paint thinner should be stored for reuse or disposed of at a Household Hazardous Waste Facility.
- Empty paint cans should be left to dry before disposal into the trash can.

