Recording requested by and mail to:

City Clerk
City of Beaumont
550 E. Sixth Street
Beaumont, CA 92223

SPACE ABOVE THIS LINE FOR RECORDER'S USE
EXEMPT FROM RECORDER'S FEES PURSUANT TO GOVERNMENT CODE SECTION 6103 AND 27383

APN: 418-210-019

STORM WATER MANAGEMENT WQMP/BMP FACILITIES

COVENANT AND AGREEMENT NO.

City of Beaumont, Riverside County, California

THIS COVENANT AND AGREEMENT is made and entered into this February 1st of 2023, by and between Pierce Hardy Limited Partnership, ("Owner"), and the City of Beaumont, California, ("City").

The Owner hereby certifies I am (we are) the sole owner of certain real property located at the southeast corner of Euclid Avenue and Third Street (APN: 418-210-019) (Site Address) in the City of Beaumont, County of Riverside, State of California, more specifically described in **Exhibit "A"** and depicted in **Exhibit "B"** ("Property").

The Owner covenants and agrees to comply with the Project Water Quality Management Plan ("WQMP"), attached hereto as **Exhibit "C"**, providing for storm water quality treatment within the confines of the Property.

The Owner covenants and agrees that the health, safety and welfare of the residents of the City of Beaumont, require that the Best Management Practice ("BMP") facilities, more specifically described in the WQMP (for example bio- swales, catch basins, roof drains and appurtenances) be constructed and maintained to minimize pollutants in urban runoff by the Owner.

The Owner further covenants and agrees as follows:

1. The on-site storm water management/BMP facilities mentioned above shall be constructed by the Owner at its sole cost and expense, in accordance with the plans and specifications identified in the WQMP approved by City.

2. The Owner shall adequately maintain the storm water management/BMP facilities in a manner assuring peak performance at all times, including source control BMPs at all times as its sole responsibility, at its sole cost

and expense. This includes all pipes and channels built to convey storm water on the Property, including catch basin inserts, underground detention ponds, swales and vegetation provided to control the quantity and quality of the storm water. Adequate maintenance is herein defined as good working condition so that these facilities are performing in accordance with their design functions continuously at all times.

3. The Owner shall annually inspect the storm water management/BMP facilities mentioned above and submit an inspection report annually to the Public Works Department by the anniversary of the date of this Agreement of each year. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the storm water management BMPs listed in the WQMP such as bioswales, catch basins and related filter units, etc. Deficiencies shall be noted in the inspection report and corrected by Owner promptly.

4. The Owner hereby grants permission to City, its authorized agents and employees, to enter upon the Property and to inspect the storm water management/BMP facilities, take samples and perform testing whenever the City deems necessary and as required by the City's most current National Pollutant Discharge Elimination System (NPDES) Permit. The purpose of the inspection, testing and sampling is to follow up on apparent and reported deficiencies and/or to respond to citizen complaints and meet the requirements of the City's NPDES Permit issued by the State Water Resources Control Board – Santa Ana River Region. The City shall provide the Owner with advanced notice of entering upon the Property, except in the event of an emergency, as determined by the City. The City shall provide the Owner copies of the inspection findings and a directive to commence with the repairs if necessary. Owner or Owner's successors or assigns shall pay City for all costs incurred by City in the inspection, sampling, testing of the BMPs within thirty (30) calendar days of City invoice.

5. In the event the Owner fails to maintain the storm water management/BMP facilities in good working condition acceptable to the City, upon five (5) days advanced written notice, the City may enter upon the Property and take whatever steps necessary to correct deficiencies identified in any inspection report and to charge the costs of such repairs to the Owner the cost of which shall constitute a lien against the Property. In the event of an emergency, as determined by City, advanced notice as aforesaid, shall not be required. Notwithstanding the forgoing, it is expressly understood and agreed that the City is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation to the City.

6. The Owner will perform the work necessary to keep these facilities in good working order as appropriate. The maintenance schedule for the storm water management BMP facilities (including sediment removal) is outlined in the approved WQMP and the schedule must be followed at all times. In the future, City of Beaumont may adopt an annual Stormwater Inspection Fee that would be assessed to the Owner.

7. In the event the City, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials and the like, the Owner, its successors and assigns shall reimburse the City upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the City hereunder.
8. This Agreement imposes no liability of any kind whatsoever on the City. Owner agrees to indemnify, defend (with counsel reasonably approved by the City) and hold harmless the City and its authorized officers,

employees, agents and volunteers from any and all claims, actions, losses, damages, and/or liability arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person and for any costs or expenses incurred by the City on account of any claim except where such indemnification is prohibited by law. This indemnification provision shall apply regardless of the existence or degree of fault of indemnitees. The Owner's indemnification obligation applies to the City's "active" as well as "passive" negligence but does not apply to the City's "sole negligence" or "willful misconduct" within the meaning of Civil Code Section 2782, or to any claims, actions, losses, damages, and/or liabilities, to the extent caused by the acts or omissions of any third party contractors undertaking any work (other than field inspections) or other maintenance on the Property on behalf of the City under this Agreement.

9. This Agreement shall be recorded with the County Recorder for the County of Riverside and shall constitute a covenant running with the land, equitable servitude and lien against the Property, and shall be binding on the Owner, its successors, assigns, transferees, administrators, executors, heirs, encumbrancers and any other successors in interests, including any homeowner's association.

10. In addition to any remedy available to City under this Agreement, if Owner violates any term of this Agreement and does not cure the violation within the time already provided in this Agreement, or, if not provided, within thirty (30) calendar days, or within such time authorized by the City if said cure reasonably requires more than the subject time, the City may bring an action at law or in equity in a court of competent jurisdiction to enforce compliance by the Owner with the terms of this Agreement. In such action, the City may recover any damages to which the City may be entitled for the violation, enjoin the violation by temporary or permanent injunction without the necessity of proving actual damages or the inadequacy of otherwise available legal remedies, or obtain other equitable relief, including, but not limited to, the restoration of the Property and/or the BMPs identified in the WQMP to the condition in which it/they existed prior to any such violation or injury.

11. Owner shall provide printed educational materials with any sale of the Property which provide information on what storm water management facilities are present, the types and locations of maintenance signs that are required and how the necessary maintenance can be maintained.

12. Owner shall provide actual notice of this Agreement and its terms to any respective buyers or successor(s) in interest.

13. In order to be valid, amendment or change to this Agreement including the WQMP and BMPs requires an amendment executed by the City and Owner which is recorded with the Riverside County Recorder.

WITNESS the following signatures:

OWNER:

By: _____ By: _____

Name: Jim Zaumek Name: _____

Title: V.P. Title: _____

84 Lumber Company

City:

CITY OF BEAUMONT

a Municipal Corporation

Signature: _____

City Manager

ATTEST:

_____

City Clerk

APPROVED AS TO FORM:

_____

John Pinkney, City Attorney

APPROVED AS TO CONTENT:

_____

Jeff Hart, Director of Engineering/Public Works

All signatures on this Agreement on behalf of the Owner must be acknowledged before a Notary Public. In the event that the owner is a corporation, the President/Vice President and the corporate secretary of the corporation must sign.

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of ~~California~~ Pennsylvania)
County of ~~Riverside~~ Washington)

On February 1, 2023, before me, Tamara R. DeMarino, notary public, personally appeared Jim Zaunick 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: Tamara R. DeMarino (Seal)

Commonwealth of Pennsylvania - Notary Seal
Tamara R. DeMarino, Notary Public
Washington County
My commission expires November 3, 2026
Commission number 1225445
Member, Pennsylvania Association of Notaries

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Riverside)

On _____, 2023, before me, _____, 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: _____ (Seal)

EXHIBIT "A"
LEGAL DESCRIPTION

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

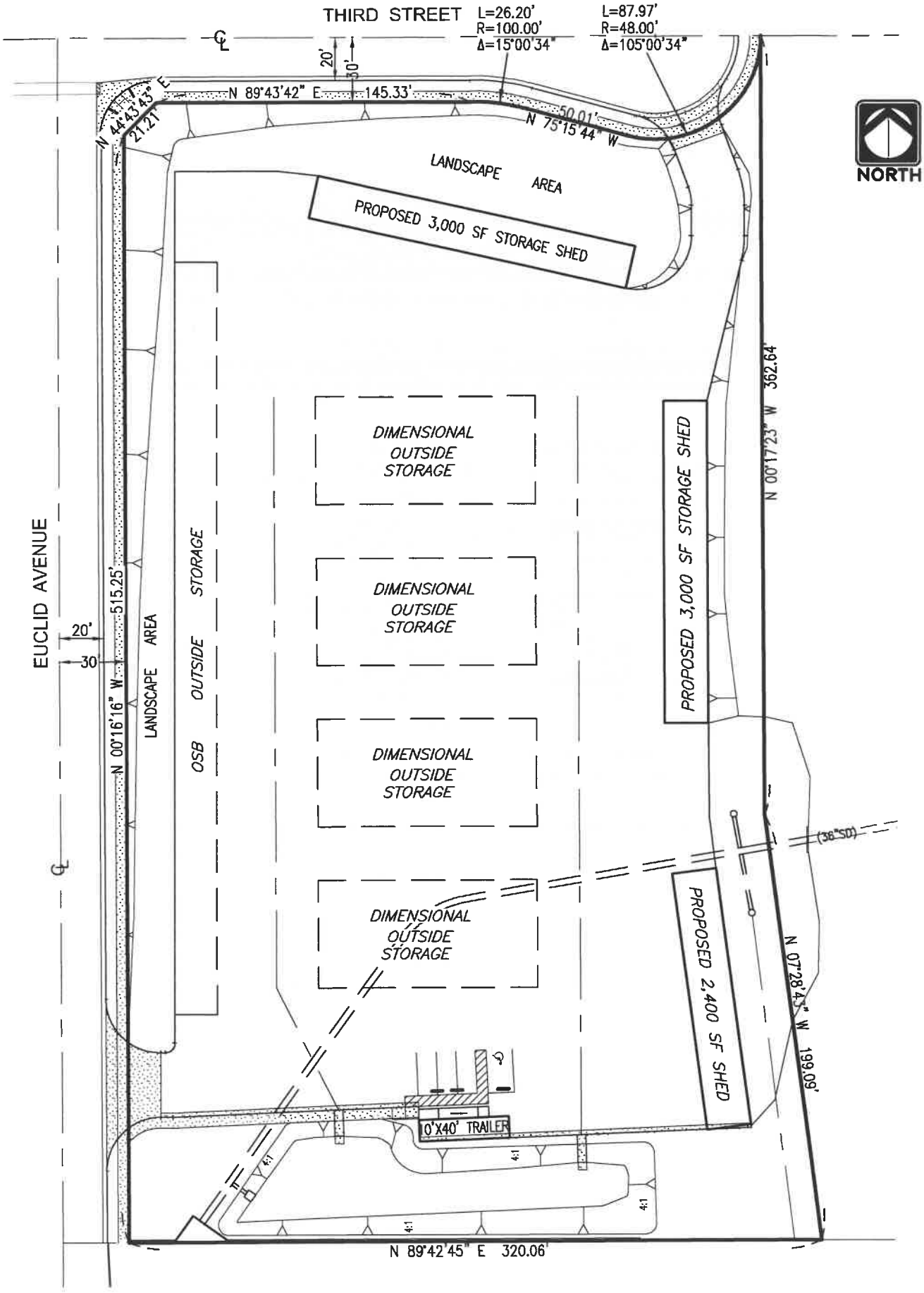
LOTS 1 THROUGH 16 INCLUSIVE, IN BLOCK 144, AS SHOWN BY THE AMENDED MAP OF THE TOWN OF BEAUMONT, IN THE CITY OF BEAUMONT, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, RECORDED IN BOOK 6, PAGES 16 AND 17 OF MAPS, SAN BERNARDINO COUNTY RECORDS.

TOGETHER WITH THOSE PORTIONS OF THE ALLEY IN SAID BLOCK 144 AND THE NORTH ONE-HALF OF SECOND STREET WHICH WOULD PASS BY OPERATION OF LAW WITH THE CONVEYANCE OF SAID LAND, SAID ALLEY AND STREET BEING VACATED BY RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF RIVERSIDE, A CERTIFIED COPY OF SAID RESOLUTION BEING RECORDED JUNE 28, 1940 IN BOOK 467, PAGE 434 OF OFFICIAL RECORDS.

EXCEPTING THEREFROM THAT PORTION GRANTED TO THE STATE OF CALIFORNIA BY DEED RECORDED JUNE 13, 1989 AS INSTRUMENT NO. 193499 OF OFFICIAL RECORDS.

APN: 418-210-019

EXHIBIT 'B'
DIAGRAM OF PROPERTY



Project Specific Water Quality Management Plan

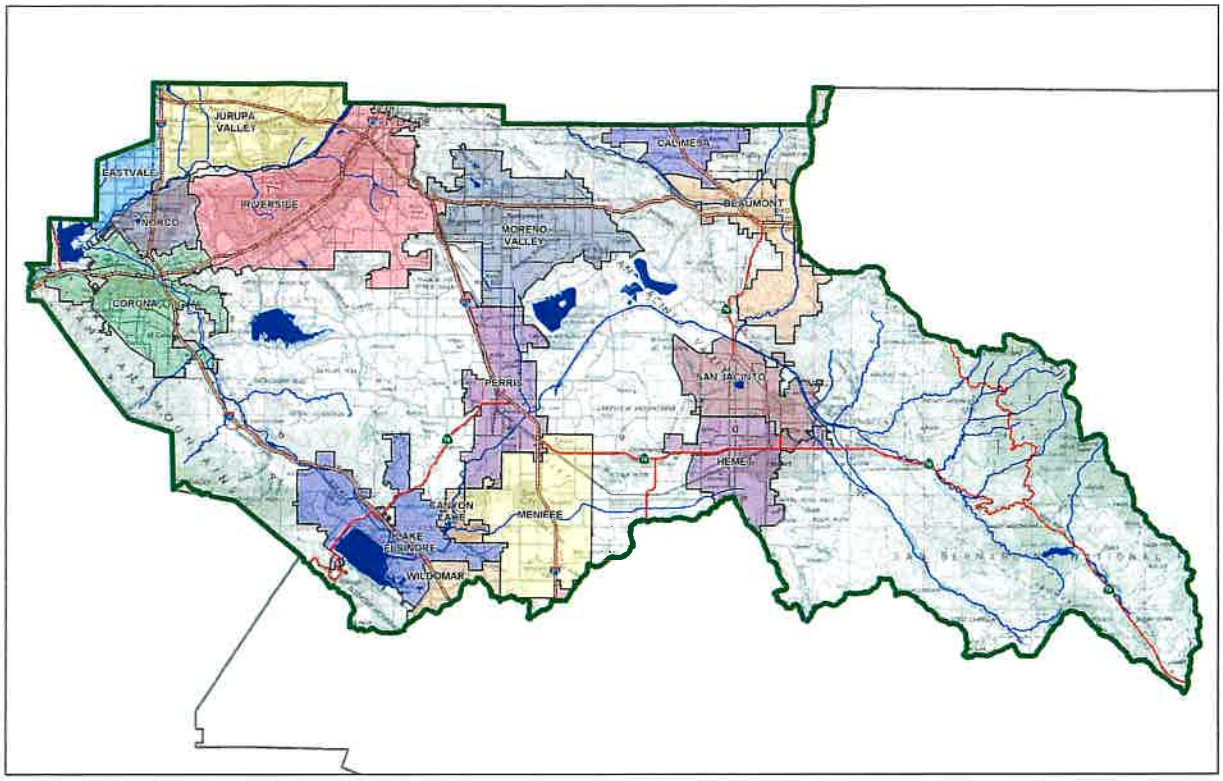
*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: 84 Lumber Storage Yard

Development No: PP2022-0458

Design Review/Case No: PW2022-0951

No further comments
NV5
05/02/2023



☐ **Preliminary**
☒ **Final**

Original Date Prepared: November 10, 2022

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

Contact Information:
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Prepared by:
Blaine Womer, President
Blaine A. Womer Civil Engineering
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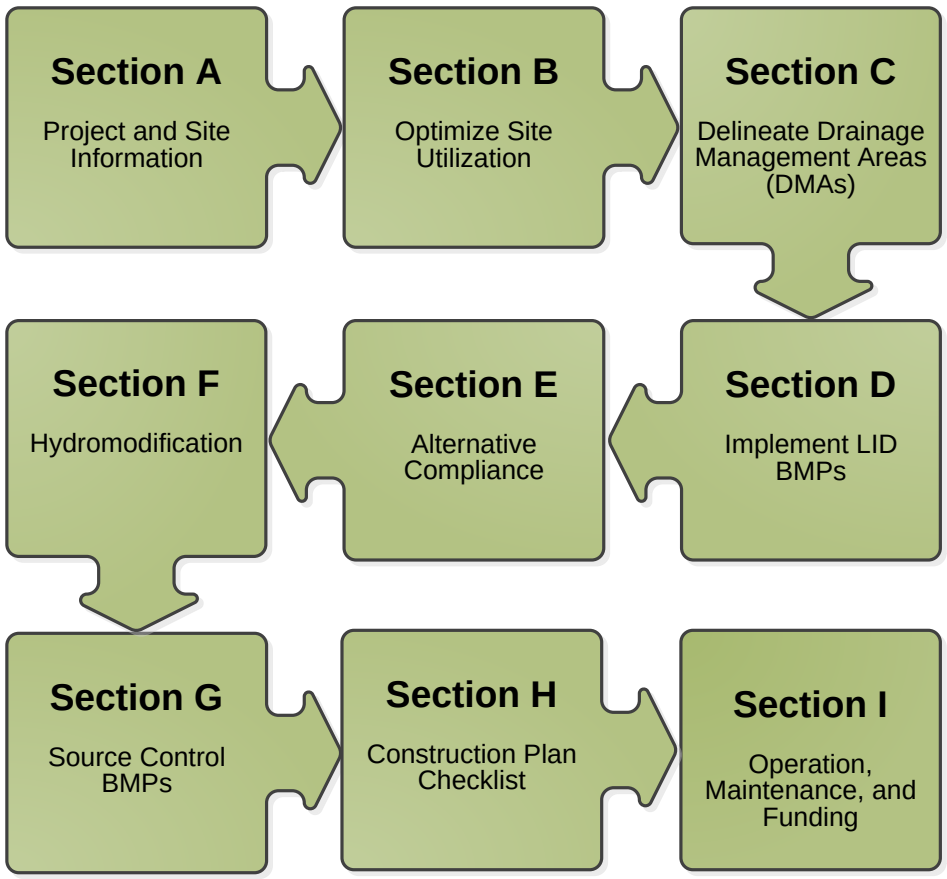
Hemet, CA 92544
baw@bawce.com
(951) 658-1727

A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Pierce Hardy Limited Partnership by Blaine A. Womer Civil Engineering for the 84 Lumber Storage Yard project.

This WQMP is intended to comply with the requirements of City of Beaumont for Water Quality Ordinance 1903 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 aware that implementation of this WQMP is enforceable under City of Beaumont Water Quality Ordinance (Municipal Code Section 13.24).

"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

2-1-23
Date

Jim Zaunick
Owner's Printed Name

V.P.
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

2/1/23
Date

Blaine Womer
Preparer's Printed Name

President
Preparer's Title/Position

Preparer's Licensure: RCE 46354
Expiration: 12/31/2024

STATE OF PENNSYLVANIA
COUNTY OF WASHINGTON

The foregoing instrument was acknowledged before me by physical presence, this 1st day of February, 2023, by Jim Zaunick, Vice President, who is personally known to me.

Tamara R DeMarino
Signature of Notary Public

Tamara R. DeMarino
Printed Name

Commonwealth of Pennsylvania - Notary Seal
Tamara R. DeMarino, Notary Public
Washington County
My commission expires November 3, 2026
Commission number 1225445
Member, Pennsylvania Association of Notaries

Table of Contents

List of Tables

List of Appendices

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Commercial
Planning Area:	Beaumont
Community Name:	Beaumont
Development Name:	84 Lumber Storage Yard
PROJECT LOCATION	
Latitude & Longitude (DMS): 33°55'28"N, -116°58'41"	
Project Watershed and Sub-Watershed: Sub-Watershed: San Timoteo Canyon Watershed: Santa Ana River	
Gross Acres: 3.5 Acres for the site, DMA total area = 3.3 Acres APN(s): 418-210-019	
Map Book and Page No.: Lots 1 – 16, Block 44, MB 6/16-17	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Lumber Storage Yard
Proposed or Potential SIC Code(s)	5211
Area of Impervious Project Footprint (SF)	114,329
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	114,329
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?	0.80

Narrative: The 84 Lumber storage yard project is located at the southeast corner of Third Street and Euclid Avenue in the City of Beaumont. The property is 3.5 acres in size, vacant and has a topographic gradient of approximately 1.8 percent toward the southwest. The site is regularly disced for weed abatement and there are no existing impervious surfaces.

The proposed project consists of outdoor storage of building materials, mainly lumber, on pavement. The project also includes an employee modular office and perimeter landscaping. The site has a drainage channel which crosses the southerly one third of the property. Discharges from a 36-inch diameter culvert under State Highway 79 will be conveyed through the site in a storm drain pipe and discharged to the drainage system's natural location at the southwest corner of the property. Water quality mitigation for the project will be accomplished in a bioretention basin located at the southern portion of the site. The project is not HCOC exempt, therefore, the incremental volume of the 2 year, 24 hour storm will be retained onsite.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Appendix 1 Exhibits:

Vicinity Map, Exhibit A-1

Regional Waters Map, Exhibit A-2

WQMP Site Plan, Exhibit A-3

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Noble Creek	N/A	N/A	2.2 Miles
San Timoteo Creek Reach 3, HU 801.61	Indicator Bacteria	GWR,-REC1-REC2-WARM-WILD	RARE
Santa Ana River, Reach 5 HU 801.52	N/A	AGR-GWR-REC1-REC2-WARM- WILD	RARE
Reach 4 HU 801.44	Pathogens	GWR-REC1-REC2-WARM- WILD-RARE SPWN	RARE
Reach 3, HU 801.21, 801.25	Copper, Lead, Pathogens	AGR-GWR-REC1-REC2-WARM- WILD-RARE SPWN	RARE
Prado Park Lake HU 801.21	Nutrients, Pathogens	REC1-REC2-COMM-WARM-WILD	RARE

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

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

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?

Yes, natural drainage is to the southwest. The project has been designed to honor that pattern.

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

The site is a regularly disced field. There is no existing vegetation to protect.

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

Site specific testing did not yield measurable infiltration capacity.

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

Impervious areas were minimized to the greatest extent possible for the proposed use.

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

Yes, runoff is diverted to the onsite 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
A/1	Natural	10,629	Self-Treating
D/1	Roof	8,800	Drains to BMP
D/2	Asphalt	105,529	Drains to BMP
D/3	Landscape	19,181	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)
A/1	10,629	Natural Grasses	None

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
D/1	Bioretention Basin
D/2	Bioretention Basin
D/3	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

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

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: **D/1, D/2 and D/3**		
...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: 0.56 Ac

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

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: 2.50 Ac

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: 1.85

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: 4.62

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)
4.62	0.56

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: 4

Project Type: Commercial

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: 2.50

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: 167

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: 417

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)
417	4

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	
D/1	☐	☐	☒	☐	☐
D/2	☐	☐	☒	☐	☐
D/3	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

Insert narrative description here.

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	*Bioretention Basin*		
	[A]		[B]	[C]	[A] x [C]			
D/1	*8,800*	*Roof*	*1.0*	*0.89*	*7,849.6*	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D/2	*105,529*	*Asphalt*	*1.0*	*0.89*	*94,131.9*			
D/3	*19,181*	*Landscape*	*0.1*	*0.11*	*2,118.7*			
	133,510				104,100.2	0.80	6940	***9290***

[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.

List DMAs here.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

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 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	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

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

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

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

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

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

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]
N/A		

[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

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

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	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[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:

INSERT TEXT HERE

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.

Post-Development Hydrograph is mitigated to Pre-Development levels through the onsite basin volume storage.

Developed Condition volume for the 2-year, 24 hour storm = 21,235 cf

Undeveloped Condition volume for the 2-year, 24 hour storm = 4,035 cf

To mitigate the increase in volume due to development of the site, the basin shall retain the difference in calculated volumes.

Retained Volume = Vo – Vu

= 21,235 cf – 4,035 cf

Retained Volume = 17,200 cf

Basin Volume Capacity = 18,148 cf

HCOC is mitigated on site

See Calculations in Appendix 7

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

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	Final landscaping plans will: 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. Use pest-resistant plants, especially adjacent to hardscape.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know for …Landscape and Gardening" Provide IPM information to new owners, lessees and operators.

	Select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.	
Condensate Drain Lines	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	N/A
Plazas, Sidewalks and Parking Lots	N/A	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 wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not to a storm drain.

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)
1	Bioretention Basin	Grading Plan, Sheet 3	33°55'24"N; -116°58'41"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

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: 84 Lumber Personnel

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

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

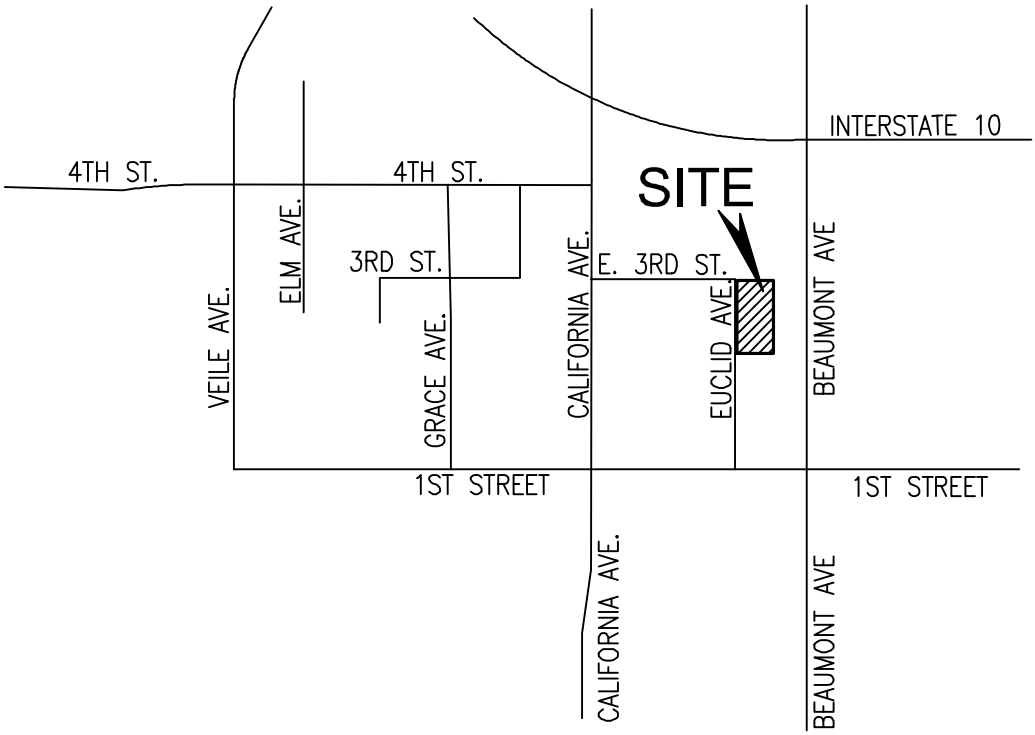
See Appendix 9

Appendix 1: Maps and Site Plans

Vicinity Map, Regional Waters Map and WQMP Site Plan

84 LUMBER STORAGE YARD

EXHIBIT A-1



VICINITY MAP

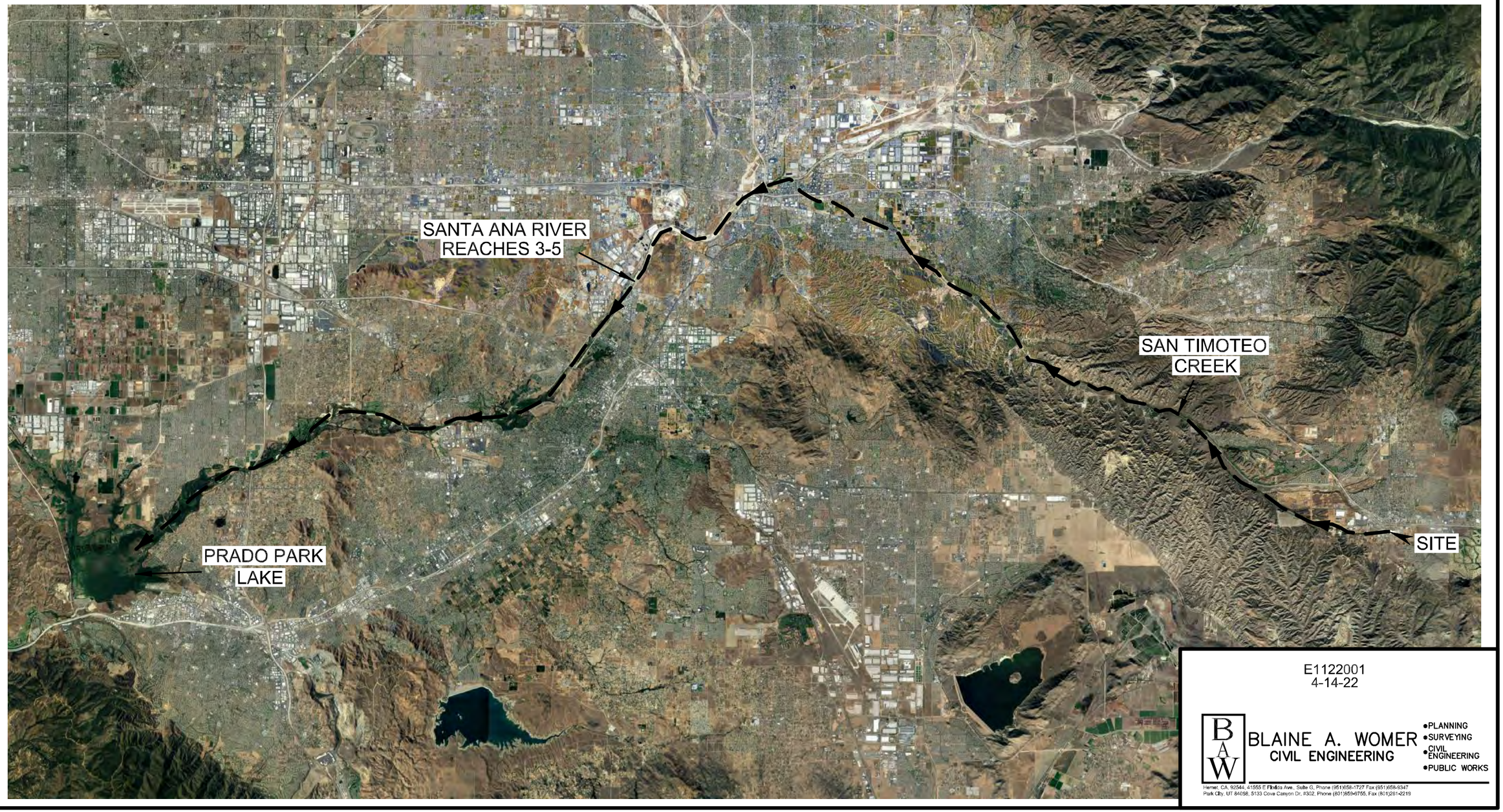
NORTH

NORTH

WQMP EXHIBIT A-2

REGIONAL WATERS MAP

84 LUMBER STORAGE YARD



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BLAINE A. WOMER
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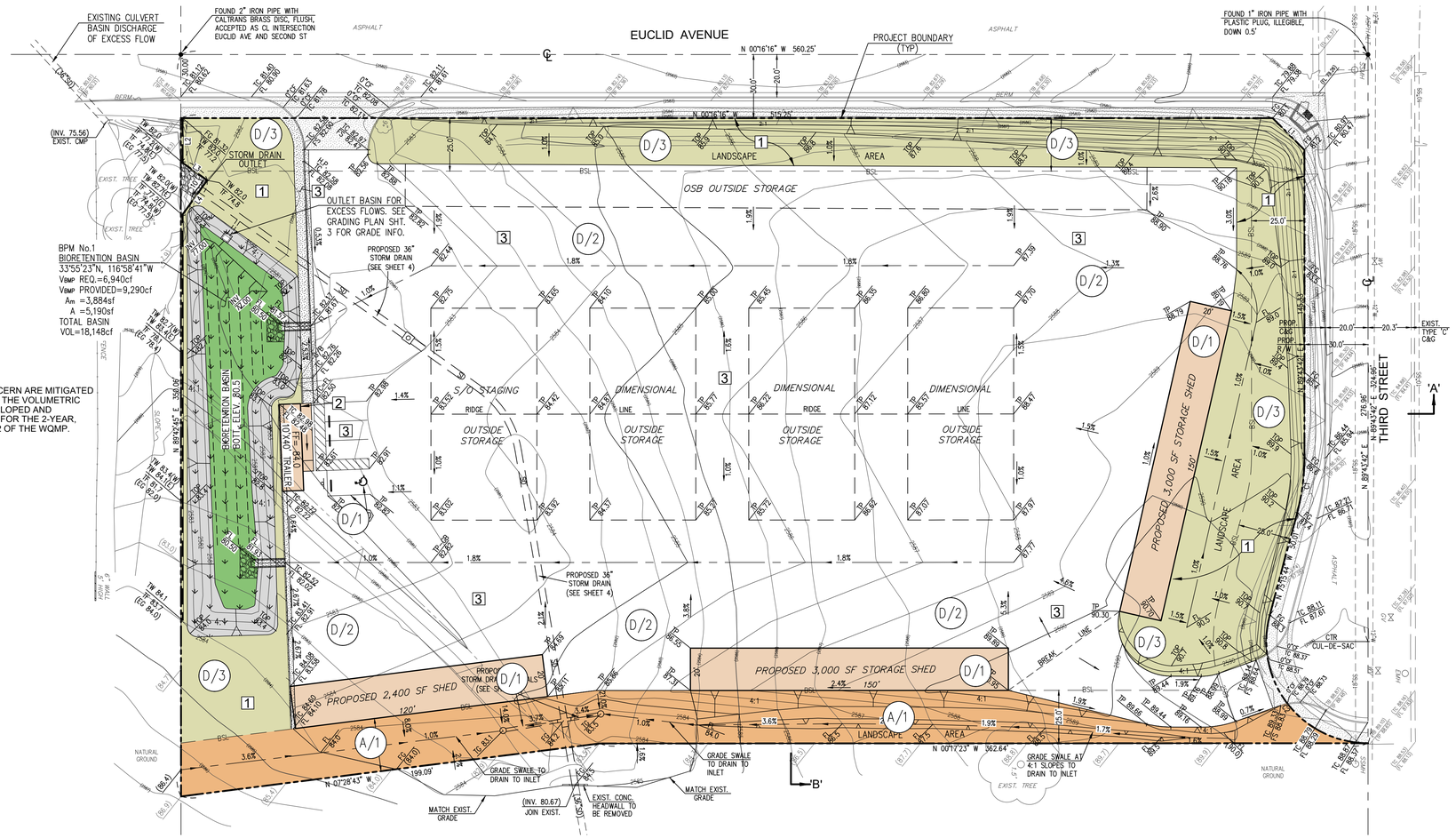
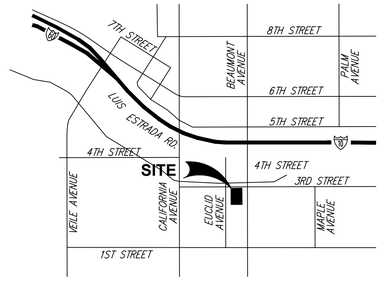
NORTH

0 30 60 90

1" = 30'





VICINITY MAP
NTS

NORTH

LEGEND

- —1508— INDICATES EXISTING CONTOUR
- SD INDICATES STORM DRAIN
- INDICATES ROOF
- INDICATES LANDSCAPE SURFACE – DRAINS TO BMP
- INDICATES ASPHALT SURFACE
- INDICATES INFILTRATION BASIN
- INDICATES LANDSCAPE SURFACE – SELF TREATING
- INDICATES CONCRETE SURFACE
- INDICATES PROJECT BOUNDARY

SOURCE CONTROL

1. LANDSCAPE / OUTDOOR PESTICIDE USE.
2. CONDENSATE DRAIN LINES.
3. PLAZAS, SIDEWALKS AND PARKING LOTS.

NOTE: STORAGE SHEDS DO NOT HAVE ROOF DRAINS OR DOWN SPOUTS.

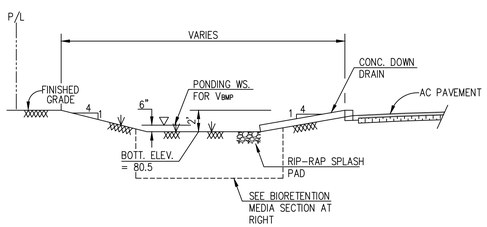
HCOC COMPLIANCE:

HYDRAULIC CONDITIONS OF CONCERN ARE MITIGATED ONSITE THROUGH RETENTION OF THE VOLUMETRIC DIFFERENCE BETWEEN THE DEVELOPED AND UNDEVELOPED SITE CONDITIONS FOR THE 2-YEAR, 24 HOUR STORM PER SECTION F.2 OF THE WQMP.

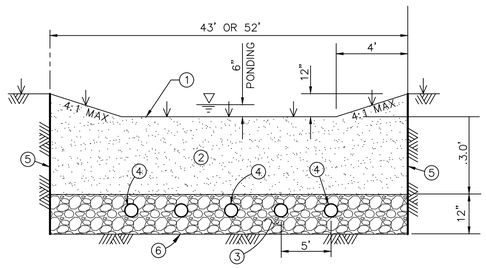
DMA SUMMARY

IDENTIFIER	AREA (SF)	SURFACE TYPE	TREATMENT	BMP
D/1	8,400	ROOF	DRAINS TO BMP	BIORETENTION
D/2	105,529	ASPHALT	DRAINS TO BMP	BIORETENTION
D/3	19,181	LANDSCAPE	DRAINS TO BMP	BIORETENTION
A/1	10,629	NATURAL	SELF-TREATING	N/A

DCV CALCULATED: 6,940 cf
DCV PROVIDED: 9,290 cf



BIORETENTION BASIN SECTION
NTS



BIORETENTION BASIN
N.T.S

NOTES

1. VEGETATIVE COVER-SPECIFICATION PER BIORETENTION FACT SHEET-WQMP.
2. ENGINEERED SOIL MEDIA-SPECIFICATION BELOW.
3. 12" GRAVEL LAYER-SPECIFICATION PER BIORETENTION FACT SHEET-WQMP.
4. 6" PERFORATED PIPE @ 5' O.C.
5. ROOT BARRIER PANELS FROM SURFACE TO BASE OF ROCK PER NDS RP SERIES OR EQUAL.
6. FILTER FABRIC, MIRAFI 140N OR EQUAL.

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 THE TABLE BELOW. THE ORGANIC COMPONENT SHALL BE NITROGEN STABILIZED COMPOST, SUCH THAT NITROGEN DOES NOT LEACH FROM THE MEDIA.

MINERAL COMPONENT RANGE REQUIREMENTS

PERCENT RANGE	COMPONENT
70-80	SAND
15-20	SILT
5-10	CLAY

LINE DATA

LINE	BEARING	DISTANCE
L1	N 44°43'43" E	21.21'
L2	N 89°42'45" E	20.72'
L3	N 35°17'13" E	14.81'
L4	N 54°42'47" W	20.82'

CURVE DATA

CURVE	RADIUS	LENGTH	DELTA	TANGENT
C1	100.00'	26.20'	15°00'34"	13.17'
C2	48.00'	87.97'	105°00'34"	62.57'

DIGALERT
Call 2 Working Days Before You Dig!
811

BENCHMARK:

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BLAINE A. WOMER
CIVIL ENGINEERING
• PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS

Walnut, CA, 92544, 41505 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-0347
Park City, UT 84098, 5133 Dove Canyon Dr. #302
Boise, ID, 83706, 4355 W Emerald Street, St. 145, Phone (208)693-7555

BLAINE A. WOMER R.C.E. 46354 — DATE

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	1"=30'
DATE:	11/10/22
JOB NUMBER:	E11-22-002

BEAUMONT CALIFORNIA

Reviewed By: _____ Staff Engineer — Date: _____
Recommended for Approval By: _____ Administrative Engineer — Date: _____
Approved By: _____ City Engineer/Director of Public Works — Date: _____

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA

84 LUMBER STORAGE YARD WQMP SITE PLAN

SHEET 1 OF 1 SHEETS
FILE NO:

Appendix 2: Construction Plans

Grading and Drainage Plans

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR
84 LUMBER STORAGE YARD

GENERAL NOTES

1. THIS PLAN SUPERSEDES ALL OTHER PLANS PREVIOUSLY APPROVED BY THE CITY OF BEAUMONT REGARDING IMPROVEMENTS SHOWN ON THIS SET OF PLANS.
2. APPROVAL OF THIS PLAN DOES NOT LESSEN OR WAIVE ANY PORTION OF THE BEAUMONT MUNICIPAL CODE, RESOLUTION OF CONDITIONAL APPROVAL, CITY STANDARDS OR OTHER ADDITIONAL DOCUMENTS LISTED HEREIN AS THEY MAY PERTAIN TO THIS PROJECT. THE ENGINEER IN RESPONSIBLE CHARGE SHALL REVISE THESE PLANS WHEN NON-CONFORMANCE IS DISCOVERED.
3. CITY APPROVAL OF PLANS DOES NOT RELIEVE THE DEVELOPER OR ENGINEER- OF-WORK FROM RESPONSIBILITY FOR THE CORRECTION OF ERRORS AND OMISSIONS DISCOVERED DURING CONSTRUCTION. ALL PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
4. A RIGHT-OF-WAY PERMIT FROM THE BUILDING & SAFETY DEPARTMENT WILL BE REQUIRED FOR ANY WORK IN THE PUBLIC RIGHT OF WAY. PRIOR TO PERMIT ISSUANCE, A CERTIFICATE OF INSURANCE MUST BE FILED NAMING THE CITY OF BEAUMONT AS AN ADDITIONAL INSURED ON THE PERMITTEE'S POLICY IN THE MINIMUM AMOUNT OF $1,000,000.00 FOR EACH OCCURRENCE OF LIABILITY. THE INSURANCE COMPANY WRITING THE POLICY MUST HAVE A RATING OF "A-" OR BETTER AND A SIZE CATEGORY OF CLASS VII OR BETTER AS ESTABLISHED BY "BESTS" KEY RATING GUIDE.
5. NO WORK SHALL BE COMMENCED UNTIL ALL PERMITS HAVE BEEN OBTAINED FROM THE CITY AND OTHER APPROPRIATE AGENCIES.
6. REVISION OF THESE PLANS MAY BE REQUIRED IF THE PROPOSED IMPROVEMENTS ARE NOT CONSTRUCTED PRIOR TO THE DEADLINE DATE OF THE IMPROVEMENT AGREEMENT.
7. NO REVISIONS WILL BE MADE TO THESE PLANS WITHOUT THE WRITTEN APPROVAL OF THE CITY ENGINEER, NOTED WITHIN THE REVISION BLOCK, ON THE APPROPRIATE SHEET OF THE PLANS AND TITLE SHEET.
8. ORIGINAL DRAWINGS SHALL BECOME THE PROPERTY OF THE CITY UPON BEING SIGNED BY THE CITY ENGINEER.
9. THE ORIGINAL DRAWING SHALL BE REVISED TO REFLECT AS-BUILT CONDITIONS BY THE ENGINEER-OF-WORK PRIOR TO FINAL ACCEPTANCE OF THE WORK BY THE CITY.
10. ACCESS FOR FIRE AND OTHER EMERGENCY VEHICLES SHALL BE MAINTAINED TO THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION.
11. WHERE TRENCHES ARE WITHIN CITY EASEMENTS, A SOILS REPORT COMPRISED OF:
    A. SUMMARY SHEET
    B. LABORATORY WORK SHEETS
    C. COMPACTION CURVES, SHALL BE SUBMITTED BY A PROFESSIONAL ENGINEER OF THE STATE OF CALIFORNIA, PRINCIPALLY DOING BUSINESS IN THE FIELD OF APPLIED SOILS MECHANICS. THE SOILS REPORT WILL BE SUBMITTED TO THE CITY ENGINEERING INSPECTOR WITHIN TWO WORKING DAYS OF COMPLETION OF FIELD TESTS. THE WRITTEN FIELD COMPACTION REPORT(S) SHALL BE IMMEDIATELY SUBMITTED TO THE CITY ENGINEERING INSPECTOR UPON COMPLETION OF THE FIELD TESTS.
12. A PRECONSTRUCTION MEETING SHALL BE HELD AT THE SITE PRIOR TO THE BEGINNING OF WORK AND SHALL BE ATTENDED BY ALL REPRESENTATIVES RESPONSIBLE FOR CONSTRUCTION, INSPECTION, SUPERVISION, TESTING AND ALL OTHER ASPECTS OF THE WORK. THE CONTRACTOR SHALL SCHEDULE THE MEETING BY CALLING THE INSPECTION LINE AT (951) 572-3224 AT LEAST FIVE (5) WORKING DAYS PRIOR TO STARTING CONSTRUCTION. APPROVED DRAWINGS MUST BE AVAILABLE PRIOR TO SCHEDULING.
13. ALL INSPECTION REQUESTS OTHER THAN FOR THE PRECONSTRUCTION MEETING WILL BE MADE BY CALLING THE BUILDING AND SAFETY INSPECTION REQUEST LINE AT (951) 572-3224. INSPECTION REQUESTS MUST BE RECEIVED PRIOR TO 2:00 P.M. ON THE DAY BEFORE THE INSPECTION IS NEEDED. INSPECTIONS WILL BE MADE THE NEXT WORK DAY UNLESS YOU REQUEST OTHERWISE. REQUESTS MADE AFTER 2:00 P.M. WILL BE SCHEDULED FOR TWO FULL WORK DAYS LATER.
14. THE OWNER AND/OR APPLICANT THROUGH THE DEVELOPER AND/OR CONTRACTOR SHALL DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING, AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS.
15. THE CONTRACTOR SHALL CONFORM TO LABOR CODE SECTION 6705 BY SUBMITTING A DETAIL PLAN TO THE CITY ENGINEER AND/OR CONCERNED AGENCY SHOWING THE DESIGN OF SHORING, BRACING SLOPE OR OTHER PROVISIONS TO BE MADE OF WORKER PROTECTION FROM THE HAZARD OF CAVING GROUND DURING THE EXCAVATION OF SUCH TRENCH OR TRENCHES OR DURING THE PIPE INSTALLATION THEREIN. THIS PLAN MUST BE PREPARED FOR ALL TRENCHES FIVE FEET (5') OR MORE IN DEPTH AND APPROVED BY THE CITY ENGINEER AND/OR CONCERNED AGENCY PRIOR TO EXCAVATION. IF THE PLAN VARIES FROM THE SHORING SYSTEM STANDARDS ESTABLISHED BY THE CONSTRUCTION SAFETY ORDERS, TITLE 8 CALIFORNIA ADMINISTRATIVE CODE, THE PLAN SHALL BE PREPARED BY A REGISTERED ENGINEER AT THE CONTRACTORS EXPENSE. A COPY OF THE OSHA EXCAVATION PERMIT MUST BE SUBMITTED TO THE INSPECTOR PRIOR TO EXCAVATION.
16. IF ANY ARCHAEOLOGICAL RESOURCES ARE DISCOVERED WITHIN ANY WORK ZONE DURING CONSTRUCTION, OPERATIONS WILL CEASE IMMEDIATELY, AND THE PERMITTEE WILL NOTIFY THE CITY ENGINEER. OPERATIONS WILL NOT RESTART UNTIL THE PERMITTEE HAS RECEIVED WRITTEN AUTHORITY FROM THE CITY ENGINEER TO DO SO.
17. ALL OPERATIONS CONDUCTED ON THE SITE OR ADJACENT THERETO SHALL ADHERE TO THE NOISE ORDINANCE SET FORTH BY THE CITY MUNICIPAL CODE. ALL OPERATIONS SHALL BE LIMITED BY THE NOISE ORDINANCE TO THE LEVEL OF DECIBELS SPECIFIED FOR THE AREA AND TIME PERIOD. CONSTRUCTION ACTIVITIES WILL BE LIMITED TO THE PERIOD BETWEEN 7:00 A.M. AND 6:00 P.M. EACH DAY MONDAY THROUGH FRIDAY, UNLESS OTHERWISE PERMITTED.
18. ALL OFF-SITE HAUL ROUTES SHALL BE SUBMITTED BY THE CONTRACTOR TO THE CITY ENGINEER FOR APPROVAL TWO FULL WORKING DAYS PRIOR TO BEGINNING OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEBRIS OR DAMAGE OCCURRING ALONG THE HAUL ROUTE OR ADJACENT STREETS AS A RESULT OF THE GRADING OPERATION.
19. NO BLASTING SHALL BE COMMENCED WITHOUT A CITY ENGINEER APPROVED BLASTING PROGRAM AND BLASTING PERMIT.
20. THE EXISTENCE AND LOCATION OF UTILITY STRUCTURES AND FACILITIES SHOWN ON THE CONSTRUCTION PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. ATTENTION IS CALLED TO THE POSSIBLE EXISTENCE OF OTHER UTILITY FACILITIES OR STRUCTURES NOT SHOWN OR IN A LOCATION DIFFERENT FROM THAT SHOWN ON THE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN ON THE PLANS AND ANY OTHER EXISTING FACILITIES OR STRUCTURES NOT SHOWN.
21. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING FACILITIES (ABOVEGROUND AND UNDERGROUND) WITHIN THE PROJECT SITE SUFFICIENTLY AHEAD OF THE CONSTRUCTION TO PERMIT THE REVISIONS OF THE CONSTRUCTION PLANS IF IT IS FOUND THAT THE ACTUAL LOCATIONS ARE IN CONFLICT WITH THE PROPOSED WORK.
22. THE CONTRACTOR SHALL NOTIFY AFFECTED UTILITY COMPANIES (SEE BELOW) AT LEAST TWO FULL WORKING DAYS PRIOR TO STARTING CONSTRUCTION NEAR THEIR FACILITIES AND SHALL COORDINATE WORK WITH A COMPANY REPRESENTATIVE.

UNDERGROUND SERVICE ALERT	(800) 422-4133
SOUTHERN CALIFORNIA EDISON	(800) 409-2365
AT&T	(800) 892-0123
TIME WARNER CABLE	(760) 340-2225
COX COMMUNICATIONS	(888) 423-3913

23. IN ACCORDANCE THE CITY STORM WATER STANDARDS ALL STORM DRAIN INLETS CONSTRUCTED BY THIS PLAN SHALL INCLUDE "STENCILS" BE ADDED TO PROHIBIT WASTE DISCHARGE DOWNSTREAM. STENCILS SHALL BE ADDED TO THE SATISFACTION OF THE CITY ENGINEER.

GEOTECHNICAL ENGINEER'S STATEMENT

THESE GRADING PLANS HAVE BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN THE GEOTECHNICAL REPORT(S) PREPARED FOR THIS PROJECT TITLED "GEOTECHNICAL INVESTIGATION FOR PROPOSED 84 LUMBER STORAGE YARD EXPANSION", DATED JUNE 2, 2022.

BRETT L. ANDERSON, CE 5389 — DATE: 04-12-2023

SLADDEN ENGINEERING
450 EGAN AVENUE
BEAUMONT, CA. 92223
(951) 845-7743

"DECLARATION OF RESPONSIBLE CHARGE"

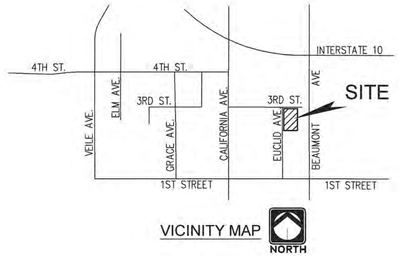
I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF BEAUMONT DOES NOT RELIEVE ME AS ENGINEER OF WORK OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

FIRM: BLAINE A. WOMER CIVIL ENGINEERING
ADDRESS: 41555 E. FLORIDA AVENUE, STE. G
CITY, ST.: HEMET, CALIFORNIA
TELEPHONE: (951) 658-1727

BY: _____ DATE: 4/12/22
BLAINE A. WOMER, RCE 46354

CONSTRUCTION NOTES/ESTIMATE OF QUANTITIES

1. INSTALL MINIMUM 3" AC OVER 6" CLASS II AGGREGATE BASE. SECTION TO BE VERIFIED BY THE PROJECT GEOTECHNICAL ENGINEER. ..... 107,026 S.F.
2. CONSTRUCT 6" TYPE A-6 CURB AND GUTTER PER RIV. CO. STD. NO. 200. ..... 261 L.F.
3. CONSTRUCT ADA ACCESS RAMP PER DETAIL THIS SHEET. ..... 72 S.F.
4. CONSTRUCT UNDER SIDEWALK DRAIN PER RIV. CO. STD. NO. 309. ..... 2 EA.
5. CONSTRUCT CONCRETE DRAINAGE CHANNEL PER DETAIL SHEET 3. ..... 34 L.F.
6. 4" WIDE WHITE PAVEMENT STRIPING. ..... L.S.
7. INSTALL TRUNCATED DOMES PER 2019 CBC SEC. 11B-705. ..... 18 S.F.
8. CONSTRUCT BLOCK RETAINING WALL PER SECTION SHOWN ON SHEET 3 REQUIRES SEPARATE PERMIT. ..... 237 L.F.
9. ADA ACCESSIBLE PARKING LOT STRIPING PER CBC 2019 SEC.11B-502 FIG. 11B-502.2, 11B-502.3 & 11B-502.3.3. ..... L.S.
10. PAINT ADA PARKING SPACE STRIPING AND LEGEND PER 2019 CBC SECTION 11B-502. ..... L.S.
11. INSTALL ADA PARKING SPACE SIGNAGE PER 2019 CBC SECTION 11B-502.6. ..... 1 EA.
12. INSTALL 4" THICK CONCRETE SIDEWALK PER RIV. CO. STD. NO. 401. ..... 944 S.F.
13. INSTALL 6.0' CONCRETE WHEEL STOP. ..... 3 EA.
14. INSTALL 18" HDPE STORM DRAIN. ..... 57 L.F.
15. INSTALL 36" HDPE STORM DRAIN. ..... 471 L.F.
16. INSTALL CONCRETE COLLAR PER R.C.F.C.&W.C.D. STD. DWG. NO. M803. ..... 2 EA.
17. CONSTRUCT STORM DRAIN MANHOLE NO. 1 PER R.C.F.C.&W.C.D. STD. DWG. MH251. ..... 1 EA.
18. REMOVE EXISTING CONCRETE HEADWALL. ..... 1 EA.
19. INSTALL 36"x36"x18" HDPE TEE. ..... 1 EA.
20. INSTALL 36"x18" HDPE CROSS. ..... 1 EA.
21. CONSTRUCT RIP RAP PAD 12" ROCK, 2.0' THICK MIN.,FILTER FABRIC, MIRAFI 500X OR EQUAL. ..... 318 S.F.
22. CONSTRUCT CONCRETE DROP INLET PER R.C.F.C.&W.C.D. STD. No. CB110. ..... 1 EA.
23. CONSTRUCT TYPE X INLET WITH INLET GRATE PER R.C.F.C &W.C.D. STD. No. CB108. ..... 2 EA.
24. CONSTRUCT CONCRETE FOREBAY PER DETAIL SHEET 3. ..... 2 EA.
25. INSTALL 6" PERFORATED PVC DRAIN PIPE @ 3.0' O.C. ..... 960 L.F.
26. INSTALL 6" SDR-35 PVC DRAIN PIPE. ..... 53 L.F.
27. INSTALL 6.0' HIGH CONCRETE SCREEN WALL PER PLANS PREPARED BY HTK STRUCTURAL ENGINEERS. REQUIRES SEPARATE PERMIT. ..... 700 L.F.
28. INSTALL 8.0' HIGH CHAIN LINK FENCE OVER TOP OF RETAINING WALL. SUPPORT POSTS SHALL BE CENTERED INTO THE BLOCK AND GROUTED. ..... 237 L.F.
29. INSTALL 8.0' HICH CHAIN LINK FENCE. ..... 608 L.F.
30. WOOD SWING GATES PER LANDSCAPE ARCHITECT PLAN. ..... 2 EA.
31. CONSTRUCT STRAIGHT HEADWALL PER CALTRANS STANDARD PLAN No. D89A. ..... 20 L.F.



VICINITY MAP — NORTH

PRIVATE ENGINEERS NOTICE TO CONTRACTOR(S)

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS AND IS RESPONSIBLE FOR THE PROTECTION OF, AND ANY DAMAGE TO THESE LINES OR STRUCTURES
2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE OWNER OF ALL UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.
3. QUANTITIES SHOWN HEREON ARE PROVIDED FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL QUANTITIES PRIOR TO BIDDING FOR CONSTRUCTION.
4. THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER CITY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE CITY.

NOTE

1. APPROVAL OF THESE PLANS APPLIES ONLY WITHIN THE JURISDICTION OF THE CITY OF BEAUMONT.
2. TRENCHING FOR UTILITIES AND STRUCTURES IS NOT ALLOWED UNTIL SOIL COMPACTION REPORT IS SUBMITTED AND APPROVED BY THE PUBLIC WORKS DEPARTMENT.
3. THE CITY RESERVES THE RIGHT TO REQUIRE REVISIONS OF THE APPROVED PLANS TO CONFORM WITH CURRENT STANDARDS AND TO POST A NEW BOND IF CONSTRUCTION HAS NOT COMMENCED WITHIN TWO YEARS AFTER PLANS WERE APPROVED.
4. SIDEWALK AND DRIVEWAY APPROACHES WILL BE POURED/CONSTRUCTED ONLY AFTER DRIVEWAY LOCATIONS ARE DETERMINED.

ASSESSOR'S PARCEL NO.

418-210-019

SITE ADDRESS:

PENDING

DISTURBED AREA

3.42 ACRES

EARTHWORK

RAW CUT ..... 3,587 C.Y.
RAW FILL ..... 3,279 C.Y.

EARTHWORK CALCULATIONS BASED ON THE RELATIONSHIP BETWEEN THE CONTOURED SURFACE AS SHOWN AND CALCULATED PROPOSED SUB-GRADE SURFACE.

IMPERVIOUS AREA: EXISTING

NONE

IMPERVIOUS AREA: PROPOSED

2.50 ACRES

SOURCE OF TOPOGRAPHY

AN FIELD SURVEY PERFORMED BY ON POINT LAND SURVEYING DATED OCTOBER, 2021.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PLAN IS THE CENTERLINE OF EUCLID AVENUE TAKEN AS N 00°16'16" W PER PM 204/85-86.

INDEX OF SHEETS

OWNER/APPLICANT:

PIERCE HARDY LIMITED PARTNERSHIP
1019 ROUTE 519, BUILDING #4
EIGHTY FOUR, PA. 15330
(724) 228-8820

LEGAL DESCRIPTION:

LOT 1-16 INCLUSIVE, OF BLOCK 144 OF THE AMENDED MAP OF THE TOWN OF BEAUMONT AS SHOWN BY MAP ON FILE IN BOOK 6, PAGES 16 & 17, RIVERSIDE COUNTY RECORDS.

WORK TO BE DONE

THE IMPROVEMENT WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING DOCUMENTS, CURRENT AT THE TIME OF CONSTRUCTION, AS DIRECTED BY THE CITY ENGINEER.

1. BEAUMONT MUNICIPAL CODE.
2. FOR STREETS: RIVERSIDE COUNTY ORDINANCE NO. 461.
   FLOOD CONTROL FACILITIES: THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S STANDARDS FOR FLOOD CONTROL FACILITIES.
   SANITARY SEWER FACILITIES: THE EASTERN MUNICIPAL WATER DISTRICT'S STANDARDS FOR SANITARY SEWER FACILITIES.
   ALL OTHER PUBLIC WORKS: THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK).
3. THIS SET OF PLANS.
4. APPROVED PLOT PLAN No. PP2022-0458, DATED OCTOBER 26, 2022.
5. SOILS REPORT AND RECOMMENDATIONS BY SLADDEN ENGINEERING, DATED JUNE 2, 2022.

LEGEND

TB	-	BERM TOP
TC	-	CURB TOP
FL	-	FLOW LINE
FH	-	FIRE HYDRANT
FS	-	FINISH SURFACE
GV	-	GAS VALVE
WV	-	WATER VALVE
SSMH	-	SEWER MANHOLE
EMH	-	ELECTRIC MANHOLE
TF	-	TOP OF FOOTING
TW	-	TOP OF WALL
TP	-	TOP OF PAVEMENT
EG	-	EXISTING GROUND
SD	-	STORM DRAIN
CB	-	CATCH BASIN
BSL	-	BUILDING SETBACK LINE
TOP	-	TOP OF SLOPE
H.P.	-	HIGH POINT
CF	-	CURB FACE
FG	-	FINISHED GRADE
C&G	-	CURB & GUTTER
R/W	-	RIGHT-OF-WAY
C/L, ℄	-	CENTER LINE
CTR	-	CENTER
G/B	-	GRADE BREAK
	-	PROPOSED AC PAVEMENT
	-	PROPOSED CONCRETE SURFACE
	-	PROPOSED MANUFACTURED SLOPE
(2588)	-	EXISTING GROUND CONTOUR
2588	-	PROPOSED GROUND CONTOUR
12"W	-	EXISTING WATER LINE BY SIZE
10"SS	-	EXISTING SEWER LINE BY SIZE
( )	-	EXISTING CULTURE OR ELEVATION
EXIST.	-	EXISTING
	-	PROPOSED FLOW LINE
	-	PROPOSED 8.0' HIGH CHAIN LINK FENCE

ALL STANDARD DRAWINGS ARE COUNTY OF RIVERSIDE ROAD IMPROVEMENT STANDARDS & SPECIFICATIONS UNLESS NOTED OTHERWISE:
* RCFC&WCD STANDARD MANUAL
** EMWD SEWER STANDARD DRAWINGS
*** STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

WDID No. 8 33C399836

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:
NGS BENCH MARK ID DX3473 AT THE JUNCTION OF CALIFORNIA AVE. AND FIFTH PL., 94.8' W/O THE AVE. C/L, 25.3' S/O THE C/L OF FIFTH PL., 3.6' N/O A GUY WIRE, 2.6' S/O A POWER POLE, 0.6' E/O A WITNESS POST.

ELEVATION=2579.30, NAVD 88

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BLAINE A. WOMER CIVIL ENGINEERING — PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS
Hemet, CA, 92544, 41555 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-0347
Park City, UT 84098, 5133 Dove Canyon Dr. #302
Boise, ID, 83706, 4355 W Emerald Street, (B 140, Phone (208)593-7555

BLAINE A. WOMER R.C.E. 46354 — DATE 4/12/22

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A. WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	N/A
DATE:	6/20/22
JOB NUMBER:	E11-22-002

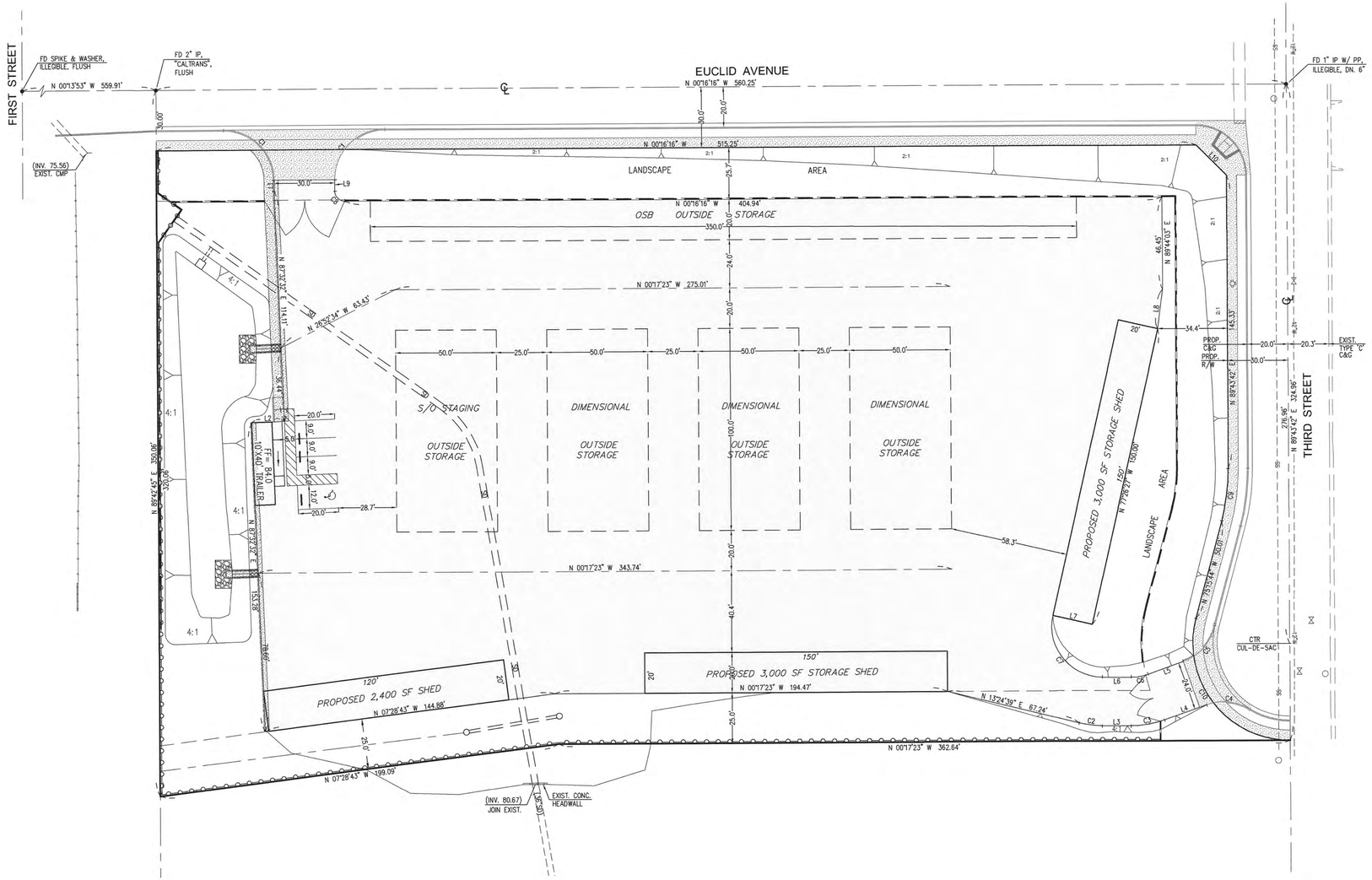
BEAUMONT — CALIFORNIA

Reviewed By:	Staff Engineer	Date: 5/2/2023
Recommended for Approval By:	Administrative Engineer	Date: 5/2/2023
Approved By:	City Engineer/Director of Public Works	Date: 05/16/2023

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St.
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD
TITLE SHEET

SHEET 1 OF 7 SHEETS
FILE NO: 3469
PW2022-0950



NORTH

0 30 60 90

1" = 30'

LINE DATA

LINE	BEARING	DISTANCE
L1	N 89°43'44" E	5.49'
L2	N 02°16'38" W	16.23'
L3	N 00°00'00" W	14.25'
L4	N 19°50'49" W	22.15'
L5	N 19°50'49" W	18.39'
L6	N 00°00'00" W	14.25'
L7	N 12°33'33" E	20.00'
L8	N 83°17'01" W	19.65'
L9	N 89°43'44" E	5.68'
L10	N 44°43'43" E	21.21'

CURVE DATA

CURVE	RADIUS	LENGTH	DELTA	TANGENT
C1	25.00'	39.27'	90°00'00"	25.00'
C2	49.00'	11.47'	13°24'39"	5.76'
C3	49.00'	16.97'	19°50'49"	8.57'
C4	25.00'	22.28'	51°04'17"	11.94'
C5	25.00'	24.82'	56°53'23"	13.54'
C6	25.00'	8.66'	19°50'49"	4.37'
C7	25.00'	44.75'	102°33'33"	31.18'
C8	5.00'	7.85'	90°00'00"	5.00'
C9	100.00'	26.20'	15°00'34"	13.17'
C10	48.00'	87.97'	105°00'34"	62.57

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:

SEE SHEET 1

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BLAINE A. WOMER CIVIL ENGINEERING
• PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS

Hemet, CA, 92544, 41555 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-9347
Park City, UT 84098, 5135 Cove Canyon Dr. #502
Boise, ID, 83706, 4355 W Emerald Street, St. 140, Phone (208)593-7555

BLAINE A. WOMER
R.C.E. 46354
DATE

SEAL — REGISTERED PROFESSIONAL ENGINEER — BLAINE A WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY: SEB
DRAWN BY: SEB
CHECKED BY: BAW
SCALE: 1"=30'
DATE: 6/20/22
JOB NUMBER: E11-22-002

BEAUMONT — CALIFORNIA

Reviewed By: _____ Staff Engineer — Date: 5/2/2023

Recommended for Approval By: _____ Administrative Engineer — Date: 5/2/2023

Approved By: _____ City Engineer/Director of Public Works — Date: 05/16/2023

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:

84 LUMBER STORAGE YARD HORIZONTAL CONTROL PLAN

SHEET 2 OF 7 SHEETS
FILE NO: 3469
PW2022-0950

NORTH

0 30 60 90

1" = 30'

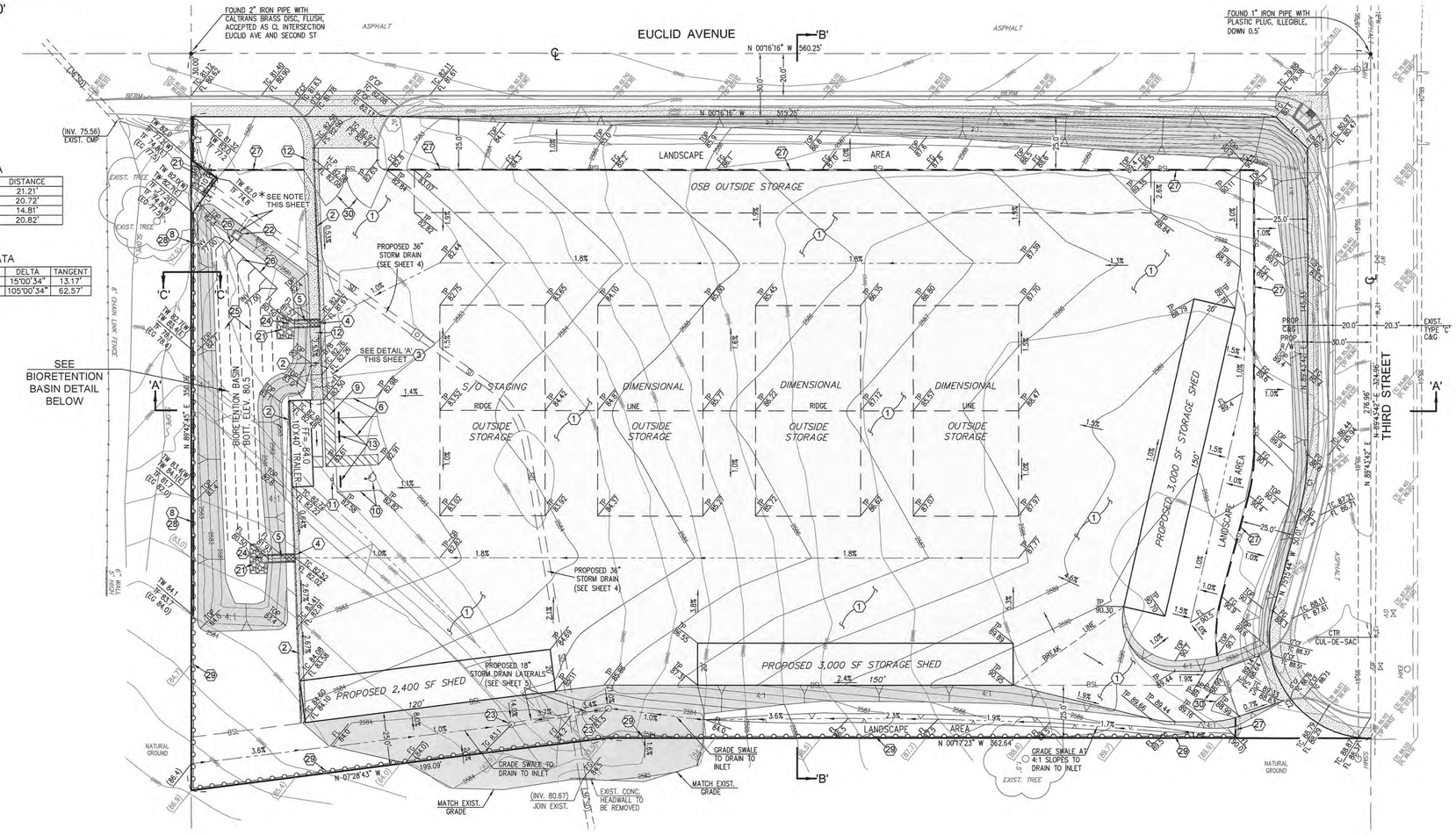
*SEE SHEET 5 FOR STORM DRAIN INLET & LATERAL INVERT ELEVATIONS

LINE DATA

LINE	BEARING	DISTANCE
L1	N 44°43'43" E	21.21'
L2	N 89°42'45" E	20.72'
L3	N 35°17'13" E	14.81'
L4	N 54°42'47" W	20.82'

CURVE DATA

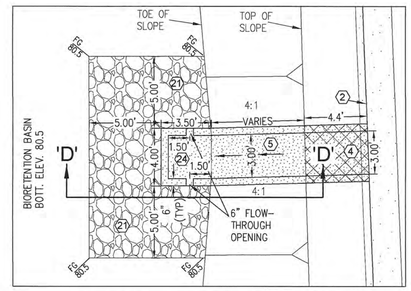
CURVE	RADIUS	LENGTH	DELTA	TANGENT
C1	100.00'	26.20'	15°00'34"	13.17'
C2	48.00'	87.97'	105°00'34"	62.57'



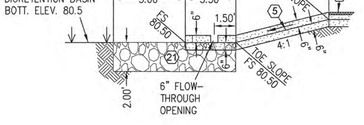
CONSTRUCTION NOTES

1. INSTALL MINIMUM 3" AC OVER 6" CLASS II AGGREGATE BASE. SECTION TO BE VERIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
2. CONSTRUCT 6" TYPE A-6 CURB AND GUTTER PER RIV. CO. STD. NO. 200.
3. CONSTRUCT ADA ACCESS RAMP PER DETAIL THIS SHEET.
4. CONSTRUCT UNDER SIDEWALK DRAIN PER RIV. CO. STD. NO. 309.
5. CONSTRUCT CONCRETE DRAINAGE CHANNEL PER DETAIL THIS SHEET.
6. 4" WIDE WHITE PAVEMENT STRIPING.
7. INSTALL TRUNCATED DOMES PER 2019 CBC SEC. 11B-705.
8. CONSTRUCT BLOCK RETAINING WALL PER SECTION SHOWN ON THIS SHEET AND REQUIRES SEPARATE PERMIT.
9. ADA ACCESSIBLE PARKING LOT STRIPING PER CBC 2019 SEC.11B-502 FIG. 11B-502.2, 11B-502.3 & 11B-502.3.3.
10. PAINT ADA PARKING SPACE STRIPING AND LEGEND PER 2019 CBC SECTION 11B-502.
11. INSTALL ADA PARKING SPACE SIGNAGE PER 2019 CBC SECTION 11B-502.6.
12. INSTALL 4" THICK CONCRETE SIDEWALK PER RIV. CO. STD. NO. 401.
13. INSTALL 6.0' CONCRETE WHEEL STOP.
21. CONSTRUCT RIP RAP PAD 12" ROCK, 2.0' THICK MIN.,FILTER FABRIC, MIRAFI 500X OR EQUAL.
22. CONSTRUCT CONCRETE DROP INLET PER R.C.F.C.&W.C.D. STD. No. CB110.
23. CONSTRUCT TYPE X INLET WITH INLET GRATE PER R.C.F.C &W.C.D. STD. No. CB108.
24. CONSTRUCT CONCRETE FOREBAY PER DETAIL THIS SHEET.
25. INSTALL 6" PERFORATED PVC DRAIN PIPE @ 3.0' O.C.
26. INSTALL 6" SDR-35 PVC DRAIN PIPE.
27. INSTALL 6.0' HIGH CONCRETE SCREEN WALL PER PLANS PREPARED BY HTK STRUCTURAL ENGINEERS. REQUIRES SEPARATE PERMIT.
28. INSTALL 8.0' HIGH CHAIN LINK FENCE OVER TOP OF RETAINING WALL. SUPPORT POSTS SHALL BE CENTERED INTO THE BLOCK AND GROUTED.
29. INSTALL 8.0' HIGH CHAIN LINK FENCE.
30. WOOD SWING GATES PER LANDSCAPE ARCHITECT PLAN.

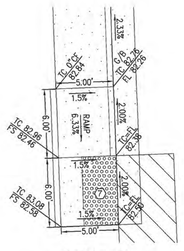
NOTE:
SEE SHEET 7 FOR SECTIONS 'A'-'A' AND 'B'-'B'



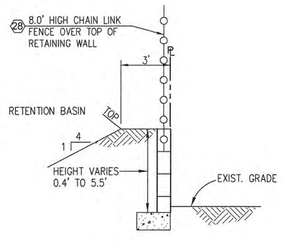
TYPICAL CONCRETE FOREBAY DETAIL (24)
NTS



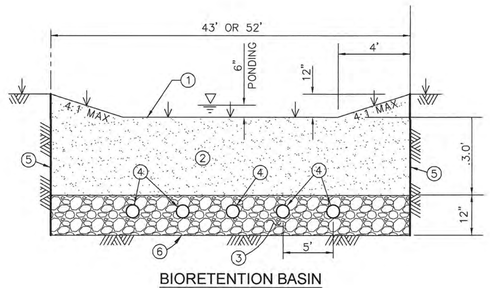
SECTION 'D'-'D'
NTS



DETAIL 'A'
CURB RAMP DETAIL (3)
NTS



SECTION 'C'-'C'
(ALL WALLS REQUIRE SEPARATE PERMIT) (8)
NOT TO SCALE



BIORETENTION BASIN
N.T.S

NOTES

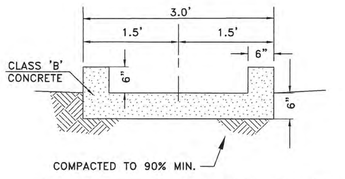
1. VEGETATIVE COVER-SPECIFICATION PER BIORETENTION FACT SHEET-WQMP.
2. ENGINEERED SOIL MEDIA-SPECIFICATION BELOW.
3. 12" GRAVEL LAYER-SPECIFICATION PER BIORETENTION FACT SHEET-WQMP.
4. 6" PERFORATED PIPE @ 5' O.C.
5. ROOT BARRIER PANELS FROM SURFACE TO BASE OF ROCK PER NDS RP SERIES OR EQUAL.
6. FILTER FABRIC, MIRAFI 140N OR EQUAL.

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 THE TABLE BELOW. THE ORGANIC COMPONENT SHALL BE NITROGEN STABILIZED COMPOST, SUCH THAT NITROGEN DOES NOT LEACH FROM THE MEDIA.

MINERAL COMPONENT RANGE REQUIRMENTS

PERCENT RANGE	COMPONENT
70-80	SAND
15-20	SILT
5-10	CLAY



CONCRETE DRAINAGE CHANNEL SECTION (5)
NTS

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BENCHMARK:

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ENGINEER		REVISIONS		CITY

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Park City, UT 84098, 9133 Dove Canyon Dr. #302
Boise, ID, 83706, 4395 W Emerald Street, Bl. 145, Phone (208)869-7555
BLAINE A. WOMER R.C.E. 46354 DATE 4/19/23

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A. WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	1"=30'
DATE:	6/20/22
JOB NUMBER:	E11-22-002

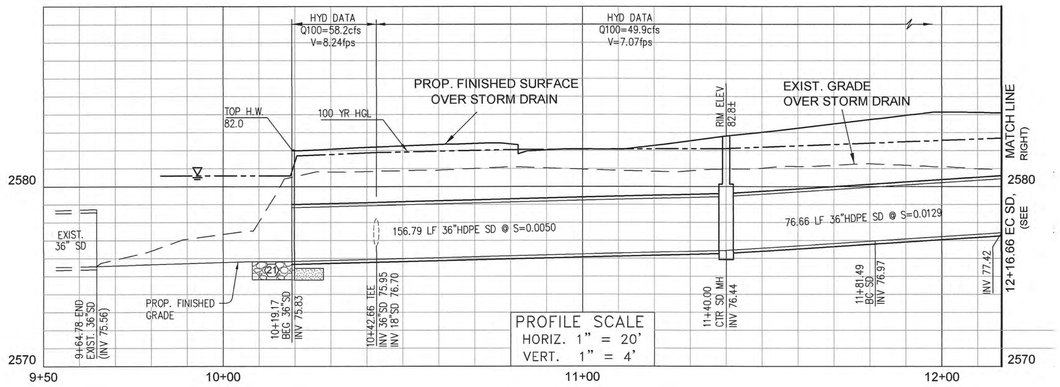
BEAUMONT CALIFORNIA

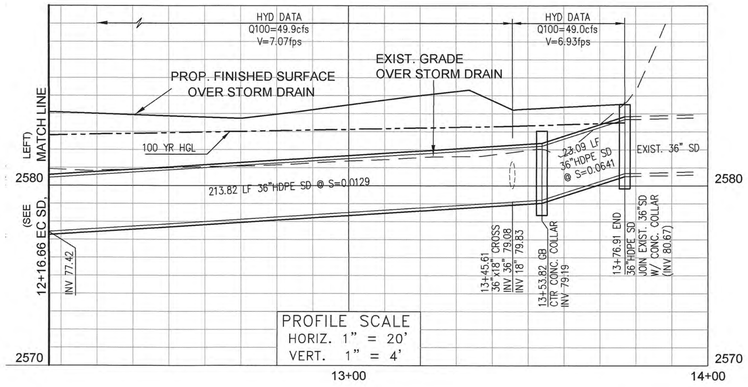
Reviewed By:	Staff Engineer	Date: 5/2/2023
Recommended for Approval By:	Administrative Engineer	Date: 5/2/2023
Approved By:	City Engineer/Director of Public Works	Date: 05/16/2023

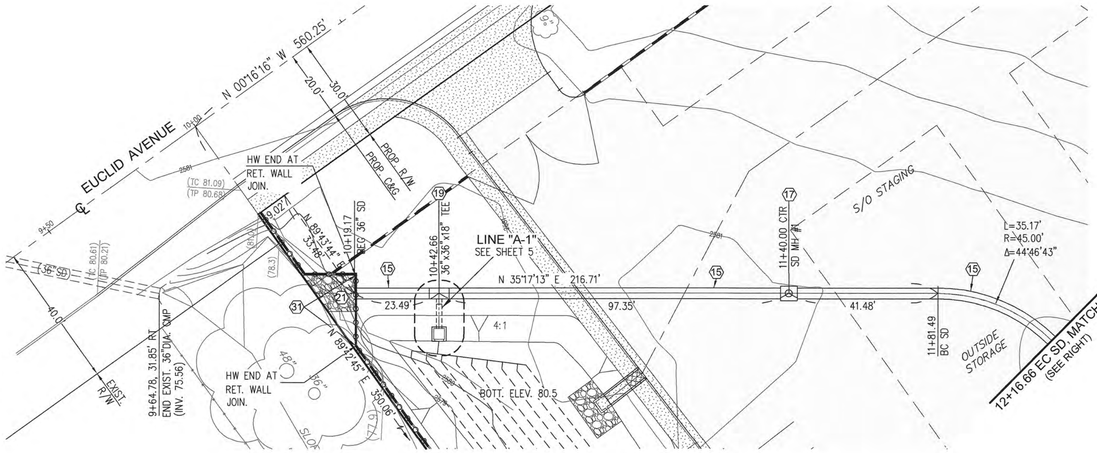
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD PRECISE GRADING PLAN

SHEET 3
OF 7 SHEETS
FILE NO: 3469
PW2022-0950





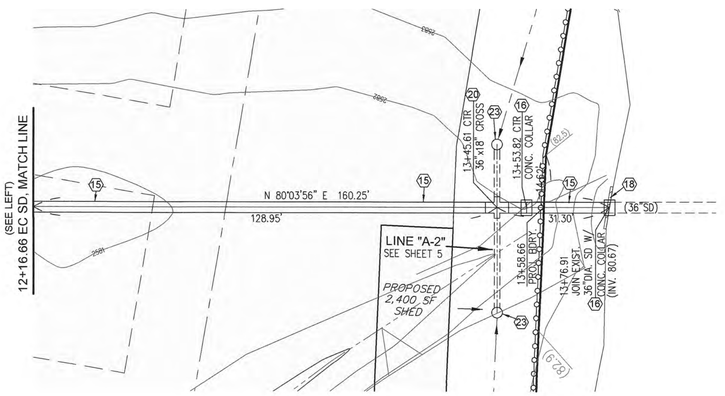


LINE "A"

NORTH

0 20 40 60

1" = 20'



LINE "A"

NORTH

0 20 40 60

1" = 20'

HEADWALL VALUES STD. D89A

31

H = 6.17'
T = 1.00'
W = 5.33'
C = 1.33'
B = 4.00'
F = 1.17'
c bars = #5 @ 12"
d bars = #6 @ 8"

CONSTRUCTION NOTES

15. INSTALL 36" HDPE STORM DRAIN.
16. INSTALL CONCRETE COLLAR PER R.C.F.C.&W.C.D. STD. DWG. NO. M803.
17. CONSTRUCT STORM DRAIN MANHOLE NO. 1 PER R.C.F.C.&W.C.D. STD. DWG. MH251.
18. REMOVE EXISTING CONCRETE HEADWALL.
19. INSTALL 36"x36"x18" HDPE TEE.
20. INSTALL 36"x18" HDPE CROSS.
21. CONSTRUCT RIP RAP PAD 12" ROCK, 2.0' THICK MIN.,FILTER FABRIC, MIRAFI 500X OR EQUAL.
23. CONSTRUCT TYPE X INLET WITH INLET GRATE PER R.C.F.C &W.C.D. STD. No. CB108.
31. CONSTRUCT STRAIGHT HEADWALL PER CALTRANS STANDARD PLAN D89A.

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:

SEE SHEET 1

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS		CITY

BLAINE A. WOMER CIVIL ENGINEERING
• PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS
Hemet, CA. 92544, 41555 E Florida Ave., Suite G, Phone:(951)658-1727 Fax:(951)658-0347
Park City, UT 84098, 3133 Cove Canyon Dr. #302
Boise, ID, 83706, 4355 W Emerald Street, St. 145, Phone:(208)593-7555

BLAINE A. WOMER R.C.E. 46354 — DATE 4/17/23

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	1"=20'
DATE:	6/20/22
JOB NUMBER:	E11-22-002

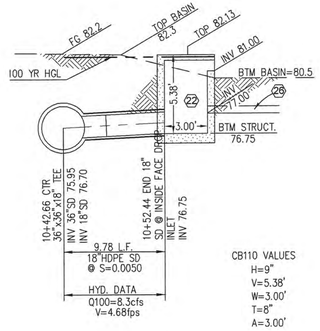
BEAUMONT — CALIFORNIA

Reviewed By:	Staff Engineer	Date: 5/2/2023
Recommended for Approval By:	Administrative Engineer	Date: 5/2/2023
Approved By:	City Engineer/Director of Public Works	Date: 05/16/2023

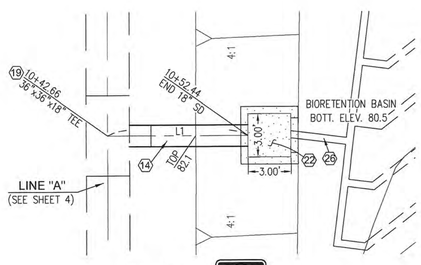
CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St.
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD
LINE "A" STORM DRAIN PLAN

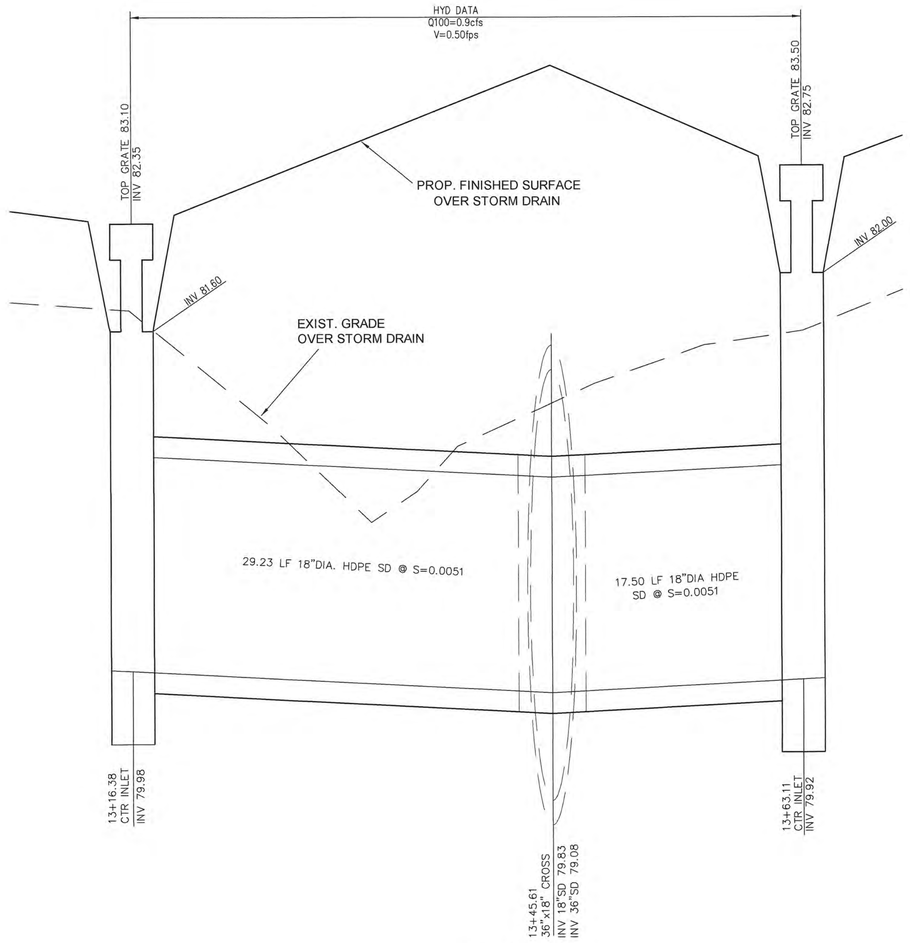
SHEET 4 OF 7 SHEETS
FILE NO: 3469
PW2022-0950



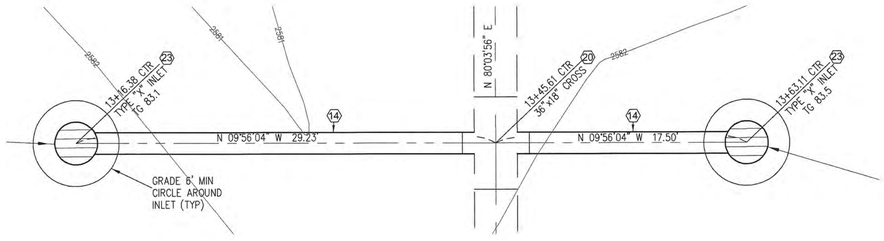
LINE "A-1"
1"=5'



LINE "A-1"
1"=5'



LINE "A-2"
HORZ - 1"=5'
VERT - 1"=0.5'



LINE "A-2"
1"=5'
NORTH

CONSTRUCTION NOTES

14. INSTALL 18" HDPE STORM DRAIN.
19. INSTALL 36"x36"x18" HDPE TEE.
20. INSTALL 36"x18" HDPE CROSS.
22. CONSTRUCT CONCRETE DROP INLET PER R.C.F.C.&W.C.D. STD. No. CB110.
23. CONSTRUCT TYPE X INLET WITH INLET GRATE PER R.C.F.C &W.C.D. STD. No. CB108.
26. INSTALL 6" SDR-35 PVC DRAIN PIPE.

LINE DATA

LINE	BEARING	DISTANCE
L1	N 54°42'47" W	9.78'

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK: SEE SHEET 1

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

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• PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS
Hemet, CA. 92544, 41555 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-0347
Park City, UT 84098, 5133 Cove Canyon Dr. 8032
Boise, ID, 83706, 4365 W Emerald Street, B. 140, Phone (208)869-7550

BLAINE A. WOMER R.C.E. 46354 — DATE 8/14/23

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	1"=5'
DATE:	6/20/22
JOB NUMBER:	E11-22-002

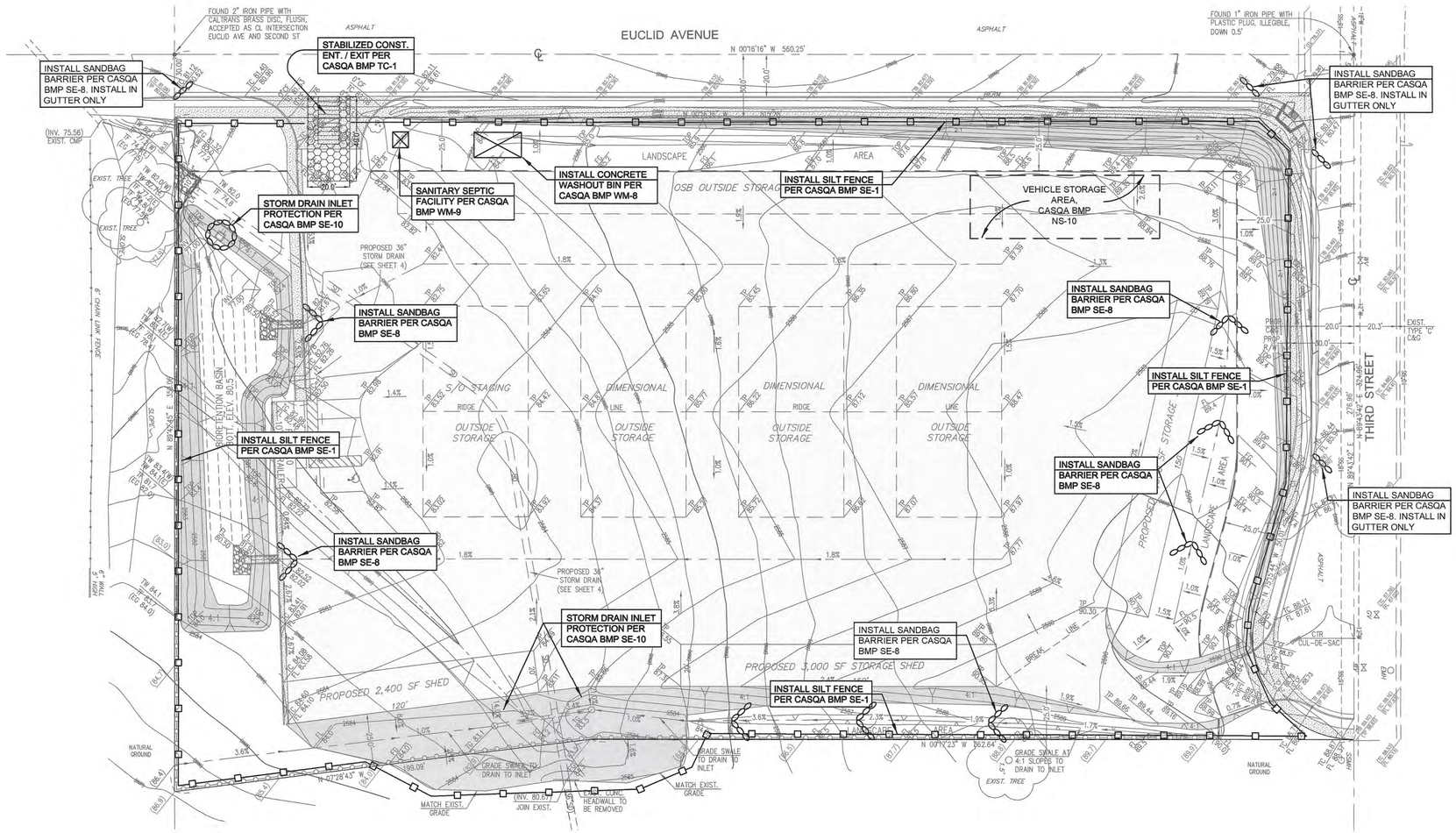
BEAUMONT — CALIFORNIA

Reviewed By:	Staff Engineer	Date: 5/2/2023
Recommended for Approval By:	Administrative Engineer	Date: 5/2/2023
Approved By:	City Engineer/Director of Public Works	Date: 05/16/2023

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St. Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD
LINES "A-1" & "A-2"
STORM DRAIN PLAN

SHEET 5 OF 7 SHEETS
FILE NO: 3469
PW2022-0950



NORTH

0 30 60 90

1" = 30'

EROSION CONTROL NOTES:

1. IN CASE OF EMERGENCY, CALL: PIERCE HARDY LIMITED PARTNERSHIP, OFFICE: (724) 228-8820.
2. EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES. NECESSARY MATERIALS SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT. EROSION CONTROL DEVICES SHALL NOT BE MOVED OR MODIFIED WITHOUT THE APPROVAL OF THE QSP.
3. ALL REMOVABLE EROSION PROTECTIVE DEVICES SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN THE 72-HOUR RAIN PROBABILITY FORECAST EXCEEDS 50%.
4. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM STREET, SURGE BERMS, SILT FENCES, AND DESILTING BASINS WITH THE BASINS PUMPED AND WATER TO BE DISPERSED ON SITE.
5. GRADED AREAS ON THE PERMITTED AREA PERIMETER MUST DRAIN AWAY FROM THE FACE OF SLOPES AT THE CONCLUSION OF EACH WORKING DAY. DRAINAGE IS TO BE DIRECTED TOWARD DESILTING FACILITIES.
6. THE PERMITTEE AND CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
7. ALL TEMPORARY GRADING HAUL ROADS WITHIN AREAS WHICH ARE TO REMAIN UNDEVELOPED AND NATURAL SHALL BE RESTORED TO NATURAL CONDITIONS AND REVEGETATED WITH NATIVE GRASSES UPON COMPLETION OF GRADING OPERATIONS.
8. STOCKPILING AND/OR VEHICLE STAGING AREAS SHALL BE LOCATED AS FAR AS PRACTICABLE FROM DWELLINGS.
9. EROSION CONTROL DEVICES WILL BE MODIFIED AS NEEDED AS THE PROJECT PROGRESSES.
10. THE PLACEMENT OF ADDITIONAL DEVICES TO REDUCE EROSION DAMAGE WITHIN THE SITE IS LEFT TO THE DISCRETION OF THE QSP.
11. THE QSP SHALL OBSERVE EROSION CONTROL WORK AND MUST INFORM THE CITY AND THE DEVELOPER IF THE WORK IS NOT IN ACCORDANCE WITH THE APPROVED PLAN.

LEGEND

~ INDICATES SILET FENCING

~ INDICATES SANDBAG BARRIER

~ INDICATES STORMDRAIN INLET PROTECTION

~ INDICATES SANITARY SEPTIC FACILITY

~ INDICATES CONCRETE WASHOUT BIN

~ INDICATES STABILIZED CONSTRUCTION ENTRANCE / EXIT

~ INDICATES VEHICLE STORAGE AREA

DIGALERT Call 2 Working Days Before You Dig! 811

BENCHMARK:

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BLAINE A. WOMER R.C.E. 46354 DATE

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DESIGN BY: SEB
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SCALE: 1"=30'
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BEAUMONT CALIFORNIA

Reviewed By: Staff Engineer — Date: 5/2/2023
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ENGINEERING DIVISION
550E. 6th St
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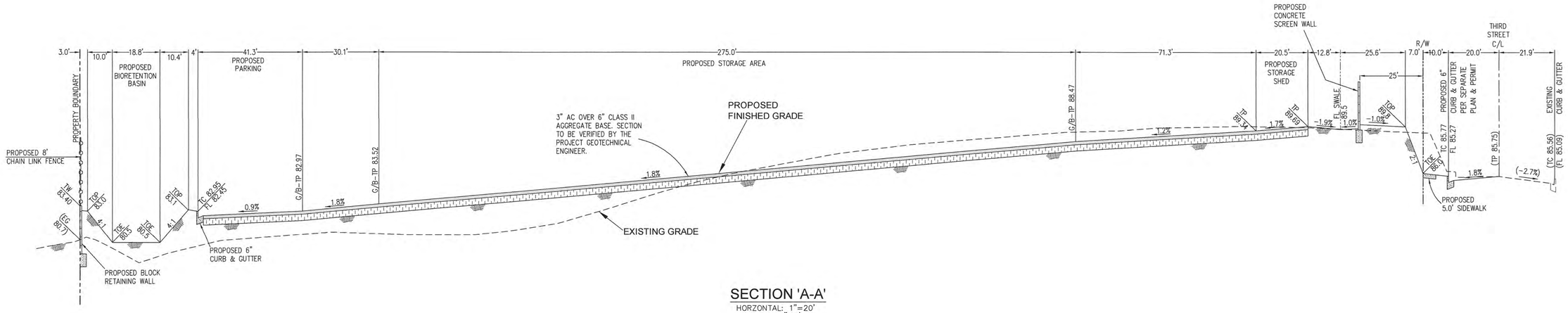
CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD EROSION CONTROL PLAN

SHEET 6 OF 7 SHEETS
FILE NO: 3469
PW2022-0950

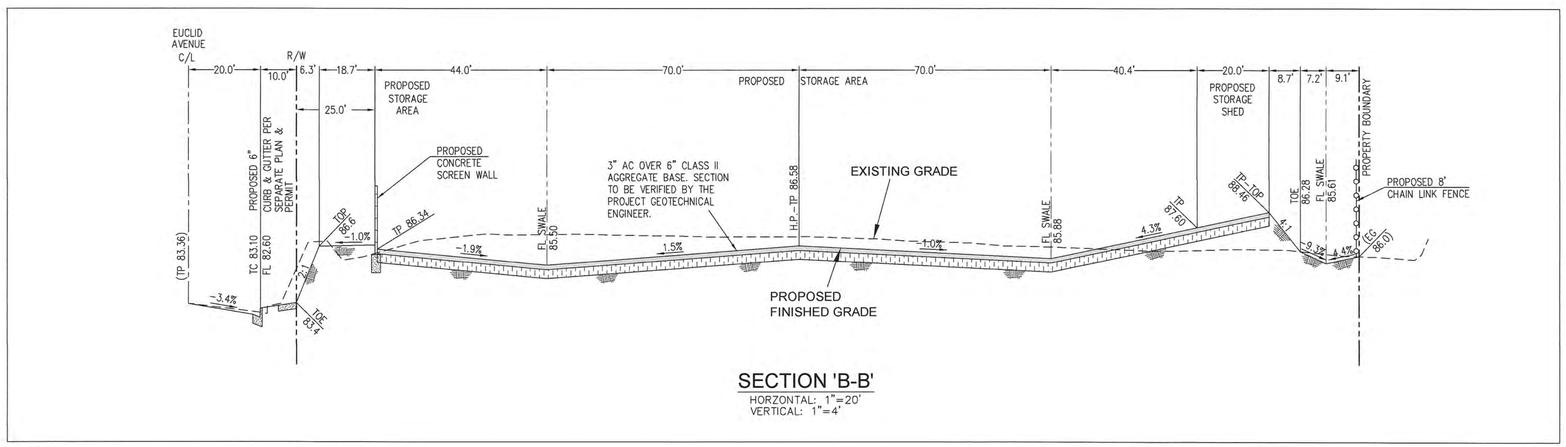
0 20 40 60

1" = 20'



SECTION 'A-A'

HORZONTAL: 1"=20'
VERTICAL: 1"=4'



SECTION 'B-B'

HORZONTAL: 1"=20'
VERTICAL: 1"=4'

DIGALERT — Call 2 Working Days Before You Dig! 811

BENCHMARK:

SEE SHEET 1

BY	MARK	DESCRIPTION	APPR.	DATE
ENGINEER		REVISIONS	CITY	

BLAINE A. WOMER
CIVIL ENGINEERING
• PLANNING • SURVEYING • CIVIL ENGINEERING • PUBLIC WORKS

Hemet, CA. 92544, 41555 E Florida Ave., Suite G, Phone (951)658-1727 Fax (951)658-0047
Park City, UT 84098, 3133 Cove Canyon Dr. #302
Boise, ID, 83706, 4365 W Emerald Street, St. 145, Phone (208)593-7355

BLAINE A. WOMER R.C.E. 46354 — DATE 4/12/23

SEAL: REGISTERED PROFESSIONAL ENGINEER — BLAINE A WOMER — No. 46354 — CIVIL — STATE OF CALIFORNIA

DESIGN BY:	SEB
DRAWN BY:	SEB
CHECKED BY:	BAW
SCALE:	1"=30'
DATE:	6/20/22
JOB NUMBER:	E11-22-002

BEAUMONT — CALIFORNIA

Reviewed By: Staff Engineer — Date: 5/2/2023

Recommended for Approval By: Administrative Engineer — Date: 5/2/2023

Approved By: City Engineer/Director of Public Works — Date: 05/16/2023

CITY OF BEAUMONT, PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
550E. 6th St
Beaumont, CA 92223
TEL: (951) 769-8520 FAX: (951) 769-8526

CITY OF BEAUMONT, CALIFORNIA
PRECISE GRADING PLAN FOR:
84 LUMBER STORAGE YARD
SECTIONS

SHEET 7 OF 7 SHEETS
FILE NO: 3469
PW2022-0950

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.SladdenEngineering.com

April 25, 2022

Project No. 644-22011
22-04-046

84 Lumber Company
1019 Route 519
Eighty Four, Pennsylvania 15330

Project: Proposed 84 Lumber Yard Expansion
APN 418-210-019
SEC Euclid Avenue and East 3rd Street
Beaumont, California

Subject: Infiltration Testing for On-Site Storm Water Management

In accordance with your request, we have performed infiltration testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water management system design. The infiltration rates determined by testing should be useful in the assessment of on-site storm water management needs. The approximate locations of the tests are indicated on the attached Test Location Plan (Figure 2).

Infiltration testing was performed on April 12, 2022 utilizing double ring infiltrometers. The tests were performed at depths of approximately 5.0 feet below the existing ground surface (bgs). The soil conditions encountered within the test hole locations consisted of clayey sand (SC). Testing was performed in general accordance with the *Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer* (ASTM D-3385).

INFILTRATION TEST RESULTS

Test Location No.	Depth (Ft)	Infiltration Rate (in/hr)
DR-1	5.0	0.2
DR-2	5.0	0.8

Supplemental percolation testing was performed on April 23, 2022 within two (2) shallow test holes excavated on the site. Testing was performed at depths of approximately 10 and 5 feet below existing grade for P-1 and P-2, respectively. Testing was performed by placing water within the test bores and recording the drop in the water surface with time. Testing was performed in general accordance with the *United States Bureau of Reclamation (BOR) Procedure 7300-89 (1999)*. Test results are summarized in the following table.

PERCOLATION TEST RESULTS

Test No.	Depth (Ft)	Percolation Rate (in/hr)	Infiltration Rate (in/hr)
P-1	10.00	13.5	1.2
P-2	5.00	8.25	0.8

The rates determined represent ultimate rates and an appropriate safety factor should be incorporated into the design to account for long-term saturation and potential "silting" of the surface soil. The safety factor should be determined with consideration to other factors considered in the storm water retention system design (specifically storm water volume estimates) and the safety factors associated with the related design components.

If you have any questions regarding this memo or the testing summarized herein, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

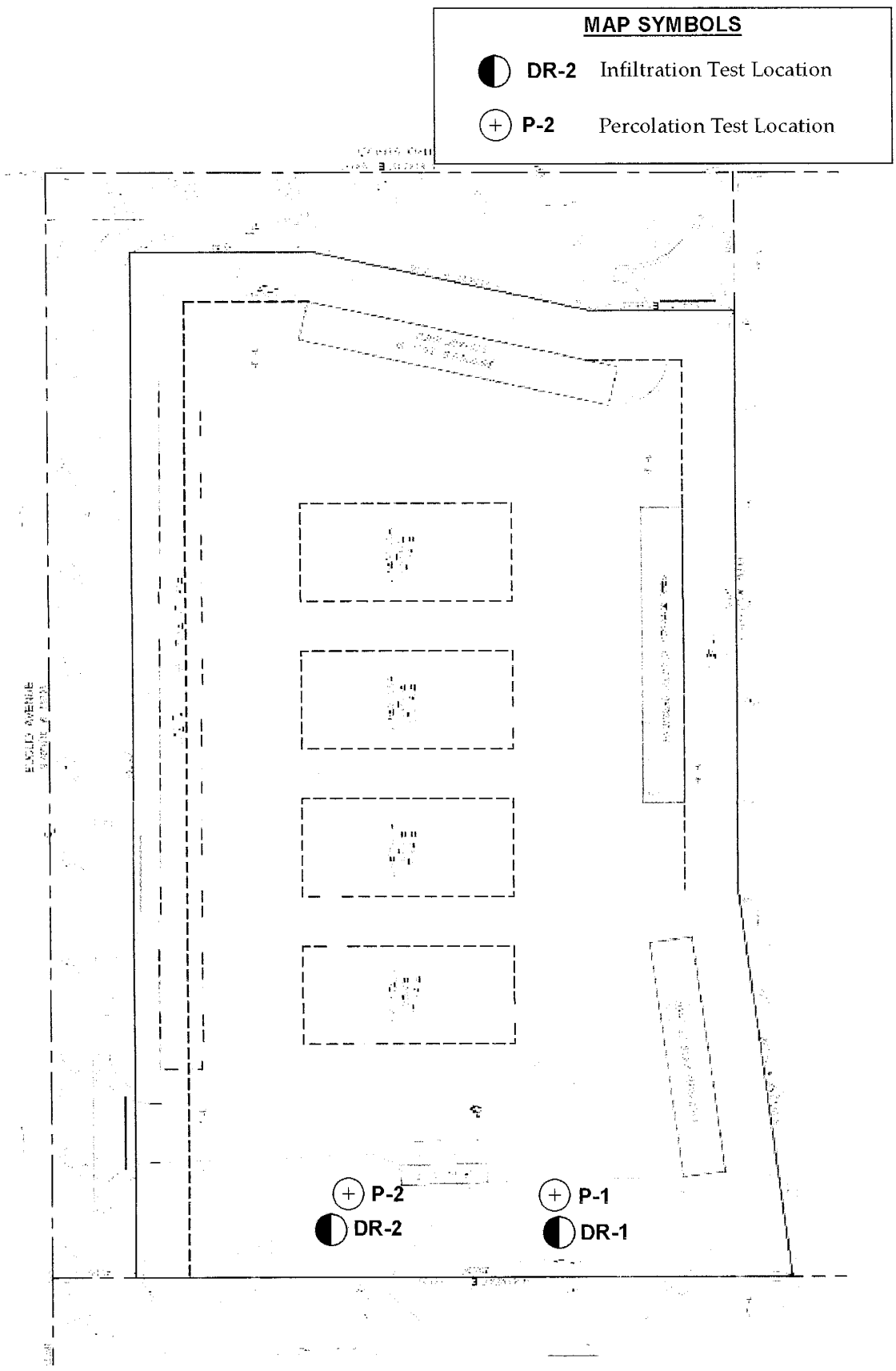
REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Copies: 4 / Addressee

FIGURES

SITE LOCATION MAP
TEST LOCATION PLAN

Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 644-22011	
	Report Number: 22-04-046	
	Date: April 25, 2022	



Sladden Engineering	TEST LOCATION PLAN		FIGURE
	Project Number:	644-22011	2
	Report Number:	22-04-046	
	Date:	April 25, 2022	

APPENDIX A

DOUBLE-RING TESTING DATA SHEETS
PERCOLATION TESTING DATA SHEETS

DOUBLE RING INFILTRATION RATE CALCULATIONS

Job No.: 644-22011

Test Hole: DR-1

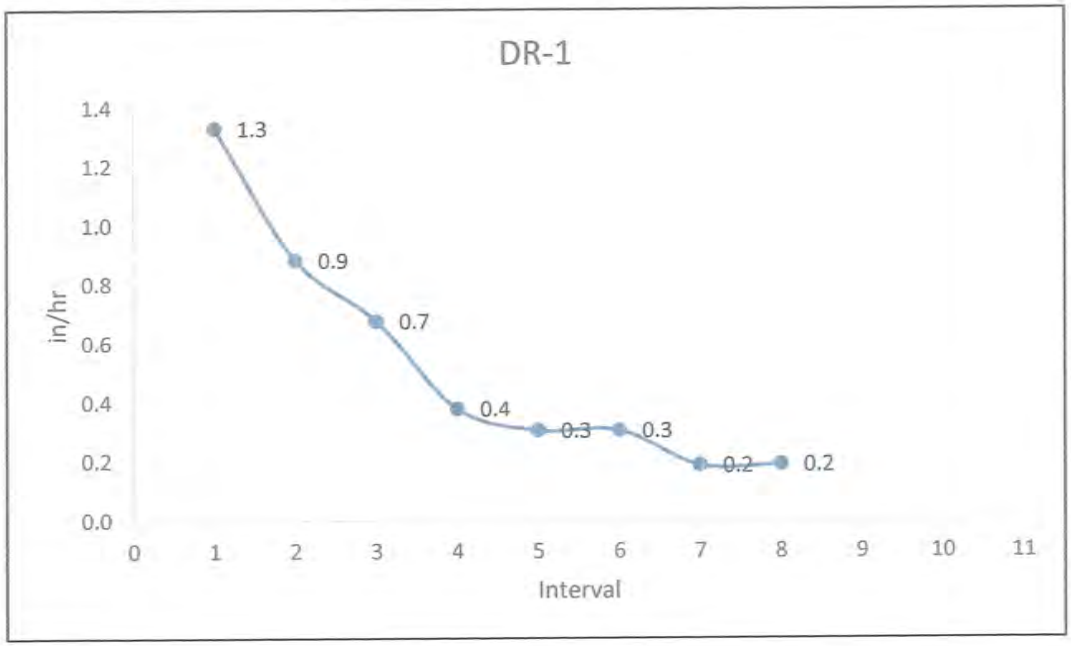
Depth (Ft.): 5.0 Ft. bgs

Date: 4/12/2022

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	47.6	26.2	0.39	8.4	8.9	75.3	113.1	30	0.50	1.3
2	44.6	30.4	0.39	5.6	8.9	50.0	113.1	30	0.50	0.9
3	46.5	35.6	0.39	4.3	8.9	38.4	113.1	30	0.50	0.7
4	45.6	39.5	0.39	2.4	8.9	21.5	113.1	30	0.50	0.4
5	46.0	41.1	0.39	1.9	8.9	17.3	113.1	30	0.50	0.3
6	46.5	41.6	0.39	1.9	8.9	17.3	113.1	30	0.50	0.3
7	46.5	40.5	0.39	2.4	8.9	21.1	113.1	60	1.00	0.2
8	45.6	39.5	0.39	2.4	8.9	21.5	113.1	60	1.00	0.2
9										
10										

AVERAGE RATE* = 0.2 (in/hr)



Sladden Engineering

DOUBLE RING INFILTRATION RATE CALCULATIONS

Job No.: 644-22011

Test Hole: DR-2

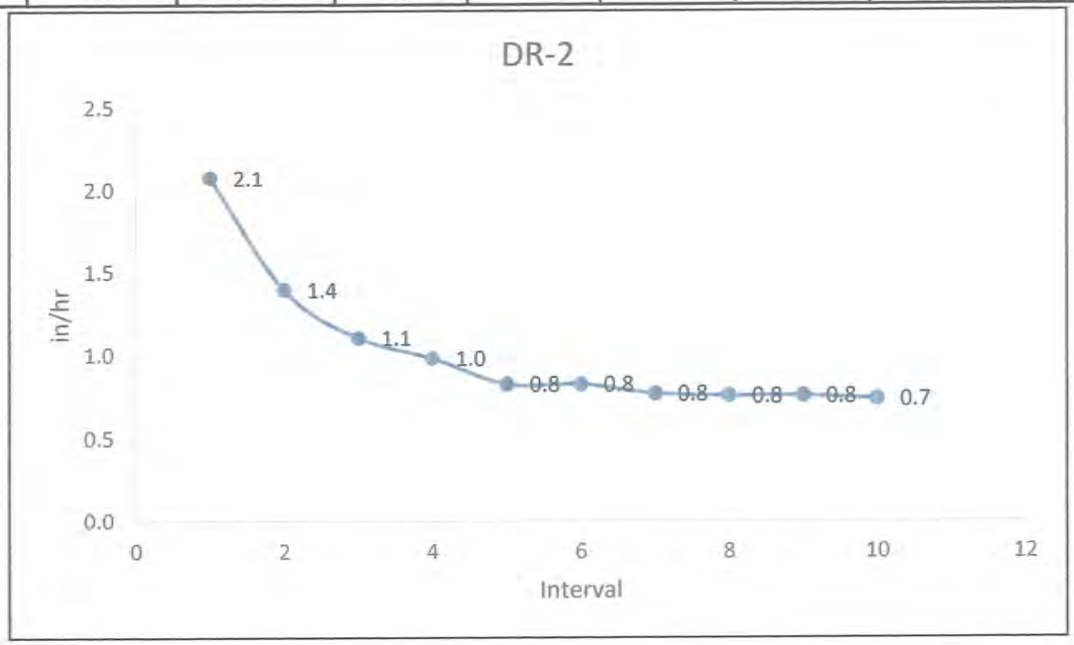
Depth (Ft.): 5.0 Ft. bgs

Date: 4/12/2022

INNER RING

Interval Number	Initial Water(cm)	Final Water(cm)	Con. Factor (cm to in)	Water (in)	Area Mar. (in2)	Volume (in3)	Area IR (in2)	Time (min)	Time (hr)	Vir (in/hr)
1	48.3	20.5	0.39	10.9	8.9	97.9	113.1	25	0.42	2.1
2	48.7	30.0	0.39	7.4	8.9	65.8	113.1	25	0.42	1.4
3	48.8	31.0	0.39	7.0	8.9	62.7	113.1	30	0.50	1.1
4	48.8	33.0	0.39	6.2	8.9	55.6	113.1	30	0.50	1.0
5	48.4	35.1	0.39	5.2	8.9	46.8	113.1	30	0.50	0.8
6	48.7	35.4	0.39	5.2	8.9	46.8	113.1	30	0.50	0.8
7	48.2	35.8	0.39	4.9	8.9	43.7	113.1	30	0.50	0.8
8	48.4	36.2	0.39	4.8	8.9	43.0	113.1	30	0.50	0.8
9	48.6	36.4	0.39	4.8	8.9	43.0	113.1	30	0.50	0.8
10	48.4	36.5	0.39	4.7	8.9	41.9	113.1	30	0.50	0.7

AVERAGE RATE* = 0.8 (in/hr)



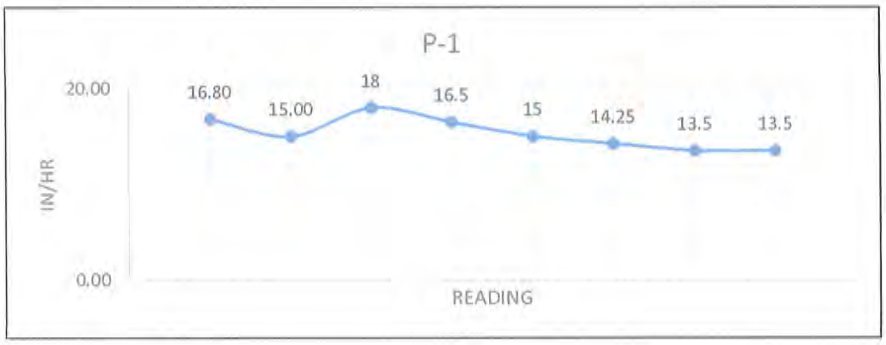
Sladden Engineering

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	SEC EUCLID AVE. AND EAST 3RD ST.	Depth (ft):	10.00
Job No. :	644-22011	USCS Soil Class:	SC
Date:	4/23/2022	Sandy Soil:	K.W.
Test Hole #:	P-1	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	10.00	20	13	7	16.80
B	25.00	10.00	20	13 6/8	6 2/8	15.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	10.00	20	17	3	18
2	10.00	10.00	20	17 2/8	2 6/8	16.5
3	10.00	10.00	20	17 4/8	2 4/8	15
4	10.00	10.00	20	17 5/8	2 3/8	14.25
5	10.00	10.00	20	17 6/8	2 2/8	13.5
6	10.00	10.00	20	17 6/8	2 2/8	13.5



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	102.25
r =	4.00
D_0 =	100
D_t =	120.00
H_0 =	20
H_f =	17.75
ΔH =	2.25
H_{avg} =	18.88

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

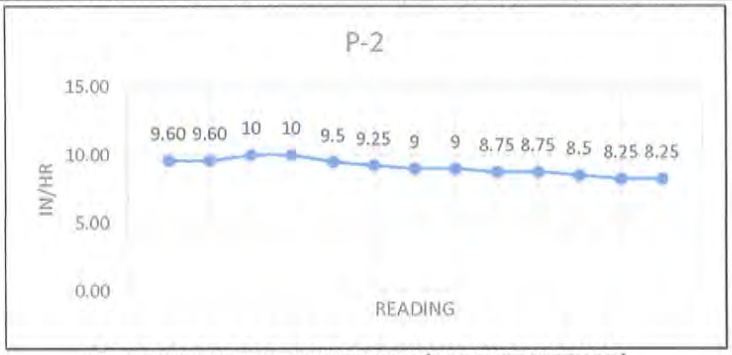
Field Rate:	13.5 in/hr
Infiltration Rate:	1.29 in/hr

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	SEC EUCLID AVE. AND EAST 3RD ST.	Depth (ft):	5.00
Job No. :	644-22011	USCS Soil Class:	SC
Date:	4/23/2022	Sandy Soil:	K.W.
Test Hole #:	P-2	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	5.00	20	16	4	9.60
B	25.00	5.00	20	16	4	9.60

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	30.00	5.00	20	15	5	10
2	30.00	5.00	20	15	5	10
3	30.00	5.00	20	15 2/8	4 6/8	9.5
4	30.00	5.00	20	15 3/8	4 5/8	9.25
5	30.00	5.00	20	15 4/8	4 4/8	9
6	30.00	5.00	20	15 4/8	4 4/8	9
7	30.00	5.00	20	15 5/8	4 3/8	8.75
8	30.00	5.00	20	15 5/8	4 3/8	8.75
9	30.00	5.00	20	15 6/8	4 2/8	8.5
10	30.00	5.00	20	15 7/8	4 1/8	8.25
11	30.00	5.00	20	15 7/8	4 1/8	8.25



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	30.00
D_f =	44.00
r =	4.00
D_0 =	40
D_t =	60.00
H_0 =	20
H_f =	16
ΔH =	4.00
H_{avg} =	18.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

Field Rate:	8.25 in/hr
Infiltration Rate:	0.80 in/hr

Appendix 4: Historical Site Conditions

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

Not Available

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}

(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: BLAINE A WOMER CIVIL ENGINEERING
Date: 11/10/2022
Designed by: BAW
Case No: 84 LUMBER
Company Project Number/Name: 84 LUMBER STORAGE YARD

BMP Identification

BMP NAME / ID: BIORETENTION BASIN

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}= 0.80 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)
D\1	8800	Roofs	1	0.89	7849.6			
D\2	105529	Concrete or Asphalt	1	0.89	94131.9			
D\3	19181	Ornamental Landscaping	0.1	0.11	2118.7			
	133510	Total			104100.2	0.80	6940	9290

Notes:

Bioretention Facility - Design Procedure	BMP ID BRB NO. 1	Legend:	Required Entries / Calculated Cells

Company Name: WOMER ENGINEERING — Date: 11/10/2022

Designed by: BAW — County/City Case No.: 34 LUMBER

Design Volume

Enter the area tributary to this feature — A_T = 3 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 6,940 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 = 53.5 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 = 1.79 ft

Minimum Surface Area, A_m

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

A_M = 3,884 ft^2

Proposed Surface Area — A= 5,190 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 0 %

6" Check Dam Spacing — 0 feet

Describe Vegetation: Natural Grasses

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

84 LUMBER

HCOC HYDROLOGY

PER RCFC+WCD HCOC APPLICABILITY MAP, THE PROJECT IS NOT HCOC EXEMPT. THEREFORE THE 2YR-24HR HCOC SHALL BE MITIGATED ON-SITE

ΔV DEV VS UNDEV = 21,235 CF − 4035 CF

= 17,200 CF MITIGATION VOL.

VOL CAPACITY OF ONSITE BASIN = 18,150 CF

∴ HCOC IS MITIGATED ON-SITE PER SECTION F.2(C).

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

Study date 04/08/22 File: 84LUMBER2YR24HRUNDEV242.out

++

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

Program License Serial Number 4061

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

English Units used in output format

---
84 LUMBER
HCOC HYDROLOGY
2 YEAR, 24 HOUR STORM
UNDEVELOPED CONDITION

Drainage Area = 3.50(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.50(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 545.00(Ft.)
Length along longest watercourse measured to centroid = 280.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.053 Mi.
Difference in elevation = 11.40(Ft.)
Slope along watercourse = 110.4440 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.041 Hr.
Lag time = 2.44 Min.
25% of lag time = 0.61 Min.
40% of lag time = 0.98 Min.
Unit time = 15.00 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]
3.50	2.50	8.75

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.50	6.00	21.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.500(In)

Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.500	78.00	0.000

Total Area Entered = 3.50(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
78.0	78.0	0.268	0.000	0.268	1.000	0.268
					Sum (F) =	0.268

Area averaged mean soil loss (F) (In/Hr) = 0.268
Minimum soil loss rate ((In/Hr)) = 0.134
(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 (hrs)		Time % of lag	Distribution Graph %		Unit Hydrograph (CFS)
1	0.250	614.123	75.765		2.672
2	0.500	1228.247	24.235		0.855
			Sum = 100.000	Sum=	3.527

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	0.25	0.20	0.020	(0.473)	0.018	0.002
2	0.50	0.30	0.030	(0.467)	0.027	0.003
3	0.75	0.30	0.030	(0.462)	0.027	0.003
4	1.00	0.40	0.040	(0.456)	0.036	0.004
5	1.25	0.30	0.030	(0.451)	0.027	0.003
6	1.50	0.30	0.030	(0.445)	0.027	0.003
7	1.75	0.30	0.030	(0.440)	0.027	0.003
8	2.00	0.40	0.040	(0.435)	0.036	0.004
9	2.25	0.40	0.040	(0.430)	0.036	0.004
10	2.50	0.40	0.040	(0.424)	0.036	0.004
11	2.75	0.50	0.050	(0.419)	0.045	0.005
12	3.00	0.50	0.050	(0.414)	0.045	0.005
13	3.25	0.50	0.050	(0.409)	0.045	0.005
14	3.50	0.50	0.050	(0.404)	0.045	0.005
15	3.75	0.50	0.050	(0.399)	0.045	0.005
16	4.00	0.60	0.060	(0.394)	0.054	0.006
17	4.25	0.60	0.060	(0.389)	0.054	0.006
18	4.50	0.70	0.070	(0.384)	0.063	0.007
	4.75	0.70	0.070	(0.379)	0.063	0.007
	5.00	0.80	0.080	(0.374)	0.072	0.008

21	5.25	0.60	0.060	(	0.369)	0.054	0.006
	5.50	0.70	0.070	(	0.364)	0.063	0.007
	5.75	0.80	0.080	(	0.360)	0.072	0.008
	6.00	0.80	0.080	(	0.355)	0.072	0.008
25	6.25	0.90	0.090	(	0.350)	0.081	0.009
26	6.50	0.90	0.090	(	0.345)	0.081	0.009
27	6.75	1.00	0.100	(	0.341)	0.090	0.010
28	7.00	1.00	0.100	(	0.336)	0.090	0.010
29	7.25	1.00	0.100	(	0.332)	0.090	0.010
30	7.50	1.10	0.110	(	0.327)	0.099	0.011
31	7.75	1.20	0.120	(	0.323)	0.108	0.012
32	8.00	1.30	0.130	(	0.318)	0.117	0.013
33	8.25	1.50	0.150	(	0.314)	0.135	0.015
34	8.50	1.50	0.150	(	0.309)	0.135	0.015
35	8.75	1.60	0.160	(	0.305)	0.144	0.016
36	9.00	1.70	0.170	(	0.301)	0.153	0.017
37	9.25	1.90	0.190	(	0.296)	0.171	0.019
38	9.50	2.00	0.200	(	0.292)	0.180	0.020
39	9.75	2.10	0.210	(	0.288)	0.189	0.021
40	10.00	2.20	0.220	(	0.284)	0.198	0.022
41	10.25	1.50	0.150	(	0.280)	0.135	0.015
42	10.50	1.50	0.150	(	0.276)	0.135	0.015
43	10.75	2.00	0.200	(	0.272)	0.180	0.020
44	11.00	2.00	0.200	(	0.268)	0.180	0.020
45	11.25	1.90	0.190	(	0.264)	0.171	0.019
46	11.50	1.90	0.190	(	0.260)	0.171	0.019
47	11.75	1.70	0.170	(	0.256)	0.153	0.017
48	12.00	1.80	0.180	(	0.252)	0.162	0.018
49	12.25	2.50	0.250	(	0.249)	0.225	0.025
50	12.50	2.60	0.260	(	0.245)	0.234	0.026
51	12.75	2.80	0.280		0.241	(0.252)	0.039
	13.00	2.90	0.290		0.238	(0.261)	0.052
	13.25	3.40	0.340		0.234	(0.306)	0.106
54	13.50	3.40	0.340		0.230	(0.306)	0.110
55	13.75	2.30	0.230	(	0.227)	0.207	0.023
56	14.00	2.30	0.230	(	0.223)	0.207	0.023
57	14.25	2.70	0.270		0.220	(0.243)	0.050
58	14.50	2.60	0.260		0.217	(0.234)	0.043
59	14.75	2.60	0.260		0.213	(0.234)	0.047
60	15.00	2.50	0.250		0.210	(0.225)	0.040
61	15.25	2.40	0.240		0.207	(0.216)	0.033
62	15.50	2.30	0.230		0.204	(0.207)	0.026
63	15.75	1.90	0.190	(	0.201)	0.171	0.019
64	16.00	1.90	0.190	(	0.198)	0.171	0.019
65	16.25	0.40	0.040	(	0.195)	0.036	0.004
66	16.50	0.40	0.040	(	0.192)	0.036	0.004
67	16.75	0.30	0.030	(	0.189)	0.027	0.003
68	17.00	0.30	0.030	(	0.186)	0.027	0.003
69	17.25	0.50	0.050	(	0.183)	0.045	0.005
70	17.50	0.50	0.050	(	0.180)	0.045	0.005
71	17.75	0.50	0.050	(	0.178)	0.045	0.005
72	18.00	0.40	0.040	(	0.175)	0.036	0.004
73	18.25	0.40	0.040	(	0.172)	0.036	0.004
74	18.50	0.40	0.040	(	0.170)	0.036	0.004
75	18.75	0.30	0.030	(	0.167)	0.027	0.003
76	19.00	0.20	0.020	(	0.165)	0.018	0.002
77	19.25	0.30	0.030	(	0.163)	0.027	0.003
78	19.50	0.40	0.040	(	0.160)	0.036	0.004
79	19.75	0.30	0.030	(	0.158)	0.027	0.003
	20.00	0.20	0.020	(	0.156)	0.018	0.002
	20.25	0.30	0.030	(	0.154)	0.027	0.003

82	20.50	0.30	0.030	(0.152)	0.027	0.003
	20.75	0.30	0.030	(0.150)	0.027	0.003
	21.00	0.20	0.020	(0.148)	0.018	0.002
	21.25	0.30	0.030	(0.147)	0.027	0.003
86	21.50	0.20	0.020	(0.145)	0.018	0.002
87	21.75	0.30	0.030	(0.143)	0.027	0.003
88	22.00	0.20	0.020	(0.142)	0.018	0.002
89	22.25	0.30	0.030	(0.140)	0.027	0.003
90	22.50	0.20	0.020	(0.139)	0.018	0.002
91	22.75	0.20	0.020	(0.138)	0.018	0.002
92	23.00	0.20	0.020	(0.137)	0.018	0.002
93	23.25	0.20	0.020	(0.136)	0.018	0.002
94	23.50	0.20	0.020	(0.135)	0.018	0.002
95	23.75	0.20	0.020	(0.134)	0.018	0.002
96	24.00	0.20	0.020	(0.134)	0.018	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 1.3

Flood volume = Effective rainfall 0.32(In)
times area 3.5(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 2.18(In)
Total soil loss = 0.637(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 4034.9 Cubic Feet
Total soil loss = 27727.3 Cubic Feet

Peak flow rate of this hydrograph = 0.384(CFS)

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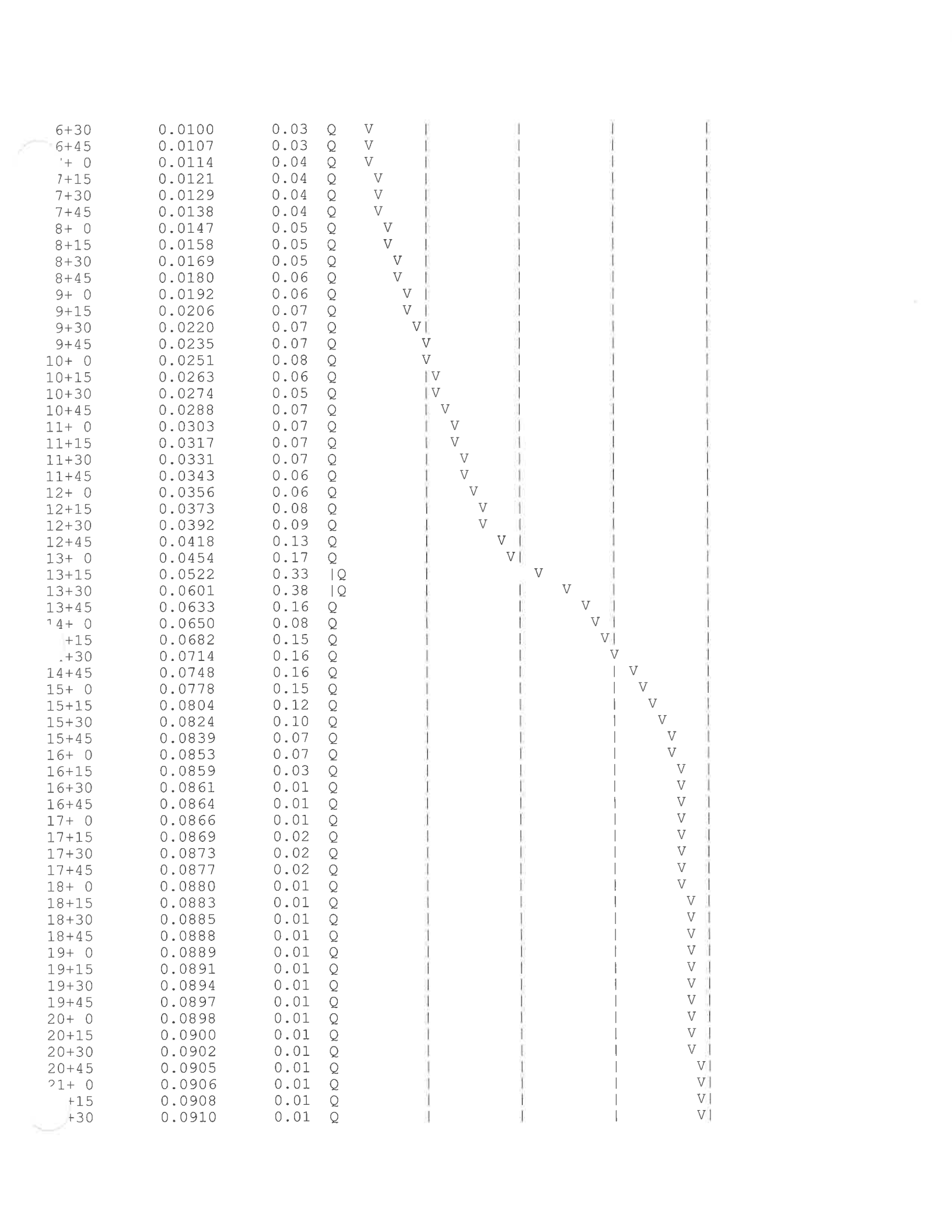
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0001	0.01	Q				
0+30	0.0003	0.01	Q				
0+45	0.0005	0.01	Q				
1+ 0	0.0008	0.01	Q				
1+15	0.0010	0.01	Q				
1+30	0.0013	0.01	Q				
1+45	0.0015	0.01	Q				
2+ 0	0.0018	0.01	Q				
2+15	0.0020	0.01	Q				
2+30	0.0023	0.01	QV				
2+45	0.0027	0.02	QV				
3+ 0	0.0030	0.02	QV				
3+15	0.0034	0.02	QV				
3+30	0.0038	0.02	QV				
3+45	0.0041	0.02	QV				
4+ 0	0.0046	0.02	QV				
4+15	0.0050	0.02	Q V				
4+30	0.0055	0.02	Q V				
4+45	0.0060	0.02	Q V				
5+ 0	0.0066	0.03	Q V				
5+15	0.0070	0.02	Q V				
5+30	0.0075	0.02	Q V				
5+45	0.0081	0.03	Q V				
6 0	0.0087	0.03	Q V				
6+15	0.0093	0.03	Q V				



21+45	0.0912	0.01	Q				V
22+ 0	0.0914	0.01	Q				V
22+15	0.0916	0.01	Q				V
22+30	0.0917	0.01	Q				V
22+45	0.0919	0.01	Q				V
23+ 0	0.0920	0.01	Q				V
23+15	0.0922	0.01	Q				V
23+30	0.0923	0.01	Q				V
23+45	0.0924	0.01	Q				V
24+ 0	0.0926	0.01	Q				V
24+15	0.0926	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

Study date 04/08/22 File: 84LUMBER2YR24HRDEV242.out

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

Program License Serial Number 4061

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

English Units used in output format

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84 LUMBER
HCOC HYDROLOGY
2 YEAR, 24 HOUR STORM
DEVELOPED CONDITION

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 470.00(Ft.)
Length along longest watercourse measured to centroid = 210.00(Ft.)
Length along longest watercourse = 0.089 Mi.
Length along longest watercourse measured to centroid = 0.040 Mi.
Difference in elevation = 7.10(Ft.)
Slope along watercourse = 79.7617 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.018 Hr.
Lag time = 1.10 Min.
25% of lag time = 0.28 Min.
40% of lag time = 0.44 Min.
Unit time = 15.00 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]
3.00	2.50	7.50

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	6.00	18.00

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.500(In)

Area Averaged 100-Year Rainfall = 6.000(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	56.00	0.850

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	56.0	0.511	0.850	0.120	1.000	0.120
					Sum (F) =	0.120

Area averaged mean soil loss (F) (In/Hr) = 0.120
Minimum soil loss rate ((In/Hr)) = 0.060
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.220

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.250	1362.510	100.000	3.023
		Sum =	100.000 Sum=	3.023

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	0.25	0.20	0.020	(0.212)	0.004	0.016
2	0.50	0.30	0.030	(0.210)	0.007	0.023
3	0.75	0.30	0.030	(0.207)	0.007	0.023
4	1.00	0.40	0.040	(0.205)	0.009	0.031
5	1.25	0.30	0.030	(0.202)	0.007	0.023
6	1.50	0.30	0.030	(0.200)	0.007	0.023
7	1.75	0.30	0.030	(0.197)	0.007	0.023
8	2.00	0.40	0.040	(0.195)	0.009	0.031
9	2.25	0.40	0.040	(0.193)	0.009	0.031
10	2.50	0.40	0.040	(0.190)	0.009	0.031
11	2.75	0.50	0.050	(0.188)	0.011	0.039
12	3.00	0.50	0.050	(0.186)	0.011	0.039
13	3.25	0.50	0.050	(0.183)	0.011	0.039
14	3.50	0.50	0.050	(0.181)	0.011	0.039
15	3.75	0.50	0.050	(0.179)	0.011	0.039
16	4.00	0.60	0.060	(0.177)	0.013	0.047
17	4.25	0.60	0.060	(0.174)	0.013	0.047
18	4.50	0.70	0.070	(0.172)	0.015	0.055
19	4.75	0.70	0.070	(0.170)	0.015	0.055
	5.00	0.80	0.080	(0.168)	0.018	0.062
	5.25	0.60	0.060	(0.166)	0.013	0.047

22	5.50	0.70	0.070	(0.163)	0.015	0.055
	5.75	0.80	0.080	(0.161)	0.018	0.062
	6.00	0.80	0.080	(0.159)	0.018	0.062
	6.25	0.90	0.090	(0.157)	0.020	0.070
26	6.50	0.90	0.090	(0.155)	0.020	0.070
27	6.75	1.00	0.100	(0.153)	0.022	0.078
28	7.00	1.00	0.100	(0.151)	0.022	0.078
29	7.25	1.00	0.100	(0.149)	0.022	0.078
30	7.50	1.10	0.110	(0.147)	0.024	0.086
31	7.75	1.20	0.120	(0.145)	0.026	0.094
32	8.00	1.30	0.130	(0.143)	0.029	0.101
33	8.25	1.50	0.150	(0.141)	0.033	0.117
34	8.50	1.50	0.150	(0.139)	0.033	0.117
35	8.75	1.60	0.160	(0.137)	0.035	0.125
36	9.00	1.70	0.170	(0.135)	0.037	0.133
37	9.25	1.90	0.190	(0.133)	0.042	0.148
38	9.50	2.00	0.200	(0.131)	0.044	0.156
39	9.75	2.10	0.210	(0.129)	0.046	0.164
40	10.00	2.20	0.220	(0.127)	0.048	0.172
41	10.25	1.50	0.150	(0.126)	0.033	0.117
42	10.50	1.50	0.150	(0.124)	0.033	0.117
43	10.75	2.00	0.200	(0.122)	0.044	0.156
44	11.00	2.00	0.200	(0.120)	0.044	0.156
45	11.25	1.90	0.190	(0.118)	0.042	0.148
46	11.50	1.90	0.190	(0.117)	0.042	0.148
47	11.75	1.70	0.170	(0.115)	0.037	0.133
48	12.00	1.80	0.180	(0.113)	0.040	0.140
49	12.25	2.50	0.250	(0.111)	0.055	0.195
50	12.50	2.60	0.260	(0.110)	0.057	0.203
51	12.75	2.80	0.280	(0.108)	0.062	0.218
52	13.00	2.90	0.290	(0.107)	0.064	0.226
	13.25	3.40	0.340	(0.105)	0.075	0.265
	13.50	3.40	0.340	(0.103)	0.075	0.265
55	13.75	2.30	0.230	(0.102)	0.051	0.179
56	14.00	2.30	0.230	(0.100)	0.051	0.179
57	14.25	2.70	0.270	(0.099)	0.059	0.211
58	14.50	2.60	0.260	(0.097)	0.057	0.203
59	14.75	2.60	0.260	(0.096)	0.057	0.203
60	15.00	2.50	0.250	(0.094)	0.055	0.195
61	15.25	2.40	0.240	(0.093)	0.053	0.187
62	15.50	2.30	0.230	(0.091)	0.051	0.179
63	15.75	1.90	0.190	(0.090)	0.042	0.148
64	16.00	1.90	0.190	(0.089)	0.042	0.148
65	16.25	0.40	0.040	(0.087)	0.009	0.031
66	16.50	0.40	0.040	(0.086)	0.009	0.031
67	16.75	0.30	0.030	(0.085)	0.007	0.023
68	17.00	0.30	0.030	(0.083)	0.007	0.023
69	17.25	0.50	0.050	(0.082)	0.011	0.039
70	17.50	0.50	0.050	(0.081)	0.011	0.039
71	17.75	0.50	0.050	(0.080)	0.011	0.039
72	18.00	0.40	0.040	(0.078)	0.009	0.031
73	18.25	0.40	0.040	(0.077)	0.009	0.031
74	18.50	0.40	0.040	(0.076)	0.009	0.031
75	18.75	0.30	0.030	(0.075)	0.007	0.023
76	19.00	0.20	0.020	(0.074)	0.004	0.016
77	19.25	0.30	0.030	(0.073)	0.007	0.023
78	19.50	0.40	0.040	(0.072)	0.009	0.031
79	19.75	0.30	0.030	(0.071)	0.007	0.023
80	20.00	0.20	0.020	(0.070)	0.004	0.016
	20.25	0.30	0.030	(0.069)	0.007	0.023
	20.50	0.30	0.030	(0.068)	0.007	0.023

83	20.75	0.30	0.030	(0.067)	0.007	0.023
	21.00	0.20	0.020	(0.067)	0.004	0.016
	21.25	0.30	0.030	(0.066)	0.007	0.023
	21.50	0.20	0.020	(0.065)	0.004	0.016
87	21.75	0.30	0.030	(0.064)	0.007	0.023
88	22.00	0.20	0.020	(0.064)	0.004	0.016
89	22.25	0.30	0.030	(0.063)	0.007	0.023
90	22.50	0.20	0.020	(0.062)	0.004	0.016
91	22.75	0.20	0.020	(0.062)	0.004	0.016
92	23.00	0.20	0.020	(0.061)	0.004	0.016
93	23.25	0.20	0.020	(0.061)	0.004	0.016
94	23.50	0.20	0.020	(0.061)	0.004	0.016
95	23.75	0.20	0.020	(0.060)	0.004	0.016
96	24.00	0.20	0.020	(0.060)	0.004	0.016

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.8

Flood volume = Effective rainfall 1.95(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.55(In)
Total soil loss = 0.137(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 21235.4 Cubic Feet
Total soil loss = 5989.5 Cubic Feet

Peak flow rate of this hydrograph = 0.802(CFS)

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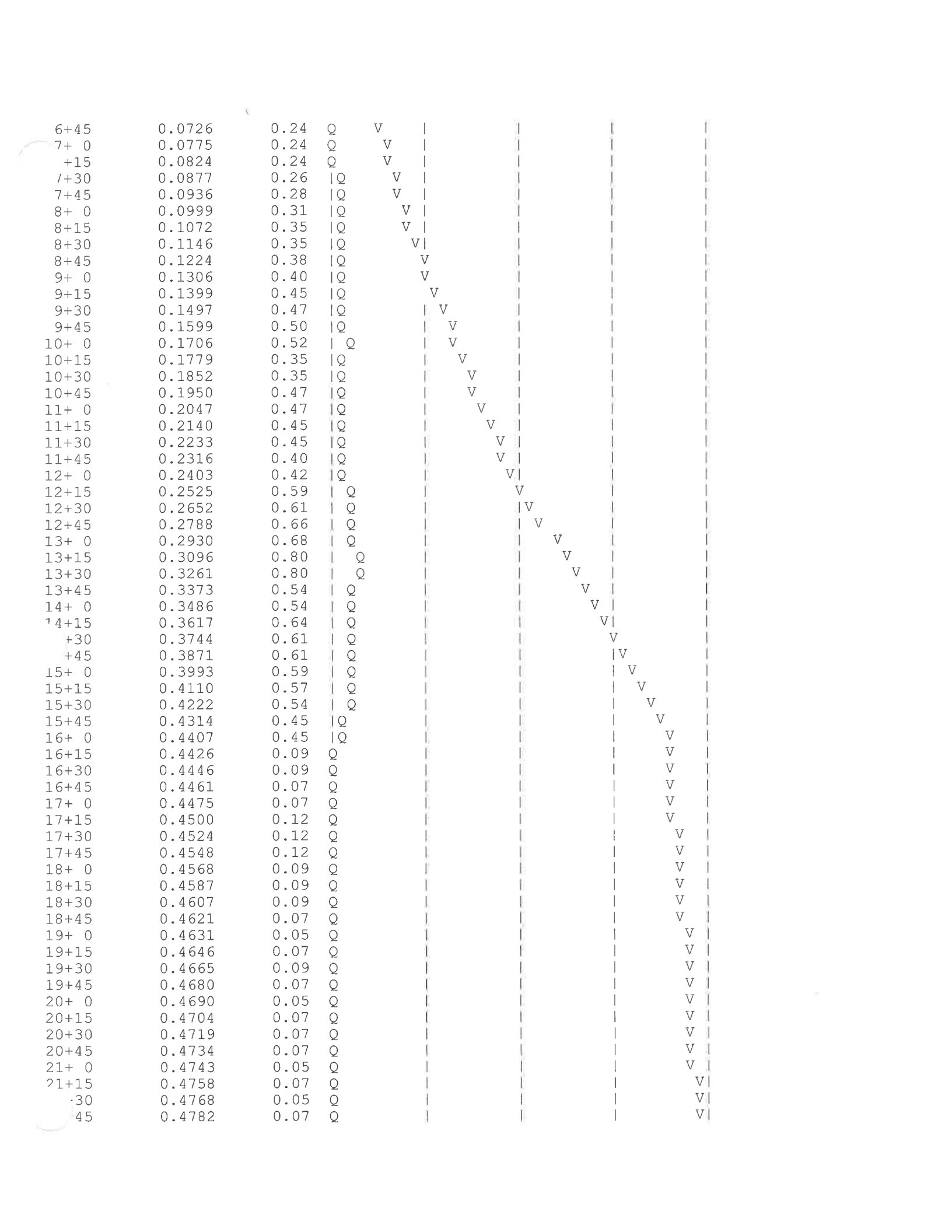
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0010	0.05	Q				
0+30	0.0024	0.07	Q				
0+45	0.0039	0.07	Q				
1+ 0	0.0058	0.09	Q				
1+15	0.0073	0.07	Q				
1+30	0.0088	0.07	Q				
1+45	0.0102	0.07	Q				
2+ 0	0.0122	0.09	Q				
2+15	0.0141	0.09	QV				
2+30	0.0161	0.09	QV				
2+45	0.0185	0.12	QV				
3+ 0	0.0210	0.12	QV				
3+15	0.0234	0.12	QV				
3+30	0.0258	0.12	Q V				
3+45	0.0283	0.12	Q V				
4+ 0	0.0312	0.14	Q V				
4+15	0.0341	0.14	Q V				
4+30	0.0375	0.17	Q V				
4+45	0.0409	0.17	Q V				
5+ 0	0.0448	0.19	Q V				
5+15	0.0478	0.14	Q V				
5+30	0.0512	0.17	Q V				
5+45	0.0551	0.19	Q V				
6+ 0	0.0590	0.19	Q V				
15	0.0634	0.21	Q V				
30	0.0678	0.21	Q V				



22+ 0	0.4792	0.05	Q	|	|	|	V|
22+15	0.4807	0.07	Q	|	|	|	V|
+30	0.4816	0.05	Q	|	|	|	V|
22+45	0.4826	0.05	Q	|	|	|	V|
23+ 0	0.4836	0.05	Q	|	|	|	V|
23+15	0.4846	0.05	Q	|	|	|	V|
23+30	0.4855	0.05	Q	|	|	|	V|
23+45	0.4865	0.05	Q	|	|	|	V|
24+ 0	0.4875	0.05	Q	|	|	|	V|

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

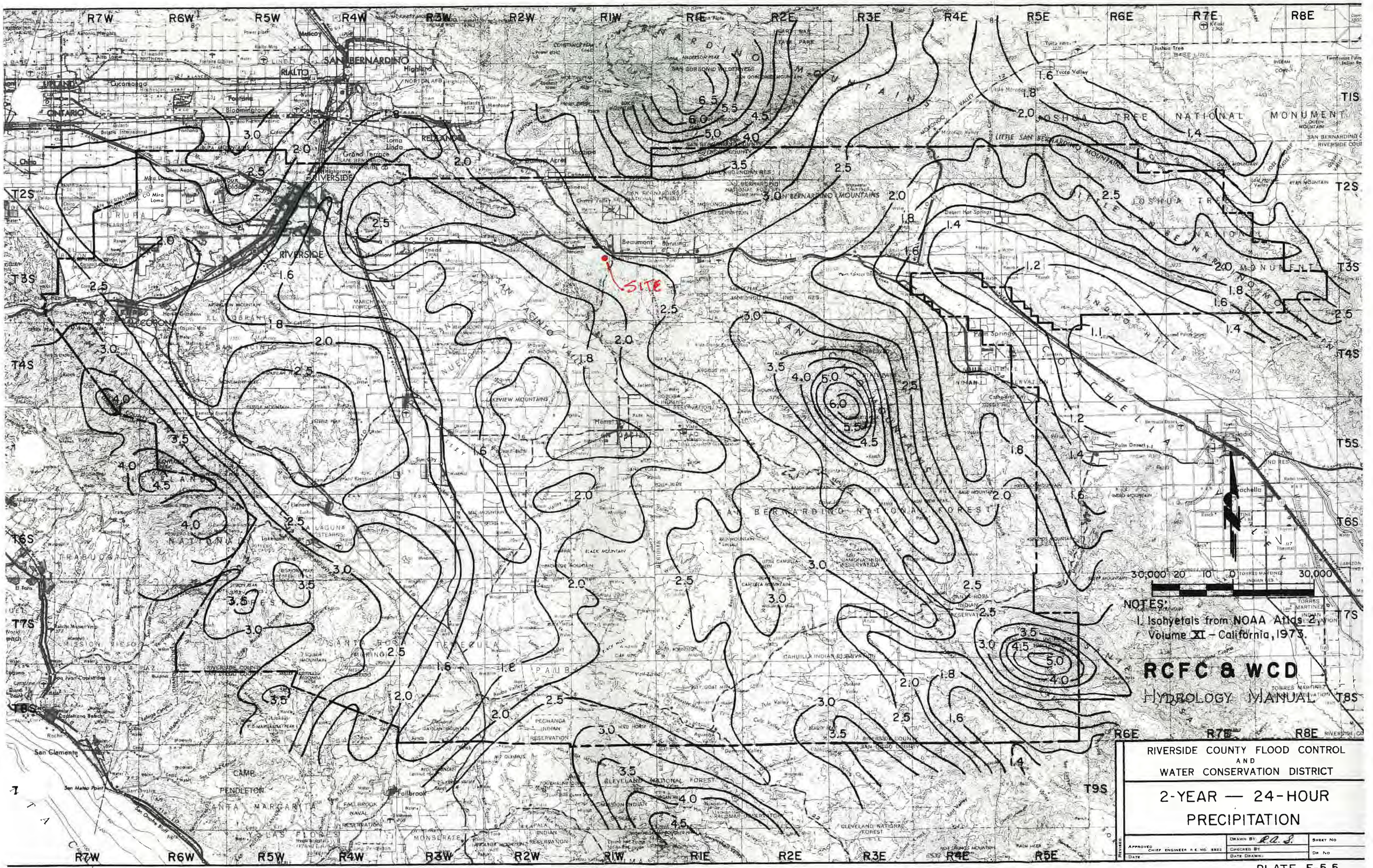
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI – California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8822	DRAWN BY R.A.S.	SHEET NO
DATE	CHECKED BY	DR NO
REVISED	DATE DRAWN	

PLATE E-5.5

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 24-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER, R.E. NO. 8822	DRAWN BY	SHEET NO.
DATE	CHECKED BY	DR. NO.
REVISED	DATE DRAWN	

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

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**
❑ **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.**

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**
❑ **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/

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**
❑ 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.

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**
❑ **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

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**
☐ **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 84 Lumber storage facility project is a proposal to develop approximately 3.5 acres at the southeast corner of Third Street and Euclid Avenue in Beaumont into a building materials storage facility. The proposed project is largely impervious with asphalt and roof surfaces dominant. Water quality mitigation for the impervious surfaces and small landscape areas will be accomplished utilizing a bioretention basin due to the lack of an acceptable infiltration rate of the onsite soil. Stormwater runoff will be routed to the bioretention basin via surface flow. Excess flows after mitigation will discharge to an outlet structure that ties into the onsite storm drain system.

II. Responsibility for Maintenance

Ultimate responsibility for maintenance of the bioretention basin BMP will rest with the property owner. Owner information is as follows:

84 Lumber Company
1019 Route 519
Eighty Four, PA 15330
(724) 228-8820

Funding for maintenance will be provided by the owner. Replacement cost of the facility is approximately $25,000.

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 bioretention basin BMP. Pervious and impervious areas are color coded by DMA designation.

2. Structural Post Construction BMPs: The bioretention basin has been designed to provide for Vbmp for the impervious surfaces. See construction drawing in Appendix 2. Stormwater sheet flow runoff is intercepted by an onsite curb and gutter and discharges to the basin located at the southerly portion of the property.

IV. Stormwater BMP Design Documentation

The biorention basin was designed to provide for Vbmp 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	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.
Asphalt Area/Sidewalk	Site Walk Daily	Weekly, or as dictated by the daily visual inspections. Pick up debris and litter. Capture debris before it drains to the porous pavement areas during washing. See SC-71 in Appendix 10.
Bioretention Basin	Ongoing After storm events Annually	Keep adjacent landscape areas maintained. Remove clippings from landscape maintenances activities. Remove trash and debris. Replace damaged grass and/or plants. Inspect areas for ponding. No water should be present 72 hours after a storm event. Examine inlets, check for erosion and repair as needed. Check basin for sediment buildup and remove as necessary.

The employee charged with inspection, and any 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. 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.

3. Asphalt Area/Sidewalk: Sweep parking lots and sidewalk weekly to prevent accumulation of litter and debris. Collect debris from washing/power washing before it discharges towards the porous pavement areas. See CASQA Fact Sheet SC-71 in Appendix 10.

Maintenance and Funding Summary Table:

			Maintenance Responsibility				Funding Mechanism for Maintenance			Maintenance Costs	
BMP	Used	Not Used	Owner **	City	County	Flood District	Owner	Developer	Public *	1-year ($)	2-year ($)
Hydro seeding & Mulching	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Landscape Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	1,000	1,000
Landscape Public	☒	☐	☒	☐	☐	☐	☒	☐	☐	2,400	4,800
Lawns											
Impervious permanent cover (concrete/ asphalt) Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	500	1,000
Impervious permanent cover (concrete/ asphalt) Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Pervious permanent cover (gravel)	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Down drains	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Ribbon Gutter Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Earthen Swale Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	600	400
Curb & gutter Public	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Curb & gutter Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	N/A	N/A
Storm Drain	☒	☐	☒	☐	☐	☐	☒	☐	☐	1,000	2,000
Detention Basin	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Education Materials	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Bioretention Basin	☒	☐	☒	☐	☐	☐	☒	☐	☐	2,400	4,800

* Provide annual costs (1- year and 2-year) for all publicly maintained BMPs. Specifically include the costs for all public landscaping and treatment control that are responsibility of the City or the Landscape Maintenance District.

** Maintenance funding contact information for each privately maintained (by owner, POA or HOA) BMP must be included.

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:

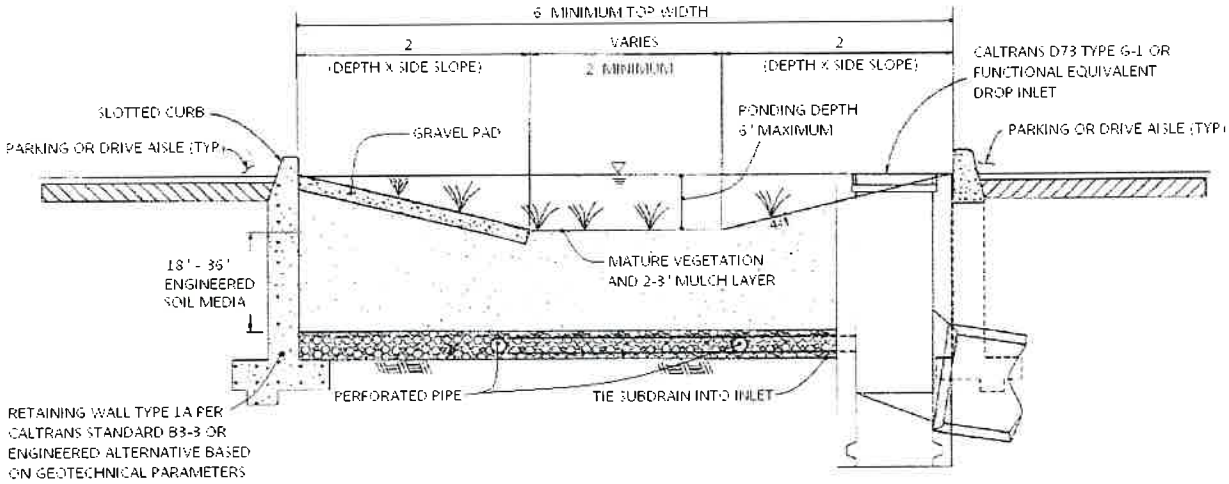
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention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

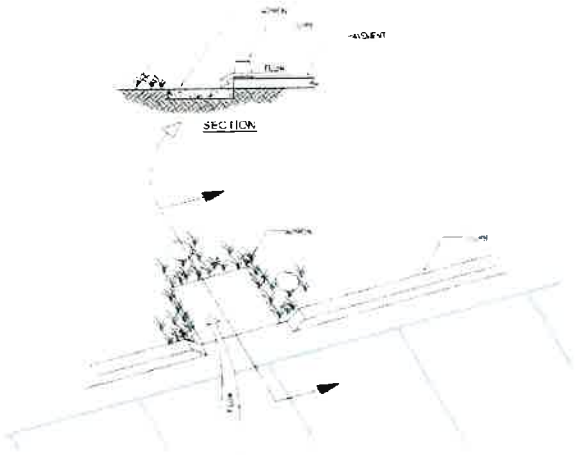


Figure 3: Apron located in a Bioretention Facility

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.

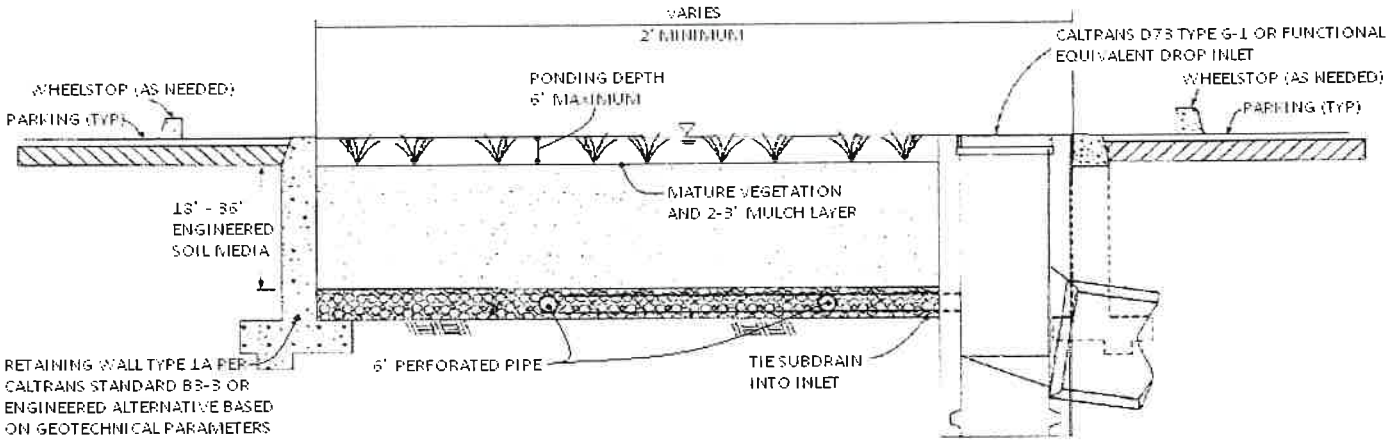
Side Slope Requirements

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.

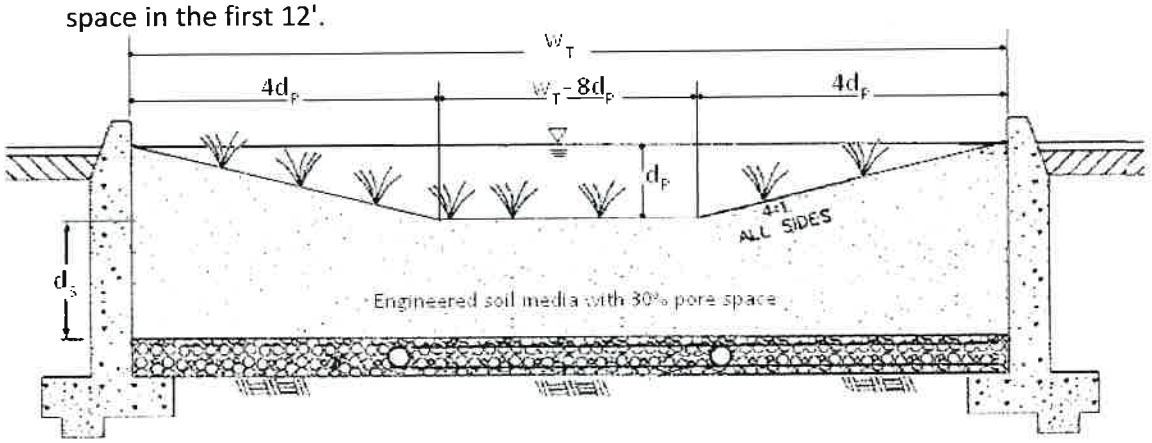
2) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

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.

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

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:

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

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.

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County of Los Angeles Public Works. Stormwater Best Management Practice Design and Maintenance Manual. Los Angeles, 2009.

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

United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

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.

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.

Roof Runoff Controls

SD-11

Rain Garden

Design Objectives

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

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

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

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

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.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

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Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Non-Stormwater Discharges SC-10

Graphic by: Margie Winter

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

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

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. For municipalities non-stormwater discharges present themselves in two situations. One is from fixed facilities owned and/or operated by the municipality. The other situation is non-stormwater discharges that are discovered during the normal operation of a field program. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, and surface cleaning. However, there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances (such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants) into storm drains. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges.

Approach

The municipality must address non-stormwater discharges from its fixed facilities by assessing the types of non-stormwater discharges and implementing BMPs for the discharges determined to pose environmental concern. For field programs

the field staff must be trained to now what to look for regarding non-stormwater discharges and the procedures to follow in investigating the detected discharges.

Suggested Protocols

Fixed Facility

General

- Post "No Dumping" signs with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Stencil 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.
- Landscaping and beautification efforts of hot spots might also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.

Illicit Connections

- Locate discharges from the fixed facility drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Use techniques such as smoke testing, dye testing and television camera inspection (as noted below) to verify physical connections.
- Isolate problem areas and plug illicit discharge points.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for several days following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- Review the "as-built" piping schematic as a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.

- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Storm Sewer

- TV Cameras can be employed to visually identify illicit connections to the fixed facility storm drain system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Clean up spills on paved surfaces with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See fact sheet SC-11 Spill Prevention, Control, and Clean Up.

Field Program

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially ones that involve more than one jurisdiction and those that are not classified as hazardous, which are often not responded to as effectively as they need to be.
- Stencil 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.
- See SC-74 Stormwater Drainage System Maintenance for additional information.

Field Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- During routine field program maintenance field staff should look for evidence of illegal discharges or illicit connection:
  - 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 and notify appropriate investigating agency.
- If trained, conduct field investigation of non-stormwater discharges to determine whether they pose a threat to water quality.

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms.
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms

- Educational materials

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any onsite drainage points observed.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Enforcement

- Educate the responsible party if identified on the impacts of their actions, explain the stormwater requirements, and provide information regarding Best Management Practices (BMP), as appropriate. Initiate follow-up and/or enforcement procedures.
- If an illegal discharge is traced to a commercial, residential or industrial source, conduct the following activities or coordinate the following activities with the appropriate agency:
  - Contact the responsible party to discuss methods of eliminating the non-stormwater discharge, including disposal options, recycling, and possible discharge to the sanitary sewer (if within POTW limits).
  - Provide information regarding BMPs to the responsible party, where appropriate.
  - Begin enforcement procedures, if appropriate.
  - Continue inspection and follow-up activities until the illicit discharge activity has ceased.
- If an illegal discharge is traced to a commercial or industrial activity, coordinate information on the discharge with the jurisdiction's commercial and industrial facility inspection program.

Training

- Train technical staff to identify and document illegal dumping incidents.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Train employees to identify non-stormwater discharges and report them to the appropriate departments.
- Train staff who have the authority to conduct surveillance and inspections, and write citations for those caught illegally dumping.

- Train municipal staff responsible for surveillance and inspection 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).
- Educate the identified responsible party on the impacts of his or her actions.

Spill Response and Prevention

- See SC-11 Spill Prevention Control and Clean Up

Other Considerations

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Many facilities do not have accurate, up-to-date schematic drawings.
- Can be difficult to locate illicit connections especially if there is groundwater infiltration.

Requirements

Costs

- Eliminating illicit connections can be expensive especially if structural modifications are required such re-plumbing cross connections under an existing slab.
- Minor cost to train field crews regarding the identification of non-stormwater discharges. The primary cost is for a fully integrated program to identify and eliminate illicit connections and illegal dumping. However, by combining with other municipal programs (i.e. pretreatment program) cost may be lowered.
- Municipal cost for containment and disposal may be borne by the discharger.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
  - Diverted stream flows;
  - Rising found waters;
  - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
  - Uncontaminated pumped ground water;
  - Foundation drains;
  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Illegal Dumping

- 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

Outreach

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people on the street who are aware of the problem and who have the tools to at least identify the incident, if not correct it. There we a number of ways of accomplishing this:

- Train municipal staff from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report the incidents.
- Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act (see below).
- Educate the public. As many as 3 out of 4 people do not understand that in most communities the storm drain does not go to the wastewater treatment plant. Unfortunately, with the heavy emphasis in recent years on public education about solid waste management, including recycling and household hazardous waste, the sewer system (both storm and sanitary) has been the likely recipient of cross-media transfers of waste.
- Provide the public with a mechanism for reporting incidents such as a hot line and/or door hanger (see below).
- Help areas where incidents occur more frequently set up environmental watch programs (like crime watch programs).
- Train volunteers to notice and report the presence and suspected source of an observed pollutant to the appropriate public agency.

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  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

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of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Storm Drain Stenciling

- Stencil storm drain inlets with a message to prohibit illegal dumpings, especially in areas with waste handling facilities.
- Encourage public reporting of improper waste disposal by a HOTLINE number stenciled onto the storm drain inlet.
- See Supplemental Information section of this fact sheet for further detail on stenciling program approach.

Oil Recycling

- Contract collection and hauling of used oil to a private licensed used oil hauler/recycler.
- Comply with all applicable state and federal regulations regarding storage, handling, and transport of petroleum products.
- Create procedures for collection such as; collection locations and schedule, acceptable containers, and maximum amounts accepted.
- The California Integrated Waste Management Board has a Recycling Hotline, (800) 553-2962, that provides information and recycling locations for used oil.

Household Hazardous Waste

- Provide household hazardous waste (HHW) collection facilities. Several types of collection approaches are available including permanent, periodic, or mobile centers, curbside collection, or a combination of these systems.

Training

- Train municipal employees and contractors in proper and consistent methods for waste disposal.
- Train municipal employees to recognize and report illegal dumping.
- Train employees and subcontractors in proper hazardous waste management.

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

- Federal Regulations (RCRA, SARA, CERCLA) and state regulations exist regarding the disposal of hazardous waste.
- Municipalities are required to have a used oil recycling element and a HHW element within their integrated waste management plan.
- Significant liability issues are involved with the collection, handling, and disposal of HHW.

Examples

The City of Palo Alto has developed a public participation program for reporting dumping violations. When a concerned citizen or public employee encounters evidence of illegal dumping, a door hanger (similar in format to hotel "Do Not Disturb" signs) is placed on the front doors in the neighborhood. The door hanger notes that a violation has occurred in the neighborhood, informs the reader why illegal dumping is a problem, and notes that illegal dumping carries a significant financial penalty. Information is also provided on what citizens can do as well as contact numbers for more information or to report a violation.

The Port of Long Beach has a state of the art database incorporating storm drain infrastructure, potential pollutant sources, facility management practices, and a pollutant tracking system.

The State Department of Fish and Game has a hotline for reporting violations called CalTIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).

The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.co.clark.wa.us/pubworks/bmpman.pdf

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

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

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (http://www.projectcleanwater.org)

Santa Clara Valley Urban Runoff Pollution Prevention Program
http://www.scvurppp-w2k.com/pdf%20documents/PS_ICID.PDF

Spill Prevention, Control & Cleanup SC-11

Objectives

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

Description

Spills and leaks, if not properly controlled, can adversely impact the storm drain system and receiving waters. Due to the type of work or the materials involved, many activities that occur either at a municipal facility or as a part of municipal field programs have the potential for accidental spills and leaks. Proper spill response planning and preparation can enable municipal employees to effectively respond to problems when they occur and minimize the discharge of pollutants to the environment.

Targeted Constituents

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

Approach

- An effective spill response and control plan should include:
  - Spill/leak prevention measures;
  - Spill response procedures;
  - Spill cleanup procedures;
  - Reporting; and
  - Training
- A well thought out and implemented plan can prevent pollutants from entering the storm drainage system and can be used as a tool for training personnel to prevent and control future spills as well.

Pollution Prevention

- Develop and implement a Spill Prevention Control and Response Plan. The plan should include:

- A description of the facility, the address, activities and materials involved
- Identification of key spill response personnel
- Identification of the potential spill areas or operations prone to spills/leaks
- Identification of which areas should be or are bermed to contain spills/leaks
- Facility map identifying the key locations of areas, activities, materials, structural BMPs, etc.
- Material handling procedures
- Spill response procedures including:
  - Assessment of the site and potential impacts
  - Containment of the material
  - Notification of the proper personnel and evacuation procedures
  - Clean up of the site
  - Disposal of the waste material and
  - Proper record keeping

- Product substitution – use less toxic materials (i.e. use water based paints instead of oil based paints)
- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of materials that are brought into the facility or into the field.

Suggested Protocols

Spill/Leak Prevention Measures

- If possible, move material handling indoors, under cover, or away from storm drains or sensitive water bodies.
- Properly label all containers so that the contents are easily identifiable.
- Berm storage areas so that if a spill or leak occurs, the material is contained.
- Cover outside storage areas either with a permanent structure or with a seasonal one such as a tarp so that rain can not come into contact with the materials.
- Check containers (and any containment sumps) often for leaks and spills. Replace containers that are leaking, corroded, or otherwise deteriorating with containers in good condition. Collect all spilled liquids and properly dispose of them.

- Store, contain and transfer liquid materials in such a manner that if the container is ruptured or the contents spilled, they will not discharge, flow or be washed into the storm drainage system, surface waters, or groundwater.
- Place drip pans or absorbent materials beneath all mounted taps and at all potential drip and spill locations during the filling and unloading of containers. Any collected liquids or soiled absorbent materials should be reused/recycled or properly disposed of.
- For field programs, only transport the minimum amount of material needed for the daily activities and transfer materials between containers at a municipal yard where leaks and spill are easier to control.
- If paved, sweep and clean storage areas monthly, do not use water to hose down the area unless all of the water will be collected and disposed of properly.
- Install a spill control device (such as a tee section) in any catch basins that collect runoff from any storage areas if the materials stored are oil, gas, or other materials that separate from and float on water. This will allow for easier cleanup if a spill occurs.
- If necessary, protect catch basins while conducting field activities so that if a spill occurs, the material will be contained.

Training

- Educate employees about spill prevention, spill response and cleanup on a routine basis.
- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - The employees should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan if one is available.
- Training of staff from all municipal departments should focus on recognizing and reporting potential or current spills/leaks and who they should contact.
- Employees responsible for aboveground storage tanks and liquid transfers for large bulk containers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

Spill Response and Prevention

- Identify key spill response personnel and train employees on who they are.
- Store and maintain appropriate spill cleanup materials in a clearly marked location near storage areas; and train employees to ensure familiarity with the site's spill control plan and/or proper spill cleanup procedures.
- Locate spill cleanup materials, such as absorbents, where they will be readily accessible (e.g. near storage and maintenance areas, on field trucks).

SC-11 Spill Prevention, Control & Cleanup

- Follow the Spill Prevention Control and Countermeasure Plan if one is available.
- If a spill occurs, notify the key spill response personnel immediately. If the material is unknown or hazardous, the local fire department may also need to be contacted.
- If safe to do so, attempt to contain the material and block the nearby storm drains so that the area impacted is minimized. If the material is unknown or hazardous wait for properly trained personnel to contain the materials.
- Perform an assessment of the area where the spill occurred and the downstream area that it could impact. Relay this information to the key spill response and clean up personnel.

Spill Cleanup Procedures

- Small non-hazardous spills
  - Use a rag, damp cloth or absorbent materials for general clean up of liquids
  - Use brooms or shovels for the general clean up of dry materials
  - If water is used, it must be collected and properly disposed of. The wash water can not be allowed to enter the storm drain.
  - Dispose of any waste materials properly
  - Clean or dispose of any equipment used to clean up the spill properly
- Large non-hazardous spills
  - Use absorbent materials for general clean up of liquids
  - Use brooms, shovels or street sweepers for the general clean up of dry materials
  - If water is used, it must be collected and properly disposed of. The wash water can not be allowed to enter the storm drain.
  - Dispose of any waste materials properly
  - Clean or dispose of any equipment used to clean up the spill properly
- For hazardous or very large spills, a private cleanup company or Hazmat team may need to be contacted to assess the situation and conduct the cleanup and disposal of the materials.
- Chemical cleanups of material can be achieved with the use of absorbents, gels, and foams. Remove the adsorbent materials promptly and dispose of according to regulations.
- If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

Reporting

- Report any spills immediately to the identified key municipal spill response personnel.

- Report spills in accordance with applicable reporting laws. Spills that pose an immediate threat to human health or the environment must be reported immediately to the Office of Emergency Service (OES)
- Spills that pose an immediate threat to human health or the environment may also need to be reported within 24 hours to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour)
- After the spill has been contained and cleaned up, a detailed report about the incident should be generated and kept on file (see the section on Reporting below). The incident may also be used in briefing staff about proper procedures

Other Considerations

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure Plan (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, if permitted to do so, prohibiting any hard connections to the storm drain.

Requirements

Costs

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of wastes, contaminated soil and water is very expensive

Maintenance

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the response and containment of a spill. A good record keeping system helps the municipality minimize incident recurrence, correctly respond with appropriate containment and cleanup activities, and comply with legal requirements.

A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm drain.

These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Examples

The City of Palo Alto includes spill prevention and control as a major element of its highly effective program for municipal vehicle maintenance shops.

References and Resources

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

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

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

Housekeeping Practices SC-60

Description

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals. Related information is provided in BMP fact sheets SC-11 Spill Prevention, Control & Cleanup and SC-34 Waste Handling & Disposal.

Approach

Pollution Prevention

- Purchase only the amount of material that will be needed for foreseeable use. In most cases this will result in cost savings in both purchasing and disposal. See SC-61 Safer Alternative Products for additional information.
- Be aware of new products that may do the same job with less environmental risk and for less or the equivalent cost. Total cost must be used here; this includes purchase price, transportation costs, storage costs, use related costs, clean up costs and disposal costs.

Suggested Protocols

General

- Keep work sites clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Dispose of wash water, sweepings, and sediments, properly.
- Recycle or dispose of fluids properly.
- Establish a daily checklist of office, yard and plant areas to confirm cleanliness and adherence to proper storage and security. Specific employees should be assigned specific inspection responsibilities and given the authority to remedy any problems found.
- Post waste disposal charts in appropriate locations detailing for each waste its hazardous nature (poison, corrosive, flammable), prohibitions on its disposal (dumpster, drain, sewer) and the recommended disposal method (recycle, sewer, burn, storage, landfill).
- Summarize the chosen BMPs applicable to your operation and post them in appropriate conspicuous places.

Objectives

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

Targeted Constituents

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

- Require a signed checklist from every user of any hazardous material detailing amount taken, amount used, amount returned and disposal of spent material.
- Do a before audit of your site to establish baseline conditions and regular subsequent audits to note any changes and whether conditions are improving or deteriorating.
- Keep records of water, air and solid waste quantities and quality tests and their disposition.
- Maintain a mass balance of incoming, outgoing and on hand materials so you know when there are unknown losses that need to be tracked down and accounted for.
- Use and reward employee suggestions related to BMPs, hazards, pollution reduction, work place safety, cost reduction, alternative materials and procedures, recycling and disposal.
- Have, and review regularly, a contingency plan for spills, leaks, weather extremes etc. Make sure all employees know about it and what their role is so that it comes into force automatically.

Training

- Train all employees, management, office, yard, manufacturing, field and clerical in BMPs and pollution prevention and make them accountable.
- Train municipal employees who handle potentially harmful materials in good housekeeping practices.
- Train personnel who use pesticides in the proper use of the pesticides. The California Department of Pesticide Regulation license pesticide dealers, certify pesticide applicators and conduct onsite inspections.
- Train employees and contractors in proper techniques for spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and Countermeasure (SPCC) plant 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

- There are no major limitations to this best management practice.
- There are no regulatory requirements to this BMP. Existing regulations already require municipalities to properly store, use, and dispose of hazardous materials

Requirements

Costs

- Minimal cost associated with this BMP. Implementation of good housekeeping practices may result in cost savings as these procedures may reduce the need for more costly BMPs.

Maintenance

- Ongoing maintenance required to keep a clean site. Level of effort is a function of site size and type of activities.

Supplemental Information

Further Detail of the BMP

- The California Integrated Waste Management Board's Recycling Hotline, 1-800-553-2962, provides information on household hazardous waste collection programs and facilities.

Examples

There are a number of communities with effective programs. The most pro-active include Santa Clara County and the City of Palo Alto, the City and County of San Francisco, and the Municipality of Metropolitan Seattle (Metro).

References and Resources

British Columbia Lake Stewardship Society. Best Management Practices to Protect Water Quality from Non-Point Source Pollution. March 2000.
http://www.nalms.org/bclss/bmphome.html#bmp

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

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 by California Coastal Commission, February 2002.

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

San Mateo STOPPP - (http://stoppp.tripod.com/bmp.html)

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.

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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.

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